PUBLIC SUMMARY REPORT

Austin A. Buhta, Rolfe D. Mandel,
and Eric C. Grimm

June 2019

Archeological Contract Series 303

Prepared by:
Archeology Laboratory
Augustana University
2032 South Grange Avenue
Sioux Falls, South Dakota 57105

Prepared for:
The Oversight Board of the
Statewide Survey of Historical
and Archaeological Sites and the
Minnesota Historical Society
345 Kellogg Boulevard West
St. Paul, Minnesota 55102-1906

Funded by the Arts and Cultural Heritage Fund of the Minnesota Clean Water, Land, and Legacy Amendment as part of the Statewide Survey of Historical and Archaeological Sites
WATONWAN COUNTY MINNESOTA:  
AN ARCHEOLOGICAL AND GEOMORPHOLOGICAL  
RESOURCES INVENTORY AND APPRAISAL

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Austin A. Buhta, Rolfe D. Mandel, 
and Eric C. Grimm

L. Adrien Hannus (Co-Principal Investigator)

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Cover Image: View of the Watonwan River valley on the edge of Madelia.
ABSTRACT

This report presents the findings of an intensive archeological and geomorphological investigation of select lands in Watonwan County, Minnesota. The project was conducted by the Archeology Laboratory, Augustana University, Sioux Falls, South Dakota, for the Minnesota Historical Society and the Oversight Board of the Statewide Survey of Historic and Archaeological Sites. The project is one in a series of studies undertaken with Legacy Amendment funds to investigate poorly understood areas in the state. The primary objective of the study was to expand the breadth of collective knowledge concerning the location and character of precontact and early postcontact archeological sites in Watonwan County. The current investigations surveyed 4,326.78 acres and documented 16 previously unrecorded archeological properties in the county. Two previously recorded sites were also revisited during the course of the study. The study also included a geomorphological investigation. The geomorphological component focused on the examination of localities in river valley settings, assessment of the properties of mapped soils in these settings, and the modeling of surface and buried archeological site potential there. The geomorphological evaluation afforded a clearer view of regional landform development and resulted in the establishment of a site probability model for precontact archeology in Watonwan County’s river valleys. These data were then incorporated into a larger, countywide narrative probability model for precontact archeological sites in Watonwan County. Results from the current study were also evaluated via Minnesota’s existing site probability model, MN/Model. Analysis revealed that over 86 percent of precontact sites (n=25) modeled in the county are in areas of high probability as predicted by MN/Model. The remaining four identified precontact sites (13.79 percent) were modeled in areas of unknown site potential; however, three of these localities would likely have been modeled as high site potential had enough data existed prior to the current study. Proximity to potable water sources—and specifically those associated with lakeshore settings—appears to have been a crucial factor in habitation site selection. Conversely, geomorphological data suggest that Watonwan County’s stream valley settings offer only menial potential for harboring precontact archeological sites.
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We are indebted to many for their help in the completion of this work. Though too numerous to list individually, our most sincere gratitude is extended to the numerous landowners who granted us permission to survey their properties. For providing us with assistance in accessing the collections at the Watonwan County Historical Society and for setting up and promoting a presentation on our project, we wish to acknowledge the efforts of Wilma Wolner and Barb Nelson. Additional thanks are extended to Jacob Foss and Andra Mathews, Minnesota Department of Transportation, for supplying us with MN/Model maps and statistical data for analyses. Special thanks to the staff and management at the Super 8 in Saint James, who kindly put up with our almost constant schedule changes due to the weather. On the topic of weather, we would be remiss for not extending a heartfelt thanks to Mother Nature herself. Thank you, Mother Nature...for absolutely nothing. Finally, we wish to acknowledge the efforts of Pat Emerson, Amanda Gronhovd, and Bruce Koenen for administering the project, and for providing advice and support (and reports, field notes, photos, and access to the collections at Fort Snelling) throughout. Thanks again, everyone, we truly appreciate it.
1. PROJECT OVERVIEW

On December 22, 2017, the Archeology Laboratory, Augustana University (Augustana), Sioux Falls, South Dakota, entered into a contract (No. 4810029) with the Minnesota Historical Society (MHS), St. Paul to investigate the prehistory and early history of Watonwan County, Minnesota. The study is one of a series undertaken since 2010 as part of the Legacy Amendment-funded Statewide Survey of Historical and Archaeological Sites (http://mn.gov/admin/archaeologist/legacy-amendment/projects-publications/). These statewide survey projects have targeted areas of Minnesota that previously received little attention archeologically. The aim of the investigations is to collect basic site inventory data that will assist in future cultural resource management (CRM) planning, archeological research, and public education.

Watonwan County is located in southcentral Minnesota within the South Subregion of the Prairie Lake Archaeological Region as originally defined by Anfinson (1990) (Table 1; Figure 1). The Prairie Lake region is a natural area of level ground moraine defined by the congruent distribution of tallgrass prairie vegetation and numerous shallow lakes. Its landforms are the result of the most recent glaciation and the vegetation of a relatively stable climate over the past 5,000 years (Anfinson 1997:9). The vast majority of the county’s surface area is now utilized for agricultural purposes and is primarily dedicated to row crop cultivation. With the rise of farming, most of the small, shallow lakes and wetlands in the county were drained. Nevertheless, Watonwan County’s landscape and ecological background suggest an area that is rich in both prehistoric and early historic archeological resources.

Despite this potential, Watonwan County has seen only limited investigations by the professional archeological community. Prior to 2017, only 14 archeological sites had been formally documented in the county. Another three localities, designated as “alpha” sites (see below), were reported but never field-verified by professional archeologists. Over 82 percent (n=14) of the 17 identified sites have a prehistoric component. However, only four of these 14 properties (about 29 percent) have been assigned to a specific cultural tradition, and all are located in close proximity to a major waterbody or waterway. The alpha sites identified in the county may be imprecisely mapped or have poor locational data and, as mentioned above, remain to be field-verified by professional archeologists. Only one site in the county, site 21WW4, has been the subject of professional excavations beyond limited testing (Lothson 1983); these excavations were completed nearly 50 years ago.

Similarly, only a limited number of archeological surveys have been conducted in Watonwan County. Nearly all of these are cultural resource management (CRM) surveys, which are often confined to narrow, linear corridors or very small, isolated parcels. Most of the other efforts have been equally limited in scope, largely confined to segments along various state and county roadways or consisting of small public access areas associated with some of the larger lakes in the county. The current study represents the first largescale, countywide systematic archeological inventory survey to be undertaken in Watonwan County. The results of the investigation are the subject of this report.

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<td>4S</td>
</tr>
<tr>
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<td>4E</td>
</tr>
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<td>4W</td>
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<tr>
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<td>5</td>
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<tr>
<td>Central Lakes Coniferous North</td>
<td>5N</td>
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<tr>
<td>Central Lakes Coniferous South</td>
<td>5S</td>
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<td>Border Lakes</td>
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<td>9</td>
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<tr>
<td>Lake Superior North</td>
<td>9N</td>
</tr>
<tr>
<td>Lake Superior South</td>
<td>9S</td>
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</tbody>
</table>

Archeology Laboratory, Augustana University

June 2019
Figure 1. Watonwan County, Minnesota relative to designated SHPO Archaeological Regions.
DESCRIPTION AND OBJECTIVES
Page 3 of the project Request for Proposals (RFP) outlines the following four objectives for the Watonwan County investigation: "...1) to summarize what is known about the prehistoric and early historic past of Watonwan County; 2) to update the State Archaeologist’s site file with regard to the status of known sites; 3) to find as many unrecorded prehistoric and early historic sites as is reasonably possible; and 4) to assist the public and local officials with understanding and interpreting the past.” Three primary tasks, described below, served as the foundation for the project research design that was ultimately constructed.

1) Assess what is known about the prehistoric human occupation of Watonwan County by reviewing archeological site records and reports, examining institutional artifact collections, interviewing local artifact collectors, and reconstructing the paleoenvironment, including the locations of upland lakes that are now drained. Data obtained from this review should allow for the mapping of known and probable site locations, the assessment of which prehistoric cultural complexes were present in the county, and establishing the focus of a research design for field investigations.

2) Conduct a joint archeological/geomorphological field survey of select localities identified in the research design. Archeological priorities will be previously recorded sites that have not been revisited in over 10 years, alpha sites and areas identified during resident/collector interviews, and areas that are felt to reflect a good sample of various landform settings with high site potential. The archeological component will focus on pedestrian reconnaissance of fields with good surface visibility and high surface/near-surface site potential. All prehistoric and early historic (pre-1837) sites will be documented upon discovery. The geomorphological component will be directed towards the examination of stream valley landforms (alluvial fans, fill terraces, colluvial slopes, etc.) in the study area to assess their potential for harboring buried cultural resources.

3) Complete an analytical and descriptive report that summarizes the literature search, collections research and collector interviews, field survey, geomorphology, and cultural and environmental backgrounds of the county. The report will include a narrative site locational probability model for identifying prehistoric resources as well as a short overview of the human prehistory and early history of the county suitable for public distribution, and will also suggest productive avenues for future archeological research in the county.

Research Design
A research orientation was established and field methodology was implemented pursuant to the specifications set forth in the RFP, as well as to governing state (Anfinson 2011; see also Monaghan et al. 2006) and federal (Advisory Council on Historic Preservation [ACHP] 2012) standards for the management and protection of cultural resources. The RFP states that the first task of the project is to assess what is known about the prehistoric human occupation of Watonwan County through a review of literature related to the county’s geology, geomorphology, paleoenvironment, and archeology, as well as relevant ethnographic and historic records.

Site records and reports were reviewed at the Minnesota Office of the State Archaeologist (OSA), Ft. Snelling History Center, and the MHS State Historic Preservation Office (SHPO), St. Paul on February 8–9, 2018 by Augustana personnel. During this time, meetings were also held with MHS and OSA staff concerning various aspects of the project. Archived records from the University of Minnesota, Twin Cities (U-of-M), MHS, and the Institute for Minnesota Archaeology (IMA), now curated at the OSA, were also consulted, as were resources available at Augustana’s Archeology Laboratory and Center for Western Studies (CWS), Sioux Falls, South Dakota. On March 15, 2018, Augustana personnel examined historic records and artifact collections curated at the Watonwan County Historical Society (WCHS) in Madelia, Minnesota.

Background research was conducted to elucidate potential trends or patterns in prehistoric and early historic site composition and distribution within Watonwan County, particularly with respect to a given site’s landform position and association with other natural features, such as waterways or waterbodies. In addition to reviewing the literature for site distribution and settlement patterns, previously constructed site locational models, such as Minnesota’s
MN/Model (Hudak et al. 2002), were utilized in conjunction with a suite of GIS-integrated Light Detection and Ranging (LiDAR) and General Land Office (GLO) survey maps. These data afforded a clearer visualization of both prehistoric and early historic-period site distribution throughout the county.

The second task outlined in the RFP is the completion of archeological field investigations of select localities within the county. Areas targeted for pedestrian survey included those containing previously recorded sites and alpha\(^1\) sites where boundaries were poorly defined, as well as select localities felt to reflect a good sample of various landform settings with high potential for harboring surface and/or near-surface prehistoric or early historic archeological deposits. The selection of survey areas was based on several factors, including previously documented site locations, a review of soils and topographic maps, landowner permission, landform composition, ground surface visibility, and vegetation/crop cover. Ultimately, although the selection of survey areas intentionally incorporated both probabilistic and non-probabilistic methodology similar to that employed during the MN/Model investigations and the Minnesota Statewide Archaeological Survey (MNSAS [MHS 1981]), the majority of parcels were selected to maximize site discovery. Because of this, and because the parameters governing the archeological survey component largely limited it to a pedestrian surface reconnaissance, cultivated fields located above present stream floodplains and drained upland lakes were a focal point.

A geomorphological component was incorporated into the field investigation of the county. It involved mapping surfaces and landforms and describing and sampling alluvial fills from a stream valley setting (see Mandel, this report). As part of the current study, an exposed cutbank section along the South Fork Watonwan River was profiled and described. The geomorphological study culminated in the development of a precontact site probability model for buried cultural resources in stream valley settings. This model incorporated mapped soils and LiDAR datasets coupled with the results of field investigations.

The archeological survey culminated in the investigation of 4,326.78 acres (Figure 2) and the documentation of 16 previously unrecorded archeological properties in the county. Two previously recorded sites, 21WW4 and 21WW5, were also revisited during the study.

