The Northern Red River Study Unit

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The Northern Red River Study Unit (NRRSU) is in northeastern North Dakota. The Canadian province of Manitoba borders it to the north, while the Red River of the North forms the North Dakota-Minnesota boundary to the east. The Sheyenne River and Southern Red River study units (SU) lie to the south. The Souris River SU is located along the northernmost portion of the western border.

Description of the Northern Red River Study Unit

The NRRSU includes all or part of the following 10 counties: Cass, Cavalier, Grand Forks, Nelson, Pembina, Rolette, Steele, Towner, Traill, and Walsh. The NRRSU covers a 7,577 mi² area. Figures 9.1 and 9.1A depict the area. Table 9.1 is a summary of whole and partial townships included in the SU.

Drainage

The Red River of the North flows northward along a sinuous course ultimately draining to Hudson Bay. It is situated in the middle of a broad glacial lake plain, 315 river miles long and 20-60 miles in width between Lake Traverse and Lake Winnipeg (Souris-Red-Rainy River Basin Commission 1972:130). The primary tributaries of the Red in the NRRSU from north to south are the Pembina (and Tongue), Park, Forest, Turtle, and Goose rivers. Many of these longer tributary streams exhibit relatively steep slopes as they drain eastward from the uplands across the Pembina Escarpment to the Red River Valley. However, within the Red River Valley, many tributaries (e.g., Salt Water and Fresh Water coulees in Grand Forks County) often have relatively flat slopes and poorly defined watersheds (cf. Doolittle et al. 1981).

Physiography

The NRRSU includes portions of the Red River Valley and Glaciated Plains physiographic regions (cf. Bluemle 1989:24). Along an east-west transect traversing the NRRSU near the international boundary; six major physiographic features are encountered (Hetzler et al. 1972:118-121, Thompson and Hetzler 1977). These are (1) the glacial Lake Agassiz plain, (2) glacial beach lines and delta deposits, (3) glacial moraine, (4) glacial meltwater trenches, (5) rolling ground moraine and till plain (including portions of the Devils Lake Basin), and (6) steep, hummocky glacial plains (Turtle Mountains).

Figure 9.1: Map of the Northern Red River Study Unit.

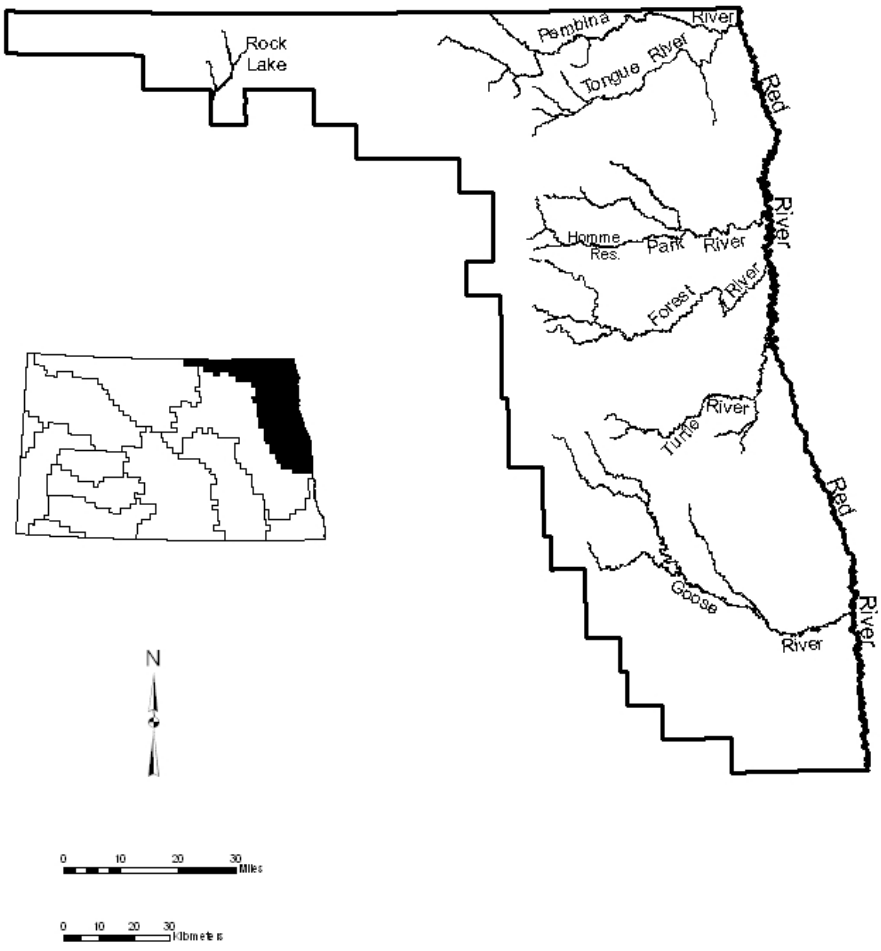

Figure 9.1A: Shaded Relief Map of the Northern Red River Study Unit.

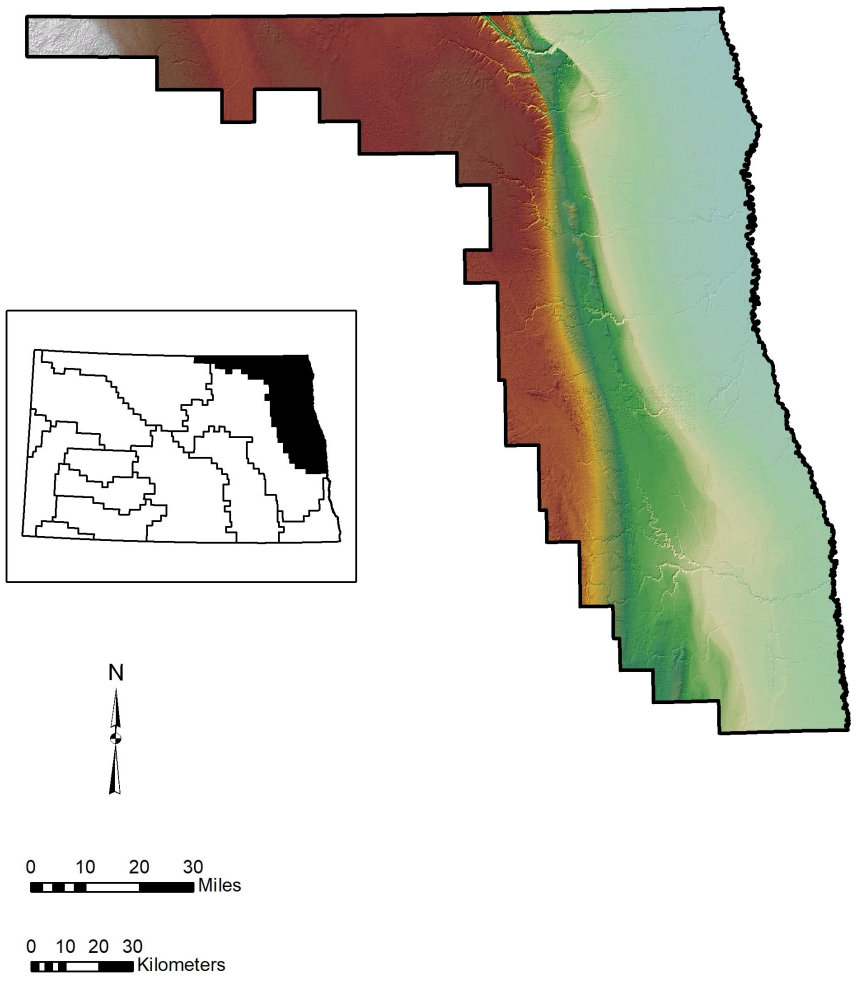

Table 9.1: Townships in the Northern Red River Study Unit.

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TOWNSHIP	RANGE
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TOWNSHIP	RANGE
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TOWNSHIP	RANGE
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TOWNSHIP	RANGE
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TOWNSHIP	RANGE
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In eastern Walsh County, the glacial Lake Agassiz plain is a broad, essentially flat lakebed filled with sediment. Elevation ranges from about 800 feet amsl along the Red River to 900 feet amsl at the western boundary of the lake basin (cf. Bluemle 2016:224-229; Hetzler et al. 1972:118). A series of distinctive beach ridges or strandlines were formed by rising and lowering glacial lake levels during late Pleistocene/early Holocene times (cf. Fenton et al. 1983; Hetzler et al. 1972:120). Delta areas along with interbeach zones formed during recession and drainage of Lake Agassiz (cf. Arndt 1975:29). The Edinburg moraine marks the last glacial advance in the county. This hilly country ranges in elevation from 1100-1250 feet amsl.

Golden Valley is a north-south trending plain in Walsh County representing the remnants of a glacial river (one of several meltwater trenches) draining to glacial Lake Agassiz (Bluemle 1973; Hetzler et al. 1972:119). Elevation ranges from about 1130-1250 feet amsl. The western margin of the upper Red River valley is marked by the steep-sided Pembina Escarpment.

To the west of this escarpment lies rolling ground moraine (upland till plain). Numerous small and large lakes dot the surface. Elevation ranges from about 1,600 feet amsl in the west to 1,250 feet amsl along the Pembina Escarpment. A small portion of the Devils Lake Basin is included within the NRRSU. This closed drainage system empties into Devils Lake (Bluemle 1989:24; Ryan and Wiche 1988). The terrain is typically glaciated till plain with low relief marked by inconspicuous drainage divides.

The Turtle Mountains comprise elevated, hummocky glacial terrain situated in the northwestern corner of the NRRSU. Elevation ranges from 1800 to 2300 feet amsl. Numerous pothole lakes (e.g., Carpenter Lake) occur in these forested and undulating settings.

The ecological and physiographic diversity typifying the NRRSU natural landscape influenced both native groups and early Euro-American explorers and traders alike. Table 9.2 is a listing of some place names for prominent localities in the region.

Climate

The modern climate at Grafton in Walsh County is continental as it is located near the geographical center of North America. Winters in the NRRSU are long and cold, while summers are warm. Precipitation averages about 18.5 inches, most of which falls from April through early September (Hetzler et al. 1972:121). The mean January temperature is 0°F while that for July is 70°F (ibid.). Annual frost-free days number about 120 in the northern end of the Red River valley.

Table 9.2: Listing of Geographical Place Names in the Red River valley and Surrounding Regions Referred to in the Early Journal Accounts (adapted from Gough 1988, 1992; Reid and Gannon 1928:199-200).

Name	Description
Bois Perce (Pierced Woods)	Vicinity of Bowesmont, ND
Forks	Junction of the Red and Assiniboine rivers, present-day Winnipeg, Manitoba
Grandes Fourches (Grand Forks)	Junction of Red and Red Lake rivers, present-day Grand Forks, ND
Lac du Diable (Devils Lake)	Lake chain in Benson and Ramsey counties, ND
Hair Hills	Pembina Mountains (uplands) west of Pembina Escarpment in Pembina and Cavalier counties, ND
Panbian River (Pembina River)	Enters the Red River from the west, near Pembina, ND
Park River	Enters the Red River from the west, near Grafton, ND; named for Assiniboine buffalo park or corral nearby
Riviere aux Buttes de Sable (Sand Hill River)	Enters the Red River from the east, near Climax, MN
Riviere a la Folle Avoine (Wild Rice River)	Enters the Red River from the east, near Halstad, MN
Riviere aux Marias (Snake River)	Enters the Red River from the east, near Stephen, MN
Salt River (Forest River)	Enters the Red River from the west, northeast of Grafton, ND
Schian River (Sheyenne River)	Enters the Red River from the west, near Fargo, ND
Vulture River (Wild Rice River)	Enters the Red River from the west, south of Fargo, ND

Landforms and Soils

As outlined above, several prominent physiographic features occur in the NRRSU. Each of these landforms exhibit sediments derived from different sorts of glacio-lacustrine processes. Local soil formation has been influenced by various pedologic factors including slope, drainage, and parent material (cf. Holliday 1990). In Walsh County for example, four major soil groupings have been identified and each is associated with a general type of setting. Table 9.3 summarizes this information.

Table 9.3: Summary of Walsh County Soil Characteristics of the NRRSU (adapted from Hetzler et al. 1972:General Soil Map).

Physiographic Setting	Soil Characteristics
Glacial Till Plain	Formed in calcareous loam or clay loam glacial till or till-derived alluvium
Interbeach, Delta, and Valley Areas	Formed in gravelly, sandy, and loamy materials deposited as deltas, fans, beaches, interbeaches, and offshore bars
Glacial Lake Plain	Lake sediments of clays, silts, and sands
Floodplains, Low Terraces	Stratified soils formed in recent alluvium ranging from clay to loam textures

Upland Plains

Undulating glacial till plain characterizes most of the terrain west of the Pembina Escarpment (Pembina Mountains). Glacial features including moraines (e.g., the Edinburg moraine) occur as well (cf. Bluemle 1973, 1984). Soils such as Barnes, Svea, and Busey are typically represented (Hetzler et al. 1972; Thompson and Hetzler 1977). Finally, the steep-sloped terrain of the Turtle Mountains occurs in the northwestern corner of the NRRSU.

Interbeaches and Deltas

Prominent beach lines marking former levels of glacial Lake Agassiz extend along a northwest-southeast axis through the NRRSU (cf. Bluemle 2016:236-241; Fenton et al. 1983; Hetzler et al. 1972:120). These areas often contain loamy and sandy soils which are particularly susceptible to erosion by wind and water (cf. Thompson and Hetzler 1977).

Glacial Lake Plain

Nearly level glacial Lake Agassiz plain terrain occurs throughout much of the eastern portions of the NRRSU (cf. Arndt 1977). Ground slope in these settings may very only a few feet per mile except where the meandering Red River and its tributary streams have downcut. Glyndon, Bearden, and Fargo series soils are routinely mapped here.

Terraces

Terraces consist of former floodplains of rivers which lie at elevations above their modern, entrenched counterparts. Some of the present-day tributaries of the Red River occupy former glacial meltwater channels which drained into Lake Agassiz. Holocene age cut/fill sequences occur in some steep walled meltwater valleys such as along the Pembina and Park rivers where terraces set some 8-18 m (20-60 feet) above the present floodplain. Ames (1975) and Arndt (1975) illustrate this rugged Valley Wall topography which occurs in the Pembina drainage. This sort of upland terrain dissected by steep valleys along and west of the Pembina Escarpment is locally known as the “Hair Hills” (Bluemle 2016:244-247.

