The Knife River Study Unit

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The Knife River Study Unit (KRSU) has the greatest density of prehistoric sites in the state because the primary source area for Knife River flint (KRF) is here. Settlements with activity areas partially or entirely devoted to the procurement and initial processing of KRF abound in the area. Additionally, the Knife River basin was used heavily for hunting and gathering wild plant foods and other materials by large populations of Plains Village peoples whose residential bases were concentrated along the Missouri River immediately to the east. Also, paralleling other southwestern North Dakota drainages, most of the KRSU has been free of glacial ice and open for exploitation throughout all of prehistory. It has surely witnessed at least intermittent human occupation since people first came to the Northern Plains, and reports of Clovis point surface finds seem to affirm that.

Description of the Knife River Study Unit

The KRSU covers about 2,445 mi^2. Maps are presented in Figures 3.1 and 3.1A followed by a complete listing of townships included within the Study Unit (Table 3.1). The use of straight township lines rather than the meandering drainage divide lines results in the exclusion and inclusion of a number of sites situated on the Knife-Missouri, Knife-Little Missouri, and Knife-Heart divides. For example, Boeckel-Renner (32ME799) on the Knife-Missouri divide (Artz 1989b) is within the KRSU while 32DU99 on the Knife River side of the Knife-Little Missouri divide (Meier 1983b) is assigned to the Little Missouri River Study Unit. Portions of Billings, Dunn, Mercer, Morton, Oliver and Stark counties are within the KRSU.

Physiography

The terrain is flat or gently rolling prairie with occasional buttes in the headwaters areas, and it is roughly broken near the drainages. The elevation varies from about 2,600 ft at the headwaters to about 1,660 ft at the confluence with the Missouri River near Stanton, North Dakota. The eastern portion of the unit is discontinuously covered with a mantle of Pleistocene glacial till and outwash sediments (Bluemle 1977b). Broadly cut late Pleistocene glacial meltwater channels run here and there mainly across northern portions of the basin (cf. Bluemle 1977b; Clayton 1980). In the western portions of the unit, outside of valleys filled with Holocene alluvium, surfaces are weathered bedrock of several formations. Sentinel Butte Formation silt, sand, clay, sandstone, lignite, baked clay, and limestone predominate (ibid.). There are also some remnants of White River Group and Golden Valley Formation silt-stones, claystones, sands, and other Eocene and Oligocene lacustrine and alluvial

Figure 3.1: Map of the Knife River Study Unit.

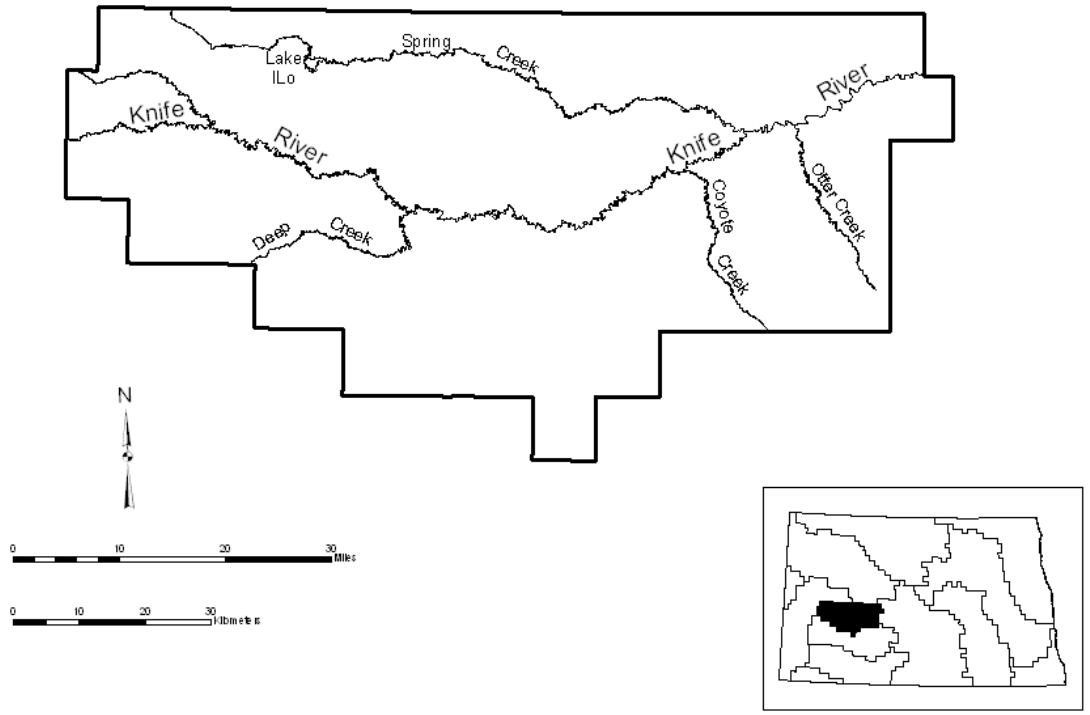

Figure 3.1A: Shaded relief map of the Knife River Study Unit.

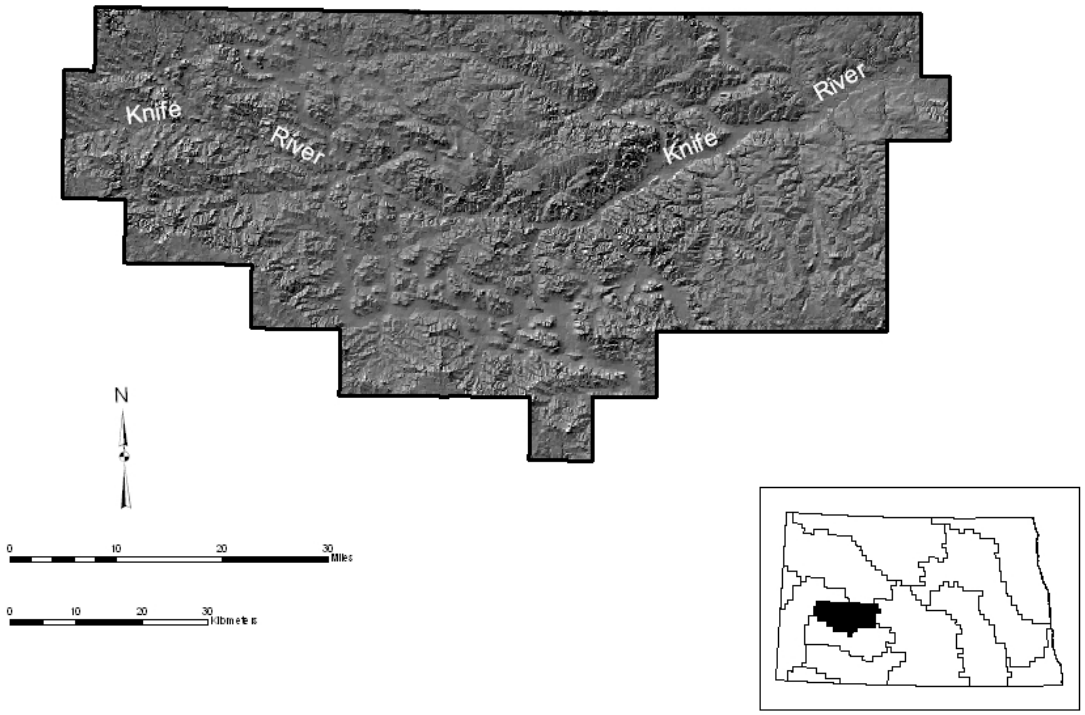

Table 3.1: Townships in the Knife River Study Unit.

TOWNSHIP	RANGE
139	91
140	90
140	91
140	92
140	93
140	94
141	86
141	87
141	88
141	89
141	90
141	91
141	92
141	93
141	94
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144	86
144	87
144	88

TOWNSHIP	RANGE
144	89
144	90
144	91
144	92
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144	94
144	95
144	96
144	97
144	98
145	85
145	86
145	87
145	88
145	89
145	90
145	91
145	92
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145	94
145	95
145	96
145	97

sediments. Few of the sandstone formations are sufficiently massive and stable to have been used for rockshelter settlements or art panels. However, rock art can be expected on durable stone exposures such as at the Voegele Petroglyph site (32ME113) where there were deeply grooved linear and hand motifs on a sandstone boulder atop a knoll (HPD, site form).

Drainage

The Knife River valley is about 90 miles long with a drop of about 13.5 feet per mile in the first 33 miles and 3.8 feet per mile for the next 57 miles with an overall average drop of about 10.4 feet per mile. The main tributary of the Knife River is Spring Creek with a drainage area of about 570 miles. Spring Creek's headwaters are in the Killdeer Mountains at an elevation of about 3,300 ft. This stream drops about 25 feet per mile in the first 14 miles, and between the towns of Killdeer and Beulah it drops an average of about 6.75 feet per mile (NDSPB 1937). The KRF primary source area, where an excellent quality brown, translucent, crypto-crystalline silica was collected and surface mined from early in North Dakota prehistory, is centered along this stream. Another tributary of the Knife River is the Little Knife River which drains an area of about 275 miles.

Climate

The annual precipitation is about 15 inches, most of it falling as rain between May and September. The ground is often snow-covered from mid-November to mid-April. Stream flows are greatest during the spring thaw. Most streams usually dry up in the summer. Springs flow from veins of lignite and Fort Union Formation sandstone strata in places (NDSPB 1937).

Landforms and Soils

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/

In order to know where to expect archeological sites, it is important to have an understanding of early Holocene landforms, especially in stream valleys within this Study Unit. Alluvial geomorphology has been an important research concern of test excavation projects in the KRF quarry area since the 1980s (see Root et al. 1986:486-503 for a summary). In a number of tested locales, KRF quarry pits were encountered in the lower levels of the excavations in places

where such pits were imperceptible from the surface. These Paleo-Indian and Early Archaic age surface mining pits had been filled in and completely leveled over by mid-Holocene and late-Holocene aeolian and alluvial sedimentation (cf. ibid.:409).

Flora and Fauna

Chokecherry *(Prunus virginiana),* juneberry *(Amelanchier alnifolia),* buffaloberry *(Shepherdia argentea),* and several kinds of currents and gooseberries *(Ribes* sp.) are fruit bearing shrubs found in this area. Cottonwoods *(Populus deltoides),* box elder *(Acer negundo),* green ash *(Fraxinus pennsylvanica),* quaking aspen *(Populus tremuloides),* Rocky Mountain red cedar *(Juniperus scopulorum),* burr oak *(Quercus macrocarpa),* and a small variety of paper birch *(Betula papyrifera)* are the major types of trees. Indian breadroot, an important native food, is common on the prairie.

Local faunal resources during prehistoric times regularly included bison, elk, mule deer, white-tailed deer, antelope, foxes, badgers, coyotes, raccoons, rabbits, skunks, and occasionally included moose, grizzly bear, wolves, and beavers (Bailey 1926). The most numerous fish in the Knife River and Spring Creek today are suckers, catfish, perch, walleyed pike, and northern pike. Large northern pike run up Spring Creek into the KRF primary source area to spawn after the spring thaw when water levels rise.

Other Natural Resource Potential

The most prominent natural resource here, and perhaps in all of North Dakota, is Knife River flint. While this flint has been known for over 10,000 years and was the resource for which the Knife River was named, the article in *Plains Anthropologist* by Clayton, Bickley, and Stone in 1970 marked the beginning of serious, academic attention to KRF. As with many of the most prominent aspects of North Dakota archeology, threats of destruction provided the impetus for intensive archeological investigations here when the quarry heartland was targeted for strip mining and construction of a lignite gassification complex with associated roads, powerlines, water pipelines, gas pipelines, and other ancillary developments (cf. Greiser and Greiser 1981; Loendorf et al. 1976, 1984). In the early 1980s, the Bureau of Land Management (BLM; controlling the mineral rights throughout much of the KRF quarry area) and the State Historic Preservation Office (SHPO) took active roles in promoting and financially supporting archeological site inventories and site significance evaluation projects. That support resulted in a series of detailed investigations into KRF as a natural resource and KRF procurement/workshop sites as cultural resources reported by Ahler (1986), Ahler and Christensen (1983), Artz and Ahler (1989), Kay and Van Nest (1984), Root et al. (1985, 1986), Root and Van Nest (1985), William (1988), and others.

With this flurry of work in the 1980s, KRF itself become central to a variety of research concerns. The following research questions were enumerated by Loendorf et al. (1984:15-18) in *North Dakota History*:

> Geologic Context of Natural KRF. What is the natural geologic context of KRF in surface and subsurface deposits in the primary source area? Did the geologic context of deposition of KRF affect its intensity of use, and which of the various types of natural occurrence of KRF were most or least intensively used in the past? Much needs to be learned in order to understand prehistoric preferences for one source location over another.
>
> Quantity of Flint Removed from the Area. What quantity of KRF has been removed from the ground and processed in individual and cumulative quarrying operations in the KRF primary source area? The answer to this question, together with information about site chronology and settlement patterns, will allow assessment of the overall significance of KRF as a lithic resource and the total human effort expenditure devoted through the ages to its extraction and distribution.
>
> Age of the Quarries. For how long have the subsurface quarries in the KRF primary source area been used? When was the first major episode of quarrying conducted in the source area, and by whom? The maximum age of the quarries remains a mystery which can only be solved by analyses of artifacts and other materials recovered from well-controlled and dated subsurface archeological contexts.
>
> Temporal Change in Intensity of KRF Use. How has the general level of intensity of exploitation of KRF changed through time, particularly that taken from subsurface quarries? Were there major periods of time when quarrying activities were most intensive and extensive, and other periods when little use of subsurface KRF occurred? If fluctuations in the intensity of use of KRF did occur, did they correlate with regional or continent-wide cultural developments?
>
> Quarrying Techniques and Effort Expenditures. What kinds of excavation techniques were used to prospect for and extract KRF from subsurface deposits? What kinds of digging tools were used, and what kinds of labor expenditures were involved in various geologic contexts? Did quarrying techniques change with time? Did KRF become measurably more scarce with time, and did later groups expend greater energy in its extraction than earlier groups?

Climatic Change and Quarrying of KRF. It is widely assumed that the KRF primary source area was subjected to a general rise in mean annual temperature and possibly a decrease in mean annual precipitation during the mid-postglacial period. Did this climatic change actually occur in the KRF primary source area? Was the change severe enough to affect surface vegetation cover, surface erosion patterns, natural exposure of KRF cobbles, and related quarrying and settlement patterns? Holocene climatic change has not been demonstrated for the primary source area, and speculations about its occurrence are based on general concepts of geomorphology integrated with climatic change models developed from data far outside the area.

Flintknapping Technologies Used with KRF. What flintknapping technologies and reduction sequences were used with KRF by the prehistoric inhabitants of the area? Once KRF cobbles were taken from the ground, what testing procedures and flaking procedures were used to produce usable artifacts? The key to answering this series of questions lies in the innovative application of new forms of technological analysis to both cores and flaking debris obtained from controlled excavations at sites within the KRF primary source area.

Lithic Reduction Technologies and Settlement Systems in the Source Area. Where were KRF flintknapping operations implemented with reference to different sorts of settlements? How did these activities integrate and correlate with other activities not specifically aimed at use of KRF (e.g., hunting, subsistence pursuits, etc.)? In other words, what is the function or range of functions for the individual component and sites in the primary source area, and how are the sites associated with a single group of people or a single time period functionally integrated with each other to form a settlement system? The key to studying these questions is accurate and objective functional classification of individual archeological components and sites in the primary source area.

Settlement System and Resource Distribution Links with Outside Areas. On a given time level, how did the settlement systems within the KRF primary source area integrate with settlement systems for the same or contemporaneous cultural groups outside the source area? Was the use of the KRF source area controlled, and was the control from the outside or by groups residing directly within the area? How was KRF distributed to its intermediate and maximal geographic limits throughout the North American continent?

Chronological Change in KRF Flintknapping Technologies and Related Settlement Systems. Did the flaking operations performed with KRF and the intended lithic end products change through time? Can such change or lack of change be explained with reference to regional or continent-wide cultural evolution, continent-wide technological innovations (such as the introduction of the bow and arrow or horticulture), or the diffusion of major religious/ceremonial complexes?

Historic contexts, geomorphic contexts, and historic preservation concerns involving KRF have been written about more and in greater detail than any other class of contexts and concerns in North Dakota archeology. Please refer to Ahler (1986:16-23), Kay and Van Nest (1984:201-227), and Root et al. (1986:565-617) for extensive summary treatments of research topics and cultural resource management considerations regarding KRF and archeological sites in the KRF primary source area. Many of the concerns treated by those authors have broader applications which can be extended beyond the primary source area.

The KRSU truly is rich in lithic raw materials. In addition to KRF, other stones include porcellanite, various forms of petrified wood, and coarse porous quartzite. Also, "a silcrete indistinguishable from the coarser varieties of TRSS is 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).

Overview of Previous Archeological Work

Work in the KRSU could be viewed as the most productive in the state because (1) more sites have been recorded per inventory project, and (2) more sites have been test excavated per unit area than anywhere else in North Dakota. This is primarily the result of implementation of the federally mandated Section 106 process in areas to be strip mined for lignite and along pipeline transects coupled with high site densities in areas where KRF naturally occurs.

Inventory Projects

As of 13 September 2007, there were 1,348 archeological sites and 638 archeological isolated finds and site leads in the state site data file for this Study Unit. With an area of 2,445 mi^2, this unit ranks first in western North Dakota with one recorded site per 1.8 mi^2. This is a result of the unit's relatively small size coupled with the extensive areas that have been intensively inventoried ahead of prospective strip mining and ancillary developments.

Table 3.2 presents a cross tabulation of data for recorded sites by the landforms upon which the sites are situated. A reader gets two immediate impressions of the data from the site files: (1) several gross patterns of recorded

Table 3.2: Feature Type by Landform of Archeological Sites in the Knife River Study Unit, 13-Sept-2007.

	Cultural Material Scatter	Earthlodge Village	Earthworks	Grave	Hearth	Mound	Other Rock Features	Pit	Quarry or Mine	Rock Art	Rock Shelter	Stone Circle	Trail	Misc.	Total
Beach or riverbank	10			1	1		1	1							14
Draw	25						2		1			2			30
Upland plain	117		1			1	14	1	4			21	1	2	162
Floodplain	32								1						33
Hill - Knoll - Bluff	458		1	3	9	3	98	8	45	1	1	116		3	746
Ridge	207			3	5	2	122	12	14			165	1	1	532
Saddle	8						5					6			19
Spur	19						6					8			33
Swale	6						1					1			8
Terrace	113				2		4		3			7		1	130
Alluvial fan	1														1
Butte	5						1	1	2			2			11
Foot slope	31	1	1	1	1	1	1	2	8			1		1	49
Other	33				1		2		2			4			42
Total	1065	1	3	8	19	7	257	25	80	1	1	333	2	8	1810

site characteristics are readily apparent, and (2) there is a great deal of missing data and bare-minimum data indicating needs for site recorders to code data in greater detail in the future.

Regarding gross patterns of site characteristics, (1) most recorded sites are on elevated landforms such as hills, ridges, and upland plains where archeological deposits are most readily detected because they are laid bare by erosion and deflation; (2) the numbers of sites along river banks and on floodplains are surely underrepresented due to burial of such site deposits by alluvial sedimentation; and (3) the solid representation of stone circle sites and other stone features is evidence that a significant percentage of the Study Unit remains in native prairie.

Regarding missing data and bare-minimum data, cultural/temporal affiliations surely are not recorded in as detailed a manner as they might be. Many more Paleo-Indian complexes are represented in the sample of recorded cultural resources than are indicated by the site file data (Table 3.3). Folsom, Plano (in the form of Scottsbluff, Eden, and Alberta), and Post-Plano (in the form of Frederick and Pryor Stemmed) are certainly represented in the KRF quarry area (cf. Ahler and Christensen 1983:Figure 38; Root et al. 1986:428). Secondly, Plains Village components should be much better represented than they are. Ten Plains Village components are recorded, yet there must be scores in the recorded site sample. There may be hesitancy to code sites with Plains Side-Notched points as Plains Village if readily identifiable Plains Village potsherds are not observed.

Several large areas within the KRSU have been intensively surveyed. They are (1) western portions of the Glenharold lignite mine, (2) Coteau Properties' areas, (3) Nakota's prospective mine and gas plant area in the KRF primary source area, (4) several other lignite mine areas and conversion facilities such as Indianhead mine, the South Beulah mine, the Coyote Station electric power plant, and the Antelope Valley gassification facility, and (5) the Lake Ilo National Wildlife Refuge.

Several of the most intensive surveys and resurveys in state archeological history took place in the 1970s and 1980s in the KRF primary source area. This work was prompted by plans of a private developer to create a lignite strip mine and a lignite-to-methanol conversion plant in the very heart of the KRF quarry area. Reviewing the results of the series of surveys in the KRF primary source area is like reviewing refinements in site survey methodology during those two decades. The initial survey recorded a seemingly large number of sites: 144 sites in 13,200 ha (Loendorf et al. 1976). The next survey identified more sites (49 in 4,000 ha) and began struggling with the problems of defining and identifying site boundaries in this area of sprawling, complex sites and intensive prehistoric land use (cf. Greiser and Greiser 1981; Root et al. 1986:505-512). Site boundary considerations have since become much more precise. Surface and subsurface artifact distributions could be viewed as nearly continuous throughout much of the KRF primary source area (cf. Steinacher 1982). Table 3.4 lists survey and

Table 3.3: Cultural/Temporal Affiliation of Archeological Resources in the Knife River Study Unit, 13-Sept-2007.

Paleo-Indian	
Unspecified	16
Clovis	2
Folsom	1
Plano	7
Total	**26**
Archaic	
Unspecified	32
Early Large Side-Notched	5
Oxbow	7
McKean/Duncan/Hanna	44
Pelican Lake	37
Total	**125**
Woodland	
Unspecified	80
Early Woodland	2
Besant/Sonota	36
Middle Woodland	2
Late Woodland	1
Avonlea	8
Total	**129**
Plains Village	
Total	**10**
Plains Nomadic	
Total	**5**
Historic	
Unspecified	10
Euro-American	4
Other	1
Total	**15**
Unknown	**1,765**

Table 3.4: From Artz and Ahler (1989:Table 2).

Summary of reports and publications relevant to the study of Knife River flint and the primary source area (from Ahler 1989:15).

Reference	Major Contribution
Dealing Directly with KRF or the Primary Source Area	
Wilson 1908-1918 (Weitzner 1979:240)	* discussion of Hidatsa use of the KRF quarries
Crawford 1936	* the first published description of the KRF quarries
Bowers 1965:120, 166	* discussion of Hidatsa use of the KRF quarries * Hidatsa arrowpoint making with KRF
Clayton et al. 1970	* accurate documentation of major KRF quarry areas * description of typical quarry pits and sites * detailed description of geologic origin of KRF
Loendorf et al. 1976	* survey of 13,200 ha in KRF primary source area, 144 sites discovered * backhoe trenching of two KRF quarries
Greiser & Greiser 1981	* sample survey of 4000 ha in KRF primary source area, 49 sites recorded * modeling of site distributions in KRF quarry area
Stanfill et al. 1983	* probing and sampling at 32 sites in the study area
Steinacher 1982	* survey within the Lynch KRF historical district, site boundary definition
Ahler & Christiansen 1983	* first controlled excavation in a KRF quarry and workshop, reported herein * analytic procedures for KRF quarry area samples, reported herein
Ahler 1983	* heat treatment in KRF, feasibility and detection
Kay and Van Nest 1984	* test excavation at four nonquarry sites in the primary source area * documents buried deposits in varied contexts * documents Paleoindian through Late Prehistoric in situ deposits
Loendorf et al. 1984	* documents the significance and content of the Lynch Knife River Flint Quarry National Historic District * distribution of KRF beyond the primary source area * discounts other major sources reported for KRF
Root & Ahler 1984	* documents first in situ Paleoindian projectile discovery in ND, in the primary source area
Ahler & Van Nest 1985	* documents chronological change in KRF reduction strategies in the primary source area
Root & Van Nest 1985	* test excavation at 10 quarry and nonquarry sites * documents Paleoindian through late occupation at several sites * Holocene sedimentary record documented at several sites
Root et al. 1985	* documents Paleoindian through Late Prehistoric workshop activity and changing depositional conditions
Root & Ahler 1985	* Holocene environmental change and changing reduction strategies in the primary source area
Clark 1985	* documents private projectile point collections in the study area * patination/age relationships in KRF * changing intensity of use of the primary source area
Van Nest 1985b	* patination in KRF artifacts
Studies in Areas Peripheral to the Primary Source Area	
Lehmer 1954	* KRF occurrence in Plains Village tradition sites in South Dakota
Johnson & Roper 1974	* KRF occurrence through time in Eastern Montana
Neuman 1975	* documents significance of KRF in Woodland Sonota complex
Leaf 1976	* KRF occurrence at sites on the Sakakawea Reservoir
Ahler 1977b	* documents significance of KRF in certain Plains Village tradition sites in South Dakota
Syms 1977	* documents significance of KRF in Sonota and other sites in Manitoba
Leaf 1979	* bipolar reduction strategies applied to KRF
Braun et al. 1982	* documents occurrence of KRF in Middle Woodland sites in the Midwest
Frison & Stanford 1982	* KRF in Folsom and Agate Basin components * distinction between KRF and South Dakota stones
Root 1983 (ed.)	* KRF workshop activities at a site just south of the primary source area
Clark 1984	* KRF exchange and movement into the Woodland period Midwest
C. Johnson 1984	* KRF occurrence in Plains Village tradition sites in South Dakota
Keuhn 1984	* KRF workshop activities at an Early Archaic site near the Killdeer Mountains
Artz 1985b	* KRF procurement and reduction north of the Killdeer Mountains, outside the primary source area

other reports and publications relevant to the study of KRF and the KRF primary source area prepared by Ahler (1986:15) and reprinted from Artz and Ahler (1989:17-19).

Currently, the North Dakota Department of Transportation (NDDOT) is sponsoring a project concerning the KRF primary source area, centered on ND Highway 200. The working title of the project is *KRF Predictive Model: Resource Distribution and Use through Time in Dunn and Mercer Counties, North Dakota* (Metcalf et al. 2009; see Other Works section below). The following is an annotated bibliography compiled by Damita Hiemstra for the forthcoming project report.

Figure 3.2: *Annotated Bibliography* from *KRF Predictive Model: Resource Distribution and Use through Time in Dunn and Mercer Counties, North Dakota*. Courtesy of Damita Hiemstra, Metcalf Archaeological Consultants, Inc., Bismarck, North Dakota. (MS# refers to a manuscript on file at the SHSND).

Annotated Bibliography from *KRF Predictive Model: Resource Distribution and Use through Time in Dunn and Mercer Counties, North Dakota*

Aaberg, S. and K. Deaver
1991 *Preliminary Report Dakota Star Reserve Archaeological Site Testing Project, Mercer County, North Dakota*, Prepared by Ethnoscience, Billings, Montana, for Coteau Properties Company, Bismarck, North Dakota. MS#5682.
*Sites 32ME1214, 32ME1234, 32ME1245, 32ME1087, 32ME1089, 32ME1213, 32ME1243, 32ME1246 mentioned. Only site 32ME1089 was discussed--limited excavation and limited data resolution.

Aaberg, S. and K. Deaver
1991 *Testing and Evaluation of Nine Prehistoric Sites in Permit D Area, Coteau East Mine, Mercer County, North Dakota*. Prepared by Ethnoscience, Billings, Montana, for Coteau Properties Company, Bismarck, North Dakota. MS#5932.
*All sites are outside of the primary source area. 32ME556, 32ME559, 32ME560, 32ME562, 32ME563, 32ME565-32ME568, 32ME1087, 32ME1089, 32ME1213-32ME1214, 32ME1234, 32ME1243, 32ME1245-32ME1246, 32ME1327.