Prolonged periods of excessive precipitation in 2018 and 2019, in the form of both rain and snow, greatly impacted the combined fieldwork efforts. Road closures, river and stream flooding, and submerged fields combined to present significant challenges for the duration of the project.

The final task outlined in the RFP is the compilation of a comprehensive investigation report detailing the findings of the study, a site locational model, recommendations for future research, and a short overview of the prehistory and early history of the county. The framework and components of this report are outlined below.

**PERSONNEL AND PROJECT ORIENTATION**

The project was conducted under the overall supervision of Austin A. Buhta and L. Adrien Hannus; the geomorphological component of the project was undertaken by Rolfe D. Mandel. Eric C. Grimm provided a paleoenvironmental overview of the study area. Carlie J. Peterson and Greg Haggerty assisted Mandel in the field. Emma Behling coordinated landowner contact information and obtained permission to access properties throughout the county. Buhta was responsible for GIS data management and map production. Buhta also assisted Mandel with the geomorphological field investigations and conducted background research, model development, and report writing. Collected artifacts were analyzed by Hannus and Buhta. Additional archeological field crew members included Timothy V. Gillen, Erin Hughes, Carlie Peterson, Scott D. Folke, Emma Behling, Tressa Munger, and Greg Haggerty. Lynette Rossum administered the project and edited the report.

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\(^1\) *Alpha* designations are assigned to those sites that are based on correspondence or written accounts but that have not been field-verified by a professional archeologist. Examples include sites reported to the SHPO or OSA by landowners or those mentioned in historic accounts.
Figure 2. Shaded relief map of the Watonwan County study area depicting the distribution of parcels investigated during the 2018–2019 study.
REPORT FRAMEWORK AND ORGANIZATION

Eight chapters comprise the report of this investigation. A brief synopsis of each chapter is provided below.

Report Chapters

1) **Project Overview** presents a general study overview, including the research objectives of the investigation, a general description of the project area, project methodology and roles of personnel involved, and an outline of the framework and organization of the report.

2) **Paleoenvironmental Context** provides a general overview of the paleoenvironmental conditions of Watonwan County and the archaeological region in which it is located. This chapter addresses southwestern and southcentral Minnesota paleoenvironmental history through the evaluation of palynological samples derived from sediment cores extracted from three different regional localities. Sediment cores obtained from Fish Lake, near Windom, Minnesota, Fox Lake, near Sherburn, Minnesota, and the Madelia site near Madelia, afford a clearer view of postglacial vegetational change in the region and, by extension, Watonwan County (Eric C. Grimm).

3) **Cultural Context** describes the culture history of the study region. Overviews are provided of the various cultural groups known to have inhabited the region through time, beginning in prehistory with Paleoindian cultures and concluding with early historic period accounts. Background concerning the later historic-period settlement of Watonwan County (post-1837) is not detailed as per specifications in the project RFP.

4) **Background Research** identifies the previous archeological research conducted in the study area and the breadth of available reports and additional literature produced as a result of these investigations. Also examined are sources detailing work conducted outside the current study area but within the larger extent of the Prairie Lake Archaeological Region.

5) **Archeological Field Investigations** details the results of the archeological pedestrian survey accomplished during the study. Descriptions of the parcels surveyed, individual archeological sites, and the artifacts are presented. Documentation for each site includes artifact and material type inventories and analysis, as well as photographs and map data.

6) **Geomorphological Investigation** provides a geomorphological assessment of the Watonwan County study area. Included are the results of a profiled stream bank section along the valley of the South Fork Watonwan River. A discussion of the sequence of river valley terrace development in the county is also provided, as is a preliminary inventory of landforms capable of containing intact deposits of prehistoric age. Finally, a precontact site probability model for buried cultural resources in stream valley settings is developed and presented (Rolfe D. Mandel).

7) **Synthesis and Recommendations** presents a discussion of the project research and evaluates the results and avenues available for further exploration. Data from the archeological and geomorphological studies are integrated and the state of prehistoric and early historic archeology in the county is reevaluated based on these findings and within the context of the site predictive model. Suggestions for refinement of the model are offered, as is a list of landforms capable of housing prehistoric sites and the likelihood of discovering such sites at varying depths below surface.

8) **References Cited** provides a comprehensive list of sources cited in the report.
2. **Late Quaternary Paleoenvironments of Watonwan County, Minnesota**

Eric C. Grimm

**INTRODUCTION**

Watonwan County lies in southcentral Minnesota, where the level topography and rich soils are ideal for agriculture and about 90 percent of the county is currently cultivated land (Minnesota Geospatial Information Office 1999). At the time of European settlement in the mid-nineteenth century, tallgrass prairie covered the county. However, the first humans to enter the county soon after the last ice age encountered a very different landscape, which changed dramatically over the ensuing millennia. Thus, throughout the postglacial period, human subsistence would have been differentially influenced by vegetation, by the animals that live in association with different vegetation communities, and by climate.

This chapter discusses southwestern and southcentral Minnesota paleoenvironmental history through the evaluation of palynological samples derived from sediment cores extracted from three different regional localities (Figure 3). Sediment cores obtained from Fish Lake, near Windom, Minnesota, Fox Lake, near Sherburn, Minnesota, and the Madelia site near Madelia, afford a clearer view of postglacial vegetational change in the region and, by extension, Watonwan County. Through a clearer understanding of regional paleoenvironments, it is possible to more accurately comprehend settlement and subsistence patterns of Watonwan County’s earliest inhabitants. In this chapter, time is given in calibrated calendar years BP (cal yr BP) unless a radiocarbon date is cited. Radiocarbon dates have been calibrated with OxCal 4.3.2 (Bronk Ramsey 2017) using the IntCal13 calibration curve (Reimer et al. 2013). Age ranges given for calibrated ages are within the 95.4 percent probability ranges. The value “µ” represents the weighted mean.

**Modern Climate and Vegetation**

According to the Köppen-Geiger classification system, the modern climate of Watonwan County is Dfc: snow, fully humid, hot summer (Kottek et al. 2006). At Saint James, mean annual temperature is 7.2°C; mean January low is -14.6°C, and mean July high is 28.6°C. Mean annual precipitation is 775 mm. Summers (June–August) are wet, with maximum monthly precipitation in June of 114 mm. Winters (December–February) are dry, with minimum monthly precipitation in February of 15 mm (data from NOAA National Center for Environmental Information www.ncdc.noaa.gov/cdo-web/).

At the time of European settlement in the mid-nineteenth century, the level terrain of Watonwan County was covered with tallgrass prairie (see Figure 3). According to the modern plant community classification system of the Minnesota Department of Natural Resources, Southern Mesic Prairie and Southern Wet Prairie covered most of the area. The most common grass was *Andropogon gerardii* (big bluestem), which was dominant in both mesic and wet prairie environments. Other mesic prairie dominants are *Sporobolus heterolepis* (prairie dropseed) and *Sorghastrum nutans* (Indian grass), with *Hesperostipa spartea* (porcupine grass) and *Schizachyrium scoparium* (little bluestem) on drier sites. Other wet prairie dominants include *Spartina pectinata* (prairie cordgrass), *Panicum virgatum* (switchgrass), *Calamagrostis canadensis* (bluejoint), and *Carex pellita* (woolly sedge) (Harris 2007a, 2007b; Marschner 1974).

The humid climate of southern Minnesota promotes high productivity of prairie grasses during summer, which, however, produces high loads of extremely flammable fuels during the relatively dry autumn months after the vegetation dries and in spring after snow melt. At Saint James, mean monthly precipitation is 55 mm in October, 41 mm in November, and 42 mm in March. In addition, the level topography of Watonwan County promoted the spread of fire, which helped maintain the prairie vegetation (Grimm 1984). Northeast of Watonwan County, major firebreaks and more rugged topography offered better protection from fire, allowing forest to persist. A band of deciduous forest occurs between prairie and northern hardwood-conifer forest in northeastern Minnesota (see Figure 3).
Watonwan County, Minnesota: An Archaeological and Geomorphological Resources Inventory and Appraisal

Figure 3. Pollen core sites discussed in chapter relative to a generalized map of Minnesota’s presettlement vegetational communities.
GLACIAL HISTORY

During the Late Wisconsin glaciation, the Des Moines lobe of the Laurentide ice sheet repeatedly advanced across southcentral Minnesota. Periods of ice stagnation may have occurred between advances rather than major retreats (Johnson et al. 2016; Lusardi et al. 2011; Patterson 1997). The glacial deposits from these advances comprise the New Ulm formation, of which three members occur in Watonwan County (Johnson et al. 2016). Ground moraine covers the southwestern half of the county, while sediments from glacial Lake Minnesota cover much of the northeastern half of the county south of the Watonwan River (Figure 4). The Ivanhoe member, which originated from the glacial advance that formed the Bemis Moraine ~17,000 cal yr BP (~14,000 14C BP) west of Watonwan County, is buried below deposits from later advances in the county. Exposed at the surface in the southwestern half of the county is the Dovray member, which was deposited by an advance to the Altamont Moraine at ~15,500 cal yr BP (~13,000 14C yr BP). Exposed in the northeastern half of the county is the Heiberg member, which is derived from a later glacial advance. Wood recovered at the base of sediment deposited by glacial Lake Minnesota was dated to 12,260 ± 90 14C yr BP (14,726–13,915 cal yr BP, μ = 14,256 cal yr BP). This wood likely came from a tree growing on stagnating ice near the proglacial lake (Jennings et al. 2011; Jennings et al. 2012; Johnson et al. 2016). Thus, the earliest that Watonwan County would have been accessible for human occupation would have been sometime between the advance to the Altamont Moraine at ~15,500 cal yr BP and the formation of glacial Lake Minnesota at ~14,000 cal yr BP.

Figure 4. Surficial geology map of Watonwan and adjacent counties based on Hobbs and Goebel (1982) and Johnson et al. (2016). The heavy dashed line shows the border between the Dovray and Heiberg members of the New Ulm formation. Sites used for paleoenvironmental reconstruction are shown in red type.
Vegetation and Climate History

In Minnesota, the best source of data for reconstructing the composition of past vegetation and timing of vegetation changes is fossil pollen from lake and wetland sediments. A large number of fossil-pollen sites have been studied in Minnesota and adjacent states, providing a regional framework; however, changes are time-transgressive and vary regionally (e.g., Webb et al. 1983; Williams et al. 2009). In general, spruce forest covered the region soon after deglaciation. In southern Minnesota, spruce declined rapidly at the end of the Pleistocene about 12,000 years ago, and deciduous forest developed. Prairie advanced from the west, and by about 9000 was beginning to replace forest in western Minnesota. Prairie continued to advance northeastwards until about 7000 years ago. Since about 6000 years ago, forest readvanced southwestward, reaching its maximum extent only a few hundred years ago (Almendinger 1992; Grimm 1983; Webb et al. 1983; Williams et al. 2009; Williams et al. 2010). Much of the Big Woods area northeast of Watonwan County was prairie during the middle Holocene. Forest expanded within the Big Woods region beginning at least 6000 years ago, but the characteristic Big Woods forest dominated by Acer saccharum (sugar maple), Tilia americana (basswood), and Ulmus (elm) did not fully develop until only a few hundred years ago during the Little Ice Age (Grimm 1983; McAndrews 1968; Umbanhowar 2004; Umbanhowar et al. 2006). Although the climate of Watonwan County may have become suitable for forest during the late Holocene, frequent fires inhibited forest invasion and prairie persisted (Grimm 1983). Patches of forest did develop west of Watonwan County where protected by large lakes from fire, most notably around Lake West Okoboji in Iowa (Van Zant 1979).

Only one site in Watonwan County, the Madelia site (Jelgersma 1962), has been studied for fossil pollen; however, it spans only the early postglacial period (see Figures 3 and 4). Fortunately, two pollen sites in adjacent counties, together with the Madelia site, form a complete postglacial sequence (Figure 5). The record from Fox Lake (Commerford et al. 2016) in Martin County spans the middle and late Holocene, while the sequence from Fish Lake (Grimm 2011), which straddles the Jackson County-Cottonwood County line, overlaps the upper part of the Madelia sequence and spans the early Holocene before the Fox Lake record.

