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The Heart River Study Unit

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2008

The Heart River Study Unit (HRSU) is somewhat understudied considering its central location within North Dakota. Much of this Study Unit has remained topographically intact while strip mines have been developed to the north and south, oil and gas developments to the west, and expansive portions of the Missouri River valley have been inundated to the southeast.

Description of the Heart River Study Unit

The HRSU covers about 3,346 mi². Figures 4.1 and 4.1A present maps of the Study Unit, followed by a complete listing of townships within it (Table 4.1). The Study Unit comprises portions of Billings, Grant, Hettinger, Morton, and Stark counties. The headwaters of the Heart River drainage lie near Fryburg, just west of the Billings County line along the Heart-Little Missouri divide. Its confluence with the Missouri River is in the community of Mandan in Morton County in the Southern Missouri River Study Unit.

Physiography

The HRSU straddles the Unglaciaded Missouri Plateau and Glaciaded Missouri Plateau Subsections of the Missouri Plateau Section of the Great Plains Physiographic Province (cf. Fenneman 1931; Hunt 1974; Pirkle and Yoho 1977). Part of the lower one-third of the Heart River basin is covered by glacial drift. The terrain is gently rolling in the headwaters areas and rougher near the courses of the main stream and its tributaries. In the lower part of the basin, the uplands rise 300 ft above the river channel which lies in a valley about 1.5 miles wide. Differences in elevation are not so great in the upper parts of the basin (NDSPB 1937:Volume 5). Prominent high points, from east to west, include Clark's Butte, Heart Butte, Camel Buttes, Sheppard Butte, and Rattlesnake Butte.

In addition to the buttes, there are frequent smaller outcroppings of sandstone, silt, sand, clay, and lignite of the Slope and Bullion Creek formations (Clayton et al. 1980). Occasionally, one encounters bedrock outcroppings large enough to have been used as rockshelter encampments. One example is at the Boulder site (32M072) in the uplands near Big Muddy Creek where there was a Plains Village encampment involving lithic workshop and big game processing activities (Billeck 1983e).

Drainage

The valley of the Heart River is about 130 miles long and drops from an elevation of about 3,000 ft at its head to about 1,610 ft where it flows into the Missouri River at Mandan, averaging about 16 ft of drop per mile. The river channel is

Figure 4.1: Map of the Heart River Study Unit.

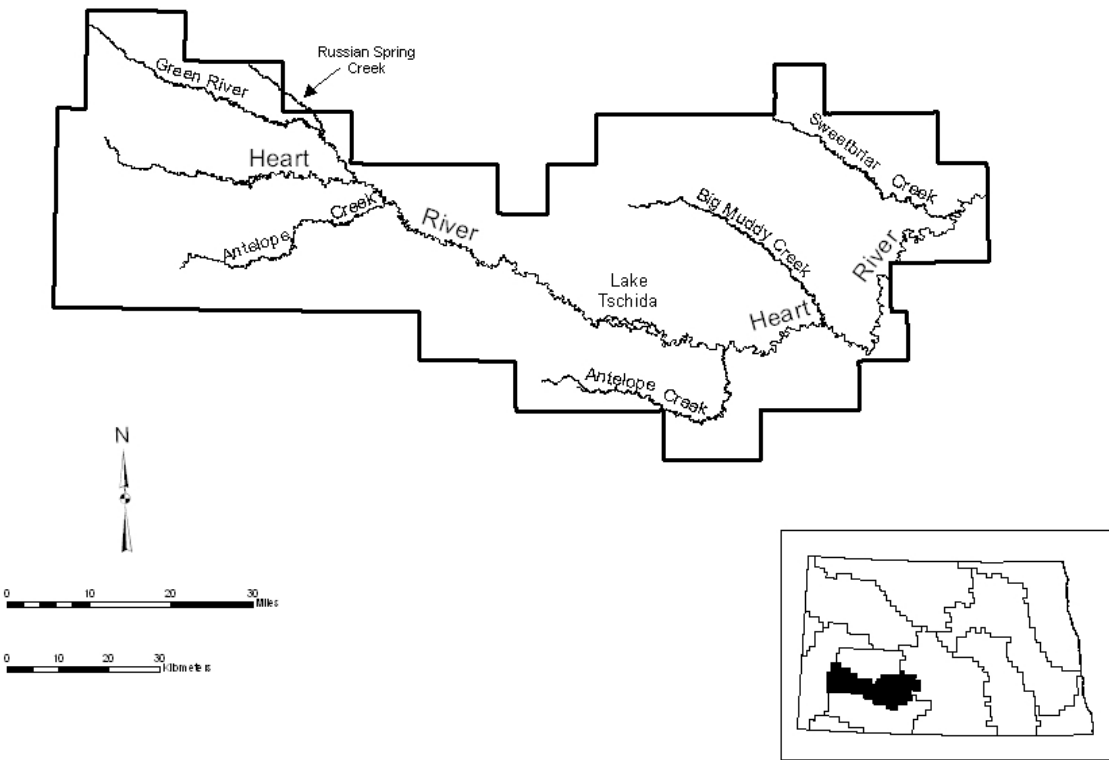


Figure 4.1A: Shaded relief map of the Heart River Study Unit.

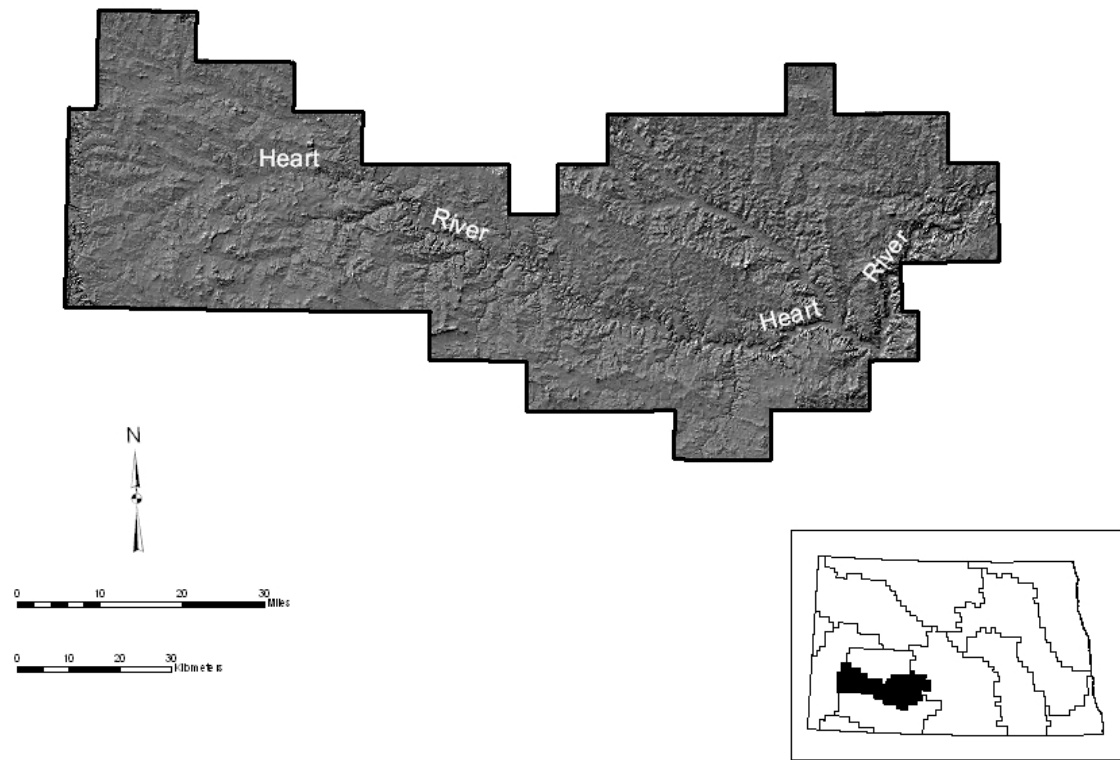


Table 4.1: Townships in the Heart River Study Unit.

TOWNSHIP	RANGE
134	87
134	88
135	85
135	86
135	87
135	88
135	89
135	90
135	91
136	84
136	85
136	86
136	87
136	88
136	89
136	90
136	91
136	92
136	93
137	84
137	85
137	86
137	87
137	88
137	89
137	90
137	91
137	92
137	93
137	94
137	95

TOWNSHIP	RANGE
137	96
137	97
137	98
137	99
137	100
138	82
138	83
138	84
138	85
138	86
138	87
138	88
138	89
138	90
138	91
138	92
138	93
138	94
138	95
138	96
138	97
138	98
138	99
138	100
139	82
139	83
139	84
139	85
139	86
139	87
139	88

TOWNSHIP	RANGE
139	89
139	90
139	92
139	93
139	94
139	95
139	96
139	97
139	98
139	99
139	100
140	83
140	84
140	85
140	86
140	87
140	88
140	89
140	95
140	96
140	97
140	98
140	99
140	100
141	85
141	96
141	97
141	98
141	99
142	98
142	99

about twice as long as the valley, therefore the actual drop of the river averages 8 ft per mile (USGS 1968).

Some of the larger named tributaries of the Heart River from west to east include Bull Creek, Ash Creek, the Green River, Russian Spring Creek, Plum Creek, Beaver Creek, Antelope Creek (of Stark County), Heart Butte Creek, Big Muddy Creek, Hailstone Creek, Sweetbriar Creek, and Antelope Creek (of Grant County). Only the Green River and the Antelope creeks are permanent streams.

Climate

The average precipitation is 15 inches per year with about 10 inches falling from May through September. The eastern portion of the Study Unit near the Missouri River usually gets more precipitation than the western portion near the Badlands (cf. Jensen 1972). The mean annual temperature for Morton County is ca. 41°F (Edwards and Ableiter 1951:Table 1). An average growing season is 124 frost-free days (ibid.).

Landforms and Soils

The upland soils are loam and silt loam with patches of sandy loam. The soils of the breaks are clay loams, and the bottomlands have sandy to clay loams. Parent materials are predominantly shale, sandstone, and glacial till (NDSPB 1937:Volume 5). Terrace soils consist of silty clays, silt loams, and fine sandy loams formed over fine textured alluvial sediments in some places and coarser sands and gravels in others. Soils formed in alluvial fans are sometimes classed as gravelly loam (Edwards and Ableiter 1951:89-101). Floodplain soils are typically silty clay loams, silt loams, and sandy loams (ibid.:102-111).

Natural Resources Conservation Service (NRCS) official soil survey resources are available on the internet (NRCS 2007a, b, c). The Web Soil Survey in particular may be useful, as it has replaced the traditional county soil survey books.

Electronic Field Office Technical Guide:

<http://www.nrcs.usda.gov/technical/efotg/>

Soil Data Mart: <http://soildatamart.nrcs.usda.gov>

Web Soil Survey: <http://websoilsurvey.nrcs.usda.gov/app/>

Flora and Fauna

Most of this area is grassland. An important dietary item for prehistoric native populations, Indian breadroot (*Psoralea esculenta*), is common on the prairie. Chokecherry (*Prunus virginiana*), juneberry (*Amelanchier alnifolia*), buffaloberry (*Shepherdia argentea*), and gooseberry (*Ribes* sp.) are fruit-bearing shrubs found in sheltered areas. Riparian zones along watercourses and hardwood draws support cottonwood (*Populus deltoides*), box elder (*Acer*

negundo), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), and burr oak (*Quercus macrocarpa*) in places. In the more rugged areas, Rocky Mountain red cedar (*Juniperus scopulorum*) may be found.

Bison once abounded in the grasslands of the Heart River drainage. Today, deer and antelope are the remaining big game animals in the region. These and other species such as elk figure prominently in the journals of the early explorers who visited the region. The wooded bottomlands of stream valleys were home to beavers, raccoons, and other furbearers. The Heart River and its tributaries contain numerous fish species along with freshwater mussels (cf. Cvancara 1983). Many of these floral and faunal resources were exploited by Native groups occupying the basin (cf. Cooper 1958).

Other Natural Resource Potential

This Study Unit contains outcroppings of good quality Tongue River silicified sediment (TRSS) (cf. Ahler 1977). "A silcrete indistinguishable from the coarser varieties of TRSS is also found in the Taylor Bed, in the Bear Den Member of the Golden Valley Formation (Ahler and Christensen 1983; Clayton 1980; Wehrfritz 1978)" (Artz et al. 1987:2.6). Other flakable stones such as chalcedonies and silicified woods can also be found in the gravelly surface lag deposits in the basin. These stones attracted prehistoric knappers who sought stock material from which to make chipped stone tools. The remains of lithic workshops occur at many locations within the HRSU.

Overview of Previous Archeological Work

Looking at the lists of reports in the manuscript file at the SHSND, it is evident that the vast majority of the surveys have been of small areas or narrow right-of-ways for transportation, energy, and communications projects. Nearly all of the excavations have been of an emergency nature related to construction of Heart Butte reservoir and the Northern Border gas pipeline.