Floodplains/Low Terraces

A floodplain comprises that portion of the valley susceptible to annual flooding. In the NRRSU it includes broad expanses of bottomland along the Red River and its major tributaries. Stratified loamy and clayey alluvial soils occur in these settings. Hetzler et al. (1972) map these locations as (1) Fairdale-LaPrairie association and (2) Wahpeton-Cashel-Fargo association in Walsh County.

Geologic studies by the North Dakota Geological Survey (NDGS) and pedologic studies by the Natural Resources Conservation Service (NRCS) have been completed on

countywide bases. Additionally, the North Dakota Geological Survey (NDGS) has published maps of till deposits in the Red River valley (Harris et al. 1996). These sources offer important background information concerning soils and stratigraphy on regional and local scales.

Natural Resources Conservation Service (NRCS) official soil survey resources are available online (NRCS 2021 a, b).

- Electronic Field Office Technical Guide: https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg/
- Web Soil Survey: https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/survey/

Flora and Fauna

Much of eastern North Dakota is situated in the North American Grasslands Biome (Barkley 1977; Odum 1971; Seabloom 2011:28-29). Ecologically, the Red River valley region east of the Pembina Escarpment is characterized by tall grass prairie. This vegetation community is dominated by big bluestem *(Andropogon gerardi)* and little bluestem *(Schizachyrium scoparium*) (Heidel 1986). One of the few remaining native tall grass locations is the Oakdale Prairie tract in Grand Forks County (cf. Sayler et al. 1989). Mixed grass prairie occurs on the more poorly drained beach ridges and delta locations. The mixed grass prairie extends to the west on the glaciated plains landscape. Aspen, woody shrubs, and grasses are found the slopes of the Pembina Escarpment.

Floodplain gallery forest occurs in the bottomlands along the Red River and its principal tributaries. Riparian communities are dominated by elm, ash, box elder, and bur oak. Numerous shrubs and forbs occur as understory. A variety of nuts, berries, and tubers would have been seasonally available in this ecozone (cf. Michlovic 1987:12-15; Ritterbush 1990:Appendices 1 and 2).

Ecological diversity typifies the Turtle Mountains to the west (cf. Burgess and Disrud 1969). Conifer-deciduous forest occurs in the rugged terrain surrounded by low-lying prairie. Wetlands occurred in poorly drained locations throughout the NRRSU.

The vegetation communities provided suitable habitats for a variety of large and small fauna for native groups and later Euro-American traders (cf. Bailey 1926). Reid and Cannon (1928) provide an extensive listing of mammals and birds (following Bailey 1926) mentioned in Alexander Henry's Red River journal (Gough 1988). Large game animals included elk, deer, antelope, moose, and caribou. Bison were ubiquitous on the prairie grasslands before being killed off. Grizzly bears were also reported to frequent the Devils Lake region.

Fur-bearing mammals in the NRRSU include muskrat, beaver, rabbit, lynx, wolf, fox, ermine, mink, marten, fisher, wolverine, otter, skunk, badger, and raccoon. Pelts of these creatures are reported in regional fur trade inventories (Reid and Cannon 1928).

Waterfowl abound in riparian settings along the Red River and wetland marshes and prairie potholes throughout the NRRSU. Various species of ducks and geese were exploited for food and feathers. Eagles, hawks, and other raptors provided feathers and bone to both native groups and later arrivals as well.

Other Natural Resource Potential

The biotic diversity of the NRRSU provided hunter-gatherers throughout prehistory with a varied array of resources to exploit for food, fuel, and shelter as attested to in the early accounts (1797-1798) of traders such as Chaboillez (Hickerson 1959). The local availability of drinkable water in the NRRSU may have been a key factor encouraging settlement during xeric as well as mesic climatic spells.

In historic times, the alkali lakes and streams provided "salt" for early traders and trappers (cf. Gough 1988; Ritterbush 1991a). Hence, the Forest River is referred to as Salt River in Alexander Henry's narratives.

Lithic resources are impoverished in portions of the NRRSU. Even small gravels are rare throughout most of the interior of the glacial lake plain. Rocks needed for cooking and sweat bathing at campsites along the Red River needed to be transported from beach zones near the margins of the glacial lake plain. Chippable stones were locally available only in the glacial till (Bakken 2011).

In 2021 the South Dakota State Historical Society published *Tool Stone Found at South Dakota Archaeological Sites* edited by Renee M. Boen. The document contains information, photographs, and maps on raw stone materials found at archaeological sites in South Dakota and will be a valuable reference for archaeologists in North Dakota as well. Craig Johnson's *Chipped Stone Technological Organization: Central Place Foraging and Exchange on the Northern Great Plains* (2019) is likewise a valuable resource regarding lithics resources and provides important research questions for future studies. Morrow (2016) has published a detailed volume on lithic resources in Minnesota.

Overview of Previous Archaeological Work

This section identifies previous archaeological work conducted in the NRRSU. The discussion focuses on investigations conducted along the (1) Red River channel, (2) major tributary drainages, (3) prominent features (beach ridges), and (4) other areas.

Inventory Projects

As of 31 December 2020, there were 302 archaeological sites, and 343 archaeological site leads and isolated finds in the database for the NRRSU. The overall area of the NRRSU is 7,596 mi^2 and the recorded site density is one site per 25.15 mi^2 or one resource per 11.8mi^2 if site leads and isolated finds are included. This low figure reflects the sporadic survey work completed rather than actual site density (cf. Michlovic 1988:56; MHS 1981).

Tables 9.4 and 9.5 present data for (1) cultural/temporal affiliation(s) and (2) feature type by the landforms on which the sites are located. Paleo-Indian (Paleo) remains include a Clovis point collected from 32PB25 along an upland ridge overlooking the Pembina River valley. At least three sites (32GF38, 32WA1, 32WA309) have produced Plano age materials. Middle/Late Archaic sites are better represented in the sample. Middle Woodland components (mounds and campsites) occur. Among the best represented are Woodland and Late Prehistoric sites. Plains Village components are poorly known compared with the Sheyenne River and Souris River SU to the west. As with most other regions in North Dakota, the cultural/temporal affiliation for most sites remains unknown.

Table 9.4: Cultural/Temporal Affiliation of Archaeological Resources in the Northern Red River Study Unit, 31 December 2020.

Paleo-Indian	
Clovis	1
Plano (Cody)	3
Total	**4**
Archaic	
Unspecified	11
Oxbow	2
McKean/Duncan/Hanna	4
Pelican Lake	3
Total	**20**
Woodland	
Unspecified	3
Sonota/Besant	6
Middle Woodland	15
Arvilla	1
Blackduck	2
Sandy Lake	6
Late Woodland	14
Total	**47**
Late Prehistoric	
Unspecified	41
Devils Lake/Sourisford	1
Plains Village	3
Total	**45**
TOTAL	**116**

Table 9.5: Feature Type by Landform for Archaeological Sites in the Northern Red River Study Unit, 31 December 2020.

SU 9	Cairn	Conical	CMS	Village	Earth	Fort	Grave	Hearth	Jump	Mound	Pit	Circle	Trail	Misc	TOTAL
Beach/River bank			8						2					1	**11**
Beachline (glacial)			12				2			1	1				**16**
Draw			1												**1**
Floodplain			24				2	1		1				1	**29**
Hill/Knoll/ Bluff	1		29				9	1		7					**47**
Lacustrian plain			5												**5**
Other			6				1			2					**9**
Ridge			25				5			3				2	**35**
Spur			1												**1**
Terrace			76	1		1	5	7		10	1		1		**102**
Upland plain	1		86	1	1		4	1		5		1	1	1	**102**
Valley wall foot slope		1	1				1								**3**
TOTAL	**2**	**1**	**274**	**2**	**1**	**1**	**29**	**10**	**2**	**29**	**2**	**1**	**2**	**5**	**361**

Conical=Conical Timber Lodge; CMS=Cultural Material Scatter; Village=Earthlodge Village; Earth=Earthwork; Fort=Fortification; Circle=Stone Circle; Misc=Miscellaneous

As indicated in Table 9.5, many of the recorded sites are situated in upland erosional settings (upland plain, terrace, hill-knoll-bluff, and ridge). The "Hair Hills" west of the Pembina Escarpment is ecologically diverse and offered many enticements to prehistoric settlement. Terrace settings along the major tributaries such as the Pembina and Tongue rivers provided locations which where free of seasonal flooding and offered resources (cf. Ames 1975; Biggs et al. 1984; Brown et al. 1982). Intensive surveys should be undertaken in other physiographic settings in the NRRSU to provide updated information concerning overall site density and the types and ages of components represented. These include: (1) River Red bottomlands, (2) Turtle Mountains locality, and (3) Glaciated Plains.

Two general recommendations merit consideration. Firstly, cultural resources monitoring of water control and recreation facilities such as Homme Reservoir should be periodically undertaken to update conditions of historic properties (US Army Corps of Engineers 1952, 1955).

Secondly, as part of background studies for large-scale inventory projects, researchers should use Landsat imagery of groundcover available for North Dakota (cf. Reid and Johnson 1978) supplemented with aerial photographic coverage (cf. US Department of the Agriculture 1937). Also, LIDAR imagery should be accessed. Recent digital imagery is available from internet sources, including (Google Earth 2021; ND GIS 2021):

- Google Earth: https://www.google.com/earth/versions/
- North Dakota GIS Hub (ND GIS): https://www.gis.nd.gov/

Cultural resources inventory and site evaluation work has been ongoing for over a century in the NRRSU, although much of this work has not been systematic or well-coordinated.

Among the earliest surveys was Lewis' work (1890) in the Red River drainage. This early work was updated by Haury (1990:33-36, 44-45) for Grand Forks County and Walsh County mound sites including 32GF123 and 32WA1.

Other early inventory work in the NRRSU was conducted under the auspices of the Smithsonian Institution River Basin Surveys (SIRBS) archaeology program in the years following World War II. Wheeler (1948) reported on surveys undertaken for the Homme Reservoir along Park River as well as work along the Pembina River and the Tongue River. Prominent mound sites were recorded during these spot-check surveys supplemented by inquiries with local informants. Hudak (1981b) resurveyed portions of the Homme Reservoir and reported no new sites. He relocated the Reunion site (32WA400), Homme Dam mound (32WA401), and the Homme Reservoir site (32WA403). All three sites are discussed in greater detail in Farmer et al. (1974) and Loendorf (1978b).

Gordon Hewes while at the University of North Dakota (UND) in 1946-1948 (cited in Cole 1968c) surveyed stretches of the Turtle River. Hewes recorded nine mound

and camp sites which received among the first SITS numbers in Grand Forks County. Cole (1968c) revisited some of these sites during brief investigations of the Turtle drainage.

Kenneth Cole (UND) during the late 1960s undertook several seasons of fieldwork in the NRRSU. His reports cover investigations conducted along stretches of several major tributaries. Cole (1968a:l-2) recorded 34 sites along the Forest River between Fordville and Inkster during three weeks of survey. An updated survey of portions of the Forest drainage was conducted in 1985 (Larson et al. 1986).

During three days of survey, Cole (1968b) relocated several known mound and rock cairn sites along a stretch of the Goose River between Mayville and Northwood. Cole referred to this work along the Goose as rather "unproductive" compared with his earlier Forest River inventory.

University of North Dakota (UND) archaeologists resumed cultural resource inventories along the Forest River (Loendorf and Good 1974a), Turtle River (Loendorf and Good 1974b), and the Park River (Loendorf and Loendorf 1975; Loendorf and Carmichael 1976) in the mid-1970s. The Forest River survey identified four prehistoric sites (32GF326, 32GF327, 32GF328, 32GF329). Besant and Pelican Lake points were found at 32GF326. 32GF327 produced Middle/Late Archaic Oxbow or Parkdale Eared bifaces (cf. MacNeish 1958). Work along the south branch of the Turtle River reported by Loendorf and Good (1974b) included identification of 32GF324 which produced two obsidian flakes from a possible Middle Woodland context.

Loendorf and Loendorf (1975) surveyed a stretch of the Middle Park River around SCS Dam #5. Two artifact scatters (32WA404, 32WA405) were recorded in tilled land on a river terrace. Corner-notched projectile points and other bifaces were also found. No pottery was encountered at either site.

Loendorf and Carmichael (1976) recorded two bone scatters and an isolated flake in an examination of some 37 mi of stream banks of the Middle Branch of the Park River and its tributaries. Low bottomland settings in these tributary drainages did not reveal much evidence for prehistoric land use. Elevated terraces were thought to contain cultural deposits.

Schneider (n.d.) investigated a site near Drayton during the mid-1970s. Late prehistoric (probably Late Woodland) remains were recovered during surface investigations.

Ames' (1975) work on the Pembelier project along the Pembina River in Pembina and Cavalier counties recorded 19 sites during a brief survey. All the sites were located on the first terrace situated some 8-18 m (20-60 feet) above the floodplain.

One of the most extensive prehistoric archaeological site inventories in the middle Red River valley was conducted in Norman County, Minnesota during 1981-1982 by

Minnesota State University-Moorhead, as an outgrowth of the Minnesota Statewide Archaeological Survey (cf. MHS 1981). The survey area covered a 22 mi strip of floodplain river frontage, 0.125 to 0.25 mi in width, along the Red River, totaling about 3,200 acres. Michlovic (1982) reported 41 previously unrecorded prehistoric sites and find spots. Most of these sites and find spots occur along high levees of the river channel, suitable locations for human settlement (ibid.:56).

During the same period, Brown et al. (1982:38) reported 42 new prehistoric sites and 13 find spots on the Pembina River project in Pembina and Cavalier counties. Among the significant finds were a Clovis point (in a private collection) from 32PB25 and Late Archaic components identified at 32PB8 and 32CV204. An exotic Knife River flint (KRF) projectile point in the collection of Mr. Carl Kartes is illustrated. Many of the sites were found to be situated on colluvial fan landforms which would not have been susceptible to annual spring flooding.

