

# **Appendix E**

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## Cultural Resource Report

**A Class I and Class III Cultural  
Resource Inventory of the Arrow  
Four Bears CDP Connect Pipeline,  
McKenzie County, North Dakota**

Prepared for

**Arrow Field Services, LLC**

Prepared by

**SWCA Environmental Consultants**

May 12, 2011

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<u>COUNTY</u>	<u>TWP</u>	<u>RNG</u>	<u>SEC</u>	<u>SU</u>
McKenzie	150N	96W	24	LM
	150N	95W	19, 20	GA

**A Class I and Class III Cultural Resource Inventory of the  
Arrow Four Bears CDP Connect Pipeline, McKenzie County, North Dakota**

Submitted to:  
**State Historical Society of North Dakota**

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## **ABSTRACT**

This report outlines the results of Class I and Class III cultural resource inventory conducted by SWCA Environmental Consultants (SWCA) on behalf of Arrow Pipeline, LLC (Arrow), on April 25 and 27, 2011, for the Four Bears CDP Connect pipeline project. Arrow proposes to construct the approximately 7,818.47-foot-long primary alignment of the Four Bears CDP Connect pipeline in McKenzie County, North Dakota. An alternative alignment was analyzed that would tie in to the CDP location, which was situated between the CDP location and north/south-trending Dry Creek. The primary alignment proceeds east from the crossing at Dry Creek and then turns north, connecting into the existing CDP facility. The alternate alignment immediately turns north at the east bank of Dry Creek, turns east, and then finally turns north again to connect into the existing CDP facility.

The jurisdictional agency presiding over the construction of the Four Bears CDP Connect pipeline is the North Dakota Public Service Commission (NDPSC). In compliance with NDPSC requirements, Arrow requested SWCA perform a cultural resource survey to assess the potential effect of activities associated with the construction of the pipeline on cultural resources. The proposed pipeline will be constructed within a 120-foot-wide temporary construction right-of-way (ROW) and a 50-foot-wide permanent ROW will be maintained after construction is complete. The final construction ROW will be entirely within the inventoried area.

The Class III inventory includes a 200-foot-wide survey corridor centered on the 7,818.47-foot-long proposed pipeline centerline. In total, 40.01 acres were inventoried for the project, of which 7.71 acres were subject to intuitive survey (survey exclusion zone) due to recent heavy surface disturbance as a result of vehicle traffic and construction activities. The acres of survey exclusion cover disturbed areas on the eastern end both the primary and the alternate alignments. The inventoried area is situated on the Johnsons Corner (1966) and Blue Buttes SE (1967), North Dakota U.S. Geological Survey (USGS) topographic quadrangles and includes parcels in Sections 19 and 20 of Township (T) 150 North (N), Range (R) 95 West (W) and Section 24 of T150N, R96W.

During the inventory, one previously recorded cultural resource (32MZ782) was revisited and one resource (32MZX1119) was newly recorded. 32MZ782 is a prehistoric cultural material scatter consisting of Knife River flint flakes. 32MZX1119 is an isolated chipped stone find. Both 32MZ782 and 32MZX1119 are recommended not eligible for the National Register of Historic Places; therefore, no further work is recommended. It is recommended that a determination of *No Historic Properties Affected* and *No Significant Sites Affected* be granted for the project to proceed as planned.

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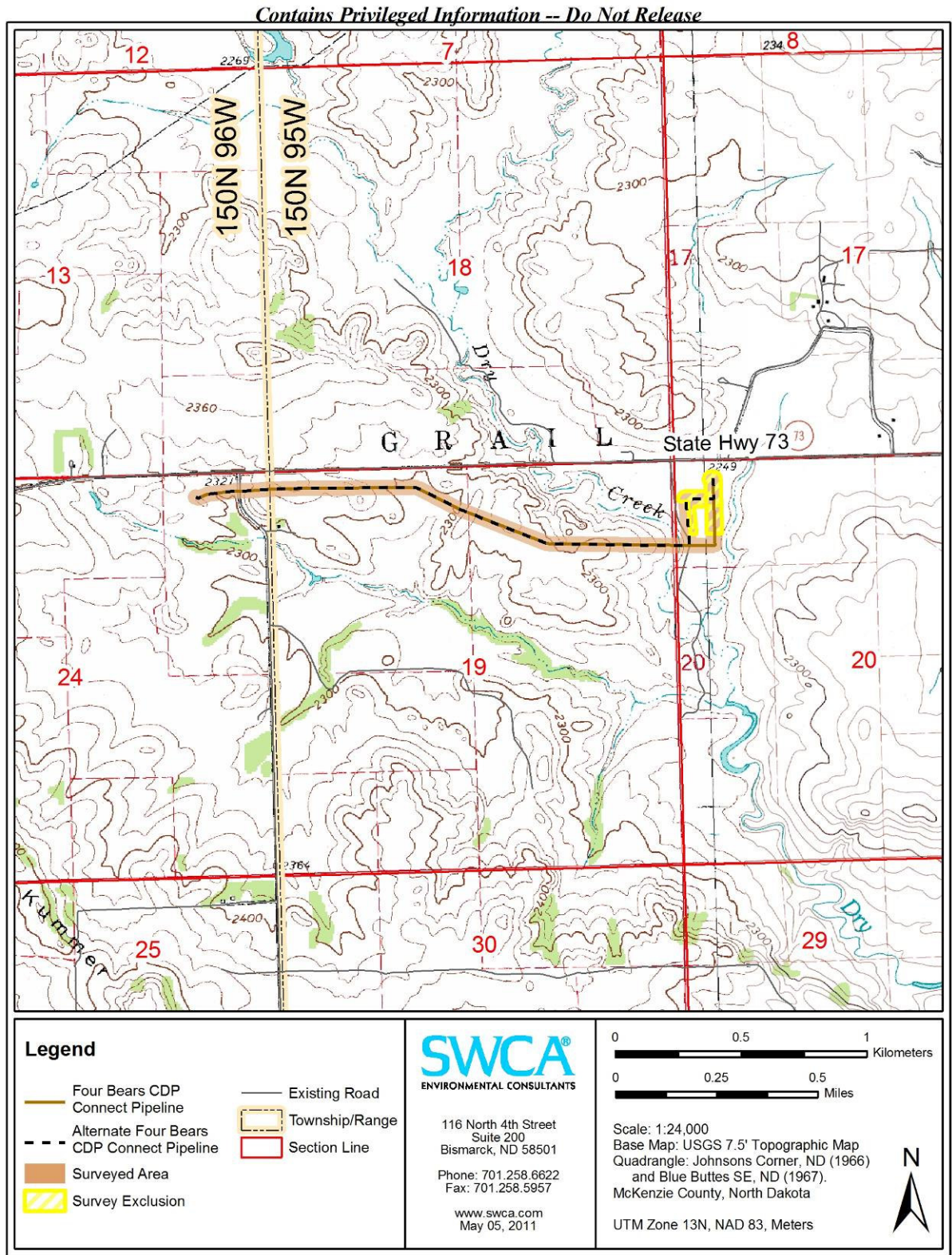
- A List of Previous Studies
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## **INTRODUCTION**

This report outlines the results of a Class I and Class III cultural resource inventory conducted by SWCA Environmental Consultants (SWCA) on behalf of Arrow Pipeline, LLC (Arrow), on April 25 and 27, 2011, for the Four Bears CDP Connect pipeline project (Four Bears CDP Connect). Arrow proposes to construct the approximately 7,818.47-foot-long Four Bears CDP Connect in McKenzie County, North Dakota. The jurisdictional agency presiding over the construction of the Four Bears CDP Connect pipeline is the North Dakota Public Service Commission (NDPSC). In compliance with NDPSC requirements, Arrow requested SWCA perform a cultural resource survey to assess the potential effect of activities associated with the construction of the pipeline on cultural resources. The proposed pipeline will be constructed within a 120-foot-wide temporary construction right-of-way (ROW) and a 50-foot-wide permanent ROW will be maintained after construction is complete. The final construction ROW will be entirely within the inventoried area.