Ahler, S.
1982 *Progress Report Concerning Archeological Investigations at the Cross Ranch in the Knife River Flint Quarry Area, Dunn County and Oliver County, North Dakota*. Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for the State Historic Preservation Office, Bismarck, North Dakota. MS#2750.
*Limited data and excavation about 32DU508, as testing was conducted in order to determine its boundaries with 32DU510 and 32DU511.

1983 Heat Treatment of Knife River Flint. *Lithic Technology* 12(1):1-8.
*Sets the macroscopic criteria by which heat-altered KRF can be recognized in the archeological record.

1986 *The Knife River Flint Quarries: Excavations at Site 32DU508*. State Historical Society of North Dakota, Bismarck.

Ahler, S. and J. Artz
1989 *Non-Technical Summary Report on Further Evaluation of the Alkali Creek Archeological Site, 32DU336-SEE, Dunn County, North Dakota*. Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for the USDA Soil Conservation Service, Bismarck, North Dakota. MS#4708.
*Good data resolution and stratigraphic data.

Ahler, S., R. Christensen and C. Falk
1983 *A Pilot Study of Knife River Flint Procurement and Reduction at Site 32DU508, a Quarry and Workshop Location in Dunn County, North Dakota*. Prepared by Department of Anthropology, University of North Dakota, Grand Forks for the Bureau of Land Management, University of North Dakota, and National Park Service. MS#2658.
*Precursor to Ahler's 1986 work. This is the first well-documented subsurface excavations in the KRF PSA.

Ahler, S., E. Hajic, J. William and K. Karsmizki
1991 *National Register Evaluation of Prehistoric and Historic Archeological Sites at Lake Ilo National Wildlife Refuge, Dunn County, North Dakota*. Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for GEI Consultants, Inc., Englewood, Colorado. MS#5342.
*Sites 32DU953-32DU955, 32DU958-32DU959, 32DU964-32DU966, 32DU968-32DU969, and 32DU972. Discussion of significance, not data. Some information on density percentages and other qualitative information.

Ahler, S. and J. Van Nest
1985 Temporal Change in Knife River Flint Reduction Strategies. In *Lithic Resource Procurement: Proceedings from the Second Conference on Historic Chert Exploitation*, edited by S. Vehik, pp. 183-198. Center for Archaeological Investigations, Occasional Paper No. 4. Southern Illinois University, Carbondale.

Artz, J.
1985a *Prehistory in Halliday: A Cultural Resources Survey of an RC & D Flood Prevention Project at Halliday, Dunn County, North Dakota*. Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for the USDA Soil Conservation Service, Bismarck, North Dakota. MS#6063.
*Field numbers given; no SITS numbers. Good data resolution.

1985b Prehistoric Procurement and Use of Knife River Flint Near the Killdeer Mountains, North Dakota, in *Journal of the North Dakota Archaeological Association* 2:120-139.

1987 *The Geomorphology and Stratigraphy of the Southeast Extension Area of Archeological Site 32DU336, Halliday, Dunn County, North Dakota (Draft)*. Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for the USDA Soil Conservation Service, Bismarck, North Dakota. MS#4467.
*Good source for stratigraphy and soils.

Artz, J. and S. Ahler
1989 *Further Evaluation of the Alkali Creek Archeological Site, 32DU336-SEE, Dunn County, North Dakota*. Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for the North Dakota State Office, Soil Conservation Service, USDA, Bismarck. MS#4799.
*Good data resolution.

Artz, J., C. Haury, D. Kuehn, R. Fox, Jr. and K. Schweigert
1987 *Southwest Pipeline Archeology: An Intensive Survey for Cultural Resources in Ten Counties of Southwestern North Dakota, Adams, Bowman, Hettinger, Grant, Stark, Billings, Morton, Golden Valley, Dunn, and Mercer*. Prepared by Department of Anthropology, University of North Dakota, Grand Forks, for North Dakota State Water Commission, Bismarck, North Dakota. MS#4247.
*Lots of sites, little data resolution.

Artz, J., E. Hayden, C. Haury, J. Arndt and D. Hopkins
1989 *Southwest Pipeline Archeology: The 1987 Survey and Test Excavation Programs at Prehistoric Sites in Mercer and Dunn Counties, North Dakota (Segments A and B2)*. Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for the North Dakota State Water Commission, Bismarck. MS#5097
*All of the sites are within the primary source area; sites 32DU197, 32DU368; 32DU321 and 32ME792 were excavated; discussion of sites 32DU364-32DU367 and 32DU375 includes systematic surface information.

Artz, J. and L. Loendorf
1987 *Southwest Pipeline Archeology: Further Investigations at the Goodman Creek (32ME796) and Boeckel-Renner (32ME799) Sites, Mercer County, North Dakota*. Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for the North Dakota State Water Commission, Bismarck. MS#4270
*Good data resolution; 32ME799 is outside of the primary source area.

Artz, J. and K. Schweigert
1986 *Southwest Pipeline Archeology: Testing and Evaluation of 15 Sites in Mercer and Dunn Counties, North Dakota (Segments 1, B-1, and B-2), Contribution No. 229.* Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for the North Dakota State Water Commission, Bismarck. MS#3898
*Sites 32DU194, 32DU198, 32DU199, 32DU307, 32DU308, within the primary source area, were excavated with good resolution. Sites 32ME182, 32ME788, 32ME800-32ME803 were excavated with good resolution but area outside of the primary source area.

Bergstrom, J. and K. Deaver
1988 *Mitigation of Site 32ME163, Mercer County, North Dakota*. Prepared by Ethnoscience, Billings, Montana, for Coteau Properties Company, Bismarck, North Dakota. MS#4712.
*Outside of the primary source area.

Bluemle, J. P.
1986 Depth to Bedrock in North Dakota. Miscellaneous Map No. 26. North Dakota Geological Survey, Bismarck, North Dakota.
*Map of varying depths to bedrock at 1:100,000 scale.

Borchert, J.
1984 *Archaeological Investigations for the Basin Electric AVS to Charlie Creek 345 KV Transmission Line, Dunn County, North Dakota.* Prepared by the University of North Dakota Archaeology Research-West, Belfield for Basin Electric Cooperative, Inc., Bismarck, North Dakota. MS#3551.
*Limited excavations of sites 32DU147 and 32DU237. Sites 32DU144 and 32DU782 are outside of the primary source area.

1986 *Archaeological Investigations for the Proposed McKenzie Electric Single Phase Upgrade Through the Lynch Knife River Flint Quarries District, Dunn County, North Dakota (UW#934)*. Prepared by the University of North Dakota Archaeology Research-West, Belfield for McKenzie Electric Cooperative, Watford City, North Dakota. MS#4100.
*Sites 32DU526, 32DU528 and 32DU395. No testing.

1987 *Final Report on Additional Test Excavations at 32ME199, Mercer County, North Dakota*. Prepared by the University of North Dakota Archaeology Research-West, Belfield for Coteau Properties Company, Bismarck, North Dakota. MS#4255.
*Outside of the primary source area.

1988 *32ME1014-1016 Evaluative Testing*. Prepared by University of North Dakota Archaeology Research-West, Belfield for the Knife River Coal Company, Bismarck, North Dakota. MS#4609.
*Outside of the primary source area, along the Beulah trench.

1990 *Preliminary Report Evaluative Testing at 32ME835, UW#1374*. Prepared by the University of North Dakota Archaeology Research-West, Belfield for the Knife River Coal Company, Bismarck, North Dakota. MS#5294.
*Outside of the primary source area.

Borchert, J. and L. Blikre
1992 *Final Report of Evaluative Testing at 32DU1032 UW#1477.* Prepared by the University of North Dakota Archaeology Research-West, Belfield for Kadrmas, Lee and Jackson on behalf of the Dunn County Auditor, Manning, North Dakota. MS#5711.
*Outside of the primary source area, near the eastern flank of the Killdeer Mountains.

Borchert, J., G. Burbidge, G. Wermers and D. Klinner
1989 *Lake Ilo Cultural Resource Inventory, Dunn County, North Dakota*. Prepared by the University of North Dakota Archaeology Research-West, Belfield for GEI Consultants, Inc., Englewood, Colorado. MS#5166.
*Point quarter system for surface, good tool descriptions, no debitage resolution. Sites 32DU953-32DU955, 32DU958-32DU959, 32DU964-32DU966, 32DU968-32DU969, and 32DU970-32DU972. Sites 32DU958, 32DU963, 32DU956, 32DU957 within the primary source area.

Boughton, J., B. Fandrich, L. Litwinionek, L. Peterson, and L. Peterson
2001 *Coteau Properties Company: Testing and Criterion D Evaluation of Prehistoric Sites Located in Permit Extension Areas D and H and the West Permit Area*. Prepared by Ethnoscience, Billings, Montana, for Coteau Properties Company, Bismarck, North Dakota. MS#8531.
*Numerous sites discussed but most are outside of the PSA. Sites within the primary source area: 32ME1492, 32ME1501, 32ME1533, 32ME1534, 32ME1588, and 32ME1589. None have data resolution, very basic testing of stone circle and cairn sites.

Boughton, J. and L. Peterson
1994 *Testing & Evaluation of Prehistoric Sites Within the North Mine Extension Area, Mercer County, North Dakota*. Prepared by Ethnoscience, Billings, Montana, for Coteau Properties Company, Bismarck, North Dakota. MS#6347.
*All are outside of the primary source area. 32ME158, 32ME776, 32ME1346-32ME1350, 32ME1352-32ME1358, 32ME1360-32ME1376, 32ME1378-32ME1388, 32ME1392-32ME1403, 32ME1417, and 32ME1419.

Boughton, J., K. Vander Steen, L.A. Peterson, L.M. Peterson, J. Lieb
1996 *Data Recovery of 13 Sites Located in the North Mine Extension Area, Mercer County, North Dakota*. Prepared by Ethnoscience, Billings, Montana, for Coteau Properties Company, Bismarck, North Dakota. MS#6689.
*All well outside the primary source area. Good resolution. 32ME158, 32ME776, 32ME1357-32ME1358, 32ME1364, 32ME1374, 32ME1376, 32ME1380, 32ME1384, 32ME1387, 32ME1392, 32ME1395, 32ME1402, and 32ME1403.

Burbidge, G. and J. Borchert
1989 *Final Report Evaluation of Eight Sites Dunn County Road, Dunn County, North Dakota*. Prepared by the University of North Dakota Archaeology Research-West, Belfield for Kadrmas, Lee and Jackson on behalf of Dunn County, Manning, North Dakota. MS#4882.
*No excavation; sites 32DU910, 32DU913-32DU918 are within the primary source area.

Christensen, R.
1991 *Instrumental Neutron Activation Analysis of Knife River Flint From the Primary Source Area, Dunn and Mercer Counties: Phase I: Elemental Description and Statement of Variability*. University of North Dakota thesis on file at the State Historic Preservation Office, Bismarck, North Dakota. MS#5621.
*Good source for patination study.

Christensen, R. and D. Kuehn
1986a *Archaeological Testing at Five Sites Along the Golden Valley South Road Improvement, Mercer County, North Dakota*. Prepared by the University of North Dakota Archaeology Research-West, Belfield for Mercer County Commission, Stanton, North Dakota. MS#4156.
*Limited excavation of sites 32ME827 and 32ME829. Basic descriptions of sites 32ME826, 32ME828, and 32ME830. All sites are within the PSA.

1986b *An Evaluation of Archaeological Sites 32ME819 and 32ME834 on the Knife River Coal Company "S-S Tract" and Site 32ME825.* Prepared by the University of North Dakota Archaeology Research-West, Belfield for the Knife River Coal Company, Bismarck, North Dakota. MS#4093.
*Site 32ME825 excavated but may have data resolution issues. The other sites are outside of the primary source area.

Clark, F.
1984a Knife River Flint and Interregional Exchange in *Midcontinental Journal of Archaeology* 9(2):173-198.

1984b *Projectile Points of the Knife River Flint Quarry Area, Dunn County, North Dakota*. MS#3428.

Cochran, S.
1993 *Dunn County Road Improvement: Results of Subsurface Testing at 32DU924, 32DU1069, 32DU1070, 32DU1071, & 32DU1073.* Prepared by Metcalf Archaeological Consultants, Inc. for Kadrmas Lee and Jackson, Dickinson, North Dakota. MS#5985.
*All sites are within the primary source area but no data resolution.

Deaver, K.
1990 *Mitigation of Site 32ME220 Mercer County, North Dakota*. Prepared by Ethnoscience, Billings, Montana, for Coteau Properties Company, Bismarck, North Dakota. MS#5163.
*Outside of the primary source area.

Deaver, K. and J. Brownell
1988 *Site Mapping, Testing and Evaluation in Area F, Coteau Freedom Mine, Mercer County, North Dakota.* Prepared by Ethnoscience, Billings, Montana, for Coteau Properties Company, Bismarck, North Dakota. MS#4713.
*Sites 32ME146, 32ME167, 32ME168, 32ME169, 32ME170, and 32ME745 are outside of the primary source area.

Deaver, K., S. Deaver, and M. Bergstrom
1989 *Onion Ring, 32ME166, A Tipi Ring Site in Central North Dakota, Mercer County, North Dakota.* Prepared by Ethnoscience, Billings, Montana, for Coteau Properties Company, Bismarck, North Dakota. MS#4886
*Excavated; not within the primary source area.

Deaver, K. and K. Schweigert
1983 *Archaeological and Historical Evaluation Project for Proposed Permit Area D Coteau Properties Freedom Mine Area 2, Mercer County, North Dakota*. Prepared by Ethnoscience, Billings, Montana, for Coteau Properties Company, Bismarck, North Dakota. MS#3225.
*Precedes MS#5932 (subsequent testing report).

Ebert, J. and T. Kohler
1988 The Theoretical Basis of Archaeological Predictive Modeling and a Consideration of Appropriate Data-Collection Methods, Chapter 4 in *Predicting the Past*, edited by L. Sebastian and W.J. Judge, pp 99-161. Bureau of Land Management, Denver, Colorado.

Feiler, E.
2000a *Sites 32DU964B, 32DU965B and 32DU972H: Results of the Supplemental Testing Program, Lake Ilo National Wildlife Refuge, Dunn County, North Dakota*. Prepared by the Quaternary Studies Program, Northern Arizona University, Flagstaff for the US Fish and Wildlife Service, Denver, Colorado. MS#7847.

*Limited data resolution; all within the primary source area.

2000b *Site 32DU965A: A Multicomponent Workshop/Campsite Location, Knife River Flint Primary Source Area, Dunn County, North Dakota*. Prepared by Quaternary Studies Program, Northern Arizona University, Flagstaff, for US Fish and Wildlife Service, Denver, Colorado. MS#7848.
*Good resolution and within the primary source area.

Franke, N.
1978 *Report of the Salvage Excavation at 32ME102.* MS#216.
*Burial eroding out of a cutbank; limited excavation. Bone recovered.

Good, K. and J. Logan
1980 *Test Excavation of Two Archaeological Sites (32ME217 and 32ME218) within Section K, Indian Head Mine, North American Coal Company, Mercer County, North Dakota.* Prepared by Historical and Archaeological Surveys, Inc., Grand Forks and Garrison, North Dakota for North American Coal Company, Indian Head Mine. MS#2530.
*Only 32ME218 within the primary source area boundary. Excavation conducted; poor data resolution.

Good, K., M. Schreiner, J. Kjos, and L. Coker
1983 *Archaeological Test Excavation Project: Site 32ME423, Northeast Permit Area, Indian Head Mine, Mercer County, North Dakota*. Prepared by Historical and Archaeological Surveys, Inc., Mandan, North Dakota for the North American Coal Company, Indian Head Mine, Bismarck, North Dakota. MS#2960.
*Tested stone circle site; outside the primary source area.

Greiser, T., G. Fox, and S. Greiser
1986 *Excavation of Site 32ME644 on Glenharold Mine Area I, Mercer County, North Dakota*. Prepared by Historical Research Associates, Missoula, Montana for Basin Cooperative Services, Bismarck, North Dakota. MS#4041.
*Outside of the PSA.

Greiser, T. and S. Greiser
1984 *Report of Findings Resulting from Phase I Mitigation of Adverse Impacts to Cultural Resource Sites in Mine Area I of the Glenharold Mine, Mercer County, North Dakota*. Prepared by Historical Research Associates, Missoula, Montana for Basin Cooperative Services, Bismarck, North Dakota. MS#3834.
*Outside of the primary source area.

Haury, C., P. Picha, and J. Artz
1988 *Evaluation of Four Cultural Resources on the Southwest Pipeline, Dunn, Mercer, and Stark Counties, North Dakota*. Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for the US Bureau of Reclamation and the North Dakota State Water Commission, Bismarck. MS#4711.
*Sites 32DU389, 32ME797, 32ME851 are outside of the primary source area.

Hiemstra, D.
2005 *Hazen Flint Quarry: Results from Evaluative Testing at 32ME365 Mercer County, North Dakota*. Prepared by Metcalf Archaeological Consultants, Inc., Bismarck, North Dakota for Ultieg Engineers on behalf of the City of Hazen, North Dakota. MS#9101.
*Good data resolution but outside of the primary source area.

Historic Research
1984 *Phase II Detailed Mitigation Plan for Significant Cultural Resources Sites Located Within Glenharold Mine Area I, Mercer County, North Dakota.* Prepared by Historical Research Associates, Missoula, Montana for Basin Cooperative Services, Bismarck, North Dakota. MS#3255.
*Site 32ME644; test pits focused on features; good data resolution.

Karsmizki, K.
1993 *History of the Lake Ilo Wildlife Refuge Area Including CCC Dam (32DU971) and WPA Dam (32DU963).* Prepared by Western History Research, Bozeman, Montana for the University of North Dakota on behalf of GEI Consultants, Inc., Englewood, Colorado. MS#6060.
*Background of the Lake Ilo project.

Kay, M. and J. Van Nest
1984 *Archeological Investigations in the Knife River Flint Primary Source Area, Dunn County, North Dakota: 1983-1984 Program*. Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for the National Park Service, Department of Interior and the State Historic Preservation Office, Bismarck, North Dakota. MS#3411.
*Very useful. Good data resolution (sites 32DU159, 32DU438, 32DU429) and stratigraphy.

Kjos, J., M. Schreiner, and D. Schwab

1983 *Recording and Evaluation of Site 32ME681 and Evaluation of Site 32ME135, Indian Head Mine NE Mine Area B, Mercer County, North Dakota.* Prepared by Historical and Archaeological Surveys, Inc., Mandan, North Dakota for the North American Coal Company, Indian Head Mine, Bismarck, North Dakota. MS#3115.
*Tested stone circle site; outside of the primary source area.

Klinner, D.
1995 *Results of the Evaluative Testing at Site 32DU1096 and Portions of Sites 32DU1097 and 32DU1098, Dunn County, North Dakota UW#1696*. Prepared by the University of North Dakota Archaeology Research-West, Belfield for Dunn County, Manning, North Dakota. MS#6444.
*Near the primary source area but not within its defined boundaries.

Kuehn, D.
1984 *Preliminary Report on the Archeological and Historical Investigation Along the Voight Bay Road, Dunn County, North Dakota.* Prepared by the University of North Dakota Archaeology Research-West, Belfield on file at the State Historic Preservation Office, Bismarck, North Dakota. MS#3415.
*Good data resolution for sites 32DU190 and 32DU205. Two sites 32DU174 and 32DU175 are outside of the PSA.

Kuehn, D.
1984 *Archaeological Testing at 32ME166.* Prepared by the University of North Dakota Archaeology Research-West, Belfield for Coteau Properties Company, Bismarck, North Dakota. MS#3561.
*Excavation; not within the primary source area.

1985 *A Report on Archaeological Evaluative Testing at Sites 32ME427 and 32ME438, Knife River Coal Mine, Mercer County, North Dakota (UW#819).* Prepared by the University of North Dakota Archaeology Research-West, Belfield for the Knife River Coal Company, Bismarck, North Dakota. MS#3860.
*Site 32ME427 is outside; no data resolution on testing of site 32ME438.

1986 *A Report on Significance Testing at Sites 32ME679 and 32ME680, Coteau Permit Area G, Mercer County, North Dakota (UW#885).* Prepared by the University of North Dakota Archaeology Research-West, Belfield for Coteau Properties Company, Bismarck, North Dakota. MS#4063.
*Sparse surface scatters, no subsurface artifacts; outside of the PSA.

Kuehn, D., J. Hodny, and K. Schweigert
1984 *National Register Evaluations of 12 Archaeological Sites and 8 Historical Sites in the Coteau Mine Areas D and J, Mercer County, North Dakota*. Prepared by the University of North Dakota Archaeology Research-West, Belfield for Coteau Properties Company, Bismarck, North Dakota. MS#3548.

Kulevsky, A.
1994 *Phase II Testing & Evaluation of Site 32ME1328 in Mercer County, North Dakota*. Prepared by Metcalf Archaeological Consultants, Inc, Bismarck, North Dakota for the Knife River Coal Company, Bismarck, North Dakota. MS#6321.
*Adjacent to the primary source area.

Larson, T., J. Miller, D. Penny, W. Kinney
1991 *A Report of Archaeological Investigations at 32ME1267 and 32ME1269, Mercer County, North Dakota*. Prepared by Larson-Tibesar Associates, Inc., Laramie, Wyoming for Interstate Engineering, Beulah, North Dakota. MS#5515.
*Both are within the primary source area; 32ME1267 has limited data resolution (primary, secondary, tertiary).

Lewis, R.
1992 *Monitor of Utility Line Excavation Within Site 32DU965, Lake Ilo NWR, North Dakota 92IL0001.* Prepared by the US Fish and Wildlife Service, Denver, Colorado for the US Fish and Wildlife Service, Denver, Colorado and the State Historic Preservation Office, Bismarck, North Dakota. MS#5860.
*Nothing found during monitoring.

McKibbin, A.
1992 *Interim Report of Findings During Data Recovery at 32ME1089, Mercer County, North Dakota*. Prepared by Metcalf Archaeological Consultants, Inc., Bismarck, North Dakota for Coteau Properties Company, Bismarck, North Dakota. MS#5788.
*Well outside of the primary source area; near site 32ME365 (MS#9101); also see MS#5932, MS#6008.

Metcalf, M. and S. Ahler
1995 *Alkali Creek in Dunn County: A Stratified Record of Prehistoric Flint Mining in North Dakota (Appendices I*

Through VIII). Prepared by Metcalf Archaeological Consultants, Inc., Bismarck, North Dakota and Northern Arizona University, Flagstaff for the USDA Soil Conservation Service, Bismarck, North Dakota. MS#6649.
*More info on Alkali Creek.

Metcalf, M., A. McKibbin, J. Medsker, K. Schweigert, and M. McFaul
1988 *A Class II Cultural Resource Survey of Five Coal Study Areas, Western North Dakota.* Prepared by Metcalf Archaeological Consultants, Inc., Bismarck, North Dakota for the Dickinson District Office, Bureau of Land Management, Dickinson, North Dakota. MS#4557.
*Using the pre-field research and modeling chapter (#5) for indices and methodologies.

Morrison, J.
2000 *Limited Testing of 32DU1028 Along Highway #8: Dunn County, North Dakota*. Prepared by Metcalf Archaeological Consultants, Inc., Bismarck, North Dakota for the North Dakota Department of Transportation, Design Division, Bismarck. MS#7412.
*Adjacent to the primary source area.

Noisat, B., J. Campbell, T. Dolan and D. Dahms
1987 *Cultural Resources Evaluation of Sites 32DU336 and 32DU337: Completion of the Historic Properties Survey for the RC & D Flood Prevention Project, Halliday, Dunn County, North Dakota*. Prepared by Overland Associates, Inc., Boulder, Colorado for the USDA, Soil Conservation Service, Bismarck, North Dakota. MS#4288.
*Good resolution of data for both sites; within the primary source area.

Olson, B. and G. Newberry
1999 *Final Report of Evaluative Testing of Sites Impacted by the Dakota Gasification Company CO_2 Pipeline: Mercer, Dunn, McKenzie, and Williams Counties, North Dakota*. Prepared by the Department of Archaeology, Powers Elevation Company, Inc., Aurora, Colorado for ENSR Consulting and Engineering, Fort Collins, Colorado. MS#7299.
*Sites 32DU342, 32DU345, 32DU348, 32DU357, 32DU359, 32DU1176, and 32DU1179 are outside of the PSA. Sites 32DU1167, 32DU1180, and 32ME1444 are within the primary source area but have limited data resolution (no debitage resolution).

O'Brien, L.
1978 *Test Excavation of the Ted Reich Farm Site- 32ME157*. Prepared by the University of North Dakota for Environmental Affairs for the American Natural Service Company, on file at the State Historical Society of North Dakota, Bismarck. MS#301.
*Minimal testing, auger probes; no details.

Persinger, R. and J. Whitehurst
1989 *Test Excavations at 11 Sites for the Proposed Mercer County Road #13 Improvement Project Draft Final Report*. Prepared by Cultural Resource and Management, Inc. For Interstate Engineering, Inc., Beulah, North Dakota. MS#4719.
*32ME452, 32ME1032, 32ME1033 are outside of the primary source area; sites 32ME1035, 32ME1036, 32ME1037, 32ME1040, 32ME1041, 32ME1044, 32ME1048, 32ME1049 are within the primary source area and have had limited excavation; site 32ME1049 has the best resolution in MS#5597.

Peterson, L.
1990 *Testing Conducted Within the Southern Extreme of Site 32DU908.* Prepared by Kadrmas Lee and Jackson, Dickinson, North Dakota on behalf of Dunn County, North Dakota. MS#5044.
*Site 32DU908 is outside the primary source area.

Peterson, L. and J. Brownell
1989 *Archaeological and Historical Investigations of Sites Within the Coteau Freedom Mines Areas, Mercer County, North Dakota (Life-of-Mine Area)*. Prepared by the University of North Dakota Archaeology Research-West, Belfield for Coteau Properties Company, Bismarck, North Dakota. MS#4914.
*Site 32ME178 is outside of the primary source area.

Peterson, L., L. Peterson, J. Boughton, K. Deaver, S. Deaver, T. Quirt, and K. Vander Steen
1995 *The Bees Nest Site, Mercer County, Mitigation of a Multi-Component Stone Ring Site in Central North Dakota, Vol. 2.* Prepared by Ethnoscience, Billings, Montana for Coteau Properties Company, Bismarck, North Dakota. MS#6270.
*Limited data resolution and outside of the primary source area.

Pool, K.
1991 *Dunn County Road Improvement: Results of Subsurface Testing at 32DU985 and Treatment Plan*. Prepared by Metcalf Archaeological Consultants, Inc., Bismarck, North Dakota for Kadrmas Lee and Jackson, Dickinson, North Dakota. MS#5796.

*Outside of the primary source area. Connects to MS#5987.

Porter, D. and D. Klinner
1996 *Evaluative Testing at Portions of Sites 32DU1100 and 32DU1113, Dunn County, North Dakota UW#1855/1856.* Prepared by the University of North Dakota Archaeology Research-West, Belfield for Dunn County, Manning, North Dakota. MS#6824.
*Near the primary source area.

Riggle, R.
1988 *Needs for the Reassessment of the Southeast Extension, Archeological Site 32DU336, Halliday Flood Prevention RC & D Project, Dunn County, North Dakota*. Prepared by the Midwest National Technical Center, Soil Conservation Service, USDA, Lincoln, Nebraska. for the State Conservationist, USDA Soil Conservation Service, Bismarck, North Dakota. MS#4691.
*Stratigraphic analysis. Limited archeological data.

Rippeteau, B.
1980 *Addendum for the CRS2913 (52) Road Improvement Testing of Archaeological Sites 4-8, Mercer County, North Dakota.* Prepared by Powers Elevation, Inc., Aurora, Colorado for Interstate Engineering on behalf of Mercer County Auditor, Stanton, North Dakota. MS#2297.
*Shovel probes only. No subsurface deposits found within the four sites inside the primary source area boundary.