Inventory Projects

As of 13 September 2007, there were 506 archeological sites and 499 archeological site leads and isolated finds in the state computerized site data file for this Study Unit. With its 3,346 mi² area, there is one recorded site per 6.6 mi².

Table 4.2 presents a cross tabulation of data for recorded sites and the landforms upon which the sites are situated. Table 4.3 is a tally of identified cultural/temporal affiliations of recorded archeological resources. There are 10 Paleo-Indian components in the database. At least one other is indicated by a site lead (32SKX48). Archaic complexes are quite well represented making up about 43% of the 152 sites where a specific cultural-temporal affiliation is recorded. There are 12 Plains Village sites recorded where there likely are hundreds given that 10,000 or so Mandan had their earthlodge village core areas in the lower

Table 4.2: Feature Type by Landform for Archeological Sites in the Heart River Study Unit, 13-Sept-2007.

	Cultural Material Scatter	Earthlodge Village	Grave	Hearth	Jump	Other Rock Features	Pit	Quarry or Mine	Rock Shelter	Stone Circle	Trail	Misc.	Total
Beach or riverbank	18					1		1				1	21
Canyon	2												2
Island	1												1
Draw	14				1	3							18
Upland plain	56			1		1		3		3		3	67
Floodplain	22			2			1						25
Hill - Knoll - Bluff	123		1	1	1	11	4	7		15			163
Ridge	72			1		8	1	9	1	14		3	109
Saddle	4				1					1			6
Spur	9					1		1		2			13
Swale	1												1
Terrace	133	2	1	8		1	3	3	1	4	1		157
Alluvial fan	2												2
Butte	6									1			7
Foot slope	6						1	1			1		9
Other	4									1			5
Total	473	2	2	13	3	26	10	25	2	41	2	7	606

Table 4.3: Cultural/Temporal Affiliation of Archeological Resources in the Heart River Study Unit, 13-Sept-2007.

Paleo-Indian	
Unspecified	5
Goshen	1
Plano	4
Total	10
Archaic	
Unspecified	14
Early Large Side-Notched	4
Oxbow	5
McKean/Duncan/Hanna	22
Pelican Lake	20
Total	65
Woodland	
Unspecified	40
Early Woodland	1
Besant/Sonota	18
Late Woodland	3
Avonlea	1
Total	63
Plains Village	
Total	12
Plains Nomadic	
Total	1
Historic	
Euro-American	1
Total	1
Unknown	
Total	876

Knife-Heart region for a century or more. A high priority is to identify the affiliations of stone circle sites in the HRSU.

As in all study units, most recorded sites are situated on elevated erosional landforms (hills, knolls, bluffs, terraces, and ridges). Approximately one-quarter of the sites are partially or entirely on terraces. Why are so many sites recorded on terraces in the Heart River basin?

The earliest reported cultural resource inventory and site evaluation work in the Heart River basin was carried out by personnel affiliated with the Smithsonian Institution, River Basin Surveys (SIRBS) program. The proposed Dickinson Reservoir (Cooper 1947) and Heart Butte Reservoir (Cooper 1947) were two of more than 200 impoundments planned nation-wide which received attention from the SIRBS program (cf. Jennings 1986:57). About 10 Plains Village (Heart River phase) sites were recorded by the Heart Butte Reservoir survey (Cooper 1958).

A period of nearly 30 years passed before the next reported investigations took place. These included small surveys at Lake Tschida (Heart Butte Reservoir) (Franke 1975) and Edward Arthur Patterson Lake (Dickinson Reservoir) (Carmichael 1974).

In 1982, archeologists returned to Lake Tschida to conduct a block survey covering the area around the reservoir. Plochman et al. (1982:38) reported finding 80 prehistoric sites in the area they surveyed. The remains of lithic workshops, campsites (both cultural material scatters and stone circles), and cairns were recorded. Diagnostic artifacts were from the Middle Plains Archaic to late Prehistoric periods.

This Study Unit has not witnessed surveys of large blocks of lands to be strip mined, as have adjacent study units to the north, south, and east (Table 4.4). Surveys of right-of-way transects have been most productive in terms of recording quantities of sites. Major transect surveys include the Northern Border Pipeline, the Southwest Pipeline, and the Sprint fiber optic line. In reporting the results of a sample survey of the Sprint line in 1988, Deaver and Deaver highlighted the point that “areas of significant topographic diversity in the western part of the state have relatively high site densities” (1988:1). Areas of topographic diversity are ecologically diverse and present greater resource potential than featureless areas. Also, sloping areas offer erosional exposures where bedrock resources are available. For example, exposed alluvial gravel deposits contain pebbles and cobbles of quartzite and Knife River flint (KRF) of sufficient quality and quantity to have attracted prehistoric procurement groups (e.g., Billeck 1983e; Plochman et al. 1982). Also, more buried archeological deposits are exposed in eroding environments than in depositional environments.

The Northern Border Pipeline survey recorded about 40 sites along a ca. 60-mile transect running in a northwest to southeast direction across Morton County. Most sites were appraised as representing field camps, possibly a few base camps, and probably some transient camps established by people moving into and out of the KRF primary source area to the north (Root et al. 1983:1021). Small sites and low surface artifact densities along the Northern Border Pipeline transect across the Heart basin were interpreted as a reflection of relatively low occupational intensity across the interior upland portions of the basin compared to the KRF primary source area and the Missouri River valley (ibid.:1024). One-third of the 216 stone tools collected from the untested sites along this transect reflect biface and flake blank production activities; 11.3% were projectile points indicative of hunting (ibid.). Three sites along Big Muddy Creek in the Curlew Valley and one along Bahr Creek yielded high frequencies of fire-cracked rock in surface collections possibly indicating food processing or lodge heating (ibid.:1023).

The Bureau of Land Management's (BLM) sampling survey of five western North Dakota Coal Study Areas (CSAs) covered two 160-acre sample units in the northern portion of the Elgin-New Leipzig CSA in the south-central portion of the Heart River basin (Metcalf et al. 1988:7, 111). Two sites were recorded yielding one site per 160 acres.

In the late 1980s, as a result of regional drought, water levels dropped at the Heart Butte Reservoir (Lake Tschida). Many artifact deposits were exposed along the dry shorelines. Observing this circumstance and opportunity, the Bureau of Reclamation (BOR), the land managing agency, quickly funded a comprehensive shoreline archeological survey of the Heart Butte Reservoir. Twenty-two prehistoric sites and 13 prehistoric isolated finds were recorded and seven prehistoric sites were relocated as a result of the inventory (Picha and Gregg 1991). A previously recorded and tested rockshelter (32GT5), thought to have been inundated decades ago by filling the reservoir, was found above the waterline (ibid.:34). The most common types of recorded sites were cultural material scatters and lithic scatters, probably representing hunting camps or kill and processing locales (ibid.:38). Discovery of diagnostic artifacts aided in the determination of cultural/temporal affiliation of sites, including: Plano (32GT158 and 32GT164), Duncan (32GT164), Late Plains Archaic (32GT159 and 32GT164), Besant (32GT164 and 32GT165), Plains Village (32GT5), and Late Prehistoric (32GT154, 32GT155, 32GT161, 32GT162, and 32GT171) (ibid.:40). Inundation, erosion, and modern human activity persistently are affecting site integrity in and along the shoreline of the reservoir. Recommendations for future work include monitoring and testing.

Beginning in 1984 and continuing through 2003, inventories have been conducted along proposed routes of the Southwest Water Pipeline right-of-way (Artz et al. 1987; Borchert et al. 1995a, b; Gregg et al. 1985; Klinner 1995, 1998, 1999a, b, 2000; Klinner and Wermers 2000; Kordecki 1995; Larson et al. 1998; Wermers 2000a, b, c). Hundreds of miles of Class III inventory have consisted of

50-100 ft linear corridors and small block surveys for ancillary facilities within the HRSU and the Cannonball River Study Unit. The right-of-way crosses the Heart River in several locations, all of which previously have been disturbed by urban development. Lithic and cultural material scatters have been the most common site types recorded during survey. Sites with stone circles and cairns also have been noted.

Table 4.4: Inventory Projects in the Heart River Study Unit, 5-Sept-2007.

Year	First Author	Second Author	Title	Ms #
1947	Cooper, P.		Preliminary Appraisal of the Archeological & Paleontological Resources of Dickinson Reservoir, Stark Co., ND	68
1947	Cooper, P.		Preliminary Appraisal of the Archeological & Paleontological Resources of Heart Butte Reservoir, Grant Co., ND	14
1974	Carmichael, G.		Results of the Archaeological Survey of the Proposed Versippi Reservoir and Dickinson Reservoir Project, Stark Co., ND	69
1975	Adamczyk, T.		Archaeological Inventory Missouri River Reach Between Fort Benton, MT & Sioux City, IA	80
1975	Franke, N.		Husky Industries, Inc. Mine, Stark Co., Negative Declaration Survey Report	281
1975	Franke, N.		Mor Gran Sou Electric Cooperative Substation Project, Heart Butte Dam Area, Negative Declaration Survey Report, Grant Co., ND	237
1975	Franke, N.		Report of the Archaeological & Historic Site Survey of Two Areas Along the Shore of Lake Tschida, Grant Co., ND	15
1976	Bailey, W.		New Salem Sewage Treatment Facilities Negative Declaration Survey Report, Morton Co., ND	246
1976	Franke, N.		Huskey Industries, Inc., Stark Co., Negative Declaration Survey Report	282
1977	Lahren, L.		Extensive Cultural Resource Evaluations on Selected Drill Site Locations in the National Grasslands of North & SD, Slope Co., Billings & Stark Counties ND	124
1978	Keyser, A.		Tracy Common Pipeline Survey, Billings Co., ND	433
1978	Robson, L.		McAlester Fuel - Federal 34-14 Well Pad & Access Road Survey, Billings Co., ND	421
1978	Robson, L.		Northwestern Bell Underground Telephone Cable (North Belfield Project), Billings Co., ND	371
1979	Allen, W.		USFS Cultural Resources Inventory of Two New Locations for Scoria Removal, Billings Co., ND	1940
1979	Khera, S.		Investigations of Historic Structures at the Little Missouri National Grasslands (Appendix II), Slope & Billings Counties ND	3744
1979	Lahren, L.		Conoco Federal Saddle #2-1 Well & Access Road Survey Report, Billings Co., ND	914
1979	Loendorf, L.		The Cultural Resource Survey of the Gas Gathering System Proposed by Western Gas Processors in Billings Co., ND	2226
1979	Loscheider, M.	J. Greer	An Intensive Cultural Resource Survey Lake Tschida, ND, Grant Co., ND	1496
1979	Metcalf, M.	C. Zier	Southland Royalty #1-35 Well Survey Report, Billings Co., ND	863
1979	Simon, A.	L. Loendorf	Archaeological Survey of the Proposed Glen Ullin Sewage Lagoon Location, Morton Co., ND	1545
1979	Woolworth Research Associates		Report on a Cultural Resources Survey of the Stanton and Preferred Transmission Line Corridors in ND and SD, Basin Electric Cooperative, Bismarck, ND, Vol. 2- ND Sites in Emmons, Morton, and Mercer Counties	2600

