THE PREHISTORIC VILLAGE CULTURES OF SOUTHERN MINNESOTA

By

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CLEAN WATER LAND & LEGACY AMENDMENT

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Cover: Cambria vessel fragment from Lake Hanska, Minnesota.

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Chapter 1
INTRODUCTION

Geography and Environment

The village cultures of the Great Plains are associated with grasslands, yet to be more precise, grasslands with gallery forests fringing the major rivers, and occasionally lakes. Village life is difficult without access to timber. Western Minnesota was a grassland or prairie throughout the native occupation of the region, certainly after the onset of the Altithermal and more modern climatic conditions. When we use the term western Minnesota here it is simply a short-hand to refer to Prairie Minnesota, which forms an "L" shape in the western and southern portion of the state (Figure 1.1). Since the grasslands interpenetrate woodlands on their eastern margins, our study area is expanded to consider portions of the Ecotone, especially in Otter Tail, Douglas, and Grant counties. Here, it appears that so-called Plains occupations are found on the lakes and rivers of the Ecotone with access to both forest and prairie.

Overall, the area on which this study focuses is a diagonal stretch of southwestern Minnesota that is more or less bisected by the Minnesota River. In the classification system developed by the Minnesota DNR and the U.S. Forest Service most of the study area is in the Prairie Parkland Province, with some extension into Hardwood Hills and Big Woods subsections of the Eastern Broadleaf Forest (Minnesota DNR) (Figure 1.2). The Prairie Parkland province extends from Manitoba to Oklahoma and from Illinois to the Dakotas. The portion of the Prairie Parkland of concern here is south and west of the West Central Lakes District, west of both the Blue Earth River and the western perimeter of the deciduous forest. This consists of several subsections of larger constituent ecological sections. The grasslands of southern and western Minnesota comprise the Inner Coteau in the far southwestern portion of the state, flanked to the northeast by the Coteau Moraines, then the Minnesota River Prairie subsection, and finally, to the north and west, the Red River Valley. In the Eastern Broadleaf Forest province are two additional subsections; the Hardwood Hills in the area of the Alexandria morainic complex and the Big Woods, on the lower portion of the Minnesota River roughly between the cities of Mankato and St. Paul.

Of the Minnesota grasslands not considered are the central portions of the Red River Valley extending to the Manitoba border. Plains Village materials are found in the southern portions of the Red River area, but infrequently farther north. This study area is a mostly slightly rolling landscape formed on deposits left by the Des Moines lobe of the Wisconsin ice sheet. Surficial geomorphic features are made up of ground and stagnation moraines, outwash channels, terraces and old lake beds. These geomorphic features retarded drainage until modern settlement and this resulted in wetland areas scattered throughout the region (Minnesota DNR).

Throughout much of this region soils are calcareous, largely a result of the lithology of the glacial deposits, but also because of the action of deeply rooted grasses that bring calcium from deeper portions of the profile. Major soil associations are Udolls (relatively humid grassland soils with a substantial A-horizon) and Aquolls (wet prairie soils), with Ustolls (drier prairie soils) in the far southwest, and Udalfs (humid woodland soils) in the eastern Big Woods (Grigal et.al 2001).

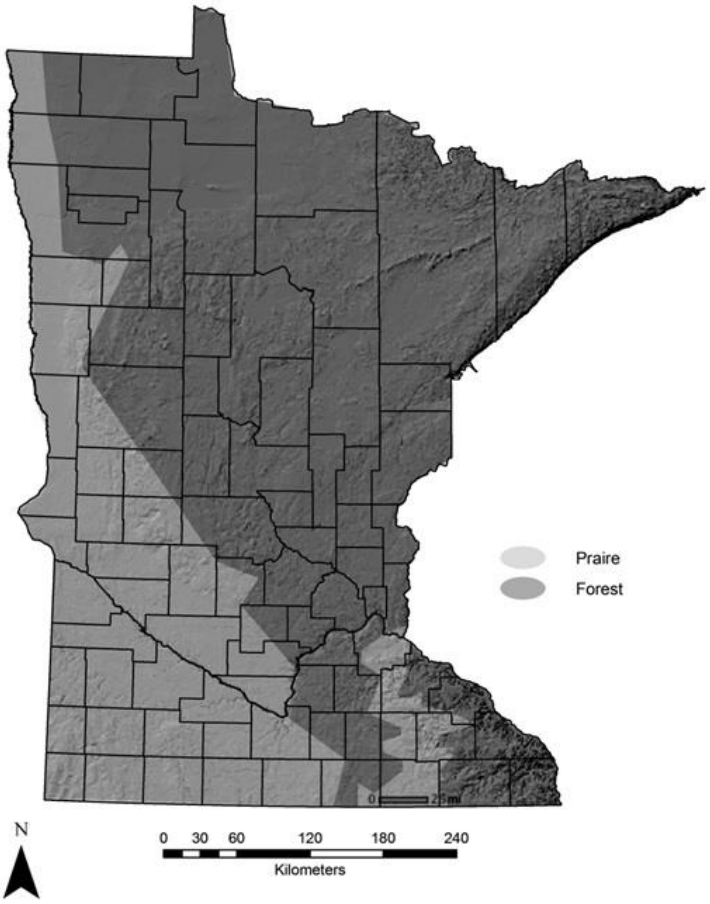

Figure 1.1. Map of Minnesota showing prairie and forest.

For the most part the environment of the region comprised prairie interspersed with timber patches along water courses and the perimeters of lakes. Groves of trees are rare. While rivers and streams were an important source for resources used by people, lakes were for the most part shallow and not as attractive for human use as the larger and deeper lakes of central Minnesota. The combination of shallow, and often resource poor lakes and grasslands limited opportunities for native populations and resulted in the absence of deep sedentism. Sedentary occupation was possible along larger rivers and lakes, but not of a kind that resulted in the village life characteristic of the Southeast, Midwest or Plains areas along major streams such as the Missouri. For this reason we suspect that the region was not a source for population concentrations and the synergy that ushers from such conditions. In short, the region was likely not innovative but rather reactive. Population movements may have been fluid and thus good evidence for long-term sequential development is not present.

We have grouped southwestern Minnesota into five archaeo-cultural regions (Figure 1.3) based on archaeological data, geographical, and floristic characteristics. These regions include Prairie Lakes (in the portions of the Minnesota River Prairie flanking the Minnesota River Valley to the northeast and southwest), Minnesota River Valley, Big Stone-Traverse, Red River Valley,

and Ecotone. All areas were primarily prairie interspersed with trees along water courses or physically isolated places.

Covering most of southwestern Minnesota, the Prairie Lakes region comprised level upland terrain with a scattering of small to large shallow lakes. In the modern ecological classification, this region covered portions of the Minnesota River Prairie, the Coteau Moraines, and portions of the Hardwood Hills. The lakes here were susceptible to drying out during periods of aridity (Anfinson 1997: 16). Most of the lakes were characterized by timber areas along the shores, which along with the streams provided the only source for timber in the region. A typical site in the region is located on a lake peninsula, is fairly large, and is characterized by multiple occupations with rich deposits of bison bone.

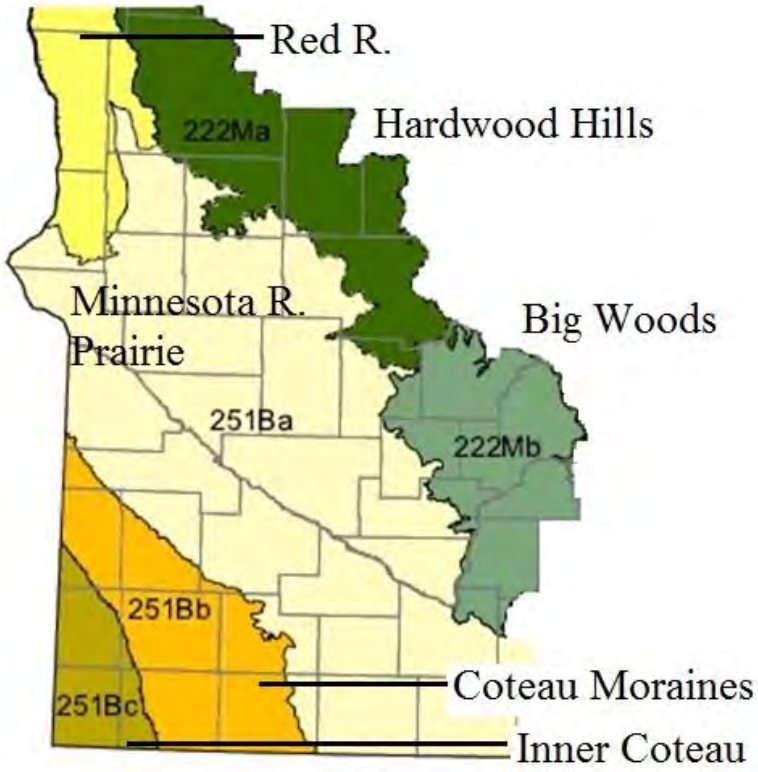

Figure 1.2. Environments of Southwest Minnesota (Minnesota DNR: 2013)

The Minnesota River was potentially an important west-east artery in the Upper Midwest, connecting the Mississippi River, Hudson Bay, and Missouri River watersheds, traversing approximately 370 miles through what would have been timbered bottomlands and prairie uplands. Our focus is on the middle to upper reaches of the river from its source at Big Stone Lake to where the river takes a major route change northward at Mankato, Minnesota. At least some portion of the Minnesota River basin was home for the bison herds that were centered in the Great Plains further west. Naturally, the Minnesota River bisects the Minnesota River Prairie subsection. This central portion of the Minnesota River Prairie subsection, that is, the Minnesota River Valley itself is of special interest to archaeologists since the broad expanse of the river

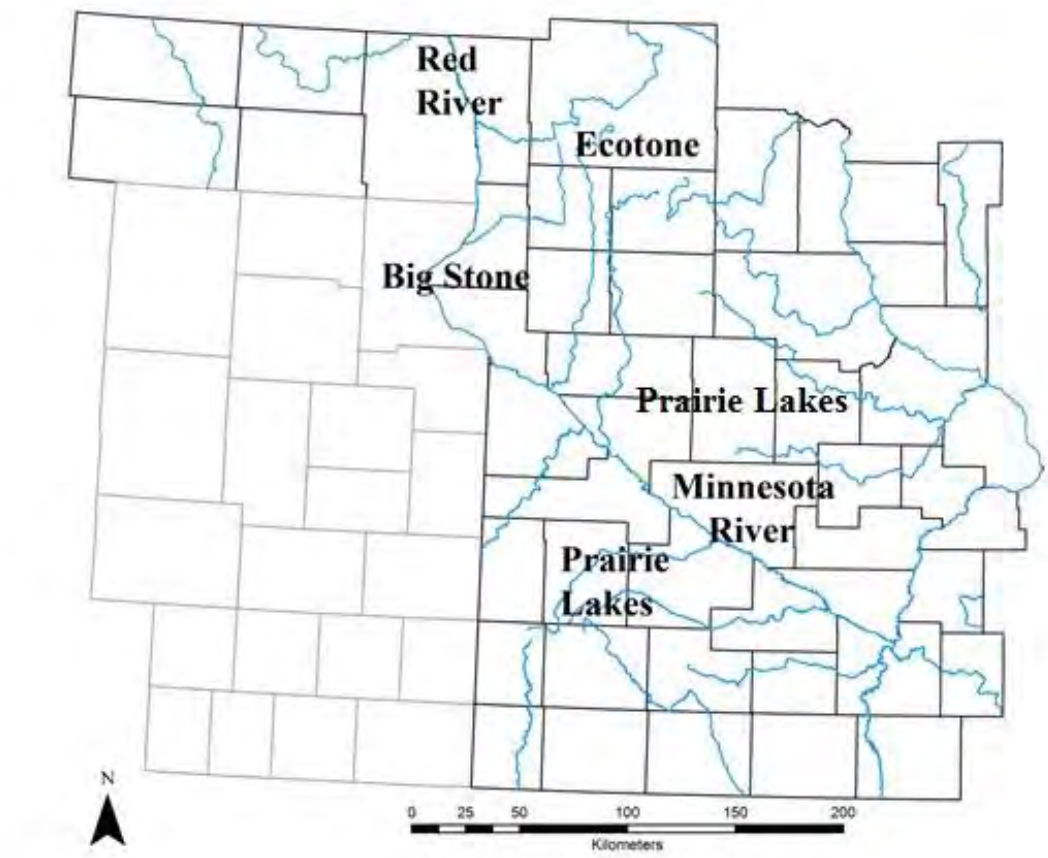

Figure 1.3. Study Regions in Southwestern Minnesota.

floodplain, formed by Glacial River Warren, sustained a substantial gallery forest that would have provided village peoples with perhaps the most attractive setting in the entire southwestern portion of the state. The Minnesota River along its lower course runs through the Big Woods of south-central Minnesota. Grimm's (1984) hypothesis that the Big Woods expanded after the demise of the active participation of Native Americans in the burning and disruption of the region remains a prevailing theory. If so, perhaps prairie areas extended farther to the east than today. Even though the Minnesota River Valley might have been the most highly attractive locale for farming settlements in the Late Prehistoric period, most sites investigated here are not characterized by a long-sequence. The Minnesota River did support a substantial gallery forest; however, settlement seems to have been concentrated, at least in the prairie areas, on the lower reaches of the river above Mankato, and at the headwaters in the Big Stone area. Even in historic times, the Dakota villages along the Minnesota were primarily north of Mankato and in the Big Stone/Traverse area. There is little evidence of heavy settlement in the central portion of the valley. Sites examined in the Prairie Lakes area, such as Pedersen (21LN2), have deposits representing multiple occupations, sometimes extending back to the Archaic. In the Minnesota Valley there are large village sites like Cambria (21BE2) and Fort Ridgley(21NL8), but these lack the stratified deposits that would suggest a long term use of the area over centuries of time. Perhaps such deposits exist and might be exposed through a program of systematic excavations in the region. To date, such work has not occurred.

The Big Stone area, comprising the large lakes of Big Stone and Lake Traverse, is situated at a continental divide. In ecological terms it is on the western edge of the Minnesota River Prairies. It is here separated from the Minnesota River Valley area since it was apparently more heavily used in prehistoric times than the upper reaches of the Minnesota River Valley itself. Further, it provides easy access to all of the major drainages of the Upper Midwest and Plains including the Missouri, Mississippi, and Hudson Bay via the Red River. According to GLO records of the area, there was a light scattering of timber along the shores of the lakes and probably along the shores of islands in the lakes. In spite of the great size of Big Stone and Lake Traverse, they are relatively shallow (less than 20 ft) and may have been less accommodating to settlement during prolonged dry spells.

The Red River Valley can be physically subdivided into three regions: headwaters, extending from Lake Traverse and the Bois de Sioux Valley past the juncture of the Otter Tail and the Bois de Sioux (which technically defined is the origin of the Red), downstream to the juncture with the Sheyenne River from North Dakota. From the Red-Sheyenne to the Canadian border is the middle Red River Valley, and lower valley, from the US-Canadian border to the mouth of the river at Lake Winnipeg. Only the headwaters and the southernmost portion of the middle Valley concern this study as they lie in Minnesota. The Red River Valley represented an extensive gallery forest in the otherwise flat and grass covered Lake Agassiz lacustrine plain. Bison hunting was an important subsistence activity in this area throughout prehistory.

North of the Prairie Lakes and east of the Red River Valley was the Ecotone separating the prairies from the forested lakes region. Ecotonal boundaries fluctuated through time (Davis 1977). Prairie expansion in southwestern Minnesota appears to occur between 6000-3000 BC (Baker et al. 1992) as a result of greater aridity. As expected, adaptations in the Ecotone include a focus on bison and lake-forest resources.

Introduction to the Plains Village Culture Concept

"Plains Village culture" has a specific meaning in North American archaeology. For many years the term has referred to certain peoples of the Late Prehistoric, Protohistoric and Historic periods on the Great Plains of the United States. The chronology for this cultural phenomenon on the Minnesota grasslands is generally agreed upon in outline, although the precise dates vary with different authorities (e.g. Anfinson 1997; Toom 2004).

The Late Prehistoric period we here define extends from about 1000-1600 (all dates herein are AD unless otherwise noted). The Protohistoric in Minnesota (1600-1662) was a relatively brief period when there may have been indirect contact with western culture intruding from the east, but prior to actual contact and associated historic accounts. The early historic period dates are from 1662-1800, that is the time from Pierre Radisson's visit to the approximate time of Alexander Henry's trip up the Red and the Lewis and Clark expedition up the Missouri.

The common understanding of the word "Plains Village" in the archaeological literature has been consistent in suggesting a permanent or semi-permanent community numbering in the scores to hundreds of people. The villages are usually assumed to have substantial structures with log or pole frames and wattle-daub, sod, bark, thatched or even adobe walls and roofing.

These structures were in some cases square to rectangular, and in others round. Some of these structures were of a size that might support a single family, while others were quite large and may have housed 20 or more people.

Village populations on the plains depended at least partially on domestic plants, particularly varieties of maize, squash and sometimes beans and sunflowers. They also used several native North American domesticates, including tobacco, sunflower, chenopodium and other starchy seeds. This characterization may be slightly misleading. Will and Hyde (1964 [1917]: 105, note17) point out that most of the tribes planted about nine parts corn to one part squash, beans, sunflower and other plants. Full scale agriculture was not practiced by Plains Villagers, but gardens were worked along the alluvial floodplains of many of the major rivers, including the Republican, Platte, Loup and Missouri. In the floodplains of these steams trees were cleared and gardens prepared. Domestic plants did not, however, comprise the sum total of the subsistence. Gathering wild plants, including various tubers, berries and seeds, and bison hunting were important elements of the diet as well. Indeed, most archaeologists who work on the Plains describe the Plains Village life-style as a "dual economy" consisting of hunting and gathering on the one hand, and horticulture on the other (Lehmer 1954: 151).

Perhaps the earliest study of the Plains Village culture is the monograph on the Mandan by G.F. Will and H.J. Spinden (1906). Their study of the Mandan includes a lengthy section on archaeology and describes the Burgois site (today known as Double Ditch). Many of the major features of Middle Missouri villages are included in their description. They note the surficial features of the site such as house depressions, defensive ditches and cache pits. The typical artifact assemblage of flaked and ground stone tools are reviewed, including the presence of small notched projectile points, a rich assemblage of bone tools, and ceramics in a variety of shapes and styles. The pottery is divided into types that have corded decoration, which they describe as the most common, and the less elaborate incised decorations. Will and Spinden even provide a fair description of the plant and animal remains, including maize, squash, beans, sunflowers and chenopodium, and a varied faunal assemblage dominated by bison.

Less than a decade after the Will and Spinden work, W.B. Nickerson (1917) excavated at the Cambria site, on the Minnesota River in southern Minnesota. Here he found a site similar in some ways to the village sites others were describing. The pottery from Cambria was described as similar in some ways to the Apple River Valley pottery in Illinois, to Mandan pottery in North Dakota, to Souris River pottery in Manitoba, and to ceramics from the Cannon River Valley in southeastern Minnesota. However, the typical Missouri Valley earthlodges were absent.

More systematic work on Plains Village culture was in progress by about 1930. W.D. Strong established the archaeological survey at the University of Nebraska in 1929. He hoped to connect the known ethnic groups of the Nebraska region, particularly the Pawnee, with the archaeological sites from the later prehistoric period (Wedel 1938: 1-2). Eventually this work led to the definition of village cultures of the Central Plains, especially those known in the archaeological literature as the Upper Republican, Nebraska, and Lower Loup, culminating in Strong's 1935 work on Nebraska archaeology. Wedel credits other researchers, including Will and Spinden, along with Nickerson for their earlier contributions, but argues that the work of Strong in Nebraska "…can fairly be said to mark the beginnings of systematic archaeology by

professionals on a sustained and continuing basis in the Plains area" (Wedel 1961: 25). By the late 1940's Wedel was able to provide a general outline of the Central Plains village cultures, suggesting a date of around 1250 for the beginnings of Upper Republican, 1300 for Nebraska culture, 1500 for Lower Loup and about 1550 for Oneota (Wedel 1947: 154). This chronology was tentative, but Wedel did seem certain that the Oneota presence was later than most of the Central Plains villages (Ibid).

While Plains Village cultures were being investigated in Nebraska, Kansas and the Dakotas, other village cultures were being identified and studied in Iowa and Minnesota. In 1927 Charles Keyes recognized a set of sites in western Iowa he named Mill Creek. These small village sites had houses and ceramics that were clearly influenced by Mississippian. Lloyd Wilford began to recognize village expressions in southern Minnesota. Wilford (1941: 234-235) identified Oneota in Minnesota, naming two foci, Blue Earth and Orr. He described Oneota occurrences as far west as Lake Traverse and provided a succinct description of the artifacts, including the ceramics. Wilford saw Oneota as an aspect of the Mississippi pattern, and noted its relative date at Tudahl Rockshelter where it overlay Woodland materials. In fact, Oneota was the only non-Woodland entity recognized by Wilford at this time. A few years later, however, Wilford (1945) reviewed the finds made at three village sites found on the prairies of southern Minnesota; Cambria, Great Oasis and Humphery. All of these Wilford categorized as representative of respective aspects that belonged to the Mississippi pattern (Wilford 1945:32). He related these sites to the Brandon site in South Dakota, and to the northwest Iowa Mill Creek sites. Humphery he affiliated with the already defined Oneota aspect, while the Great Oasis, or Low site and Cambria required new categories to accommodate them. Wilford recognized differences between these aspects, noting for instance that the projectile points from Great Oasis were stemmed and unlike the small notched forms from the other villages (Ibid: 34). He argued for Middle Mississippi influence on the Cambria site due to the rolled rims and trailed line decoration, and noted that the Great Oasis ceramics seemed to be heavily influenced by Woodland cultures. No houses were found at these sites and it was not possible to affiliate them with the sites from the Missouri River in the Dakotas, or to the Central Plains sites being described at that time by Strong and Wedel.

Thus, by 1945 the village cultures almost as we know them today were identified in one form or another for the prairie counties of southern Minnesota. Wilford (1945: 39) placed Great Oasis in a category more closely related to Cambria than to Oneota, recognized the Great Oasis similarities to Brandon village and to Upper Republican, and suggested that Cambria might be a link between the western Mill Creek villages and the Mississippian site of Aztalan. There also was universal agreement that Oneota was a Mississippian related entity, and in time, it would be regarded as something other than a Plains Village culture, while Cambria and Great Oasis would over time be more and more closely affiliated with the Plains Village culture, culminating with Tiffany's (1983) statement that Cambria and Great Oasis could be assigned to a variant of the Middle Missouri Tradition.

While the definition of the Plains Village culture has its origins in the work of W.D. Strong and W. Wedel in the 1930's and 1940's, the formal statement of classification may be attributed to D. Lehmer, who in the 1950's took various taxonomic categories already defined by others and began combining them into a few major categories which he placed within the

Sedentary horizon of the Northern Plains (Lehmer 1954). This was done according to the stipulations of the Midwestern Taxonomic System. The Sedentary horizon of the Northern Plains had its beginning around 1300 and it persisted until about 1750, when the Equestrian horizon emerged with the arrival of horse nomadism. Thus, the term "Plains Village" specifically referred to various Late Prehistoric cultures of the High Plains, particularly in Kansas, Nebraska and the Dakotas. The village cultures showed the same basic orientation toward the Plains environment, one which was strikingly different from that of their predecessors and successors. However, there is evidence of numerous detailed differences between individual village complexes and of a definable series of culture changes within the period (Lehmer 1954: 142).

The major subdivisions of this village horizon consisted of the Middle Missouri, Central Plains and Coalescent traditions, along with Dismal River to the southwest and Oneota to the northeast. Focusing on the Central Plains and Middle Missouri areas, Lehmer (1954: 143-145) characterized the differences between these two village expressions. The Central Plains villages typically had square houses with rounded corners more or less haphazardly arranged in communities. Defensive architecture was not present. Pottery tended to be cordmarked with flared rims. Basally notched projectile points along with diamond shaped chipped stone knives are typically present at sites. Mussel shell is often found in village deposits along with other game animal remains. To the north along the Missouri River in the Dakotas villages are characterized by rectangular houses with off-centered fire hearths. These houses are usually arranged within the village in a regular pattern, and defensive ditches are common. Pottery recovered from these sites is simple stamped in northern South Dakota and North Dakota sites, and S-shaped rims are typical. Plano-convex edged stone knives, side notched projectile points, and an abundance of bison bone usually is found in the Middle Missouri region.

Lehmer, along with Wedel, Wilford and others recognized a distinction between the village cultures to the west and Oneota. While Oneota was designated as a part of the Sedentary horizon and shared with the western villages the dual economy, scapula hoes, triangular points, shaft smoothers and grooved mauls, the pottery reflected clear Mississippian influence (Lehmer 1954: 149). For this reason, and perhaps for its more easterly geographic location, Oneota was regarded as Upper Mississippi rather than Plains Village.

By the 1960's Willey (1966) was able to characterize what he called the Plains Village tradition in his overview of North American prehistory. He saw that tradition as a synthesis of cultural elements dating back to the Archaic which diffused up the Missouri River drainage, and was best expressed in the historic cultures of the Mandan and Hidatsa (Willey 1966: 313). The Plains Village tradition was coeval with Mississippian and represented a fusion of Mississippian cultural elements and Plains life-ways unique to the Plains region (Ibid: 320).

For southwestern Minnesota two of the cultural entities discussed as "village" cultures in the Late Prehistoric are Cambria and Oneota. Oneota has always been understood to have a close relationship with Mississippian, partly because of its eastward extension into Illinois, and because the shell tempered jars are similar in various ways to Mississippian vessels. Cambria was more difficult to classify and showed similarities to both Plains Village and to Mississippian cultures. We hope to show below that it should be separated from the Plains Villages and its eastern affinities highlighted.

Chapter 2
REASSESSING PLAINS VILLAGE CULTURE IN MINNESOTA

Archaeologists working in southwestern Minnesota and the adjacent Lakes and Red River Valley regions are accustomed to identifying Plains Village archaeological cultures based solely on the presence of ceramics with the following characteristics: thin walls, grit temper, polished or plain surface, and incising. This is not especially problematic in the region since most of the post-Archaic prehistoric Minnesota cultures are largely defined on the basis of ceramic characteristics.

This definition by pottery raises an issue that causes some confusion for archaeologists and is an important consideration in this study. The issue revolves around questions of resource use, both food resources and lithic raw materials, and their relationship to the Village Tradition. Many Village sites in Minnesota are multi-component sites containing materials belonging to earlier and later portions of the Woodland period, along with Villager materials as well. There are exceptions to this, such as the large Cambria sites on the lower portion of the Minnesota River. Other sites have a confusing mix of materials and in examining collections it is not always clear whether or not specific lots of lithic or organic material are associated with one or another ceramic ware.

The Maplewood site (Figure 2.1) provides a good example of such a collection. This site was excavated in the late 1960's and the collection at the Minnesota Historical Society is in good condition and records are easy to follow. Furthermore, Watrall's (1976) report on the site clearly and thoroughly documents the finds. Some of the ceramics found at the site are most readily defined as Cambria, while others may be assigned to several different Woodland wares. It is a straightforward matter to separate the ceramic collection into Village and Woodland components. However, the lithic collection from the site includes late prehistoric Plains Side-Notched points and Eastern Triangular, which conform in age to Village ceramics, but these same point types are also found in Late Woodland assemblages. Besides this, there are also larger side-notched points, Brewerton Corner-Notched, Larter Tanged, and Hanna, types dating from the Middle Archaic through the Middle Woodland.

In a case such as Maplewood, it is difficult to render a decision about which artifacts are associated with any particular period, except of course for the pottery, which is the diagnostic by which we define the culture-historical periods. The points and lithic raw materials may represent the Village period or some earlier or coeval non-village presence at the site. There is a further difficulty with point types and cultural periods. Ethnographic collections show that historically known groups used smaller and larger points, with multiple hafting strategies, simultaneously. Smaller tips were used on arrows, while larger notched forms were used on spears to be handled in a thrusting fashion. Naturally, it is sometimes possible to associate particular point styles and lithic materials to features and offer some suggestion as to resource use associated with a particular type of projectile tip. In our examination of collections we found few instances where such an effort would be rewarded with a promise of success. For instance the section below on radiocarbon dating includes two dates from Maplewood found in a well-defined feature. This feature contained smooth-surfaced, grit tempered and broad incised or trailed decorated ceramic sherds. The bone from the same feature gave an age of about 1100 BC. While we may be certain

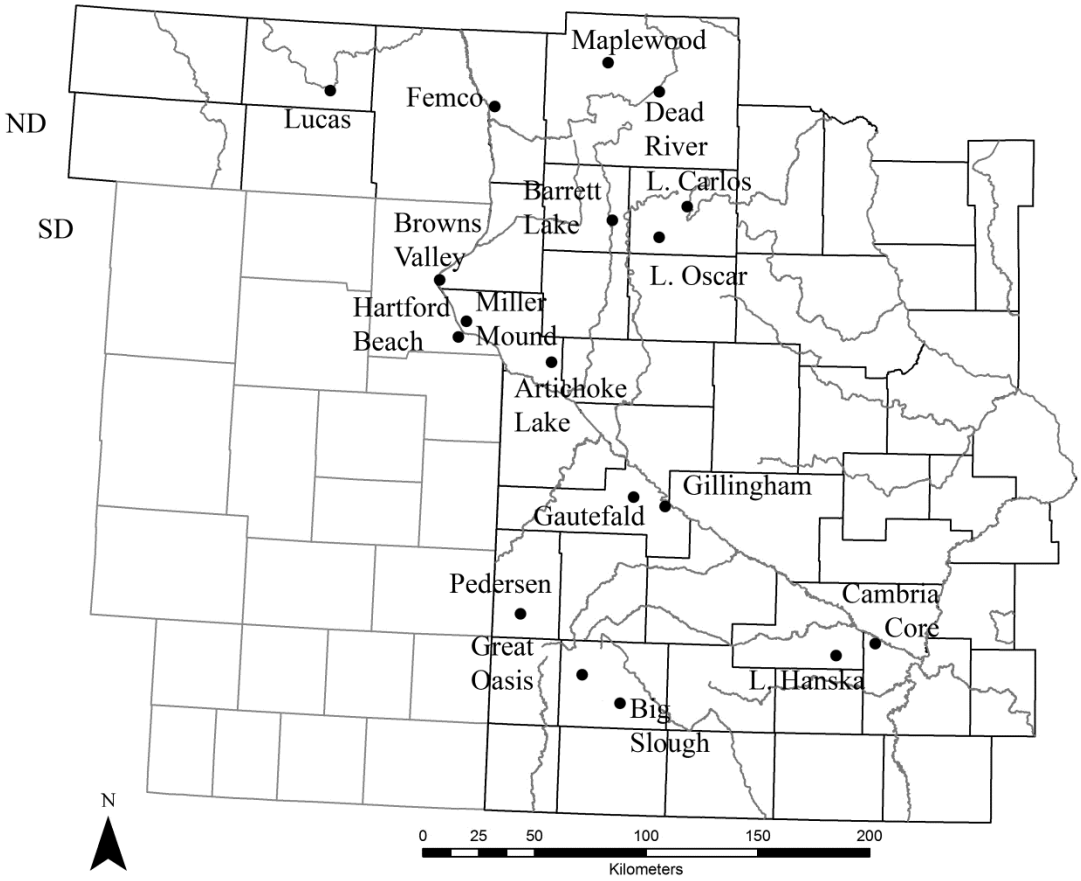

Figure 2.1. Location of Principal Sites Investigated.

that the pottery does not date from that early time period, it is unclear whether lithic material from the same feature is associated with the bone that was dated, or with the pottery that was found there. So while we may be certain the ceramics are Cambria-related, the lithics in the feature may be of the same age as the dated bone, or of the time period indicated by the pottery.

Other examples from the sample of sites examined might be offered in evidence of the difficulty of affiliating lithic and ceramic remains from previously excavated sites. At Big Slough (21MU1) there are Village period ceramics, but a lithic collection that includes Late Archaic-Middle Woodland forms, including Motley, Avonlea, and possibly Hanna, along with Late Woodland triangular points. The Dead River site (21OT51) also features Cambria ceramics, and a range of point types (and other ceramics) dating to the Middle and Late Woodland periods, such as Snyders points and Prairie Side-Notched point types.

Unfortunately, even the point types typically accepted by archaeologists as dating to the Late Prehistoric period, Eastern Triangular, for instance, or Plains Side-Notched, may be associated with Late Woodland ceramics as well as with Villager pottery. For all of the reasons presented here we chose to focus on ceramic artifacts in discussing the Plains Village Tradition

in Minnesota. In working with previously excavated collections there is too much uncertainty in provenience to make reliable statements about the association of diagnostic ceramics with lithic materials. Such associations are best established by careful excavations at archaeological sites, not by the study of collections in museums.

Over the past 25 years the Plains Village cultures of Minnesota have been repeatedly discussed in the archaeological literature (e.g., Anfinson 1997; Henning 2001, 2005; Gibbon 1993; C. Johnson 1991; Tiffany 1983; Toom 2004). The roster of relevant Plains-related archaeological constructs in Minnesota includes Great Oasis, Cambria, Big Stone, and to the northwest, ceramics related to the Northeastern Plains Village culture found largely in eastern North Dakota, but extending into the Red River Valley and the West-Central Lakes District of Minnesota. Dating and nomenclature concerns are critical in the understanding of these units. For the most part, we lack high-precision radio-carbon dates, which has contributed to quandaries over associations and dating. Also lacking is a synthetic treatment of these units across all of southwestern Minnesota.

The approach offered here to this enigmatic prairie village complex of southern Minnesota is informed by an evaluation of the identified cultural units, an examination of the material indicators, the submission of radio-carbon samples, and an in depth examination of one relevant archaeological site. Evidence has been accumulating since the 1950s of a Plains-cast to Late Prehistoric ceramic collections in the region. Some of these finds are in Ecotone contexts that are distant from the grassland environment that nurtured Plains village culture (for example, Douglas County). Have the people in the region always had their roots in both sides of the cultural divide between the Plains and the Woodlands, as often suggested by Elden Johnson?

We undertook archaeological investigations at one site that was potentially relevant to the issue of Plains Village culture in Minnesota. This is the "village" site of Browns Valley (21TR5), which once featured a large roughly circular enclosure that represents a plausible Plains village in Minnesota. The work at this site involved reconnaissance, shovel testing and remote sensing to identify the remnant of this enclosure within the limits of the town of Browns Valley. Our efforts were successfully in acquiring material for dating and a small sample of prehistoric debris.

We examined potential Plains Village-like ceramics from 53 sites. These archaeological collections were housed at various institutions, including the Minnesota Historical Society, the Science Museum of Minnesota, Minnesota State Universities at Mankato and Moorhead, the Grant County Historical Society Museum in Elbow Lake, and the Big Stone County Historical Society Museum in Ortonville. The analysis comprised in some cases a detailed inspection of rims and decorated sherds and in others a more cursory inspection. In examining each collection the goal was to vary the effort invested in direct proportion to the perceived benefits of the material to solving the overall problem. Not all relevant material was accessible in our time constraints. Our efforts were concentrated on collections that were largely unreported in the archaeological literature. For example, Cambria and Great Oasis ceramics from the type sites have been reported on in numerous publications and were mostly avoided. Our understanding of the Cambria locality collections was aided by Katy Mollerud who is currently studying the ceramics from the Jones, Price, and Cambria sites.

A total of 16 new radio-carbon dates was submitted to two labs. These derived from both previously dated sites and from a number of sites not previously dated. For the Cambria locality we relied on Mollerud's control of the data to select reliable samples to date.

The question posed here is: to what extent is the Plains Village Tradition in Minnesota truly "Plains Village" and where is its source? Did it arise from eastern influences, perhaps from impulses related to the Cahokia polity? Was it a product of the development of village cultures in Iowa or South Dakota with an ultimate origin in the Missouri Valley or the Central Plains? Or was the village complex of cultures in Late Prehistoric Minnesota a local development, arising out of local Woodland precursors?

In the traditional telling of Plains history, including the interpretation of Native history, the movement of peoples and ideas in the central portion of the United States has been characterized as an east-to-west flow. This tendency in characterizing the past sometimes evokes the old notion of manifest destiny and of the western movement of civilization. This was not always the case. The prevailing interpretation of the settling of North America from the Bering Straits characterizes the original movement of people as northwest to southeast. This trend apparently continued until sometime in the Archaic period for the area of Minnesota. In the case of the Archaic it was the eastward spread of the grasslands and its keystone species, the bison, which resulted in a fluid situation in western Minnesota between the east and west. Based on technology, adaptation, and style the Archaic in southwest Minnesota is Plains Archaic. Typical point styles during the Archaic include Oxbow, McKean complex types, Pelican Lake and into the earlier portion of the Woodland, Besant. This situation changes for a time during the Woodland period. At this time the practice of pottery making and the use of cultigens show that the source of ideas and innovations intrude from the south and east. The appellation Plains Woodland is now in vogue to characterize this period, signifying a blending of eastern and Plains traditions. In the Late Prehistoric period, the emergence of sedentary village life as expressed in the form of the Initial Middle Missouri complex, there was again the purported movement of peoples and ideas from east to west. The tide appears to shift after the demise of the Cahokian-centered world of the 11th and 12th centuries, when large fortified villages emerge on the Missouri River. This would eventually lead to one of the greatest concentrations of native peoples in North America from 1400-1700. Testimony to the last gasp of this western focus in our region is the position of the Biesterfeldt site along the Sheyenne River in eastern North Dakota around 1750, and the introduction of the horse, which also moved southwest to northeast.

The rootedness of village culture in the Plains is complicated. In spite of the development of unique technologies that are tied to a Plains adaptation (pemmican, tipi, small points for hunting bison with a bow, travois), the sequence of developments in the Plains are largely understood as the result of external influences. Fitting into the general perceived notion of progress in history, it was the introduction of maize that resulted in the sustained village life in the Great Plains that defined the Late Prehistoric adaptation and the introduction of the horse that defined the Historic adaptation. In short, life in the Plains would not have flourished, i.e. developed village life or sustained population growth were it not for the introduction of externally derived innovations.

For the Plains Village culture the roots of its adaptation is the solution to the problem of living in a grassland environment and buffalo hunting. The latter resulted in the proliferation of bison bone tools, such as the scapula hoe. The other source relates directly to developments incubated during the Late Woodland period, particularly during the Terminal Late Woodland time span (McElrath et al. 2000). This includes horticulture, permanent housing, and sedentary life-styles. Other southeastern traits such as mound building arrived much earlier in Minnesota.

Yet ceramics are the most tangible and readily identifiable signature of the Plains Village Tradition, especially when contrasted with the numerous eastern-based traditions that emerged during the Late Prehistoric. These other ceramic traditions, which are primarily shell-tempered, include Mississippian, Oneota, and Sandy Lake and are normally contrasted with the Plains Village ceramic productions.

Plains Village ceramics are exclusively grit tempered and depending upon sub-region and time period exhibit a variety of surface treatments and variations in the shape of the jar. The single most visible Plains Village ceramic trait is the S-shaped jar rim. Surface treatments, while most typically smoothed plain, may also include simple and check stamping. Cord impressions to form a variety of designs are also important. Tooled impressions on the rim, finger pinching or notching are also characteristic of the region. Specific designs that are diagnostic include the horizontal pattern of circumferential lines or the horizontal line pattern (HIP), the overlapping diagonal, rainbow, and herringbone.

The location of ceramic decoration is important in distinguishing Plains Village pottery from southeastern US traditions (Figure 2.2). For the latter, decorations (at least for jars) were confined to the shoulder, below the neck/rim juncture. Ramey Incised is the classic example of this focus, and is likely the fount for this expression. To be sure, there are differences among the eastern traditions as the jar evolved from the nearly neck-less variety of Ramey Incised to the clearly defined neck juncture of Oneota. For Plains Village cultures, designs are mostly confined to the neck/rim, notwithstanding Wood's (1962) analysis of Plains shoulder designs. Neck rim decorations are so fundamental that they served as the main fulcrum for Johnson's (2007a) recent seriation of the Middle Missouri sequence (Table 2.1). If we examine the roots of the Plains Village Tradition, this focus on the upper body is explained. Near the end of the Late Woodland period across the Prairie Peninsula, there was a move towards plain upper necks and/or a focus on decoration of the neck proper. This is present in Minnesota (Blackduck, Kathio, and Lake Benton) (Figure 2.3), Iowa, South Dakota (Loseke) and elsewhere (Tables 2.2 and 2.3). The earliest candidate for Initial Middle Missouri is Great Oasis, which is likewise characterized by the Terminal Late Woodland design presentation, albeit in a novel fashion. Divergence in the Plains tradition emerges in response to Cahokia, the above-mentioned Ramey Incised, with the appearance of shoulder decorations that did not entirely supplant the neck focus in the Plains. An accommodation of both is a hallmark of the region.

From a ceramic perspective, Plains pottery is a hybrid of terminal Late Woodland, local, and southeastern wares and types. Yet, Minnesota is replete with archaeological cultures that are hybrids - - Fox Lake is a perfect example in western Minnesota. This hybrid nature led archaeologists such as Syms (1977) to propose alternative models to explain ceramic variability

in the Plains, in particular the Northeastern Plains. Syms reasoned that this variability could be due to serial occupation of the same space by different peoples.

Figure 2.2. Comparison of design fields for Great Oasis (left) and Cambria (right).

Figure 2.3. Late Woodland design fields. Blackduck (left), Dead River site. Lake Benton (right), Pedersen site.

Nomenclature and Plains Archaeological Variants, Phases, and Units in Minnesota

There are two related Plains traditions that have been identified in Minnesota. The Middle Missouri Tradition (MMT), which was concentrated along the middle course of the Missouri River and the Northeastern Plains Village Tradition (NEPV) that was scattered to the east of the Missouri Trench in eastern North Dakota, far eastern South Dakota and western Minnesota. The Middle Missouri Tradition has two phases of the Initial Middle Missouri Variant (IMMV) that have previously been identified in Minnesota: Great Oasis and Cambria. Other variants of the Middle Missouri Tradition, including Extended Middle Missouri and Terminal Middle Missouri, have not been identified in Minnesota except in the form of isolated sherds. The Northeastern Plains Village Tradition consists of several site concentrations in the Big Stone and Devils Lake (North Dakota) areas, and along the James, Sheyenne, Red River regions. These have been assigned to different periods in the Tradition (Toom 2004), but the constituent phases of this cultural taxon have not been worked out at this point. It is appropriate to mention here that

Henning and Toom (2003: 216) removes Cambria from the Initial Middle Missouri category and re-assigns it to the Northeastern Plains Tradition. Winham and Calabrese (1998) suggest that Great Oasis is not part of the Initial Middle Missouri either, and re-define it as Late Woodland. Gibbon (2012: 163) and Henning (2001) place Great Oasis in the Initial Middle Missouri Tradition. At this point agreement seems lacking on taxonomic assignment of the village cultures southern Minnesota.

Middle Missouri Tradition

Along the Missouri River nearest to western Minnesota there is a succession of two archaeological traditions – Middle Missouri and Coalescent. The Middle Missouri is subdivided into three variants: Initial, Extended, and Terminal (Table 2.1). Initial Middle Missouri (Winham and Calabrese 1998:278) represents the onset of a full-fledged dual economy village life.

Longitudinal variation is pronounced and used to separate variants in the east IMM from a westerly IMM (Henning 2001:224). This division is accepted by most working in the area, although membership for Minnesota village manifestations, Cambria and Great Oasis, are problematical and do not have common consent. Dating of the Initial Middle Missouri is also not unanimous, in part a result of the inclusion of Terminal Late Woodland expressions into the equation. A "big-tent" approach would give 900-1300. Toom (1996) and Johnson (2007a:101) favor 1000-1300, while Lensink and Tiffany (2005) argue for a more tightly bounded time span of 1100-1250.

The Extended and Terminal Middle Missouri variants are not recognized in Western Minnesota. This absence is attributed to the migration of Initial Middle Missouri peoples to the Missouri River to form villages which eventually became the Extended Middle Missouri Tradition (Toom 1992). Finally, the Coalescent Tradition is also not represented in Minnesota by cultural units. These later expressions would only appear in the region as visitors/traders/ pioneers. Ceramic trade wares have been found along the border area of the state from these two periods.

Great Oasis

Great Oasis was first identified by Lloyd Wilford (1945) based on his excavations at the Low Village site (21MU2) in extreme southwestern Minnesota. His excavations revealed an intensive occupation with numerous pits, evidence for maize, and a unique ceramic style featuring well-made vessels with a proliferation of incised designs on the neck. These designs were chiefly a horizontal incised pattern (HIP) augmented with diagonal lines or motifs that have been identified as corn, Big Bluestem grass, or deer figures. Wilford (1945, 1955) reasoned that Great Oasis was part of the Mississippian Tradition as the traits distinguishing it from Late Woodland clearly pointed to the Late Prehistoric developments centered further east. Such traits included the shape of storage pits and the presence of maize; traits which would not today be considered as *sui generis* Mississippian. In spite of the eastern and Mississippian trappings, Wilford (1945:38, 1955) did recognize similarities with western expressions. Clearly, the stylistic disjunction with the preceding Late Woodland ceramics was one factor in Wilford's

designation, even though these ceramic differences could not be ascribed to Mississippian standards.

Table 2.1. Middle Missouri and Coalescent Sequence (from Johnson 2007a).

Middle Missouri Variant	Time AD	Coalescent Variant	Time AD
Initial Middle Missouri	1100-1300	Initial	1300-1500
Extended Middle Missouri	1200-1400	Extended	1400-1650
Terminal Middle Missouri	1400-1500	Post-Contact	1650-1886

Table 2.2. Northeastern Plains Sequences

Northeastern Plains Village (Toom 2004)	Southeastern North Dakota	Red River (Upper-Middle)	Upper James River (Schneider 1982)
	Blackduck	Blackduck	Period 2 Plains Late Woodland 1000-1300
	Lucas 900-1200	Blackduck?	Period 3 Plains Village 1200-1400
Early 1200-1300	Matoti 1200-1400	Mooney 1200-1400	Period 4 Plains Village 1400-1700
Middle 1300-1600	Shea 1400-1500	Late Sandy Lake 1400-Contact	Period 5 Historic 1700-1850
	Swanson ?1500-1600?		
Late 1600-1800	Chaiena ?1700-1750?		

Table 2.3. Western Minnesota and Iowa Sequences

Prairie Lakes (Anfinson 1997)	Big Stone*	NW Iowa ^
Lake Benton (700-1200)	Lake Benton/Katio	Cordage Horizon (650-800)
Great Oasis (900-1200)	Big Stone (1100-1300)	High Rim Horizon (800-1100)
Cambria (1000-1200)		IMMe (1100-1200)
Blue Earth (1000-1650)		Oneota (1200-1700)
	Sandy Lake	

***** Anfinson (1997), Beissel et al. 1984, C. Johnson (1991). ^Alex (2000), Benn and Green (2000).

Great Oasis did not languish for long as an isolated archaeological construct. Increased archaeological coverage in surrounding regions and a re-investigation of the Low Village (Henning 1971) and other sites in Minnesota (Anfinson 1982) resulted in the designation of Great Oasis as an IMM member (Gibbon 1993) and expanded its range to the neighboring states of South Dakota, Iowa, and Nebraska. Presently, the Minnesota occupation is limited to only a few sites that are interpreted as used intermittently by people from more intensively occupied areas (Anfinson 1997:216-217). These investigations have led to the discovery of squared houses with key-hole entrances and further cemented the notion that Great Oasis was a farming culture.

Nomenclature and chronology figure prominently in discussions of Great Oasis (Winham and Calabrese 1998:273-275). The principal question is whether Great Oasis was the cultural fount for the IMM or just one of many members of an expanded notion of IMM. Wilford (1945:38) was of the opinion that Great Oasis preceded the other Minnesota IMM candidate

Cambria based on stratigraphy (Cambria sherds were found at the Low Village in the upper levels), point styles (Low Village had stemmed points, Cambria triangular points), and the lack of handles at Great Oasis, while they are present at Cambria. In his summary Wilford (1955:138) continued to argue for a separation between Great Oasis and Cambria. Dale Henning (2005) has argued against this position maintaining that Great Oasis persisted over a long time span and was contemporaneous, at least for a short period of time, with Cambria. He based this on the radiocarbon assays and the presence of later traits at several sites, although these statements of longevity are often qualified (see Henning and Henning 1978:12). Anfinson (1997:90-95) has perpetuated the same view with the acceptance of a 900-1200 time range for Great Oasis. Support for the robust dating for Great Oasis is also given in Craig Johnson's (2007:93) review of the radiocarbon assays with a 950-1250 time span. Johnson concludes that since these dates overlap with other IMM units, it is not possible to identify it as a source.

No one has put forward an argument identifying the various Late Woodland cultures of Minnesota (Kathio, Blackduck, Lake Benton, or Onamia) as viable ancestors to Great Oasis. The origin of Great Oasis was likely in northwestern Iowa, something that the density of sites in that area would support (Lensink and Tiffany 2005), along with the stylistic connections with a variety of Late Woodland cord impressed types that are part of the cordage horizon identified by Benn and Green (2000:453-469; see also Hall and Hall 2004:104). These ceramic types feature an organization of an upper band of diagonals (or tooled impressions), and a lower band of horizontal lines occasionally incorporating diagonals or triangles, which is a hallmark of the Great Oasis approach (Fishel 2005:35). What is lacking is an argument explaining the decorative shift from cord impression to incision. For example, Craig Johnson's analysis of Great Oasis collections reveals only a negligible presence of cord impressions (2007a: Table A.1). However, in the western IMM this trait is present and may represent a holdover from Late Woodland times (Johnson 2007b:48; Tiffany 1983:96). The Missouri River trench hold on cord impression in general is notable (Tiffany 2007:12). As will be detailed, the role of cord impressions in Minnesota is problematical but likely important in resolving the nature of Plains Village affiliation and the nature of Terminal Late Woodland and Late Prehistoric cultures.

A nagging problem in resolving the transition from Late Woodland to the Late Prehistoric is the role of cord impressions. For a time, cord impressions were viewed in Minnesota as foreign (linked to either Wisconsin or Iowa). No formal named type in the Minnesota Ceramic Handbook had a local cord impressed type (Anfinson 1979). At the Nelson site (21BE24) Michael Scullin (1981) identified quite a lot of cord impressed ceramics and evidence for maize. Dating this site and placing the ceramic variation in reference to other regions is a priority for the future and will be important in resolving the non-Great Oasis segment of the Late Woodland-Late Prehistoric transition.

Benn and Green (2000:477, 470, 481) argue that Great Oasis was a Terminal Late Woodland culture and part of the High Rim Horizon. This argument is in keeping with a pan-Midwestern transformation for Terminal Late Woodland cultures during the 900-1000 time frame, whereby societies institutionalized maize farming and began to transform into the patterns typical of the Late Prehistoric (McElrath et al. 2000:20-21), which in this case was the Plains Village Tradition. The absence of fortifications, along with the absence or paucity of other late traits can be used to argue that Great Oasis is representative of Terminal Late Woodland and not

Plains Village (see Lensink and Tiffany 2005; Tiffany 1983). This position may represent a consensus in the field (Gibbon 1993; Tiffany 1983:97, 2007:7; Winham and Calabrese 1998:280), although it does not negate the notion that Great Oasis was a contributor to IMM (Johnson 2007b:48;Wood 2001:190).

Lensink and Tiffany's (2005) argument for a contraction of the time span for Great Oasis hinges on the timing of Cahokia influence in the region. Reliable Cahokia influence, principally evident in the ceramic sphere, coincides with the Stirling phase (1050-1150). Cahokia traits include rolled-rim neckless jars with a focus on broad incised curvilinear motifs. The role of Cahokia is still undergoing evaluation and the identification of pre-Stirling contacts along the Mississippi River (Benden 2004; Boszhardt 2004) may warrant a reconsideration of the northwestern response to Cahokia. Henning (1991) and Benn and Green (2000:481) see eastern sources, particularly the emerging Cahokia phenomenon during Terminal Late Woodland times, as critical in the budding of Great Oasis. Although in contrast to later (post 1050) developments, this early Cahokia influence is not manifest in the ceramic arts.

Speculation exists concerning the fate of Great Oasis peoples who did not become IMM farmers. Anfinson (1997:90) has suggested that some were unchanged by these developments, becoming a sort-of disaffected group inhabiting southwestern Minnesota, presumably remaining hunter-gatherers without any dependence on domesticates. However, with the recovery of maize in Lake Benton contexts (Hunter 1992), this position may prove to be untenable.

Cambria

The paucity of Great Oasis sites in Minnesota contrasts with the abundance of sites containing Cambria ceramics. Although widespread it does appear to be anchored in the Minnesota River Valley. Cambria encapsulates the trends of post-Late Woodland developments across the Midwest and Plains. Its Midwestern connections involve the mimicry of ceramic vogues generated at Cahokia. Cambria represents the northwestern most expression of an imitation of Cahokia standards in the manufacture of rolled rim jars with broadly incised curvilinear designs. Yet, given its northwestern location, Cambria was also connected with its neighbors to the south and west.

Dating and nomenclature issues are also of fundamental importance to this phase. Cambria is an example of an archaeological complex that is well known in the archaeological literature, yet remains poorly understood since Wilford (1945) first discussed its position within Minnesota prehistory. For an overview of Cambria archaeology refer to Anfinson (1997) and Gibbon (1993, 2012).

As originally defined, Cambria was, like Great Oasis, identified as a Mississippian-related phenomenon (Wilford 1945, 1955). Wilford (1945:39) did recognize, however, similarities with the Plains. In contrast to Great Oasis, which manifested vague connections with Mississippian cultures, Cambria contained bona-fide copies of Cahokian Mississippian standards. Traits identified by Wilford (1945: 40) that supported this Mississippian connection included primarily ceramic traits such as the presence of handles and design similarities, although such traits as shaft smoothers, triangular arrow points, and scapula hoes were of

importance (Wilford 1955). Wilford eventually split the Cambria phase from Middle Mississippi (1955:139) based on the notable absence of the full suite of Mississippian traits.

Wilford identified three ceramic types for Cambria (Wilford 1945; 1955), the brief description of which is important in our analysis. Type A (Wilford 1945:36-37) represented short-neck jars with a wide variety of incised decorations, some of which were executed as broad incising. Most of the designs were rectilinear including the HIP and chevron. Type B represented S-shaped jars (Wilford 1945: 37-38) and Type C comprised the Cahokia rolled-rim jar facsimiles (Wilford 1945:38). Some of Type A and all of Type C involve copying Cahokia vogues (broad trailed incising, angled shoulders, rolled rims). The remainder of A and all of Type B are vogues in common with Plains village cultures. A number of scholars have stressed that there are no "true" S-shaped rims in the varied Cambria collections (cf. Anfinson 1997:99), and it appears that some design examples within Type A vessels are unique configurations (Mollerud, personal communication).

Knudson's (1967) description of Cambria site ceramics is noteworthy for systematizing and tabulating the Nickerson and Wilford collections. Her typological scheme involved the application of the type-variety system of nomenclature. Instead of the ternary division of Wilford, Knudson offered four primary types. She separated Wilford's Type A into two types (Linden, and Mankato) and accounted for Type C with a local Ramey Incised variety. Type B (S-shape jars) was identified as Judson Composite. One advantage of her schema was in the differentiation of styles that are linked to the east and those to the west. However, styles that are ostensibly from the same tradition, for example the varied HIP vessels, are subdivided among two types (see Knudson 1967:Plate 5). This and other problems reveal the shortcomings of typologies in dealing with the seemingly random application of decorative techniques, designs, and design fields.

Later, Cambria was assigned, along with Great Oasis and others, into the Initial Middle Missouri, and thus a bona-fide ancestor of Plains Village cultures (Henning and Henning 1978; Tiffany 1983). This nomenclature designation occurred well after the initial definition of Middle Missouri Tradition. Specifically, Cambria was seen as an eastern variant (Henning and Henning, 1978:14; Toom 1992) contrasting with a western variant. In spite of its isolation, Cambria did appear to be a viable Plains Village unit in Minnesota (Johnson 2007a:172).

Elden Johnson (1961) continued to examine the Cambria phenomena, attempting to make sense of the diverse sites tested, but unpublished, by Wilford (Gautefald, Miller Mound, Gillingham), and by conducting surveys and testing. One important outcome was Johnson's recognition that the presence of flat-topped mounds in the region appeared to represent a possible Cambria pattern (Elden Johnson 1961:77). When combined with the Cahokia-related Red Wing Silvernale expression, Johnson offered a compelling model for Cambria. Cambria became a procurer of all things related to the buffalo that eventually made their way to the Mississippi River. Johnson was attempting to deal with the noted archaeological site contexts in southwestern Minnesota that are characterized as bison-hunting locales. Johnson (1991) envisioned Cambria as being an integrated system of large village sites, secondary villages scattered along the Minnesota River and throughout the Prairie-Lakes region, and equally scattered burial mounds (many of which were flat-topped); representing a scaled-down version

of a Mississippian period settlement pattern. Gibbon's (1993) and Anfinson's (1997) reconsiderations amplified the notion that Cambria settlements were scattered across the southwestern portion of the state and that these were largely different in content from the locality or core.

Anfinson's (1997) review of Cambria drew attention to the significant differences between those sites clustered in the Cambria locality as opposed to those scattered away from this locality, i.e., to the north, west and southwest. We identify this southeasterly locality as the Cambria core. This core comprised at least three settlements; a recent survey identified a new site (21BE290) that indicates a potentially greater spread of people in the core.

Ceramics identified as Cambria have been found in a much larger area occupying most counties in southwestern Minnesota (Anfinson 1997; Gibbon 1993). Few of these sites have been excavated; exceptions include Dead River (Michlovic 1979), Lake Carlos (Benn 1992), Maplewood (Watarall 1976), and Pedersen (Hudak 1974, 1976;Wilford 1961). Anfinson (1997:103) draws a distinction between Cambria and Cambria-like ceramics. True Cambria he attributes to only a few sites outside of the core and all but one (Gautefald) within the Minnesota River Trench. The other sites scattered in the Prairie-Lakes region that are Cambria-like appear to be associated with bison hunting points or other short-term use and do not represent Mississippian or Plains-village farmers. This ceramic diversity has not been explained, although it has been used to suggest temporal variation. None of the other known or excavated sites appear to match the conditions identified in the Cambria core. Although no houses have been identified in the core, or any solid evidence for a stockade, the density of pit features is far beyond what has been uncovered elsewhere in the region.

The dating of Cambria has been an issue. Based on the early assays, dates for Cambria sites extend from 900-1300 (Knudson 1967:247; Ready 1979:51). More recent assays however place Cambria from 1000-1200 (Anfinson 1997), or 1050-1200 (Scullin 2007). All agree that Cambria contains Stirling phase Cahokia imitations (rolled rim, angled shoulder jars with broad curvilinear designs), a host of vessels shapes, rim and decorative treatments that are shared with neighbors to the south and west, and local styles. Scullin (2007:85) introduced another division into the Cambria phenomenon, a later or Terminal Cambria that is found in Big Stone and dates 1200-1300, but would include Jones site in the core. He interprets the absence of Ramey-like pottery as the key. In a related vein, Benn (1992) has identified an even later Cambria (1400) in the Lake Oscar region of Douglas County, well to the north of the Minnesota River Valley.

In summary, Cambria has been variously identified. Wilford (1945) originally proposed a Middle Mississippi affiliation, but eventually argued that it was different (1955), without offering an alternative. Tiffany (1983) projected Cambria as a member of IMM and this designation held for a long time (Gibbon 1991: 217, 1993:178; 2012: 165; Henning 2001; E. Johnson 1991; Johnson 2007a:14-15; 2007; Tiffany 2007: 91-92; Winham and Calabrese 1998).

The most recent proposal dealing with Cambria is offered by Henning and Toom (2003:215-216) who place it in the Northeastern Plains Village (NEPV) Tradition, parallel to the Middle Missouri Tradition. Their argument is presented in a re-evaluation of all Initial Middle Missouri units and is based on the presumption that it is unrelated to the preceding Great Oasis,

the contemporary Initial Middle Missouri east and west variants, and the succeeding Extended Middle Missouri and Coalescent Traditions that led to the Mandan and other historic period tribes of the Middle Missouri region. This argument of consanguine purity has been around for a while if not in the precise form expressed most recently (see Spaulding 1956:98-99).

Northeastern Plains Village Tradition (NEPV)

The NEPV is part of a broader settling-down processes witnessed in the appearance of the Initial Middle Missouri Tradition in Iowa and southwestern Minnesota (Anfinson 1997; Henning 2005; Tiffany 2007) and Cambria in southern Minnesota (Anfinson 1997; Henning and Toom 2003; E. Johnson 1991; Scullin 2007; Tiffany 2003). It was also influenced by this pan-Midwestern and Plains Late Woodland transformation, although the exact origins are unknown. As first defined it emerged around 1000 (Picha and Gregg 1991:B.36-37), although Toom (2004) has suggested that it was not until after 1200 that a full-blown NEPV complex is recognizable.

The NEPV comprised settlements with evidence for routine cultivation of maize and other cultigens, structures, ditch enclosures, and earthen burial mounds. Toom (2004) argues that these developments were not on par with the commitment to village life and agriculture witnessed at the larger villages along the Missouri River. Yet, Schneider (2002, 2008) and Michlovic's (2008) reconstructions are at odds with Toom's down-playing of settled life in the region. Toom (2004) has proposed an early, middle, and late sequence for the entire region (Table 2.2). However, this sequence in its details best characterizes only the Upper James River and Devils Lake subregions.

One well studied portion of the NEPV is the Shea phase, found in the Maple River Valley, a tributary of the Sheyenne River in southeastern North Dakota. The phase is best known from two upland hamlets in unplowed pasture. Both are surrounded by ditches which are about 1.5 m deep and 2-2.5 m wide. Evidence of maize was found at both sites, along with bison, mollusks, and waterfowl. One interesting feature of this phase as it relates to the village complexes of southern Minnesota is the presence of distinctive ceramic wares that were clearly contemporaneous and in some cases blended on single vessels (Michlovic 2008). This is reminiscent of the ceramic assemblage at the Cambria village sites. It is probably important for us to recognize that ceramic variability is typical at these late prehistoric Plains village sites, and as shown below, artifactual variability may be extended to architecture and other aspects of culture as well.

The Big Stone phase is the only named unit in southwestern Minnesota that has been subsumed under the NEPV complex. As noted above, Henning and Toom (2003) have recently offered Cambria as a member of this complex. Other areas, such as the Lower James, Red River Valley, Bois de Sioux, have evidence for Plains-like occupations, but these have not been formally described.

Big Stone Phase

The Big Stone phase concept was originally offered by James Haug in an unpublished paper presentation (Anfinson 1997:104). Haug (1983a) wished to differentiate the ceramics

recovered from excavations at the fortified hill-top Hartford Beach site in Roberts County, South Dakota from regional assemblages previously reported in the literature. It was a concept that emerged much in the same way that the NEPV concept was initiated, that is, existing nomenclature did not account for the local variation. Anfinson (1997:104-112) subsequently expanded the phase to include sites and mounds excavated on the Minnesota side of Big Stone Lake and Lake Traverse. This included the smorgasbord of collections derived from Jenks' excavations at Browns Valley in search of Paleoindians, the fortified hill-top enclosure site of Shady Dell, excavated by Wilford, as well as the Zacarahis and Jensen Island village sites in South Dakota. These collections yielded a mix of ceramics from Woodland through the Late Prehistoric. Also included in this mix were the Cambria related burial mounds, Schoen #2 and Miller Mound (Johnson 1961). One of the village sites was identified by Johnson (1961:54) as extensive (21BS14); however, site file data do not support the designation as a large site. Another Cambria-related site is the Artichoke Lake site (21BS23) in Big Stone County (Hanson 1971).

A systematic survey of Traverse County by Craig Johnson (1991) represented the first attempt to account for the diversity of sites identified along the lake margins. His work revealed a large number of potential Big Stone phase sites in a variety of settings. Johnson also identified some collections on the South Dakota side of Lake Traverse as having Extended Middle Missouri ceramics.

Membership in the Big Stone phase is based primarily on geography, site type (fortified hill top), and the presence of Late Prehistoric ceramics (Anfinson 1997:104-112). This phase is clearly a hybrid, although it is impossible to tell at the present whether there is a great deal of time represented or instead, the coexistence of heterogeneous styles (the perennial dilemma of poorly known archaeological regions). It is worth noting here that the previously referenced Shea phase and other Late Prehistoric phases on the Northeastern Plains are also characterized by heterogeneous ceramics. Perhaps such heterogeneity is a characteristic of the Plains Villages.

Excluding Wilford's early excavations and other early work on mounds in the region (Sigstad and Sigstad 1973; Smith 1941), there have been no excavations in the region outside of the work at Hartford Beach (Haug and Fosha 2008) and environs (Haug 1983b). This excavation program extensively exposing the Late Prehistoric occupation has yielded a time span of 1030-1400, averaging in the mid-thirteenth century. We are unsure what ceramic variation, besides the HIP and broad incising, dates to this time span.

The status of the Big Stone phase is at best problematical owing to the paucity of dates and the inclusion of very diverse ceramic assemblages in a relatively small area. We prefer at the present to focus on the geographical aspects of the unit and are unsure as currently construed if it is a phase, period or tradition. Even our understanding of geography must be qualified. There are several sites on prairie lakes in the easternmost part of Big Stone County that yielded Big Stone material (Hanson 1971; Harrison 2002). These are discussed in the appropriate section below.

One problem with the Big Stone phase is that it has come to be simply Cambria without rolled rims (Henning and Toom 2003:208). Big Stone is not western Cambria, although Anfinson (1997:104) does equivocate on this matter. The Henning and Toom solution of

switching Cambria to the NEP would eliminate any nomenclature issues by uniting Big Stone and Cambria.

Red River Valley

Occupations along the Red River Valley represent another subdivision of the Northeastern Plains, although only the southernmost portions of this region are of direct concern here. Most archaeological sites are located on the banks of the river. Vertical accretion of sediments due to flooding allows only the most recent archaeological occupations (Late Prehistoric) to be evident on the surface (Michlovic 1983; 1984b). Nearly all sites in the Middle portions of the Red in western Minnesota south of the Sand Hill River are associated with the Late Prehistoric Sandy Lake occupation. At present Sandy Lake is a monolithic unit with only limited temporal subdivisions. For example, the shift from grit to shell temper is the major change in the region, such that by around 1400 all of the pottery is shell-tempered (Mather 2000). The minor appearance of ceramics other than Sandy Lake is the only indication of temporal variability. These minority sherds have Plains and southeastern (Cambria and Oneota) affiliations.

Archaeological investigations have been limited to reconnaissance survey and testing (Michlovic 1982, 1983, 1984b). Wilford conducted minor surface work in the area in addition to excavating a few burial mounds. No formal phases have been offered for the Red River Valley, although a preliminary sequence is suggested.

The principal drainage in the headwaters of the Red River is the Bois de Sioux River. There has been little archaeological attention directed to this drainage. Excavations at the Dead River site on Lake Otter Tail resulted in the identification of Blackduck Late Woodland and minor Cambria occupations. The upper and middle courses of the Red River have been surveyed (Wilkin, Clay, and Norman counties) resulting in the recovery of a large number of Late Prehistoric Sandy Lake occupations (Michlovic 1983, 1984b). Testing at some of these sites has identified minor Plains Village affiliations and some secure radiocarbon assays (Blikre 2008; Johnson 1995; Michlovic 1984a, 1986, 1987a).

Evidence for Plains Village occupation has been limited to a poorly known Red River ware and the isolated occurrence of a Cambria and possible Oneota occupations (Holley and Michlovic 2011). Michlovic early on recognized a grit-tempered plain ware that he first identified as Red River ware (1983, 1984a, 1985b) and subsequently as Northeastern Plains ware (Michlovic 1987a). The concept was needed to get a handle on Late Prehistoric plain surface vessels in the region (see also Breakey 1981). These ceramics are smoothed plain, occasionally polished, jars with notched lips, sometimes with modified lips, and also likely incised with a variety of designs. Other archaeologists have found the concept useful in categorizing similar ceramics recovered from counties west of the Red River Valley (Benn 1992) that are the subject of this research. However, the term was jettisoned in favor of preexisting terminology (Michlovic and Swenson 1998:14, 16) such as Lisbon and Buchanan Flared Rim. These types were identified in the 1960s by Wheeler (1963) and Wood (1963). About the same time a Riggs Ware was defined for the Middle Missouri (Wood and Woolworth 1964) that essentially matches the Lisbon and Buchanan types. We can characterize this ware, which is always a minority on

Red River Sandy Lake sites, as indicative of external contact with Cambria, Plains Village, and Oneota.

Radiocarbon dating from two Sandy Lake sites, Mooney (Johnson 1995; Michlovic 1984a, 1987) and Omild 1(Blikre 2008) allow us to date an early phase for the Sandy Lake occupation of the valley in the span of 1200-1400. Ceramic diagnostics comprise a reduced presence of shell temper in the Sandy Lake cordmarked ceramics and a minority presence of plain, incised surfaces that are primarily grit-tempered. The incised designs include curvilinear trailed related to Cambria and rectilinear designs, sometimes with punctations, that may be affiliated with Oneota.

Although not in Minnesota proper, Plains ceramics are also reported from southern Manitoba and northernmost North Dakota (Fox 1982; Syms 1977).

End of the Plains Village Cultures in Minnesota

The identification of Plains Village societies appears to end sometime during the 1300s. Conflicts of a highly violent nature were a part of the social landscape along the Missouri River during this period as witnessed at Crow Creek (Willey and Emerson 1993). Conflict was a feature of life among Plains Villagers for successive centuries (Bamforth and Nepstad-Thornberry 2007; Mitchell 2007). Parts of southwestern Minnesota were overrun by Oneota peoples during the 1300s, although intensively occupied places do not seem to have occurred west of the Fort Ridgely area along the Minnesota River. In the north, Sandy Lake was the sole and preeminent presence along the Red River and the northern lakes region. Later, peoples with Missouri Valley ceramics occupied large parts of eastern North Dakota and Canada (Biesterfeldt, James River, and Vickers Focus). Oneota and Sandy Lake occupations are present in most areas of southwestern Minnesota, although the former is gone before the Europeans arrived. It is possible that increased incidence of droughts beginning after 1300 and continuing into the seventeenth century, which is documented by a variety of proxy measures (Shuman et al. 2009), may have caused the local disruptions witnessed in southwestern Minnesota.

Implicit in this placement of Cambria is the recognition of notable similarities with cultures in the west (Mill Creek and Over) and to the east (Silvernale and Cahokia). Nevertheless, a fundamental question remains unaddressed; how much of this similarity is due to purported ancestry from Great Oasis. Clearly, the Cahokia connections are a sign of the times and not necessarily indicative of routinized contact between Cambria and the east. For Minnesota archaeologists, Cambria represented a continuation of the village pattern initiated during Great Oasis, although early radiocarbon dates showed contemporaneity. But the problem in linking the two is geography, as they are greatly displaced in space. The presence of Cambria sherds at the Great Oasis site (21MU2) has not been vetted.

Although widespread in southwestern Minnesota, Cambria is most associated with the Minnesota River. In spite of successive investigations following Wilford by Shane and Gibbon, and Scullin, no houses have been identified or any reliable traces of fortifications. The attempt to lump the Gillingham site (Gibbon 1993; Wilford 1955:139) with the Cambria locality is

questionable, since ceramics from this site do not have the classic Cambria ceramic characteristics.

In the chapters that follow data collected during the present project will be presented in discrete sections based on environmental zones from which the materials derive. These zones include the Minnesota River Valley, the Prairie Lakes, the Big Stone region, the Ecotone, and the Upper Red River Valley. Within each of these ceramic variability will be described and a cultural sequence based on ceramics, and to some extent, radiocarbon dates, will be proposed. The emphasis is on ceramic collections, following established archaeological practice in the Plains and Midwest. Village cultures in the Plains and Midwest of North America had a robust ceramic technology and the variability across time and space in the manufacture of pottery is perhaps the best cultural indicator (cf. Johnson 1998: 311). Lithic materials or faunal remains represented in collections of multicomponent sites are not normally reliably associated with the ceramic remains that define components. Thus, our efforts were directed at ceramic remains in each of the identified sub-regions discussed below.

Chapter 3
MINNESOTA RIVER REGION

Cambria is nearly the exclusive focus of the Minnesota River region because of the concentration of villages in the core and the paucity of archaeology for the remainder of the region. Once Cambria was identified outside of the core at sites such as Gautefald and Gillingham a new idea of Cambria emerged as being of two kinds, an inner or core and an outer or peripheral Cambria. The core locality displays the greatest variation and greatest concentration of occupation and people. It is located in prairie just outside the forest in the southern Minnesota Valley. The peripheral Cambria is scattered, never concentrated. The core Cambria ceramic profile has elements that are distinctly Mississippian, copies of Mississippian (Linden), Plains affinis (S-shape, varieties of HIP), and uniquely local expressions (Mankato Incised). Such a mix is not out of character with Initial Middle Missouri complexes particularly the eastern strains, which is why the issue of Plains Village in Minnesota has arisen. The peripheral Cambria is distinctly different and for the most part not as heterogeneous. A major issue at the present is whether this disparity is temporal, that is, the core region with a longer time depth witnessed the ebb and flow of styles and the marginal regions are limited in time (the prevailing guess is later), or simply selective copying/influence.

We first present an assessment of our dates from the Cambria Locality and then focus on the peripheral Cambria along the Minnesota River drainage. The Cambria Locality is well situated in time, as all three sites of the locality (Cambria, Price, and Jones) have been dated. What is lacking is an analysis of the dates in reference to the occupation and an understanding whether the occupation is divisible into sub-units based on ceramic variations. Katy Mollerud, a Ph.D. candidate at the Department of Anthropology, University of Wisconsin-Milwaukee, has undertaken a reanalysis of the Cambria ceramics from these three sites. In the process of doing her work she has examined the collections for possible features to date. She has had available charred wood samples from Price and Jones, along with the ceramics from some of these features. In all we dated charcoal from five features at these sites. The resulting dates are consistent with the range previously recovered from the site. We were expecting a difference with the Price site, since previous dates were relatively late and there is paucity of rolled-rim Ramey-like jars at the site, based on an admittedly small sample.

Outside of the Cambria core the Cahokia packaging of rolled-rim and inslanted jars with broad-trailed curvilinear designs is uncommon. What we have is one-step removed as represented by the Linden Everted type (Knudson 1967) with plain surface broad-trailed incising on necked jars, which is the dominant type at the Cambria area. One should question whether Cambria is the source of these traits. Or, more precisely, one should question what is called Cambria as most analyses lump all thin-walled, plain (or polished) surface, trailed curvilinear incised as Cambria (Anfinson 1997:96-97). For the present, we retain Cambria as a designation, yet fully expect that future work will uncover collections relevant to this issue and warrant a terminological change.