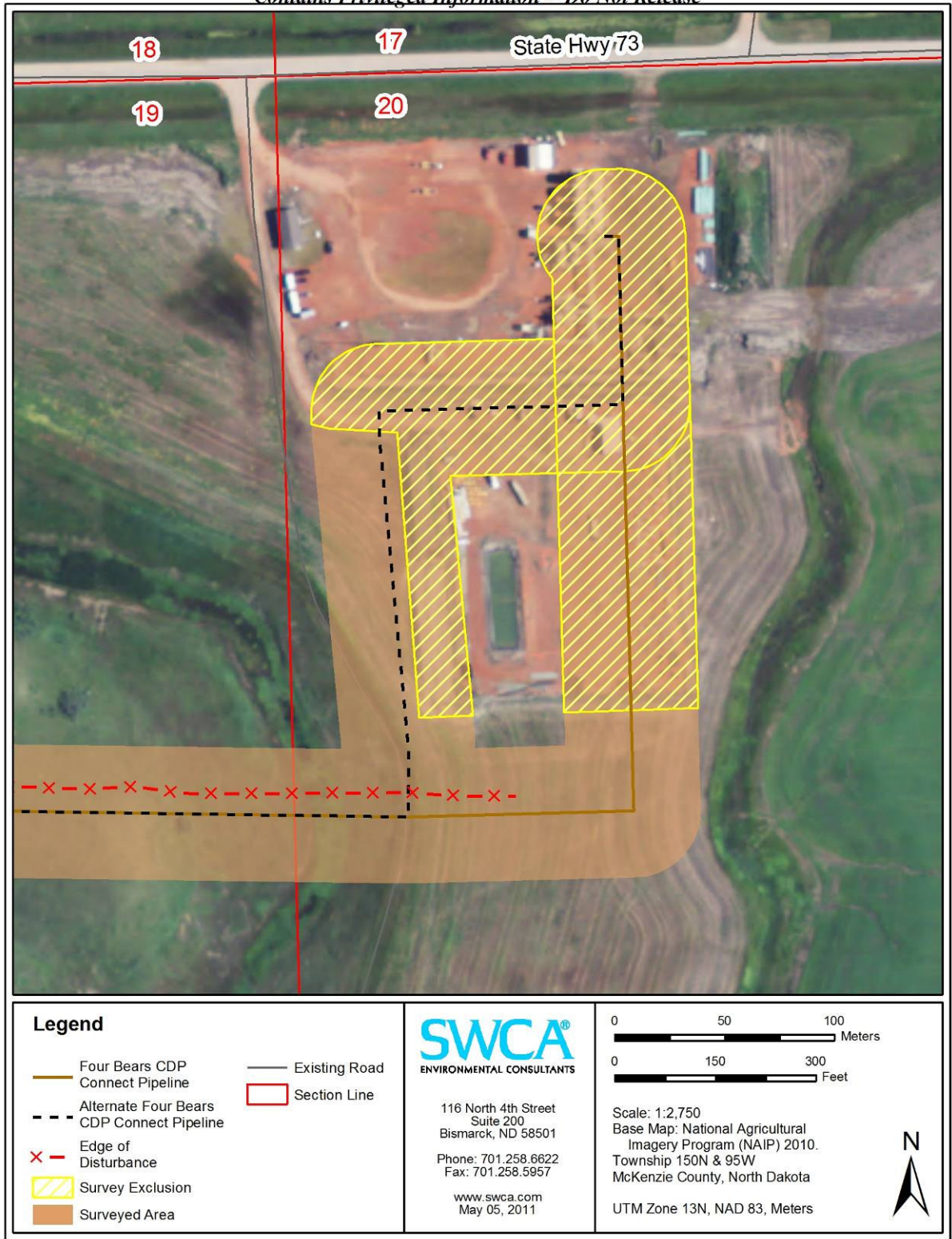
The Class III inventory includes a 200-foot-wide survey corridor centered on the proposed 7,818.47-foot-long pipeline centerline (Figure 1). In total, 40.01 acres were inventoried for the project, of which 7.71 acres were subject to intuitive survey (survey exclusion zone [Figure 2]) due to recent heavy surface disturbance as a result of vehicle traffic and construction activities. The inventoried area is situated on the Johnsons Corner (1966) and Blue Buttes SE (1967), North Dakota U.S. Geological Survey (USGS) topographic quadrangles and includes parcels in Section 19 of Township (T) 150 North (N), Range (R) 95 West (W); in SW<sup>1</sup>/<sub>4</sub> NW<sup>1</sup>/<sub>4</sub> Section 20 of T150N, R95W; and N<sup>1</sup>/<sub>2</sub> NE<sup>1</sup>/<sub>4</sub> NE<sup>1</sup>/<sub>4</sub> Section 24 of T150N, R96W.

For the cultural resource investigation, Judith Cooper and Michael Retter served as Principal Investigators. Stephanie Lechert, Michelle Delmas, and Adam Leroy (all of SWCA) completed the fieldwork. All field notes and photographs are on file at SWCA's Bismarck, North Dakota, office under project number 16599.



**Figure 1. Project area map.**

*Contains Privileged Information -- Do Not Release*



**Figure 2. Aerial map of cultural resources exclusion area.**

## **PROJECT SETTING**

### **TOPOGRAPHY**

The project area is located in the glaciated Missouri Plateau section of the Great Plains physiographic province in west-central North Dakota (Fenneman 1931). The glaciated Missouri Plateau section is characterized by old plateaus and isolated mountains (Fenneman 1931). The project area is located in rolling grasslands and is crossed by Dry Creek to the east. Dry Creek eventually drains into the Lake Sakakawea portion of the Missouri River to the east of the project area. The elevation in the project area ranges from approximately 2,238 to 2,323 feet (682 to 708 meters [m]), with the highest elevations in the western portions of the project area. Located on the Missouri Plateau, in the northwest Great Plains ecoregion, the general topography of the proposed project area is fairly consistent—semiarid rolling plains of shale, siltstone, and sandstone with the occasional butte (Bryce et al. 1998) (Figures 3 and 4). Largely unaffected by glaciation, this ecoregion retains its original soils and complex drainage system (Bryce et al. 1998).



**Figure 3. Project area overview depicting general topography on the western end of pipeline corridor, facing west.**



**Figure 4. Project area overview depicting general topography at the eastern end of pipeline corridor, facing north.**

## **CLIMATE**

The climate for west-central North Dakota is temperate. Based on climatic data collected from Keene 3 S, North Dakota, between 1971 to 2000, January is the coldest month with a mean daily temperature of 10.8 degrees Fahrenheit (°F) while July is the warmest month with a mean daily temperature of 69.4°F (National Climatic Data Center [NCDC] 2009). Temperature extremes on record range from -43°F at the coldest to 107°F at the warmest. On average, 137 days are frost free (28°F or above); the average date of the first fall frost is September 27, and the average date of the last spring frost is May 12 (North Dakota Agricultural Statistics Service 2005). Per annum, Keene 3 S receives 16.0 inches of precipitation (NCDC 2009). The wettest month is June, with an average of 3.19 inches of precipitation received; February is the driest, with only 0.37 inch of precipitation received on average. Thirty-five inches of snow are received annually, on average, with the highest accumulations (6.9 inches, on average) received in January and February (NCDC 2009). The highest monthly snowfall on record occurred in March at 27.0 inches. Overall, west-central North Dakota, like much of the northwestern Great Plains, is characterized by a moderate to cool climate, with cold, dry winters and mild to warm, dry to moderately wet summers.

**HYDROLOGY**

The survey area crosses Dry Creek towards the eastern end of the pipeline corridor. The creek eventually drains into Bear Den Creek approximately 4.8 miles southeast of the eastern portion of the project area. Bear Den Creek eventually drains into Bear Den Bay, which in turn drains into the Lake Sakakawea portion of the Missouri River, at its nearest point, which is approximately 11.6 miles east of the project area.

**GEOLOGY**

In general, the geology of the project area is characterized by the Paleocene-aged Sentinel Butte Formation. The Sentinel Butte Formation consists of gray/brown silt, sand, clay, sandstone, and lignite riparian and swamp sediments, up to 600 feet thick (Clayton 1980).

**SOILS**

Twenty soil series are present in the project area (Natural Resources Conservation Service [NRCS] 2010); however, the dominant soil types in the project area are fine-loamy till and coarse-loamy alluvium derived from sedimentary rock, both found on hills, rises, and knolls. Table 1 summarizes the soils within the project area.

**Table 1. Summary of Soil Series within the Project Area (NRCS 2010).**

<b>Soil Series</b>	<b>Parent Material</b>	<b>Drainage</b>	<b>Slope</b>	<b>Landform</b>
Beisigl-Flasher loamy fine sands	Sandy residuum weathered from sandstone	Somewhat excessively drained	6%–15%	Hills, ridges
Beisigl-Flasher-Tally complex	Sandy residuum weathered from sandstone; Coarse-loamy alluvium derived from sedimentary rock	Somewhat excessively drained; Well drained	9%–50%	Hills, ridges
Belfield-Savage silty clay loams	Clayey alluvium derived from sedimentary rock	Moderately well drained; Well drained	2%–6%	Flats, alluvial fans
Brandenburg-Cabba-Dogtooth complex	Loamy residuum weathered from porcellanite; Fine-loamy residuum weathered from sedimentary rock; Clayey residuum weathered from shale	Excessively drained; Well drained	15%–70%	Knobs, ridges
Brandenburg-Searing-Dogtooth complex	Loamy residuum weathered from porcellanite; Fine-loamy residuum weathered from porcellanite	Excessively drained; Well drained	6%–15%	Knobs, ridges
Chama-Cabba-Sen silt loams	Fine-silty residuum weathered from siltstone; Fine-silty residuum weathered from sedimentary rock	Well drained	6%–15%	Hills, ridges