Root, M.
1981 *Archeological Site Survey and Testing Along the Northern Border Pipeline, North Dakota: Annual Progress Report, 1980, McKenzie, Mercer, Dunn, Stark, Morton, Emmons, McIntosh, and Williams Counties*. Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for the Northern Border Pipeline Company, Omaha, Nebraska. MS#2564.
*All are outside of the primary source area.

1985 *A Report Concerning Gravel Mining Within the Proposed Lynch Knife River Flint Quarry National Register District at Site 32DU531.* Prepared by the University of North Dakota, Grand Forks for the State Historic Preservation Office, Bismarck, North Dakota. MS#3897.
*No testing at site 32DU531; area destroyed by mining.

1992 *The Knife River Flint Quarries: The Organization of Stone Tool Production*. Ph.D. dissertation, Washington State University, Pullman. University Microfilms, Ann Arbor.
*Sites are all within the primary source area, including 32DU508, 32DU490, 32DU512, 32DU184, 32DU224, 32DU461, 32DU452A, 32DU159, 32DU124, 32DU185, 32DU121, 32DU438, 32DU429, 32DU181, 32DU182, 32DU518, 32DU520, 32DU193, and 32DU452E. Good data resolution and discussion on trends/patterns.

2000 *The Archaeology of the Bobtail Wolf Site in Dunn County, North Dakota*. Prepared by the University of North Dakota--Grand Forks, Washington State University--Pullman, and Northern Arizona University--Flagstaff in conjunction with the US Fish and Wildlife Service and the National Park Service. MS#7856.
*Inside of the primary source area with good data and stratigraphic resolution.

Root, M., S. A. Ahler, J. Van Nest, C. R. Falk and J. E. Foss
1985 *Archeological Investigations in the Knife River Flint Primary Source Area, Dunn County, North Dakota: The Benz Site, 32DU452 (Contribution No. 225)*. Prepared by the University of North Dakota Grand Forks for the National Park Service and the State Historic Preservation Office, Bismarck, North Dakota. MS#3733.
*Good data and stratigraphy resolution for 32DU452.

Root, M., S. Ahler, C. Falk, J. Foss, H. Haas and J. Artz
1986 *Archeological Investigations in the Knife River Flint Primary Source Area, Dunn County, North Dakota: 1982-1986 Program*. Prepared by the University of North Dakota Grand Forks for the National Park Service and the State Historic Preservation Office, Bismarck, North Dakota. MS#4273.
*Good data resolution for sites 32DU121, 32DU184, 32DU185, 32DU224, 32DU452E, and 32DU461; all are within the primary source area.

Root, M. and A. Emerson
1994 *Archaeology of the Bobtail Wolf Site (32DU955A): 1993-1994 Progress Report*. Prepared by the Center for Northwest Anthropology, Washington State University, Pullman for the US Fish and Wildlife Service and the University of North Dakota, Grand Forks. MS#6415.
*Preliminary report for MS#7856.

Root, M. and M. Gregg
1983a *Archeology of the Northern Border Pipeline, North Dakota: Vol. 2, Parts 1-3 Survey and Background Information, McIntosh, Emmons, Morton, Stark, Mercer, Dunn, McKenzie, and Williams Counties, North Dakota*.

Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for the Northern Border Pipeline Company, Omaha, Nebraska. MS#3455.

*Part of Northern Border; no sites are within the primary source area.

1983b *Archeology of the Northern Border Pipeline, North Dakota: Vol. 3, Test Excavations, McIntosh, Emmons, Morton, Stark, Mercer, Dunn, McKenzie, and Williams Counties, North Dakota*. Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for the Northern Border Pipeline Company, Omaha, Nebraska. MS#3456.

*Good data resolution for sites 32DU71 and 32DU385; many sites area outside of the primary source area.

1983c *Archeology of the Northern Border Pipeline, North Dakota: Vol. 4, The Emerson Site, 32DU285: Lithic Deduction and Settlement in the Knife River Flint*. Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for the Northern Border Pipeline Company, Omaha, Nebraska. MS#3457.

*Outside of the primary source area.

Root, M. and J. Van Nest

1985 *Archeological Investigations in the Knife River Flint Primary Source Area, Dunn County, North Dakota: 1984-1985 Sites Testing Program*. Prepared by the Department of Anthropology, University of North Dakota, Grand Forks for the National Park Service and the State Historic Preservation Office, Bismarck, North Dakota. MS#3552.

*Good data and stratigraphy resolution for sites 32DU124, 32DU181, 32DU182, 32DU185, and 32DU193.

Root, M., J. Van Nest, A. Emerson and S. Ahler

1993 *Site 32DU995A: Folsom Occupation of the Knife River Flint Primary Source Area Phase III (Part 1) Archaeological Data Recovery at Lake Ilo National Wildlife Refuge, Dunn County, North Dakota: Interim Report for 1992-1993 Investigations*. Prepared by Washington State University, Pullman and the University of North Dakota, Grand Forks for the US Fish and Wildlife Service, the University of North Dakota, and GEI Consultants, Inc., Englewood, Colorado. MS#6204.

*Good data resolution and stratigraphy within the primary source area.

Sanders, P. and T. Larson

1991 *The 1989 Archaeological Investigations at 32ME797, 32ME799 & 32ME847 Along the Southwest Pipeline Project, Mercer County, North Dakota*. Prepared by Larson-Tibesar Associates, Inc., Laramie, Wyoming for the North Dakota State Water Commission, Bismarck. MS#5463.

*All of the sites are outside of the primary source area, although 32ME799 and 32ME847 are near.

Shaw, T. and D. Kuehn

1987 *Final Report on the Archaeological Testing Carried Out on the Golden Valley Road South Improvement Project, Mercer County, North Dakota*. Prepared by University of North Dakota Archaeology Research-West, Belfield for Interstate Engineering on behalf of Mercer County, Stanton, North Dakota. MS#4256.

*Site 32ME842 and 32ME843 are within the primary source area; limited excavation at 32ME843. Sites 32ME845 and 32ME846 are outside of the primary source area.

Shifrin, L.

2000a *Young-Man-Chief (32DU955D): A Folsom, Late Plains Archaic, and Late Prehistoric Site*. Prepared by the Bilby Research Center, Northern Arizona University, Flagstaff for the US Fish and Wildlife Service, Denver, Colorado. MS#7852.

*Good resolution and within the primary source area.

2000b *Investigations at Hard Horn (32DU972E): Archaic Occupations in the Knife River Flint Quarry Area*. Prepared by the Bilby Research Center, Northern Arizona University, Flagstaff for the US Fish and Wildlife Service, Denver, Colorado. MS#7853.

*Good resolution; within the primary source area.

2000c *Investigations at the Smells Site (32DU966C): A Multicomponent Camp and Lithic Workshop in the Knife River Flint Quarry Area*. Prepared by the Bilby Research Center, Northern Arizona University, Flagstaff for the US Fish and Wildlife Service, Denver, Colorado. MS#7854.

*Good resolution; within the primary source area.

Shifrin, L., A. Emerson and M. Timpson

2000 *Packs Antelope (32DU964 Lower): A Late Prehistoric Stone Circle Site in the Knife River Flint Quarry Area*. Prepared by the Bilby Research Center, Northern Arizona University, Flagstaff for the US Fish and Wildlife Service, Denver, Colorado. MS#7855.

*Good resolution; within the primary source area.

Späth, C.

1991 *32ME1049: Archaeological Data Recovery T142N, R89W Sections 23 &24, Mercer County, North Dakota*. Prepared by Metcalf Archaeological Consultants, Inc., Bismarck, North Dakota for Interstate Engineering. MS#5597.
*Good resolution; within the primary source area.

1992 *Dunn County Road Improvement T144N R97W Sec. 26 &27 Dunn County, North Dakota Data Recovery at 32DU985.* Prepared by Metcalf Archaeological Consultants, Inc., Bismarck, North Dakota for Kadrmas Lee and Jackson Engineering, Dickinson, North Dakota. MS#5987.
*Outside of the primary source area, near Fayette; good data resolution.

Späth, C. and R. Christensen
1991 *32ME254, Evaluation and Intensive Testing*. Prepared by Metcalf Archaeological Consultants, Inc., Bismarck, North Dakota for Coteau Properties, Bismarck, North Dakota. MS#5798.
*Outside of the primary source area (north and east of Beulah); see MS#7180.

Stanfill, A., H. Plochman, S. Greiser and T., Greiser
1983 *Dunn-Nakota Methanol Project, Dunn County, North Dakota, Test Excavation and Evaluation of Selected Archaeological Sites, Vol. I.* Prepared by Historical Research Associates, Missoula, Montana for Dames and Moore, Seattle, Washington on behalf of the Nakota Company, Bismarck, North Dakota. MS#3173.
*No data resolution on sites that were excavated.

Stine, E. and A. McKibbin
1992 *Coteau Freedom Mine Testing and Evaluation of Nine Sites in Mercer County, North Dakota*. Prepared by Metcalf Archaeological Consultants, Inc., Bismarck, North Dakota for Coteau Properties, Bismarck, North Dakota. MS#6007.
*All of the sites are outside of the primary source area. Limited data resolution. 32ME1075-32ME1076, 32ME1078, 32ME1085-32ME1086, 32ME1212, 32ME1239, 32ME1257, 32ME1289.

Stine, E., A. McKibbin, and C. Späth
1993 *Hanging Out at the Rock: Excavation at 32ME1089, Mercer County, North Dakota*. Prepared by Metcalf Archaeological Consultants, Inc., Bismarck, North Dakota for Coteau Properties, Bismarck, North Dakota. MS#6008.
*Outside of the PSA (near Hazen); good data resolution.

Strait, J., L. Peterson, and S. Deaver
2003 *Coteau Properties Company: Testing and NRHP Evaluation of Properties Located in the Mine Area 2 North, Mercer County, North Dakota*. Prepared by Ethnoscience, Billings, Montana, for Coteau Properties Company, Bismarck, North Dakota. MS#8748.
*Numerous sites, all outside of the primary source area; very limited testing information.

Van Hoy, T.
1982 *Shell Oil Young Bear 23-4 Test Excavations, Dunn County, North Dakota.* Prepared by the University of North Dakota Archaeology Research-West, Belfield for the Shell Oil Company, Houston, Texas. MS#2714.
*Outside of the primary source area; tested site but no excavation.

Van Nest, J.
1984 *Natural and Cultural Stratigraphy at 32DU452, A Multicomponent Site in the Knife River Flint Primary Source Area, Dunn County, North Dakota*. Paper presented at the 42nd Annual Plains Anthropology Conference, October 17-18, 1984, Lincoln, Nebraska. MS#3489.
*Useful for stratigraphic analysis.

Wermers, G.
2002 *Evaluative Testing of the Southern Portion of Site 32DU319, Dunn County, North Dakota UW-2313.* Prepared by the University of North Dakota Archaeology Research-West, Belfield for Dunn County, Manning, North Dakota. MS#8171.
*Good data resolution and within the primary source area.

2004 *Evaluative Testing at Sites 32ME427, 32ME2180, and 32ME2181, Mercer County, North Dakota.* Prepared by the University of North Dakota Archaeology Research-West, Belfield for Dakota Westmoreland Corporation, Beulah, North Dakota. MS#9144.
*All of the sites are outside of the primary source area.

William, J.
2000 *Site 32DU954F (Big Coat): Mitigation Efforts at a Multicomponent Site in the Lake Ilo National Wildlife Refuge, Dunn County, North Dakota*. Prepared by Northern Arizona University, Flagstaff for the US Fish and Wildlife Service, Denver, Colorado. MS#7849.
*Good resolution and within the primary source area.

Annotated Bibliography from *KRF Predictive Model: Resource Distribution and Use through Time in Dunn and Mercer Counties, North Dakota*

William, J., editor
2000 *The Big Black Site (32DU955C) A Folsom Complex Workshop in the Knife River Flint Quarry Area, North Dakota*. Washington State University Press, Pullman. MS#7850.
*Good resolution and within the primary source area.

William, J., S. Ahler, E. Hajic, K. Karsmizki and J. Overturf
1992 *Phase II Cultural Resource Investigations Associated With Proposed Dam Safety Modifications at Lake Ilo National Wildlife Refuge, Dunn County, North Dakota Parts 1 & 2.* Prepared by the University of North Dakota, Grand Forks and Northern Arizona University , Flagstaff in conjunction with the US Fish and Wildlife Service and the National Park Service. MS#5702.
*Sites are all within the primary source area and have good data resolution: 32DU953, 32DU954A-32DU954H, 32DU955A-32DU955E, 32DU958, 32DU959, 32DU964, 32DU966A-32DU966E, 32DU966Y-32DU966Z, 32DU967-32DU970, 32DU972A-32DU972H.

William, J., J. Zabel, J. Glennon, S. Ahler and M. Timpson
2000 *Site 32DU954G: An Early Plains Archaic Workshop in the Lake Ilo National Wildlife Refuge, Dunn County, North Dakota*. Prepared by the Bilby Research Center, Northern Arizona University, Flagstaff for the US Fish and Wildlife Service, Denver, Colorado. MS#7851.
*Good resolution and within the primary source area.

Winzler, S., J. Boughton, and L. Peterson
1998 *Data Recovery at 32ME254 Mercer County, North Dakota*. Prepared by Ethnoscience, Billings, Montana, for Coteau Properties Company, Bismarck, North Dakota. MS#7180. *Limited data resolution and outside of the primary source area. Connects to MS#5798.

In a rapid series of responses to threats of destruction to potentially vast tracts of land within the KRF quarry heartland, sufficient site inventory work and test excavations were conducted in order to compile a National Register nomination entitled the Lynch Knife River Flint Quarries National Register District (see Loendorf et al. 1984 for a review of events leading to the nomination and a description of the District). The Lynch Quarry site (32DU526) is the KRF quarry type-site (Clayton et al. 1970). Site surveys and test excavations in the KRF primary source area continue in order to refine understandings of this very important cultural resource base.

In 1988, a survey and evaluation project was conducted to the south of the Lynch District. The project was designed to collect specific sets of data to enable more precise site characterizations. The specific sets of data included (1) artifact density data from auger holes and point-quarter survey, (2) stratigraphic data from auger holes, (3) technomorphological content data for chipped stone tools from surface collections and auger samples, (4) temporal data from patination studies, (5) diagnostic artifact temporal data, (6) identification of non-KRF exotics, and (7) observations on surface features. These data, along with other information routinely collected by inventory projects, were utilized in attempts to (1) develop and apply a consistent definition for the concept of "a site," (2) develop and apply methods for determining site boundaries so that the site boundary concept has management utility, and (3) develop and apply methods for evaluating National Register of Historic Places (NRHP) eligibility in the absence of data from test excavation (William 1988). This survey work was performed at a rate of about 30 acres per person-day.

Inconsistent definitions of what a site is in the KRF area have resulted in fewer sites being recorded than indicated by the distribution of surface artifacts

(William 1988:289). Surveyors have been overwhelmed by extensive scatters of KRF chips and have subjectively elevated the threshold of the flaking debris density required to classify light-density artifact scatters as sites rather than isolated finds. However, in a 1988 BLM-SHPO-sponsored survey, it was found that it is actually undesirable to adhere rigidly to a single site definition. It was determined that site definitions *should* vary between localities with different sorts of archeological deposits. In areas with continuous occurrences of artifacts, sites were delimited by concentrations. In areas with very few background artifacts or poor visibility, a low number of artifacts such as 5 per 2,500 m^2 sometimes were considered sufficient to define a site (William 1988:293). It was concluded that the combination of auger probing and surface reconnaissance leads to a more reliable estimation of site boundaries than the use of either method alone (ibid.:294).

National Register of Historic Places evaluations were attempted by calculating "research value rankings" for each site. The scorings involved (1) number of artifact classes present, (2) features present, (3) site disturbance, (4) number of cultural components, (5) site size, (6) surface visibility, (7) presence of exotic artifacts, (8) soil depth, (9) site function, (10) presence of paleosols, and (11) surface artifact density (William 1988:294). In William's assessment, in many cases, sites can be evaluated as eligible for NRHP listing without need for data from test excavations.

Coteau

This surveyed area is land mined by the Coteau Properties Company (Coteau) north of Spring Creek, in the northeastern portion of the KRSU. The area consists of tens of thousands of acres. Initial surveys were by Woolworth Research Associates (1974) and Margaret Taylor working for the BLM. In 1977, survey by Dill and Ludwickson covered 27,721 acres and identified 149 sites, not all of them prehistoric (Dill 1978). Additional surveys in 1979 and 1981 covered several thousand acres and recorded more sites. With this work, isolated finds began to be recorded. In 1983, 23,555 acres were intensively inventoried with surveyors walking at 35 m intervals (North American Consultants 1984). Stone circle and stone feature sites were the principal sorts of archeological sites recorded in native prairie. The number of stone circles per site ranged from one to 85. Some 817 stone circle features were identified on 72 stone circle sites (ibid.: Table A-1). Cultural material scatters dominated the inventory in tilled areas. Inventories for Coteau continue as the mining operations expand (Boughton 2005; Boughton et al. 1994, 2000; Strait et al. 2003).

Boughton et al. (2000) report on a 22,820 acre Class III inventory conducted for Coteau's expansion area north of Beulah. The project area includes the KRSU (West Permit Area and Permit Area D Extension) and a smaller portion in the Garrison Study Unit (Permit Area H Extension). Two hundred and thirty-one prehistoric sites were recorded. Within the largest expansion block (West Permit Area), 157 of the 204 prehistoric sites are stone circle sites. Other

types include 28 rock feature sites (cairns, alignments, and a petroglyph) and 17 lithic scatters. In this block alone, more than 1,400 stone circles, 400 cairns, and 16 rock alignments were observed (ibid.:9.1).

Boughton et al. (2000) provide an analysis of site patterning in the project area. Investigators offer several salient issues regarding stone feature site placement, including (1) distance from natural resources, (2) feature size as it relates to topography, elevation, and site size, and (3) special purposes. Some general trends described in the report are: (1) larger stone circle sites, and larger rings within sites, are located nearer drainages; (2) the frequency and density of stone feature sites, and rings within sites, are preferentially placed north and east of drainages; 3) larger stone circles are more often placed in less rugged, higher elevations; (4) most stone circles are single course; (5) when both stone circles and cairns are present at a site, there is a greater quantity of cairns; and (6) rock alignments generally are observed in less rugged areas, often in the vicinity of stone circles (Boughton et al. 2000:9.1-9.17).

During the field season of 2002, 6,510 acres were inventoried for Coteau at the Freedom Mine northeast of Beulah (Strait et al. 2003). Thirty prehistoric sites and four multi-component sites were recorded. Again, the sites consist of stone circles (n=22) and lithic scatters (n=8) (ibid.:8.1).

Northern Border Pipeline

Survey of the Northern Border Pipeline right-of-way covered a ca. 50-mile transect across the KRSU from the Killdeer Mountains to Hebron; about 80 sites were recorded (Root, Kordecki, Billeck et al. 1983; Root, Kordecki, and Meier 1983). Temporally diagnostic artifacts indicated components ranging from Early Archaic to Plains Village in age. Sites were found mostly on the crests and upper slopes of hills and ridges with lower frequencies in stream valleys. This is the expected surface site distribution: discoveries are most common in areas where Holocene-age sediments are thinnest. Most of the sites were hypothesized to represent short-term occupations such as field camps, stations, and locations (Root, Kordecki, and Meier 1983:893). However, functional classification of sites was rendered difficult because most of them appeared to represent “palimpsest deposits which accumulated through successive occupations” (ibid.:898). Site densities were especially high in the rolling uplands west of the KRF quarries and near the Knife River. Densities were low to the south of the Knife River. High site densities were hypothesized to be attributable to settings with high plant and animal resource potential. The area of low site density, south of the Knife River, was viewed as having had lower natural resource density and diversity (e.g., plants, animals, water, KRF, and timber) (ibid.). Overall, site densities and surface artifact densities were greater in the Knife River basin portion of the Northern Border transect than in other portions of the pipeline route across North Dakota. These high densities probably are attributable primarily to the heavy use of the KRF primary source area for lithic raw material procurement.

Southwest Pipeline

Survey of the Southwest Pipeline right-of-way yielded inventory information for transects totaling ca. 75 miles in length within the Knife River basin, and 57 sites and 30 isolated finds were recorded (Artz et al. 1987:Table 9.2). As with the Northern Border Pipeline survey, this was the highest site density of all drainage basins transected by the Southwest Pipeline, greater than in the Missouri, Cannonball, Heart, Cedar, Grand, or Little Missouri basins (ibid.). Within the Knife River basin site density was highest in the Spring Creek drainage. Two particularly dense concentrations were identified near Golden Valley and Dodge along Spring Creek where greater topographic diversity and water availability translate to plant and animal resource diversity further attracting prehistoric settlement by people who were already drawn by KRF availability. Sites were also clustered near the Knife River-Spring Creek divide (ibid.:9.9). As with the Northern Border transect, site densities were higher north of the Knife River than to the south.

Lake Ilo

In 1989, archeologists conducted a Phase I inventory at the Lake Ilo National Wildlife Refuge in Dunn County. A total of 1,360 acres, in areas with low water levels, were surveyed using pedestrian transects spaced no further than 10 m apart. Fifteen prehistoric sites were recorded. Diagnostic artifacts collected from the sites ranged in age from Paleo-Indian through Late Prehistoric. The sites were evaluated as "probably significant" and "potentially significant" (Borchert et al. 1990). Six sites were evaluated as probably significant meaning that they contain datable materials, intact cultural deposits, and an abundance of artifacts (ibid.:E-117). The other sites were evaluated as potentially significant. That is, investigators were less sure about the potential to find datable materials, intact deposits, and/or answers to research questions at the sites (ibid.). Test excavations were recommended at both types of sites.

Table 3.5 lists reports of archeological site inventory work on file in the HPD manuscript collection. Some reports probably have been missed in the table due to missing data in the manuscript data file.

Table 3.5: Inventory Projects in the Knife River Study Unit, 5-Sept-2007.

Year	First Author	Second Author	Title	Ms #
n.d.	Dill, C.		1976 Archeological and Historic Site Survey of North American Coal Corporation's Indianhead Mine, Limited & Extended Mining Plan Areas, Mercer Co., ND	30
1947	Bauxar, J.		Preliminary Appraisal of the Archeological & Paleontological Resources of Broncho Reservoir, Mercer Co., ND	25
1974	Woolworth Research Associates		A Final Report on an Archaeological/Historical Assessment Program for the North Dakota Coal Gasification Project in Mercer Co., ND	32
1975	Adamczyk, T.		Archaeological Inventory of the Missouri River Reach Between Fort Benton, MT & Sioux City, IA	80

Year	First Author	Second Author	Title	Ms #
1975	Dill, C.		Archaeological and Historic Site Survey, South Beulah & Gascoyne Mine Expansion Areas, Knife River Coal Company	119
1976	Dill, C.		Basin Electric Power Cooperative Mercer Co. Plant Negative Declaration Survey Report	260
1976	Fox, R.	W. Stolt et al.	Archaeological & Historical Studies in the Vicinity of the Proposed Coyote Station Electrical Generation Plant Site Near Beulah, Mercer Co., ND	215
1976	Loendorf, L.	A. Carmichael et al.	Archaeological & Historical Studies for a Proposed Coal Gasification Complex, Dunn Co., ND	8
1977	Dill, C.		1974-1976 Archeological & Historic Site Survey of Consolidation Coal Company's Glenharold Mine, Limited & Extended Mining Plan Areas, Mercer Co., ND	27
1977	Dill, C.		Consolidation Coal Company Glenharold Mine Addition, Mercer Co., Negative Declaration Survey Report	272
1977	Dill, C.		ND Highway Department Project No. F-1-200 ( )150, Hazen Bypass, Negative Declaration Survey Report, Mercer Co., ND	271
1977	Fox, R.		Beulah Sewage Lagoon Survey, Mercer Co., ND	151
1977	Noble, B.		EMRIA Reclamation Studies Drilling Locations: Cultural Resources Report, Mercer Co., ND	143
1978	Dill, C.		1977 Cultural Resources Inventory: Antelope Valley Station/ANGCGC Gasification Plant Site, Associated Mining Areas & Ancillary Facilities, Mercer Co., ND	225
1978	Dill, C.		Addendum to Consolidation Coal Company's Glenharold Mine, Limited & Extended Mining Plan Areas Negative Declaration Survey Report, Mercer Co., ND	295
1978	Fox, R.		Coyote Station Pipeline Survey, Mercer Co., ND	159
1978	O'Brien, L.	L. Loendorf	Cultural Resource Inventory of the Proposed Transmission Line Route Between the Coyote Station and the Milton Young Plant, Oliver Co., ND	308
1978	Woolworth, A.	N. Woolworth	A Report on an Archaeological & Historical Reconnaissance Survey of the Great Lakes Gas Transmission Company Pipeline Route in ND and MN	306
1979	Ahler, S.		Possible Water Diversion Ditch Construction in the Glenharold Mine Area, Mercer Co., ND	2656
1979	Fox, R.		PO #KR11097 Intensive Cultural Resources Pedestrian Survey for Knife River Coal Mining Company, Oliver Co., ND	3321
1979	Good, K.		Archaeological and Historical Survey, Proposed Haul Road and Watershed Project, Indian Head Mine, Mercer Co., ND	925
1979	Loendorf, L.	A. Simon	Montana-Dakota Utilities: Killdeer Pipeline Survey, Billings Co. & Dunn Co., ND	2229
1979	O'Brien, L.		Hazen Lagoon Site - 32ME365	3855
1979	Simon, A.	L. Loendorf	The Cultural Resource Survey of the Proposed Gathering Lines for Western ND Amoco Pipeline Company, Billings Co., McKenzie Co. & Dunn Co., ND	2253
1979	Williams, B.		Knife River Coal Company, South Beulah Mine, Coal Lease Proposal Survey, Oliver Co., ND	3521
1979	Woolworth Research Associates		Report on a Cultural Resources Survey of the Stanton & Preferred Transmission Line Corridors in ND and SD, Basin Electric Cooperative, Bismarck, ND, Vol. 2--ND Sites in Emmons, Morton & Mercer Counties	2600
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 & Dunn Counties, ND	2228
1980	Rippeteau, B.		A Cultural Resource Survey for Veigel Engineering, Knife River Rechannel, River Rechanneling, Billings Co., ND	2411