Figure 5. Composite pollen diagram constructed from sequences at Fox Lake, Fish Lake, and Madelia. Color scheme: light blue – dominant taxa of early postglacial pioneer vegetation; dark blue – dominant conifers of the late glacial; medium blue – taxon derived entirely from long-distance transport; green – deciduous trees; gold – prairie taxa.

To construct the composite postglacial pollen record from the three sites, new age models were developed for Fish Lake and Madelia. For Fox Lake, the Neotoma 1 age model in the Neotoma Paleoecology Database (www.neotomadb.org) was used. This age model was constructed with the Bayesian age modeling program Bacon (Blaauw and Christen 2011). For Fish Lake, a new Bacon age model was constructed based on the 12 radiocarbon dates from the site (Grimm 2011). For Madelia, a new Bacon age model was constructed based on stratigraphic tie points with the pollen record from Fish Lake.
At the Madelia site, buried lake sediments were discovered in an excavation in 1958. The pollen and radiocarbon dates indicated that it was a late-glacial deposit in which sediment began accumulating soon after deglaciation (Jelgersma 1962). The original pollen counts have been lost, but the diagram was digitized and the original counts reconstructed (Grimm 2011). The basal date of 12,260 ± 90 14C yr BP (14,726–13,915 cal yr BP, µ = 14,256 cal yr BP) from glacial Lake Minnesota immediately south of Madelia (276–281 centimeters below surface [cmbs] depth) is slightly younger than the lowermost date from Madelia of 12,650 ± 350 14C yr BP (16,023–13,840 cal yr BP, µ = 14,945 cal yr BP); however, the dates are statistically the same and have a large overlap. The lake sediments at Madelia extend below the lowermost radiocarbon date to a depth of 300 cmbs. For the age model used by Grimm (2011), the extrapolated age of the base of the sediments was 13,793 14C yr BP. This age is ~1500 years older than the basal date from glacial Lake Minnesota. Although the linear extrapolation may not be appropriate, the Madelia radiocarbon date is on bulk lake sediment, and dates on bulk sediment are frequently too old (Grimm et al. 2009). Thus, given the uncertainty in the reliability of the Madelia radiocarbon ages, a new age model was constructed based on pollen-stratigraphic correlation with the pollen record from Fish Lake (Table 2). Based on this age model, the basal age of the Madelia sequence is 14,367 cal yr BP with a 95.4 percent range of 14,848–13,931 cal yr BP. This age is consistent with the basal age of 14,256 (14,726–13,915) cal yr BP for glacial Lake Minnesota.

<table>
<thead>
<tr>
<th>Depth (cmbs)</th>
<th>Age (cal yr BP)</th>
<th>Error</th>
<th>Pollen Stratigraphic Tie Point</th>
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<tr>
<td>215</td>
<td>11,989</td>
<td>229</td>
<td>Betula decline</td>
</tr>
<tr>
<td>222.5</td>
<td>12,226</td>
<td>160</td>
<td>Pinus decline, Quercus rise</td>
</tr>
<tr>
<td>226.25</td>
<td>12,373</td>
<td>123</td>
<td>Bottom of Ulmus rise</td>
</tr>
<tr>
<td>250</td>
<td>12,760</td>
<td>93</td>
<td>Bottom of Alnus and Betula rise</td>
</tr>
<tr>
<td>275</td>
<td>13,637</td>
<td>184</td>
<td>Bottommost age from Fish Lake, Pinus maximum of ~80 percent</td>
</tr>
</tbody>
</table>

For the composite pollen diagram (see Figure 5), the more detailed Fish Lake sequence is shown where it overlaps with Madelia. The Madelia sequence is used for the oldest part of the composite diagram. The entire Fox Lake sequence is used. The basal age of the Fox Lake sequence is 9079 cal yr BP. Fish Lake was analyzed at high temporal resolution for the late-glacial period, but at low resolution for the Holocene. The uppermost sample for the high-resolution section has an age of 11,519 cal yr BP. The ~2400-year interval between these two high-resolution sections is represented by four samples from Fish Lake, which, however, do provide an outline of the vegetation history. The composite pollen record is divided into seven pollen assemblage zones.

Zone 1, 14,370–13,760 cal yr BP
This zone is dominated by Cyperaceae (sedge) with a peak of Salix (willow) and Picea (spruce) increasing from <20 percent to ~40 percent. While Cyperaceae characterizes the modern tundra, this pollen assemblage may more accurately represent a pioneer vegetation on the newly deglaciated landscape, dominated by Cyperaceae with scattered Salix and Picea. A similar late-glacial assemblage from the Norwood site in Sibley County was also given this interpretation, based especially on the fossil beetle assemblage, which was boreal in character, but not tundra (Ashworth et al. 1981). Although the age model suggests that this phase lasted about 600 years, this part of the age model is based on extrapolation of the accumulation rate of overlying sediments, and it may have been shorter if the basal sediments at Madelia accumulated more rapidly.

Zone 2, 13,760–12,730 cal yr BP
This zone is dominated by Picea, which gradually declines from ~80 percent at the base to ~50 percent at the top of the zone. Larix (larch), Abies (fir), and Fraxinus (ash) increase during this period. Larix is a poor pollen producer and was probably much more abundant on the landscape than represented by its pollen. Thus, this zone represents a forested environment, dominated by Picea in the beginning, but with increasing presence of Larix, Abies, and Fraxinus. At Fish Lake, where the Fraxinus types were distinguished, Fraxinus nigra-type is predominant. Zone 2 corresponds in time with the Allerod interstadial (Greenland Interstadial 1c-1a), which dates to 13,900–12,850 cal yr BP (Lowe et al. 2008). A quantitative climate reconstruction from Crystal Lake in northeastern Illinois, which was farther away from the ice sheet, indicates that this period was relatively warm and wet, particularly with wet winters indicated by Abies,
which indicates high winter moisture in the form of snow, and Fraxinus nigra, which indicates wet soils (Gonzales et al. 2009).

**Zone 3, 12,730–11,990 cal yr BP**

This zone represents a transitional period between the late-glacial *Picea* forest and the early Holocene deciduous forest. *Alnus* (alder) and *Betula* (birch) peak during this period, *Alnus* somewhat earlier than *Betula*. About 300 years before the end of this period, the boreal conifers *Picea*, *Larix*, and *Abies* decline precipitously. *Alnus* also declines, while *Ulmus* (elm) and *Quercus* (oak) begin to rise. At the top of this zone, *Betula* and *Fraxinus* decline, while *Ulmus* rises steeply. Thus, a boreal-like conifer forest with an admixture of *Fraxinus* transitioned to a deciduous forest dominated by *Ulmus* and *Quercus*. Zone 3 corresponds in time with the Younger Dryas stadial (Greenland Stadal 1), which dates to 12,850–11,650 cal yr BP (Lowe et al. 2008) but probably ends a few hundred years before the end of the Younger Dryas; the final decline of *Picea* certainly ends before the termination of the Younger Dryas. In Europe and in the Greenland ice-core record, the Younger Dryas is a cold stadial period. The Laurentide ice sheet advanced during the Younger Dryas to the Marquette Moraine in northern Wisconsin and the Upper Peninsula of Michigan (Drexler et al. 1983; Farrand and Drexler 1985; Larson and Schaezel 2001; Lowell et al. 1999); in northeastern Illinois, *Picea* decreased. However, in southwestern Minnesota, *Picea* decreased progressively during the Younger Dryas, which, together with the increase in more southern deciduous-tree taxa, indicates warming throughout this period, rather than cooling.

**Zone 4, 11,990–8180 cal yr BP**

During the early Holocene, the landscape was covered with mesic deciduous forest dominated by *Ulmus*, *Quercus*, *Ostrya/Carpinus* (hornbeam or ironwood), *Carya* (hickory), *Acer* (maple), and *Tilia* (basswood). Compositionally, the pollen assemblage resembles those from the pre-European settlement Big Woods (Grimm 1984; McAndrews 1968; Umbanhowar 2004), but with higher values of *Ulmus* of nearly 50 percent at the base of the zone, then dropping to ~30 percent. Given that *Ulmus* was the most common tree in the Big Woods as recorded in the Public Land Surveys (Grimm 1984), a predominance of *Ulmus* in the early Holocene forest is indicated. The preference of *Ulmus* for wet, poorly drained soils (Grimm 1984) indicates a relatively wet climate. The percentages of prairie pollen types Poaceae (grass), *Ambrosia* (ragweed), and *Amaranthaceae* (goosefoot/amaranth) also rise somewhat in this zone but are similar to values from the pre-European settlement Big Woods (Grimm 1983; McAndrews 1968; Umbanhowar 2004). These herbaceous pollen types may have been derived from openings within the forest, wetland margins, or long-distance transport from grasslands farther west. Near the top of the zone, beginning ~9000 cal yr BP, deciduous trees begin to gradually decline while the dominant prairie types Poaceae, *Ambrosia*, *Artemisia* (sage), Asteroidae (undifferentiated types in the Aster subfamily), and *Amaranthaceae* begin to increase, indicating either local development of prairie openings, oak savanna, or movement of the main prairie-forest border into southwestern Minnesota.

**Zone 5, 8180–3200 cal yr BP**

The beginning of Zone 5 is marked by declines in *Ulmus* and *Quercus* and a sharp increase in *Ambrosia* pollen. This zone marks the development of widespread prairie in southwestern Minnesota. However, the mid-Holocene prairie differed from the modern tallgrass prairie, particularly in having higher percentages of *Ambrosia*. In addition, the pollen spectra of Zone 5 are characterized by high variability, which characterizes mid-Holocene pollen spectra from the northern Great Plains (Grimm 2001; Grimm et al. 2011; Laird et al. 1998). High resolution work at Kettle Lake, North Dakota shows that this variability is a signal of decadal-scale moisture variability, with frequent droughts alternating with wetter periods. Work at West Olaf Lake in west-central Minnesota also indicated that higher *Ambrosia* pollen characterized the intervals with greatest drought (Nelson et al. 2006). Repeated drought is a disturbance factor that favors weedy taxa such as *Ambrosia* and *Amaranthaceae* (Grimm et al. 2011; Nelson et al. 2004). At West Olaf Lake, δ¹³C analysis of Poaceae pollen grains indicated a shift to C₄ grasses during the mid-Holocene in concert with drier conditions. The modern tallgrass prairie is dominated by C₃ grasses, while C₄ grasses dominate the drier mixedgrass prairie farther west. Thus, the mid-Holocene prairie of Minnesota differed from the modern tallgrass prairie in terms of both greater abundance of weedy taxa and cool season C₄ grasses more characteristic of the mixedgrass prairie.
In general, drier mid-Holocene climate in the Midwest is associated with higher summer insolation, collapse of the Laurentide ice sheet, and final drainage of Lake Agassiz. Insolation peaked about 2,000 years before the development of prairie, but the mesoclimatic effects of the ice sheet and Lake Agassiz delayed warming in the midcontinent (Williams et al. 2010). The sudden increase in Ambrosia pollen at the base of Zone 5 is coeval with the so-called 8.2 ka event in the Greenland ice cores, a short-lived cooling event associated with diminished thermohaline circulation in the North Atlantic (Alley and Ágústsdóttir 2005; Rohling and Pälike 2005). Hu et al. (1999) found evidence of drought at 8200 cal yr BP at Deep Lake in northwestern Minnesota and suggested that the 8.2 ka event may be associated with enhanced drought intensity in the American midcontinent. In southwestern and southcentral Minnesota, a sudden shift to drier conditions occurred at 8200 cal yr BP, and these conditions prevailed for the next 5000 years. Although this trend was probably driven by orbital parameters, the 8.2 ka event may have triggered the sudden shift.

**Zone 6, 3200–100 cal yr BP**

At 3200 cal yr BP, Ambrosia values declined, while Quercus and Ulmus increased. This zone represents the development of the modern tallgrass prairie in southwestern Minnesota. The decrease in Ambrosia and the increase in trees indicate a shift to wetter conditions. The increase in tree pollen may have derived from regional development of woodland patches around lakes, such as that documented at Lake West Okoboji in northwestern Iowa (Van Zant 1979), or from long-distance transport as the Big Woods area to the north was reforested (Grimm 1983; Umbanhowar et al. 2006). During the mid-Holocene, many of the shallow lakes in southern Minnesota were probably dry, and the maintenance of permanent water would have created more effective firebreaks and development of woodland in the lee of these breaks. Increased values of Pinus and Betula in Zone 6 almost certainly represent long-distance transport. Thus, the increases in Ulmus and Quercus probably derived from both regional and extra-regional sources.