Year	First Author	Second Author	Title	Ms #
1980	Keyser, J.		West Plains Power Line to Porter Waterwell Survey Report, Billings Co., ND	1130
1980	Kordecki, C.		Northern Plains Natural Gas Company Richardton Pipe Storage Yard Survey, Stark Co., ND	2190
1980	Kuehn, D.		L. W. Veigel Co., Bridge Replacement Survey, Stark Co., ND	1431
1980	Loendorf, L.	J. Borchert	Class III Intensive Inventory for All Cultural Resources for the Proposed Amoco Pipeline Company's Gathering Line Through Portions of Billings and Dunn Counties, ND	2228
1980	Rippeteau, B.		A Cultural Resource Survey for Viegel Engineering, PC, Heart River Rechannel, River Rechannel & Road Fill, Stark Co., ND	2772
1980	Rippeteau, B.		Chambers Oil Company Gov't Creek 1-6 Well Location & Access Route Survey, Billings Co., ND	1607
1980	Rippeteau, B.		Wesco Pipelines' Crude Oil Line in Golden Valley & Billings Counties, ND, Revised	2294
1980	Roberson, W.		Class III Intensive Inventory for All Cultural Resources At a Proposed Sanitary Landfill for the City of Mandan, Section 35, T139N, R82W, Morton Co., ND	1571
1980	Robson, L.		Class III Intensive Inventory for All Cultural Resources, Mandan, ND, Flood Control Levee, Morton Co., ND	2054
1980	Simon, A.	L. Loendorf	Continental Pipeline Company Tank Station Survey, Billings Co., ND	1589
1980	Simon, A.	L. Loendorf	Jerry Chambers Oil Producer Survey of Access Road Through Southeast Corner of Section 6, Billings Co., ND	1340
1980	Simon, A.	J. Pearson	The Class III Intensive Inventory for All Cultural Resources for the Proposed Carson Sewage Lagoon in Grant Co., ND	1401
1980	Simon, A.	L. Loendorf	Wesco Pipeline Company Crude Oil Line & Tank Battery Station, Billings Co., ND	1570
1980	Tate, M.		Conoco 2-2 Fed. Saddle Well Pad Survey, Billings Co., ND	1251
1980	Tate, M.		Veigel and Company Proposed Sewage Lagoons Survey, Stark Co., ND	1641
1981	Beckes, M.	T. Burge	USFS Paasch Common Spring Improvements Amendment No. 4, Billings Co., ND	1923
1981	Borchert, J.	L. Ritterbush et al.	A Class III Intensive Inventory for the Gulf-Ogre Natural Gas Pipeline in Stark Co., ND	2264
1981	Moore, G.		Cultural Resources Inventory, Medora Grazing Association, 07-5-81, Billings Co., ND	1833
1981	Moore, G.		Cultural Resources Inventory, Medora Grazing Association, 07-9-81, Billings Co., ND	1847
1981	Pearson, J.	A. Simon	A Class III Intensive Inventory of the Glenn Ullin Water and Sewer Extensions in Morton Co., ND	2998
1981	Rippeteau, B.		Phelps Dodge Fuel Corporation #1 Shell Federal Survey Report, Billings Co., ND	2435
1981	Rippeteau, B.		Wesco Little Missouri Pipeline Survey Report, Billings Co. & Golden Valley Co., ND	2455
1981	Root, M.		Archeological Site Survey & Testing Along the Northern Border Pipeline, ND: Annual Progress Report, 1980, McKenzie, Mercer, Dunn, Stark, Morton, Emmons, McIntosh, & Williams Counties	2564
1981	Simon, A.	J. Borchert	A Class III Cultural Resource Inventory for the Proposed Fryburg Highway Improvement Billings Co., ND	2562
1981	Sperry, J.		A Preliminary Archeological Survey of Theodore Roosevelt National Memorial Park, McKenzie & Billings Co., ND	2552
1981	Stanley, L.	S. Montgomery et al.	A Class III Intensive Inventory of the Montana-Dakota Utilities Gulf Leviathan Natural Gas Pipeline Stark Co., ND	5731

Year	First Author	Second Author	Title	Ms #
1981	Stanley, L.	A. Simon	Northwestern Bell Buried Cable Line Survey, Billings Co., ND	2090
1982	Fox, S.	K. Schweigert	Cultural Resource Survey of Coal Lease Lands in the Miles City District, MT & Dickinson District, ND, Stark, Billings, & Golden Valley Co.	2862
1982	Gnabasik, V.		Archaeological Investigations at 32SK10, Proposed South Heart Lagoon Expansion Area, Stark Co., ND	2781
1982	Greiser, T.	H. Plochman et al.	Cultural Resource Inventory of Heart Butte Reservoir, Grant Co., ND	2525
1982	Hartley, R.		Theodore Roosevelt National Park-Improve Existing Water Systems (Pkg. #183) Repair and Replace 15 Miles of Buffalo Fence (PRIP-FO3), McKenzie & Billings Co., ND	4352
1982	Loendorf, L.	J. Brownell et al.	Cultural Resource Survey on the Little Missouri Buttes and Adjacent Areas, Western ND & Appendix I, McKenzie, Stark, Billings & Slope Counties	2462
1982	Montgomery, S.		A Class III Cultural Resource Inventory for the Proposed South Heart Lagoon Expansion in Stark Co., ND	2780
1982	Montgomery, S.	A. Simon	Veigel Engineering Billings County Road Improvement Survey in Portions of Sections 10, 11, 14, 15-T140N-R100W	2148
1982	Montgomery, S.	A. Simon	Veigel Engineering Government Creek Road Improvement Survey, Billings Co., ND	2147
1982	Simon, A.		Class III Intensive Inventory of the Klym Road Scoria Pit and Intersection, Billings Co., ND	2674
1982	Simon, A.		Class III Intensive Inventory of the Proposed Teddy Roosevelt Compressor Station SE/NE/NE Section 16, 142/98, Billings Co., ND	2586
1982	Simon, A.		Class III Inventory of the Proposed Matador Tank Battery, Billings Co., ND	2669
1982	Simon, A.	K. Keim	Cultural Resources Inventory Report for Rocky Ridge Road Improvement, Billings Co., ND, Through Portions of Sections 16 and 21, T137N, R100W	2665
1983	Aivazian, B.		Donald C. Slawson No. 1-17 Well Location & 0.30 Miles of Access Road, Billings Co., ND	2919
1983	Enders, R.		Diamond Chemicals Church Fee 34-27 Well Location & Access Road, Billings Co., ND	3199
1983	Enders, R.		Diamond Shamrock Lutheran 41-27 Well Location & 1.0 Miles of Access Road, Billings Co., ND	2925
1983	Enders, R.		Donald C. Slawson No. 2-7 Federal Well Location, Billings Co., ND	2924
1983	Floodman, M.		Donald C. Slawson 2-6 Federal (Well & Access), Billings Co., ND	3040
1983	Floodman, M.		Donald C. Slawson Federal 1-1 Access, Billings Co., ND (New Alternate Access)	3043
1983	MacDonald, L.		A Class III Intensive Inventory of the Heart Butte Dam Modification Emergency Spillway in Grant Co., ND	2844
1983	Moore, G.		Medora Grazing Association Mike Kelly Allotment Dam, Billings Co., ND	3079
1983	Moore, G.		Medora Grazing Association Mike Kelly Allotment Spring #28, Billings Co., ND	3080
1983	Moore, G.		Medora Grazing Association Ron Block Allotment Spring #13B, Billings Co., ND	3073
1983	Moore, G.		Medora Grazing Association Ron Block Allotment Section 29 Survey, Billings Co., ND	3074
1983	Moore, G.		Medora Grazing Association Ron Block Allotment Spring #31, Billings Co., ND	3128

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1983	Phillips, B.		Cultural Resource Surveys: Billings Microwave System in Golden Valley, Morton, Oliver, Mercer, Slope, Stark, & Billings Counties ND	3347
1983	Root, M.	M. Gregg	Archeology of the Northern Border Pipeline, ND: Vol. 2, Pts. 1-3 Survey & Background Information, McIntosh, Emmons, Morton, Stark, Mercer, Dunn, McKenzie, & Williams Counties, ND	3455
1983	Schweigert, K.	J. Sluss et al.	Final Report Historical & Architectural Survey of Portions of Dickinson, Stark Co., ND & Vol. 10 (Sketch Maps)	4327
1983	Thiessen, T.		Archeological Reconnaissance of Boundary Fences at Theodore Roosevelt National Park, June 2-9, 1983, Billings & McKenzie Counties, ND	3749
1984	Bass, S.		Grant Co., Lands Base Adjustment, 84-MT030-32 (B).	3792
1984	Borchert, J.		Amerada Hess Federal #25-41, Billings, Co., ND	3280
1984	Borchert, J.		Class III Intensive Inventory Billings County Road Improvements Sections 33 and 34, T140N, R100W	4162
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1984	Borchert, J.		Cultural Resource Survey Billings Co., Curve Realignment Section 4, T137N, R100W, Billings Co., ND	3582
1984	Borchert, J.		Cultural Resources Inventory Howie Road, Billings Co., ND	3426
1984	Burge, T.		Talkington Dugout, Billings Co., ND	3351
1984	Campbell, J.		Medora Grazing Association Mike Kelly Pipeline, Billings Co., ND	3501
1984	Floodman, M.		Donald C. Slawson Oil Company Block Survey, Final Report, Billings Co., ND	3300
1984	Gnabasik, V.		USAF GWEN Site Near Fryburg, ND, Electronic System Division Air Force Systems Command, USAF Hanscom AFB, MA 01731, Billings Co., ND	3801
1984	Gnabasik, V.		USAF Support Facilities Site, Dickinson, Stark Co., ND & Operations Site, Hettinger Co., ND, Cultural Resources Survey	3825
1984	Kuehn, D.		Southwest Pipeline Project Along ca. 14 Miles on USFS Lands in Billings Co. & Golden Valley Co., East and West of Medora, ND	3569
1985	Borchert, J.		Cultural Resource Survey, Canterra BN 15-31 Location & Access, Billings Co., ND (UW#790)	3628
1985	Borchert, J.		Cultural Resource Survey, Park Road Improvements, Billings Co., ND	3627
1985	Floodman, M.		Milestone Petroleum, Inc. 23-31 M.P.I., Billings Co., ND	3685
1985	Gregg, M.	C. Kordecki et al.	Southwest Pipeline Archeology: Initial Survey of Selected Tracts, Adams, Bowman, Hettinger, Grant, Stark, Billings, Golden Valley, Dunn, & Mercer Co., ND	3554
1985	Rood, R.		Fugere Molm, Ducks Unlimited Project, Billings Co., ND	3802
1985	Rood, R.		Proposed WAPA Fryburg Repeater Tower for Department of Energy, Western Area Power Administration, Billings Co., ND Area Office	3800
1986	Borchert, J.		Cultural Resource Survey Jacobs Engineering Belfield Alternate No. 2 Well Site Stark Co., ND.	4134
1986	Kuehn, D.		A Cultural Resource Inventory of the Proposed Williston Basin-Glen Ullin Natural Gas Pipeline & Compressor Station, Morton Co., ND	4064
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1986	Riggle, R.		Historic Properties Review, North Dickinson Critical Area Treatment Measure, Dickinson, Stark Co., ND	4045
1986	Schweigert, K.	R. Persinger	A Cultural Resource Investigation of the Zenith AML Site, Stark Co., ND	4176
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1987	Blikre, L.	D. Kuehn et al.	A Cultural Resource Inventory of Two Uranium Mill Tailings Remedial Action Project Areas in Stark & Bowman Counties in Western ND	4243
1987	Blikre, L.	D. Kuehn	A Cultural Resource Inventory of US Forest Service Land to be Impacted by Proposed Improvements Along the Howie Road, Billings Co., ND	4237
1987	Floodman, M.		Armstrong Corporation Unnamed Well Pad & Access Billings Co., ND	5047
1987	Kuehn, D.		A Cultural Resource Inventory of the Easy Hill Road Improvement, Billings Co., ND	4251
1987	Metcalf, M.	K. Schweigert	Cultural Resources Investigations on the ND Segment of the Exxon Company, USA Bairoil-Dakota CO ₂ Pipeline Project, Golden Valley, Billings, Stark, Dunn, McKenzie, & Williams Co., Western ND Vols. 1 & 2	4319
1987	Metcalf, M.		Grenadier Federal 3-30 Well Pad & Access Route, Billings Co., ND	4274
1987	Persinger, R.		A Class III Cultural Resource Survey of Rural Electrical Lines Near Lake Tschida, Grant Co., ND	4422
1987	Rood, R.		Tracy Mountain 3-31 and 6-31, Billings Co., ND	4403
1987	Schweigert, K.	R. Persinger	A Cultural Resources Survey of a Proposed Royal Oak Industries Coal Mine, Stark Co., ND	4421
1987	Shaw, T.	L. Loendorf	A Cultural Resource Inventory of Amerada Hess Corporation AHC Koch Federal #7-21 Well Pad, Access Road & Borrow Source, Billings Co., ND	4265
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1988	Blikre, L.	D. Kuehn	Royal Oak Road, Cultural Resource Inventory Stark Co., ND	4532
1988	Borchert, J.	D. Kuehn	Easy Hill Road Improvements Cultural Resource Inventory Billings Co., ND	4767
1988	Borchert, J.	D. Kuehn	Gladstone to Regent Road Improvement Stark Co., Portion Cultural Resources Inventory	4635
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1988	Borchert, J.	D. Kuehn	Rocky Fritz Spring Developments Cultural Resource Inventory Slope and Billings Counties, ND	4699
1988	Deaver, K.	S. Deaver	Preliminary Report on Pedestrian Sample of the Sprint Line in Stutsman, Kidder, Stark, Billings, Cass, Golden Valley, Burleigh, Morton Counties, ND	4595
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1988	Kuehn, D.		1987 Archeological Survey in Theodore Roosevelt National Park, McKenzie & Billings Co., ND	4705
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1989	Banks, K.		Where Has All The Water Gone, Long Time Passing: A Cultural Resources Inventory of the Nelson & Turtle Lake Water Lines, Morton & McLean Counties, ND	4793
1989	Borchert, J.		Hettinger County ½ Mile Road Improvement to Regent Hettinger and Stark Counties, ND	4814
1989	Borchert, J.	J. Brownell et al.	Walters A AML Project ND017 Cultural Resource Inventory & Historic Sites Evaluations Stark Co., ND	4829
1989	Burbidge, G.	J. Borchert	Lake Tschida Road Improvement CRS 1912(52), Grant Co., ND	4879
1989	Good, K.		A Class III Cultural Resource Survey of U.S. West Communications Rural Underground Telephone Line Glen Ullin-Elgin-Mott Toll, Grant Co., ND	5055
1989	Lewis & Clark Reg. Council		Reconnaissance Level Survey of the City of New Salem, Morton Co., ND	4838
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1990	Borchert, J.		Disk Pipe in the Badlands, Billings Co., ND	5663
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1990	Floodman, M.		Edward Patterson Lake Cultural Resources Inventory Stark Co., ND	5048
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1990	Martorano, M.	D. Killam et al.	Class I Literature Search and Class III Intensive Inventory Charlie Creek to Belfield 345-KV Transmission Line Project, Stark, McKenzie, Dunn, & Billings Counties, ND	4744
1990	Metcalf, M.		North Fork Davis Creek Road, Billings Co., ND	5236
1990	Peterson, L.		North New Salem Mine Reclamation Project, Morton Co., ND	5145
1990	Späth, C.		An Alternate Route for Lyons Road Improvement, Morton Co., Class III Cultural Resource Inventory	5085
1990	Späth, C.		Missouri West Rural Water System Phase I Cultural Resources Survey Morton Co., ND	8750