*A Class I and Class III Cultural Resource Inventory of the Arrow Four Bears CDP Connect Pipeline,  
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<b>Soil Series</b>	<b>Parent Material</b>	<b>Drainage</b>	<b>Slope</b>	<b>Landform</b>
Daglum-Belfield complex	Clayey alluvium; Clayey alluvium derived from sedimentary rock	Moderately well drained; Well drained	0–6%	Flats, alluvial fans, alluvial flats
Dogtooth-Janesburg-Cabba complex	Clayey residuum weathered from shale; Fine-loamy residuum weathered from sedimentary rock	Well drained	6%–30%	Hills, ridges
Farnuf loam	Fine-loamy alluvium derived from sedimentary rock	Well drained	2%–6%	Alluvial fans, terraces
Golva silt loam	Fine-silty alluvium derived from siltstone	Well drained	6%–9%	Hills, ridges
Korchea loam, channeled	Stratified fine-loamy alluvium derived from sedimentary rock	Well drained	0–2%	Floodplains on river valleys
Lawther silty clay	Clayey alluvium derived from sedimentary rock	Well drained	0–2%	Alluvial flats
Manning-Schaller-Wabek complex	Coarse-loamy alluvium derived from sedimentary rock; Sandy and gravelly alluvium; Sandy alluvium derived from sedimentary rock	Somewhat excessively drained; excessively drained	6%–25%	Escarps on stream terraces
Pits, gravel and sand	N/A	N/A	N/A	Stream terraces
Reeder-Farnuf loams	Fine-loamy residuum weathered from mudstone; Fine-loamy alluvium derived from sedimentary rock	Well drained	3%–30%	Pediments, alluvial fans, terraces
Rhoades-Daglum complex	Clayey alluvium derived from shale and siltstone; Clayey alluvium	Moderately well drained	0–6%	Alluvial fans, alluvial flats
Zahl-Beisigl-Tally complex	Fine-loamy till; Sandy residuum weathered from sandstone; Coarse-loamy alluvium derived from sedimentary rock	Well drained	9%–15%	Hills, ridges
Zahl-Cabba-Williams complex	Fine-loamy till; Fine-silty residuum weathered from sedimentary rock	Well drained	9%–15%	Hills, ridges
Zahl-Tally-Williams complex	Fine-loamy till; Coarse-loamy alluvium derived from sedimentary rock	Well drained	6%–9%	Hills, ridges, knolls
Zahl-Williams loams	Fine-loamy till	Well drained	15%–25%	Hills, ridges

## FLORA AND FAUNA

The project area is situated within the northwestern Great Plains ecoregion, characterized by native grasslands over rolling plains (Figure 5). Present vegetation includes such species as needle-and-thread grass (*Stipa comata*), western wheatgrass (*Pascopyrum smithii*), prairie junegrass (*Koeleria macrantha*), and green needlegrass (*Nassella viridula*) (Bryce et al. 1998).



**Figure 5. Overview of the vegetation characteristic of the project area, facing west.**

Approximately 160 wildlife species are resident or seasonal visitors to the Missouri River ecosystem, and hundreds of native fish species live in the mainstem and tributaries. Some of the animal species that would have been common and available for human use in the Missouri River Valley area—both prehistorically and historically—include fur bearing mammals such as beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), eastern cottontail (*Sylvilagus floridanus*), elk (*Cervus elaphus*), moose (*Alces alces*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), pronghorn (*Antilocapra americana*), and bison (*Bison bison*); and bird and waterfowl species such as mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), sharp-tailed grouse (*Pedioecetes phasianellus campestris*), golden eagle (*Aquila chrysaetos*), and bald eagle (*Haliaeetus leucocephalus*) (Seabloom et al. 1978).

Several wildlife species that are listed as threatened or endangered under the Endangered Species Act either currently reside or once resided in McKenzie County. These include the black-footed ferret (*Mustela nigripes*), gray wolf (*Canis lupus*), interior least tern (*Sterna antillarum*), pallid sturgeon (*Scaphirhynchus albus*), piping plover (*Charadrius melodus*), and whooping crane (*Grus americana*) (U.S. Fish and Wildlife Service 2010).

## **ENVIRONMENTAL CONSTRAINTS**

Preservation of archaeological materials within or adjacent to the project area has been impacted largely by natural erosion including ongoing aeolian and colluvial processes. Secondary sources of impact to archaeological resources include livestock grazing; oil and gas development; and road construction and vehicle traffic. Steep slopes tend to restrict land use to cattle grazing or dryland farming. Significant oil and gas development has occurred adjacent to the project area, and is presently increasing as demand for domestic energy sources has grown in recent years.

In some places, these varied land uses have resulted in increased ground visibility and removal of overburden, allowing for the identification of numerous sites and an interpretation of high site density. In other cases, though, it has simply removed the archaeological materials and resulted in the identification of low site densities. In combination, these factors may have disrupted the contexts of a moderate percentage of cultural materials.

## **CULTURAL/HISTORIC OVERVIEW**

### **PREHISTORIC CONTEXTS**

The following discussion incorporates a variety of sources to develop a prehistoric overview for the work conducted for this project and includes information from the Little Missouri River Study Unit (LMRSU) and the Garrison Study Unit (GSU) in which the project area is located (Gregg and Bleier 2008a, 2008b). As of 2007, 2,329 archaeological sites were identified in the LMRSU, the majority of which were identified on ridges (35.8 percent); hills, bluffs, and knolls (21.2 percent); and terraces (17.8 percent) (Gregg and Bleier 2008a). In the GSU, there were 3,303 archaeological sites identified as of 2007, the majority of which were identified on ridges (40.6 percent); hills, bluffs, and knolls (24.0 percent); and terraces (10.4 percent) (Gregg and Bleier 2008b).

#### **Paleoindian Tradition (ca. 11,500–7,900 years before present [B.P.]**

Although speculation exists regarding the possibility of earlier habitation of the Great Plains, the Paleoindian tradition is the oldest of the region, and, in general, is associated with a hunting and gathering adaptation (Gregg 1985). The Paleoindian tradition is subdivided here into six main complexes: Clovis, Goshen, Folsom, Hell Gap/Agate Basin, Alberta/Cody, and Parallel Oblique Flaked. In total, 30 Paleoindian archaeological resources have been identified in the LMRSU and 14 have been identified in the GSU (Gregg and Bleier 2008a, 2008b).

The Clovis complex (ca. 11,500–10,800 B.P.), defined by large, fluted lanceolate projectile points, is the earliest unequivocal complex in North America. Clovis artifacts have been found with megafauna, such as mammoth, in buried contexts in the Southwest and Great Plains (Grayson and Meltzer 2002); however, although megafauna were probably dietary constituents, it is debated to what degree Early Paleoindians pursued large game (Cannon and Meltzer 2004; Grayson and Meltzer 2002). Few Clovis sites have been recorded in the region and only one Clovis archaeological resource has been identified in the LMRSU (Gregg and Bleier 2008a). No Clovis archaeological resources have been identified in the GSU (Gregg

and Bleier 2008b). In the South Dakota Badlands, the Lange-Ferguson site yields the best evidence for proboscidean exploitation (Hannus 1990). Here, modified mammoth bones are directly associated with a flake and three projectile points that were recovered from deposits similar to those containing mammoth, indicating that Clovis hunter-gatherers either killed the animals or scavenged their carcasses (Hannus 1990).

Goshen (ca. 10,900–10,100 B.P.) is a technological complex first identified at Hell Gap, Wyoming (Irwin 1967, 1971), but it is also found at Mill Iron, Montana, Carter-Kerr/McGee, Wyoming, and the Jim Pitts site, located in the South Dakota Black Hills (Sellet 2001). Goshen is poorly understood—the basally thinned, unfluted projectile points share affinities with both Clovis and Folsom, but are also similar to Southern Plains Plainview points. In stratified deposits, Goshen materials typically underlie Folsom (Frison et al. 1996). No Goshen material has been identified in the LMRSU or the GSU (Gregg and Bleier 2008a, 2008b).

The Folsom complex (ca. 10,900–10,200 B.P.) is typified by distinctive fluted lanceolate projectile points. With most large grazers extinct by Folsom times and grasslands dominating the Great Plains, bison populations flourished, providing resources for Folsom hunters (Frison 1991). However, many high-elevation Folsom sites also demonstrate broad diets of diverse small prey (Hill 2007). Probable structures recorded at the Mountaineer and Barger Gulch sites in Colorado suggest long-term occupations in mountain settings (Stiger 2006; Surovell and Waguespack 2007). In North Dakota, there are numerous documented Folsom sites (Gregg 1985), including the Bobtail Wolf (32DU955A), Big Black (32DU955C), and Young-Man-Chief (32DU955D) sites (Root 2000; Shifrin 2000; William 2000). These sites are interpreted as camps, quarries, and lithic workshops where Knife River flint was procured and used for tool production. In the LMRSU, three Folsom archaeological resources have been identified, while only one has been identified in the GSU (Gregg and Bleier 2008a, 2008b).

Both the Agate Basin (ca. 10,500–10,000 B.P.) and Hell Gap (ca. 10,000–9,500 B.P.) technocomplexes are typified by lanceolate projectile points with thick lenticular cross-sections (Frison 1991). Based on morphological similarities and stratigraphic evidence, Hell Gap is technologically descended from Agate Basin. Agate Basin and Hell Gap hunter-gatherers were probably specialized bison hunters. Sites like Agate Basin II (Hill 2001) and Casper (Todd et al. 1997) indicate more frequent extraction of marrow and within-bone nutrients, suggesting a greater focus on planning than previously evident. Some sites associated with this tradition have been recorded in North Dakota and South Dakota, but these mainly consist of isolated and surface finds (Gregg 1985). A Hell Gap/Agate Basin-style projectile point was identified at 32MZ1447 (Klinner and Wermers 2000).