Brown and Brown (1983) work on the Walhalla alcohol fuel plant survey resulted in the recording of two prehistoric sites (32PB39 and 32PB40). These sites are situated in river terrace and glacial beach ridge settings.

Biggs et al. (1984) discuss findings of the ring levee project along the Red River undertaken under the auspices of the US Army Corps of Engineers. In a stratified, random (15%) sample of some 314 farmsteads having ring levees, six previously unrecorded prehistoric sites and two prehistoric isolates were recorded. A site lead for Roy's Post (a fur trade post) was also reported.

During the summer of 1985, some 25 sections of land in the Forest River drainage in Grand Forks and Walsh counties were inventoried for cultural resources. Larson et al. (1986) reported 231 sites ranging from Paleo to the recent historic era. This one project generated most of the site records in the SU database.

Inventory work associated with modifications to the Riverside Park Dam along the Red River in Grand Forks has been reported by Haury (1988a, 1988b). One buried artifact scatter was recorded along the banks of the Red River. Annual overbank flooding appears to have capped other late prehistoric cultural deposits with a meter or more of alluvium. Gregg and Picha (1989a) surveyed the Red River-English Coulee confluence and recorded the Omlid 1 site (32GF130) in a tilled field adjacent to the river (see Major Excavations section). Stream confluence localities here as elsewhere appear to have high potential for containing remains of prehistoric settlements (cf. Anfinson 1990:159-160).

Schweigert and Persinger (1989b) discuss the Langdon Rural Water survey which covered some 219 miles of pipeline route and recorded 11 prehistoric sites. Some prominent sites such as 32CV64 and 32PB57 were recorded during this inventory. However, linear corridor surveys in the NRRSU which cross vast stretches of the Lake Agassiz Plain and adjacent areas of the glaciated plains are largely unproductive unless the transect encounters high potential localities such as beach ridges or stream confluences and crossings.

During Ritterbush's (1991b) search for fur trade posts in northeastern North Dakota, 16 archaeological sites were identified. Ritterbush (1991a:44-49) discusses some of the problems associated with finding sites in Red River bottomland settings. As noted by Ritterbush, a geoarchaeological framework will aid in selecting likely site locations and help in determining the age of cultural deposits encountered in these settings.

The proposed construction of an approximately 1,845-mile-long crude oil pipeline (TransCanada), originating in Canada and terminating in Illinois and Oklahoma, necessitated Class I, II, and III cultural resource inventories in eastern North Dakota (Bleier et al. 2006). Driven by a geomorphologist, the Class II inventory covered 100% of the original pipeline route. The Class III inventory was a 31% sample of the proposed pipeline route(s). The sample segments represented higher probability areas (ibid.:ii). The pedestrian survey was supplemented by shovel probes in areas of reduced ground surface visibility. Counties within the NRRSU include portions of Cavalier, Nelson, Pembina, Steele, and Walsh. Terrain along the proposed route varies from prominent riparian forests along stream valleys to flat farmland to gently rolling plains with intermittent wetlands. More specifically, the contemporary landscape comprises the Pembina Gorge, cultivated fields, pasture, and Conservation Reserve Program (CRP) fields. During the Class III inventory, one archaeological site and two archaeological isolated finds were recorded within the NRRSU (ibid.:Table 10).

Along the 2006 proposed TransCanada pipeline route, all the archaeological resources within the NRRSU consisted of lithics. Site 32PB202 is a small lithic scatter located in a flat cultivated field with a rise to the east and a man-made drainage to the north. Twenty artifacts were documented; except for one KRF flake, all were Swan River chert (SRC) (ibid.:36). A Besant-type projectile point and a core also were found (ibid.). The two isolated finds, 32PBx176 and 32WAx211, were recorded in plowed fields and comprise one SRC flake and one light brown chert flake, respectively (ibid.:52). In general, the documented site settings and feature type are not unexpected (cf. Table 9.5).

Numerous archaeological sites have been recorded in eastern North Dakota along sampled, cross-state linear project corridors, such as the TransCanada pipeline inventory. More surveys of this nature inevitably would result in the recordation of more archaeological sites.

As of 31 December 2020, there have been 682 inventories conducted within the NRRSU. Most of these inventories for energy projects. The nature of the inventories in the NRRSU compared to SU in the western half of the state appear to reflect the emphasis on channels of commerce in the east, and the surge in oil and gas production in the west.

In general, site avoidance, rather than formal testing and/or mitigation, has been the choice of applicants. The result is initial documentation of many new sites but relatively few evaluative investigations, and therefore little new knowledge about the prehistory of North Dakota.

Formal Test Excavation Projects

Test excavations in the NRRSU were first reported by SIRBS and UND personnel in the years following World War II (Hoffman 1969). Table 9.6 is a listing of these projects. The earliest excavations along the Pembina River are reported by Wheeler (1948). Some historical archaeological projects are listed but no further discussed in the accompanying test. Wheeler tested three rock cairn features which contained historic era burials of two dogs and a pig skeleton. It is also suspected (but not documented) that Gordon Hewes during his tenure at UND in the late 1940s tested several mounds which he had previously identified during inventories along the Turtle River.

Table 9.6: Formal Test Excavation Projects in the Northern Red River Study Unit, 31 December 2020.

Year	First Author	Second Author	Title	Site Number	MS #
1948	Wheeler, R.		Appraisal of the Archaeological Resources of Homme Reservoir, Cavalier County, and Tongue River Reservoir, Pembina County, ND		State Archives
1969	Hoffman, J.		Outline of Human Prehistory in the Souris-Red-Rainy River Basins		State Archives
1975	Ames, K.		Archaeological Site Survey of the Pembilier Project Area	32CV201 32CV203 32CV204 32CV205 32CV206 32CV208 32CV209 32CV210 32CV211 32CV212 32CV213 32CV214 32CV215 32CV216 32CV217 32CV218 32CV219	6
1978	Loendorf, L.		Statement of Negative Findings on the Test Excavations at the Reunion Site-32WA400	32WA400	2261
1984	Toom, D.		Lower Forest River Stabilization Project Archaeological Investigations, Walsh County, ND	32WA10	3400
1984	Toom, D.		Archaeological Survey of Select Locations along the Lower Forest River and Testing of the Skalicki Site (32WA10), Walsh County, ND	32WA10	3417
1986	Porsche, A.	D. Kuehn	A Report on Evaluative Testing at 32RO2, Turtle Mountain Indian Reservation, Rolette County, ND	32RO2	4067
1988	Haury, C.		Survey and Site Testing Along the Red River of the North, For the Riverside Dam Project, Grand Forks County, ND	32GF116	4577

Year	First Author	Second Author	Title	Site Number	MS #
1989	Larson, T.	P. Sanders	Archaeological Investigations of Sites 32GF121 and 32GF123, Grand Forks County, ND	32GF121 32GF123	4722
1993	Penny, D.	T. Larson	A Report on the Results of Test Excavations at 32GF155, Grand Forks County, ND	32GF155	6082
1994	Breakey, K.	C. Dobbs	Evaluation of the Archaeological Sites on the Lakehead Pipe Line Company Corridor between Neche, ND and Clearbrook, MN, 32PB153 and the Angle Road Tongue River, Pembina County, ND	32PB153	6256
1994	Breakey, K.	C. Dobbs	Evaluation of the Archaeological Sites on the Lakehead Pipe Line Company Corridor between Neche, North Dakota and Clearbrook, Minnesota 32PB154, 32PB155, and 32PB161 Red River, Pembina County, ND	32PB154 32PB155 32PB161	6257
1994	Olson, B.	M. Tate	Highway 200 Project: Evaluative Testing at 32TR677, 32TR402, and 21NR29 Traill County, ND and Norman County, MN	32TR402	6301
1995	Klinner, D.		Results of the Evaluative Testing of Sites 32PB63 and 32PB66: Two Fur Trade Era Sites in Pembina County, ND	32PB63 32PB66	6867
1996	Ward, J.		Archaeological Investigations at 32WA62 (The Aafedt Site), Walsh County and 32PB95 (The Olafson Site), Pembina County, ND	32WA62	7044
1997	Ward, J.		A Phase II Cultural Resources Evaluation of Historic Archaeological Site 32GF116 City of Grand Forks, Grand Forks County, ND	32GF116	6871
2008	Stine, E.	A. Kulevsky	TransCanada Keystone Pipeline: Evaluative Testing at 32RM260, 32WA250 and 32WA251, Ransom and Walsh Counties, ND	32RM260 32WA250 32WA251	10361
2010	Stine, E.	A. Kulevsky	TransCanada Keystone Pipeline Project: Subsurface Investigations at 32PB211, Pembina County, ND	32PB211	11386

Nearly a quarter of a century passed before the next phase of testing work was done in the NRRSU. Ames (1975) placed four 1-x-2-m tests at both the Woodtick site (32CV201) and the Carpenter site (32CV204). Few diagnostic artifacts were found in the tests; most appear to date to late prehistoric times. Cultural materials were restricted to the uppermost dark topsoil (A horizon) which was underlain by sediments derived from Walsh Formation clays.

Toom (1984) reported testing at the Skalicki site (32WA10) along the Park River for the NRCS. One 1-x-2-m test was excavated along the river cutbank to sample cultural deposits. A Late Woodland component was identified containing cord-roughened pottery, a small side-notched arrowpoint, and an antler tine flaker tool. Small quantities of chipped stone flaking debris (mostly KRF and SRC), fire-cracked rock, and bone also were recovered.

Porsche and Kuehn (1986) excavated a 1-x-1-m test unit at 32RO2 which was found to contain both prehistoric and later historic components. Little cultural material was recovered (a few flakes along with some bone fragments). No diagnostic artifacts

were encountered which could aid in dating the prehistoric deposit. A late prehistoric affiliation is probable.

Larson and Sanders (1989) reported test excavations at 32GF121 and the Smilden-Rostberg site (32GF123) recorded during work undertaken for the Larimore Dam access road investigated initially by Artz and Kordecki (1988). At 32GF121, three 1-x-1-m tests were dug to evaluate what turned out to be a sparse prehistoric deposit containing few artifacts.

Testing work at the Smilden-Rostberg site (32GF123) comprised three 1-x-1-m tests and a single larger 1-x-2-m unit (Larson and Sanders 1989). A bison bone bed was encountered in one unit. A preliminary date of 7195±115 RCYBP (GX 14514) was obtained on bone remains from the deposit. Major excavations were subsequently undertaken in 1990 (see below).

Test excavations, including 48 shovel tests and two 1-x-1-m test units, were conducted at 32GF155 (Penny and Larson 1993). The site is located south of the confluence of the Turtle and Red rivers. Cultural materials recovered during excavation were charcoal, fired clay (chinking), glass, metal, shell, and burned bone, and unburned large mammal bone with green breaks (ibid.:6). Investigators speculate (ibid.:8) that "The hand wrought nail, the fire clay, the pipe stem fragment and the scatter of bone are all consistent with the ages of the Turtle River [trading] posts (AD 1802 through 1815) as well as the archaeological evidence from other fur trade sites in North Dakota (e.g., Pembina)."

At 32TR677 and 32TR402, located where ND Highway 200 crosses the Red River, test excavations and geomorphological analysis were undertaken (Olson and Tate 1994). The Viker site (32TR677), a cultural material scatter, was initially recorded in 1989. At that time, the site's surface expression included one quartzite biface, two gray chalcedony flakes, three KRF flakes, one plain ceramic body sherd, bone and freshwater mussel fragments, and fire-cracked rock (ibid.:7). During testing, 38 auger probes were placed at the Viker site; none contained prehistoric cultural material.

Site 32TR402, alternatively known as the Halstad site or the Kelso Ridge site, is in a cultivated field on a low ridge between Grandin Lake to the west and the Red River to the east. Test excavations at the site consisted of 92 shallow auger probes, 16 deep auger probes, three deep cores, and five formal 1-x-2-m excavation units (ibid.:21-26). A buried pit feature (Feature 1), containing Northeastern Plains Village ware, flakes, clamshell fragments, burned and unburned bone, fire-cracked rock, a rounded cobble, and charcoal, was recorded (ibid.:36-39). The larger site assemblage includes dozens of native ceramic sherds and a small, triangular arrow point of possibly heat-treated reddish chert (ibid.). More diagnostic artifacts, previously collected from the site by a local resident, also were examined. The collection contained 22 projectile points, including a Pelican Lake-type point and generically described Woodland/Plains Village points (ibid.:46). A data recovery program was undertaken at 32TR402 in 1996 (see Major Excavation Projects section).

Sites 32PB63 and 32PB66 (the Walhalla State Historic Site), on the Pembina River, were tested in 1994 (Klinner 1995). Site 32PB63 is located within the Pembina City Park and is heavily disturbed. Geophysical testing has been recommended for that site (ibid.:iii). Artifacts recovered from 32PB66 include a Blackduck rim sherd, a body sherd, chipped stone flaking debris, and items consistent with those found at fur trade and military post sites (ibid.).

Test excavations were conducted at three prehistoric cultural material scatters, 32GF80, 32GF81, and 32GF82, along the Red River (Florin et al. 1998). No diagnostic artifacts were recovered from 32GF80. The artifact assemblages of 32GF81 and 32GF82 included Swan River chert flakes, bone and shell fragments, and native ceramics. Investigators identified the ceramic body sherds as "Late Plains Woodland Period, 'hybrid Village-Woodland complexes,' or the Northeastern Plains Village complex" (ibid.:45).

The Vettel site (32TR750) is a pre-contact site located near the Red River and County Highway 13. The surficial expression of the site included SRC debitage, a dentate impressed body sherd, burned and unburned bone fragments, and a shell fragment (Mulholland and Farrell 2007:Table 2). Shovel tests, a formal excavation unit, backhoe trenches, and geomorphological investigations revealed additional information about the Vettel site (32TR750). Results of the testing program reveal a buried surface at one meter below surface "but there were no deeply buried archaeological sites associated with it in the project area" (ibid.:39).