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1991	Good, K.		Highway #8, Richardton South-Heart River Bridge Replacement in Stark Co., ND, Project SAP-5-008(005)063	5690
1991	Klinner, D.	J. Borchert	Gladstone to Regent Gravel Pit Survey Stark Co., ND	5404
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1993	Kulevsky, A.		Regrading of Morton Co., Road From I-94 Via Bluegrass to Co., Line: A Class III Cultural Resource Inventory Morton Co., ND & Addendum	6155
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1994	Klinner, D.		Amerada Hess Corporation's AHC Federal 29-42 Well Pad and Access Road Class III Cultural Resource Inventory Billings Co., ND	6397
1994	Klinner, D.		City of Dickinson Road Realignment Class III Cultural Resource Inventory Stark Co., ND	6359
1994	Klinner, D.		Theodore Roosevelt National Park, South Unit: Preconstruction Site Inventory for the Repairs & Relocation of a Dishtank and Plumbing, Billings Co., ND	6997
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1994	Maginniss, H.	J. Hess et al.	Historical & Architectural Inventory of Eighteen Rural Roman Catholic Churches in the Diocese of Bismarck, ND	6248
1994	Snortland, J.		Heart Butte Well Drilling, Grant Co., Class III Cultural Resource Survey	6350
1994	Toom, D.		Bridge Replacements, Archeological Sites, & Archeological Site Surveys in ND	6249
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1995	Kulevsky, A.		Des Lacs Sand and Gravel's Richardton SE Gravel Pit & Access Road: A Class III Survey in Stark Co., ND	6479
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1996	Kinney, W.		The W. Mayer Inventory Property, A Class III Cultural Resource Inventory of ca. 180 Acres in Hettinger Co., ND for the USDA, Farm Service Agency, Fargo, ND. Order Number 60-87AS-6-C0002	6877
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1998	Larson, T.	D. Penny et al.	Results of Class I, Class II & Class III Cultural Resource Investigations for the Southwest Pipeline Project: The Bucyrus & Three Pocket Service Areas, Adams, Bowman, Hettinger, Slope, Stark Co., ND	7137
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2000	Bluemle, W.		Kuhn Cattle Company Irrigation: A Class III Cultural Resource Inventory, Morton Co., ND	7767
2000	Borchert, J.		Highway 49 Safety Improvements Glen Ullin to Elgin Class III Cultural Resource Inventory in Mercer & Grant Co., ND	7776
2000	Borchert, J.		NH-5-085(040)075: Class II Cultural Resource Inventory for a Hot Bituminous Surfacing Project on Highway 85, Stark and Billings Co., ND	7633
2000	Good, K.		Hebron-Glen Ullin Regional Airport Morton Co., ND Class III Cultural Resource Inventory	7598
2000	Klinner, D.		Belco Energy Corporation Bull Creek Federal #1-13H Well Pad & Access Road in Billings Co., ND	7720
2000	Klinner, D.		Belco Energy Corporation Bull Creek Federal #4-21H Well Pad & Access Road in Billings Co., ND	7722
2000	Klinner, D.		BTA Oil Producers 20003 JV-F Morgan #1 Well & Access Road in Billings Co., ND and Addendum	7723
2000	Klinner, D.		Project Identification: Avira Energy Corporation #1-30-2 State Well Pad & Access Road in Billings & Golden Valley Counties, ND	7724
2000	Klinner, D.		Reroutes and Additions for the Southwest Pipeline Project, Contract 7-3B/7-5B, SE Jung Lake & South Hebron Pocket Areas in Hettinger, Adams & Morton Counties ND	7640
2000	Klinner, D.	G. Wermers	Southwest Water Pipeline Project-Class III Inventories for the Burt Service Area in Grant, Hettinger & Morton Co., ND	7642
2000	Morrison, J.		Abrasive Plant Survey: A Class III Cultural Resource Inventory, Morton Co., ND	7637
2000	Morrison, J.		Fryburg #1-1 Well Pad & Access Road: A Class III Cultural Resource Inventory, Billings Co., ND	7623
2000	Morrison, J.		Heart Butte Creek Bridge Replacement: A Class III Cultural Resource Inventory and Limited Testing of 32MO197, Morton Co., ND	7536

Year	First Author	Second Author	Title	Ms #
2000	Morrison, J.		Norwegian Creek Bridge Survey: A Class III Cultural Resource Inventory, Stark Co., ND	7539
2000	Olson, B.		Upton Resources, USA Inc., Davis Creek #1-5H and #1-12H Cultural Resources Inventory, Billings Co., ND	7661
2000	Olson, B.		Upton Resources, USA Inc., Fryburg #3-6 Cultural Resources Inventory, Billings Co., ND	7643
2000	Rom, L.		Cultural Resources Inventory of Sioux Falls Tower Specialists Inc's Communication Towers 304 & 334 in Billings & Cass Co., ND	7712
2000	Rom, L.		Cultural Resources Inventory of Sioux Falls Tower Specialists Inc's Communication Towers 311, 317, 327 & 337 in GV, KD, MO, & SN Counties, ND	7808
2000	Rom, L.		Cultural Resources Inventory of Sioux Falls Tower Specialists Inc's Communication Towers in BA, BI, BL, CS, GV, KD, SK, SN, & MO Co., ND	7677
2000	Wermers, G.		Belco Energy Corp. Hewson Federal #1-26H Well Pad & Access Road in Billings Co., ND	7672
2000	Wermers, G.		Belco Energy Corporation Bull Creek Federal #3-15H Well Pad & Access Road in Billings Co., ND	7721
2000	Wermers, G.		Southwest Pipeline Routes in the Southeast Jung Lake & South Hebron Pocket Areas, Adams, Morton, & Grant Co., ND	7545
2000	Wermers, G.		Southwest Water Pipeline Project-Class III Inventories of Pipeline Reroutes & Additions Within the Burt Service Area, & a Tank Site Within the Coffin Buttes Service Area, Grant & Hettinger Co., ND	7763
2001	Bluemle, W.		Westport Fryburg Federal #21-29: A Class III Cultural Resource Inventory, Billings Co., ND	7859
2001	Bluemle, W.		Westport Fryburg Federal 31-31H Well Pad: A Class III Cultural Resource Inventory, Billings Co., ND	8143
2001	Christensen, B.		PJ-056, PJ-057, PJ-058 Class III Inventory Report, Grant Co., ND	7976
2001	Christensen, B.		PJ-059 Class III Inventory Report, Grant Co., ND	7977
2001	Klinner, D.		Whiting Petroleum Corporation's Davis Creek #1-17H & Alternate Davis Creek #1-17H Well Pads & Access Road in Billings Co., ND	7864
2001	Klinner, D.		Whiting Petroleum Corporation's Davis Creek #1-18H Well Pad & Access Road in Billings Co., ND	7865
2001	Klinner, D.		Whiting Petroleum Corporation's Davis Creek #1-8H Well Pad & Access Road in Billings Co., ND	7863
2001	Morrison, J.		Fryberg Federal #14-33H Well Pad & Access Road: A Class III Cultural Resource Inventory, Billings Co., ND	7953
2001	Morrison, J.		Fryberg Federal #24-29 Well Pad & Access Road: A Class III Cultural Resource Inventory, Billings Co., ND	7954
2001	Morrison, J.		Mormon Borrow Area: A Class III Cultural Resource Inventory, Morton Co., ND	8001
2001	Morrison, J.		State Avenue and Empire Road: A Class III Cultural Resource Inventory, Stark Co., ND	8002
2001	Olson, B.		NDDOT I-94 Highway Improvement Project IM-5-094(029)023 From Medora to Fryburg, Billings Co., ND: A Class III Cultural Resources Inventory	8061
2001	Olson, B.		Upton Resources, USA Inc., Davis Creek # 1-5H, #1-3 & #2-12, Cultural Resources Inventory, Billings Co., ND	7892
2001	Olson, B.		Upton Resources, USA Inc., Davis Creek #1-4 Cultural Resources Inventory, Billings Co., ND	8062
2001	Wermers, G.		Belco Energy Corp. Richard #2-24H Well Pad & Access Road in Stark and Billings Co., ND	7935

Year	First Author	Second Author	Title	Ms #
2001	Wermers, G.		Bridge #45-104-19.0 Replacement Project, Federal Aid No. BRO-45(33), in Sections 27 & 34, T138N, R99W, Stark Co., ND	8018
2001	Wermers, G.		Bridge Replacement (Structure Numbers: 45-105-17.0, 45-105-18.1, and 45-105-18.2), Road Improvement, and Creek Rechannelization Project in Stark Co., ND	8019
2001	Wermers, G.		West Plains Electric Cooperative Inc. Overhead Transmission Line & Substation Location, Work Order 19154, in Billings Co., ND	8263
2001	Wermers, G.		Whiting Petroleum Corp. Davis Creek #1-19H Well Pad and Access Road in Billings Co., ND	7862
2002	Bluemle, W.		Fairway Street Expansion: A Class III Cultural Resource Inventory, Stark Co., ND	8384
2002	Floodman, M.		Dakota Prairie Grasslands FY 02 Well Plugging Projects McKenzie, Billings, Ransom & Richland Counties, ND	8210
2002	Floodman, M.		Munderloh Allotment East Fence Cedar River National Grasslands Grant Co., ND	8255
2002	Morrison, J.		Co., Highway 139/Highway 10: A Class III Cultural Resource Inventory in Morton Co., ND	8202
2002	Morrison, J.		Doll Plant Location: A Class III Cultural Resource Inventory, Morton Co., ND	8156
2002	Morrison, J.		Fairway Street Survey: A Class III Cultural Resource Inventory, Stark Co., ND	8220
2002	Morrison, J.		Fifteenth Street Survey: A Class III Cultural Resource Inventory, Stark Co., ND	8221
2002	Morrison, J.		Freise Gravel Pit: A Class III Cultural Resource Inventory, Morton Co., ND	8157
2002	Morrison, J.		Hoovestal Gravel Pit: A Class III Cultural Resource Inventory, Morton Co., ND	8282
2002	Morrison, J.		Wolf Gravel Pit: A Class III Cultural Resource Inventory, Morton Co., ND	8158
2002	Stine, E.	A. Kulevsky	Class III Cultural Resource Inventory, Highway 31 Junction I-94 North To Junction 200A: Morton, Oliver & Mercer Co., ND NDDOT Project Number: SS-1-031-(010)078	8888
2002	Stine, E.		Class III Cultural Resource Inventory, Interstate 94 From Highway 25 to Grant Marsh Bridge: Morton Co., ND	8351
2002	Stine, E.	A. Kulevsky	Class III Cultural Resource Inventory, Interstate 94 From Sweet Briar to Highway 25: Morton Co., ND	8766
2002	Toom, D.		Heart Butte Reservoir 2001 Cultural Resources Survey, Grant Co., ND	9075
2002	Wermers, G.		Bridge Replacement and Road Improvement Project in Stark Co., ND	8440
2002	Wermers, G.		Class III Inventories for Pipeline Additions in the Burt Service Area, Contract 7-6A, & in the Coffin Buttes Service Area, Contract 7-6B, Hettinger & Grant Co., ND	8129
2002	Wermers, G.		Interstate 94 Right-Of-Way Class III Inventory, South Heart to Dickinson, Stark Co., ND	8295
2002	Wermers, G.		Interstate 94 Right-Of-Way Class III Inventory, Belfield to South Heart, Stark Co., ND	8294
2002	Wermers, G.		Whiting Petroleum Corp. Davis Creek #2-4H & Davis Creek #2-9H Access Road & Utility Corridor Reroutes in Billings Co., ND	8338
2002	Wermers, G.		Whiting Petroleum Corporation 50 Acre Block Survey for Road & Pipeline Corridor in Billings Co., ND	8402
2002	Wermers, G.		Whiting Petroleum Corporation's Davis Creek Federal #1-21H Well Pad & Access Road in Billings Co., ND	8132