Alberta (9800–9000 B.P.) is a poorly dated technology that probably descends from Hell Gap and is documented at the Hell Gap, Wyoming, and Hudson-Meng, Nebraska, sites (Agenbroad 1978; Frison 1991). Hudson-Meng is one of the largest documented bison kills and suggests that Alberta people focused on bison hunting (Agenbroad 1978); however, more recent work suggests that humans were not responsible for killing the bison and that they died of a natural event (Todd and Rapson 1999). The Cody Complex (9200–8800 B.P.), which includes stemmed/shouldered Eden and Scottsbluff projectile points and the distinctive Cody knife, apparently arose from Alberta (Frison 1991). These sites are widespread across the

Northwestern and Central Great Plains, with components at the Wyoming Horner I, Finley, and Medicine Lodge Creek sites (Frison and Todd 1986; Frison and Walker 2007) and the Mammoth Meadows, Myers-Hindman, and MacHaffie sites in Montana (Davis 1993). Such sites indicate that Cody adaptations were diverse and utilized large fauna as well as small prey and floral resources (Frison et al. 1996; Galvan 2007). Alberta/Cody sites have been recorded in North Dakota and South Dakota. In fact, Hudson-Meng contains a substantial amount of Knife River flint, showing a strong connection to the Missouri River region.

The Parallel Oblique Flaked complex is a catch-all grouping of Paleoindian projectile point types (Gregg 1985) including Angostura, Milnesand, Browns Valley, Lusk, Allen, and Frederick; these range in age from around 9400 to 7900 B.P. All types are lanceolate with parallel oblique flaking. Bison kill-butcheries became rare on the Northwestern and Northern Plains after approximately 8000 B.P. (Frison 1998), perhaps due to severe ecological deterioration that could no longer support large bison populations. Complex excavated and surface sites have been recorded in the Dakotas, including sites on the Missouri River. In the LMRSU, 14 archaeological resources defined under the general “Plano” category have been identified, while 6 have been identified in the GSU (Gregg and Bleier 2008a, 2008b).

#### **Plains Archaic Tradition (ca. 8000–1500 B.P.)**

The transition from Paleoindian to Archaic is archaeologically visible as an abrupt shift to large notched projectile points (Frison 1991), perhaps indicating a shift to atlatl propelled darts from hand-thrown spears. This transition is also associated with warming/drying trends that prompted diverse subsistence adaptations among hunter-gatherers (Carlson 1994). Ground stone appears in the Archaic, suggesting a greater focus on processing floral resources. In conjunction with the appearance of pithouses and storage pits in the western intermontane basins, this suggests a shift in subsistence base, a reduction in overall residential mobility, and more predictable seasonal rounds (Frison 1991). In the LMRSU, 241 Archaic archaeological resources have been identified (Gregg and Bleier 2008a). In the GSU, 96 Archaic archaeological resources have been identified (Gregg and Bleier 2008b).

The Logan Creek/Mummy Cave complex (5700–4000 B.P.) is the earliest example of large side-notched projectile points on the northern Great Plains. The blending of the Logan Creek and Mummy Cave for this complex is due to varied nomenclature used among archaeologists regionally for similar archaeological complexes (Gregg 1985). Settlement types associated with this complex include bison kills, transient camps, and some stone circle sites. Twenty-three archaeological resources containing large side-notched projectile point varieties have been identified in the LMRSU, while only four have been found in the GSU (Gregg and Bleier 2008a, 2008b).

The Oxbow complex (5600–3500 B.P.), typified by side-notched, deeply concave-based projectile points, is concentrated in northern Montana, Alberta, and Saskatchewan (Hannus 1994:180) but is also quite common in North Dakota and South Dakota, with numerous sites along the Missouri River and its tributary system. Oxbow subsistence apparently centered on bison and sites include bison impoundments and jumps, encampments on stream terraces, stone circles, and processing areas (Hannus 1994; Reeves 1969). However, numerous birds and small mammals were probably exploited (Aaberg et al. 2006:174). Some Northern Plains

sites further yield evidence of complex cultural behavior including bundle burials with elaborate grave goods (Bryan 1991). Fifteen Oxbow archaeological resources have been identified in the LMRSU (Gregg and Bleier 2008a), including three subsurface Oxbow projectile points that were found at 32MZ1184 (Borchert and Wermers 1994). In the GSU, only four Oxbow archaeological resources have been identified (Gregg and Bleier 2008b).

The McKean complex (ca. 4500–3400 B.P.) encompasses three distinct sub-phases—the McKean lanceolate, Duncan, and Hannah. The McKean complex is widespread across the Great Plains, and sites from this period can be found associated with bison kills, stone circles, lithic caching, and seasonal settlements (Frison 1991). Slab-lined pit hearths are common, as are ground stone artifacts suggesting a greater reliance on plant resources (Carlson 1994; Frison 1991). McKean complex sites often demonstrate evidence of lithic raw material exchange, including Swan River chert, Tongue River silicified sediment, and Knife River flint (Gregg 1985). In the LMRSU, 70 archaeological resources dating to the McKean complex have been identified (Gregg and Bleier 2008a), including four McKean Lanceolate points that were recovered from the Big Gulch-Chase site (32DU273) (Artz et al. 1983). In the GSU, 23 archaeological resources dating to the McKean complex have been identified (Gregg and Bleier 2008b).

Pelican Lake (ca. 3000–2700 B.P.), typified by broad, thin corner-notched projectile points, is likely a descendant of McKean and is found across the Northern and Central Plains (Frison 1991). This wide spatial distribution may indicate significant population growth in response to the favorable moist conditions of the Sub-Atlantic episode (Reeves 1983). Numerous communal bison kills, such as Head-Smashed-In (Frison 1991), indicate communal bison hunting, but this does not suggest it was an exclusive feature of their subsistence. Rather, Pelican Lake populations probably relied on a broad-based economy across diverse ecozones (Hannus 1994). Sixty-three Pelican Lake archaeological resources have been identified in the LMRSU (Gregg and Bleier 2008a). These include the Sunday Sage site (32BI22) and Ice Box Canyon Ridge site (32MZ38) (Simon and Borchert 1981a). In the GSU, 34 Pelican Lake archaeological resources have been identified (Gregg and Bleier 2008b).

### **Plains Woodland Tradition (ca. 2000–450 B.P.)**

Temporally overlapping with the Northwestern Plains Late Archaic, the Plains Woodland tradition is characterized by increased sedentism, garden horticultural activity, expanding regional exchange networks with eastern Woodland populations (Adena and Hopewell), and the elaboration of ceremonial activities and mortuary practices, specifically mound burials (Griffin 1967). Significant technological advances such as bow and arrow and ceramics use are also apparent (Gregg 1985); however, the fundamental subsistence strategies of the Plains Woodland did not drastically differ from their Archaic predecessors (Zimmerman 1985). It is assumed that this tradition saw the beginning of horticultural practices in the region. For the purposes of this study, the complexes that are classed as belonging to the Plains Woodland include Besant, Sonota, Laurel, Avonlea, Old Woman's, and Blackduck.

The Besant complex (ca. 2000–1500 B.P.), typified by small to medium-sized side-notched triangular projectile points, represents the earliest presence of ceramics in North Dakota, probably resulting from eastern woodland influence (Walde 2006). Besant ceramics are more

common in the eastern half of the Dakotas; the vessels show a basic conoidal shape and suggest lump modeling manufacture with some coarse cording (Wood and Johnson 1973). Besant sites show extensive use of Knife River flint (Reeves 1970). Site types include stone circle sites, habitations on stream and river terraces, and bison kills. Numerous communal kill sites, including the Ruby bison pound in Wyoming (Frison 1991), suggest that Besant people were sophisticated bison hunters. The Sonota complex (1850–1350 B.P.) appears to be a possible sub-complex of Besant, but differs in that burial mounds are common at Sonota sites (Reeves 1983; Wood 1967). These mounds include rectangular subfloor pits/tombs with dismembered bodies and, commonly, articulated bison remains (Johnson and Johnson 1998). The presence of associated exotic artifacts is often cited as evidence of Hopewell influence on Middle Plains Woodland populations (Johnson and Johnson 1998). In the LMRSU and the GSU, 68 Besant/Sonota archaeological resources have been identified, including at the Sunday Sage site (32BI22) (Simon and Borchert 1981b) and the Boeckel-Renner site (32ME799) (cf. Artz 1989).

Sites from the Laurel complex (2100–850 B.P.) are generally found in the eastern portions of North Dakota, northern Minnesota, and southern Canada. Laurel pottery and mound building are fairly distinct, but lithics associated with this complex tend to be various and lack a particular style (Gregg 1985).

Avonlea complex (ca. 1800–1000 B.P.) sites occur across the northern Great Plains and are contemporaneous with Besant. This complex includes a variety of site types, including stone circles, bison kills, and rock shelter habitations (Reeves 1970). Avonlea represents the first regional complex to produce arrow points exclusively, suggesting a transition to bow and arrow technology (Frison 1988). Avonlea point types are small and indistinctly side-notched. Saskatchewan Basin Complex: Early Variant pottery is found at Avonlea sites (Byrne 1973). Avonlea subsistence in the north relied heavily on communal bison procurement, but in their southern range bison hunting was supplemented by smaller game (e.g., pronghorn), fish, and seasonal plant exploitation (Smith and Walker 1988). Avonlea sites are relatively rare in the Dakotas (Vickers 1994). In North Dakota, the Evans site (32MN301) contained Avonlea projectile points and ceramics (Schneider and Kinney 1978). Thirteen Avonlea-aged archaeological resources have been identified in the LMRSU and the GSU (Gregg and Bleier 2008a, 2008b).

Rare in North Dakota is the Old Woman's complex (A.D. 700–1300). This complex is contemporary with the Plains Village tradition, so it would seem likely that many associated sites would be granted the latter designation (Gregg 1985).

