

**United States Department of the Interior
National Park Service**

National Register of Historic Places Multiple Property Documentation Form

This form is used for documenting property groups relating to one or several historic contexts. See instructions in National Register Bulletin *How to Complete the Multiple Property Documentation Form* (formerly 16B). Complete each item by entering the requested information.

New Submission Amended Submission

A. Name of Multiple Property Listing

Bison Kill Sites in South Dakota, 9000 B.C. – A.D. 1875

B. Associated Historic Contexts

(Name each associated historic context, identifying theme, geographical area, and chronological period for each.)

South Dakota State Plan for Archaeological Resources 2018 Update, Statewide, 9,500 B.C. – A.D. 1950

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D. Certification

As the designated authority under the National Historic Preservation Act of 1966, as amended, I hereby certify that this documentation form meets the National Register documentation standards and sets forth requirements for the listing of related properties consistent with the National Register criteria. This submission meets the procedural and professional requirements set forth in 36 CFR 60 and the Secretary of the Interior’s Standards and Guidelines for Archeology and Historic Preservation.

Signature of certifying official	Title	Date
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State or Federal Agency or Tribal government

I hereby certify that this multiple property documentation form has been approved by the National Register as a basis for evaluating related properties for listing in the National Register.

Signature of the Keeper	Date of Action
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Create a Table of Contents and list the page numbers for each of these sections in the space below.

Provide narrative explanations for each of these sections on continuation sheets. In the header of each section, cite the letter, page number, and name of the multiple property listing. Refer to *How to Complete the Multiple Property Documentation Form* for additional guidance.

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Paperwork Reduction Act Statement: This information is being collected for applications to the National Register of Historic Places to nominate properties for listing or determine eligibility for listing, to list properties, and to amend existing listings. Response to this request is required to obtain a benefit in accordance with the National Historic Preservation Act, as amended (16 U.S.C.460 et seq.).

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E. Statement of Historic Contexts

1. Introduction

Bison kills, as referred to in this document, were communal efforts to drive a group or groups of bison to a location where hunters could easily kill multiple individuals in a single event. Archaeological and historical records indicate that American Indian cultures inhabiting the Great Plains practiced such events for millennia.

1.1 Archaeology in South Dakota

South Dakota has been a topic of archaeological study since before statehood. During this period of exploration and initial description, from roughly 1874 to the early 1900s, settlers and explorers recorded some of the archaeological resources of the state. In the eastern half of the state, mounds were recorded and excavated during the 1880s, contributing to the ongoing debates over the origins of the 'Moundbuilders.' From 1881 to 1895, T.H. Lewis recorded mounds in the eastern half of the state as part of an ambitious project to record all ruins throughout the Minnesota-Dakota-Iowa region. Lewis also recorded several boulder effigies during his time in South Dakota.

From approximately 1910 to 1946, archaeological research in South Dakota aimed to compile data on prehistoric life and to collect specimens for museums. Naturalist William H. Over established a museum at the University of South Dakota in 1913 to showcase the state's natural and archaeological history. Over himself was responsible for excavations of village sites and mound sites in the southeastern portion of the state as well as at Ludlow Cave in the northwestern corner of the state.

The next stage of archaeological study in South Dakota, during the mid-twentieth century, was salvage archaeology associated with the construction of hydroelectric dams along the Missouri River. The Smithsonian Institution and the National Park Service cooperated to administer the River Basin Surveys program in South Dakota in advance of the construction of dams along the Missouri and other rivers and the subsequent inundation of hundreds of sites. The River Basin Surveys program tended to prioritize village sites along the Missouri and included both recordation and excavation. The state legislature also provided funds from 1947 to 1959 for the excavation of sites endangered by dam construction. However, the funding was limited, and only 12 sites were excavated as a result of the state-funded commission.

The following two stages of archaeology within the state overlap in time and are the result of and the reaction to historic preservation legislation. Cultural Resource Management (CRM) archaeology took hold in the state in 1971 as a result of the National Historic Preservation Act of 1966 and subsequent legislation, and it continues to the present. Shortly thereafter, beginning around 1978 and also continuing to the present, problem-orientated approaches to archaeology in South Dakota arose. Problem-oriented archaeology took the data CRM archaeology projects had created and formulated research questions. Such problem-oriented archaeology includes intensive excavation of potentially important sites, thematic studies aimed at discovering particular kinds of sites, reinvestigation of previously-studied sites, synthesis of previously-collected data, and multidisciplinary research initiatives. During this time, American Indians greatly influenced archaeology in the state, and archaeologists, in

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turn, changed their perceptions and treatment of human remains (Sundstrom 2018: 25-34).

From past and current archaeological investigations, archaeologists have developed a broad cultural history of the state. The first people entered what would become South Dakota around 11,500 years ago, during the Paleoindian period. Paleoindian peoples were largely nomadic big game hunters, hunting mammoth, extinct bison, and other ice age megafauna. During the Archaic Period, from 8,000 to 1,500 years ago, subsistence shifted to a more generalized foraging strategy. In addition to hunting large and small game, Archaic cultures fished and collected plants and mollusks. The construction of pit houses during the Archaic period suggests that groups seasonally, or at least occasionally, returned to resource areas.

During the end of the Archaic Period, the cultures inhabiting different parts of the state took on different characteristics and different historical, cultural, and social trajectories. While the Late Archaic prospered in the western half of the state, the Woodland Tradition flourished in the eastern half from roughly 2,500 to 1,100 years ago. Whereas Late Archaic cultures continued the nomadic Archaic Period hunting and foraging subsistence strategy, those of the Woodland Tradition practiced a more sedentary lifestyle. Woodland cultures within South Dakota are associated with the construction of mounds, the manufacture of ceramics, and the development of incipient horticulture. The Late Prehistoric Period followed the Archaic Period in the western part of South Dakota and lasted from roughly 1,500 years ago to 200 years ago. Late Prehistoric cultures followed a similar seasonal round of bison hunting and plant-food gathering as had Archaic cultures. However, this time period saw the use of the bow and arrow as opposed to the atlatl and dart. In the eastern half of the state and along the Missouri River, the Woodland Period gave rise to the Plains Village Tradition. The Plains Village Tradition lasted from A.D. 900 to A.D. 1850 and is characterized by large earthlodge villages and well-established agricultural fields.

The introduction of Euro-American goods and Euro-American people had huge repercussions for American Indian cultures throughout the state. The Protohistoric Period is marked by the introduction of non-native trade goods into the area in advance of white settlement. American Indian tribes acquired horses and firearms via indirect trade in the eighteenth century. By the middle of the eighteenth century, Euro-Americans began exploring what would become South Dakota, largely following the rivers. By the middle of the nineteenth century, white settlement had begun in the eastern part of the state, marking the Historic Period. Apart from the 1875-1876 gold rush in the Black Hills and the subsequent flood of settlers into that area, white settlement largely proceeded from east to west as the Dakota, Nakota, and Lakota were increasingly confined to reservations.

1.2 Introduction to Bison Kill Sites

Bison kill sites are sites created for and/or by American Indians' communal slaughter of bison in the past. Bison kill sites throughout the Great Plains have long been a topic of archaeological study. In studying the Southern Great Plains, Wendorf and Hester (1962:164-166) write "Kill sites are characterized by animal skeletons, frequently in high numbers, with the associated projectile point utilized to kill them, plus a limited number of chipped and flaked butchering tools." More recent research in other areas of the Great Plains emphasizes the importance of topography in addition to the presence of bison bone and projectile points in identifying bison kill sites. Wheat (1978:84-86) notes

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that kill sites can be identified by “a natural or contrived trap” consisting of a cliff, box canyon, river and river ice, sand dune complex, bog or arroyo with which a bone bed and butchering tools or projectiles are associated. Kuehn (1997:322) goes as far to say that bison kill sites can be identified based on the presence of significant numbers of bison bone downslope from an escarpment, the topographic setting, and the presence of a high frequency of adjacent upland campsites even if erosion has destroyed the actual kill site.

For distinct subregions or topographic features of the Great Plains, the identifying features of bison kills can be very specific. Referring specifically to bison kills in the Powder River Basin of Wyoming and Montana, Frison (1968) notes that bison kill sites in this region are identified by a layer of bison bones with artifacts such as projectile points and other butchering tools in association in the profile of an arroyo covered by a layer of sterile soil.

For the purposes of this document, most bison kill sites in South Dakota can be identified by a suite of characteristics. Bison kill sites usually contain a significant number of bison (*Bison spp.*) bones, have artifacts or archaeological features present, and exhibit evidence of minimal processing of the bison remains. Although isolated drive lines may not contain all three aforementioned characteristics, as shall be discussed later, all other types of bison kill sites within the state will usually exhibit all three characteristics.

As the aim of communal bison kills was to slaughter numerous individual bison in a single event, a significant number of bison bones are usually present at bison kill sites. The bison bones will likely represent multiple individuals. However, as the zooarchaeological calculation of the minimum number of individuals (MNI) is an estimate subject to the problem of aggregation and to the methodological preferences of the analyst, this quantitative measure could estimate a minimum of only one bison at a kill site. Bison bones at kill sites often are preserved archaeologically in beds as the slaughtered animals decayed en masse after the hunters had processed the kill. However, erosion or other site formation processes may dissipate or entirely remove the bone bed. As such, evidence may exist that there was a bone bed present at one point in time, even if the bone bed itself is no longer present in the archaeological record.

A bison kill site must contain evidence of human involvement in the death of the animals, as opposed to a bone bed present as a result of a natural catastrophic event, such as a flood, or a faunal assemblage resulting solely from human involvement in the processing and/or consumption of the animals. Evidence of human involvement in the creation of a bison bone bed can be found in artifacts and/or features associated with the bone bed or in evidence of butchery on the bison remains, such as cut marks on the bones. *In situ* projectile points, scrapers, knives, choppers, and flakes evidence the presence of humans at the site. Bamforth (2011:26) writes that projectile points are “overwhelmingly the most common class of stone artifacts recovered from large recent kills.” Projectile points were likely used in the dispatching of the animals. To remove meat from the carcasses or to dismember the carcasses at the kill site, people utilized lithic or bone knives, scrapers, and choppers. Expedient bone butchering tools created from the broken bones of the animals being butchered are common at bison kill sites on the Great Plains from the Paleoindian and the Late Prehistoric Periods (Frison et al. 1976:48). Lithic tools were likely manufactured elsewhere and brought to the bison kill site. Lithic flakes present within the bone bed are likely the result of retouching or re-sharpening lithic tools, as opposed to the manufacture of tools. Features associated with a bison bone bed also can indicate human involvement.

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Post holes may indicate the construction of a wooden corral/pound or other structure used in the trapping or driving of bison (Frison 1998:14580) or occasionally may indicate the presence of ceremonial structures associated with the kill site. Additionally, rock cairns or stone alignments may be present which define the drive line to pounds or cliffs.

Artifacts found in association with bison remains and evidence of butchery on bison remains can indicate either a kill site or a processing site. As such, bison kill sites are distinguished by minimal processing of bison remains. Because communal bison kills often resulted in more individuals killed than could be consumed, transported, and/or preserved, some individuals at the kill site were likely only minimally butchered to remove select portions or not butchered at all. Therefore, bison kill sites may contain many complete or nearly complete elements (Bamforth 1987; Frison 1998:14580; Wheat 1978:84-86).

Those skeletal elements at bison kill sites which do exhibit evidence of butchery will likely reflect dismemberment of the carcass, or primary butchery, rather than processing of the remains for individual consumption or preservation, or secondary butchery, as one would see at a processing site. Bison at a kill site may have been completely butchered/disarticulated on site, or they may have been halved, quartered, or further reduced and the portions moved to a separate area of the kill site or to a distinct processing site for secondary butchery (Frison et al. 1976:49; Kehoe 1973:148). As such, the elements in the primary bone bed or the main kill location of a bison kill site likely will not exhibit many spiral fractures for marrow extraction. Marrow extraction was likely practiced at a processing area separate from the main kill site. Some bison kill sites may retain evidence of one or multiple processing locations within the site boundary (Frison 1971:87). At Head-Smashed-In in Alberta, a contemporary processing location east of the jump dates to the time period when bison jumps were most frequently used in the area, evidencing on-site slaughter and processing (Fagan 1994:38). Arroyos, however, are prone to much geologic activity, so processing areas associated with arroyo traps are difficult to discern throughout the Great Plains and Rocky Mountains (Kornfeld et al. 2010:216-217). Sites which only contain evidence of secondary butchery and no other characteristics of a bison kill site cannot be interpreted as a kill site and, thus, are not included in this multiple property submission. Additionally, material culture may be used to differentiate a kill site from a processing site. Kill sites will usually contain lithic and/or bone artifacts used in primary butchery, such as knives and scrapers. Processing sites will contain artifacts used to further break down the bison remains, such as ground stone hammers or anvils used in breaking the long bones to extract marrow or ceramic vessels used in the cooking of meat. Although processing sites may also contain lithic and/or bone scrapers and knives, kill sites will only contain ground stone tools and ceramics if the site contains a separate processing and/or occupation area; ground stone tools and ceramics will not be associated with the bone bed of the main kill location.

It must be noted that some bison kill sites are part of larger multicomponent sites and some bison kill sites are single component sites. For single component bison kill sites, the bison kill site can be identified by the characteristics mentioned above and elaborated elsewhere in the document. For multicomponent sites, the bison kill component of the site also can be identified by the previously-mentioned characteristics; however, additional artifacts and/or features within the site boundary may be present and must be interpreted within their own appropriate historical context(s).

Sites which have been positively identified as bison kill sites may be further identified based on the type of bison kill site present. There are four property types associated with bison kill sites in South

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Dakota, 9,000 B.C. – A.D. 1875: **jumps, impoundments, general kill sites, and isolated drive lines.** These property types will be discussed in more detail (see section 5.1 Types of Bison Kills Sites in E. Statement of Historic Contexts and F. Associated Property Types).

1.3 Significance of Bison Kill Sites

Human survival depends on food, water, and shelter, hence archaeologists' concern with understanding past cultures' subsistence strategies. Bison kill sites, as archaeological sites which can date from the Paleoindian period through the historic period, have the potential to contribute important information on American Indian subsistence strategies through time. Not only can bison kill sites reveal trends in what cultures were hunting and consuming, they can reveal trends in how and why cultures were practicing communal bison kills. The latter have implications for the social organization of individual people or groups of people within bison-hunting cultures and for trade networks extending across North America in the pre-contact, contact, and post-contact eras. As Bamforth (1987:1) notes, "...the role of bison procurement in aboriginal High Plains society has become increasingly apparent to anthropologists."

The artifacts and features present at bison kill sites can evidence the long-standing ethnic heritage of American Indian peoples in the Great Plains. Other areas of significance pertaining to bison kill sites include the seasonal migration and/or settlement of past peoples in the Great Plains, the manipulation of the landscape to serve a human need, local and far-reaching trade networks, possible ritual or religious connections to bison or bison kills, the organization of individuals or groups of individuals within a culture to accomplish a communal bison kill, and many others.

1.4 Archaeology of Bison Kill Sites in South Dakota

As of 2018, there are over 30 sites recorded as bison kill sites or as multicomponent sites with a bison kill component in the Archaeological Resources Management System (ARMS) database maintained by the South Dakota State Historical Society Archaeological Research Center. Just under half of the recorded bison kill sites have a time period and cultural affiliation assigned to them. These affiliations in the ARMS database include Paleoindian, dated to Pre-5000 B.C.; Hanna, Early Archaic, and Middle Archaic, dated to 3500-1500 B.C.; Besant, Late Archaic, and Woodland, dated to 1500 B.C. – A.D. 900; and Late Prehistoric and Initial Middle Missouri, dated to A.D. 900-1700. Bison kill sites from neighboring states indicate that communal bison kills were practiced in the Great Plains until the mid- to late-nineteenth century (Kehoe 1973:175). As more bison kill sites are recorded within the state and additional analyses are performed, the cultural affiliations and/or time periods of individual sites likely will be altered and/or refined. However, it is evident from the data at hand that many American Indian cultures practiced communal bison hunting within South Dakota over an extended period of time.

In addition to representing millennia of American Indian occupation of South Dakota, recorded bison kill sites represent a regional and statewide phenomenon. Bison kill sites have been recorded from the Sandstone Buttes, Belle Fourche, Black Hills, Grand Moreau Tablelands, White River Badlands, Bad

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River Basin, Bad/Cheyenne, Upper James, Middle James, Lower James, Fort Randall, Vermillion Basin, and Upper Big Sioux archaeological regions (Figure 1).

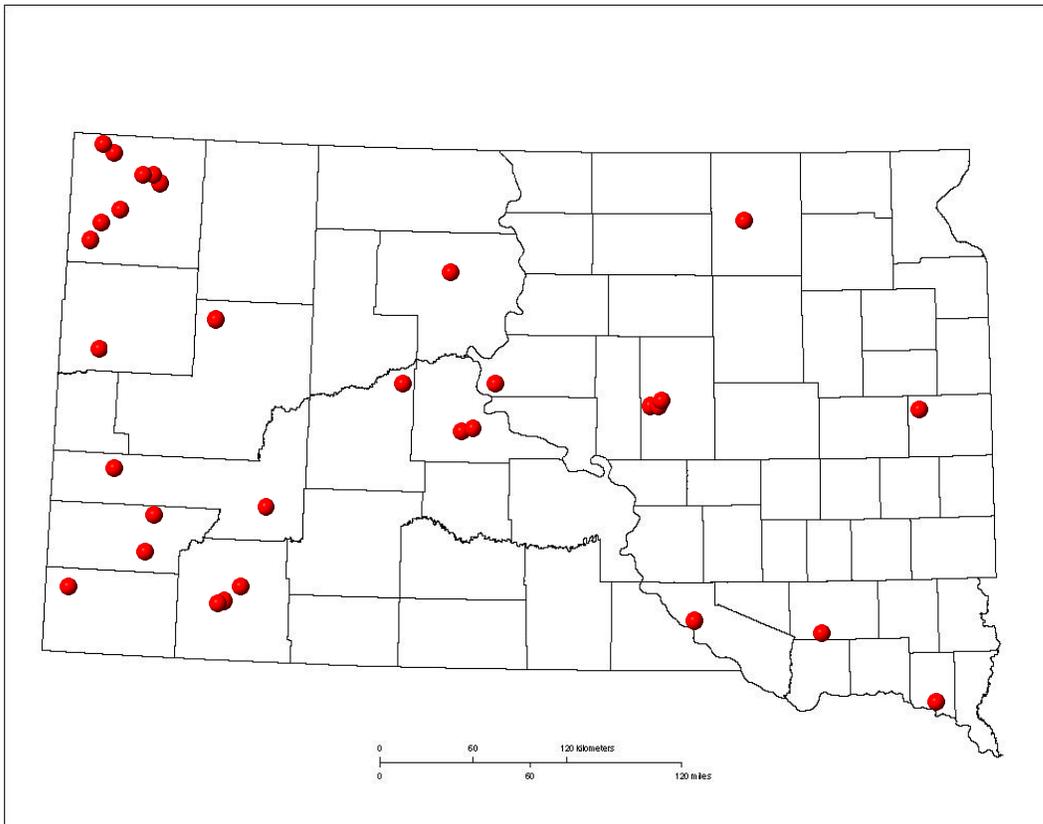


Figure 1. Distribution of bison kill sites recorded in the Archaeological Resources Management System (ARMS) database as of 2018.

While the data contained within the ARMS database clearly illustrate trends in the geographic and temporal distribution of bison kill sites within the state, the quantity and quality of the data pertaining to each individual bison kill site within the database greatly varies from site to site. At times, failure of contractors or federal agencies to share archaeological reports with the Archaeological Research Center, South Dakota’s official repository for archaeological collections and reports, results in incomplete records in the ARMS database. Additionally, some bison kill sites were recorded over twenty years ago and have never been revisited due to restricted access to the site. Lack of access to sites for evaluation or re-evaluation contributes heavily to the preponderance of bison kill sites within the state which are currently unevaluated for listing in the National Register of Historic Places. Of the 31 recorded bison kill sites in South Dakota, the ARMS database indicates that 26 are currently unevaluated, three have been determined eligible, and two have been determined not eligible. Recent survey of bison kill sites within the state (as described in further detail in Section H) has allowed for the

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evaluation of seven sites, with six being determined eligible and one being determined not eligible.