**Zone 7, 100 cal yr BP–Present**

Major Euroamerican settlement in southern Minnesota occurred soon after the land was surveyed beginning in 1853 (Grimm 1984), when the tallgrass prairie was rapidly converted to cropland. The primary signal of this event is a dramatic increase in Ambrosia pollen. Zone 7 shows the typical pattern in southern Minnesota, where Ambrosia percentages were higher during the late nineteenth and early twentieth centuries when less attention was paid to soil conservation and when small grains, which are typically harvested before Ambrosia flowers in late summer, were the primary crops. With better land management and the switch to maize and soybeans as the major crops, Ambrosia typically decreases in the latter part of the twentieth century (Grimm 1984).

**SUMMARY**

Watonwan County was deglaciated sometime before 14,000 cal yr BP and was available for human occupation before the Clovis cultural tradition spread across the midcontinent. The modern vegetation of the county was tallgrass prairie, but vegetation and climate changed dramatically during the postglacial period. After a brief period of Cyperaceae-dominated pioneer vegetation, conifer-dominated forest with Picea, Larix, and Abies, and some Fraxinus covered the landscape from ~13,760 cal yr BP to ~12,730 cal yr BP. The climate was cool and wet, especially with wet winters. During the period from ~12,730–12,000 cal yr BP, the vegetation transitioned from conifer to deciduous forest. Alnus and Betula reached peak abundances during this interval. Deciduous forest dominated by Ulmus, Quercus, and other mesic taxa characterized the early Holocene interval of ~12,000–8200 cal yr BP. At ~9000 cal yr BP, prairie taxa began increasing gradually as Ulmus decreased, but a sudden shift to much drier prairie conditions occurred at ~8200 cal yr BP. The mid-Holocene period of ~8200–3200 cal yr BP was the driest interval of the postglacial. Prairie covered the landscape, but the vegetation differed from the modern tallgrass prairie in having a greater abundance of weedy forb taxa and, based on other studies, probably cool-season C4 grasses more typical of the mixedgrass prairie to the west. Climate was more variable than today, or the amplitude of variation was greater, as repeated droughts created bare areas suitable for colonization by weedy taxa. At ~3200 cal yr BP, climate shifted to a wetter, less variable regime, and the modern tallgrass prairie developed. Trees became more common along rivers and around lakes, especially as shallow lakes held water more continuously, forming more effective firebreaks. Nevertheless, the high-resolution pollen data for the last three millennia indicate variability on a decadal to multi-decadal scale, and periodic droughts would have affected human subsistence. These conditions prevailed until settlement by Euroamericans and rapid conversion of the tallgrass prairie to cropland.
3. CULTURAL CONTEXT

The prehistoric cultural chronological framework of the Watonwan County study area is poorly understood. This is likely, at least in part, the result of the paucity of archeological research initiatives and cultural resource management projects conducted in the area to-date. As a consequence of the poorly understood local record, much of what follows is extrapolated from earlier work by Anfinson (1987, 1990, 1997), Gibbon (2012), and others, as well as from data and site records associated with the broader Prairie Lake Archaeological Region. Existing evidence from the study area proper suggests a continuing cultural presence on the landscape from potentially late Archaic times to the present-day; however, paleoenvironmental data suggest a landscape suitable for habitation by the terminal Pleistocene, or about 14,000 cal yr BP (see Grimm, this report). Although the principal focus of this study is precontact and early historic-period cultural groups, it should be noted that Watonwan County has a rich and interesting post-settlement history. Those interested in a more detailed account of Euroamerican settlement and significant historical events in the county should reference Andreas (1874) and Brown (1916).

As a means of facilitating the evaluation and interpretation of archeological properties, the Minnesota SHPO developed a series of statewide historic context documents that outline the various cultural periods. The first to be produced outlines the prehistoric contexts and describes the precontact cultures identified throughout the state from approximately 12,000 to 300 years ago (Dobbs 1989). In the document, Dobbs (1989:44–239) identifies six subdivisions comprising Minnesota’s prehistoric contextual framework. These subdivisions, from oldest to most recent, are: Pre-projectile Point Pattern; Fluted Point Pattern; Lanceolate Point Pattern; Archaic Stage; Ceramic/Mound Stage; and Late Prehistoric Period. No definitive sites of the Pre-projectile Point Pattern have been documented in Minnesota to-date, but see Anfinson (2007), Buhta et al. (2011:12–15), Olmanson (2007, 2008), and Olmanson and Wells (2005, 2006) for discussions and debates on this topic. For the purposes of this discussion, the Fluted Point and Lanceolate Point pattern subdivisions identified by Dobbs (1989) have been combined into what will be termed the Paleoindian period, and the Ceramic/Mound Stage is reclassified as the Woodland period in keeping with the more recently produced Minnesota Statewide Multiple Property Documentation Form for the Woodland Tradition (Arzigian 2008).

PALEOINDIAN PERIOD

The Paleoindian tradition (ca. 12,000–8000 14C yr BP) was adapted to hunting megafauna and other large game during the late Pleistocene and early Holocene. However, recent studies have provided increasing evidence to suggest that foraging and small game hunting strategies played equal, and sometimes more prominent, roles in the subsistence strategies of certain Paleoindian groups (see for example Bamforth 2007; Frison and Walker 2007). Evidence of this tradition is largely derived from isolated surface finds and small, temporary encampments associated with the butchering of mammoths and extinct forms of bison. Extensive projectile point variation and geographic distribution within this tradition are indicative of a nomadic lifestyle (Frison 1991; Figure 6).

Two patterns comprise the Paleoindian tradition in Minnesota: the Fluted Point Pattern and the Lanceolate Point Pattern. The Fluted Point Pattern includes both Clovis and Folsom contexts (Dobbs 1989:50–53); however, more recent evidence of other eastern fluted variants in Minnesota, such as Gainey, Holcombe, and Barnes, suggests that these types should perhaps be included here as well (see Buhta et al. 2011:15–17). Dobbs (1989:50) assigns this pattern to an approximate time frame of 11,500–10,000 14C yr BP; however, there are no absolute dates associated with early Paleoindian finds in Minnesota. The Lanceolate Point Pattern is assigned to an approximate time frame of 10,500–8,000 14C yr BP (Dobbs 1989:64), although, again, chronological control is severely lacking in Minnesota for

Figure 6. Selection of Paleoindian projectile points demonstrating the range in variation between given complexes. Complexes represented from left to right are: Clovis, Folsom, Agate Basin, Hell Gap, Eden, and Dalton (specimens from Augustana comparative collection).
this pattern. Contexts attributed to this pattern include Dalton and Plano. The Plano context includes several different point styles, such as Agate Basin, Hell Gap, Browns Valley, Alberta, Cody, and others (Dobbs 1989:69–72).

Evidence of Paleoindian groups in southwestern and southcentral Minnesota is scarce. In the Prairie Lake region, the majority of artifacts identified in association with these groups are isolated surface finds or specimens documented in collections of local avocations. No sites with Paleoindian components have been documented in Watonwan County to-date. However, Paleoindian projectile point styles recorded elsewhere in the Prairie Lake Archaeological Region include Clovis, Folsom, Browns Valley, Scottsluff, Agate Basin, Plainview, Eden, and Dalton. A Hell Gap point is reported from Lincoln County (Anfinson 1997:32–33; Buhta et al. 2011:30–32).

**Archaic Period**

The transition between the Pleistocene and the Holocene was accompanied by many significant changes, including a warmer, drier climatic regime, the extinction of numerous species of megafauna, and an increase in bison populations across the Plains. Among early New World inhabitants, these changes necessitated adaptations in subsistence strategies that focused upon a far broader spectrum of resources. The result was an increase in reliance upon foraging and local plant materials, as well as the hunting of smaller game species and, in the western part of the state, the numerous bison beginning to populate the area. Between approximately 5000 and 3000 ¹³C yr BP, the use of native copper for ornament and tool production appears in artifact assemblages from Minnesota as part of the Old Copper Culture (Mason 1998:606–608). Additionally, atlatl and dart hunting technology became far more prevalent during this time, a trend that is reflected in the smaller, notched and stemmed projectile point forms characteristic of the period (Figure 7). Of course, these adaptations occurred at different times in different places and, as Gibbon (2012:65), Morrow (2017), and others have pointed-out, the boundaries between Archaic and Paleoindian groups and Archaic and Woodland groups are far more blurred than was originally perceived.

Because it spans such a considerable timeframe, the Archaic in North America was traditionally subdivided into Early, Middle, and Late periods; however, the conventional segregation of the Archaic into early, middle, and late divisions was found to be both overly simplistic and not entirely sufficient for application in Minnesota. Instead, it was determined that there was greater utility in separating Archaic groups into historic contexts based more on the variance in adaptive strategies as dictated by their respective environments (Dobbs 1989; Dobbs and Anfinson 1993). From their work on the development of the state’s historic contexts, Dobbs and Anfinson (1993) settled on four distinct biome-based Archaic contexts: Prairie Archaic, Riverine Archaic, Lake Forest Archaic, and Shield Archaic. Given the extensive timeframe of the Archaic, Dobbs and Anfinson (1993) note that these contexts are only useful if one assumes that they are environment-specific, cohesive adaptations. More recently, Gibbon (2012:65) defined Minnesota’s Archaic tradition as “…one that lacks both Paleoindian projectile points and pottery and that dates roughly before 500 BC,” but he retained the use of the more conventional early, middle, and late descriptors.

In Minnesota, the Archaic (ca. 11,500–2500 BP) is the period where we first recognize a technological shift in hafted bifaces from larger, lanceolate specimens to smaller, stemmed and notched varieties, possibly signaling the application of atlatl technology (but see McElrath et al. 2009:6-10 for a discussion of this problematic issue). We also begin to see the proliferation of groundstone and native copper tools (e.g., Gibbon 2012:77–78; Mason 1998) during this time, as well as evidence of early horticulture and the use of pemmican and lodgepole structures (Michlovic 2017). Early utilization of milling stones appears during the Archaic further to the west (e.g., Jennings 1980) while evidence of seine weights was discovered during this timeframe in aquatic settings in the Midwest (e.g., Struever and Holton 2000).

In the Prairie Lake region, detailed site studies have been carried-out along the Minnesota River valley just northwest of the study area at the Hildahl (21YM35), Granite Falls Bison Kill (21YM47), and J-Squared (21RW53) sites. Michlovic (2015:15) and Anfinson (1997:36–38) provide a summary of these other potential Prairie Archaic sites in
the region. A possible trend observed among several of these Middle Holocene sites is a widespread, regional adaptation to bison hunting. However, other regional Archaic sites exhibit evidence of small game exploitation, making it clear that these groups were adapted to utilizing the full scope of resources available on the prairie.

The Alton Anderson site (21WW4) represents one of only two professionally documented properties in Watonwan County with a potential Archaic affiliation. A bone sample from the site yielded a radiocarbon age of 4760 ± 100 ¹⁴C yr BP, placing it securely within the Archaic timeframe. However, the date has a large standard deviation and Lothson (1983:65) rejected it on the basis of calcium carbonate contamination. Human osteological and artifactual evidence from the site supports a more recent, initial Woodland, timeframe for the site. It cannot be definitively ascertained whether site 21WW4 truly has an Archaic affiliation; however, at this point, designation as such seems premature. The other site, 21WW8, includes a Late Plains Archaic Pelican Lake projectile point in the curated artifact assemblage (see Chapter 4). However, despite the presence of this specimen, no Archaic component was ever defined for the site; the reasons for this remain unclear.

**WOODLAND PERIOD**


In the eastern United States, the Woodland tradition is segregated into Early, Middle, and Later periods. However, Dobbs (1989:106) questioned the applicability of a traditional “Woodland” classification for Minnesota; hence, the change in nomenclature to Ceramic/Mound Stage. He notes that, except perhaps in the southeastern quarter of the state, there really is no manifestation of “Early” Woodland in Minnesota’s archeological record (Dobbs 1989:107) insofar as the traditional definition is concerned. Furthermore, many of the other hallmarks of the period, such as horticultural practices and burial mound construction, occurred late relative to ceramic technology, which itself developed at different times in different parts of the state (Anfinson and Wright 1990:222; Dobbs 1989:106). More recently, the Ceramic/Mound Stage was reclassified as the Woodland tradition (Arzigian 2008). For the purpose of continuity, this report utilizes the most recent “Woodland” designation.