The Blackduck complex (A.D. 1150–450) derives from northern Minnesota and was concentrated in southern Manitoba. It is contemporary with both Avonlea and Old Woman's complexes, and with Extended and Terminal Middle Missouri traditions. Some evidence of possible Blackduck pottery has been found along the Missouri River, which suggests trade between the Missouri River villagers and the Blackduck people to the north (Joyes 1970).

### **Plains Village Tradition (ca. 1050–350 B.P.)**

Lehmer (1971) defined the Plains Village tradition as possessing the following diagnostic traits: equal horticulture and hunting and gathering strategies; semi-permanent villages near the Missouri River floodplain; earthlodges; large storage and refuse pits; distinctive ceramics; abundant end scrapers and arrow points; bison scapula hoes; and a well-developed bone tool industry. The Plains Village Tradition is divided into the Middle Missouri tradition (A.D. 969–1500) and the Coalescent tradition (A.D. 1300–1650), discussed below. In total, 23 Plains Village archaeological resources have been identified in the LMRSU, while only 15 have been identified in the GSU (Gregg and Bleier 2008a, 2008b).

Three primary Middle Missouri variants are recognized: Initial Middle Missouri (A.D. 969–1297), Extended Middle Missouri (A.D. 1075–1443), and Terminal Middle Missouri (A.D. 1300–1500) (Eighmy and LaBelle 1996). These represent a continuation and intensification of Northern Plains Woodland lifeways and their appearance coincides with the onset of the Medieval Warm Period (Bryson et al. 1970) when a moisture increase likely permitted horticulture in areas previously characterized by tenuous farming conditions (Wood 2001).

The Initial Middle Missouri Variant (IMMV) is thought to have developed as an outgrowth of the Great Oasis (Tiffany 2007) or via the arrival of eastern populations already exploiting a Plains Village lifeway (Lehmer 1971). The IMMV was concentrated in the southern portions of the Middle Missouri region and characterized by highly fortified villages of large, semi-subterranean rectangular houses (Lehmer 1971; Winham and Calabrese 1998). In the LMRSU, an Initial Middle Missouri deposit has been identified at site 32MZ380D (Jorstad et al. 1986:179).

The Extended Middle Missouri Variant (EMMV) is concentrated in the northern portions of the Middle Missouri region (Lehmer 1971). EMMV groups resided in small villages of semi-subterranean rectangular houses; southern villages were more often fortified than those in the north (Wood 2001). It is unclear whether the EMMV replaced the IMMV or represents a contemporaneous offshoot of the IMMV. Origins aside, it is assumed that IMMV populations were eventually absorbed into EMMV populations. The final expression of this tradition was the Terminal Middle Missouri (Winham and Calabrese 1998:282). These sites were concentrated in a smaller geographic area along the Missouri River in southern North Dakota and characterized by fewer but much larger villages (Wood 2001). Sites again contained long, rectangular semi-subterranean houses but were highly fortified (Wood 2001). A continuation of the Middle Missouri Tradition is recognized historically as the Siuwan-speaking Mandan and Hidatsa (Wood 2001).

The Coalescent period is temporally divided into Initial (650–350 B.P.), Extended (500–300 B.P.), and Post-Contact Coalescent (300 B.P.–Historic period) (Johnson 1998; Lehmer 1971). The Coalescent Tradition is thought to represent a geographic movement of Central Plains Tradition village-dwelling populations to the Missouri River Valley in South Dakota (Blakeslee 1993). Central Plains Traditions might have migrated from Nebraska and Kansas in response to drought brought on by the Pacific climatic episode (Lehmer 1971). Similar to Middle Missouri Tradition groups, Coalescent populations practiced an economy split between mixed cultigen horticulture and bison hunting (Johnson 1998).

Initial Coalescent Variant sites are located on bluffs overlooking the Missouri River and its drainages in southern South Dakota. Populations lived in fortified villages consisting of subrectangular to circular/oval earthlodges and often surrounded by complex fortifications (Johnson 1998). Violence amongst Coalescent groups is evidenced at the Crow Creek site (39BF11) where approximately 486 individuals were killed in the village fortification ditch around 625 B.P. (Willey and Emerson 1993). Crow Creek is interpreted as evidence of internecine warfare amongst Initial Coalescent groups over land competition (Zimmerman and Bradley 1993) or, conversely, as evidence of warfare between immigrant Coalescent groups and resident Middle Missouri Tradition peoples (Johnson 1998). The Extended Coalescent Variant apparently descended from the Initial Coalescent sometime in the fifteenth century A.D. Sites are concentrated along the Missouri River and its tributaries in central and northern South Dakota (Krause 2001). Extended Coalescent sites are far more abundant than during the Initial Coalescent and are characterized by a dispersed, unfortified village structure of circular earthlodges (Johnson 1998; Krause 2001; Lehmer 1971). In the LMRSU, the Connell Ranch site (32BI439) has been identified as an Extended Coalescent bison butchering site (Metcalf 1988). The Extended Coalescent Variant evolved into the Post-Contact Coalescent during the Protohistoric and Historic and the Coalescent Tradition is recognized as the Arikara (Krause 2001). The last post-contact village was Like-a-Fishhook Village, occupied by the Arikara, Mandan, and Hidatsa; it was abandoned in 1886 when groups relocated to the Fort Berthold Reservation (Smith 1972).

## **HISTORIC CONTEXTS**

### **European Trade and Exploration (A.D. 1738–1858)**

Perhaps the earliest attempts at exploring the Northern Great Plains came as a result of the ventures of Pierre Gaultier de Varennes Siure de la Verendrye (Dill 1983). His travels from New France into North Dakota led him as far as the Missouri River (somewhere near Bismarck), and led to subsequent expeditions by his sons, which went farther south into South Dakota (near Pierre) and west towards the Black Hills. While the elder la Verendrye met the Mandan, his sons encountered the Arikara and other tribes in South Dakota. Their reports heightened interest in the region and the possibilities that existed for trade with its inhabitants.

Following the la Verendryes, a modest fur trade developed in the region, but until the expedition of Captains Meriwether Lewis and William Clark returned successfully from their voyage up the Missouri, the region was considered a wild unknown (Schulenberg 1957).

In 1807, Manuel Lisa established a short-lived post at the mouth of the Bighorn River, and by 1809 his St. Louis Missouri Fur Company was building posts among most of the tribes all along the Missouri River. Other notable companies, such as the Northwest Company, Hudson Bay Company, the Columbia Fur Company, and the American Fur Company, soon followed suit (Schulenberg 1957). The life of these posts tended to be short, but they did much to influence the tribes who frequented the Missouri River in both North Dakota and South Dakota. Fort Union—at the confluence of the Yellowstone and Missouri—was the last of the great posts, and its waning during the late 1850s saw the fur trade in the Dakotas in its last throes.

### **Post-Contact Tribal Overview (A.D. 1780–1900)**

In addition to the tribes that arose from the Middle Missouri and Coalescent traditions (Mandan, Hidatsa, and Arikara), the Northern Great Plains and the Missouri River were also used by countless other tribes since before European contact.

The Assiniboine were known to frequent the northern Missouri River (mainly near the confluence with the Yellowstone), and were active in the fur trade throughout the eighteenth and nineteenth centuries. As well, the Cheyenne were pushed westward by the Chippewa during the middle of the eighteenth century and took up at least a temporary settlement period on the Missouri River. At least one earthlodge village has been attributed to the Cheyenne in eastern North Dakota, and some Cheyenne villages on the Missouri River were located between the Mandan to the north, and the Arikara to the south, where they built earthlodges and pursued horticulture and buffalo hunting (Schlesier 1968).

The Plains Cree and Plains Chippewa also frequented the northern Missouri—mainly near the confluence with the Yellowstone, but also near Fort Clark. Both tribes traded actively with the Mandan and Hidatsa. The Crow, although more westerly in their territory, were related to the Hidatsa and would often trade and visit with the Missouri River tribes (Schulenberg 1957).

Based on linguistic evidence, the Sioux (or Dakota) originated from the southwest Great Lakes region (DeMallie 2001a). The timing of the migration is unclear, but ceramic evidence suggests that the Dakota were living on the plains several centuries before the arrival of Europeans (Hanson 1998). Based on linguistics, it is thought that the Assiniboine split from the Sioux sometime before the mid-seventeenth century (Hanson 1998). The Teton Dakota are divided into seven sub-tribes, including the Oglala, Brule, Sans Arc, Hunkpapa, Blackfeet, Miniconjou, and Two Kettles (Hanson 1998). According to DeMallie (2001a), by the mid-eighteenth century, the Teton Dakota hunted bison in the area east of the Missouri River, their movements limited in part by the Arikara stronghold along the Missouri River. However, a series of smallpox epidemics from 1771 to 1781 devastated the Arikara villages (Johnson 1998) and permitted the Teton Dakota to move west of the Missouri River. Like the Teton Dakota, the Yankton and Yanktonai Dakota occupied the prairies east of the Missouri River and north into Minnesota in the mid-seventeenth century (DeMallie 2001a). By the mid-nineteenth century, the Yankton and Yanktonai occupied the prairies east of the Missouri River from the mouth of the Big Sioux River in the south to the Red River in the north (DeMallie 2001b).