Year	First Author	Second Author	Title	Ms #
1980	Rippeteau, B.		Archaeological Survey for Mercer Co., CRS 2913 (52) Co. Road Improvement	2993
1980	Rippeteau, B.		Beulah Bridge Survey, Mercer Co., ND	1512
1980	Rippeteau, B.		Cultural Resource Survey Addendum for Adobe Oil & Gas Killdeer 41-4, Dunn Co., ND	2446
1980	Rippeteau, B.		Golden Valley Bridge Survey, Mercer Co., ND	1513
1980	Roberson, W.		West Study Area, South Beulah Mine Extension, Mercer Co., ND Cultural Resources Survey & Test Excavations	964
1980	Simon, A.	J. Borchert	Additional Cultural Resource Work for the Proposed MDU Transmission Line Route Between the Coyote Station & the Milton Young Plant, Oliver Co., ND	2234
1980	Wilt, J.	M. Swegle	Inventory of Cultural Resources, Glenharold Mine Extension, Mercer and Oliver Counties, ND Vol. 1	2765
1981	Good, K.	L. Sprunk et al.	Historical and Archaeological Survey & Testing Project Proposed Mining Area, The Coteau Properties Company, Antelope Valley, Mercer Co., ND	2541
1981	Greiser, T.	S. Greiser	Class II Cultural Resource Inventory, Dunn Center Coal Deposit Area, Dunn Co., ND, Vol. I, 2	2543
1981	Historical & Archaeological Survey		Cultural Resource Inventory & Report for the Indian Head Mine Tipple Expansion Project, Mercer Co., ND	2989
1981	Montgomery, S.	J. Borchert	A Class III Cultural Resource Inventory for the Proposed Killdeer Lagoon Expansion in Dunn Co., ND	2240
1981	Pearson, J.	A. Simon	The Class III Cultural Resource Inventory for the Proposed Killdeer Sewage Lagoon Project, Dunn Co., ND	2262
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. Pearson	A Class III Intensive Inventory for All Cultural Resources for the Proposed Montana-Dakota Utilities Killdeer Lateral Pipeline, Dunn Co., ND	2255
1981	Simon, A.		A Class III Intensive Inventory for the Proposed Bridge Improvement in Dunn Co., ND (Bridge BRO-13-4)	1205
1981	Simon, A.	S. Montgomery	The Class III Cultural Resource Inventory and Reassessment of Possible Impacts for the Proposed Knife River Rechannelment in Billings Co., ND	2529
1981	Sprunk, L.	K. Good	Cultural Resource Investigation: Indian Head Mine--Tipple Expansion (Zap Colliery Mine Camp Site--32ME502)	2581
1981	Steele, C.		Adobe Oil and Gas Proposed Well Location & Access Route Survey, Dunn Co., ND	1597
1982	Fricke, W.	A. Simon	McDonald Well Location Survey Report, Dunn Co., ND UW #555	2748
1982	Good, K.		32ME502--Indian Head Mining Camp Phase II, Task I, Tipple Expansion Project, Indian Head, Mercer Co., ND	3191
1982	Good, K.	J. Kjos et al.	Cultural Resource Inventory of Portions of Basin Cooperative Service's (Basin Electric Power Cooperative) Glenharold Mine, Mercer & Oliver Counties, ND	3226
1982	Klein, A.		Beulah AML Project, Mercer Co., ND	2875
1982	Melton, D.	M. Schreiner	Archeological Reconnaissance Survey and Test Excavation Project: Site 32ME126, Indian Head Mine, Mercer Co., ND	2894
1982	Peterson, J.		ND Cultural Resources Survey: Hazen Project, Mercer Co., ND	2557
1982	Vivian, J.		Historical Assessment of the Nokota Project Site, Dunn Co., ND	3746
1983	Dahlberg, J.	M. Schreiner	Cultural Resource Inventory and Evaluation of Four Historic Sites, Coteau Properties Mine Areas D & E, Mercer Co., ND	3121

Year	First Author	Second Author	Title	Ms #
1983	Enders, R.	W. Gear	Sage Energy #1 Wike Federal, Well Location & Access Road, Billings Co., ND	3101
1983	Good, K.	J. Kjos et al.	Beulah C Site, AML (84) Cultural Resource Site, In & Adjacent to Beulah, Mercer Co., ND (Final Report)	3228
1983	Kjos, J	M. Schreiner et al.	Class III Cultural Resource Inventory and Investigations at Five Previously Recorded Sites Within Glenharold Mine Area I, Mercer Co., ND, Vols. I & II	3133
1983	Loendorf, L.	J. Borchert	Archaeological & Historical Investigation of the Proposed ANG Pipeline Through Mercer Co., ND	2752
1983	Montgomery, S.	J. Borchert	Gulf Wike Federal 3-24-3D Survey Report, Billings Co., ND	2775
1983	Root, M.	M. Gregg	Archeology of the Northern Border Pipeline, ND: Vol. 2, Pts. 1-3 Survey and Background Information, McIntosh, Emmons, Morton, Stark, Mercer, Dunn, McKenzie, & Williams Counties ND	3455
1983	Simon, A.	K. Keim	Class III Intensive Inventory of Proposed Halliday Sewage Treatment Facility (Portions of S½ Section 30, T145N, R91W, Dunn Co., ND)	3175
1983	Simon, A.	J. Borchert	Class III Intensive Inventory of the Proposed Highway 200 to Voight Bay Road, Dunn Co., ND	3247
1983	Will, G.	K. Schweigert et al.	Final Report: Historical and Architectural Survey of Portions of Hebron, Morton Co., ND.	3841
1983	Wilson, R.	F. Kirby	An Intensive Archeological Field Inventory of the Isaak AML Project, West of Dodge, Dunn Co., ND	2847
1984	Artz, J.		A Preliminary Reconnaissance of Late Quaternary Deposits in Sloughs & Depressions of the KRF Primary Source Area, Dunn Co., ND.	4017
1984	Metcalf, M.		Conoco Federal 29-1 Well Location, Dunn Co., ND	3765
1984	North American Consultants		Cultural Resources Survey of Mine Areas 1, 2 & 4, the Coteau Properties Company, Mercer Co., ND (Vol. I)	3231
1985	Artz, J.		Prehistory in Halliday: A Cultural Resources Survey of an RC & D Flood Prevention Project at Halliday, Dunn Co., ND	6063
1985	Christensen, R.	D. Kuehn	A Cultural Resource Inventory of FAS 2905 Road Improvement Project, Mercer Co., ND	3883
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 Counties ND	3554
1985	Kuehn, D.		A Cultural Resource Inventory of Two Tracts in the West Branch Creek Area, Knife River Coal Beulah Mine, Mercer Co., ND	3861
1985	Schweigert, K.		A Cultural Resource Survey of Abandoned Mine Tipple Near Hazen, Mercer Co., ND	3941
1985	Schweigert, K.		Recording & National Register Evaluation of Historic Site 32ME446, Knife River Coal-Beulah Mine, Mercer Co., ND	3858
1986	Borchert, J.		Archaeological Investigations for the Proposed McKenzie Electric Single Phase Upgrade Through the Lynch Knife River Flint Quarries District, Dunn Co., ND (UW#934)	4100
1986	Christensen, R.	D. Kuehn	A Cultural Resource Inventory of Knife River Coal Company Proposed "S-S Tract," Mercer Co., ND (UW#902)	4068
1986	Kuehn, D.		A Cultural Resource Inventory of a Portion of the Golden Valley South Road Improvement Project, Mercer & Morton Counties, ND	4137
1987	Artz, J.	C. Haury et al.	Southwest Pipeline Archeology: An Intensive Survey for Cultural Resources in Ten Counties of Southwestern ND, Adams, Bowman, Hettinger, Grant, Stark, Billings, Morton, Golden Valley, Dunn, & Mercer	4247

Year	First Author	Second Author	Title	Ms #
1987	Blikre, L.	D. Kuehn	A Cultural Resources Inventory of the Proposed Dunn Center Buried Telephone Cable Route within the Knife River Flint Quarry District Dunn Co., ND	4559
1987	Dowdy, K.	D. Kuehn	A Cultural Resource Inventory of the Killdeer Bridge Replacement & Road Improvement, Dunn Co., ND	4301
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 Counties, Western ND, Vols. 1 & 2	4319
1987	Shaw, T.	L. Loendorf	Beulah to Zap Mercer County Road Improvement Class III Cultural Resource Inventory Results	4398
1987	Shaw, T.		Results of a Cultural Resource Survey of Mercer Countiy's Proposed Reroute of Golden Valley South Road around 32ME43	4448
1988	Ahler, S.	D. Toom	KNRI Visitor Center Water Line Survey at T144N, R85W Section 1 in Mercer Co., ND	6009
1988	Blikre, L.	D. Kuehn	Mercer County Road #13, A Cultural Resource Inventory of Nine Miles of Road South of Zap, ND	4533
1988	Borchert, J.	D. Kuehn	Knife River Bridge Replacement Project Cultural Resource Inventory Dunn Co., ND	4725
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
1988	Deaver, K.	S. Deaver et al.	US Sprint Fiber Optic Cable Project Spokane, Washington to Fargo, Billings, Stark, Golden Valley, Morton, Kidder, Stutsman, Burleigh, & Cass Co., ND	4638
1988	Kuehn, D.		Knife River Coal-Black Pit and Main Drainage Area, Beulah Mine, Cultural Resource Inventory, Mercer Co., ND	4525
1988	Persinger, R.		Results of an Intensive Cultural Resource Survey for a County Road Improvement Project in Dunn Co., ND.	4453
1988	William, J.	D. Rufledt et al.	Archaeological Investigations In the Knife River Flint Primary Source Area, Dunn Co., ND: 1987-1988 Survey & Evaluation Program	4516
1989	Borchert, J.	J. Brownell et al.	Abbey AML Project ND025 Cultural Resource Inventory & Historic Site Evaluations Stark Co., ND	4824
1989	Borchert, J.		Addendum to Knife River Bridge Replacement Project Cultural Resource Inventory Dunn Co., ND	4739
1989	Borchert, J.	G. Burbidge et al.	Lake Ilo Cultural Resource Inventory, Dunn Co., ND	5166
1989	Burbidge, G.	J. Borchert	Killdeer Reservoir SWC Project 237-25 Cultural Resource Inventory, Dunn Co., ND	4878
1989	Foster, J.	J. Borchert	A Class III Cultural Resource Inventory of CRS 1330(52), Dunn Co., ND	4746
1989	Lippincott, K.	E. Lueck et al.	An Intensive Cultural Resource Survey of a Proposed Fiber Optic Line Between Beulah & Golden Valley in Mercer Co., ND	4836
1989	Wenker, C.	J. Borchert	A Class III Cultural Resource Inventory of Dunn Co. Bridge No. 143-29 CBRS 1341(52)	4804
1990	Burbidge, G.	L. Peterson	Dunn County Barrow Areas Cultural Resource Inventory	5132
1990	Christensen, R.	K. Schweigert	Archaeological Inventory of McKenzie Electric Cooperative Pole Replacement in Dunn & McKenzie Counties, ND	4846
1990	Christensen, R.	R. Persinger	Select FMHA Tracts in Mercer Co., ND, Class III Cultural Resource Inventory	5310
1990	Granger, S.	S. Kelly	Five Mercer Co. Townsites: ND Cultural Resources Survey 1989-1990	5321
1990	Jackson, M.	L. Peterson	Kovaloff #18-1H Cultural Resource Inventory Dunn Co., ND	5134

Year	First Author	Second Author	Title	Ms #
1990	Klinner, D.	J. Borchert	Interstate Engineering's Grading North of Golden Valley Project B88-49 Cultural Resource Inventory Mercer Co., ND	5108
1990	Klinner, D.	J. Borchert	Mercer Co. Road Improvement and Bridge Replacement	4960
1990	Martorano, M.	D. Killam et al.	Class I Literature Search & Class III Intensive Inventory Charlie Creek to Belfield 345-kV Transmission Line Project, Stark, McKenzie, Dunn, & Billings Counties, ND	4744
1990	Oliver, T.	J. Borchert	Two Proposed Barrow Areas Near the Knife River A Class III Cultural Resource Inventory Dunn Co., ND	5299
1990	Oliver, T.	D. Klinner et al.	Dunn County Road Monitoring Dunn Co., ND	5271
1990	Persinger, R.	C. Späth	Consolidated Telephone Cooperative - Halliday to Dodge Subsurface Fiber Optic Line, Dunn & Mercer Counties, Class III Cultural Resource Inventory	5315
1990	Späth, C.	N. Ross et al.	Dakota Star Reserve Cultural Resource Inventory, Mercer Co., ND	5455
1990	Späth, C.		Ten Acre Solid Waste Area Bellaire Corporation's Indian Head, Mercer Co., ND, Class III Cultural Resource Inventory	5311
1990	Wermers, G.	J. Borchert	CBRS-1307(52) Dunn Co. Road Improvement Class III Cultural Resource Inventory	5264
1991	Blikre, L.	J. Borchert	Dunn County Bridge No. 110-29 Structure & Approaches Cultural Resource Inventory	5570
1991	Borchert, J.		ND533 Consolidated Telephone Halliday to Marshall Cable Route & Selected Tracts in Stark and Dunn Counties Cultural Resource Inventory	5573
1991	Burbidge, G.	J. Borchert	Dunn Center Exchange Consolidated Telephone's Fiber Optic Line Cultural Resource Inventory Dunn Co., ND	5401
1991	Kiely, C.		Five Year Land Adjustment Cultural Resource Inventory Schulte Survey in Mercer Co., Bureau of Land Management Dickinson District Office	5334
1991	Späth, C.		Report of Tasks I and IV: Inventory of 80 Acres & Documentation & Evaluation of 32ME175	5453
1992	Blikre, L.	J. Foster et al.	Knife River Coal Beulah Mine Expansion Cultural Resource Inventory, Mercer & Oliver Counties, ND	6140
1992	Borchert, J.		Dunn County Road Improvement {SC-1330(53)} Class III Cultural Resource Inventory	5845
1992	Foster, J.		Mercer County Bridge Replacement Project No. BRO-29(10) Class III Cultural Resource Inventory	5883
1992	Johnson, L.	M. Hufstetler et al.	Historic Bridges in ND	5920
1992	Lahren, L.		Cultural Resource Evaluations of the Beulah E AML Area Mercer Co., ND	5935
1992	Lewis, R.		Dike Projects, Dunn Co., ND	5859
1992	Lewis, R.		Monitor of Utility Line Excavation within Site 32DU965, Lake Ilo NWR, ND 92IL0001	5860
1992	Stine, E.		Dakota Star Reserve-1991 A Class III Cultural Resource Inventory Mercer Co., ND	6205
1992	Wermers, G.		Mercer County Road Improvement Class III Cultural Resource Inventory Mercer Co., ND	5884
1993	Banks, K.		The 2-7C Contract, Southwest Pipeline: A Cultural Resources Inventory, Stark & Dunn Counties, ND	6084
1993	Borchert, J.		Consolidated Telephone Grassy Butte Exchange #1-10 Cable Routes Class III Reconnaissance Inventory McKenzie, Dunn and Billings Counties	6146
1993	Borchert, J.		Dunn Co. Borrow Area On Road Improvement Project SC-1330(53) Class III Cultural Resource Inventory	6113
1993	Borchert, J.		Dunn Co. Road Realignment, BRO 13(7), Class III Cultural Resource Inventory	6226

Year	First Author	Second Author	Title	Ms #
1993	Borchert, J.		Killdeer Outdoor Recreation Project, Dunn Co., Class III Cultural Resource Inventory	6049
1993	Borchert, J.		McKenzie Electric Cooperative, Inc. 1993-1994 Construction Routes in Dunn & McKenzie Counties, Class III Cultural Resource Inventory	6051
1993	Stine, E.		Beulah Exchange Class II Reconnaissance Survey Finley/West River Buried Cable Route in Mercer & Oliver Counties, ND	6093
1993	Wermers, G.	J. Borchert	Mercer Co. Road Improvement Class III Cultural Resource Inventory	6202
1994	Borchert, J.		Dunn Co. SC-1307(53) and BRC-1307(54) Road Relocation Project Class III Cultural Resource Inventory	6255
1994	Boughton, J.	J. Brownell et al.	Coteau: A Cultural Resource Inventory of the North Mine Extension Area, Mercer Co., ND	6245
1994	Boughton, J.		Negative Survey Report for the E½ of the NW¼ and E½ of Sec 3, T145N R87W, Mercer Co., ND	6405
1994	Klinner, D.		Dunn County Road Realignment in Section 10,T142N, R97W, Dunn Co., ND	6360
1994	Klinner, D.		West Plains Electric Underground Line Replacement, Stark Co., Class III Cultural Resource Inventory	6335
1994	Kulevsky, A.		Coteau Properties, Inc. Road Widening: A Class III Cultural Resource Survey Mercer Co., ND	6282
1994	Kulevsky, A.		Halliday to Twin Buttes Fiber Optics Route: A Class III Cultural Resource Inventory in Dunn Co., ND	6334
1994	Maginniss, H.	J. Hess et al.	Historical & Architectural Inventory of Eighteen Rural Roman Catholic Churches in the Diocese of Bismarck, ND	6248
1994	Olson, B.		Heuer Gravel Source Mercer Co., ND	6238
1994	Toom, D.		Bridge Replacements, Archeological Sites, & Archeological Site Surveys in ND	6249
1995	Borchert, J.		ND Department of Transportation Material Source Projects Cultural Resource Review 1989-1994	6509
1995	Borchert, J.	G. Wermers et al.	Southwest Pipeline Phase II Cultural Resources Inventory of Selected Segments, Stark & Dunn Counties, ND: Taylor Service Area (SCS PL 566 Watershed Project Area)	9062
1995	Borchert, J.	G. Wermers et al.	Southwest Pipeline Phase II Cultural Resources Inventory of Selected Segments, Stark & Dunn Counties, ND: New Hradec, Taylor, & Davis Buttes Service Areas (Construction Segment 7-1B) Parts I & II	6355
1995	Klinner, D.		Southwest Pipeline Phase II Cultural Resources Inventory of Reroute Segments in Dunn, Hettinger, & Stark Counties, ND: New Hradec, Belfield, & New England Service Areas (Construction Segments 7-1B, 7-2, & 2-5A)	6650
1995	Klinner, D.		The Federal Aid Project Number BRO-1329(60) Bridge Replacement Project in Dunn Co., ND: Results of a Class III Cultural Resources Inventory	6643
1995	Klinner, D.		US Fish & Wildlife Service Small Earthen Dam Projects, Order Number 62110-5-0052: Results of Four Class III Cultural Resources Inventories in Burke, Dunn, & Williams Counties, ND	6465
1995	Klinner, D.		US Fish & Wildlife Service Small Earthen Dam Projects, Order Number 62110-4-0374: A Class III Cultural Resource Inventory Dunn Co. ND	6420
1995	Klinner, D.		US Fish & Wildlife Service Small Earthen Dam Projects, Order Number 62110-5-0020: A Class III Cultural Resource Inventory Dunn Co., ND	6421

Year	First Author	Second Author	Title	Ms #
1995	Klinner, D.		US Fish and Wildlife Service Small Earthen Dam Projects, Order Number 62110-5-0031: A Class III Cultural Resource Inventory Dunn Co., ND	6422
1995	Klinner, D.		US Fish and Wildlife Service Small Earthen Dam Projects, Order Number 62110-5-0044: A Class III Cultural Resource Inventory Dunn Co., ND	6423
1995	Klinner, D.		US Fish and Wildlife Service Small Earthen Dam Projects, Order Number 62110-5-0274: The Results of Five Class III Cultural Resources Inventories in Adams, Dunn, & Oliver Counties, ND	6531
1995	Kulevsky, A.		Kadrmas, Lee and Jackson's Deep Creek Bridge Replacement: A Class III Cultural Resource Inventory in Dunn Co., ND	6494
1995	Stine, E.		Interstate Engineering's Bridge Replacement: A Class III Inventory in Mercer Co., ND	6492
1995	Stine, E.		Stanton Exchange: A Cultural Resource Inventory for West River Mutual Aid Corporation, North & West of Stanton, Mercer Co., ND	6641
1996	Klinner, D.		Dunn Co. Road Improvement Project-Federal Aid Project Number HEO-13(11): Results of a Class III Cultural Resources Inventory in Section 22, T143N, R94W, Dunn Co., ND	6648
1996	Kulevsky, A.		Fisher's Oliver Co. Gravel Pit: A Class III Cultural Resource Inventory, Oliver Co., ND	6768
1996	Kulevsky, A.		KLJ/CTC Grassy Butte Telephone Exchange: A Class II & Class III Cultural Resource Inventory in Dunn & McKenzie Counties, ND	6769
1996	Lewis, R.		Gary Fritz 96PLP600, Dunn Co., ND	6730
1996	Lewis, R.		Tony Ridl 96PLP601, Dunn Co., ND	6731
1996	Scott, J.		Interstate Engineering's Mercer County Road #25 Class III Cultural Resource Inventory, Mercer Co., ND	6773
1996	Wermers, G.		Northern Geophysical Seismic Lines on Bureau of Land Management Property in Stark Co., ND: Results of the Class III Cultural Resources Inventory	6832
1996	Wermers, G.		Six Miles of Road Improvement in Mercer Co., ND: Results of the Class III Cultural Resources Inventory. ND Transportation Number: SC-2937(53)	6801
1997	Christensen, B.		Knife River Bank Survey, Mercer Co., ND	7043
1997	Graham, C.		North Beulah Fiber Optic Upgrade: A Class II & Class III Cultural Resource Inventory, Mercer Co., ND	6936
1997	Kinney, W.		Class III Cultural Resource Inventory for a Proposed Oliver Co. Borrow Area. NDDOT Project #DPI-SC-0179(001)305	7017
1997	Klinner, D.		Dunn Co. Bridge Replacement in Sections 31 & 32, T144N, R96W-Structure No. 13-110-39.0	7064
1997	Klinner, D.		ND533-Consolidated Telephone Cooperative, South Heart Exchange Cable Improvements in Stark, Billings, & Slope Counties, ND	6953
1997	Lewis, R.		Field School Dam Site 97ILO003, Dunn Co, ND	6931
1997	Olson, B.		Paulson Borrow Area Class III Cultural Resources Inventory Dunn Co., ND	6956
1997	Wermers, G		Co. Road Improvement Project in Dunn Co., ND. Federal Aid Project Number: SC-1305(51)	7010
1997	Wermers, G.		Dunn Co. Bridge Replacement in Section 10, T142N, R91W-Structure No. 13-143-47.0	7094
1997	Wermers, G.		US Fish & Wildlife Service Casey Germundson Earthen Dam Project in Dunn Co., ND, Order Number ND-62110-97-006	6963

Year	First Author	Second Author	Title	Ms #
1998	Kinney, W.		Mercer County HUD Bridge Repair Project. A Class III Cultural Resource Inventory for NDDOT Project #DPI-0036(004)291. SITS# 32ME1332 (Bridge #29-135-16.0)	7169
1998	Klinner, D.		Southwest Pipeline Phase II Cultural Resources Investigations in Portions of the Hebron-Glen Ullin Service Area, Morton & Stark Counties, ND	7159
1998	Morrison, J.		Interstate Engineering, Inc. Coteau Road Regrade: A Class III Cultural Resource Inventory, Mercer Co., ND	7235
1998	Olson, B.		Dakota Gasification Company CO_2 Pipeline Selected Segments in Mercer, Dunn, McKenzie, Williams & Divide Counties, ND: A Class III Cultural Resources Inventory & Appendix B: USGS Topographic Coverage of the Pipeline	7144
1998	Olson, B.		Southwest Pipeline Project Extension to Northern Border Pipeline's Compressor Station #5 Cultural Resources Inventory, Dunn Co., ND	7261
1998	Rothwell, S.	T. Larson et al.	Addendum 1998 to: Results of Class II & Class III Cultural Resource Inventories for Upgrades to Telecommunication Lines: The Hazen & Pick City Exchanges in Mercer & Oliver Co., ND	7111
1998	Sabroski, D.	D. Flemmer	An Intensive (Class III) Cultural Resource Inventory of Rebson Pond, Dunn Co., ND	7214
1998	Wermers, G.		West Plains Electric Overhead Power Line Replacement and Substation Construction Project in Dunn Co., ND	7148
1999	Isern, T.	K. Nesemeier	Wrought Iron Cross Cemeteries in ND-Continuing Survey, 1998-99	7725
1999	Klinner, D.		Dunn County Road Improvement Project in Portions of T143N, R97W, Dunn Co., ND	7291
1999	Klinner, D.		Mercer County Road Improvement Project in Sections 13, 14, 23, and 24, T145N, R88W, ND	7343
1999	Klinner, D.	G. Wermers	Southwest Water Pipeline Project-Class III Inventories for the Mott-Elgin Main Line, Elgin-Carson Main Line, South Hebron Pneumatic Pocket Area, & the Southeast Jung Lake Pocket Area, ND	7455
1999	Klinner, D.		The Liebelt Project Along ND Highway 49 in Section 14, T143N, R88W, Mercer Co., ND: Class III Inventory Results	7616
1999	Morrison, J.		Grassy Butte Cable Route: A Class III Cultural Resource Inventory, Billings, Dunn & McKenzie Counties, ND	7427
1999	Wermers, G.		Road Improvement Project in Portions of T141N, R93W and T142N, R93W, Dunn Co., ND	7293
1999	Wermers, G.		Road Improvement Project in Portions of T143N, R91W, T143N, R92W, T144N, R91W, & T144N, R92W, Dunn Co., ND	7311
1999	Wermers, G.		Road Improvement Project in Portions of T145N, R88W & T146N, R88W, Mercer Co., ND	7341
2000	Bluemle, W.		Oliver Mercer 343: A Class III Cultural Resource Inventory, Mercer Co., ND	7614
2000	Bluemle, W.		Oliver-Mercer #359: A Class III Cultural Resource Inventory Mercer Co., ND	7691
2000	Bluemle, W.		South Spring Creek Borrow: A Class III Cultural Resource Inventory, Stark Co., ND	7750
2000	Boughton, J.	L. Litwinionek et al.	Cultural Resource Inventory of Permit Area Extensions D & H & the West Permit Area, the Coteau Mine, Beulah, Mercer Co., ND	7610
2000	Klinner, D.		Stark County Bridge Replacement Projects in Sections 2, 11, 14, T140N, R92W, ND, Structures 45-147-03.0 and 45-147-05.0	7771
2000	Morrison, J.		Horse Creek Bridge Replacement: A Class III Cultural Resource Inventory, Dunn Co., ND	7537

Year	First Author	Second Author	Title	Ms #
2000	Morrison, J.		Mercer County Road #13: A Class III Cultural Resource Inventory, Mercer Co., ND	7811
2000	Morrison, J.		Mercer County Road #16: A Class III Cultural Resource Inventory, Mercer Co., ND	7818
2000	Morrison, J.		South Spring Creek Bridge Replacement: A Class III Cultural Resource Inventory, Stark Co., ND	7541
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	Rothwell, S.	T. Larson et al.	Results of Class II & Class III Cultural Resource Inventories for Upgrades to Telecommunications Lines: The Beulah Exchange, Mercer & Oliver Co., ND	7562
2001	Bluemle, W.		Hazen Bike Path: A Class III Cultural Resource Inventory, Mercer Co., ND	7828
2001	Wermers, G.		Tracts 1, 2, and 3 Knife River Corporation, Beulah Mine Division, Mercer Co., ND: Class III Inventory Results	9143
2002	Bluemle, W.		Dvirnak Borrow Area: A Class III Cultural Resource Inventory, Dunn Co., ND	8269
2002	Bluemle, W.		Killdeer Exchange: A Class II & III Cultural Resource Inventory, Dunn Co., ND	8223
2002	Bluemle, W.		Kralicek Borrow Area and Access Road: A Class III Cultural Resource Inventory, Dunn Co., ND	8276
2002	Christensen, B.		DUC-001 Marshall Number One Class III Inventory Report Dunn Co., ND	8151
2002	Christensen, B.		DUC-002 Class III Inventory Report Dunn Co., ND	8152
2002	Dodd, W.		Project Summary: 2002 Beulah Coal Fire Emergency Project, Mercer Co., ND	9528
2002	Lewis, R.		A Cultural Resource Inventory of Portions of the Lee Paul Slough Lake Ilo National Wildlife Refuge Dunn Co., ND 02ILO001	8208
2002	Stine, E.	A. Kulevsky	Class III Cultural Resource Inventory, Highway 31 Junction I-94 North To Junction 200A: Morton, Oliver and Mercer Co., ND NDDOT Project Number: SS-1-031-(010)078	8888
2002	Wermers, G.		Borrow Area, Federal Aid No. SC-1329(062), in Section 14, T141N, R93W, Dunn Co., ND	8333
2002	Wermers, G.		Bowman Municipal Airport Expansion Project, Bowman Co., ND	8192
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.		Fridley Pit Expansion & Access Road: A Class III Cultural Resource Inventory, Dunn Co., ND	8511
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.		Intersection Improvement at Highways 200 & 8, South of Halliday: A Cultural Resources Inventory in Dunn Co., ND NDDOT Project #HSP-5-200(007)117	8672
2003	Kulevsky, A.		Recovery Approach at the Intersection of Highways 200 & 8 at Halliday, Dunn Co, NDDOT Project #HSP-5-999(004)	8673
2003	Morrison, J.		Consolidated Telcom's Halliday to Dunn Center Exchange: A Class III Cultural Resource Inventory Dunn Co., ND	8550
2003	Morrison, J.		Manning Station Supply Waterline: A Class III Cultural Resource Inventory, Dunn Co., ND	8630
2003	Morrison, J.		ND Highway 22 From Killdeer to Lost Bridge: A Class III Cultural Resource Inventory, Dunn Co., ND	8448