Evaluative testing was conducted at 32WA250 and 32WA251 on behalf of the proposed TransCanada Keystone Pipeline (Stine and Kulevsky, 2008). Site 32WA250 is a sparse prehistoric cultural material scatter located on a terrace above the South Branch Park River in Walsh County. No features or diagnostic artifacts were recovered at 32WA250, and the site was determined not eligible for the National Register of Historic Places (NRHP). Site 32WA251 is a prehistoric cultural material scatter located on the edge of the uplands overlooking the South Branch Park River to the north. Cord-roughened, grit-tempered ceramics and a diagnostic projectile point (Besant) were recovered, and a portion of a burned earth feature was excavated. The site was determined eligible for the NRHP, and avoidance was recommended (Stine and Kulevsky, 2008).

Additional evaluative testing was also conducted at 32PB211 on behalf of the proposed TransCanada Keystone Pipeline (Stine and Kulevsky, 2010). Subsurface excavations resulted in the identification of at least one activity area, the recovery of a large amount of chipped stone flaking debris, burned bone, fire cracked rock and two diagnostic projectile points (Besant and Plains side-notched). No features were identified, but 32PB211 was recommended to be eligible for inclusion on the NRHP.

National Register of Historic Places

The National Park Service website includes a list of sites in the NRHP.

Major Excavation Projects

Major excavations in the NRRSU have been on-going but sporadic since about 1880. Table 9.7 provides a listing of major projects undertaken and reported to date. The earliest known excavations were conducted in 1888 in Grand Forks. Montgomery (1906:650, cited in Haury 1988a:15) reportedly excavated a mound (formerly 32GF12) in the vicinity of present-day Lincoln Park. At least two other mound groups are suspected to have been in the area (Haury 1988a:15).

Table 9.7: Major Excavation Projects in the Northern Red River Study Unit, 31 December 2020.

Year	First Author	Second Author	Title	Site Numbers	MS #
1990	Larson, T.	D. Penny	The Smilden-Rostberg Site: An Early Archaic Component in the Northeastern Plains	32GF123	5498
1997	Larson, T.	R. Hilman	A Report on Data Recovery Operations at the Halstad Site, 32TR402, Traill County, ND	32TR402	6872
2003	Blikre, L.	D. Benn	Phase III Cultural Resources Mitigation of Omlid 1 Site (32GF130) Grand Forks County, ND, Volumes I and II	32GF130	8466

The Fordville-Blasky Mounds (32WA1) were recorded and surveyed as containing 43 mounds and four linear embankments by Theodore Lewis in 1886 (Haury 1990; Wilford 1970:7). In 1935 Albert Jenks (then affiliated with the University of Minnesota) excavated two mounds at the site (ibid.). Hlady (1950:254) reported that the site was first visited by Henry Montgomery (1906) in 1883 who lists the count as "35 mounds and at least 4 artificial ridges." Montgomery subsequently excavated at least three mounds in the group. During 1947, Gordon Hewes (UND) and then in 1949 Hlady (UND) returned to the site and excavated another mound (Mound C) which produced few artifacts (Hlady 1950).

The second group of early mound excavations undertaken in the NRRSU was conducted at the Arvilla Mounds (32GF1) (Jenks 1932; Johnson 1973:6-14). During 1933 and 1935, Jenks (UM) excavated three mounds of the group. The remains recovered by Jenks form the basis for the definition of the Arvilla complex (Johnson 1973; Syms 1982b).

Three decades passed before Kenneth Cole (UND) undertook further excavations at two mound sites in Grand Forks County. At the Colony Mound (32GF305), Cole (1967b) excavated a 5-x-20-ft trench which revealed two superimposed burial pits. One of these features contained the remains of an infant interred with *Natica* beads. Cole (n.d.) also reported on burials recovered from 32GF308 and several other sites including 32NE301 which produced a beaver incisor, shell pendants, and *Busycon* columella artifacts.

Williams (1982) discusses the skeletal biology of a Woodland mortuary excavated by State Historical Society of North Dakota (SHSND) personnel in 1980 at the Inskter site (32GF19). Few artifacts were recovered with the interment of at least 28 individuals. Other mound excavations occurred on tributaries of the Red River on the Minnesota side such as the Warner mound (21PL5) along the Sand Hill River (Thompson 1985; Wiland n.d.).

Major excavations have been carried out at the Smilden-Rostberg site (32GF123). Archaeologists affiliated with Larson-Tibesar Associates excavated a ca. 56 m^2 block containing a bison bone bed and several artifact concentrations which date to 3850 BC (Larson and Penny 1990). Recovered materials included stone and bone tools, chipped stone flaking debris, and bison, dog, and human remains.

In 1996, a data recovery program was conducted at the Halstad site (32TR402) (Larson et al. 1997). Based on the extensive excavations, investigators were able to address questions regarding prehistoric cultural chronology, climate, subsistence, activities, and exchange. First, radiocarbon dating by Larson et al. (ibid.:40) corroborates the radiocarbon date reported earlier by Olson and Tate (1994); calibrated ages of the samples are AD 1290 and AD 1282, respectively. Diagnostic artifacts at the site include Sandy Lake, Lisbon Flared Rim, and Buchanan Flared Rim wares and small corner-notched arrow points (Larson et al. 1997:44). No cultural materials were recorded below the A-horizon (ibid.:40). Second, it appears that the prehistoric climate was like the present. Third, from the minimal amount of floral and faunal remains recovered, investigators speculate, "Perhaps the most intriguing potential indicator of plant foods at the site are two possible cucurbit phytoliths from Feature 1…this appears to be the first instance of potential cucurbits within the Northeastern Plains Village occupations of the Red River Valley" (ibid.:43). Fourth, the chipped stone flaking debris indicates that tool maintenance was an activity at the site. In contrast to previous assumptions (cf. Olson and Tate 1994), KRF accounted for 45% of the 1996 lithic assemblage (Larson et al. 1997:44). Finally, no exotic items were found during data recovery, suggesting the site may be on the periphery of the trade network further to the southwest (ibid.:46).

Excavations were undertaken at 32GF130 in 2001 (Florin 2002). The multi-component (prehistoric and historic) site is located north of the city of Grand Forks, between the English Coulee and the Red River. The prehistoric components date to the Late Plains Woodland and Northeastern Plains Village periods, as evinced by the recovered ceramics (ibid.:72). The prehistoric deposits contain a variety of cultural materials. Notably, the recovered lithic artifacts indicate an even reliance on locally available SRC and KRF (ibid.). Investigators state, "Artifact types indicate the site functioned as a habitation and included activities related to animal processing, lithic reduction and stone tool manufacture/maintenance, cooking, and possibly pottery vessel manufacturing" (ibid.).

Mitigation of 32GF130 occurred during the summer of 2002 (Blikre and Benn 2003). The project reaffirmed that the prehistoric component comprises episodes of Late Plains Woodland period occupations. Chronometric markers for this include Sandy Lake

ware ceramics and five suspected archaeological house features (ibid.:122). "Radiocarbon dates around AD 1300 have been assayed for the Sandy Lake occupation on the Lower Terrace, adding to the short list of dated sites and comparing favorably to the Femco site in Wilkin County, Minnesota" (ibid.). Investigators propose that the function of the site was a repeatedly used, short-term occupation inhabited by family-sized bands hunting bison (ibid.:120).

Stone Circle and Cairn Sites

As of 31 December 2020, two stone cairn sites and one stone circle site have been recorded in the NRRSU (see Table 9.5). The relatively low stone features recorded within may be interpreted as (1) a result of the number of surveys conducted within the NRRSU compared to other SU and/or (2) it may be that these types of sites have been destroyed by extensive agricultural practices employed in the region. Suggested uses of cairns include markers for events and travel routes, bracing poles for a variety of camp structures, caches, drive lines, or covering a burial. Hecker (1937-1950:161) reports that piles of stones were placed over buffalo chip fireplaces to heat stones used to dry meat.

The monograph on stone circle sites in *Plains Anthropologist Memoir 19* is a valuable source of information (Davis 1983). Compilations of radiocarbon dates from sites in McLean, Mercer, and Oliver counties can be found in Strait and Peterson (2007:4.6-4.8), in Mclean County (Thomas and Peterson 2010:6.2-6.3) and from Besant/Sonota sites in Deaver and Deaver (1987). A useful discussion of single stone circle site function based on ethnographic accounts is available in Gregg et al. (1983:[3]864-869). An assessment of nomadic settlement-subsistence structure and bison ecology is discussed by Hanson (1983b:1342-1417). Additional references for stone features sites can be found in the reference section of the Cultural Heritage Form.

Other Work

Prehistoric and protohistoric cultural dynamics responded to developments in adjacent regions of the prairie-woodland ecotone. This listing includes diverse topics such as impacts of prescribed burning on biological and cultural resources (Sayler et al. 1989).

In 1993, Toom and Kordecki (1994) assessed the condition of 28 flood-damaged sites across the state. One archaeological site within the NRRSU was examined. The Drayton site (32PB1) was originally survey in 1975. At that time, the site was documented as a large surface scatter covering a plowed field at a meander in the Red River. During their 1993 inventory, Toom and Kordecki reported that the eastern portion of the site was inundated by water (ibid.:14). They observed few artifacts and cautioned of continual disturbance by flooding, farming activities, and possibly looting (ibid.).

A 2006 *Plains Anthropologist* volume (Nicholson et al.), titled "Changing Opportunities and Challenges: Human-Environmental Interaction in the Canadian Prairies Ecozone," is devoted to an inter-disciplinary project north of the NRRSU. Integrated research in archaeology, ethnohistory, geoarchaeology, geomatics, landscape

analysis, oral traditions, paleoenvironmental studies, soils science, and zooarchaeology is the focus of the Study of Cultural Adaptations in the Canadian Prairie Ecozone (SCAPE) funded by the Social Sciences and Humanities Research Center in Canada (ibid.:231). The six goals of the project, as stated by Nicholson et al. (2006:232), are:

1. to reconstruct the "natural" and "cultural" landscapes of selected locales at ca. 9000 BP; 6,000 BP; 3,000 BP; 1,500 BP; and 500 BP
2. to recover data on landscape use by human groups in dune field, riverine and upland environments through time and to compare our results with published works on other ecologically diverse localities in the Canadian Prairie Ecozone
3. to understand the perceptions and cultural responses of groups, at particular times and places, to ecologically diverse localities within the Canadian Prairie Ecozone
4. to characterize areas of high biodiversity within the larger Canadian Prairie Ecozone biome through collection of geoarchaeological data
5. to identify ways in which human groups intentionally modified their environment through practices such as fire ecology and selective hunting
6. to model human adaptive strategies to areas of high biodiversity in the context of the Canadian Prairies Ecozone using Geographical Information Systems technology.

The program is enhanced using current technology and information from native oral traditions. Subsequent volumes are planned that will expound on researchers' theories and models, and cultural patterns in an environmental context of the region.

Publications

It is critical for archaeologists to publish their work to enhance public support and understanding of the value of conducting formal archaeological investigations. In the 2021 edition of the Archaeological Component of the State Plan, we include a table in each study unit of selected publications available to general audiences (Table 9.8). Of particular interest may be the journal of the Plains Anthropological Society (*Plains Anthropologist*) and the journal of the North Dakota Archaeological Association (*North Dakota Archaeology*), in addition to published books.

Table 9.8: Selected Published References for the Northern Red River Study Unit.

Author(s)	Year	Reference
Anfinson, Scott F.	1979	A Handbook of Minnesota Prehistoric Ceramics. *Occasional Publications in Minnesota Anthropology* No. 5, Minnesota Archaeological Society.
Anfinson, Scott F.	1997	*Southwestern Minnesota Archaeology: 12,000 Years in the Prairie Lake Region.* Minnesota Historical Society, St. Paul.
Anderson, Laura L. (editor)	2003	*Being Dakota: Tales and Traditions of the Sisseton &* Wahpeton, by Amos E. Onerod and Alanson B. Skinner. Minnesota Historical Society, St. Paul.
Cooper, L. R., and E. Johnson	1964	Sandy Lake Ware and Its Distribution. *American Antiquity* 29:474-479.
DeMallie, Raymond J.	1975	Joseph N. Nicollet's Account of the Sioux and Assiniboin in 1839. *South Dakota History* 5:343-359.
Bakken, Kent E.	1985	Lithic Raw Materials in Northwest Minnesota. *Minnesota Archaeologist* 44:34-46.
Bakken, Kent E.	2011	Lithic Raw Material Use Patterns in Minnesota. PhD dissertation, Department of Anthropology, University of Minnesota, Minneapolis.
DeMallie Raymond J.	1976	Sioux Ethnohistory: A Methodological Critique. *Journal of Ethnic Studies* 4(3):77-83.
Feraca, Stephen E., and James H. Howard	1963	The Identity and Demography of the Dakota or Sioux Tribe. *Plains Anthropologist* 8(20):80-84.
Floodman, Mervin G.	2012	*Prehistory of the Dakota Prairie Grasslands: An Overview*. US Forest Service, Bismarck, North Dakota.
Gregg, Michael	1994	Archaeological Complexes of the Northwestern Plains and Prairie-Woodland Border, A.D. 500-1500. In *Plains Indians, A.D. 500-1500: The Archaeological Past of Historic Groups,* edited by Karl H. Schlesier, pp. 71-95. University of Oklahoma Press, Norman.
Gagnon, Gregory O.	2011	*Culture and Customs of the Sioux Indians.* Greenwood.
Gibbon, Guy	2003	*The Sioux: The Dakota and Lakota Nations.* Blackwell.
Gregg, Michael L., David Meyer, Paul R. Picha, and David G. Stanley	1996	Archaeology of the Northeastern Plains. In *Archeological and Bioarcheological Resources of the Northern Plains: A Volume in the Central and Northern Plains Archeological Overview*, pp. 77-90. Arkansas Archeological Survey, Fayetteville.
Hogue, Michel	2015	*Metis and the Medicine Line: Creating a Border and Dividing a People*. University of North Carolina Press.
Holley, George R.	2008	Place names, Mounds and Landscape: An Interpretation of the Late Prehistoric Occupation of the Northeastern Plains. *Journal of the North Dakota Archaeological Association* (8):53-67.
Holley, George R.	2010	Oneota in the Northeastern Plains. *The Minnesota Archaeologist* 69:13-44.
Holley, George R., and Mike Simonson	2016	Incised Catlinite Tablets from the Red River Valley of the Northeastern Plains. *The Minnesota Archaeologist 75:105-137.*
Howard, James H.	1953	The Southern Cult in the Northern Plains. *American Antiquity* 19:130-138.
Howard, James H.	1954	Yanktonai Dakota Eagle Trapping. *Southwestern Journal of Anthropology* 10(1):69-74.
Howard, James H.	1966	*The Dakota or Sioux Indians: A Study in Human Ecology.* J &L Reprints, Lincoln, Nebraska.
Howard, James H	1972	Notes on the Ethnogeography of the Yankton Dakota. *Plains Anthropologist* 17(58-1):281-307.