The Reservation Period began in the 1850s and continues into today. Fort Berthold Indian Reservation was created during the Fort Laramie Treaty of 1851, the boundaries of which were later redefined by executive orders of Ulysses S. Grant in 1870 and Rutherford B. Hayes in 1880 (Schneider 2001). By 1866, following the Treaty of Fort Berthold, members of the Mandan, Hidatsa, and Arikara (later the Three Affiliated Tribes) resided in Like-a-Fishhook Village (formed in 1845 by Mandan and Hidatsa leaders), located in the far southeast corner of the reservation territory adjacent the fur trade post of Fort Berthold (Schneider 2001; Stewart 2001). By 1886, however, the village was abandoned as a result of overcrowding and tribal members relocated to individual homesteads dispersed throughout the reservation (Schneider 2001; Smith 1972). This time period contains numerous accounts of attempts of

forced assimilation by the United States Government—including government actions to stop tribal ceremonialism and forced boarding school education of Indian children (Schneider 2001). However, the tribes who lived on, and used, the Missouri River have persisted to the present as strong and vital people with a living culture that has survived for present and future generations.

In the LMRSU, 34 Hidatsa, 1 Sioux, and 15 unspecified historic Native American archaeological resources have been identified (Gregg and Bleier 2008a). In the GSU, 5 Hidatsa, 1 Arikara, 1 Mandan, 1 Chippewa, and 21 unspecified historic Native American archaeological resources have been identified (Gregg and Bleier 2008b).

### **Homesteading in the Dakotas (A.D. 1860–1930)**

The first homestead in North Dakota was filed in 1868, which was the only homestead filed until 1871. The true rush for homesteads did not take place until 1885. This rush was spurred by the extension of the Northern Pacific Railroad across the Red River from Minnesota (Works Progress Administration [WPA] 1950). Western North Dakota—including McKenzie County—did not see much settlement prior to the 1890s, and the major settlement of this region did not start in any great numbers until between 1900 and 1910. In general, those homesteaders who selected lands along the Missouri River were able to do some crop farming, but the majority of homesteads were arranged as ranch operations for sheep or cattle.

In addition to the homesteading, which brought an increasing number of people to western North Dakota, the discovery of large deposits of lignite coal further boosted interest in the development of McKenzie County and the surrounding area (WPA 1950). Although slow at first, the mining industry started to flourish during the 1930s; to this day it remains a major focus of activity which drives the economy of both the county and the state. In total, 14 historic Euro-American archaeological resources have been identified in the LMRSU and the GSU (Gregg and Bleier 2008a, 2008b).

## **BACKGROUND RESEARCH**

As part of the initial phase of this investigation, SWCA conducted a background search of archaeological and historical literature and records for the project area and surrounding 1-mile area. Researchers searched relevant records holdings at the State Historical Society of North Dakota and other available sources for information regarding previously recorded historic and prehistoric sites located within the project area. Background research was conducted on March 18 and April 26, 2011.

Results of the background search identified five previously recorded cultural resources within the project area and surrounding 1-mile study area (Table 2). Of the four prehistoric sites, one is a cultural material scatter (32MZ772); one is a cultural material scatter and stone circle site (32MZ782); one site is a cultural material scatter and other rock feature (32MZ793); and one site is an isolated chipped stone find (32MZX1094). The remaining site is an historic depression, dump, and foundation site (32MZ2074). Regarding eligibility for listing on the National Register of Historic Places (NRHP), two of the previously recorded sites have been

recommended as unevaluated and the remaining three are recommended not eligible. One previously recorded resource, 32MZ782, is located within the project area and was revisited during the present survey. 32MZX1094 is located immediately south of the project survey corridor but was not revisited as it fell outside of the project area.

**Table 2. Previously Recorded Resources.**

<b>Site Number</b>	<b>Site Name</b>	<b>Legal Location</b>	<b>Site Type</b>	<b>Cultural Affiliation</b>	<b>NRHP Recommendation</b>
32MZ772	N/A	SW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> , Section 18, T150N, R95W	Cultural Material Scatter	Unknown Prehistoric	Unevaluated
32MZ782	N/A	S <sup>1</sup> / <sub>2</sub> NE <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> , Section 19, T150N, R95W	Cultural Material Scatter and Stone Circle	Unknown Prehistoric	Recommended Not Eligible
32MZ793	N/A	N <sup>1</sup> / <sub>2</sub> SE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> , SE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> , SW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> , Section 18, T150N, R95W	Cultural Material Scatter and Other Rock Features	Unknown Prehistoric	Not Eligible
32MZ2074	N/A	NW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> , Section 25, T150N, R96W	Depression, Dump, Foundation	Historic - Post 1960	Unevaluated
32MZX1094	N/A	NW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> , Section 24, T150N, R96W	Isolated Chipped Stone Find	Unknown Prehistoric	Not Eligible

NRHP = National Register of Historic Places

Nine previous studies, or other research projects, have been performed within the 1-mile study area. These include eight cultural resource inventories and one inventory/excavation project. A bibliographic listing of previous archaeological and historic studies for project lands and the 1-mile study area in McKenzie County, North Dakota, is provided in Appendix A.

## **FIELDWORK METHODS**

Fieldwork was designed so that project archaeologists could collect all appropriate and necessary data for the completion of the project report of results and recommendations, and to ensure accurate completion of site forms for all resources encountered.

In accordance with the scope of work, archaeologists surveyed a 200-foot-wide corridor using parallel linear transects with spacing not exceeding 30 m. The ground surface was examined for artifacts, features, or other evidence of cultural occupation. Cut banks, eroded surfaces, and other areas with significant exposure were examined intensively throughout fieldwork,

especially where previously recorded cultural resources existed. In areas with high vegetation cover and high probability of cultural resources, survey transects were reduced to 10 m to maintain adequate visibility. Ground visibility during the project ranged from 30 to 100 percent, with highest visibility in agricultural fields and disturbed areas. No snow cover was present at the time of inventory.

Where cultural resources were located, project archaeologists made an intensive effort to fully and accurately establish the extent and boundaries of new and previously recorded sites. As such, sites were mapped using sub-meter accurate Trimble Global Positioning System (GPS) units. When detailed mapping or remapping was required, all linear site features, such as site boundaries, roads, and fence lines, as well as point features, such as the site datum, cultural features, artifact concentrations, diagnostic artifacts and tools, and other necessary data, were mapped with the Trimble GPS unit for post-processing into ArcMap 9.3 shapefiles, and for plotting onto associated USGS 7.5-minute quadrangles to ensure accuracy and to produce required location maps of all sites and resources.

In addition to site mapping, project personnel photographed sites in overview and for other data collection needs. Associated features and diagnostic artifacts were described, measured, recorded with GPS, and photographed, as appropriate. Field personnel noted environmental setting, context, topography, and geographical location for each cultural resource. No collection or subsurface testing was conducted during the inventory.

## **SITE EVALUATION**

SWCA evaluated sites and their significance, as defined by criteria set forth in Title 36 Code of Federal Regulations 60.4 (National Park Service [NPS] 1991), which states:

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

- A) That are associated with events that have made a significant contribution to the broad patterns of our history; or
- B) That are associated with the lives of persons significant in our past; or
- C) That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D) That has yielded or may be likely to yield information important in prehistory or history.

Not eligible sites have lost integrity and are unlikely to contribute further data significant to knowledge of prehistory or history.

### **Prehistoric Archaeological Sites**

Prehistoric lithic scatters/campsites (sites without any structures or association with known significant events or persons) recorded for the project generally will not contain NRHP discussion for Criteria A, B, or C. Instead, for NRHP recommendation purposes, these properties will be discussed for their potential to yield information significant to prehistory or the archaeological record under NRHP Criterion D. Special cases generally apply to Criterion A, where a prehistoric site type (such as a stone circle site) may not be recommended eligible for the NRHP from an archaeological perspective, but may be considered important to cultures of Native American peoples.

Evaluation of the significance of archaeological sites under Criterion D considers general characteristics such as the nature, size, and diversity of the site assemblage; the potential presence or absence of subsurface cultural deposits; the nature of any features within the site (construction techniques, building materials, structural integrity); and the age range reflected by the site assemblage. Sites considered to be significant generally contain an assemblage of cultural remains that reflects sufficient diversity to permit identification of activities and to allow confirmation of the period of site use. Sites with the most potential to address research questions about human lifeways contain associated features, structures, and/or relatively intact and dateable artifacts.

### **Historic Archaeological Sites or Components**

Historic sites containing or consisting of preserved features or structures are evaluated primarily under Criteria A, B, and C. Historic trash scatters lacking associated features or structures are primarily evaluated under Criterion D. In general, these types of sites represent ephemeral prospecting or stock management activities, but they lack identifiable or important association with specific persons or events of regional or national history (Criteria A and B), and they lack the formal and structural attributes necessary to qualify as eligible under Criterion C. The evaluation of significance of historic archaeological sites under Criterion D focuses on the capacity of the sites or components to yield significant information regarding knowledge of history during the period(s) of site significance. Evaluation of the significance of historic sites considers general characteristics such as the nature, size, and diversity of the site assemblage; the potential presence or absence of subsurface cultural deposits; the nature of any features within the site; construction techniques; building materials; structural integrity; and the age range reflected by the site assemblage.

Historic sites considered to be significant under Criterion D generally contain an assemblage of cultural remains that reflects sufficient diversity to permit identification of activities and to allow confirmation of the period of site use. Sites with the most potential to address research questions contain associated features, structures, and relatively intact and datable artifacts. Significant sites are those that could impart information not available solely from historical documents. Although archival research may provide an essential form of information, often historical records are inaccurate or incomplete. For example, examination of construction techniques or household assemblages can provide information on economic slumps, reuse of structures for other than original purposes, and re-occupation cycles. As a result, insight may be gained into questions about human lifeways that are often asked in archaeology, but rarely specified directly in historical documentation.