Year	First Author	Second Author	Title	Ms #
2003	Morrison, J.		Williston Basin Interstate Pipeline Company: NBVS Access Road in Dunn Co., ND	8653
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	Stine, E.		Reinhardt Gravel Pit: A Cultural Resource Inventory in Mercer Co., ND	8605
2003	Strait, J.	B. Fandrich, et al.	A Class III Cultural Resource Inventory of the Coteau Properties Company's Mine Area 2 North, Mercer Co., ND	8464
2003	Wermers, G.		Dunn County Bridge Replacement Project in Sections 10 & 15, T141N, R94W, ND, Structure 13-125-53.0	8493
2004	Bluemle, W.		Oliver-Mercer 2004: A Class III Cultural Resource Inventory, Oliver and Mercer Counties, ND	8840
2004	Borchert, J.		NH-1-200(045)900 Highway 200A Resurfacing Class III Cultural Resources Inventory	8836
2004	Hiemstra, D.		Clemens and Pulver Tree Tracts: A Class III Cultural Resources Inventory in Stutsman & Oliver Counties, ND	9028
2004	Stine, E.		Highway 8: An Intensive Cultural Resource Inventory in Stark and Dunn Counties, ND	8915
2004	Stine, E.		Killdeer Cemetery, Community Transportation Enhancement Project: An Intensive Cultural Resource Inventory in Dunn Co., ND	8931
2004	Stine, E.		Richardton to Taylor Exchange: A Class III Cultural Resource Inventory in Stark Co., ND	8824
2004	Wermers, G.		Dunn County Bridge Replacement and Road Improvement Project in Sections 23 & 24, T145N, R92W, ND, Structure 13-135-31.0	9072
2004	Wermers, G.	J. Hertaus	Road Improvement Project in Sections 10,11,12,13,14, & 15, T141N, R92W, Dunn Co., ND [Federal Aid Project SC-1354(051)]	8873
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	Bluemle, W.		America the Beautiful 2005 Community Challenge Grant Program Sites in Grand Forks & Mercer Counties, ND: A Class III Cultural Resource Inventory	9323
2005	Bluemle, W.		Highway 200 Survey: A Class III Cultural Resource Inventory in Mercer Co., ND	9177
2005	Borchert, J.		HSP-5-049(005)082, Highway 49, Morton Co. Line North to Highway 200, Class II Cultural Resource Inventory, Mercer Co., ND	9081
2005	Boughton, J.		A Cultural Resource Inventory of the SE¼ of Section 4, the NE¼ of Section 9, the SW¼ of Section 13, and the NE¼ of Section 14 of T145N R87W for the Coteau Properties Company, Beulah, ND	9543
2005	Klinner, D.	J. Morrison	Hannover Road Reconstruction Project: A Class III Cultural Resource Inventory in Oliver Co., ND	9127
2005	Klinner, D.		Highway 8 Improvements: A Class III Cultural Resource Inventory, Dunn Co., ND	9446
2005	Kordecki, C.		Dunn County Road Improvement Survey, Class III Cultural Resources Inventory Near Killdeer, Dunn Co., ND	9561
2005	Kordecki, C.		Dunn County Road Improvement Survey, Class III Cultural Resources Inventory Near Manning, Dunn Co., ND	9562

Year	First Author	Second Author	Title	Ms #
2005	Loflin, G.		Archaeological Survey of Twelve Acres for a Wetland Creation, Dunn Co., ND	9146
2005	Springer, K.		05-057-047 to -050 Pipeline System & Fence Cultural Resources Inventory, Mercer Co., ND	9572
2005	Springer, K.		The Revision of The 05-057-055 Ag Waste System Project, Cultural Resources Inventory, Mercer Co., ND	9533
2005	Stine, E.		Community Transportation Enhancement Grant Program: A Class III Cultural Resource Inventory in Dunn, Pierce, Steele and Williams Co., ND	9320
2006	Boughton, J.	S. Wagers	A Class III Inventory of a 5.67 Mile Segment of US Highway 200 in Mercer Co., ND	9580
2006	Burns, W.		The Hauck Survey, Dunn Co.: A Class III Cultural Resource Inventory	9885
2006	Fandrich, B.		Hazen Bypass: A Class III Cultural Resource Inventory Along a 2-mile Segment of State Highway 200, Mercer Co., ND	9857
2006	Hiemstra, D.		Highway 200: A Class III Cultural Resource Inventory in Dunn & Mercer Counties, ND	9913
2006	Hope, S.	J. Boughton	NDDOT: A Class III Inventory of an 18.96-Mile Segment of Highway 15 in Eddy Co., ND	9948
2006	Klinner, D.		Gerald Tuhy 21-4H Well Pad & Access Road: A Class III Cultural Resource Inventory, Dunn Co., ND	9860
2006	Kordecki, C.		Dunn Co. Road Improvement Survey, Additional Class I & Class III Cultural Resources Inventory Near Manning, Dunn Co., ND, 2006	9818
2006	Springer, K.		04-057-158 to-61 Pipelines Cultural Resources Inventory, Mercer Co., ND	9542
2006	Springer, K.		05-057-045 Well & Tank Cultural Resources Inventory, Mercer Co., ND	9571
2007	Carlson, W.	J. Payette	Phase I Cultural Resource Investigation of Proposed ND-04-Hebron Telecommunications Tower Project Area, Hebron, Morton Co., ND	10123
2007	Harty, J.		Knudsvig 34-7H Well Pad & Access Road: A Class III Cultural Resource Inventory, Dunn Co., ND	10084
2007	Heiner, P.		Schwindt 31-10H Well Pad: A Class III Cultural Resource Inventory, Dunn Co., ND	9958
2007	Heiner, P.	J. Harty	Three Fiber Optic Cable Routes: Class II & Class III Cultural Resource Inventories, Bowman and Dunn Counties, ND	10040
2007	Hiemstra, D.		ND04 Knife River Alt: A Class III Cultural Resource Inventory for a Proposed Cell Phone Tower & Ancillary Facilities in Mercer Co., ND	10087
2007	Hiemstra, D.		ND04 Manning Alt 1: A Class III Cultural Resource Survey for a Proposed Cell Phone Tower & Ancillary Facilities in Dunn Co., ND	10100
2007	Klinner, D.		Gerald Tuhy 21-4H Access Road: A Class III Cultural Resource Inventory in Dunn Co., ND	9959
2007	Springer, K.		06-057-045 & -047 Tree Planting Project Cultural Resources Inventory, Mercer Co., ND	10002
2007	Wermers, G.		STATEOP-0433 Class III Inventory Report, Oliver Co., ND	10012

Test Excavation Projects

This Study Unit has the highest ratio of testing projects to inventory projects in the state. This high rate of testing is due principally to several very big, high-impact developments where site avoidance was not considered seriously. For example, strip mines cannot readily be moved to avoid sites. Also, the route of the Northern Border Pipeline was guided more by engineering considerations than by cultural resource ones. Table 3.6 lists reported test excavation projects.

Table 3.6: Test Excavation Projects in the Knife River Study Unit, 5-Sept-2007.

Year	First Author	Second Author	Title	Ms #
1978	O'Brien, L.		Test Excavation of the Ted Reich Farm Site - 32ME157	301
1980	Good, K.	J. Logan	Test Excavation of Two Archeological Sites (32ME217 & 32ME218) within Section K, Indian Head Mine, North American Coal Company, Mercer Co., ND	2530
1980	Rippeteau, B.		Addendum for the CRS2913(52) Road Improvement Testing of Archaeological Sites 4-8, Mercer Co., ND	2297
1980	Tate, M.		Beulah Bridge Replacement Addendum Report, Mercer Co., ND	1868
1981	Roberson, W.		Northern Border Pipeline Historic Sites Testing Data, Morton, Dunn, McKenzie & Williams Counties, ND	2588
1981	Roberson, W.	C. Parish	Northern Border Pipeline, ND: Historic Sites Testing & Evaluation, Morton, Dunn, McKenzie & Williams Counties	2566
1982	Ahler, S.		Progress Report Concerning Archeological Investigations at the Cross Ranch & in the Knife River Flint Quarry Area, Dunn & Oliver Counties, ND	2750
1982	Van Hoy, T.		Shell Oil Young Bear 23-4 Test Excavations, Dunn Co., ND	2714
1983	Ahler, S.	R. Christensen et al.	A Pilot Study of Knife River Flint Procurement & Reduction at Site 32DU508, a Quarry & Workshop Location in Dunn Co., ND	2658
1983	Deaver, K.	K. Schweigert	Archaeological & Historical Evaluation Project for Proposed Permit Area D Coteau Properties Freedom Mine Area 2, Mercer Co., ND	3225
1983	Kjos, J	M. Schreiner et al.	Recording & Evaluation of Site 32ME681 & Evaluation of Site 32ME135, Indian Head Mine NE Mine Area B, Mercer Co., ND	3115
1983	Root, M.	M. Gregg	Archeology of the Northern Border Pipeline, ND: Vol. 3, Test Excavations, McIntosh, Emmons, Morton, Stark, Mercer, Dunn, McKenzie, & Williams Counties, ND	3456
1983	Stanfill, A.	H. Plochman et al.	Dunn-Nakota Methanol Project, Dunn Co., ND, Test Excavation & Evaluation of Selected Archaeological Sites, Vol. I	3173
1984	Borchert, J.		Archaeological Investigations for the Basin Electric AVS to Charlie Creek 345 kV Transmission Line, Dunn Co., ND	3551
1984	Greiser, T.	S. Greiser	Report of Findings Resulting from Phase I Mitigation of Adverse Impacts to Cultural Resource Sites in Mine Area I of the Glenharold Mine, Mercer Co., ND, 2 Vols.	3834
1984	Historical Research Associates		Phase II Detailed Mitigation Plan for Significant Cultural Resources Sites Located Within Glenharold Mine Area I, Mercer Co., ND	3255
1984	Kay, M.	J. Van Nest	Archeological Investigations in the Knife River Flint Primary Source Area, Dunn Co., ND: 1983-1984 Program	3411
1984	Kuehn, D.		Archaeological Testing at 32ME166	3561
1984	Kuehn, D.	J. Hodny et al.	National Register Evaluations of 12 Archaeological Sites & 8 Historical Sites in the Coteau Mine Areas D and J, Mercer Co., ND	3548

Year	First Author	Second Author	Title	Ms #
1984	Kuehn, D.		Preliminary Report on the Archeological & Historical Investigation Along the Voight Bay Road, Dunn Co., ND	3415
1985	Artz, J.		Boeckel-Renner (32ME799): A Mound Complex and Stone Circle Site in Mercer Co., ND (Paper Presented at the 43rd Plain Conference, October 23-26, 1985, Iowa City, IA)	3891
1985	Kuehn, D.		A Report on Archaeological Evaluative Testing at Sites 32ME427 & 32ME438, Knife River Coal Mine, Mercer Co., ND	3860
1985	Root, M.	J. Van Nest	Archeological Investigations in the Knife River Flint Primary Source Area, Dunn Co., ND: 1984-1985 Site Testing Program	3552
1985	Root, M.	S. Ahler et al.	Archeological Investigations in the Knife River Flint Primary Source Area, Dunn Co., ND: The Benz Site, 32DU452 (Contribution No. 225)	3733
1986	Artz, J.	K. Schweigert	Southwest Pipeline Archeology: Testing & Evaluation of 15 Sites in Mercer & Dunn Counties, ND (Segments A, B-1, & B-2), Contribution No. 229	3898
1986	Christensen, R.	D. Kuehn	An Evaluation of Archaeological Sites 32ME819 & 32ME834 on the Knife River Coal Company "S-S Tract" & Site 32ME825	4093
1986	Christensen, R.	D. Kuehn	Archaeological Testing at Five Sites Along the Golden Valley South Road Improvement, Mercer Co., ND	4156
1986	Kuehn, D.		A Report on Significance Testing at Sites 32ME679 & 32ME680, Coteau Permit Area G, Mercer Co., ND	4063
1986	Kuehn, D.	L. Perry et al.	Archaeological & Historical Investigations Along the Voigt Bay Road, Dunn Co., ND.	4151
1986	Root, M.	S. Ahler et al.	Archeological Investigations in the Knife River Flint Primary Source Area, Dunn Co., ND: 1982-1986 Program.	4273
1987	Artz, J.	L. Loendorf	Southwest Pipeline Archeology: Further Investigations at the Goodman Creek (32ME796) & Boeckel-Renner (32ME799) Sites, Mercer Co., ND	4270
1987	Borchert, J.		Final Report on Additional Test Excavations at 32ME199, Mercer Co., ND	4255
1987	Noisat, B.	J. Campbell et al.	Cultural Resources Evaluation of Sites 32DU336 & 32DU337: Completion of the Historic Properties Survey for the RC & D Flood Prevention Project, Halliday, Dunn Co., ND	4288
1987	Shaw, T.	D. Kuehn	Final Report on the Archaeological Testing Carried Out on the Golden Valley Road South Improvement Project, Mercer Co., ND	4256
1988	Bergstrom, M.	K. Deaver	Mitigation of Site 32ME163, Mercer Co., ND	4712
1988	Borchert, J.		32ME1014 to 32ME1016 Evaluative Testing	4609
1988	Deaver, K.	J. Brownell	Site Mapping, Testing and Evaluation in Area F, Coteau Freedom Mine, Mercer Co., ND	4713
1988	Haury, C.	P. Picha et al.	Evaluation of Four Cultural Resources on the Southwest Pipeline, Dunn, Mercer, and Stark Co., ND	4711
1989	Ahler, S.	J. Artz	Non-Technical Summary Report on Further Evaluation of the Alkali Creek Archeological Site, 32DU336-SEE, Dunn Co., ND	4708
1989	Artz, J.	S. Ahler	Further Evaluation of the Alkali Creek Archeological Site, 32DU336-SEE, Dunn Co., ND	4799
1989	Artz, J.	E. Hayden et al.	Southwest Pipeline Archeology: The 1987 Survey & Test Excavation Programs at Prehistoric Sites in Mercer & Dunn Counties, ND (Segment A and B2)	5097
1989	Burbidge, G.	J. Borchert	Final Report Evaluation of Eight Sites Dunn Co., Road Dunn Co., ND	4882
1989	Persinger, R.	J. Whitehurst	Test Excavations at 11 Sites For the Proposed Mercer County Road #13 Improvement Project Draft Final Report	4719
1989	Peterson, L.	J. Brownell	Archaeological & Historical Investigations of Sites within the Coteau Freedom Mines Areas, Mercer Co., ND (Life-of-Mine Area)	4914
1990	Borchert, J.		Preliminary Report Evaluative Testing at 32ME835	5294
1990	Peterson, L.		Testing Conducted within the Southern Extreme of Site 32DU908	5044

Year	First Author	Second Author	Title	Ms #
1991	Aaberg, S.	K. Deaver	Preliminary Report Dakota Star Reserve Archaeological Site Testing Project, Mercer Co., ND	5682
1991	Aaberg, S.	K. Deaver	Testing & Evaluation of Nine Prehistoric Sites in Permit D Area, Coteau East Mine, Mercer Co., ND	5932
1991	Larson, T.	J. Miller et al.	A Report of Archaeological Investigations at 32ME1267 & 32ME1269, Mercer Co., ND	5515
1991	Newberry, G.	B. Olson	Western Area Power Administration Charlie Creek-Belfield Transmission Line Project: Results of Limited Testing at Four Prehistoric Sites in Billings and McKenzie Counties, ND	5161
1991	Pool, K.		Dunn Co., Road Improvement: Results of Subsurface Testing at 32DU985 & Treatment Plan	5796
1991	Späth, C.		32ME1049: Archaeological Data Recovery T142N, R89W Sections 23 & 24, Mercer Co., ND	5597
1991	Späth, C.	R. Christensen	32ME254, Evaluation and Intensive Testing	5798
1991	Späth, C.		The Bees Nest Ring Site (32ME175): Inventory of 80 Acres T145N R88W Section 2 Mercer Co., & Documentation & Limited Testing of 32ME175	5799
1992	Borchert, J.	L. Blikre	Final Report of Evaluative Testing at 32DU1032 (UW#1477)	5711
1992	McKibbin, A.		Interim Report of Findings During Data Recovery at 32ME1089, Mercer Co., ND	5788
1992	Stine, E.	A. McKibbin	Coteau Freedom Mine Testing & Evaluation of Nine Sites in Mercer Co., ND	6007
1992	William, J.	S. Ahler et al.	Phase II Cultural Resource Investigations Associated With Proposed Dam Safety Modifications at Lake Ilo National Wildlife Refuge, Dunn Co., ND Parts 1, 2	5702
1993	Cochran, S.		Dunn County Road Improvement: Results of Subsurface Testing at 32DU924, 32DU1069, 32DU1070, 32DU1071, & 32DU1073	5985
1994	Boughton, J.	L. Peterson	Testing & Evaluation of Prehistoric Sites within the North Mine Extension Area, Mercer Co., ND	6347
1994	Kulevsky, A.		Phase II Testing & Evaluation of Site 32ME1328 in Mercer Co., ND	6321
1995	Klinner, D.		Results of the Evaluative Testing at Site 32DU1096 & Portions of Sites 32DU1097 & 32DU1098, Dunn Co., ND (UW#1696)	6444
1996	Porter, D.	D. Klinner	Evaluative Testing at Portions of Sites 32DU1100 and 32DU1113, Dunn Co., ND	6824
1998	Christensen, R.		Otter Creek Archaeology: Testing of 32OL336 and 32OL337, Oliver Co, ND	7154
1999	Olson, B.	G. Newberry	Final Report of Evaluative Testing of Sites Impacted by the Dakota Gasification Company CO_2 Pipeline: Mercer, Dunn, McKenzie, and Williams Counties, ND	7299
2000	Morrison, J.		Limited Testing of 32DU1028 Along Highway #8: Dunn Co., ND	7412
2001	Boughton, J.	B. Fandrich et al.	Coteau Properties Company: Testing & Criterion D Evaluation of Prehistoric Sites Located in Permit Extension Areas D & H & the West Permit Area, Mercer Co., ND	8531
2002	Wermers, G.		Evaluative Testing of the Southern Portion of Site 32DU319, Dunn Co., ND	8171
2003	Strait, J.	L. Peterson et al.	Coteau Properties Company: Testing and NRHP Evaluation of Properties Located in the Mine Area 2 North, Mercer Co., ND	8748
2003	Wermers, G.		Results of Investigations at Feature 5, Site 32ME1330, Mercer Co., ND	8830
2004	Wermers, G.		Evaluative Testing at Sites 32ME427, 32ME2180, & 32ME2181, Mercer Co., ND	9144

Year	First Author	Second Author	Title	Ms #
2005	Hiemstra, D.		Hazen Flint Quarry: Results from Evaluative Testing at 32ME365 Mercer Co., ND	9101
2005	Stine, E.	D. Hiemstra	Grasslands Pipeline: Archaeological Investigations in Billings, Dunn, Golden Valley & Stark Counties, ND	9154
2007	Toom, D.	C. Kordecki	Site 32DU1301 Archeological Test Excavations on the Upper Knife River, Dunn Co., ND	9989

When developers cannot avoid historic properties, there is sure to be close attention paid to site significance evaluations. If sites are evaluated as not significant, they can be destroyed without further expenditures. The effects from this scrutiny have been more positive than negative for archeology. For example, it has become clear that greater numbers of artifacts are not necessarily indicative of sites with greater potential to yield important information. In fact, just the opposite may sometimes be the case. Larger sites and denser artifact deposits typically signify places that were recurrently occupied, and the resultant palimpsest deposits result in an obscured archeological record. It has been concluded that well-stratified sites especially are significant in this Study Unit as in all other parts of the state (cf. Artz 1988a:21).

In dealing with shallow stone circle sites, however, high artifact densities often translate directly into positive significance evaluations. For example, the first mitigating excavation of a Coteau Properties' archeological resource was at 32ME166, a site with 11 stone circles, five functionally problematic stone features, two cairns, and one small depression (Kuehn 1984). Artifacts were found in 42% of 50 auger probes and nine shovel probes dug during testing. All six of the 1-x-1-m test units yielded artifacts. The recovered artifacts included chipped stone tools and flaking debris, ground stone tools, bone, fire-cracked rock, and shell. However, high densities of these sorts of artifacts mean very little if the artifacts (along with their functions, raw materials, etc.) are not assignable to specific episodes of occupation, archeological complexes, or cultural periods. Intact, low density, single-component cultural deposits can yield important information.

The listing of test excavation project report manuscripts on file at the HPD shows that 16 prehistoric sites were tested along the Northern Border Pipeline right-of-way in the Knife River drainage basin. Testing of another two (32DU37 and 32DU285) was followed up with small salvage excavations. The same analytical methodology was applied to all of the excavated materials from all of the Northern Border sites. Basically, the same analytical methodology has been applied to significant numbers of other tested sites in this Study Unit in the KRF quarry area and along the Southwest Water Pipeline right-of-way (e.g., Artz 1986; Root et al. 1985, 1986). These projects have generated a large database which can be used to evaluate the importance of the application of methodologies which generate comparable data in archeology. What is the value of adopting uniform standards for test excavation, and what is the significance of that which is lost when standards are not applied?

During 1988 and 1989, a proposed county road improvement project necessitated test excavations at 11 sites in Mercer County. Three sites (32ME454, 32ME1035, and 32ME1040) were recommended eligible for the NRHP. Site 32ME454 is a quarry and lithic workshop, principally comprised of KRF flakes. A Besant projectile point dates the site. Investigators suggest it was used as a field camp. The recovered artifact assemblage indicates, "The technology utilized in the lithic reduction industry may have changed through time" (Christensen and Whitehurst 1989:12). Site 32ME1035 is a multi-component, dense lithic scatter mainly composed of KRF. A McKean projectile point dates deposits at the site to 3000-600 BC (ibid.:27). Surface collection included Besant and Late Prehistoric points, and a large corner-notched biface (ibid.:29). Site 32ME1040 differs from sites 32ME454 and 32ME1035 because it contains stone circles and cairns in addition to a lithic scatter. The density of the lithic scatter and the presence of the stone circles suggest a relatively intense, short-term occupations (ibid.:40). Moreover, the differing degrees of patination indicate multiple occupational episodes (ibid.).

Site 32ME1267, located south of Lake Sakakawea, is a single component short-term camp (Larson et al. 1991). Investigators suggest the Avonlea-aged site functioned as a small base camp where the primary activities likely included tool maintenance and cooking, as evinced by the ceramics, quantity of tertiary KRF flakes, and small site size (ibid.:14).

Site 32MZ1005 is a moderately dense, multi-component cultural material scatter located on the edge of a ridge dividing the Little Missouri and Little Knife rivers (Newberry and Olson 1991). Projectile points dating to approximately 1400 BP were observed during the initial inventory of the sites. Buried deposits are present in portions of the site not affected by erosion from intermittent streams. Test excavation consisted of 135 shovel tests and eight formal test units. The artifact assemblage includes ceramics (Talking Crow ware), flaking debris, and bone (ibid.). Obsidian, sourced to Obsidian Cliff, was collected. The ceramic type and obsidian hydration tests confirm the site is multi-component (ibid.:72). The artifact assemblage is similar to that found at 24RL1225 (Nollmeyer Village in eastern Montana). Investigators suggest that site 32MZ1005 is "one of series of localities occupied by groups moving between the Yellowstone River Valley and the Missouri Coteau" (ibid.:71).

Sites 32OL336 and 32OL337, situated approximately 150 m apart on a terrace of the west bank of Otter Creek, were tested in 1997 by NDDOT archeologists (Christensen 1998). The sites are cultural material scatters, primarily composed of KRF flakes, and likely the remnants of short-term campsites (ibid.:11). In addition to lithics, granitic fire-cracked rock and ceramics (Plains Woodland or Plains Village) were recovered from site 32OL336. Investigators suggest the site was occupied in the last 1,000 years (ibid.:12). The artifact assemblage at site 32OL337 included a piece of fire-cracked rock, KRF stone tools (a spokeshave, a biface, a drill, and a Pelican Lake projectile point). The drill and point were observed on the surface during the initial inventory

(ibid.:9). A Late Plains Archaic age is proposed for the site. Further work is recommended for both sites, as they are located along Otter Creek between the Knife and Missouri rivers.

Evaluation of 32DU1180 was undertaken in response to work on a proposed pipeline. The stone feature site is located on the western edge of a north-south trending ridge (Olson and Newberry 1999:31). Testing included shovel probes and formal test units arrayed on four transects. Knife River flint lithic debris and an end scraper indicate tool maintenance at the site. With no permanent water source in the immediate area, investigators conclude that the site functioned as a temporary campsite.

Site 32ME365, a lithic procurement site, is located on an upper terrace above Antelope Creek within the Knife River valley. Investigators note that the site is east of the KRF primary source area and therefore has the potential to elucidate prehistoric quarrying activities outside of the delineated primary source area. Test excavation included 116 shovel probes and five test units (Hiemstra 2005:ii). The artifact assemblage includes 22 cores/tested raw material, seven unpatterned flake tools, six early stage bifaces/biface fragments, one scraper, an unidentifiable projectile point fragment, 1,749 pieces of debitage, and one hearth (ibid.:21-26). Knife River flint was the lithic raw material for 36 of the tools and 99.7% of the debitage (ibid.:21, 27). Twenty pieces of debitage appear to have been heat-altered/burned (ibid.:32). Investigators conclude that the site appears to have functioned as a lithic procurement locale with at least one KRF quarry pit and three activity areas/workshops (ibid.:33). Cultural/temporal affiliation of the site was undeterminable during the limited testing in 2004. However, the presence of a projectile point base and burned debris indicate that this issue could be addressed with additional excavation.

Coteau

Test excavation for Coteau began in 1989 (Peterson and Brownell 1989). Archeological site 32ME175 is on a native prairie-covered upland flat with intermittent drainages bordering the south and east. Testing consisted of the excavation of 410 shovel probes and 10 formal excavation units (ibid.:24). Archeological features observed at the site include: 70 stone circles, 15 stone arcs, 54 cairns, one charcoal stain, and one charcoal-filled pit (ibid.:18). The artifact assemblage comprised bone fragments, fire-cracked rock, ceramics, chipped stone tools, and chipped stone flaking debris (KRF=98%; ibid.:34). Temporal information for the site was gleaned from the recovery of seven projectile point fragments, including a McKean Lanceolate point and several Late Prehistoric points (ibid.). Population estimates were derived by (1) assuming 4-11 people inhabited a structure, (2) inclusion of the all the site's stone circles in a single component, and (3) dividing the number of stone circles into Occupation B (low density of artifacts) opposed to Occupation A (high density of artifacts) (ibid.:39). Considering the number of features, investigators speculate that the stone circles with moderate to high densities of artifacts may have been populated by 234-638

people and 116-319 people for stone circles with lesser artifact densities (ibid.:39-40).

Three archeological components were identified at 32ME175 (ibid.:38-39). Component A was dated to the Middle Plains Archaic with a McKean point. Component B was dated with a radiocarbon sample from a roasting pit. The resultant date indicates a Pelican Lake or Late Plains Archaic occupation. Stone features and ceramics were used to date Component C. Check-stamped ceramics date it to AD 1200-1700. Component C likely was used multiple times. Investigators recommend 32ME175 as eligible for listing in the NRHP because it retains contextual integrity and the potential to address research questions concerning settlement and subsistence strategies, and stone feature placement (ibid.:41).