Author(s)	Year	Reference
Howard, James H	1976	Yanktonai Ethnohistory and the John K. Bear Winter Count. *Plains Anthropological Society* Memoir 11.
Jacobson, Clair	1980	A History of the Yanktonai and Hunkpatina Sioux. *North Dakota History* 47(1):4-24.
Johnson, Elden	1973	The Arvilla Complex: Based on Field Notes by Lloyd A. Wilford. *Minnesota Prehistoric Archaeology* Series No.9. Minnesota Historical Society, St. Paul.
Low, Bruce	1996	Swan River Chert. *Plains Anthropologist* 41(156):165-174.
Mallery, Garrick	1987	*The Dakota and Corbusier Winter Counts*. J & L Reprints, Lincoln, Nebraska.
Michael, Ronald L.	1965	Fur Trade of the Red River Valley of the North:1763-1812. Master's thesis, University of North Dakota, Grand Forks.
Michlovic, Michael G.	1983	The Red River Valley in the Prehistory of the Northern Plains. *Plains Anthropologist* 28:23-31.
Michlovic, Michael G.	1985	The Problem of Teton migration. In *Archaeology, Ecology and Ethnohistory of the Prairie-Forest Border Zone of Minnesota and Manitoba*, edited by Janet Spector and Elden Johnson, pp. 131-145. J & L Reprints, Lincoln, Nebraska.
Michlovic, Michael G.	1988	The Archaeology of the Red River Valley. *Minnesota History* 51:55-32.
Michlovic, Michael G.	1990	Northern Plains-Woodland Interaction in Prehistory. In *The Woodland Tradition in the Western Great Lakes: Papers Presented to Elden Johnson*, edited by Guy E. Gibbon, pp. 45-54. Publications in Anthropology. University of Minnesota.
Nicholson, B. A.	1988	Modeling Subsistence Strategies in the Forest/Grasslands Transition Zone of Western Manitoba During the Late Prehistoric and Early Historic Periods. *Plains Anthropologist* 33 (21).
Payment, Diane P.	2001	Plains Metis. In *Handbook of North American Indians. Vol 13 Plains*, edited by Raymond J. DeMallie, pp. 661-676.
Peterson, Jacqueline C.	1990	Gathering at the River: The Metis Peopling of the Northern Plains. In *The Fur Trade in North Dakota*, edited by Virginia L. Heidenreich, pp. 47-70. State Historical Society of North Dakota, Bismarck.
Peterson, Jacqueline C., and Jennifer S. H. Brown	1985	*The New Peoples: Being and Becoming Metis in North America*. University of Manitoba Press, Winnipeg.
Rife, Clarence	1925	Norman Kittson, A Fur Trader at Pembina. *Minnesota History* 6(3):225-252.
Ritterbush, Lauren W.	1990	Culture Change and Continuity: Ethnohistoric Analysis of Ojibwas and Ottawa Adjustment to the Prairies. PhD dissertation, Department of Anthropology, University of Kansas, Lawrence.
Schneider, Mary Jane	1986	*North Dakota Indians: An Introduction*. Kendall/Hunt Publishing.
Skinner, Alanson	1925	Tree-Dweller Bundles of the Wahpeton Dakota. *Indian Notes* 2:66-73.
Smith, G. Hubert	1947	Trade Among the Dakota. *Minnesota Archaeologist* 13:65-69/
Spector, Janet, and Eldon Johnson	1885	*Archaeology, Ecology and Ethnohistory of the Prairie-Forest Border Zone of Minnesota and Manitoba*. J & L Reprints, Lincoln, Nebraska.
Swenson, Fern E., and Michael L. Gregg	1988	A Devils-Lake Sourisford Mortuary Vessel from Southeastern North Dakota. *Journal of the North Dakota Archaeological Association* 3:1-15.
Syms, Leigh E.	1977	The Devils Lake-Sourisford Burial Complex on the Northern Plains. *Plains Anthropologist* 24:283-308.

Author(s)	Year	Reference
Treuer, Anton Steven	1994	Ojibwe-Dakota Relations: Diplomacy, War and Social Union, 1679-1862. 2 vols., Master's thesis, University of Minnesota, Minneapolis.
Van Kirk, Sylvia	1980	*Many Tender Ties: Women in Fur-Trade Society, 1670-1870*. University of Oklahoma Press, Norman.
Wedel, M. M.	1974	LeSueur and the Dakota Sioux. In *Aspects of Upper Great Lakes Anthropology. Papers in Honor of Lloyd A. Wilford,* edited by E. Johnson, pp. 157-71. Minnesota Prehistoric Archaeology Series No. 11.
Whelan, Mary K.	1993	Dakota Indian Economics and the Nineteenth-Century Fur Trade. *Ethnohistory* 40:246-276.
Wilford, Lloyd A.	1970	*Burial Mounds of the Red River Headwaters*. Minnesota Historical Society, St. Paul.
Warren, William W.	1984	*History of the Ojibway People*. Minnesota Historical Society, St. Paul.
Wood, W. Raymond	1980	Plains Trade in Prehistoric and Protohistoric Intertribal Relations. In *Anthropology on the Great Plains*, edited by W. R. Wood and Margot Liberty, pp. 98-109. University of Nebraska, Lincoln.
Wood, W. Raymond	1985	The Plains-Lake Connection: Reflections from a Western Perspective. In *Archaeology, Ecology, and Ethnohistory of the Prairie-Forest Border Zone in Minnesota and Manitoba*, edited by J. Spector and E. Johnson, 31:1-8. J & L Reprints, Lincoln.
Woolworth, Alan R. (compiler)	1983	The Red Pipestone Quarry of Minnesota: Archaeological and Historic Reports. *The Minnesota Archaeologist* 42(1 and 2).
Woolworth, Alan R., and N. L. Woolworth	1980	Eastern Dakota Settlement and Subsistence Patterns Prior to 1851. *Minnesota Archaeologist* 39(2):70-89.

Paleo-Indian Period

The Paleo tradition dominated during a 4,000-year period between 9500 and 5500 BC. Following the recession of Wisconsinan ice and the filling of glacial Lake Agassiz, those portions of the NRRSU west of the Pembina Escarpment would have been open for initial settlement. The hunting and gathering lifeways of these early groups adapted to Early Holocene flora, fauna, and climatic regimes. At the close of the Paleo period with the declining water levels and the complete drainage of Lake Agassiz, all the SU was habitable.

Paleoenvironmental Modeling

The late glacial chronology for northeastern North Dakota has been set forth by Clayton and Moran (1982) with additional details provided by Hallberg and Kemmis (1986). Glacial ice advanced and retreated several times in the NRRSU during late Pleistocene times. The initial filling of glacial Lake Agassiz with meltwater had begun by 11,700 BP. (Fenton et al. 1983). Lake levels in the southern portion of the basin fluctuated during the next several millennia with high water levels marked by prominent beach strandlines. However, as Fenton et al. (1983:57-58) indicate, the actual lacustrine history of the lake is more complex than originally thought. Additional geoarchaeological investigations of Lake Agassiz should take place with emphasis directed toward the mapping and correlation of beach deposits. Collection of datable organic remains from

these contexts is needed to put existing chronologies on more sound footing (cf. Ashworth and Cvancara 1983: 138).

Palaeoecological study of the Agassiz basin is summarized by Shay (1967) and Ashworth and Cvancara (1983). Following the retreat of glacial ice, a spruce forest mosaic with openings colonized the tundra-like environs of the NRRSU. Climatic reconstruction of the basin based on pollen profiles and plant macrofossil data suggest that prairie replaced spruce forest by 8500 BP (ibid). To the west along the Prairie Coteau, mixed deciduous forest with prairie openings replaced the spruce forests of the early Holocene. With increasing aridity in the next millennium, a prairie grassland habitat came to dominate much of the NRRSU by 8000 BP.

Cultural Chronology

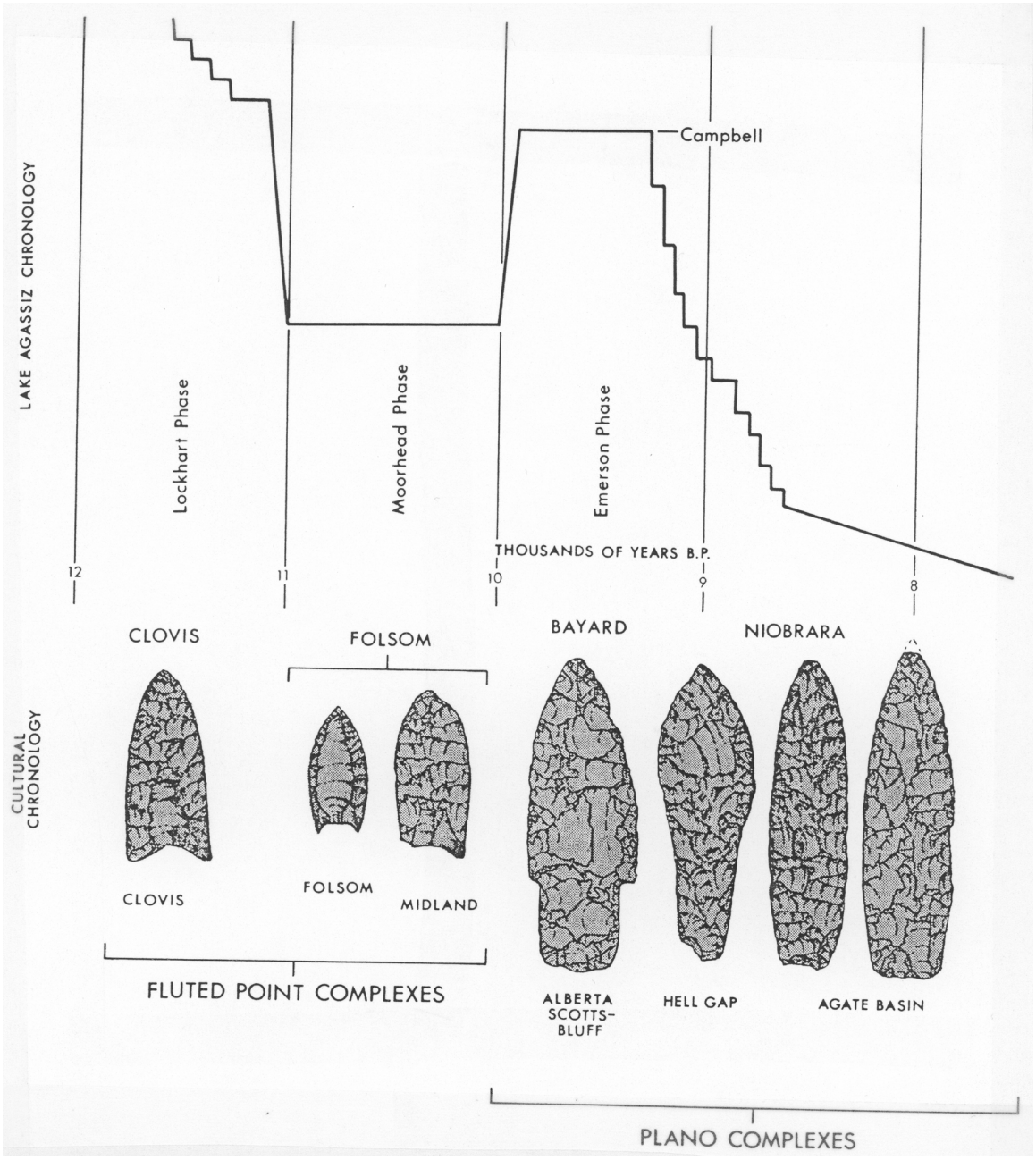
The Paleo cultural chronology identifies Clovis, Folsom, and Plano complexes as occurring or anticipated in the NRRSU. Figure 9.2 depicts these complexes juxtaposed with lake levels in the glacial Lake Agassiz basin. A Clovis point is reported from an upland setting at 32PB25 along the Pembina River. Folsom components have not yet been identified. Plano complex (including Caribou Lake) artifacts are better known from several sites based on recent investigations. These finds have become known since Schneider's (1982) survey. An updated survey for Paleo artifacts and associated cultural deposits should be undertaken in the NRRSU. Geomorphological information on cultural settings producing artifacts should be gathered. An attendant eye for poorly known complexes such as Goshen as well as later Plano materials including a prepared blade core technology is necessary (cf. Frison 1988b).

Settlement Behavior

Buchner and Pettipas (1990:53) report that the six known Clovis specimens from southern Manitoba are all from locations west and above the Manitoba Escarpment (marking the western edge of glacial Lake Agassiz). Seven Folsom locations are known to date from the province (ibid.). However, later Plano specimens are commonplace with find spots totaling near 1000 localities in Manitoba. Occurrences of early Paleo remains in northern Minnesota are spotty (cf. Munson 1990). Plano age (Reservoir Lakes phase) artifacts are reported from a great many more locations (cf. Johnson 1988:9; Steinbring 1974:66). The few known site locations in the NRRSU are situated on landforms adjacent to paleochannels or early Holocene age terraces.

To begin to predict possible locations of Paleo deposits, landform modeling and assessments of land use patterns must be developed and tested. How different were Paleo settlement practices in the early Holocene boreal environs compared to those of mid- and late Holocene Archaic peoples in the prairie-forest ecotone?

Figure 9.2: Paleocultural Sequence in Manitoba, Canada, and Juxtaposition with Glacial Lake Agassiz Chronology (from Buchner and Pettipas 1990:52).



Native Subsistence Practices

Bison were the primary food resource reported from the late Paleo Caribou Lake component at the Sinnock site located along the Winnipeg River in southern Manitoba (cf. Bobrowsky et al. 1990; Buchner 1981). However, Paleo hunter-gatherers frequenting the NRRSU faced a changing biome which included diverse floral and faunal communities, certain elements of which were doomed to extinction (cf. Guthrie 1984).