Arzigian (2008:1) identifies 11 historic contexts associated with the Woodland tradition in Minnesota. These contexts are: Brainerd Complex, the Southeast Minnesota Early Woodland Complex, the Havana–Related Complex, the Laurel Complex, the Fox Lake Complex, the Lake Benton Complex, the Central Minnesota Transitional Woodland Complex, the Southeast Minnesota Late Woodland Complex, the Blackduck-Kathio Complex, the Rainy River Late Woodland Complex, and the Pinomani Complex. Those contexts most relevant to the current study area and the Prairie Lake Region are the Fox Lake and Lake Benton complexes. A few sites with Brainerd, Havana-related, St. Croix and Onamia, Southeast Minnesota Late Woodland, and Blackduck-Kathio ceramics have been identified in the Prairie Lake Region; however, these are extremely limited in number and, in most cases, regionally peripheral (Johnson and Buhta 2014:7–15). Because of this, only the Fox Lake and Lake Benton complexes are further addressed here. Anfinson (1997:47–85) and Arzigian (2008:63–84) describe these complexes in detail; they are summarized below.

The Fox Lake complex is the earliest established Woodland manifestation in the Prairie Lake region.¹ Dating from approximately 200 BC to AD 700, the complex exhibits a clearly Plains-focused adaptive strategy. Evidence suggests the utilization of both lake and river environs (with lakes being favored) coupled with the exploitation of bison and other prairie resources. Settlement and subsistence strategies appear largely consistent with those of the preceding Late Archaic and the subsequent Lake Benton complex. Fox Lake is characterized as separate from the latter two complexes based on the presence of ceramics (relative to the Archaic predecessors) and ceramic styles and lack of burial mound construction (relative to Lake Benton) (Arzigian 2008:63).

¹ Though the Brainerd complex is older, Brainerd sites in the Prairie Lake region are largely viewed as outliers.
Anfinson (1994) defines the attributes of Fox Lake Ware as:

... moderate to small-sized conoidal to sub-conoidal vessels with bold exterior cordmarking that is usually vertically oriented, but occasionally oblique or horizontally oriented; the horizontally cordmarked vessels are often partially smoothed and a few Fox Lake rims feature complete smoothing. Vessel walls are relatively thick (6–12 mm) and the paste is sand-tempered. Lips can be round or flat and the rims can be slightly inverted to slightly everted. About two-thirds of the vessels feature some exterior rim decoration, notably trailing, bossing, punctating, and dentate or cordwrapped stick stamping (in order of importance). Occasional interior decoration features short, vertically oriented tool or cordwrapped stick impressions in a single band immediately below the lip. Occasional lip decoration with tool or cordwrapped stick impressions can give the lip a notched appearance (Anfinson 1994:1-2).

Anfinson (1997:59–66) has defined five Fox Lake types based on decoration or surface treatment on undecorated pottery: Fox Lake Trailed (Figure 8), Fox Lake Vertical Cordmarked, Fox Lake Horizontal Cordmarked, Fox Lake Smooth, and Fox Lake Cordwrapped Stick. Several temporal trends are proposed (Anfinson 1997:65), including thinning with time, somewhat more exterior smoothing, an increase in horizontal cordmarking, more complex incised patterns made with thinner lines, and less bossing and more punctates later in time (Johnson and Buhta 2014:11).

Fox Lake pottery has been identified at a number of sites located in southwestern and south-central Minnesota, including Mountain Lake (21CO1) (Bonney 1965), Pedersen (21LN2) (Hudak 1974, 1976, 1978), Alton Anderson (21WW4), Kunz (21WW8), and the typesite, Fox Lake (21MR2) (Anfinson 1997:47–51). Sites 21WW4 and 21WW8 are located in Watonwan County.

The Lake Benton complex follows Fox Lake chronologically in the Prairie Lake region. Lake Benton dates from about AD 700–1200 and appears contemporaneous with Late Woodland manifestations from further east in the state. Settlement and subsistence patterns basically mimic those observed among Fox Lake sites in the region; however, evidence of widespread burial mound construction and substantial changes in ceramic technology define Lake Benton. A transition from dart to bow-and-arrow technology is also evident during this time (Anfinson 1997:75).

Lake Benton pottery is the hallmark of the Late Woodland in southwestern and south-central Minnesota and adjacent areas of South Dakota and Iowa in the Prairie Lake region (Anfinson 1997:75–80; Benn and Green 2000:463, 465). Defined types include Lake Benton Cordwrapped Stick, Lake Benton Vertical Cordmarked, Lake Benton Plain, Lake Benton Horizontal Cordmarked, and Lake Benton Dentate (Figure 9). Lake Benton pottery represents a change from the early Fox Lake ceramic tradition, with a switch from sand to grit tempering, thinning of vessels walls, more subconoidal overall vessel shape, the disappearance of trailing and embossing, and the prevalence of cordwrapped stick impressions on the exterior rims made with larger sticks impressed less deeply (Anfinson 1997:77, 88). Additional characteristics include dentate stamping and/or punctates on the rim and upper shoulder; bossing is present on rare occasions. Interior surfaces are occasionally decorated with cordwrapped stick impressions and up to one-half of identified lips exhibit cordmarking (Anfinson 1997:76–77).

Significant southwestern and south-central Minnesota Lake Benton sites include Mountain Lake (21CO1) (Bonney 1965), the type-site, Pedersen (21LN2) (Hudak 1974, 1976, 1978), Fox Lake (21MR2), Synstebey (21BW1), and others (Anfinson 1997:47–51).

Four sites with Woodland components, 21WW4, 21WW8, 21WW9, and 21WW16, were previously documented in Watonwan County. Of these, sites 21WW4 and 21WW8 are attributed to the Fox Lake complex. Sites 21WW9 and 21WW16 have unspecified complexes, although 21WW16 is identified as Early Woodland based on projectile point typology.
LATE PREHISTORIC PERIOD

In the Plains and Midwest, the Late Prehistoric period (ca. 1000–300 \(^{14}C\) yr BP) is traditionally heralded by the appearance and refinement of horticulture in association with rectangular, semisubterranean earthlodge dwellings in large, complex village settlements reflective of increasingly sedentary lifeways (Scheiber 2006:597; Scott et al. 2006:35). Settlement fortification is common during this time, suggesting that the increased levels of interaction were not always on friendly terms. Additionally, a trend in projectile point technology during this time, increasingly favoring smaller, triangular side-notched and unnotched varieties, suggests a greater reliance upon the bow-and-arrow for the procurement of bison and other game (Frisson 1991:111). In contrast to the Woodland period, Late Prehistoric ceramics traditionally exhibit a more globular shape with thinner vessel walls, more even firing at higher temperatures, and a broader range of decorative motifs and stylistic designs.

In the northeastern Plains and the prairie-forest border, these developments were, however, scaled-back as compared to some of the massive earthlodge villages found along the Missouri River further to the west. Fortification systems were still common among village settlements of the northeastern Plains, but the expansive villages seen along the Missouri were replaced with much smaller “hamlets” (Holley and Michlovic 2010:14). There appears to have been less reliance upon intensive farming practices and the subsistence economy, instead, continued to include regular bison hunting augmented by the hunting and gathering of additional local resources (Michlovic 2008:35; State Historical Society of North Dakota [SHSND] 1990:B.36). The transition between the Woodland and Late Prehistoric periods in southern Minnesota and the Prairie Lake region is defined by changes in ceramic form and decoration and the emergence of a new subsistence pattern focused on horticulture in riverine settings (Anfinson 1997:89).

Dobbs (1989:191) initially identified six historic contexts associated with Minnesota’s Late Prehistoric period: Great Oasis, Oneota, Cambria, Blackduck, Kathio, and Sandy Lake. However, since the original classification of these contexts, new data have resulted in a multitude of changes to this list. The Blackduck and Kathio contexts have since been amalgamated into a single context and reclassified as a terminal Woodland manifestation (see above). After reevaluation, Sandy Lake has been changed from a context to a ceramic ware associated with the terminal Woodland/Protohistoric/early Historic Psinomani context (Arzigian 2008:126; see above). Cambria and Great Oasis have been included with a third context, Big Stone, as part of the broader Plains Village tradition (MHS 2006:4). The Oneota context has been classified, together with the Blue Earth and Orr contexts, under the larger umbrella of the Oneota tradition (MHS 2006:4). Finally, a context called Silvemale was defined and placed within the broader Mississippian tradition (MHS 2006:4). Sites associated with the Oneota and Plains Village traditions are present in the Prairie Lake region (Michlovic 2015:17). Mississippian Silvenale sites have no identifiable presence in the Prairie Lake archeological record to-date; these sites are focused on a small locality near the confluence of the Cannon and Mississippi rivers in southeastern Minnesota.

Great Oasis is recognized as one of the earliest and most widespread of the Village manifestations (Anfinson 1997:90). Great Oasis was first defined by Wilford in 1945 following excavations at site 21MU2 west of the study area in the Prairie Lake region. Wilford’s (1945) excavations revealed a substantial settlement with numerous cache pits and evidence of maize coupled with unique ceramics (Holley and Michlovic 2013:17). Holley and Michlovic (2013:17) describe the Great Oasis ceramics as: “...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” (Figure 10). Vessel forms are globular with smooth to slightly polished rims and smooth or cordmarked-smoothed exteriors; grit temper is utilized (Anfinson 1997:92). Anfinson (1997:90) assigns a timeframe of AD 900–1200 for Great Oasis in the Prairie Lake region. Great Oasis sites are confined to an area south and west of the Minnesota River valley (Michlovic 2015:18). The densest concentration of these sites is found in northwestern Iowa. Minnesota’s Prairie Lake region harbors only a handful of Great Oasis sites; excepting the type-site, evidence of Great Oasis sites in the Prairie Lake region consists of small satellite camps with settlement patterns more consistent with those of preceding Woodland groups than those observed among Great Oasis sites from other regions (Anfinson 1997:92–93, 95). Great Oasis sites have not been identified in Watonwan County.
Probably the best-known of southern Minnesota’s village manifestations, though by no means the best understood, is Cambria. The type-site for Cambria, 21BE2, is located north and east of the study area in the Prairie Lake region. It includes an amalgamation of Woodland, Plains Village, and Mississippian traits that are particularly notable in its ceramic assemblage (Anfinson 1997:96). Though Cambria appears to be a Prairie Lake region manifestation, its site distribution remains poorly understood. Complications in understanding Cambria site distribution can be attributed to the aforementioned blending of traits. Despite Cambria’s largely Prairie Lake affiliation, most well-defined Cambria sites are located in a relatively restricted geographic area along the Minnesota River upstream of Mankato. Large villages and smaller satellite villages are typically located along the Minnesota River terraces while temporary camps have been discovered on lakeshores and smaller waterways in the region; a number of burial mound sites also have Cambria components (Anfinson 1997:102). Subsistence patterns appear to largely mirror those of preceding Woodland groups with perhaps a greater emphasis on gardening. Anfinson (1997:97) describes Cambria ceramics as “…almost all grit-tempered, globular jars with restricted necks, pronounced shoulders, and smooth surfaces.” Some vessels have handles. Vessel decoration generally consists of a blend of Mississippian, Oneota, Plains Village, and Woodland motifs which, taken individually or in limited number, create classificatory problems. Rolled rims with grit temper appear to be a trait solely diagnostic of Cambria; however, these are only present among the assemblages of the type-site and two additional sites near the type-site (Anfinson 1997:96) (Figure 11). A number of Cambria vessels exhibit broad, curvilinear trailing in conjunction with rolled rims and angular shoulders, traits that are reminiscent of Cahokia Sterling phase vessels (Holley and Michlovic 2013:22).

A number of sites with Cambria components have been documented in the Prairie Lake region. However, determining the number of legitimate Cambria sites in the region is more problematic. As Anfinson (1997:96–97) points out, numerous western Minnesota sites with non-Great Oasis Plains Village pottery were simply designated “Cambria,” despite the fact that, in most cases, the “Cambria” ceramics from these sites consist of only a few thin, grit-tempered sherds with smooth surfaces. Thus, a number of sites in the state site files may, in fact, be misidentified as Cambria.