1.5 Explanation of Historic Context

Bison kill sites are a known and numerous archaeological resource within South Dakota. By drawing from multiple sources of information, a clearer understanding of how communal bison hunting was practiced across South Dakota and at individual sites can be obtained. Although archaeology is ultimately the study of the people of the past, these people did not live in a vacuum, and their actions were shaped by and helped to shape the natural environment around them. As such, the historical contexts included in this document discuss not only the cultural context of the peoples who were engaged in communal bison kills but also the environmental context in which these kills took place and the ethological context of the bison they hunted. Chronologies presented in this context use multiple abbreviations to designate time, including B.P. (Before Present) and B.C. / A.D. (Before Christ / Anno Domini). When known and when appropriate to understanding the historic context, the names of archaeological complexes or the names of individual indigenous groups are used. However, the term “American Indian” is used when discussing general trends or patterns over large expanses of time or when the individual archaeological complex or indigenous group is not known. No terminology used in this document is intended to be offensive.

2. Environmental Context

Archaeologists divide South Dakota into 24 different archaeological regions. These regions are defined by a combination of drainage basins and physiographic zones (Sundstrom 2018). Apart from the Black Hills in the western part of the state, South Dakota is largely covered in open prairie, plains, or steppe (Strong 1972:356). Widga et al. (2010) divide South Dakota into the tallgrass prairie along the eastern edge of the state, the mixed-grass prairie in the east-central portion of the state, the shortgrass prairie in the western half of the state, and the Black Hills along the west-central edge of the state. The prairies of South Dakota are predominantly covered in grasses, but the floodplains of the Missouri River and of other rivers in the eastern half of the state also produce large groves of deciduous trees.

In the western half of the state bison, mule deer, and big-horn sheep were all formerly abundant; whereas bison, pronghorn, and white-tailed deer were once numerous in the eastern half of the state (Strong 1972:356). Although pockets of wild and protected herds of each species can still be seen in South Dakota, domesticated species, such as cattle, horses, and sheep, now largely dominate the landscape.

South Dakota, and the Upper Great Plains in general, is marked by four distinct seasons. Precipitation decreases from east to west as a result of the Rocky Mountain rain shadow and closer proximity to the Gulf of Mexico moisture source (Widga et al. 2010:452), meaning that eastern South Dakota receives more annual rainfall than western South Dakota, and the vegetation found in each half of the state reflects these differences in precipitation. Agriculture is the largest industry in the state, with those on the eastern half of the state practicing farming and those on the western half predominantly practicing ranching.

The differences observed today from one end of South Dakota to the other largely can be traced

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to the differences in the geological processes which occurred in different areas of the state. The topography and soils present in eastern South Dakota today are the result of pre-glacial topography and recent glacial activity. In contrast, western South Dakota has a mature, erosional landscape formed by much more ancient geological processes (Johnson et al. 1995:314).

The Great Plains originated when rivers and streams from the mountains deposited fluvial materials in the lower elevations millennia ago. Around 25 million years ago, the mixed grass prairie which covers the central third of the North American Great Plains was probably created. The periods of climatic fluctuation correlated with the advance and retreat of the glaciers caused the intermingling of mid grasses with short, drought-resistance species, resulting in the mixed vegetation similar to what is seen today (Coupland 1958:279).

In South Dakota, the glaciers were restricted to what is now the eastern portion of the state. Portions of the Laurentide ice sheet extended into South Dakota and Iowa until 12,300 years ago during the Wisconsin glaciation (Schwalb and Dean 1998:20). The James Lobe of the Wisconsin glaciation covered much of eastern South Dakota, while the Des Moines lobe covered a small portion of the northeastern corner of the state (Valero-Garces et al. 1997:360, Figure 1; Widga et al. 2010:452). The dynamics of the fluctuating Laurentide ice sheet and its extending lobes controlled the climate of the Northern Great Plains throughout the late glacial period (Schwalb and Dean 1998). Later, the climate was controlled by the influences of glacial Lake Agassiz. When the Laurentide ice sheet melted roughly 12,000 years ago, the meltwater formed glacial Lake Agassiz. Lake Agassiz was one of the largest glacial lakes in North America and covered portions of what is now Manitoba, Ontario, Saskatchewan, North Dakota, and Minnesota. At its maximum extent between 11,600 and 9,500 years ago, Lake Agassiz clipped the extreme northeastern corner of South Dakota (Dean and Schwalb 2000:12; Strong 1972:357).

The Paleoindian period coincides with the end of the glacial period. It also marks the transition from a relatively moist, even climate to the drier, more extreme climate of the post-glacial era (Sundstrom 2018:60). Between 12,000 and 10,300 years ago, glacial Lake Agassiz switched from draining into the Mississippi River to draining into Lake Superior during the Younger Dryas. The winters became long and cold, and the summers were warm but short. The vegetation changed from tundra grasses to dense spruce forest (Schwalb and Dean 1998). Sediment cores from Pickerel Lake in Northeastern South Dakota indicate that the climate before 12,000 years ago was cool, moist, and windy. A boreal forest dominated by spruce (*Picea* spp.) surrounded the lake until about 10,670 years ago (Dean and Schwalb 2000; Schwalb and Dean 1998). Most of the state was covered in white spruce parklands in the low areas, with prairie grasses and herbs in the higher elevations (Sundstrom 2018:65). Around 11,500 years ago, Pleistocene animals such as mammoth, giant bison, camel, horse, and peccary roamed South Dakota. Pronghorn and deer, which still make their home in the state, were also present during this time (Sundstrom 2018:69).

With the retreat of the glaciers, climate change during the Paleoindian period was rapid and variable, and environments were somewhat patchy. This created an environment that supported more diverse flora and fauna than what is present in the Great Plains today (Sundstrom 2018:60). Glacial Lake Agassiz drained and had disappeared by around 8,200 years ago, marking a period of climatic warming (Schwalb and Dean 1998:25). This drier and warmer period resulted in the retreat of the spruce forest and the expansion of grasslands on the Northern plains (Valero-Garces et al. 1997:359). The

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spruce forests were replaced by deciduous forests dominated by elm and oak, and grasslands expanded into the open savannas of the early Holocene (Schwalb and Dean 1998:24; Valero-Garces et al. 1997:363). Many of the Pleistocene megafauna went extinct, but bison, deer, and pronghorn remained and thrived on the grasslands.

This changeover from wooded environments to grasslands on the Great Plains continued throughout the Holocene. Sediment cores from eastern North Dakota show a gradual decrease in moisture between 9,500 and 7,100 years ago, resulting in a long-term change to extreme aridity during the Middle Holocene or Altithermal (Valero-Garces et al. 1997:367-368). The open oak savanna was well-established in eastern South Dakota by 8,000 B.P., and from 8,000 to 4,000 years ago, a bluestem prairie dominated by grasses and a few stands of oak, elm, and pine was present in the area (Schwalb and Dean 1998).

The Middle Holocene, or Altithermal as it is sometimes referred, was a considerably drier period with more frequent and more severe droughts than what is seen currently in the Great Plains (Widga et al. 2010:452). By this time, grasslands replaced the remaining spruce forests of the Great Plains east of the Missouri River (Valero-Garces et al. 1997). Given the overall warm and dry climate of the Middle Holocene, it is unsurprising that warm season C4 grasses predominated during this period (Meltzer 1999:406). Peak aridity in South Dakota during the Middle Holocene was between 8,000 and 5,000 years ago, with the most severe droughts occurring between 6,000 and 5,000 years ago. Rainfall was infrequent, but when it did occur, it was extremely heavy, making conditions highly variable for any given area from year to year (Michlovic and Running 2005:7-8; Sundstrom 2018:91). This variability occurred throughout the Great Plains during the Middle Holocene. The southern Great Plains likely experienced the most warming and drying; whereas, the rivers of the Central and Northern Great Plains maintained water along all or most of their courses (Meltzer 1999).

The Middle Holocene coincides with the early Archaic period in the cultural history of South Dakota. The generalized foraging patterns of early Archaic peoples, as shall be discussed below, may be the result of a relative scarcity of big game during this time period (Lass 1981:2). The number of bison on the Great Plains decreased during the Middle Holocene, perhaps as a result of the decrease in surface water and forage (Meltzer 1999:406). The extreme aridity of the Plains may have caused plant communities to shift to higher elevations. This, in turn, may have caused the remaining animal herds to seek refuge in the higher elevations as well. Kornfeld et al. (2010:254) and Frison (1998:14578) hypothesize that the Black Hills of South Dakota and Wyoming may have served as a sort of oasis for bison herds between 7,500 and 5,000 years ago. Elsewhere in the state, the number of bison may have declined as a result of the lack of suitable forage and water.

When the Altithermal ended around 5,000 years ago, the climate and the bison population both rebounded (Meltzer 1999:411-412). The climate, and the resulting vegetation, were very similar to what the Great Plains experience today. Modern vegetation and seasonal variability were established throughout the Great Plains roughly 4,000 years ago. During normal years, precipitation was spread relatively evenly throughout the year and cool season C3 plants bloomed during the spring and fall, while warm season C4 plants bloomed during the summer (Sundstrom 2018:102; Widga et al. 2010:452).

During the last 3,000 years, the climate of South Dakota has been marked by cycles of variability. A cool and moist climate dominated from roughly 1000 B.C. to A.D. 250, followed by a cool and dry

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climate until A.D. 750. Then a warm and moist period occurred from A.D. 750 to 1150, followed by another cool and dry period until A.D. 1550. Despite the slight fluctuations in temperature and moisture, the types of vegetation in the region remained relatively constant, with prairie covering the uplands and oak and ash deciduous forests thriving around lakes and streams (Bozell 1995:154; Schwalb and Dean 1998). Similarly, bison numbers around the Missouri River do not appear to have been greatly affected by the slight fluctuations in climate during this time period (Bozell 1995:157).

From A.D. 1550 until the contact period, climatic conditions on the Central Plains were moist and cool, a period known as the Little Ice Age. During this time period, bison herds on the Plains flourished, and in the northwestern Great Plains, especially, American Indian hunters intensified their use of bison jumps as a means of communal bison hunting (Barsh and Marlor 2003:574; Bozell 1995:154).

3. Ethological Context

In planning and implementing communal bison kills, hunters had to have vast knowledge and understanding of their prey. Hunters were physically incapable of literally following herds of migrating bison throughout the year. As such, they had to know, or least have an educated guess based upon years of experience and observation, where the herds would be at different times of the year. Authors refer to this as the “predictability” of the herds (e.g., Bamforth 1987; Barsh and Marlor 2003). Assessing the predictability of bison herds from millennia past can be difficult, however, not only because our modern environmental conditions have changed greatly from what they were in the past but also because the bison themselves have changed.

3.1 Bison in North America

Bison first entered North America from Siberia between 300,000 and 130,000 years ago (Shapiro et al. 2004). Shortly thereafter, some of these steppe bison (*Bison piscus*) moved southward into the middle of North America. However, the steppe bison which remained in Beringia and those which traveled to North America followed very different evolutionary trajectories, as the Laurentide and Cordilleran ice sheets formed a barrier to gene flow between bison populations to the north in Beringia and those to the south in the midcontinent (Wilson et al. 2008:848). The steppe bison that stayed in Beringia expanded eastward and have been dated to as recently as 11,800 B.P. at the northern portal of the Ice Free Corridor (Zazula et al. 2009:2741), while the steppe bison that inhabited the middle of North America eventually gave rise to modern bison, including those which still inhabit the parklands and pastures of the Great Plains (Zazula et al. 2009).

The steppe bison (*Bison piscus*) inhabiting the North American midcontinent likely evolved into the long-horned *Bison latifrons* around 200,000 years ago (Schultz and Hillerud 1977). *Bison latifrons* were the largest of any bison species to roam North America, standing up to eight feet tall and with horns spreading up to seven feet from tip to tip. Most researchers agree that *Bison latifrons* gave rise to *Bison antiquus*, who then gave rise to modern *Bison bison* (e.g., Meltzer 1999; Schultz and Hillerud 1977). Schultz and Hillerud (1977:112), however, write that after *Bison latifrons* was established in North America, multiple contemporary ‘paleospecies’ of bison likely inhabited North America, with

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each species occupying different ecological niches and giving rise to several different lineages of bison throughout the Late Quaternary. A *Bison latifrons* cranium with horncores was recovered from a quarry in Haakon County, South Dakota, evidencing their presence within the state during the Middle Pleistocene (Schultz and Hillerud 1977:111)

Given the multiple species of bison which roamed North America during the Late Quaternary, the exact classification of and evolutionary relationships amongst Pleistocene bison is debated. Frison (1998) and Meagher (1986) see *Bison antiquus* and *Bison occidentalis* as separate species, while Wilson (1987:12) argues that the two are different subspecies of *Bison bison*. Some of these differences in taxonomic classification arise out of chronology and location, with bison predating 10,000 B.P. being classified as *B. antiquus* and those postdating 10,000 B.P. being classified as *B. occidentalis* (Wilson et al. 2008:830). Genetic evidence suggests that bison populations in North America experienced a population maximum around 45,000 to 30,000 B.P., followed by a population minimum and severe genetic bottleneck around 10,000 B.P. This bottleneck may have been caused by hunting pressures (Wilson et al. 2008:853).

Throughout the Holocene, bison gradually dwarfed from the over-seven-foot-tall *Bison antiquus* to the over-five-foot-tall *Bison bison* still present today (Wilson 1978:22). Additionally, the evolution of bison from ancient to modern forms underwent alternating periods of stasis, rapid change, and stasis during this time (Johnson and Lewis 2016:336). However, it appears that 5,000 B.P. can be taken as the point at which early Holocene *Bison bison antiquus/Bison bison occidentalis* gave rise to late Holocene *Bison bison* (Meltzer 1999:406; Wilson 1978:19). At this point, clearly identifiable *Bison bison* appear in the archaeological records of the Great Plains and the Rocky Mountains (Kornfeld et al. 2010:155). Following another population bottleneck around only 200 years ago, two subspecies of bison survive in North America today: *Bison bison bison*, the plains bison, and *Bison bison athabascaae*, the wood bison (Shapiro et al. 2004:1561).

3.2 Bison Behavior

The study of modern animal behavior as a proxy for the behavior of extinct forms of that animal or even as a proxy for the behavior of that animal in the past is not without its challenges. Natural environments, outside pressures, and the animal itself all influence how that animal will behave in certain situations. All three of these have changed considerably since humans first began hunting bison on the Great Plains over 10,000 years ago. However, knowing the prey animal's behavior and herd structure can be extremely helpful in the interpretation of archaeological kill sites, providing clues as to how the animals may have been tracked, hunted, and ultimately dispatched. Moreover, information on the animal's behavior and herd structure can inform our interpretation of the faunal remains from kill sites, allowing for the extrapolation of the season of the kill from the age and sex distribution of the remains in the faunal assemblage.

Given the pressures of development and the small numbers of bison left in North America, bison behavior can no longer be studied in the natural habitat of the bison: the open plains. And while historical documents may shed light on past bison behavior, it must be remembered that increased human exploitation of bison as a result of the nineteenth-century hide industry may have altered bison adaptations from what they were in prehistoric times (Bamforth 1987). Despite these caveats, studying

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modern bison biology and behavior and even the behavior of modern ungulates still able to live in open plains environments can give archaeologists hints at the behavior of bison in the past. The bison were just as important a player, if not the most important player, in the planning and implementation of communal bison kills in the past. As such, bison kill sites need to be understood from an ethological as well as from an environmental and cultural standpoint.

3.2.1 General Information

Modern bison generally live in one of three habitats: flat, open prairies; rolling hills and draws, such as woody ravines, valleys, and creek bottoms; or tabletops and breaks, such as steeply eroded sod tables, canyons, and washes (Graves 2008:541). Additionally, their physical attributes make them well-suited to live in the extreme temperatures that can plague the Great Plains. Bison's deep, dense hair allow them to cope with intense cold. Males, especially, are known for their dense head hair, beards, and pantaloons. These features are particularly pronounced during the rut to make them more attractive to potential mates. Even bison calves have an adaptive mechanism which reduces their metabolism in the extreme cold to conserve energy (Plumb and Dodd 1993:639). Although few studies have focused specifically on the heat tolerance of bison, the historical presence of modern *Bison bison* in Mexico and Texas suggests that heat is not much of a deterrent to bison occupying an area with adequate forage and water (Meagher 1986:4).

Bison are diurnal, meaning they are most active during the day (Arthun and Holechek 1982:123). They utilize these daylight hours to perform a variety of behaviors. Compared to cattle, modern bison spend less time grazing and invest a greater amount of time in non-feeding activities, particularly during rut. Play, aggression, defense, and grooming behavior all consume a considerable amount of time. The exact amount of time and with and towards whom these behaviors are directed are all heavily dependent on the sex and dominance status of the individual (Plumb and Dodd 1993:636).

Modern bison can live for up to 30 or 40 years, especially those in captivity. However, most bison have a lifespan of 15 to 20 years (Arthun and Holechek 1982:123; Meagher 1986:5). Given the vagaries that can accompany skeletal aging techniques, it is difficult to know if prehistoric bison populations had a similar life expectancy.

3.2.2 Herd Structure

Modern bison are gregarious animals and tend to congregate with members of their own species. Extinct species of bison and prehistoric herds of *Bison bison* were able to be stampeded in large numbers into artificial and natural traps during communal bison kills, suggesting that prehistoric bison lived in large herds similar to those seen in modern bison (Kornfeld et al. 2010:160). The exact size of modern bison herds depends on the forage capacity and availability provided by the local environment. For example, bison in predominantly grassland ecosystems tend to form larger, more stable herds than those bison which inhabit forest-edge or aspen park ecosystems (Hanson 1984). In a similar vein, Bamforth (1987:6) warns, "...no single pattern of migration and aggregation characterized all bison in all parts of their range." Thus, the environmental context remains integral to understanding bison kill sites.

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In general, bison form two different types of herds: mixed (or cow) groups and bachelor bull groups. Mixed groups consist of cows of all ages, calves, bulls up to two and three years old, and a very small number of elderly bulls. Mixed herds are commonly larger than bachelor bull herds and are more cohesive. In the mixed herds, the dominance hierarchy is relatively stable, with the age and weight of an individual cow strongly correlated with her dominance ranking in the herd (Hanson 1984; Meagher 1986; Roden et al. 2005:175).

Mature bulls only aggregate with the mixed herds during the rutting season. All other times of the year, mature bulls live in bachelor bull herds of two to thirty individuals (Meagher 1986:6; Roden et al. 2005). In the bachelor herds during the non-rut season, dominance hierarchies are linear, with the older and heavier individuals at the top of the hierarchy (Roden et al. 2005). However, the oldest bulls, typically those over eleven years of age, tend to live in solitude and rarely engage in social or sexual interactions with others (Roden et al. 2005:175). Compared with the mixed herds, bachelor bull herds tend to be more dispersed over the landscape and travel greater distances within their range when compared to the more sedentary mixed herds (Hanson 1984).

During the summer rutting season, bulls join the mixed herds, creating herds that can reach up to 500 animals. This maximum herd size is naturally limited by the number of bison in a given area and the availability of resources. Graves (2008:541) notes that the smallest of any bison herds are seen during the winter months, possibly as a means to conserve forage. The bison herds at Wind Cave National Park in western South Dakota average 61.3 individuals during the summer rut, compared to 34.9 individuals during all other seasons (Hanson 1984:96). Historical documents, however, suggest that summer herds may have numbered in the hundreds of thousands (Graves 2008:543). Because of the interaction of numerous unfamiliar bulls with each other during the rutting season, the dominance hierarchies of mixed herds during this time become very unstable (Roden et al. 2005:174). To reduce competition with other males, individual bulls and females will separate briefly from the larger mixed herd, forming 'tending bonds' of short duration (Wilson 1978:9). However, once the rutting season ends, the bulls return to their bachelor herds, and dominance hierarchies of both the bachelor and mixed herds tend to return to stasis.

3.2.3 Movement

Bison move across the landscape for a variety of reasons such as the coalescence of mixed and bachelor herds during the rut, the need to obtain foodstuffs, or to escape pressures put on by outside forces, such as those exerted on a herd during a bison drive. Despite their size, bison are remarkably quick and agile. Bison gaits include walking, trotting, galloping, and bounding, and they can attain speeds of over 35 miles per hour in short spurts (Meagher 1986:6). Moreover, bison are strong swimmers and spend a fair amount of time in bogs and swamps. Unless crippled, aged, or sick, bison are undeterred by water crossings and can get out of mires very easily (Frison 1998:14579; Meagher 1986:6).

When travelling as a herd, bison usually move in a linear fashion, although this can be influenced by the terrain and habitat conditions. An adult cow usually leads the herd, though this is not necessarily the same adult cow on all occasions (Meagher 1986:6).