A 1994 cultural resource investigation identified two stone feature sites (32ME158 and 32ME776) in the KRSU (Boughton and Peterson 1994). Site 32ME158, situated above sloughs to the south and southwest, is a large site with 47 stone circles and three cairns. In contrast, 32ME776, located on the east slope of a knoll above a drained slough, consists of four stone circles and one arc.

Testing at 32ME158 included a shovel probe inside each of 39 stone circles and a formal test unit within each cairn. The stone circle diameters ranged between 3-7.5 m and the size of the cairns exceeded 3 m (ibid.:32). Seventeen stone circles contained chipped stone flaking debris and excavation of the cairns yielded flaking debris, a core, and bison bone (ibid.:43). Varying amounts of lithic reduction occurred at the site. Investigators suggest the site has been occupied multiple times based on the clustering of the features, and rock densities and size of the stone features (ibid.:44).

Test excavation at 32ME776 was similar to 32ME158. Two of the stone circles were tested with shovel probes and one formal test unit was placed in a third stone circle (ibid.:46). The test unit contained flaking debris and one utilized flake blade (ibid.). Investigators speculate that 32ME776 was a habitation site which may have been an extension of 32ME158 (ibid.:49).

In 2000 a large test excavation project was undertaken to examine 179 previously unevaluated sites within three mining expansion areas in central Mercer County (Boughton et al. 2001). Testing involved the excavation of 403 m^2 from test units, shovel tests, shovel probes, and soil cores (ibid.). Thirty-five prehistoric sites were recommended eligible for listing in the NRHP. Further, archeologists suggest 13 sites have the potential to yield information concerning research questions presented in the State Plan, particularly those concerning stone circles and prehistoric hunting strategies.

Two the mine expansion areas are within the KRSU and one is in the Garrison Study Unit. Within the KRSU, the sites include 84 stone circle/cairn sites, 52 stone circle sites, 5 stone circle/cairn/alignment sites, 4 stone

circle/alignment sites, 4 cairn sites, 1 stone circle/cairn/petroform site, 12 lithic scatters, and one lithic/bone scatter (ibid.). Of the 163 sites within the KRSU, 30 were recommended eligible for listing in the NRHP. A combination of factors was used to determine eligibility including site size, artifact density per site, site location, integrity of the site, and "uncommon feature characteristics" (ibid.:11.1). Investigators provide an example of this evaluation process: "For instance, 32ME108 demonstrated a lower artifact density than many of the other eligible sites. At the same time, it contained stone ring features that are greater than 10 m in size. As such, this site had a greater potential of providing information on the function of unusually large stone rings than the other sites within the sample" (ibid.:11.1).

Strait et al. (2003) report the results of more cultural resource investigations conducted for Coteau stemming from a proposed 6,670 acre expansion of mining operations. Three of the 33 prehistoric sites evaluated are within the KRSU. Sites 32ME566, 32ME567, and 32ME2203 are stone feature sites and a lithic scatter, respectively. Virtually no artifacts were recovered during test excavations. Moreover, no cultural/temporal affiliation could be determined for the sites. None of the three sites were recommended eligible for listing in the NRHP.

Lake Ilo

In 1990, Phase II cultural resource evaluations were undertaken at the Lake Ilo National Wildlife Refuge (LINWR) in central Dunn County (William et al. 1992). Lake Ilo resulted from damming Spring Creek in the 1930s. The Lake Ilo basin is west of the confluence of the Spring and Murphy creeks, southeast of the Killdeer Mountains and north of the Knife River. The impetus for the investigations was safety issues with the Lake Ilo Dam operated by the US Fish and Wildlife Service. Twenty-six of the 37 archeological sites were recommended eligible for listing in the NRHP. The importance of these sites to the understanding of North Dakota prehistory cannot be overstated. The refuge is on the northwestern edge of the KRF primary source area with diagnostic artifacts dating as far back as the Paleo-Indian period. The following discussion *very* briefly summarizes the LINWR investigations. For a comprehensive report of the findings the reader is directed to William et al. (1992).

The 1990 fieldwork at archeological sites in the LINWR included 105 backhoe trenches (1,238.2 m), 120 excavation units (56.2 m^3), 184 auger samples, and 2,893 mi^2 of controlled surface collection (ibid.:67-68). Four of the thirteen prehistoric sites (32DU954, 32DU955, 32DU966, and 32DU972) were sub-divided into areas of concentration (ibid.:17). For example, due to its size and significance 32DU955 was split into concentration areas 32DU955A through 32DU955E. The total artifact assemblage across all the sites consisted of 58,424 specimens, including: 51,848 pieces of chipped stone flaking debris; 2,753 stone tools; 1,920 pieces of natural KRF; 693 pieces of fire-cracked rock; 655 pieces of shell; 380 pieces of bone; 151 historic materials; 11 pieces of burnt KRF; one piece

of charcoal; one bone tool; one pot sherd; and five miscellaneous items (ibid.). Approximately 72% of this sample was recovered during controlled surface collection at 32DU955A (ibid.). Ninety-eight classifiable projectile points, spanning from the early Paleo-Indian to Late Prehistoric periods, were recovered (ibid.:71). In summarizing site investigations, William et al. (1992:524) state: "It can be noted that prehistoric remains exist in two basically different settings and contexts: in partially or completely eroded condition on the exposed lakebed, and in relatively less eroded condition in areas above the high water line of the lake (2190.5 ft elevation)." The report concludes with significance evaluations and management recommendations for the recorded Lake Ilo cultural properties.
NRHP and NDSHSR

Fifty-four sites were specified in the NRHP nomination for the Lynch Knife River Flint Quarries District. This 6,375-acre area represents one of the largest known flint quarrying complexes in North America (Loendorf et al. 1984:4). The Lynch Quarry sits in the heart of the proposed Lynch Knife River Flint Quarry National Historic District. The Keeper of the NRHP rendered a formal determination of eligibility for the proposed district at the national level of significance. Due to landowner disagreements over federal recognition of the district in the 1980s, it was never formally nominated. The sentiments of the landowners have changed considerably over the ensuing 25 years and now many wish to see these cultural resources protected (Damita Hiemstra, personal communication 2008). The Lynch Quarry site proper (32DU526) covers 693 acres and is the largest of the known KRF quarry sites. Another much smaller quarry site, the Crowley Flint Quarry in Mercer County, is listed in the 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 ratio of major excavations to test excavations in the KRSU is surprisingly low. Most of the major excavations have been at the Coteau Properties and Glenharold lignite strip mines and the LINWR. The work at 32DU508 in the Lynch Knife River Flint Quarries District, while generating quantities of new information commensurate with a well-designed major excavation, was described by the report authors as a "small-scale exploratory testing program" (Ahler and Christensen 1983:i).

Mitigative measures were undertaken at 32ME799-Area K (Boekel-Renner site) and 32ME847 in 1989 because of construction on the Southwest Pipeline project (Sanders 1992). The sites are located on ridgetops approximately 1.5 miles west of the Beulah Trench. Interpretations of the data recovery results from both

sites were supplemented by analyses of lithics, fauna, ceramics, stratigraphy, macroflora, pollen, and phosphate samples. These analyses allowed investigators to provide answers to research questions outlined for the sites. The reader is directed to Sanders (ibid.) for a comprehensive discussion of the sites and interpretations. The following discussion is a synopsis gleaned from that manuscript.

Site 32ME799 is a stone feature and earthen mound site. Diagnostic artifacts recovered from surface collection and excavation at the site date from the Middle Plains Archaic through the Late Prehistoric periods. Specifically, the Besant, Avonlea, Pelican Lake, and Plains Side-Notched complexes are represented (ibid.:6-19). Further, ceramics characteristic of the Woodland period also were collected (ibid.:6-23). Site 32ME847 is a stone feature and cultural material scatter site. Identifiable projectile points date two distinct occupations at the site to the Avonlea Complex (ibid.:7-2). In fact, 43 Avonlea points were documented in the upper two cultural layers (ibid.:7-32). Hearths, bone filled pits, bone uprights, and a post mold were documented at the sites.

In 1990, an extensive data recovery program was required at the Alkali Creek site (32DU336-SEE) resulting from the Halliday Flood Prevention Project (Metcalf and Ahler 1995). The site is in rolling uplands, southeast of the confluence of Alkali and Spring creeks. It is within the north-central portion of the KRF primary source area. Glacial gravels in the area contain nodules of KRF.

The Alkali Creek site functioned as a KRF quarrying site for approximately 10,000 years (ibid.:ii). Prior to the burial of the site by mid-Holocene alluvium, it was heavily exploited by people during the Paleo-Indian and Late Archaic/Middle Woodland periods (ibid.). Features and diagnostic artifacts recovered at the Alkali Creek site reflect its rich history. Features include quarrying pits, lithic workshops, hearths, and large amounts of bovid and canid bones (ibid.). The majority of the artifact assemblage consists of lithic materials. Investigators note, “Projectile points found suggest affiliations with named cultural complexes including Goshen, Hell Gap, and possibly Agate Basin and Alberta for Paleoindian, Calf Creek and Mummy Cave for the Early Plains Archaic, Oxbow and Duncan-Hanna for the Middle Plains Archaic, Besant for the Late Archaic or Middle Plains Woodland, and unnamed Late Prehistoric” (ibid.:2). Radiocarbon dating also was used to date the site.

Numerous research questions steered the Alkali Creek project. The general topics outlined by the project supervisors include: (1) understanding site formation processes, (2) paleoenvironmental reconstruction, (3) technology, (4) non-quarry activities, (5) organizational strategies and group mobility, (6) cultural chronology and culture history, (7) KRF patination studies, and (8) development of hunter-gatherer theory (ibid.:25-26). These topics were addressed by integrating geoarcheological, floral, and faunal analyses into the archeological investigation. The complex nature of the Alkali Creek site and the

archeological investigation thereof are comprehensively discussed by Metcalf and Ahler (1995).

In 1992 a proposed transportation project in Dunn County resulted in the undertaking of a data recovery program at 32DU985. The lithic scatter is located on a bench above the Knife River which previously was disturbed by construction of a section line fence. The site had been inventoried and tested; therefore, the goals of the program were to determine the vertical extent of the site and recover cultural data within the area of potential effect. The results were sparse. Five formal test units yielded 78 pieces of debitage and three KRF scrapers (Späth 1992:9). No diagnostic materials were found. Investigators concluded that the site would not provide significant information about regional prehistory and clearance for the road project was recommended (ibid.:10).

Coteau

Several major excavation projects have been undertaken in central North Dakota resulting from Coteau's mining operations. Investigators (Deaver 1990; Deaver et al. 1989) have noted that there is a general trend within the mining region: the small- to medium-sized stone feature sites date to the Besant phase. Similarities of the sites include: function (satellite field camps), re-use, and utilization of KRF and other local (cherts, quartzite) and nonlocal (obsidian) materials. Research topics posed for these sites include: (1) site chronology, (2) types and frequency of lithic raw materials, (3) site function, and (4) subsistence strategy (Deaver 1990:18).

Lithic scatters are less common than stone feature sites in the Coteau mining region but occasionally have been excavated. Data recovery was conducted at 32ME1089, a large lithic scatter, in 1992 (Stine et al. 1993:1). The site is set in rolling plains uplands topped by glacial till and outwash sediments. Diagnostic artifacts recovered from the site indicate occupational episodes dating from the Middle Plains Archaic through Plains Village periods, however the disturbed nature of the stratigraphy precludes any conclusive statements concerning site chronology (ibid.:48). Site activities seem to have been concentrated around a large granite boulder that may have functioned as an anvil (ibid.:40-41). From this vantage point, the viewshed is good in all directions but particularly so to the west-southwest along a drainage on the north end of the site (ibid.). The artifact concentration(s) and assemblage suggest the site was a location or station used in the manufacture and maintenance of KRF tools (ibid.:51). For lack of data, no conclusions were drawn regarding site chronology, settlement, or subsistence.

Mitigation of a portion of the Bees Nest site (32ME175) was required in 1993 due to expansion of mining operations in the Life-of-Mine area. Excavation was conducted on the seven acres of the site within the area of impact. The multi-component stone feature site covers 64 acres of glaciated rolling uplands (Peterson and Peterson 1995:1.1). The site is approximately seven miles south of

the Missouri River. Intermittent wetlands are additional water sources in the area.

Several research topics were outlined prior to mitigation of the Bees Nest site. The six general research topics are: (1) chronology, (2) paleoenvironment, (3) settlement and site function, (4) diet and subsistence, (5) lithic technology, and (6) external relations and exchange (ibid.:3.1-3.10). Specific questions were posed by investigators for each topic. In addition to diagnostic artifacts and other data collected during excavation, supplemental analyses (radiocarbon, pollen, macrofloral, blood residue, obsidian hydration, and obsidian x-ray fluorescence) informed investigators as to the history of occupation (ibid.). Nine components have been identified at the Bees Nest site, including one possible Paleo-Indian occupation, one Middle Plains Archaic occupation, one McKean Complex occupation, two Besant occupations, a Late Prehistoric occupation, two Plains Village occupations, and one historic occupation (ibid.:6.6-6.8).

The results of the archeological work conducted at the Bees Nest site suggest that the stone circles were temporary base camps where tool manufacture and maintenance, floral and faunal processing, and possibly ceremonial activities occurred. The primary lithic raw material used was KRF. No particular season seems to have been favored over another. The grand scale and complexity of the Bees Nest site provide archeologists with an opportunity to reconstruct human occupation of the area over thousands of years.

Site 32ME154 is another large (130-acre), multi-component stone feature site within the Coteau mining area. Mitigation of the site was conducted in 1997. The site is in a similar setting as that of the Bees Nest site and comparable research topics also were addressed (Winzler et al. 1998:3.1-3.6).

Five components at 32ME154 have been delineated, including: Oxbow, McKean, Pelican Lake, and Besant complexes and the Plains Village/Late Prehistoric period (ibid.:7.1-7.2). In addition to establishing a site chronology, investigators relayed other conclusions about 32ME154. First, there does not appear to be a correlation between lithic density and stone circle size or wall density (ibid.:7.3). Second, the frequency of discarded tools inside and outside of a stone feature is not significantly different (ibid.). Third, a variety of floral (bulrush seeds, grasses, and a member of the umbel family) and faunal (bison, mice, rabbits, deer, and squirrel/beaver/porcupine) resources found within the area were exploited by its inhabitants (ibid.:7.4). Finally, because no Paleo-Indian component was observed at the site, research questions concerning Paleo-Indian subsistence strategies and lithic technologies were revised. Rather, general questions pertaining to subsistence and lithics of local prehistoric groups were posed (ibid.).

In 2005, 263 m^2 was excavated in Coteau's West Mine Area (Hope et al. 2006). Again, the excavation efforts focused on stone circle and cairn sites. The environmental setting consists of glaciated rolling uplands and prairie potholes.

Several answers to posed research questions were presented by Hope et al. (2006:7.1-7.5). A brief summary of the substantive results are provided here.

First, a strong indicator that a site functions as a base camp (with associated activities) is the presence of interior hearths containing higher densities of bone and chipped stone tools. Conversely, lesser densities of these artifact types suggest satellite camps and specialized endeavors. Second, the density of flaking debris increases as the size of the stone circle increases. Third, large cairns were constructed in single construction episodes. Eighty-five percent of the projectile points found in cairns date to the Late Prehistoric period. Finally, due to erosion, stone circles generally are located on ridge edges where glacial cobbles are numerous. The patterns of stone feature placement conform to the landscape.

Lake Ilo

After completion of inventory and testing projects at the LINWR (see Inventory Projects and Test Excavation Projects sections above), Phase III mitigation of the Bobtail Wolf site (32DU955A) was undertaken from 1992-1994 (Root 1993; Root and Emerson 1994). With intact cultural deposits dating from the Paleo-Indian to the Late Prehistoric periods, the site functioned as a KRF procurement location, lithic workshop, and field camp (Root 1993, 2000; Root and Emerson 1994). The site is located on a low Pleistocene terrace of Spring Creek in the western portion of the KRF primary source area. The size of the Bobtail Wolf site is 1.75 ha (Root 2000:5). Fieldwork included excavation of formal test units, block excavations, and trenches, totaling 489 m^2 (ibid.:2).

Several research questions, developed prior to excavation, influenced the investigators' approaches to and analyses of the Bobtail Wolf site. As stated by Root (ibid.:14-18), the research topics include: 1) the ages of site occupations; 2) site and regional geologic history; 3) procurement of KRF; 4) KRF reduction technology; 5) campsite activities; 6) Folsom projectile point technology; and 7) the organization of Folsom tool production, group mobility, and exchange.

The Bobtail Wolf site was divided into three geologic areas. The Leonard Paleosol (dating to the Paleo-Indian period) preserved across portions of the site is referred to as "terrace areas" (ibid.). Above the Leonard Paleosol, the Early Plains Archaic component is found in terrace veneer sediments (ibid.). On the surface and in deposits nearest the surface, Paleo-Indian, Plains Archaic, and Late Prehistoric components have been impacted by erosion and are disordered. Paleo-Indian deposits also are present in the "central rise," a subtle (deflated) rise in the center of the Spring Creek floodplain (ibid.). Investigators labeled areas virtually void of artifacts as the "Holocene channel-belt" (ibid.).

Paleo-Indian components include well-stratified Folsom deposits, and eroding surface expressions of the Hell Gap and Cody complexes (ibid.:363). The terrace areas and the central rise yielded thousands of Folsom artifacts.

Relatively trace amounts of cultural material dating to the Early Plains Archaic period was recovered from atop the Folsom component in the western and southern parts of the site (ibid.). Archaic and Late Prehistoric components were found muddled together on the surface and in shallow deposits (ibid.). Continual erosion and deflation have taken their toll on the site.

The majority of the artifact assemblage is Folsom. In fact, fully two-thirds of the tools and three-quarters of the debitage are from that component (ibid.:366). Five percent of the assemblage dates to the Archaic and the remainder comes from surface and mixed deposits (ibid.). Approximately 12,700 stone tools and over three million flakes were recovered at the site (ibid.:367). The composition of the artifact assemblage indicates that occupants prepared blanks for transport away from the campsite but during the Folsom period evidence from all stages of tool production has been found. Knife River flint was not the only lithic material present at the site. Indeed, other materials such as Rainy Buttes silicified wood (RBSW) were also discarded here. The small number of preserved large mammal remains, primarily bison, suggests people carried out single hunts and came back to the site to process the kills (ibid.).

The Big Black site (32DU955C) is located approximately 300 m north of the Bobtail Wolf site (William 2000a:1). During 1993 and 1994, data recovery was conducted at the site as part of the dam safety project at Lake Ilo. The approach to archeological work at the Big Black site resembled that of the Bobtail Wolf site because the setting, geomorphology, function, and artifact assemblages are similar, and may relate to one another (ibid.). Investigators suggest the Big Black site was used as a field camp, lithic workshop, and “minor” lithic procurement locale during the Folsom, Middle Plains Archaic, Late Plains Archaic, and Plains Village periods (ibid.). Specifically, the Folsom occupations across the site reveal different stages of tool manufacture (ibid.).

A number of research questions were posed before the project began and evolved as excavation progressed. As summarized by William (2000:12-14), general research categories include: 1) site chronology; 2) non-KRF lithic resources and subsistence-settlement patterns; 3) environmental change and geologic processes; 4) settlement, technology, and KRF; and 5) KRF procurement and distribution.

The area of the Big Black site is 21,000 m² (ibid.:15). Data recovery consisted of 2,050 m² of surface collection and excavations covering 403.05 m² (ibid.). The artifact assemblage includes 1,577 stone tools and 241,275 flakes (ibid.). A significant quantity of RBSW artifacts also is present. The intact Folsom deposits contain the densest amount of artifacts, 963 stone tools and 189,886 flakes (ibid.:1). Investigators predict that more Folsom deposits exist at the site and future work is recommended.

The Young-Man-Chief site (32DU955D) is a third locality within the 32DU955 site complex. Data recovery was conducted here in 1993 but ceased

after a month due to flooding caused by summer rains (Shifrin 2000c:1). However, investigators were able to glean some information from the site, increasing the body of knowledge concerning prehistory at Lake Ilo.

The Young-Man-Chief site functioned as a field camp and lithic workshop during the Folsom, Late Plains Archaic, and Late Prehistoric periods. The site is located on a Pleistocene terrace, west of Spring Creek. The approach to archeological investigations here resembled those of the Bobtail Wolf and Big Black sites.

The area of the Young-Man-Chief site is 44 m^2 (ibid.:99). Intact Folsom-age deposits contain tools made of KRF and non-local raw materials (ibid.:1). The recovery of Pelican Lake and Avonlea projectile points from mixed contexts indicate the site was occupied in later times as well (ibid.:68). The abundant evidence of core reduction and biface manufacture suggest the importance of the site as a lithic workshop. To a lesser degree, the presence of expedient and patterned flake tools and fire-cracked rock indicate field camp activities (ibid.). Other artifacts found at the site are chipped stone flaking debris, shell, faunal remains, and historic items. Observed lithic raw material types include RBSW, TRSS, chert, chalcedonies, quartz, meta-quartzite, and silicified wood (ibid.:52).

Shifrin (2000:11-12) identifies several research topics that investigators hoped to address with work at the Young-Man-Chief site. These topics are: 1) chronometric studies; 2) geologic processes and environmental change; 3) site function and settlement organization; 4) mobility and extra-local contact patterns; and 5) issues in lithic technology.

During excavation of the Bobtail Wolf, Big Black, and Young-Man-Chief sites, a distinction was made between bifaces and ultrathin bifaces (Root 2000, 2007; Shifrin 2000; William 2000). First coined by Stan Ahler, the term "ultrathin" refers to bifaces that are wide and thin with width-to-thickness ratios documented up to 20:1 (Root 2007:1). Once a distinction had been made, other archeologists remarked that this type of biface had been observed at various sites in the Great Plains. Investigators (ibid.) state, "[T]he thin cross section with the maximum thickness near the edges creates an efficient cutting edge by reducing frictional drag on the rest of the tool surfaces during use. The single defect, however, is that the brittle stone is easy to break if it strikes a bone or other substance (Root, William, Kay, and Shifrin 1999:164)." It has been suggested that the ultrathins were used as meat knives to make bison jerky (Jodry 1998).

Another "megasite" investigated at LINWR is 32DU954 (William et al. 2000:1). Data recovery was undertaken at 32DU954F (Big Coat site) and 32DU954G in 1993 and 1994, respectively. Site 32DU954F dates from the Paleo-Indian through Late Prehistoric periods (William 2000b:1). Cultural materials recovered from the multi-component site suggest it functioned as a field camp, lithic workshop, and possible KRF procurement area (ibid.). Occupation of 32DU954G appears to have been more limited, dating to the Paleo-Indian/Early

Plains Archaic and the Late Plains Archaic periods (William et al. 2000:1). It appears the site functioned as a short-term field camp and lithic workshop (ibid.:2). In addition to chipped stone tools and flaking debris, fire-cracked rock, and faunal remains were collected at the sites. Unfortunately, work at both sites ended abruptly due to inclement weather conditions.

Site 32DU965 is similar somewhat to other sites within the LINWR. It consists of sub-sites that are multi-component field camps and lithic workshops. However, it differs from these sites because it is situated on uplands, not a terrace remnant (Feiler 2000). The uplands are south of Lake Ilo, along the former Spring Creek channel. Feiler (2000) reports preliminary findings for 32DU965A. A final report is anticipated and future research at the site is recommended.

Numerous other archeological sites were investigated during the early 1990s at the LINWR, including portions of 32DU694B (Packs Antelope site), 32DU965B, 32DU966C (Smells site), 32DU972E (Hard Horn site), and 32DU972H (Feiler 2000; Shifrin 2000a, b; Shifrin et al. 2000). The recovery efforts indicate these sites were multi-component field camps and lithic workshops, dating to the Paleo-Indian, Plains Archaic, and Late Prehistoric periods. Evidence of site functionality is substantiated by the number of stone tools, chipped stone flaking debris, bone tools, fire-cracked rock, faunal remains, and rock features (one stone circle and cairn at 32DU964).

Table 3.7: Major Test Excavation Projects in the Knife River Study Unit, 5-Sept-2007.

Year	First Author	Second Author	Title	Ms #
1978	Franke, N.		Report of the Salvage Excavation at 32ME102	216
1983	Good, K.	M. Schreiner et al.	Archaeological Test Excavation Project: Site 32ME423, Northeast Permit Area, Indian Head Mine, Mercer Co., ND	2960
1983	Root, M.	M. Gregg	Archeology of the Northern Border Pipeline, ND: Vol. 4, The Emerson Site, 32DU285: Lithic Reduction and Settlement in the Knife River Flint Primary Source Region	3457
1986	Greiser, T.	G. Fox et al.	Excavation of Site 32ME644 on Glenharold Mine Area I, Mercer Co., ND.	4041
1989	Deaver, K.	S. Deaver et al.	Onion Ring, 32ME166, A Tipi Ring Site in Central ND, Mercer Co.	4886
1990	Deaver, K.		Mitigation of Site 32ME220 Mercer Co., ND	5163
1991	Sanders, P.	T. Larson	The 1989 Archaeological Investigations at 32ME797, 32ME799 & 32ME847 Along the Southwest Pipeline Project, Mercer Co., ND	5463
1992	Späth, C.		Dunn County Road Improvement T144N R97W Section 26 & 27 Dunn Co., ND Data Recovery at 32DU985	5987
1993	Root, M.	J. Van Nest et al.	Site 32DU955A: Folsom Occupation of the Knife River Flint Primary Source Area Phase III (Part 1) Archaeological Data Recovery at Lake Ilo National Wildlife Refuge, Dunn Co., ND: Interim Report for 1992-1993 Investigation	6204
1993	Stine, E.	A. McKibbin et al.	Hanging Out at the Rock: Excavation at 32ME1089, Mercer Co., ND	6008
1994	Root, M.	A. Emerson	Archaeology of the Bobtail Wolf Site (32DU955A): 1993-1994 Progress Report	6415
1995	Metcalf, M.	S. Ahler et al.	Alkali Creek in Dunn Co.: A Stratified Record of Prehistoric Flint Mining in ND (Appendices I-VIII)	6649
1995	Peterson, L.	L. Peterson et al.	The Bees Nest Site, Mercer Co., Mitigation of a Multi-Component Stone Ring Site in Central ND Vol. 2	6270
1996	Boughton, J.	K. VanderSteen et al.	Data Recovery of 13 Sites Located in the North Mine Extension Area, Mercer Co., ND	6689
1998	Winzler, S.	J. Boughton et al.	Data Recovery at 32ME254 Mercer Co., ND	7180
2000	Feiler, E.		Sites 32DU964B, 32DU965B & 32DU972H: Results of the Supplemental Testing Program, Lake Ilo National Wildlife Refuge, Dunn Co, ND	7847
2000	Feiler, E.		Site 32DU965A: A Multicomponent Workshop/Campsite Location, Knife River Flint Primary Source Area, Dunn Co., ND	7848
2000	Root, M.		The Archaeology of the Bobtail Wolf Site in Dunn Co., ND	7856
2000	Shifrin, L.		Investigations at Hard Horn (32DU972E): Archaic Occupations in the Knife River Flint Quarry Area	7853
2000	Shifrin, L.		Investigations at the Smells Site (32DU966C): A Multicomponent Camp and Lithic Workshop in the Knife River Flint Quarry Area	7854
2000	Shifrin, L.	A. Emerson et al.	Packs Antelope (32DU964 Lower): A Late Prehistoric Stone Circle Site in the Knife River Flint Quarry Area	7855
2000	Shifrin, L.		Young-Man-Chief (32DU955D): A Folsom, Late Plains Archaic, & Late Prehistoric Site	7852
2000	William, J.		Site 32DU954F (Big Coat): Mitigation Efforts at a Multicomponent Site in the Lake Ilo National Wildlife Refuge, Dunn Co., ND	7849
2000	William, J.	J. Zabel et al.	Site 32DU954G: An Early Plains Archaic Workshop in the Lake Ilo National Wildlife Refuge, Dunn Co., ND	7851
2000	William, J.		The Big Black Site (32DU955C) A Folsom Complex Workshop in the Knife River Flint Quarry Area, ND	7850
2006	Bales, J.	J. Boughton et al.	Coteau Properties: Data Recovery at Nine Sites in Mine Area 2 North, Mercer Co., ND	9598
2006	Hope, S.	J. Boughton et al.	Coteau: Data Recovery in the West Mine Area, Mercer Co., ND	9942

Other Work

Reports of work other than Section 106 compliance inventories, site evaluations, and impact-mitigating excavations have mostly focused on KRF, especially its geomorphic context, physical characteristics, and variations in use through time. Clark (1985) examined over 600 projectile points from private collections in the KRF quarry heartland and assigned them to time periods based on typological dating. Information was also recorded on stone material types and patination. The Paleo-Indian period was represented by 5.3% of the specimens, Early Archaic 6.4%, Middle Archaic 23.6%, Late Archaic 44.8%, and late prehistoric 19.9% (Clark 1985:Table 2). What is the most appropriate method for evaluating variations in intensity of use of the quarries through time?