We have examined the ceramics from the Gautefald site in detail (Holley 2011a) and a preliminary inspection of the Gillingham site collection. Our attempts to identify other collections from this region failed to reveal any significant material.

Gautefald Site (21YM1)

Lloyd Wilford excavated the Gautefald site in 1948 (Wilford 1953). Although a number of archaeologists have attempted to fit this occupation into a synthetic study of the region (Anfinson 1997; Dobbs 1989), this collection has not been reanalyzed. One hindrance is the dependence on a purported surface collection from the site, which may be contaminated with material from other sites in the region. A detailed analysis of the material (Holley 2011a, which is slightly modified here) concluded that even if all of these ceramics are not from the Gautefald site, they are from the region. Thirty-two discrete vessels based on rims comprised Late Woodland (n=6), Cambria (n=19), Oneota (n=6), and Sandy Lake (n=1).

For the grit-tempered sherds and rims with intact surfaces (n=312), most were smoothed plain (48%), followed by cordmarked (34%). The reduced proportion of cordmarked sherds is indicative of the reduced presence of the Late Woodland component, athough cordmarking does continue into the Late Prehistoric. Six rims are identified as Late Woodland that includes vertical cordmarked and rod stamped (the most common), the latter is most like Late Benton with modified rims and wrapped rod stamping of the rim and lip. Incised sherds comprised 15% of the grit-tempered sample. Incised lines were primarily medium in width (average line width of 3.5 mm, n=46, range .5-8 mm). A small number of incised sherds revealed the cameo-effect or intaglio on the interior due to the depth of incising (25%). These broad incised examples resemble the trailing of a finger on the surface. The cameo-effect is a diagnostic of Cambria, and Red Wing Silvernale phase (Holley 2007), and is even evident on succeeding Oneota vessels; it is not however a signature of Cahokia (Holley 1989), although it is present.

Only two of the 19 Cambria vessels, based on discrete rims, have incised designs on the exterior, although most of the vessels were incised and the reduced frequency may be attributed to the small size of the rims. The only vessel bearing a discernible design has a bared triangle, apex downward. One vessel has incising on the interior with a design featuring a meandering line bordering hachured lines, which might represent a chevron (Figure 3.3 f). Interior designs are known from the Cambria core (Linden Everted Type). Although fragmentary, the incised sherds reveal designs that are consistent with what has been identified at the Cambria core (Figure 3.3 a, b). Absent, however, are other examples of Linden and Mankato (Anfinson 1979; Knudson 1967) that include exterior rim decorations and the hachured triangle (Anfinson 1997:Figure 48).

Punctations and jags are present on a few sherds, though not in combination with incising and occur primarily on the shoulder juncture (Figure 3.3). Another decorative technique is tooled impressions, resembling notches, on a sublabial appliqué (Figure 3.2 a). These decorations could be identified as finger or thumb-impressed. The overall effect of this decorative technique is similar to the Initial Middle Missouri tradition, where it is a mode that cross cuts various wares but is often associated with the type Kimball Modified Lip (for example, Tiffany 2007).

Rim modification comprised modeling the rim and tooling or notching. More than half of the jars have some form of rim modification (Figures 3.1 and 3.2), which can resemble rolled rims of Cahokia, but most are protruding. In most cases it is difficult to tell if the rim modification is the result of an intentional treatment or simply the residue of applied pressure from decorating the lip. The remaining rim treatments are either direct, or more rarely, tapered.

Notching or tooling of the rim and lip was present on nearly half of the vessels. The most common was a plain dowel impressed on the exterior (Figure 3.2 a), the interior, or the most common the superior crest (Figure 3.2 b-e). One of the exterior examples resembles Kimball Modified Lip. Second in frequency was the slash, whereby the rim is slashed with a sharp tool. Slashes were confined to the superior crest. The four remaining notched rims are decorated with wrapped dowel impressions. Two have cordwrapped dowels impressed in the form of a crisscross pattern (Figure 3.2 f, g).

Jars shapes have been divided into three composite types, based on varying rim treatment (Table 3.1). Most have a straight-to-inslanted profile with a modified or unmodified rim (Figure 3.1). Flared jars are rounding to sharp (uncommon) at the neck juncture and are second in frequency and these may be associated with rim modification (Figure 3.1). The S-shaped jar is not represented by rims in the sample, although one sherd has a sublabial shelf on the exterior that may represent an S-shaped jar. The jar necks are all stubby or weakly defined, with 2.0 cm representing the tallest neck. The high-neck jar is associated with the Mankato and Linden types in the Cambria core.

Detached shoulder sherds reveal the presence of angled, hyperangular, and rounded-angled jar shoulders (Figure 3.1 i-k). Hyperangular examples are early in the Cahokia environs (Lohmann-Early Stirling), however, the Gautefald examples may simply represent instances where the potter found the need to thicken the shoulder juncture for stability (Figure 3.1 j). Handles are also present.

The striking feature of the Gautefald sample is the absence of many Cambria traits present in the core. These include S-shaped and high-neck jars, cord-impressed surface treatments, well-defined rolled-rims, inslanted neck jars, blackened surfaces, and Mankato Incised. These differences, while profound, do not negate that this collection is Cambria in affiliation. One source for the diversity may be vessel size. As a rule, the high-neck jars from the Cambria core are moderate to large in size, while it appears that most of the jars from Gautefald are small. In keeping with the notion that briefly occupied sites have smaller-sized groups eating together we would expect smaller vessels at sites like Gautefald. This may account for why the vessel profiles look substantially different from those illustrated from the Cambria core. Thus, absent the high neck for the jars would mandate a reduction in a number of decorative patterns diagnostic of the core.

The Gillingham Site (21YM3)

The Gillingham site is one of the more enigmatic sites in southwestern Minnesota. It is likely a composite site that comprised an occupation and earthworks on a bluff overlooking the Minnesota River. On the west end was a ditch enclosure, moderate in size, and to the east was an irregular string of nine conical earthen mounds, and also likely other features including two other mounds and embankment (Winchell 1911:116-117). The entire site has been destroyed by gravel quarring.

According to Samuel Riggs (written in 1852), the earth was drawn up on both sides of the ditch and slight elevations within the ditch may indicate house locations (Winchell 1911:116). Riggs was also of the opinion that this enclosure was built by the Cheyenne on their migration from the Mississippi River.

We are fortunate that Wilford (1951) tested the enclosure on two occasions in the 1940s, providing the only secure archaeological data from the site. Wilford identified three depressions within the enclosure which he believed to represent structures. Two of the depressions were foundations for historic houses, a third was strictly prehistoric and although no structural elements were identified the numerous hearths leads one to believe that this third depression may have represented a structure. A testing of the ditch failed to yield any prehistoric remains of significance.

A moderate-sized sample of prehistoric ceramics were recovered (1061 sherds), but most of these were crumbs and are not considered further here. We inspected the rims and decorated sherds and relied on Wilford for a description of the remaining body sherds. There was a roughly equal balance of cordmarked and plain surface sherds, attesting to the predominance of the Cambria component, a weak presence of Late Woodland, and a moderate presence of Middle Woodland. A cursory inspection of the body sherds indicates that a number of the cordmarked sherds are thick-walled and likely Middle Woodland in affiliation.

A striking feature of the Gillingham sample is the large number of S-shaped vessels (Table 3.1; Figure 3.8). Although fragmentary, and perhaps inflated, our preliminary estimate of a 1/3 proportional relationship of S-shape jars is highly unusual. These jars do not fully comply with the standards practiced in the Middle Missouri drainage in that they are weakly developed S-shaped vessels and they are seldom decorated on the neck exterior. Only three S-shaped jars are decorated on the neck; two with sublabial jags another with cross-hatching (Figure 3.5 a). However, most of these jars are decorated with rim or lip notching (77%) (Figures 3.5 a, h and 3.8 a-c, e).

As based on the Gautefald sample, three other jar types are represented at Gillingham: flared, straight-to-inslanted, and S-shaped (Figure 3.7 and 3.8). The straight necked jars within the straight-inslanted category have longer necks (Figure 3.7 b) than those from Gautefald and overall there appear to be larger jars at Gillingham. Rim modification is not as common, representing 33% of the jar sample, and even excluding the S-shaped jar, is slightly less than half (48%) of the jar sample. Notching is more common in the Gillingham sample, but this is attributed to the inflated S-shaped jar category. There is considerable variability in the notching that includes long slashes (Figure 3.5 a-c), deep short slashes (Figure 3.5 h), rounded impressions (Figure 3.6 a), and thumb-impressions (Figure 3.6 e). One large vessel has cord wrapped rod impressions on the rim (Figure 3.4). Two examples of the herringbone motif are present (Figure 3.5 e) and additional jars appear to have related decorative treatments, as for example lip crest punctations and an interior diagonal notch. One vessel's lip is adorned with the crosshatched pattern. Angled shoulders are commonly encountered, some of which bear punctations or jags on the shoulder (Figures 3.4; 3.6 c, d). Handle scars are present on the jar sherds as well.

The herringbone rim treatment is found widely in southwestern Minnesota and deserves some discussion. It differs from examples identified in the Plains Village cultures. For example, in Initial Middle Missouri contexts it comprises a chevron-like pattern on the lip (Caldwell and Jensen 1962:42, Figure 15 g) and in Coalescent contexts (Johnson 2007a: 128, 132) it is confined to the exterior rim (Johnson 2007a:Figure B.15 k) or braced rim (Johnson 2007a Figure B.16 g). Our examples are characterized by a continuation of the motif on opposing surfaces (lip and exterior rim, or lip and interior rim, or, all three), in some cases these displacements are not staggered sufficiently to create a true herringbone, but they have been grouped together as they

appear to represent a style unique to our region. Woodland examples of the herringbone treatment in Minnesota (Anfinson 1979:Figures 9a, 46) are different in overall execution than these Late Prehistoric examples from our region as they do not involve the lip or interior. For the most part these herringbone patterns are confined to a Cambria time span as they involve, for the most part, modified rims (although any thick rim will suffice). They are normally sufficiently large to allow this kind of decoration. Examples from the Cambria site (Knudson 1967:Plates 4 a, c-e; 5 a, i) typically involve a thin slash on the superior crest and a large impression or thumb impression on the exterior rim, a treatment not found at the other sites in our study area.

The broad incised sample is wider on average than Gautefald and more frequently creates an intaglio effect on the vessel interior. Designs are difficult to identify in a small sample but include scrolls (Figures 3.4 and 3.6 b), chevrons, and commonly a hachured element. Reed punctations are also incorporated with the incised lines, as well as jags or punctations on the shoulder that apparently are not related or in consort with an incised motif. It is a remote possibility that the some of these sherds may represent the combination of incisions and punctations found related to the Mankato Incised design. Mankato Incised has not been identified at any other site we examined in our study, except for the Cambria core.

Residual carry-overs from Late Woodland are also present in the Cambria jars at Gillingham. One vessel with a flared rim was decorated with a wrapped rod on the exterior rim and interior (Figure 3.4). There is also cordmarking evident below the smoothed plain angled shoulder, and some vessels retain vestiges of smoothed over cordmarking as well. A cord impressed vessel is also represented in the sample (Figure 3.5 d). There are two other vessels that were identified as Late Woodland but could represent Cambria examples. One is a smoothed over cordmarked rim that has a channel. The other rim has widely spaced vertical stamping on a thin-walled jar. This wrapped rod stamping differs markedly from Late Woodland Lake Benton jars.

Table 3.1. Comparison of Cambria Vessels, Guatefald and Gillingham sites.

Variable	Guatefald N	Guatefald %	Gillingham N	Gillingham %
Flared rim Jar	7	37	10	24
Straight-Inslanted	12	63	19	45
S-Shape	0	0	13	31
Total	*19*	*100*	*42*	*100*
Modified Rim jars	12	63	14	33
Notched Lip	5	26	19	45
Crosshatched lip	2	10	1	2

Comparing the two collections, with an eye towards the Cambria core is revealing but definitive determinations await more control over time. Both collections, along with all Cambria affiliated collections in the region, are a truncated version of Cambria. Excluding a possible fragment from Gillingham, Mankato Incised is absent from these sites. Also absent are the attempts to copy the Cahokia Stirling vogue of rolled rim, inslanted jar, angled shoulder, broad incising, and intaglio impressions on the interior with a darkened or black surface. Traits in reduced frequency are cord impressed jars and those with the horizontal pattern, which occurs in a variety of contexts in the Cambria core.

A temporal difference may explain this disparity, since we are lacking a working sequence for the Cambria core and are presented with only a conflated ceramic assemblage. Recent mitigation near the Cambria Core identified a small site with primarily examples of rolled rim jars and vertical neck jars (21BE290, site form), without Mankato Incised and S-shaped jars. If dated, this could provide the key to unlocking the sequence. If this disparity is not due to time, we find it difficult to envisage the social mechanisms that would account for the stylistic impoverishment for Cambria affiliated ceramics displaced from the core. Functional differences may also be apparent here with Gillingham a representative of a settled village with at least one house and Guatefald representing a short-term use site, which would result in the projected differences in the vessel size.

Discussion and Summary

Our dates support a two-fold division of the Cambria occupation, but we lack the ability to identify what might constitute the diagnostics of this division. Criteria, at least based on material from outside the region, are suggested elsewhere in this report. There is no assurance, however, that this division applies to the Cambria core.

One scenario to suggest a sequence is admittedly simplistic. If a given trait (surface finish, temper, etc) is associated with the angled shoulder then that trait is at least early. In our data we see cordmarked, broad incised, cordwrapped rod, rolled or near rolled rims all associated with the angled shoulder. Late Cambria would have no angled shoulder and no modified rims.

We are woefully lacking collections from other sites in the Minnesota River valley as there is a vast portion of the valley between the Cambria core and the Gillingham/Gautefald cluster. Within Brown County, to the west of Lake Hanska, are two sites (21BW6 and 54) that have cord impressed (HIP) necks, with or without fringe punctations and cordmarked shoulders. Smoothed plain thin-walled sherds are also present. We see no reason why Cambria-affiliated sites should not be present in various parts of the valley. Further west in Swift County, which is near the Big Stone region, we found a small number of sherds from sites along the rivers draining the prairies in this county that have Cambria diagnostics (thin-walled, plain surface sherds, angled shoulders, and cord impressed decorations). Cambria diagnostics are also present along the shores of the few lakes in Swift County (Holley, Michlovic and Dalan 2011b). Although our assessment is far from complete, it is interesting to observe that the river sites are multicomponent with Woodland and Late Prehistoric components, while the sites identified on the lakes are apparently single components dating from the Late Prehistoric period. A small sample of sherds from sites in nearby Chippewa County does not reveal abundant Cambria diagnostics – although it is present in the form of cord impressed decorations and smoothed plain surface necks with exterior notching, and possibly broad incising (Koenen 1999). We find it hard to believe that this not an artifact of limited archaeological coverage.

The apparent absence of Great Oasis along the Minnesota River is most puzzling. Even sites on the margins that we discussed for the Big Stone region do not have evidence for this culture. It would appear that the Minnesota River was a natural border to this cultural phenomenon. Although vessels that bear similar designs have been identified in private collections in Stearns County (personal communication, Craig Johnson 2013) and a few sherds from Kandiyohi County (21KH67) may be related to this culture as well. All examples, are

stylistically removed from Great Oasis proper, however, and may represent a generic Initial Middle Missouri Influence from the west and not southwest.

Oneota is well represented in this region, away from the Cambria core, and somewhere west of Nicollet County toward the Big Stone region was the border between entrenched Oneota and the Plains. Presumably, any semblance of Village culture after ca. 1300 would not be expected to be present.

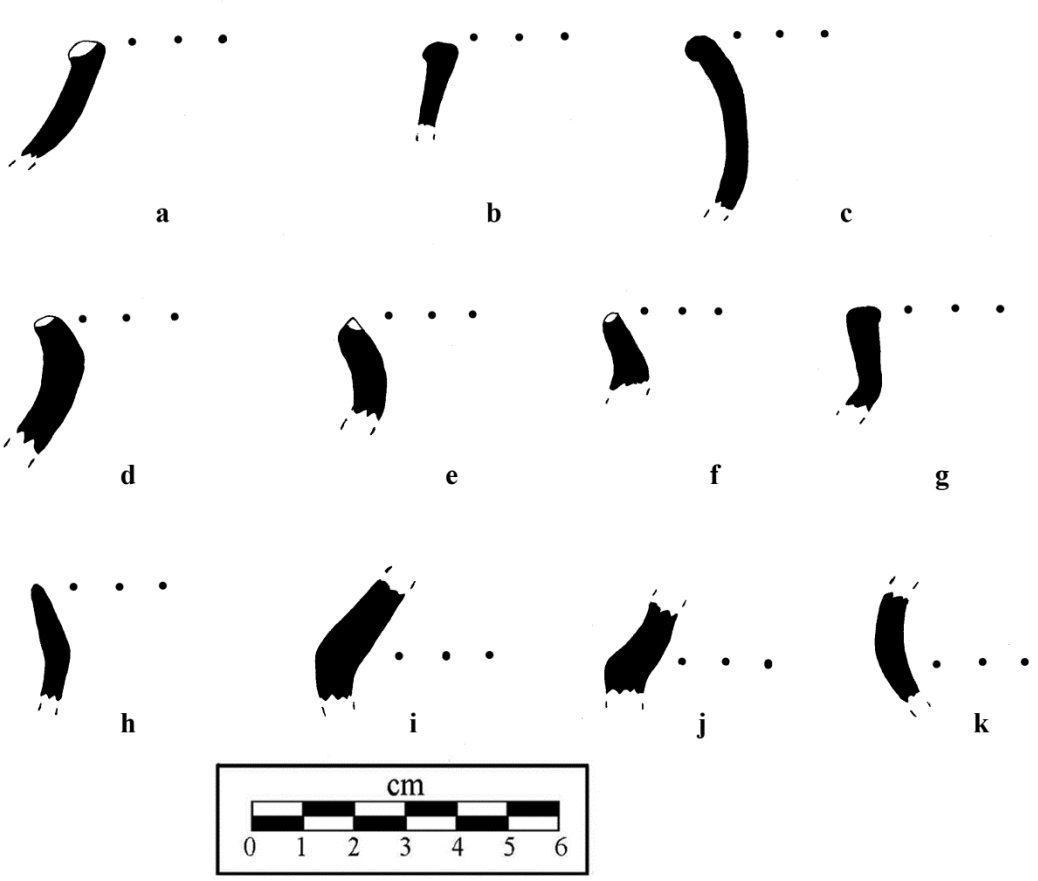

Figure 3.1. Cambria vessel profiles, Gautefald site.

a inslanted jar with modified (rolled) rim, exterior notch (see Figure 3.2 a)
b inslanted jar with modified (rolled) rim
c flared jar with modified rim
d flared jar, superior notch, barred triangle incised design
e flared jar, interior notch
f flared jar, superior notch, interior incised hachure design (see Figure 3.3 f)
g straight neck jar, modified rim
h flared jar
i angled shoulder
j angled shoulder, similar to hyper-angular shoulder
k rounded shoulder

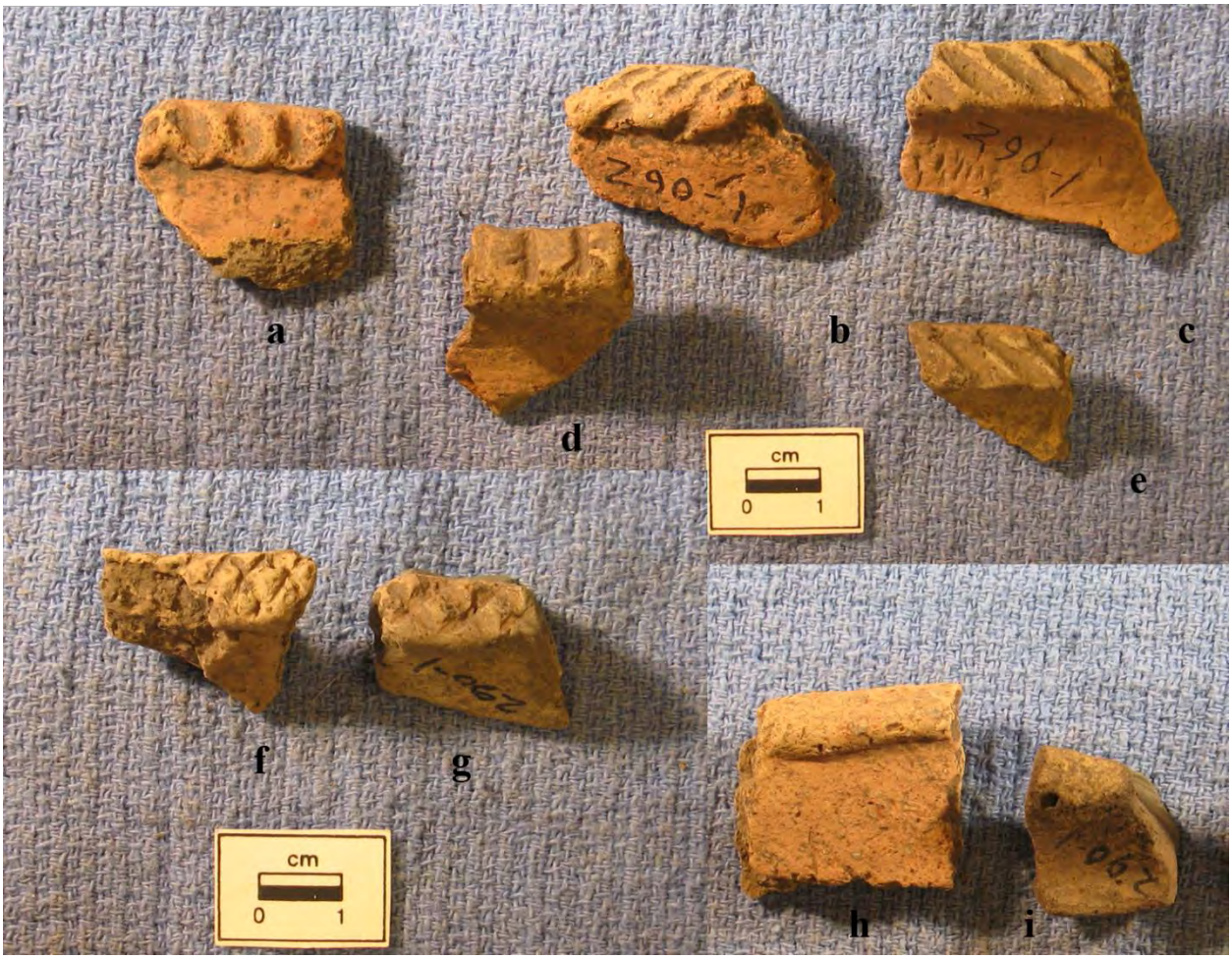

Figure 3.2. Gautefald jar rims: a, thumb impressed fillet; b, exterior notch and superior notch forming a quasi-herringbone pattern; c; exterior notch (partially smoothed over cordmarked exterior surface); d, superior notched rim; e, superior notch; f, modified rim, cross-hatched lip; g, modified-rim cross-hatched lip; h, rolled (modified) rim; i, flared jar.

Figure 3.3. Gautefald site decorated sherds and rim: a, b, punctated shoulder; c, d, parallel incised lines; e, hachured shoulder; f, interior design on jar rim; g, incised shoulder; h, i, barred triangle design.

Figure 3.4. Gillingham rim. Cord impressed decoration on rim exterior and interior, broad incising over smoothed-cordmarked surface, with shoulder punctations.

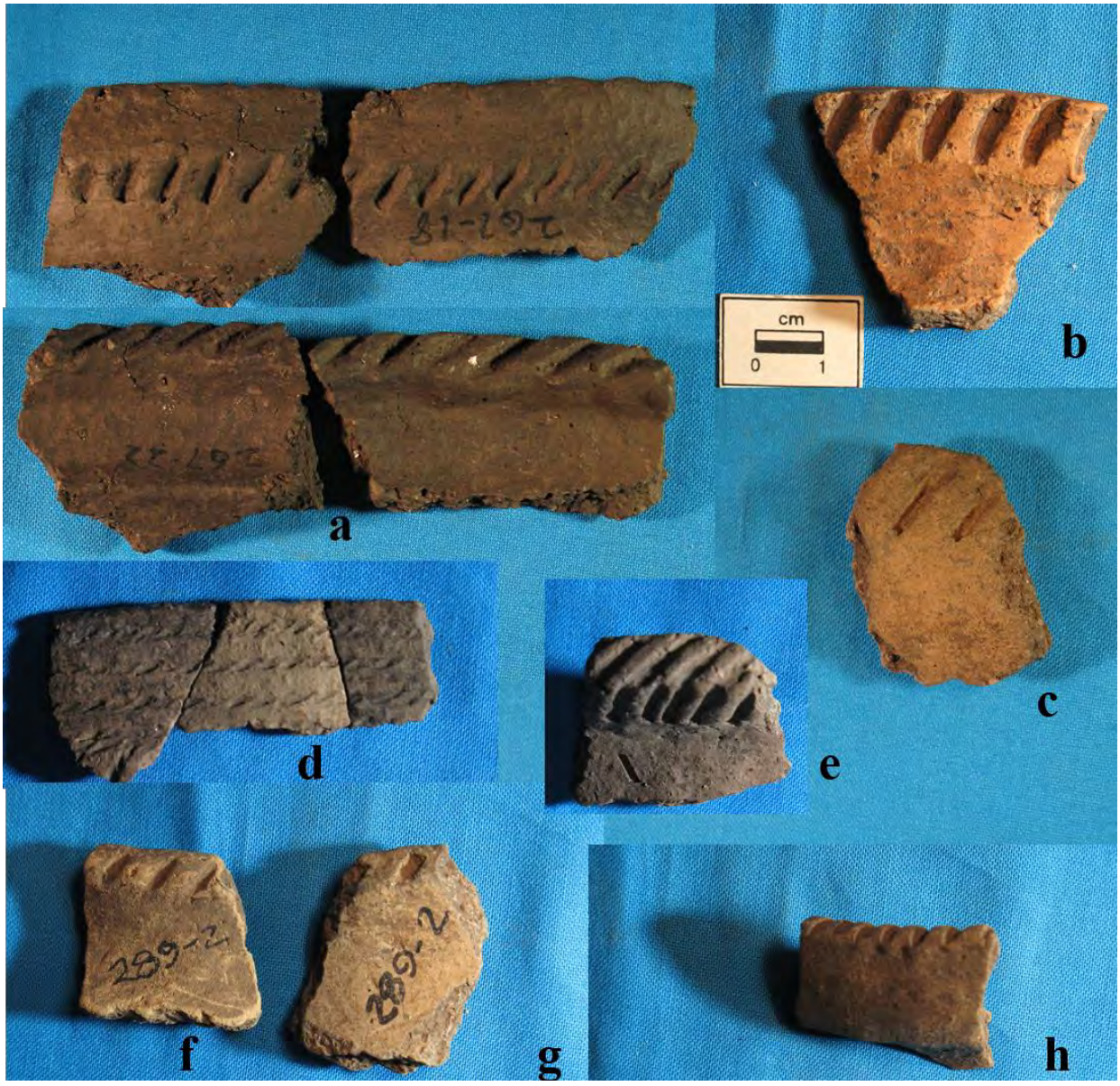

Figure 3.5. Gillingham jar rims: a, interior and exterior view of s-shaped jar; b; flared rim jar with bolster and exterior notch ; c, f, g, interior and exterior view of flared jar rim with interior and exterior notches; d, cord impressed jar; e, herringbone decorated rim; h, s-shaped jar with superior notching.

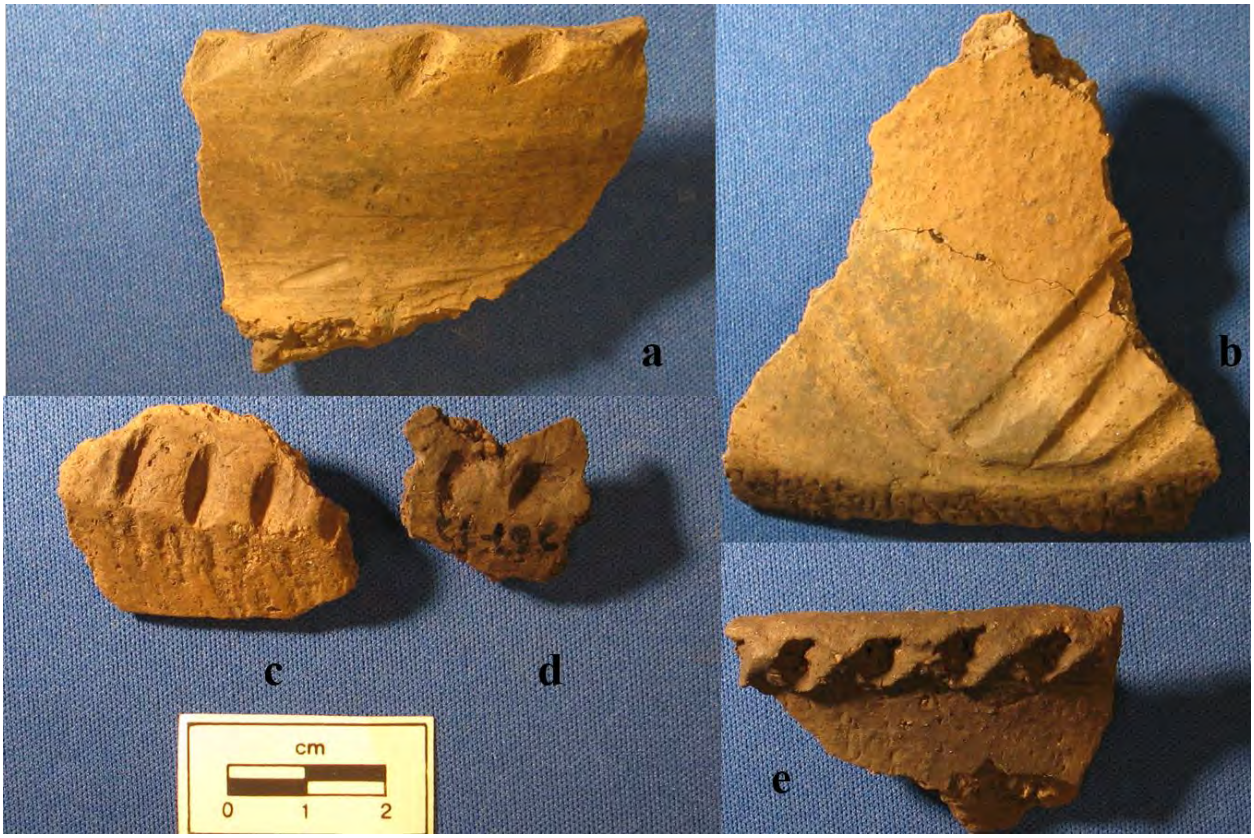

Figure 3.6. Gillingham site rims and decorated sherds: a, straight neck jar with exterior notches and incised neck juncture; b, incised shoulder with scroll (?) and hachure elements on angled shoulder with cordmarked lower body; c, d, punctated/tooled shoulder (note smoothed over cordmarked lower body); e, modified rim with exterior notching.

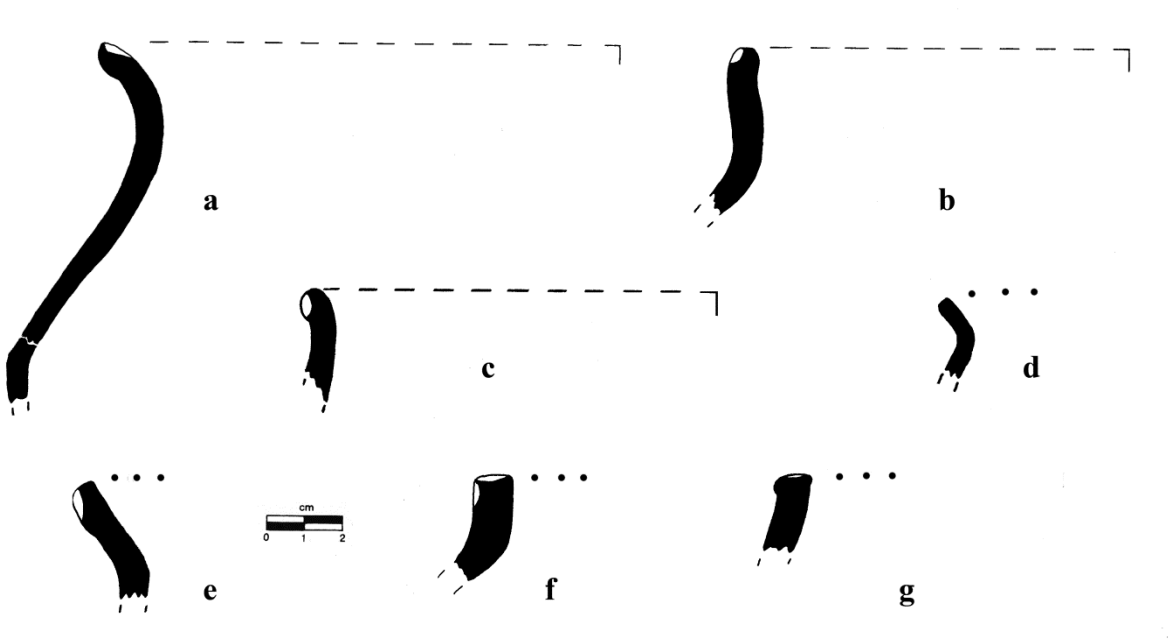

Figure 3.7. Gillingham jar profiles.

a flared jar with modified rim, cord impressed interior and exterior rim, broad incising over smoothed cordmarked surface, punctations on shoulder (see Figure 3.4)
b straight-neck jar, exterior notch (see Figure 3.6 a)
c straight-neck jar with modified (rolled) rim, exterior notching (see Figure 3.6 e)
d flared jar
e flared jar with rim bolster, exterior notch (see Figure 3.5 b)
f straight (?) jar with herringbone rim
g straight-inslanted jar with modified rim, superior crosshatched decoration

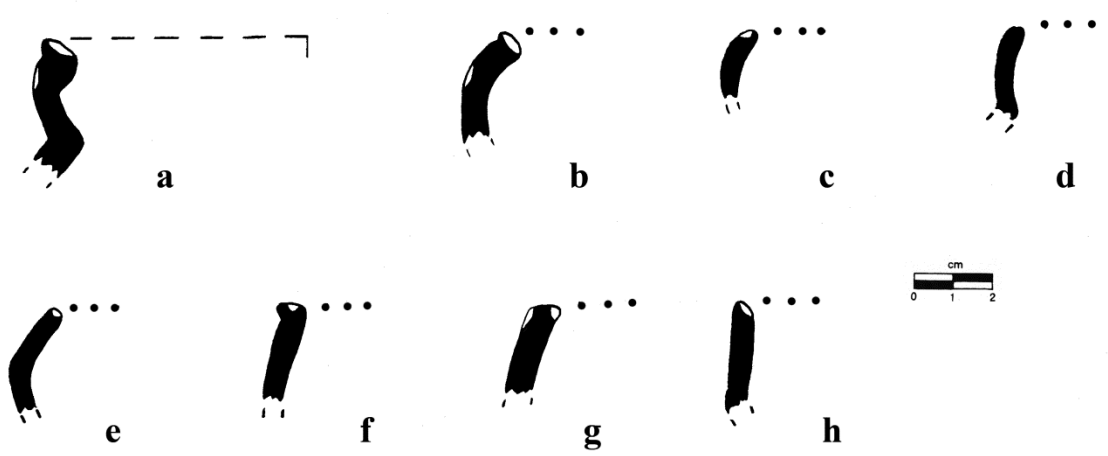

Figure 3.8. Gillingham site s-shaped and other jars.

a s-shaped jar, exterior punctations, superior notch (see Figure 3.5 a)
b s-shaped jar, exterior punctations, superior notch
c s-shaped jar, exterior notch
d s-shaped jar
e s-shaped jar, superior notch
f inslanted jar with superior punctations
g inslanted jar with interior and exterior notching
h cord impressed jar with shoulder (?) (see Figure 3.5 d)

Chapter 4
PRAIRIE LAKES REGION

The Prairie Lake region covers most of southwestern Minnesota. Outside of the Pipestone Quarry, investigations have been limited to surveys and testing of several prominent sites, principally by Lloyd Wilford. An absolute chronology in this region is limited to only a few sites and most contexts are insufficient to develop an understanding of the ceramic variability for any dated time span.

The Great Oasis or Low Village (21MU2 and the Thompson site 21MU17) is the most important site and the exception in this region. Excavations by Wilford (1954b) in 1941 and 1950, Henning in 1971, and subsequently by others have resulted in the identification of numerous and diverse pit features, a large sample of artifacts, and multiple radiocarbon dates. We have avoided the collections from this site for a variety of reasons. A new synthesis of Great Oasis (Lensink and Tiffany 2005) is available and Dale Henning is planning to describe his excavations. We also maintain that the dates presently available from the site are in line with Lensink and Tiffany's current thinking as well as our own.

The dates for Low Village and Thompson are reported in the radiocarbon section of this report. For convenience, the raw date and calibrated two sigma values for the sites are given below as well.

Low Village (21MU2)	Wis-532	975±65	AD966-1215
Thompson (21MU17)	Wis-522	1050±60	AD869-1155

We make only a few observations on Great Oasis in southwestern Minnesota. A major reason to cursorily deal with the Great Oasis ceramics is that the sample is so uniform (Wilford 1954b:4). This is in contrast to most other sites and temporal units in the region. Vessels are primarily jars with well-defined necks. The necks are decorated with finely-incised elaborate designs that involve the HIP (see Figure 4.1). Rims are decorated with diagonal dashes or notches and lips are typically not decorated. For most of the jars the lower bodies are cordmarked or smoothed-over-cordmarked. Only a small number of rims are smoothed plain without decoration or bear evidence for smoothed cordmarking. Miniature pinch pots are also present, which is typically a Late Woodland hallmark. Cambria pottery is also identified at the Great Oasis site and Wilford noted that these were consistently in the upper levels (Wilford 1954b:26). Stray Woodland material reported from the Wilford excavations most likely pre-dates the Great Oasis and Cambria occupations.

Wilford's sample from the site was extensive and consisted of 5551 sherds. The body sherd sample comprised a large number of cordmarked or smoothed-over-cordmarked surfaces (69%). The upper body of vessels was for the most part smoothed, and only 2% of the rims have any traces of cordmarking. Nearly ¼ of the rims and near rims are plain, while most are incised (68%). Plain or cordmarked treatments to the lip rims are uncommon.

Ware designations were established by Henning and Henning (1978) and included a Great Oasis High Rim and Great Oasis Wedge Lip. The Great Oasis examples represent a small segment of a much larger tradition for which we have identified as HIP or Horizontal Incised

Pattern. This tradition begins during Terminal Late Woodland and is present until the Historic period. Oneota vessels even bear relationships with this tradition. Given the duration and areal spread, it is obvious that problems would arise due to multiple type names assigned to the various regional expressions of this tradition. The Great Oasis expression is very distinctive at least as regards execution and a few uncommon designs. The execution is characterized by very fine lines and the uncommon designs are the add-ons to the horizontal line pattern such as the tri-lobe, "deer," and a variety of other unique motifs. What is not unique about Great Oasis is the presentation of diagonal rim gashes above the horizontal lines, as this treatment is nearly universal across time and space.

Our efforts were directed at examining collections from sites that have not been adequately presented in the literature. We selected the following sites: Pedersen, Big Slough, Mountain Lake, Fox Lake, and Lake Hanska.

The Pedersen Site (21LN2)

The Pedersen site is one of the premier archaeological sites on the southwestern margins of the state and is an example of an intensively utilized peninsula, and an occasional island, with an occupation ostensibly spanning the entire prehistoric sequence. Lake Benton is a large lake in southwestern Minnesota encompassing approximately 2,857 acres. It is connected by drainages to the Missouri River. The Pedersen site occupies a peninsula near the eastern and widest part of the lake. To the south the lake opens into a marshy drainage, and numerous significant native landmark features were present along the elevated margins. These features stretch for five miles and include three forts or embankments, a boulder circle, and four clusters of earthen mounds, which include multiple flat top mounds (Winchell 1911:118-119).

Wilford (1961) in 1956 conducted the first professional excavations at the site, which by that time was well known for producing artifacts. Winchell (1911:119), for example, reports that shell tempered pottery was found at this location. Wilford's four units generated a large collection of ceramics belonging to the Woodland, Cambria, and Oneota periods, as well as Plains material. Notably, Great Oasis was not represented. Wilford noted that evidence for stratigraphy was evident in general detail, that is there was a tendency for Mississippian (Cambria and Oneota) materials to be concentrated, although not exclusively, in the top layers. He also noted that bison bone was quite common.

Wilford's sherd tabulations revealed that grit tempered sherds with intact surfaces showed a preponderance of cordmarked surfaces, dating from Middle Woodland into the Late Prehistoric, and only a small proportion of plain surface sherds (15.6%). It is not possible to assign this collection of rims and near rims by surface treatment into appropriate periods. A preliminary inspection of Wilford's collection revealed 31 discrete vessels that might date to the Late Prehistoric, representing less than ½ of the total number of rims reported. We have lumped together the early and middle Late Prehistoric rims since it is not possible to subdivide the rims with confidence into different time periods. These vessels and sherds are discussed below.

The small number of bona-fide Plains Village material (early and late) indicates that the Cambria at this location may represent something with affinities to Mill Creek. Rachel Bonney (1965) conducted a further analysis of the Wilford's pottery and acknowledged the presence of Cambria and Oneota, but did not elaborate on the presence of Plains-related ceramics.

Hudak excavated in 1973 and 1974 and expanded the coverage of the site and resulted in the second major collection from the site. However, the report on the work from the site focused exclusively on the Woodland occupation. A radio-carbon date from the site presumably associated with Lake Benton pottery of 1280 (Anfinson 1997:Table 1) has served as evidence that this Late Woodland culture extended to well within the Late Prehistoric period. Although the contexts were not examined for this date, later material is quite common at the site and thus we believe this date best fits in the middle period identified in this project. Hudak's excavations reaffirmed the idea that extensive processing of bison characterized the occupation on the peninsula and that rock-lined hearths were a common feature. Although the ceramics are not extensively discussed, Hudak does present sufficient evidence to indicate that most of the vessels (74%) derive from the Woodland periods, including both the Middle and Late Woodland. Caution must be applied in reading his types for a particular time period. Many specimens classified as Type A, for example, are identified as Plains-related in our study. Hudak assiduously avoided discussion of non-Woodland material from the site. The entire Hudak collection curated at the Science Museum of Minnesota was not available for study as it lies in deep storage and could not be reliably tabulated. This analysis is based on diagnostics that were pulled.

Another sample of rims was available from the numerous collections made by the land owner. This sample comprised large rims and was invaluable in understanding the range of variation for the site. Table 4.1 presents a tabulation of rims from the three collections that are considered to date from the entirety of the Late Prehistoric period. Beyond general descriptions and highlighting of a few diagnostics, it is not possible to evaluate the relative intensity of any subdivision of this broad time span. Impressionistically, we identify an early to middle strain (1100-1300) that would appear to accommodate most of the ceramic diagnostics. We include in this putative division a hodgepodge of local, Initial Middle Missouri and Cambria diagnostics.

If an early subdivision would approximate a mix of Late Woodland and Cambria-horizon traits, then we could place the varied stamped, impressed and well-defined cordmarked jars as candidates (Table 4.1). Cord impressed sherds and rims are uncommon. The sherds appear to have closely-spaced cord impressions, that are horizontally placed and the lower body is cordmarked in all examples. The single rim is large and reveals an example of a meandering chevron design (Figures 4.8 a; 4.9 a); this vessel is likely associated with Mill Creek or earlier. Some of these cord impressed sherds may date from the Late Woodland period, or at least are characterized by cordmarked lower bodies (Figure 4.8 d). There are also vertical cordmarked jars with well-defined flaring necks and exterior rim tool impressions that resemble the Lisbon Cordmarked jar of eastern North Dakota (Wood 1963) that date from the Late Prehistoric period. Also indicating a blending of traditions is the presence of cordmarked angled shoulders (Figures 4.6 f; 4.8 c). Two vessels also have delicate wrapped rod stamping and may represent a cross-over into the Late Prehistoric (Figures 4.9 b; 4.13 a).

All of the Cambria-related material would fit as well in this time frame. Most of the plain surface rims are likely associated with the broad incising of Cambria (Figure 4.5) and a number of broad incised jar shoulders, including angled shoulder examples are present. Curvilinear designs, such as the scroll, appear to be the most common design for the broad incised jars. A single example of jags or tooled impressions on the angled shoulder was present. Another broad incised shoulder has a cordmarked lower body (Figure 4.5 e, f). One broad incised sherd appears

to have a punctated fringe. Plain surface jars have weakly defined necks and unmodified rims (Figure 4.3), modified rims and slightly flared necks (Figure 4.4), inslanted necks (Figure 4.6), or rarely, well-defined necks (Figure 4.6 d). Weak neck jars with direct rims and no notching appear to be the most common plain surface jar (Table 4.1).

About half of the plain surface jars have notched lips, with most of the notching characterized by moderate sized tooled impressions on the interior (Figure 4.3 a, e). Less common are exterior tooled impressions (Figures 4.3 b; 4.5 b) or slashed notches (Figure 4.2 d, e). Two t-shaped rims have short necks (Figure 4.4 a, b), one has cord-wrapped rod impressions on the lip, and the other has a herringbone design on the rim. A herringbone motif jar has a bolstered rim and another has a short flared neck (Figure 4.4 d). Only one vessel might represent an example of Linden Everted with a broad incised line on the neck juncture (Figure 4.6 c). Two rims appear to represent an in-slanted jar typical of Cahokia influence. One has a rolled rim with exterior impressions and an incised HIP on the neck (Figures 4.5 b; 4.6 a). The other has a beveled rim with a herringbone decorated rim and a HIP as well (Figures 4.5 a; 4.6 b). One oddity that fits within this time span is an angled shoulder jar with a thin-incised design framing tiny punctations (Figures 4.6 g; 4.7 b).

Definitive Plains Village traits were limited to only a few vessels and sherds. Two rims are S-shaped jars one with an incised cross-hatched rim and the other with small diagonal jags on the rim (Figures 4.8 b, e; 4.9 c, d). One polished surface jar with a well-defined angled neck is well made and has a faintly channeled rim (Figures 4.2 a; 4.6 d); affinities with this jar are with the type Maxon Flared Rim (Lehmer 1951), which is a minority type in Mill Creek. Simple stamped sherds are also present but are not specifically related to any Late Prehistoric temporal subdivision.

Affinities are also recognized with Sandy Lake to the north in the form of interior decorations on the jar neck. One jar with a flaring neck (Figures 4.4 e; 4.7 c, d) and superior notching has a thumb impressed decoration on the interior neck juncture, as well as a plain neck and cordmarked lower body. This treatment is identified in the Red River Valley on Sandy Lake jars (Blikre 2008:Figure 10 f), which dates around 1200-1400 in our estimation (Holley and Michlovic 2010).

The late portion of the Late Prehistoric period includes examples from diverse areas as well. Oneota and Sandy Lake are representatives of further north and east and are not part of our discussion. However, Coalescent material is present that is likely a continuation of the diversity witnessed earlier. Four rims, represented in all three collections, are likely Post-Contact Coalescent rims (Figures 4.10; 4.11). One is braced with tooled impressions, the other has a rounded lip, another has a stamped lip, and the last example has a beveled lip with tooled impressions on the lip.

No other site that we examined has the kinds of diversity present in the Pedersen site. But this diversity is replicated at other sites further south along the borders of Minnesota, Iowa, and South Dakota including the Pipestone Quarry and Blood Run. Pipestone was not considered in our presentation because it was a location utilized by a plethora of peoples in historic and prehistoric times and is not a typical of village occupations.

Table 4.1. Frequency Tabulations of Pedersen Site Vessels. All grit tempered except for Sandy Lake Cordmarked and Oneota. Wilford, Hudak, and Surface Collections.

Period	Surface Treatment/Type	N
Late Woodland – Early Late Prehistoric	Fine Stamping and wrapped rod decoration	2
Late Woodland – Late Prehistoric	Vertical Cordmarked, exterior notching	1
E-M Late Prehistoric	Cord impressed neck, cordmarked body	1
E-M Late Prehistoric	Inslanted jar, rolled rim, exterior notching, HIP	1
E-M Late Prehistoric	Inslanted jar, beveled rim, herringbone, HIP	1
E-M Late Prehistoric	Flared jar, Linden Everted?	1
E-M Late Prehistoric	Flared jar, herringbone, HIP	1
E-M Late Prehistoric	Plain surface jar, notched lip	7
E-M Late Prehistoric	Plain surface jar, direct rim	11
E-M Late Prehistoric	Flared jar, notched lip, cordmarked shoulder, thumb impressed applique interior	1
E-M Late Prehistoric	Flared jar (Maxon Flared Rim)	2
E-M Late Prehistoric	Modified rim, notched lip	1
E-M Late Prehistoric	Modified rim	1
E-M Late Prehistoric	Modified rim, herringbone	1
E-M Late Prehistoric	T-shaped rim, herringbone	1
E-M Late Prehistoric	T-shaped rim, cordwrapped rod notch	1
E-M Late Prehistoric	S-shaped jar, crosshatched rim	1
E-M Late Prehistoric	S-shaped jar, tooled rim, simple stamped shoulder	1
Terminal Late Prehistoric	Sandy Lake Cordmarked	3
Terminal Late Prehistoric	Oneota (1 HIP)	17
Terminal Late Prehistoric	Coalescent, polished, tooled rim	1
Terminal Late Prehistoric	Coalescent, plain neck	1
Terminal Late Prehistoric	Coalescent, plain neck, wrapped rod impression	2
Total		**61**

E-M= Early - Middle

The Big Slough Site (21MU1)

The Big Slough site is situated on an island surrounded by a once shallow lake in Murray County. Excavations at the site were first conducted by Wilford in 1949 (1954a) and followed by Henning. We examined the Wilford and Henning collections curated at the MHS.

Wilford identified Late Woodland, Great Oasis, and Oneota occupations for the island, that probably included an Archaic occupation as well (Anfinson 1982:57). Bison bones were commonly encountered at the site. Anfinson identified Fox Lake, Late Woodland (Lake Benton), Plains Village (Great Oasis and Cambria), and Oneota occupations. Based on stratigraphy Anfinson (1982:57) argued that the Plains Village occupation was about the same time as the Lake Benton. The stratigraphic record in these prairie sites is often dubious, usually being based on artifact content from arbitrary levels. It may be useful in identification of overall trends at these sites; however, the conflation of Lake Benton and Plains Village in time is an idea that should be discarded. At the present without fine controls we can only speculate that some overlap or blending with Late Woodland and Late Prehistoric cultures characterizes the region.

Wilford (1954a) recovered a decent sample of ceramics from his excavations (n=625 sherds). Most of the grit-tempered body sherds were cordmarked (83%) with a small number

plain (16%), and simple stamped (1%). The rims examined reveal Middle Woodland, Late Woodland and Great Oasis styles. In spite of the popularity of cordmarked to the lip vessels, few are thin-walled and notched, but a few have collars.

Potentially relevant material for our study comprised three smoothed plain surface jars with direct rims, a herringbone decorated modified rim (Figure 4.12 a), and a cord impressed rim with cord impressed rim notching. These rims represented about 7% of the grit-tempered sample. In addition, 12 rims (16%) were Great Oasis (Figure 4.1). A cord impressed rim dates either from Late Woodland or the Late Prehistoric. Two sherds were incised with relatively thin, shallow lines (under 2.0 mm) to form linear or geometric designs (Figure 4.12 d, e). These might represent some form of variation in Great Oasis. No broad incised Cambria sherds were recognized. There are, however, plain polished sherds that are relatively thin (average of 3.89 cm with a range of 2.6 to 5.7 cm; n=21) that hints at a Cambria occupation. An Oneota occupation is present as well.

A preliminary tabulation was made of classifiable rims from Henning's collection (Table 4.2). This collection contained greater variety through the entire sequence than Wilford's. The Late Woodland comprised vertical cordmarked vessels with modified or direct rims and little evidence of lip or rim notching. A variety of stamped surfaces, some fine, are likely Late Woodland in time. For the cord impressed rims it is not possible to distinguish whether they date from Late Woodland or Late Prehistoric times. These are thin-walled with fine impressions of horizontal rows and no evidence is present of the diverse motifs witnessed in the Big Stone region. In addition to the Great Oasis Incised rims, five vessels are possibly related to Plains Village. One is a fragmentary S-shaped jar with superior notching, another is a stubby neck jar with exterior notching, two are decorated with crosshatched rims (one of which is an odd lattice incised modified rim Figure 4.12 b), and the final one is a plain surface thin-walled jar. Three broad incised sherds are likely Cambria in the Henning sample; one was a scroll/disc motif. Thin-walled smoothed plain and polished sherds are also present that range from 3 to 4 cm in thickness. A loop handle likewise fits into the Early to Middle span of the Late Prehistoric.

Table 4.2. Preliminary Tabulation of Identifiable Vessels by Time Period and Surface Finish, Big Slough site, Henning Excavations.

Period Designation	Surface Treatment/Type	N
Middle Woodland	Fox Lake, Noded, Thick-walled Vertical Cordmarked	16
Brainerd	Horizontal Cordmarked	6
Late Woodland	Vertical Cordmarked	13
Late Woodland	Lake Benton Stamped, Wrapped Rod, Punctated	11
Late Woodland-Late Prehistoric	Cord Impressed	3
Great Oasis	Fine Incised	6
Early-Middle Late Prehistoric	Plain surface and decorated jars	5
Total		**60**

The transition from Late Woodland to the Late Prehistoric is likely represented at Big Slough but impossible to disentangle at the present. A Great Oasis presence is significant and represented in both collections examined. Remains from this component outnumber those that could be identified as somewhat later in time. The tandem occurrence of cord impressions and stamping could replicate the contexts at Shady Dell; however, there is no evidence in the stamped material to indicate a later dating, or in the cord impressed material. Excluding the

definitive Cambria material, the remaining diagnostics could simply fit within a Great Oasis time frame. Later Coalescent Plains Village diagnostics are absent.

The Mountain Lake Site (21CO1)

Mountain Lake is another island site in a drained lake basin in Cottonwood County. Lloyd Wilford (1962b) first tested the site in 1962 and recovered Woodland and Oneota ceramics. Further test excavations by the Science Museum of Minnesota, directed by G. Joseph Hudak in 1976, resulted in the recovery of Cambria ceramics (Shane 1978). Although a Cambria component was identified there is no information present on detailing any specifics about this occupation outside of faunal remains. An examination of the material curated at the Science Museum revealed the same components identified by Shane as Archaic and Fox Lake but no obvious Cambria ceramics were present. Lake Benton and Oneota were also represented. What might serve as the material to define a new phase are a variety of vertical cordmarked jars with notched lips and two unique rims with the horizontal pattern motif made from cord impressions or incising (Figure 4.13 c, d). These rims have punched nodes; the cord impressed vessel (Z-twist) has sublabial nodes, the other near the neck-shoulder juncture. The cordmarked jars may represent terminal examples as they have collars or cord impressions on the interior and may relate to the Nelson site occupation (Scullin 1981). Unfortunately, the Mountain Lake site is problematical as a Plains Village representative in Minnesota. It does seem likely that moving this far to the east and south marks an end to Plains Village affinities. There is one late date from Mountain Lake (I-9611) that is corrected at 1650 (Anfinson 1997:Table 1), which is too late for even the Oneota occupation.

The Fox Lake Site (21MR2)

The Fox Lake site, like Pedersen, is a large occupation (10 acres) on an island that is intermittently a peninsula (Anfinson 1997: 47ff). Extensive archaeological investigations were conducted here by Jenks, Wilford, and Anfinson. As the type site for the archaeological culture, much of the occupation dates from this Middle Woodland time span. We examined the collections at MHS and noticed only a small sample that might be relevant to the issue of Plains Village culture. Of particular interest are the cord impressed ceramics (Anfinson 1997:79-80; Figure 40). These are uniformly of the horizontal pattern and are thin-walled (ranging from 4.0 to 6.0 cm) (Figure 4.14). A plain surface neck sherd was likely Cambria in affiliation (Figure 4.12 f), as was one HIP sherd. An example of an incised geometric design, possibly a nested chevron-like design (Figure 4.12 c), may hint at a later Cambria date, however, the presence of Oneota at the site is not typical for this expression. That is, we tend to find Oneota-like motifs on grit tempered ceramics from sites without Oneota ceramics.

The Lake Hanska Site (21BW1)

The Lake Hanska site, alternatively known as the Synsteby Mounds and Village, has been studied for a long time and it was an important site in the Prairie Lakes to the immediate south of the Minnesota River. As is typical of many lake sites, Lake Hanska is a sprawling multicomponent occupation covering at least 125 acres that was also the location of a sod fort built during the Dakota war of 1862. At least two conical burial mounds are associated with the site; a new number (21BW59) was designated for another two nearby mounds. Wilford (1962a) initiated excavations at the mounds and village (1952, 1953). His excavations revealed a strong

Fox Lake occupation with traces of Lake Benton, Cambria, and Oneota. Subsequent investigations involved reconnaissance survey and testing associated with the Lake Hanska County Park that incorporates part of the site. The secondary burials recovered from the mound by Wilford (1962a) are presumably Woodland in age (Anfinson 1997: Table 6), although attributions are diverse and chronological associations are far from settled (Arzigan and Stevensen 2003:352). There is also an extensive Archaic period occupation.

An interesting landscape perspective of the site is afforded by a letter from a soldier who served at the sod fort (quoted in Hudak 1975: Appendix B):

> "We are in a first rate place to take everything in consideration. The lake is about twenty five rods from the fort. We can have plenty of fish by fishing. . . . North of us is a lake of one and a half mile in length. This is an old Indian trail. We can see twelve or fofteen (sic) miles in almost any direction."

Wilford recovered a sizeable sample of pottery (522 sherds) from his investigations of the village, all of which were grit tempered. Cordmarked pottery predominated (around 70% of the identified sherds). Although Wilford recognized a Cambria component, he believed that it was insignificant when compared with the Fox Lake occupation. Wilford's collection was cursorily examined, confirming his initial estimate of the occupations. We identified only three rims and one body sherd as possibly relevant to our issue. All are unique. The rims comprised a plain surface jar with a folded lip (Figures 4.15 b, 4.16 c), the other a small angled shoulder jar with flared rim and crudely incised HIP (Figures 4.15 a; 4.16 d), and a rod stamped sherd and rim. The sherd was highly polished with fine dentate stamping, that could fall within the range of Lake Benton. The incised HIP rim is a fascinating example of the diversity we imagine for the early portions of the Late Prehistoric. Although not mentioned by Wilford, the site has been characterized by subsequent investigators as having a bison "bone bed."

Hudak (1975) made a collection from the site and combined this with private collections to provide a decent sample that is currently curated at the MHS. This collection was examined in more detail (Table 4.3) and revealed similar ceramics to what was identified by Wilford and provided a few large rims that are essential to understanding regional ceramic variation.

The most surprising material in the sample was the thin-walled cordmarked pottery with diagnostic examples of a rounded-angled shoulder, and a large rim with a distinctive flaring neck (Figure 4.16 b). It is possible that these ceramics represent an unreported Late Woodland component of the Prairie Lakes region. Anfinson (1997:77) did recognize something different with his Vertical Cordmarked and Cordwrapped undefined types at the site. The absence of a strong Late Woodland for the region, such as Lake Benton, is notable and points to a potential regional ceramic differentiation within the Prairie Lakes region. A partially smoothed-over cordmarked jar is perhaps symptomatic of this time span (Figure 4.15 c). Cord impressed ceramics are only weakly represented (Figure 4.15 d). Cambria in turn is represented by a large Linden Everted rim (Figures 4.16 a; 4.17). A rectilinear incised sherd, some form of oblique diagonal or chevron, resembles Oneota or Plains designs and not Cambria standards (Figure 4.15 e). We have recognized similar sherds from other sites in the project. Oneota is well represented at the site. The Hudak collection also contained abundant bison bone with teeth and limbs represented in the sample.

Table 4.3. Frequency Counts and Weights of Hudak collection, Lake Hanska Site by surface treatment and conjectural temporal designation. Grit tempered unless otherwise identified.

Temporal Designation	Surface Treatment	N	Wt (g)
Middle Woodland	Thick-walled plain	1	4.9
Middle Woodland	Fox Lake/MW Decorated	1	12.9
Middle Woodland	Fox Lake Cordmarked Rim	2	10.7
Middle/Late Woodland	Thin-walled cordmarked $\leq$.69 cm	42	99.6
Middle/Late Woodland	Thick-walled cordmarked $\geq$70 cm	17	129.1
Middle/Late Woodland	Cordmarked neck	3	31.4
Middle/Late Woodland	Thin-walled cordmarked rim	3	10.2
Middle/Late Woodland	Thick-walled cordmarked rim	1	78.1
Middle/Late Woodland	Indeterminate	7	14.8
Late Woodland	Wrapped rod	2	6.2
Late Woodland	Wrapped rod rim	1	3.4
Late Woodland/Late Prehistoric	Cord impressed	2	5.9
Late Prehistoric	Thin, cordmarked angled-rounded shoulder	3	30.8
Woodland/Late Prehistoric	Thin-walled plain	15	35.9
Late Prehistoric	Linden Everted rim	1	75.1
Late Prehistoric	Incised rectilinear	1	2.1
Late Prehistoric	Incised broad (Cambria)	1	1.6
Late Prehistoric	Shell tempered Oneota	16	46,9
Late Prehistoric	Shell tempered Oneota Rim	1	137.2
Total		**120**	**736.8**

Another testing program was conducted at the site in 1974 by J. W. Oothoudt (1974). His test pits encountered rich debris that was defined as “bone layer” with broken bone, stone mauls, cracked rocks, and pottery sherds with blackened interior surfaces. One of the test pits produced ceramics similar to that presented above for the Hudak investigations (Table 4.4).

Table 4.4. Frequency Tabulation of Ceramics by Category for Test Pit (1974), Lake Hanska.

Ceramic Category	Count
Grit tempered, cordmarked	36
Grit tempered, smoothed Plain	5
Grit tempered, rod impressed (stick impressed)	6
Grit tempered, Indeterminate	1
Shell tempered, smoothed Plain	14
Total	**62**

Small-scale CRM projects in more recent times have recovered examples of cord impressed (identified as Great Oasis), wrapped rod stamped (Onamia/Lake Benton) and Oneota sherds (Hannus and Buhta 2011). As with many other sites, it is possible that a localized portion of this sprawling site will reveal discrete components.

In summary, the Lake Hanska site complex reveals a long occupation sequence with a presumed focus on bison hunting. This prolonged sequence and the presence of burial mounds are likely testimony to its location as an oasis in the surrounding prairie. Much of the Late Woodland and Late Prehistoric occupations are problematical at this site, which may have

something to do with its displacement from other well-known Prairie Lakes sites; it is 80 miles from the Pedersen site, but only a days-walk or 16 miles from the Cambria Core. Unfortunately, the Late Woodland and pre-Cambria developments in and surrounding the Cambria Core are unknown. Given the size of the site it is quite likely that localized occupations will be identified.

Discussion and Summary

Excluding the Low Village site, all excavated sites considered here in the Prairie Lake region reveal a focus on bison use. This exception is a rare example of a village site in southwestern Minnesota. Regardless of the current designation of Great Oasis as a Terminal Late Woodland culture or variant of the Initial Middle Missouri, the Low Village site and the Great Oasis ceramics appear to represent a significant break with Late Woodland. However, we know very little about the Late Woodland in this region. While Lake Benton seems the obvious designation there is much variation that is not encompassed by published examples. We have not been able to confidently place examples of the Vertical Cordmarked and Cord Impressed types at these sites. It is clear Great Oasis becomes attenuated in all directions from the southwestern corner. Once we reach the Pedersen, Mountain Lake, and Lake Hanska sites we are no longer dealing with Great Oasis. We are not able to precisely identify what is contemporaneous with Great Oasis at these sites, although obviously if occupied it must represent some kind of blended expression.

Subsequent developments in the region reveal a nearly uniform, if irregular, participation in Initial Middle Missouri and Cambria. Initial Middle Missouri Plains Village traits are recognizable at the Pedersen site, but become less obvious moving east. The role of cord impressed decorations in these developments is a major problem in need of resolution. Still, there are ceramics from the region, for example a private collection from Murray County (MHS 78-1 collection), that include Maxon Plain-like jars (Figure 4.18 a) as well as good examples of the herringbone rim (Figure 4.18 b, c). These jars are symptomatic of what a post-Great Oasis ceramic collection should resemble. Even so, we only see traces of this from these varied sites.

A Cambria equivalent is recognizable in the region, if weakly represented. The possible Cambria examples are difficult to sort from Initial Middle Missouri expressions. It seems likely that this region is marginal to the Cambria experience, especially moving far to the west. Lake Hanska to the northeast has the potential to be placed as part of the Cambria core if more collections are forthcoming for analysis.

Oneota occupations appear widespread and post-date Cambria; the occasional grit-tempered sherd with geometric designs may yet signal a late Cambria, or something coeval with Oneota. A diffuse Sandy Lake occupation is also suggested. Finally, the westernmost site, Pedersen, has evidence for late Coalescent ceramics. These three (Oneota, Sandy Lake, and Coalescent) may well mark the terminal occupation(s) of the region or the successive/ overlapping use of the region.

Figure 4.1. Great Oasis rims, Big Slough site. These classic examples of Great Oasis reveal the use of thin incisions, almost as if created with a tool, to form a HIP on the neck, below a sublabial band of diagonal notches or tooled impressions. An additional diagnostic is the use of spacers or diagonal lines on top of the HIP as enhancement. Great Oasis designs are solely confined to the neck and in most cases the shoulder and lower body remained cordmarked (see Figure 2.2)

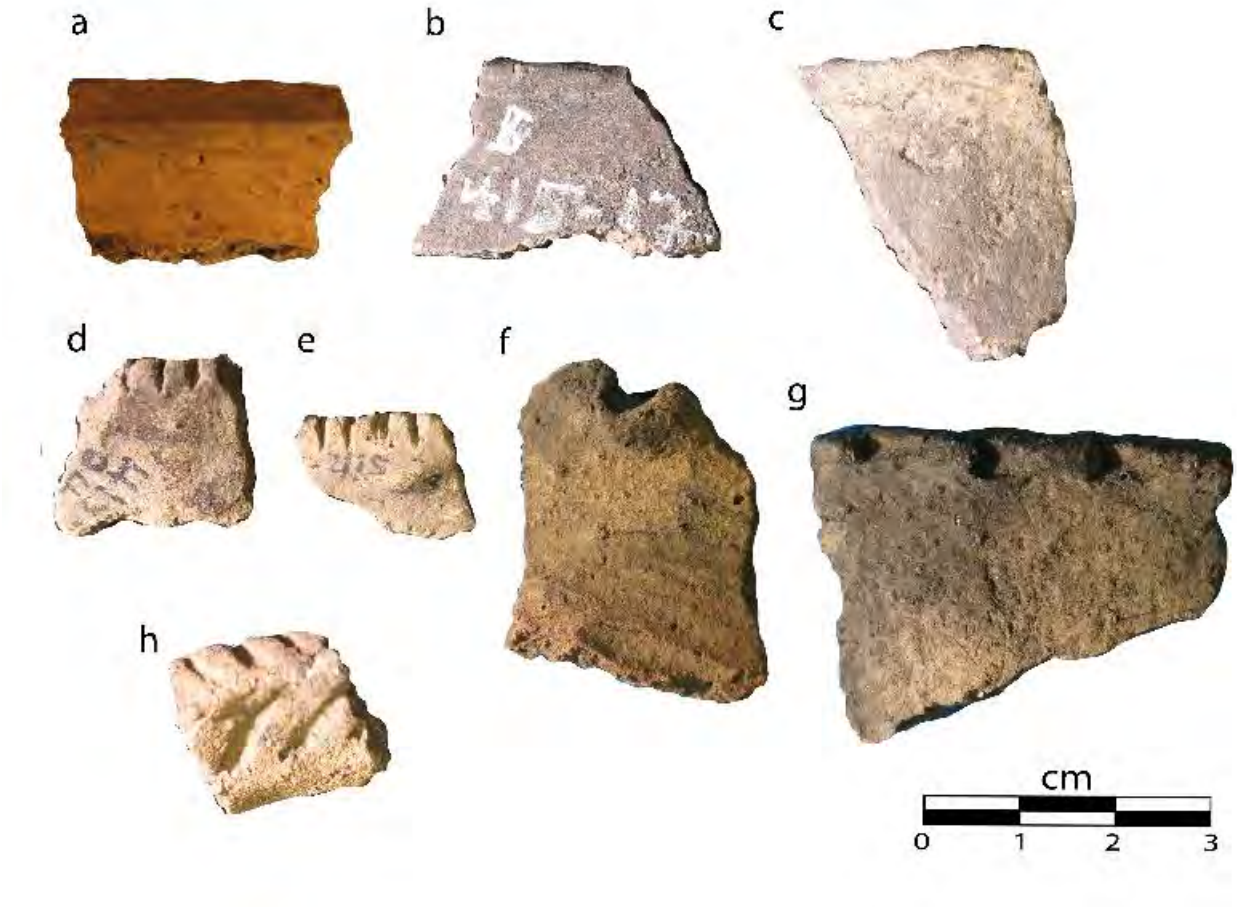

Figure 4.2. Pedersen site rims: a, Hudak excavations; b-h, Wilford excavations. a, polished similar to Maxon Flared Rim; b, modified rim; c, direct rim; d, e, slash notch; f, notched lug or spout; g, exterior notch; h, herringbone rim.

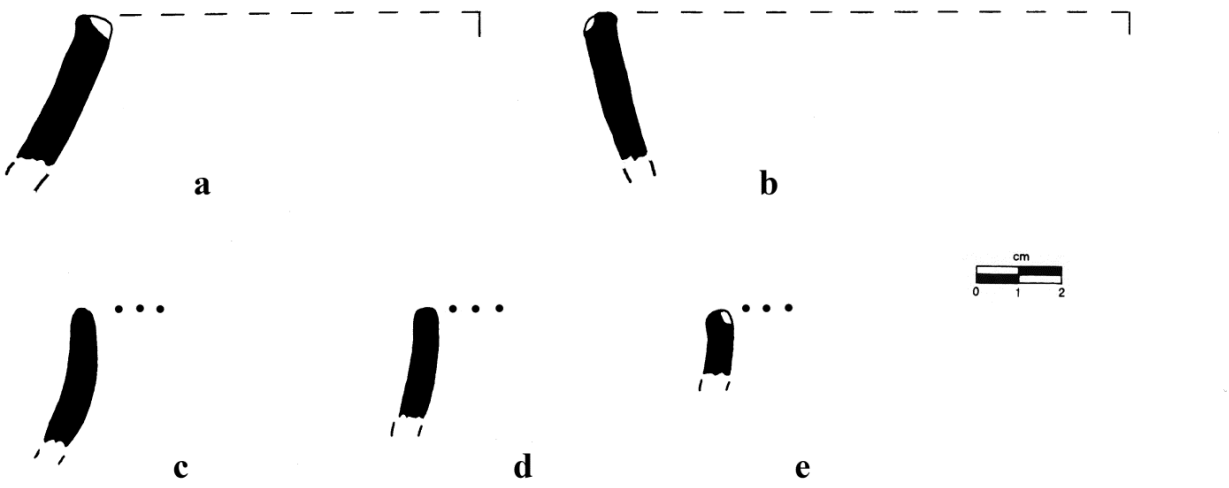

Figure 4.3. Pedersen site profiles, plain surface jars: a-c Wilford excavations; d, e, Hudak excavations.

a interior notch, triangular shape, inslanted jar
b exterior notch, outflaring rim or bowl? (see Figure 4.2 g)
c direct rim jar
d direct rim jar
e slightly modified rim jar with interior notch

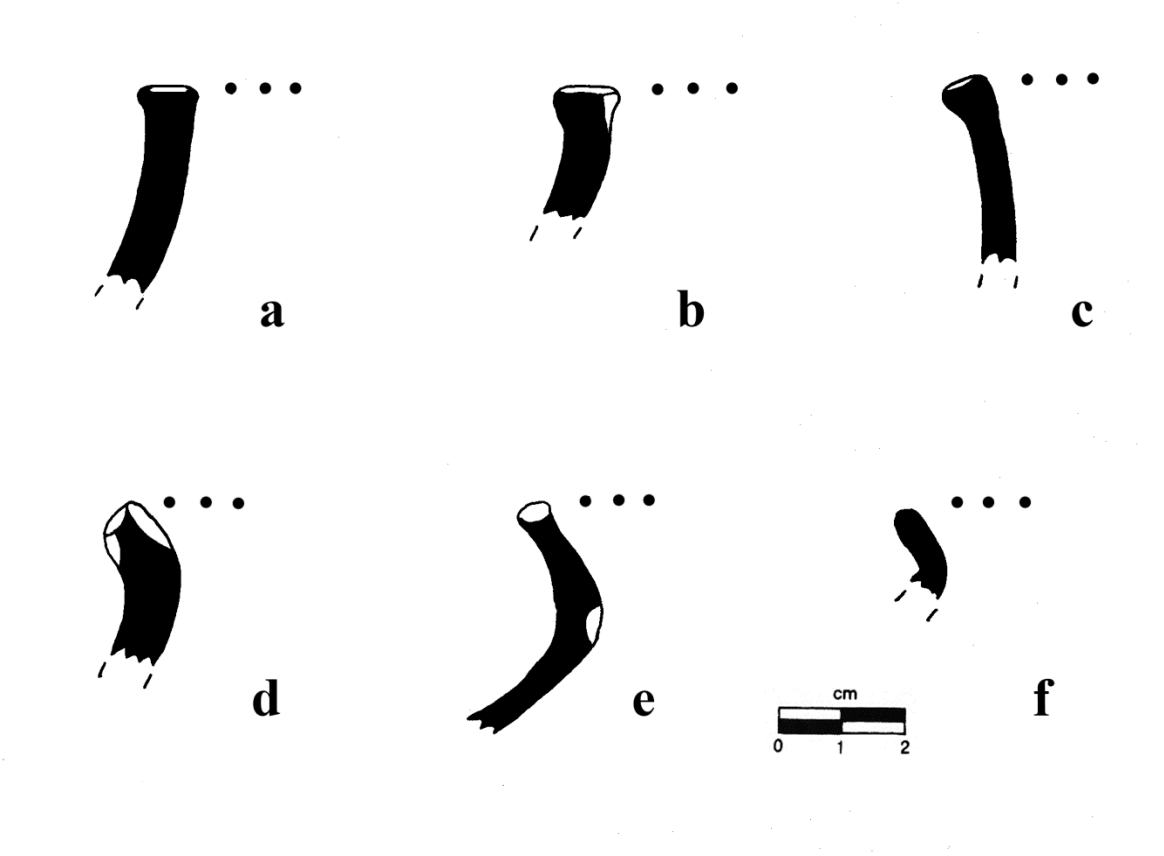

Figure 4.4. Pedersen site modified and flared jars: a, b, e, Wilford excavations; c, f, Hudak excavations; d, surface collection.

a t-shaped rim, superior notch
b t-shaped rim, herringbone decoration (see Figure 4.2 h)
c modified rim, superior notch
d flared rim, herringbone decoration
e plain rim, cordmarked neck, slash superior notch, thumb impressed applique on neck interior (see Figure 4.7 c, d)
f flared jar

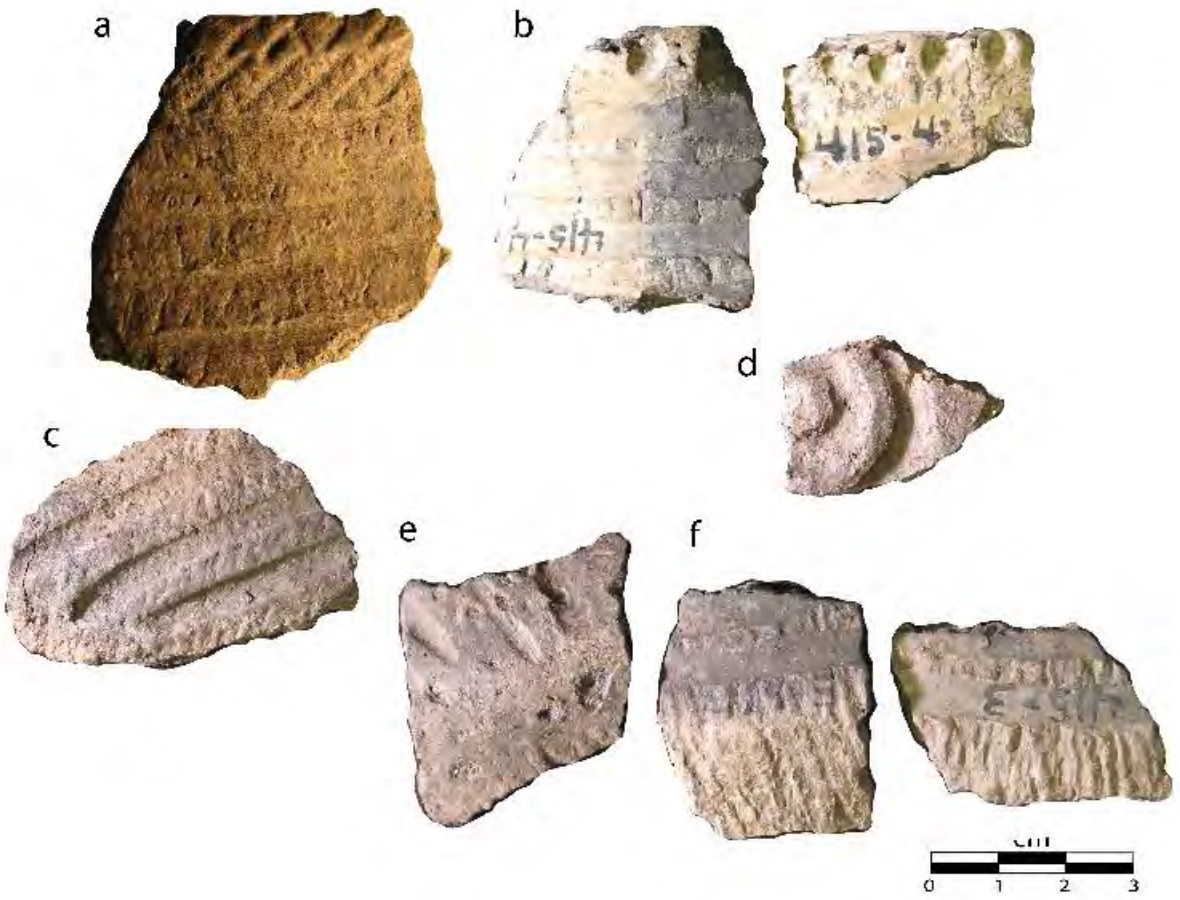

Figure 4.5. Cambria-related ceramics: a, Hudak excavation; b-f, Wilford excavation. a, beveled rim, herringbone decoration, HIP motif; b, modified rim, exterior notches, HIP motif on smoothed cordmarked surface (two rims from same vessel); c, e, f, incised on shoulders with cordmarked shoulder or cordmarked lower body (f comprised two shoulder sherds from same vessel); d, incised, scroll motif.