The timing, frequency, and length of herd movements are closely correlated with the quality of

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forage in the herd's home range. This forage quality is in turn influenced by topography, hydrology, fire history, and the location of prairie dog towns, as prairie dog towns promote shortgrass growth (Barsh and Marlor 2003:579). Bison that live in areas of poor forage likely live in relatively small herds which move faster, further, and more frequently within a larger home range than do those who live in areas of adequate forage (Bozell 1995:154). In the past, too, bison movement and grazing preferences were strongly influenced by the availability of local resources. Studies of Middle Holocene bison suggest that bison lived on the northern Great Plains throughout the entire year and only moved small distances in response to ecological pressures. However, the Middle Holocene bison which lived further north into Canada employed regular, long-distance migrations to obtain the more dispersed forage (Widga et al. 2010:461-462).

Bison's need to move across the landscape, even if only short distances, in response to seasonal foraging requirements means that their movements can be predicted to a certain degree. "Predictability" refers to the regularity with which bison herds returned to the same points on the landscape at the same time of the year. As Bamforth (1987:2) writes, "Animal distributions can be 'predictable' in a sense which allows hunters to exploit their prey with great success without those distributions being precisely the same from year to year. Although occasional starvation among the Plains tribes leaves no doubt that bison movements were 'unpredictable' to a degree, there is good reason to expect that the bison had reasonably repetitive responses to variation in local forage and weather conditions." Hanson (1984:102) expands upon this, noting that nomadism, meat preservation and storage, wide-ranging scouting parties, elaborate buffalo calling rituals, and other customs can all be seen as evidence that even experienced hunters had uncertainties regarding the nature of bison movement and availability. Barsh and Marlor (2003:579) similarly note that bison herds follow long-established trails, but the timing and direction of their movements are not fixed. Additionally, as bison herds shrink and swell throughout the year due to rut and calving season, the exact size and membership of the herds is regularly in flux which may, in turn, lead to some 'unpredictable' movements.

During communal bison hunts, the herds were routinely driven rather than just followed. In general, bachelor bull herds are difficult to drive, partly due to the more widely-dispersed nature of their constituents (Wilson 1978:9). In mixed herds, cows with calves up to two weeks old are disagreeable, unpredictable, and difficult to drive (Frison 1970a:5). As their calves get older, the cows become easier to handle unless they are separated from their calves. During the rut season, the behavior of cows and bulls can be unpredictable, and both can be difficult to drive without the assistance of horses. Therefore, Frison (1971:87) suggests that the easiest bison to drive are mixed herds once the rut is over and before calving begins.

When herded, bison avoid obstacles at all costs. Bison, like other wild animals, will not push through a solid obstacle unless absolutely necessary. If they encounter a fence, they will not crowd the fence until they are forced into it by other animals and will actively push back against others to avoid crowding that fence (Frison 1968:35; Kornfeld et al. 2010:267-268). However, if bison see a gap or a hole in any kind of barrier and they are able to get their head through that gap, they will try to force their way through it (Kornfeld et al. 2010:147). These behaviors of modern bison have clear implications for the practices that may have been used hundreds or thousands of years ago to drive bison to the kill site and, especially in the case of an impoundment, to secure the bison within that site until they could be dispatched.

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Apart from active driving and hunting, humans also affected bison movement and herd size by their settlement patterns. Human settlement often happens along water sources. As semi-permanent or permanent settlements increase, bison herds are no longer able to access these water sources. As a result, bison home ranges are constricted and altered, often causing herd sizes to increase as multiple herds coalesce into one (Bamforth 1987:5). These large herds may then have to alter their usual migratory routes to access different locations of water and its associated forage.

3.2.4 Diet

Bison are ruminants and are very efficient at digesting the roughage provided by the prairie. Bison can utilize the high fiber forages of the Great Plains more efficiently than can domestic cattle (Arthun and Holechek 1982:123). As grazers, bison living on the Great Plains consume primarily grasses and sedges. Browse, or woody vegetation, contributes less than 10% of the overall diet of modern Plains bison. Each adult bison consumes an average of 7.4 kg of forage per day (Meagher 1986:5; Plumb and Dodd 1993:634). Isotopic studies of Middle Holocene bison teeth from the eastern Great Plains show that bison diets during this time period were predominated by C4 grasses, indicating a diet that closely resembles the makeup of the historic tallgrass prairie (Widga et al. 2010).

Although bison consume primarily grasses, they do not consume the same type of grasses throughout the entire year. Bison favor grasses which are in the greatest supply during most of the year; grasses which are usually rare are consumed when they are of high nutritional quality. Bison at Wind Cave National Park subsist primarily on the more nutritious cool season grasses such as western wheatgrass during much of the year. However, during the summer when the herds congregate near prairie dog towns, the bison increase their consumption of warm season grasses like blue grama (Hanson 1984:102). Similarly, Plumb and Dodd (1993:634) found that bison on pasture in north-central South Dakota consumed warm season C4 grasses in the spring and early summer and cool season C3 grasses in the early fall.

Bison will actively seek out forage with a higher nutritional content. During the early stages of growth, plants have the highest nutritional content. Bison and other ungulates will therefore seek out the plants in the locations where they are actively growing. Grasses begin growing in the early spring, and animals, desperate for the nutritious fodder, have been known to run themselves to death attempting to find it, especially after hard winters (Kornfeld et al. 2010:40). During the growing season, grasslands can supply an abundance of highly nutritious forage in a small area, resulting in high densities of animals. The combining of herds during the rutting season coincides with the period of greatest forage production, allowing for those high densities of animals to thrive. Similarly, when forage is of poor quality during the dry season, animals return to their original mixed or bachelor herds and spread out on the landscape (Bamforth 1987).

The seasons and resource availability not only influence herd structure and movement, but they also greatly affect individual bison. In general, bison are in poor condition in the early spring after winter. When green grasses begin to appear at the end of April and beginning of May, their condition begins to improve (Frison 1970a:5). When bison cows drop their calves in late spring, they prefer to graze in open areas that allow for better visibility of predators. In this way, cows will sacrifice nutritious forage to better protect their offspring, meaning that their poor condition from the rigors of gestation and

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parturition are compounded by the lack of highly nutritious forage (Graves 2008; Niven et al. 2004:1790). In male bison, seeking out the nutritious forage is necessary in the early spring to ready them for the rutting season ahead. Rut and breeding can cause significant losses of body mass in mature male bison. Therefore, male bison spend the late spring and early summer building up fat reserves. It is at this point that they are in their best overall condition of the year (Graves 2008; Roden et al. 2005:175). However, hormones during the rutting season may render the fatty meat of males undesirable (Carlson and Bement 2013:94)

Within their home range, bison will move about to those areas with actively growing and nutritious forage. Therefore, home ranges that contain both cool and warm season grasses and sedges are ideal, as they can offer a nearly continuous supply of nutritious forage throughout a typical growing season (Hanson 1984:105). However, climate fluctuations from year to year can affect the locations and densities of nutritious forage. Protein in forage, which affects not only forage production but also its palatability, is directly correlated with moisture (Bamforth 1987; Bozell 1995). In years of insufficient precipitation, herds may have to expand their home ranges to seek out foodstuffs.

Like all animals, bison require water for survival. Bison cannot get enough water from the food they eat, and most will ingest water or snow daily (Bamforth 1987; Meagher 1986:5). Each herd's home range must include a water source. However, bison rarely stay at the water sources, eating and depleting all of the foodstuffs; rather, they commute between feeding and watering areas on a regular basis (Bamforth 1987:3).

Bison are heavy grazers, which can have both short-term and long-term effects on the ecosystem. Short-term, heavy grazing from bison promotes the growth of forbs and shrubs, which are the primary foodstuffs of pronghorn. This system promotes a natural rotational grazing in which each species' grazing habits promotes the growth of the other's preferred forage, and bison return to the same or nearby areas year after year. However, if the grasses are destroyed, either by overgrazing or by other factors, bison move to a new grazing area out of necessity and will not return to the original grazing area for several years, thereby allowing the range to recover (Arthun and Holechek 1982:125).

3.2.5 Reproduction

Proper nutrition allows a bison to not only thrive as an individual but, perhaps more importantly, to reproduce as well. Most bison reach sexual maturity between two and four years of age, and cows will usually drop their first calves as either two- or three-year-olds (Arthun and Holechek 1982:123; Meagher 1986:4). As mentioned earlier, rut, or breeding season, is when the bulls enter the mixed herds, which can be anywhere from late June through September. Usually the bison rut lasts for about a month, with a peak two-week span typically occurring around late July or early August (Frison 1971:87; Kornfeld et al. 2010:41, 147; Meagher 1986:4). After an approximately 9.5-month gestation, calves are born the following spring.

Depending on the exact timing of the rut, calves can be born anywhere from mid-April to the end of June. In the Northwestern plains, bison calves are usually born beginning in early May (Frison 1970b:30). If calves are born earlier, they can survive snowy conditions provided the temperature does not stay at an extremely low temperature for an extended period of time (Kornfeld et al. 2010:40). The calves usually weigh between 25 and 40 pounds at birth and are usually single births. Twin bison births

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have been documented, but they are very rare (Arthun and Holecheck 1982:123; Meagher 1985:5). Within their first week, bison calves may begin to graze and to drink water. Calves orphaned at seven to eight weeks of age have survived, but most are nursed for at least seven to eight months and are completely weaned by the end of their first year (Meagher 1986:5).

3.2.6 Predation

Bison have relatively poor vision, but they have keen senses of hearing and smell. At a distance, bison can detect movement but are unable to detect much detail. At a distance of hundreds of meters, however, bison are able to detect individual smells (Arthun and Holechek 1982:123; Barsh and Marlor 2003:586). Their strong sense of smell permits bison to readily detect predators, and their speed and agility permit them to evade said predators.

In current bison populations, wolves are the predominant predator. During the Late Pleistocene, American lions were the primary predators of bison, but the diverse diet of gray wolves at this time also included bison. When many Late Pleistocene carnivores, including the American lion, went extinct, the gray wolf emerged as the major predator of bison (Johnson and Lewis 2016:332). This predator-prey relationship between wolves and bison has lasted until today, although grizzly bears and mountain lions also will prey occasionally on bison. When wolves do prey on bison, they usually single out young calves in the spring and lone, senile adults in the late winter (Arthun and Holechek 1982:123).

As would be expected, bison exhibit fear when they sense wolves. However, bison react with utter indifference towards coyotes (Barsh and Marlor 2003). These different reactions evidence not only the long predator-prey relationship of wolves and bison but also bison’s keen sense of smell in distinguishing different predators. Armed with this knowledge, prehistoric and historic hunters would have known to position themselves downwind of the herd. Additionally, hunters could have used the hides of different carnivores and/or copied the actions of different carnivores to elicit different responses from the herd.

Given the reproductive, grazing, and movement behaviors of modern bison, archaeologists have attempted to define the optimal conditions under which communal bison hunts may have occurred in the past, including the placement of the kills on the landscape and the seasons in which these kills may have taken place. Fall appears to be an ideal time in which to conduct the hunts. The bison are in good condition and, especially if in mixed herds, can be driven without the aid of horses. Additionally, the upcoming winter season means that excess meat can be processed and frozen for later use (Frison 1970b:29; Frison 1971:87; Kornfeld et al. 2010). Seasonality indicators from the bison remains, such as age and sex distributions, reveal that this was likely a common strategy in the Great Plains. Both fall kill sites and those kill sites which were utilized outside of this hypothesized optimal season offer archaeologists the chance to explore further facets of the cultures which created them.

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4. Cultural Context

The cultural history of South Dakota can be divided into seven major periods: Paleoindian, Archaic, Woodland Tradition, Late Prehistoric, Plains Village, Protohistoric, and Historic (e.g. Lass 1981; Sundstrom 2018). However, given the great ecological, environmental, and cultural variation present both today and throughout the past millennia within the modern boundaries of South Dakota, Sundstrom (2018:56) states, “This sequence is too general to describe regional differences. For example, the Missouri River area was home to numerous Plains Village cultures, while very few Plains Village sites occur in Western South Dakota.” Such regional differences, when present, will be noted below in the discussion of the cultural contexts of the state. Moreover, the general timeframe of American Indian bison kill sites in South Dakota is from 9,000 B.C. to A.D. 1875. As such, the discussion of the Protohistoric and Historic periods in the state is truncated to focus on American Indian cultures during this time and is referred to as the Post Contact Period leading up to the Reservation Period.

4.1 Paleoindian Period (13,500 – 8,000 B.P.)

The Paleoindian period coincides with the end of the glacial period in North America. Throughout the New World, there is unrefuted archaeological evidence for human occupation beginning around 12,500 B.P. In South Dakota, and in the Great Plains in general, the earliest sites date to approximately 11,500 B.P. These sites are attributed to the Clovis, Goshen, and Folsom cultures; no definite Pre-Clovis sites have been identified yet in South Dakota (Sundstrom 2018:60).

By and large, Paleoindians lived in small, nomadic groups and were big game hunters. They subsisted largely by hunting mammoth, *Bison antiquus*, and other ice age animals. However, they supplemented their large game diet with smaller animals—such as deer, mountain sheep, rabbits, turtles, and prairie dogs—and with wild plants (Lass 1981; Sundstrom 2018:34-35, 60). Following the Younger Dryas cold snap, many of the Ice Age megafauna died out. However, bison adapted well to the new climate. With the extinction of the mammoth by roughly 10,500 B.P., Paleoindian peoples turned their focus to bison. It is during this period that the Folsom complex emerged. Bamforth (1994) suggests that Folsom groups reacted to the predictability of large bison herds by utilizing communal hunts in preferred locations and concentrating into larger social groups than had been seen in the earlier Clovis culture.

Paleoindians had well-developed chipped-stone tool technology. Most notably, and identifiable, are the large, lanceolate projectile points used in the dispatching of large game. These points can be classified as Clovis, Goshen, Folsom-Midland, Plainview, Early Plano, or Late Plano based on fluting, or lack thereof, and details of point shape (Sundstrom 2018). Notably, Clovis points, the earliest of the Paleoindian projectile points in South Dakota, were medium to large, lanceolate points with flutes extending from the base to midway up the point. Folsom points, on the other hand, were fluted entirely up to their tips.

Paleoindian sites in South Dakota are rare, but they have been reported across the state. Such sites within the state include kill sites, butchering sites, campsites, hearths, quarry sites, and isolated finds, but animal kill sites, butchering sites, and small camps are the most common (Sundstrom 2018:61).

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4.2 Early Archaic Period (8,000 – 5,500 B.P.)

The Early Archaic period marks the transition from the relatively moist and mild climate of the terminal Pleistocene to the drier and more extreme climate of the Holocene, a climatic episode known as the Hypsithermal or Altithermal. Perhaps related to this shift in environmental conditions, Early Archaic peoples were more generalized foragers than their Paleoindian predecessors. Although Archaic cultures still relied heavily on hunting of large and small game, they also fished and collected plants and mollusks (Lass 1981:2).

This more generalized subsistence strategy was accompanied by seasonal migration patterns and an expanded tool kit (Lass 1981; Sundstrom 2018:35). Pit houses first appear in the archaeological record during this period and can be found in the Black Hills and throughout the northwestern Great Plains. Archaeologically, they appear as “deep, circular stains, sometimes with central post molds. Others are oval with multiple post molds along the long axis” (Sundstrom 1996). The effort that went into the construction of pit houses suggests that Early Archaic peoples regularly travelled between resource areas, thereby re-using the habitation sites at regular intervals (Sundstrom 2018:90-91).

Similar to the Paleoindian period, the atlatl and dart were the main weapon system throughout the entire Archaic period. However, the projectile points are markedly different. Early Archaic projectile points are generally large, triangular points with notches at the sides (Sundstrom 2018:92). Notching allowed for a stronger binding of the point to the foreshaft of the spear. While all Early Archaic points exhibit notching, the exact form of the point exhibits great regional variation. The most commonly-found Early Archaic point in South Dakota is the Hawken point, which was named after the Hawken Site, an arroyo impoundment bison kill site in the Northwestern Black Hills.

Throughout the Great Plains, Early Archaic sites are rare relative to sites from other periods likely due to a loss of sites from this time period due to erosion or deep burial. Early Archaic sites in South Dakota are also relatively rare but can be found throughout the state, especially in the western half of the state and along the Missouri River. Animal kill sites, butchering sites, and small camps are the most common Early Archaic site types found in South Dakota (Sundstrom 2018).

4.3 Middle Archaic Period (5,500 – 3,500 B.P.)

The Middle Archaic period is marked by a number of innovations including pit houses, corrals and pounds for communal game procurement, tool and food caches, extensive use of grinding stones, production of microblades and microtools, large rock-filled roasting pits, diverse faunal and floral remains, and the production of pemmican. Sundstrom (2018:124) notes that some of these are true innovations while others are an intensification or expansion of traits from previous periods.

The end of the Altithermal signaled a return to modern climate conditions and coincides with the beginning of the Middle Archaic period. This more moderate climate permitted Middle Archaic groups to practice a seasonal round of subsistence, moving through well-defined territories according to a schedule of seasonal hunting and foraging activities. Such mobility also allowed for the procurement of far-reaching materials for the production of stone tools. Communal bison hunting continued to be a hallmark of the Middle Archaic period, with hunters developing bison corrals/pounds to assist in their detaining and dispatching of the prey. Corraling of bison likely meant that fewer individuals were

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needed to engage actively in the hunt when compared to other communal bison kill strategies. Despite the emphasis on bison, groups also hunted deer and other large game individually and collected a variety of plantstuffs. In general, faunal assemblages from Middle Archaic sites are more diverse and contain less bison than sites dating to earlier and later periods (Sundstrom 2018:108-109, 123).

During the winters, Middle Archaic peoples likely lived in prepared pit houses. Pit houses first appear near the end of the Early Archaic period and contain numerous features including cache pits, fire pits, and grinding stones, suggesting repeated use of the structures. Other indicators of Middle Archaic habitation are stone circles. Stone circles first appear in significant numbers in the northwest Great Plains during this time period, and they may represent sites where tipis or circular cribbed log structures were used. Most stone circles measure between 13 and 23 feet in diameter. Unlike pit houses, stone circle sites contain few features, aside from an occasional central hearth, and few artifacts, suggesting short-term use of the site and overall mobility (Sundstrom 2018:35, 120-121).

Although not diagnostic to the period, ground stone artifacts are a hallmark of Middle and Late Archaic sites in South Dakota. These may be shaped or unshaped grinding slabs and blocky or round one-handed manos. Ground stone tools could have been used in processing plant materials or in the making of pemmican (Sundstrom 2018:119). Chipped stone tool technology remained strong in the Middle Archaic period as well. This time period saw the use of relatively more exotic tool-stone when compared to previous periods, suggesting a rather wide-ranging, mobile, and flexible adaptive strategy. Middle Archaic projectile points can be broad, deeply-notched or ‘eared’ dart points or triangular to lanceolate basally-notched forms. Generally smaller than Paleoindian points, Middle Archaic points are not as small as the arrow points which define the Late Prehistoric Period. The most common Middle Archaic points found in South Dakota are Oxbow, McKean, Hanna, Duncan, and Mallory (Sundstrom 2018: 102-103, 120).

Middle Archaic sites occur throughout South Dakota but, similar to the Early Archaic, tend to be concentrated west of the Missouri River. Campsites, bison kill sites, and burial sites are the most commonly recorded Middle Archaic site types in the state. However, rock art, plant food processing sites, pit houses, special activity stations, and campsites identified as either reused based camps or small camps have all been identified to this period within South Dakota (Sundstrom 2018).

4.4 Late Archaic Period (3,500 – 1,500 B.P.)

The Late Archaic Period and the Plains Woodland Tradition are largely contemporaneous in South Dakota but occur in different parts of the state. Late Archaic sites are often found in the western half of South Dakota, whereas Plains Woodland sites are found along the Missouri River and in the eastern half of the state. Helping to distinguish these two cultural trajectories and their geographical distributions is the material culture associated with each. Late Archaic sites in South Dakota are identified by three cultural complexes: Yonkee, Pelican Lake, and Besant. These three complexes are all identified on the basis of distinctive projectile points, but all exhibit corner-notching. Sites that contain Besant or Pelican Lake projectile points but have no ceramics are classified as Late Archaic; those with ceramics or associated burial mounds are categorized as Woodland (Sundstrom 2018).

Late Archaic cultures in western South Dakota had a mixed bison hunting and foraging subsistence base. However, when compared to the Middle Archaic, Late Archaic peoples had a greater

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use of bison and a shift away from a diverse, broad-spectrum subsistence to a more limited and specialized subsistence pattern (Sundstrom 2018:128). The Besant cultural complex, especially, is associated with bison hunting (Sundstrom 2018:36). Besant bison kill sites often utilized skillfully constructed bison corrals, indicating great knowledge and understanding of stampeding animals (Fagan 2000). Throughout the Late Archaic, American Indian groups followed a highly dispersed mobile settlement pattern that continued the patterns of the previous Middle Archaic period, leaving some of the earliest evidence of the use of tipis or similar portable structures (Sundstrom 2018:129-130).