Year	First Author	Second Author	Title	Ms #
2002	Wermers, G.		Whiting Petroleum Corporation's Davis Creek Federal #1-24H Well Pad & Access Road in Billings Co., ND	8133
2002	Wermers, G.		Whiting Petroleum Corporation's Davis Creek Federal #1-30H Well Pad & Access Road in Billings Co., ND	8134
2002	Wermers, G.		Whiting Petroleum Corporation's Utility Corridor in Billings Co., ND	8403
2002	Williams, B.		A Class III Cultural Resource Survey of a Schnell Recreation Area Parking Lot in Stark Co., ND	8301
2003	ACRE		Results of Supplemental Surveys Conducted for the Proposed Grasslands Project in Billings, Dunn, Golden Valley & Stark Co., ND & 2 Addendums	8535
2003	Bluemle, W.		Dickinson to Gladstone: A Class III Cultural Resource Inventory, Stark Co., ND	8636
2003	Bluemle, W.		Young Mans Butte to Eagles Nest: A Class III Cultural Resource Inventory Along I-94, Morton & Stark Co., ND	8704
2003	Kulevsky, A.		Interstate 94 Business Loop & Highway 10 Intersection Improvement: A Class III Cultural Resources Inventory in Dickinson, Stark Co., ND NDDOT Project #HSP-5-094(041)904	8671
2003	Morrison, J.		Grasslands Access Road: A Class III Cultural Resource Inventory, Stark Co., ND	8629
2003	Morrison, J.		Heart River HDD Extra Work Space: A Class III Inventory in Stark Co., ND	8679
2003	Potter, A.		Berube Borrow Area: A Class III Cultural Resource Inventory in Morton Co., ND	8607
2003	Salisbury, E.	E. Stine	2003 Living Snow Fence Survey (B) of 22 Tree Sites in Adams, Grant, Hettinger, Kidder, McIntosh, Oliver, & Stutsman Counties, ND: A Class III Cultural Resource Inventory	8724
2003	Schweigert, K.		Cultural Resources Inventory & Evaluation for the Proposed Grasslands Project in Billings, Dunn, Golden Valley & Stark Counties, ND	8529
2003	Springer, K.		A Cultural Resources Inventory of the 03-089-091 Ag Waste System Project Stark Co., ND	8688
2003	Springer, K.		The 04-037-031 Pipeline System Project Cultural Resources Inventory Grant Co., ND	8717
2003	Wermers, G.		Addendum to the "Southwest Pipeline Project-Class I & Class III Cultural Resource Investigations for Portions of the Medora to Beach Regional Service Area WO 3033.900" Report, Golden Valley Co., ND	8699
2003	Wermers, G.		Road Improvement Project SC-1356(054) in Dunn Co., ND	8526
2003	Wermers, G.		Stark Co., Bridge Replacement Project in Sections 15 & 22, T139N, R97W, ND, Structure 45-116-11.0	8742
2003	Wermers, G.		West Plains Electric Underground Cable, Class III Cultural Resources Inventory, Billings, Co., ND	8739
2004	Bluemle, W.		Hebron Alternative Microwave Site: A Class III Cultural Resource Inventory, Morton Co., ND	8797
2004	Bluemle, W.		Hoovestol Plant Site: A Class III Cultural Resource Inventory, Morton Co., ND	8771
2004	Bluemle, W.		Verifications Survey: A Class III Cultural Resource Inventory, Morton Co., ND	8963
2004	Floodman, M.		Allotment 212 Dam Maintenance Projects, Billings Co., ND	8811
2004	Hiemstra, D.		Hebron's Microwave Site: A Class III Cultural Resource Inventory, Morton Co., ND	8990
2004	Hiemstra, D.		Williams Tree Tract: A Class III Cultural Resource Inventory in Grant Co., ND	8928
2004	Lehman Turck, D.		Heart Butte Reservoir Access to Closed Lands and Parking Lot: A Class III Cultural Resource Inventory Grant Co., ND	8808

Year	First Author	Second Author	Title	Ms #
2004	Morrison, J.		23rd Avenue West Dickinson: A Class III Cultural Resource Inventory, Stark Co., ND	8864
2004	Morrison, J.		Old Red Trail Bike Path Extension: A Class III Cultural Resource Inventory, Morton Co., ND	8968
2004	Stine, E.		Richardton to Taylor Exchange: A Class III Cultural Resource Inventory in Stark Co., ND	8824
2004	Stine, E.		Rock for Heart Butte: A Reconnaissance Inventory North of Almont, Morton Co., ND	8930
2004	Wermers, G.		Bridge Replacement Project (Structure No. 30-119-22.0) in Sections 19 & 30, T137N, R87W, Morton Co., ND	8837
2004	Wermers, G.		Bridge Replacement/Road Improvement Project in Stark Co., ND, Structure 45-130-17.0	8745
2004	Wermers, G.		Sweet Briar Road - MC#138 Project in Morton Co., ND	9400
2005	Bleier, A.		2005 Living Snow Fence Transportation Enhancement Program Sites in Adams, Dickey, Emmons, Stark & Stutsman Counties, ND: A Class III Cultural Resource Inventory	9296
2005	Bleier, A.		2005 State Wide Forest Land Enhancement Program Sites in Burleigh, Dunn, Emmons, Stark, Stutsman, & Walsh Counties, ND: A Class III Cultural Resource Inventory	9212
2005	Bleier, A.		2005 State Wide Tree Mitigation Sites in Burleigh, McLean, Pembina, Ransom, Stark, & Stutsman Counties, ND: A Class III Cultural Resource Inventory	9197
2005	Bluemle, W.		Interstate 94 2005 Survey: A Class III Cultural Resource Inventory in Billings & Stark Co., ND	9175
2005	Christensen, B.		Small Scale Safety Project SE Dickinson Class III Inventory Report, Stark Co., ND	9517
2005	Klinner, D.	J. Morrison	Bridge 30-122-04.0 Replacement Project: A Class III Cultural Resource Inventory in Morton Co., ND	9126
2005	Klinner, D.		Slawson Exploration Whiskey Joe 2-7 Well Pad & Access Road: A Class III Cultural Resource Inventory, Billings Co., ND	9164
2005	Morrison, J.		Dickinson Municipal Airport Wildlife Fence: A Class III Cultural Resource Inventory, Stark Co., ND	9039
2005	Salkin, P.		An Archaeological Survey of a Proposed Communications Tower Site in the Village of Dickinson, Stark Co., ND	9293
2005	Stine, E.		Mor-Gran Sou's Proposed Roughrider Substation: A Class III Cultural Resource Inventory in Morton Co., ND	9367
2005	Turck, D.		A Class III Cultural Resource Survey Lands in the lower Heart River Irrigation District for New Power & Pipelines in Grant & Morton Co., ND	9273
2006	Bleier, A.		Stark Co., Processing Plant: A Class III Cultural Resource Inventory in Stark Co., ND	9595
2006	Heiner, P.	J. Morrison	Bridge 45-121-16.0 and Borrow Area Project: A Class III Cultural Resource Inventory, Stark Co., ND	9934
2006	Hiemstra, D.		Marmot Gravel Pit: A Cultural Resources Inventory of a Proposed Expansion Area in Morton Co., ND	9936
2006	Klinner, D.		Anheluk 44-1H Well Pad & Access Road: A Class III Cultural Resource Inventory, Billings Co., ND	9630
2006	Klinner, D.		SDA, Inc, Borrow Area: A Class III Cultural Resource Inventory, Stark Co., ND	9678
2006	Stine, E.		Mor-Gran-Sou's Almont Tower: A Class III Cultural Resource Inventory in Morton Co., ND	9608
2006	Toom, D.		Construction Monitoring: Grant Co., Bridge Survey, Class III Cultural Resources Inventory, Grant Co., ND [Project BRO-19(10), Bridge 19-106-03.0] Report Addendum	9478

Year	First Author	Second Author	Title	Ms #
2006	Toom, D.		Hienle Gravel Pit Expansion Cultural Resources Survey, Morton Co., ND	9764
2006	Williams, B.		A Class III Cultural Resource Survey of a Schnell Recreation Area Stock Water Pipeline & Tank in Stark Co., ND	9751
2007	Hiemstra, D.		Logan Materials Pit: A Class III Cultural Resource Inventory in Billings Co., ND	10139
2007	Turck, D.		A Class III Cultural Resource Survey of Lands in the Lower Heart River Irrigation Company for an Additional Pivot in Morton Co., ND	10148
2007	Turck, D.		Heart Butte Irrigation District - Lynn Stark 5 Acre Addition, Morton Co., ND	10089

Test Excavation Projects

The first test excavations reported in the Heart River drainage were conducted during a one-week period in 1947 by Gordon Hewes (1949b, c) at the Plains Village Koehler site (32GT1). Hewes excavated eight 5-x-5-ft units (Cooper 1958:12). Cultural -deposits were found to contain stone tools, flaking debris, pottery, bone, and mussel shell fragments, but no cache pits or earthlodge remains. Subsequent major excavations were undertaken by SIRBS personnel the following year (1948) (see Major Excavation Projects section below).

The next reported subsurface investigation in the Heart River basin involved the use of limited shovel probing as an aid in site evaluation. This took place as part of a Heart Butte Reservoir survey project (Plochman et al. 1982).

A number of test excavations were undertaken in the Study Unit as part of the Northern Border Pipeline project (cf. Root and Gregg 1983). Cultural remains dating from the Early Plains Archaic through Plains Village periods were found at the 18 sites test excavated. Middle and Late Plains Archaic components were most common followed by Plains Village and Middle Plains Woodland.

Subsurface testing was conducted at 32SK855 for the North Dakota Department of Transportation (NDDOT). The site, located on a bluff above the Heart River, has been classified as a workshop/chipping station (Kulevsky and Stine 1993). Testing included 110 auger probes along three transects and three formal test units. Flaking debris, a core, tested raw material, a McKean projectile point, and bone were recovered at the site (ibid.:i). Lithic raw material types included KRF, petrified wood, TRSS, agates, and chalcedonies. The site was recommended eligible for the NRHP due to the presence of intact deposits and its possible connection to a nearby, multi-component habitation site (32SK854) (ibid.:14).

During the field season of 1992, a NDDOT-sponsored test excavation project was conducted at 32BI828. This stone feature site is situated on a rise south of an unnamed drainage and two miles east of the Little Missouri Badlands (Stine 1993b). The site consists of two stone circles and eight depressions. No cultural materials were recovered from shovel probes placed within selected depressions. However, shovel probes placed in and outside of the stone circles

produced flaking debris, bifaces, core fragments, a retouched flake, and tested raw material. Lithic raw material types consisted of KRF, chalcedonies, Rainy Buttes silicified wood (RBSW), petrified wood, quartzite, moss agate, and cherts. Tongue River silicified sediment comprise the stone circle feature rocks but no chipped or ground TRSS artifacts were recovered. Investigators suggest the site functioned as a “single use intensive lithic reduction site possibly with emphasis on early stage biface manufacture” (ibid.:15).

Test excavations were undertaken at 32SK809 in 1995 because of damage caused by vehicles used during a seismic project on Bureau of Reclamation (BOR)-managed land (Olson 1996). The site crosses three physiographic zones, including the Heart River and Ash Creek floodplains, Pleistocene terrace remnants, and an upland (ibid.:3). Ninety-one auger probes and eight formal test units were placed along four transects at the site. Cultural materials at the lithic scatter included flaking debris, ground stone fragments, and a projectile point mid-section, all manufactured from a variety of lithic raw materials. Bone fragments and charcoal also were found. Radiocarbon tests of charcoal samples reveal dates for two separate occupations at the site, ca. 2500 and 1000 radiocarbon years BP (ibid.:66). Additionally, one buried rock feature was unearthed. It is composed of a single course of 16 rocks in a straight line measuring 1.2 m , 2-15.5 cm below a cultural component (ibid.:47-50). Archeologists suggest the feature may be a remnant of a hide windbreak (ibid.:50).

Formal subsurface testing occurred at 11 archeological sites at the Dickinson Dam in 1996. Investigators recommended no sites as eligible for the NRHP due to the scarcity of cultural materials and the sites’ lack of integrity (Klinner et al. 1999).

Test excavations were conducted at 32SK134 in 1998 for the NDDOT. The site is located on the edge of a valley overlooking the Heart River. Two hundred shovel and auger probes and 11 formal test units comprise the subsurface investigation (Larson et al. 1999). Cultural materials recovered from the site included flaking debris, a KRF biface fragment, projectile point fragments, fire-cracked rock, hearth remnants, and large mammal bone (ibid.). Knife River flint was the most common lithic raw material type but a few chalcedony, TRSS, and porcellanite flakes also were present. Based on point typology and radiocarbon dating, the site appears to date to the Pelican Lake Complex (ibid.:38).