### **Non-Archaeological Historic Sites or Components**

Non-archaeological historic sites or sites with non-archaeological components are those primarily assessed for NRHP eligibility under Criteria A, B, or C, rather than Criterion D and typically are not subject to subsurface testing. Individual segments of significant historic sites are evaluated as contributing or non-contributing in terms of physical and environmental integrity. Examples of historic site types include linear historic features, such as transportation routes and water conduits, standing building and structure sites, and potentially extend to any historic feature on an otherwise archaeological site, such as Traditional Cultural Property (TCP) features. Historic and ethnographic sites evaluated for potential contribution to history or cultural traditions for reasons beyond their possible future research value tend to have different evaluation and management considerations than archaeological sites. Typically, the integrity of historic sites is addressed using the guidelines presented in National Register Bulletin 15 (NPS 1991), which defines the seven elements of integrity as location, design, materials, workmanship, setting, feeling, and association. As such, properties are basically evaluated in consideration of their physical integrity and the integrity of their surroundings. TCPs are also considered under the guidelines of National Register Bulletin 38 (Parker and King 1998).

## **INVENTORY RESULTS AND RECOMMENDATIONS**

During the Four Bears CDP Connect Pipeline inventory, SWCA archaeologists revisited one previously recorded site (32MZ782) and newly recorded one isolated resource (32MZX1119). 32MZ782 is a prehistoric site consisting of a cultural material scatter and 32MZX1119 is an isolated chipped stone find. Both are discussed in detail below. Copies of the North Dakota Site Forms for both resources are provided in the detached Appendix B, and resource location maps are provided in Appendix C.

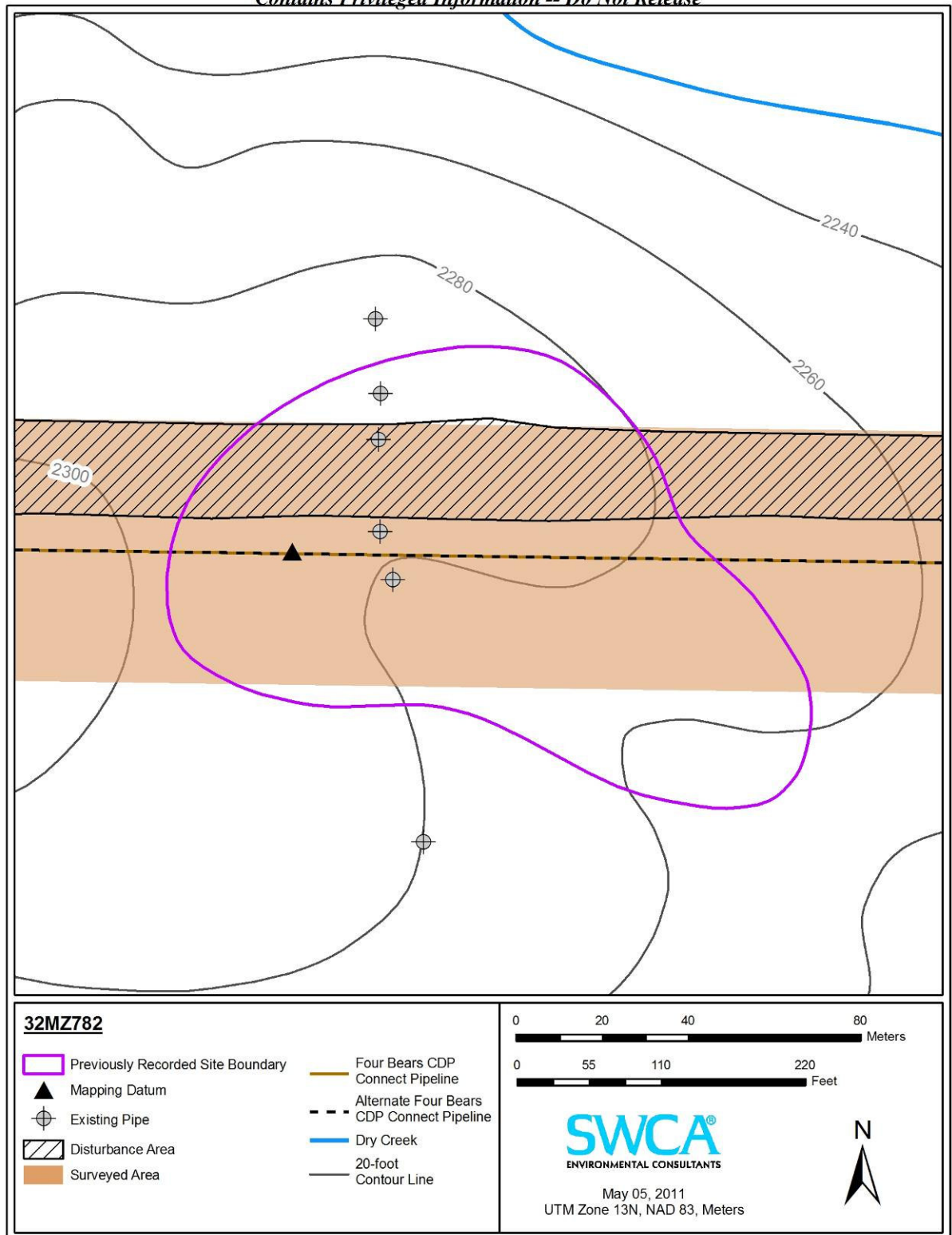
### **32MZ782**

Site Type:	Cultural Material Scatter
Association:	Unknown Prehistoric
Site Size:	138.63 by 87.00 m (10,408.70 m <sup>2</sup> )
NRHP Recommendation:	Not Eligible
Management Recommendation/Project Effect:	No Further Work/No Effect

### **Site Description and Previous Recording**

32MZ782 is located on a small knoll above a bluff overlooking Dry Creek, approximately 100 m to the north of the site datum (Figures 6 and 7). Views of the area extend out 360 degrees with the best view to the north over Dry Creek. The site consists of two pieces of Knife River flint debitage within the project area. Soil consists of a medium brown clay loam with approximately 60 percent stones, cobbles, and boulders of alluvial deposition. The site area is heavily disturbed by pipeline construction activity and bioturbation. No vegetation is present in the disturbed area of the site, providing 100 percent visibility. Mixed grasses and shrubs exist in undisturbed areas, dropping ground surface visibility to approximately 10 to 20 percent.

*Contains Privileged Information -- Do Not Release*



**Figure 6. 32MZ782 site sketch map.**



**Figure 7. 32MZ782 site overview, facing north.**

32MZ782 was originally recorded in 1985 as part of the Exxon CO<sub>2</sub> Pipeline project by M. Metcalf. The Exxon CO<sub>2</sub> pipeline is collocated to the west of the Amoco line. During the 1985 recording, 15+ pieces of Knife River flint debitage were documented. Additionally, three to five chunks/cores of Knife River flint and one piece of chert debitage were identified. Twenty-two auger probes and two 1- by 1-m test units were excavated; one flake was documented in each of two separate auger probes, but no artifacts were recovered from the 1- by 1-m units excavated adjacent to the positive auger probes. A stone circle, 4.3 m in diameter, was discovered in the southwest portion of the site while excavating the auger probes. No further information pertaining to the stone circle was noted. Bioturbation, grazing, and the construction of the Amoco pipeline were noted as impacting the site at the time of recording. Metcalf recommended the site not eligible for NRHP nomination on the original site form.

### **Survey Results**

On April 27, 2011, SWCA archaeologists revisited 32MZ782 to assess the condition and extent of the site. A newly disturbed east/west-trending pipeline corridor bisects the northern portion of the site and intersects with two older north/south-trending buried pipelines, including the Exxon CO<sub>2</sub> pipeline surveyed in 1985 and the paralleling Amoco pipeline, which bisect the west-central portion of the site. The stone circle discovered during the original site recording 1985 was not relocated; it is believed to have been destroyed as a result of the construction of multiple pipelines within the site area. Two secondary Knife River flint debitage flakes, measuring approximately 4 centimeters in maximum dimension, were found within the pipeline disturbance area. No other cultural materials were observed.

### **NRHP Eligibility Recommendation**

Although the original 1985 site recording documented a sparse distribution of artifacts during subsurface testing, no definite buried subsurface layer was observed. Additionally, the site was observed to have been disturbed by construction of the Amoco pipeline and rodent burrowing; therefore, the site was recommended not eligible for NRHP nomination. Due to the construction of multiple pipelines through the site area, as well as disturbances caused by numerous animal burrows, the integrity of the site has been greatly impacted. Additionally, the stone circle feature originally documented at the site in 1985 appears to have been destroyed by the previous pipeline construction activities in the area.

32MZ782 has been severely impacted by at least three pipeline construction projects and bioturbation. The site is presently represented by a limited and sparse cultural material scatter, which is unlikely to contribute further information to the understanding of prehistoric land use and life ways in the area. Therefore, SWCA's findings support the original not eligible recommendation for NRHP nomination under Criterion D.

### **Management Recommendation**

No further work is recommended.