Seasonal habitation sites are some of the most common Late Archaic sites found in western South Dakota. These sites can often be classified as camps or special use sites. Other Late Archaic sites commonly found in the state include bison kill sites and isolated finds of projectile points (Sundstrom 2018:129).

4.5 Woodland Tradition (2,500 – 1,100 B.P.)

As stated above, the Woodland Tradition and the Late Archaic Period are largely contemporaneous in South Dakota. However, Woodland Tradition sites in South Dakota have a different suite of material culture and represent distinct lifeways. Twelve cultural contexts have been identified for the Woodland Tradition in South Dakota. These include: Fox Lake, Woodland Besant, Sonota, Valley, Unassigned Middle Woodland, Unassigned Late Woodland, Lake Benton, Arvilla, Loseke Creek, Randall, Great Oasis, and Blackduck/Sandy Lake. These cultural contexts are all identified on the basis of unique material culture traits. Some are identified by ceramics, such as Fox Lake which is distinctively sand-tempered. Others, such as the Woodland Besant, are identified by the presence of characteristic points in conjunction with other Woodland features. And still other cultural complexes are identified by their distinctive burial practices, such as the Sonota Burial Complex, which is comprised of mounds with rectangular subfloor tombs in which secondary burials were placed, and the Arvilla Complex, which is easily recognized by subsurface pits with linear and geometric burial mounds constructed over them (Sundstrom 2018).

In addition to the construction of burial mounds, Woodland Tradition cultures can be characterized by the production and use of thick-walled, sack-like conical pottery vessels and the manufacture of various corner- and side-notched projectile points. These practices were greatly influenced by cultures to the east. Perhaps as early as 500 B.C., but probably around A.D. 1, traits from the heartland of the Hopewell culture in what is now southern Ohio diffused westward to the Plains, forming the Plains Woodland Tradition (Lass 1981:3). Such outside influences remained throughout the Woodland Period. Trade networks during this period were extensive, as evidenced in the presence of Pacific and Gulf Coast marine shell, copper, and obsidian.

Woodland peoples lived a sedentary life compared to those of the Archaic and Paleoindian periods. The practice of horticulture developed in the Late Woodland, and people lived in small, semi-permanent settlements, possibly in simple wattle-and-daub houses or in tipis similar to those utilized in historic times. Before horticulture was practiced, and even following its development, Woodland people followed a broad-based subsistence pattern, hunting bison, deer, and waterfowl, gathering foods, and tending to patches of edible plants (Lass 1981; Sundstrom 2018:36, 141).

In South Dakota, Woodland sites can be divided further along temporal lines. The Middle

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Woodland in the state is marked by the first occurrence of pottery as well as the appearance of medium-sized corner- and side-notched dart points. The earliest burial mounds in the state also date to this period, roughly 1,900-1,100 B.P. (Sundstrom 2018:153). The pottery from this time period was often cord-roughened and, over time, the vessels became more globular in shape and had more elaborate decoration. The shift from conical forms of pottery lacking necks and shoulders to more spherical forms with somewhat constricted necks and elaborate decoration was one of two major innovations which mark the Late Woodland period. The other is the intensification of plant food production, including incipient horticulture. Additionally, the Late Woodland, approximately 1,400 to 1,000 B.P., saw the onset of the bow and arrow, which required smaller projectile points than those used previously (Sundstrom 2018:155). A widely-distributed terminal Woodland complex is Great Oasis. Great Oasis peoples lived in unfortified, dispersed hamlets or farmsteads. They practiced maize horticulture, especially after A.D. 1000, and combined this practice with bison or deer hunting and the use of waterfowl, shellfish, and native plants to subsist (Sundstrom 2018:167). Many Woodland cultures in South Dakota would eventually develop into or merge with the Plains Village Tradition found along the Missouri River and in the eastern half of the state, as shall be discussed below (see Section 4.7).

Woodland sites in South Dakota are most often found along major rivers, including the Missouri, James, and Big Sioux. The rivers provided the fertile soils needed for the horticultural practices of the period. Although burial mounds are perhaps the most easily-recognized type of Woodland site within the state, multiple-family habitation sites, short-term camps, base-camps, stone circles, and bison kill sites have all been identified within South Dakota (Sundstrom 2018:129, 141).

4.6 Late Prehistoric Period (1,500 – 200 B.P. / A.D. 500 – 1800)

The Late Prehistoric period overlaps with the Late Woodland period in South Dakota, and both saw the transition from the atlatl and dart to the bow and arrow sometime around 1,500 B.P. (Kornfeld et al. 2010:268). In western South Dakota, the Late Prehistoric Period is largely a continuation of the patterns established during the Archaic Period, with small groups of people following a seasonal round of bison hunting and plant-food gathering. In contrast, along the Missouri River and in the eastern half of the state, the small settlements and horticultural experiments of the Woodland Period developed into larger villages fully dependent on agriculture for much of their economic base (Sundstrom 2018:172). This is referred to as the Plains Village Period and shall be discussed separately in Section 4.7 below.

Late Prehistoric groups continued to rely on the hunting and gathering subsistence strategies that were seen during the Archaic period. However, Late Prehistoric cultures likely had a greater focus on bison hunting than their predecessors. Living in dispersed tipi camps throughout most of the year and gathering into large encampments in the summer for trade and ceremonies allowed people to follow the bison herds for their subsistence (Sundstrom 2018:36). No evidence of horticulture, a hallmark of the Woodland period, has been found in the Black Hills, but pottery has been recovered there, suggesting that Woodland and Late Prehistoric cultures had at least occasional interaction (Noisat and Sundstrom 1996).

In South Dakota, Late Prehistoric sites can be classified as either Avonlea or generalized nomadic Northern Plains bison-hunting groups (Sundstrom 2018). Avonlea subsistence was largely dependent on communal bison procurement, and bison jumps and impoundments are common

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throughout the Avonlea period in the Northern Plains. However, Avonlea diets were supplemented by smaller game and by seasonal plant resources (Sundstrom 2018:175). When the small triangular points characteristic of the Avonlea complex are absent in Late Prehistoric sites in South Dakota, these sites are often one of numerous cultural complexes which are categorized as generalized nomadic Northern Plains bison-hunting groups. These nomadic bison hunters followed the herds and lived in hide tipis, relying to varying extents on waterfowl, fish, and plant resources depending on the local environments in which they lived (Sundstrom 2018:180-182).

Because of their nomadic nature, Late Prehistoric bison hunters generally left small sites marked by stone circles or scatters of chipped stone artifacts. The projectile points they manufactured and utilized were small, side-notched and unnotched arrow points. Only occasionally will small amounts of pottery be recovered from Late Prehistoric sites. Late Prehistoric sites recorded within South Dakota include base camps, hunting camps, bison jumps and impoundments, drive lines, and rock art (Sundstrom 2018). Few burials in the western part of the state date to this time period, suggesting that most groups utilized scaffold or tree burials (Sundstrom 2018:182).

The cultures associated with the Late Prehistoric period in western South Dakota may have ties to current American Indian tribes. Between the early fifteenth and the late-eighteenth centuries, the western half of South Dakota was controlled sequentially or concurrently by the Mandan, Hidatsa, Arikara, Crow, Naishan, Dene (Kiowa Apache), Eastern Shoshone, Arapaho, Cheyenne, and Lakota. The Arapaho, Cheyenne, and Lakota, however, did not enter the area until the late-eighteenth century, after the introduction of the horse (Sundstrom 2018:37).

4.7 Plains Village Tradition (A.D. 900 – 1850)

Along the Missouri River and in much of eastern South Dakota, the cultural patterns of the Woodland Period expanded and developed during the Late Prehistoric Period into what is known as the Plains Village Tradition. Most archaeologists attribute the development of the Plains Village Tradition to Mississippian traits from the east diffusing into the Plains around A.D. 900 and fusing with the local Woodland cultures (e.g. Lass 1981). This cultural pattern would last for roughly a millennium and can be identified as the Mandan and Hidatsa tribes occupying northern South Dakota roughly 500 years ago (Wood 1986). In historic times, Plains Village people emerged as the Mandan, Hidatsa, Arikara, Ponca, and Omaha tribes (Sundstrom 2018:36).

In general, the Plains Village Tradition is characterized by villages consisting of clusters of earth-covered timber houses, each housing several nuclear families; a plaza for public gatherings; and agricultural fields on river bottoms. The Plains Village Tradition was also marked by more numerous and more varied ceramics than was seen in the earlier Woodland Tradition. Ceramic decorations became more elaborate and loop handles, strap handles, lip tabs, and lip lugs became common vessel appendages. In addition to more elaborate ceramics, the dwellings of the Plains Village Tradition were more elaborate than in the preceding Woodland Period. The earthlodges of the Plains Village Tradition were substantial permanent structures, with timber frames and walled entryways extending out from the main structure. After about A.D. 1200, farming groups along the Missouri River alternated between earthlodge villages in the summer and small tipi camps in the winter (Sundstrom 2018:36).

The Plains Village Tradition coincides with a marked rise in population along the Missouri

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River. As a result, villages were large; Plains Village Tradition settlements were consistently larger than those seen in the Woodland Period. Additionally, many villages were fortified to ward off attacks, possibly from enemy raiders seeking valuable dried corn (Lass 1981; Sundstrom 2018:36). The horticultural way of life had been established along the Middle Missouri region by approximately A.D. 1000. The rich floodplains of the rivers were well-suited to growing corn, beans, squash, and sunflowers. In addition to supplying a good portion of the diet, farming produced surpluses which could be stored in underground pits in the village or traded for exotic goods (Sundstrom 2018:36, 185).

Although well-established horticulture was a hallmark of the Plains Village Tradition, bison hunting remained a crucial part of the economy. Near the villages, floodplains were used for gardens, uplands were used for hunting game, and rivers supplied abundant fish. Additionally, seasonal hunting parties would travel long distances to obtain most of the year's meat supply. In summer and fall, large hunting parties travelled to western and northwestern South Dakota in search of bison and other resources while others remained in the village and tended to the crops (Sundstrom 2018).

In South Dakota, the Plains Village Tradition can be subdivided into multiple contexts and subcontexts. The three main contexts are Middle Missouri, Central Plains / Coalescent, and Oneota (Sundstrom 2018).

Middle Missouri Tradition peoples lived in villages comprised of long, semi-subterranean rectangular houses that averaged 25 by 35 feet and had entrance ramps. The villages typically contained twenty to thirty houses aligned in rows and were sometimes fortified with a ditch and a palisade system (Lehmer 1971; Sundstrom 2018:194). The mixed horticulture and bison-hunting subsistence strategy which defines the Plains Village Tradition in general was practiced throughout the Middle Missouri Tradition. Some Middle Missouri Tradition villages represent proto-Mandan and subgroups of proto-Hidatsa peoples (Sundstrom 2018:184).

The Middle Missouri dates from A.D. 900 to 1675 and can be temporally divided into the Initial, Extended, and Terminal Middle Missouri. The Initial Middle Missouri Tradition may have developed out of the Late Woodland, especially the Great Oasis cultures (Johnson 1996:208-210). Although the housing and village structures were consistent throughout the Middle Missouri Tradition, ceramic styles did change slightly. During the Initial Middle Missouri, people produced globular, grit-tempered jars. They also utilized bowls, seed jars, water bottles, and Mississippian-influenced vessels. During the Extended and Terminal Middle Missouri, grit-tempered globular jars were most common, with stamped and plain surface treatments (Lehmer 1971).

The Central Plains / Coalescent Tradition is a blending of Middle Missouri Tradition attributes with those of other village cultures farther to the south in the Central Plains. Lehmer (1971) suggests that this blending of cultures was the result of an actual migration of Central Plains villagers into the Big Bend subregion of the Middle Missouri region around A.D. 1300. Then the coalescent tradition spread up the Missouri River Valley. Unlike Middle Missouri Tradition villages, the houses of Coalescent villages were oval, circular, or rounded square in shape. These earth-covered structures had four large interior roof supports, central hearths, and cylindrical or bell-shaped sub-floor pits for storing crops or other items. Houses were arranged in a linear fashion or in small clusters, in contrast to the larger, more compact Middle Missouri village arrangements (Sundstrom 2018:228-229). Although not all Coalescent Tradition villages were fortified, those during the Initial Coalescent were almost always fortified (Lehmer 1971). During the Extended Coalescent variant, which dates to A.D. 1500 to 1650, the Plains

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Village Tradition reached its zenith and its maximum distribution prior to large-scale influence from Europeans. Post-contact Coalescent sites in South Dakota, as the name implies, date to the time of contact with Europeans and Euro-Americans and include deposits with horse bones and Euro-American trade goods (Sundstrom 2018:251). The villages of the Coalescent Tradition likely gave rise to the historic Mandan, Hidatsa, Arikara, and Cheyenne tribes (Sundstrom 2018:185).

The Oneota Tradition is the most recent of the Plains Village traditions, dating from A.D. 900 to 1870. Oneota is part of the broader Upper Mississippian culture, which spread from Lake Michigan to northern Missouri, southern Minnesota, and out to the Great Plains. Oneota peoples lived in rectangular wall-trench structures with subterranean basins or in pole structures similar to longhouses or wigwams covered in bark, mats, or skins, but some that lived along the Missouri River adopted the earthlodge (Henning 1998). Their settlements were small to large unfortified villages located near major river drainages or lakes. Oneota subsistence was based on hunting, gathering, and horticulture. Most Oneota sites in South Dakota are in the southeastern part of the state on or near the Big Sioux, Vermillion, James, and Missouri Rivers (Sundstrom 2018:262-263). The Oneota culture in the Great Plains represents the Siouan-speaking ancestors of the Omaha and Ponca nations of historic times (Sundstrom 2018:186).

In general, Plains Village Tradition settlements were located on terraces or ridges overlooking arable stream bottoms, allowing people to cultivate crops in the rich bottomlands and hunt bison and other game elsewhere. In South Dakota, Plains Village Tradition sites include large and small fortified and unfortified villages, camp sites, special use sites, individual burials, and cemeteries (Sundstrom 2018).

4.8 Post-Contact Period to the Reservation Period (A.D. 1650 - ca. 1875)

The influence of Europeans in South Dakota was felt long before any Europeans set foot within the state. As Sundstrom (2018:267) writes, “In northern Great Plains archaeology, the term Protohistoric refers to the period after which European goods and species had entered the material culture assemblage but before permanent non-native settlement began.” American Indians in the Great Plains acquired horses indirectly from the Spanish in the Southwest through extensive trade networks with other tribes. Other material culture, notably firearms, arrived in the Great Plains indirectly from the French, English, and American fur traders in the Northeast.

Most of our knowledge of the Protohistoric era in South Dakota comes from historic writings dating to the time of early European contact in the region; however, a few archaeological sites have been excavated (Sundstrom 2018). Most sources indicate that Protohistoric and Post-Contact Plains groups were highly mobile and focused intensely on bison hunting with only a supplemental emphasis on other resources. The mobility needed to cover the migratory ranges of bison and the rapid influx of other American Indian groups in the face of European and American encroachment led to much competition and movement amongst tribes during the seventeenth through nineteenth centuries.

Starting in the 1640s, Eastern Woodland tribes gradually migrated westward due to disease and the fur trade. Ojibwe groups from the Upper Great Lakes expanded west and south between 1670 and 1800. The Ojibwe (also known as Chippewa) were heavily involved in the fur trade and were enemies of the bands collectively referred to as the Sioux by those outside of the Nakota/Dakota/Lakota alliance.

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Wars between the Sioux and Ojibwe from roughly 1695 to 1768 ultimately drove the Dakota from the woodlands of Minnesota and Wisconsin to the Plains of eastern North and South Dakota. Finding footing in central and southern Minnesota and eastern North and South Dakota, the Dakota gathered wild rice and prairie turnips, fished, hunted moose and deer, and raised large gardens of maize, squash, beans, and pumpkins (Sundstrom 2018:272-273).

Dakota is one of three dialects which comprise the *Oceti Šakowin*, or Seven Council Fires. The three dialects (Nakota, Dakota, Lakota) are related by kinship, location, and language, and each dialect includes individual bands. For example, the Dakota, or Santee Sioux as they are also known, includes the Sisitonwan, Wahpetonwan, Wahpekute, and Mdewakanonwan bands. Although numerous terms can be used to refer to the *Oceti Šakowin*, this document will refer primarily to the individual dialects (Nakota, Dakota, Lakota) and bands and will only use the etic, or outsider, term “Sioux” when it is appropriate in understanding the historic context.

The Dakota were not the only indigenous group to move into South Dakota during the Protohistoric and Post-Contact periods. In the second half of the seventeenth century, bands of Cheyenne moved from Minnesota to the Missouri River. Additionally, the Omaha-Ponca reached Iowa and Minnesota sometime before 1700 and had a village at the mouth of the White River in South Dakota between 1710 and 1714. The Blood Run site on the South Dakota – Iowa border has an Omaha-Ponca component and served as an important trading center for both French and American Indian items. By the early 1700s, the Omaha-Ponca had split into two separate entities: the Omaha and the Ponca (Sundstrom 2018:270-271).

During the seventeenth and early-eighteenth century, the native inhabitants of South Dakota had contact with not only other native groups from elsewhere in the Great Plains and Eastern Woodlands but also with white material culture. About 1675, the villages of the Extended Coalescent Variant of the Plains Village Tradition first came into contact with non-native material culture (Lass 1981:10). Secoy (1953) estimates that the first guns and horses may have reached the Black Hills around 1730 to 1750.

By the turn of the eighteenth century, South Dakota was home to Mandan, Hidatsa, Arikara, Crow, Kiowa-Apache, Kiowa, Comanche, Suhtai Cheyenne, Arapaho, Ponca, Dakota, and the Ihanjktowan (Yankton) and Ihanjktonanna (Yanktonai) bands of Nakota (Sundstrom 2018:273-274). Originally from Minnesota and the east, the Nakota moved into eastern South Dakota and relied on a mix of fishing, foraging, gardening, and hunting, conducting one or two large bison hunts each year (Sundstrom 2018:272).

By the middle of the eighteenth century, Europeans and Euro-Americans began to explore the area that now constitutes South Dakota. When non-natives first entered the Middle Missouri region, they encountered the large thriving villages of the Arikara high on the bluffs of the river. They noted that women managed garden plots on the lower terraces, and the men conducted bison hunts, trapped catfish, and defended the village from enemies. By 1780, the Arikara had as many as 45 villages up and down the Missouri River (Lass 1981:10; Sundstrom 2018:268-270). By 1800, French and Spanish traders established trading posts on the Missouri River (Sundstrom 2018:37). Pressure from encroaching white settlement along the river and the late-eighteenth-century Lakota stronghold of hunting grounds to the west meant that Arikara holdings in South Dakota were waning. By 1862, the Arikara had uprooted from South Dakota and joined the Mandan and the Hidatsa at their combined village, Like a Fishhook, at Fort Berthold in North Dakota (Sundstrom 2018:270).

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Throughout the first half of the eighteenth century, the Cheyenne occupied western South Dakota. However, by 1775, Lakota had entered the area and took hold over the Black Hills. Lakota control of the Black Hills meant that Missouri villagers could no longer come west for hunting, gathering, and trading (Sundstrom 2018:275-276). The Lakota used the Black Hills as hunting and gathering grounds and held the hills as sacred (Sundstrom 2018:284-286). With the introduction of the horse, both the Lakota and the neighboring Cheyenne took up a nomadic, equestrian lifestyle, relying on bison for sustenance. As a response to the hide trade, the Lakota shifted their focus from bison meat to bison hides. The Lakota relied on the trade and tended to the herds to their benefit, allowing the bison to grow their fall coats before killing them (Sundstrom 2018:287).

At the time of the Lewis and Clark expedition, there were likely Dakota, Nakota, Lakota, Cheyenne, Arikara, and Suhtai (a Cheyenne relative) in South Dakota. However, by the 1830s, the state was nearly all territory of the Dakota, Nakota, and Lakota, with pockets of Crow and Cheyenne in the Black Hills. The Vore Buffalo jump, located in eastern Wyoming, has multiple layers dating to the Protohistoric period; however, the upper, most recent level likely can be attributed to the historic Cheyenne living in the Black Hills of South Dakota and Wyoming (Sundstrom 2018:268-269).