Test excavations were required at 32MO66, west of the community of Mandan, because of the slumping and sliding of the bank along Business I-94. Prehistorically, the confluence of the Heart and Missouri rivers was approximately six miles east of the site. In 1980, a local resident reported that there had been stone circles, depressions, and a stone effigy in the area before it was plowed (Stine and Morrison 2004:8). Sixty-three shovel probes and five formal test units were excavated (ibid.:ii). Testing included the salvage of an eroding pit feature atop a hill. In total, five features were excavated, four in the

upper Plains Village component and one in a second, deeper (180 cm below ground surface) component (ibid.). Two features were post molds. Although the tested portion of the site is small, investigators have not ruled out the possibility that it could be part of a village. No horticultural tools were recovered but floral remains included corn and sunflower seeds. Radiocarbon dates indicate the age of the Plains Village component is AD 1400-1450 which corroborates the recovered diagnostic artifacts (ibid.). The second component was not dated. Investigators recommended listing in the NRHP and further testing, as the site has potential to provide information about site function and regional horticulture and seasonality (ibid.).

During the field seasons of 1998, 1999, and 2000, the University of North Dakota (UND) conducted test excavations at seven sites near the Heart Butte Reservoir for the BOR (Jackson et al. 2001). Three of the sites (32GT11, 32GT69, and 32GT238) were recommended eligible for the NRHP primarily based on research potential. The remainder of this section provides brief descriptions of test excavations conducted at these sites.

The Black Pearl site (32GT11), a single component early Plains Village campsite, is situated on a low terrace of the Heart River (ibid.:5.1). Five formal test units were excavated. A basin-hearth feature, containing flaking debris, a stone tool, a modified bone (possibly an ornament), and lesser amounts of bone, fire-cracked rock and charcoal, were salvaged (ibid.:5.15). Other cultural materials recovered from the site were projectile points, a scraper, retouched flakes, tested raw material, a smoking pipe, ceramics, large and small mammal bone, mussel shell, and one black freshwater pearl (ibid.:5.15-5.24). The cultural/temporal affiliation was determined by the ceramics present. Investigators recommended salvage excavation of the site due to continual erosion caused by the Heart River.

Site 32GT69 is a multi-component cultural material scatter situated on a terrace overlooking the Heart River to the north. Subsurface testing consisted of the excavation of three formal test units (ibid.:6.4). Two ceramic pieces date the component within the A Horizon to the Plains Village period (ibid.:6.9). The second component is located within the B Horizon. No datable materials were recovered from this layer but investigators suggest a pre-ceramic period, such as Plains Archaic or Paleo-Indian, based in part on the recovery of heavily patinated KRF artifacts (ibid.). A shallow surface hearth, containing scant amounts of fire-cracked rock, shell, and burned bone, was excavated from Test Unit 1 (TU1) (ibid.:6.10). Flaking debris, fire-cracked rock, unidentifiable burned and unburned bone, and shell also came from TU1. Artifacts recovered from the site include bifaces, flake tools, cores, and ground stone tools, all manufactured from TRSS and KRF (ibid.:6.13). At the time of excavation, the site was in good condition and protection and preservation were recommended.

The Beadmaker site (32GT238), within the floodplain of the Heart River, along with 32GT8 and 32GT69, is one of the three sites comprising the

Beadmaker site locality. The name of the site is derived from the stone beads, a bone bead, and bead manufacturing debris recorded at the Beadmaker site. Other cultural materials recovered from the site include ceramics (early Heart River phase), stone tools, flaking debris, modified and unmodified bone, modified and unmodified shell, fire-cracked rock, burned seeds, and charcoal (ibid.:10.1). No projectile points were found. The site appears to have functioned as a field camp. Subsurface testing consisted of 10 formal test units and 26 auger probes (ibid.:10.13-10.14). Three features were revealed, two basin hearths and a bison bone concentration. Radiocarbon tests date the site to ca. AD 1480-1650 (ibid.:10.32). Investigators “are inclined to assign the Plains Village component at Beadmaker to the early Post-Contact Coalescent variant, not so much because of the interpretation of its radiocarbon dates, but because of its ceramic assemblage” (ibid.:10.32). Rapid erosion has affected the site but it retains potential for archeological research. Moreover, project archeologists suggest that “It is clearly the most significant, remaining archaeological site in the Heart Butte locality that is presently known....the Beadmaker site has the ability to contribute substantial and important new information on the full range of Plains Village settlement and subsistence patterns, and therein lies its true significance” (ibid.:10.70).

A data recovery program was undertaken by UND at the Beadmaker site. Laboratory analysis of the collection is in process. A full report of archeological investigation at the site is anticipated.

Table 4.5: Test Excavation Projects in the Heart River Study Unit, 13-Sept-2007.

Year	First Author	Second Author	Title	Ms #
1981	Robeson, W.	C. Parish	Northern Border Pipeline, North Dakota: Historic Sites Testing and Evaluation, Morton, Dunn, McKenzie & Williams Counties	2566
1983	Root, M.	M. Gregg	Archeology of the Northern Border Pipeline, North Dakota: Vol. 3, Test Excavations, McIntosh, Emmons, Morton, Stark, Mercer, Dunn, McKenzie, & Williams Counties, ND	3456
1986	Borchert, J.		Archaeological Testing 32MO112 Morton Co., ND	4611
1986	Christensen, R.	A. Porsche et al.	Muddy Waters II, 32MO113: A Besant Occupation on Big Muddy Creek, Western Morton Co., ND	4101
1989	Borchert, J.		Evaluative Test Excavations at 32MO137, 32MO138 & 32MO140 Morton Co., ND	4796
1990	Borchert, J.	J. Brownell et al.	Final Report: The Evaluation of Select Sites Along the Gladstone to Regent Road, Stark and Hettinger Counties	6185
1990	Pool, K.		Testing of Archaeological Site 32MO164 for Lyons Road Improvement, Morton County, ND	5312
1991	Klinner, D.	J. Borchert	Archaeological Testing at 32SK846 in Stark County, ND	5403
1993	Kulevsky, A.	E. Stine	Testing & Evaluation of Site 32SK855 Stark Co., ND	6331
1993	Stine, E.		Swenson Site Testing and Evaluation of 32BI828 Billings Co., ND	6001
1995	Olson, B.		32SK809 & 32SK829: Evaluative Testing of Two Late Archaic Sites Stark Co., ND	6569
1998	Scott, J.		Forty-Eighth Avenue Bridge Replacement Project: Archaeological Testing of 32MO353 & 32MO354 in Morton Co., ND	7215
1999	Klinner, D.	G. Wermers et al.	Dickinson Dam 1996 Archeological Site Evaluation Project, Stark County, ND	7177
1999	Larson, T.	D. Penny et al.	Results of Stage 1 Investigations at 32SK134	7414

Year	First Author	Second Author	Title	Ms #
2001	Jackson, M.	D. Toom et al.	Heart Butte Reservoir 1998-2000 Archeological Investigations, Grant Co., ND Vols. I & II	9074
2003	Stine, E.	J. Morrison	Sunny Slide Test Excavations at 32MO66 Morton Co., ND	8738
2004	Wermers, G.		Testing at Sites 32DU1283 & 32DU1284, Dunn Co., ND	8744
2005	Stine, E.	D. Hiemstra	Grasslands Pipeline: Archaeological Investigations in Billings, Dunn, Golden Valley and Stark Counties, ND	9154
2006	Hiemstra, D.		Sunny Gravel Pit: A Cultural Resources Inventory of a Proposed Expansion Area in Morton Co., ND	9941

NRHP and NDSHSR

Just three archeological sites in the HRSU have been determined eligible for the National Register of Historic Places (NRHP), and none have been listed. No archeological sites from the basin are listed on the North Dakota State Historic Sites Register (NDSHSR).

The current list of archeological sites in North Dakota listed in the NRHP is available on the National Park Service website. The following internet links are useful (NPS 2008a, b):

General information and links to specific information: <http://www.nps.gov/nr/>
National Register Information System: <http://www.nr.nps.gov/>

Major Excavation Projects

The only reported major excavation undertaken in the basin was conducted by Paul Cooper (1958) of the SIRBS at the Koehler site (32GT1) in the Heart Butte Reservoir. The remains of a Heart River phase camp were excavated. LeBeau Ware ceramics from the site support the Heart River phase taxonomic assignment.

Table 4.6: Major Excavation Projects in the Heart River Study Unit, 13-Sept-2007.

Year	Author	Title	Ms #
1948	Cooper, P.	Field Notes & Drawings Taken from SIRBS Survey Files, Grant Co., ND	16
1958	Cooper, P.	Archeological Investigations in the Heart Butte Reservoir Area	--

Other Work

The Sappington (1980) manuscript is a brief letter report to Jim Connolly of Fargo, North Dakota, regarding sourcing of obsidian artifacts reportedly found along the Cannonball and Heart rivers. Samples from an undesignated site at the confluence of an unspecified stream and the Heart River in T136N, R88W, Grant County, were sourced to the Centennial Mountains along the Idaho-Montana border. No site numbers or cultural/temporal affiliations are mentioned.

In 1993, Toom and Kordecki (1994) assessed the condition of 28 flood-damaged sites across the state. Ten sites were reported as significantly damaged due to high water levels. Recommendations for bank stabilization were made for nine of the sites. Complete salvage of 32MO97 was recommended because it is a known ossuary.

Table 4.7: Other Work in the Heart River Study Unit, 13-Sept-2007.

Year	First Author	Second Author	Title	Ms #
1965	Anonymous		Historic Sites Under the Authority of the State Historical Society of ND as Established by The 39 th Legislative Assembly	2011
1977	Econ, Inc.		Interpretive Guide: Archaeological Photo Interpretation & Feasibility Study of a Five Co., Area in West Central ND Using Small Scale (1:80,000) Aerial False Color Infrared	79
1979	Ridl, D.		The Geary Buffalo Kill Site, Billings Co., ND	587
1980	Sappington, L.		Analysis of Obsidian Samples From Cannonball & Heart River Sites, Grant Co., ND	2493
1985	Kuehn, D.		Letter Report: Archaeological Monitoring of Road Construction Activity at Three Areas in Theodore Roosevelt National Park, Billings Co., East Park Road Improvement Project	3732
1987	Kuehn, D.		Archaeological Monitoring of Pipeline Trenching at Site 32MO113, Near Glen Ullin, ND	4252
1989	Penny, D.	T. Larson	Results of a Cultural Resource Inventory of Six Farmers Home Administration Parcels, Stark, Sioux, Mountrail, Williams, Morton, & Burleigh Co., ND	4911
1989	Thiessen, T.		An Archeological Field Survey of Seven Borrow Sources in Mercer, Oliver, & McLean Counties, ND	4933
1990	Karsmizki, K.		Garfield Coal Mine Historical Research in Morton Co., ND	5164
1990	Karsmizki, K.		Klym Uranium Mine, Billings Co., ND	5089
1990	Long, B.		Survey of Selected State Properties The Evolution of Dickinson State Normal School in Stark Co., ND 1912-1940	5206
1990	Olson, B.		Report on Bison Bone Find Charlie Creek Substation Construction Site Western Area Power Authority Stark Co., ND	5205
1990	Späth, C.		Commissary Building Construction Project at Fort Abraham Lincoln, Morton Co., ND	5447
1991	Karsmizki, K.		U308 Uranium Industry Context Statement. Adams, Slope, Golden Valley, Billings, Bowman, Dunn, & Stark Counties, ND	5477
1991	Thiessen, T.		A Summary of Archeological Investigations Conducted In Conjunction With Development of a Permanent Visitor Center/Administrative Facility at the Knife River Indian Villages National Historic Site, ME, ML, & OL Counties, ND	5742
1992	Banks, K.		Southwest Pipeline Segments C3 & C4 in Hettinger and Stark Counties: Site Updates	5735
1992	Gregg, M.		Heart Butte Reservoir, Grant Co., ND: 1992 Archeological Investigations	6010
1992	Johnson, L.	M. Hufstetler et al.	Ethnic Architecture in Stark Co., ND A Historic Context	5919

Year	First Author	Second Author	Title	Ms #
1993	Kurtz, W.		The Custer Trail & Battle of the Badlands Report of Investigations, 1992-1994 Billings, Golden Valley & Adams Counties, ND	7931
1994	Toom, D.	C. Kordecki	Flood Damage Assessment Survey of Twenty-Eight Archeological Sites Along the Cannonball, Heart, James, Maple, Red & Sheyenne Rivers, ND: Final Report	6222
1994	Vyzralek, F.		A Survey of the Historic Townsite of Sims, Morton Co., ND, & its Environs, Including Baby Mine, Bly's Mine & the Brick & Terra Cotta Plant of the Carbon Pressed Brick and Lime Company	6412
1994	Vyzralek, F.		An Historic and Architectural Survey of Richardton, Stark Co., ND	6400
2002	Hafermehl, L.		Stark Co., Bridge Number 45-105-17.0 Documentation of the Structure & an Examination of its Construction as a Result of the New Deal's Works Projects Administration Activities in ND	8298
2003	Wermers, G.		Southwest Pipeline Project-Medora to Beach Phase, Results of Auger Probing at Site 32BI411 Within the Proposed Fryburg Tank Site, Billings Co., ND	8562
2005	Fox, R.		The Custer Trail Project (1992-1994, 1999): A Synthesis; Custer Military Trail Historic Archaeological District Little Missouri National Grasslands Billings & Golden Valley Co., ND The National Register of Historic Places	9616
2005	Hufstetler, M.	J. Goff	Historic Bridges in North Dakota 2004 Revision	10128
2005	Turck, T.		Custer Trail Self Guided Auto Tour, Billings & Golden Valley Co., ND	9259

Paleo-Indian Period

Paleo-Indian sites are underrepresented in the site file database. Considering the greater numbers of Paleo finds reported in the Knife River and Cannonball River study units, to the north and south, the earliest North Dakotans should have been regular users of the HRSU.