In Watonwan County, state site records note the presence of one site with a Cambria component. This site, 21WW8, was visited in 1971 by MHS archeologists as part of trunk highway archeological investigations (Nystuen 1972:45). It was then revisited and tested in 1973 as part of another MNDOT-sponsored study (Peterson 1974). In examining the state site file, it is clear that the primary component at 21WW8 is Woodland, with Fox Lake ceramics specifically identified. Indeed, with regard to Cambria, the site description merely notes: “…and perhaps some Cambria.”

The Big Stone phase is a cultural manifestation originally defined by Haug (1983) based on work at the Hartford Beach site (39RO5) in South Dakota. Its genesis is traced to the unconformity of the site assemblage relative to other village sites in the literature. Though Big Stone sites contain ceramics similar to some Cambria pottery, the Big Stone varieties lack rolled rims (Figure 12). While most Cambria sites are along the Minnesota Valley west of Mankato, Big Stone settlements are more lake-adapted and cluster around Big Stone and Traverse lakes above the Minnesota headwaters (Anfinson 1997:107). Big Stone phase sites are fortified like Middle Missouri villages further west; however, they are substantially smaller in size and limited in artifact density compared to the Missouri River settlements. Big Stone sites are often located on hilltops. A timeframe of AD 1100–1300 is assigned to the phase by Anfinson (1997:104), though subsequent work expanded this range to AD 1030–1400 (Holley and Michlovic 2013:24). Due to the heterogeneity observed among Big Stone phase ceramics and their restricted geographic distribution, Holley and Michlovic (2013:83–85) have suggested that Big Stone may be more appropriately designated as a regional variant than a phase.
State site files identify no properties with Big Stone phase components in Watonwan County. Given the geographically restricted nature of the phase and the distance between Watonwan County and Minnesota River headwaters, a Big Stone phase presence in the county is considered unlikely.

The Oneota tradition is a Mississippian-influenced cultural phenomenon characterized by largely sedentary village societies centered on an agricultural/bison hunting subsistence economy. It is largely defined within the archaeological record by its hallmark pottery: shell-tempered, globular pots with smoothed surfaces, constricted necks, outward-flaring rims, and a distinct design motif consisting of broad, rectilinear patterns confined to the vessel shoulder area (Anfinson 1979:39) (Figure 13). An Oneota presence in the northeastern Plains has been documented for some time. Holley and Michlovic (2010:13) place the Oneota presence in this area temporally between approximately 700 and 400 \(^{14} \text{C} \) yr BP. In the Prairie Lake region, the majority of identified Oneota sites lie south of the Minnesota River valley, although sites with Oneota components have been recorded north of the valley (Michlovic 2015:18). No sites with Oneota or Oneota-like ceramics have yet been identified in Watonwan County. The likelihood of an Oneota presence in the county is greater than that of the Big Stone phase; although, it is assumed that any such presence would be in the form of small, temporary satellite camps rather than the larger, more established villages.

**THE PROTOHISTORIC PERIOD AND EARLY EUROPEAN CONTACT**

Prior to the first European explorers reaching Watonwan County, several early historic-period Indian tribes populated the Prairie Lake region. The documentation of Psinomani sites in the archeological record of the Lake Traverse area and Oneota ceramics scattered throughout the region indicate an earlier, proto-Dakota and proto-Iowa/Oto/Omaha presence regionally as well. The Siouan Lakota and Dakota are well-documented historically in the Prairie Lake Region up and down the Minnesota River valley from the headwaters area around Big Stone downstream to the Twin Cities. Forays out from this core habitation area almost certainly involved exploitation of resources in Watonwan County. Additionally, the Chiwere-speaking Iowa/Omaha/Oto maintained settlements near the Blue Earth River just east of Watonwan County (see Michlovic 2015:8-13). Given the proximity of these settlements to the study area, it is highly probable that these groups also maintained a presence throughout Watonwan County.

State site files identify one protohistoric Indian habitation, site 21WW6, in the study area. The site, located on the western side of Kansas Lake, was first discovered in 1971 by MHS archeologists conducting investigations as part of the highway archeology program (Nystuen 1972). Neither the site card nor the report provide any additional information about this site. Adding to the confusion are the GIS data, which classify the site as a precontact lithic scatter. It is anticipated that most protohistoric and historic Native American sites would be smaller, semi-permanent habitations similar to those attributed to mobile bison hunting camps that contain some Euroamerican trade goods in their artifact assemblages.

European settlement of the Watonwan County study area did not begin until the mid-nineteenth century. Settlement first began in 1855, when H. B. Sherman, T. Fitch, and J. N. Barker staked separate claims (Brown 1916:376). Settlers continued their entrada at a fairly limited pace from this point, with the majority of individuals of Norwegian, Swedish, German, and Irish descent (Brown 1916:380; Murray 1992:1). Among the earliest establishments in the county was the Ashippun post office, a small log cabin constructed in 1857 (Figure 14). The site of the original post office, in Rosendale Township near the banks of the South Fork Watonwan River, is listed in the state site files.
as alpha site 21WWb. The cabin was long ago removed from this location and is presently on display at the Watonwan County Historical Society in Madelia.

Watonwan County was part of Blue Earth County until February of 1860, when then Governor Alexander Ramsey signed the appropriate legislation to create Watonwan County (Murray 1992:1). The county was formally organized the following year, with Madelia being named the county seat (Brown 1916:381). Shortly thereafter, with the onset of the US–Dakota War in 1862, settlement of the county abated; it resumed slowly in the years that followed. The railroad arrived in Watonwan County in 1870 when a line was constructed between Lake Crystal, Minnesota and St. James (Murray 1992:1). The county seat was officially moved to St. James in 1978 following a countywide referendum (Murray 1992:1).
4. BACKGROUND RESEARCH

PREVIOUS INVESTIGATIONS

Very few systematic archeological investigations have been undertaken in Watonwan County to-date. GIS and site file data provided by MNDOT, SHPO, and OSA identify 36 previous survey projects, or portions thereof, in Watonwan County since 1969 (Figure 15). The majority of previous investigations within the county are reconnaissance-level surveys primarily related to highway construction and utility installation projects. Some of the larger-scale studies conducted in the county are trunk highway surveys undertaken between 1970 and 1976 (e.g., Franke 1970; Nystuen 1971, 1972; Peterson 1974, 1975). The majority of additional large-scale investigations appear to be utility corridors which, like highway projects, have narrow, linear footprints (e.g., Kennedy 2007). Several small-scale investigations have been undertaken throughout the county under the auspices of the Minnesota Department of Natural Resources (DNR) (e.g., Skaar 1996, 1997a, 1997b, 1998; Skaar et al. 2001). Other small cultural resource management investigations include road realignment and bridge replacement undertakings (Schirmer and Roetzel 1994; Shaffer 1995), wastewater treatment facility projects (Harrison 2000; Stemper 2008), riverbank erosion control projects (Harrison 1984), and recreation studies (Harrison 2002; Justin 2008). The most detailed investigation to-date in the county relates to the salvaging of burials at the Alton Anderson site (21WW4). Seventeen burials, containing remains of at least 69 individuals, were recovered from two localities along a glacial esker at the site (Lothson 1983). Investigations at site 21WW4 were undertaken by MHS personnel in 1970 and 1971.

The earliest records of archeological investigations in the county come from two short memos by Lloyd Wilford. In the memos, Wilford (1951, 1952) briefly describes his interaction with Madelia resident Leonard Larson, who, at the time, owned a sizeable private artifact collection. Unfortunately, Wilford (1951) describes the collection as “...not too well labeled as to origin.” Although he asked Mr. Larson twice to take him to these sites, Wilford was apparently unsuccessful. Aside from these two brief memos, no additional archeological investigations in Watonwan County are documented until the end of the 1960s.

Archeological work in Watonwan County from the end of the 1960s through the 1970s predominantly consisted of pedestrian surveys undertaken by MHS personnel as part of the Minnesota Trunk Highway Archaeological Reconnaissance Survey program (Franke 1970; Nystuen 1971, 1972; Peterson 1973, 1974, 1975, 1976). During these investigations, archeological sites 21WW5, 21WW6, 21WW7, 21WW8, and 21WW9, were discovered (Nystuen 1972; Peterson 1973). Additionally, MHS personnel conducted investigations at the Alton Anderson site (21WW4) in 1970 and 1971 (Lothson 1983; see also Arzigian and Stevenson 2003:519–520).

Site records do not reflect any professional archeological investigations in Watonwan County from the end of the 1970s through the early 1980s. The only archeological work indicated in the county during the 1980s is a small riverbank erosion control project located along a section of the Watonwan River in Madelia (Harrison 1984). This study identified no cultural resources. The county then saw another hiatus in archeological work that extended into the first half of the 1990s.

From the mid-1990s onward, archeological work in Watonwan County has been limited to a series of investigations conducted primarily in response to Section 106 review and compliance legislation (see Figure 15). These investigations have largely consisted of small, limited acreage surveys, the majority of which were confined to narrow linear corridors for highway and bridge replacement undertakings (Schirmer and Roetzel 1994; Shaffer 1995) or small lakeshore parcels investigated for public water access projects (Skaar 1996, 1997a, 1997b, 1998). Archeological sites 21WW10, 21WW11, 21WW12, and 21WW13 were documented during these investigations (Shaffer 1995; Skaar 1996, 1997a, 1997b).

The limited array of archeological projects conducted in the county during the twenty-first century is similar in many respects to the projects of the 1990s, often limited in scope and/or geographic footprint. Investigations have been conducted for a series of recreation and small-scale DNR projects (Harrison 2002; Justin 2008; Skaar et al. 2001), utility undertakings (Howell 2008; Kennedy 2007; Thornton et al. 2004), and wastewater treatment projects (Harrison 2000; Stemper 2008). Archeological sites 21WW14, 21WW15, 21WW16, and 21WW17 were documented as a result of this work (Howell 2008; Justin 2008; Thornton et al. 2004).
Figure 15. Watonwan County study area depicting documented cultural resources surveys and archeological sites.
The most significant observation evident in the examination of the distribution of previous surveys in Figure 15 is just how little of the county has actually been investigated. The data layer Previous Survey in Figure 15 is incomplete and does not reflect every survey conducted in the county; it identifies only those areas for which boundaries could be reasonably ascertained from original project reports, GIS shapefiles, and maps. Nevertheless, the amount of survey coverage in the county to-date remains extremely limited.

**PREDICTED SITE LOCATIONS**

No archeological site predictive studies have been completed specifically for Watonwan County. However, three previous studies that have addressed areas within a larger, regional framework are relevant to the current project. Each of those studies is briefly discussed here.

The first study was developed as part of the Statewide Archaeological Survey (SAS), and modeled prehistoric site locations in Brown and Redwood counties, just north and northwest of the study area in the Prairie Lake South Archaeological Subregion (MHS 1981:22–26). As these counties are within Archaeological Subregion 2s, they share a number of geomorphic and physiographic characteristics with Watonwan County. Chief among these is the expansive, gently rolling upland till plain formed by the Des Moines Lobe. Data for the studies were obtained through a probabilistic pedestrian survey of 193 40-acre parcels. The parcels sampled were assigned to one of seven different landscape settings for the purpose of modeling: streamshores, islands, lakeshores, lake inlets/outlets, stream confluences, wetlands, and settings located away from freshwater (MHS 1981:25). Survey results indicated that lakeshore settings harbored the majority of prehistoric sites and that streamshores reflected the next highest percentage. No sites were discovered in island or wetland settings during the study; however, the limited sample size of only 24 identified sites greatly restricts the interpretive value of the dataset (MHS 1981:26).

The second study, by Anfinson (1990), consisted of a synthesis of known and predicted site locations as part of the SHPO’s development of archaeological regions. Anfinson (1990:151–161) provides a separate summary of known and predicted site locations for each archaeological region, although his focus with respect to predicted site locations is directed towards Woodland-period sites. For Region 2, it is predicted that Woodland base camps should be located along major waterways or major lakeshores near ample supplies of timber. Temporary camps should be located along waterways or lakeshores of any size, with winter camps in close proximity to timber. Resource procurement sites are predicted to be most common in association with water sources as well (Anfinson 1990:155).