By 1857, the fur trade was largely over, and white settlement was pressing from the east, forcing the Dakota and the Ponca onto reservations (Sundstrom 2018:37). The Yankton Treaty of 1858 opened 11 million acres of land along and east of the Missouri River to white settlement and established the Yankton Indian Reservation in the southeastern part of the state (Sundstrom 2018:296). Ten years later, the 1868 Fort Laramie Treaty designated all of western South Dakota as the Sioux Reservation under Lakota control. However, the Black Hills gold rush of 1875 and 1876 meant that whites were still entering Lakota lands. In an 1877 agreement, the boundary of the Sioux Reservation was moved east of the Black Hills and later broken into the five separate units which constitute western South Dakota's modern reservation boundaries (Sundstrom 2018:38, 301-302). Being forced onto the reservations was the culmination of the decades-long decline of the traditional lifeways of South Dakota's native inhabitants.

5. Bison Kill Sites in the Great Plains

As mentioned in the introduction (Section E, 1.2), bison kill sites are the locations which contain evidence of American Indians' past actions to communally slaughter bison. This evidence is usually found in the presence of a large number of bison (*Bison* spp.) bones, the existence of artifacts or features in relative association with the bison bones, and evidence of minimal processing of the bison remains. This section further describes the types of bison kill sites which have been or may be recorded in South Dakota. Additionally, information on individual bison kill sites recorded in the Great Plains is presented as a means of further contextualizing the bison kill sites which have been or may be recorded within South Dakota.

5.1 Types of Bison Kill Sites

Bison kill sites throughout North America as a result of communal driving actions can largely be divided into either jumps or impoundments (Kehoe 1973:3). However, the multicomponent nature of

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some sites and/or post-depositional processes, such as natural erosion or cultural modification of the landscape, can hinder the clear identification of a bison kill site as either a jump or an impoundment. Therefore, this multiple property listing recognizes four associated property types: **jumps, impoundments, general kill sites, and isolated drive lines.**

5.1.1 Jumps

Bison jumps involve driving a large herd of bison over a steep cliff, such that the fall itself or the impact of other bison falling on top killed a large number of individuals or at least rendered them immobile so that hunters then easily could dispatch them. Given that many bison likely died as a result of the fall, jump sites may contain fewer projectile points associated with the bison remains when compared to impoundments in a similar context (Frison 1970b:29). Jump sites rely on adequate natural topography, namely rimrock cliffs (Kehoe 1973:3), and a cultural system of herding and then driving the bison to the cliff (Carlson and Bement 2013). Catchment areas were often located upwind from the planned kill site, so the bison could not detect the multiple people waiting in the kill area (Brink 2016:381). Additionally, the herd had to be driven in a way so the lead animals would not see the upcoming cliff until it was too late and they were pushed over the edge by those following them. If the bison were driven straight at the cliff or at an easy gait, the lead animals could easily veer away from the edge of the cliff, rendering the hunt unsuccessful. Moreover, the herd being driven had to be large, likely upwards of 100 bison, and kept intact to create the momentum needed to push the animals over the cliff (Kornfeld et al. 2010:273). Doing so often required lines of barriers of some kind which acted as wings to funnel the herd to the kill site and to direct the herd’s movements over the cliff (Kehoe 1973:3). These barriers may have been brush or wood piles or rock cairns which were then elaborated upon to keep the herd moving in the intended direction. Such drive lines were especially important where control of the bison was vital to the success of the jump, such as in tight turns or along ridge edges (Carlson and Bement 213: 95).

Because the cliffs used for bison jumps may have been selected for specific topographic features, they may have been utilized as kill sites multiple times. The sheer number of bison needed to make a bison jump successful likely resulted in multiple bison carcasses left intact or nearly intact at the site. Hunters would burn the rotten carcasses to the remove the smell, thereby improving the conditions needed to reuse the site as a future jump (Frison 1970a:6). At the Gull Lake Site in Saskatchewan, layers of unburned whole bison bones on top of charcoal and heavily butchered bone scraps suggest that burning was practiced in preparation for the subsequent drive (Kehoe 1973:39).

Bison jumps are very common in the eastern foothills of the Rocky Mountains in Alberta, Montana, and Wyoming. Roughly half of the bison jump sites in this region are located in the historic territory of the Blackfoot, of whom Europeans wrote detailed accounts of their bison hunting practices (Barsh and Marlor 2003:574). However, bison jumps can be expected wherever the prehistoric or historic topography was appropriate for driving bison over cliffs.

5.1.2 Impoundments

Bison impoundments or traps required driving a herd into a natural or cultural feature from which

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the bison could not easily escape. Hunters then could kill the animals with relative ease using projectiles. Although some have suggested that swamps were an easy natural feature into which bison could be impounded, it was likely much easier to kill bison on dry land. Bison are strong swimmers and can get out of swamps or bogs relatively easily. Moreover, it would be much easier for the hunters to butcher the animals if the kill took place on dry land, rather than in a swampy environment (Frison 1998:14579). As such, many bison impoundment sites are located within dry gullies or arroyos, with the bison being driven into a headcut of the arroyo to trap them. Often, a natural or artificial drop-off into the headcut was used to prevent the animals from going back through the entrance. For those without drop-offs, hunters may have constructed barriers out of hides or other material to close in on the herd once they had entered the headcut, as the bison would not push their way through the obstacle unless pushed from behind and absolutely necessary (Frison 1968:35; Frison 1971:88-89; Kornfeld et al. 2010).

Sometimes the headcut itself was such that it formed a natural trap. Other times, full or partial corrals would have to be constructed to trap the bison. Even if the enclosure itself was entirely man-made, it was often constructed with great respect to the topography, relying on natural contours, such as a sharp turn or a downslope, to keep the enclosure hidden from view until the last moment (Kornfeld et al. 2010).

As with bison jumps, bison impoundments required driving the herd to the preferred kill location, typically requiring an upwind catchment area and drive lines to funnel the bison into the preferred point of the arroyo or the enclosure (Brink 2016:381; Kehoe 1973:3). The drive lines often became more substantial as they got closer to the impoundment site, ensuring that the herd kept moving in the right direction. Similar to the drive lines of jumps, impoundment drive lines may have been made of solid fences, wattling, or rock cairns (Kehoe 1973:176-178). Unlike jumps, however, impoundment kills were successful with smaller herds, as they rarely relied on hundreds of bison forcing the lead animals into a known trap (Kornfeld et al. 2010:273).

Kornfeld et al. (2010:215) note, “Different variations of traps utilizing the natural topography formed by dry arroyos has probably accounted for most of the systematic communal bison hunting.” Arroyos are common in the Great Plains, and their topography makes them well-suited for impounding bison. Additionally, the vegetation of arroyos makes them attractive to both bison and hunters. Arroyos trap moisture in otherwise arid environments, providing lush forage to large herbivores (Frison 1984:296). Bison teeth from the Late Archaic Buffalo Creek kill site in Wyoming suggest that hunting episodes corresponded with periods of physiological stress on the bison. As the bison were actively seeking out the forage found in arroyos, hunters simultaneously took advantage of the herd’s predictability and the topography of the arroyo (Niven et al. 2004). Hunters could also take advantage of the woody plants lining the arroyos to construct their drive lines or their corrals, if needed (Kehoe 1973:3).

5.1.3 General Kill Sites

At times, drive lines and topographic features can clearly indicate whether bison were driven off a cliff or driven into a trap. Even in the absence of drive lines, sometimes the topography, the deposition of the bison remains, or the presence of other archaeological features such as the postmolds from a corral can indicate whether a kill site was a jump or an impoundment. However, there are times when a site

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may have a clear culturally-created bone bed with minimal processing of the animal remains and associated material culture, but it is unclear if the bison were driven into a trap or driven off a cliff to result in current archaeological deposits. Other times, a kill site may have been used multiple times in different ways, with a jump used to kill bison at one point and an impoundment used to trap bison at another point. At these times, the site may be classified as a general bison kill.

Difficulty in discerning between a jump and an impoundment is largely a result of changes in the landscape. Geological and, more recently, cultural processes alter the topography, leaving archaeologists to interpret land surfaces from millennia ago with only very small samples of the original (Frison 1984:308; Kuehn 1997:321). As Brink (2016:374) notes, "Topography is clearly critical to where communal drives were placed and how they operated." If that past topography is unable to be discerned from the modern remnants, the operation of the bison drive can rarely be discerned.

5.1.4 Isolated Drive Lines

Erosion and cultural modifications of the landscape can not only fuzzy the identification of a bison kill site as a jump versus an impoundment, but they also can remove or disperse the bone bed to such an extent that the only extant features remaining of the kill site are the drive lines. Additionally, drive lines may have been constructed with the plan of utilizing them in a future bison drive. However, if the drive was unsuccessful or if the drive lines were abandoned before they were utilized, the features of the drive lines may remain on the landscape but may not be associated with any bone bed. Additional features of bison kill sites, such as impoundment corrals, may also have been constructed without being utilized. However, given the nature of the materials used to construct the various possible features of a bison kill, drive lines are the most likely features to preserve in the archaeological record and be identifiable as specifically associated with a bison kill site.

Drive lines were designed to funnel stampeding bison into the pound or over the jump. They were constructed to keep the bison moving and to play into the mob mentality of the stampeding herd to keep them on course. Historical accounts indicate that drive lines were constructed of rocks, brush, tipi lodge poles, blankets, snow, dung, and people (Barsh and Maylor 2003:575; Brink 2016:380; Keyser and Knight 1976:293). Given the poor preservation of organic materials in the continental temperate climate of the Great Plains, the stone features of drive lines, such as cairns and alignments, are often all that remain. These stones may have been embellished with chunks of sod or with smoldering dung or brush to serve as a more formidable visual barrier. They also may have marked where people were stationed or hidden along the drive route.

To determine if a stone alignment with no associated bone bed is in fact an isolated drive line and not some other stone feature, the overall context of the alignment must be considered. Topography is a critical component of many bison kill sites and should be taken into account when evaluating stone alignments as isolated drive lines (e.g. Carlson and Bement 2013). As Brink (2016:377) writes, "[drive lines'] placement on the landscape must have related to human perceptions of where lines would be observed and what the herd reactions would be." The drive lines were meant to be seen by the herds but had to be of the proper shape and alignment to drive the herd in the proper direction. Therefore, if the topography is consistent with that associated with bison jumps or impoundments in the region and stone alignments or cairns are present leading to that topographical feature, the stone features may be

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interpreted as bison kill site drive lines even if a bone bed was never created or is not currently present. Modern human activity such as quarrying may have removed the bone bed at the base of a jump or in the impoundment. Similarly, natural processes may have removed the bone bed or buried it to the extent that it is no longer evident. Spring runoff and summer storms can cause arroyos to rapidly change their configuration and, depending on the action of the stream, can bury all archaeological evidence of the bone bed or can remove it completely (Kornfeld et al. 2010:288).

The Ross Site in southeastern Alberta, Canada, is an example of a drive line site where no excavations have occurred to expose the bone bed, if one exists. The stone drive lines form a funnel which ends at a break where the upland prairie collapses in a steep drop to the flats of a river valley bottom below. The topography of the site clearly indicates a communal animal kill site. Furthermore, archaeological and ethnographic evidence from the region point to this site being used as a bison jump rather than as an antelope kill site based on the placement and orientation of the drive lines (Brink 2016).

5.2 Temporal Affiliations of Bison Kill Sites

Bison kill sites on the Great Plains date from the Paleoindian Period through the nineteenth century. Although each bison kill site is unique, archaeologists have noted temporal trends in the features present at the sites.

The earliest recorded communal bison kills date to the Paleoindian Period and consist of small, natural traps such as arroyos or parabolic sand dunes used to corner ten or more bison (Barsh and Marlor 2003:574; Frison 1998:14580). At the time of this writing, no bison kill site from the Paleoindian Period has returned evidence of any human-constructed facilities, such as corrals or drive lines, associated with the kill (Bamforth 2011:27-28). Although most Paleoindian kill sites indicate that only a dozen or so bison were killed during each event, the Folsom site of Lipscomb in the Texas panhandle returned evidence of at least 55 individual bison being killed (Todd et al. 1990:823).

Paleoindian bison kill sites on the Great Plains often lack features associated with the processing of remains, such as boiling pits or piles of bones crushed to extract the bone grease. In fact, faunal remains from Paleoindian bison kills suggest that Paleoindian hunters did not intensively butcher carcasses from large kills, leaving the carcasses relatively intact (Bamforth 2011:27-28; Todd et al. 1990:821). This lack of intensive processing and failure to reuse kill locations suggests that Paleoindian hunters followed a “nonrepetitive and unpredictable pattern of movement across the landscape” (Bamforth 2011:28) compared to later bison hunting cultures.

Most of the Great Plains kill sites dating to the Archaic Period are very similar to Paleoindian kill sites, in that they exhibit limited carcass processing and no construction of drive lines or corrals (Bamforth 2011:29). Starting around 5,500 B.P., Archaic hunters began using bison jumps. The use of bison jumps, especially in the Northern and Northwestern Great Plains, and the number of bison killed in each jump event increased greatly after 2,000 B.P. Additionally, these bison jumps were often used repeatedly for generations. The need to procure more bison more frequently suggests that human population in the region was growing, people were consuming more processed meats such as jerky and pemmican, and trade in pemmican and hides with Mississippian cultures was intensifying (Barsh and Marlor 2003).

The Northern and Northwestern Great Plains—namely modern-day Wyoming, Montana,

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Saskatchewan, and Alberta—experienced an intensification of communal bison hunting during the Archaic Period that was not seen to the same degree elsewhere in the Great Plains. Jumps and impoundments were elaborate and were used repeatedly, tying large-scale hunting activities to particular points on the landscape. Additionally, bones at the sites were heavily processed, allowing for the extraction of bone grease and marrow. The increased utilization of bone grease and marrow may be linked with increased pemmican production, which could then be traded with the cultures living further to the east (Bamforth 2011). Even in stratified sites, such as the Gull Lake Site in southwestern Saskatchewan, an increase in bone processing to extract bone grease is evident when comparing the upper, more recent levels with the lower levels (Kehoe 1973).

Outside of the Northern and Northwestern Great Plains, Archaic bison hunters tended to follow a more Paleoindian pattern of hunting, with limited processing occurring at the sites. However, starting around 2,000 years ago, bison kill sites throughout the Great Plains exhibit an increase in bone grease production, suggesting that all areas of the Plains were trading pemmican (Bamforth 2011:32). Additionally, though other areas of the Plains did not see the sheer number of bison being killed at each event as did the Northern and Northwestern Plains, the frequency of kills throughout the region did increase. Bison kills dating from the Late Archaic to the historic period are common across the entire Great Plains.

Through the eighteenth and nineteenth centuries, American Indian hunting parties did not travel to specific kill locations but would rather travel to the general locations where they thought they would encounter the herds and enact communal kills using the resources at hand (Bamforth 2011:34). An 1857 account refers to Dakota hunters following a herd of bison like wolves (Barsh and Marlor 2003:583). Once horses were introduced and widely adopted by the Plains tribes, the stylized methods of bison procurement were largely abandoned (Frison 1971:86). However, in 1852, Blackfoot hunters conducted the last known impoundment bison drive in Montana, and the North Blackfoot of Canada are reported to have continued using bison drives until 1872 (Kehoe 1973:175).

5.3 Bison Kill Sites in South Dakota

Compared to the highly-visible, almost romanticized bison jumps of the Northwestern Plains, little research has been published on the bison kill sites present within South Dakota. Rather, most of the information pertaining to bison kill sites recorded within the state of South Dakota is contained within archaeological “grey literature,” the unpublished reports and field notes produced during cultural resource management projects. The lack of visibility of South Dakota’s bison kill sites in the literature of Great Plains archaeology highlights the need for a document such as this to aid cultural resource managers in the identification and evaluation of these sites.

Licking Bison (39HN0570) is a site in northwestern South Dakota on which data has been published and presented. Licking Bison is an Early Archaic bison kill site in which bison were likely driven into an arroyo impoundment. Excavations revealed that one portion of the bone bed contains complete or nearly complete carcasses which were never processed. Another portion contained large articulated portions of bison, representing carcasses which had been roughly halved anteriorly-posteriorly. A smaller area of the bone bed contained smaller articulated portions of bison and many individual elements. Radiocarbon dates of 5630 +/- 40 B.P. substantiate the Early Archaic date of the

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site (Fosha 2001; Kornfeld et al. 2010:252-254).

The Fawcett Kill Site (39HD0115), in east-central South Dakota, is located near the crest of a large mesa. Hunters could have driven bison either up into the side of the mesa to trap them or over the edge of the mesa and impounded them in a depression below. A radiocarbon date of 809 +/- 22 B.P. and the associated projectile points firmly place the site within the Initial Middle Missouri of the Plains Village Tradition. Multiple contemporary occupation sites are located near to the kill site, but the exact relationship of the kill site to the occupations is yet to be determined (Fosha 2016; Mayer 2018).

5.4 Bison Kill Sites in Neighboring States

Bison kill sites have been documented and published on from most of the states neighboring South Dakota. The kill sites in Wyoming are arguably more publicized than those in other neighboring states because of the elaborate bison driving systems in place in this area during the height of Archaic Period pemmican production. However, each site from each of the neighboring states can offer insights into bison kill sites within South Dakota. As such, general information on a sample of sites from the surrounding states is presented below.

5.4.1 Bison Kill Sites in Wyoming

Large-scale bison kill sites can be found in Wyoming dating to all periods of prehistory and into the historic period as well. Two diagnostic projectile points found throughout the Great Plains were first identified at Wyoming bison kill sites: Agate Basin points and Hawken points.

Agate Basin points are late Paleoindian points named for those originally recovered from the Agate Basin bison kill site. Bison at Agate Basin were driven into an arroyo headcut and then killed. Remains indicate that the bison were killed in the winter and then cut into large units and likely frozen for later consumption (Frison 1998).

The Carter / Kerr-McGee site is another Paleoindian site located in Wyoming. The deposits at Carter / Kerr-McGee are stratified, with clear Cody Complex, Hell Gap-Agate Basin, Folsom, and Clovis levels. It appears that hunters at the site drove small herds of bison up the bottom of a steep-sided arroyo until a knickpoint, an artificial barrier, or some combination thereof was reached. Similar to the Agate Basin site, the bison in the Cody Complex layer of the Carter / Kerr-McGee site were killed in the winter, between early December and mid-January (Frison 1984).

The Hawken site, located in the Black Hills of northeastern Wyoming, dates to around 6,600 years ago. At the site, at least 100 bison were trapped during one or more communal late fall or early winter drives. The three levels of deposition at the site suggest that the impoundment was used multiple times. The Hawken site is a classic example of an arroyo impoundment. A large bison catchment area is located next to a series of sandstone bluffs. Drainages from the catchment formed natural channels which could be used to funnel the herd into arroyos. Hunters then drove bison up the bottom of the arroyo until they reached a perpendicular headcut and could efficiently dispatch the animals (Frison et al. 1976; Kornfeld et al. 2010:250).

Middle Archaic bison kill sites in Wyoming include the Scoggin site and 48SH312. Radiocarbon dates at the Scoggin site in south-central Wyoming indicate it was used around 4540 +/- 110 B.P. The

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Scoggin site is a largely man-made impoundment site where bison were driven over a low cuesta into a corral constructed of pine, juniper, and cobbles. After being killed, the bison were disarticulated inside of the corral, with more intensive processing of remains occurring at processing features located nearby. Tooth wear patterns and the placement of bison long bones into post holes as a part of corral maintenance indicate that the site was used at least twice as an impoundment, once in the summer/early fall and once in the late fall/early winter (Niven and Hill 1998). 48SH312 is also a Middle Archaic impoundment site but, like the Hawken site, was an arroyo impoundment in which the bison were trapped within a headcut and killed. The distribution of faunal remains at 48SH312 suggests that hindquarters were selectively removed for consumption (Frison 1968).

Both natural and man-made impoundments were utilized during the Late Archaic in Wyoming as well. The Rourke site in northeastern Wyoming dates to around 2500 to 1700 B.P. The bonebed of the site lies in the bottom of an arroyo which may have been modified with cedar posts to form a corral. Tooth wear at the Rourke site suggests that it was a late spring / early summer kill site which was only used once (Niven and Hill 1998). Also in northeastern Wyoming is the Buffalo Creek site. The site returned radiocarbon dates of 2460 +/- 140 B.P. and 2600 +/- 200 B.P. Dentition from Buffalo Creek indicate the site was utilized for at least three kill events: spring/early summer, late fall/winter, and mid-to late-winter. Similar to the Rourke site, Buffalo Creek was an arroyo impoundment in which hunters may have constructed a corral structure to aid in the trapping of the herd (Niven et al. 2004:1784-1785).