The widely accepted importance of sites in the KRSU is reflected in the attention to monitoring and management planning represented by some of the "other works" listed below. However, the reports of other work are quite limited in light of the fact that KRF utilization is one of the broadest and most important research topics in Northern Plains archeology. This limitation can be explained in part by the attention paid to KRF by the archeological community and the low level of funding to support analysis and reporting outside of the Section 106 process. It is a great benefit to have (1) Historic Preservation Fund Grant support for projects such as Clark's study of KRF projectile points and (2) SHSND financial support for publication and broad dissemination of reports such as *The Knife River Flint Quarries: Excavations at Site 32DU508* (Ahler 1986). Graduate student thesis research can also be expected to generate significant new information.

Currently, the North Dakota Department of Transportation (NDDOT) is sponsoring a project concerning the KRF primary source area, centered on ND Highway 200. The working title of the project is *KRF Predictive Model: Resource Distribution and Use through Time in Dunn and Mercer Counties, North Dakota* (Metcalf et al. 2009). The following is a preliminary summary offered by the authors.

KRF Predictive Model: Resource Distribution and Use through Time in Dunn and Mercer Counties, North Dakota
Michael Metcalf, Damita Hiemstra, and Michael McFaul

> The Knife River flint importance in the prehistoric past has led to a diverse range of research topics for archaeologists and geologists alike. Time and space need to be accounted for in assessing the distribution of the raw material throughout the region and continent. These concepts are addressed in multiple research paths beginning with the raw material formation in peat bogs in the Eocene age. Thousands of years after the formation of the raw material, the glacial systems sweeping through the area and retreating caused the raw material to erode out of its bed. Boulders

of the material were also knocked loose, as the apron of the KRF was exposed through deflation of the landscape. More significantly, meltwater channels where runoff of melting glacial water poured from the leading edge of the ice mass swept the newly freed smaller raw material downstream to be deposited along the shores and stream beds. Two main arterial routes the waters took were down the Knife River and Spring Creek. These waterways were coated with hunks of the raw material, sometimes multiple episodes of deposition occurred to form layers of stream tumbled cobbles and pebbles. As the stream flow weakened, the larger-sized rocks would fall out in sedimentary layers. Thus, as one moves downstream away from the original formation deposits, the smaller the rocks become. Cobbles and pebbles of Knife River flint (named for one of the two major deposits) were quickly buried beneath sandy deposits as the glaciers retreated and the streams lost most of their force.

Since the retreat of those glaciers, Native Americans have harvested the raw material as tool stone, recognizing the large quantity and high quality of the material. Over the centuries, the tool stone source area has been widely utilized and a projected 200 hectares have been quarried in the primary source area (Ahler 1986:105). Some of the material was taken for personal use while still greater quantities were removed for use as trade materials later in time. This trade network extended over the central United States and southern Canada, ranging as far east as Ohio and down into Texas. Although through most of prehistory access to the KRF was thought to be egalitarian, there is evidence that at certain point(s) this access was controlled as the demand for KRF as a trade good varied through time.

The Knife River Predictive Model project began through the sponsorship of the North Dakota Department of Transportation. Numerous road and bridge projects depend on the assessment of existing roads and possible clearing of new routes through the heart of the Knife River flint primary source area. The area surrounding North Dakota State Highway 200 has the highest site density in the entire state and road work is nearly impossible without impacting the cultural resources. To understand the regional cultural resources and assess some more economical approaches to cultural resource management in these counties, a predictive model plan was devised. As the Knife River flint's presence in these counties is a dominating feature in the archaeological record, the model is essentially being developed to understand the influence that the presence and distribution of KRF has over settlement patterns through time. The predictive model would address the distribution of geologic and sedimentological (soils) characteristics, as well as landform changes, cultural resource occurrence, and ethnographic

and paleo-botanical data, adding all into a Geographical Information System (GIS) database map. The mapped model would be useful for the Knife River flint primary source area as well as adaptable for other regions in the state. Additional layers could be introduced as more information is gathered in the future.

Table 3.8: Other Work in the Knife River Study Unit, 5-Sept-2007.

Year	First Author	Second Author	Title	Ms #
n.d.	Hecker, T.		List of Known Earth Lodge Village Sites Above the Grand River	94
1965	Anonymous		Historic Sites Under the Authority of the State Historical Society of ND As Established by The 39th Legislative Assembly	2011
1970	Clayton, L.	W. Bickley et al.	Knife River Flint	--
1973	Carlson, C.		Geology of Mercer & Oliver Counties, North Dakota	--
1977	Econ, Inc.		Interpretive Guide: Archaeological Photo Interpretation & Feasibility Study of a Five County Area in West Central ND Using Small Scale (1:80,000) Aerial False Color Infrared	79
1977	Woolworth, A.		A Report on a Study Designed to Mitigate Possible Adverse Effects Upon a German-Russian Mud & Stone Structure & on Archeological Site 32ME107 on the August Keller Farm Northwest of Beulah, Mercer Co., ND	213
1979	Simon, A.		Monitoring of Bull Dozer Work for MDU Pipeline, Dunn Co., ND	2902
1982	Snortland-Coles, J.		Inventory & Archeological Assessment of the State Historical Society of ND's State Historic Sites	1814
1983	Borchert, J.		Basin Electric Charles Creek Line, Sites UND-1 through 22 Update, McKenzie Co. and Dunn Co., ND	2762
1983	Greiser, T.	S. Greiser	Mitigation Plan for Cultural Resource Sites in Mine Area I of the Glenharold Mine, Mercer Co., ND	3124
1983	Reiten, J.		Quaternary Geology of the Knife River Indian Villages National Historic Site, Mercer Co., ND	3245
1984	Clark, F.		Knife River Flint and Interregional Exchange	--
1984	Clark, F.		Projectile Points of the Knife River Flint Quarry Area, Dunn Co., ND	3428
1984	Root, M.		Archeological Investigations in the Knife River Flint Primary Source Area, Dunn County, North Dakota	--
1984	Van Nest, J.		Natural and Cultural Stratigraphy at 32DU452, A Multicomponent Site in the Knife River Flint Primary Source Are, Dunn Co., ND	3489
1985	Ahler, S.	Van Nest, J.	Temporal Change in Knife River Flint Reduction Strategies	--
1985	Artz, J.		Prehistoric Procurement & Use of Knife River Flint Near the Killdeer Mountains, North Dakota	--
1985	Clark, F.		Projectile Points of the Knife River Flint Quarry Area	--
1985	Kuehn, D.		Letter Report: Field Investigation at the Halliday Hot-Mix Plant (Archaeological Site 826-SWP-B-34), Dunn Co., ND	3574
1985	Root, M.		A Report Concerning Gravel Mining Within the Proposed Lynch Knife River Flint Quarry National Register District at Site 32DU531	3897
1985	Van Nest, J.		Patination of Knife River Flint Artifacts	--
1986	Root, M.	Ahler, S.	The Effects of Field Sorting on Artifact Recovery	--
1987	Artz, J.		The Geomorphology & Stratigraphy of the Southeast Extension Area of Archeological Site 32DU336, Halliday, Dunn Co., ND (Draft)	4467
1988	Borchert, J.		Evaluation of 32DU794 an Historic Dam Dunn Co., ND (UW#1138)	4564
1988	Riggle, R.		Needs for the Reassessment of the Southeast Extension, Archeological Site 32DU336, Halliday Flood Prevention RC & D Project, Dunn Co., ND	4691

Year	First Author	Second Author	Title	Ms #
1989	Ahler, S.	J. Artz	Non-Technical Summary Report on Further Evaluation of the Alkali Creek Archeological Site, 32DU336-SEE, Dunn County, North Dakota	--
1989	Artz, J.	Haury, C.	A Cultural Resource Management Plan for the Southwest Pipeline, Southwestern North Dakota	--
1989	Thiessen, T.		An Archeological Field Survey of Seven Borrow Sources in Mercer, Oliver, & McLean Counties, ND	4933
1990	Peterson, L.	J. Borchert	Scope-Of-Work Dunn Co., Road Borrow Area	5105
1990	Thiessen, T.		Culvert Installation on Mercer Co., Roadway at Knife River Indian Villages National Park	5076
1991	Ahler, S.	E. Hajic et al.	National Register Evaluation of Prehistoric and Historic Archeological Sites at Lake Ilo National Wildlife Refuge, Dunn Co., ND	5342
1991	Christensen, R.		Instrumental Neutron Activation Analysis of Knife River Flint From the Primary Source Area, Dunn and Mercer Counties: Phase I: Elemental Description and Statement of Variability	5621
1991	Deaver, K.	J. Brownell	Cultural Resources Management Plan for the Coteau East Mine Area (Life-of-Mine Area), Mercer Co., ND	5673
1991	Pool, K.		Historic Burial on Fandrich's Land & Prehistoric Isolate, Mercer Co., ND (PO#92203)	5595
1991	Pool, K.		Monitoring of Drill Holes at 32ME1089 (PO#92203)	5596
1991	Ross, N.		Report of Task II: Evaluations and Recommendations For Five Historic Properties In the Coteau Freedom Mine Life-of-Mine Area, Sites 32ME710, 32ME712, 32ME713, 32ME714 & 32ME780	5457
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	Karsmizki, K.	C. Purcell	Historical Account Krem Coal Mines (32ME1117 & 32ME1201) & Truax-Traer Dakota Star Coal Mine (32ME823)	5938
1993	Karsmizki, K.		History of the Lake Ilo Wildlife Refuge Area Including CCC Dam (32DU971) & WPA Dam (32DU963)	6060
1993	Williams, J.		Unidentified Human Skeletal Remains Recovered from Knife River Indian Villages National Historic Site, Mercer Co., ND	6069
1994	Peterson, L.		Interim Report Mitigation of the Bees Nest Site, Mercer Co., ND	6194
1996	Johnson, L.		Historic American Buildings Survey Christian Scheid Housein Mercer Co., Mitigation HABS No. ND-XX	6685
2000	Ahler, S.	P. Geib	Why Flute? Folsom Point Design and Adaptation. *Journal of Archaeological Science* 27(9):799-200	--
2000	Klinner, D.		Site 32OL325: National Register Criteria A & B Evaluations	7584
2002	Ahler, S.	P. Geib	Why the Folsom Point was Fluted: Implications from a Particular Technofunctional Explanation in *Folsom Technology and Lifeways*. Edited by John E. Clark and Michael B. Collins, pp. 371-390	--
2004	Dooley, M.		Long-Term Hunter-Gatherer Land Use in Central North Dakota: An Environmental Analysis. *Plains Anthropologist* 49(190):105-127	--
2005	Hufstetler, M.	J. Goff	Historic Bridges in ND 2004 Revision	10128
2007	Root, M.		A Folsom Ultrathin Biface from Deepwater Creek, McClean County, North Dakota	--
2009	Metcalf, M.	D. Hiemstra et al.	KRF Predictive Model: Resource Distribution & Use through Time in Dunn & Mercer Counties, North Dakota	--

Paleo-Indian Period

Over two dozen Paleo-Indian sites have been documented in the KRSU (Table 3.3). Sites in the quarry area with *documented intact* deposits of Paleo-Indian age are 32ME175, 32DU181, 32DU182, 32DU185, 32DU224, 32DU336, 32DU452, 32DU461, 32DU490, possibly 32DU508, 32DU954, and 32DU955. Information from studies of those deposits has led to a proliferation of realistic, answerable research questions. The earliest North Dakotans expended great effort on a local resource--KRF--which was prized by the earliest peoples throughout the Plains (cf. Artz 1988a:1).

Paleo-Environmental Modeling

Environmental conditions are known to have been generally mesic, at least during the early and middle portions of the Paleo-Indian period, because numerous artifact deposits of this age within the KRF quarry area have been found contained within the Leonard paleosol. For example, in a tested portion of the several-hundred acre Many Earths KRF quarry-workshop site (32DU490), Paleo-Indian deposits within the Leonard paleosol are the deepest cultural stratum in a layered sequence running through Early, Middle, and Late Plains Archaic and up to late prehistoric/Plains Village (Root and Van Nest 1985:140, 196). This buried topsoil represents a span of time within the early Holocene during which vegetation was relatively dense, land surfaces were stable, and wind erosion was minimal (Clayton et al. 1976). Regional biomass and human carrying capacity should have been quite high. Spring Creek sedimentation rates increased dramatically sometime after ca. 9500 RCYBP (Root et al. 1986:496) indicating a shift to arid climatic conditions. Regional biomass and human carrying capacity should then have dropped significantly.

Vigorous attempts to recover stratified undisturbed sediment samples from sloughs in order to build detailed pollen sequences for paleo-environmental modeling have yielded disappointing results (cf. Root et al. 1986:489-491). The principal problem with the pollen sample columns parallels a major problem in the archeological deposits: the compression of 10,000 years of accumulated sediments into 1 m or 2 m thick bands which have lost their integrity through postdepositional disturbance processes such as bioturbation. Any well-dated uncontaminated early Holocene sedimentary contexts encountered during excavations should be sampled for pollen to aid in understanding Early Holocene environments in the Knife River basin.

Cultural Chronology

Quite a variety of methods have been employed in attempts to document the presence of Paleo-Indian cultural deposits in this Study Unit. Foremost among these is radiocarbon dating of soil humates from buried topsoils thought possibly to be Leonard paleosols containing intact artifact deposits (e.g., Artz 1989; Root et al. 1986:137, 423-426). However, a persistent problem with these

"dirt dates" is contamination with tiny particles of lignite introducing ancient carbon and yielding dates which are older than the soils and associated artifacts (cf. Artz 1988a:21; Root ed. 1983:80-82). Contamination with recent humates tends to render some dirt dates younger than they should be. Great care must be taken in decontaminating samples of organic material that are radiocarbon dated. This goes not only for sites in this Study Unit, but in locations throughout western North Dakota where windblown powdered lignite may have become incorporated in site sediments.

Data concerning the frequency and intensity of KRF patination have been used to document prehistoric re-excavation of quarry areas and for ordering excavated artifact samples according to relative chronological age (Ahler 1986:105). Most Paleo-Indian KRF diagnostics are moderately and heavily patinated whereas most later points are lightly patinated and unpatinated (cf. Root et al. 1986:445). How does intensity of KRF patination vary with depth of burial in archeological contexts?

Settlement Behavior

Throughout prehistory, the KRF primary source area attracted people who came to the north-central portions of the KRSU to collect flint. Northern Plains Paleo-Indian peoples are thought to have been mobile hunter-gatherers of the sort who would have used portions of Knife River basin periodically, perhaps scheduling time each year for KRF quarrying, and possibly also focusing on floral or faunal resources which were then abundant (but which are now unimagined). The KRF quarry area probably has the densest concentration of intact Paleo-Indian components in the state. However, it will require considerable care to extract settlement behavioral information for specific episodes of occupation due to a condition referred to as the "palimpsest conundrum" (Root et al. 1986:451): "rates of sedimentation are generally slow and it is likely that the artifactual remains from multiple occupations were often deposited on the same former land surface or on surfaces that were vertically separated by only a few centimeters of sediment. Thus, single excavation levels and culture analytic units are likely to contain artifacts from several or many individual occupational episodes. Each of these distinct occupational episodes may have been functionally distinct (cf. Binford 1982). Artifacts from different occupations may also be inextricably mixed by postdepositional vertical artifact movements." How can functional settlement types be defined and identified in Paleo-Indian site studies?

Native Subsistence Practices

Bison rib fragments from the Paleo-Indian deposits at the Many Earths site (32DU490) and other, fragments of bison bone from 32DU452A are possible indicators of Paleo-Indian subsistence from the KRF primary source area (Root et al. 1986:468). There is little else to date from archeological contexts. Environmental modeling for the early Holocene is probably the quickest way to identify the range of floral and faunal resources utilized by Paleo-Indian peoples.

It can be hypothesized that all readily available and economically important floral and faunal resources were exploited to some extent. Early Holocene paleontological finds should be excavated with an eye toward gaining a better understanding of the plant and animal resource potentials of Paleo-Indian times.

Technologies

Flintknappers such as Gary Merlie of Decatur, Illinois, have commented on the toughness of KRF and the desirability of this attribute when it comes to fashioning cutting edges that will stand up to heavy use. The durability of KRF may have been a significant factor in its selection for making a variety of cutting and scraping tools from Paleo times onward throughout prehistory. How does the durability of KRF tools compare with the durability of the same sorts of tools made from other materials? Answers to this question will require replicative experimental studies possibly in combination with materials science modeling. Making and using tools of different materials would make a good project for students, avocationals, or professionals.

Heat treatment of KRF (intentional thermal alteration) is another consideration germane to components of all ages from Paleo-Indian to protohistoric. The fracturing characteristics of heat treated KRF are more like glass than raw KRF, and thermally altered KRF is often readily identifiable because of its increased luster, darkened inclusions, and overall darkened coloration with reference to "raw" KRF (Ahler 1983). Knife River flint appears not to have been routinely heat treated as some other tougher materials such as Swan River chert were. Nevertheless, sometimes it was. Did people ever heat treat KRF during the Paleo-Indian period? Confirmation of intentional thermal alteration is usually difficult to come by. Thermal alteration sometimes happens incidentally (1) when objects are in proximity to hearths (Artz 1988a:20) and (2) when natural burns occur. However, heat-damaged flint is usually distinguishable from successfully, intentionally thermally altered flint.

There is little question that large tabular pieces of KRF were well-suited for Paleo-Indian biface production technologies as modeled by Callahan (1979) and evidenced by Paleo deposits at KRF workshop sites. It may be that biface production peaked in terms of relative intensity during Paleo-Indian times (cf. Root et al. 1986:406).

Artifact Styles

Paleo-Indian point styles reported by Clark (1985:73) and Root et al. (1986:436) to be represented by surface finds in the KRF quarry area include Folsom, Plainview/Midland (Goshen?), Eden, Scottsbluff, Alberta, Frederick, Angostura/Agate Basin, Pryor Stemmed, and Hell Gap/Agate Basin. Earlier Clovis finds are reported for 32DU602 and 32DU603 in the HPD site file database, but they have not been written up.

Ahler and Geib (2000:817) provide a well-developed explanation for Folsom point design and adaptation. They recommend the model be "tested and refined through studies of finished point and preform length, artefact [*sic*] proportions and fracture patterns, basal margin treatment, use-wear in archaeological specimens and through actualistic studies of experimental point/haft arrangements."

The Scottsbluff point excavated from the Leonard paleosol of the Aggie Brown Member of the Oahe Formation at 32DU452 (Root et al. 1985:Figure 17b) displays greater stylistic affinities with southern and western Scottsbluff styles than it does with eastern styles (e.g., Buckmaster and Raquette 1988). Yet KRF was used to make both the pronounced-shoulder and indistinct-shoulder forms. Are shoulder morphology variations of Scottsbluff points attributable to geographic variations, temporal diversity, or both?

Regional Interaction

An excellent indication of the extent of regional interaction during Paleo-Indian times can be gained by examining the geographic extent of occurrence of KRF Paleo-Indian points. After reviewing the literature, Loendorf et al. (1984:13-15) concluded that KRF attained its widest distribution during two periods of time: (1) from about 8000 to 6000 BC in the Paleo-Indian period and (2) from about 1000 BC to AD 500 in Late Archaic to Middle Woodland times. "The most distant reported occurrence of KRF artifacts includes a Paleoindian age projectile point and scrapers from Warren County, Pennsylvania" some 1,200 miles distant from the quarries (Ahler 1986:5). What Paleo-Indian KRF artifact occurrences can be documented to expand the maximum distribution of KRF as illustrated by Ahler (1986:4)? What nonlocal materials from Paleo-Indian sites in the Knife River basin indicate any greater extent of regional interaction?

Historic Preservation Goals, Priorities, and Strategies

Nowhere does it appear to be more evident than in reports of excavations from the KRF quarry area that optimal advancements in understanding prehistoric cultural deposits are only possible when there is comparability of data from different projects. This is exemplified by comparability in methods of artifact recovery and data collection applied by Ahler, Artz, Root, and their methodological colleagues at KRF quarry and workshop sites since the 1980s and the findings generated by those investigators.

Archeologists should continue to work with landowners and landowner-collectors to record sites and document collections. Kermit Nordsven, owner of the Nordsven Quarry site (32DU461), had a collection recorded and reported by Clark (1985) containing Scottsbluff, Hell Gap, and Parallel-Oblique flaked points amongst other later materials. Most of these pieces were reportedly found in the area of 32DU464 (Root et al. 1986:268). Albert Schwenk had picked up materials throughout the Knife River basin for decades and amassed a gigantic artifact

collection. In the early 1980s, Dale Davidson of the BLM-Dickinson office worked with Schwenk recording some of the finds. Through this effort, Eden point finds were recorded for 32DU110, 32DUx131, 32DUx132, 32DU602, and 32DU603 (Jack Stewart, personal communication to Mike Gregg, December 1989). The Schwenk collection has now been auctioned off by pieces and lots to artifact collectors from elsewhere and is lost to North Dakota archeology.

Plains Archaic Period

Early, Middle, and Late Archaic components have been documented at sites in the Knife River basin. As in most parts of the state, Early Archaic deposits are least common and Middle and Late Archaic deposits are more common.

Paleo-Environmental Modeling

At 32DU336 in Halliday along Spring Creek, excavations have revealed that prehistoric peoples in early Holocene times may have collected KRF cobbles directly from stream gravel deposits that were exposed in the bottomland (cf. Artz 1988a:18). This procurement practice would have differed from the more prominently recognized (1) quarry pit surface mining in the terrain along the margins of the valley (Ahler 1986; Loendorf et al. 1984) and (2) simple surface collecting here and there across the rolling plains (cf. Gregg 1983b:117). This revelation has been surprising to some because there are few exposures of stream gravels along the stream bottoms today, and such gravels have probably not been exposed since Early Plains Archaic times prior to the onset of the Altithermal droughts. Were KRF cobbles and other gravels widely exposed in the numerous alluvial valleys of the KRSU during terminal Pleistocene and early Holocene times? Were they then buried by windblown sediments during the arid Altithermal episodes? Regarding geology of the Alkali Creek site (32DU336-SEE), Metcalf and Ahler (1995:52) state “Eventually enough of the site was exposed for Artz and Ahler [1989] to recognize that a cap of younger Holocene alluvium buried a portion of a Pleistocene terrace containing KRF-bearing gravels. They demonstrated the presence and antiquity of KRF artifacts in gravelly quarry spoil deposits lying below, and sealed by, the early Holocene Leonard Paleosol.” Paleoclimatic reconstruction and geomorphological studies of mid-Holocene contexts should continue to be central to investigations of Archaic cultural deposits in this and other study units.

Prospects are good for upgrading paleoenvironmental models for the Archaic periods by studying ecofactual remains from specific strata of the Oahe Formation found to contain Archaic components. Knowledge of the general ages of the various members, submembers, and paleosols of the Oahe Formation spanning the entire Holocene often enables identifying the general age of archeological deposits when they are contained within distinct soil strata in the Knife River basin. What are the most likely depositional contexts for good preservation of pollen and phytolyths? Soils throughout North Dakota in general and the Knife River basin in particular are recognized as being “pollen poor”

soils. Persistent wetting and drying of soils plus alkalinity combine to destroy high percentages of pollen grains and phytolyths so that even delicate pollen recovery procedures seldom aid in generating samples to use in environmental reconstruction (cf. Scott and Lewis 1983).

Cultural Chronology

Early Archaic components were identified based on typological dating at two sites near Spring Creek along the Southwest Pipeline right-of-way. A side-notched point similar to the Hawken style (cf. Frison et al. 1976:Figure 11b) was surface collected at 32ME794 (Gregg et al. 1985:50). Oxbow points were recovered by test excavation at the Goodman Creek site (32ME796) (Artz 1986:260, 263) and 32ME154 (Winzler et al. 1998:7.1-7.2).

The deepest cultural zone at the Emerson site (32DU285) lies in an Altithermal-age sedimentary context thought to represent the Pick City Member of the Oahe Formation (William 1983c:253). Although no diagnostics were recovered from this zone and there were no radiocarbon dates for it, it probably represents an Early Archaic deposit.

There are Early Archaic deposits in the KRF quarry area at 32DU452 and 32DU181 (Root et al. 1986:410, 414). As at the Emerson site, at 32DU181 the Early Archaic deposit is in a Pick City sedimentary context, but in this case overlying a distinct representation of the Paleo-Indian age Leonard paleosol (Root and Van Nest 1985:269-299). Did the Spring Creek valley, fed along its length by many springs, provide Early Archaic peoples with at least a partial refugium from mid-Holocene drought as posited by Artz et al. (1987:9.15)?

Scarcity of Oxbow components from excavated contexts must be a matter of sampling error rather than an expression of actual scarcity of Oxbow occupation in the KRSU. Clark identified 54 Oxbow points in her sample of 609 typed points from the KRF quarry area (Clark 1985:74). Also, considerable use of KRF in surrounding regions by people with Oxbow material culture is evidence for Oxbow procurement in the quarry area. One possible Oxbow component has been identified from a deeply buried humic horizon at 32DU429 near Dunn Center (Kay and Van Nest 1984:195; Root et al. 1986:413), but the dirt date of 3555±63 RCYBP (SUM-131) is quite late for Oxbow. An Oxbow component was identified at 32ME154, as were subsequent McKean, Pelican Lake, Besant, and Plains Village/Late Prehistoric components (Winzler et al. 1998:7.1-7.2). Is there any solid evidence for intact single component Oxbow deposits dating later than 2500 BC anywhere in this Study Unit?

Regarding the Middle Archaic period, it is suggested that less common occurrences of McKean Lanceolate points in comparison with greater numbers of Duncan point finds and even more Hanna forms is evidence for increased intensity of use of the KRF quarry area during the course of the Middle Archaic period by peoples with material culture attributable to these three complexes (cf. Clark

1985:74). A McKean Lanceolate point was excavated in a Slow Creek terrace edge setting in one of a series of buried soils along with artifacts and stratigraphic information indicating lithic workshop activities, possible camp occupation, and also possibly KRF quarrying (Root et al. 1986:185). This discovery is in a setting where mid-to late-Holocene sediments are well-stratified. Another was discovered in a level underlying Late Archaic materials at 32DU452 on a bench overlooking the Spring Creek floodplain (Root et al. 1985:63). A McKean point was recovered at the Bees Nest site (32ME175), dating Component A (Peterson and Brownell 1990:38). The Bees Nest site is a large, multi-component stone feature site located in native prairie on an upland flat, overlooking intermittent drainages to the south and east (cf. 32ME154 in Winzler et al. 1998). In what depositional contexts are McKean Lanceolate components most likely to be found?

A Middle Archaic cultural zone assignable to the Duncan complex was encountered in a small block excavation at 120 to 130 cm below ground surface at the Goodman Creek site (32ME796) (Artz 1989b:43). Duncan components are fairly common throughout the basin. One is recorded at 32DU44 just to the east of the Killdeer Mountains (Root, Kordecki, and Meier 1983:752). Another intact component was revealed by testing at 32DU461 in the KRF quarry area (Root et al. 1986:335).