The most comprehensive site predictive study undertaken in Minnesota to-date is the MN/Model (Hudak et al. 2002). MN/Model is a GIS-based statewide predictive locational model for prehistoric archeological sites. It utilizes a suite of statistical models to map archeological site potential for surface sites that predate AD 1837. Because of the immense scope of the project and the extreme environmental variability present throughout the state, a regional approach was necessary. As part of this regional approach, the state was segregated into 20 distinct subsections based on a series of defining environmental characteristics, and separate models were generated for each of these areas. Watonwan County is located within the Minnesota River Prairie subsection (Hudak et al. 2002). The model for the Minnesota River Prairie subsection predicts that the majority of high and medium potential areas are along major rivers and around larger lakes. It also predicts a general trend of high site potential in close proximity to water (MNDOT 2002).

A MN/Model map depicting archeological site potential for Watonwan County was recently generated by MNDOT Archeologist and Streamlining Projects Manager, Mike Bergervoet (Figure 16). Two characteristics of this model are particularly noteworthy when compared with Figure 15, the map of previously recorded site distribution: 1) nearly all of the previously recorded sites in the county are located within areas classified as either high or medium site potential by MN/Model, suggesting that the model has demonstrated reliability in its ability to predict site locations, even considering the limited sample size; and 2) a large percentage of the surface area, particularly in the southern and western portions of the county, is classified by MN/Model as unknown. This indicates that, while the model has thus far performed reliably, its overall utility is quite limited for most of Watonwan County. These constraints in utility bespeak the paucity of previous archeological research in the county.
Figure 16. MIN/MNDOT's model archeological site potential map for Watonwan County, Minnesota (courtesy of MNDOT).
Watonwan County was likely home to a myriad of cultural groups throughout prehistoric and early historic times. What little evidence exists from previously recorded sites in the county seems, at least superficially, to bear this out. Prior to completion of the current study, preliminary site locational expectations were formulated based on previously recorded sites, existing site probability models, and geomorphological findings from elsewhere regionally. It was anticipated that the distribution of prehistoric sites would form identifiable patterns that dictated which land parcels should be targeted for investigation. For instance, we expected that sites would be found near sources of potable water and that a direct correlation exists between site density and proximity to such water sources. The documented sites in the county closely mirror this pattern with respect to both riverine and lakeshore settings. One exception would be Middle Archaic-period sites associated with the Hypsithermal. During this time period, all of the small, shallow lakes in the county would have dried-up; Archaic sites associated with this period would not, therefore, be anticipated in association with lakeshores. Investigation of this hypothesis was felt to be warranted. Therefore, an attempt was made to target both current and previous lakeshore settings as part of this study.

It was also expected that many sites in river valley settings would be buried beneath mantles of recent alluvial deposition. Detection of such sites would not be possible via traditional pedestrian survey techniques and would, therefore, necessitate the use of alternate methodological approaches (i.e., cutbank inspection and/or deep testing and geomorphological analyses).

ARCHEOLOGICAL SITE COMPOSITION

Files search data derived from OSA, SHPO, and MNDOT have identified a total of 17 previously recorded or reported archeological sites in Watonwan County (Tables 3 and 4; see Figure 15). Fourteen of these sites are formally numbered; the remaining three are assigned an alpha designation. The three reported alpha sites, 21WWa, 21WWb, and 21WWc, are historic ghost towns; their documentation is based on historic records that have not been field-verified by professional archeologists. Of the 14 formally numbered sites, only four (less than 29 percent) have been assigned to a general cultural tradition; all four have some form of Woodland affiliation. At present, there is no property identified as site 21WW1 in the state files; the number was apparently never assigned. Sites 21WW2 and 21WW3 were initially reported to be archeological sites; however, subsequent examinations of the areas in question determined that they were both noncultural in nature.

### Table 3. Previously Documented Archeological Sites in Watonwan County.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Cultural Affiliation (Context)</th>
<th>Site Type/Inferred Function</th>
<th>Revisited by Augustana?</th>
<th>Report Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>21WW4</td>
<td>Late Archaic or Initial Woodland (Fox Lake)</td>
<td>Cemetery, Artifact Scatter/Burial</td>
<td>Yes*</td>
<td>Lothson 1983</td>
</tr>
<tr>
<td>21WW5</td>
<td>Precontact and Postcontact</td>
<td>Artifact Scatter/Habitation</td>
<td>Yes</td>
<td>Nystuen 1972</td>
</tr>
<tr>
<td>21WW6</td>
<td>Protohistoric</td>
<td>Artifact Scatter/Habitation</td>
<td>No</td>
<td>Nystuen 1972</td>
</tr>
<tr>
<td>21WW7</td>
<td>Precontact</td>
<td>Artifact Scatter/Habitation</td>
<td>No</td>
<td>Nystuen 1972</td>
</tr>
<tr>
<td>21WW8</td>
<td>Fox Lake and Cambria</td>
<td>Artifact Scatter/Habitation</td>
<td>No</td>
<td>Nystuen 1972</td>
</tr>
<tr>
<td>21WW9</td>
<td>Woodland</td>
<td>Artifact Scatter/Habitation</td>
<td>No</td>
<td>Peterson 1974</td>
</tr>
<tr>
<td>21WW10</td>
<td>Precontact</td>
<td>Single Artifact/Core Reduction</td>
<td>No</td>
<td>Shaffer 1995</td>
</tr>
<tr>
<td>21WW11</td>
<td>Precontact</td>
<td>Single Artifact/Core Reduction</td>
<td>No</td>
<td>Shaffer 1995</td>
</tr>
<tr>
<td>21WW12</td>
<td>Precontact</td>
<td>Lithic Scatter/Limited Use Habitation</td>
<td>No</td>
<td>Skaar 1996</td>
</tr>
<tr>
<td>21WW13</td>
<td>Precontact</td>
<td>Lithic Scatter/Limited Use Habitation</td>
<td>No</td>
<td>Skaar 1997a</td>
</tr>
<tr>
<td>21WW14</td>
<td>Precontact</td>
<td>Lithic Scatter/Temporary Camp</td>
<td>No</td>
<td>Thornton et al. 2004</td>
</tr>
<tr>
<td>21WW15</td>
<td>Precontact and Postcontact</td>
<td>Artifact Scatter/Camp</td>
<td>No</td>
<td>Justin 2008</td>
</tr>
<tr>
<td>21WW16</td>
<td>Early Woodland</td>
<td>Lithic Scatter/Workshop</td>
<td>No</td>
<td>Howell 2008</td>
</tr>
<tr>
<td>21WW17</td>
<td>Precontact</td>
<td>Lithic Scatter/Workshop</td>
<td>No</td>
<td>Howell 2008</td>
</tr>
</tbody>
</table>

* Mapped site area revisited but no evidence of site observed.

### Table 4. Previously Reported Alpha Sites in Watonwan County.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Cultural Affiliation (Context)</th>
<th>Site Type/Function</th>
<th>Revisited by Augustana?</th>
<th>Report Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>21WWa (Antrim)</td>
<td>Postcontact</td>
<td>Ghost town/Post Office</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>21WWb (Ashippun)</td>
<td>Postcontact</td>
<td>Ghost town/Post Office</td>
<td>No</td>
<td>N/A</td>
</tr>
<tr>
<td>21WWc (New London/New Glory)</td>
<td>Postcontact</td>
<td>Ghost town</td>
<td>No</td>
<td>N/A</td>
</tr>
</tbody>
</table>
The 17 previously documented sites consist of 20 components (Table 5), including postcontact (n=5), precontact (n=14), and protohistoric (n=1). Only four of the precontact components have been identified to the cultural tradition level; all four are associated with the Woodland tradition and one also includes a cambria component. Of the four sites with identified components, three have been further assigned to a more specific historic context. Site 21WW4 is a mortuary site classified as Fox Lake Initial Woodland (Myster and O’Connell 1997:281), though a Late Archaic radiocarbon date with a large standard deviation was acquired from the site (see below). Anfinson (1997:74) suggested that site 21WW4 might represent a “…forerunner to mound burial in the Prairie Lake Region” (see also Arzigian and Stevenson 2003:519–520). Site 21WW16 is classified as Early Woodland. Site 21WW8 includes contexts classified as Early Woodland (Fox Lake) and Cambria. All of the previously recorded sites in the county are precontact except the three designated as “alpha” sites and 21WW6; the alpha sites are listed as the ghost towns of Antrim, Ashippun, and New London/New Glory. Ashippun and Antrim represent original post office locations. Site 21WW6 is listed as a protohistoric habitation in the site file. Sites 21WW5 and 21WW15 have postcontact components.

<table>
<thead>
<tr>
<th>Cultural Period/Tradition</th>
<th>Specific Context(s) Identified</th>
<th>Component Count</th>
<th>Notes/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paleoinian</td>
<td></td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Archaic</td>
<td></td>
<td>1*</td>
<td>Radiocarbon date from 21WW4</td>
</tr>
<tr>
<td>Woodland</td>
<td>Fox Lake (n=2)</td>
<td>4</td>
<td>21WW4, 21WW8, 21WW9, 21WW16</td>
</tr>
<tr>
<td>Plains Village</td>
<td>Cambria</td>
<td>1</td>
<td>21WW8</td>
</tr>
<tr>
<td>Unidentified Precontact</td>
<td></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Protohistoric</td>
<td></td>
<td>1</td>
<td>21WW6</td>
</tr>
<tr>
<td>Postcontact</td>
<td>Railroads and Agricultural Development, 1870–1940 (n=4); Early Agriculture and River Settlement, 1840–1870 (n=1)</td>
<td>5</td>
<td>21WW5, 21WW15, 21WWa, 21WWb, 21WWc</td>
</tr>
</tbody>
</table>

* Based on tenuous radiocarbon date with large standard deviation (Lothson 1983)

Identified site component types include cemetery/mortuary (n=1), lithic scatter (n=5), artifact scatter (n=7), and single artifact (n=2); identification of the three alpha-designated ghost towns is based solely on historic documentation. A preliminary examination of Figure 15 reveals that the majority of identified sites in the county are clustered around the lakes and waterways. The RFP (MHS 2017:3) indicates that most of the previously recorded sites in the county have received little to no attention archeologically beyond reconnaissance-level investigations. The only site subjected to professional excavations is the Alton Anderson site (21WW4). Site 21WW4 is a mortuary site located atop two ridges on a glacial esker. MHS personnel excavated 17 burials at the site between 1970 and 1971. Though no mound superstructures were observed at the site, it was suggested that evidence of mounds might have been plowed down over the years (Lothson 1983:16). The site yielded a radiocarbon age of 4760 ± 100 14C yr BP; however, Lothson (1983:65) rejected the date due to calcium carbonate contamination. Despite this, the remains were originally classified as terminal Archaic/Initial Woodland Besant-Avonlea (Lothson 1983). Subsequent evaluations have suggested a Fox Lake affiliation (Anfinson 1997:74; Myster and O’Connell 1997:281). Arzigian and Stevenson (2003:519–520) provide a brief summary of the work conducted at the Alton Anderson mortuary site (21WW4).

The limited archeological work conducted in Watonwan County prior to this investigation resulted in the documentation of 14 archeological sites (Table 3). An additional three unconfirmed (alpha) sites are reported from the study area (Table 4). These localities are unconfirmed because they are based on reports by area residents or identified in historic accounts but remain to be field-verified by professional archeologists. Of the 17 total sites identified previously, two were revisited during the current study. The remaining 15 properties were not revisited because the sites in question were either not within the temporal scope of the current investigation (i.e., they were later historic-period sites), because landowners denied access permission or were not able to be contacted, or because the focus was on documenting as many previously unidentified sites as possible. Sites that were reexamined, as well as all newly documented properties, are discussed in greater detail in the following chapter.

State site files and GIS data identify five different site types within the known site assemblage. Included types include: ghost town (n=3), lithic scatters (n=5), artifact scatters (n=7), cemetery (n=1), and single artifacts (n=2). All but two of

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1 Cultural component count totals exceed the total site count as some properties are multicomponent.
the previously documented sites with prehistoric components are located in immediate proximity to either a stream valley or waterbody; sites 21WW16 and 21WW17 are located on upland knolls situated above former wetlands. Seven of the identified precontact sites are in lakeshore settings; the remaining five are located along stream valleys (see Figure 15). The RFP indicates that only one site in the county, 21WW4, has been the subject of archeological excavations that employed multiple formal units; none have had major excavations (Phase III) to-date. However, only site 21WW6 has not been tested in at least some manner. Limited test excavations were conducted at sites 21WW3, 21WW5, 21WW7, 21WW8, and 21WW9 in 1973 (Peterson 1974:28–29). Sites 21WW10, 21WW11 (Shaffer 1995) and 21WW12 (Skaar 1996) were tested in 1995. Site 21WW13 was tested in 1995 and 1996 (Skaar 1997a). Testing at site 21WW14 was completed in 2004 (Thorton et al. 2004), while sites 21WW15 (Justin 2008), 21WW16, and 21WW17 (Howell 2008) were evaluated in 2008.