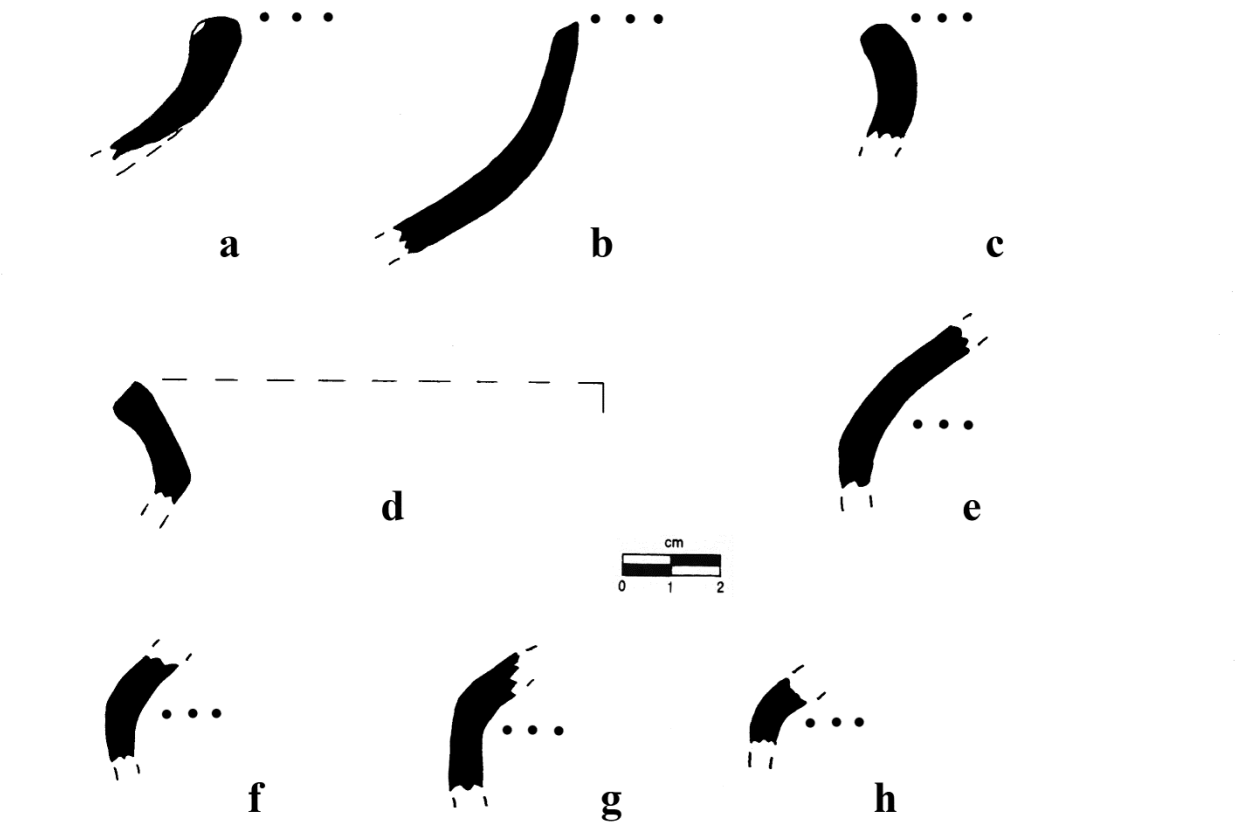

Figure 4.6. Jar and shoulder profiles, Pedersen site: a, e, f, Wilford excavations; b-d, Hudak excavations; g, h, surface collection.

a rolled rim, exterior notch, inslanted jar, HIP (see Figure 4.5 b)
b beveled rim, inslanted jar, HIP, herringbone (see Figure 4.5 a)
c incised (?) flared jar, Linden Everted
d plain surface, flared (angled neck) jar, Maxon Flared Rim (see Figure 4.2 a)
e incised angled shoulder
f cordmarked angled shoulder
g incised and punctated angled shoulder (see Figure 4.7 b)
h dentate stamped angled shoulder (see Figure 4.7 a).

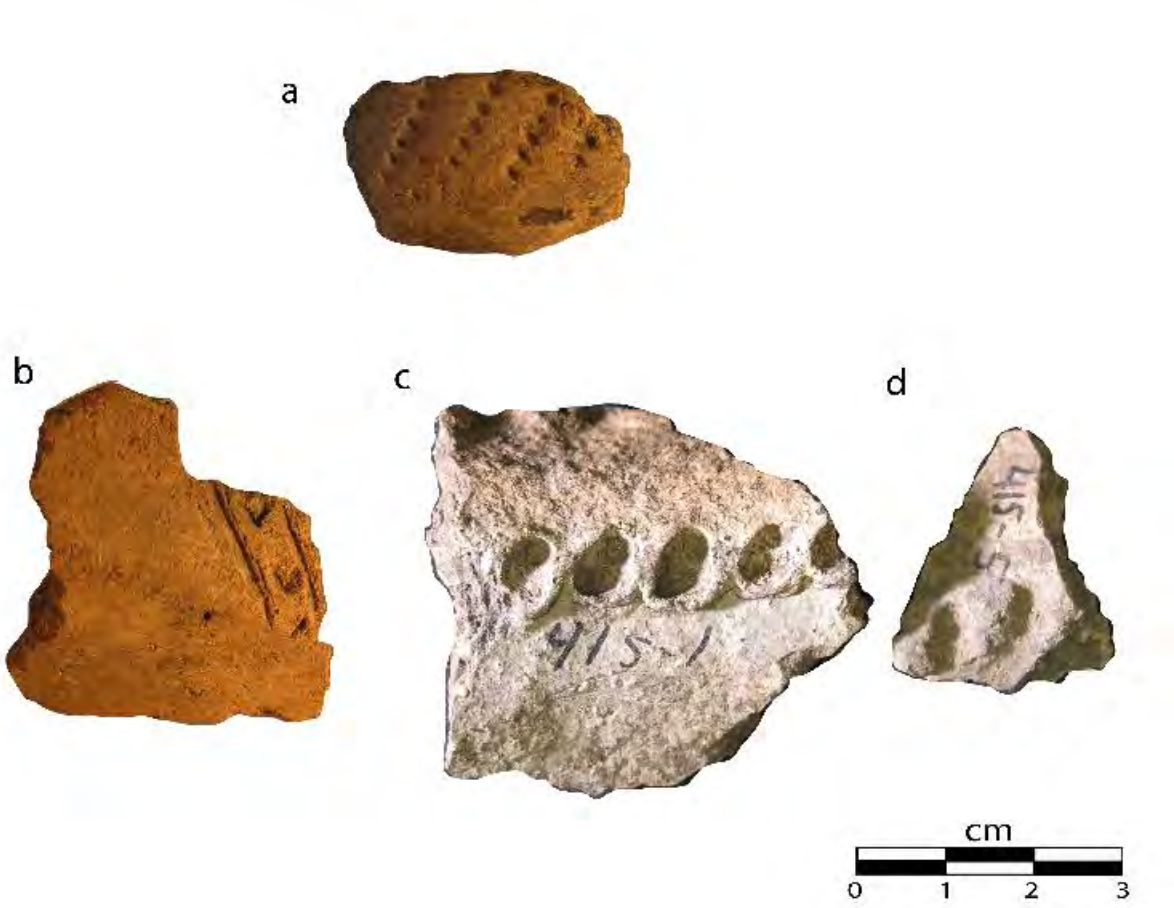

Figure 4.7. Pedersen site decorated ceramics: a, b, Hudak excavations; c, d, Wilford excavations. a, dentate stamped angular shoulder; b, incised bounded punctations, shoulder; c, d, interior thumb impressed fillet.

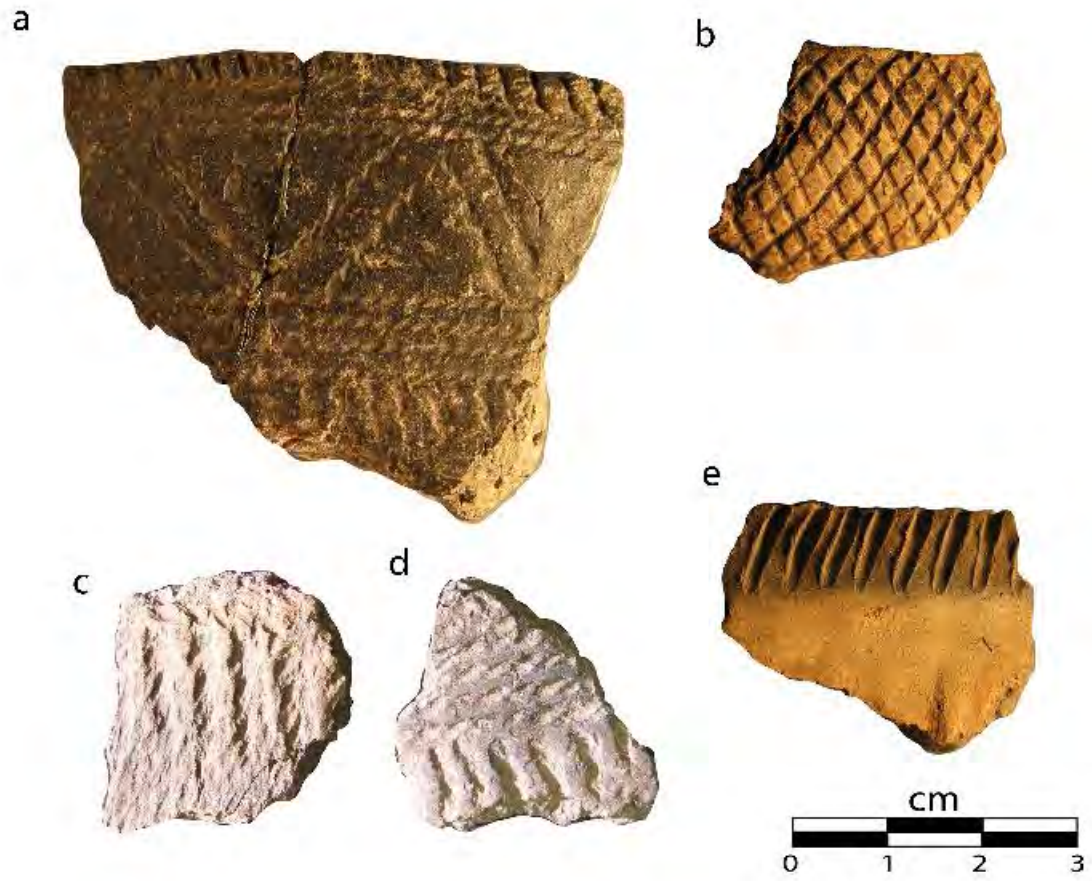

Figure 4.8. Pedersen site decorated ceramics: a, e, surface collection; b, d, Hudak excavations; c, Wilford excavation. a, cord impressed jar; b, incised crosshatched s-shaped jar; c, cordmarked angled shoulder; d, cord impressed neck sherd; e, incised s-shaped jar.

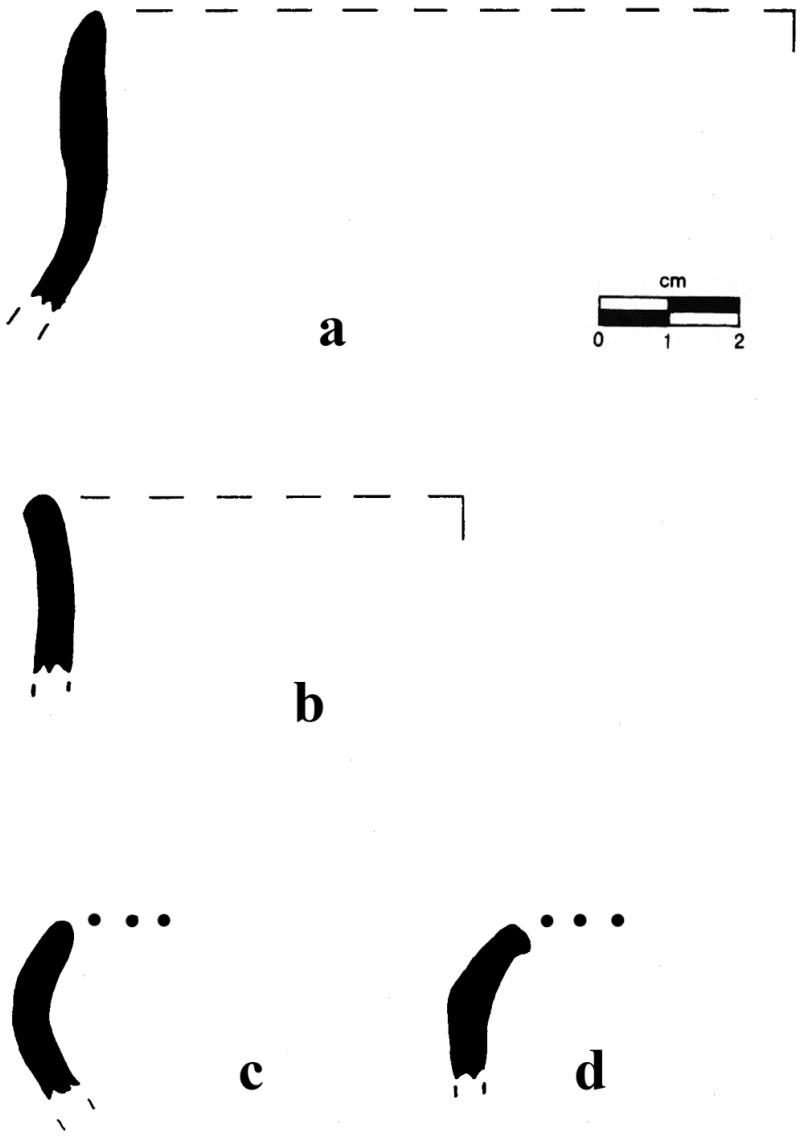

Figure 4.9. Possible Plains Village and stamped vessels: a, d, private collection; b, c, Hudak excavation.

a cord impressed jar (see Figure 4.8 a)
b wrapped rod stamped jar (see Figure 4.13 a)
c crosshatched, s-shaped jar (see Figure 4.8 b)
d incised s-shaped jar (see Figure 4.8 e).

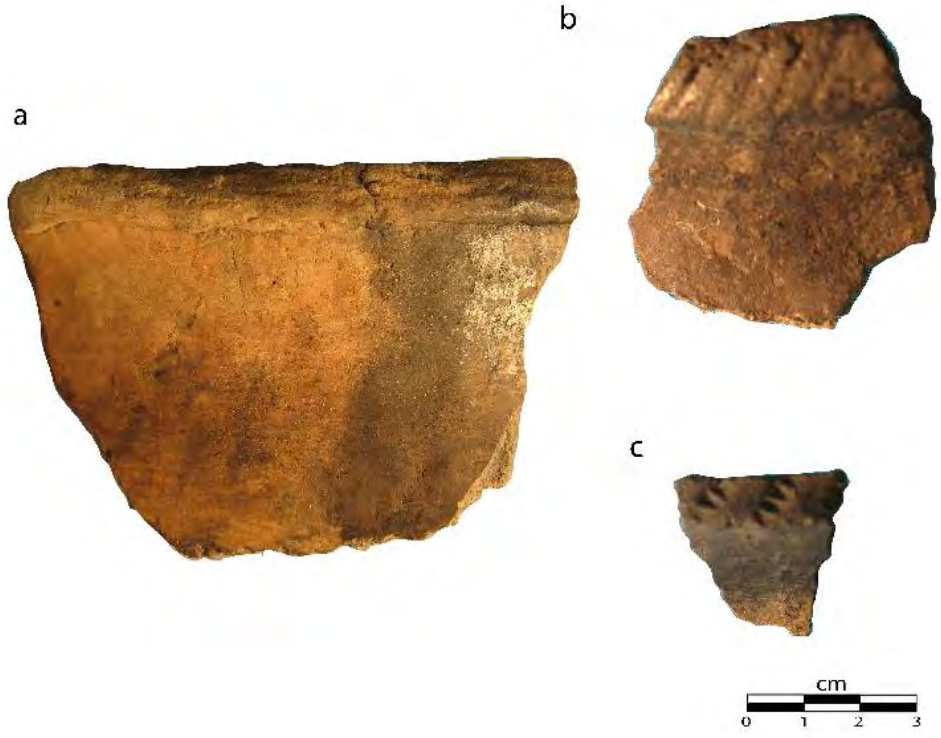

Figure 4.10. Pedersen site Coalescent vessels: a, private collection; b, c, Wilford excavations. a, b, cord impressed decoration on rim; c, wrapped rod or stamped decoration on rim.

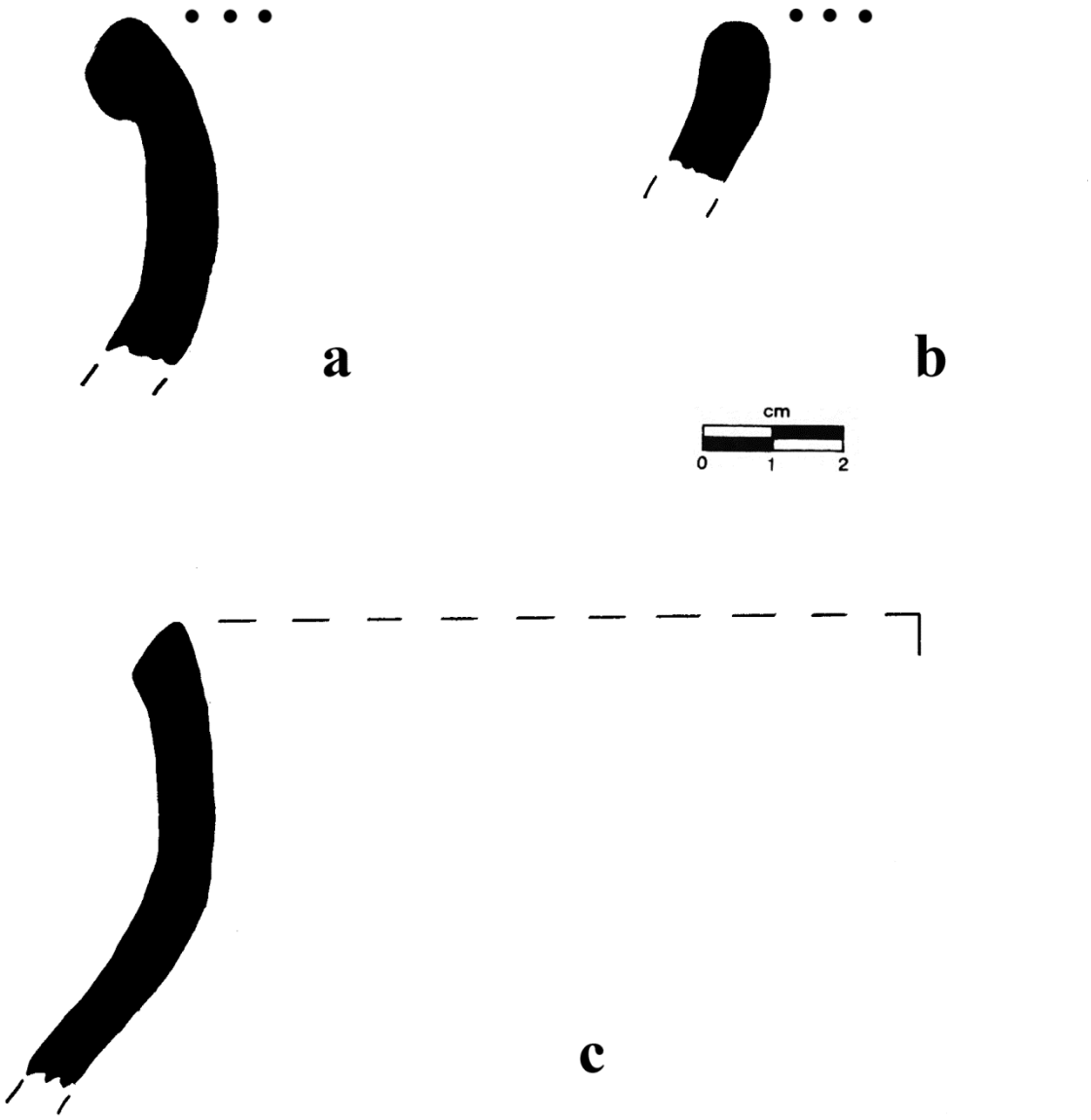

Figure 4.11. Pedersen site, Coalescent rim profiles: a, Wilford excavation; b, Hudak excavation; c, private collection.

a bolstered rim (see Figure 4.10 b)
b plain surface
c cord impressed lip (see Figure 4.10 a).

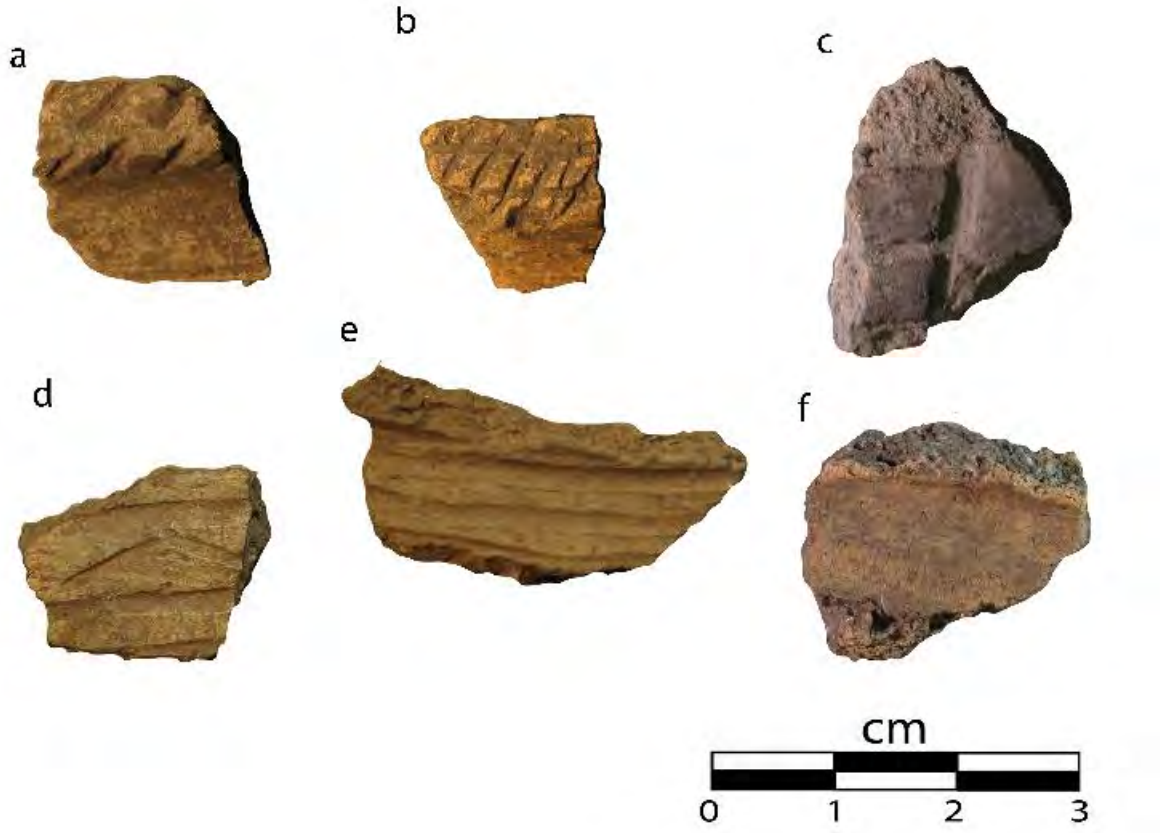

Figure 4.12. Prairie Lake decorated ceramics: a, b, d, e, Big Slough site; c, f, Fox Lake site. a, Wilford excavations, herringbone decorated rim; b, Henning excavations, modified rim, incised lattice design rim; c, geometric incised; d, meandering incised line (Cambria?); e, HIP incised shoulder; f, broad incised shoulder.

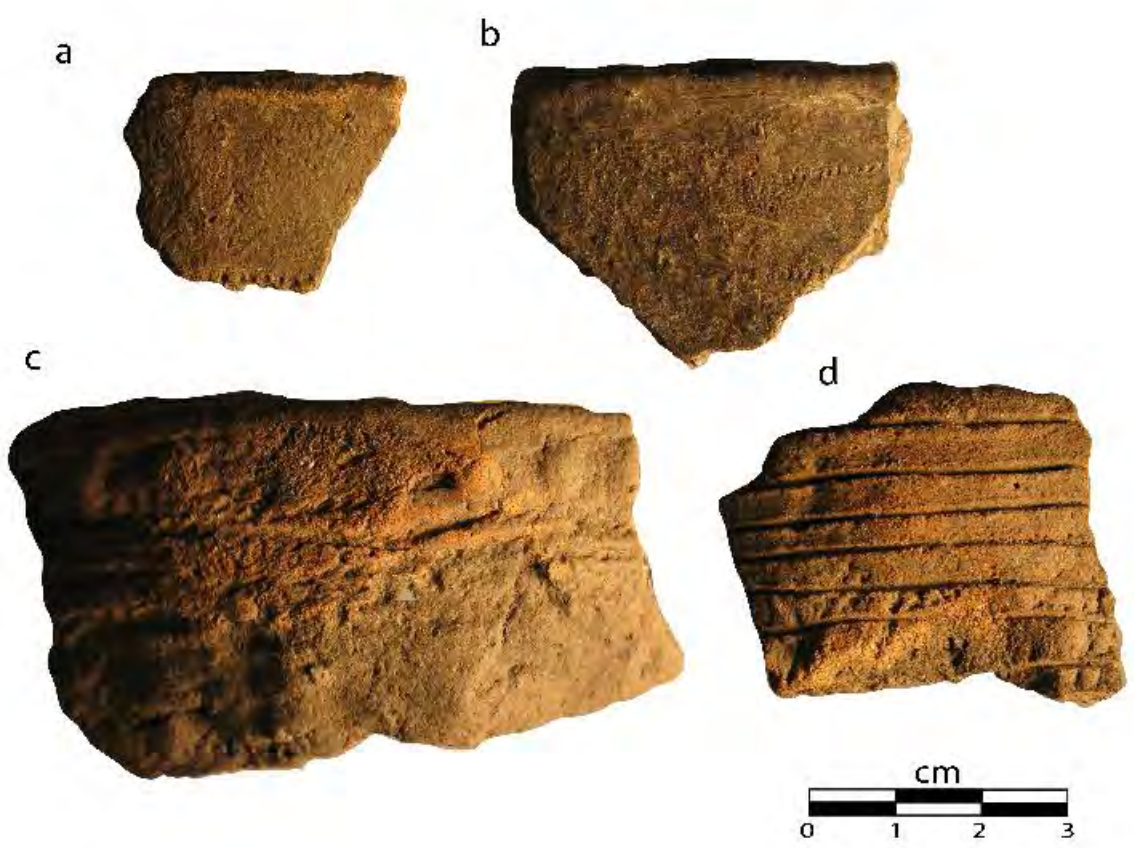

Figure 4.13. Prairie Lake sites, unique decorations: a, Pedersen site, Hudak excavations; b-d, Mountain Lake site. a, b, wrapped rod stamped; c, cord impressed horizontal with punched nodes; d, HIP with punched nodes.

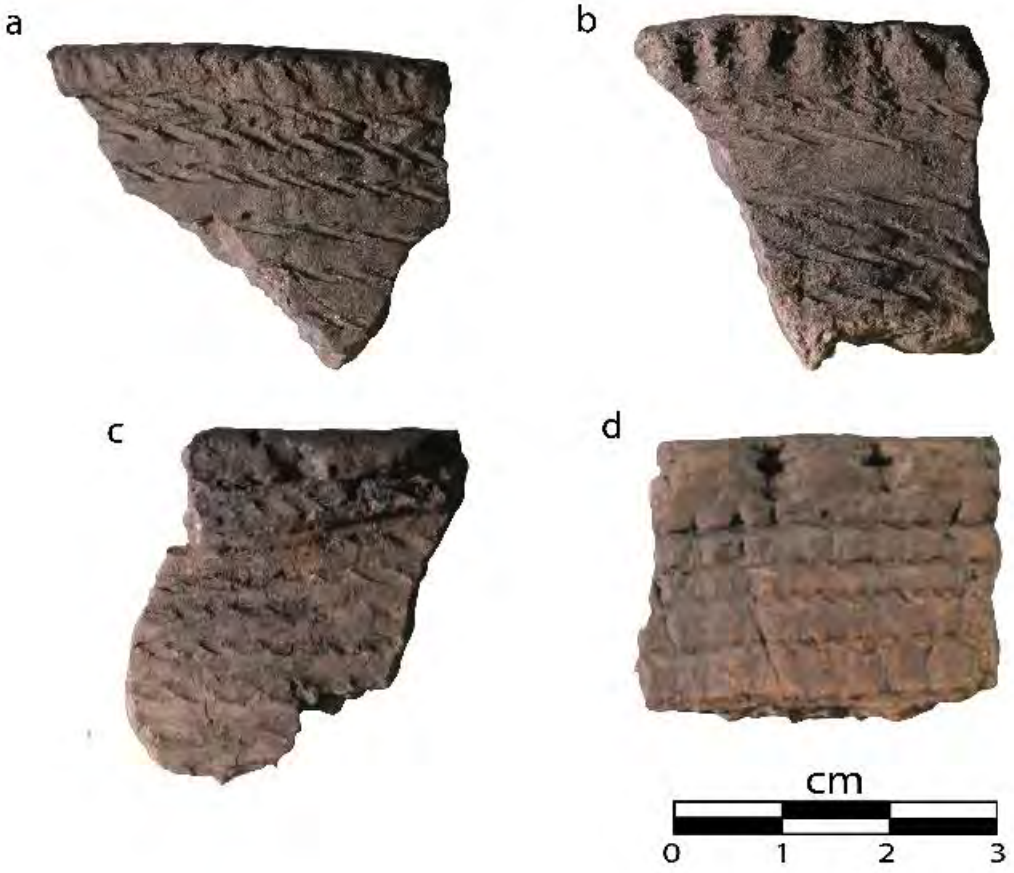

Figure 4.14. Fox Lake site cord impressed rims.

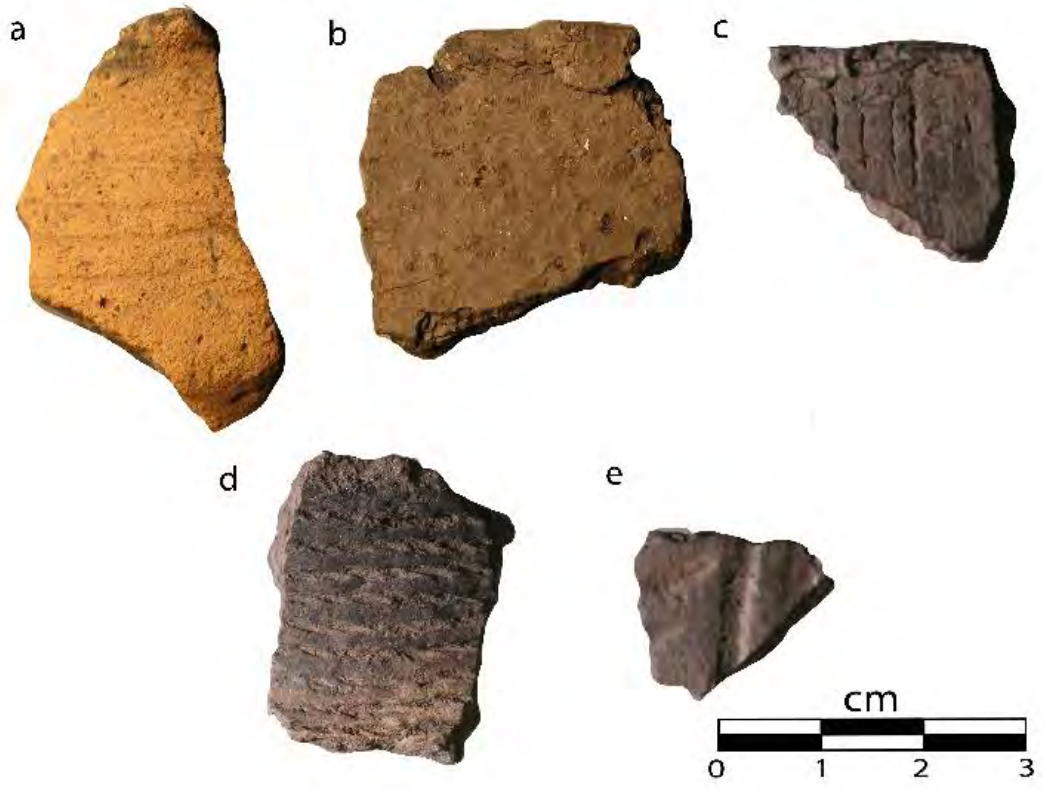

Figure 4.15. Lake Hanska decorated ceramics: a, thin-incised HIP pattern on angled shoulder jar with flared rim; b, roughly folded over rim; c, smoothed over cordmarked rim; d, cord impressed; e, possible Oneota-like design.

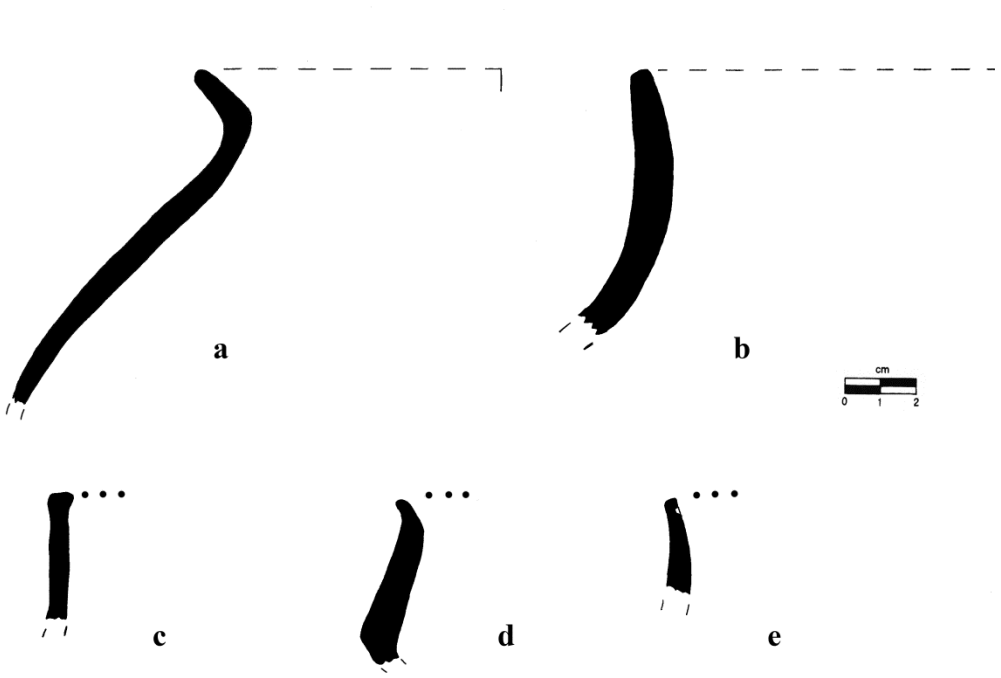

Figure 4.16. Lake Hanska jar profiles.

a flared rim Cambria jar (see Figure 4.17)
b vertical cordmarked jar
c modified rim jar (see Figure 4.15 b)
d flared rim, angled shoulder, HIP (see Figure 4.15 a)
e plain surface jar with interior punctations

Figure 4.17. Lake Hanska, Cambria jar with scroll motif.

Figure 4.18. Murray County private collections: a, Maxon Flared Rim with traces of smoothed over cordmarking; b, c, herringbone decorated rims.

Chapter 5
BIG STONE REGION

The twin lakes of Big Stone and Lake Traverse encompass some 45 miles in length and are positioned at the headwaters of two drainages (Minnesota and Red River) and within easy access to the Missouri and Mississippi River drainages. Such an ideal position has contributed to a unique Native American occupational sequence. Although only lightly timbered, the twin lakes would have offered an oasis from the extensive prairies to the east and west.

As discussed above, the concept of Big Stone was first established as a cultural and temporal unit, yet we are compelled at the present to suggest that it represents a region for reasons that will be identified below. Even as a putative region, we are poorly prepared to define its boundaries. To further complicate the matter we believe that, at times, it was occupied by diverse peoples. The presence of numerous enclosures on both sides of the lakes further suggests that the region was contested. There are also the clusters of earthen burial mounds in the same topographic locations as the enclosures that were also likely involved in land claims.

Twenty-eight sites are identified as possibly having components relevant to the Village time span in Big Stone and Traverse Counties. Fifteen of these were examined here. Additional sites are known on the South Dakota side. Hartford Beach, a hill-top enclosure in Roberts County overlooking Big Stone Lake, was the only site with a sufficiently large ceramic collection and associated radio-carbon dates. This site, however, has not been subjected to a systematic analysis. Based on the brief description (Haug 2004; Haug and Fosha 2008), we suspect that the ceramics, all grit tempered, comprised jars with well-defined necks and cordmarked or plain smoothed surfaces and incised decorations on jar bodies. Incised designs comprise curvilinear and rectilinear motifs as well as the HIP. The two-sigma range for three dates for the site are 1030-1420, with two of the dates from 1260-1420. We presume that a time range around 1200-1400 dates this occupation. It is important to underscore that these dates are relatively late for incised grit-tempered jars in the region. Other excavated collections obtained by Lloyd Wilford at Shady Dell (21TR6), which were repatriated, and the Zacharias and Jensen Island sites (on the South Dakota side) are not dated. Another excavated sample comprised the Browns Valley site (21TR5). Materials from mound excavations were meager but important in our characterization of the region.

In addition to the excavated data, which is compromised or less than ideal, we have surface collections available for study resulting from Craig Johnson's (1991) Traverse County survey and Elden Johnson's (1962) Big Stone County survey. These materials were important in filling in the sequence evident in the excavated data. In addition, we had the collection from the unreported Lake Traverse site.

We acquired four new dates from prior excavations and our investigations in the area. Two dates were obtained from bone gathered during the 1930s excavations at Browns Valley (21TR5) (Appendix A) and an additional date was taken from the fill of Lou Miller Mound (21BS4). Our investigations at the Browns Valley enclosure (21TR19) resulted in the recovery of material for dating as well (Appendix B). With the aid of these dates and a comparative perspective of cultural sequences from nearby regions (Anfinson 1997), we can offer a ternary division of the Late Prehistoric into early, middle, and late. This sequence is not entirely germane

to the issue of Village culture but is necessary to understand the context of the ebb and flow of peoples within the region.

Nearly all Late Prehistoric cultural units identified in west-central and southwestern Minnesota are represented in the Big Stone region. Late Woodland occupations of the region do not appear to dominate the collections. Although cordmarked pottery is ubiquitous, it is likely that some of this cordmarked pottery was made into the Late Prehistoric period as judged by their minor representation at the Cambria site (Knudson 1967:255) and during the terminal Sandy Lake occupation. Diagnostics from the Late Woodland period comprise St. Croix and Lake Benton with a focus on cordwrapped and wrapped rod decorations that are a mix of diagonal and horizontal orientations on the neck. Wall thickness for these sherds range form .4-.8 cm. Cord impressed ceramics are present and would seem to last for a considerable time from Late Woodland through the Late Prehistoric periods. The St. Croix Stamped type is dated from a mound on the South Dakota side of Lake Traverse (DeSpiegler Site; Johnson 1964:41-42): human bone 600 (calibrated 2 sigma of around 500-900) and bark surrounding a pot 1300 (calibrated 2 sigma of 1165-1439). The second date is within the Late Prehistoric period and we do not believe these dentate-stamped vessels existed this late into the sequence and believe that either the date is in error or the burial was revisited at a later date. St. Croix Stamped was also recognized at two other sites on the Minnesota side of the lakes in Big Stone and Traverse counties and a large collection from Artichoke Lake. This distribution gives credence to the notion that there is a large uniform area extending from Central Minnesota (Gibbon and Caine 1980) west to the Sheyenne River and south to the Big Stone region that participated in the making of St. Croix Stamped pottery.

The earliest post-Late Woodland occupation should have some vestige of cordmarked surfaces, as attested in the continuation of this surface treatment in the Initial Middle Missouri time span to the west during Mill Creek times at the Brandon Village site (Over and Meleen 1941) and further east in Cambria (Knudson 1967:255). A prime candidate for the earliest Late Prehistoric occupation is the material excavated by Wilford (1958) from the Shady Dell (21TR5) enclosure site in the uplands adjacent to Lake Traverse, a position similar to Hartford Beach on the South Dakota side of Big Stone Lake. Unfortunately the collection was repatriated and we are left with Wilford's pithy description, a single color slide of diagnostic ceramics (Figure 5.1) and a selection of profiles and photos provided by Craig Johnson (1991).

Wilford's scattered excavations in and out of the enclosure resulted in the recovery of 352 sherds and rims. Cordmarked surfaces, primarily the lower body of jars as there were no jars cordmarked to the rim, account for 75% of the ceramics. Wilford noted that there was tendency for plain surface sherds, particular the larger specimens, to be higher in the stratigraphic profile, which supports the presumed trend for the region. Decorated ceramics comprised a mixture of cord impressed (the most common decorative treatment on half of the rims), stamped, and incised. The cord impressed vessels have a smoothed neck and cordmarked lower body. The necks are long and flaring and there appears to be no short-neck jar. Rims may be decorated with oblique wrapped rod stamping on the exterior and interior. Cord impressions comprise parallel lines, triangles (pointing upward) that are outlined by paired or single impressions. The space between the triangles is filled with oblique lines. Punctations are present below the cord impressions on a few examples. The stamping may be affiliated with Lake Benton, and thereby residual from a Late Woodland occupation. It is remotely possible that some of these may

represent an early Late Prehistoric treatment, as for example the lugged-rim jar (Figure 5.1 h). Most of the incised rims and sherds appear to be from one vessel that has diagonal tooled impressions on the thumb-impressed rim, a short stubby neck and parallel incised lines on the neck (Figure 5.1 c, i). This is presumably an example of the HIP in the region and it vaguely resembles the St. Helena variant (Hall and Hall 2004:Figure 8 e). An admitted stretch of the limited stratigraphic data could result in projecting two components at the Shady Dell site, one associated with Lake Benton and perhaps some of the cord impressed ceramics, a second with plain surface sherds, cord impressions, minor stamping and the HIP vessel.

From nearby Browns Valley the 1930s excavations (21TR5, Appendix A) yielded about the same proportion of cordmarked ceramics as Shady Dell; however, this collection differs, among other aspects, in the presence of jars cordmarked to the lip. The other disparities when comparing the two collections are significant and strain any notion that they are coeval. For the Shady Dell collection the predominance of cord impressed and stamped neck decorations contrasts markedly with that of Browns Valley. The only other shared traits are the presence of the HIP, although the treatments and vessel shape are not similar. The Browns Valley material based on radio-carbon dating dates within the span of 1000-1150. Impressionistically, Shady Dell should date before Browns Valley, thus 900-1050. If they are contemporaneous we would have a prime candidate for heterogeneity early in the Late Prehistoric sequence and perhaps reason for the presence of fortifications. Two problems are apparent in the early portion of the sequence and that concerns the variety in the HIP vessels and the dating of the cord impressed decorative techniques.

Heterogeneity is also a problem with the Browns Valley collection. We have a vertical cordmarked jar with well-defined flaring neck, a rounded to straight neck jar with the HIP that mimics the standards of Great Oasis, yet lacks the fine line incising, crossing spacers, and vessel shapes. A noded Late Woodland jar is also present and a coarse ware bag-shaped jar as well. A related rim was also recovered from the Cambria Gillingham site. Alternatively, these vessels could represent Middle Woodland jars. It is possible this heterogeneity is the result of sequential occupations spanning Late Woodland through the early Late Prehistoric, but the dates do not support such a scenario.

The two components at Shady Dell and Browns Valley represent a considerable range of variation for early Late Prehistoric in the Big Stone region. Plains affiliations are best recognized in the HIP motif and cord impressed decorations. Most of the vessels were cordmarked below the neck. Wrapped rod stamping is another possible treatment.

Other enclosures, besides Hartford Beach discussed below, are known from the Minnesota side of the lakes but have not been excavated. Material from the Tenny enclosure (21TR11) collected by Craig Johnson (1991) appears to largely date from the Woodland period, possibly even the Middle Woodland period, but did include a rather unique example of the HIP motif (Figure 5.5 e), which would link it to Shady Dell and Browns Valley. We suspect the putative earlier material at Tenny does not date the enclosure, but rather the HIP rim sherd places it squarely in the early portion of the Late Prehistoric period. An enclosure that was believed to date from the same time as Shady Dell site in southeastern North Dakota, the Lucas site (Holley and Kalinowski 2008; Michlovic 1989) was dated with our program, however, the resulting date of bison bone was from the Archaic time span. The Lucas phase has ceramic styles similar to the early range in the Big Stone region but lacks absolute dates at the present. Nearby in Roberts

County, South Dakota there is a report of an enclosure that has Great Oasis pottery (Beissel et al. 1984:12). However, only thin-walled sherds are securely known from the site (Lensink and Tiffany 2005:250-251) and we can thus only tentatively place it in the Late Prehistoric.

Two burial mounds from the Big Stone region potentially date relatively early in the Late Prehistoric sequence. Schoen Mound no. 1 in Big Stone County was a flat top burial mound on the bluff top (Johnson 1961:57; Smith 1941). Smith describes the small sample of pottery from the mound fill as "Woodland." These sherds have apparently been repatriated although Johnson made a point of stressing that they were likely from one vessel and could not be associated with any burial (Johnson 1961:70-71). This vessel, with drawings provided by Johnson (Figure 5.3), is a slightly flared rim jar with HIP motif that also has diagonal lines. Johnson identified the vessel as Cambria Type A (1961:70), although this would appear to be a forced identification. Anfinson concurs (1997:109) but does note that like Browns Valley examples, these are cruder renderings of Great Oasis. We should also note that the lower body appears to be plain and not cordmarked and this differs markedly from the cordmarked lower bodies found at Shady Dell and Browns Valley. This mound dates, we presume, directly after the Browns Valley (21TR5) occupation.

The second mound, also from Big Stone County is the Lindholm Mound (21BS3). Only a small number of sherds, including cordmarked body sherds and a plain surface rim, and a whole miniature pot were recovered from this mound (Johnson 1961:14). The whole pot (Figure 5.4) was polished with no decoration. Johnson interpreted the mound as Cambria affiliated (1961:14). Given the lack of incising and the plain surface, we presume it must also date slightly after the earliest Late Prehistoric in the Big Stone region.

A middle Late Prehistoric Big Stone unit lacks the large collections from excavations, except at Hartford Beach, which dates into the 15th century. We have to rely on the much smaller, disparate collections from Elden and Craig Johnson's surveys. The time span from 1150 to 1350 is likely represented by the various Cambria-related components identified in the area.

We derived two dates that fit within this middle time span: the Browns Valley enclosure (1220-1260) and a slightly later date from the Lou Miller Mound. Unfortunately, the ceramic sample from these sites is woefully inadequate. The Browns Valley enclosure sample derived from shovel testing (Appendix B) consisted of cord impressed, plain and cordmarked sherds (with only 33% cordmarked), the proportions of which may post-date early Big Stone as defined here. The Lou Miller Mound sample provides a slightly later date with definitive diagnostics (and is discussed in detail below).

The surface material from the Craig Johnson and Elden Johnson surveys have samples ranging from 27 to 48 sherds and rims (21TR39, 43, 47, 21BS14) and appear to date largely from this middle phase based on the presence of plain (and polished) incised sherds with a reduced presence of cordmarking. Cordmarked surfaces (but no rims cordmarked to the lip are present) range from 4% to 47% in the samples. The site with few cordmarked sherds (21BS14), with only one smoothed cordmarked sherd, is identified as a large Cambria village by Elden Johnson (1964). The plain surface sherds were thin walled, especially those with polished surfaces and thus attributable to the peripheral Cambria complex. The incised sherds comprised broad curving incised designs (Figure 5.5 f) that are associated with Cambria, an exception (Figure 5.5 d) has a geometric incised design that we are interpreting as late in this span.

Simple stamping is a Plains-related surface treatment and it is present in the three Traverse County sites and on Jensen Island and the Zacharias site in South Dakota but not in Big Stone County. Other interesting diagnostics from Big Stone County include an angled shoulder jar that is decorated with cord wrapped dowels on the shoulder (Figure 5.2 d), a feature that is also present at Artichoke Lake (see Figure 5.15 f, g); cord impressed decorations (Figure 5.2 c); and a variety of wrapped rod stamped sherds that could date from Late Woodland times or later (Figure 5.2 a, b).

The Lou Miller Mound (Johnson 1961:Plate 5) includes examples that are identified as Cambria, that comprised a whole pot, a large sherd, as well as sherds with the HIP motif. The complete vessel (Figure 5.7) has been repatriated. A connection with the well-known Link pot from the Bryan site in the Red Wing Locality (Link 1976) is an obvious connection for the repatriated pot. A ceramic sequence for Red Wing places this pot in the Link phase, a unit that post-dates the Silvernale phase, which is coeval with Cambria (Holley 2007). The large decorated shoulder sherd (Figures 5.6 e; 5.9 d) and an incised sherd with punctated fringe (Figure 5.6 f) are also indicative of the Link phase as well. The punctated fringe sherds from this site are rounded and resemble the tooled impressions on a rim (Figure 5.6 a). The HIP sherds (Figure 5.8) were not present in the collection that we analyzed, although it is noted to have a plain lower body, which is atypical for early expressions of this motif. We propose that the Lou Miller Mound (particularly the whole pot and large sherd) are indicative of the Hartford Beach time span and thus late Cambria.

Another mound/village site 21TR9 (Strader) collected by Wilford and destroyed by borrowing, has only Cambria ceramics remaining that includes an unmodified flared jar (Figure 5.9 a) and broad incised sherds (Figure 5.6 g, h). A similar rim was recovered from the Lou Miller Mound and other sites in the nearby regions (Figure 5.6 b, c), which likely is indicative of a late Cambria or middle phase of the Big Stone region.

Reliable Plains Village components appear uncommon in the collections from the Big Stone region, excluding the Zacharias and Jensen Island collections. Both sites were excavated by Wilford in the summer of 1953 and the notes for these excavations are curated at the MHS facility, Fort Snelling, along with the collections.

The Zacharias site is situated along the western (South Dakota) side of Lake Traverse. Wilford excavated a 20x20 ft square, near the lakeshore, divided into four units. Although the sherd sample was large (Table 5.1), most of these were small and rims were infrequent.

Ceramic categories reveal a rich sequence with Middle Woodland (characterized by thick-walled cordmarked and plain surfaces, punched nodes, and stamping), Late Woodland (a variety of stamping, such as St. Croix, and cordmarked rims), and Late Prehistoric. Cordmarked or smoothed cordmarked surfaces dominated the sample. All were grit tempered.

The Late Prehistoric likely includes an early phase expression (cord impressed and wrapped rod) and middle phase examples (polished, cord impressed, Cambria incised, red slip). Broad incised sherds with jags or punctations are present. Medium-width incision examples resemble those identified at Big Slough (see Figure 4.12 d). The cord impressed sherds match those found at Shady Dell (see Figure 5.1), although there did not appear to be in an equal

proportion of wrapped rod stamping seen at Shady Dell. HIP sherds were absent. The high proportion of polishing does point to a significant Cambria occupation. A crude measure of the proportional representation of the Late Prehistoric (i.e., counting thin walled plain surface, polished, and a variety of decorative treatments) indicates that it comprised about ¼ of the material.

Table 5.1. Frequency Tabulation of Wilford Zacharias Excavation Unit by Levels.

Ceramic Category	**L1**	**L2**	**L3**	**L4**	**L5**	**Total**
Thick walled cordmarked	37	35	35	10	1	118
Thin walled cordmarked	172	164	106	57	9	508
Cordmarked fragment	14	7	13	13	2	49
Thick walled smoothed cordmarked	15	12	24	11	2	64
Thin walled smoothed cordmarked	43	36	29	19	1	128
Smoothed cordmarked fragment	1	3	3	2		9
Thick walled plain	29	23	13	18	1	84
Thin walled plain	57	62	39	26	2	186
Plain fragment	2		2	3		7
Indeterminate	24	40	38	22	2	126
Polished	65	44	20	7	1	137
Simple Stamped	13	7	6			26
Middle Woodland decorated	4	2	3	2		11
Fabric impressed	4		2			6
St. Croix Stamped	2		2			4
St. Croix Stamped rim	1					1
Cordmarked rim		2				2
Smoothed cordmarked rim	1					1
Wrapped rod	4	2		1		7
Wrapped rod rim	1	1				2
Cord Impressed	7	5	4			16
Cord impressed rim		1				1
Plain rim	2	2				4
Polished rim	1	1				2
Broad incised	7	3	1	1		12
Red slip	1	1				2
Total	**507**	**453**	**340**	**192**	**21**	**1513**

Thick refers to greater than 6 mm in wall thickness.

As with most stratigraphic excavations in the region there is a hint of a sequence. Polished ceramics are a signature for Cambria or Late Prehistoric in the region and these sherds decrease from a proportional 13% in Level 1 to 4.7% in Level 5. We can also see that such categories as red slipped, Cambria Incised, cord impressed, and simple stamped are more popular in the upper two levels.

Jensen Island, located in the middle of Late Traverse, was also the setting for a series of test pits by Wilford in the same year as Zacharias. Wilford dug three units and made a surface

collection (Table 5.2). Units 1 and 2 were near the center of the island and Unit 3 near the shore. Historic contamination to the bottom of the squares was present in all of the units and thus no stratigraphy is available. Although fewer sherds were recovered in these excavations the sherds were larger and thus more diagnostics are evident.

There is an overall similarity with Zacharias, except in the greater diversity with Jensen Island, especially with the later dating material. A Middle Woodland is well represent that includs a Fox Lake rim, horizontal cordmarked, and a unique surface treatment characterized by irregular patches of cordmarking. Late Woodland, while likely accounting for the vast numbers of cordmarked sherds was not well represented in the rims. Cord impressed ceramics were more common and we could project, based on a stylistic sequence, three types of impressions. The earliest (likely overlapping Late Woodland and the early portion of the Late Prehistoric) is primarily horizontal bands that are closely spaced with cordmarked lower bodies (Figure 5.10 d, e). An intermediate expression would have more diverse applications, yet possibly retaining cordmarking at least for a few vessels, but overall a well-made jar (Figures 5.10 c; 5.12 e). These jars have weakly-defined necks. The last variant would comprise S-shaped jars (Figures 5.10 a-b; 5.12 b-d) with more elaborate designs and no cordmarked lower bodies. In areas where S-shaped jars are not an important type, the middle and late variants maybe more difficult to sort based on design elements alone.

A Cambria occupation is indicated by the presence of polished surfaces, broad incisions (Figure 5. 11 c, d), and a variety of plain surface jars, with or without lip notching. However, given the presence of S-shaped, cord impressed jars, we are reluctant to firmly identify this as Cambria as opposed to Mill Creek since the distance between this island and the two opposing sources is about the same. Another potential Late Prehistoric surface treatment is the wrapped rod (Figure 5.11 b), which is problematical. As with the Zacharias site the Late Prehistoric occupation comprised about ¼ of the sample, that is excluding the terminal shell tempered sample.

In addition to the S-shaped jars the rim tab (Figures 5.11 a; 5.12 a), derived from the surface collection of the island, is another late diagnostic. Craig Johnson (1991) noted that some of the material resembles Extended Middle Missouri and this is the only location in the Big Stone region that we are aware of that yielded a number of these decidedly Middle Missouri traits.

Later dating traits, such as shell tempered ceramics and striated decorated (very fine all over incising to form oblique diagonal designs), are present and point to a terminal occupation for the region. There is even an Oneota design (punctations surrounded by diagonal lines) in grit temper. These later dating ceramics are more common near the lake edge, which is where Unit 3 and the surface collections were gathered.

The other collection we examined was a private collection made from a lake shore or island in Lake Traverse; the presence of water worn sherds testifies to the location. We are further assured that the collection derives from a single site on Lake Traverse. We included this sample because it was thoroughly collected as evidenced by the numerous small sherds and

because it is possible to recognize a general sequence stretching from Middle Woodland times through the terminal occupations attributed to Sandy Lake.

Table 5.2. Frequency Tabulation of Ceramic Categories by Collection Unit on Jensen Island.

Ceramic Category	Unit 1	Unit 2	Unit 3	Surface	Total
Thick walled cordmarked	3	7	47	20	77
Thin walled cordmarked	4	11	158	34	207
Cordmarked fragment			78	11	89
Irregular cordmarked			20		20
Thick walled smoothed cordmarked	3	3	36	2	44
Thin walled smoothed cordmarked	2		27	4	33
Smoothed cordmarked fragment		1	2		3
Horizontal cordmarked			16		16
Thick walled plain	4	6	24	4	38
Thin walled plain	4		46	10	60
Plain fragment			9	1	10
Net Impressed			1		1
Indeterminate	1	3	123	4	131
Polished			26	1	27
Simple stamped			5	1	6
Horizontal cordmarked rim		1	3		4
Horizontal cordmarked decorated			1		1
Fox Lake rim				1	1
Middle Woodland decorated			2	2	4
Middle Woodland decorated rims			1	1	2
Cordmarked rim		1	3		4
Vertical cordmarked punctated			1		1
Wrapped Rod			4	1	5
Wrapped Rod Rim			4	1	5
Cord Impressed	1	2	16	1	20
Cord impressed rim		1		4	5
Plain Rim			4		4
Broad incised			6	4	10
Red slipped			1		1
Oneota design grit temper			1		1
Striated decorated			2		2
Shell temper indeterminate		1	4	1	6
Sandy Lake		2	18	1	21
Sandy Lake rim		1	3		4
Shell tempered plain			9	1	10
Shell tempered plain rim			1		1
Plain, Late Prehistoric rim		1	4	2	7
Total	**22**	**41**	**406**	**112**	**881**

Thick refers to greater than 6 mm in wall thickness.

As with Zacharias and Jensen Island, this collection appears to have every known ceramic component (Table 5.3). Late Woodland is represented by St. Croix stamped sherds and a variety of vertical cordmarked rims, some with punctations below the rim, the latter is also present at Jensen Island. Given our findings from Browns Valley we remain cautious about assigning all vertical cordmarked vessels to Late Woodland. A variety of cord impressed sherds are present in this sample as are incised sherds. The cord impressed sherds include examples with plain shoulders below the impressions; impressions forming a variety of geometric designs (Figure 5.14); as well as typical parallel lines (Figure 5.14). Cord impressed rims may also be decorated on the interior. The incised sherds include the broad incising associated with Cambria as well as examples with punctations and jags (Figure 5.13 d, e) and medium incised geometric patterns resembling Oneota or late Cambria (Figure 5.13 f). Plains Village like ceramics comprise rims that include a modified rim jar with cord impressed herringbone motif on the rim (Figure 5.13 a, b) and a variety of plain surface jars (Figure 5.13 c) with or without lip tool impressions or notching. Shell tempered ceramics are notably tiny in size, probably the result of lake-side erosion, and included examples of Sandy Lake. These sherds mark the terminal occupations of this site.

A late subdivision of Big Stone is characterized by a Sandy Lake occupation and a possible minor Oneota representation. An earlier expression would be characterized by Oneota with or without Sandy Lake; a Sandy Lake linkage with Oneota is the pattern to the north (Holley and Michlovic 2011). A later expression would be solely represented by Sandy Lake and would likely extend into the Historic Period. A large Sandy Lake site (39RO45/21TR35), encompassing 90 ha, presumably an example of the putative terminal span, was identified by testing on the northern outskirts of Browns Valley (Beissel et al. 1984:116-124). Shell-tempered Sandy Lake ceramics are weakly represented at other sites in our sample. The presence of these components and the absence of clear evidence for Terminal Middle Missouri or Coalescent material indicate that the Plains affiliations end sometime after 1300-1400.

We have identified Big Stone as a region with temporally, culturally, and functionally diverse settlements. But identifying the boundaries for this region is problematical at the present. Moving to the east there are two lakes (Toqua and Artichoke Lakes) in Big Stone County that may be part of this region as they contain Late Prehistoric occupations with similar ceramic styles.

A survey of Toqua Lakes (Harrison 2002), located approximately 18 miles due east of Browns Valley, resulted in the identification of at least two multicomponent sites with Cambria material (21BS48 and 50). Although no cord impressed sherds were identified, judging by the description of the ceramics we cannot be sure that they are not present. Potential Cambria-related material, including plain surface ceramics, is a decided minority. Bison bones are present, as well as lake resources, and the Knife River flint represents around 8.5% of the sample. Another of the sites (21BS51) has an Oneota and Sandy Lake occupation as well. As with other areas Late Woodland predominates. A liberal reading of the ceramic tabulations would result in potential Cambria-like ceramics representing 10% of the sample from 21BS48.

Table 5.3. Frequency tabulation of Unknown Lake Traverse site ceramics.

Surface Treatment	**Count**
Indeterminate	657
Indeterminate rims	7
Cordmarked	628
Fox Lake Incised	5
Brainerd Horizontal cordmarked	3
Brainerd Net Impressed	1
Middle Woodland decorated	3
Middle Woodland cordmarked	3
Fabric impressed	8
Fabric impressed rim	1
Dentate stamped, punctated	1
Stamped punctated	1
Indeterminate punctated	3
St. Croix Stamped	1
Combed and wrapped rod	1
Vertical Cordmarked rims	8
Vertical Cordmarked rims punctated	2
Vertical Cordmarked punctated	5
Incised punctated	2
Wrapped rod rims	9
Wrapped rod	8
Cord impressed	39
Cord impressed rims	12
Plain	388
Polished	13
Polished rim	1
Simple stamped	43
Simple stamped rim	1
Incised, HIP	3
Incised rim	1
Broad incised	11
Broad incised, punctated	3
Thin-medium width incision	7
Herringbone rim	2
Late Prehistoric plain rims	16
Shell tempered, indeterminate	6
Shell tempered, cordmarked	7
Total	1910

Artichoke Island (21BS23) is an island site in the lake of the same name. Hanson (1971) made an extensive collection at this eastern Big Stone County locality. Anfinson (1997) identified the Artichoke Lake site as affiliated with the Big Stone phase. We were unable to examine the entire collection, currently housed in the Big Stone County Historical Museum, because of accessibility issues. The material we did inspect revealed examples that are typical of Big Stone (broad incising, angled shoulders and cord impressions) with numerous plain surface jars with well-defined necks and lip impressions or notching (Figures 5.16 and 5.18). Punctations on the shoulder of broad incised jars (Figure 5.16 g) are also present as well as punctations

incorporated into a broad incised design (Figure 5.16 e). Cord impressions are used to form nested triangles (Figure 5.15 a, b). The one-of-a-kind specimens appear to resemble Middle Missouri vogues, as do examples that resemble Brandon Village specimens (Figure 5.16 b).

Other unique specimens include plain surface jars with stamped chevrons on the rim (Figure 5.17 f); fine-incised shoulders with the overlapping diagonal motif of the Coalescent (Figure 5.17 a). One shoulder sherd appears to represent a use of the HIP (Figure 5.17 d) that is also represented at Hartford Beach. Two sherds are angled shoulders with cord wrapped rod decorations that are testimony to the longevity of this technique into the Late Prehistoric (Figure 5.15 f, g). Some of the vertical cordmarked rims looked as if they might fit the Late Prehistoric period based on their well-defined necks; one vessel is likely Sandy Lake. There are also examples of a patterned or flexible stamping (Figure 5.15 d), which is an unnamed Late Woodland type that is abundant to the north and east (Kanabec and Kandiyohi Counties). Oneota ceramics are present as well.

To the immediate east in Swift County ceramic collections revealed examples of cord impressions, IMM-like bolstered rims, stamped lips and Cambria examples (Holley, Michlovic, and Dalan 2011b). Importantly, Cambria-like sites identified during the Swift County survey were concentrated on the lakes and creek valleys and not upland settings.

Discussion and Summary

We have offered an alternative interpretation of Big Stone, arguing that the temporal and cultural diversity suggests more than a single phase and rather represents a region. The proposed ternary division for the region represents an approximation; we expect that future archaeologists will subdivide this skeleton sequence. By classifying Big Stone as a region we do not avoid the problem of heterogeniety.

Extending back at least to Middle Woodland times, based on the point styles and bison burials from Round Mound (Wilford 1970), the Big Stone region was occupied by Plains people. We can definitively state that Plains connections extend back to an undetermined time in the Archaic period. For at least part of the Late Woodland, as exemplified by St. Croix Stamped, Big Stone was part of a culture that occupied lakes and prairies. At some time during the Late Prehistoric period ceramics in the area began to diverge from surrounding regions. However, to a significant extent, the adjoining Ecotone and Prairie Lakes regions appear to form a similar ceramic culture that was regionally cohesive and unique. This culture has elements of Cambria, Initial Middle Missouri, Extended Middle Missouri, and Oneota. At some time after 1400 this culture is replaced by Sandy Lake. By the time the Europeans arrive in the 1800s they observe Dakota (Sandy Lake) peoples living and farming in villages along the lake shores and islands of Big Stone.

Several ceramic trends are evident that can be used to characterize the region. Five surface treatments or styles display continuity and diversity through the early and middle phases of the Late Prehistoric period in the Big Stone region. Cord impressed styles likely were initiated during Late Woodland, at least that is what other regional sequences reveal, and it continues into the middle phase in the Big Stone region. Yet it is hardly ubiquitous across the region, only about half of the sites with ceramics have this decoration. As befitting its temporal duration it is diverse as regards vessel shape and motifs. We tentatively define three types of cord impressed.

The first and perhaps earliest is simply a horizontal pattern and is likely associated with a cordmarked lower body. The second used cord impressions to form simple geometric designs, which may or may not be associated with cordmarking. A final expression used cord impressions to form rainbow motifs on S-shaped jars and is not associated with cordmarking. To complicate matters, the horizontal pattern for cord impressions continues unabated through the sequence.

Another decorative style with durability is that of the Horizontal Incised Pattern (HIP). This treatment is associated with a number of type names in the Plains and is of considerable temporal duration. For the Big Stone region it appears to span the period from 950 to 1400. The earliest examples from Shady Dell and Browns Valley sites appear to have cordmarked lower bodies and the HIP on the jar neck. These follow the pattern associated with Great Oasis, i.e., a series of horizontal incised lines, bordered on the top by diagonal tool impressions on the rim, and occasionally further decorated with diagonal line patterns. None of the Browns Valley specimens are as finely incised as the Great Oasis examples from southwestern Minnesota nor are there any similarities in vessel shape. Vessels with the exacting standards of Great Oasis are, in Minnesota, confined to a narrow region in a few counties. The HIP is a minority in the Cambria core (Knudson 1967). At the Schoen Mound No. 1 (Figure 5.3), the HIP motif is associated with a smoothed plain lower body, which is presumed typical for the middle time span in the Big Stone Region. A later variant features a jar with the HIP on the jar shoulder at Hartford Beach (Haug and Fosha 2008:Figure 14) and represents another variant in this pattern.

Incised jars, excluding the HIP, display an equally perplexing history. Broad trailed lines associated with Cambria appear during the middle phase and comprise curvilinear motifs, such as scrolls. At a later date geometric forms appear as do more moderate width incisions. In some cases we have what appear to be Oneota designs with grit temper. Such a blending of traditions is common in the Northeastern Plains (Holley and Michlovic 2010) beginning sometime after 1250/1350. We suspect the same here as well.

The final two decorative methods are rooted in Late Woodland and are questionable members of the Late Prehistoric sequence. Vertical cordmarked jars are difficult to confine to the Late Woodland period in the Upper Midwest and Plains. Numerous examples are present in the Northeastern Plains and in Sandy Lake of central and western Minnesota. Examples that are not from the Late Woodland period included well-defined and flared neck jars (Lisbon Cordmarked) and those with shell tempering (Sandy Lake). The Browns Valley sample included jars that are most definitely not Late Woodland and attest to vertical cordmarked vessels after 900. However, the remaining samples from the counties are too small to determine if they are potentially later dating. Although vertical cordmarked jars are not considered a Plains trait they are found in a variety of contexts after 900 in the Plains. Lastly, there is the wrapped rod decorative technique. Most of the examples are simply wrapped rod and not cord wrapped rod but this may represent a distinction without a difference. Late Woodland Lake Benton sherds are obviously present in the samples; however, there are also examples that are of a different, harder paste and display a different look to the stamping. Unfortunately this is a problem that can only be rectified with large samples. Oneota is present but appears only on the eastern margins of the region at the Toqua and Artichoke Lakes.

Assessing the central issue of Plains Village culture in Big Stone is not easy. To be sure the only definitive Plains Village ceramics that are not the result of a possible Cambria connection were found in the Jensen collection, which occupies the South Dakota or western side

of Lake Traverse. The presence of the HIP and simple stamping are signs of a Plains affiliation and may suggest that sometime during the middle phase there was a stronger connection with the west. However, given the continuous spread of Cambria-like traits from east to west, it seems likely that we are simply witnessing a border phenomenon. Another competing idea cannot be discounted and that is the simultaneous occupation of the region by Plains Village peoples and Minnesota Prairie peoples. Enclosures appear to be concentrated through the early and middle spans of the Late Prehistoric on both sides of the lakes, at times when Plains Village traits are present. No enclosures are known for the terminal Sandy Lake occupation nor were any recorded in this region in historic times.

Figure 5.1. Shady Dell (21TR6) ceramic diagnostics: a, b, e-g, k, cord impressed; c, i, modified rim jar with HIP; d, h, j, l, wrapped rod stamped; m, indeterminate. University of Minnesota Dept. of Anthropology NAGPRA Inventory, 1997.