Site 48CA302 is also a Late Archaic impoundment site in Wyoming. Dating to around 1,700 years ago, the site contains a largely human-made bison corral, a ceremonial structure, and a processing area. The corral is located within an arroyo, with the side of the arroyo forming one of the walls of the corral. The arroyo also helps to hide the corral from view, with the drive lane taking a sharp turn into the corral. Once the bison were past the turn in the drive lane, hunters speared the bison. Those animals which made it into the corral itself and were trapped were speared as well. Butchering at 48CA302 suggests that the carcasses were disarticulated at the joints rather than cutting through the long bones and that entire hides, including the tail, were removed. Disarticulated segments were then transported to the processing area for secondary butchering and processing. Tooth eruption in the bison remains from 48CA302 indicate the site was a fall kill site (Frison 1971).

Climate may have influenced bison hunting practices in Wyoming. Bison kills in Wyoming are very common during the Archaic Period. However, kill sites are relatively rare from roughly A.D. 1000 to A.D. 1500, corresponding with a cool and dry period in which Bozell (1995:155) estimates that bison population densities were low for substantial portions of the Central Plains.

The Vore site in northeastern Wyoming and the Glenrock Buffalo Jump in central Wyoming indicate that American Indians once again practiced large-scale bison kills in the state by A.D. 1500. Vore is a bison jump with 15-meter deep bone deposits at the bottom of a gypsum sink. It is estimated that the site contains the remains of at least 10,000 *Bison bison*, as the site was utilized multiple times from roughly A.D. 1500 to A.D. 1800. Apart from the bone bed, the site includes hearths and ceremonial circular alignments of bison crania (Reher and Frison 1980).

The Glenrock Buffalo Jump is a kill site in which Late Prehistoric peoples drove bison as far as three miles before stampeding them over a 40-foot high bluff. Control over the herd was vital at Glenrock to ensure that the animals were driven over the most lethal portion of the cliff. Near to the site are at least 15 stone circles assumed to be associated with ceremonial or shamanistic activities

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surrounding the kill event and stone cairns marking the location of the elaborate drive line (Frison 1970a).

5.4.2 *Bison Kill Sites in Montana*

Bison kill sites can be found throughout the state of Montana. The Kobold Site is a bison jump located in southeastern Montana. The site was used as a bison jump across a span of approximately 3,500 to 4,000 years, beginning around 5,000 years ago. Three distinct layers of bison jumping activity are present at the site. The site contains stone drive line markers delineating the route to the 25-foot drop of the jump. Various butchering and processing techniques are evident at the site; sometimes meat was stripped from the carcasses and other times carcasses were disarticulated and bones were deliberately broken. Evidence from the site suggests that the jump was utilized predominantly in the late summer and fall (Frison 1970b).

5.4.3 *Bison Kill Sites in Nebraska*

The Scottsbluff site in Nebraska is a Paleoindian bison bone bed with a minimum of 30 *Bison antiquus* represented. In the 1932 excavations of the site, archaeologists uncovered four projectile points and four scrapers associated with the bison bone. Dentition from the site indicates that the bison were slaughtered during the late spring or summer (Todd et al. 1990).

Perhaps the most publicized bison kill site in Nebraska is the Hudson-Meng site, a Paleoindian site in the western part of the state dated to between 10,500 and 11,250 years ago. Agenbroad (1978:128) suggests that Hudson-Meng is an arroyo jump site with at least 300 individual bison present. The bison at Hudson-Meng are *Bison antiquus* or perhaps an intermediate species between *Bison antiquus* and *Bison bison*. The site was a kill and butchering location used over multiple periods of time with at least two different distinct kill events represented at the site. The most visible components of the site are Alberta with some Eden components as well, but the site also may have been used into the Archaic period (Barg 2013).

5.4.4 *Bison Kill Sites in Iowa*

Little has been published on bison kill sites in Iowa. The Simonsen Site in northwestern Iowa dates to approximately 8,500 B.P. The site has produced projectile points in association with a dense bone bed. More than 25 bison have been recovered from the site, all identified as *Bison bison occidentalis*. The site is located in a river bank, 15 feet below the top of the alluvial terrace (Agogino and Frankforter 1960). Given the lack of lack of rimrock in the area, the Simonsen Site most likely represents a late Paleoindian impoundment site.

5.4.5 *Bison Kill Sites in Minnesota*

Bison kill sites also have been recorded throughout Minnesota. The Itasca Site, in north-central Minnesota, dates to 7,000 to 8,000 years ago and contains a minimum of 16 bison identified as *Bison*

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bison occidentalis. The specific hunting technique used at this site is not known, but archaeologists think that the site was an impoundment, with bison either being driven into the narrow point of what is now known as Nicollet Valley or with bison being driven and ambushed as they crossed the narrow bay at the southern end of Lake Itasca. The faunal remains of the Itasca Site represent cow-calf groupings, indicating that the kill event occurred outside of the summer rutting season (Shay 1978).

6. Conclusion

Communal bison hunting occurred throughout the state of South Dakota for thousands of years. As additional sites are recorded and analyzed, the temporal and geographic distribution of bison kill sites within the state is expected to fluctuate. Additional analyses of bison kill sites within South Dakota is also expected to refine the cultural affiliations assigned to communal bison hunting sites within the state. Despite the need for additional research, current research indicates that multiple American Indian cultures in South Dakota practiced communal bison hunting from the Paleoindian to at least the Late Prehistoric and Plains Village Periods and likely into the Historic Period. This document will aid future researchers in identifying and evaluating bison kill sites within the state of South Dakota and in interpreting the significance of these sites for nominations to the National Register of Historic Places.

F. Associated Property Types

There are four property types associated with bison kill sites in South Dakota: **jumps, impoundments, general kill sites, and isolated drive lines**. In identifying, evaluating, and possibly nominating these properties to the National Register of Historic Places, cultural resource managers should be aware that bison kill sites may contain multiple resources or may be contained within a larger multicomponent site.

Bison kill sites may contain bone beds, drive lines, ritual activity areas, processing areas, or any other number and combination of features. When considering the boundary of a bison kill site, all features which are significant to the kill site and retain integrity should be included.

If the kill site is part of a larger multicomponent site, resources not associated with the bison kill are likely to be encountered. For example, stone circles placed within drive lines likely were constructed after the lines had served their purpose in the kill event. If the stone circles were placed purposely as part of a post-kill ritual or ceremony or they are evidence of habitation structures during the processing of the remains, they should be included as integral to the site. However, if the stone circles are not contemporaneous with any part of the kill event or have no ritual significance with bison kills, they are not considered integral to the site and should be noted as such. Similarly, if the area surrounding the bison kill site has been developed for agriculture and a grain bin is now located within the boundary of the bison kill site, the grain bin would be considered not integral to the site.

Determining the boundary of the bison kill site requires an understanding of the nature of the activities leading up to and creating the bison kill site. Hunters may have loosely herded the bison into a catchment area before driving them to the kill location. If said catchment area is discernable on the landscape and retains integrity, the boundary should be drawn to include the catchment area. If a kill site contains a bone bed at the base of a cliff, and the faunal remains and artifact assemblage from the bone

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bed indicate the bison were driven off the cliff, the kill site can be identified as a jump and, as long as both the cliff and the bone bed retain integrity, the boundary should be drawn to include both. However, if the only discernable feature of a bison kill site is the bone bed because erosion or other processes have altered the surrounding features and the drive route no longer retains integrity, the boundary would only include the bone bed. Consult *National Register Bulletin: How to Complete the National Register Registration Form* and *National Register Bulletin: Defining Boundaries for National Register Properties* for additional information on determining the boundary of individual bison kill sites for listing.

1. Property Type: Jumps

1.1 Description

Bison jumps are sites in which American Indians drove a herd of bison over a steep cliff as a means of killing large numbers of bison in a single event. The fall from the cliff killed many bison and/or left bison immobile to the extent that hunters could easily dispatch them. Then, people utilized stone and bone tools to dismember the carcasses. Portions of the carcasses could then be taken elsewhere at the site or to a different site to further process, to preserve, and/or to consume the remains.

Jump sites rely on an adequate cliff over which to drive bison, meaning they are usually located in areas where rimrock cliffs are present or were present in the past. Jump sites may contain drive lines or natural topography, or a combination thereof, which indicate the route in which the bison were driven to ensure they reached the cliff edge in a stampede. Additionally, as the success of a bison jump relied on a large herd of around 100 bison or more, jump sites often resulted in many more individuals being killed than could be consumed or processed. As such, jump sites will likely contain a bone bed at the base of the cliff in which entire bison may have been left intact.

Because the location of a bison jump was often selected because of its specific topographic features, a single jump site may have been utilized as a kill site multiple times. American Indians may have burned the remnant carcasses or skeletal remains at the base of the cliff in preparation of the site for another kill event. As such, the bone bed of a jump site may have a charcoal layer(s) separating discrete kill events.

Depending on the nature and extent of surface features and artifacts at a jump site, excavation may or may not be necessary to evaluate the site for eligibility to the National Register of Historic Places. Excavation may be necessary to positively identify the site as a kill site and not a natural deposition of bison remains at the base of a cliff and/or to determine if the site represents a single kill event or multiple kill events. Additionally, excavation may be necessary to recover *in situ* diagnostic artifacts or to obtain uncontaminated samples of bison collagen for radiocarbon analysis. Such dating techniques may be needed to define the site's period of significance.

1.2 Statement of Significance

A jump can be eligible for listing in the National Register of Historic Places under **Criterion A**, **Criterion C**, or **Criterion D**. It is very unlikely that a jump site will be eligible under **Criterion B**.

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However, if historic, oral historic, or ethnographic evidence indicate that a bison jump was associated with an important, named individual in the past, the site may be eligible under Criterion B. The likelihood of a jump being eligible under Criterion B, however, is so minimal that it will not be treated in detail in this document and should be evaluated on a site-by-site basis, if necessary.

1.2.1 Criterion A

A jump may be eligible for its association with **Ethnic Heritage (Native American), Commerce, and/or Exploration/Settlement.**

Ethnic Heritage (Native American) – Jump sites may be eligible for their association with the indigenous peoples who inhabited the area which would become the state of South Dakota from 9500 B.C. to the present day. Bison hunting, including communal bison jumps, has long been associated with the indigenous peoples of the Great Plains. Archaeological, historical, and ethnographic evidence indicate that bison hunting was widespread across numerous Plains cultures and occurred for millennia.

Commerce – The intensified use of bison jumps in the Great Plains during the Archaic Period has been linked with increased pemmican production for trade with Mississippian and other cultures further to the east. Therefore, bison jumps in South Dakota may be eligible under Criterion A for their association with trade networks during key periods of time.

Exploration/Settlement – Bison jumps may be eligible under Criterion A for their association with the various settlement patterns of indigenous cultures living in the area which would become South Dakota. Settlement patterns strongly influence and are influenced by the provisioning strategies employed by a cultural group. In what is now South Dakota, past provisioning strategies included nomadic big-game hunting, seasonal migration to available resources, and horticultural/agricultural sedentism with far-reaching hunting parties. Bison jumps are evidence of the provisioning strategies of indigenous cultures and can offer insights into the settlement and/or movement of indigenous groups across the Northern Plains in relation to bison populations, natural resources, and environmental conditions.

1.2.2 Criterion C

A jump may be eligible if it evidences clear human manipulation of the landscape to facilitate the driving and stampeding of a large group of bison over a cliff. As such, a jump may be eligible under Criterion C for the **Landscape Architecture** area of significance.

Landscape Architecture – A jump site that contains clear evidence of how humans manipulated or altered the landscape to facilitate the successful killing of a large number of bison during a single event by driving them over a cliff may be eligible under Criterion C. Jumps eligible under Criterion C must retain a high degree of integrity, even if that integrity is at an archaeological level, to convey not just the kill event itself, but the manipulation or alteration of the landscape that made such a kill event possible. Jumps that contain drive lines, evidence of catchment areas, or other evidence of how indigenous

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peoples drove the bison over the cliff may be eligible under this criterion if the features are well-preserved and clearly recognizable as features of a bison jump. These features illustrate important concepts in indigenous planning and design of meat procurement.

1.2.3 Criterion D

Jump sites have the potential to yield information on a variety of topics important in prehistory and history. Therefore, jump sites may be eligible under Criterion D for **Archaeology (Prehistoric)** and **Archaeology (Historic – Aboriginal)**. Depending on the artifacts and features present, jump sites may reveal information on tool use and expedient tool manufacture, butchering and processing strategies, the social organization of people necessary to conduct a communal bison jump, religious or ceremonial associations with bison jumps, and the movement and/or settlement of indigenous peoples across the landscape. As such, bison jumps also may be eligible under Criterion D for **Ethnic Heritage (Native American)**, **Commerce**, **Exploration/ Settlement**, **Religion**, **Social History**, and Other Areas.

Archaeology (Prehistoric) – A jump site has enormous potential to yield important information regarding the aboriginal cultures of South Dakota and the Great Plains before the advent of written records. A jump site may yield information on expedient tool manufacture, tool use, subsistence strategies, butchering and processing techniques, human-environment interaction, and social organization.

Archaeology (Historic-Aboriginal) – A jump site from the period when written records were kept of South Dakota and the Great Plains also has potential to yield important information regarding aboriginal cultures. A jump site from the historic era may yield information on expedient tool manufacture, tool use, subsistence strategies, butchering and processing techniques, human-environment interaction, and social organization.

Ethnic Heritage (Native American) - Jump sites may be eligible for their potential to yield important information regarding the indigenous peoples who inhabited the area which would become the state of South Dakota from 9500 B.C. to the present day. Bison hunting, including the use of communal bison jumps, has been associated with numerous cultures across the Great Plains for millennia.

Commerce – The intensified use of bison jumps in the Great Plains during the Archaic Period has been linked with increased pemmican production for trade with Mississippian and other cultures further to the east. Therefore, bison jumps in South Dakota may be eligible under Criterion D for yielding or having the potential to yield information regarding trade networks during key periods of time.

Exploration/ Settlement – A bison jump may be eligible under this criterion for its ability to provide information regarding the diachronic peopling and settlement of the area which would become South Dakota. Bison jumps may be able to provide relative dates of the occupation or utilization of an area based on projectile point and lithic tool typologies or absolute dates of the occupation or utilization of an area from radioisotopic analysis of bison remains. Additionally, as settlement patterns influence and are influenced by the provisioning strategies employed by a cultural group, bison jumps may yield

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information on the nomadism, seasonal migrations, or sedentism practiced by different indigenous cultures at different points in time.

Religion – Some bison kill sites in the Great Plains contain features evident of shamanistic or ceremonial activity at the site. Therefore, a bison jump in South Dakota may be eligible under Criterion D if it has the potential to yield information on American Indian religious practices connected to communal bison kills.

Social History – Bison jumps may contain artifacts and/or features which reveal the lifeways of indigenous Plains cultures. Combined with ethnographic evidence and oral histories, evidence from a bison jump may reveal information on how different social groups within the Plains cultures were organized to stalk, drive, kill, and butcher the bison. Such information can inform our understanding of the different roles played by different age groups and/or social groups within a society, such as the sexual division of labor within Plains cultures as it pertained to provisioning.

Possible Research Questions Associated with Criterion D

- What characteristics do jumps in South Dakota share with bison jumps elsewhere in the Great Plains? What might account for these similarities or differences?
- Do trends in the preferences of utilizing jumps versus impoundments as bison kill sites follow any temporal or geographic trends within South Dakota?
- What can bison jumps reveal about technology and trade networks in the Great Plains?
- Do the temporal and geographic distributions of jump sites in South Dakota reflect any of the large-scale climatic changes which the Great Plains experienced over the past 11,000 years?
- Is the hypothesis that the Black Hills served as a refuge for plants and animals during the Altithermal supported in the archaeological evidence from bison jumps?
- What can bison jumps in South Dakota reveal about the climatic and environmental conditions within the state at certain points in prehistory and history?
- Is there any relationship between the species or subspecies of bison killed at a jump site and the artifacts and features present at that site or the strategies evidenced at the site to drive the bison to the jump site?
- Do the intensive hunting and processing strategies seen at Archaic Period jump sites in Wyoming and Montana extend into South Dakota?

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- What can jumps reveal about the extent to which tribes living in what is now South Dakota were involved in the pemmican trade?
- During what season were most bison jumps utilized?
- What can the seasonality of utilization of bison jumps reveal about seasonal migration patterns or settlement patterns of indigenous cultures in what is now South Dakota?
- What evidence is there at bison jumps in South Dakota of any ritual or ceremonial behaviors surrounding the kill?
- How does a more sedentary lifestyle and the advent of horticulture and agriculture in the Woodland and Plains Village tradition affect bison hunting practices?
- What type of social organization and knowledge is necessary to locate herds of bison on the Plains and drive them to a jump?

1.3 Registration Requirements

1.3.1 Criterion A

To be eligible under Criterion A, a jump must be positively identified as a bison kill site and not as a natural deposition of bone and/or other material in association with a cliff. Evidence from the site's topography and/or from the archaeological assemblage must be consistent with that of bison jump locations to clearly identify the kill site as a jump as opposed to an impoundment.

An eligible jump will usually retain integrity of location, setting, materials, design, and association. The jump should contain diagnostic artifacts or dateable features to place the site within the proper chronological and/or cultural context. The jump should not have been extensively damaged by excavation, either purposeful or inadvertent, or have radical changes to its local environment which inhibit the interpretation of the site as a prehistoric or historic bison jump. Given the importance of the landscape in constructing and utilizing bison jumps, the overall setting of the jump should reflect the general environment in which the kill event took place but need not be completely immune to natural or cultural modification. If the exact cliff over which the bison were driven has eroded or been destroyed, but the overall environment still contains rimrock cliffs, the jump may still be eligible. Similarly, if recent development has occurred within the viewshed of the jump, the jump may still be eligible if the immediate setting of the jump has been retained. In jumps containing drive lines, processing areas, or other features, or in jumps in which the archaeological assemblage reflects a kill site in which bison were killed by driving them over a cliff, integrity of design is also retained. Integrity of workmanship may be retained depending on the artifacts and features present, and integrity of feeling may be retained depending on the features present and the integrity of the setting.

A jump may be eligible under Criterion A if it can be attributed to an identified cultural group or

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if it contains artifacts or features which clearly associate the jump with trade networks.

1.3.2 Criterion C

To be eligible under Criterion C, a jump must be positively identified as a bison kill site and not as a natural deposition of bone and/or other material in association with a cliff. The topography surrounding the site, or evidence of past topography, must be consistent with that of bison jump locations to clearly identify the kill site as a jump as opposed to an impoundment. Additionally, the jump should contain clear evidence of human manipulation and/or alteration of the landscape to facilitate the driving and stampeding of a large group of bison over a cliff.

A jump eligible under Criterion C will usually retain integrity of location, design, setting, materials, feeling, and association. The jump should contain diagnostic artifacts or dateable features to place the site within the proper chronological and/or cultural context. The jump should also contain features that evidence human manipulation or alteration of the landscape, such as drive lines, natural or cultural catchment areas, or others. The jump should not have been extensively damaged by excavation, either purposeful or inadvertent, or have radical changes to its local environment. The features associated with the manipulation or alteration of the landscape should be clearly associated with the jump to evidence the design of the kill site.

1.3.3 Criterion D

To be eligible under Criterion D, a jump must be positively identified as a bison kill site and not as a natural deposition of bone and/or other material in association with a cliff. The topography surrounding the site, or evidence of past topography, must be consistent with that of bison jump locations to clearly identify the kill site as a jump as opposed to an impoundment.

An eligible jump should retain integrity of location, materials, and association. The materials present at the site should be sufficient to demonstrate the chronological and/or cultural context of the site and to answer or provide information relevant to one or more of the possible research questions listed above. Although a jump eligible under Criterion D may have been subject to purposeful or inadvertent excavation, the site should still contain or have contained enough undisturbed cultural deposits to be able to place the features and artifacts at the site within the proper context.

2. Property Type: Impoundments

2.1 Description

Bison impoundments are sites in which American Indians drove a group of bison into a natural or cultural feature from which they could not easily escape, allowing the hunters to dispatch easily a large number of animals using projectiles or other weapons. American Indians then used stone and bone tools to dismember the bison. Portions of the carcasses could then be transported to other areas of the site or to a completely different site for further processing, preservation, and/or consumption.

Many impoundments were located in arroyos or dry gullies as headcuts form natural barriers into

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which a group of animals can be driven. Natural or artificial features associated with the headcut, such as drop-offs or constructed barriers, could prevent the animals from escaping once they had entered the headcut. Depending on the topography and environment of the area, hunters could also drive bison into parabolic sand dunes to trap them. Sometimes partial corrals were constructed in arroyos to assist in trapping the bison. Other times, complete corrals were constructed to trap bison. These complete corrals may or may not have been constructed in arroyos. Wherever they were constructed, corrals likely were constructed with respect to the surrounding topography, so the bison would not be aware of the structure’s presence until it was too late.