Paleo-Environmental Modeling

The identification of late Paleo-Indian age land surfaces in the Heart River drainage may be explored through the use of remote sensing techniques coupled with soil bore hole data. Studies along the South Sulphur River in northeastern Texas indicate that electrical resistivity survey can be used to delineate basin morphology and buried geomorphic features (Darwin et al. 1990:77). Can electrical soil resistivity survey or other remote sensing techniques be used to identify the Leonard paleosol in the Oahe Formation in the Heart River drainage?

Cultural Chronology

All Paleo-Indian complexes specified in the statewide chronology should be represented in the HRSU. The base of a Goshen point (32SKx53) was found with several bone fragments and a piece of shell in stripped railroad right-of-way near the community of Richardton. Other cultural resources (32MO320, 32SK37, 32SK844, and 32SKx48) within the HRSU, temporally affiliated with the Plano period, are known from private collections. An effort should be made to work with artifact collectors to identify types of Paleo points that have been surface collected.

Settlement Behavior

Paleo-Indian settlement strategies in the basin are not known. Terrace settings along the Missouri may have been preferred over settings along tributary drainages such as the Heart River. The occurrence and availability of necessary resources such as chippable stone and the location of prey animals within the drainage may have dictated the settlement options of early groups. Do TRSS lithic procurement and workshop sites exhibit the time depth of the KRF quarry area to the north?

Native Subsistence Practices

Varying climatic conditions, on both a seasonal and a year-to-year basis, undoubtedly affected Paleo-Indian strategies for taking large prey such as mammoth and bison. Herd size and composition at a given time were certainly related to environmental factors. Similarly, wild plant foraging behavior would have been affected by these same environmental constraints. What was the range of floral and faunal resources available to Paleo-Indian peoples in the HRSU?

Technologies

Small groups of hunters armed with Paleo-Indian weaponry could readily dispatch their big game quarry based on experimental studies involving the African elephant (cf. Frison 1989). Frison (1989) has reported that certain key technological components of Paleo-Indian weaponry needed to work in tandem. He also presented experimental results concerning the use of bifacial thinning flake tools made from Spanish Diggings quartzite to butcher an African elephant. This material was found to hold an edge better, thus requiring less frequent re-sharpening than fine-grained chert specimens employed in the study. Does KRF utilization supersede that of TRSS during Paleo-Indian times because of specific constraints imposed by the characteristics of the raw material? (cf. Goodyear 1989; Kelly 1988:718).

Artifact Styles

Finds of Paleo-Indian projectile points from Stark County suggest that Plano materials can be expected to occur in the Study Unit. The specimens are from a private collection. A Scottsbluff point was found at 32SK37, and an Eden point is reported from a second location (32SKx48) (Jack Stewart, personal communication to M. Gregg, December 1989). Do any of the Paleo-Indian point type styles in the HRSU differ in any way from those in other parts of North Dakota?

Regional Interaction

Paleo-Indian groups likely traversed the Heart River drainage enroute to and from the KRF flint quarries during the course of other subsistence pursuits.

The occurrence of both Folsom and Agate Basin lanceolate projectile tips made of KRF at the Agate Basin site in northeastern Wyoming suggests direct acquisition of this stone from the quarry area. The most direct travel route between these two locales would cross portions of the HRSU (cf. Frison 1982:Figure 2.119). The recovery of exotic stone materials of Hartville Uplift origin in Paleo-Indian age contexts would lend additional support to the former existence of trans-Heart travel routes to and from the KRF quarries.

Historic Preservation Goals, Priorities, and Strategies

A high priority is to record a sample of Paleo-Indian sites in the Heart River basin. The most expedient strategy is to work with collector-informants who have personally surface collected Paleo points from HRSU contexts.

Plains Archaic Period

All three Plains Archaic periods are represented by finds from the Heart River basin. In most study units, corner-notched points of inferred Late Plains Archaic origin are more numerous than points of earlier Plains Archaic types.

Paleo-Environmental Modeling

Plains Archaic components in the Heart River basin are best known from upland settings where artifact deposits are either deflated or shallowly buried. As with the preceding Paleo-Indian period, Early and Middle Plains Archaic remains may well be deeply buried by alluvial and colluvial fill in the valley bottoms. Late Plains Archaic components can be expected within soil zones above present-day river levels along the lower reaches of the Heart much the same as in the other major rivers valleys. Whenever possible, archeologists should work with the North Dakota Geological Survey in identifying sedimentary and topographic contexts of Holocene soils and paleolandscapes.

Cultural Chronology

The Plains Archaic chronology in the HRSU broadly conforms to that outlined for the state as a whole. Most of the components discussed below have been classified using artifact style cross dating rather than absolute dating methods. Early Plains Archaic materials have been reported from few sites in the Study Unit (Table 4.3).

Middle Plains Archaic materials are better represented. Various lithic materials including KRF, petrified wood, TRSS, agates, and chalcedonies were recovered during testing at 32SK855, a workshop/chipping station. A McKean projectile point dates the site to the Middle Plains Archaic (Kulevsky and Stine 1993). Plochman et al. (1982:60) reported a cultural material scatter at 32GT34 near Beaver Creek contained an Oxbow point. A second Middle Plains Archaic component was identified at 32GT66, along Lake Tschida, where a Hanna point

was found associated with other stone tools and flaking debris (ibid:115). A 1990 inventory of sites, also along Lake Tschida, recorded a Duncan point at 32GT164 (Picha et al. 1991).

The Northern Border Pipeline project recorded a number of Middle Plains Archaic components. These were mostly in upland settings because the pipeline route kept to that landform type as much as possible. The components included a McKean Lanceolate point from 32MO74 (Billeck 1983f). An Oxbow point was found at 32MO245 (Billeck 1983i). Hanna points were recovered from three sites: 32MO58 (Meier 1983j), 32MO74 (Billeck 1983f), and 32MO255 (Billeck 1983p).

Late Plains Archaic components were identified at eight sites along the route of the Northern Border Pipeline across the eastern portion Heart River drainage. These cultural/temporal assessments were based on the recovery of corner-notched points. Included are 32MO253 (Billeck 1983n), the Jones site (32MO242) (Gregg 1983c), and the Judson site (32MO58) (Meier 1983j), among others. None of the eight sites produced any associated pottery. Corner-notched points are not always Late Archaic. They are also found in Early and Middle Plains Woodland components (Gregg 1987d). What traits can be used to distinguish between Plains Archaic and Plains Woodland corner-notched point styles?

Late Plains Archaic sites are well represented within the HRSU. A Pelican Lake point was recovered during testing at 32SK134 and radiocarbon tests confirm the age of that component (Larson et al. 1999:38). Two occupational episodes have been identified at 32SK809, a lithic scatter with bone and charcoal. Here, radiocarbon tests of charcoal samples date to ca. 2500 and 1000 radiocarbon years BP (Olson 1995:66), the Late Plains Archaic and Late Plains Woodland periods.

Settlement Behavior

Many of the known Plains Archaic components are in upland settings. This locational correlation is thought to reflect patches of intact landscape of Late Plains Archaic age combined with some site locational preferences. Eroded or deflated upland deposits are interpreted as representing primarily temporary campsites. A major activity which took place at these locations was procurement of lithic raw materials for tool production from deposits of stones such as KRF, TRSS, and various chalcedonies and silicified woods (cf. Plochman et al. 1982:Table 6.3; Root and Gregg 1983:Part 2).

Few bottomland sites have been investigated in detail. An exception is the Bahm site (32MO97), located on the Heart River floodplain north of Flasher in Morton County. A buried rock-lined pit containing ocher-stained human remains was found exposed along the cutbank 3 m below the surface in a paleosol (SHSND site files). A few flakes and bone fragments also were noted in the

paleosol. Due to lack of diagnostic artifacts, cultural/temporal affiliation is not known. Buried Plains Archaic sites in the bottomlands along the Heart River need to be identified and evaluated in order to learn something of settlement variation.

Native Subsistence Practices

Little is known concerning Plains Archaic subsistence regimens in the Heart River drainage. The occurrence of projectile points/cutting tools in assemblages indicates that hunting was a major subsistence pursuit. Undoubtedly, prey included bison and antelope. The recovery of small amounts of freshwater mussel shells from 32MO249 (Billeck 1983j) and 32MO252 (Billeck 1983m) in upland settings suggests mussels may have served as a dietary supplement to Plains Archaic groups in the basin. What were the variations in subsistence resource potential across the basin as climatic conditions varied through the Plains Archaic periods?

Technologies

Stone, bone, shell, wood, fiber, and other technologies can be analyzed only when discrete Plains Archaic artifact samples are recovered. There is a need to recover samples of Early, Middle, and Late Plains Archaic artifact deposits by controlled hand excavation from sites with depositional integrity in the Heart River basin. Floodplain alluvial contexts would be the most likely setting to hold such deposits.

Artifact Styles

The projectile point forms identified thus far in the HRSU conform to well-known Northern Plains styles. Middle Plains Archaic remains in the Heart Butte Reservoir include an Oxbow point from 32GT34 and a Hanna point from 32GT66 (Plochman et al. 1982:Figure 8.2). Additional Middle Plains Archaic components represented by Hanna points include 32MO58, 32MO74, and 32MO255 found in Morton County during the Northern Border Pipeline project. What is the variation in the Hanna point style represented by finds from the Heart River basin?

Regional Interaction

Extents of regional interaction involving people whose material culture is classified in one of the named archeological units can be determined by (1) identifying artifacts of Heart River basin origin in distant archeological sites and (2) identifying artifacts of distant origin in Heart River sites. Can any Plains Archaic artifacts be specified which are distinctly of Heart River basin origin?

Historic Preservation Goals, Priorities, and Strategies

A priority is to establish a Plains Archaic cultural chronology for the HRSU based on chronometrically dated components. Single component deposits need to be identified and sampled by controlled hand excavation in order to learn more about subsistence practices, technologies, and artifact styles.

Plains Woodland Period

Sixty-three sites have been assigned to the Plains Woodland tradition (Table 4.3). However, 40 of these sites are “unspecified” Plains Woodland without potsherds. Plains Woodland components are difficult to identify. Most occupations likely will be buried in floodplain alluvial contexts.

Paleo-Environmental Modeling

The Scandic climatic episode of AD 400-750 is thought to have been generally arid. Windblown sediments should have capped Early and Middle Plains Woodland sites in the bottomlands and on the south and east slopes of hills and ridges in the uplands. Attempts should be made to identify sedimentary units of this age in these topographic contexts.

Cultural Chronology

Early Plains Woodland cultural remains rarely have been identified in the Heart River basin. One small corner-notched point from the Judson site (Meier 1983j:Figure 52.6d) is similar to Early Plains Woodland points from the James River valley (cf. Gregg 1987d:Figure 8.2b). The occurrence of Late Plains Archaic Pelican Lake and Middle Plains Woodland Besant Side-Notched materials point to cultural continuity between Archaic and Woodland periods. More Early Plains Woodland sites will undoubtedly be found as work progresses.

Middle Plains Woodland components containing Besant/Sonota materials have been reported from 18 sites in the basin. Plochman et al. (1982) collected an isolated Besant Side-Notched point during the Heart Butte Reservoir survey. Another was found at 32MO76 during Northern Border Pipeline investigations (Billeck 983r:810). Diagnostic artifacts recorded at 32GT164 and 32GT165 along Lake Tschida date to the Besant period (Picha et al. 1991).

Three Late Plains Woodland components are represented in the site file database. Given the occurrence of a full-blown Plains Village lifeway in the Study Unit in subsequent centuries, many more Late Woodland sites are expected. What accounts for the paucity of Late Plains Woodland period components in the HRSU?

Settlement Behavior

Settlement systems of Plains Woodland peoples in the Heart River drainage are unknown. Middle Plains Woodland sites are recorded in terrace, canyon, and upland settings. With few Late Plains Woodland components identified, settlement behavior hardly can be considered.

Additional survey work in the breaks terrain near the Missouri-Heart River confluence may serve to locate Late Plains Woodland sites in topographic/physiographic settings similar to those reported on the Cross Ranch in the Southern Missouri River Study Unit to the north (cf. Ahler et al. 1981, 1982). Do Late Plains Woodland components occur in terrace and breaks terrain along the drainage?