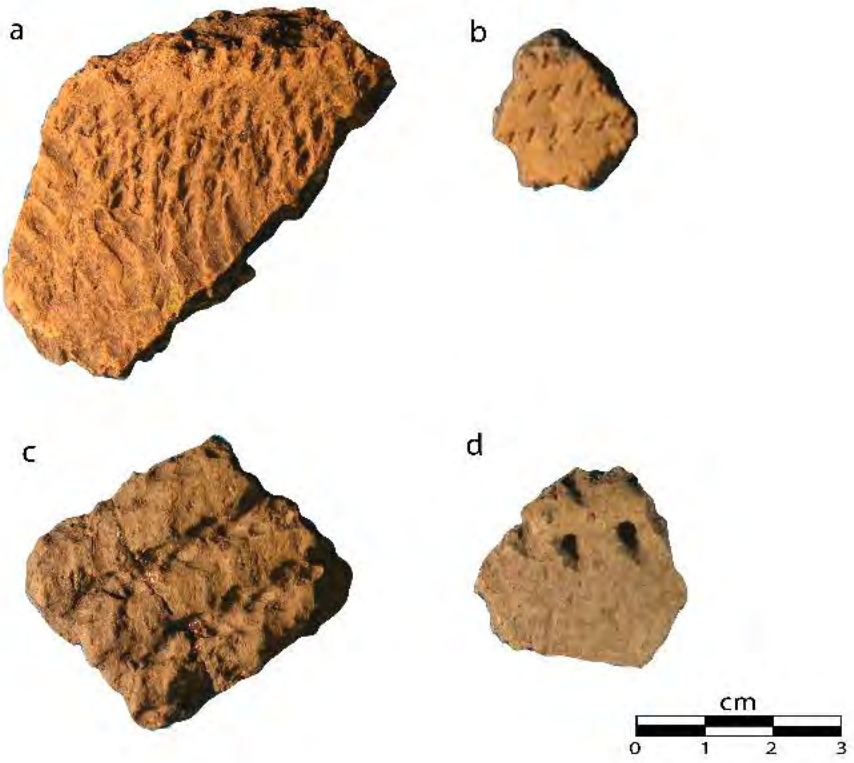

Figure 5.2. Big Stone stamped and cord impressed ceramics: a, c, 21TR39; b, T21TR47; d, 21TR43. a, wrapped rod stamped neck, cordmarked lower body; b, wrapped rod stamped; c, cord impressed diagonal pattern; d, cordwrapped rod stamped on angled shoulder.

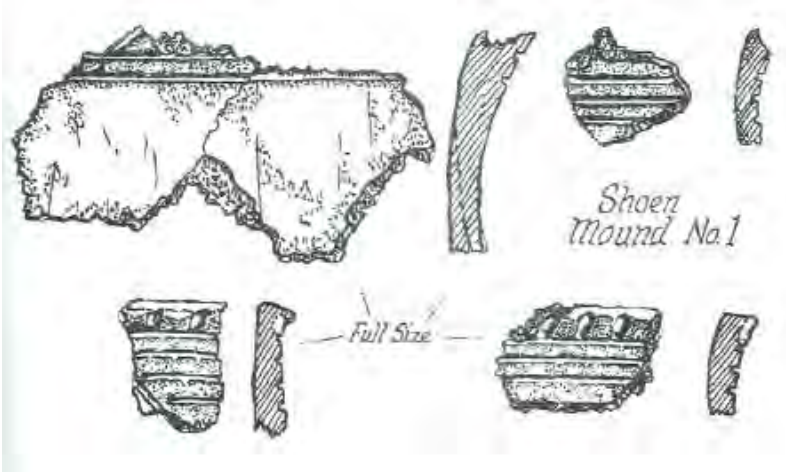

Figure 5.3. Schoen Mound No. 1 ceramics (Johnson 1961:Plate 5). Used by permission.

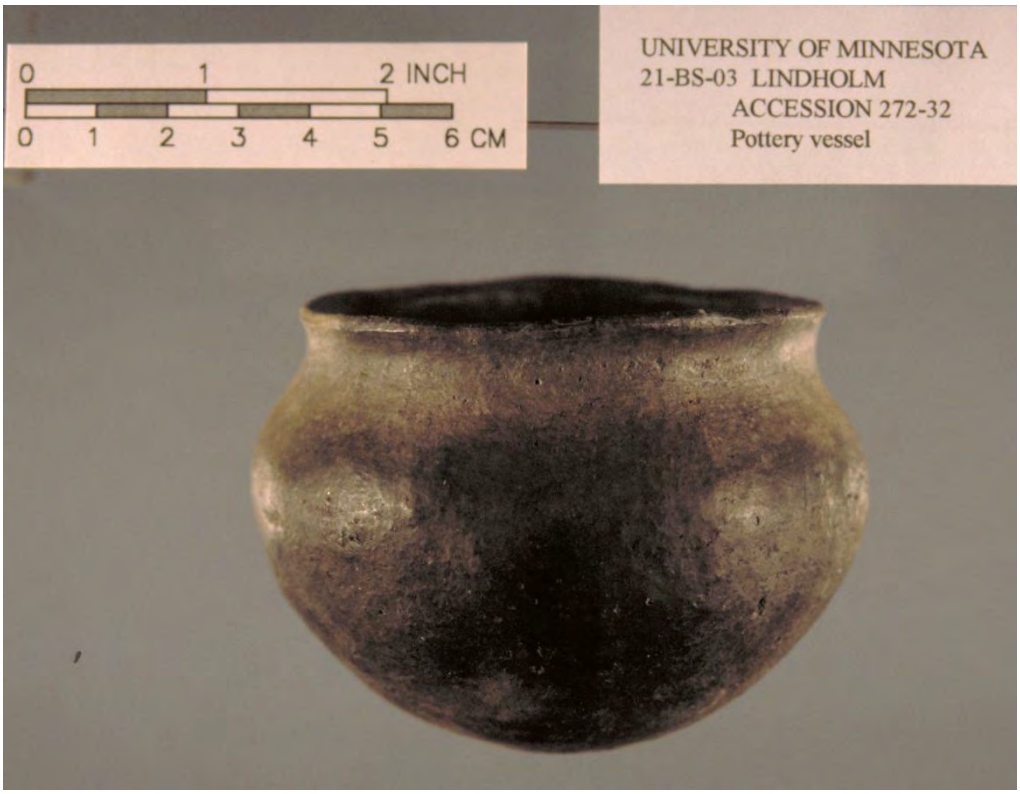

Figure 5.4. Lindholm Mound (21BS3) repatriated vessel. Grit tempered, polished surface. University of Minnesota Dept. of Anthropology NAGPRA Inventory, 1997.

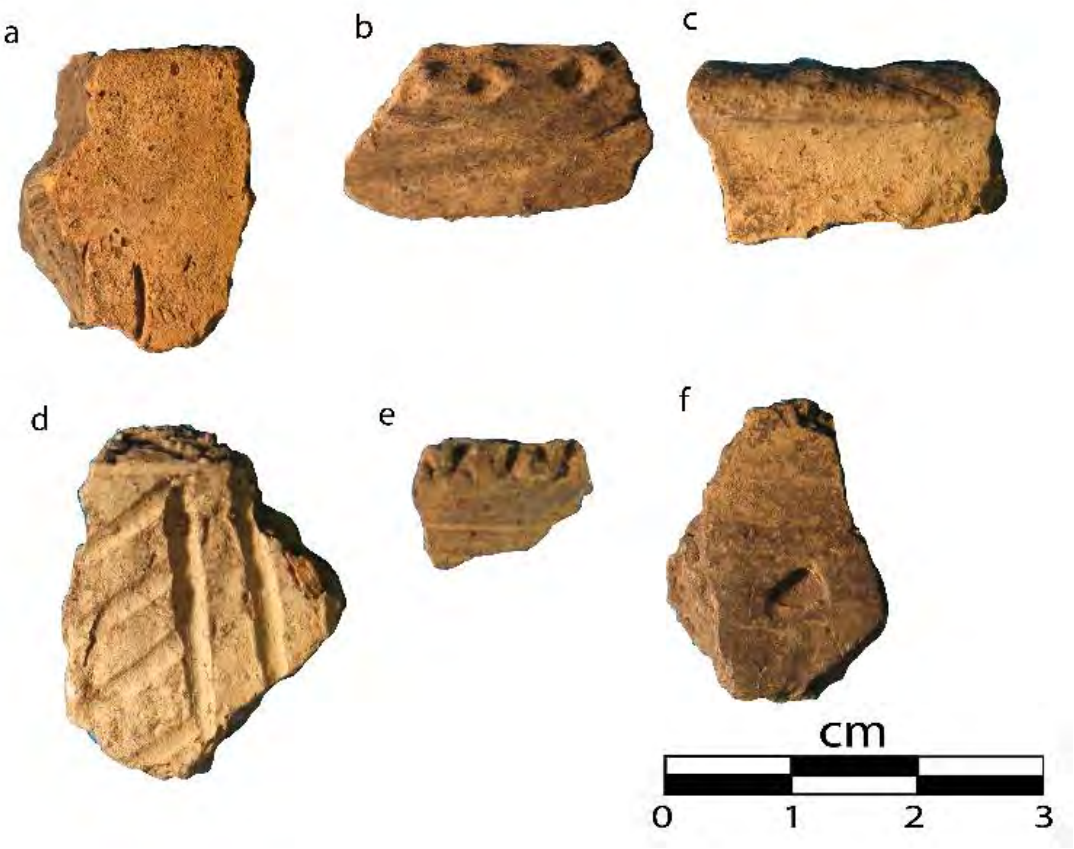

Figure 5. 5. Big Stone incised ceramics: a, b, 21TR29; c, e, 21TR11; d, 21TR39; f; 21TR43. a, thin incision, slash superior notch; b, broad incising; c, deep superior notches; d, geometric chevron (Oneota-like) design; e, HIP rim with slash notching; f, broad incised with punctation?

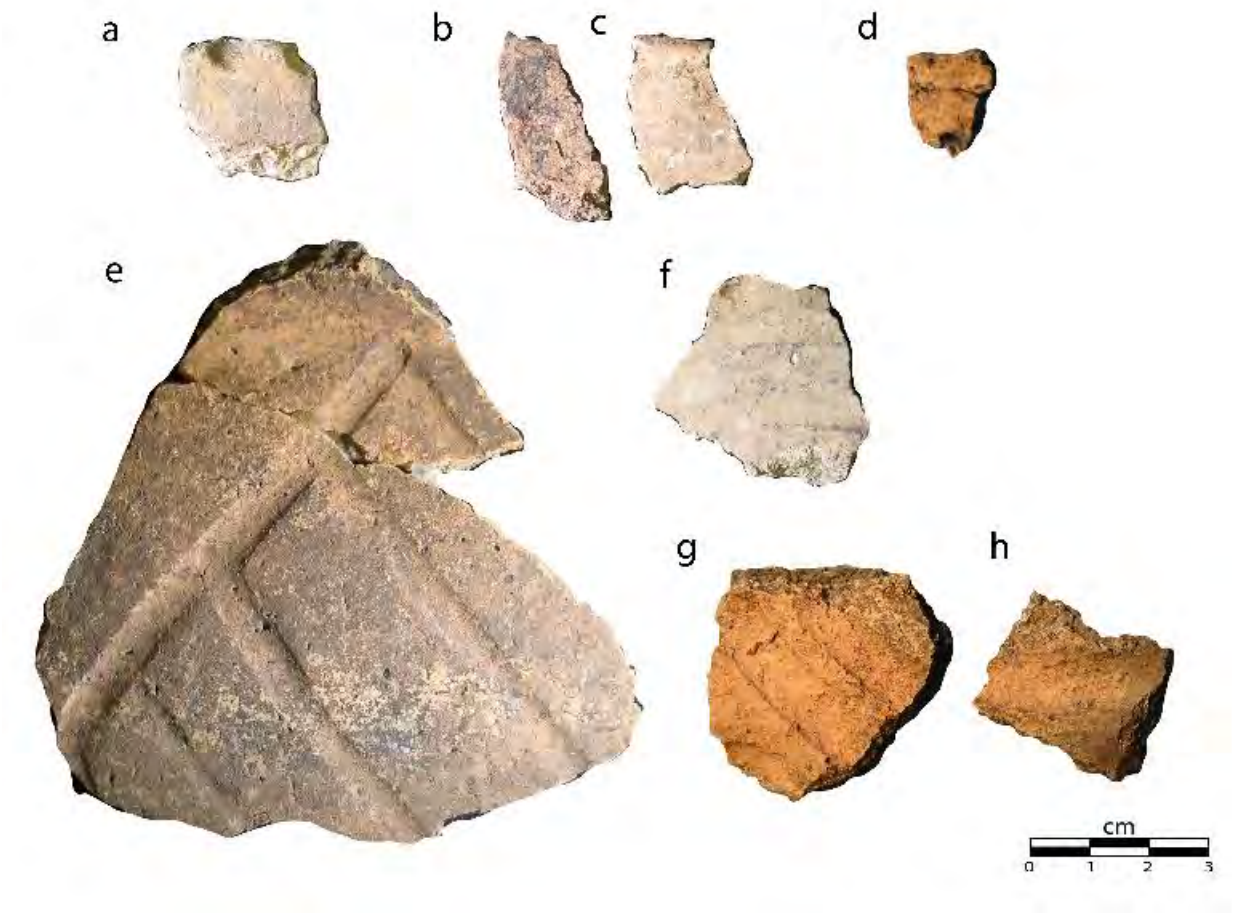

Figure 5.6. Big Stone Cambria ceramics: a-c, f, 21BS14; d, 21TR48; e; 21BS4; g, h, 21TR9. a, rounded tool impressed rim; b, c, unmodified jar rims; c, modified (rolled) rim; e, flared jar shoulder, broad incising; f, broad incising and punctation; g, h, broad incising.

Figure 5.7. Lou Miller Mound (21BS4) repatriated vessel. University of Minnesota Dept. of Anthropology NAGPRA Inventory, 1997.

Figure 5.8. Lou Miller Mound (21BS4) HIP sherds (Johnson 1961:Plate 5). Used by Permission.

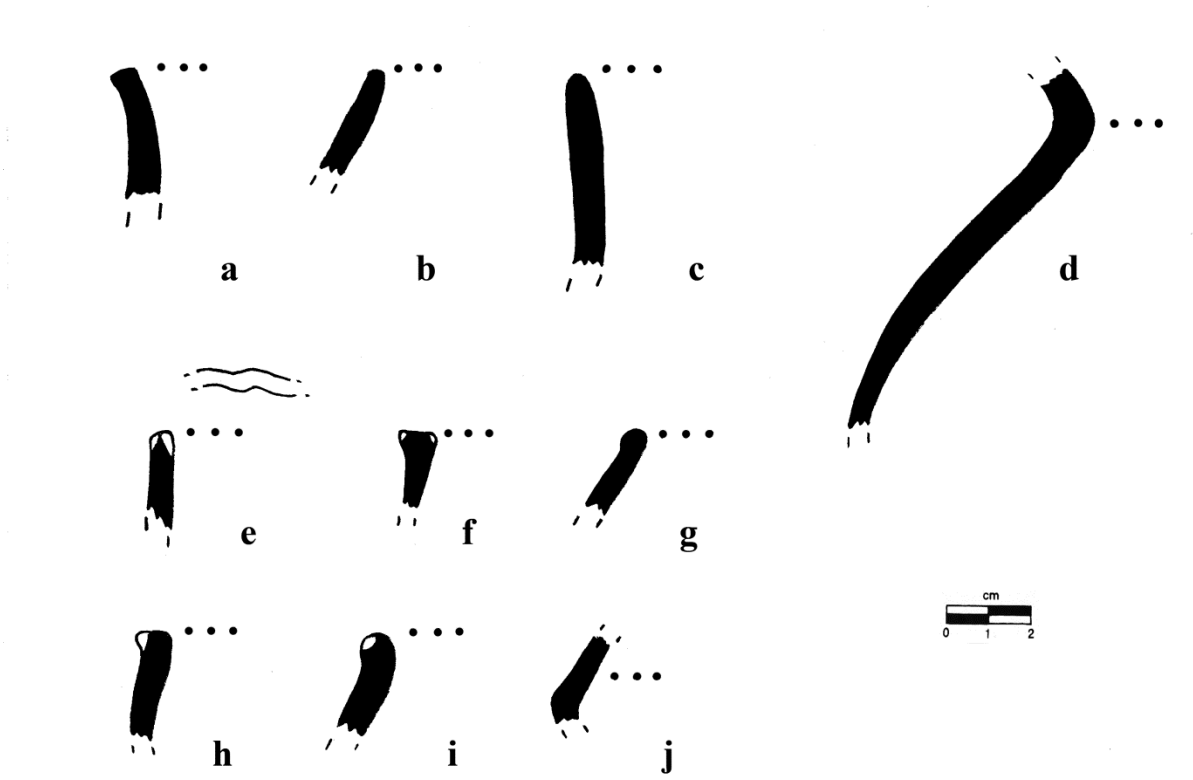

Figure 5. 9. Big Stone jar profiles and angled shoulders: a, 21TR9; b, e, g, 21BS14; c, j, 21TR43; d, 21BS4; f, 21TR29; h, i, 21TR47.

a flared jar, slightly modified rim
b polished inslanted jar
c unusual, high straight neck jar
d flared jar, shoulder (see Figure 5.6 e)
e jar with notching on interior and exterior to create a wavy crenulated appearance (see Figure 5.6 a)
f modified rim with small notches on interior and exterior and broad incising on the exterior (see Figure 5.5 b)
g rolled rim jar with broad incising
h inslanted jar, exterior wrapped rod notch
i inslanted jar, rounded exterior notched jar, simple stamped
j angled shoulder, incised and punctated? (see Figure 5.5 f)

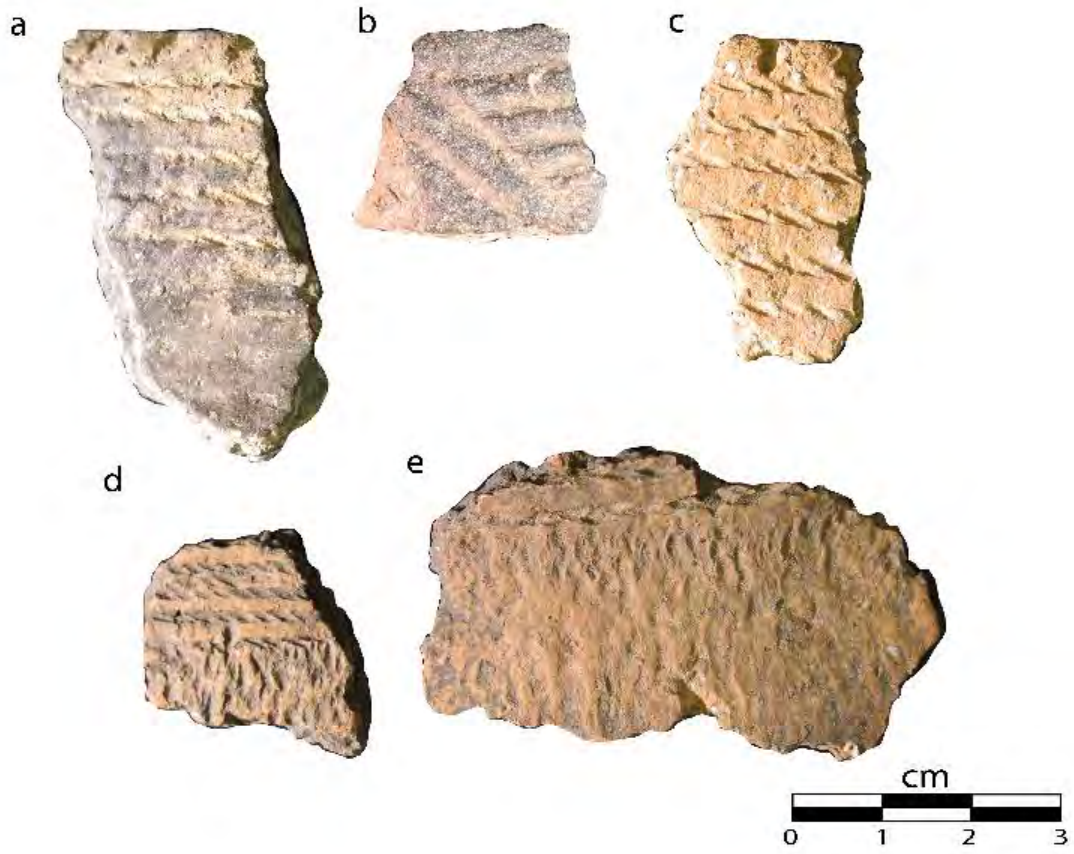

Figure 5.10. Jensen Island, cord impressed ceramics: a, c, horizontal cord impressed pattern with cord impressed exterior notches; b, barred triangle design; d, e, horizontal impressions on neck and cordmarked body.

Figure 5.11. Jensen Island decorated ceramics: a, rim tab; b, wrapped rod decoration; c, d, broad Cambria incised.

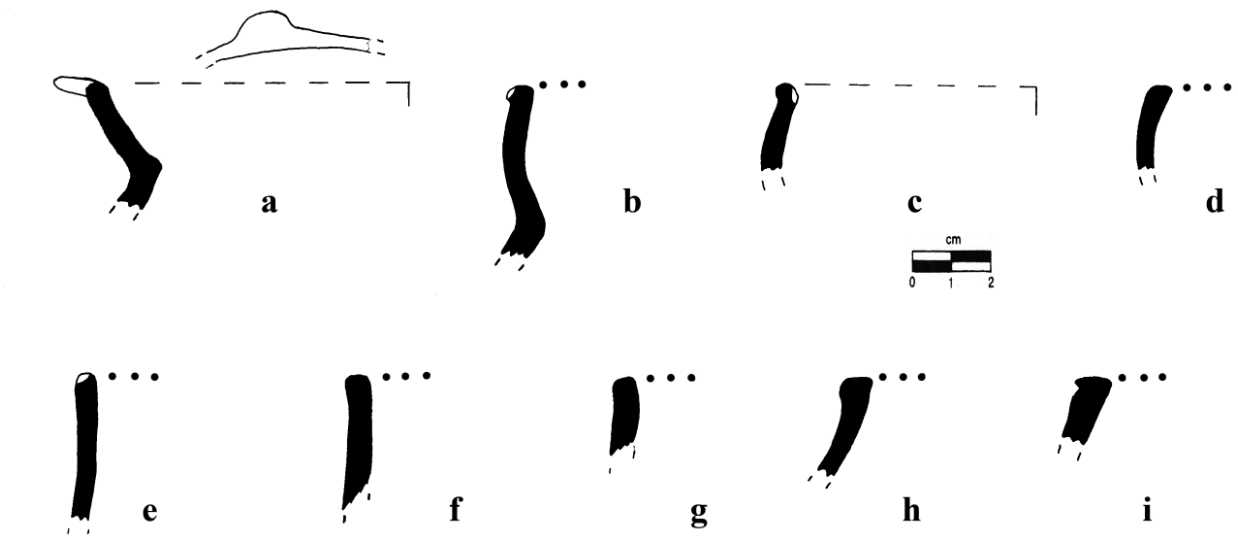

Figure 5.12. Jensen Island vessel profiles:
a flared rim jar with tab, plain surface, see Figure 5.11 a
b s-shaped jar, cord impressed, see Figure 5.10 a
c s-shaped jar, cord impressed, see Figure 5.10 b
d s-shaped jar, cord impressed
e straight neck jar, cord impressed, see Figure 5.10 c
f straight neck jar, cord impressed
g straight neck jar, cord impressed
h inslanted jar, bolstered rim, cord impressed
i inslanted jar, cord impressed

Figure 5.13. Unknown Lake Traverse site ceramics: a, cord impressed superior rim, exterior tooled impression to form herringbone; b, tooled impressions to form herringbone; c, polished plain jar with slightly modified rim; d, e, broad incising with punctations; e, broad incising to form hachured design (Oneota-related?).

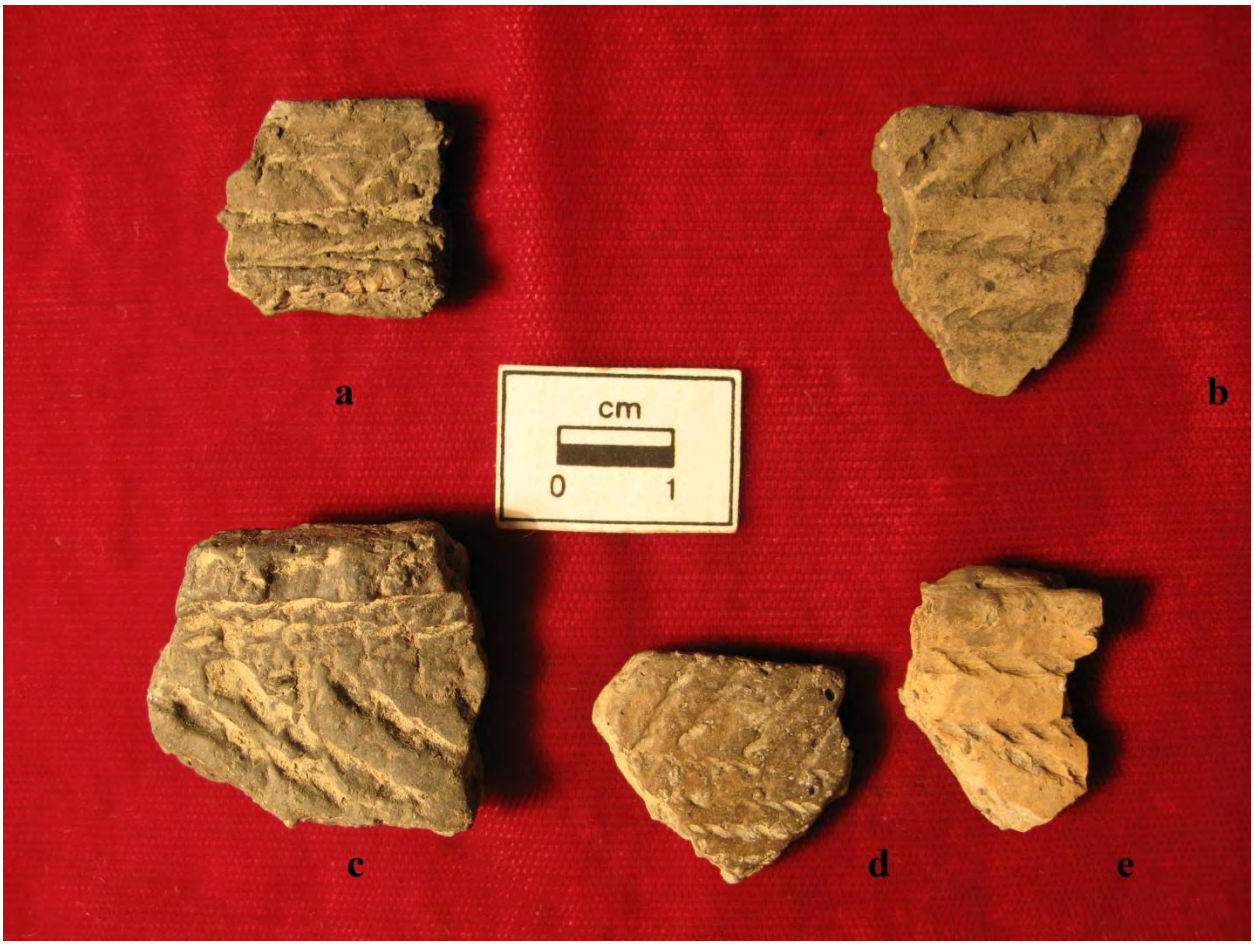

Figure 5.14. Unknown Lake Traverse site cord impressed ceramics.

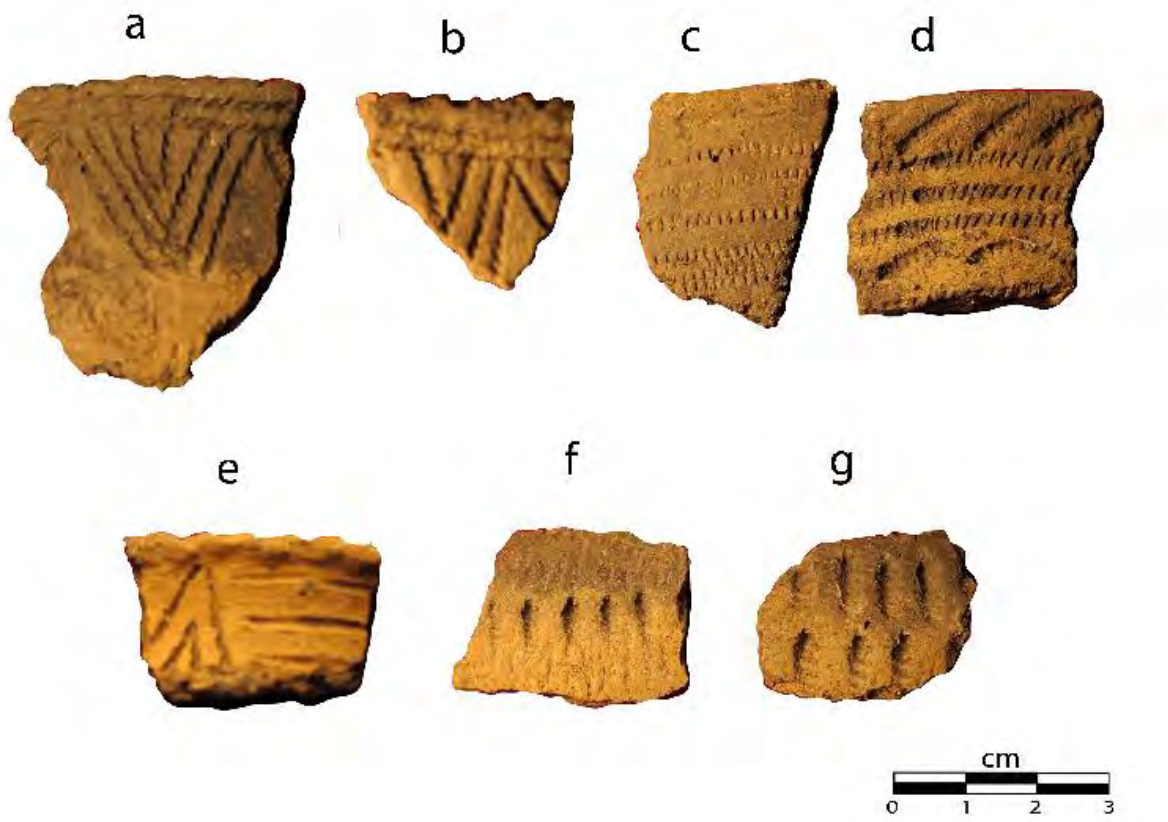

Figure 5.15. Artichoke Lake cord impressed and stamped ceramics: a, b, cord impressed; c, wrapped rod stamped; d, flexible rod stamped; e, incised and stamped neck; f, g, cordwrapped rod impressions on angled jar shoulder.

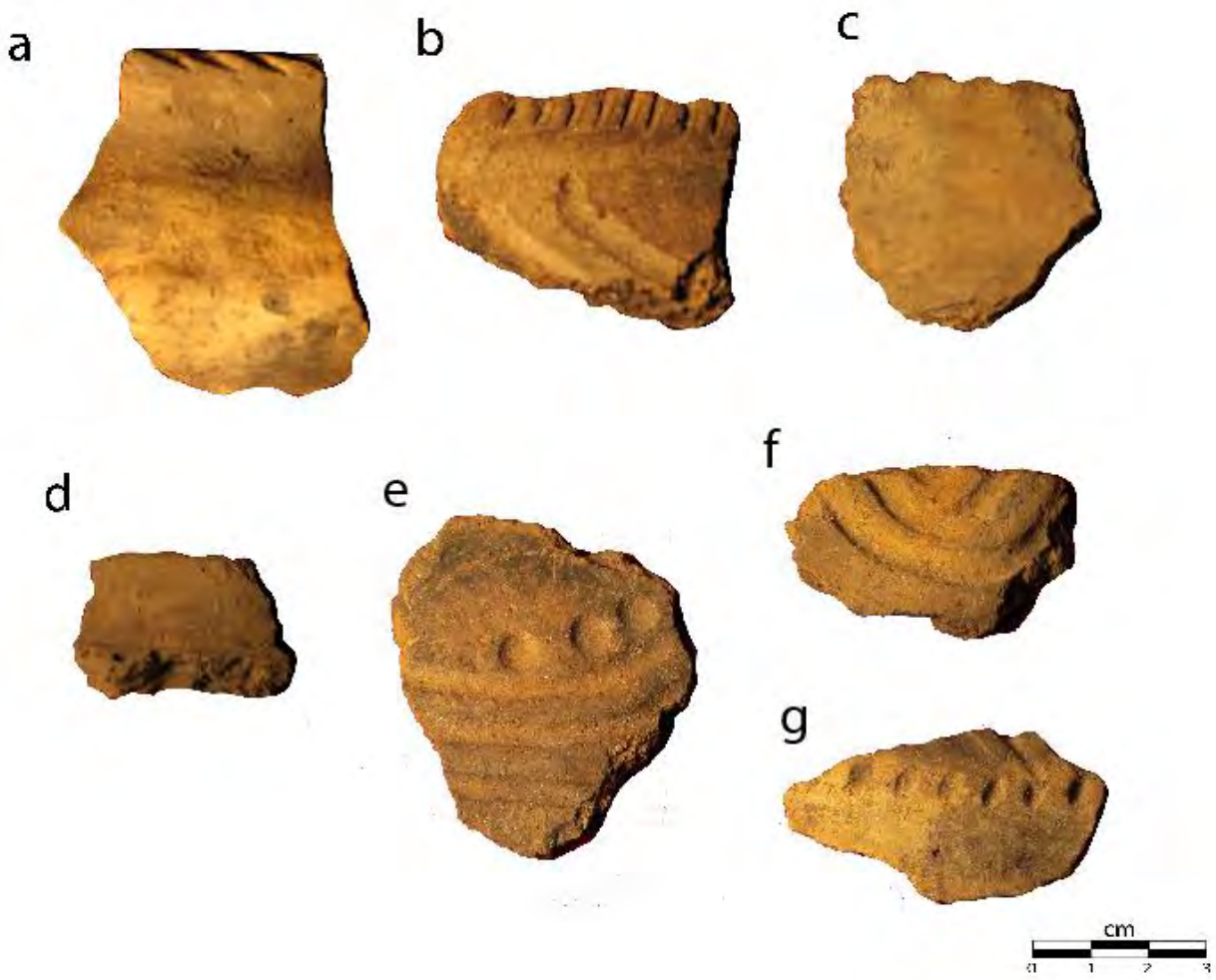

Figure 5.16. Artichoke Lake Cambria ceramics: a, plain surface, angled shoulder jar with diagonal tooled impressions; b, broad incised stubby jar with tooled impressions; c, d, plain surface jar with superior notches; e, broad incising with fringe punctation; f, broad incising on shoulder, scroll design; g, broad incising on angled jar shoulder with fringe punctations possibly unrelated to the design.

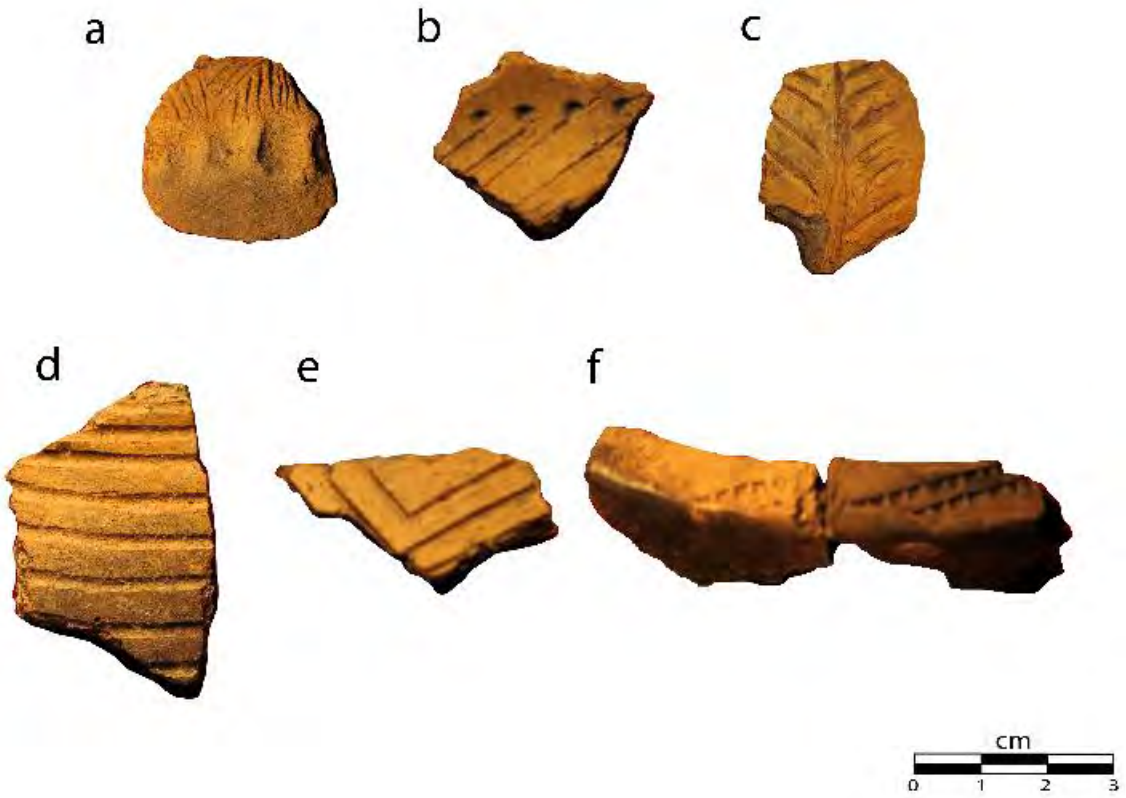

Figure 5. 16. Artichoke Lake incised and decorated ceramics: a, thumb-pinched shoulder, fine-line incisions forming oblique diagonal motif; b, neck punctations with diagonal incised line; c, "feather" incised design; d, HIP; e, nested chevron, medium width incision; f, dentate stamped pattern on flat lip, short-necked jar.

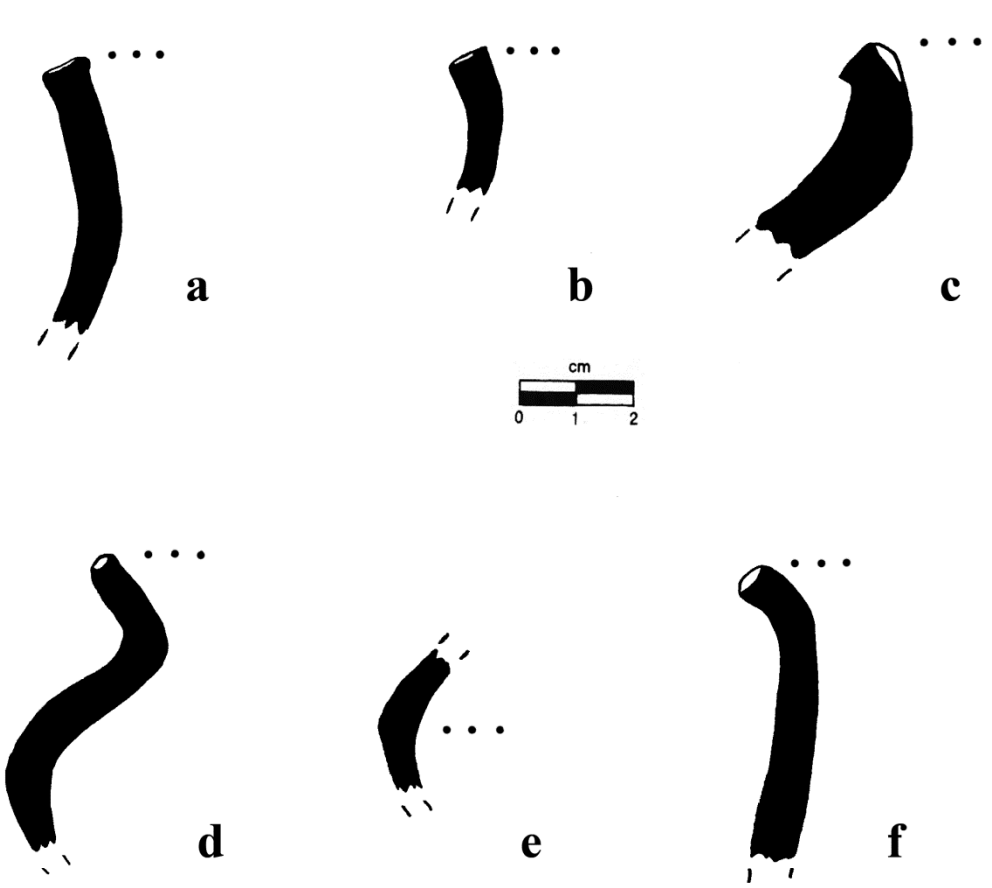

Figure 5.18. Artichoke Lake ceramic profiles:

a flared rim jar, cord impressed, cord impressed superior notch, see Figure 5.15 a
b flared rim jar, incised wrapped rod decoration, wrapped rod notch, see Figure 5.15 e
c Stubby necked jar, broad incised shoulder, exterior notch, see Figure 5.16 b
d flared rim jar, rounded-angled shoulder, plain surface, exterior notch, see Figure 5.16 a
e angled shoulder, wrapped rod decoration, see Figure 5.15 g
f flared rim jar, cordmarked exterior, super notch

Chapter 6
ECOTONE REGION

The precise geographic limits of the much discussed Minnesota Ecotone are difficult to define at any single time in the past. In Minnesota, the Ecotone was a northwest to southeast swath of land between the prairie and lake-forest regions. Although on the edge of the woodlands, the Ecotone has yielded numerous examples of sites with purportedly Plains Village pottery. Only three sites have undergone moderate testing in the region – Maplewood, Dead River and Johnsrud. We have acquired dates for Maplewood and Johnsrud was dated prior to our work. Dates are available for Dead River, but they apply to features containing only Blackduck ceramics at the site.

Otter Tail, Grant, and Douglas counties, and perhaps Becker, represent the northernmost distribution for Cambria and Plains Village material in the central portion of the state. These counties are ensconced in the Lakes region. Of the 39 sites known for this area, we examined the collections from 21 sites curated at MHS as well as collections from unrecorded sites.

A prevailing interpretation of the Ecotone is that multiple ethnic groups occupied the lakeshores in the region and participated in bison hunting (Maplewood site) or the region was used as thoroughfare, such as Lake Oscar (Sellars 1992:186-186) by peoples moving west to east for lake and forest resources or east to west for bison resources, leaving it as a no-man's land for territorial claim (hence no large substantive sites). Archaeological materials presently at hand are not sufficient to support the weight of such an assumption at the present.

The Maplewood site (21OT36) is located on a peninsula within the southeastern margins of Lake Lida in northwestern Otter Tail County. As befitting its ecotonal position, it is reconstructed as being situated within hardwood forests but adjacent to the prairies associated with the Red River Valley. Although known since the 1930s, it was not until the 1960s through the 1970s that archaeological investigations were initiated in response to mitigation projects for the Maplewood State Park (Streiff 1981; Watrall 1976).

Collections from two prior investigations by Peter Bleed (MHS Acc no. 640) and Alan Borass (acc no. 667) were examined and ceramics from Middle Woodland through Late Woodland (Kathio/Blackduck) was present, with no Cambria or Plains Village material evident. It was during the 1969 field season by Watrall that evidence for a Late Prehistoric occupation was identified. Watrall excavated a larger area and uncovered evidence for numerous cultural features. The features were uniformly shallow at the base of the A-horizon. In all, Watrall worked in six areas (loci) spread out over an area approximately 160 m by 50 m (1976: Figure 6). The largest exposure and the greatest number of features and material debris was in Locus I (Watrall 1976:99-112). This is part of an accumulating data base that indicates most of these lake sites have discrete components buried within seemingly mixed and extensive deposits.

Watrall concluded (1976:283-284) that the ceramics were comparatively unique with affiliations to central Minnesota. Such determinations are understandable given the focus of most archaeological work prior to his investigations. Work in the Northeastern Plains was just

beginning and no systematic overviews had been formulated at this time. Based on the ceramics he reasoned that there were two occupations at the site (1976:285-286). The earliest was dated to the Late Middle Woodland (650-900) and the second to Late Woodland (1450-1630); period designations that are not consistent with current understandings. The terminal date was based on a guess for a glass bead. He specifically denied any connection with the west or Cambria. These occupations were interpreted as a seasonal village (fall through spring) with a primary focus on bison, although the full complement of lake faunal resources are evident (Watrall 1976:291-295).

Almost all possible Plains ceramics derive from Locus I, and possibly Locus IV. All of the trailed and punctated sherds, the sole incised rim and the multiple plain surface neck jars with labial notching were found in Locus I. Notably, plain smoothed sherds were weakly present (12% of sherds); cordmarked sherds were the most dominant. Locus VI revealed the greatest proportion of plain surface sherds. However, a definitive Middle Woodland sherd derived from this locus and it may represent the source of this category. Diagnostics were generally uncommon in other loci. Locus II, for example, yielded the greatest concentration of fabric impressed sherds. Dentate stamping (St. Croix Stamped) was also confined to Locus I (Watrall 1976:158-159). This type is typically considered as Late Woodland in central Minnesota (Gibbon and Caine 1980). In short, there does appear to be a concentration of multiple occupations across the site. Our tentative assessment is that there is an extensive occupational sequence beginning during the Middle Woodland period and lasting until near the end of the sequence; this does not include Archaic occupations. However, the absence of Sandy Lake shell-tempered cordmarked ceramics is puzzling and may cast doubt on any late occupation.

Our examination of the material led to a focus on Locus I to identify potentially datable features. Four features were identified in this area as possessing ceramics along with material that might be dated (charcoal or bone). Of these we identified two with plain surface sherds (Feature 42; Watrall 1976:106) or Cambria diagnostics (Feature 89; Watrall 1976: 107). We do not have sherd frequencies for the two features as the sherds were lumped together based on surface finish in large bags at the Ft. Snelling facility. Most of the sherds recovered from the site were cordmarked. Nearly all other decorated sherds were collected from this locus as well. Feature 89 is identified as a possible pit (Watrall 1976:110) with charcoal, bone fragments, and a few sherds that included a rim from a decorated vessel (Figures 6.1 a; 6.3 a). Another rim from this vessel was found in a nearby Feature 15 (Figure 6.1 a). Because this rim was diagnostic we dated material from Feature 89.

Watrall (1976:161) identified 98 rim sherds from his 1969 excavations. In our examination of the collection we identified 51 rims of sufficient size with intact surface. Of this total we surmised that 20 discrete vessels are represented. Only six vessels were considered relevant to a Plains Village presence. Five of these were from Locus I, a single problematical rim (Figures 6.1 e; 6.3 d) was from Locus IV. The vessel from a pit used for dating (Feature 89) is an inslanted jar with pinched rim and broad shallow incising, with at least three parallel horizontal lines (HIP or Horizontal Incised Pattern). The vessel is truly a polyglot with an incurved shape resembling Ramey Incised, a quasi-rolled rim, and broad line incising (Figures 6.1 a; 6.3 a). However, if the motif is an example of the HIP, it affiliates the vessel to a Plains Village style, an evaluation reinforced by lip pinching, although a variant of this is present at Cambria (Knudson 1967: Plate 4). Two of the vessels have slightly flaring upper necks (necks around 3.5 cm high)

with superior notching (Figures 6.1 b, c; 6.3 b). One rim is non-descript with no notching, another has an elongated superior notch that is an elongated triangle (Figures 6.1 d; 6.3 c). A final vessel from Locus IV is a stubby plain neck jar with deep gouging on the superior crest to form closely spaced triangular impressions or a chevron (Figures 6.1 e; 6.3 d). There is a scar for a punctation/node on the exterior below the rim. Other rims that vaguely may relate to this occupation include a possible cord impressed jar with a modified rim (Figure 6.3 f) and a horizontal cordmarked jar with superior notching (Figure 6.3 e); the latter does not resemble the Brainerd varieties.

In addition to the rims, there are seven incised (trailed) and punctated sherds (Figure 6.2), all from Locus I, which corresponds to the total identified by Watrall (1976: 157). Designs are difficult to ascertain but they do not appear to be curving to form a scroll design that is so typical for the Stirling horizon. One of the sherds was from an angled shoulder indicating that this vessel form is present. Presumably, these sherds are the body sherds for the plain surface rims. One of the sherds has broad punctations that is also associated with broad incising (Figure 6.2 a). For six of the broad incised examples an intaglio of the design was visible on the interior, one was fragmentary and another had no evidence for intaglio.

Another potential indicator of Plains connections is the presence of Knife River Flint. This material accounts for 33% of cores, tools and microblades (Watrall 1976:216). Knife River flint flakes, however, represented only 4.87% of the sample (Watrall 1976:215). Interestingly, for our research, most of the Knife River Flint was from Locus I (Watrall 1976:219).

Watrall (1976; 1985) was of the opinion that the site was occupied by a large group of people in the fall-winter period focused on bison procurement and that the diverse ceramics were representative of ethnically diverse groups (1985:68). Although this remains a possibility, we can identify the presence of ceramics with a considerable time span (Middle Woodland, Brainerd, Kathio, Onamia, St. Croix and Cambria). It does appear that bison procurement was an important focus at the site, with all of the bison parts represented in the archaeological deposits. However, as with other lake sites there are also indications of a reliance on fish and small mammals. Flotation samples were analyzed but maize was not present.

Although Watrall (1974) did not identify a Cambria occupation at the site, in a subsequent publication (1985) he argued that the Late Prehistoric occupation of Maplewood resulted from the abandonment of the Cambria area due to a regional drought and resource depletion. The move west was geared to bison as a drought food.

A few miles to the north and west of Lake Lida lies another site, 21OT39, on Prairie Lake with a curvilinear incised Cambria sherd (MHS Acc no. 667) along with Blackduck and Sandy Lake ceramics. These sherds approximate a sequence for the Ecotone of Late Woodland, followed by Cambria and terminated by Sandy Lake.

Approximately 25 km south and east of the Maplewood site is the Dead River site (21OT51). Excavations here revealed a discrete Cambria occupation within a much larger and intensive Blackduck occupation (Michlovic 1979). A mixed hunting strategy is recognized in the faunal remains with bison present but also a wide range of lake-related resources as well. There

is no doubt though that the site was first and foremost a fishing place. The Cambria ceramics were confined to Linden Everted jars with angled shoulders (Michlovic 1979:21; Holley and Michlovic 2010:Figure 2). Jar rims from this site were not modified.

Limited testing at another Otter Tail County site (21OT191) yielded evidence for an earth oven with polished plain pottery, as well as shell-tempered ceramics, and a date of 650 BP $\pm$ 20 and a 2-sigma range of 1280-1390 (personal communication, LeRoy Gonsior). This site lies is in the Battle Lake region of the county, south and east of Maplewood. An occupation was identified at nearby 21OT90 that might bear similarity with the Maplewood and Battle Lake region site. Plain short necked jars (Figure 6.3 g) are present along with moderate width incising on jar necks (HIP) and a variety of vertical cordmarked jars with slightly angled shoulders. Also present are plain surface shell tempered jars with red slipped interiors.

Otter Tail County has the greatest number of known mounds in our study area (Anfinson 1984:Table 1). Most of these are of unknown temporal affiliation. One of these, the Orwell site (21OT7) has been linked to the Cambria time span. As first mapped by T.H. Lewis and presented by Winchell (1911:319-321), the Orwell site comprised a large enclosure incorporating several mounds; additional mounds were outside. The enclosure was shallow, the excavated dirt placed on the inside, and there appear to be several bastions along the enclosure circuit. In contrast to Plains Village fortifications, this enclosure does not end at the edge of the steep bluff overlooking the Otter Tail River, but rather is purposefully complete, with a formal entrance along the bluff edge. Additional mounds (13 in all) were spread to the south. Elden Johnson investigated the site in the 1960s as part of a larger program associated with the Lake Agassiz beach ridges (Johnson 1962). The presence of Cambria ceramics and flat top mounds drew his attention to the site. Johnson opened large areas with machine stripping around the enclosure and excavated four of the mounds. In spite of the intensive nature of Johnson's investigations, he found little in the way of diagnostics to date to the site. No evidence for a village occupation was identified and, excluding the burial mounds, little material at all was found throughout the site.

Gibbon (2008) recently provided a summary of Johnson's investigations. Before the publication by Gibbon we had examined material from the site with an aim toward understanding its significance as it represented an important enclosure in the Northeastern Plains. An MSUM student, Carl Zachman, was in charge of our brief assessment of excavations at the site. Our assessment largely agreed with Gibbon's interpretation, except for the issue of dating.

Gibbon attributes the mounds to the Sonota complex, a vaguely defined burial complex that presumably dates to the Middle Woodland period in the Plains. Such designations of primarily burial data are outmoded and are the by-product of limited archaeology, that is, archaeological attention generally moves on a path from the obvious (burial mounds, temples, etc.) to the mundane over time. However, for most of the Woodland period in the Plains, attention on the mundane has been slow in developing.

Identifying criteria for the Sonota complex is contradictory and is said to include participation in the Hopewell interaction sphere, use of Besant and Samantha point styles, and of thick-walled primarily cordmarked pots with the distinctive Middle Woodland treatments, such as punched nodes. Gibbon (2008:118) does concede that the concept is problematical. He notes

(2008:119) that none of the pottery found at the site seems to be associated with Sonota and thus offers the alternative that the Orwell occupation is relatively late Sonota (Gibbon 2008:119-120).

Of foremost importance in the Sonota designation was the presence of bison burials in Mound 4, located within the enclosure (Gibbon 2008:114-115), a practice identified in nearby Traverse County at the Round Mound, which has bona-fide Middle Woodland style points (Wilford 1970). Pottery was also not found at this excavation from the Middle Woodland period.

Two radiocarbon dates from the site would place the mounds at the interface of Middle and Late Woodland, and in agreement with Gibbon's temporal but not cultural assessment. There is no functioning Middle Woodland exchange system to participate in at this time. An understanding of this site requires a rethinking of developments in the region.

We maintain that the Sonota concept is antiquated and is redolent of a time when archaeologists were unable to link burial mounds with domestic occupations. But given the nascent understanding of the varied archaeological sequences in Minnesota an alternative designation is not forthcoming. Examining the ceramic sample as a group, regardless of context we agree with Gibbon that these do not support a Middle Woodland occupation, per se.

We have lumped the 27 sherds recovered from the various investigations into two locations - a generalized within the enclosure category (that includes possible material from Mound 2 and the numerous trenches associated with the enclosure (see Gibbon 2008:Figure 10) (some of which may have recovered material outside the enclosure) and a small sample from Mound 9 (Table 6.1). Most of the material from inside the enclosure would date from the Late Prehistoric period. The grit-tempered ceramics are thin-walled, with an average thickness of 4.77 (range of 3.1 to 6.3 mm) and given the preponderance of polished surfaces are likely Cambria in association. However, the incised sherds are of medium line width and not like the typical broad incision of Cambria. These could just as easily date late in the Cambria time-span. Red slipping is also unique and is problematical in the Midwest and Plains as regarding dating. We can find it in Middle Woodland and Late Prehistoric contexts, typically a minority ware for shell tempered pottery, and it is present during the proto-historic Biesterfeldt occupation in eastern North Dakota (Wood 1971). Finally, the shell tempered cordmarked ceramics are likely Sandy Lake, although plain surface shell tempered ceramics are not typical. Such a blending of shell and grit temper is present in Late Prehistoric contexts elsewhere in the Ecotone and in eastern North Dakota.

Table 6.1. Frequency Tabulation of Ceramic Sherds from Orwell Site (21OT7).

Ceramic Category	**Enclosure**	**Mound 9**
Shell tempered, Smoothed Plain	1	
Shell tempered, indeterminate surface	3	
Shell tempered, cordmarked	7	
Grit tempered, cordmarked	1	1
Grit tempered, smoothed plain	2	2
Grit tempered, polished	6	
Grit tempered, polished, red slipped	2	
Grit tempered, medium width incised	2	

To conclude, we have evidence for roughly a continuous, if episodic and of an ephemeral domestic nature, use of the Orwell site from Middle Woodland (and perhaps earlier) times into the Late Prehistoric. The Sandy Lake occupation may represent a continuation of the ritual practice or a mundane use for the landform. A connection is evident with the Brown's Valley enclosure as regards size, presence of a formal entrance, and possibly dating.

To the south of Otter Tail County are Grant and Douglas counties. Grant is to the west represents a more prairie county and Douglas to the east is primarily forested. More archaeological coverage is available in Douglas County and this is where we first focus.

Ironically, the most important site for our purposes is one of the smaller ones. The Johnsrud site (21DL76), located on Lake Oscar in Douglas County, was tested in a mitigation project revealing two spatially and temporally distinct occupations (Sellars 1992), one identified as Lake Benton (Area B), and the other as Cambria (Area A). The Cambria occupation was apparently seasonal based on the sparse occupational debris. Corn was present (Sellars 1992) and the ceramics diverse. The corrected date for the charcoal from a hearth feature was 1480 $\pm$ 70 (430 BP) (Sellars 1992: 78). This date seems late, and other dates from the Lake Benton occupation were also recent and not accepted.

All of the sherds from the Area A at the Johnsrud occupation are grit-tempered, smoothed plain, many have polished surfaces, and all are thin-walled. Traces of smoothed over cordmarking indicate that the vessels were originally cordmarked. The jars have flaring rims with no evidence for rim modification or angled shoulders. Rim tabs were present with interior notches (Figures 6.4 f, g; 6.5 b). Broad incising was common, including fringe punctations (Figure 6.5 d), and we presume all jars were incised. Identifiable motifs include chevrons, parallel lines, and curving lines. All of the incisions are quite broad. A portion of the rims are identified as bowls, which does appear possible given the profiles (Figure 6.4 f, g), however, bowls are extremely rare in Minnesota (even in the Red Wing area) and it is just as likely that, given the presence of tabs and flaring rims, that these are not bowls. The sample lacks a profile well below the rim that would substantiate the presence of a bowl. We can, however, firmly conclude that the vessels are different from those previously reported for Cambria. Similarities in form and decoration are evident with Northeastern Plains Village sites identified in North Dakota. For example, the Wichmann site (Michlovic 1987b), not dated at the present, has similar rim tabs with interior notching, and plain surface jars. Wichmann, along with other sites along the Red and Maple Rivers differ from Johnsrud in the substantive co-occurrence of Sandy Lake ceramic styles. Even further afield at Devils Lake in North Dakota, there are incised jars with well-defined necks and decorated tabs (Toom 2008) that date 1295-1403 (2-sigma). Tabs are also a feature of Extended Middle Missouri sites as well (Sperry 1995; Thiessen 1995).

Another indicator of a relatively late date at Johnsrud is the presence of catlinite (Sellars and Stanley 1992:144) in the Area A deposits. Maize was fairly common (Hunter 1992:164-166), but no evidence for bison was identified in the non-descript bone sample (J. J. Martin and J. C. Richmond 1992:170-174). Knife River Flint, often an indicator of connection to the Plains represented only 7.2% of the lithic debris and 28% of the tools.

There are 17 additional sites identified as Plains Village or Cambria in Douglas County. For the most part, this information derives from survey and private collections with only limited

testing. An important site (21DL2) has been tested with a radiocarbon date for a Cambria component. A date of 740 BP + 50 with a 2-sigma range of 1220-1375 (Beta 327485) is associated with a smoothed plain surface sherd with broad incising (personal communication, LeRoy Gonsior).

One private collection (MHS acc# 170-1) that may derive from one or two sites in Douglas County has a variety of diagnostic rims (n=13) and sherds (n=13). Smoothed plain neck jars with notched rims are common with flared or curving necks. We presume these rims are associated with the numerous broad incised sherds that feature a scroll, chevron and other curvilinear and rectilinear motifs (Figure 6.9). One has an apparent row of linear punctations between horizontal lines (Figure 6.9 f). An incised angled shoulder has a cordmarked lower body (Figure 6.10 e). A cordmarked angled shoulder jar has "6" shaped punctations on the shoulder (Figure 6.10 a). Cord impressed vessels are also present, as well as wrapped rod decorations that could date from Late Woodland or the Late Prehistoric. A unique vessel is an S-shaped jar with faint broad incising and a crenulated lip (Figures 6.8 b; 6.11 b). Another vessel, perhaps S-shaped, has wrapped rods used to form an overlapping diagonal motif (Figures 6.8 c; 6.11 a). These latter two display the strongest connections to the Plains vogues. A Sandy Lake shell tempered cordmarked vessel is also present.

The combination of cordmarking and angled shoulders is believed to represent a blending of Cambria and Late Woodland vogues and is expected to occur early within the Cambria sequence; however, since influences like Cambria may be time transgressive, the actual date may vary, especially on the margins. This combination of traits has been found associated with shell-tempered Sandy Lake ceramics in Douglas County at the Basswood shores site (21DL90). One smoothed cordmarked jar has a distinctive angled shoulder and is radio-carbon dated to 1750 (uncorrected) (Justin and Schuster 1994). Although the date may be questionable as it derived from burned bone, there should be no confusion with this example and the numerous angled shoulders discussed in this report. The Basswood Shores vessel has a noticeable difference with our Late Prehistoric examples in the presence of thickening (padding) of the angled shoulder juncture to nearly double the wall thickness (Justin and Schuster 1994:Figure 6). While the association of a shell-tempered jar with an angled shoulder is an enigma in our present understanding, we should note that around the same time further west in the Sheyenne Bend region of eastern North Dakota there are angled shouldered jars at the Biesterfeldt site (Wood 1971).

Ceramics from site 21DL8 represent a mixed lot. The extended sequence prior to the Late Prehistoric includes Fox Lake and Lake Benton sherds. Thin-walled (under 5.0 mm in thickness) cordmarked and smoothed over cordmarked sherds may date from the Late Prehistoric and represent the lower body of plain surface jars. Smoothed plain necked jars are present, one of which has impressed punctations on the interior neck crease (Figures 6.6 b; 6.7 c), similar to a Lake Pedersen example. This trait is also found on Sandy Lake jars to the north (Blikre 2008:Figure 10 f), which dates around 1200-1400 in our estimation (Holley and Michlovic 2010). Another is a very large bolstered rim with equally large tooled impressed or notches on the superior crest (Figures 6.6 d; 6.7 f). Angled shoulders and broad incised sherds with curvilinear motifs are also present. Cord impressed rims round out the possible Late Prehistoric

vessels. The remaining Douglas County sites have only small samples but include important temporal diagnostics such as the wrapped rod crosshatched rim (21DL12).

Becker County was considered too far north for this project, however, thin-walled plains surface sherds were recovered from a site in the county (21BK33, curated at the Becker County Historical Museum). An oddity curated at the museum is a check-stamped incurved jar with shell temper and is likely a variant of Sandy Lake.

To the west of Douglas County is Grant County, which lies on the edge of the Ecotone. There has been little formal archaeological work in the county; however, large collections from lakeside sites are curated at the Grant County Historical Museum. These provide abundant information on Plains-related Late Prehistoric occupations. The largest collection from Barrett Lake (21GR5) is currently on display at the museum in Elbow Lake and we were not able to physically examine the sample. A brief assessment of this collection has been prepared (Holley 2011b). A robust ceramic sequence is indicated with Fox Lake, Brainerd, St. Croix, Onamia, Lake Benton and Kathio/Blackduck representing the Woodland period. Cambria is represented by a large vessel fragment that has a short stubby neck with a scroll motif. Plains-related ceramics include simple stamping, an s-shaped jar with wrapped rod decoration, a design formed by repeating rows of punctations and incised lines (likely related to an Oneota style) and cord impressed decorations. A more detailed analysis is possible with four collections present at the museum. One of these is from Wilson Lake, two unidentified, and one possibly from Barrett Lake.

The material claimed to derive from or around Barrett Lake (a few miles south of the town of Elbow Lake) is small and judging by the conditions of the sherds appear to derive from a plowed field and did not undergo water or wave damage. In all, the collection has 12 sherds and 5 rims (Table 6.2). Late Woodland and Late Prehistoric diagnostics are represented. Late Prehistoric diagnostics comprise Cambria related broad incised (scroll design present) as well as thin incised forming a hachured motif (similar to a specimen from Lou Miller Mound, see Figure 5.6 e). Two rims have polished surfaces; one has an interior notch (Figure 6.12 c) and another has an interior notch on a rim tab (Figure 6.12 a). Both jars have small flared rims and the notches are made with cordwrapped dowels. Cord impressed sherds comprise panels of diagonal designs and a horizontal pattern (Figure 6.12 b). One of the cord impressed rims has a herringbone pattern formed by lip and interior tooled impressions. Late Woodland is represented by a variety of wrapped rod decorations that includes incising and simple stamping. It is possible that some of these are contemporaneous with the Cambria diagnostics. This sample would appear to span Late Woodland and the Late Prehistoric period. Diagnostics are present to suggest an early, middle and late for the latter. Early traits would comprise a mixture of stamping and cord impressions. A middle span would represent the Cambria scrolls, while the late would be indicated by the decorated rim tab. It is of course a possibility that this collection largely dates from one diverse occupation; if so it must date relatively late (after 1200).

The two unprovenienced collections comprise what appear to be two different sites based on the diagnostics, although like all collections reported here they span approximately the same time periods. Site no. 1 has a similar mix as the Barrett Lake sample above, with notably more cord impressed decorations (Table 6.3). Most of the cord impressions are very close together and

none have evidence for any designs besides the horizontal pattern. One rim from a straight jar with exterior notch may represent a variant of horizontal cordmarked that is not early (i.e., Brainerd) and may represent some Late Woodland variant. We have recognized similar rims elsewhere in the region, as for example at the Gillingham site.

Table 6.2. Frequency Tabulation of Ceramics, Barrett Lake. All grit tempered.

Ceramic Category	Count
Saint Croix Stamped	1
Wrapped rod	2
Wrapped rod, incised, punctated	1
Wrapped rod rim	1
Simple stamped, wrapped rod	1
Cord impressed	3
Cord impressed rim	1
Incised, cord impressed, notched rim	1
Polished	1
Polished rim, wrapped rod interior notch	1
Fine line incised, geometric design	1
Broad incised	2
Polished rim, rim tab with interior wrapped rod notch	1

Table 6.3. Frequency of ceramics, Unknown Site #1, Grant County. All grit tempered.

Ceramic Category	Count
Fabric Impressed/Net Impressed	8
Cordmarked	81
Wrapped rod	1
Cordmarked, wrapped rod	1
Stamped	1
Cord Impressed	12
Cord Impressed rim	2
Plain	12
Plain surface, tooled exterior rim	1
Polished	2
Broad incised (Cambria)	2
Thin-medium width incision	4
Indeterminate	1

Site no. 2 is a much large collection (Table 6.4) and provides a greater variety of diagnostics. Smoothed plain (including polished) surfaces predominate the sample. Excluding the small numbers of assuredly Woodland sherds, most of the diagnostic ceramics date from the Late Prehistoric. Unlike Site no. 1 that has numerous examples of stamping and cord impressed ceramics, this site has only a few of these treatments. We are certain that most of the smoothed plain sherds date from the Late Prehistoric period as there are numerous plain neck and shoulder fragments as well as angled shoulder fragments; the latter may have cordmarked lower bodies. Numerous broad incised sherds are present with most involving scroll-like motifs (Figures 6.13 e) and geometric patterns. Most (73%) of the broad incised have an intaglio impression on the interior and the line width averages 4.89 mm (range of 3-7.5 mm) and the depth averages 0.7 mm (range of .2 to 1.4 mm). Nearly half (40%) involve punctations (Figure 6.13 f-g). Only a few are

Table 6.4. Frequency Tabulation of Ceramics, Unknown Site #2, Grant County. Grit tempered unless noted.

Ceramic Category	Count
Fabric Impressed/Net Impressed	3
Middle Woodland Stamped	1
Brainerd Horizontal Cordmarked	1
St. Croix Stamped	1
Cordmarked	128
Vertical Cordmarked	2
Wrapped Rod	1
Wrapped rod rim	2
Cord Impressed	2
Plain	178
Plain rim	10
Plain rim, notched	10
Plain rim, notched tab	1
Polished	48
Polished rim	5
Brushed	1
Simple Stamped	1
Simple Stamped? S-shape?	1
Broad Incised	15
Incised Thin to moderate width	2
Thin Incised, S-shape	1
Applique ridge	1
Pipe	1
Indeterminate	17
Shell tempered Plain	2
Shell tempered rim, indeterminate	1
Shell tempered rim, cordmarked	1

thin-moderate width incisions and appear to form geometric designs like a hachure. Most of the rims are smoothed plain (Figure 6.13 a, b, d). The jars are either flaring or direct and no modified rims are present. Notching accounts for nearly half of the jars and one jar has a rim tab that is notched on the interior. Two of the rims have very large ovoid punctations (identified here as notching) on the interior wall (Figure 6.13 c). The presence of shell tempered ceramics is supportive of a late dating for the assemblage.

Connections are evident with the Lake Oscar Johnsrud site. This is reflected in the paucity of modified rims, notched tabs, and in a sublabial ridge on the jar neck in one vessel. There may be a similar example from an unknown site in Lake Traverse.

The final site from Grant County is reportedly from Wilson Lake, which is about equidistant between Lake Oscar in Douglas County and Barrett Lake. Smoothed plain or polished surface sherds dominate the sample (Table 6.5). Diagnostics, excluding the few Late Woodland examples, represent an equal proportion of cord impressed (Figure 6.14 a-c) and broad incised ceramics (Figure 6.14 e, f). Only a few rims are present in the sample. Cambria diagnostics include plain neck and shoulder sherds, broad incising, and angled shoulders. Most (86%) of the broad incised sherds have an intaglio impression on the interior and the line width averages 4.56 mm (range of 2.9-10.5 mm) and the depth averages 0.79 mm (range of 0.4 to 1.7

mm). Motifs are difficult to recognize owing to the small size of the sherds, although one identifiable motif is the chevron. Punctations are present but uncommon. The rims are not diagnostic, and no modified rims are present in the plain surface sample, although some are notched (Figure 6.14 d). Wrapped rod decorations are more common than at other sites, although some appear to represent Late Woodland and others that are very fine may date to the Late Prehistoric. Definitive diagnostics that are linked to Plains Village expressions include simple stamped sherds and an S-shaped jar rim.

Table 6.5. Frequency Tabulation of Ceramics, Wilson Lake, Grant County. All grit tempered.

Ceramic Category	Count
Cordmarked	72
St. Croix Stamped	4
Patterned Brushed	1
Wrapped rod	5
Wrapped Rod Rim	1
Cord Impressed	13
Cord Impressed rim	2
Plain	62
Plain rim, notched lip, S-shape	1
Plain rim, notched lip	1
Polished	23
Polished rim	1
Simple Stamped	5
Broad Incised	22
Incised Thin to moderate width	4
Indeterminate	16

Discussion and Summary

Radiocarbon dating for the Ecotone region reveals a prolonged Late Prehistoric occupation. The earliest was identified at the Maplewood site in our two dates of a single feature. A two-sigma span of 1022-1125 is important for more than one reason. Although the time span should overlap with Great Oasis, there is no evidence for this expression in the region. The early date is associated with an incised jar that breaks many of the rules in the HIP tradition. That is, it has broad incising, the shape is inslanted, and the modified rim is decorated with notches. This site also yielded cord impressed decorations. Cord impressed decorations are quite common at other areas in the Ecotone, particularly Grant County. If this date is correct, it contrasts with what we consider early in the Big Stone region. The tandem of cord impressed and wrapped rod decorations that seem so obvious in Big Stone, seems uncommon here, but this may have something to do with dating, as the Grant County ceramics in particular may have little in the way of early occupations.

A middle span for the Late Prehistoric was not dated by us in our work. We are fortunate in having three dates from other researchers; two encompass 1220-1390 and a third 1395-1528. If we disregard the late range from the Johnsrud date, we have an approximately good range of 1200 to 1400; however, except for Johnsrud we have little material to associate with the other dates. This period represents the late strains of Cambria and at least is well represented in the varied from collections particularly from Douglas County.

An early Cambria expression comprised plain surface jars with broad incising and angled shoulders and is present in Otter Tail, Douglas, and Grant counties. Cord impressed decorations, which could conceivably stretch back to Late Woodland may also be found in this time span. This decorative technique does have a spotty distribution especially when compared with the ubiquitous presence of the broad incised sherds. Definitive examples of Plains Village traits likely date from this period and include S-shaped jars and simple stamping; these are uncommon. Other Plains-related cultural elements, such as a focus on bison and Knife River flint, are also present.

The later range reveals that the smoothed plain jar with broad incising continues unabated in the Ecotone. This is best revealed at the Johnsrud site where flared rim jars with broad incising and punctations proliferate, examples of these thin-walled flared jars are present at other sites in Douglas County. Decorated rim tabs are an uncommon but very important diagnostic that spans the same time period. These are found in a variety of Northeastern Plains Village contexts in North Dakota.

Succeeding these smoothed plain and incised jars in this the region is Sandy Lake, similar to the Big Stone region. While there are reports of Oneota in the Ecotone, we did not see any definitive examples from the various counties. Sandy Lake is the terminal native occupation, supported by the 18th century radiocarbon date from the Basswood Shore site.

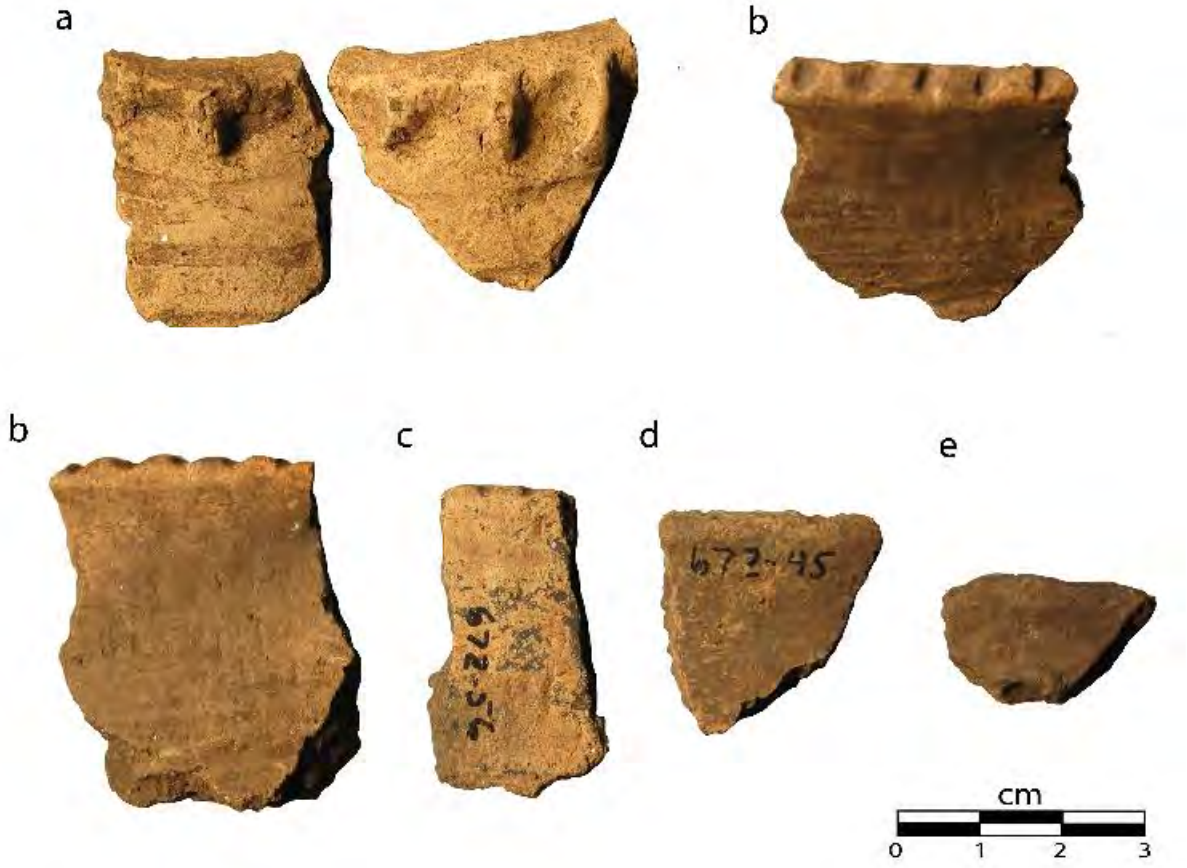

Figure 6. 1. Maplewood site rims: a, inslanted jar with modified rim and thumb-impressed notching, broad incising HIP (two rims from the same vessel and from two different features); b flaring high neck jar with superior notching and smoothed over cordmarking; c, d, superior notched plain surface jars; e, small neck jar with punctation or node?