Impoundments required the driving of a bison herd to the preferred kill location. As such, drive lines may have been constructed to funnel the bison into the arroyo or the enclosure. Other times the natural topography, or a combination of drive lines and natural topography, may have been sufficient to guide the bison’s movement to the impoundment.

Because impoundments relied on hunters to deliver the fatal blows to a large number of bison, projectile points or other weapons will likely be encountered at an impoundment site at a higher relative concentration than one would expect at a jump site. Other tools used to dismember the carcass, or evidence of the re-sharpening of tools, may also be present. These tools or weapons may be found in association with a bone bed. Additionally, an impoundment site may contain evidence of features created to aid in the driving or impounding of the bison, such as post molds demarcating a corral or the remnants of drive lines.

An impoundment will likely require some excavation to evaluate the site for eligibility to the National Register of Historic Places. The topography associated with many impoundment sites is subject to great geological activity. Arroyos regularly flood, deposit sediment in some locations, erode in other locations, and change configuration entirely (Kornfeld et al. 2010:288). Similarly, aeolian processes create and alter sand dunes. Impoundments consisting largely of human-made corrals or other structures may only be identifiable as such through the excavation of post molds or other features. Bone beds eroding out of sediments may signal the likely presence of an impoundment, but excavation will likely be necessary to positively identify the bone bed as resulting from a kill event and to reveal information on the nature of the impoundment. Moreover, as bison impounding was practiced for thousands of years, *in situ* artifacts and bison remains may be necessary for dating the site.

2.2 Statement of Significance

An impoundment can be eligible for listing in the National Register of Historic Places under **Criterion A**, **Criterion C**, or **Criterion D**. Only rarely will an impoundment be eligible under **Criterion B** if the site can be associated with an important, named individual. Because of the rarity of an impoundment being eligible under Criterion B, it will not be treated in detail in this document and will be evaluated on a site-by-site basis, if necessary.

2.2.1 Criterion A

An impoundment may be eligible for its association with **Ethnic Heritage (Native American)**, **Commerce**, and/or **Exploration/Settlement**.

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Ethnic Heritage (Native American) – Impoundments may be eligible for their association with the indigenous peoples who have inhabited the area which would become the state of South Dakota from 9500 B.C. to the present day. Communal bison hunting, including the use of impoundments, has long been associated with the indigenous peoples of the Great Plains. Archaeological, historical, and ethnographic evidence indicate that bison hunting was widespread across numerous Plains cultures and occurred for millennia.

Commerce – Intensified bison hunting in the Great Plains during the Archaic Period has been linked with increased pemmican production for trade with Mississippian and other cultures further to the east. Therefore, bison impoundments in South Dakota may be eligible under Criterion A for their association with trade networks during key periods of time.

Exploration/Settlement – Bison impoundments may be eligible under Criterion A for their association with the various settlement patterns of indigenous cultures living in the area which would become South Dakota. Settlement patterns strongly influence and are influenced by the provisioning strategies employed by a cultural group. In what is now South Dakota, past provisioning strategies included nomadic big-game hunting, seasonal migration to available resources, and horticultural/ agricultural sedentism with far-reaching hunting parties. Bison impoundments are evidence of the provisioning strategies of indigenous cultures and can offer insights into the settlement and/or movement of indigenous groups across the Northern Plains in relation to bison populations, natural resources, and environmental conditions.

2.2.2 Criterion C

An impoundment may be eligible if it evidences clear human manipulation or alteration of the landscape to facilitate the driving of a group of bison into an impoundment. This may include the construction of drive lines or an elaborate impoundment strategically placed on the landscape. As such, a jump may be eligible under the **Landscape Architecture** area of significance.

Landscape Architecture – An impoundment that contains clear evidence of how humans manipulated or altered the landscape to facilitate the successful killing of a large number of bison during a single event by driving them into a pound may be eligible under Criterion C. Impoundments eligible under Criterion C must retain a high degree of integrity, even if that integrity is at an archaeological level, to convey the active manipulation of the landscape leading up to the kill event and not just the kill event itself. Impoundments that contain evidence of drive lines or of human manipulation or alteration of a natural landform to drive the bison into the impoundment may be eligible under this criterion. Impoundments that contain evidence of a human construction to impound the bison or to aid in the impounding of the bison, such as a complete or partial corral, may also be eligible under this criterion. To be eligible under Criterion C, the features of the impoundment must be well-preserved and clearly identifiable as features or structures which aid in the driving and/or impounding of bison.

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2.2.3 Criterion D

Impoundments have the potential to yield information on a variety of topics important in prehistory and history. Therefore, an impoundment may be eligible under Criterion D for **Archaeology (Prehistoric)** and **Archaeology (Historic – Aboriginal)**. Depending on the artifacts and features present, impoundments may reveal information on tool use and expedient tool manufacture, butchering and processing strategies, the social organization of people necessary to conduct a communal bison impoundment, religious or ceremonial associations with communal bison hunting, and the movement and/or settlement of indigenous peoples across the landscape. As such, impoundments also may be eligible under Criterion D for **Ethnic Heritage (Native American), Commerce, Exploration/Settlement, Religion, Social History**, and Other Areas.

Archaeology (Prehistoric) – An impoundment has enormous potential to yield important information regarding the aboriginal cultures of South Dakota and the Great Plains before the advent of written records. An impoundment may yield information on expedient tool manufacture, tool use, subsistence strategies, butchering and processing techniques, human-environment interaction, and social organization.

Archaeology (Historic-Aboriginal) – An impoundment from the period when written records were kept of South Dakota and the Great Plains also has potential to yield important information regarding aboriginal cultures. An impoundment from the historic era may yield information on expedient tool manufacture, tool use, subsistence strategies, butchering and processing techniques, human-environment interaction, and social organization.

Ethnic Heritage (Native American) - Impoundments may be eligible for their potential to yield important information regarding the indigenous peoples who have inhabited the area which would become the state of South Dakota from 9500 B.C. to the present day. Bison hunting, including the use of communal bison pounds, has been associated with numerous cultures across the Great Plains for millennia.

Commerce – Intensified communal bison hunting in the Great Plains during the Archaic Period has been linked with increased pemmican production for trade with Mississippian and other cultures further to the east. Therefore, bison impoundments in South Dakota may be eligible under Criterion D for yielding or having the potential to yield information regarding trade networks during key periods of time.

Exploration/ Settlement – An impoundment may be eligible under this criterion for its ability to provide information regarding the diachronic peopling and settlement of the area which would become South Dakota. Bison impoundments may be able to provide relative dates of the occupation or utilization of an area based on projectile point and lithic tool typologies or absolute dates of the occupation or utilization of an area from radioisotopic analysis of bison remains. Additionally, as settlement patterns influence and are influenced by the provisioning strategies employed by a cultural group, impoundments may yield information on the nomadism, seasonal migrations, or sedentism practiced by different indigenous cultures at different points in time.

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Religion – Some bison kill sites in the Great Plains contain features evident of shamanistic or ceremonial activity at the site. Therefore, an impoundment in South Dakota may be eligible under Criterion D if it has the potential to yield information on American Indian religious practices connected to communal bison kills.

Social History – Impoundment sites may contain artifacts and/or features which reveal the lifeways of indigenous Plains cultures. Combined with ethnographic evidence and oral histories, evidence from an impoundment may also reveal information on how different social groups within the Plains cultures were organized to stalk, drive, kill, and butcher the bison. Such information can inform our understanding of the different roles played by different age groups and/or social groups within a society, such as the sexual division of labor within Plains cultures as it pertained to provisioning.

Possible Research Questions Associated with Criterion D

- What characteristics do impoundments in South Dakota share with bison impoundments elsewhere in the Great Plains? What might account for these similarities or differences?
- Do trends in the preferences of utilizing jumps versus impoundments as bison kill sites follow any temporal or geographic trends within South Dakota?
- What can bison impoundments reveal about technology and trade networks in the Great Plains?
- Do the temporal and geographic distributions of impoundment sites in South Dakota reflect any of the large-scale climatic changes which the Great Plains experienced over the past 11,000 years?
- Is the hypothesis that the Black Hills served as a refuge for plants and animals during the Altithermal supported in the archaeological evidence from bison impoundments?
- What can impoundments in South Dakota reveal about the climatic and environmental conditions within the state at certain points in prehistory and history?
- Is there any relationship between the species or subspecies of bison killed at an impoundment and the artifacts and features present at that site or the strategies evidenced at the site to drive the bison to and trap the bison at the impoundment?
- Do the intensive hunting and processing strategies seen at Archaic Period bison kill sites in Wyoming and Montana extend into South Dakota?

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- What can impoundments reveal about the extent to which tribes living in what is now South Dakota were involved in the pemmican trade?
- During what season were most bison impoundments utilized?
- What can the seasonality of utilization of impoundments reveal about seasonal migration patterns or settlement patterns of indigenous cultures in what is now South Dakota?
- What evidence is there at impoundment sites in South Dakota of any ritual or ceremonial behaviors surrounding the kill?
- How does a more sedentary lifestyle and the advent of horticulture and agriculture in the Woodland and Plains Village tradition affect bison hunting practices?
- What type of social organization and knowledge is necessary to locate herds of bison on the Plains and drive them to and trap them in an impoundment?

2.3 Registration Requirements

2.3.1 Criterion A

To be eligible under Criterion A, an impoundment must be positively identified as a bison kill site and not as a natural deposition of bone and/or other material. Additionally, the topography of the site and/or features and artifacts present at the site should indicate that the bison killed at the site were impounded and then killed, rather than being killed or immobilized by driving them off a cliff.

An eligible impoundment should retain integrity of location, setting, materials, design, and association. The impoundment should contain diagnostic artifacts to place the site within the proper chronological and/or cultural context. The site should not be extensively damaged by purposeful or inadvertent excavation. Any archaeological excavation at the site should be done in a systematic manner with proper field notes taken so as to not destroy the site. Additionally, the local environment of the impoundment should not have been radically altered. Although the topography surrounding the impoundment may have changed through geological activity, it should still be able to convey a sense of the setting of the impoundment at the time of the kill event. Impoundments that contain evidence of features which aided in the trapping of the bison, such as drive lines or corrals, also retain integrity of design.

An impoundment may be eligible under Criterion A if it can be attributed to an identified cultural group or if it contains artifacts or features which clearly associate the site with trade networks.

2.3.2 Criterion C

To be eligible under Criterion C, an impoundment must be positively identified as a bison kill

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site and not as a natural deposition of bone and/or other material. Additionally, the topography of the site and/or features and artifacts present at the site should indicate that the bison killed at the site were impounded and then killed, rather than being killed or immobilized by driving them off a cliff. Furthermore, an impoundment eligible under Criterion C should contain clear evidence of human manipulation or alteration of the landscape to facilitate the driving of the bison into the pound, to impound the bison, or to aid in the impounding of the bison.

An impoundment eligible under Criterion C will usually retain integrity of location, design, setting, materials, feeling, and association. The impoundment should contain diagnostic artifacts to place the site within the proper chronological and/or cultural context. The impoundment should also contain features that evidence human manipulation or alteration of the landscape, such as drive lines, partial or complete corrals, or others. The site should not be extensively damaged by purposeful or inadvertent excavation. Any archaeological excavation at the site should be done in a systematic manner with proper field notes taken so as to not destroy the site. Additionally, the local environment of the impoundment should not have been radically altered. Although the topography surrounding the impoundment may have changed through geological activity, it should still be able to convey a sense of the setting of the impoundment at the time of the kill event. The features associated with the manipulation or alteration of the landscape should be clearly associated with the impoundment to evidence the design of the kill site.

2.3.3 Criterion D

To be eligible under Criterion D, an impoundment must be positively identified as a bison kill site and not as a natural deposition of bone and/or other material. Additionally, the topography of the site and/or features and artifacts present at the site should indicate that the bison killed at the site were impounded and then killed, rather than being killed or immobilized by driving them off a cliff.

An eligible impoundment should retain integrity of location, materials, and association. The materials present at the site should be sufficient to demonstrate the chronological and/or cultural context of the site and to answer or provide information relevant to one or more of the possible research questions listed above. Although an impoundment eligible under Criterion D may have been subject to purposeful or inadvertent excavation, the site should still contain or have contained enough undisturbed cultural deposits to be able to place the features and artifacts at the site within the proper context. Any archaeological excavation at the site should be done in a systematic manner with proper field notes taken so as to not destroy the site.

3. Property Type: General Kill Sites

3.1 Description

General kill sites are communal bison kill sites in which American Indians killed multiple bison at once and then used stone and/or bone tools to dismember the bison. Portions of the carcass could then be transported to other areas of the site or to a different site for furthering processing, preservation, and/or consumption.

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At a general kill site, bison may have been killed on separate occasions using different means or bison may have been killed using a single means, but it is unclear whether that means was by driving them off a cliff (jump) or by impounding them and killing them with points or other weapons (impoundments). Repeated use of a geographic area may result in the overlap of an identifiable jump site and an identifiable impoundment site within the same site boundary. In some instances, a general kill site may only have been used once, but the terrain in which the site is located could lend itself to multiple options and it may not be clear if jumping or impounding was the mass procurement method utilized. Similarly, geological or cultural processes may have altered the topography to such an extent that it is difficult or impossible to ascertain the past topography of the site and/or how a communal bison kill was operated. General bison kill sites will still contain evidence of the slaughter and primary butchery of multiple bison, usually in the form of a minimally-processed bone bed with associated artifacts.

General kill sites may or may not require excavation for evaluation, depending on the nature and extent of the site. However, the site must be able to be positively identified as a kill site as opposed to a natural accumulation of bison remains. Excavations likely will be necessary to assess the potential of subsurface deposits for revealing past topography and/or how the site was operated. If the excavations fail to determine how the site was operated, the site may still be eligible as a general kill site. Additionally, excavation at a general kill site may recover *in situ* diagnostic artifacts or bison remains which may be necessary for dating the site and determining the site's period of significance.

3.2 Statement of Significance

A general bison kill site can be eligible for listing in the National Register of Historic Places under **Criterion A**, **Criterion C**, or **Criterion D**. It is very unlikely that a general kill site will be eligible under **Criterion B**. If historic, oral historic, or ethnographic evidence indicate that a general kill site was associated with an important, named individual in the past, the site may be eligible under Criterion B. The likelihood of a general kill site being eligible under Criterion B, however, is so minimal that it will not be treated in detail in this document and will be evaluated on a site-by-site basis, if necessary. Additionally, very few general kill sites will be eligible under Criterion C. Only those which are identified as general kill sites because they contain evidence that both jumping and impounding were practiced or could have been practiced at the site may be eligible under Criterion C.

3.2.1 Criterion A

A general kill site may be eligible for its association with **Ethnic Heritage (Native American)**, **Commerce**, and/or **Exploration/Settlement**.

Ethnic Heritage (Native American) – General kill sites may be eligible for their association with the indigenous peoples who have inhabited the area which would become the state of South Dakota from 9500 B.C. to the present day. Communal bison hunting has long been associated with the indigenous peoples of the Great Plains. Archaeological, historical, and ethnographic evidence indicate that bison hunting was widespread across numerous Plains cultures and occurred for millennia.

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Commerce – Intensified bison hunting in the Great Plains during the Archaic Period has been linked with increased pemmican production for trade with Mississippian and other cultures further to the east. Therefore, general kill sites in South Dakota may be eligible under Criterion A for their association with trade networks during key periods of time.

Exploration/Settlement – General kill sites may be eligible under Criterion A for their association with the various settlement patterns of indigenous cultures living in the area which would become South Dakota. Settlement patterns strongly influence and are influenced by the provisioning strategies employed by a cultural group. In what is now South Dakota, past provisioning strategies included nomadic big-game hunting, seasonal migration to available resources, and horticultural/ agricultural sedentism with far-reaching hunting parties. General bison kills can evidence the provisioning strategies of indigenous cultures and can offer insights into the settlement and/or movement of indigenous groups across the Northern Plains in relation to bison populations, natural resources, and environmental conditions.

3.2.2 Criterion C

Only those general kill sites which contain clear evidence that both bison jumping and bison impounding were practiced or could have been practiced at the site may be eligible under Criterion C if they evidence clear human manipulation or alteration of the landscape to facilitate both the driving of groups of bison into an impoundment and over a cliff. General kill sites in which only a bone bed remains and it is unclear whether the bison were killed via impounding or via jumping will lack the necessary landscape features to make them eligible under Criterion C. Those general kill sites which do contain evidence of the human manipulation or alteration of the landscape to communally slaughter a group of bison by multiple means may be eligible under the **Landscape Architecture** area of significance.

Landscape Architecture – A general kill site that contains clear evidence of how humans manipulated or altered the landscape to create both jumping and impounding conditions for killing a large number of bison during a single event may be eligible under Criterion C. General kill sites eligible under Criterion C must retain a high degree of integrity, even if that integrity is at an archaeological level, to convey the active manipulation of the landscape leading up to the kill event and not just the kill event itself. General kill sites which may be eligible under this criterion include those that contain evidence of drive lines to a cliff as well as drive lines to an impoundment.

3.2.3 Criterion D

General kill sites have the potential to yield information on a variety of topics important in prehistory and history. Therefore, general kill sites may be eligible under Criterion D for **Archaeology (Prehistoric)** and **Archaeology (Historic – Aboriginal)**. Depending on the artifacts and features present, general kill sites may reveal information on tool use and expedient tool manufacture, butchering

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and processing strategies, religious or ceremonial associations with communal bison hunting, and the movement and/or settlement of indigenous peoples across the landscape. As such, general kill sites also may be eligible under Criterion D for **Ethnic Heritage (Native American), Commerce, Exploration/ Settlement, Religion, Social History,** and Other Areas.

Archaeology (Prehistoric) – A general kill site has potential to yield information important regarding the aboriginal cultures of South Dakota and the Great Plains before the advent of written records. A general kill site may yield information on expedient tool manufacture, tool use, subsistence strategies, butchering and processing techniques, human-environment interaction, and social organization.

Archaeology (Historic-Aboriginal) – A general kill site from the period when written records were kept of South Dakota and the Great Plains also has potential to yield important information regarding aboriginal cultures. A general kill site from the historic era may yield information on expedient tool manufacture, tool use, subsistence strategies, butchering and processing techniques, human-environment interaction, and social organization.

Ethnic Heritage (Native American) – General kill sites may be eligible for their potential to yield important information regarding the indigenous peoples who have inhabited the area which would become the state of South Dakota from 9500 B.C. to the present day. Communal bison hunting has been associated with numerous cultures across the Great Plains for millennia.

Commerce – Intensified bison hunting in the Great Plains during the Archaic Period has been linked with increased pemmican production for trade with Mississippian and other cultures further to the east. Therefore, general bison kill sites in South Dakota may be eligible under Criterion D for yielding or having the potential to yield information regarding trade networks during key periods of time.

Exploration/ Settlement – A general kill site may be eligible under this criterion for its ability to provide information regarding the diachronic peopling and settlement of the area which would become South Dakota. General kill sites may be able to provide relative dates of the occupation or utilization of an area based on projectile point and lithic tool typologies or absolute dates of the occupation or utilization of an area from radioisotope analysis of bison remains. Additionally, as settlement patterns strongly influence and are influenced by the provisioning strategies employed by a cultural group, general kill sites may yield information on the nomadism, seasonal migrations, or sedentism practiced by different indigenous cultures at different points in time.

Religion – Some bison kill sites in the Great Plains contain features evident of shamanistic or ceremonial activity at the site. Therefore, a general kill site in South Dakota may be eligible under Criterion D if it has the potential to yield information on American Indian religious practices connected to communal bison kills.

Social History – General kill sites may contain artifacts and/or features which reveal the lifeways of indigenous Plains cultures. Combined with ethnographic evidence and oral histories, evidence from a

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general kill site also may reveal information on how different social groups within the Plains cultures were organized to stalk, drive, kill, and butcher the bison. Such information can inform our understanding of the different roles played by different age groups and/or social groups within a society, such as the sexual division of labor within Plains cultures as it pertained to provisioning.