Early Clovis and Folsom groups likely depended on megafauna such as mammoth, mastodon, camelids, and bison. Plano peoples focused more on herds of modern bison (Frison 1988a, 1991). Paleo deposits when encountered must be sampled for subsistence remains either directly (i.e., fine mesh screening and flotation) or by other more sophisticated means (i.e., blood residues on stone tools). Faunal data are needed to counter the current hiatus regarding early subsistence practices.

Technologies

As with subsistence, very little is known regarding Paleo technologies other than that available for stone tools, which is relatively meager. Peterson (1973) reported on an early lithic workshop site in Roseau County, Minnesota exposed in Lake Agassiz beach gravels. What other materials serve to typify Plano technologies other than stone? Costin (1991) has outlined a multi-dimensional scheme useful for characterizing the organization of production. Paleo stone, bone, and woodworking technologies could be fruitfully investigated by adopting this perspective.

Glacial lake beach settings which occur throughout the NRRSU offer promise for good preservation of organic remains including bone and shell (cf. Gregg and Aird 1991). Without more firsthand information at our discretion, further discussion of technological issues borders on pure speculation.

Artifact Styles

The reported Paleo artifacts, restricted to tips for projectiles made of stone, conform to regionally identified norms of lithic craftsmanship. Brown et al. (1982) report a KRF Clovis point from 32PB25 in the possession of a local collector. A Caribou Lake point made from a fine-grained quartzite was collected from 32GF38 (Larson et al. 1986:Figure 7a). Other Scottsbluff specimens reportedly occur in private collections from at least two Forest River localities (Larson et al. 1986:67).

Does a Paleo-age prepared blade core technology occur at sites within the NRRSU as has been identified at the Pelland site in northern Minnesota and the Moe site (32MN101) in western North Dakota?

Regional Interaction

Aspects of Paleo adaptive behavior along with accompanying technological practices and toolkits can be explored most directly through the study of lithic procurement strategies (cf. Tankersley et al. 1990). However, the identification and reporting of stone materials is a necessary first step (see Bakken 1985, 2011). As Frison (1988a:94) implies regarding the presence of exotic stones in the Folsom component at the Agate Basin site, "The societal mechanisms that brought about and sustained this kind of distribution are undetermined, but trade across territorial boundaries seems more likely to have been the case than direct procurement expeditions." Does this statement hold true for the NRRSU and adjacent northern Minnesota?

Historic Preservation Goals, Priorities, and Strategies

An updated survey of Paleo sites in the NRRSU should be conducted in concert with recording information on artifacts housed in private collections (cf. Munson 1990). A multi-faceted research program aimed at exploring relationships between environmental and cultural change during the Paleo period in northeastern North Dakota merits development and implementation. Bettinger (1991) provides important background information on hunter-gatherers which can be incorporated into such a study.

Plains Archaic Period

The Plains Archaic tradition dominated in the NRRSU between 5500 and 400 BC. Early, Middle, and Late subperiods are recognized based largely on artifact stylistics and an increasing number of associated chronometric dates. Essentially modern resources were exploited by Archaic hunter-gatherers during mid- and late Holocene times.

Paleoenvironmental Modeling

Current paleoclimatic models for the Northeastern Plains hold that three major climatic episodes (Atlantic, Sub-Boreal, and Sub-Atlantic) characterized the regional environs during the Archaic. Droughty, arid (xeric) conditions typified much of the early and middle periods. However, periodically mesic interludes of unknown duration likely prevailed during certain times which would have promoted landform stability and enabled increased buildup of the regional biomass. It is suspected that much of the tributary valley infilling occurred during xeric periods during the Atlantic. Middle and Late Plains Archaic remains occur in surface and near-surface contexts on alluvial/colluvial fan landforms feeding the mainstem valley lending creditability to this proposition. It is proposed that Early Plains Archaic deposits are lacking from surface and near surface contexts here because these landforms were being rapidly created when xeric conditions prevailed during the Early Plains Archaic period. If Early Archaic sites are to be found here, it is proposed they will be deeply buried within the fans as they are at sites like Koster in the Illinois River Valley.

By the late Holocene, conditions appear to have improved fostering increased human settlement in the NRRSU. The greater number of Late Plains Archaic sites compared with earlier ones in the NDCRS data files tends to support this claim.

Environmental reconstruction of Holocene conditions in differing physiographic settings containing stratified cultural deposits in the NRRSU should be undertaken. These include: (1) valley bottomland, (2) alluvial/colluvial fans, and (3) glaciated plains, specifically pond settings in the Turtle Mountains locality.

Cultural Chronology

The Plains Archaic chronology in the NRRSU follows that outlined for the rest of North Dakota except for the addition of the Old Copper complex during the Late Archaic. Mason (1981:181-195), Stoltman (1986:217-226), and Gibbon (1998) provide useful introductions along with good illustrations of Old Copper materials. The division of Early (pre-Oxbow and Oxbow) and Middle (post-Oxbow) Archaic periods on purely temporal grounds still presents somewhat of a problem due to the paucity of securely dated contexts in the region.

Early Plains Archaic remains are rare in the NRRSU. Larson et al. (1986:Figure 7b) illustrate a probable early side-notched dart point collected from 32WA1 in the Forest River drainage. Shay's (1971) report covering the Itasca Bison Kill site remains a key source concerning the Early Archaic. Dobbs and Christianson (1991) provide an update on work at another Early Archaic component at the Peterson site (21YM47) to the southeast. Recent investigations at the Smilden-Rostberg site (32GF123) revealed a pre-Oxbow component (Larson and Penny 1990). Bison remains in association with side-notched points like Itasca forms were dated to 5660±170 BP (GX 15665) and 5860±210 BP (GX 15666) (ibid). An earlier reported date of 7195±115 BP (GX 14514) for the deposit has been rejected as too early based on results of subsequent analyses.

Oxbow components are better represented in the Northern Red River Basin (cf. Wettlaufer 1960 a, b, c). Larson et al. (1986) reported Oxbow materials from 32GF57. Others occur in the Forest and Pembina drainages (Brown et al. 1982; Loendorf and Good 1974a). Still other unreported Oxbow campsites are suspected to occur in Grand Forks County based on informant interviews and artifacts in private collections (Kermit Bakke, personal communication to Michael Gregg, April 1991; "Artifacts Give a Glimpse of Region's History, *Grand Forks Herald,* April 4, 1991).

Middle Plains Archaic Duncan and Hanna components are also known from several reported and unreported locations throughout the NRRSU (cf. Brown et al. 1982; Michlovic 1986). It is postulated that increased site frequencies are correlated with and reflect increased regional population densities.

Late Plains Archaic Pelican Lake remains are suspected to be quite common, although this suggestion is not currently borne out by existing NDCRS site data (see Table 9.4). Corner-notched dart points are taken to be Late Archaic temporal/cultural

indicators. Some of the sites classed as unknown undoubtedly contain Pelican Lake components. Likewise, Old Copper remains have been reported from locations within and west of the NRRSU (cf. Gibbon 1998; Johnson 1964; Spiss 1968). Unreported Old Copper remains occur in contexts along beachlines of glacial Lake Agassiz as well as other locations (Kermit Bakke, personal communication to Michael Gregg, April 1991; John Beach, personal communication to Michael Gregg, July 1991). An inventory and catalog of Old Copper artifacts from eastern North Dakota locations should be prepared. Knowledgeable local individuals should be consulted and asked to contribute to this process.

Settlement Behavior

Archaic base camps from all subperiods are suspected to be located along the Red and its major tributaries in areas providing ready access to dependable stores of food, water, fuel, and shelter (cf. Larson and Penny 1990; Michlovic 1986). Temporary camps can be expected in many of these same locations as well as along more ephemeral drainageways throughout the NRRSU. Glacial beach ridge settings are also thought to contain remains of Archaic settlements (cf. Johnson 1964). Previously unreported Oxbow encampments situated along minor drainages have recently come to our attention. During mesic climatic episodes, the regional biomass would have increased and thus have been capable of supporting greater numbers of both herd animals and people.

Are there quantifiable differences in settlement behavior among the various Archaic groups who frequented the NRRSU throughout the mid- and late Holocene?

Native Subsistence Practices

Recent excavations at the Smilden-Rostberg site (32GF123) provide the largest sample of Archaic subsistence remains recovered in the NRRSU. Bison bones along with those of a canid were recovered from a context dated to ca. 3850 BC. (Larson and Penny 1990). Michlovic's (1986) investigations of a Hanna component at the Canning site (21NR9) dating some 2,000 years later also show a continued dependence on bison as a key resource. The role of plant foods in regional Archaic diets remains unsettled.

Did Archaic groups modify their subsistence strategies during mesic as well as during less productive xeric environmental conditions as the result of social factors? How important was food storage and food sharing to these people during times of both feast and famine?

Technologies

Block excavations at the Smilden-Rostberg site (32GF123) produced a sample of some 59 stone tools and 788 pieces of flaking debris (Larson and Penny 1990). Side-notched dart points along with other cutting and scraping tools predominated. Only one bone tool was recovered. Much the same situation was reported at Canning by Michlovic (1986) where, except for worked beaver incisors, stone artifacts were most prevalent.

This picture of low overall technological diversity is also mirrored at Itasca (cf. Shay 1971). Next to nothing is known concerning Archaic housing and architecture from any of these sites which have been subjected to the greatest amounts of excavation. Did conical skin or bark covered structures serve as forerunners to the tipi for Archaic populations in the NRRSU?

Copper ore was used to fashion a variety of Late Archaic tool forms from various sites in the SU. How does technological organization differ among Archaic populations in the primary copper source areas and the NRRSU (cf. M. Nelson 1991)? Similarly, the role of other non-lithic resources needs to be assessed. How important were bone, antler, and shell materials to Archaic hunter-gatherers in the upper Red River valley?

Artifact Styles

Early Archaic dart point styles at sites such as Smilden-Rostberg and 32WA1 appear to be akin to those identified by Shay (1971) at Itasca. Middle and Late Archaic complexes (Duncan, Hanna, and Pelican Lake) are largely recognized by artifact cross dating in the basin. The range of variability in Old Copper artifacts from the basin needs to be assessed. What other attributes can be used to identify Archaic components in lithic aggregates presently classed as unknown?

Regional Interaction

The Smilden-Rostberg and Canning chipped stone assemblages are dominated by local materials (SRC, chert, and quartzite) along with liberal quantities of KRF (Larson and Penny 1990; Michlovic 1986). Use of exotic stone materials by Archaic peoples appears to provide important clues regarding spheres of interaction and trade in the Red River valley and surrounding environs. What are the specific source areas for the Old Copper artifacts occurring in the NRRSU? Do source areas for associated stone tool materials reflect similar distributions (cf. Bakken 1985; Rapp et al. 1990)?

Historic Preservation Goals, Priorities, and Strategies

Interviews with knowledgeable local informants must be pursued more vigorously before information on many of these poorly known Archaic cultures (e.g., Oxbow, Old Copper) in the basin is lost.

Plains Woodland Period

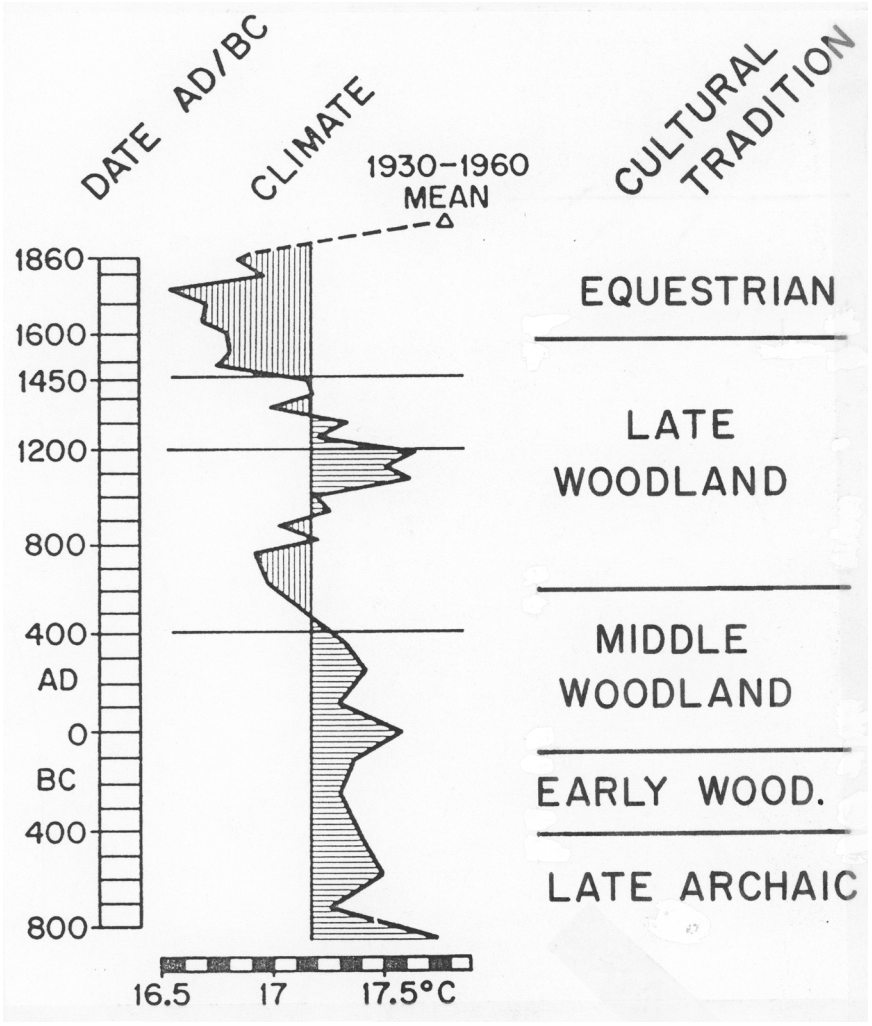
The Plains Woodland tradition in the NRRSU comprises Early, Middle, and Late periods. Woodland lifeways in the region entail a long and diverse history since about 400 BC marked by the introduction of ceramics and mound burial. Those lifeways persisted up to and following Euro-American contact in the 17th century.