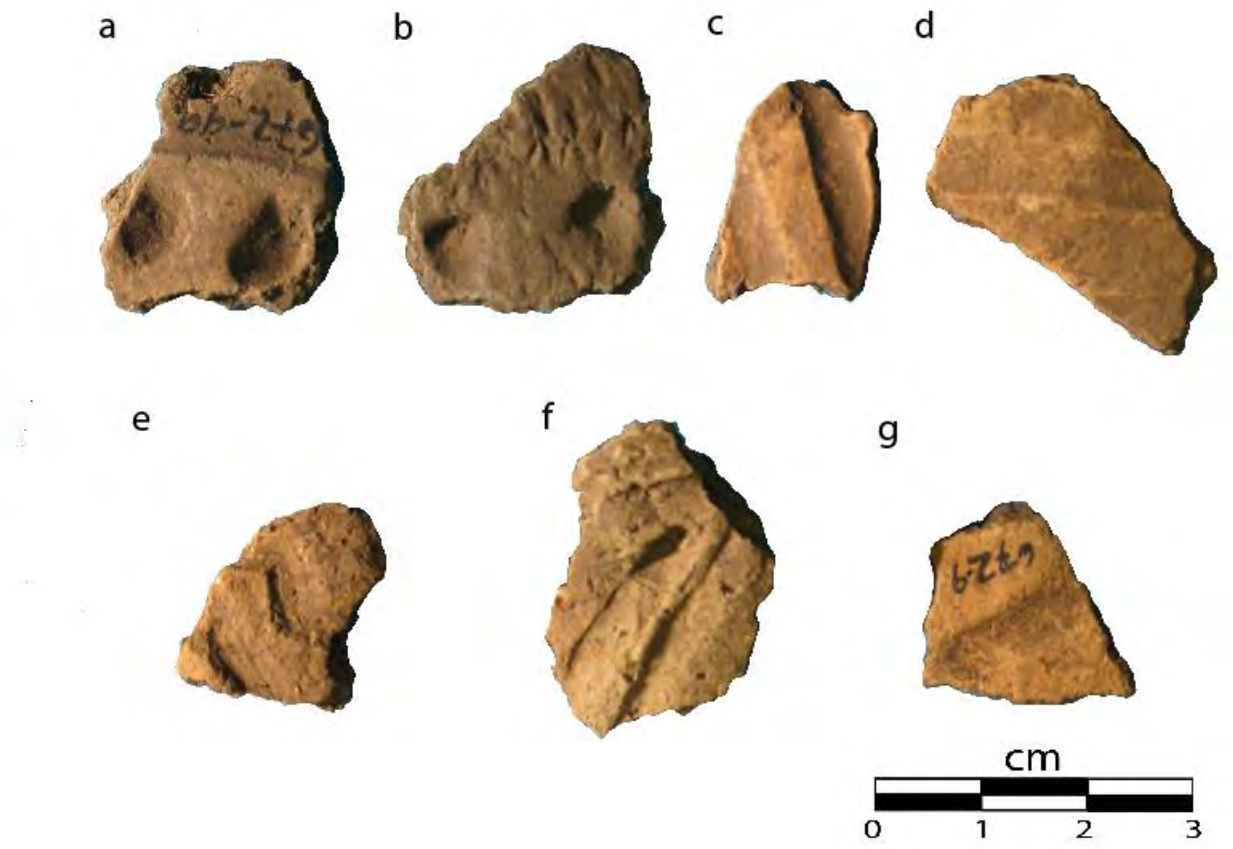

Figure 6. 2. Maplewood site incised and punctated sherds: a, b, incised and punctated sherds note smoothed over cordmarking); c-g, broad incising.

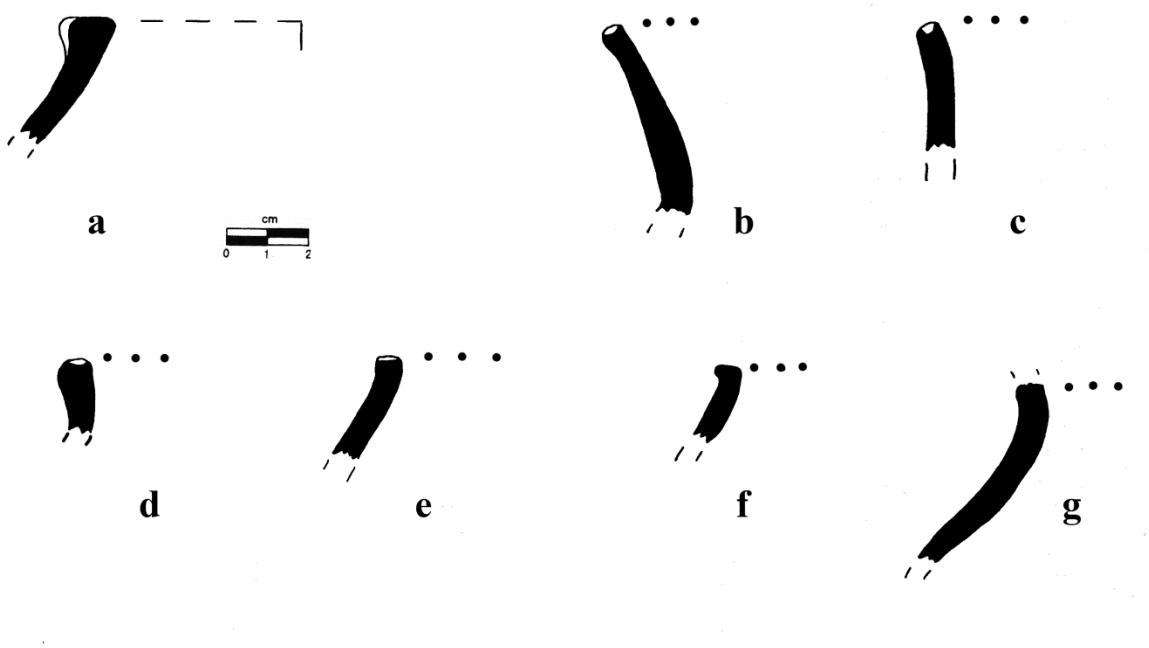

Figure 6. 3. Maplewood site (a-f) and Otter Tail County site (g) profiles

a inslanted jar, thumb-impressed decorated rim, HIP (see Figure 6.1 a)
b flared jar, superior notch (see Figure 6.1 b)
c flared jar (?), superior notch (see Figure 6.1 d)
d stubby jar with swollen rim, tooled continuous chevron on lip, node or punctation (see Figure 6.1 e)
e inslanted jar with horizontal cordmarking and superior notch
f straight-inslanted jar with modified rim, cord impressed surface
g plain neck jar

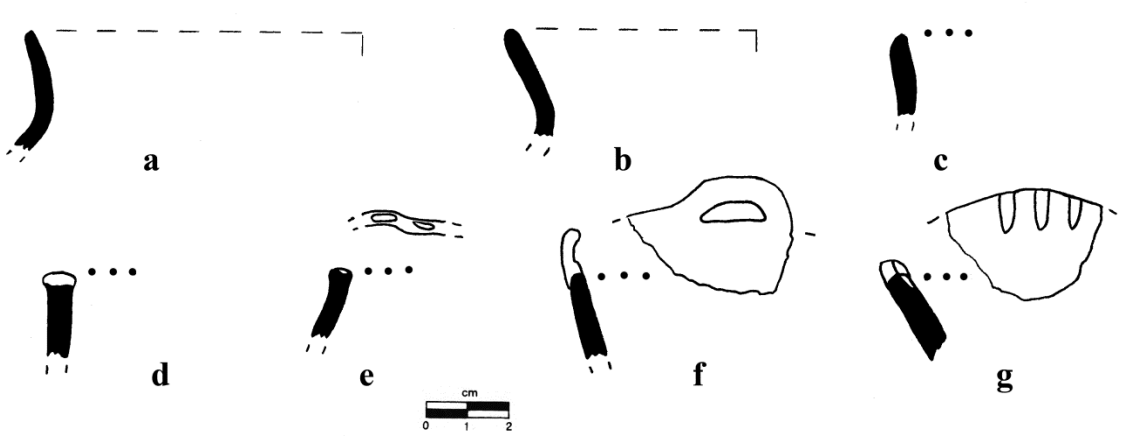

Figure 6.4. Johnsrud site (21DL76) profiles.

a flared jar (see Figure 6.5 a)
b flared jar
c flared jar
d superior notched jar
e inslanted jar (?) with superior notching and wavy rim
f bowl (?), rim tab with depressed area
g bowl (?), tab (or peak) with three interior notches (see Figure 6.5 b)

Figure 6.5. Johnsrud site (21DL76) decorated ceramics; a flared jar with incising on neck or tooling marks; b, rim with notched tab or peak; c, broad incising; d, broad incising with punctations.

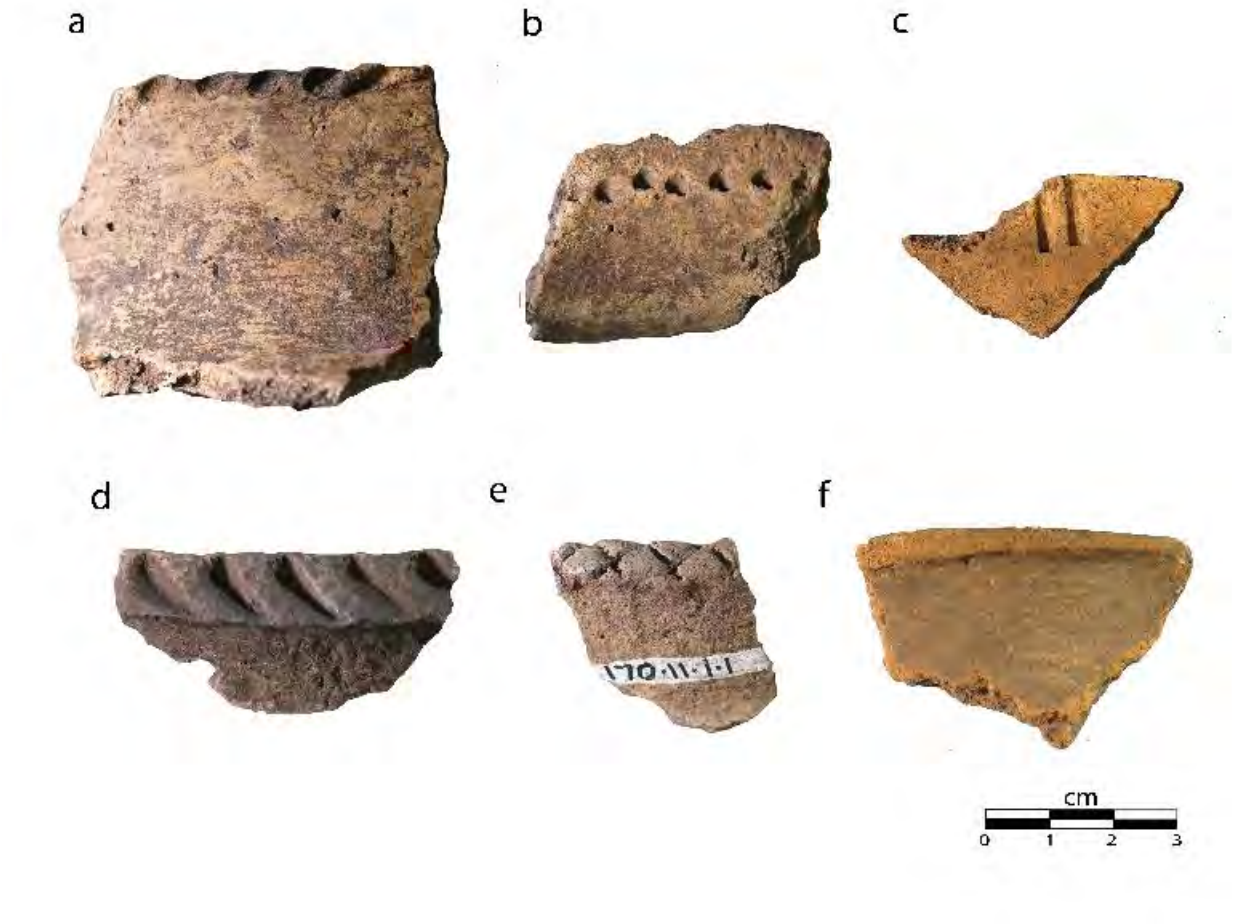

Figure 6. 6. Douglas County jar rims: a, c, private collection, b, d, 21DL8; c, 21DL38; e, 21DL12; f, 21DL32. a, plain surface jar with diagonal exterior notches; b, plain surface jar with interior punctations; c, plain surface jar with incised pattern on interior; d, plain surface jar with deep lunate notches on lip; e, plain surface jar wrapped rod crosshatched lip; f, modified rim jar.

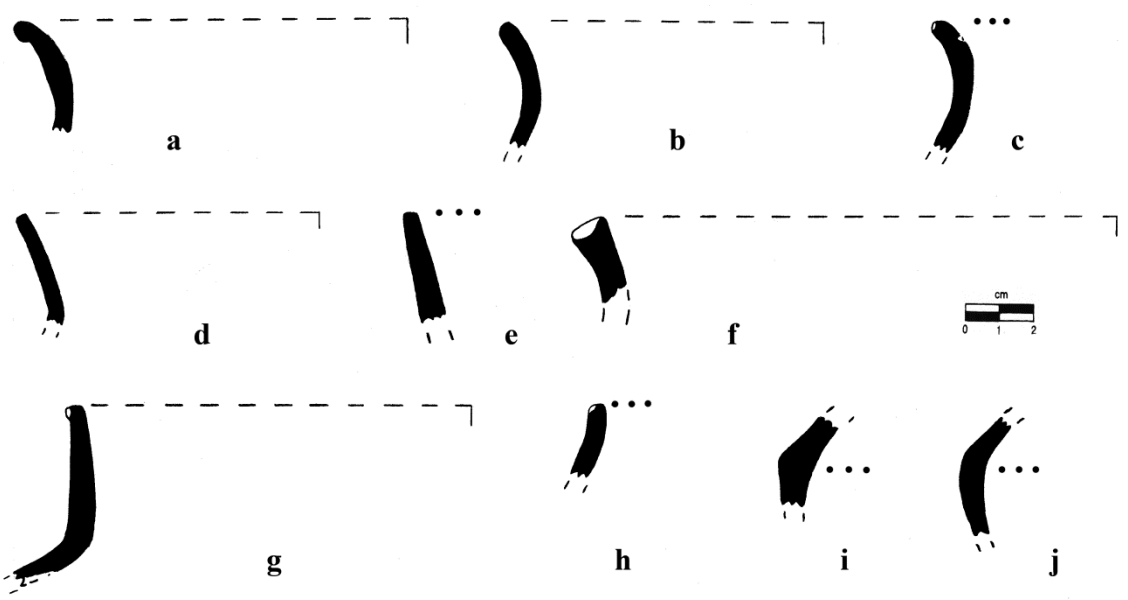

Figure 6. 7. Douglas County ceramic profiles: a, 21DL32; b, d, g-i, private collection; c, f, j, 21DL8; e, 21DL38.

a flared jar, modified rim, plain surface, see Figure 6.6 f
b flared jar, plain surface
c flared jar, plain surface, interior punctation, see Figure 6.6 b
d flared jar, plain surface
e flared jar (?), plain surface, incised pattern on interior, see Figure 6.6 c
f flared jar, modified rim, plain surface, deep superior notches, see Figure 6.6 d
g straight neck jar, diagonal tooled rim notches, see Figure 6.6 a
h inslanted neck jar, diamond shaped exterior notches
i angled shoulder, incised over cordmarked, see Figure 6.10 e
j angled shoulder, cordmarked with punctations on shoulder, see Figure 6.10 a

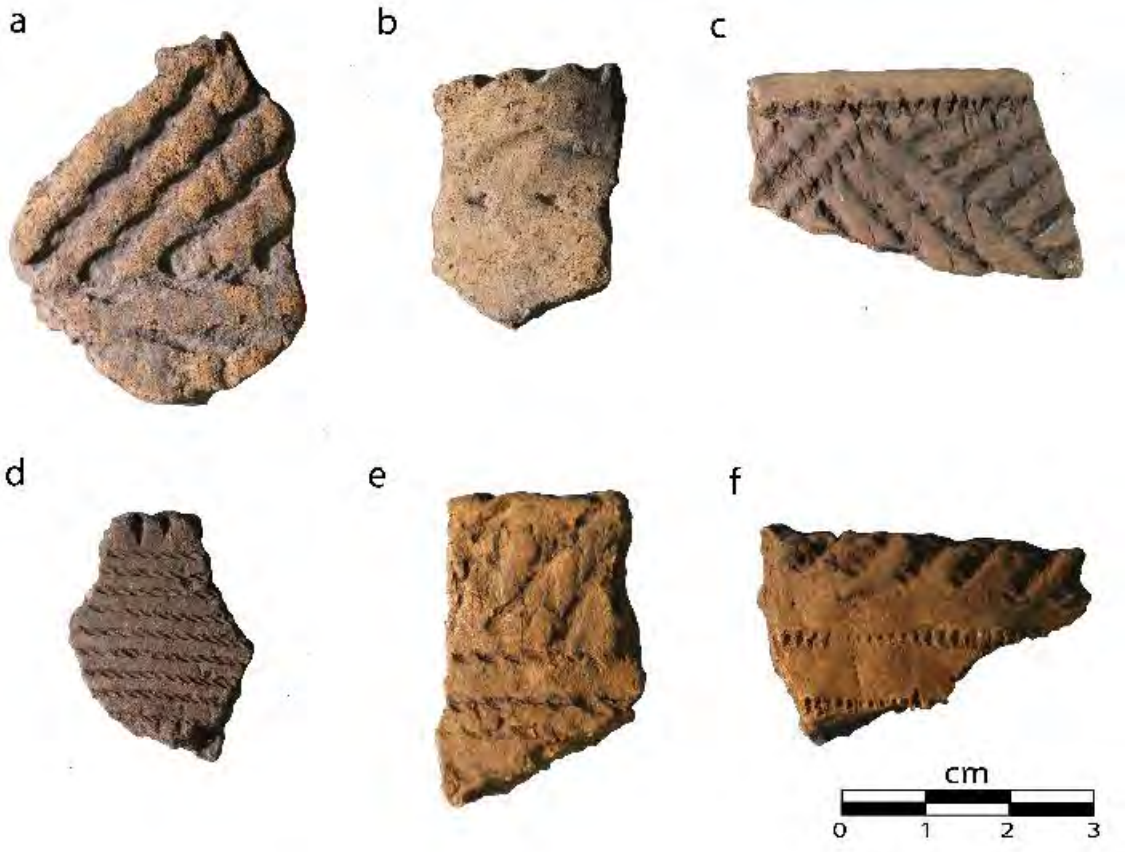

Figure 6.8. Douglas County stamped and impressed rims and sherds: a-e, private collection, f, 21DL47. a, cord impressed; b, quasi-s-shaped jar with broad incising and notched lip; c, wrapped rod decorated to form oblique diagonals, s-shaped (?) jar with notching; d, cord impressed with triangular-shaped notches; e, cord impressed; f, wrapped rod notching and decoration.

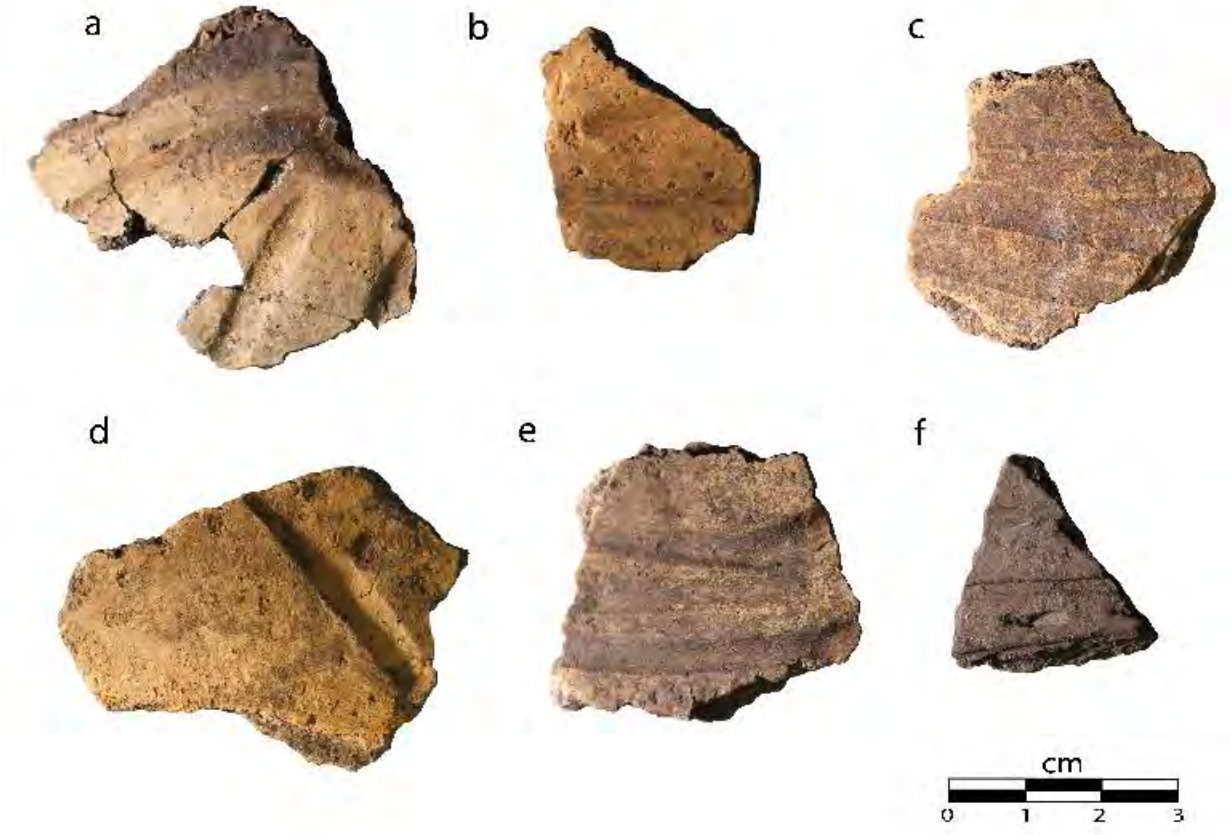

Figure. 6.9. Douglas County, Private Collection, Cambria sherds: a-e, broad incised; f, medium width incision with row of linear punctations.

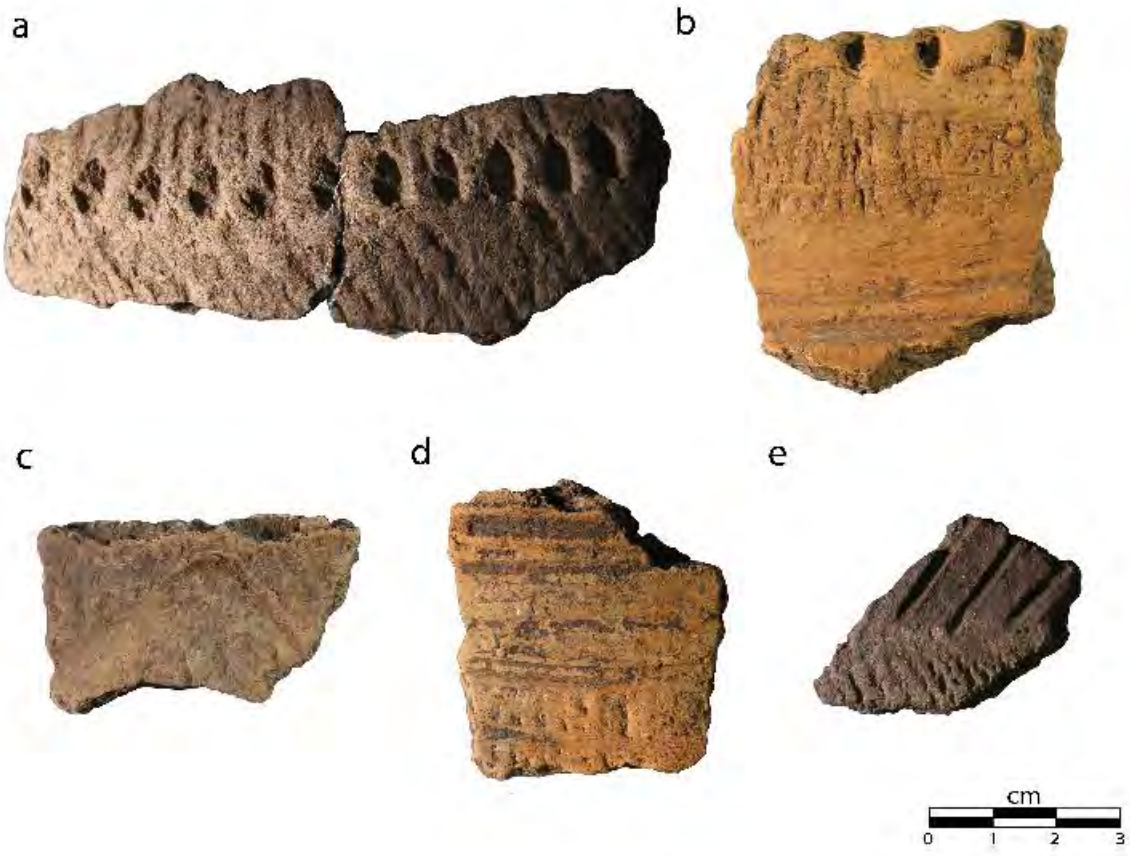

Figure 6. 10. Douglas County incised, punctated and decorated rims: a, c-e, private collection; b, 21DL24. a, cordmarked angled shoulder jar with 6-shaped punctations; b, smoothed cordmarked jar, wrapped rod exterior notching, ridge at neck juncture and incision; c, broad incising over cordmarked ; d, broad incising (HIP?) over smoothed cordmarked; e, angled shoulder with broad incising and cordmarked lower body.

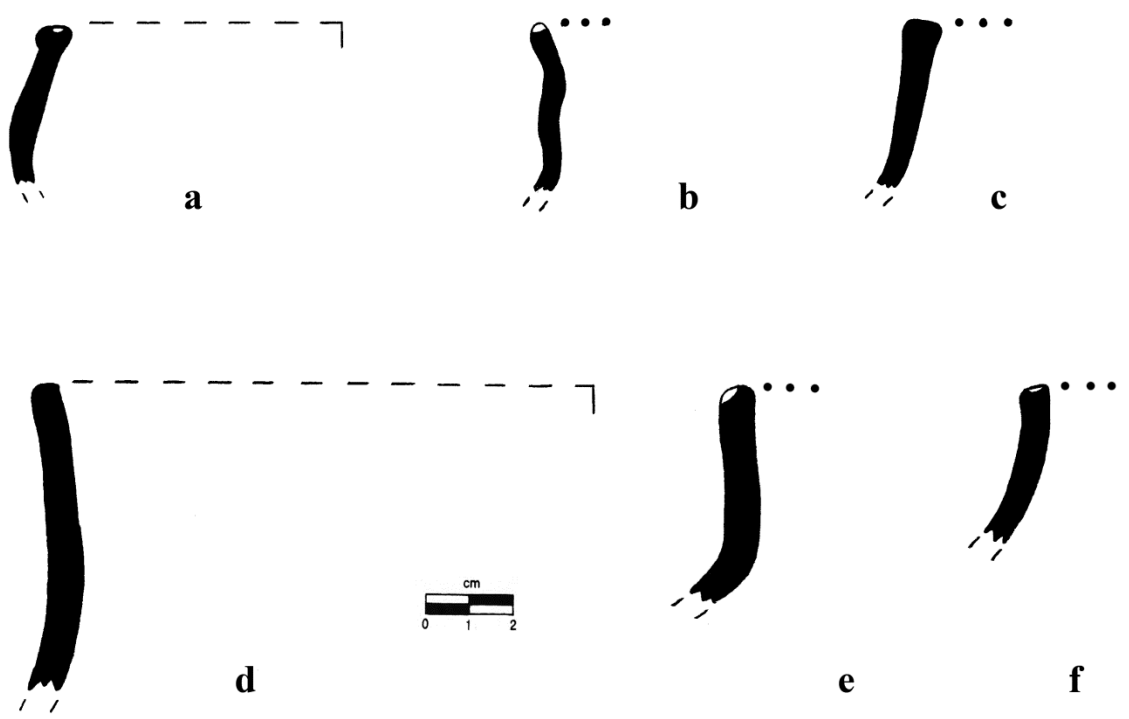

Figure 6. 11. Douglas County vessel profiles: a, b, f, private collections; c, 21DL12; d, 21DL46; e, 21Dl24.

a s-shaped jar (?), wrapped rod decoration, see Figure 6.8 c
b quasi s-shaped jar, broad incising and superior notch, see Figure 6.8 b
c inslanted jar with swollen rim, wrapped rod superior crosshatch, see Figure 6. 6 e
d high straight neck jar decorated with flexible wrapped rod to form chevrons
e straight neck jar, smoothed cordmarked, wrapped rod exterior notching, see Figure 6.10 b
f straight neck jar, cord impressed exterior and superior notching, see Figure 6.8 e

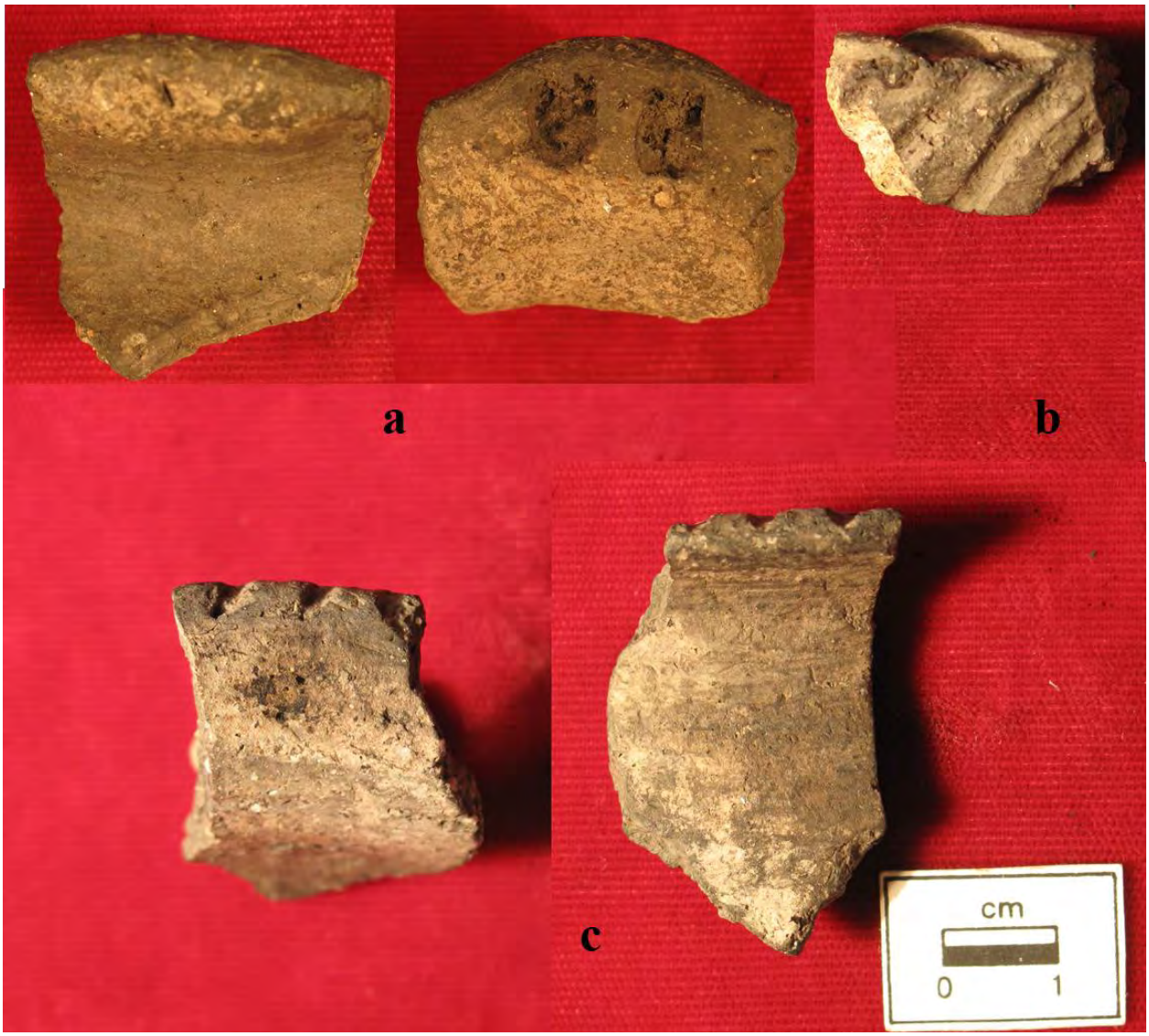

Figure 6.12. Barrett Lake rims: a, rim tab with wrapped rod notches, exterior and interior view; b, herringbone rim, notches on superior and exterior rim; c, plain surface jar with interior notches, interior and exterior view.

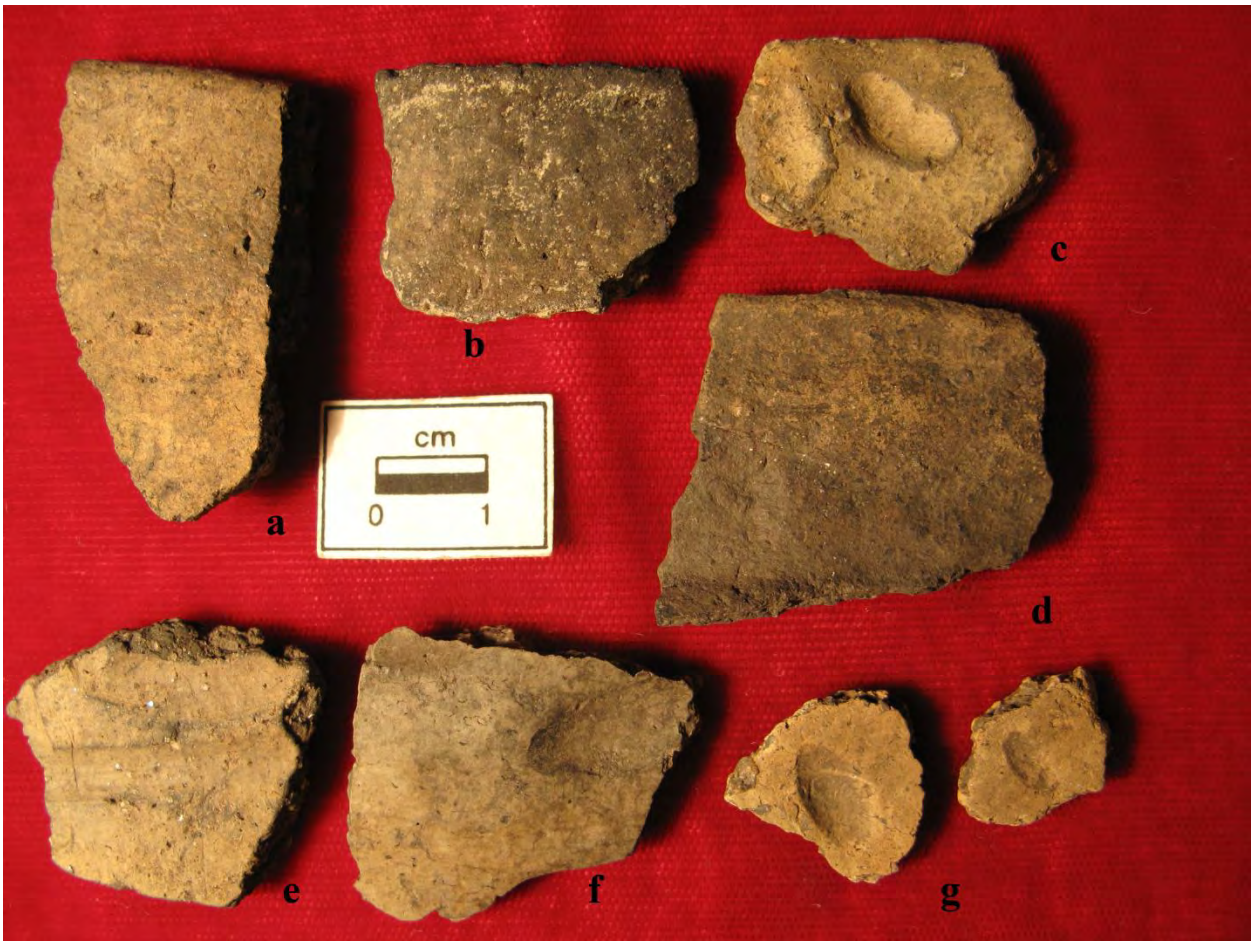

Figure 6. 13. Site no. 2, Grant County, plain and decorated ceramics: a, high straight neck jar; b, straight neck jar, interior notching; c, interior punctation of straight neck jar; c, flaring jar with medial ridge, interior notching; e, broad incising, curvilinear design; f, broad incising and large punctation(?); g, isolated punctations.

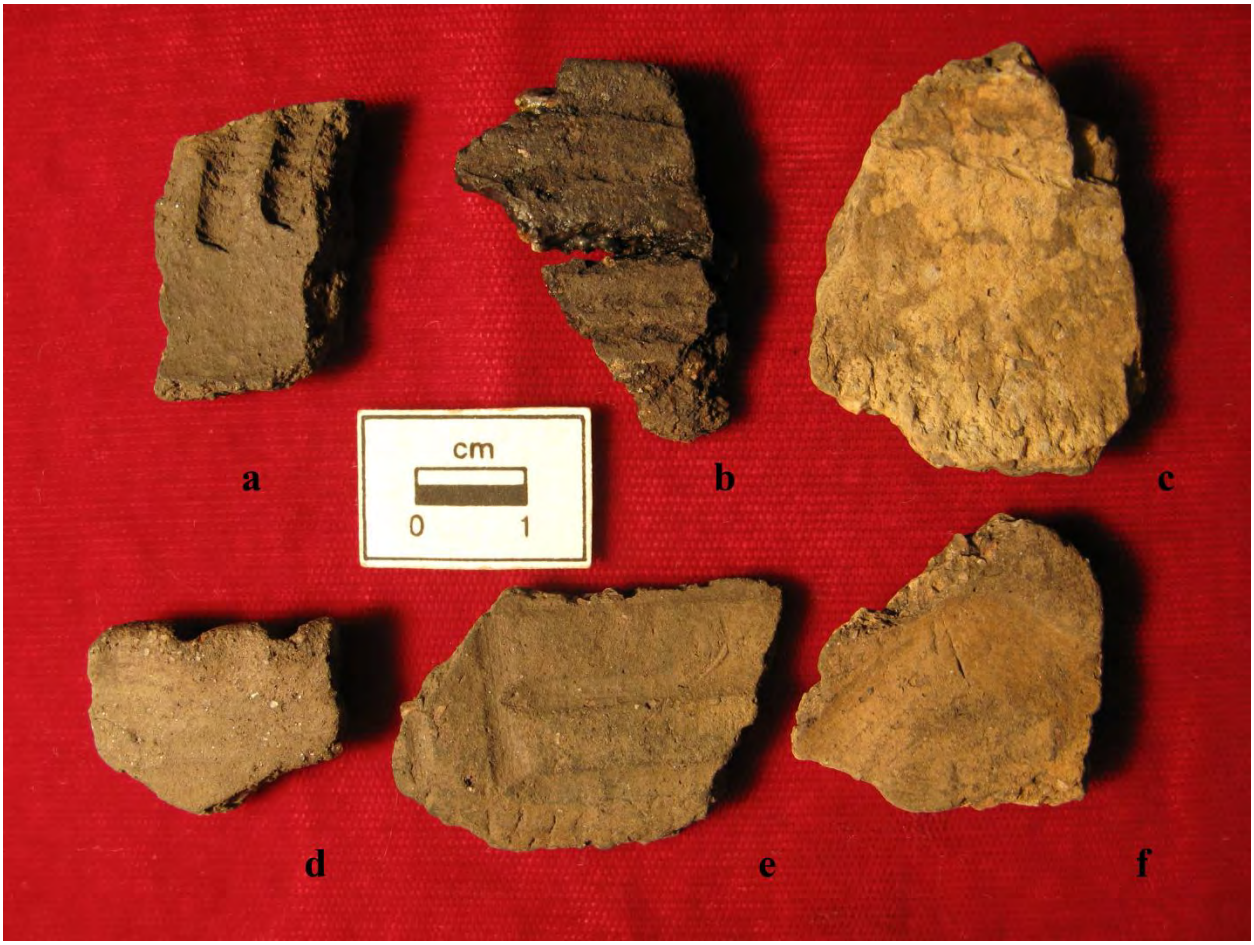

Figure 6. 14. Wilson Lake, Grant County, decorated ceramics: a, straight neck jar, interior cordwrapped rod notching; b, cord impressed jar; c, cord impressed neck, smoothed cordmarked lower shoulder; d, possible s-shaped jar with superior notches; e, broad incised shoulder over smoothed cordmarked surface forming geometric design; f, broad incised forming curvilinear design.

Chapter 7
RED RIVER HEADWATERS REGION

The Red River valley is an important artery in the Upper Midwest. It drains north into Hudson's Bay and was a timbered oasis amidst the grasslands of western Minnesota and eastern North Dakota. We are concerned here only with the headwaters of the Red. Wilford (1970) excavated two mound sites on the Upper Red at Femco and McCauleyville, and made a collection of a nearby site in North Dakota. Michlovic (1984) surveyed Wilkin County and tested the Femco habitation site. These collections constitute our only sample from this important region. No radiocarbon dates are available for the Late Prehistoric period in this area. Of the 15 reported sites with potential Plains Village occupations we were only able to examine three, in addition to an unrecorded site.

Late Woodland in the region is poorly known as all of the investigations have generated information only relating to the Late Prehistoric. It is possible that the Late Woodland sites in this region are buried in the alluvial deposits of the Red. Decorated ceramics from this time span appear to have Lake Benton/Kathio affinities (Michlovic 1984: Plates 2 and 3; Fie 1986:Figure 4). We suspect that there are at least three components/occupations for the Late Prehistoric. The earliest dates in the 12th and 13th centuries and is comprised of the Cambria-related complex of smoothed plain incised jars. A 14th to 15th century time span is likely characterized by a mix of Oneota and Sandy Lake ceramics. The terminal occupation would be characterized by strictly Sandy Lake ceramics. The evidence for this Late Prehistoric sequence is limited and thus the sequence is conjectural at the present, but does allow a means of provisionally organizing the archaeological material. Plains Village material, while present, appears to date from the first two subdivisions.

Testing at the Femco village (21WL1) (Michlovic 1984; Fie 1986) failed to generate a stratigraphic sequence as a mixture of shell and grit tempered pottery were found below 80 cm. Cordmarked pottery dominated the sample, in both shell and grit temper. Sandy Lake and Oneota rims were recovered along with a possible S-shaped jar with cord impressed decorations (Figure 7.1 a). The sherd sample comprised a Cambria broad incised sherd (Figure 7.1 e) and numerous stamped rims and sherds (Figure 7.1 b-d). Once again a dating for the varied stamped surfaces is not possible, although we maintain that some of these must date from Late Prehistoric times.

Excluding the North Dakota side of the River, for which we expended no effort in identifying collections except what was mentioned above, Michlovic identified 14 sites along the approximately 30 mile stretch of the Upper Red River with plain surface grit tempered ceramics. Although diagnostics were few, and we were not able to examine the collection, illustrations of these from our files indicate that they are Late Prehistoric ceramics and affiliated with the Northeastern Plains Village complex and Cambria. Diagnostics include curvilinear incising, a combination of incising and punctations, and small neck jars, with optional lip notching. Plain surface sherds were the most frequently encountered and in contrast to surveys down river to the north, Sandy Lake was not dominant in the collection. Overall, the Upper Red materials appear to resemble those identified from nearby Grant County.

The only unique collection that represents a narrow time span is that made by Wilford from an unnumbered site (Olson farm) near Fort Abercrombie on the North Dakota side. This collection (MHS accession no. 358), garnered from a land owner, comprised 63 sherds and rims

that were grit tempered plain or polished, with multiple examples of broad trailing and punctations (Figure 7.2). These are examples consistent with what we have identified as late peripheral Cambria in Douglas County at the Johnsrud site. One rim has three discrete but broad horizontal lines on the interior; such large tooling on the interior is also found in the Grant County sample. An inspection of collections that were once housed at the museum for Fort Abercrombie revealed the presence of plain surface incised jars that match this collection. We also suspect that the many sites found during the survey with plain surface pottery are aligned with this time span.

Table 7.1. Frequency Tabulation of Ceramics, Olson Farm. All grit tempered.

Ceramic Category	No.
Polished	29
Polished, rim	1
Polished rim, interior decorated	1
Plain	19
Broad Incised	5
Incised Punctated	3
Indeterminate	5

Wilford recovered a sherd and rim from his testing at Femco and McCauleyville (21WL2) that are also likely from our putative early-to-middle time span. The rim from the Femco site is grit tempered with a channeled lip. The sherd from McCauleyville is also grit tempered and has an Oneota-like nested chevron design (Holley and Michlovic 2010:Figure 7). Oneota pottery was also found at these sites (Holley and Michlovic 2010; Wilford 1970:Plate 21). This cluster of sites represents the northwestern most concentration of bona-fide Oneota pottery, but not strictly Oneota sites. We presume that this is an instance of multiple cultures occupying the same region. Plains Village traits, however, are uncommon.

Although no site was identified in the Michlovic survey that was solely characterized by Sandy Lake ceramics (cordmarked and tempered with shell), it is possible that a terminal occupation in the headwaters would resemble that identified in the Big Stone region as an occupation with solely Sandy Lake ceramics. Such sites are quite common downriver. Plains Village influence is weakly present downriver, although the characteristics of Cambria and Oneota influenced ceramics are present (Breakey 1981; Holley and Michlovic 2010; Johnson 1995; Michlovic 1984a). A sole rim sherd from Norman County (Breakey 1981:Figure 2) is likely Coalescent and is one of the rare Plains-related vessel found the middle portions of the Red River.

Beyond the Red

About 45 miles west of the Red River in North Dakota lays the bend of the Sheyenne River, a remarkably rich archaeological region. Put in perspective, this distance is less than the maximum width of Yellow Medicine County in Minnesota. Our interest in this region is based on a long-term research program that has revealed parallel ceramic trends with western Minnesota. An early Late Prehistoric unit is suspected and identified as the Lucas phase. Ceramics from this phase (Holley and Kalinowski 2008) appear to correspond to an early portion of the Big Stone region as represented at the Shady Dell site with cordmarked, cord impressed, stamped and incised decorations. We attempted to date this occupation based on bison bone

recovered from deposits at the Lucas site (32RM225) with ceramics. The bone, however, must have been residual from an Archaic period occupation, and the resulting date of 4000 BC is a decided outlier for our interests.

Subsequent developments in the Bend region appear to mimic in part what we suspect for southwestern Minnesota (see Table 2.2). The Matoti (or Bear's Den) complex, provisionally dated from 1200-1400, represents a combination of Cambria- or post-Cambria like plain ceramics with evidence for Extended Middle Missouri contact. Plain surface or polished surfaces are predominant; the presence of broad incising and fringe punctations is also noteworthy. This complex is presumed to encompass the Olson farm site collected by Wilford. The Shea phase (1450-1550) (Michlovic 2008), the only securely dated complex, follows next with a strong Sandy Lake focus and a presence of Oneota-like ceramics in grit or shell temper with reduced influence from Middle Missouri sources. The final two units are strongly influenced by the Middle Missouri traditions if not the result of actual migration and comprise the Swanson phase (associated with Terminal Middle Missouri) and the Biesterfeldt Chaiena phase (associated with the Protohistoric Coalescent). A similar pattern of strong Plains Village influence is also noted in western Manitoba near the end of the prehistoric sequence in the Vickers Focus (Nicholson et al. 2008).

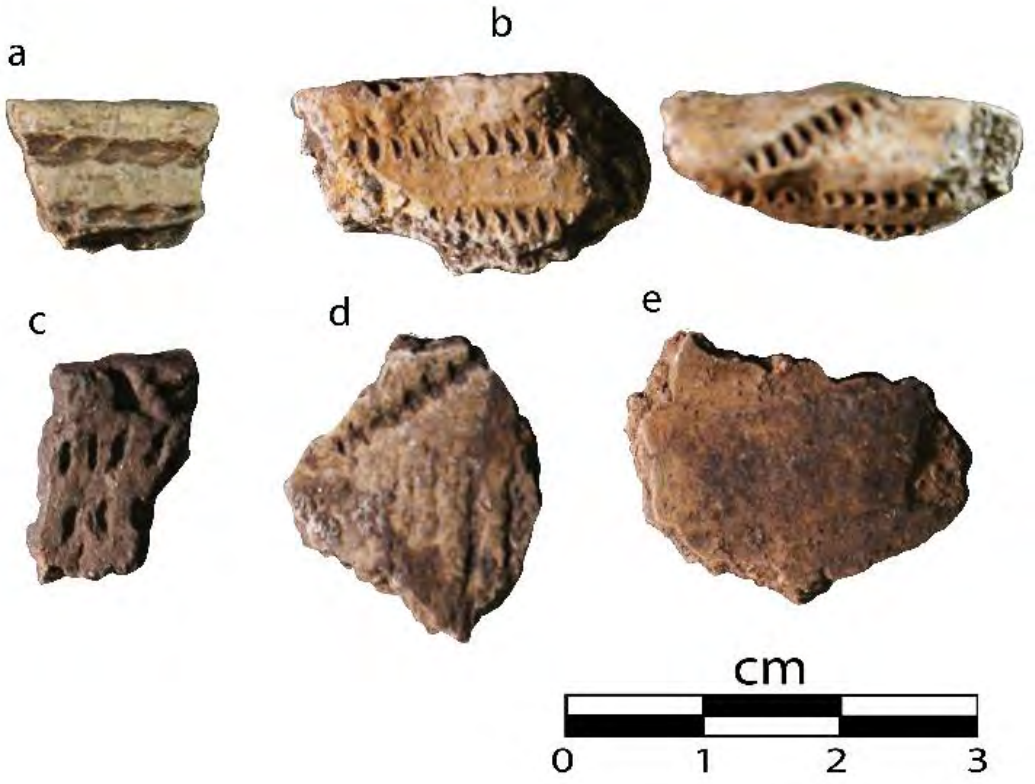

Figure 7.1. Femco site (WL1) decorated sherds: a, well-made jar (s-shape?) with cord impressed exterior; b, wrapped rod stamped exterior and lip crest that pushed out an area on the interior side and top view; c, wrapped rod exterior and wrapped rod notching; d, diagonal wrapped rod (with bead-on-a-string effect) on a plain neck with cordmarked lower body; e, broad incised (Cambria) neck with two incised lines.

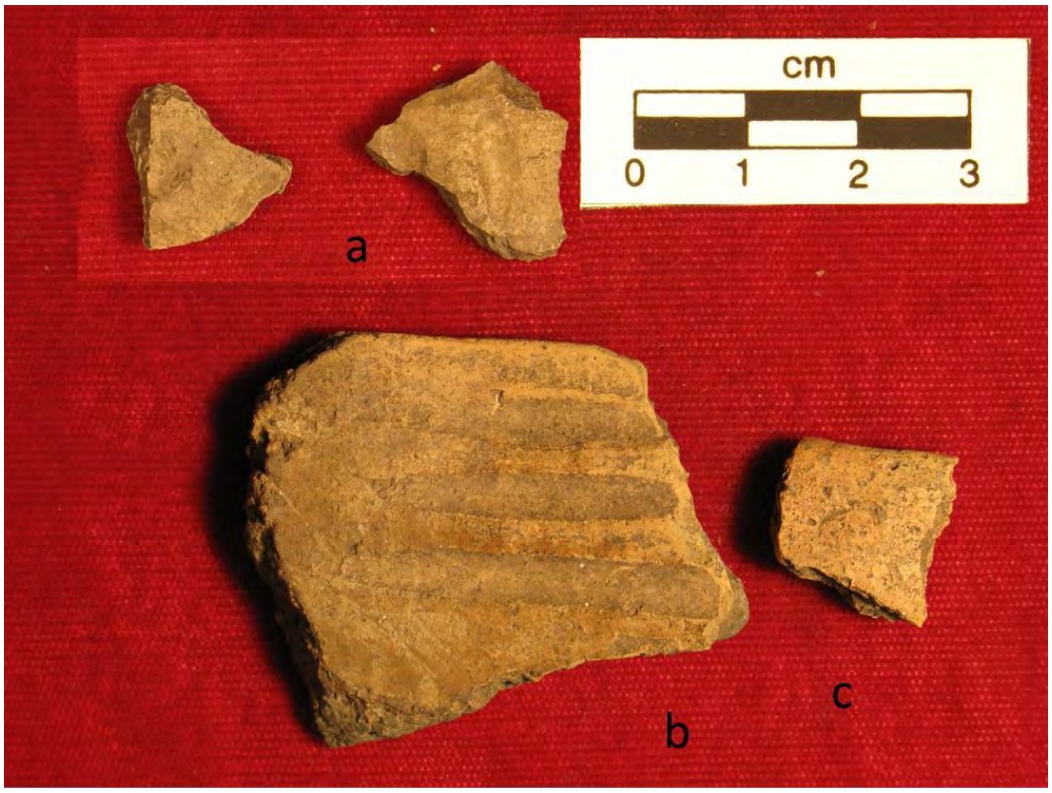

Figure. 7.2. Olson Farm Ceramics: a, incised and punctated; b; polished jar with broad incising on interior c; smoothed plain rim.

Chapter 8
FILE SEARCH

In June, 2012 a search was conducted in the files of the Office of the State Archaeologist. These files contain much of the gray literature on archaeological contract work done in the state of Minnesota since the 1970's. While the OSA files are not exhaustive, and there are completed reports not on file at this location, the overall collection of manuscripts represents a substantial amount of cultural resource management work done throughout the state over the past 40 years.

Not all reports in the file collection were examined, but rather those reports that documented phase II and III archaeological work; that is tests for significance and full-scale mitigation projects. Phase I surveys directed at site discovery were not examined since these reports are normally negative and even when they do recover cultural material usually do not have contextual information nor do they normally produce very large collections of artifactual material.

The following counties were examined for Phase II-III reports: Faribault, Martin, Jackson, Nobles, Rock, Pipestone, Murray, Cottonwood, Watonwan, Blue Earth, Waseca, Le Sueur, Nicollet, Brown, Redwood, Lyon, Lincoln, Yellow Medicine, Renville, Sibley, McLeod, Meeker, Kandiyohi, Chippewa, Lac Qui Parle, Swift, Pope, Stevens, Grant, Big Stone and Traverse. These counties comprise the southwestern portion of the state in the prairie region west of the ectone and of the Blue Earth River. In other words that portion of the State of Minnesota that might contain Plains Village culture sites.

The only project that provides actual evidence of ceramics that might be classified as Plains Village wares of one sort or another is a Phase II evaluation of 21CP68, City of Montevideo, Chippewa County. From this site sherds assigned to Great Oasis, Big Stone and Cambria wares are described from the test excavations. Lake Benton pottery was also found mixed with the Great Oasis sherds. The total number of sherds described amounts to fewer than a dozen. These are described as coming from two Lake Benton vessels, one Great Oasis, One Big Stone and two Cambria. No radiocarbon dates are recorded in association with the ceramic finds (Haas, Picard, Friewald and Eichmann 2012: 46-53). Other phase II projects in Jackson, Nicollet and Meeker counties did not recover any Plains Village materials, although some of these sites do have associated radiocarbon dates. Schoen (2002:41) reports a calibrated date of 1109 on bone found in shovel probes, with Lake Benton pottery from nearby tests; a second date of 887 but without ceramics or other artifacts is also reported in association.

Chapter 9
RADIOCARBON DATES

One of the primary goals of the Prehistoric Village Cultures in Minnesota study was to accumulate additional radiocarbon dates on sites from southwestern Minnesota. A major element in the project was to make use of existing collections from excavated sites to recover datable material for submission to radiocarbon labs. Collections from over two dozen excavated sites in southern Minnesota were examined. Each of these sites had ceramic collections that allow them to be assigned to the Late Prehistoric period, although not all of them could be described as 'villages' culture sites. Only charcoal or bone was used for dates. Organic residues from ceramic interiors, bulk soil samples or other organic substances such as shell were avoided.

A preference was given for organic samples from sites that had reliable sample provenience. Materials recovered from excavated features, or from what appeared to be sealed strata were preferred. Materials from shallow deposits or from general site excavation areas were mostly avoided. The project goal was to obtain up to 20 radiocarbon dates. Unfortunately the condition of organic samples in many of the excavated site collections did not provide for that many assays. In the end a total of 16 assays were performed on samples.

Some of the earlier radiocarbon dates on village site were done several decades ago and used decay counting techniques that are now being superseded by AMS methods. These more modern methods, while superior, are considerably more costly than the older dates. However, they do provide estimates of age that carry a smaller error. For example, a previous date on the Cambria site (21BE2), listed in one of the tables below, is 815 $\pm$ 125. An AMS date run on the Price site (21BE36) is close in age, but the reported error is much smaller, 825 $\pm$ 15. The resulting calibration curves are shown here for comparison (Figure 9.1). The upper date in the figure is the older decay counting assay; the lower date is the recent AMS date.

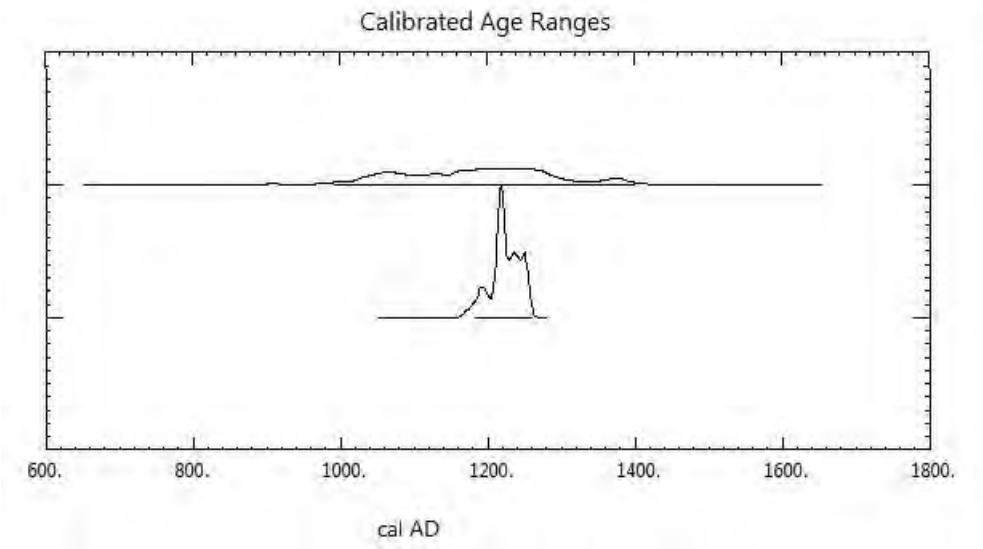

Figure 9.1. Comparison of radiocarbon dating methods

Radiocarbon dates are listed below in the CALIB format. The 1986-2005 version of CALIB online was used to calibrate the dates. Whenever possible, charcoal and bone samples were sent to two labs, Beta Analytic (Florida) and PaleoResearch Institute (Colorado). This was done to ascertain whether different labs would provide widely divergent dates. When sample size and condition permitted a single sample was split in two parts and submitted. Dates are listed in the CALIB format in Table 9.1 and illustrated graphically in Figure 9.2.

Maplewood site (21OT36): The four dates (dates 1-4) for the Maplewood site (21OT36) were on two split samples. Each pair of samples was from a discrete feature context. Dates #1-2 were on charcoal from feature 89. This feature contained smooth surface, grit tempered pottery and was regarded as Plains Village in age. The feature was lens-like and about 5 cm in thickness. The second pair of dates was from bone found in feature #42. This also had smooth surfaced pottery in association. Unfortunately, this feature was vertically quite deep, extending from 30-75 cm below the surface. While the first pair of dates conforms to expectations for a Plains Village age, the second pair, while consistent with each other, are obviously from an older occupation, or perhaps from older materials into which a later feature intruded.

Browns Valley sites (21TR5 and 21TR19): There are two sites at Browns Valley, both overlooking a broad lowland extending to the southeast of Lake Traverse from an elevated glacial feature. 21TR5 is the site that includes the "Browns Valley Man" find from the 1930's. Subsequent to the discovery of the skeletal material in a gravel quarry, archaeologists dug northwest of the find and located a number of features, probably from a late prehistoric village. This work was done in 1935. Some of the ceramics from this area were from plain, grit tempered vessels. A number of ash stains and hearths were also identified. Two dates were assayed for 21TR5, both on bone recovered from this previous work. One was from a 7" deep hearth, and another from the general excavation area. These are dates #5-6. The second site at Browns Valley is 21TR19. This is the large enclosure mapped by T.H. Lewis and reported by Winchell (1911: 309). The sample for date #7 was taken from an animal rib fragment found during the 2012 testing of the enclosure area. The small sample offered only enough material for a single assay.

Jones village (21BE5): Dates #8-9 were a split sample charcoal from feature 11 at the Jones site in Blue Earth County, a Cambria site. The site was excavated by Wilford in 1941 (Anfinson 1997: 97). Feature 11 was found at a depth of about 70-80 cm below surface at the site. Wood charcoal used for the date was identified as Honey Locust. A third date for the Jones site is date #10. This assay was completed on a small sample of charcoal identified as cottonwood. The provenience of the sample was feature 17, buried at a depth of 60 cm below surface. All of the material submitted for dating from the Jones site was associated with ceramics that are considered to be constituent types of Cambria ware. Specifically, the ceramics were smooth surfaced and featured grit temper. Broad incising or trailing was also present on some of the pottery.

Price site (21BE36): This is another Cambria site from Blue Earth County. The site was excavated by Michael Scullin in 1974-1975 (Anfinson 1997: 97). A split sample of basswood charcoal was sent to each lab for radiocarbon dates listed as #11-12. Both of these dates were taken from material excavated in feature 3 at the Price site. Samples #13-14 were walnut and

ironwood charcoal from the general excavations at Price. All of these materials were associated with Cambria ceramics at the site.

Lucas site (32RM225): Sample #15 were bone fragments from a non-feature context at the Lucas site in Ransom County, southeastern North Dakota. The Lucas site is a small (about ½ acre) enclosure site with a deep ditch surrounding it. The site was tested in 1989 but not excavated on a large scale. The diagnostic material from the site is believed to represent an early phase in the development of the Northeastern Plains Village Tradition, and is assumed to be around 800-900 years old.

Miller Mound site (21BS4): Sample #16 was a fragment of bison rib bone from the Miller Mound site in Big Stone County collected during Jenk's 1935 excavation of the site (Johnson 1961). The ceramics from the Miller Mound site include trailed-line decorated vessels that are usually regarded as Cambria, although some of the decorative elements are reminiscent of Oneota. One complete vessel associated with the Miller burial has a design field reminiscent of the Link vessel from the Silvernale site.

All sites except for Lucas are Minnesota sites. Datable material was taken from collections at the Minnesota Historical Society, Minnesota State University-Mankato, and from the Minnesota State University Moorhead archaeology lab. All of the samples were believed to be from a Late Prehistoric context. Three of the dates were obviously from earlier periods, or were simply defective in one way or another. In the list below, these early dates are offset to the right. The two early dates on bone from the Maplewood site (21OT36) are consistently old, and were produced by different labs. The fact that these two dates are in agreement suggests that the age of the bone from feature 42 at that site is reliable and probably originated from a Late Archaic context. The bone date for the Lucas site was also Archaic period in age.

If we remove the two early dates from feature 42 at Maplewood, and the early bone sample from the Lucas site there remain 13 dates that fit into the Late Prehistoric time frame. These will be the dates of concern here. Taken together these 13 dates are significantly different at the 95% confidence interval. A chi-square test provided by the CALIB program provides a value of 21, df=12. The mean pooled age for all samples of 839.45 years before present. The pooled age is simply a rough indicator of the age of all the sites, but since the dates are significantly different, the interesting aspect of the chronology revolves around which dates are early in the sequence and which are later. The earliest dates are the charcoal samples from the Maplewood site, 21OT36, and the two bone dates from 21TR5 at Browns Valley. These four dates have a mean pooled date of 969 bp.

The western "Cambria" site at Maplewood appears to be slightly older than the large villages in the Cambria heartland in Blue Earth County. Also, the presumed Great Oasis related site at Browns Valley is older than the Cambria sites in Blue Earth, but that site appears to be roughly the same age as the Maplewood village component.

Two dates from Jones (21BE5) and two dates from Price (21BE36) seem to cluster together. These are dates 880±30 and 870±30 (Beta327489 and Beta 327491) and 875±20 and 825±15 (PRI 12-0994 and PRI 12-0996). These four dates are statistically the same at the 95%

confidence level. However, if we take the remaining four dates from sites 21BE5, 21TR19 and 21BE36, which are 795±20, 790±30, 790±20 and 720±30, they are statistically the same as a group at the 95% confidence level.

This method of comparison does not comprise a rigorous statistical test, but it does help to separate the dates into possible groupings; one early, one intermediate and one late. It is interesting that the western dates are earlier than those on the lower Minnesota River, and that both Cambria sites at Jones and Price seem to have intermediate and late dates. Perhaps these sites were occupied for a long period, even up to a century, or they were used, abandoned, and re-occupied at a later time. On the other hand, perhaps the dates simply reflect the ongoing occupation by these Late Prehistoric peoples of the southwestern part of Minnesota. There may be no phases or periodization, but rather a long term use of this region. In figure 9.2 below, you may see the dates arranged from latest on top to earliest on the bottom.

In the list below the site, radiocarbon lab number and the catalog number of the material dated are in the first line of the entry. The raw radiocarbon age is in the second line.

Table 9.1. Radiocarbon Dates

CALIB RADIOCARBON CALIBRATION PROGRAM*
Copyright 1986-2011 M Stuiver and PJ Reimer

*To be used in conjunction with:
Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.

1. 21OT36 Maplewood charcoal Beta#327485 (Feature 89, 35-40cm bs), MHS collection, #672-130
Radiocarbon Age 950±30
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1028: cal AD 1050] 0.274433
[cal AD 1082: cal AD 1125] 0.53157
[cal AD 1136: cal AD 1152] 0.193997
Two Sigma Ranges: [start:end] relative area
[cal AD 1024: cal AD 1156] 1.
2. 21OT36
Maplewood charcoal PRI #12-0991(Feature 89, 35-40cm bs), MHS collection, #672-130
Radiocarbon Age 970±20
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1022: cal AD 1045] 0.540037
[cal AD 1097: cal AD 1119] 0.385201
[cal AD 1142: cal AD 1147] 0.074762
Two Sigma Ranges: [start:end] relative area
[cal AD 1018: cal AD 1052] 0.444783
[cal AD 1080: cal AD 1129] 0.421901
[cal AD 1132: cal AD 1153] 0.133315

3. 21OT36
Maplewood bone Beta #327486 (Feature 42, 30-75 cm bs), MHS collection, #672-173
Radiocarbon Age 2900±30

Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 1126: cal BC 1024] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 1211: cal BC 1001] 1.
4. 21OT36
Maplewood bone PRI #12-0992 (Feature 42, 30-75 cm bs) MHS collection, #672-173
Radiocarbon Age 2810±20
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 994: cal BC 985] 0.147893
[cal BC 980: cal BC 928] 0.852107
Two Sigma Ranges: [start:end] relative area
[cal BC 1010: cal BC 909] 1.

5. 21TR5
Browns Valley large mammal bone Beta #327487 (general excavation area) MHS collection, #163-11
Radiocarbon Age 930±30
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1041: cal AD 1058] 0.184209
[cal AD 1074: cal AD 1109] 0.384549
[cal AD 1116: cal AD 1154] 0.431242
Two Sigma Ranges: [start:end] relative area
[cal AD 1025: cal AD 1168] 1.

6. 21TR5
Browns Valley bone PRI #12-0993 (7" deep hearth, no feature designation) MHS collection, #163-15
Radiocarbon Age 995±20
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1014: cal AD 1040] 0.979317
[cal AD 1113: cal AD 1115] 0.020683
Two Sigma Ranges: [start:end] relative area
[cal AD 992: cal AD 1045] 0.849325
[cal AD 1093: cal AD 1120] 0.125023
[cal AD 1140: cal AD 1148] 0.025652

7. 21TR19
Browns Valley bone Beta #327488 (shovel probe #9 MSU Moorhead 2012 testing) MSUMoorhead collection
Radiocarbon Age 790±30
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1224: cal AD 1263] 1.
Two Sigma Ranges: [start:end] relative area
[cal AD 1189: cal AD 1197] 0.01608
[cal AD 1207: cal AD 1279] 0.98392

8. 21BE5
Jones charcoal Beta #327489 (T5, feature 11, 70-80cm bs) Minnesota State U. Mankato collection
Radiocarbon Age 880±30

Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1055: cal AD 1076] 0.208111
[cal AD 1154: cal AD 1213] 0.791889
Two Sigma Ranges: [start:end] relative area
[cal AD 1043: cal AD 1106] 0.279268
[cal AD 1118: cal AD 1221] 0.720732

9. 21BE5
Jones charcoal PRI #12-0994 (T5, feature 11, 70-80 cm bs) Minnesota State U. Mankato collection
Radiocarbon Age 875±20
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1160: cal AD 1208] 1.
Two Sigma Ranges: [start:end] relative area
[cal AD 1051: cal AD 1081] 0.126799
[cal AD 1126: cal AD 1135] 0.021929
[cal AD 1152: cal AD 1218] 0.851272

10. 21BE5
Jones charcoal PRI #12-0995 (Area B feature 17 60cm bs) Minnesota State U. Mankato collection
Radiocarbon Age 795±20
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1224: cal AD 1249] 0.747709
[cal AD 1251: cal AD 1258] 0.252291
Two Sigma Ranges: [start:end] relative area
[cal AD 1216: cal AD 1269] 1.

11. 21BE36
Price charcoal Beta #327490 (feature 3, 50-55 cm bs) Minnesota State U. Mankato collection
Radiocarbon Age 720±30
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1267: cal AD 1289] 1.
Two Sigma Ranges: [start:end] relative area
[cal AD 1228: cal AD 1232] 0.007712
[cal AD 1238: cal AD 1249] 0.021442
[cal AD 1250: cal AD 1301] 0.920266
[cal AD 1367: cal AD 1382] 0.050581

12. 21BE36
Price charcoal Beta #327491 (feature 3, 50-55 cm bs) Minnesota State U. Mankato collection
Radiocarbon Age 870±30
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1059: cal AD 1063] 0.037236
[cal AD 1155: cal AD 1218] 0.962764
Two Sigma Ranges: [start:end] relative area
[cal AD 1045: cal AD 1095] 0.183341
[cal AD 1119: cal AD 1142] 0.058984

[cal AD 1147: cal AD 1229] 0.733572
[cal AD 1231: cal AD 1244] 0.01649
[cal AD 1246: cal AD 1252] 0.007612

13. 21BE36
Price charcoal PRI #12-0996 (feature 7) Minnesota State U. Mankato collection
Radiocarbon Age 825±15
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1211: cal AD 1252] 1.
Two Sigma Ranges: [start:end] relative area
[cal AD 1183: cal AD 1259] 1.

14. 21BE36
Price charcoal PRI #12-0997 (feature 14) Minnesota State U. Mankato collection
Radiocarbon Age 790±20
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1225: cal AD 1235] 0.297554
[cal AD 1237: cal AD 1248] 0.356173
[cal AD 1251: cal AD 1261] 0.346273
Two Sigma Ranges: [start:end] relative area
[cal AD 1218: cal AD 1270] 1.

15. 32RM225
Lucas bone Beta #327492 (bone frags, 15-20 cm bs) Minnesota State U Moorhead
Radiocarbon Age 5210±40
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal BC 4042: cal BC 3974] 1.
Two Sigma Ranges: [start:end] relative area
[cal BC 4226: cal BC 4205] 0.034319
[cal BC 4165: cal BC 4130] 0.063678
[cal BC 4112: cal BC 4102] 0.008671
[cal BC 4073: cal BC 3954] 0.893333

16. 21BS4
Miller Mound site PRI#13-012 fill from mound. Bison rib fragment (29.2g). Minnesota Historical Society collection
Radiocarbon Age 700±15
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1278: cal AD 1289] 1.
Two Sigma Ranges: [start:end] relative area
[cal AD 1271: cal AD 1297] 0.996334
[cal AD 1374: cal AD 1376] 0.003666

Ranges marked with a * are suspect due to impingment on the end of the calibration data set
PJ Reimer, MGL Baillie, E Bard, A Bayliss, JW Beck, PG Blackwell,
C Bronk Ramsey, CE Buck, GS Burr, RL Edwards, M Friedrich, PM Grootes,
TP Guilderson, I Hajdas, TJ Heaton, AG Hogg, KA Hughen, KF Kaiser, B Kromer,
FG McCormac, SW Manning, RW Reimer, DA Richards, JR Southon, S Talamo,
CSM Turney, J van der Plicht, CE Weyhenmeyer (2009) Radiocarbon 51:1111-1150.