Possible Research Questions Associated with Criterion D

- What can general kill sites in South Dakota reveal about communal bison hunting in the Great Plains?
- What can general kill sites reveal about technology and trade networks in the Great Plains?
- Do the temporal and geographic distributions of general kill sites in South Dakota reflect any of the large-scale climatic changes which the Great Plains experienced in the past 11,000 years?
- Is the hypothesis that the Black Hills served as a refuge for plants and animals during the Altithermal supported in the archaeological evidence from general kill sites?
- What can general kill sites in South Dakota reveal about the climatic and environmental conditions within the state at certain points in prehistory and history?
- Do the intensive hunting and processing strategies seen at Archaic Period bison kill sites in Wyoming and Montana extend into South Dakota?
- What can general bison kill sites reveal about the extent to which tribes living in what is now South Dakota were involved in the pemmican trade?
- During what season did most of the events at general kills sites occur?
- What can the seasonality of general kill sites reveal about seasonal migration patterns or settlement patterns of indigenous cultures in what is now South Dakota?
- What evidence is there at general bison kill sites in South Dakota of any ritual or ceremonial behaviors surrounding the kill?
- How does a more sedentary lifestyle and the advent of horticulture and agriculture in the Woodland and Plains Village tradition affect bison hunting practices?
- What type of social organization and knowledge is necessary to conduct a communal bison kill?

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3.3 Registration Requirements

3.3.1 Criterion A

To be eligible under Criterion A, a general kill site must be positively identified as a bison kill site and not as a natural deposition of bone and/or other material.

An eligible general kill site will usually retain integrity of location, materials, feeling, and association. The kill site should contain diagnostic artifacts or dateable remains to place the site within the proper chronological and/or cultural context. The general kill site should not have been extensively damaged by either purposeful or inadvertent excavation. Any archaeological excavation at the site should be done in a systematic manner with proper field notes taken so as to not destroy the site. Although geological processes may have altered the topography of the site to such an extent that it cannot be determined how the bison were killed, the cultural deposits of the site should be intact enough to still convey the association of the deposits with the kill event.

A general kill site may be eligible under Criterion A if it can be attributed to an identified cultural group or if it contains artifacts or features which clearly associate the site with trade networks.

3.3.2 Criterion C

To be eligible under Criterion C, a general kill site must be positively identified as a bison kill site and not as a natural deposition of bone and/or other material. Additionally, the topography of the site and the features present at the site should indicate that the site was used or could be used for both jumping and impounding kill activities. As such, a general kill site eligible under Criterion C should contain clear evidence of the human manipulation or alteration of the landscape to facilitate the driving of bison to either a jump or a pound located within the same site boundary.

A general kill site eligible under Criterion C will usually retain integrity of location, design, setting, materials, feeling, and association. The site should contain diagnostic artifacts to place the site within the proper chronological and/or cultural context. The kill site should also contain features that evidence human manipulation or alteration of the landscape, such as drive lines, partial or complete corrals, or others. The site should not be extensively damaged by purposeful or inadvertent excavation. Any archaeological excavation at the site should be done in a systematic manner with proper field notes taken so as to not destroy the site. Additionally, the local environment of the general kill site should not have been radically altered. Although the topography surrounding the site may have changed through geological activity, it should still be able to convey a sense of the setting of the site at the time of the kill event. The features associated with the manipulation or alteration of the landscape should be clearly associated with both jumping and impounding activities to evidence the design of the kill site either at distinct points in time in which one activity was preferred over the other or at a single point in time in which multiple options were available for the hunters to use in dispatching the bison.

3.3.3 Criterion D

To be eligible under Criterion D, a general kill site must be positively identified as a bison kill

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site and not as a natural deposition of bone and/or other material.

An eligible general kill site should retain integrity of location, materials, and association. The materials present at the site should be sufficient to demonstrate the chronological and/or cultural context of the site and to answer or provide information relevant to one or more of the possible research questions listed above. The general kill site should not have been extensively damaged by either purposeful or inadvertent excavation. Any archaeological excavation at the site should be done in a systematic manner with proper field notes taken so as to not destroy the site. Although geological processes may have altered the topography of the site to such an extent that it cannot be determined how the bison were killed, the cultural deposits of the site should be intact enough to yield or have the potential to yield information important in prehistory or history.

4. Property Type: Isolated Drive Lines

4.1 Description

Isolated drive lines are the remnants of the constructions used by American Indians to assist in herding a group of bison to the kill location, where the kill location itself is no longer extant or where there is no evidence of the kill event ever taking place. Drive lines can be associated with either jumps or impoundments, but isolated drive lines cannot be associated with a specific type of kill site because the actual kill location is not identifiable. If drive lines clearly can be associated with either a jump or an impoundment, they should be recorded as an integral feature of that property type.

Isolated drive lines may be identified by the presence of rock cairns, stone alignments, a series of post molds in a roughly linear arrangement, or other purposefully-arranged features. Historical accounts indicate that drive lines were constructed of rocks, brush, tipi lodge poles, blankets, snow, dung, and people and may have been embellished with brush or smoldering dung. Additionally, the features of drive lines may have marked the locations of people along the drive route (Barsh and Maylor 2003:575; Brink 2016:380; Keyser and Knight 1976:293).

To determine if a stone alignment or series of post molds with no clearly associated kill location is an isolated drive line as opposed to a different feature, the overall context of the alignment must be considered. Topography is a key component to any bison kill site, and isolated drive lines are no exception. Drive lines were placed purposefully on the landscape to be seen by bison and to direct the movements of the bison to a preferred location. Human activity, such as quarrying, or natural activity, such as erosion, may have obliterated the evidence of the bison kill at the actual jump or impoundment location. Or, the drive lines may have been constructed but never utilized in a successful kill event. However, if the topography of the location of the isolated drive line is consistent with that associated with bison jumps or impoundments in the region, an isolated drive line may be identified as a type of bison kill property even if the site does not contain a significant number of *Bison* spp. bones.

Isolated drive lines may be identified and evaluated through surface or subsurface investigations, depending on the nature of the isolated drive lines. Isolated drive lines constructed of rock cairns or other stone features will likely be identifiable through pedestrian survey. Mapping of the stone features can reveal the alignment of the features on the landscape, and excavations likely will not be necessary to evaluate the features as an isolated drive line. Isolated drive lines constructed of wooden posts/poles or

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other organic materials, however, will likely not leave any surface indications of their presence. Rather, organic isolated drive lines will likely require identification and evaluation of subsurface features, either through excavation, remote sensing techniques, or geophysical survey methods. Organic isolated drive lines may be identified as such by the presence of post molds or other soil anomalies in purposeful or inadvertent excavation of the site. Additionally, remote sensing, such as LIDAR, or geophysical survey, such as ground-penetrating radar or magnetometry, may be able to identify the post molds or other soil anomalies associated with organic isolated drive lines without needing to excavate. If excavation is done of isolated drive lines, care should be taken to not excavate the isolated drive lines out of existence by removing all features. Soil samples from excavations may be analyzed for soil chemistry to better understand the components of a drive line, such as the use of dung in drive line construction and use. Additionally, as very few, if any, diagnostic tools are expected to be recovered from isolated drive lines, excavation may produce charcoal in association with the features that can be radiocarbon dated or soil samples which can be dated by optically stimulated luminescence (OSL) to produce a more refined period of significance for the site.

4.2 Statement of Significance

An isolated drive line can be eligible for listing in the National Register of Historic Places under **Criterion A**, **Criterion C**, or **Criterion D**. It is very unlikely that an isolated drive line will be eligible under **Criterion B**. However, if historic, oral historic, or ethnographic evidence indicates that an isolated drive line was associated with an important, named individual in the past, the site may be eligible under Criterion B. Evaluating an isolated drive line under Criterion B is likely to be such a rare occurrence that it will be done so on an as-needed basis rather than addressed in detail in this document.

4.2.1 Criterion A

An isolated drive line may be eligible for its association with **Ethnic Heritage (Native American)**.

Ethnic Heritage (Native American) – Isolated drive lines may be eligible for their association with the indigenous peoples who have inhabited the area which would become the state of South Dakota from 9500 B.C. to the present day. Communal bison hunting has long been associated with the indigenous peoples of the Great Plains. Archaeological, historical, and ethnographic evidence indicate that bison hunting was widespread across numerous Plains cultures and occurred for millennia.

4.2.2 Criterion C

An isolated drive line may be eligible if it evidences clear human manipulation of the landscape to facilitate the driving of bison to a kill location. As such, an isolated drive line may be eligible under the **Landscape Architecture** area of significance.

Landscape Architecture – An isolated drive line that clearly evidences how humans manipulated or

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altered the landscape to facilitate the driving of a group of bison may be eligible under Criterion C. Isolated drive lines eligible under this criterion may have been constructed of stone, wood, or any other materials but must be well-preserved to clearly convey the route bison were driven or were planned to be driven across the landscape.

4.2.3 Criterion D

Isolated drive lines may have the potential to yield information on a variety of topics important in prehistory and history. Therefore, isolated drive lines may be eligible under Criterion D for **Archaeology (Prehistoric)** and **Archaeology (Historic – Aboriginal)**. Depending on the artifacts and the features associated with the site, an isolated drive line site may reveal information on increased trade during key periods of time, the social organization of people necessary to conduct a communal bison jump, and the movement and/or settlement of indigenous peoples across the landscape. Although artifacts are likely to be rare at isolated drive line sites, the presence of artifacts or other features may make an isolated drive line as eligible under Criterion D for **Ethnic Heritage (Native American), Commerce, Exploration/ Settlement, Social History, and Other Areas**.

Archaeology (Prehistoric) – An isolated drive line site may have potential to yield important information regarding the aboriginal cultures of South Dakota and the Great Plains before the advent of written records. An isolated drive line site may yield information on human-environment interaction and social organization.

Archaeology (Historic-Aboriginal) – An isolated drive line site from the period when written records were kept of South Dakota and the Great Plains also has potential to yield important information regarding aboriginal cultures. An isolated drive line site from the historic era may yield information on human-environment interaction and social organization.

Ethnic Heritage (Native American) – Isolated drive lines may be eligible for their potential to yield important information regarding the indigenous peoples who have inhabited the area which would become the state of South Dakota from 9500 B.C. to the present day. Communal bison hunting has been associated with numerous cultures across the Great Plains for millennia.

Commerce – Intensified bison hunting in the Great Plains during the Archaic Period has been linked with increased pemmican production for trade with Mississippian and other cultures further to the east. Therefore, isolated drive lines in South Dakota may be eligible under Criterion D for having the potential to yield information regarding increased trade activity during key periods of time, if they contain diagnostic artifacts or dateable features which place them within these periods of increased trade.

Exploration/ Settlement – An isolated drive line site may be eligible under this criterion for its ability to provide information regarding the diachronic peopling and settlement of the area which would become South Dakota. Depending on the materials recovered from the site, an isolated drive line site may be able to provide a date for the occupation or utilization of an area of the state. Additionally, as settlement

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patterns strongly influence and are influenced by the provisioning strategies employed by a cultural group, isolated drive lines may yield information on the nomadism, seasonal migrations, or sedentism practiced by different indigenous cultures at different points in time.

Social History – Isolated drive lines may reveal information on the lifeways of indigenous Plains cultures. Combined with ethnographic evidence and oral histories, evidence from an isolated drive line site may also reveal information on how individuals were organized within the culture and across the landscape to facilitate the stalking of bison and the driving of bison to a kill location. Such information can inform our understanding of the different roles played by different age groups and/or social groups within a society, such as the organization of individuals of different ages to perform different tasks to force the bison to behave and move in the desired manner.

Possible Research Questions Associated with Criterion D

- What characteristics do drive lines in South Dakota share with drive lines elsewhere in the Great Plains? What might account for these similarities or differences?
- Do isolated drive lines tend to be situated more in a topographic environment that favors jumps or impoundments? What can this reveal about past bison driving strategies? What can this reveal about the natural and cultural forces which may have removed or dissipated the evidence of the kill location itself?
- What can isolated drive lines reveal about technology and trade networks in the Great Plains?
- Of what materials were drive lines in South Dakota constructed? What can this reveal about past climatic and environmental conditions in the state?
- How were drive lines placed and utilized on the landscape to facilitate the successful driving of groups of bison?
- Do the intensive hunting strategies seen at Archaic Period bison kill sites in Wyoming and Montana extend into South Dakota?
- Can seasonality of site creation and/or usage be determined at an isolated drive line site? What can the seasonality of utilization of bison kill sites reveal about seasonal migration patterns or settlement patterns of indigenous cultures in what is now South Dakota?
- How does a more sedentary lifestyle and the advent of horticulture and agriculture in the Woodland and Plains Village tradition affect bison hunting practices?

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- What type of social organization and knowledge is necessary to create elaborate bison driving systems utilizing drive lines?

4.3 Registration Requirements

4.3.1 Criterion A

To be eligible under Criterion A, an isolated drive line site must be positively identified as such based on artifacts and features found at the site, the alignment of the features found at the site, and the topography surrounding the site.

An eligible isolated drive line site will usually retain integrity of location, setting, materials, design, and association. Although not required, the presence of diagnostic artifacts in association with the features of the isolated drive line will assist in placing the site within the proper chronological and/or cultural context. The features of the drive lines should not have been excavated, either purposefully or inadvertently, out of existence, thereby evidencing the design of the isolated drive lines. Although the physical location of the kill itself will not be present, the isolated drive lines and their surrounding environment should still retain the setting of the site.

An isolated drive line site that can be attributed to an identified cultural group based on diagnostic artifacts, ethnographic evidence, or oral history, may be eligible under Criterion A.

4.3.2 Criterion C

To be eligible under Criterion C, an isolated drive line site must be positively identified as such based on artifacts and features found at the site, the alignment of the features found at the site, and the topography surrounding the site. Additionally, the isolated drive line site should contain enough substantial features or contain enough other evidence to clearly convey human manipulation and/or alteration of the landscape to facilitate the driving of bison to a kill location.

An isolated drive line site eligible under Criterion C will usually retain integrity of location, design, setting, materials, feeling, and association. Although not required, the presence of diagnostic artifacts in association with the features of the isolated drive line will assist in placing the site within the proper chronological and/or cultural context. The features of the drive lines should not have been excavated, either purposefully or inadvertently, out of existence. Although the physical location of the kill itself will not be present, the isolated drive lines and their surrounding environment should still retain the setting and feeling of the site. The features present at the site or other materials at the site should clearly evidence the design of the drive lines on or within the landscape.

4.3.3 Criterion D

To be eligible under Criterion D, an isolated drive line site must be positively identified as such based on artifacts and features found at the site, the alignment of the features found at the site, and the topography surrounding the site.

An eligible drive line site should retain integrity of location, setting, materials, and association.

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Although not required, the presence of diagnostic artifacts in association with the features of the isolated drive line will assist in placing the site within the proper chronological and/or cultural context. The features of the drive lines should not have been excavated, either purposefully or inadvertently, out of existence. Although the physical location of the kill itself will not be present, the isolated drive lines and their surrounding environment should still retain the setting of the site, especially as this is used to identify the site as an isolated drive line.

5. Period of Significance and Level of Significance

The period of significance for bison kill sites in South Dakota is 9000 B.C. to A.D. 1875. This begins in the Paleoindian Period and extends into the beginning of the Reservation Period in South Dakota. The earliest evidence of human occupation of South Dakota dates to approximately 9500 B.C. Following the extinction of the Ice Age megafauna around 8500 B.C., Paleoindian peoples focused their hunting efforts on bison. Therefore, although very few, if any, communal bison kill sites are expected to date to 9000 B.C. within South Dakota, a period of significance beginning at 9000 B.C. will be able to encompass the earliest possible communal bison kill sites within the state. Archaeological, ethnographic, and historic evidence indicate that communal bison hunting continued through the introduction of European and Euro-American goods and settlers into the region. Bison kill sites in eastern Wyoming evidence the use of jumps from A.D. 1500 to 1800 and have been attributed to the historic Cheyenne living in the Black Hills (Kehoe 1973; Reher and Frison 1980; Sundstrom 2018). Thus, communal bison hunting likely was practiced in South Dakota into the historic era as well. However, the date 1875 was chosen as an arbitrary end date for the period of significance for bison kill sites as, by this time, most American Indians in South Dakota had been forced onto reservations, thus causing the discontinuation of many traditional provisioning practices. Additionally, by 1875, the number of bison within the state had been severely diminished through overhunting and the reduction of habitat.

The level of significance of bison kill sites is statewide. Bison kill sites have been recorded across South Dakota, occurring in numerous archaeological regions of the state. However, the significance of bison kill sites can more accurately be placed at the regional level. The current political boundaries of South Dakota wholly post-date the bison kill sites within those boundaries. Additionally, indigenous cultures across the Great Plains practiced communal bison hunting utilizing the resources and landscapes at hand. While the property types and the details of this Multiple Property Listing are specific to South Dakota, much of the information contained herein and the significance ascribed to bison kill sites can be applied beyond the geographic boundaries of the state.

G. Geographical Data

The state of South Dakota

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H. Summary of Identification and Evaluation Methods

The multiple property listing of bison kill sites in South Dakota, 9000 B.C. – A.D. 1875, is based upon decades of records of bison kill sites contained within the Archaeological Resources Management System (ARMS) database, excavation reports and field notes from previous archaeological investigations of bison kill sites, and survey and re-visitation of recorded bison kill sites within the state beginning in 2018. Bison kill sites in the state have been recorded as a result of the identification efforts mandated by the National Historic Preservation Act, state-sponsored surveys throughout the state, the Smithsonian Institute River Basin Survey, university-sponsored surveys of particular property types, or landowners discovering artifacts and/or features on their property. Individual sites were prioritized for survey and re-visitation based upon the information contained within the site forms in the ARMS database maintained by the Archaeological Research Center, a program of the South Dakota State Historical Society. Site forms include descriptions of the location, components, and field work of each site within South Dakota that has been assigned a Smithsonian trinomial. Staff at the State Historic Preservation Office and the Archaeological Research Center selected individual bison kill sites for survey based upon the location of the site, permission of the landowner, and accessibility of the site. For sites which had been formally excavated in the past, research articles, excavation reports, and field notes were consulted for additional information on the features and artifacts recovered from the site. For those sites which actively were being excavated, bison bone and associated artifacts were recovered *in situ* when possible or by passing the excavated sediment through ¼-inch hardware mesh. All recovered bones and artifacts were collected for further analysis. SHPO staff assisted with the excavation.

The bison kill sites which could be included in this multiple property listing were contextualized environmentally, ethologically, and culturally, as bison kill sites must be understood in terms of the interactions amongst humans, bison, and the natural environment. The period of significance for this multiple property listing is purposefully broad to include bison kill sites which have not yet been recorded within the state but is based upon archaeological and historical data found within South Dakota and the surrounding region. Information on the cultural contexts of bison kill sites within South Dakota was taken largely from the *South Dakota State Plan for Archaeological Resources 2018 Update* (Sundstrom 2018), which provided information on the historic contexts of South Dakota for the time periods included in this multiple property listing.

Associated property types were identified based upon information gathered from the sites visited during the surveys and upon evidence from bison kill sites throughout the Great Plains, prioritizing those in states which directly border South Dakota while considering the cultural and environmental intraregional differences which may or may not be present. Property types were defined by their form, as evidence from within the state and the surrounding region indicates that the type of bison kill site utilized was influenced by local topography and environment more so than its temporal or cultural affiliation. Additionally, defining the property type by form allowed for the inclusion of property types where the site may not have retained the integrity necessary to define the property by function but where the site still may be associated with historic events and trends, evidence human manipulation or alteration of the landscape, or have the potential to yield information important in history or prehistory.

The registration requirements for integrity were developed based upon a combination of knowledge of the condition of some of the existing properties and predictions for other recorded and

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unrecorded properties based upon trends in land use in different areas of the state. The registration requirements are worded in such a way as to allow for some flexibility in determining the eligibility of a site. If a site does not retain one of the recommended aspects of integrity, it still may be eligible for listing if it has significance and adequate integrity, as judged by the other remaining aspects.

Not all of the recorded bison kill sites in the state were able to be surveyed prior to this writing due to lack of landowner permission or inaccessible conditions. As such, this document leaned heavily on site forms, excavation reports, and field notes of recorded bison kill sites within the state as well as written research articles pertaining to bison kill sites in the Great Plains. It is hoped that this document is written in such a way as to be flexible enough to allow for consideration of the numerous bison kill sites within the state that have yet to be revisited and/or surveyed. However, as additional research is completed on individual bison kill sites within the state and new bison kill sites are recorded, the specific registration requirements and details regarding associated property types laid out in this document may be improved and refined to accommodate the latest information.

Jenna Carlson Dietmeier of the South Dakota State Historic Preservation Office prepared this multiple property listing with the assistance of and feedback from C.B. Nelson, South Dakota State Historic Preservation Office, and Michael Fosha, South Dakota Archaeological Research Center, throughout its development and writing. Additionally, Kristen (K.C.) Carlson of Augustana University provided comments on and contributed to the final draft of the document.

The Bison Kill Sites in South Dakota multiple property documentation form was discussed at a meeting hosted by the South Dakota State Historic Preservation Officer (SHPO) of all Tribal Historic Preservation Officers (THPO) within South Dakota. Additionally, each THPO received an electronic copy of the document for review and comment. No comments were received.

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