Paleoenvironmental Modeling

Environmental history in the Red River valley region during the Woodland period spans some 2,500 years and is a complicated, unresolved affair. Five major climatic episodes have been identified during the period between 500 BC and AD 1600: Sub-Atlantic, Scandic, Neo-Atlantic, Pacific, and Neo-Boreal (cf. Anfinson and Wright 1990). Conditions are suggested to have been generally mesic during the Sub-Atlantic, turning xeric in the Scandic, improving again in Neo-Atlantic, and returning to periodically xeric early in the Pacific. Figure 9.3 is a diagram illustrating the relationship between climate and culture during the late Holocene based on the work of Bernabo (1981) and Bryson (1987).

Pond sediments in the Turtle Mountains and elsewhere in the NRRSU which exhibit continuous Holocene stratigraphic records should be sampled and analyzed to expand our current knowledge regarding past regional environments (cf. Anfinson and Wright 1990:216-218).

Figure 9.3: Diagram of the Relationship between Climate and Culture During the Late Holocene (adapted and modified from Bryson 1987:Figure 4).



Cultural Chronology

The regional Woodland cultural chronology includes Middle Woodland (Sonota, Laurel, and Malmo) and Late Woodland (St. Croix-Arvilla, Blackduck, Sandy Lake, and Devils Lake/Sourisford) complexes (cf. Anfinson 1990; Gibbon and Caine 1980; Gibbon et al. 2002).

Early Woodland remains are not well known in the NRRSU. Some of the corner-notched and side-notched dart point forms found at sites could be indicators of Early Woodland use of the prairie-forest ecotone during improved conditions concordant with mesic intervals in the Sub-Atlantic episode. Likewise, early ceramics have not been readily identified. Anfinson and Wright (1990:219) have recently indicated that the earliest reliably dated mound in Minnesota occurs at the Anderson site (21ML1) which produced a corrected date of 260BC±180 (I-786). An early date (of 800 BC) from Morrison mound (21OT2) has been suggested by many to be too early (cf. Wilford et al. 1969). A comprehensive chronometric dating program aimed at refining the existing Woodland chronology in Minnesota and the Dakotas should be initiated. Lenius and Olinyk (1990:Table 8.1) and Reid and Rajnovich (1991:Table 1) have summarized Laurel and Blackduck dates from the Upper Great Lakes region.

Middle Woodland components are better represented by both mounds and campsites. Besant side-notched points occur at sites in the Pembina, Forest, and Turtle River valleys (Bleier et al. 2006; Brown et al. 1982; Larson et al. 1986; Loendorf and Good 1974a, b). However, ceramic remains akin to Laurel have not been commonly reported (cf. Lugenbeal 1978b; Stoltman 1973).

Many of the reported earthen mounds in the NRRSU are thought to have begun to be used to inter the dead by early Middle Woodland times (cf. Cole 1967b, n.d.). Unfortunately, few of these components have been absolutely dated. The Inkster Mound (32GF19) along the Forest River contained the remains of at least 28 interred individuals. Two dates of 1380±100 BP (Beta-12570) and 1670±140 BP (Beta-12571) have been reported (Larson et al. 1986:41). The cultural/temporal determinations for the other sites are largely based on artifact cross dating.

Transitional Middle-Late Woodland (ca. AD 600-900) remains from the Red River valley have been grouped in the Arvilla complex by Johnson (1973). The Arvilla Mounds (32GF1) serve as the namesake for the complex. Syms (1982b) has pointed to the apparent artifact heterogeneity to suggest greater temporal and cultural diversity within Arvilla. It now appears that earlier (unnamed) Middle Woodland, transitional St. Croix, and possibly later Devils Lake/Sourisford remains are presently included under the existing rubric.

Contemporaneous Late Woodland Blackduck and Sandy Lake ceramics can be expected to occur at sites in the northern and southern ends of the SU on an AD 1000-1600-time level (cf. Blikre and Benn 2003; Breakey 1981; Cooper and Johnson 1964; Klinner 1995; Larson et al. 1997; Lenius and Olinyk 1990; Lugenbeal 1978a). This long

and complicated cultural sequence will be refined and modified as work progresses in the NRRSU.

Settlement Behavior

Woodland settlement behavior in the upper Red River valley in North Dakota has not been investigated in any detail. Middle and Late Woodland habitation and mound sites are known to occur along glacial Lake Agassiz beaches to the east in Minnesota (Anfinson 1990; Bakken 1988; Johnson 1973; Thompson 1985; Winchell 1911).

Encampments can be expected in terrace settings along all the major tributaries such as the Pembina, Forest, Turtle, and Goose rivers (cf. Cole 1968a, b; Larson et al. 1986). Mound groups should be situated in prominent upland settings and along glacial beach settings nearby (cf. Haury 1990; Winchell 1911). What is the spectrum of Middle Woodland site types in the Red River Basin?

Native Subsistence Practices

Wild game including bison is suspected to have been a critical resource. Domestic dogs may also have served dual functions as beasts of burden and food resources. Similarly, the role of plant foods is largely undetermined. Lofstrom (1987) has speculated on the importance of wild rice in the diets of Woodland peoples. How different were Early and Middle Woodland subsistence economies in the interior of the basin from those of the protohistoric groups contacted by Euro-American traders in the 17th century (cf. Gough 1988, 1992; Hickerson 1959)?

Freshwater mussels and snails were dietary items of Woodland and Archaic peoples in the Midwest and Midsouth. The Red River of the North contains harvestable populations of clams (cf. Cvancara 1983; "Clams on the Red River," *Grand Forks Herald,* September 6, 1990). How important were mussels as a dietary item to NRRSU Woodland peoples (cf. Riggle and Freitag 1990)?

Williams (1982) provides one of the few available assessments of Woodland era nutrition and health undertaken through the study of skeletal biology of a mortuary population from the Inkster Mound (32GF19). Based on dental data, Williams (1982:181) suggests an "unprocessed, abrasive, low carbohydrate diet." Much more remains to be done in this realm (cf. Ossenberg 1974). Further bioarchaeological studies focusing on diet, nutrition, and prehistoric health merit inquiry (e.g., Williams 1996).

Technologies

Woodland ceramic technology has been a subject of interest to archaeologists for some time, particularly since these containers (along with mound construction) serve as key material traits used to mark the beginning of the Woodland era in Northeastern Plains (cf. Anfinson and Wright 1990). Did ceramic vessels among Laurel groups serve different functions from those of their contemporary Sonota and Malmo counterparts (cf.

B. Nelson 1991)? Analyses of food residues may provide corroboratory information (cf. Thompson 1990).

Lithic craftspeople used a variety of locally available and exotic stone materials to fashion stone tools. A comprehensive study of Woodland lithic utilization could be carried out to determine stone use patterns in the valley and surrounding environs (cf. Bakken 1985, 2011). Clark (1982, 1984) provides useful background information concerning KRF use by regional groups. The addition of the bow and arrow to the technological repertoire has been proposed by some to be a Late Woodland development (cf. Anfinson and Wright 1990:222). How do we identify the addition of this piece of weaponry in the archaeological record of the NRRSU?

Bone and shell artifacts largely occur as grave goods in Woodland mortuary contexts in and around the NRRSU (cf. Cole 1967b, n.d.; Johnson 1973; Stoltman 1973; Wilford et al. 1969). Gregg and Aird (1991) illustrate a rare, barbed bone harpoon recovered from an Agassiz beach setting. Other perishable items of wood, bark, and vegetative matting were likely produced by Woodland craftspeople too (cf. Montgomery 1906). What other "invisible" but potentially diagnostic items of material culture have eluded the archaeologist's detection in the NRRSU?

Artifact Styles

Regional Early, Middle (Sonota, Laurel, and Malmo), and Late (Kathio, St. Croix, Blackduck, Sandy Lake, and Devils Lake/Sourisford) Woodland ceramic complexes have been reported in the archaeological literature for some time. However, studies by Lenius and Olinyk (1990) and Reid and Rajnovich (1991) indicate the potential of further quantitative and qualitative analyses as an aid in refining the cultural chronology and typological/classificatory schemes.

Middle Woodland age Besant side-notched and St. Croix corner-notched points have been reported from sites in the Forest River drainage and elsewhere throughout the upper Red River valley (Bleier et al. 2006; Brown et al. 1982; Larson et al. 1986:Figure 8a; Loendorf and Good 1974a). Late Woodland projectile tips include small side-notched and triangular forms (Larson et al. 1986; Michlovic 1987). What is the spatial and temporal distribution of Avonlea remains in the NRRSU?

Bone and shell items (except for nonlocal/exotic remains) have generally not received as much attention in prior studies of Woodland craft production. Barbed bone and antler harpoon points frequently occur in Laurel assemblages to the northeast (cf. Stoltman 1973). Johnson (1973) reported similar items from the Arvilla Mounds (32GF1). Freshwater mussels served as stock material to produce utilitarian and ornamental objects (ibid.). What classes of bone and shell artifacts serve as useful Woodland cultural/temporal indicators in the NRRSU?

Regional Interaction

As elsewhere in the Northern Plains, artifacts fashioned from nonlocal or exotic stones, bones, shells, and metal ores provide the best evidence for long-distance trade and interaction (cf. Gregg and Picha 1989a; Michlovic 1990). Regional Middle Woodland groups are posited to have been linked to an intersocietal network of exchange referred to as the Hopewell Interaction Sphere (HIS). Various materials such as KRF, obsidian, copper, and freshwater and marine shell circulated through the midcontinent as part of the HIS exchange (cf. Brose 1990; Clark 1984; Gregg and Picha 1989a).

Cole (1967b) reported 21 marine gastropods, including three larger incised shells, associated with an infant interment at the Colony Mound (32GF305). Columella artifacts are also reported from the surface. Although the illustrations of these items are not good, it appears that *Natica* and possibly *Olivella* are represented. Excavations undertaken by Albert Jenks in 1936 at the Red Lake River Mounds (21RL1) revealed 319 *Natica* beads arranged in rows interred with an individual in Mound 1 (Johnson 1973:31-35). Although the age(s) of these components have not been determined, it can be suggested that a Middle Woodland affiliation is likely.

Loendorf and Good (1974b) reported that two obsidian flakes were collected from 32GF324 along the Turtle River watershed. The Anderson-McDonald mound (32GF235) is located nearby. A distributional study of obsidian artifacts from eastern North Dakota sites should be prepared in conjunction with a source affinity testing program for these materials. Husted (1978) illustrates a series of corner-notched points recovered from a cultural layer at Mummy Cave in northwestern Wyoming dated to ca. 87 BC coinciding with the zenith of the HIS activity in the Midwest. These specimens are like some regional Middle Woodland forms. Obsidian is rare in Laurel sites to the northeast (Stoltman 1973). At present it is unknown if KRF artifacts and other HIS materials occur in Middle Woodland age deposits in and near the Yellowstone National Park obsidian source area.

Other Arvilla complex sites reported by Johnson (1973) such as 32GF1 have produced copper artifacts. A copper celt from the Inkster Mound (32GF19) may also be Arvilla. A copper sourcing project (cf. Rapp et al. 1990) could aid in sorting out the complexities associated with Woodland era regional interaction in the NRRSU.

Both Jackson (1991) and Lofstrom (1987) have independently introduced the notion of the "trade fair" as a social mechanism responsible for stimulating intersocietal exchange and the formation of cooperative work efforts necessary for the construction of Woodland era earthen tumuli. What are some archaeologically testable implications of this hypothesis, and what sorts of artifact samples would be needed to yield scientifically sound data for hypothesis testing?

Historic Preservation Goals, Priorities, and Strategies

Trinkley (1990:38-44) has outlined a series of preservation goals for the South Carolina Woodland period, some of which are already in place in North Dakota. Among these noteworthy suggestions which could apply to North Dakota include:

1. Identification
   a. Development of Funding Sources for Cultural Resources Research
   b. Master Plan of Statewide Survey Priorities

2. Evaluation
   a. Refinement and Standardization of Research Techniques

3. Treatment
   a. Standardization of Data Recovery Standards
   b. Encourage Public Participation
   c. Encourage Preservation as Part of State or Federal Programs

Plains Village Period

Paleoenvironmental Modeling

Climatic conditions are suggested to have improved during the Neo-Atlantic episode concordant with the spread of Plains Village horticulture elsewhere in the Northeastern Plains (cf. Anfinson and Wright 1990:222-223; Michlovic and Schneider 1988; Shay 1990:119). As discussed earlier, paleoenvironmental research focusing on stratified lakebed deposits could provide an updated local climatic history for the NRRSU.

Cultural Chronology

The current chronology suggests use of the adjacent Devils Lake Basin by early Villager (possibly ancestral Hidatsa) groups. As indicated in Table 9.4, three Plains Village sites (32GF79, 32PB164, and 32TR402) are identified in the NRRSU. Syms (1982a, 1985) suggests that Devils Lake/Sourisford remains be incorporated within the taxon as well. Some of the mounds in the Devils Lake and Red River basins undoubtedly contain interments of Plains Village peoples. Associated campsites must be located nearby. Susan Gregg (1991:3) in her introduction to *Between Bands and States* indicated that "three tightly related variables--abundant resources, permanent or semi-permanent residential groups, and individually based social networks--characterize small-scale, nonhierarchical societies." Does this scenario cover Northeastern Plains Villagers as well?

Hybrid Village-Woodland cultures are also suspected to have developed in transitional forest-prairie ecotonal settings such as the upper Red River drainage. Florin et al. describe ceramic body sherds recovered from 32GF81 and 32GF82 as "Late Plains

Woodland Period, 'hybrid Village-Woodland complexes,' or the Northeastern Plains Village complex" (1998:45). Other possible regional examples include the Mortlach complex (Wettlaufer 1955) which may be represented in adjacent portions of the Souris Basin to the west and in the Turtle Mountains in the NRRSU (SHSND 2016:B.39).

Settlement Behavior

No fortified Plains Village encampments like those found along the Sheyenne and the Maple rivers to the south are reported from the upper Red River valley (cf. Michlovic and Schneider 1988). Temporary camps, stone chipping scatters, bison butchering stations, and mortuary and other ceremonial loci can be expected in the NRRSU. Until further inventory work is undertaken along reaches of the upper Red River, Plains Village settlement history and land use will remain sketchy.