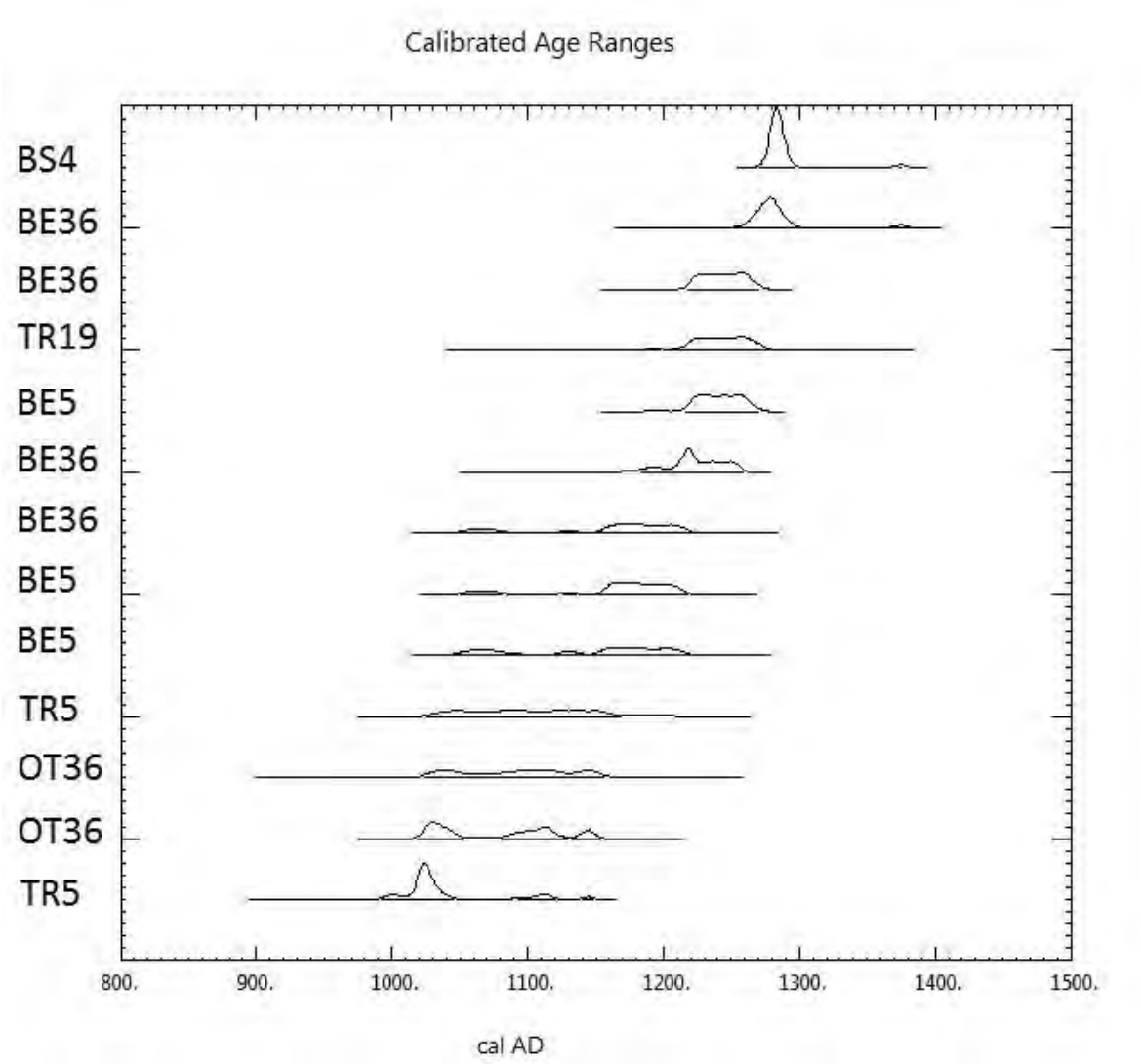

Figure 9.2. Calibrated radiocarbon age plot for project dates

Other Dates

In addition to the radiocarbon dates provided by this project, a group of previously run assays was assembled for comparison. Some of these dates were obtained several decades ago and have relatively large associated error factors (Table 9.2). A glance at figure 9.3 shows that the previously run dates range in age from almost 900-1600, while the dates for this project range over a much narrow chronological frame; about 1000-1300. Part of this discrepancy is undoubtedly due to the fact that different sites were sampled, and that there are 50% more dates in the previously dated sample (18 dates as compared to 13). However, it should also be clear that the previous dates provide graphs that are much less bounded or flatter; that is spread over a longer span of time.

Table 9.2. Previous Radiocarbon Dates

CALIB RADIOCARBON CALIBRATION PROGRAM*

*To be used in conjunction with:
Stuiver, M., and Reimer, P.J., 1993, Radiocarbon, 35, 215-230.

21DL2
Description
Radiocarbon Age 740±50
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1226: cal AD 1234] 0.099565
[cal AD 1237: cal AD 1289] 0.900435
Two Sigma Ranges: [start:end] relative area
[cal AD 1186: cal AD 1202] 0.018892
[cal AD 1205: cal AD 1312] 0.904538
[cal AD 1358: cal AD 1387] 0.07657

21OT191
Description
Radiocarbon Age 620±20
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1300: cal AD 1321] 0.418549
[cal AD 1349: cal AD 1368] 0.389665
[cal AD 1381: cal AD 1391] 0.191787
Two Sigma Ranges: [start:end] relative area
[cal AD 1294: cal AD 1330] 0.393937
[cal AD 1338: cal AD 1397] 0.606063

21DL76
Description
Radiocarbon Age 430±70
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1417: cal AD 1519] 0.838032
[cal AD 1593: cal AD 1619] 0.161968
Two Sigma Ranges: [start:end] relative area
[cal AD 1334: cal AD 1336] 0.001964
[cal AD 1398: cal AD 1643] 0.998036

21MU2
Description
Radiocarbon Age 975±65
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1015: cal AD 1059] 0.338832
[cal AD 1064: cal AD 1155] 0.661168
Two Sigma Ranges: [start:end] relative area

[cal AD 900: cal AD 917] 0.018293
[cal AD 966: cal AD 1215] 0.981707

21MU17
Description
Radiocarbon Age 1050±60
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 897: cal AD 922] 0.196441
[cal AD 941: cal AD 1028] 0.803559
Two Sigma Ranges: [start:end] relative area
[cal AD 832: cal AD 836] 0.002458
[cal AD 869: cal AD 1155] 0.997542

21BE2-1
Description
Radiocarbon Age 815±125
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1045: cal AD 1095] 0.203149
[cal AD 1120: cal AD 1141] 0.084372
[cal AD 1147: cal AD 1285] 0.712479
Two Sigma Ranges: [start:end] relative area
[cal AD 991: cal AD 1334] 0.926022
[cal AD 1336: cal AD 1398] 0.073978

21BE2-2
Description
Radiocarbon Age 775±130
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1050: cal AD 1083] 0.109066
[cal AD 1124: cal AD 1136] 0.037452
[cal AD 1151: cal AD 1308] 0.7701
[cal AD 1361: cal AD 1386] 0.083382
Two Sigma Ranges: [start:end] relative area
[cal AD 1017: cal AD 1417] 1.

21BE5-1
Description
Radiocarbon Age 750±100
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1166: cal AD 1309] 0.882382
[cal AD 1361: cal AD 1386] 0.117618
Two Sigma Ranges: [start:end] relative area
[cal AD 1043: cal AD 1103] 0.082258
[cal AD 1118: cal AD 1143] 0.031645
[cal AD 1146: cal AD 1406] 0.886097

21BE5-2
Description
Radiocarbon Age 870±110
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1044: cal AD 1102] 0.298049
[cal AD 1118: cal AD 1143] 0.125852
[cal AD 1146: cal AD 1254] 0.5761
Two Sigma Ranges: [start:end] relative area
[cal AD 902: cal AD 915] 0.006337
[cal AD 968: cal AD 1303] 0.984574
[cal AD 1366: cal AD 1383] 0.009089

21BE5-3
Description
Radiocarbon Age 780±100
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1057: cal AD 1076] 0.063522
[cal AD 1154: cal AD 1298] 0.905579
[cal AD 1370: cal AD 1379] 0.030899
Two Sigma Ranges: [start:end] relative area
[cal AD 1031: cal AD 1324] 0.915668
[cal AD 1345: cal AD 1393] 0.084332

21BE5-4
Description
Radiocarbon Age 920±90
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1027: cal AD 1186] 0.968884
[cal AD 1200: cal AD 1206] 0.031116
Two Sigma Ranges: [start:end] relative area
[cal AD 908: cal AD 911] 0.002066
[cal AD 972: cal AD 1273] 0.997934

21BE5-5
Description
Radiocarbon Age 700±60
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1259: cal AD 1313] 0.683506
[cal AD 1357: cal AD 1388] 0.316494
Two Sigma Ranges: [start:end] relative area
[cal AD 1219: cal AD 1333] 0.679379
[cal AD 1336: cal AD 1398] 0.320621

21BE25-1
Description
Radiocarbon Age 845±80
Calibration data set: intcal09.14c
Reimer et al. 2009

One Sigma Ranges: [start:end] relative area
[cal AD 1051: cal AD 1081] 0.165193
[cal AD 1127: cal AD 1135] 0.035861
[cal AD 1152: cal AD 1264] 0.798946
Two Sigma Ranges: [start:end] relative area
[cal AD 1029: cal AD 1279] 1.

21BE25-2
Description
Radiocarbon Age 885±80
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1043: cal AD 1103] 0.368337
[cal AD 1118: cal AD 1143] 0.152176
[cal AD 1146: cal AD 1218] 0.479487
Two Sigma Ranges: [start:end] relative area
[cal AD 1018: cal AD 1272] 1.

21BE25-3
Description
Radiocarbon Age 1000±80
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 976: cal AD 1059] 0.51601
[cal AD 1064: cal AD 1155] 0.48399
Two Sigma Ranges: [start:end] relative area
[cal AD 885: cal AD 1217] 1.

39RO5-1
Description
Radiocarbon Age 830±70
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1058: cal AD 1065] 0.029551
[cal AD 1068: cal AD 1071] 0.009771
[cal AD 1155: cal AD 1272] 0.960679
Two Sigma Ranges: [start:end] relative area
[cal AD 1040: cal AD 1112] 0.193552
[cal AD 1115: cal AD 1281] 0.806448

39RO5-2
Description
Radiocarbon Age 650±70
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1281: cal AD 1324] 0.465983
[cal AD 1345: cal AD 1393] 0.534017
Two Sigma Ranges: [start:end] relative area
[cal AD 1254: cal AD 1425] 1.

39RO5-3
Description
Radiocarbon Age 620±40
Calibration data set: intcal09.14c
Reimer et al. 2009
One Sigma Ranges: [start:end] relative area
[cal AD 1297: cal AD 1325] 0.376794
[cal AD 1344: cal AD 1373] 0.395949
[cal AD 1377: cal AD 1393] 0.227257
Two Sigma Ranges: [start:end] relative area
[cal AD 1288: cal AD 1405] 1.

Ranges marked with a * are suspect due to impingment on the end of the calibration data set

PJ Reimer, MGL Baillie, E Bard, A Bayliss, JW Beck, PG Blackwell,
C Bronk Ramsey, CE Buck, GS Burr, RL Edwards, M Friedrich, PM Grootes,
TP Guilderson, I Hajdas, TJ Heaton, AG Hogg, KA Hughen, KF Kaiser, B Kromer,
FG McCormac, SW Manning, RW Reimer, DA Richards, JR Southon, S Talamo,
CSM Turney, J van der Plicht, CE Weyhenmeyer (2009) Radiocarbon 51:1111-1150.

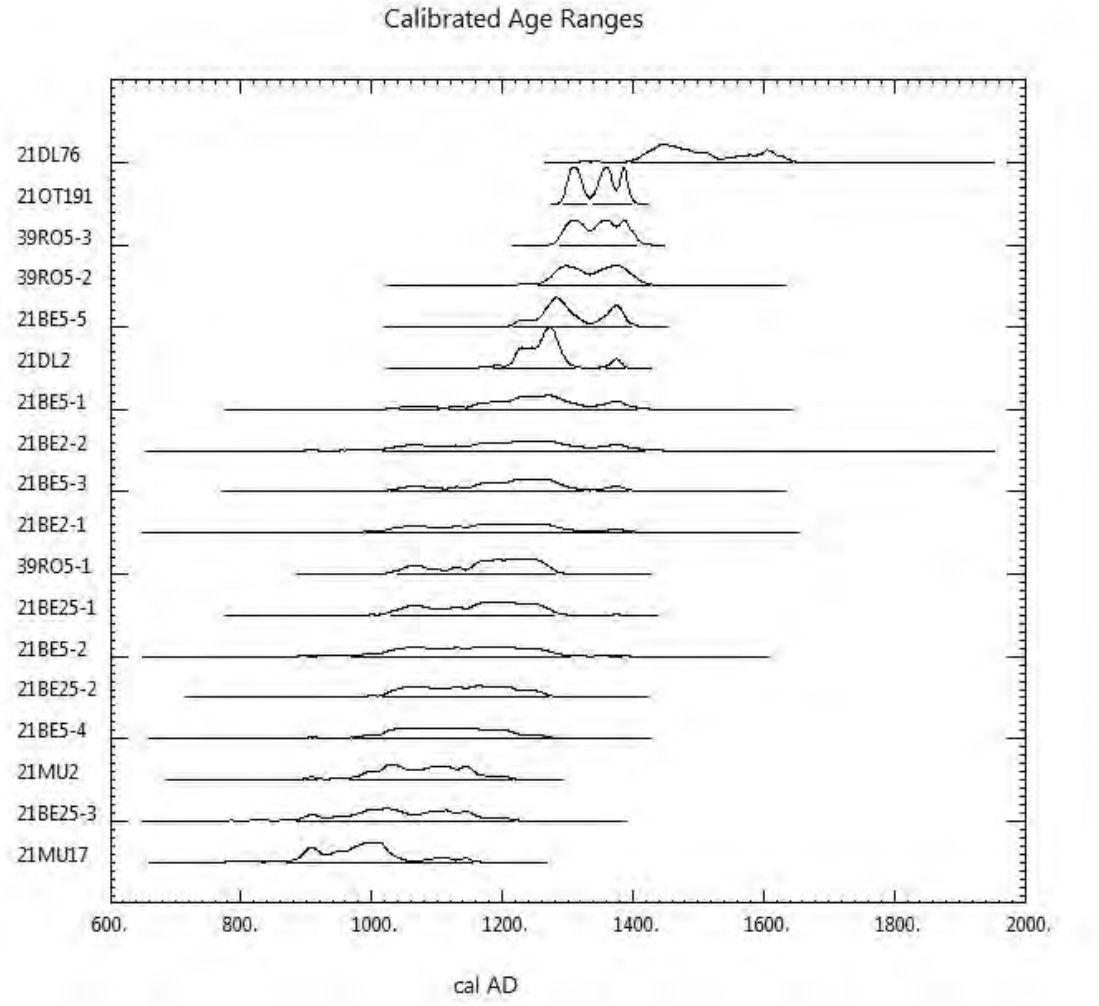

Figure 9.3. Radiocarbon Age Ranges for Previous Dates.

Chapter 10
HISTORIC PERIOD NATIVE SETTLEMENTS IN SOUTHWESTERN MINNESOTA

Historic records provide us with an invaluable account of the settlement patterns of native people in an around southwestern Minnesota. Some early maps provide locations of villages, settlements or peoples, but the inexact nature of the maps and the uncertainty about some of the people represented make them archaeologically difficult to use. There are accounts of the Cheyenne having villages along the course of the Minnesota River in the seventeenth and eighteenth centuries, with specific mention of settlements located between the Blue Earth River and Lac qui Parle. Another village of the Cheyenne is mentioned on the Yellow Medicine River where old earthworks were seen in the middle of the nineteenth century and attributed to a settlement of a century earlier. These same people, the Cheyenne, are said to have subsequently moved to a location between Lake Traverse and Big Stone Lake where they established a village (Grinnell 1923:16-17). There is reason to suspect that some of these references to the Cheyenne are inaccurate; however, that there were villages located at various points along the Minnesota River is to some extent supported by the fact that in later times, more reliably documented occupations are present.

Winchell's 1911 volume, *The Aborigines of Minnesota* provides a useful summary of the early historic maps depicting Minnesota and the native peoples who lived in various portions of the state. Here, Winchell's descriptions of the southern and southwestern portion of the state are focused on with the objective of arriving at a preliminary understanding of the early historic use of the southern prairie areas of the state.

It might be best to mention at the outset that on any number of maps from the late seventeenth through the eighteenth century the Teton (Tinton, Thinthontha, etc) are shown located west of the Mississipppi, or in the western portion of Minnesota and also at points farther to the west in the Dakotas. There can be little doubt that the Teton were already on the plains and were known as the Prairie people when the first Europeans began recording the location of native groups in the region (Winchell 1911: 28-32). The De L'Isle map of 1703 shows the Teton at Lake Traverse/Big Stone, and Popple's *Atlas of the British Empire in America* for 1755 shows the Traverse/Big Stone area as "Lake of the Tetons" (Winchell 1911: 35-37).

On the 1688 version of the Franquelin map a people identified as "les Mascoutens Nadouscioux" are located on the upper reaches of the Des Moines River in southwestern Minnesota. Winchell mentions in a footnote that these might be the Mascoutin from Wisconsin (Winchell 1911: 30).

Early maps also mention some of the other peoples resident in early Historic Minnesota. Popple's Atlas shows the Yankton on the Minnesota River in the vicinity of present day New Ulm (at the mouth of the Cottonwood River), while the map of Robert de Vaugondy (1762?) illustrates lakes in southern Minnesota under the control of the Iowa (Winchell 1911: 37, 48). A 1779 map based on the travels of Jonathan Carver shows a people named the Hinhanelon on the Chippewa River in Swift County (Ibid: 51). This term may refer to the Yankton.

The 1806-07 map of Samuel Lewis, based on one by William Clark, shows the Sisatoone (Sisseton) on the Minnesota River above Lac qui Parle, Wapatoota (Wahpekute) on the Minnesota and Yellowwood rivers (sic) (this is a southern tributary of the Minnesota River), and a Sioux village on the west side of the Minnesota River near modern day Bloomington. The Wahpatoon (Wahpeton) are west of the Blue Earth River near St. Peters, and the Foxes are on the Des Moines River (Winchell 1911: 60).

The accuracy of some of the earlier accounts of native villages and ethnic locations may be estimated from the Cheyenne case. Mention of the Chaienaton in western Wisconsin as a reference to the Cheyenne on the Franquelin map may actually be a reference to a Dakota band (Gooding 2008: 141). The earthworks on the Yellow Medicine River mentioned above, and regarded as an early Cheyenne village is probably the Gillingham site, which does not appear from modern archaeological inspection to have been anything like a settlement of a farming people in historic times. Finally, the supposed Cheyenne village between Big Stone Lake and Lake Traverse is most likely a reference to the earthworks at Browns Valley, which as we have shown here, is much too early for an association with the eighteenth century Cheyenne. Furthermore, the earthwork may not have been an enclosed village settlement (see Appendix).

Jonathan Carver (1974 [1778]:80) mentions eight bands (rather than villages) of the Sioux of the plains. Among these are people who are obviously the Wahpeton and the Teton, but two of the eight bands are the Maha and the Schian, while another is referred to as Schianese. Is Carver here referring to the actual Cheyenne people, or is he referring to names used for various bands of the Sioux.

> The tribal, ethnic, and band names used mutually among peoples of the Great Lakes and North American Plains were not only confusing in any one time, but also changed through the centuries, so that there are literally hundreds of names used between 1680 and 1882 to describe the peoples of that area (Moore 1996:14).

Keeping in mind the difficulties with identifying ethnic groups at the time of European contact, we may still review the characterization of various ethnic groups in the earliest historic times. These short descriptions focus on the life style of the early inhabitants of southern and western Minnesota rather than to their ethnic identity, and in fact, the ethnic identity does not matter for the purpose of this argument. Presumably, early historic period descriptions of houses and subsistence practices were less susceptible to misunderstanding than were the names of peoples for themselves or others, presented to Europeans in languages they hardly understood. People's settlements, houses, and life styles could simply be described. Here, these characterizations are offered simply to illustrate the way in which southern Minnesota was being used for subsistence and settlement when the earliest records were produced. We begin with some early (seventeenth and eighteenth century) descriptions of people in southern and western Minnesota, and then move to more substantial accounts from the early nineteenth century.

Winchell (1911:69-74) provides some detail about early historic period native occupation in Minnesota. For instance, he notes that when Le Seuer built Fort L'Huillier the Dakota were in southern Minnesota, and the Iowa lived to the south of them. Referring to other sources, such as Gideon Pond, Winchell (1911:70) locates the Iowa 7-8 miles south of Fort Snelling, and suggests that their earth covered lodges collapsed to form tumuli like burial mounds. Later, the Iowa

along with the Omaha controlled southwestern Minnesota. He also notes that mounds on the Minnesota River from Shakopee to Fort Snelling were left by either the Gros Ventres or Iowa, depending on the source consulted (Winchell 1911: 69), and that according to Col. Colville the Assiniboin, Omaha and Iowa all lived at one time in southeastern Minnesota. And in 1701, Le Seuer found the Mantanton (Mandan) at the mouth of the Minnesota River (Ibid:71). Finally, Winchell (1911:73) places the Cheyenne on the upper Minnesota River prior to the occupation of this region by the Sioux. From Winchell we can place the Hidatsa, Mandan, Omaha, Iowa, Assiniboin, Cheyenne and the Mascoutin in southern Minnesota prior to the Sioux. Furthermore, prior to the eighteenth century the earliest maps, along with related accounts, show the Mandan and the Cheyenne in the Mille Lacs area (Winchell 1911:74).

In 1695 a chief of the Sioux visiting Montreal indicated that there were 22 villages of his people, and the same number appears on the Franquelin map of 1697. Of those shown on the map eleven are villages of the Sioux of the East, 12 were settlements of the Sioux of the West (DeMaillie 2001:722). At this early time the Sioux were east of the Mississippi according to contemporary sources. Hennepin provides the first description of the western or Teton (Tintonha) who lived in a land with few trees. Hennepin notes that they journeyed for several months to get to Mille Lacs, and that they made fires with buffalo dung when wood was unavailable, and that they used clay pots as they still had none of metal (Ibid:725).

Using early historic documents, DeMaillie (2001:724-725) shows that the Dakota at contact were sometimes described as using a small amount of maize, and sometimes as not using cultivated foods of any kind. Apparently, the Dakota farmed intermittently, and then not very intensively. Tobacco may have been their most important cultivated product. The summer bison hunt was a major undertaking, sometimes involving several villages together, and resulting in over 100 kills. Of course, the woodland Dakota used wild rice intensively as well. There is more on the Dakota life-way in the work of S. Pond, described below.

At the beginning of the eighteenth century, the Iowa people had a settlement near the mouth of the Blue Earth on the Minnesota River at Fort L'Huillier, but departed under pressure from their enemies. They moved to an area in northwest Iowa close to the Minnesota border (M. Wedel 2001: 434). From these villages the Iowa would almost certainly have made forays into the prairies of southern Minnesota. But there is something else worth reporting about the Iowa, and about other groups that used southern and southwestern Minnesota prairies, namely that their cultures comprised an amalgam of traits from various sources. M. Wedel (2001: 432) reports that the Iowa possessed a mixed heritage:

> From their Siouan-speaking progenitors the Iowa inherited horticulture and a sharply defined class system; from contact with early or Proto-Central Algonquians they borrowed their social structure, including patrilineal descent, clans and kinship…From association with Plains cultures they adopted summer village bison hunts and many material items…and from the Santee Sioux they obtained certain traditional tales.

The Iowa used several types of houses, no doubt also a result of contacts with multiple neighbors. They used pole framed lodges covered with bark and approximately 10 meters in diameter for extended families and for some ceremonies; they used smaller oval lodges for

nuclear families which were occupied in winter, and finally, they also used the Plains tipi (M. Wedel 2001: 436).

The subsistence system of the Iowa involved maize, beans and squash grown in gardens. Tobacco was also used. Food storage in caches was common and these storage pits were dug into the floors of the lodges. Hunting on the grasslands into southern Minnesota was practiced until the middle of the eighteenth century. This included use of the Blue Earth River valley and the headwaters of the Des Moines River. Gathering wild plants in the vicinity of their villages was routine, along with fishing and collecting mollusks (M. Wedel 2001: 432; 435-436).

The Oto also are reported to have used the south central and southwestern portions of Minnesota in the latter part of the seventeenth and into the eighteenth centuries. The De L'Isle map (1703) locates them on the Blue Earth River, south of present day Mankato (Schweitzer 2001: 448). Like the Iowa, the Oto lived in substantial earthlodge structures about 12 meters in diameter which housed several families. They also used smaller bark lodges and tipis for single families (Ibid: 449). It may be worth noting that both the Omaha and Ponca, who in early historic times are located at a point to the south and west of Minnesota on the Nebraska-South Dakota border, also used the same types of house structures as the Iowa and Oto; earthlodges for larger groups and wigwams and tipis for use in the summer or on bison hunts (Liberty, Wood and Irwin 2001: 402; Brown and Irwin 2001: 419-420).

Like the Iowa the Oto were village dwellers who practiced horticulture, gathered a variety of wild plants and hunted game animals, especially bison (Schweitzer 2001: 448). In most respects, their life style mimicked that of the Iowa and other prairie villagers.

We may speculate that the earthlodge structure was in use as part of the horticultural lifeway of all of these people, while the wigwam was a Woodland survival. The tipi would undoubtedly be an adoption by these peoples of a trait from the cultures of the Great Plains. This combination of architectural features from different areas fits with M. Wedel's observation that the culture of the Iowa people was a combination of traits from Siouan ancestors, Algonquian neighbors, and the Plains environment. From this it is clear that people who entered the Plains in the early portion of the historic period brought with them cultural baggage from their past and adopted features that would aid them in their newly adopted environment. Such a pattern of combining traits from different cultures in different areas is worth noting in relation to the ceramic variability found at the Late Prehistoric sites in southern Minnesota.

The early accounts of ethnic groups and their use of the southern Minnesota region in the early historic period give only a rough notion of how the area was being use for settlement in the eighteenth century. More recent historical accounts from the early nineteenth century are more reliable and detailed (Figure 10.1). Joseph Nicollet, for instance, describes his trip from Mendota up the Minnesota River and over to Pipestone in 1838. He describes the villages of the Dakota as he proceeds. Black Dog's village is four miles upstream from Fort Snelling. Next day, Nicollet passes the village of Eagle's Head. About 12-14 miles from Mendota is Shakopee's village. A day later he passes the village of Little Rapids with 15 bark lodges, and also the village of the Sandbar of Fevers, a Wahpeton settlement of six to eight lodges. Upstream from these settlements was Broken Arm's village near modern Belle Plaine, Minnesota. These last three

settlements were all Wahpeton, separated from their relatives who lived at Big Stone and Lake Traverse (Bray and Bray 1976: 43-46).

Twenty miles or so beyond this village was a rendezvous of the Sisston near present day Ottawa, Minnesota.

> "Formerly the rendezvous of all the Sissetons when they left for the buffalo hunts, or when they went to gather wild rice in the beautiful lakes which are in the area. It is also here that they used to wait for traders from Mackinac to trade peltries…"

From here Nicollet crossed the Traverse des Sioux and struck out toward New Ulm. About seven miles east of that settlement he stopped at Swan Lake, which he described in glowing terms as containing islands covered with thick stands of trees.

> "We rest until 2:00 on the shore of this lake to contemplate its grandeur and the richness of the beautiful islands, fertile and well wooded. These islands number seven; one is large, and we regret that we cannot mark them on the sketch map…Now some families of Indians occupy these islands, to live on the *tipsinna* and a little hunting. These are the families of the warriors that we met at the Traverse des Sioux …the old mother of Sleepy Eyes has come herself on canes to offer me as a present a duck already cooked and skinned, which they were without doubt about to eat when they learned of our arrival. Here are the barbarians who take food from their mouths to help the traveler!" (Bray and Bray, 1976: 51-52).

Travelling west from the mouth of the Cottonwood, Nicollet enters the prairies and makes note of the groves of trees occasionally found there. These he compares to oases in Europe, and suggests they be called islands of the prairies or "Prairie islands" (Ibid: 56). The Dakota called them "wood islands." (Ibid: 56, note 32). Some distance west of the mouth of the Cottonwood, perhaps 20 or so miles, Nicollet reports a "wood island"

> "…celebrated among the Sioux as the rendezvous of the different tribes for hunts since time immemorial. The…Sioux [called this] the isle of the fruit that cracks when one eats it. It is the *Celtis Occidentalis*."(Ibid).

The day after describing the prairie islands Nicollet makes note of a salt lick or pond frequented by the bison herds. This would be a good place for hunting, he states, except that;

> "…the Sioux seldom come here for fear of meeting their enemies, the Sac, the Fox, the Mahas, and the Potawatomi newly established on the Missouri, with whom they started hostilities last year by killing two of these new arrivals. The pond is what the Americans call a 'lick'" (Ibid: 57).

As Nicollet continues his journey some miles beyond the 'lick' he comes to a hill that stands about 60' above the level prairie and which is covered with rocks.

> This hill is the lookout to which the Sioux still came barely eight years ago to watch the arrival of the herds of buffalo in the country. The buffalo have departed, and the lookout serves the Sioux only as a place from which to watch for their enemies. For this reason we name it Indian Lookout Mountain—*horhewahedan*—the hill where one climbs." (Bray and Bray 1976: 58).

Toward the source of the Cottonwood River Nicollet comes to Lake Shetek. The lakes here are full of fish and frequented by game animals. Nicollet's own hunting parties here bag Canada geese, teal, and many ducks, in a few hours' time (Ibid: 61-63). After leaving the lakes the traveler describes a conical hill:

> …it is a hill which has served and still serves as a cemetery for the Sioux who died while camping at the lakes. These hills always cast a melancholy air over deserted scenes, and I never encountered them without being deeply moved… the Sioux of these regions, because of the nature of their country, are forced to chase the buffalo, and, if we did not see any of them all during our visit, it is because they are on the track of the herds that gather for breeding or because they flee the traces of the Sauk or the Fox who seek battle with them (Ibid: 64).

At Lake Shetek he note that there were no Indian lodges, but Bray and Bray, editors of his journal, explain that this was probably because the lodges had been abandoned and left evidence of their previous presence (Ibid: 62, note 42). Somewhere near the headwaters of the Des Moines River Nicollet encounters an abandoned village of the Sisseton. This is near one of the Prairie islands, or wooded areas that Nicollet had previously described. He states that until a few months ago there were 30 lodges of a Sisseton band and of the Wahpekute (Ibid: 65). Nicollet reaches the great oasis and describes the abundance of trees and game, and he notes how the lakes protect the wooded areas from the ravages of prairie fires. Moving westward he describes various formations and deposits of stones.

> The Sioux use these rolled stones and massed materials laid bare on the highest summits to make signals sometimes these are in conical pyramids. Sometimes they cover the tomb of those who died traveling across the prairies and to want to be buried on the high places. Sometimes the Sioux have amused themselves by making fantastic objects. They give names to these localities, which thus serve as landmarks in a country where there are no other geographical beacons… The Sioux, one does not know when, brought together the stones of the place and made with them a representation of a man and named the place *iyan Wiychashta karhapi* – the place where they have made a man of stone. (Ibid: 68-70).

Nicollet traveled west about 13 miles from the Des Moines River where he approached the sources of the Rock River. Traversing what he describes as a beautiful prairie, he comes upon some Indian earthworks. His description follows:

> Toward noon we see traces of the recent passage of buffalo on this Prairie, and we soon stumble upon a circular breastwork about 2000 feet in circumference that is evidently the work of man's hands. The parapet that surrounds it is made after the manner of the plains

> Indians, just high enough to cover the bodies of those who defend from within, lying down and using a gun or a bow and arrow. The principal entrance is still marked by the lodges of the chiefs and important men who, according to custom, always occupy the position that shows the direction from which their enemies come. Two miles farther on we find a second encampment like the first. Although the system of fortifications was in neither case complicated, it indicated there have been long talks and the issue of the matter may have been war. The small number of graves evident within the forts showed that the parties remained here some length of time, but that a serious battle did not take place. The Sioux have lost the tradition of these camps; they supposed that they served to end the difficulties which divided the Teton and the Yankton (Ibid: 72).

Soon after this, Nicollet arrived at the red Pipestone Quarries. Since leaving Swan Lake, just east of New Ulm, and proceeding up the Cottonwood River, Nicollet described no major Indian villages for several days. At the beginning of his journey on the lower course of the Minnesota River there were villages every several miles. Outside the Minnesota Valley he does describe hunting locations, game licks, lookouts, and burial grounds. Around Lake Shetek and the Great Oasis there is more evidence of occupation, and at the Des Moines and Rock rivers he again describes evidence of Indian settlement, and again as he nears the Pipestone Quarries.

Samuel Pond provides additional descriptions of the Dakota in the Minnesota River Valley and adjoining areas. Pond reports that in 1834 nearly all the Dakota of Minnesota were living on the Mississippi or Minnesota rivers or at Big Stone and Lake Traverse. Exceptions were a village on the Cannon River and one at Lake Calhoun. There was also a Sioux village at Two Woods south of Lac qui Parle. These are the villages where the Dakota lived during the summer. In the winter they would live wherever deer and furs were to be found. The Mdewakonton lived on the Mississippi and Minnesota rivers from Winona to Shakopee. The Wahpeton were to be found on the Minnesota River above Shakopee. The Wahpeton and Sisseton were found at big stone and Lake Traverse. The Wahpekute were on the Cannon River and at Traverse des Sioux (Pond 1986[1908]: 4). The Dakota coalesced into larger communities out of fear of attack by their enemies. Otherwise they lived in smaller groups. Chiefship among the Dakota was hereditary. Chief Sleepy Eye was the leader of several villages. In the summer he lived near Swan Lake, but was often at Traverse des Sioux (Ibid 6-7; 14).

The Dakota were hunters and gatherers at this time, but they did plant some corn. Gardening was not done by all families but rather by some, and they normally planted only enough corn to last for a few days. At Lake Traverse the Dakota produced a surplus of corn, but Pond believed this was the result of the influence of the local trader ((Pond 1986[1908]:26). He notes that it was unusual for the Dakota plant anything besides corn, and what was planted was often used green. Sometimes the corn was put in bark barrels and buried to be dug up when needed; often in mid-January during the deer hunt (Ibid: 27-28). Wild plants were of considerable importance. These included wild turnip*, psinchincha*, waterlily, wild rice, *psincha*, and *mdo*. In the prairies they gathered prairie turnips, which required a digging stick and a great deal of effort. Acorns were also used but were not preferred (Ibid: 28-29).

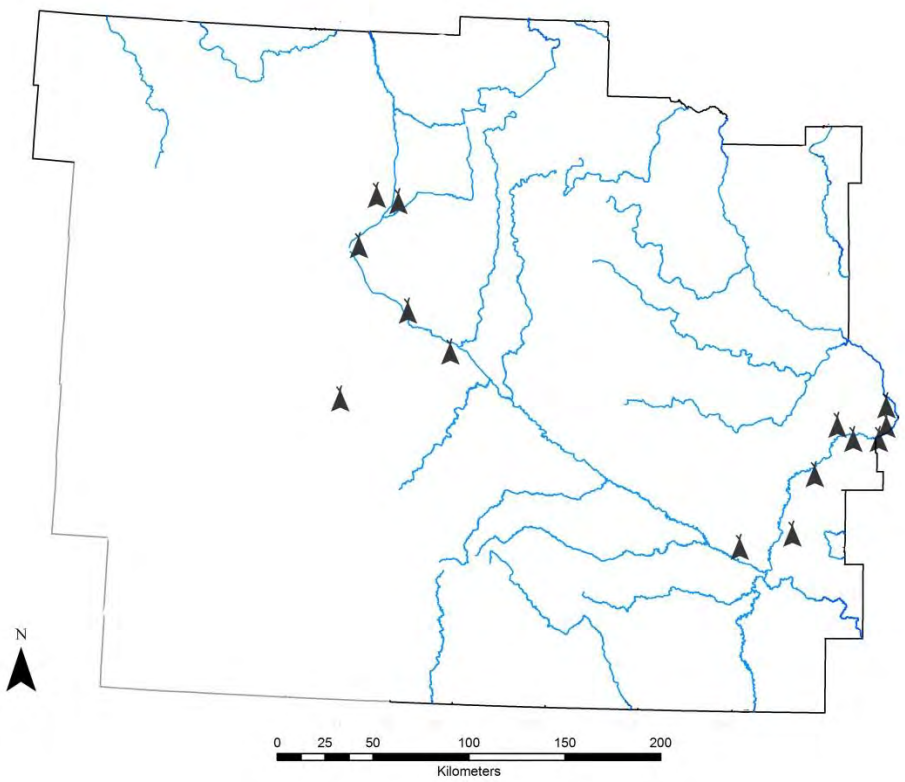

Figure 10.1. Early 19th Century Dakota Settlements in Southwestern Minnesota and South Dakota (from Woolworth and Woolworth 1980).

Pond estimated that the Dakota bands at Shakopee and Carver killed over 2000 deer per year. The best hunters among them might take up to 60 a year. Elk were scarce, and bear, though numerous, was difficult to hunt because of their erratic behavior. In the west bison were of primary importance. Dog was considered a delicacy that was used only on special occasions. Fish and turtles were taken in great quantities and muskrat used only in cold weather. During the winter fishing through the ice was common (Ibid: 29-30).

During the summer the Dakota lived in pole-framed houses with gabled roofs. These were covered with bark. Larger houses had doors at both ends while the smaller ones had only one door. There were benches around the walls for eating, sleeping, and socializing. Small structures housed a single-family, while larger structures served several families together. Tipis were also used (Ibid: 37-38).

A major undertaking for the Dakota was the late fall-early winter deer hunt. The hunt started in October and just about everyone went on the hunt. The hunt normally ended in January when the deer were lean. Hunters stayed for several days in an area until the game was hunted out, then they moved to a place where their efforts would be better rewarded. In March muskrat were taken, while others went for Maple sugar. During the summer people went in all directions to collect roots, seeds, nuts, game, and raw materials like Pipestone for manufacturing (Pond 1986[1908]: 53; 58). Pond was impressed with the Dakota's abilities as hunters. He described them in this way:

> The Dakota was a hunter, descended from a long line of hunters, trained to hunting by precept and example, with all the wisdom of a hunter that could be handed down by tradition or gained by experience, and with all the instincts of a hunter that could be transmitted by inheritance (Ibid: 66).

In Pond's day the Dakota buried their dead in coffins. He does however described earlier customs in which burials were wrapped in robes, placed on the scaffold or in a tree, and buried between a few days to a few months later. Those who died in summer might be buried immediately. No special ceremony surrounded burials. In 1834 Dakota graves were protected by fencing or placing wooden posts over them. Grave goods belonging to the individual were often buried with them and food might be placed on the grave as well (Ibid: 162-165). It is of some interest that the Dakota informed Pond that the mounds found in the Twin Cities ara were the houses of the Iowa.

Considering the early nineteenth century narratives about the land use in southern Minnesota provided by Pond and Nicollet, we might assume that since Indian people were using the land as hunters, gatherers, fishers, and gardeners at this time, whatever the influence of Europeans, it had not totally transformed their traditional life style. The descriptions of these two commentators are not greatly at variance with descriptions of observers a century of so earlier (cf. Carver in 1778 [1974] or Hennepin in 1680). Overall, we might extract from the historic descriptions of Dakota life the following generalizations:

<u>Subsistence</u>:

- Hunting was high status activity for Dakota men
- Deer used in east on the lower Minnesota and Mississippi
- Bison hunted to the west
- Gardening was common but was not of primary importance
- Not much was grown beside maize
- Much maize eaten when harvested, but some was stored in bark barrels for winter
- Wild plants such as *psinpsincha*, *psincha*, *mdo*, prairie turnips, hackberry, water lily were heavily used
- Wild rice was used where it occurred

<u>Settlements and site types</u>

- Most Dakota settlements were on the lower Minnesota River and the Mississippi toward the Wisconsin border
- Some villages were large with dozens of lodges; these were normally along the rivers
- Smaller, hamlet sized settlements with fewer than ten lodges were on islands in lakes, or on rivers
- Settlements might be found in "prairie islands" or oases; depending on the size of the oasis or island these might be smaller or larger
- Rendezvous points were known for departures on long distance hunts
- Lookouts on high places (eg. *horhewahedan* = "the hill where one climbs")
- Special food gathering places (e.g. "the isle of the fruit that cracks when one eats it" or hackberry)

- Salt licks for hunting
- Burial grounds on hills
- Ceremonial rock piles (eg. *iyan Wiychashta karhapi*, "place where they made a man of stone")
- Both Nicollet and Pond describe single bands such as the Wahpeton and Sisseton living in split communities (eg. the Wahpeton at Belle Plaine had relatives living at Big Stone, 150 miles to the northwest)

Village living groups in southwestern Minnesota were clearly not the same as the villagers of the Northern Plains, particularly those of the Middle Missouri region. The life-way of the Dakota did indeed involve life in villages, yet they were only occasional gardeners, primarily hunters, lived in tipis and pole-framed gabled houses, and rarely used the earth lodge (for an exception among the Yankton, see Hurt and Howard 1950). In the Historic period the villagers of southwestern Minnesota would hardly be called "Plains Villagers" in the sense of the Mandan-Hidatsa and Arikara-Pawnee.

Earthworks in the Minnesota Prairies

T.H Lewis and others recorded the presence of a number of earthen embankments and enclosures in southern and southwestern Minnesota in the nineteenth century (Figure 10.2). These were reported in Winchell (1911) and are reviewed here. Some of these have been destroyed; a few have been tested archaeologically. Since fortification ditches and/or embankments are often found associated with Plains villages, such enclosures are typically regarded as having a relationship to the Late Prehistoric period. It is notable that in the eastern United States enclosures and embankments are often associated with much earlier cultural complexes such as Hopewell. The presence of an enclosure should not automatically be taken to indicate a Late Prehistoric date. Furthermore, not all enclosures and embankments were necessarily fortifications, or meant to accommodate within them a settled community. Some may have been village settlements while others may have been temporary defensive works quickly constructed, used and then abandoned. Some enclosures may be ceremonial as well. For the eastern US woodlands, Mainfort and Sullivan summarize the current state of our knowledge in this way:

> We now know that earthen (and occasionally stone) enclosures were constructed in various regions in eastern North America during a period spanning roughly 3000 years, between approximately 1500 B.C. and A.D. 1500. Current interpretations suggest that there was also considerable diversity in the subsistence bases of the societies that constructed these structures (Mainfort and Sullivan 1998: 2).

Enclosures as defined here consist of earthen embankments, embankments with ditches, and ditches without embankments. We identify these based on county below (see Figure 10.2).

Pipestone County: Nicollet described an embankment in section 5, T106R45 of Pipestone County during his journey to the Pipestone Quarry. It had a circumference of about 2000 feet, with a height of about one foot and a width of 18 feet. Another circular enclosure about two miles northeast of Pipestone had a circumference of 2386 feet with an embankment ranging from

a few inches to around four feet. About half mile to the east of this is a set of five crescent-like embankments. Winchell (1911: 108-110) describes these and compares the enclosures to palisaded villages recorded along the Minnesota River.

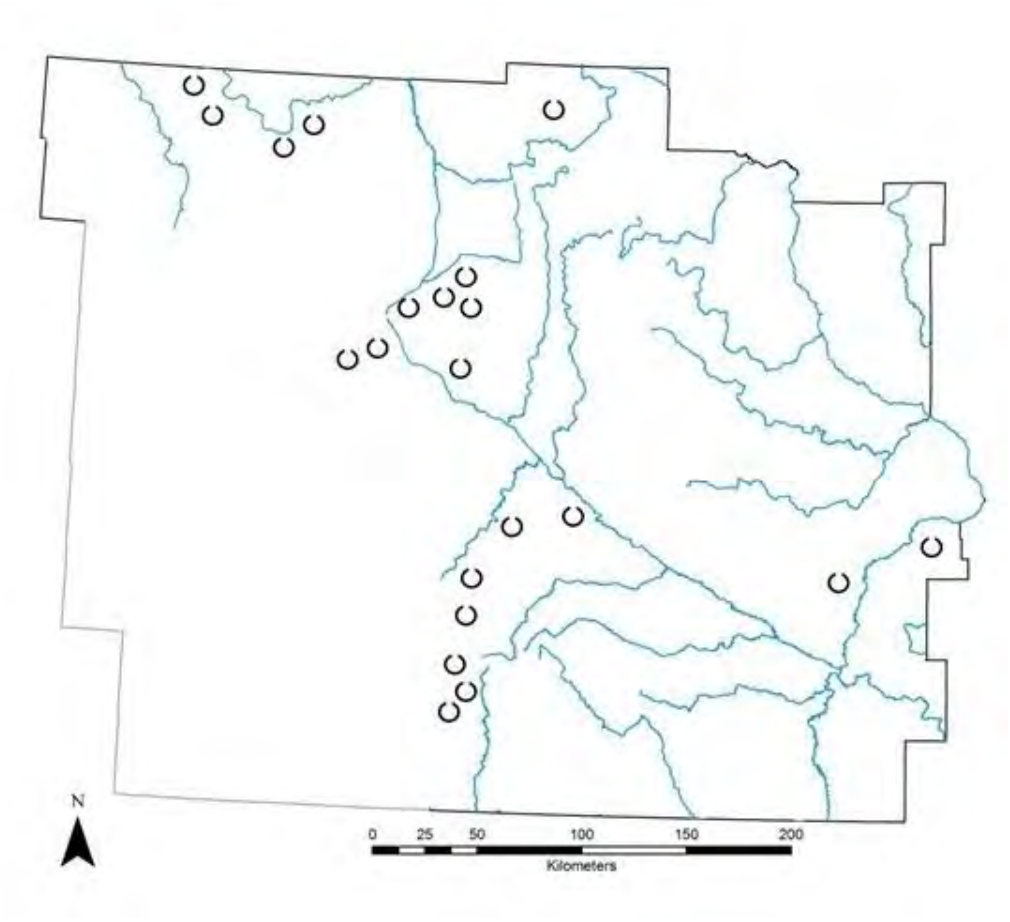

Figure 10.2 Enclosures recorded for southwestern Minnesota and adjacent areas.

Yellow Medicine County: Winchell (1911:116) describes an enclosure and T115R39 situated on the edge of a bluff. Quoting Riggs he offers the following description of the enclosure.

> The excavation extends around three sides of a somewhat irregular square protected by the edge of the hill, which is now covered by timber after infilling over years, or perhaps centuries, the ditch is still about 3 feet deep… The area enclosed is not far from half an acre on each of the three excavated sides there was left a gateway of about two paces. The earth was evidently thrown up on both sides, but the embankments have now almost entirely disappeared to the level of the Prairie. Within the enclosure there are numerous very slight elevations, which seem to mark places occupied by the dwellings of those who were once entrenched here.

Winchell (1911: 116) is of the opinion that enclosures such as this one, found as he says in many locations within this region, were built by the Dakota for purpose of defending their villages. The "slight elevations" within the enclosures are, he feels, probably the remains of domestic structures.

Lincoln County: Two enclosures are reported in T109R45, one in section 19 and another in section 30. Winchell (1911: 119) describes both of these sites as Indian forts. Both feature ditches and embankments. The site in section 19 is described as being small, and Winchell suggested is not worth further study. The site in section 30 includes pits within the ditch area, all of which overlooks lower ground from the top of a bluff. The features of this site are so indistinct that they are dismissed as not worthy of survey.

Big Stone County: in section 19, T121R45 Winchell (1911:121) describes the Odessa site. This site is located about 60 feet above the river below, and is not a fortified site with ditch and embankments, but rather a set of embankments that set off a narrow neck of high ground from the surrounding upland.

Scott County: Winchell (1911: 189-190) notes the presence of an enclosure in section 4, T115R22 among a group of six mounds. The site is over 30 feet above the swamp land below. The enclosure surrounds an area of about 50 x 90'. The embankment which forms the enclosure is from between 17 to 18 feet wide. Apparently this was not a ditched settlement but rather an embankment perhaps associated with the construction of the nearby mounds.

Carver County: An enclosure of an oblong configuration is found adjacent to a group of 29 mounds near Little Rapids (Winchell 1911: 191). The enclosure comprises an embankment about 100'x50' with the earthen perimeter about 8-13' in width. During the 1980's Janet Spector, an archaeologist at the University of Minnesota, excavated the Little Rapids site and documented it as Inyan Ceyaka Atonwan, a Wahpeton settlement of the nineteenth century. Spector was able to show that this particular enclosure was an integral part of the surrounding Wahpeton village, and probably served as a dance area.

> We do not need to do much excavating to determine that this enclosure was linked to the 19th century Wahpeton community. In the two narrow trenches we excavated through the embankment, one on the west side and another on the north, we found materials very similar to those in the community: animal bone fragments, charcoal, ash, glass trade beads, metal fragments, and pieces of 19th century ceramics. In contrast to the relatively dense concentration of materials in the embankment, we found very little in the five small, square pits …excavated inside the enclosure.
>
> It seemed to us that people had cleaned the flat area now within the boundaries of the enclosure and, in the process, created a low earthen wall of refuse composed of the topsoil and accumulated refuse. Pond mentions that Dakota women cleared and leveled the ground surface with hoes before constructing their lodges (pond 1908 [1908] 1986, 39, 46). Perhaps, in much the same way, they periodically cleared the surface before holding a dance. The slight rise this created may have been the foundation for the hide

> covered wooden framework that, as Eastman illustrated, created a low barrier between the dancers and the audience (Spector 1993:120).

Pope County: An enclosure and associated single mound are located in section 32, T126R36, near Westport Lake (Winchell 1911: 298). The enclosure consists of an embankment and associated ditch. It is located at an elevation of about 25 feet above the nearby Lake. In some places the embankment is as much as 13 feet wide. Winchell does not mention the depth of the ditch.

Traverse County: Winchell (1911:302, 306, 309) describes several enclosures above Lake Traverse. One "fort" is in section 28, T126R48, and consists of a roughly circular enclosure situated on a height 70 feet above the lake. The ditch is about 20 feet and it is 2 to 2 ½ feet deep. Winchell's map of the site indicates the enclosure to be about 100' x 75'. A second enclosure at Lake Traverse is the Bunker Hill site. This is located in section 1, T125R49 and sits about 70 feet above Lake Traverse below. The area enclosed by the ditch is roughly circular and the ditch has a depth of about 1 ½ feet. In the same general area is another enclosure known as the Tenney earthworks. Here is another ditched enclosure with an opening facing the bluff edge from which a trail runs downslope toward the lake. One additional enclosure in Traverse County is the Browns Valley site. This is described elsewhere in this report (see Appendix). This enclosure, however, is much larger than the other small "forts" described by Winchell for the Lake Traverse area. Winchell (1911: 309) describes the Browns Valley site as a roughly circular area with a ditch about 16' wide and 1' deep. The associated embankment is about 11/2' high and 12' wide.

Otter Tail County: A single, large enclosure is described for a site about ten miles southwest of Fergus Falls, Minnesota. The site is in section 33, T132R44. Winchell's description is as follows:

> The enclosure is a ditch with the dirt thrown inside. The inside is from 1 ft. to 2 ft. above the bottom of the ditch, and the outside about 1 ft. high. The width is 12 ft. but sometimes 15 ft. It has not a smooth, even curvature, but sways outward at irregular intervals in the form of bows. It has a narrow opening on the north side, which is 5 ft. wide. The enclosure is near the upper, or Herman, beach of Lake Agassiz, where it is crossed by the Red River of the North (Winchell 1911: 321).

This is the Orwell site, which Gibbon (2008) has identified as a Sonota, or Middle (Initial) Woodland construction probably built for ritual or cult activity. There are several burial mounds associated with this enclosure. Excavations were conducted here in several decades past by Elden Johnson and a team from the University of Minnesota. Although a great deal of trenching was done at the site, there was very little evidence of occupational debris or features suggestive of domestic activities. Our estimation of the Orwell date is at some variance with Gibbon's conclusion, since some of the ceramics from the site are possibly Late Prehistoric in age.

Reviewing the reported enclosures in southwest Minnesota, and adding a few that have been discovered since Winchell in the eastern Dakotas, several descriptive overview statements may be made. Most obvious from the map presented above is that many enclosures are located along the western perimeter of this portion of the state. They extend into the eastern portions of

the Dakotas as well, and of course, enclosures are common along the Middle Missouri trench. However, the Missouri Valley enclosures are village fortifications associated with earthlodge settlements. Most of the fortifications in the southwestern Minnesota area are not as large as the Missouri Villages, and those that are, such as Browns Valley, are decidedly not earthlodge settlements.

Chapter 11
CONCLUSIONS

1. This study presents a chronological and taxonomic model for prairie adaptations in Late Prehistoric Minnesota that contradicts those offered previously. Our version is constrained by a lack of systematic archaeological survey coverage and limited excavation. The notion that Plains Village culture moved into the prairie margins of Minnesota is of recent vintage. As with most Late Prehistoric phenomena it is predicated largely on the basis of ceramic styles. After reviewing the reported (and finding unreported) instances of this culture in Western Minnesota, we maintain that the ceramic styles used to define Plains Village culture in this portion of Minnesota represents an east-west adaptive profile similar to that recognized in the historic Dakota. Indeed, since Archaic times a connection between the eastern margins of the plains and the western prairie of Minnesota has existed (cf. Anfinson 1997: 39).

We recognize that definitions are a fundamental problem regarding the presence of Plains Village in Minnesota. There has been too little work that involves well controlled excavation at sites with short occupational spans. Until this is resolved, even with the accumulation of additional precise dates from anomalous contexts, we are left with approximations. Nevertheless, some issues may be clarified here. The village cultures of southwestern Minnesota are indeed situated in a grassland environment; however, it is not entirely appropriate to refer to them as Plains Villages. The term Plains Village carries connotations of cultural relationships with the Central Plains and Missouri Valley. While some such connections are apparent in southwestern Minnesota, it is our contention that affiliating the Minnesota prairie villages genetically with those of the western Plains is misleading. The cultural relationships of these Minnesota Prairie Villages is to an extent with the western Plains Village cultures, perhaps predominantly the relationships are with the easterly village cultures associated with the Mississippian and Oneota worlds. For this reason we here propose to refer to these Minnesota grassland inhabitants of the Late Prehistoric period as Prairie Villagers.

The Prairie Villagers of southwestern Minnesota were not confined to a grassland environment. Indeed, the clear evidence of diffused traits from the east suggests that there was no necessary dependence on open country resources, such as bison. Undoubtedly, these people were capable of exploiting a range of habitats, and clearly did so. The diagnostic cultural indicators of the Prairie Villagers thus extend into the lake-forest portions of Minnesota, and are commonly encountered in the archaeological collections deriving from ecotonal settings, and in some cases, from even farther into the central portions of Minnesota. The similarity to the Dakota land use pattern is obvious.

Geography, including physical distance, landform, and vegetation cover are influential variables in the distribution of peoples and their affinities. Population density is also a factor. Based on the recent survey of Swift County (Holley, Michlovic and Dalan 2011b), a county that typifies the diversity of the prairie environs, with rivers, creeks, and lakes, and occasionally elevated side-margins, we posit local concentrations of people, noting that overall population densities never exceeded the average carrying capacity of the land. As a result, one factor in understanding the past in this region is to recognize that certain cultural expressions may represent a congregation of peoples for a short-lived time that hides the true population density.

Woolworth and Woolworth (1980) illustrate the nature of Dakota land use, with many substantial villages in some areas such as the lower Minnesota River, while farther upstream occupation is much lighter. Babcock's (1945) work may be used to estimate a Dakota population of 10000-15000 for our study area in the Historic period, but a population obviously concentrated in some areas, sparse in others. Fox Lake culture represents one intriguing expression of this during Middle Woodland times. This complex is heavily represented on at least one lake in southwestern Minnesota, while Fox Lake ceramics are widely distributed, but never dominant. Outside this core area there are no other comparable Fox Lake concentrations. The same holds for Cambria and Oneota, excepting that we concede with the introduction of cultigens to the mix sometime during Late Woodland, overall population density did increase.

2. Radiocarbon dates falling within the Late Prehistoric period were acquired for five sites, several of which had not previously been dated. The dated sites are Owen D. Jones (21BE5), Price (21BE36), Maplewood (21OT36), Browns Valley (21TR5) and Lou Miller Mound (21BS4). Owen Jones and Price are Cambria sites from the Cambria core area and had been previously dated. Dates on the other three sites provide a radiometric age for diagnostic ceramics that may be assigned to the Prairie Villages, and span a period from about 1000-1300 in the calibrated radiocarbon chronology. All dates consisted of assays on charcoal or bone and were obtained using AMS. The dates on three of the five sites included split samples sent to different radiocarbon labs. In all cases the dates from the separate labs were in close correspondence.

The dates obtained here are consistent with previously published ones, although our project dates cover a less expansive time period. While earlier Cambria core area dates spanned 900-1400, the dates presented here for Price and Jones run only from 1000-1300. This suggests that the Cambria core area with the clearest Cahokia ceramic affinities may be somewhat more restricted in time than previous dates indicate. On the other hand, the Cambria-affinis pottery from the Big Stone and Ecotone regions does appear, from previously run assays, to extend into the fifteenth century.

3. Diagnostic artifacts associated with the Prairie Villages of southwestern Minnesota include, among other features, cord-impressed decorations, broad incising or trailing, shallow punctates, rolled or pseudo-rolled rims, incised hachure or short incised lines, rim tabs with angled shoulders, smooth surfaces and grit temper. There is a clear pattern across southern Minnesota of a diminishing incidence of rolled and pseudo-rolled rim treatment. This pattern extends from the southeast, where such treatment is common, to northwest, where it seems to disappear in the west-central Minnesota lakes area. Cord impressed decoration and the HIP (horizontal incised pattern) may be earlier, while trailing continues to be more popular in the middle and later Village time period. There is evidence in the Minnesota prairie area of western ceramic traits as well. Occasional S-shaped rims, simple stamped vessel surfaces, and tightly spaced, multiple cord impressed decorations are found here occasionally.

Beginning at the interface of Late Woodland and the Late Prehistoric profound regional variations emerge in southwest Minnesota. Great Oasis, at least as defined by the narrow definition of finely-made incisions on two types of jars, is confined to the edges of southwestern Minnesota. This culture dates from 950-1050. It has been the contention of prior archaeologists

(for example, Anfinson 1997:124) to naturally assume that the local residents who did not move nor adopt this new style retained the local Late Woodland tradition, such as Lake Benton, Kathio or Blackduck. Our earliest radio-carbon dates from Maplewood and Browns Valley overlap this time span and could be taken as representing the local alternative to Great Oasis. While both sites and regions display minority ceramics that resemble the HIP of Great Oasis, they remain different and would only be included in Great Oasis if a big-tent approach were advocated. It is possible to argue that they post-date Great Oasis, although the undated but presumed occupation at Shady Dell in the Big Stone region has all the hallmarks of a transitional expression.

The tandem occurrence of cord impressions and wrapped rod stamping identified archaeologically at Shady Dell are solid signatures for a transitional Late Woodland –Late Prehistoric expression. But these decorative techniques likely have longevity in the region; they have demonstrated longevity in the Plains. Ronald Shirmer (personal communication 2013) has observed cord impressed ceramics stratigraphically below the minor Great Oasis occupation at the Langseth site (21NO11). If the cord impressed ceramics were primarily of the HIP variety with cordmarked lower bodies, such a dating would not be inconsistent with our perspective. Cord impressions continue until well after Great Oasis and became a standard for Middle Missouri traditions. The interesting question that arises from this query is why did Great Oasis people take such great effort in disassociating themselves from this method of decoration?

The earliest ceramics from Maplewood and Browns Valley are truly a polyglot. Browns Valley ceramics defy classification displaying a hodge-podge of treatments and a striking contrast to the uniformity of Great Oasis. Perhaps this is the secret to unlocking the Late Prehistoric in the region. Yet we hesitate from making the logical leap that the Late Prehistoric was always characterized by a congeries of people. This notion though may characterize some regions at some times within our study area.

We come away with a notion of an early Late Prehistoric (approximately 900/1000-1150/1200) as being regionally heterogeneous and displaying vestiges of Late Woodland styles. Even most Great Oasis vessels were cordmarked and judging by the continued appearance of cordmarking and Cambria styles, this heritage was not uniformly forsaken in our middle period.

A middle period (1150/1200-1400) is characterized by greater uniformity; although one that belies diversity as well. The Cambria horizon, which is part of Cahokia-fueled, Stirling rolled-rim horizon, is on the recognition level of sherds a homogeneous expression. At potentially any site in our region one may encounter thin-walled smoothed plain (or polished or incised) sherds that are labeled Cambria. This designation is both correct and incorrect. It is correct because it does signify the appearance of a vessel that is smoothed all-over (mostly), polished, and incised (typically with a broad incision that may verge on finger-incising). It is incorrect if we assume that the appearance of this vessel signifies across-the-board affinity with the Cambria core or that it is contemporaneous with the Cambria core. In short, this vessel outlasts the Cambria core and the Cahokia horizon and is contemporaneous with the succeeding Oneota horizon. In short, the distinction between Cahokia-based styles and Oneota-based styles that archeologists to the east and south readily make becomes blurred on the margins. Indigenous potters never fully bought in to the Stirling horizon (there is no shell temper, for example) and it appears that this reluctance or part-sharing continued after the Cambria horizon. These potters

jettisoned the angled shoulder and inslanted jar and brought in punctations (or took them from purely decorative to integrative with the incised designs), exactly as did Oneota potters.

Not only is temporal diversity present in Cambria, here identified as middle Late Prehistoric, there is spatial diversity as well. What has been called Cambria in the past can be divided into three. There is a core locality that has the greatest ceramic variation and the greatest concentration of people. It is located just outside the forest zone into the prairie. The core Cambria has elements that are distinctly Mississippian, copies of Mississippian (Linden), Plains affinis (S-shape), and uniquely local expressions (Mankato Incised). Such local expressions are agued to have derived from a Great Oasis base. Such a mix is not out of character with Initial Middle Missouri complexes particularly the eastern strains, which was one of reasons behind the identification of Plains Village in Minnesota (cf. Gibbon 2012: 165).

The second variety of Cambria is scattered throughout western and southwestern Minnesota, never concentrated or at least never concentrated in the same manner as the core locality. It is associated with burial mounds and seemingly small scale occupations. Ceramics for this variant are limited to plain surface jars with broad incising and reduced representation of jar rim modification. Angled jar shoulders are also present. This peripheral Cambria, so called because it is found geographically westward of the core area, is typically found at places where Late Woodland is present, and sometimes significantly so. It appears that early examples have cordmarked lower bodies and incised shoulders. A third Cambria manifestation comprises a late variety of the scattered second. Like the second it is comprised of small scale settlements, and burial mounds, and the ceramics are also plain surface jars with broad to medium incising and rim tabs without evidence for angled jar shoulders. This is a Cambria that may have a greater influence from Oneota. A pattern is dimly perceived in the limited samples available for inspection. In areas where Oneota sites or material is found there is little evidence for this late Cambria. For example, in the Ecotone Oneota is not reported, but Cambria is present, albeit in its late and peripheral variety. Big Stone is another example where Oneota is absent, but peripheral late Cambria is present. An exception is the Upper Red River where, even though a true Oneota site is not found, there is a clustering of sites with Oneota, Sandy Lake, and a Cambria-Oneota stylistic mix that may represent a cultural entrepôt. Oneota sites are represented in the Minnesota River area and Oneota ceramics are present on the lakes in southwestern Minnesota.

These two varieties of peripheral Cambria appear to be largely limited to plain surface, incised jars. However, in the Ecotone there is the potential for cord impressions (early) and shell tempered pottery (late). True Plains Village pottery, while occurring in small numbers during this time throughout most of our study area, was never significant, except perhaps on the fringes at the Pedersen site and western Lake Traverse. If this is true, why then would this "other" Cambria be identified as Plains Village? There is a simulacrum quality to this Cambria. It resembles what is closest to it: early it is the Stirling horizon, later it is Oneota. And, to be sure, there are Plains Village elements, but these pale in frequency compared to the ultimate modeling source to the south and east.

Cambria's participation in the Stirling horizon is part of a style-decay process. Proportional representations for the rolled rim stretching from Red Wing to the Red River illustrates this phenomenon. At Red Wing rolled rim jars constitute about 70% of the vessels

during the Silvernale phase, corresponding to the Cambria core (note this proportion greatly exceeds anything witnessed in the shadows of Monks Mound at Cahokia). At the Cambria site, based on a rough count of vessel profiles provided by Katy Mollerud, rolled rims comprise about 25% of the vessels. In peripheral Cambria sites where we have a large sample, such as Gillingham and Guatefald, rolled rims (using that term loosely) account for 5-15%, respectfully and most of the so-called rolled rims have notching of some form – a decidedly non-Cahokia treatment. In truth, these rolled-rims should be lumped with others as a category of modified rim. Moving further afield we find a few stray examples of rolled rims in the Big Stone region and Prairie Lakes but we coarsely estimate that they are less than 5% of the jar rims. Needless to say, the third or later version of peripheral Cambria has not even a trace of modified rims.

As noted the third or late Cambria found scattered particularly in the Ecotone and Big Stone regions is contemporaneous with Oneota. For the most part, these ceramics do not co-occur with Oneota, that is they represent a copy of Oneota and we suspect they date from 1300-1450. We do not know what other kinds of vessels are being used, although it is likely that some shell tempered vessels might be present as well as some Plains Village vessels.

The terminal occupation of the region would appear to be exclusively Sandy Lake. Although prior presentations of the spatial distribution of Sandy Lake have stressed that it is north of the Minnesota River (cf. Lofstrom 1988), we believe this is erroneous. There can be no doubt that Sandy Lake, probably after 1400, moves from the north into southwestern Minnesota. At times these people may interact with Coalescent and Oneota peoples, creating such occupations as witnessed at the Pedersen site. Given the current definition of Plains Village, it is not possible to identify this terminal occupation as a Plains Village component.

It is as a solution to the quandary of Plains Village culture in southern Minnesota that we offer the alternative construct of Prairie Village. For the most part, it is simply replacing the term Plains with Prairie, but it is also recognition that what developed in the region between the Mississippi and Missouri Rivers was a unique pattern. It also recognizes the significance of the eastern influences in the region, in contradistinction to past practice, which separated these southwestern Minnesota cultural materials from their eastern progenitors and affiliated them with the Missouri Valley, a practice that continues in some quarters today (cf. Gibbon 2012).

4. The view presented here that the Prairie Villagers of southern Minnesota display ties to the east is reinforced by the relatively frequent presence of earthworks throughout the region. Earthworks associated with the Plains Villagers in Kansas, Nebraska and the Dakotas consist primarily of occasional conical mounds and fortification ditches.

In southern Minnesota there are a variety of earthen features that reflect eastern influence. Mounds are common, though perhaps not as common as in the woodland settings to the east and north. Some of these mounds are reported in early mapping projects to have had flat tops, not unlike more substantial examples in the Mississippian world. In addition to the mounds there are a variety of earthen enclosures in the prairies of southern Minnesota. While most of these have disappeared under the plow, the reports of Lewis and others, summarized in Winchell, make clear that enclosures were present from the eastern to the western boundaries of the Minnesota prairie. These enclosures were sometimes clearly defensive, as may be seen in the ditches at the

Tenny, Bunker Hill and Shady Dell sites in Traverse County. Other enclosures are much larger than these and are not necessarily associated with heavy habitation debris. These enclosures may include ditches and embankments, such as were reported in Lincoln County and Browns Valley. Others appear to have been embankments only, as at the Little Rapids site. Since the Little Rapids site is a historic period Wahpeton village, and since the enclosure was probably used for dancing, it is obvious that enclosures may have had ceremonial uses in some cases, defensive uses in others. It is also clear that enclosures were used into the Historic period and were used by peoples historically described as living in village settings. The use of ceremonial enclosures is in clear evidence at eastern North American sites extending from the Woodland through the Mississippian periods. Such features are much less common westward in the High Plains.

5. Plains Village culture as it has been understood historically is heavily influenced by the cultures of the Middle Missouri Valley of the Dakotas. In that area the well documented communities of the Arikara, Mandan and Hidatsa stand as the exemplars of village living. Earth lodge houses with depressed floors, substantial timber frameworks, circular shapes and multifamily living spaces were arranged within the communities, sometimes surrounded by a fortification ditch. Subsistence was based on bison hunting, a variety wild plant foods, and produce from floodplain gardens that were primarily planted with maize, but also with beans, squash, sunflower and tobacco. Archaeologists describe these as "dual economy" settlements based on sub-equal attention to river bottom gardens and wild resources.

This view of village life is at some variance with the life-style practiced by the Prairie Villagers of southern Minnesota. During the Historic period, particularly until about 1850, the southern Minnesota region was home to the Eastern Dakota. Various bands of the Santee, and in the west some groups of Yanktonai-Yankton, lived in village communities from the Twin Cities area, through the Minnesota River Valley and into the Big Stone region. Those among these Dakota villagers who lived to the west were known to occasionally use small earth lodges without entry-ways. Other Santee used the pole-framed gabled multi-family house, the tipi and occasionally a wigwam. Although a single ethnicity, the Dakota used a variety of house types and shapes. Furthermore, unlike the Missouri Villagers, the Dakota are often described in historic reports as desultory farmers or gardeners. They considered themselves hunters and described themselves as such to Euro-Americans, such as Samuel Pond. Even so, the Dakota of the Minnesota River Valley were quite clearly villagers who lived in sizable communities and used some domesticates.

The nineteenth century Dakota villages of the Minnesota prairie region were clearly unlike the villages of the Middle Missouri area. The Dakota had contacts with people in the east such as the Ojibwa, Iowa, Oto, Menominee and Winnebago. Not only their house types and the amount of effort they put into gardening differed from that of the Missouri River villagers, they also lacked the same type of ceremonies and social structure found among the Mandan, Hidatsa, Arikara and Pawnee. Given the differences between the village culture in southern Minnesota and the Missouri Valley in the Historic period, it seems fair to suggest that a similar overall difference in culture would be present in the centuries prior to European contact.

It is important when considering prehistoric cultures identified on the basis of material culture that there is only an approximate correspondence to ethnographic cultures known from

the present of the recent, historic past. While there may be a gradual diminution of some artifactual trait over space, such as rolled rims, it is unlikely that the use of such a trait was a salient feature of any particular self-identified group. If we consider the Santee Dakota, for instance, they regarded themselves as Dakota, related ethnically and historically to other Dakota, such as the Yankton or Teton. If we view their culture in terms of individual traits, whether material, social or ideological, we see a number of features in common with their neighbors to the north and east, the Ojibwa. For example, the Santee shared with the Ojibwa floral decorative patterns readily distinguished from those of their Teton relatives, whose Plains-like geometric artistic motifs were obviously different. Even in some elements of kinship terminology the Santee appear intermediate between the Ojibwa and the Teton. Tracing patterns of artifact element distributions is not a method for the detection of discrete cultures, but rather a technique for tracking time, contact and affiliation in the archaeological record.

Archaeologists tend to understand archaeological cultures in the same terms as ethnographic cultures. The two are not the same. Certainly, the analysis of a carefully excavated site may provide the foundation for a description that might indeed correspond to real community at some time in the past. On the other hand, using museum collections, survey data, and curated materials from miscellaneous past projects is unlikely to provide the kinds of data needed to reconstruct an equivalent to an ethnographic culture. Instead, it may be possible to track the distribution of culture traits that in the past extended across emically real ethnographic boundaries. It should, however, be possible to identify trait clusters that reflect some actual contacts and communication between peoples who may have belonged to different cultural groups. For these reasons we are not suggesting here that the Prairie Villagers of southern Minnesota were an actual ethnic group such as the Dakota. We are suggesting that given the obvious differences between the Santee and the Mandan-Hidatsa-Arikara that the cultural materials reported here, have clear eastern affiliations. The Prairie Village culture of southern Minnesota was, therefore, perhaps as disjunct from the Middle Missouri Villagers as the Santee Dakota were from the Mandan-Hidatsa. The occasional Middle Missouri archaeological trait found in the Minnesota prairie area need not lead us to conflate the archaeological remains of these two regions any more than the use of a modified earth lodge by the Yankton need lead us to confuse Yankton Dakota culture with that of the Arikara.

6. Henning and Toom (2003) have joined the Cambria sites of southern Minnesota, here regarded as part of the Prairie Villagers, with the Northeastern Plains Village complex. Under this scheme the southern Minnesota villages represented by Cambria comprise the earliest phase or variant in the Northeastern Plains Village tradition, dating from about 1200-1300 (Toom 2004:283; 294). He suggests that these village peoples eventually moved to the northwest, ultimately arriving on the Missouri River to become the Hidatsa. We recognize that there are certain advantages to this position. Toom and Henning found a way to incorporate the archaeological materials from the Late Prehistoric period in southern Minnesota with the villages of the Middle Missouri cultural climax without the complications of extending the Initial Middle Missouri variant into southwestern Minnesota. While we concur with this position to a certain extent, on balance we refrain from embracing it for several reasons.

One problem with collapsing the Cambria materials into the Northeastern Plains Villages is that Cambria consists of relatively large villages in the core area with some distinctive ceramic

types that show clear Mississippian affinities. We do not argue that Cambria was integrated into some larger Mississippian network. Still, making Cambria part of any Plains Village tradition leads to taxonomic problems. For example, the distinctive ceramic features that define Cambria include smoothed surfaces and trailed line or broad incised decorative motifs, often placed on the vessel shoulder. Rolled rims and pseudo-rolled rims are also an eastern trait found in the Cambria materials. Although some of these features do appear on Plains Village ceramics they are not the features that make these Plains ceramics distinctive. Cord impressed decoration, S-shaped rims, simple and check stamped bodies and some distinctive motifs on the upper neck and rim are a few of these distinctive features.

Another issue is the nature of the Northeastern Plains Village sites already defined. This cultural taxon arose in part out of the concept of the Stutsman Focus of the James Valley in North Dakota (Toom 2004: 283). Stutsman materials are believed to date to the protohistoric period, and include round houses with entryways and ceramics that include some distinctive smooth surfaced materials, some Woodland-like pottery, and other vessels that include S-shaped forms and other types that are clearly Middle Missouri in inspiration, or perhaps even in origin. More recent work has identified Northeastern Plains materials in the Sheyenne and Red River valleys and in southern Manitoba as well. Some of this more easterly of the Northeastern Plains Village material has been classified as part of the Shea phase in the Maple Valley of southeastern North Dakota (Michlovic 2008). Here there are small bluff-top communities of around one to two acres in size. A number of these are surrounded by substantial ditches for the purpose of fortification. Maize and tobacco have been documented at the Shea and Sprunk sites, and bison represent a large proportion of the faunal remains, although river mollusks, waterfowl and wild plant are commonly present as well. Small triangular and notched points, end scrapers and many expedient tools are also found. The ceramic assemblage contains very few indications of Middle Missouri influence, but is dominated by Sandy Lake ware, and by several types of smooth surfaced, or smoothed over cordmarked surfaces, and some simple stamping. The smoothed pottery often is decorated with incised lines, shallow punctuates and lip impressions. This latter pottery does display some traits in common with Cambria; however, the decorative designs are closer to Oneota. Sinking Cambria into this complex of materials seems to include too much variability and perhaps masks some significant cultural differences. It also ignores the obvious eastern affiliations of the Cambria phenomenon. In fact, the Shea phase ceramics are more readily understood if the relationship of Oneota and Cambria to various peripheral ceramic styles is taken into consideration. In the case of both Cambria and Oneota, as shown above, ceramic vogues on the perimeter of the core distributions of these styles imitate their well-defined and established neighbors.