Hanna components are recorded at 32DU23 along the western margin of the Killdeer-Glen Ullin glacial meltwater channel (Root, Kordecki, and Meier 1983:769-778). There is another at 32DU71 in the Murphy Creek valley southwest of Dunn Center (Root 1983o:Figure 15.8a,c). Hanna points were very well represented by 52 specimens in Clark's sample of 609 diagnostics from the KRF quarry area (1985:74). Do increased numbers of Hanna point finds indicate increased intensity of occupation in terminal Middle Archaic times in the Knife River basin?

Pelican Lake and other unnamed Late Archaic complexes with corner-notched dart points appear to be abundant in surveyed portions of the KRSU. Although corner-notched points were made in varying frequencies throughout most of prehistory (cf. Gregg 1985c:116-117), the surface-discovery and shallow subsurface-discovery of most of these KRSU specimens indicates late Holocene geomorphic contexts and thus Late Archaic temporal placement. Corner-notched points evincing probable Late Archaic occupations along the Northern Border Pipeline transect through the Knife River basin include 32DU37 (Artz et al. 1983:Figure 4.1c,g); 32DU71 (Root 1983o:Figure 15.8b); 32DU67 (Root 1983b:Figure 17.4k); 32DU68 (Root 1983c:Figure 17.4i); 32DU290 (Billeck 1983c:Figure 18.4a,b); 32DU284, 32DU44, 32DU284, 32DU77, 32SK11, and 32M0238 plus several isolated finds (Root, Kordecki, Billeck et al. 1983:Figure 15.7b, e, f; Root, Kordecki, and Meier 1983:Figure 14.6c, i, j, l; Figure 14.18j, l) and more. Site 32DU200 is a Late Archaic site in the Knife River bottomlands near the town of Marshall (Gregg et al. 1985:61-62). What evidence is there for

different archeological complexes being represented by distinctive forms of corner-notched dart points at components within the Knife River basin?

Settlement Behavior

Early Archaic components are represented by such small-excavated samples, it is not possible to identify any specific functional settlement types. However, for the later periods, sufficiently large samples have been excavated to recognize or infer the former presence of base camps, field camps, and lithic workshop locations. At the multi-component stratified Emerson site (32DU285) on a low bluff overlooking the Knife River in the west-central portion of the Study Unit, the two most prominent cultural zones in a 94 m^2 block excavation were a Middle Archaic deposit dated 3670±280 RCYBP (UCR-1582) and a Late Archaic deposit dated stratigraphically between 3000 and 2000 BP (William 1983c:254, 257). Both deposits were assessed as representing warm season field camps where KRF procurement and processing tasks predominated. Evidence supporting this assessment for the Middle Archaic zone included: (1) a relatively low frequency of artifacts and features per volume of matrix; (2) a thin cultural deposit indicative of short-term occupation; (3) presence of tested KRF and primary reduction flaking debris; (4) an abundance of flaking debris concentrations, broken or rejected unfinished stone tools; (5) occurrence of functional or worn out tools used for maintenance tasks; (6) low frequency of finished or expended patterned chipped stone tools; and (7) no indication of fixed residential structures (ibid.:255). The inference of warm-season occupation was based on the open, windswept bluff-top setting. All test and salvage excavations projects should attempt to identify the functional settlement types represented by remains from sampled components. Where should Archaic base camp deposits be anticipated, and what types of remains evince base camp activities?

Activities represented in the Duncan cultural zone sampled by a 15 m^2 Goodman Creek site included stone tool manufacture, use of unprepared surface hearths, resource processing, equipment maintenance tasks, and cooking (Artz 1989b:78-79). Stone tool repair and maintenance were evidenced by traces of small flakes of quartzite, chert, and porcellanite in conjunction with a lack of cores and unfinished tools of those materials. The low density of bone refuse along with the unprepared nature of the hearths led to the inference that food processing and consumption was not an important aspect of the settlement (ibid.). Settlement behavior must be reconstructed from activities represented by small samples of cultural remains recovered from small-excavated areas because most Section 106 salvage/mitigation archeology is not geared to recovery of representative samples of entire site deposits.

Native Subsistence Practices

Subsistence remains are uncommon in Archaic components in this Study Unit based on results from the considerable amount of testing and salvage excavation which has been reported. This is due partly to poor preservation

contexts where organic subsistence remains in shallow deposits are rapidly decomposed by biological agents in conjunction with frequent freeze-thaw cycles. In some cases, however, stone tools used for processing subsistence resources are found where traces of the actual resources have decomposed. An example is the recovery of a large complex anvil stone of coarse-grained sandstone from the primary cultural zone of Middle and Late Archaic remains at the Misty Mountain site (32DU37) (Gregg 1983b:115). Use-wear on the working surface indicated processing of materials such as berries, dried meat, or bone, which could not be specifically identified. How did the floral and faunal resource potential of the Knife River basin vary through the Archaic periods?

Technologies

The early stages of Early, Middle, and Late Archaic flintknapping technological sequences are well represented in the KRF primary source area. But they are also well represented in the southwestern North Dakota source areas for silicified wood and TRSS. How important was KRF to Archaic technologies in comparison with technologies of earlier and later stone-age times?

Duncan flintknapping reduction sequences, both for producing bifaces and flake blanks, are represented in samples from a 15 m^2 block excavation at the Goodman Creek site (32ME796) (Artz 1989b:72-74). These reduction sequences can be reconstructed by studying discarded tools as well the flaking debris by-products of the knapping. Can anything be identified in the stone toolmaking sequences of the McKean Lanceolate, Duncan, and Hanna complexes that will aid in distinguishing them?

Certainly the density of sites and surface mining pits in the KRF quarry area stand as prominent testimony to the economic and technological importance of KRF throughout prehistory. Additional affirmation can be seen in the high densities of large sites in areas peripheral to the quarry area proper. An example is the Misty Mountain site (32DU37) at the head of the Knife River basin on the eastern footslopes of the Killdeer Mountains where hundreds of prehistoric occupations may be represented in a total site area of 40-50 ha (100 acres or more) (Gregg 1983b). Some 76 m^2 of mitigating excavation was carried out in several portions of this stratified site transected by the Northern Border Pipeline.

Archaic technologies other than chipped stone technologies are poorly represented in excavated samples due to (1) poor preservation conditions and (2) the lack of investigation of residential base settlements where cultural deposits have more diverse artifact and feature contents than in sites of short-term occupation. What potentially are the most favorable contexts for preservation of organic remains in Archaic-age sites in the KRSU?

Artifact Styles

A bifacial cutting tool from the Duncan cultural zone at the Goodman Creek site (32ME796) is a basally notched form which bears some resemblance to

the McKean Lanceolate style, but it is distinctly asymmetrical in outline with one steeply and irregularly retouched blade margin (Artz 1989b:69,72). What is the range of variation of McKean Lanceolate forms?

More efforts need to go into defining corner-notched point forms having different cultural/temporal affiliations. Corner-notched, arrowpoint-sized specimens have been found in Late Archaic and Early Plains Woodland contexts in the James River Study Unit (Gregg 1987d:258; Gregg et al. 1986:147). For southwestern Manitoba, Syms reserves the Pelican Lake point type name for medium-to-small, straight-sided, deeply corner-notched point forms (1980:364-370). He distinguishes these smaller Pelican Lake points from distinctly larger and earlier corner-notched forms which he classifies as "Archaic Barbed." There is considerable variation in corner-notched point forms.

Regional Interaction

Given the widespread distribution of KRF across the Northern Plains and into adjacent regions during the Late Plains Archaic period, "we can be confident in inferring that many distinct groups visited the quarries during this several thousand year long period. The wide variety of corner-notched point forms may well reflect this phenomenon" (Root et al. 1986:446).

A heavy duty scraping tool made from an exhausted core of Miocene flint in the Duncan cultural zone of the Goodman Creek site (Artz 1989b:72) suggests movement of the Middle Archaic group responsible for the deposit within a territory extending southwestward to the Sentinel Butte locality. What is the range of interaction indicated by nonlocal lithic materials in Late Archaic components in the KRSU?

Historic Preservation Goals, Priorities, and Strategies

A high priority should be given to identifying subsistence remains which can be attributed to specific Archaic complexes. If this is given a high priority, then excavation will focus on cultural deposits with firmly established cultural/temporal affiliations. Also as a result of this priority, residential base settlements, undocumented for any of the Archaic periods in this Study Unit to date, would be more likely to be targeted for salvage excavation because high densities of subsistence remains are expected in the refuse at residential bases.

Plains Woodland Period

Early, Middle, and Late Woodland components are to be expected throughout this Study Unit. In an Early Woodland cultural zone deposited between 550 and 410 BC at the Naze site (32SN246) along the James River, KRF accounted for more than 75% of an excavated sample of flaking debris (Picha and Gregg 1987:Table 7.5). Such a high level of KRF utilization suggests direct procurement rather than acquisition through exchange relations.

Paleo-Environmental Modeling

Oddly, although the Besant/Sonota Middle Woodland complex is the most renown of all prehistoric complexes for intensity of KRF utilization in components throughout the Northern Plains, Besant/Sonota deposits with ceramics are rare in the KRF quarry area. In the quarry area, what must be aceramic Early and Middle Woodland components are necessarily classified as "Late Archaic" and contribute to the dense artifact deposits of 2,000-3,000 years ago which are thought to evince the "peak time of KRF use" (cf. Root et al. 1986:472). Besant/Sonota components in Spring Creek floodplain settings may be expected to occur in 1,500-2,000 year old buried humic horizons such as those at 32DU159, 32DU193, and 32DU224 (cf. Root et al. 1986:493). Are Besant/Sonota components in the Knife River basin often found contained within buried topsoils indicating mesic conditions and high biotic resource potential during Middle Woodland (or Late Archaic) times?

Cultural Chronology

It has been proposed that KRF patination may be a key to determining the gross ages of some artifact deposits in western North Dakota. Root et al. (1986:446) suggested that a KRF assemblage with at least 15% to 20% of the artifacts having moderate, heavy, or eroded patination can be expected to be 1,500 years old or older. Such assemblages can be suggested to date to Middle Plains Woodland or earlier times. Patination thus has potential utility for (1) gross relative dating of samples as well as (2) sorting older artifacts from more recent artifacts in mixed samples. A moderately or heavily patinated KRF assemblage associated with cordmarked potsherds in a single component deposit indicates an Early or Middle Plains Woodland temporal affiliation. A similar KRF assemblage associated with thin, well made ceramics would indicate a multiple component deposit. Any moderately or heavily patinated KRF artifacts (but not necessarily any other brown chert or chalcedony) from unquestionably Late Woodland or Plains Village contexts should be prominently reported because of their scarcity and importance in understanding variations in rates of KRF patination in differing depositional contexts. The many environmental variables that influence the rate of KRF patination have limited the potential uses of patination information in the interpretation of the archeological record (Van Nest 1985:325).

Settlement Behavior

Rarely Early Woodland settlement has been documented in the Knife River basin. Middle Woodland sites are present and recorded as Besant and Besant/Sonota. Deaver (1990) and Deaver et al. (1989) note that a general trend within the Coteau mining region is the small- to medium-sized stone feature sites date to the Besant Phase. These sites also tend to share other characteristics such as function, re-use, and lithic raw material exploitation. Other Middle Woodland

components are identified generically as Late Archaic when Besant Side-Notched points and Sonota ceramics are lacking. Middle Woodland/Late Archaic occupation at 32DU159 in the KRF quarry area may be classifiable as a field camp (cf. Root et al. 1986:411-412). Site 32ME166 at Coteau was assessed by Kuehn (1984) as a Besant base camp or tipi field camp. Does lack of Sonota ceramics indicate a lack of Middle Woodland residential base settlement in the interior of the Knife River basin?

A possible Avonlea component at the Goodman Creek site (32ME796) (Artz 1986:261-262) has the potential to yield significant information concerning Late Woodland settlement. This intact deposit contains potsherds, stone tools, flaking debris, butchered bone, and fire-cracked rock (ibid.:245). The artifact diversity alone indicates some sort of a residential base or field camp is likely represented. Are Avonlea sites generally poorly represented in the eastern portion of the Avonlea range in most of North Dakota, well represented in the KRF primary source area? Results of work during the past 15 years indicate this is so.

Native Subsistence Practices

Broad arrays of subsistence remains are rare at most temporarily occupied, basin-interior sites regardless of time period. But it should be possible to identify special-purpose food procurement and processing sites related to big game hunting. Such sites should be expected in and around good hunting places such as stream valleys, margins of wetlands, wooded draws, and wooded north slopes of buttes and valley walls. The deeper the site burial, the more likely it will be that organic subsistence remains are preserved. What subsistence remains should be expected at Early, Middle, and Late Woodland components in the Knife River drainage?

Technologies

Woodland ceramic technologies in western North Dakota are best known from sites in the Southern Missouri River Study Unit such as Besant/Sonota from High Butte (Wood and Johnson 1973) and Late Woodland from Cross Ranch (Ahler et al. 1981, 1982). What technological attributes can be used to differentiate Woodland ceramics from Plains Village ceramics at high levels of probability? This question will be difficult to approach with data from sites in the interior portions of the basin because sherd samples are typically very small here. The low frequency of sherds is characteristic not only of Woodland deposits, but later Plains Village deposits as well.

Cordmarked exterior surfaces are often viewed as an indicator of Woodland rather than Plains Village cultural/temporal affiliation in this part of North Dakota. At 32DU508 for example, fragments of “an apparently cord-roughened pottery vessel” found in the workshop portion of the site were interpreted as a probable indicator of Woodland occupation (Ahler 1986:105).

Middle Woodland (or Late Archaic) KRF flintworking techniques appear to have emphasized production of large, nonbipolar, percussion flake blanks which were reduced into patterned bifacial cutting tools and projectile points (cf. Ahler and Van Nest 1985:193-194; Root et al. 1986:411). This represents a shift from earlier Archaic and Paleo-Indian technologies which involved a considerable amount of percussion knapping of large biface blanks directly from tabular cobbles of flint.

At some time during late prehistoric (Late Woodland or Plains Village) times, perhaps after the widespread adoption of bow and arrow weaponry, the bipolar core reduction technology became very common in workshops in the KRF quarry area (Ahler and Van Nest 1985:16). Granite boulders exposed on the surface near quarries were often used as anvils, and the relatively recent debris from the bipolar knapping is found in great quantities in near-surface contexts around such boulders (for example, 32ME1089). At the Many Earths site (32DU490), one 1-x-1-m test unit placed alongside one of these boulder anvils was estimated to contain nearly 50,000 pieces of flaking debris within 27 cm of the present ground surface (Root et al. 1986:406). Despite the obvious importance of late prehistoric bipolar core reduction, the purpose of this form of flake blank production is not clearly understood. What was the main purpose of late prehistoric/Late Woodland/Plains Village bipolar flake blank production?

Artifact Styles

The Avonlea arrow point is a distinctively styled Late Woodland artifact which has been identified more frequently at sites here than in other study units. Clark (1985:74) recognized 11 Avonlea points in the sample of 609 she identified from the KRF quarry area. Forty-three Avonlea points were recovered from the upper two cultural levels at 32ME847 (Sanders and Larson 1991:7-33). Further, actual KRF quarrying by people with Avonlea material culture has been documented at 32DU184 along Slow Creek a mile south of the Lynch Quarry District boundary (Root et al. 1986:121).

Avonlea points and ceramics have been recovered from a shallowly buried cultural stratum in Area A at the Goodman Creek site (32ME796) (Artz 1986: 261-262). Although five ceramic vessels are thought to be represented by 26 sherds from two 1-x-1-m test units, the sherds are too small to display any stylistic features (cordmarked, simple stamped, and smoothed exterior surface treatments are present in the sample). What styles (i.e., wares and types) of ceramics might be expected in Avonlea components in the Knife basin and elsewhere in western North Dakota?

Regional Interaction

Most of the obsidian found in North Dakota sites is from western Rocky Mountain sources, and it is thought to have most likely been obtained by exchange mechanisms rather than direct procurement (Baugh and Nelson

1988:81). Obsidian seems to begin appearing as an exchanged commodity in Late Archaic sites, and it is occasionally found in components dating to subsequent periods. However, the peak intensity of obsidian exchange across the Northern Plains was during the Middle Woodland period (ibid.:87). Obsidian, from Obsidian Cliffs, was recovered from Besant Complex deposits at 32ME166, 32ME175, and 32ME220 (Lynelle Peterson to Paul Picha 2007, personal communication). Obsidian from southeastern Idaho/Black Hills was found at 32ME799 in Sonota Complex component (ibid.). Site 32MZ1005, located on a ridge dividing the Little Missouri and Little Knife rivers, yielded obsidian sourced to Obsidian Cliffs. Obsidian hydration tests and recovery of Talking Crow ware ceramics date the site to 1400 BP (Newberry and Olson 1991:72). Are obsidian artifacts more likely to represent Middle Plains Woodland occupations than occupations of any other cultural/temporal affiliation when they are found at campsites in the interior portions of the Knife River basin?

Historic Preservation Goals, Priorities, and Strategies

More sites are coded Woodland than any other major taxon. A primary goal and top priority should be to identify more Woodland pottery, and a strategy to enhance prospects for such identifications would be to stop field sorting and begin laboratory sorting of materials recovered during shovel/auger probing, test excavations, and salvage excavations. Many small potsherds have undoubtedly gone undetected in quarter-inch mesh screen loads of site matrix and have been discarded or forced through the screen along with small lumps of dry soil. Waterscreening a sample of every level of every unit is also essential for recovery of small potsherds. There are some archeologists who do not waterscreen on a regular basis. Size-grading ceramics in mechanical screens destroys fragile specimens. Carefully analyzing surface treatment of larger “cordmarked” sherds and reconstructions is essential to understanding manufacturing techniques and ware definitions.

Plains Village Period

Plains Village earthlodge residential bases in the Knife-Missouri river confluence locality are overwhelmingly late Plains Village in age, but the confluence locality was utilized at least from the time of the earliest Villagers of the Clark’s Creek phase (AD 1200-1300) and probably during the preceding Formative Village times as well (cf. Ahler 1988a:77; Lovick and Ahler 1982:13). Plains Village components should be abundant along the Knife.

Paleo-Environmental Modeling

Use of the Knife River basin by Villagers would have partly depended upon the nature of floral and faunal resource availability which in turn was heavily influenced by climatic conditions. But ecofactual data are scarce for the various climatic regimes of the Neo-Atlantic (850-1250), Pacific (1250-1550), and Neo-Boreal (1500-1883) episodes because Plains Village deposits in the interior usually have poor integrity. They are typically shallowly buried and thus subject

to disturbance by a host of destructive biotic and cultural processes. Attempts should be made to identify deeply buried intact Plains Village deposits and sample them for both ecofacts and artifacts so as to increase understanding of the paleo-environmental conditions of Plains Village times.

Cultural Chronology

Plains Village and other late prehistoric components are poorly represented in the sample of shallow and often mixed site deposits tested in the KRF quarry area (Root et al. 1986:476). Diagnostic artifacts are uncommon with reference to Village sites along the Missouri, and datable single component Plains Village deposits are rare. Methodologies need to be developed for identifying Plains Village components at field camps and locations in the interior portions of the KRSU.

Settlement Behavior

Based on ethnographic and ethnohistoric analogies with the Mandan and Hidatsa, Plains Village activity areas should have a widespread distribution through the KRSU. Beyond the earthlodge villages there should have been field camps, hunting locations, wild plant material collecting locations, KRF quarrying locations, stations and caches of various sorts, and sacred and religious sites. Did Plains Village settlement systems, which included residential bases near the mouth of the Knife River, extend throughout the entire KRSU?

Native Subsistence Practices

Earthlodge villages were situated at the Knife-Missouri confluence in part because the locality enabled hunting and gathering sufficient to supplement gardening to support permanent aggregations of hundreds of people. To what extent were the subsistence resources of the interior Knife River basin relied upon to support the permanent settlements at the confluence?

Technologies

Information should abound in this Study Unit (as in the other western North Dakota Study Units) concerning Plains Village lithic, ceramic, and bone technologies outside of the earthlodge village core areas. What was the extent of KRF surface mining by Villagers in comparison with peoples who lived other lifeways? Were ceramic clay resources of the interior Knife River basin used by the Villagers? Were bone raw materials preformed at kill and butchering sites the way lithic raw materials were preformed at lithic workshop sites?

A bison scapula digging tool radiocarbon dated to 200±50 RCYBP (SMU-1196) from the quarry area at 32DU508 may be evidence for late prehistoric or

protohistoric Plains Village quarrying (Ahler 1986:105). Are there diagnostic Plains Village lithic technological procedures that can be identified in lithic artifact assemblages to enable distinguishing Plains Village artifact deposits from those of contemporary non-villagers?

Plains Village ceramic technology is nowhere near as well-represented at sites in the Knife basin interior as in the earthlodge residential bases along the Missouri River. Technological attributes and mere hints of vessel form become as important as stylistic traits in identifying cultural/temporal affiliations of small samples of sherds from surface collections and limited tests in the primary source area. For example, a vessel from 32DU429 was appraised to be of Late Woodland or Plains Village affiliation because exterior surfaces of body sherds were smoothed and neck sherds indicated a constricted orifice (Kay and Van Nest 1984:195). Within 32ME175, Component C contained check-stamped ceramics dating to AD 1200-1700 (Peterson and Brownell 1990:39).

Artifact Styles

Initial age estimates for archeological deposits typically involve typological considerations. Culturally and/or temporally diagnostic artifact styles are important in the process of identifying historic properties. However, while the village sites in the confluence locality abound in diagnostic artifacts, sites in the interior often have deposits which are sparse or lacking in obvious stylistic diversity. There is a need to identify more styles of artifacts, especially chipped stone materials that endure in archeological deposits, which are diagnostic of Plains Village sites.

Regional Interaction

Knife River flint was distributed widely through Plains Village populations of the Northern Plains, especially those with Extended and Terminal Middle Missouri material culture. All Middle Missouri sites show a consistent selection for KRF regardless of the distance and directions to the primary source area (Ahler 1977:148). This preference was perpetuated by later Coalescent peoples in North Dakota. At the Lower Hidatsa site at the mouth of the Knife River, KRF constitutes more than 93% of the flaking debris assemblages throughout the duration of occupation from ca. 1680-1780 (Ahler and Weston 1981:186, 190). This pattern persisted into the Historic period. Analyses of lithic assemblages from Lower Hidatsa Village and Sakakawea Village in the Knife River Indian Villages (KNRI) document that KRF was the preferred lithic material during the decline of native lithic technology throughout the Euro-American contact period (Ahler and Weston 1981; Goulding 1980; (William et al. 1983:50). Did local Villagers living along the nearby Missouri River control access to the primary source area or otherwise control the distribution of KRF into surrounding regions?

Occurrences of exotics other than lithics from distant source areas can be expected to be uncommon at sites within the basin because of the temporary nature of most occupations and resultant restricted diversity of artifact deposits. Exotic stones should be well represented in situations where tool kits were being refurbished and worn out tools made from other materials were discarded. Less frequently, other sorts of exotics may be found. A *Dentalium* shell recovered at 32DU508 (Ahler and Christensen 1983:286) is quite likely a late prehistoric or protohistoric Plains Village artifact because it was during this period that *Dentalium* was most commonly exchanged from its Pacific Coast source area into the exchange networks of the Northern Plains Villagers (Brine et al. 1983:18.9).

Historic Preservation Goals, Priorities, and Strategies

A hypothetical model should be developed for Plains Village use of the Knife River basin. The model could be based on existing ethnographic, ethnohistoric, and archeological data. The model should identify the range of site types which should be expected as well as their likely distribution.

Equestrian/Fur Trade Period

Components of this period are distinguished primarily by the occurrence of European trade goods. Ethnohistoric documentation should be compiled for use of the KRSU by horse-mounted Villagers as well as horse-mounted hunter-gatherers.

Paleo-Environmental Modeling

The period 1780-1880 is the final one-third of the Neo-Boreal climatic episode (cf. Wendland 1978a, 1978b). There are fairly precise records of temperature and precipitation for the Knife-Missouri confluence locality from as early as the fall-winter-spring of 1804-1805 in the records of the Lewis and Clark expedition. The journals and other records of the trappers, traders, and explorers of this era also contain information concerning the density and distribution of floral and faunal resources (cf. Hanson 1983b:1359-1363). A detailed account should be prepared of the environmental circumstances of the confluence locality and as much of the interior basin as possible. This could become the “present” with which prehistoric environmental conditions could be compared and contrasted.

Cultural Chronology

The chronology of Plains Village cultures reflects several severe cultural changes which took place during the Equestrian period. Major epidemics of European diseases decimated the Villagers in the early 1780s and again in the 1830s. They had been the dominant cultural force on the Northern Plains for centuries, but that dominance was taken over by the Equestrian Nomads.

When did the Villagers lose control of the Knife River basin, and how do Plains Village chronological shifts in the upper Knife-Heart region (cf. Abler 1988a:77) bear upon the cultural chronology of the basin as a whole?

Settlement Behavior

After the Equestrian Nomads became dominant over the Villagers, there were changes in the Villagers' settlement practices. Attacks from the Nomads sometimes kept the Villagers pinned in the earthlodge communities. How did Plains Village settlement behavior in the Knife River basin change as a result of population decline and the cultural changes of the Equestrian period?

Native Subsistence Practices

Population decline and warfare should have had a significant effect on the Villagers' harvesting of the faunal and floral subsistence resources in the Knife basin. Did Equestrian Nomads fill the niche of hunters and gatherers of natural resources in the Knife River basin upon the decline of Plains Village cultural dominance?

Technologies

Decline of native technologies and adoption of European metal implements acquired through trade during the 1700s and 1800s is documented at numerous village sites along the Missouri River in the Dakotas (e.g., Goulding 1981; Toom 1979). However, KRF and other stones continued to be chipped for tools well into the Equestrian period. Alfred Bowers related to Stan Ahler the story of a discovery "of wooden quarrying tools at one of the major KRF quarries near Horse Nose Butte in Dunn County. Crows Heart, a Mandan, reported to Bowers his finding of fire-hardened ash digging sticks or poles at one of the flint quarries while he and friends were hunting in the area in the 1870s" (Ahler 1986:106). How late did KRF quarrying persist, and what were the last Native American uses for this stone material?

Peter Fidler was told by the Piegans of southern Saskatchewan in 1793 that they did not burn coal in their tents because of its noxious odor (Russell 1989:60-61). Native Americans of the Northern Plains were aware of lignite as a potential fuel source, but did they use it for anything?

Artifact Styles

Styles of glass beads have been used to date protohistoric occupations at several sites in the interior of the Knife River basin. While some styles can be dated quite specifically, others cannot. One bead from the multi-component stratified Emerson site (32DU285) was of a style manufactured and distributed between 1650 and 1890 (William 1983c:261). What styles of glass beads and

other trade goods can be expected in the KRSU, and what are the dates of manufacture?

Regional Interaction

Native American interaction networks were more extensive during the Equestrian period than at any time during prehistory. Studies of these interaction networks have specifically included the Villagers who lived in the Knife-Missouri confluence locality during the Equestrian period (cf. Wood 1972, 1974). Not only did horses enable faster and more distant interchanges between natives, but also the fur trade network extended contacts indirectly to Europe. What is the evidence that KRF declined in importance as a trade commodity through the first half of the Equestrian Period?

Historic Preservation Goals, Priorities, and Strategies

A top priority should be to develop approaches for distinguishing between Plains Village and Equestrian Nomadic archeological deposits of the Equestrian period in the portions of the Knife River basin removed from the Plains Village heartland of the Knife-Missouri locality. One strategy for approaching this problem would be to comparatively study archeological deposits left by people who lived those different lifeways during that period.