Native Subsistence Practices

Plains Village groups in the NRRSU are suspected to have pursued hunter-gatherer-gardener lifeways like their counterparts elsewhere in the Northern Plains. Bison hunting probably occupied a central position in the overall subsistence economy. Gardening also played a yet undetermined role. Maize has been reported as far north as the Lockport site in southern Manitoba by AD 1500 (Shay 1990:119). Wild plants were also undoubtedly important to the diet at certain times of the year. Shay (1990:124) has succinctly summarized the situation: "It would be valuable to reanalyze old faunal collections with an eye to correcting bias in original recovery and reporting. Previously collected and unanalyzed plant remains should be studied, and carbon isotope analysis conducted on available skeletal populations." The collections made by Montgomery (1906) for example could be reinvestigated.

Technologies

Since relatively little is known about Plains Village lifeways along the upper Red River, baseline information concerning regional stone, ceramic, bone, and shell technologies needs to be compiled. For example, how prevalent was the use of ceramic containers among Plains Village groups in this drainage (cf. Longacre 1991; B. Nelson 1991)?

Michlovic and Swenson (1998) provide an assessment of Northeastern Plains Village ceramics and propose a refined taxonomy for the artifact class. The archaeologists write, "Ceramics of the Northeastern Plains Village complex are evidently a product of local stylistic preferences that were strongly influenced by Oneota and/or Cambria and Missouri Valley wares as well" (ibid.:23).

Artifact Styles

An exotically shaped chipped stone lance point of KRF from a private collection in the Pembina valley is illustrated by Brown et al. (1982). Collections housed in various

county historical societies along with those of local collectors should be inventoried, and diagnostic Plains Village artifacts should be analyzed and photographed (e.g., Larson et al. 1997).

Regional Interaction

Michlovic (1990:46-48) has summarized archaeological and ethnohistoric evidence in support of an extensive trade network being in force on the Northeastern Plains during late prehistoric times. Artifacts crafted from nonlocal stones such as obsidian, KRF, and Catlinite were but one group of exchanged materials (cf. Swagerty 1988; Wood 1980). Larson et al. (1997:44) report that KRF comprises 45% of the lithic materials recovered in 1996 from the Halstad site (32TR402). The 2001 lithic assemblage from 32GF130 reflects an equal reliance on KRF as SRC (Florin 2002:72). Possible overland trails crosscutting the NRRSU should be researched and checked by on-the-ground reconnaissance (cf. Gilman et al. 1979).

Historic Preservation Goals, Priorities, and Strategies

An updated inventory for Plains Village settlements along the Red River and elsewhere (e.g., Turtle Mountains) in the NRRSU needs to be completed prior to any further speculation regarding the poorly understood Villager lifeways in the basin.

Plains Equestrian Period/Fur Trade Period

The Equestrian period in northeastern North Dakota spans the advent of the introduction of the gun and the horse to protohistoric native groups in the upper Red River Basin. The gun was introduced first from early French-Canadian and British sources located to the north and east; the horse was probably relatively rare in the NRRSU until the early to mid-19th century.

The upper Red River drainage basin is a vast territory that was frequented by numerous and diverse tribal groups who spoke an equally diverse number of languages and dialects when first contacted by Euro-American traders and explorers in the 17th century (cf. Albers and Ray 1987; Michlovic 1990:48). Some of these well-known peoples include bands of the Dakota, Chippewa, Plains Cree, Plains Ojibwa, and Assiniboine.

Paleoenvironmental Modeling

Climatic conditions during late prehistoric and protohistoric times are thought to have been cooler and moister with reference to the present (1990s). Climatologists refer to this time as the Neo-Boreal episode or “Little Ice Age” (cf. Grove 1988). Concordant with these moister conditions was a posited buildup in the regional biomass including the bison herds. If the writings in the journals of early traders such as Alexander Henry penned in the early 19th century are reliable, animal and plant communities flourished in the Red River valley at that time (cf. Gough 1988, 1992; Reid and Cannon 1928).

Late Holocene environmental change has been a subject of interest to historians, geographers, and archaeologists (cf. Ball 1984; Penman 1988; Rannie 1983). Interdisciplinary research focused on this topic will serve to refine the existing regional paleoclimatic model.

Cultural Chronology

There are no defined and named protohistoric archaeological units of the Equestrian tradition in the NRRSU (cf. SHSND 2016). Table 9.9 provides a listing of native tribal and "mixed blood" (Métis) groups posited to have included the NRRSU as part of their territory during early historic times. Because of the high degree of inter-band mixing, it may prove very difficult to distinguish physical traces/archaeological deposits left by different ethnic groups (see below).

Table 9.9: Sources of Background Information for the Equestrian Period in the NRRSU.

Group	Author (Date)
Assiniboine	Lowie (1909) Denig (1961)
Dakota (Yankton and Yanktonai)	Denig (1961) Howard (1966, 1972, 1976) Warren (1986)
Métis	Peterson and Brown (1985) Peterson (1990)
Ojibwa (Chippewa)	Hickerson (1970, 1988) Ritzenthaler (1978)
Plains Cree	Mandelbaum (1979) Milloy (1988)
Plains Ojibwa (and Ottawa)	Howard (1965) Ritterbush (1990)
General	Hodge (1975) Gregg and Hanson (1985) Albers and Kay (1987) Dobbs (1989a)

Ritterbush (1991b) has identified several possible fur trade related archaeological sites along the Red. Additional investigations, including test excavation, should be undertaken to shore up the chronology, subsistence, artifact styles, and technology gaps with some empirical data.

Settlement Behavior

Late prehistoric settlement in the NRRSU is suspected to have been characterized by seasonal mobility attuned to access components of the local resource base (cf. Gamble and Boismier 1991). Regional population density is also suggested to have increased during the period (Shay 1990:118). However, this growth was not substantial enough to have altered long-term trends in Plains sociopolitical organization. As Kelly (1991:153) has suggested, "In many cases, evolution of nonegalitarian hunter-gatherer societies

involved responding to a situation in which residential mobility was not a viable response to local resource failure."

Native settlement in post-contact times was linked to fur trade-related activity during at least certain stages of the annual round (cf. Hickerson 1956; Penny and Larson 1993; Ritterbush 1990; Woolworth 1986). Early Euro-American land use in the basin was inextricably linked to this economic system as well (cf. Listenfelt 1913; Michael 1965; Ritterbush 1991a, b; Wheeler 1948). What attributes can be used to identify post-contact settlements in the "Hair Hills?"

Native Subsistence Practices

Ritterbush (1990:60-83) provides an excellent summary of Plains Ojibwa (and Ottawa) subsistence in the upper Red River valley based on her extensive ethnohistoric research. Similarly, pertinent discussions of subsistence practices for other groups such as the Yanktonai Dakota have appeared in the literature as well (cf. Warren 1986; Woolworth 1986). Empirical tests of these premises can be carried out with further testing work being undertaken at sites in the NRRSU. It is imperative that fine-mesh screening and flotation be implemented to sample for seeds of tobacco and other plant macrofossils in cultural deposits.

Technologies

The arrival of Euro-American implements obtained via the fur trade altered existing native technologies. Ethnohistoric research provides some indication of the quantity and diversity of provisions entering the NRRSU as well as those goods exiting the system (cf. Reid and Cannon 1928; Ritterbush 1991b). However, the processes of internal technological change have not been identified and investigated in any detail. All facets of material culture, including chipped stone, bone, and shell technologies were likely affected. Samples of fur trade era assemblages in the NRRSU need to be studied with this goal in mind.

Artifact Styles

DeBoer (1991) has discussed the distinction between *pervasive* and *partitive* decorative organizations. In *pervasive* schemes, decoration crosscuts multiple artifactual categories such as pottery, bone, shell, textiles, and even body tattooing, whereas in *partitive* schemes specific decorations are associated with individual artifactual media. In-depth study of various regional artifact styles may provide useful clues for separating or combining the material culture of specific ethnic groups on the Northern Plains. Are there recognizable stylistic differences in the archaeological remains left by Siouan and Algonquian speakers in the NRRSU?

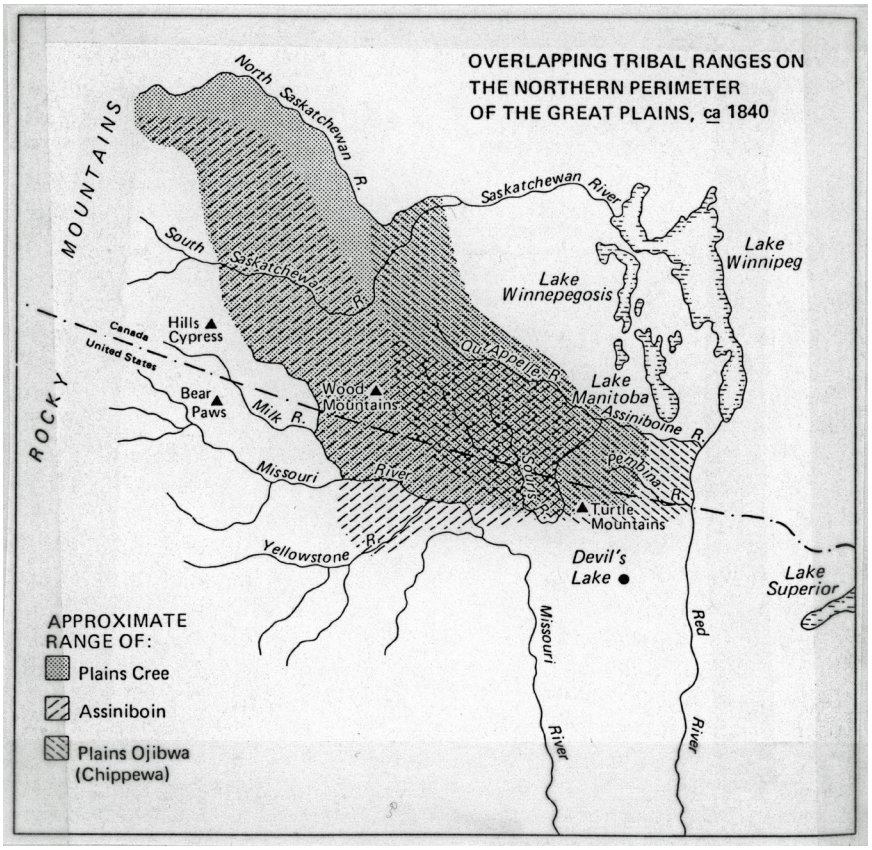
Regional Interaction

Long-distance movements of people, materials, and ideas were relatively commonplace by protohistoric times on the Northern Plains. As Albers and Kay (1987:68-69) state,

> …the two groups (Assiniboine and Cree) formed joint war parties and traveled together on trading expeditions to the horticultural villages on the Missouri River as well as to European posts on the Red, Pembina, and Assiniboine rivers. By the turn of the nineteenth century, migrating bands of Chippewa, Saulteux, and Ottawa added to the ethnic complexity of the region.

Figure 9.4 depicts overlapping tribal ranges of the Plains Cree, Assiniboine, and the Plains Ojibwa in the northern parts of the NRRSU at about 1840. We can add the Yankton and Yanktonai Dakotas and the Metis to this list as one moves southward through the Red River drainage (cf. Denig 1961). This documented territorial palimpsest confirms the complexity of comprehending and defining areas used by different groups of people through time (cf. Syms 1985). Can distribution patterns of certain materials (e.g., Catlinite) and artifact styles aid in delimiting trade routes in the upper Red River valley and beyond?

Figure 9.4: Tribal Ranges near the NRRSU (from Albers and Kay 1987:68).



Historic Preservation Goals, Priorities, and Strategies

The following is but one of many data gaps that remain in the NRRSU. A cultural resources inventory of (all or portions of) the Turtle Mountain Indian Reservation and surrounding areas could be undertaken to generate information concerning prehistoric and protohistoric settlement and land use in this little studied part of north-central North Dakota. Complimentary ethnohistoric research would serve in providing the necessary background information to enhance and round out such a study.

Prioritization of Historic Preservation Goals in the NRRSU

This section presents a listing of prospective research projects which have been mentioned above. The list is prioritized according to research merit, feasibility, and in some cases broadness of scope.

1. An illustrated inventory of Old Copper artifacts from eastern North Dakota should be prepared. Knowledgeable local individuals should be consulted and invited to contribute to this process (Gibbon 1998).

2. An updated survey for Paleo artifacts (specifically projectile points, blade cores, and blades) and associated cultural deposits should be undertaken.

3. Possible overland trails crosscutting the NRRSU should be researched. This project should include on-the-ground inventory to identify remnant segments of trails as well as associated camps and possibly other sorts of sites (cf. Gilman et al. 1979:16).

4. A comprehensive study of Woodland lithic utilization should be carried out to identify patterns of stone use at different times in the prehistory of the valley (cf. Bakken 1985, 2011).

5. Pond sediments in the Turtle Mountains and elsewhere in the NRRSU which exhibit continuous Holocene stratigraphic records should be sampled and analyzed to expand our current knowledge of past regional environments (cf. Anfinson and Wright 1990:216-218).

6. Collections held by various county historical societies and private collectors should be inventoried, and diagnostic Plains Village artifacts should be analyzed and photographed.

7. A cultural resources inventory of all or portions of the Turtle Mountain Indian Reservation and surrounding areas should be undertaken to generate information concerning prehistoric and protohistoric settlement and land use in this little studied part of the state. Related ethnohistoric research would identify specific high potential areas for survey and

enhance the findings of the inventory in various ways. Members of the reservation community should be invited to participate in the project.

8. Additional geoarchaeological investigations of the area of former glacial Lake Agassiz should be undertaken with emphasis on mapping and correlating beach ridges and strandlines. Radiocarbon dates on organic remains from these contexts (preferably from single component archaeological deposits associated with specific beaches) are needed to put existing chronologies on more sound footing (cf. Ashworth and Cvancara 1983:138).

9. Are there recognizable stylistic differences detectible in the archaeological remains left by Siouan and Algonquian speakers in the NRRSU? Research should focus on native ceramics as well as European and Euro-American trade goods.