### **32MZX1119**

32MZX1119 is on top of a foothill area on the slope of a small rise located above an unnamed tributary drainage of Dry Creek situated to the west; the high point of the rise is approximately 30 m to the east. Views of the area extend out 360 degrees with the best view to the north across Dry Creek. Soils consist of medium brown clay loam with approximately 60 percent stones, cobbles, and boulders of alluvial deposition. The area is heavily disturbed by pipeline construction activity. The resource consists of one modified secondary Knife River flint flake found within a disturbed area of the project corridor. The flake measures 45 by 40 by 10 millimeters with approximately 15 percent cortex. The flake has been modified on both the dorsal and proximal margins.

32MZX1119 is recommended not eligible for the NRHP. By definition, isolated finds are considered to lack the historic integrity to be determined eligible for nomination to the NRHP. Therefore, no further work is recommended for this resource.

## **CONCLUSIONS**

This report outlines the results of Class I and Class III cultural resource inventory conducted by SWCA on behalf of Arrow on April 25 and 27, 2011, for the Four Bears CDP Connect pipeline project. Arrow proposes to construct the approximately 7,818.47-foot-long primary alignment of the Four Bears CDP Connect pipeline in McKenzie County, North Dakota. An alternative alignment was analyzed that would tie in to the CDP location, which was situated between the CDP location and north/south-trending Dry Creek. The primary alignment proceeds east from the crossing at Dry Creek and then turns north, connecting into the existing CDP facility. The alternate alignment immediately turns north at the east bank of Dry Creek, turns east, and then finally turns north again to connect into the existing CDP facility.

The jurisdictional agency presiding over the construction of the Four Bears CDP Connect pipeline is the NDPSC. In compliance with NDPSC requirements, Arrow requested SWCA perform a cultural resource survey to assess the potential effect of activities associated with the construction of the pipeline on cultural resources. The proposed pipeline will be constructed within a 120-foot-wide temporary construction ROW and a 50-foot-wide permanent ROW will be maintained after construction is complete. The final construction ROW will be entirely within the inventoried area.

The Class III inventory includes a 200-foot-wide survey corridor centered on the 7,818,47-foot-long proposed pipeline centerline. In total, 40.01 acres were inventoried for the project, of which 7.71 acres were subject to intuitive survey (survey exclusion zone) due to recent heavy surface disturbance as a result of vehicle traffic and construction activities. The acres of survey exclusion cover disturbed areas on the eastern end of both the primary and the alternate alignments. The inventoried area is situated on the Johnsons Corner (1966) and Blue Buttes SE (1967), North Dakota USGS topographic quadrangles and includes parcels in Sections 19 and 20 of T150N, R95W, and Section 24 of T150N, R96W.

During the inventory, one previously recorded cultural resource (32MZ782) was revisited and one resource (32MZX1119) was newly recorded. 32MZ782 is a prehistoric cultural material scatter consisting of Knife River flint flakes. 32MZX1119 is an isolated chipped stone find. Both 32MZ782 and 32MZX1119 are recommended not eligible for the NRHP; therefore, no further work is recommended. It is recommended that a determination of *No Historic Properties Affected* and *No Significant Sites Affected* be granted for the project to proceed as planned.

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**APPENDIX A**  
**List of Previous Studies**

**Bibliographic Listing of Previous Archaeological and Historic Studies for Project Lands in McKenzie County, North Dakota.**

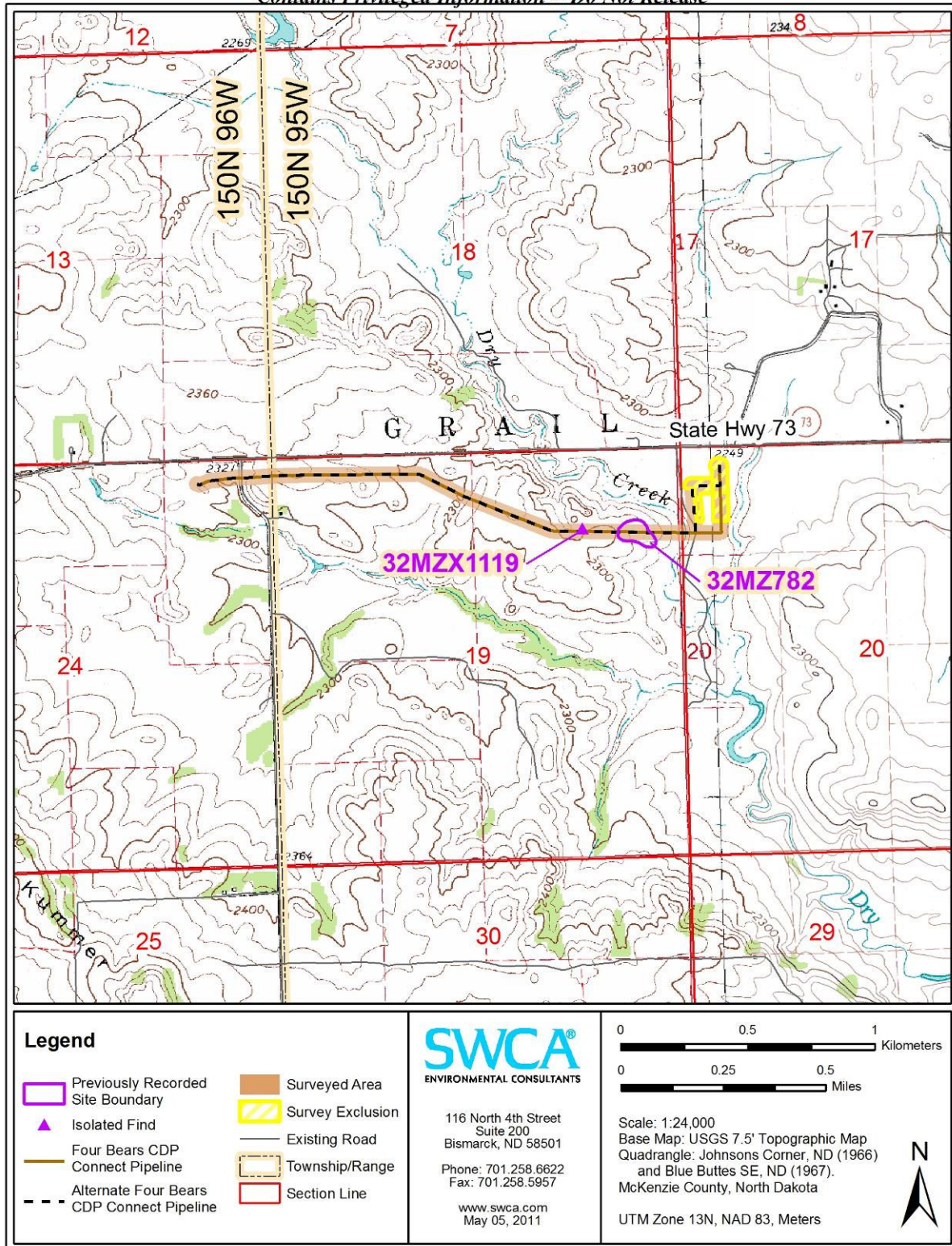
<b>Manuscript Number</b>	<b>Location</b>	<b>Title</b>	<b>Authors</b>	<b>Year</b>
003469	Section 21, T150N, R96W	Cultural Resource Survey 11-21 Berwald Federal Section 21, T150N, R95W, McKenzie County, ND	J. Borchert	1984
004319	Sections 18, 19, 29, 30, T150N, R95W	Cultural Resource Investigations on the North Dakota Segment of the Exxon Company, USA Bairoil – Dakota CO2 Pipeline Project, Golden Valley, Billings, Stark, Dunn, McKenzie, & Williams Co., Western North Dakota Vols 1 & 2	M. Metcalf and K. Schweigert	1987
006051	Sections 13, 24, T150N, R96W	McKenzie Electric Cooperative, Inc. 1993-1994 Construction Routes in Dunn and McKenzie Counties, Class III Cultural Resource Inventory UW#1606	J. Borchert	1993
007144	Sections 13, 24, 25, T150N, R96W	Dakota Gasification Company CO2 Pipeline Selected Segments in Mercer, Dunn, McKenzie, Williams, and Divide Counties, ND: A Class III Cultural Resources Inventory and Appendix B: USGS Topographic Coverage of the Pipeline	B. Olson	1998
010019	Section 25, T150N, R96W	Burlington’s Mathiestad 41-35H: A Class III Cultural Resource Survey in McKenzie Co., ND	D. Hiemstra	2007
011710	Sections 13, 23, 24, T150N, R96W; Sections 17, 19, 20, 21, 28, T150N, R95W	2010 McKenzie Rural Water District Phase II Waterline: Class II and III Cultural Resource Inventory and Test Excavations, McKenzie Co., ND	J. Morrison	2010
011790	Sections 18, 19, 29, 30, T150N, R95W	SORTI and Dunn Pipeline Projects: A Class III Cultural Resource Inventory, Williams and McKenzie Co., ND	J. Harty, M. Shropshire, and D. Klinner	2010
011791	Sections 13, 24, 25, T150N, R96W	Bridger Pipeline Project: Class I and III Cultural Resource Investigations in Western North Dakota, Dunn, Billings, McKenzie Counties	E. France and D. Reinhart	2010
012014	Section 13, T150N, R96W	Addendum 2 to Bridger Pipeline: Class I and III Cultural Resource Investigations in Western North Dakota, Dunn & McKenzie Counties: Four Reroutes	A. Kulevsky	2010

**APPENDIX B  
(Detached)  
North Dakota Site Forms**



**APPENDIX C**  
**Resource Location Map**

*Contains Privileged Information -- Do Not Release*



Resource location map for at 1:24,000 scale.