Native Subsistence Practices

Presently, little is known about Plains Woodland subsistence practices because recovered floral and faunal samples have not been studied in detail. Projects which involve test excavation should use fine-mesh screen recovery techniques in processing site matrix in order to collect samples of floral and faunal remains for study. When did corn and other domesticated garden crops begin to be cultivated regularly in the Heart River drainage? Was gardening principally a Late Plains Woodland or Plains Village subsistence pursuit?

Technologies

Knife River flint was locally available in lag deposits in the HRSU. Where were the most heavily exploited KRF source areas within the HRSU?

Ceramic remains attributable to the Plains Woodland period have not been reported at many sites in the basin. Middle Plains Woodland Besant/Sonota groups frequenting the basin undoubtedly made and used ceramic containers similar to those reported from nearby sites located along the Missouri River (Neuman 1975). What are the technological differences between ceramics from Besant/Sonota residential base settlements along the Missouri River and field camps in the interior portions of the Heart River basin?

Artifact Styles

A Besant Side-Notched point was collected from an isolated find spot along the Heart Butte Reservoir (Plochman et al. 1982:Figure 8.2). What is the frequency of occurrence of Samantha Side-Notched points at sites in the Heart River basin?

Some of the large corner-notched Pelican Lake and small corner-notched projectile points found at sites in the basin were likely made during Early Plains

Woodland times. The lack of cultural deposits from dated contexts has hindered their identification in the archeological record.

Diagnostic projectile point forms such as Besant Side-Notched presently provide the best indication of Middle Plains Woodland occupation in the Study Unit. Pottery remains occur much less frequently in collections. Pottery styles are thought to follow regional Sonota decorative modes.

Late Plains Woodland peoples are thought to have been the forebears of Plains Village culture in the region. Are there material traits or artifact styles distinctive to proto-Mandan and proto-Hidatsa groups in the Heart River valley?

Regional Interaction

The Heart River valley would have been a natural east-west travel route between the Little Missouri Badlands and the Missouri River Trench (cf. Cooper 1947:3). Prehistoric hunters likely followed the drainage westward during hunting treks.

Historic Preservation Goals, Priorities, and Strategies

The identification and recordation of mound sites in the Study Unit should be a top priority. These data may also provide clues concerning the intensity and location of Woodland habitation sites in the Heart River drainage. Residential bases, special purpose mortuary sites, and temporary campsites should be present near these earthworks (cf. Gregg 1987c).

Plains Village Period

Plains Village properties abound in this Study Unit, even though only 12 were identified as such in the site data files on 13 September 2007. Plains Village cultural florescence in North Dakota may have peaked in the late prehistoric earthlodge communities concentrated in the Heart River-Missouri River confluence locality.

Paleo-Environmental Modeling

Plains Village florescence in the Heart River drainage is suspected to have coincided with favorable climatic conditions occurring on a regional scale in the Upper Missouri River valley during the Neo-Atlantic climatic episode some time after AD 1000 (cf. Wedel 1986:Table 3.1). A climatic deterioration is postulated to have occurred during the following centuries. About AD 1550, conditions are thought to have improved once again during the Neo-Boreal episode.

The collection of paleo-environmental data from Plains Village sites in the basin will aid in clarifying the current climatic model. Future excavations at sites

such as the Koehler site (32GT1) will provide an excellent opportunity to examine climatic change for sites located off the Missouri River Trench. The cultural deposits at the Koehler site were encountered in a light-colored silt layer (Zone D) comprising a number of thin, discontinuous lenses of darker earth (Cooper 1958:16). Unfortunately, absolute dating techniques were not commonplace when the site was excavated.

Cultural Chronology

As in most other study units, with the possible exceptions of those far removed from the Missouri River and James River valleys, Plains Village components of all time periods can be expected to occur in the Heart River drainage. Sites dating to the era of the Heart River phase in the upper Knife-Heart region (ca. 1400-1710) may be expected to be most common because the population density of the Villagers was probably densest during that era. Many of the Plains Village sites investigated in the basin do indeed date to this era which is also mostly contemporary with the “Terminal variant of the Middle Missouri tradition” in the Cannonball region and lower portion of the Knife-Heart region (Lehmer 1971) or Huff focus (Wood 1967) and Fort Yates phase (Thiessen 1976) combined (cf. Gregg 1985c:Figure 31). The Boulder site hunting camp (32MO72) yielded a radiocarbon date (UCR-1628) which, when corrected and calibrated, indicates Plains Village occupation during the period AD 1405-1695 (Billeck 1983e:741). Early Heart River Phase ceramics were recovered during testing at the Beadmaker site (32GT238) (Jackson et al. 2001:10.1). A radiocarbon date range (ca. AD 1480-1650) for the Beadmaker site correlates with the diagnostic materials (ibid.:10.32). The Koehler site and other sites in the Heart Butte Reservoir locality appear to be of similar antiquity based on cross dating of pottery vessel styles (cf. Cooper 1958:plates; Johnson 1983:9.44). How does the Plains Village cultural chronology for the interior Heart River basin differ from that of the upper Knife-Heart region?

Settlement Behavior

The Heart River basin interior was probably used by the Villagers generally in the same manner they used other major tributary basins. This use has been described summarily by Wedel (1961:160): “These valleys have so far disclosed...few evidences of fixed towns and villages; but scattered campsites suggest that they furnished routes of travel for small groups engaged in hunting, trading, raiding, and other...short-term activities” such as durable raw material procurement. Were interior basin localities ever used for residential base purposes?

Native Subsistence Practices

The Koehler site (32GT1) faunal assemblage consisted primarily of bison (*Bison bison*) and dog (*Canis familiaris*); other identified mammal remains included beaver (*Castor canadensis*) (Cooper 1958:31-32). Freshwater mussels

were also well represented in the collection; five species were identified including *Quadrula quadrula* and *Amblema costata* which had not been known to occur in the Missouri River or its tributaries (cf. Cvancara 1983:Table 1). Horse bones and other Euro-American trade materials were not found during excavations. Botanical remains and other evidence of gardening (e.g., scapula hoes) were not present. The overall composition of the faunal inventory is concordant with remains expected at a hunting camp (cf. Hurt 1969).

The Plains Village component tested at the Boulder site contained large quantities of bison remains along with some small mammal and bird bones (Billeck 1983e:761-763). This site too has been interpreted as a Plains Village hunting camp.

Floral remains recovered from the Beadmaker site (32GT238) include 49 burnt seeds (Jackson et al. 2001:10.66). Investigators suggest that activities at the site may have included use and/or processing of maize, wild grasses, and wild berries. A maize kernel underwent AMS radiocarbon analysis. The result is an uncalibrated age of 230 ± 35 years BP. Did the Villagers do any gardening in the Heart River basin upriver from the Missouri?

Technologies

“Bone uprights,” most commonly associated with Besant/Sonota components, also occur in Plains Village sites where they functioned as pegs, wedges, and possibly even anvils upon which marrow and grease bones were broken up for processing (cf. Billeck 1983e:742-746).

Plains Villagers occupying the Koehler site made and used a number of bone and antler tools. Identified forms include awls, spatulates, fleshers, a perforated rib tool, and a bone bead (Cooper 1958:Table 1). The majority of these items were likely used in hideworking and stone tool manufacture.

Seventeen stone bead artifacts, including one finished bead, 14 bead fragments, two bead blanks, and three pieces of manufacturing debris, were recovered from the Beadmaker site (32GT238) (Jackson et al. 2001:10.48). The majority of the beads came from hearth fill (ibid.). Made from a locally available silty mudstone, the items are disk-shaped with a central hole (ibid.). The beads recovered at the Beadmaker site closely resemble those from the Koehler site, On-A-Slant Village (32MO26), and Huff Village (32MO11) (ibid.:10.54).

Plains Village groups undoubtedly undertook a variety of activities at campsites away from their earthlodge village locations. Lithic procurement and stone working of KRF were well represented at the Boulder site (Billeck 1983e). Plochman et al. (1982:Table 6.3) also identified a number of lithic procurement/workshop sites around the Heart Butte Reservoir.

One of the hallmarks of the Plains Village lifeway was the production of well-made ceramic containers (cf. Cooper 1958:Plates 6, 7). Pottery samples from other sites in the basin such as 32MO72 (Billeck 1983e) are too small to draw many meaningful comparisons. Are there technologically diagnostic attributes of Plains Village ceramics such that small samples of body sherds from campsites could be identified as Plains Village?

Artifact Styles

The Plains Village stone tool aggregate from the Koehler site contains many patterned forms which are nearly identical to those from Heart River phase villages attributed to the Mandan near the Missouri-Heart River confluence (Cooper 1958:29). These include On-A-Slant and Double Ditch (32BL8). Small well-made side-notched arrowpoints are a frequent occurrence. The asymmetrical bifacial cutting tool is also very common (Cooper 1958:Plate 9). Pottery remains recovered from the Koehler site share stylistic similarities in rim form and decorative attributes with Le Beau ware vessels from On-A-Slant Village (cf. Breakey and Ahler 1985:Figure 2; Cooper 1958:25-26). How would it be possible to test the hypothesis that Mandan people from On-A-Slant village were the occupants of the Koehler site?

Regional Interaction

Plains Village social interactions during prehistoric times, prior to the advent of the Fur Trade and the introduction of the horse, likely were dominated by contacts with neighboring earthlodge village communities. Lithic resources necessary for stone working were locally available. Sources of clay materials for making pottery were also found locally. What did the Villagers need which could be acquired only by long-distance trade?

Historic Preservation Goals, Priorities, and Strategies

An effort should be made to build a Plains Village cultural chronology for the Heart River basin and compare it to the chronology for the upper Knife-Heart region. Were the Plains Village cultural developments of the Knife-Heart region paralleled in the Heart River basin? Stratified, multiple component Plains Village deposits in floodplain alluvial contexts would be ideally suited for such studies.

Equestrian/Fur Trade Period

The Equestrian Period in the HRSU virtually is unknown archeologically. This condition of the archeological record is much the same as reported by Paul Cooper (1947:2) during preliminary reconnaissance in the Dickinson area over 40 years ago.

Paleo-Environmental Modeling

During the period AD 1780-1880, what were the climatic conditions and floral and faunal resource potentials of the HRSU?

Cultural Chronology

During early historic times, the western reaches of the Heart River basin would have been frequented by various equestrian groups including Villagers from the Missouri River, the Crows, and the Teton Dakota (Cooper 1947:3). The earthlodge villages near the present-day Bismarck-Mandan community are thought to have been abandoned as a consequence of late 18th century depopulation resultant from plagues of European diseases which ravaged the sedentary village communities. What is the nature of material cultural complexes typical of native peoples who utilized the HRSU during this period?

Settlement Behavior

Stone circle sites are a common occurrence in the HRSU. Surely, some of these locations were repeatedly occupied by Equestrian groups during this general time span. What was the nature of native settlement here during the Equestrian period?

Native Subsistence Practices

Equestrian lifeways are often linked in peoples' minds with bison hunting on the northern Great Plains (Bamforth 1988:97). In other regions of North Dakota such as the Souris River, James River, and Sheyenne River study units, bison bone was a common occurrence on the prairies before it was gathered up between 1880 and 1910 by Euro-American settlers (Barnett 1972; Hecker, SHSND archives). Historic documents should be reviewed in an attempt to identify bone collecting locations in the Heart River basin which might have been the sites of Equestrian period bison kills. These sites could then be excavated to recover information concerning a variety of Equestrian period research topics.

Technologies

The horse and gun, along with a vast assortment of other items of Euro-American origin, were available to Northern Plains groups by the late 18th century (cf. Secoy 1953). Equestrian period sites are often identified by the recovery of trade goods such as gunflints, brass or iron arrowpoints, and glass beads. Villages along the Missouri River were focal points for receiving and distributing Euro-American goods in the fur trade (cf. Wood 1972). What were the changes in the technologies of nomadic equestrian groups during the 100 year duration of the Equestrian period?

Artifact Styles

Distinctive stylistic elements of Native American origin dating to the Equestrian period are seen in hide paintings, winter counts on rawhide, petroglyphs and pictographs depicting horses and guns, and ledger book art. Some of these stylistic elements may have been incorporated in beadwork and quillwork, but these are not the sorts of artifacts preserved in open-air archeological sites in the Northern Plains. Are there any distinctively styled artifacts produced by Native Americans and diagnostic of Equestrian period groups in the HRSU?

Regional Interaction

Regional trade centers such as Fort Union and Fort Clark could have supplied some of these Native groups with goods of Euro-American origin in exchange for bison hides. Inter-tribal exchange relations were also far-flung during this period (cf. Wood 1972, 1974). This may be the only time period for which artifactual remains of nonlocal origin are more important for chronological considerations than artifacts produced within the Study Unit.

Historic Preservation, Goals, Priorities, and Strategies

A sample of Equestrian period sites will some day be identified in the Heart River basin. Artifact content and information potentials ought to be assessed. Any site with potential to add information to these contexts should be considered eligible for listing in the NRHP. A review of historic records and documents could provide leads to sites of this period in the Heart River basin.