We are hesitant, on the basis of a review of literature and collections, and the accumulation of a few additional radiocarbon dates, to recommend wholesale changes to our understanding of southern prairie archaeology in Minnesota. We are most comfortable suggesting that the Plains Village concept is best dropped from future discussions of this particular region. That notion is one that ties the archaeological assemblages from Minnesota to those from the major drainages of the Central Plains and the Middle Missouri Valley. Attaching southwestern Minnesota to these Plains assemblages does make some sense, especially insofar as the farther west one moves in southern Minnesota, the more likely one is to find some true Plains Village related material. Overall, however, we feel “Plains Village” designation ignores the

larger issue of clear and strong eastern affiliations for the Minnesota prairie assemblages. This includes consideration not only of ceramics, but of earthworks, such as mounds and enclosures as well. It is probably appropriate to also point out that during the early historic period the known cultures of southwestern Minnesota were of mostly local or eastern connections. Adding another term such as Prairie Villager complicates discussion, but we feel clarifies the nature of the actual material present in the region.

We are not suggesting formal taxonomic status for the concept of Prairie Villages in southwestern Minnesota. This is something that may be considered only after there is additional excavation at several village sites in the region. One of the bluff top sites in the Lake Traverse-Big Stone area, additional work on the upper Minnesota River, and some in depth study of a site in the Cottonwood River drainage would be invaluable in more fully characterizing the Prairie Villagers and their relationships.

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Appendices

By

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Browns Valley Investigations

Browns Valley is an enigmatic site, or, more properly, a series of closely spaced prehistoric components that represent multiple uses of the landform over millennia. These sites are clustered on the northeastern edge of the town of Browns Valley in Traverse County, Minnesota. The town of Browns Valley was an elevated gravel bar, essentially an island, in the middle of a large channel resulting from the drainage of Lake Agassiz. The gravel bar was a fan deposited by the Little Minnesota River after the termination of the River Warren discharge. This fan resulted in the formation of Lake Traverse by altering the discharge flow (Wright 1990).

The archaeological significance of Browns Valley was brought to the attention of the public by the discovery of a late Paleoindian burial during gravel borrowing operations (Jenks 1937). At the time, this find represented one of the earliest burials in North America. In an attempt to find additional information relating to this significant burial excavations were expanded from the burial spot along and into the exposed face of the borrow pit. This excavation, which is only summarized by Jenks, resulted in the recovery of deposits dating later in time and thus investigations were halted. To the immediate north and west of these investigations lay the remains of a prehistoric enclosure first identified by Theodore Lewis in 1883 (Lewis 1883) as part of his survey of native earthen monuments. Winchell (1911) transferred Lewis's sketch map onto a plat map of Browns Valley, revealing one of the largest native enclosures in Minnesota.

These three archaeological components were later designated by two site numbers. The Paleoindian burial and Big Stone occupations are associated with the site identified as 21TR5. The earthwork was designated as 21TR19. The Browns Valley man find was a source of archaeological debate (Anfinson 1997); whereas the later dating occupation was ignored until Anfinson (1997) combined them with other miscellaneous components into the Big Stone phase of the Late Prehistoric period. In contrast, the earthwork has been ignored since no further work was expended on the earthen feature.

Our investigations were directed toward the later dating deposits near the Browns Valley Man find (21TR5) that involved the analysis of the recovered material and the submission of bone samples for dating. Reconnaissance field work was invested by the 2012 Minnesota State U. Moorhead Field School in Archaeology in finding remnant traces of the earthwork (21TR19).

Appendix A provides our analysis of the 21TR5 data. Appendix B details our methods of investigation and interpretation of 21TR19.

Appendix A: 21TR5

The Excavations

The material described is currently curated at the Minnesota Historical Society facilities and derives from excavations at Browns Valley (21TR5). A Works Progress Administration (WPA) crew shaved the face of the borrow pit in the vicinity of the Browns Valley Man find. No field notes are associated with the collection, although catalog descriptions of the accession numbers provide some information, along with a brief description by Jenks and a surviving photograph of the excavation in progress. The first excavations were led by James West (1936), a graduate student trained by Jenks, and associated with the accession no. 163, and Carmen Brown (1937) and associated with accession no. 165 (Table A1). More material with multiple designations of fire pits is associated with the 1936 work; all of the 1937 collections are lumped as one (Table A2). We are unsure if Brown continued excavation much beyond West's work as the catalog provides only information on when the material was accessioned (1937).

The photograph (ID 7477-A) from 1936 accessed at (http://collections.mnhs.org/cms/display.php?irn=10844831&websites=no&q=browns%20valley&startindex=1&count=25) reveals the excavation strategy of shaving the face of the exposed borrow pit. It appears that they excavated to a depth of 7-8 feet, based on Jenk's presumption that there were deeper deposits associated with or prior to the Browns Valley Man burial.

It is worthwhile to provide Jenks's (1937:10-11) quote of the missing report from West:

> The excavation was a continuation of that conducted in 1934 by Dr. Jenks and a seven foot vertical bank of gravel was maintained in front of us at all times. The gravel was gently scraped down this face to the bottom, for whence it was shoveled to the rear. This was done so as not to disturb any gravel overlying any find deep in the pit. We worked

> thirty hours a week for three months with a number of men varying from seven to nineteen per day, totaling 3,841 man hours. During the time we excavated approximately 3,000 cubic yards of gravel . . . No additional traces of the Browns Valley Man culture found, but we did find many evidences of later Indian habitation as expressed in fire hearths, artifacts, and caches. Numerous small hearths were excavated. We inspected about fourteen of the larger hearths, sixty artifacts, and four caches. Animal bones were present in abundance, but no human bones were encountered.

In another quoted passage, West mentions that he covered an area 50 feet west of the Browns Valley Man find (Jenks 1937:11). Jenks further notes that Brown by December of 1936 uncovered an additional 2,600 cubic yards. And, based on catalog notes, Brown may have continued working into 1937. Some simple calculations estimate that if a 50 ft arc was excavated to a depth of 7 feet deep it would result in an area of up to 20 feet wide, and given that excavations may have continued, we might assume that more was excavated.

No further data was retrieved relating to the terminal Paleo burial, although a collection of ceramics, lithics, and bone was recovered from general excavation and feature contexts (Table 2). Three hearths were identified with associated ceramics, lithics and animal bone.

Although we have no records of the borrowing, local informants and aerial photographs of 1938 and 1951 reveal that the borrowing for gravel continued. Thus we assume that traces of the ceramic occupation were obliterated in this area. At the present, borrowing has ceased.

Table A1. Catalog Information on Collections, 21TR5

Accession No	Name excavator/donor	Year(s) acquired
163	**James West, WPA Project**	**1936**
165	**Carmen Brown, WPA project**	**1937**

Table A2. Accession number and Context, 21TR5.

Accession No.	Context
163-1	General contexts
163-3	General contexts
163-6	Articulated
163-8	from top stripping operations
163-13	fire hearth W of B.V. man, 8 in. deep
163-14	fire hearth associated w/ burnt bones & knife
163-15	fire hearth in surface dirt, 7 in. deep
165-1-5	General contexts

Scott Anfinson (1997) in his attempt to synthesize the archaeological sequence for southwestern Minnesota reexamined the collection and provided a description of the ceramics. No trace existed of the landform near the excavations as borrowing continued into more recent times. Anfinson placed the occupation in the polyglot Big Stone phase that represented the third possible Middle Missouri-influenced archaeological culture in the region. This designation as Big Stone phase lumped it with a jumble of other ceramic strains in the region and possibly obfuscing its significance.

We have analyzed the stone and ceramic remains. We did not analyze the bone, although bison elements were selected for dating.

Ceramic Description

All of the ceramics curated from the 1930s excavations are grit tempered. The grit temper comprised crushed or rotten glacial till rocks. Stray particles may reach 5 mm in size although most of the visible temper ranges up to 2 mm in size. Some of the sherds have a pinkish-colored paste, and some of these may have reduced cores, but most are variegated (gray to yellowish) indicating incompletely oxidized firing environments. Pinkish to whitish colored pastes are commonly identified in the sample of sherds from Lake Traverse County collected by Craig Johnson (1991). A preliminary consideration (simplified) of paste and temper indicates the presence of two wares: coarse grit, which comprises most of the cordmarked sherds, and fine grit that incorporates some of the cordmarked and all of the decorated vessels.

A consideration of body sherds, jar necks, and rims provides a means of reconstructing the vessels (Figure A1-A5). Slightly less than half of the rims are cordmarked to the lip (6 of 13) (Table A; Figure A2 a-c). However, it is likely that all or nearly all were cordmarked on the lower body below the neck. This is based on the predominance of cordmarked sherds (84% of sherds with intact surfaces). Sherds with a portion of the upper neck, i.e., above the crease, were cordmarked on the shoulder and plain above the neck crease. Base fragments, evident by their thick walls and curvature were uniformly cordmarked (Figure A5 e, f). Neck junctures were also thick-walled (Figure A5 b). Most of the cords were wide and smeared on the vessel surface, or were partially obliterated in the finishing process. Clearly many of the vessels were partially smoothed, although given that it was an incomplete process, this could not be reliably determined. Based strictly on the discrete vessels, only one of the six appeared to represent nearly complete smoothing, although there was a gradient from distinct cord strands evident to a wiped blur. For this reason, cord twist was hardly identifiable in the sample. Only four surfaces revealed cord twist (Z-3, S-1), but given the paucity is an unreliable measure.

The incised and rod stamped sherds are consistently thicker, perhaps partly because of sample size, and the fact that most occur in the neck area of the jar. If we examine thickness for all vessels in the area between the rim and neck juncture we arrive at thicker average, and the same applies to the neck juncture, which can be as thick as the base.

Slightly more than half of the jars were decorated with incising, stamping, or punctation. All decorations were on a smoothed plain surface. Although two of the rims were identified as smoothed plain, these were too small to reliably reveal surface treatment. Incised jars comprised at least three patterns: horizontal lines (HIP) with up to seven lines (Figure A1 a, b); oblique diagonal with slightly overlapping of the lines (Figure A1 d); and a fragmentary pattern or horizontal lines bounding (on top of) diagonal lines (Figure A1 c). The incision was moderate in width (1-3 mm) and depth (1 mm) and the lines were spaced from 1-3 mm. On one vessel the incised lines appear sloppily executed and portions were partially smoothed over. Overall, the incised treatments contrast markedly with the somewhat similar but betterl-executed Great Oasis examples found at other sites. The placement of diagonal tooled impressions or notches on the exterior rim are in keeping with the vogues of Great Oasis and Chamberlin Horizontal Incised (Johnson 2007:Figure B3e), which may postdate Great Oasis and would thereby agree with the dates we retrieved from this deposit.

Stamping was the second most common decoration and involved the application of a wrapped rod or framing device that left behind a depressed row of impressions (Figure A3 d, e). One rim is decorated in this manner as well as a number of sherds. One sherd appears to have a row of impressions that resemble a form of dentate stamps. Two of the rod-stamped sherds have a row of diagonally stamps as a border; one above and one below. More than four rod stamped rows are present on the vessel necks. A Lake Benton association may be indicated for these sherds.

Two additional decorative techniques are present. One is an interior punched node on a cordmarked jar. This is a technique that dates back to Middle Woodland times and may derive from an earlier occupation. However, a flared rim cordmarked jar with punched nodes was recovered from a burial at the Jamestown Mound sites (Snortland-Coles 1984:5.13-5.17) and is dated (calibrated) around 1000. This vessel is identified as Sandy Lake, but this is erroneous and points to a problem in the classification of grit tempered vertical cordmarked vessels in the Northern Plains and Upper Midwest. The other is a characterized by two rows of punctations on the surface of a smoothed plain jar. Punctation rows are widespread in the Upper Midwest extending from Canada to Minnesota. Nearby examples from the Dead River site (Michlovic 1979:Figure 19) are noteworthy in that they may be contemporaneous but are associated with Blackduck ceramics and not Great Oasis.

Rim notching was present on all but two vessels. The three incised jars have exterior rim tooled impressions that are slightly slanted to the right or forward slash on the keyboard. One of these also has small notches on the interior. Four of the six cordmarked jars have notching; three are superior impressions with a bolstered lip and the noded jar has exterior tool impressed notching. The crudely formed bag-shaped jar may have a scalloped rim. The two plain jars are notched, one with a superior notch similar to the cordmarked vessel and the other with an exterior slash similar to the incised jars. The sole rod stamped jar has small tool impressions on the interior and exterior of the jar.

Critical to understanding this collection is context. Foremost is the extent to which these varied styles co-occur. Three of the proveniences identify hearths (163-13, 14, 15). The other provenience numbers represent presumably generalized contexts found while excavating. The three main categories (cordmarked, incised, rod stamped) were not present in each of the hearths, although multiples were represented in all. It seems reasonable to conclude that most of the rims are contemporaneous. Of course a few vessels are odd – bag shaped for instance.

A typological approach to this collection results in the identification of four types. The incised jars are identifiable as Great Oasis High Rim, except that the execution of the incising is sloppier than typical for Great Oasis. Chamberlin Incised may also qualify as a designation for these sherds. Subjective assessments aside, these sherds are clearly part of the style that begins in Terminal Late Woodland times and remains popular throughout the Late Prehistoric period in a large area and for diverse cultures.

A type that is not affiliated with known regional variation is the cordmarked jar with a well-defined neck. At least two of the three jars have a neck shape similar to the Great Oasis High Rim and thus suggest contemporaneity or in the nomenclature of Irving Rouse, mode affiliation. They resemble cordmarked jars from the Schultz site, Lisbon Cordmarked (Michlovic, Holley, and Dalan 2012; Michlovic and Swenson 1998; Wood 1963). Based on

isolated neck sherds, however, this sharply flared neck is atypical.

The bag-shaped cordmarked jars (n=2) are seemingly out of place, as the other jars have well-defined necks. Are these examples of an earlier component? Yet such forms and stylistic traits seemingly have no home in the defined Late Woodland (Lake Benton) of the region. It is possible that this pottery represents an unknown Late Woodland component. A somewhat similar coarse ware jar was recovered from the Gillingham site.

The final type is a polyglot and comprises the rod stamped sherds. Only one rim is present, the jar neck shape is outcurving. Given the kinds of stamping and the small size of the sherds, it appears that a variety of effects are present. We can rule out such well-known types as Lake Benton and Blackduck, although these sherds may represent a genetic link to these well-established Late Woodland types.

Table A.3. Tabulation of Surface Finish Treatments for sherds and rims, 21TR5.

Surface Finish	**N**	**Wt (g)**
Cordmarked	174	774.0
Indeterminate	93	51.8
Simple Stamped?	17	25.1
Smoothed Plain	17	36.0
Incised	13	72.5
Punctuated	3	24.5
Rod Stamped	6	256
Coarse Indeterminate	1	0.3
Total	**323**	**1009.5**

Table A.4. Wall Thickness Averages by Surface Treatment, 21TR5.

Surface Treatment	**Average (cm)**	**N**	**Range (cm)**
Smoothed Cordmarked	.54	75	.31-.82
Smoothed Simple Stamped	.46	10	.33-.59
Smoothed Plain	.38	10	.28-.53
Incised	.67	8	.61-.74
Rod Stamped	.72	5	.59-.82
CM/SMCM Bases	1.13	8	.90-1.46
Jar Necks	.64	18*	.47-.74
Jar Neck Junctures	.85	13*	.43-1.09

* multiple measurements from a single sherd

Ceramic Affiliations

Brown's Valley is identified by Anfinson (1997:106, 108) as a member of the Big Stone phase. His characterization as Woodland and Plains Village expresses the presence of melding of diverse traditions or a long time span of successive cultures that can be not be reliably sorted with the present data. Indeed if the current collection under study is all contemporaneous, it does represent the mixture of Late Woodland traits in the form of cordmarking, Great Oasis incised necks, and well-formed necks typical of the Late Prehistoric. Somewhat similar examples are known from Great Oasis sites such as the Cowan site (Fishel 2005:Figure 4.5c and 4.7f). Absent from the collection, however, are wedge lip or modified lip jars of any kind, although these are a minor part of the Low Village (21MU2) collection made by Wilford .

Haberman (1993) has defined a series of collections from eastern South Dakota that would appear to represent a contemporaneous occupation. The Randall phase, dating 1050-1250, comprises grit-tempered ceramics with cordmarked bodies and smoothed plain necks that are (largely) decorated with the Great Oasis style of circumferential parallel incised lines or horizontal line pattern (HIP). Connections with Great Oasis are generic, as the Randall phase collections lack the fine-line control and neck shape diversity of Great Oasis. Also absent is any hint of the Stirling horizon or evidence for handles.

It is necessary to distinguish Great Oasis from Great Oasis-like. Researchers familiar with the variability consistently stress that the Great Oasis collections, occupying a restricted geographic area, display traits that are seldom broadcast outside of the hearth (This is the same argument made for Cambria).

It is clear that a portion of the collections are contemporaneous with the Great Oasis culture. Like the Randall phase, it is absent traces of the Stirling horizon or the local equivalent, Cambria. Cambria affiliations are projected for the Big Stone phase. Does this signify a pre-1100 time frame or an intentional avoidance of this region, which would be in agreement with the presence of fortifications? This might indicate that subsequent smaller fortifications represent a breakdown or dispersal of the aggregation implied by Browns Valley. Broad trailed curvilinear sherds are symptomatic of the Stirling horizon (1050-1200), but probably slightly later on the fringes.

Table A5. Vessel Data 21TR5. Based on discrete rims. All are tempered with grit.

VNO	Surface	Diam	NL	Jar Type	Notch	Other
1	Vertical CM	22	4.9	Flared	Superior	
2	Incised Neck	14	3.4	Flared	Exterior Diagonal	
3	Vertical CM	22	4.8	Flared	Superior	
4	SM CM	20	3.2	Flared	Superior	
5	SM CM	16	4.6	Vertical LW	Exterior	Node
6	Incised Neck	16		Flared	Ext and Int	
7	Diagonal CM			Bag-shape	Scallop?	
8	Plain Polished	16		Flared		Punctation
9	Incised Neck			Ind	Ext and Int	
10	Plain			Ind	Superior	
11	CM, plain rim			Short neck		
12	Rod Stamped			Ind	Ext and Int	
13	Plain			Ind	Exterior	

All of the pits have similar ceramics except for the rarely occurring rod stamped. Incised examples are present in two but not a third pit; however, this pit also had plain surface sherds which are possibly commensurate with the incised vessel, i.e., they are not Late Woodland. It is tempting to imagine that we have evidence for a wide range of short-term occupations spanning from early in Late Woodland (the punched node), to sometime early within the Late Prehistoric (incised and plain). Of course, this could all represent a single, but heterogeneous occupation as well.

Table A6. Body Sherd Totals by Surface Finish and Provenience, 21TR5. N-Wtg

Provenience	CM	SS?	Plain	Indeter	Total
163-1	2-4.0				2-4.0
163-3	10-99.7	17-25.1	4-5.0	2-5.3	33-135.1
163-6	1-1.0				1-1.0
163-8	65-59.8			39-20.0	104-79.8
163-13	37-43.9				37-43.9
163-14	8-15.0		1-2.0	6-2.3	15-19.3
163-15	4-7.1		7-10.2	5-5.4	16-23.7
163-16+	1-20.6				1-20.6
165-1	28-279.7		1-12.1	5-7.0*	34-298.8
Unknown	9-65.2		2-1.2	37-12.1	48-78.5
Grand Total	**165-596.0**	**17-25.1**	**15-30.5**	**94-52.1**	**291-703.7**

*includes coarse tempered sherd (0.3 g) + number not in catalog, likely 15.

Table A7. Decorated Sherds by Provenience, 21TR5. N-Wtg

Provenience	Incised	Rod	Punctated	Total
163-3	1-12.3	1-0.8	1-6.7	3-19.8
163-13	2-1.2			2-1.2
163-14	1-1.0	1-13.4		2-13.5
165-1	1-2.7	1-3.1		2-5.8
Indeterminate		1-1.8		1-1.8
Grand Total	**5-16.2**	**4-19.1**	**1-6.7**	**10-42.0**

Table A8. Vessels (13 discrete vessels) by Provenience, 21TR5. N-Wtg

Provenience	CM	Plain	Incised	Rod	Punctated	Total
163-3	1-19.5 (V4) 1-20.9 (V7) 1-5.2 (V11)			1-6.2 (V12)	2-17.8 (V8)	6-69.6
163-8			6-31.8 (V6) 1-5.0 (V9)			7-36.8
163-14		1-1.2 (V13)	1-19.4 (V2)			2-20.6
163-15		1-4.3 (V10)				1-4.3
165-1	2-71.6 (V1) 2-27.4 (V3) 2-33.4 (V5)					6-132.4
Total	**9-178.0**	**2-5.5**	**8-56.2**	**1-6.2**	**2-17.8**	**22-263.7**

Table A9. Tabulation of Ceramics from Feature Contexts, 21TR5.

Provenience	CM	Incised	Rod	Plain	Indeter
163-13	37-43.9	2-1.2			
163-14	8-15.0	2-19.5	1-13.4	2-3.2	6-2.3
163-15	4-7.1			8-14.5	5-5.4

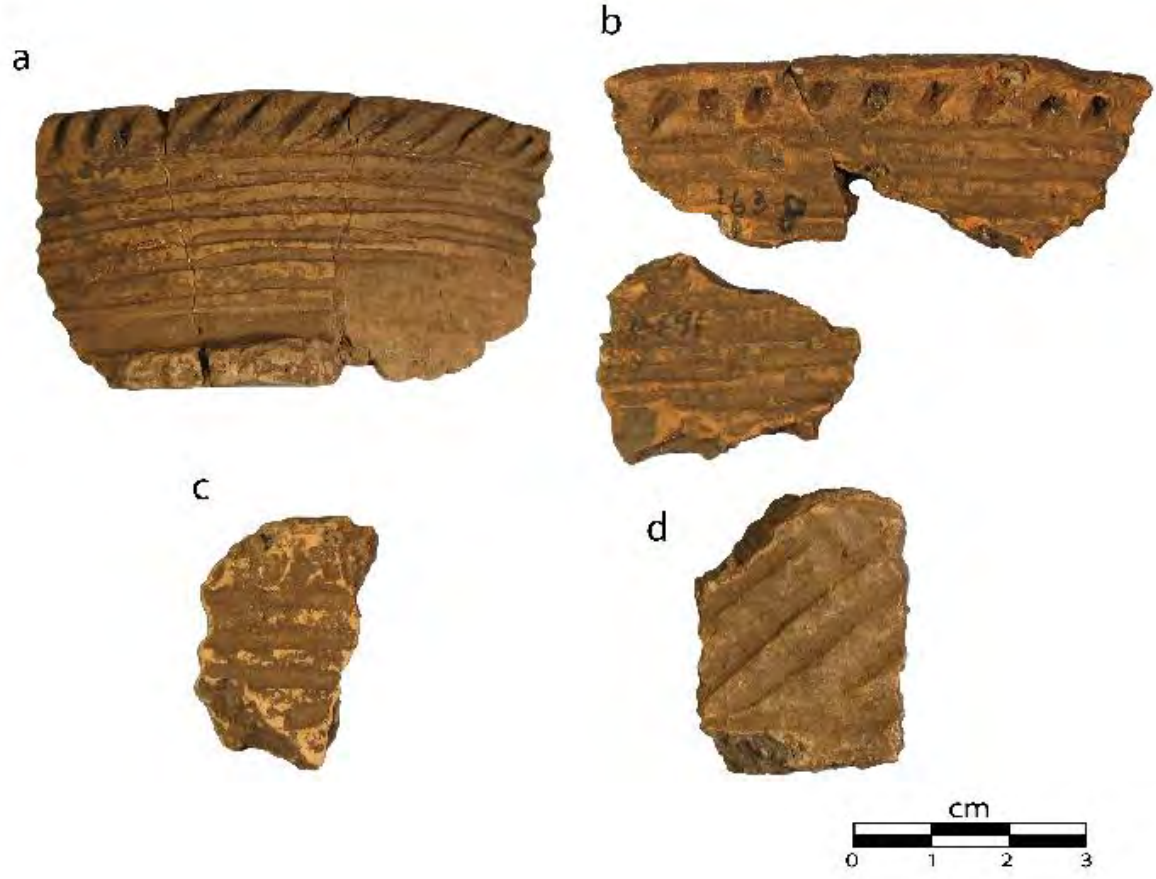


Figure A1. Browns Valley (21TR5) Incised Jars: a, Vno 2; b, Vno 6 (rim and neck sherd); c, Vno 9; d, incised neck.

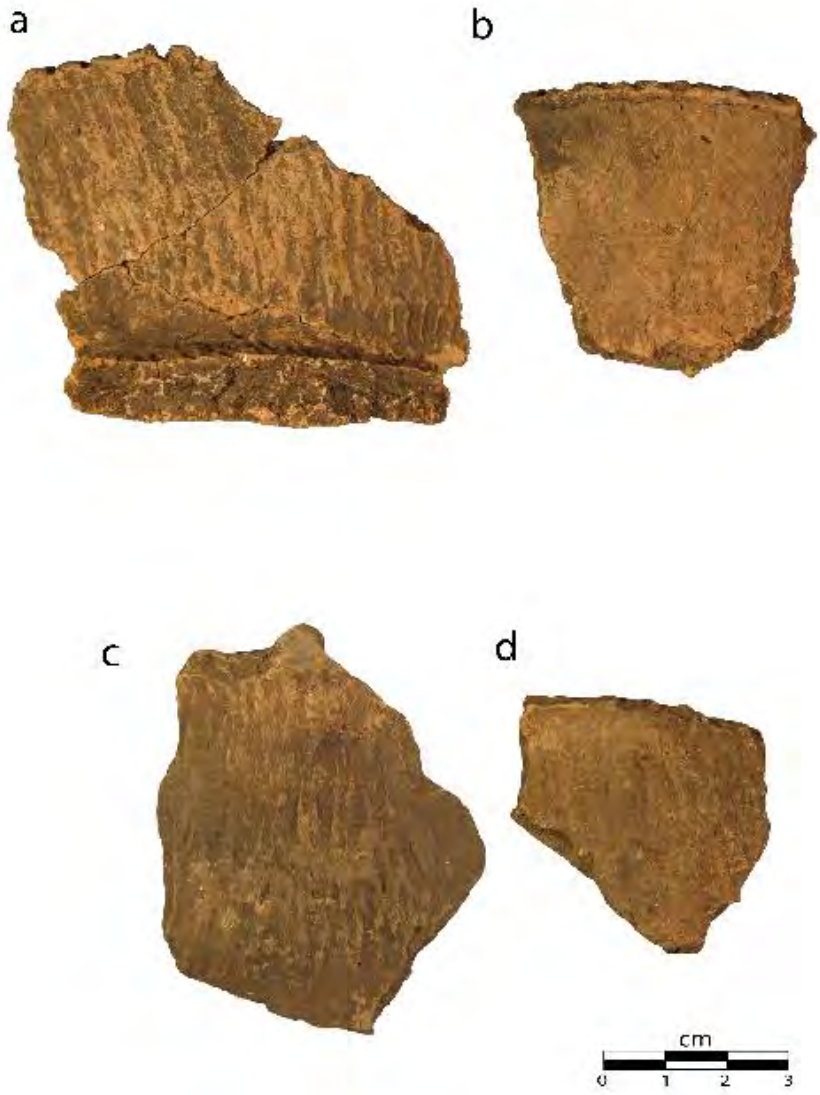


Figure A2. Browns Valley (21TR5) Cordmarked: a, Vno 1; b, Vno 3; c, d cordmarked necks.

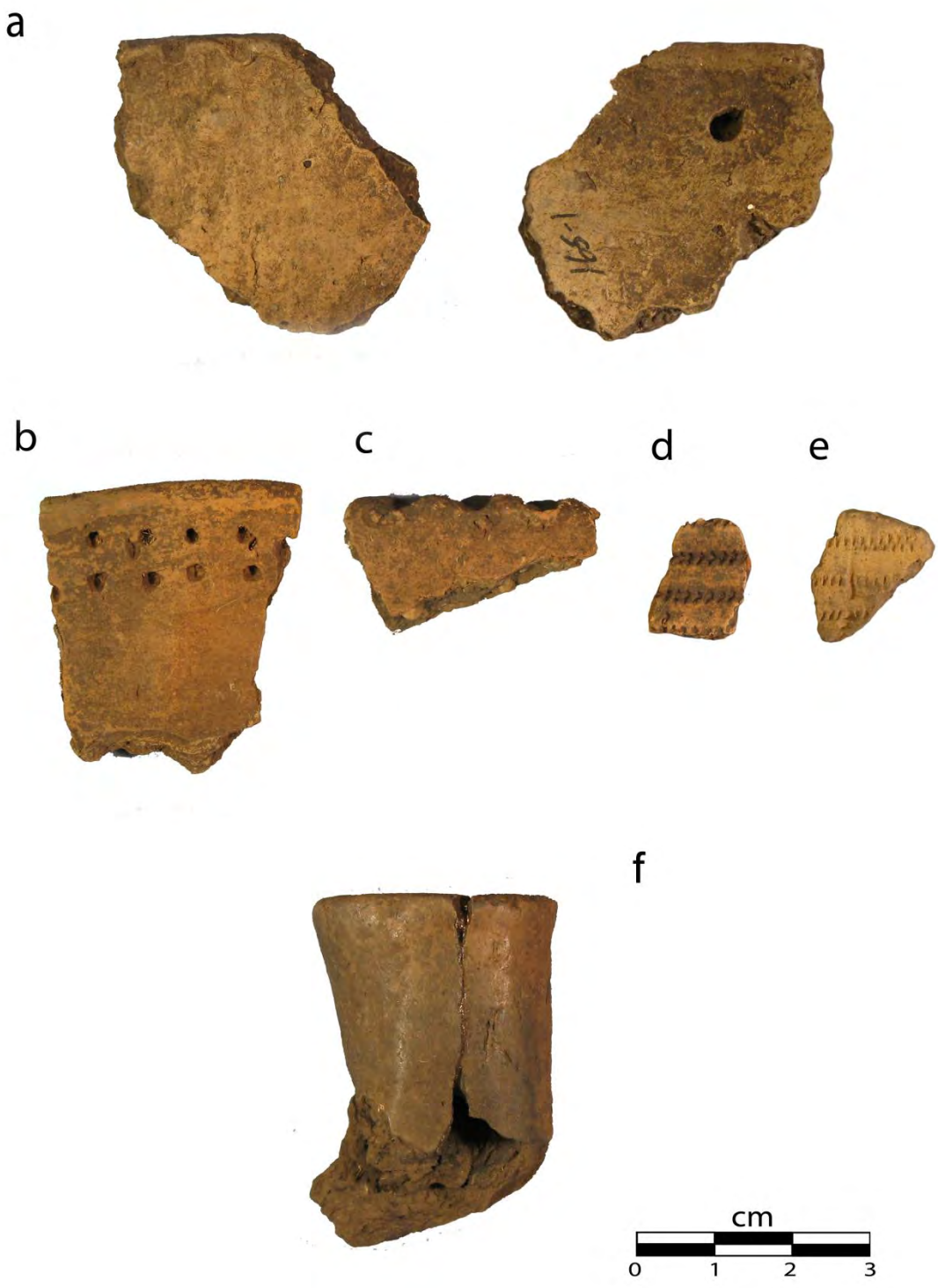


Figure A3. Browns Valley Decorated Rims and Sherds and Pipe: a, interior and exterior view, Vno 5; b, Vno 8; c, Vno 10; d, e stamped sherds; f, ceramic pipe.

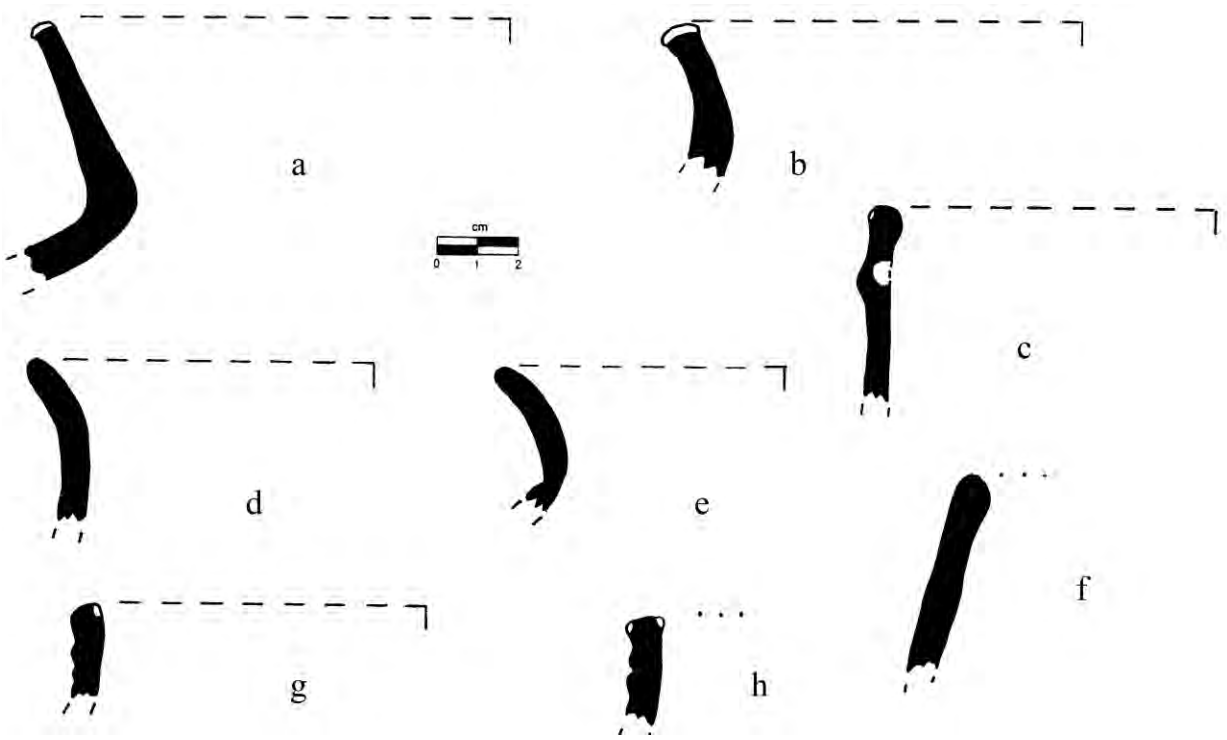


Figure A4. Profiles of Browns Valley Jar Rims: a, Vno 1; b, Vno 4; c, Vno 5; d, Vno 8; e, Vno 2; f, Vno 7; g, Vno 6; h, Vno 12.

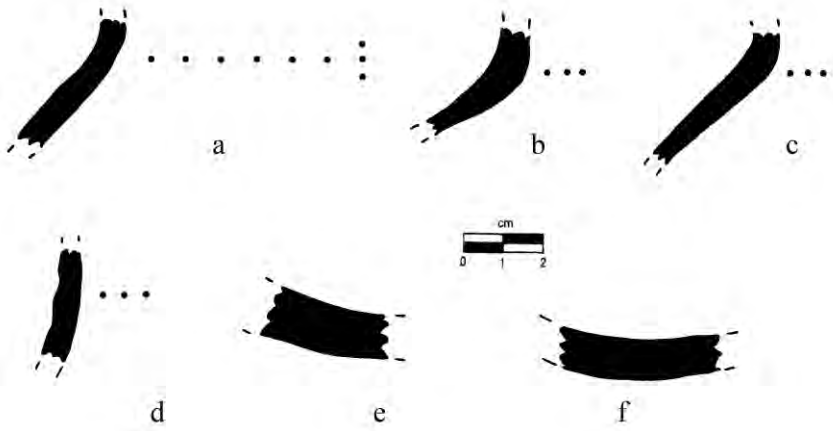


Figure A5. Profile of Cordmarked Necks, Stamped Neck and Cordmarked Bases, Browns Valley (21TR5): a, b cordmarked; c, plain neck, cordmarked lower body; d, incised neck; e, f cordmarked bases.

Lithics

The lithic sample from the Browns Valley site (21TR5) available in the collections at the Minnesota Historical Society was catalogued as 163-15. It consisted of 136 items. One of these items was a grooved maul. Of this total, 23 items were actual implements or amorphous worked pieces. Just over 110 pieces of lithic debris, including core fragments, are in the sample, which is an unusually high incidence of worked lithics. The sample is, in fact, so skewed in the direction of implements (about 20%) that we suspect collection was biased. The sample probably cannot be used to reconstruct an archaeologically robust description of the lithic technology, but there is enough material in the collection to make some statements about raw material use, projectile point typology and perhaps an educated guess about reduction processes.

Raw materials are listed in the table below. All materials, whether debris or implement are included.

Table A.10. Lithic Raw Materials in MHS #163-15: Browns Valley Site (21TR5).

Material	**#**	**Weight (g)**	**Cortex**	**Type***
Pipestone	1	2.4	-	fragment with working grooves
Sandstone	1	251.0	-	biface, evidence of burning
Knife River Flint	62	44.4	3	spokeshave on flake, 2 endscrapers, 1 uniface, 2 utilized flakes
Swan River Chert	42	166.2	12	6 biface fragments, 1 endscraper, 5 core fragments
Red River Chert	14	34	1	2 side-notched points, 1 blade, 1 grooved netsinker, 2 small biface or core fragments
Grand Meadow Chert	3	2.8	-	1 biface fragment
Tongue River Silica	1	2.3	-	1 bifacial fragment
Quartz	1	0.9	-	
Quartzite	7	42.6	-	1 endscraper, 1 core fragment
Jasper	1	1.8	-	1 uniface fragment
Miscellaneous	2	6.4	-	1 utilized flake
Total	**135**	**554.8**	**16**	

* flakes not distinguished

The lithic debris from the site was divided into categories defined by Sullivan and Rozen (1985). The classification scheme they recommend is probably best used as a descriptive system rather than an analytical one. Even so, it makes possible some simple concluding remarks about the debris sample from the site.

The flaking debris was divided into complete flakes, broken flakes (meaning flake edges were not intact), flake fragments (defined as not having a bulb or a platform, but with ventral and dorsal differences), and debris (splinters having no ventral or dorsal surface, no bulb or platform). The basic idea in this system is that differences in the frequencies of these categories probably represent differences in the types of reduction conducted at the site. Unfortunately, at Browns Valley the number of tools and worked pieces is so large that it would seem that a fair collection of all lithic material present was not saved.

The total collection of flaking material includes:
I 40 complete flakes (39%)
II 17 broken flakes (17%)
III 33 flake fragments (32%)
IV 12 pieces of debris (12%)

Comparing these totals to the individual lithic raw material categories reveals a few interesting technological details. Various material types break down as follows:

Knife River flint I 47%, II 21%, III 30%, IV 2%
Swan River chert 30% 16% 43% 10%

These raw materials were the only ones represented by enough lithic debris to be compared. Note that Knife River flint is best represented in the complete flake category and Swan River chert in the flake fragment category, while the second largest categories in the two material types are reversed; flake fragments are second most abundant in Knife River flint, while flakes are second most abundant in Swan River chert. Broken flakes (II) and debris (IV) are third and fourth in abundance in both types of material. It would appear from this that there may have been some difference in the manner of working these two materials at the site, but the flake types reported here are only suggestive. More telling is the representation of tools in each category. Normally, Knife River flint is most commonly used for tools in Plains area sites. However, at Browns Valley, Swan River chert shows l6% of the sample are tools, while for Knife River flint the figure is only 8%. Furthermore, many of the complete flakes in the Knife River flint sample are small pressure-sized flakes. They probably reflect tool edge sharpening. This is reinforced by the average weight of the debris; about 4 g in the Swan River chert sample, while the Knife River flint is only about 1.4 g. Ordinarily, the figures for tool representation would be used to suggest that Swan River chert was a more highly valued material and was preferred for tool making. The average weight suggests the opposite, that Knife River flint was being more carefully husbanded and heavily reduced, thus the smaller average size of each flake.

The implements curated in the Browns Valley collection include the following tools or tool fragments:

Curated or Formal Tool	**Expedient Tool**
Scraper 5	Spokeshave 1
Biface 10	Utilized flake 4
Point 2	Core 6

One expectation of a settled village is that many of the items put to use will be on an expedient basis. Hunter-gatherers are often regarded as having a more carefully managed assemblage consisting of a higher frequency of formal and finished tools. The Browns Valley site in some ways appears to be less a village and more a hunting camp in terms of the tool and debris sample represented in the site lithic collection. Furthermore, the highest quality raw material, Knife River flint, is not treated in the same way as one would expect for an imported material at a prehistoric site. However, there is no doubt that the site does indeed date to the Village period, that is the later portion of the prehistoric. This is indicated by the two small side-

notched points from the site (Figure A.6) . Both of these fit in the category of Plains Side-Notched. A date of after 1000 would be most appropriate for these points, a time that coincides with the radiocarbon date for the site and conforms to the ceramics from the site as well.

The grooved maul from the site was recovered during the 1935 investigations. The complete specimen is well made and illustrated below (Figure A.7).

Figure A.6. Notched projectile points

Figure A.7. Grooved-maul.

Appendix B: Browns Valley Earthwork Investigations

The Browns Valley earthwork is one of many enigmas in Minnesota prehistory. Without the mapping by T.H. Lewis in 1883, as part of his survey of native earthworks in the Midwest and Plains and subsequent enhancement of this map published by Winchell (1911:309), this feature would be lost to the past, as historic and modern land use has all but obliterated it. The outline of this earthwork is shown in Figure B.1 in the present cityscape of Browns Valley. As revealed by these early investigations, the enclosure was one of the largest identified in Minnesota, approximately 160 m by 140 m. Since the early 20th century the enclosure has been forgotten. Recently, Scott Anfinson (1997:Figure 9) attempted to place Winchell's map on the existing landform and surmised that a portion, the southwest ¼, might remain undisturbed. Craig Johnson's (1991:19) surface survey of Traverse County recovered non-diagnostic prehistoric debris in the vicinity of the earthwork. Since this feature is so large and thereby a possible candidate for the Plains Village culture in Minnesota, we resolved to attempt a resolution of this feature.

Theodore Lewis (1883) only provided a brief description and sketch map of the earthwork with no details on surrounding features or terrain: "The embankment is 12 feet wide and 1 ½ feet high. The ditch is 16 feet wide and 1 foot deep." Spoil from excavating the ditch was piled up on the exterior as a curtain wall or rampart. The earthwork is further distinguished by a formal entrance to the northeast that has an overlapping wall and a sole bastion to the south appears to be placed in the exact center. A flat top mound is reported in Winchell (1911:309) to the northwest of the fort, but not by T. H. Lewis, and lies curiously at the corner of a section, which may mean it is of recent vintage and served as a surveying marker. It is important to note that Lewis made no mention of house depressions within the enclosure – he did notice such features in other contexts.

The ethnohistoric record for the region provides one possible interpretation for the fort. It is reported that the Cheyenne in their westward movement built a fortified earth lodge village between Big Stone Lake and Lake Traverse after 1688 -- the Gillingham site was an earlier stop on the journey (Beissel et al. 1984:50; Grinnell 1972:17). No reference for fortified villages exists for the Dakota in the Big Stone region, who inhabited the area when the first Americans arrived.

Our interest in the Browns Valley earthwork was due to the conjunction of research relating to this contract, the locational geography of the site, and the desire to incorporate some modest field work into our project. The focus on Plains Village in Minnesota would have to resolve the nature of reported fortified places in our region. Browns Valley is one of three large enclosures in western Minnesota. Another of these, Orwell in Otter Tail County (21OT7) was investigated by Elden Johnson and summarized by Gibbon (2008).

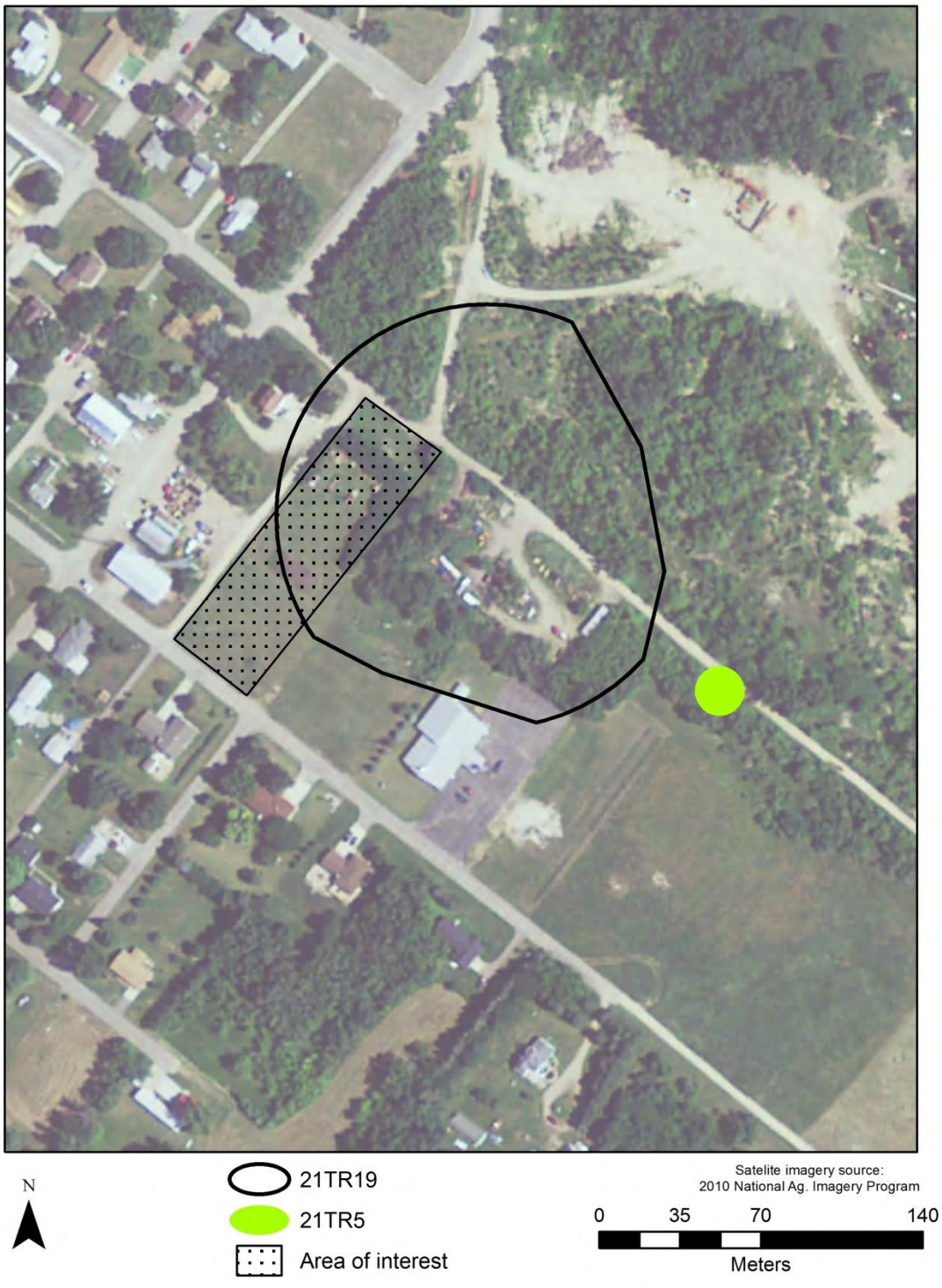


Figure B. 1. Browns Valley earthwork (21TR19) from Winchell, 1911 superimposed on the townscape

The geographical location of the earthwork within Browns Valley is regionally important with easy access to the major drainages of the Upper Midwest, and near the headwaters of the Minnesota and Red Rivers. This placement was an unparalleled artery for movement throughout the region.

We decided to employ a combination of remote sensing and limited testing to investigate if any traces remained of this earthen feature and related occupation. We have found these methods useful in other enclosure sites in the region (Holley, Michlovic and Dalan 2011a). The scale of the remaining portion of the site was considered manageable to explore with a small group (field school) and limited time schedule.

Investigations

Initial investigations comprised field inspection and contact with the land owner, which occurred prior to the project in the summer of 2011. During this initial inspection we observed a topographic low crossed the southern section of the property that we believed might represent a remnant of the original enclosure.

The project area lay in the Plateau Addition of Browns Valley that was originally divided into blocks and lots. Our focus was on one city block (Block 20) on the edge of the town that was currently unoccupied and cleared of any structural traces (Block 20 is outlined in Figure B.1). To the immediate north and east are the limits of the quarry pit that is inactive. This quarrying destroyed nearly ¾ of the enclosure circuit as mapped by Winchell. Although a level field exists to the immediate east, most of this was removed for borrow and subsequently filled to avoid mass wasting of the landform. To the west lies an extant, but currently abandoned residence with outbuildings that is characterized by large areas of concrete.

The city block for our investigation has been greatly modified by a former residence and subsequent demolition and leveling. We were able to piece together this story based on the examination of aerial photographs and interviews with local residents. The residence included a house in the northern portion of the block surrounded on all but the southern boundary by a lilac hedge and an outbuilding to the south. A scattering of trees was also present. The southernmost portion of the block was unoccupied, although recent sewer work has modified this area.

At some time the house was abandoned and the scattering of trees grew into woods, such that it was impossible to see the house from the south during the growing season. This is verified by aerial photos until at least 1990. The lilac hedge was also overgrown. Recently (after 1990), the house was demolished and the wooded area removed leaving only the lilac hedge. The buildings were demolished and wooded area removed with heavy machinery and the entire surface was graded. A rectangular garden area was also prepared near the southern limit of the terrain modification.

Maps

As mentioned earlier two maps form the basis for all subsequent investigations at the site. Lewis's sketch map and the more detailed map offered in Winchell. A more recent map was made by Anfinson (1997:Figure 9) incorporating the location of surrounding features. Anfinson's map shows only about 1/5 of the earthwork remains after borrowing and development activities. We were originally misled by Anfinson's map as the city block is

truncated on the south. We assumed this corresponded to the north edge of Ash Street, and that the earthwork was located in the southern portion of this block. Georeferences with the city plat map corrected this impression. In addition we added LIDAR data and aerial photographs from 1938, 1991, and 2012.

Lewis's sketch map was just that, a sketch map, and when compared to other works by him, a decidedly cursive attempt at that. We have not reproduced Lewis's map, although we did attempt to georeference it on contemporary maps. Our efforts were compromised by the lack of multiple landmark points to reference. The only clearly defined reference points on the Lewis sketch were the corner points of two land blocks, while the Winchell map offered streets, most of which do not exist on any other document as they are obliterated by borrowing or were never constructed. With our copy of the plat maps, we attempted to reconcile these two sources on aerial photographs. The outcome is an approximation and with repeated attempts we resolved to use Winchell's transcription of Lewis's sketch map.

Based on the 1938 aerial photograph we identified two historic structures (Figure B.2). To the north was a residence, encased within the lilac border and to the south was an outbuilding, likely a shed. Both buildings were demolished. A faint outline of the residence is evident today. This outline does not identically match the 1938 photo and may warrant further investigation.

Field Work

Our field work was initiated in the summer of 2012 in conjunction with the annual field school of the Department of Anthropology and Earth Science at Minnesota State University Moorhead. This field work involved several days of work employing shovel testing, remote sensing, and field mapping. We used our georeferenced maps to direct our investigations. When we initiated the field work we did not have the plat maps of the city that were useful in georeferencing the ditch location. For this reason we concentrated our geophysical survey along the southeastern edge in a single grid. Subsequently, we realized that the ditch was more to the north near the intersection with the lilac border and had to add additional grids.

Browns Valley Geophysical Survey

Preliminary Tests

The suitability of two geophysical methods for the Browns Valley site, electrical resistivity and electromagnetic conductivity, was tested on May 15, 2012. These tests were conducted along a 40 m long, north-south trending line in the southern portion of the area of interest crossing undulating terrain originally suspected as relating to the enclosure (Figure B.3). The instruments employed were a Gossen Geohm 40D (electrical resistivity) and a Geonics EM38MK2 (electromagnetic conductivity). The latter instrument, the EM38MK2 is capable of simultaneously measuring conductivity (quad-phase) and magnetic susceptibility (in phase) data at two different coils spacings (and thus two different depths). As employed in the vertical dipole mode these coil spacings yield effective penetration depths of approximately 0.75 m and 1.5 m for conductivity measurements and 0.25 and 0.5 m for magnetic susceptibility. For both methods, readings were taken at 0.5 m intervals along the test line. A Wenner array was used for the resistivity survey with 1 m probe spacing. Several passes were made with the EM38MK2 to

evaluate the reproducibility of data using both manual and auto recording techniques. The EM instrument was slid along the ground surface.

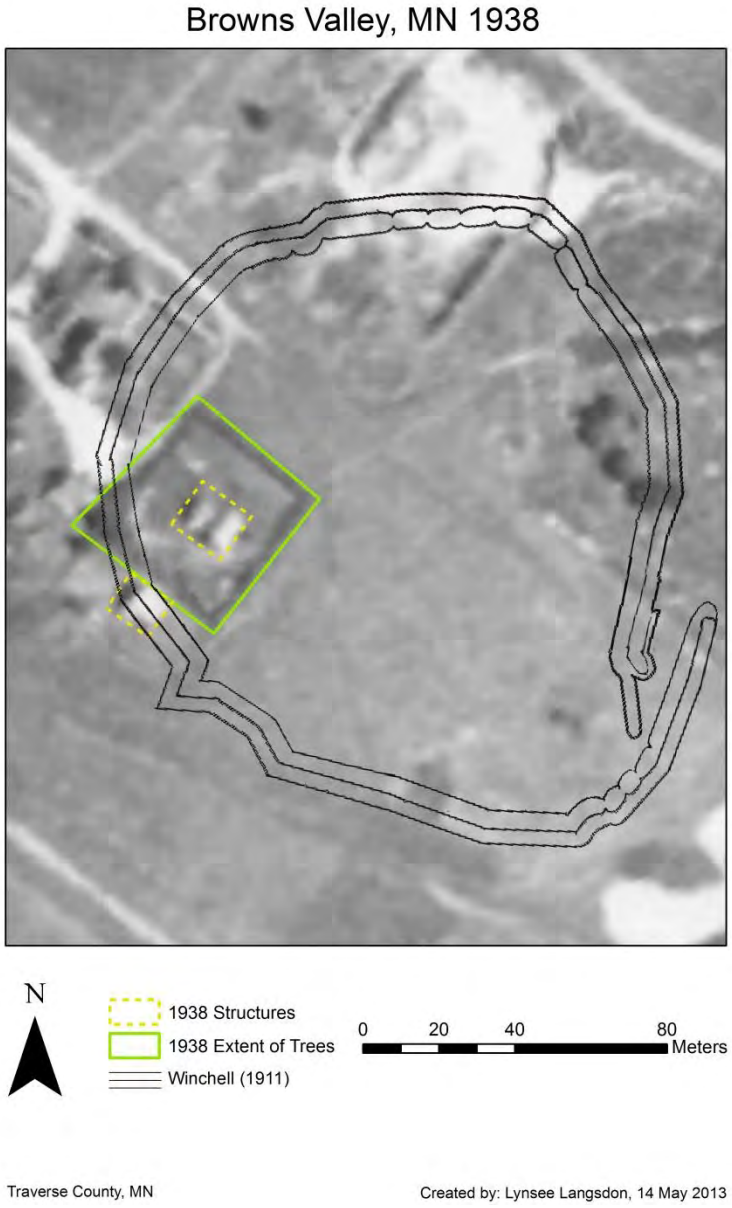


Figure B. 2. Georeferenced Map of Browns Valley Earthwork (Winchell 1911) on 1938 Aerial photograph. Historic buildings and wooded area identified.

Figure B.3. Area of Geophysical Investigations, Browns Valley earthwork (21TR19).

These brief tests indicated contrasts in conductivity/resistivity along the survey line, in some cases corresponding to changes in topography (Figure B.4). High and erratic values of resistivity indicated that probe resistance methods could be problematic. Resistivity values ranged from 175-383 ohm-m, with most values between 180 and 280 ohm-m.

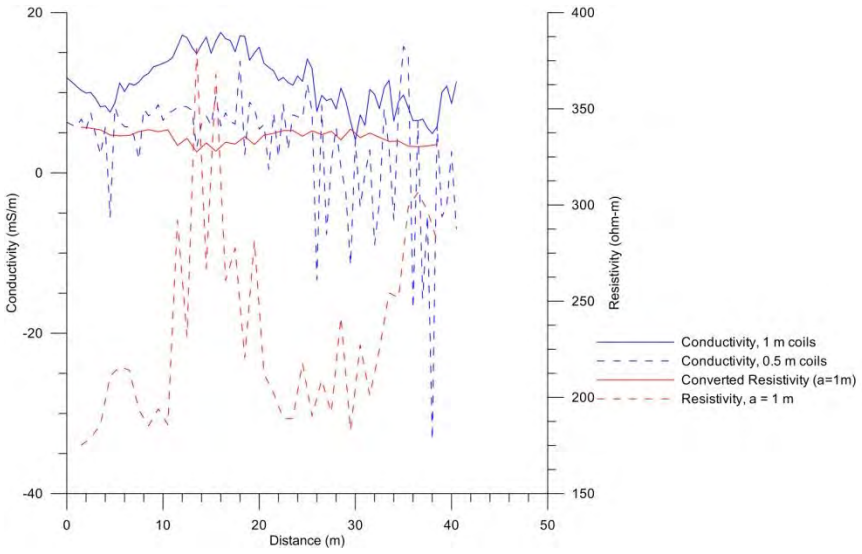


Figure B.4. Conductivity and Resistivity Data from the Preliminary Tests. Resistivity measurements are shown in units of ohm-m. Conductivity measurements are in units of mS/m. For comparison, the resistivity measurements have also been converted to units of conductivity (mS/m; by taking the inverse and multiplying by 10^3).

The conductivity tests were more encouraging than the resistivity profile (Figures B.4 and B.5). Conductivity values were less noisy, in particular the data provided by 1 m coil separation. The conductivity data presented in Figures B.4 and B.5 was recorded manually. Conductivity values ranged from approximately 4 to 18 mS/m (mean of 11 mS/m) for the deeper, 1 m coil separation and -33 to 15 mS/m (mean of 3 mS/m) for the shallower, 0.5 m coil separation. Conductivity was thus very low (as expected based on the high resistivity values) and increased with depth. More erratic values for the shallow conductivity data relate to shallow metallic sources as well as variable interface between surface soils and underlying gravels. Conductivity tended to decrease (and resistivity to increase) to the north. The conductivity data recorded using the auto setting showed the same general values and trends, but was more variable. The converted resistivity data is most similar to conductivity values obtained with the 0.5 m coil spacing

The EM tests indicated that noise from metal trash would also be an issue. This was particularly apparent in the in-phase data (Figure B.5). As with conductivity, the shallower data (obtained using the 0.5 m coil separation) was noisier than the deeper data (1.0 m coil separation).

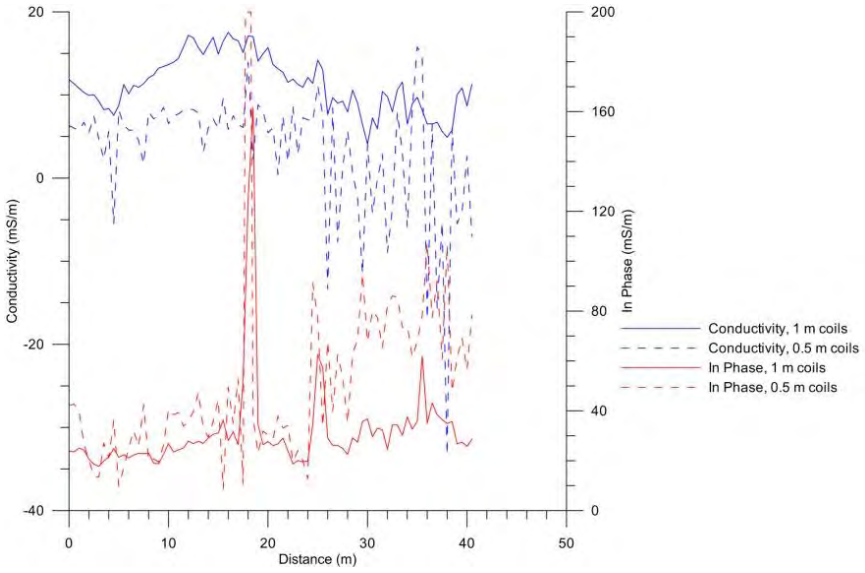


Figure B.5. EM profile showing conductivity and in-phase data collected using manual recording techniques for the two different coil separation. In-phase data is presented in units of mS/m (i.e., has not been converted to units of magnetic susceptibility).

Geophysical Survey

Our grid for the remote sensing work was established first along a north-south line parallel to the eastern edge of the property (Figure B.3. We placed stakes at 20 m intervals along this line. Triangulation was used to lay out 20 m x 20 m grids over an area 80 m x 40 m. We used hand-held Garmin GPS units (Oregon 550t) to locate all of the stakes. The point-averaging method assured that we would obtain the highest resolution possible for the stake locations.

Based on the preliminary tests, it was decided to employ the EM38MK2 to survey for the enclosure ditch and embankment but also to at least attempt further probe resistance measurements. A different instrument, a Geoscan Instruments RM-15, was used to collect the resistance data. This instrument uses a twin probe array, with two moving probes and two remote probes. The geophysical surveys were conducted on June 4, 6, and 13. The areas surveyed with the EM conductivity and resistance are shown in Figures B.3 and B25.

The resistance survey consisted of 3, 20x20 m grids running n/s along east edge of property and a single 20 m x 20 m grid along the northwest edge of the property. The line spacing used was 0.5 m and the measurement spacing along lines was also 0.5 m. Lines were oriented north-south and data collected in a zig-zag fashion. A 0.5 m probe separation was used as the twin probe array yields a depth penetration approximately equal to the probe separation and the expected depth of embankment was shallow. We originally surveyed the three grids along the east edge of the property but expanded this later to include the grid to the northwest when we realized the probable path of the earthwork came through this area (see Figure B.25). The two areas were analyzed as separate units.

As anticipated, resistance values were high and erratic. Consistent problems were encountered introducing current into the very dry and gravelly ground and achieving the necessary data resolution. In many cases, multiple readings had to be attempted. Since data quality was poor, and as the resistance data did not add anything to the patterns revealed by the electromagnetic conductivity surveys of these same areas, the resistivity data is not presented here.

As expected based on the preliminary tests, the EM data proved more useful, although it was not without its problems. For the EM surveys a 2m line spacing was employed with measurements recorded manually at 0.5 m increments along lines. A zig-zag pattern was used to collect data, with the instrument consistently facing the same direction (north). Because of the uneven terrain and brush, it was decided to record data manually, stopping at each position. One student recorded all the data, while other students assisted with moving ropes, recording reference values, recording surface features and topographic changes, setting up grids, etc. As with the preliminary tests, 4 data streams were collected, conductivity with 1.0 and 0.5 m coils and in-phase data with 1.0 and 0.5 m coils.

Reference values were collected at a reference station at the beginning, middle, and end of each day's survey and at the end of every 2nd line. These readings were taken with the instrument on the calibration stand with all gear attached but held as far as possible behind the operator in a consistent position). Eight values were recorded (In-phase and Quad-Phase in the horizontal and vertical dipole modes (HDM and VDM) for both 1.0 and 0.5 m coil separations) for use in drift correction and calculating magnetic susceptibility. For the conductivity data, C values (VDM-2HDM), as they drift from an original setting of 0) can be subtracted from readings on the ground to correct the conductivity data. For the in-phase data, magnetic susceptibility can be calculated by subtracting the in-phase value at height from the recorded value on the ground (in mS/m) and multiplying by 0.000057 for 1.0 m coils and 0.0000145 for the 0.5 m coils to arrive at the magnetic susceptibility of a homogeneous half space (in SI units). A linear interpolation is used to calculate values between reference stations.

EM surveys included a 40x50 m grid in the southern portion of the area of interest. This grid started 10 m north of the area surveyed using the RM15. The southern 10 m of the gridded area was not surveyed. EM surveys were also conducted over a 20x30 m grid in the northwest portion of the study area, when georeferencing indicated the earthwork potentially crossed the property here. Results from each of these areas were analyzed and will be discussed separately (Figures B.3 and B25).

Unprocessed data for the deeper conductivity (1 m coil separation) are shown in Figure B.6. Conductivity values varied from -205 to 119 mS/m, but the data have been clipped in Figure B.6 to a range of -15 to 45 mS/m to better illustrate trends and patterns. Blank (white) spaces within contours indicate where the data has been clipped. As reference values for conductivity at height for the 1.0 m coils only varied 1.5 mS/m and as C values only varied less than 4 mS/m the entire day, drift correction of the conductivity data was not necessary. Data processing involved applying a 5x3 median filter to get rid of the near-surface metal sources. This processed data is presented in Figure B.7.

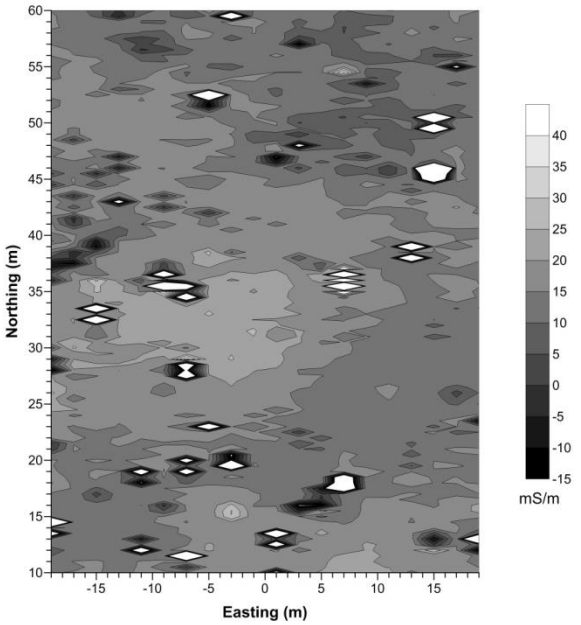


Figure B.6. Unprocessed (clipped)1.0 m conductivity data for the southern EM survey area

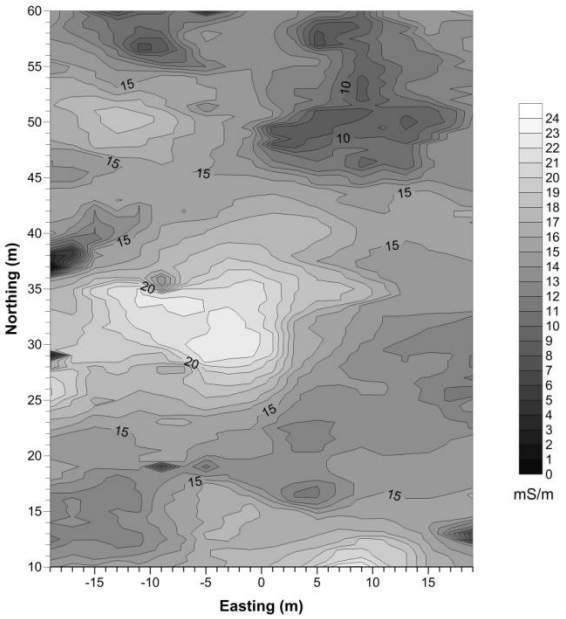


Figure B.7. Median-filtered conductivity data shown in Figure B.6.

Unprocessed and median-filtered conductivity data is shown for the shallower (0.5 m) coil separation in Figures B.8 and B.9. Full scale for the unprocessed data is -1180 to 100 mS/m; Figure B.8 has been clipped to -40 to 5 mS/m. In Figure B.9, a median filter has been applied, and this plot has also been clipped to present a similar range. As with the 1.0 m data, no drift correction was necessary. VDM reference values for the 0.5 m coils varied only 2.5 mS/m and C values varied less than 5 mS/m.

Similar patterns are evident in the conductivity data for the two depths. As expected, the 0.5 m data was noisier, but when filtered looks much the same (although values are lower). The undulating topography is reflected in variable conductivity values. A nw/se trending area of low conductivity on the north edge of the grid was a possible candidate for the earthwork although its rectangular eastern outline suggests it is more likely related to the 1938 outbuilding or the current garden (Figure B.2).

The in-phase data are presented in Figures B-10-B.13. Figure B.10 shows the unprocessed in-phase data for the 1.0 m coils (in units of mS/m). Values have been clipped from -564 to 551 mS/m to -40 to 120 mS/M (approximately 2 standard deviations). In Figure B.11, the data have been drift corrected and converted to susceptibility and then a 5x3 median filter was applied. Values have been clipped from a maximum of 0.00054 to 0.004 and levels adjusted. Figure B.12 presents the unprocessed shallower in-phase data (0.5 m coil separation). It has been clipped down from 1280 to 1130 to -20 to 200 mS/m. The slight striping of this data due to drift is taken care of in data processing (Figure B.13). Data processing, as for the 1.0 m in-phase data, includes drift correction, calculation of susceptibility, and the application of a median filter. In Figure B.13, values have been clipped from a maximum of 0.00606 to 0.003 and levels adjusted.

The processed in-phase maps for the two depths show similar patterns. An anomalous region in the northern portion of the grid is indicated, also with an abrupt eastern edge, as in the conductivity data.

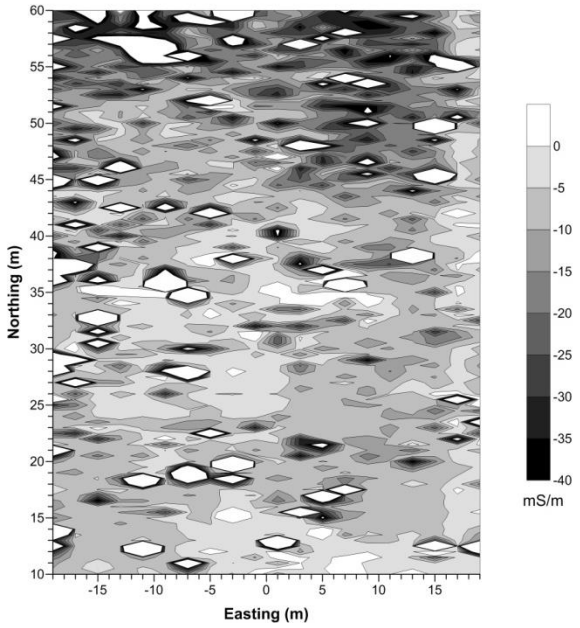


Figure B.8. Unprocessed (clipped)0.5 m conductivity data for the southern EM survey area

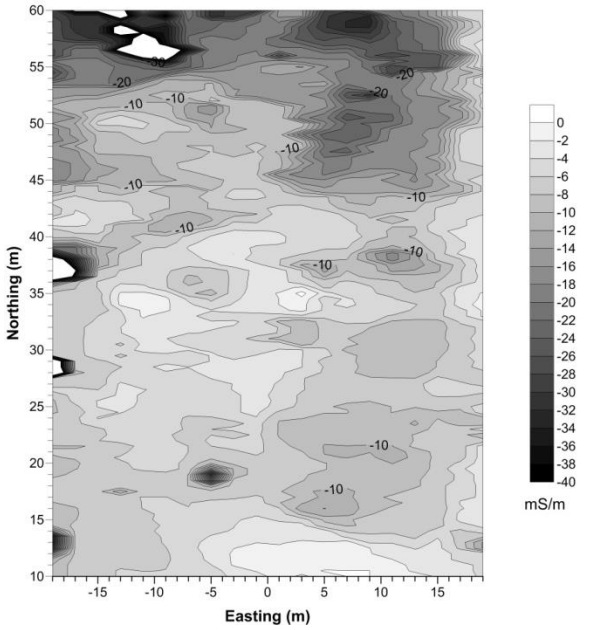


Figure B.9. Median-filtered conductivity data shown in Figure B.8. Data have been clipped to -40 to 0 mS/m

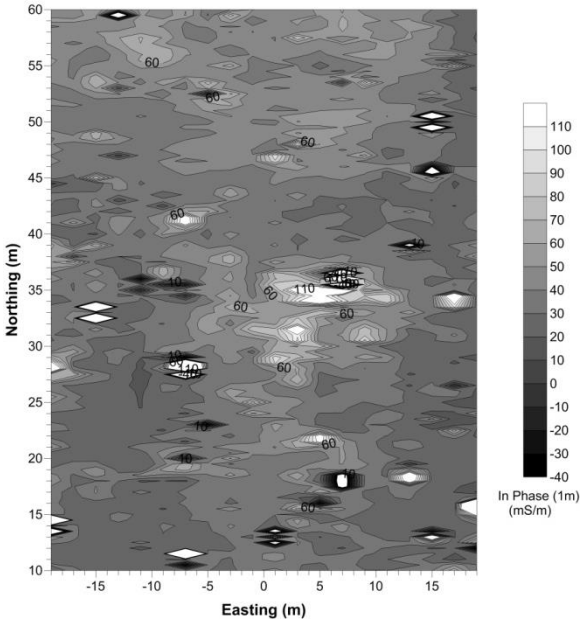


Figure B.10. Unprocessed (clipped)1.0 m in-phase data for the southern EM survey area

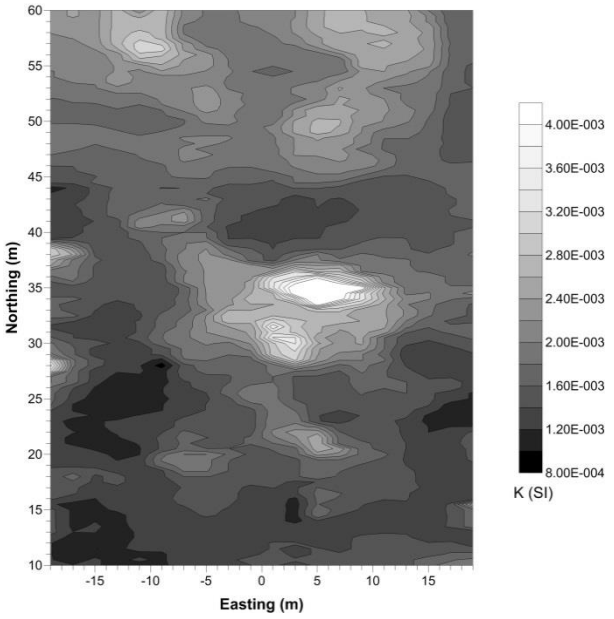


Figure B.11. Processed data from Figure B.10. Processing includes drift-correction, calculation of susceptibility, and median filtering.

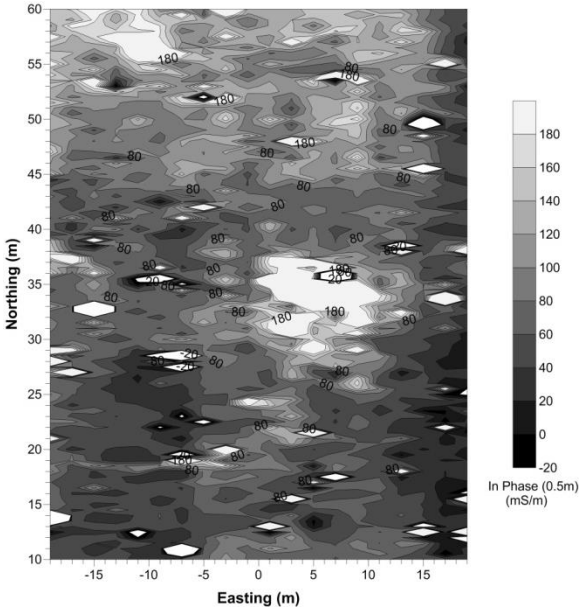


Figure B.12. Unprocessed (clipped) 0.5 m in-phase data for the southern EM survey area

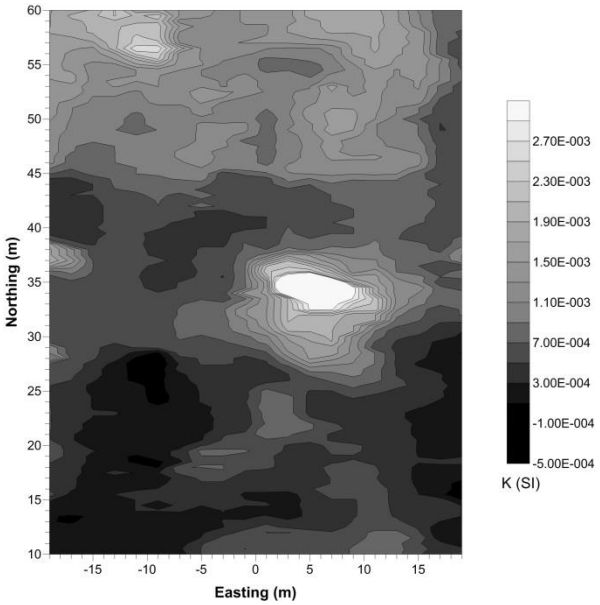


Figure B.13. Processed data from Figure B.12. Processing includes drift-correction, calculation of susceptibility, and median filtering.

Unprocessed and processed conductivity data for the northern, 20x30 m survey area are shown in Figures B.14-B.17. Unprocessed, clipped conductivity values for the 1.0 m coils are presented in Figure B.14 and for the 0.5 m coils in Figure B.16. Conductivity values ranged from -180 to 25 mS/m (clipped to -8 to 20 mS/m in Figure B.14) for the 1.0 m coils and from -1150 to 55 mS/m (clipped to -50 to 30 mS/m) for the 0.5 m coils. As C values varied just 1-1.5 mS/m for the 1.0 m coils and 3 mS/m for the 0.5 m coils, it was not necessary to do a drift correction. Therefore processing involved just the application of a 5x3 median filter. Processed conductivity data are presented in Figures B.15 and B.17.

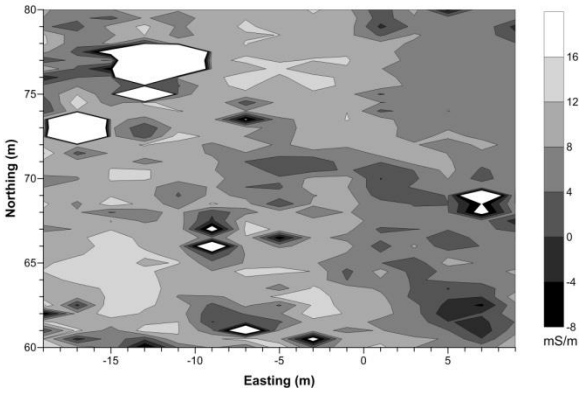


Figure B.14. Unprocessed (clipped)1.0 m conductivity data for the northern EM survey area

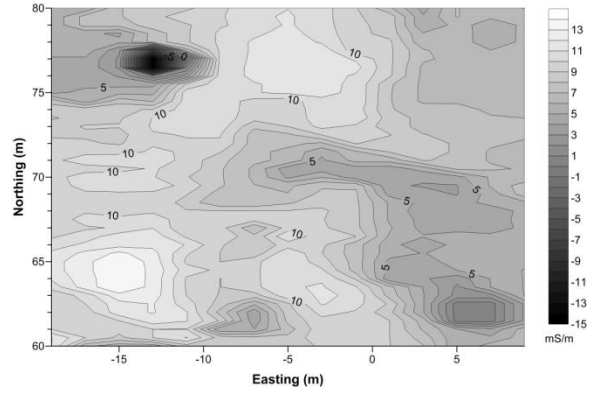


Figure B.15 L. Median-filtered conductivity data shown in Figure B.14.

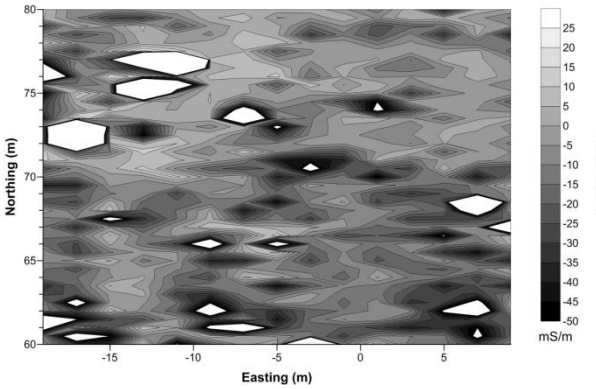


Figure B.16. Unprocessed (clipped)0.5 m conductivity data for the northern EM survey area

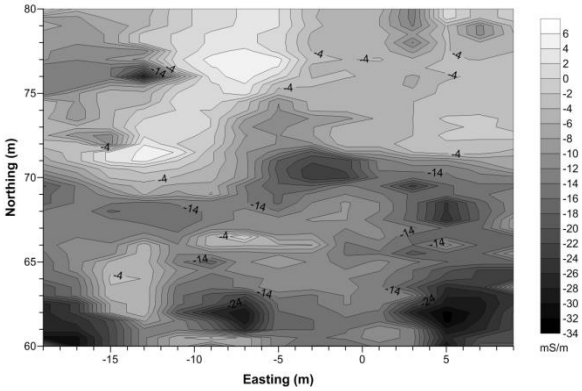


Figure B.17. Median-filtered conductivity data shown in Figure B.16.

Unprocessed and processed in-phase data for the northern, 20x30 m survey area are shown in Figures B.18-B.21. Unprocessed, clipped in-phase data in mS/m for the 1.0 m coils are presented in Figure B.18 and for the 0.5 m coils in Figure B.20. In-phase values ranged from -391 to 293 mS/m (clipped to 0 to 65 mS/m in Figure B.18) for the 1.0 m coils and from -1056 to 539 mS/m (clipped to 10 to 250 mS/m) for the 0.5 m coils. Processing involved drift correction, calculation of magnetic susceptibility and the application of a 5x3 median filter. Processed in-phase data are presented in Figures B.19 and B.21.

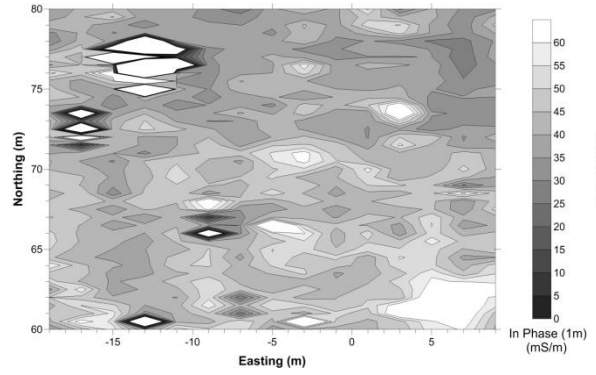


Figure B.18. Unprocessed (clipped) 1.0 m in-phase data for the northern EM survey area

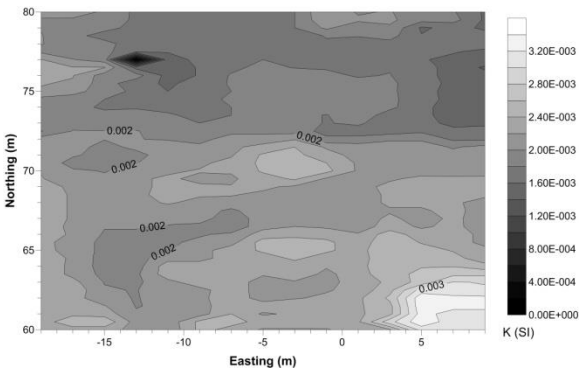


Figure B.19. Processed data from Figure B.18. Processing includes drift-correction, calculation of susceptibility, and median filtering.

Conductivity maps at the two depths show similar patterns although the 1.0 m conductivity data shows most clearly a nw/se trending low conductivity feature that is a possible candidate for the earthwork. For the 0.5 m conductivity data the area to the southwest of this feature is low conductivity and to the northeast it is high. This feature is not apparent in the in-

phase data, although what is shown is a general pattern of low susceptibility to the north and high susceptibility to the south.

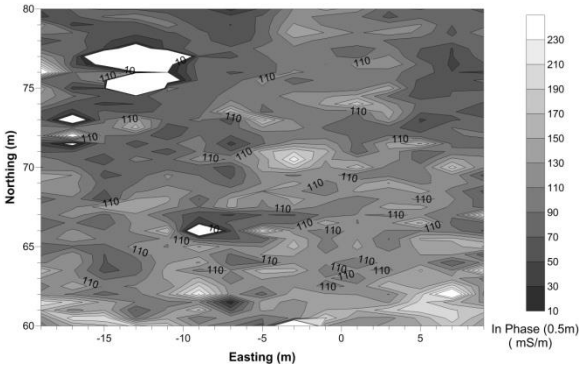


Figure B.20. Unprocessed (clipped) 0.5 m in-phase data for the northern EM survey area

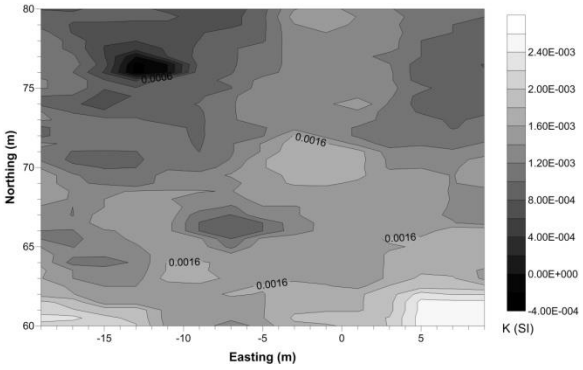


Figure B.21. Processed data from Figure B.20. Processing includes drift-correction, calculation of susceptibility, and median filtering.

Geophysical investigations at Browns Valley are hampered by a number of factors. First, of course, is the extensive landscape modification that has taken place subsequent to the earthwork construction. This has destroyed most of the earthwork, leaving potentially only a small portion to investigate and even that small segment has been compromised. In terms of pattern recognition, having a longer length of the earthwork to survey would have been beneficial. Because of the urban setting of this last remnant certain methods were unsuitable (e.g., magnetometry) while others (e.g., resistance) were problematic due to the shallow gravelly soils. Because the earthwork was only a shallow excavation, not intruding deeply into the gravels, contrasts easily detectable by geophysical methods were not produced. Finally, the convergence of multiple historic modifications and abundant metal debris complicated anomaly interpretation.

The conductivity surveys indicated two nw/se trending anomalies that are in the vicinity of the projected earthwork location and also matches the approximate width (8-10 m) identified by Lewis and the location by our georeferenced Winchell (1911) map (Figures B.22 and B.23). These anomalies, however, are problematic for a number of reasons. First, they are low conductivity/high susceptibility across the entire 8-10 m width, and not comprised of two units of differing properties (ditch and rampart) recorded by Lewis. Second, the two anomalies, one in the northern survey area and one in the south, do not connect, and thus only one (or neither) can be a candidate for the earthwork. The southern anomaly in particular may correlate with an outbuilding depicted in the 1938 aerial photograph. It is also possible that both anomalies represent the southern limits of the landscape modification involving tree and building removal to create a level landform. The location of the principal residence in Figures B.22 and B.23 appears offset to the south and east from our field inspected placement.

In sum, we must conclude that we have not conclusively identified the earthwork through remote sensing. We also conclude that there is a low likelihood given the limited area left to investigate and the extensive disturbance of this area that remote sensing will be able to provide a definitive answer to where the earthwork was originally located.

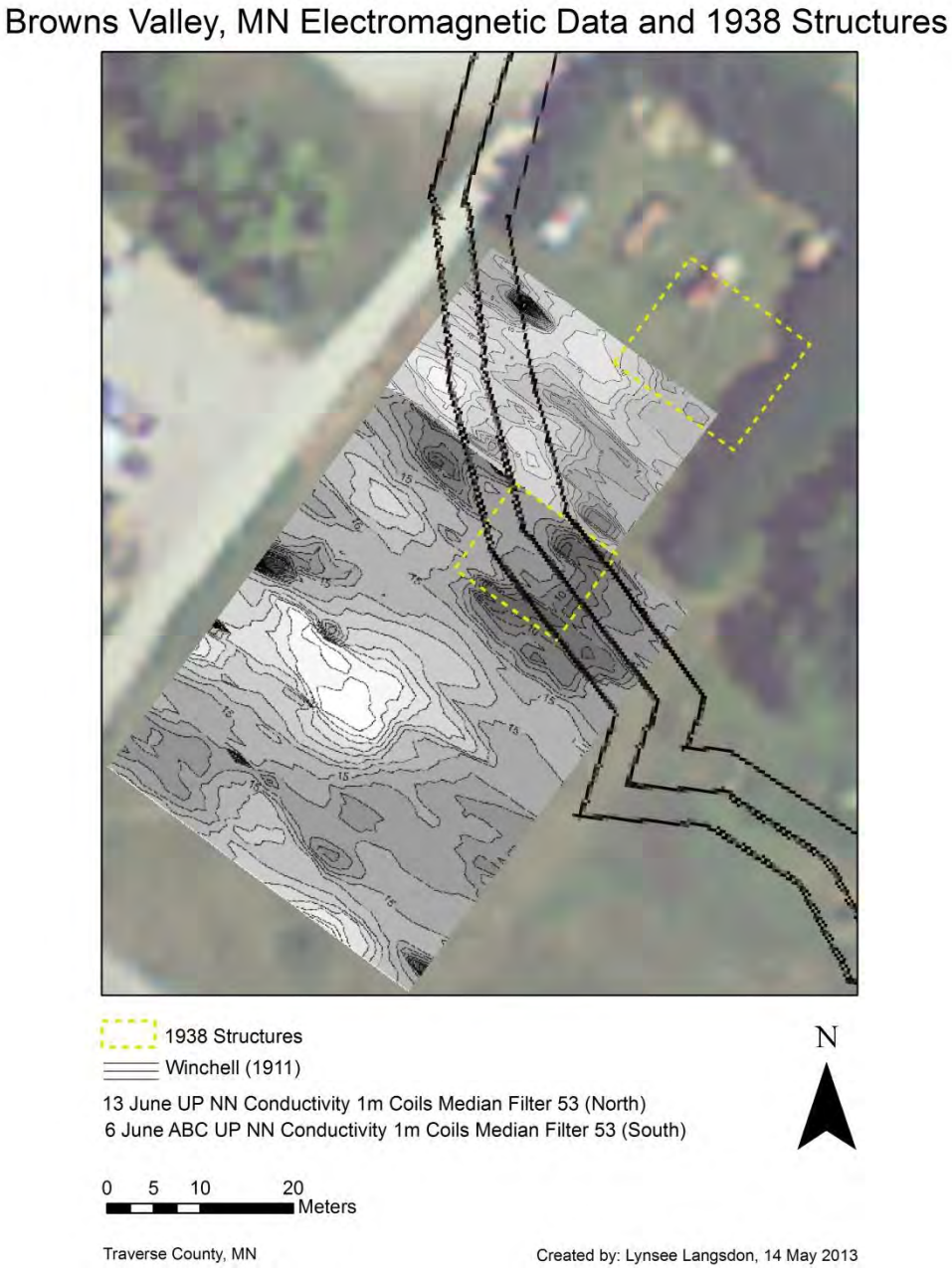


Figure B.22. Conductivity Map of Electromagnetic Survey.

Figure B.23. In-phase Data Map.

Shovel Testing

Shovel testing was designed as an economical means of exploring a large area of the block. These tests comprised the excavation of a 30 cm diameter hole to a depth of around 30-40 cm. In all, 44 shovel tests were excavated in search of intact prehistoric deposits (Figure B.24). Shovel tests were located with the aid of hand-held Garmin GPS units. Excavated soil was screened through ¼-in hardware cloth. Excavation was difficult throughout most of the block due to gravel, historic debris, and disturbances. In only a few areas of the block was it possible to recognize a "natural" stratigraphy. This natural deposit comprised a black loam grading to a sandy loam with gravel at depths of 30-35 cm bs. Soils for the project area comprise the Lohnes series sandy loam (Floren 1990:74-75) that are characterized by mollic epipedeons that formed in prairie settings, which in this area was rather shallow.

These natural deposits were most consistently encountered in the northeastern portion of the block within and near the lilac border. The depth of top soil closely matched the estimation of the ditch depth and we reason that the builders of the enclosure terminated their excavations due to the presence of compact gravel, which we found difficult to excavate with shovels.

Historic debris were noted but not collected consistently as this was not the objective of the testing program. All historic debris not collected were tabulated and redeposited in the excavated hole. The historic debris was consistent with domestic trash from the early 20th century through more recent times. This debris comprised ceramics, saw-cut bone, glass containers, and construction material. Square nails were the only sure sign of an early 20th century construction for the house. The most frequent historic items per shovel test were encountered to the immediate northeast of the former residence within the lilac patch and to the south of the house around the projected location of the earthwork. In these areas up to 20 historic items were encountered per shovel test. One area shovel-tested to the south east of the garden yielded burned wood and burned historic debris presumably relating to the demolition of the outbuilding.

Twelve shovel tests yielded no historic debris, although half of these were interpreted as disturbed contexts. Disturbed contexts comprised mottled soil, reverse stratigraphy (gravel on top), tree litter and charred wood.

Definitive prehistoric artifacts comprised prehistoric sherds and flakes (Table B.1). In some cases bone fragments were considered possibly related to the prehistoric occupation, especially when combined with bona fide prehistoric artifacts (Table B.1). Shovel testing resulted in the recovery of seven sherds and four flakes from seven shovel tests, all of which were within the curtain of the projected earthwork (Figure B.25). In all, 33 bone fragments were recovered from 10 shovel tests that we deemed as possibly relating to the prehistoric occupation. The large rib from shovel test 9 used for radiocarbon dating was obviously prehistoric, as were the weathered fragments. We also presumed that bones from smaller mammals would be prehistoric. In one shovel test positioned within the lilac bushes to the northeast abundant bone was recovered that exhibited saw cuts and was presumed to be the result of dumping associated with the historic residence.

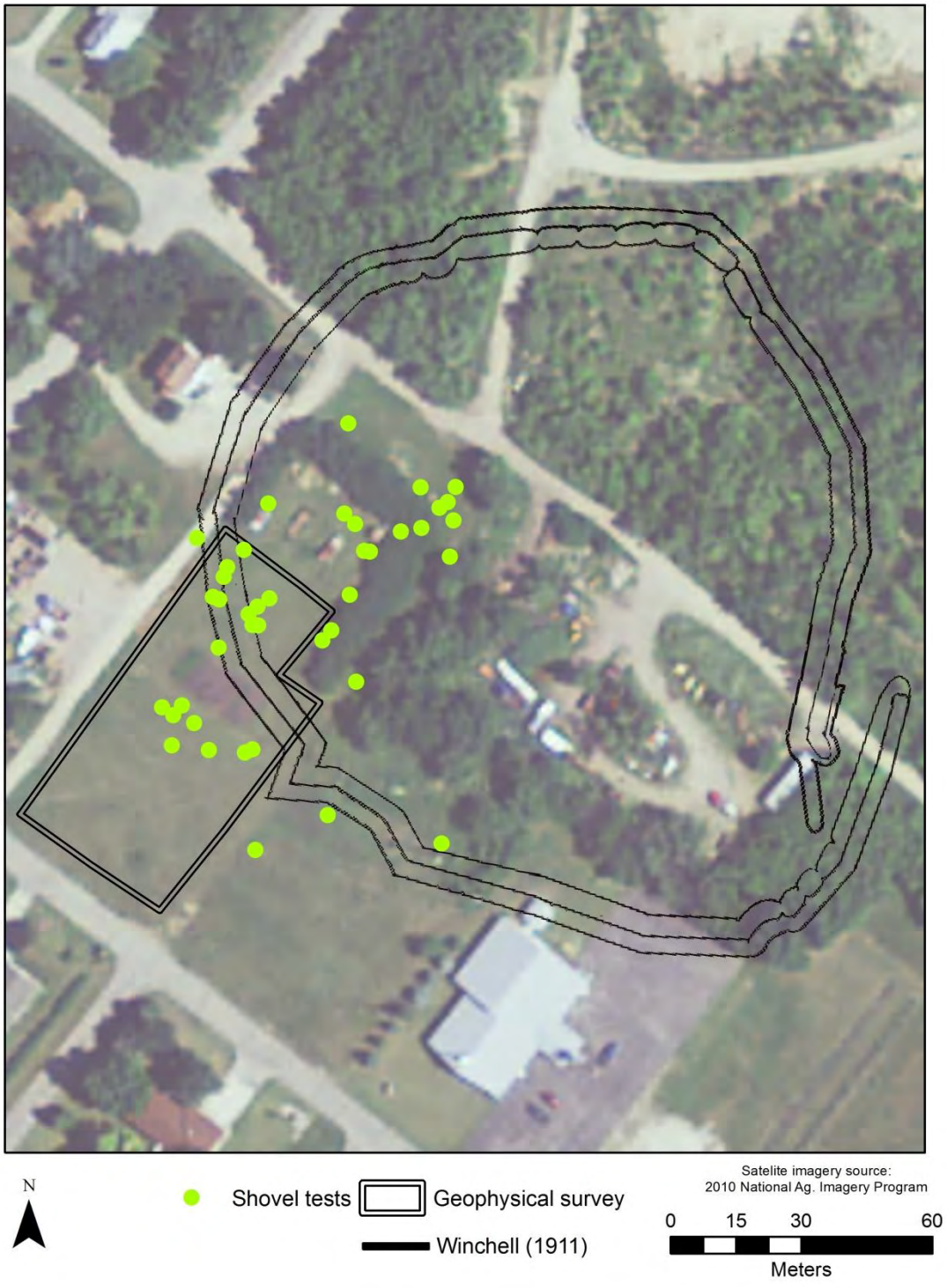


Figure B.24. Shovel Test Locations in Project Area.

Thus, for the shovel tests where we recovered only bone fragments with no other prehistoric debris we identified as possibly prehistoric (n=5). Freshwater shell fragments were also considered prehistoric, but were always found with other prehistoric items. Cracked rock, some of which appeared to be fire cracked, were also counted as prehistoric, although in one shovel test the rock was found with no other prehistoric material and was not identified as prehistoric. In total, twelve shovel tests generated prehistoric debris and possible prehistoric debris.

The concentration of shovel tests to the south were placed in an area that was originally believed to represent the earthwork based on our misunderstanding of the Anfinson map and the 2011 reconnaissance, and we concentrated on this area while we were preparing and conducting the initial remote sensing. A Lidar topographic map of Block 20 is shown in Figure B.26 revealing the undulations to the south. Upon further inspection and based on the shovel testing, we realized that the terrain, however, slight in elevation, did not match what would be expected of the ditch, i.e., shallow on the inside and raised rampart on the outside. What we observed in this area, from south to north, was a rise, depression, then rise. Our shovel testing also generated no positive finds of prehistoric artifacts. We also observed "natural" and disturbed contexts in close proximity. It is likely that the surface undulations marked the southern terminus to grading.

The radio-carbon date was obtained from a shovel test in the northeastern corner of the lilac border and was taken from a rib fragment from a large mammal, likely a bison. In the same shovel test was a polished plain ceramic neck fragment. The resulting date, with a 2-sigma of 1210-1280 would be appropriate for the polished neck and would correspond to the Cambria time span. However, the presence of cord impressed and cordmarked ceramics does not comfortably fit with our conception of the 13th century. To be sure, our understanding of the sequence is rudimentary.

Table B.1. Prehistoric Artifacts Recovered from Shovel Testing, 21TR19

Material	**Description**	**Comment**
Ceramic	Cordmarked (n=3)	3.3-3.8 mm thick
	Cord impressed	3.1 mm thick, S-twist
	Polished neck	Found with dated bone
	Smoothed Plain (n=2)	3.8 mm thick
Lithics	Knife River Flint, thinning flake	
	Swan River Chert, shatter	
	Swan River Chert, flake	
	Quartzite, Flake	
Rock	Fire cracked rock? (n=5)	
Shell	Freshwater fragment (n=8)	
Bone	Bison rib	Used for radiocarbon date
	Fragments (n=32)	(small and large mammals, fish, bird)

Figure B.25. Distribution of positive prehistoric (ceramics and lithics) and questionable prehistoric (bone) shovel tests.

Discussion and Conclusions

During our initial reconnaissance we believed that a trace remained of the ditch and rampart in the southern portion of the block. This interpretation was incorrect as subsequent work revealed that this undulating terrain was likely related to the southernmost limit of terrain modification. As there was no other topographic trace of the earthwork across the property, our remote sensing and shovel testing program was a coordinated attempt to identify if traces of this earthwork remained under the surface.

The cumulative impact of the historic homestead and recent landscape modification greatly disturbed the only remaining piece of this large enclosure. Our geophysics surveys did reveal subsurface anomalies that roughly match the projected location, based on georeferencing, and width (approximately 28 ft) of the enclosure. But these anomalies did not match the rampart-

ditch pattern that we would expect with the two distinctive signatures, but rather represented a single unit. The anomalies were also not continuous.

Figure B.26. Lidar Topographic Map of the Project Area.

The shovel testing results were not definitive as regards the potential identification of the rampart and ditch. One problem is the coincidence of the trench depth and the depth of gravel that we believe are related. Thus the trench does not provide a contrast sufficient to recognize it with either our geophysical approaches or shovel testing. What we recognize is the undulating gravel surface and the extensive historic modifications. We believe that the only reliable means of identifying the trench would be with extensive excavation trenches and specialized soils

analysis. However, given the shallowness of the trench and the modification it seems that even this would be difficult.

Although we were unable to identify intact prehistoric deposits in shovel testing or in remote sensing, the recovery of a small number of prehistoric items and a single radio-carbon date does lead to the conclusion that the earthwork was present in approximately the location we have projected. The concentration of prehistoric debris within the projected boundaries of the enclosure is what one expects if an occupation were within the earthwork. This occupation, however, was not on the scale of that witnessed, for example, at the Biesterfeldt site, with numerous structure and pit depressions evident and with very rich debris in the surrounding terrain. Since the distribution of the debris at Browns Valley matches our projection of the enclosure we can only surmise that it is indeed contemporaneous. Nevertheless, we have identified another occupation to the south on this landform with prehistoric debris and it is therefore a possibility that the materials we found are unrelated to the enclosure and represent a short-term occupation similar to that identified for TR5 (Appendix A).

A sample of six small sherds is hardly the stuff to build a ceramic sequence, although we note that the plain neck sherd is consistent with the date derived from the bone found in the same shovel test. We presume that the cord impressed sherd is symptomatic of the Big Stone region, although absent from nearby TR5. Judging by the presence of bone, chert, and pottery we can presume that if associated with the earthwork that the occupation was short-lived and domestic in nature.

From a comparative perspective, the Browns Valley earthwork shares few features with the other enclosures in the Northeastern Plains. The large size of the enclosure dwarfs the previously reported hill-top enclosures in the Big Stone region and elsewhere by 2-3 times (Holley 2008; Michlovic 2008; Winchell 1911). It approaches the size of the Biesterfeldt site (Holley, Michlovic and Dalan 2011; Wood 1971) and the Orwell enclosure (Gibbon 2008; Winchell 1911:319-321). Both Browns Valley and Orwell were characterized by spoil from the ditch placed on the interior. For the Biesterfeldt site the initial trench soil was placed inside the trench, while periodic cleaning of the ditch was placed outside the ditch as spoil. The Orwell enclosure also has the dirt placed on the inside. Furthermore, all of the smaller enclosures, such as Shady Dell, Sprunk, and Shea (the latter two in North Dakota), have the dirt piled on the interior and ditches of varying depths.

The external placement of ditch fill for the Browns Valley earthwork is atypical and resembles military fieldworks or impromptu construction of fortifications. An impromptu or rapid construction for a temporary need would accommodate the light prehistoric debris within the enclosure and would be consistent then with a short-term occupation. There is also the factor of the great difficulty in excavating the gravel subsoil. Why, however, construct such a large enclosure for short-term use? We await further analysis of these enclosures to resolve this issue.

Appendix C: Radiocarbon Data Sheets

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.1:lab. mult=1)

Laboratory number: **Beta-327485**

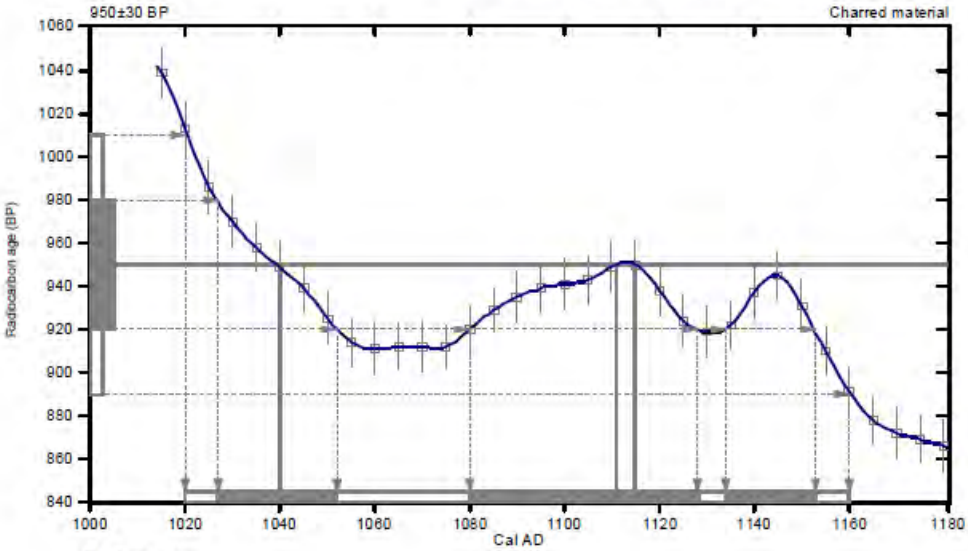
Conventional radiocarbon age: **950±30 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 1020 to 1160 (Cal BP 930 to 790)**

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal AD 1040 (Cal BP 910) and
Cal AD 1110 (Cal BP 840) and
Cal AD 1120 (Cal BP 840)

1 Sigma calibrated results: (68% probability) Cal AD 1030 to 1050 (Cal BP 920 to 900) and
Cal AD 1080 to 1130 (Cal BP 870 to 820) and
Cal AD 1130 to 1150 (Cal BP 820 to 800)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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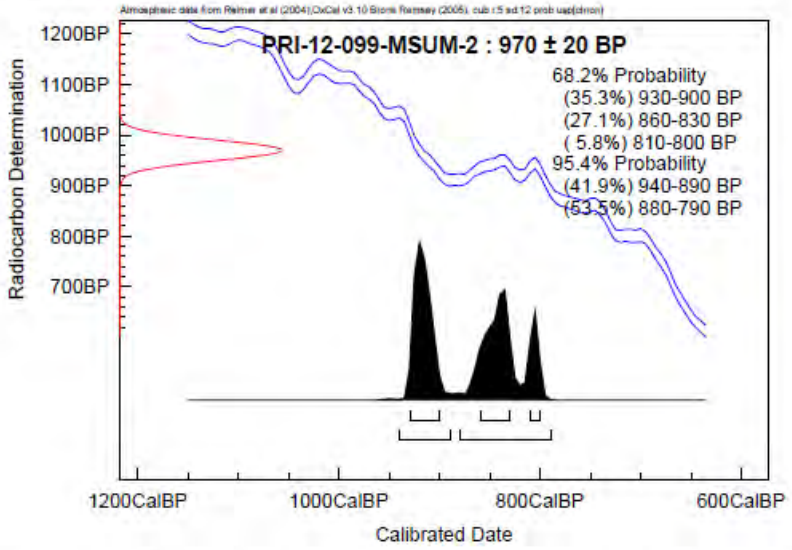
FIGURE 12. PRI RADIOCARBON AGE CALIBRATION

Laboratory Number: PRI-12-099-MSUM-2
Sample Identification: *Quercus* - *Leucobalanus* group charcoal
Average Lifespan: Variable, depending on species, from 100-400 years average
Conventional AMS ^{14}C Date: 970 ± 20 RCYBP
1-sigma Calibrated Age Range (68.2%): 930-900; 860-830; 810-800 CAL yr. BP
2-sigma Calibrated Age Range (95.4%): 940-890; 880-790 CAL yr. BP



Intercept Statement. For radiocarbon calibration, PRI uses OxCal3.10 (Bronk Ramsey 2005), which is a probability-based method for converting ages in radiocarbon years (RCYBP) into calibrated dates (CAL yr BP). This method is preferred over the intercept-based alternative because instead of providing individual point estimates, it reflects the probability of the date's occurrence within a given range (reflected by the amplitude [height] of the curve). As a result, the probability-based method produces more stable calibrated values than do intercept-based methods (Telford 2004). Ongoing refinements and adjustments to the calibration curve have a greater apparent effect on individual points than on ranges.

References

Bronk Ramsey, C., 2005, OxCal. 3.1 ed. www.rlaha.ox.ac.uk/oxcal/oxcal.htm.

Reimer, P. J., M. G. L. Baillie, E. Bard, A. Bayliss, J. W. Beck, P.G. Blackwell, C. Bronk Ramsey, C. E. Buck, G. S. Burr, R. L. Edwards, M. Friedrich, P. M. Grootes, T. P. Guilderson, I. Hajdas, T. J. Heaton, A. G. Hogg, K. A. Hughen, K. F. Kaiser, B. Kromer, F. G. McCormac, S. W. Manning, R. W. Reimer, D. A. Richards, J. R. Southon, S. Talamo, C. S. M. Turney, J. van der Plicht, C. E. Weyhenmeyer. 2009. IntCal09 and Marine09 radiocarbon age calibration curves, 0-50,000 years cal BP. *Radiocarbon* 51(4):1111–1150.

Telford, R. J., E. Heegaard, and H. J. B. Birks, 2004, *The Holocene* 14(2):296-298.

Project Date #2

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-18.4:lab. mult=1)

Laboratory number: Beta-327486

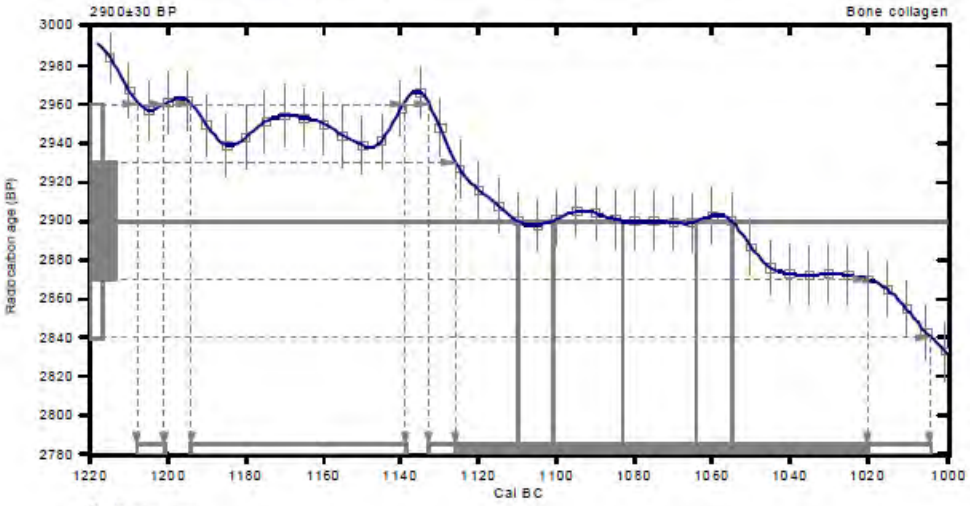
Conventional radiocarbon age: 2900±30 BP

2 Sigma calibrated results: (95% probability)
Cal BC 1210 to 1200 (Cal BP 3160 to 3150) and
Cal BC 1190 to 1140 (Cal BP 3140 to 3090) and
Cal BC 1130 to 1000 (Cal BP 3080 to 2950)

Intercept data

Intercepts of radiocarbon age with calibration curve:
Cal BC 1110 (Cal BP 3060) and
Cal BC 1100 (Cal BP 3050) and
Cal BC 1080 (Cal BP 3030) and
Cal BC 1060 (Cal BP 3010) and
Cal BC 1060 (Cal BP 3000)

1 Sigma calibrated result: (68% probability) Cal BC 1130 to 1020 (Cal BP 3080 to 2970)



References:

Database used
INTCAL09

References to INTCAL09 database
Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario
A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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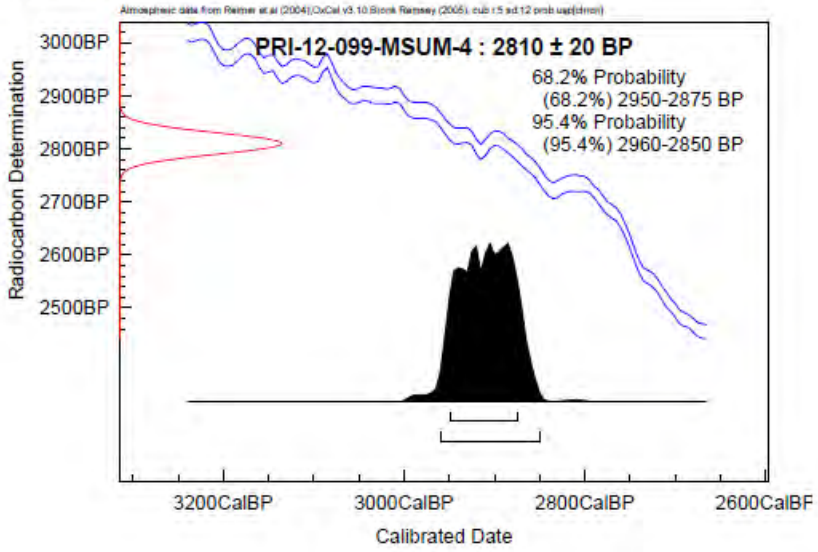
FIGURE 14. PRI RADIOCARBON AGE CALIBRATION

Laboratory Number: PRI-12-099-MSUM-4
Sample Identification: Bison bone
Conventional AMS ^{14}C Date: 2810 ± 20 RCYBP
1-sigma Calibrated Age Range (68.2%): 2950-2875 CAL yr. BP
2-sigma Calibrated Age Range (95.4%): 2960-2850 CAL yr. BP



Intercept Statement. For radiocarbon calibration, PRI uses OxCal3.10 (Bronk Ramsey 2005), which is a probability-based method for converting ages in radiocarbon years (RCYBP) into calibrated dates (CAL yr BP). This method is preferred over the intercept-based alternative because instead of providing individual point estimates, it reflects the probability of the date's occurrence within a given range (reflected by the amplitude [height] of the curve). As a result, the probability-based method produces more stable calibrated values than do intercept-based methods (Telford 2004). Ongoing refinements and adjustments to the calibration curve have a greater apparent effect on individual points than on ranges.

References

Bronk Ramsey, C., 2005, OxCal. 3.1 ed. www.rlaha.ox.ac.uk/oxcal/oxcal.htm.

Reimer, P. J., M. G. L. Baillie, E. Bard, A. Bayliss, J. W. Beck, P.G. Blackwell, C. Bronk Ramsey, C. E. Buck, G. S. Burr, R. L. Edwards, M. Friedrich, P. M. Grootes, T. P. Guilderson, I. Hajdas, T. J. Heaton, A. G. Hogg, K. A. Hughen, K. F. Kaiser, B. Kromer, F. G. McCormac, S. W. Manning, R. W. Reimer, D. A. Richards, J. R. Southon, S. Talamo, C. S. M. Turney, J. van der Plicht, C. E. Weyhenmeyer. 2009. IntCal09 and Marine09 radiocarbon age calibration curves, 0-50,000 years cal BP. *Radiocarbon* 51(4):1111–1150.

Telford, R. J., E. Heegaard, and H. J. B. Birks, 2004, *The Holocene* 14(2):296-298.

Project Date #4

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-18.5:lab. mult=1)

Laboratory number: Beta-327487

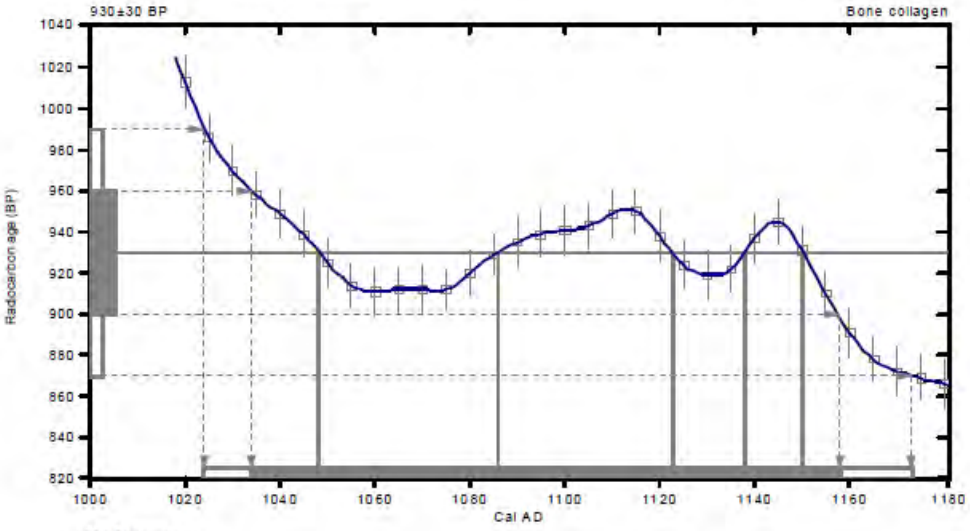
Conventional radiocarbon age: 930±30 BP

2 Sigma calibrated result: (95% probability) Cal AD 1020 to 1170 (Cal BP 930 to 780)

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal AD 1050 (Cal BP 900) and
Cal AD 1090 (Cal BP 860) and
Cal AD 1120 (Cal BP 830) and
Cal AD 1140 (Cal BP 810) and
Cal AD 1150 (Cal BP 800)

1 Sigma calibrated result: (68% probability) Cal AD 1030 to 1160 (Cal BP 920 to 790)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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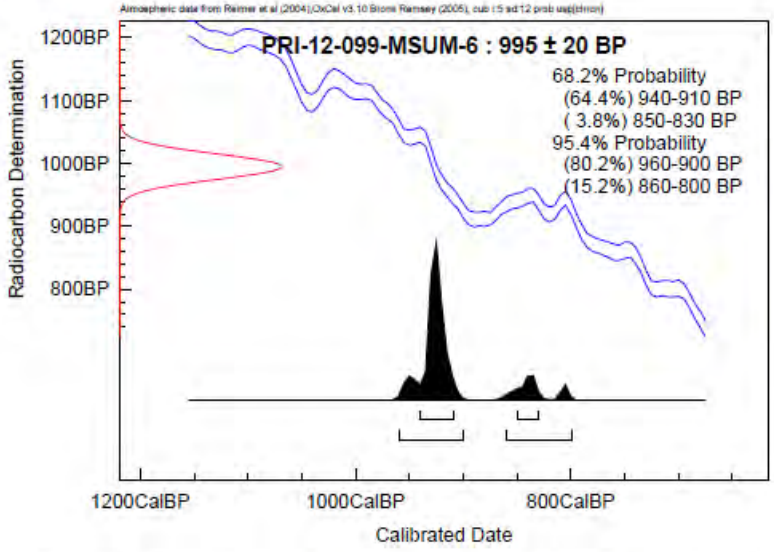
FIGURE 16. PRI RADIOCARBON AGE CALIBRATION

Laboratory Number: PRI-12-099-MSUM-6
Sample Identification: Probable bison bone
Conventional AMS ^{14}C Date: 995 ± 20 RCYBP
1-sigma Calibrated Age Range (68.2%): 940-910; 850-830 CAL yr. BP
2-sigma Calibrated Age Range (95.4%): 960-900; 860-800 CAL yr. BP



Intercept Statement. For radiocarbon calibration, PRI uses OxCal3.10 (Bronk Ramsey 2005), which is a probability-based method for converting ages in radiocarbon years (RCYBP) into calibrated dates (CAL yr BP). This method is preferred over the intercept-based alternative because instead of providing individual point estimates, it reflects the probability of the date's occurrence within a given range (reflected by the amplitude [height] of the curve). As a result, the probability-based method produces more stable calibrated values than do intercept-based methods (Telford 2004). Ongoing refinements and adjustments to the calibration curve have a greater apparent effect on individual points than on ranges.

References

Bronk Ramsey, C., 2005, OxCal. 3.1 ed. www.rlaha.ox.ac.uk/oxcal/oxcal.htm.

Reimer, P. J., M. G. L. Baillie, E. Bard, A. Bayliss, J. W. Beck, P.G. Blackwell, C. Bronk Ramsey, C. E. Buck, G. S. Burr, R. L. Edwards, M. Friedrich, P. M. Grootes, T. P. Guilderson, I. Hajdas, T. J. Heaton, A. G. Hogg, K. A. Hughen, K. F. Kaiser, B. Kromer, F. G. McCormac, S. W. Manning, R. W. Reimer, D. A. Richards, J. R. Southon, S. Talamo, C. S. M. Turney, J. van der Plicht, C. E. Weyhenmeyer. 2009. IntCal09 and Marine09 radiocarbon age calibration curves, 0-50,000 years cal BP. *Radiocarbon* 51(4):1111–1150.

Telford, R. J., E. Heegaard, and H. J. B. Birks, 2004, *The Holocene* 14(2):296-298.

Project Date #6

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-15.6:lab. mult=1)

Laboratory number: **Beta-327488**

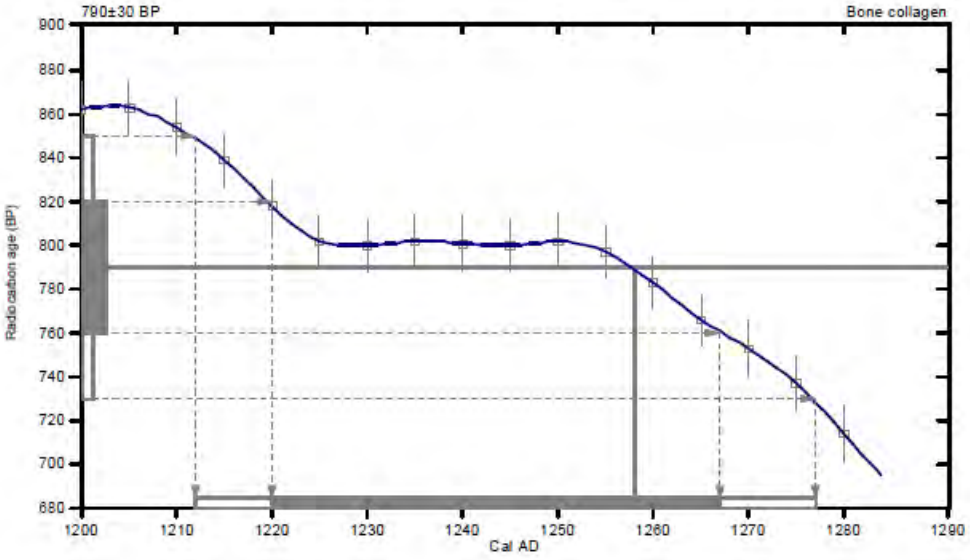
Conventional radiocarbon age: **790±30 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 1210 to 1280 (Cal BP 740 to 670)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1260 (Cal BP 690)

1 Sigma calibrated result: (68% probability) Cal AD 1220 to 1270 (Cal BP 730 to 680)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.5:lab. mult=1)

Laboratory number: **Beta-327489**

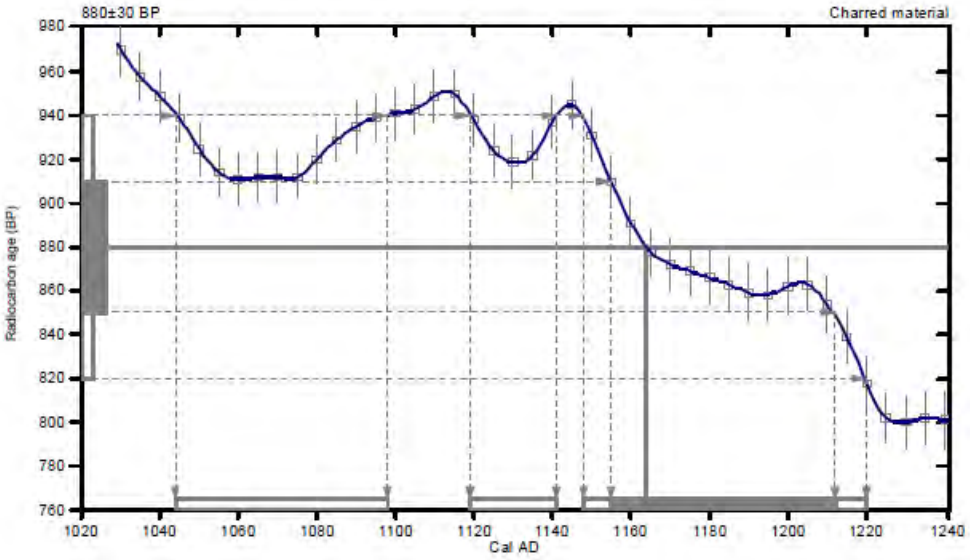
Conventional radiocarbon age: **880±30 BP**

2 Sigma calibrated results: (95% probability) **Cal AD 1040 to 1100 (Cal BP 910 to 850) and Cal AD 1120 to 1140 (Cal BP 830 to 810) and Cal AD 1150 to 1220 (Cal BP 800 to 730)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1160 (Cal BP 790)

1 Sigma calibrated result: (68% probability) Cal AD 1160 to 1210 (Cal BP 800 to 740)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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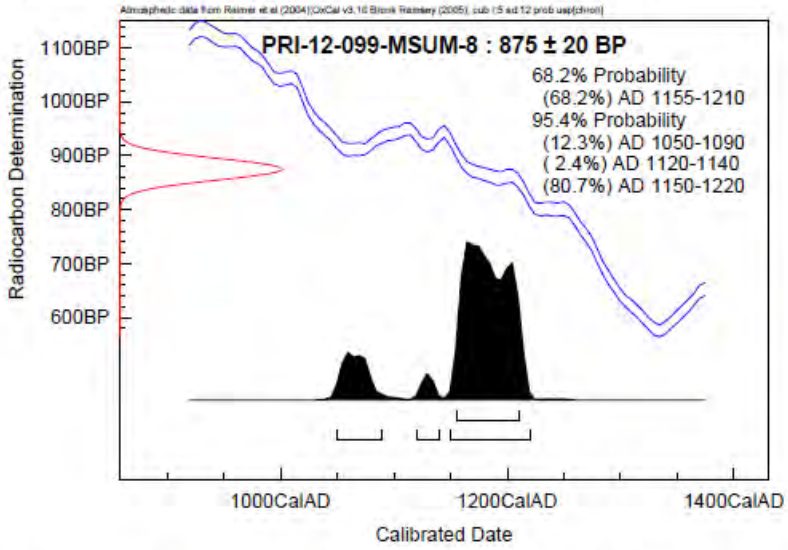
FIGURE 5. PRI RADIOCARBON AGE CALIBRATION

Laboratory Number: PRI-12-099-MSUM-8
Sample Identification: *Ulmus* charcoal
Average Lifespan: 150-300 years
Conventional AMS ^{14}C Date: 875 ± 20 RCYBP
1-sigma Calibrated Age Range (68.2%): AD 1155-1210
2-sigma Calibrated Age Range (95.4%): AD 1050-1090; AD 1120-1140; AD 1150-1220



Intercept Statement. For radiocarbon calibration, PRI uses OxCal3.10 (Bronk Ramsey 2005), which is a probability-based method for converting ages in radiocarbon years (RCYBP) into calibrated dates (CAL yr BP). This method is preferred over the intercept-based alternative because instead of providing individual point estimates, it reflects the probability of the date's occurrence within a given range (reflected by the amplitude [height] of the curve). As a result, the probability-based method produces more stable calibrated values than do intercept-based methods (Telford 2004). Ongoing refinements and adjustments to the calibration curve have a greater apparent effect on individual points than on ranges.

References

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Reimer, P. J., M. G. L. Baillie, E. Bard, A. Bayliss, J. W. Beck, P.G. Blackwell, C. Bronk Ramsey, C. E. Buck, G. S. Burr, R. L. Edwards, M. Friedrich, P. M. Grootes, T. P. Guilderson, I. Hajdas, T. J. Heaton, A. G. Hogg, K. A. Hughen, K. F. Kaiser, B. Kromer, F. G. McCormac, S. W. Manning, R. W. Reimer, D. A. Richards, J. R. Southon, S. Talamo, C. S. M. Turney, J. van der Plicht, C. E. Weyhenmeyer. 2009. IntCal09 and Marine09 radiocarbon age calibration curves, 0-50,000 years cal BP. *Radiocarbon* 51(4):1111–1150.

Telford, R. J., E. Heegaard, and H. J. B. Birks, 2004, *The Holocene* 14(2):296-298.

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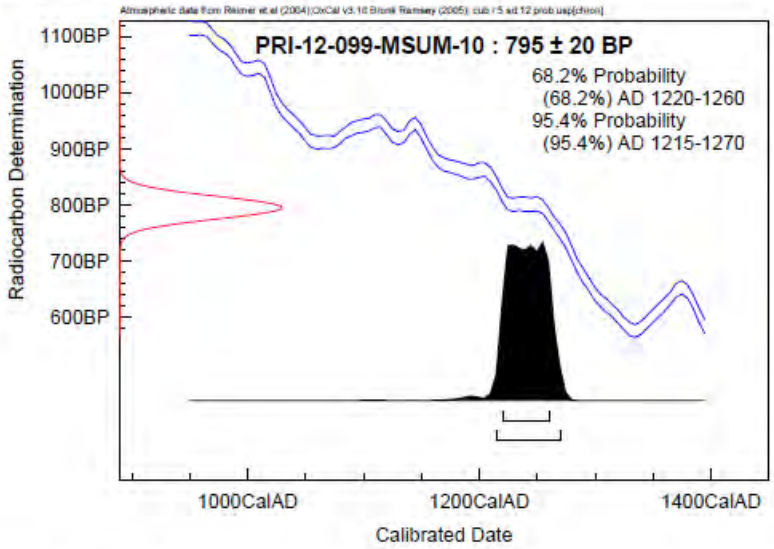
FIGURE 3. PRI RADIOCARBON AGE CALIBRATION

Laboratory Number: PRI-12-099-MSUM-10
Sample Identification: *Populus* charcoal
Average Lifespan: Variable, depending on species, from 40-200 years
Conventional AMS ^{14}C Date: 795 ± 20 RCYBP
1-sigma Calibrated Age Range (68.2%): AD 1220-1260
2-sigma Calibrated Age Range (95.4%): AD 1215-1270



Intercept Statement. For radiocarbon calibration, PRI uses OxCal3.10 (Bronk Ramsey 2005), which is a probability-based method for converting ages in radiocarbon years (RCYBP) into calibrated dates (CAL yr BP). This method is preferred over the intercept-based alternative because instead of providing individual point estimates, it reflects the probability of the date's occurrence within a given range (reflected by the amplitude [height] of the curve). As a result, the probability-based method produces more stable calibrated values than do intercept-based methods (Telford 2004). Ongoing refinements and adjustments to the calibration curve have a greater apparent effect on individual points than on ranges.

References

Bronk Ramsey, C., 2005, OxCal. 3.1 ed. www.rlaha.ox.ac.uk/oxcal/oxcal.htm.

Reimer, P. J., M. G. L. Baillie, E. Bard, A. Bayliss, J. W. Beck, P.G. Blackwell, C. Bronk Ramsey, C. E. Buck, G. S. Burr, R. L. Edwards, M. Friedrich, P. M. Grootes, T. P. Guilderson, I. Hajdas, T. J. Heaton, A. G. Hogg, K. A. Hughen, K. F. Kaiser, B. Kromer, F. G. McCormac, S. W. Manning, R. W. Reimer, D. A. Richards, J. R. Southon, S. Talamo, C. S. M. Turney, J. van der Plicht, C. E. Weyhenmeyer. 2009. IntCal09 and Marine09 radiocarbon age calibration curves, 0-50,000 years cal BP. *Radiocarbon* 51(4):1111–1150.

Telford, R. J., E. Heegaard, and H. J. B. Birks, 2004, *The Holocene* 14(2):296-298.

Project Date #10

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.8:lab. mult=1)

Laboratory number: **Beta-327490**

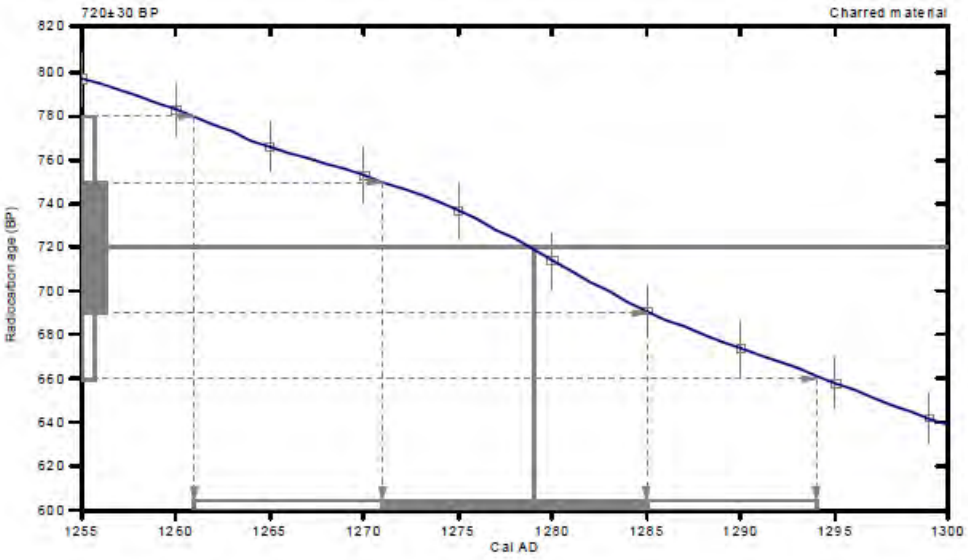
Conventional radiocarbon age: **720±30 BP**

2 Sigma calibrated result: (95% probability) **Cal AD 1260 to 1290 (Cal BP 690 to 660)**

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1280 (Cal BP 670)

1 Sigma calibrated result: (68% probability) Cal AD 1270 to 1280 (Cal BP 680 to 660)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

A Simplified Approach to Calibrating C14 Dates

Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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Project Date #11

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-24.9:lab. mult=1)

Laboratory number: **Beta-327491**

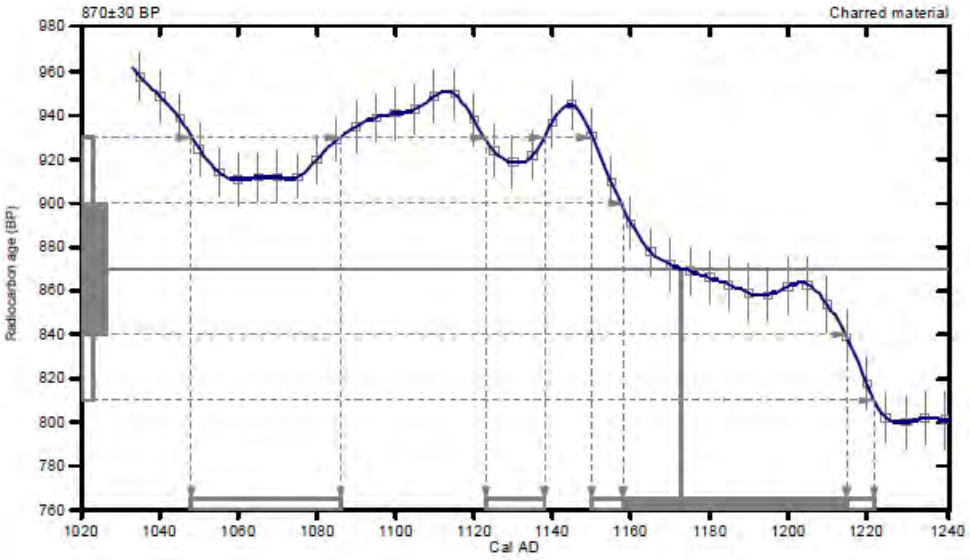
Conventional radiocarbon age: **870±30 BP**

2 Sigma calibrated results: **Cal AD 1050 to 1090 (Cal BP 900 to 860) and**
(95% probability) **Cal AD 1120 to 1140 (Cal BP 830 to 810) and**
Cal AD 1150 to 1220 (Cal BP 800 to 730)

Intercept data

Intercept of radiocarbon age with calibration curve: Cal AD 1170 (Cal BP 780)

1 Sigma calibrated result: Cal AD 1160 to 1220 (Cal BP 790 to 740)
(68% probability)



References:

Database used

INTCAL09

References to INTCAL09 database

Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario

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Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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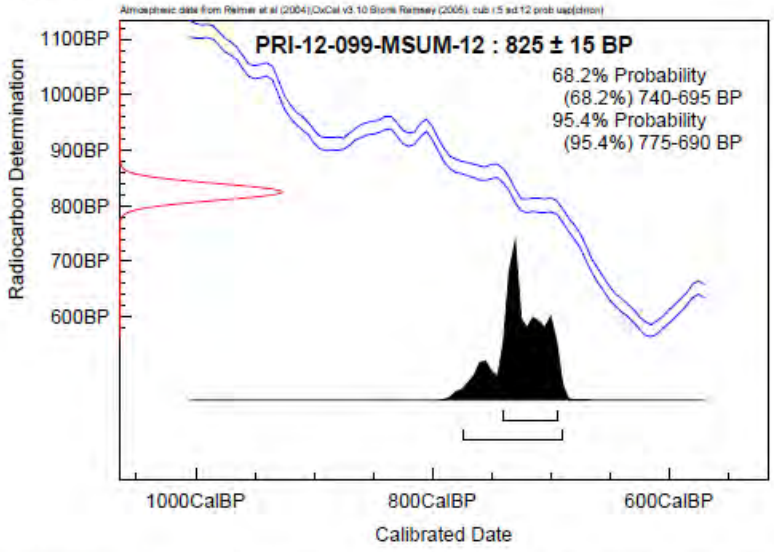
FIGURE 8. PRI RADIOCARBON AGE CALIBRATION

Laboratory Number: PRI-12-099-MSUM-12
Sample Identification: *Acer saccharinum* charcoal
Average Lifespan: 130+ years; 380-400 years - maximum
Conventional AMS ^{14}C Date: 825 ± 15 RCYBP
1-sigma Calibrated Age Range (68.2%): 740-695 CAL yr. BP
2-sigma Calibrated Age Range (95.4%): 775-690 CAL yr. BP



Intercept Statement. For radiocarbon calibration, PRI uses OxCal3.10 (Bronk Ramsey 2005), which is a probability-based method for converting ages in radiocarbon years (RCYBP) into calibrated dates (CAL yr BP). This method is preferred over the intercept-based alternative because instead of providing individual point estimates, it reflects the probability of the date's occurrence within a given range (reflected by the amplitude [height] of the curve). As a result, the probability-based method produces more stable calibrated values than do intercept-based methods (Telford 2004). Ongoing refinements and adjustments to the calibration curve have a greater apparent effect on individual points than on ranges.

References

Bronk Ramsey, C., 2005, OxCal. 3.1 ed. www.rlaha.ox.ac.uk/oxcal/oxcal.htm.

Reimer, P. J., M. G. L. Baillie, E. Bard, A. Bayliss, J. W. Beck, P.G. Blackwell, C. Bronk Ramsey, C. E. Buck, G. S. Burr, R. L. Edwards, M. Friedrich, P. M. Grootes, T. P. Guilderson, I. Hajdas, T. J. Heaton, A. G. Hogg, K. A. Hughen, K. F. Kaiser, B. Kromer, F. G. McCormac, S. W. Manning, R. W. Reimer, D. A. Richards, J. R. Southon, S. Talamo, C. S. M. Turney, J. van der Plicht, C. E. Weyhenmeyer. 2009. IntCal09 and Marine09 radiocarbon age calibration curves, 0-50,000 years cal BP. *Radiocarbon* 51(4):1111–1150.

Telford, R. J., E. Heegaard, and H. J. B. Birks, 2004, *The Holocene* 14(2):296-298.

Project Date #13

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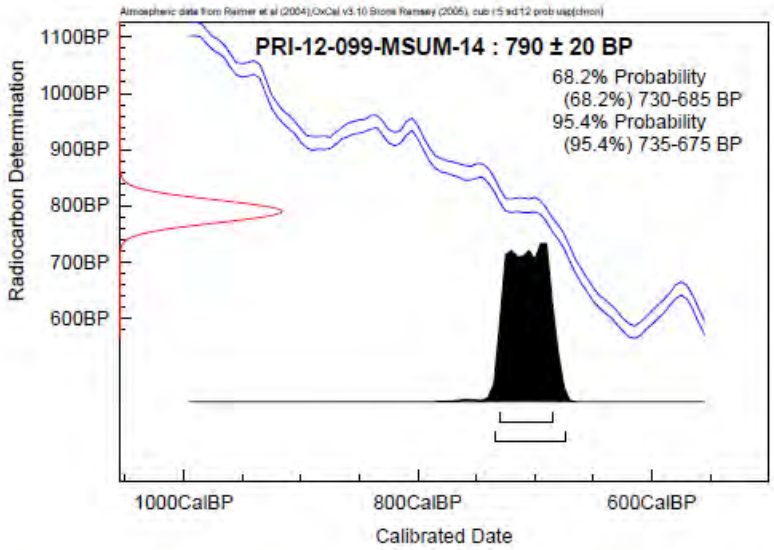
FIGURE 10. PRI RADIOCARBON AGE CALIBRATION

Laboratory Number: PRI-12-099-MSUM-14
Sample Identification: *Ostrya virginiana* charcoal
Average Lifespan: 100-150 years
Conventional AMS ^{14}C Date: 790 ± 20 RCYBP
1-sigma Calibrated Age Range (68.2%): 730-685 CAL yr. BP
2-sigma Calibrated Age Range (95.4%): 735-675 CAL yr. BP



Intercept Statement. For radiocarbon calibration, PRI uses OxCal3.10 (Bronk Ramsey 2005), which is a probability-based method for converting ages in radiocarbon years (RCYBP) into calibrated dates (CAL yr BP). This method is preferred over the intercept-based alternative because instead of providing individual point estimates, it reflects the probability of the date's occurrence within a given range (reflected by the amplitude [height] of the curve). As a result, the probability-based method produces more stable calibrated values than do intercept-based methods (Telford 2004). Ongoing refinements and adjustments to the calibration curve have a greater apparent effect on individual points than on ranges.

References

Bronk Ramsey, C., 2005, OxCal. 3.1 ed. www.rlaha.ox.ac.uk/oxcal/oxcal.htm.

Reimer, P. J., M. G. L. Baillie, E. Bard, A. Bayliss, J. W. Beck, P.G. Blackwell, C. Bronk Ramsey, C. E. Buck, G. S. Burr, R. L. Edwards, M. Friedrich, P. M. Grootes, T. P. Guilderson, I. Hajdas, T. J. Heaton, A. G. Hogg, K. A. Hughen, K. F. Kaiser, B. Kromer, F. G. McCormac, S. W. Manning, R. W. Reimer, D. A. Richards, J. R. Southon, S. Talamo, C. S. M. Turney, J. van der Plicht, C. E. Weyhenmeyer. 2009. IntCal09 and Marine09 radiocarbon age calibration curves, 0-50,000 years cal BP. *Radiocarbon* 51(4):1111–1150.

Telford, R. J., E. Heegaard, and H. J. B. Birks, 2004, *The Holocene* 14(2):296-298.

Project Date #14

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-16.1:lab. mult=1)

Laboratory number: Beta-327492

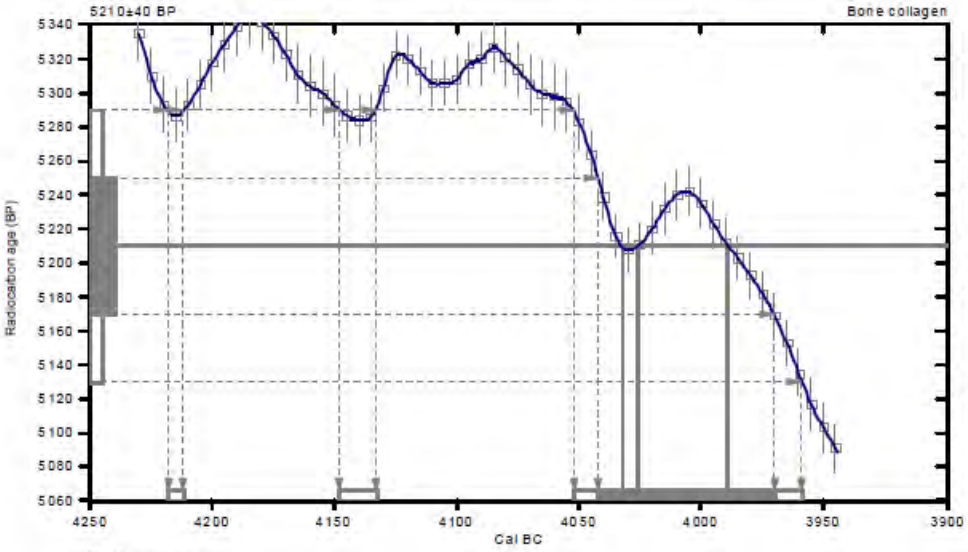
Conventional radiocarbon age: 5210±40 BP

2 Sigma calibrated results: Cal BC 4220 to 4210 (Cal BP 6170 to 6160) and
(95% probability) Cal BC 4150 to 4130 (Cal BP 6100 to 6080) and
Cal BC 4050 to 3960 (Cal BP 6000 to 5910)

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal BC 4030 (Cal BP 5980) and
Cal BC 4030 (Cal BP 5980) and
Cal BC 3990 (Cal BP 5940)

1 Sigma calibrated result: Cal BC 4040 to 3970 (Cal BP 5990 to 5920)
(68% probability)



References:

Database used
INTCAL09

References to INTCAL09 database
Heaton,et.al.,2009, Radiocarbon 51(4):1151-1164, Reimer,et.al, 2009, Radiocarbon 51(4):1111-1150, Stuiver,et.al,1993, Radiocarbon 35(1):137-189, Oeschger,et.al.,1975,Tellus 27:168-192

Mathematics used for calibration scenario
A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322

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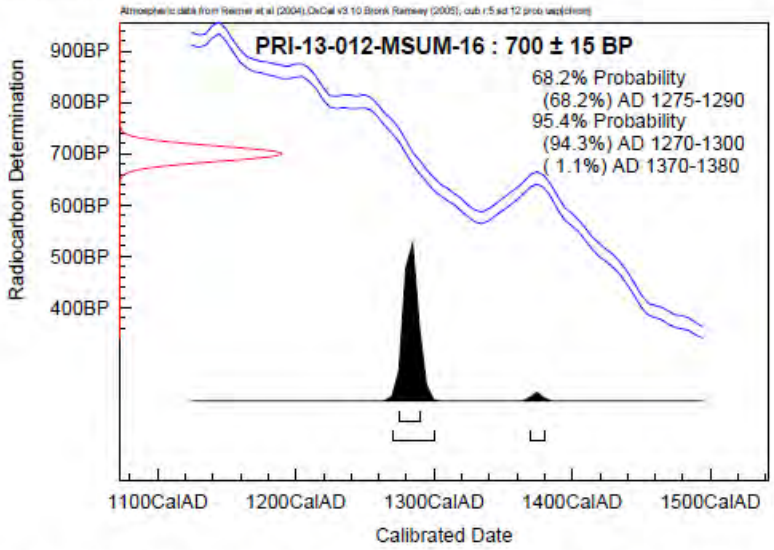
FIGURE 1. PRI RADIOCARBON AGE CALIBRATION

Laboratory Number: PRI-13-012-MSUM-16
Sample Identification: Probable bison rib bone fragment
Conventional AMS ^{14}C Date: 700 ± 15 RCYBP
1-sigma Calibrated Age Range (68.2%): AD 1275-1290
2-sigma Calibrated Age Range (95.4%): AD 1270-1300; AD 1370-1380



Intercept Statement. For radiocarbon calibration, PRI uses OxCal3.10 (Bronk Ramsey 2005), which is a probability-based method for converting ages in radiocarbon years (RCYBP) into calibrated dates (CAL yr BP). This method is preferred over the intercept-based alternative because instead of providing individual point estimates, it reflects the probability of the date's occurrence within a given range (reflected by the amplitude [height] of the curve). As a result, the probability-based method produces more stable calibrated values than do intercept-based methods (Telford 2004). Ongoing refinements and adjustments to the calibration curve have a greater apparent effect on individual points than on ranges.

References

Bronk Ramsey, C., 2005, OxCal. 3.1 ed. www.rlaha.ox.ac.uk/oxcal/oxcal.htm.

Reimer, P. J., M. G. L. Baillie, E. Bard, A. Bayliss, J. W. Beck, P.G. Blackwell, C. Bronk Ramsey, C. E. Buck, G. S. Burr, R. L. Edwards, M. Friedrich, P. M. Grootes, T. P. Guilderson, I. Hajdas, T. J. Heaton, A. G. Hogg, K. A. Hughen, K. F. Kaiser, B. Kromer, F. G. McCormac, S. W. Manning, R. W. Reimer, D. A. Richards, J. R. Southon, S. Talamo, C. S. M. Turney, J. van der Plicht, C. E. Weyhenmeyer. 2009. IntCal09 and Marine09 radiocarbon age calibration curves, 0-50,000 years cal BP. *Radiocarbon* 51(4):1111–1150.

Telford, R. J., E. Heegaard, and H. J. B. Birks, 2004, *The Holocene* 14(2):296-298.

Project Date #16