**ARTIFACT COLLECTIONS**

Artifacts from two institutional collections were documented as part of the current study. Augustana personnel examined collections curated by the MHS and specimens curated by the Watonwan County Historical Society (WCHS). Both collections consist, primarily, of lithic and ceramic artifacts; however, two native copper artifacts were observed in the WCHS collection and a small piece of catlinite is present in the MHS collection. Although provenience data for the MHS collection specimens is generally well-documented, the same cannot be said for specimens comprising the WCHS collection. The specimens in the WCHS collection were predominantly donated by private collectors who were residents of Watonwan County. However, there is virtually no specific provenience data accompanying the material and researchers observed multiple items interspersed throughout the collections that exhibit characteristics of modern replicas. These items were not documented.

It should be noted that, in the interest of time management, much of the technical detail pertaining to individual specimens is not included here. Efforts were directed primarily towards photodocumentation as a means of alerting researchers to the presence of the collections. The following brief overview of the collections is designed to highlight their general composition and provide baseline information for those wishing to pursue future study. Scale photographs are provided for the specimens; however, not every piece was individually documented in this manner. Detailed information such as color, material type, metric measurements, and outline sketches is not provided.

**Watonwan County Historical Society**

The WCHS collection was photodocumented on March 15, 2018 at the county historical museum in Madelia, Minnesota. The collection consists of approximately 10 cases of assorted lithic bifaces, ceramics, native copper items (Figure 17), and other, more recently crafted Native American tools. The majority of specimens in this collection, including all lithic bifaces and copper implements, are fastened by glue and/or wire to their respective frames; hence, detailed examination of both faces of these particular artifacts was not possible. The specimens in the collection were acquired and donated by various Watonwan County residents over the years. The majority of artifacts are believed to have been collected from the general vicinity of Watonwan County, though not necessarily from within the county boundaries; precise provenience is lacking for all specimens in the collection.

The copper artifacts consist of two spear points, one exhibiting a socked-tang base (left specimen in Figure 17) and one with a sawtooth base (right specimen in Figure 17). Ceramic artifacts depicted in Figure 17 are all affiliated with the Late Prehistoric Cambria phase. Clockwise from the upper left corner of the image, specific ware types represented appear to include: Mankato Incised; Powell Plain; Judson; Linden Everted; uncertain; and Powell Incised (Scott Anfinson, personal communication 2018). Lithic specimens appear to have largely been produced from a variety of glacially derived cobble cherts and chalcedonies. Although a few nonlocal materials such as Knife River Flint and Hixton Orthoquartzite were observed, the raw material types are generally consistent with locally or regionally available sources and no exotic materials were noted. Numerous examples of oolitic Prairie du Chien chert and Swan River chert were observed in the collection. The tool types include end scrapers and hafted scrapers, bifacially worked knives, and a variety of projectile points. Projectile point styles include triangular unnotched, side-notched, corner-notched, and stemmed specimens that appear to represent a temporal range spanning from the terminal Archaic/initial Woodland period through the Late Prehistoric.
A limited number of specimens in the WCHS collection share some production characteristics that typify mass-produced modern replicas often found for sale at tourist shops throughout the United States, Mexico, and elsewhere. These include the serial replication of form from different material types, sharp, v-shaped side-notches and rounded serrated blade preparation, coupled with the use of brightly colored, exotic materials and flake blanks for expedited production. Cases containing such specimens were not photodocumented.
Portions of the MHS collection of Watonwan County artifacts were photodocumented on February 8 and 9, 2018 and on January 14, 2019 at the Fort Snelling History Center, St. Paul, Minnesota. The MHS houses collections associated with 10 sites in Watonwan County. Sites with collections include 21WW5, 21WW6, 21WW7, 21WW8, 21WW9, 21WW10, 21WW11, 21WW12, 21WW13, and 21WW15. Some site collections are assigned multiple accession numbers; however, collections from all sites are fairly small. Material comprising the collection from site 21WW4 is no longer curated at MHS; all specimens associated with this site were previously repatriated. Material associated with site 21WW12 could not be located at the time of the visit. The various site collections were acquired from professional investigations at the aforementioned sites between the early 1970s and 2007. A sample of the items observed among the collections is depicted in Figures 18–23.

Ceramic artifacts pictured in Figures 18–23 are predominantly Woodland in affiliation. The majority of these specimens are small bodysherds of varying thicknesses with cordmarked exterior surfaces and sand temper. The vast majority of lithic specimens in the MHS collections are, unsurprisingly, pieces of debitage. As with the previously described collection, the most common material types observed are Swan River chert and oolitic Prairie du Chien chert. A variety of other cherts and chalcedonies were also observed; most appear to be locally available from glacial drift deposits scattered throughout the county. The most noteworthy exotic material type depicted is catlinite (see Figure 20, left central image). Formal tool types include bifacially worked knives and a variety of side-notched, corner-notched, and unnotched projectile points. Specimens appear to represent a temporal range spanning the terminal Archaic/initial Woodland period through the Late Prehistoric.

Site records identify the precontact component of 21WW5 as a habitation or possible butchering locale based on the substantial amount of bone observed. However, the small collection from the site curated by MHS under accession number 232.2 included no faunal specimens. Instead, it consisted of a small collection of lithic debitage and ceramic bodysherds (see Figure 18). Ceramics are relatively thin-walled with crushed granite temper; specimens include both
smooth and cordmarked exterior surface examples. The site file assigns 21WW5 to no specific historic context; however, the limited artifact collection suggests at least a Late Woodland affiliation.

Collections for sites 21WW6 and 21WW7 are curated at MHS under accession numbers 232.3 and 232.4, respectively. The 21WW6 collection consists entirely of lithic debitage (see Figure 19, left image); artifacts from site 21WW7 include lithic debitage and fragmented bison remains (see Figure 19, right image). Neither site assemblage includes temporally diagnostic specimens.

The site file designates 21WW8 as an open air habitation with Woodland and possible Plains Village components. Specifically, the site is attributed to Fox Lake and Cambria contexts. Accession number 396 was assigned to this site. For the most part, the artifact assemblage seems to corroborate this Early Woodland to Late Prehistoric designation; however, one specimen in the collection, a corner-notched dart point (see Figure 20, lower right image), is classified as a Late Archaic Pelican Lake point on the specimen card. It is unclear why a Late Archaic component was not also assigned to this site.

Site 21WW9 is described as a Woodland-period habitation in the site records. Artifacts from this site were assigned Accession number 393. Although diagnostic artifacts recovered from site 21WW9 exhibit characteristics largely attributable to the Woodland period, as with the 21WW8 site assemblage, one specimen is somewhat anomalous. This item is a straight rimsherd with grit temper and a design motif consisting of three parallel, wide-trailed horizontal lines (see Figure 21, lower image, right specimen). These characteristics are more typical of Late Prehistoric Cambria designs than they are of the preceding Woodland contexts.

The 21WW10 and 21WW11 site artifact assemblages are curated at MHS under accession numbers 1996.155 and 1996.156, respectively. Both collections consist of one or two pieces of lithic debitage (see Figure 22); none of the specimens are temporally diagnostic.
Collections for sites 21WW13 and 21WW15 are curated at MHS under accession numbers 1996.317 and 2007.128, respectively. The 21WW13 collection consists of three pieces of lithic debitage and one stemmed projectile point (see Figure 23, left image); artifacts from site 21WW15 include 15 pieces of lithic debitage (see Figure 23, right image). The site 21WW13 projectile point appears to be consistent with other small, stemmed varieties discovered in association with Woodland-period site assemblages (e.g., Anfinson 1997:Figure 32). Skaar (1997a:3) more specifically attributes the specimen to a transitional or terminal Woodland context.
NATIONAL REGISTER PROPERTIES

Seven historic properties in Watonwan County are currently listed on the National Register of Historic Places (NRHP). Six of these properties are historic-period buildings or groups of buildings; one is an historic district associated with the Chicago, St. Paul, Minneapolis, and Omaha Railroad that also includes buildings (National Park Service 2018). All of the current NRHP-listed properties fall beyond the timeframe of focus for the current investigation.

RESEARCH SUMMARY AND QUESTIONS

The ability to extrapolate meaningful conclusions from such a limited dataset is clearly restricted. Nevertheless, a select number of general research questions can be formulated. While conducting a countywide investigation of Red Lake County in 2012, similar in both scope and extent to the current study, Augustana posited a series of research questions concerning the archaeology of the county (Buhta et al. 2012:27–28). Three of the questions generated for that study are equally applicable to the present investigation. They are reiterated here:

1) Is the perceived paucity of prehistoric sites in the study area the result of environmental factors restricting the extent and tempo of human occupation, or is it simply the result of the limited amount and scope of previous archeological work? A glance at Figure 15, above, reveals just how little attention the study area has received archeologically. Of the archeological work that has been conducted in the county, the vast majority has been relegated to pedestrian surface survey of very small areas or narrow, linear corridors. Although it was felt, initially, that the answer was likely to fall somewhere in-between, it was also suspected that the reason was more heavily weighted towards the lack of previous investigations and/or the survey methodology.

2) What is the potential for buried sites in the study area, particularly relative to those sites of greatest antiquity? Not surprisingly, very few buried, intact prehistoric sites have been documented in the study area. Additionally, no geomorphological studies to address buried archeological site potential have been conducted. An assessment of those landforms capable of harboring such sites, conducted in a manner similar to that outlined in the MNDOT deep test protocol (Monaghan et al. 2006), coupled with a detailed radiocarbon chronological study of stream valley landform development, would greatly assist our ability to understand where certain sites may be encountered and whether some sites are too old to be expected in a particular setting. The geomorphic implications of such a study are directly relevant to the archeological survey methodology required for given landforms, and the knowledge of the presence and respective ages of these landforms will greatly assist during research design and planning phases of future undertakings.

3) Where do prehistoric sites tend to be located and why? This is perhaps the most cogent question relative to the current study. Results of previous research in the region suggest a strong correlation between site location and proximity to major water sources (see above) because such areas offer the greatest abundance of resources requisite for survival (e.g., freshwater, forage, access to game, timber for shelter and fire). Findings from the current study are later compared with the results of previous studies, and updated models are presented.
5. ARCHEOLOGICAL FIELD INVESTIGATIONS

FIELD METHODOLOGY

Fieldwork was conducted during several sessions between May 7 and November 16, 2018 and again between April 24 and May 17, 2019. Investigations consisted of complementary archeological and geomorphological components. The geomorphic study is the subject of the following chapter (Chapter 6). The archeological component was completed over the course of four 5-day field sessions and three three-day sessions. As was previously mentioned (see page 4), a combination of probabilistic and non-probabilistic methodology was incorporated in the survey parcel selection process although the focus was more heavily directed towards the maximization of previously undocumented site discovery. It was initially felt that at least some degree of random sampling would be ideal. However, a number of factors such as landowner permission, crop harvest schedule, weather, and time constraints, made a random sampling strategy too cumbersome to effectively and efficiently employ while adhering to the primary objective of maximizing site discovery. As a result of these parameters, a primary target of the investigation was cultivated fields, many of which were located in close proximity to waterways or drained upland lakes.

Selected land parcels within the project area were investigated by means of a 100-percent intensive pedestrian survey utilizing parallel, linear transects spaced at approximately 15-m intervals or less. In areas of reduced visibility, or where sites were previously recorded or reported, survey transects were narrowed to 5-m intervals or less. The surface investigation was further augmented by the examination of animal burrows and backdirt piles, road cuts, cutbank exposures, and gravel bars where such features were present.

Standardized documentation procedures were utilized during field investigations. Digital photographs were obtained for overviews of each site as well as for any specific features identified. The position of each artifact and cultural feature observed was demarcated with high-visibility pin flags, and site boundaries were then recorded with the use of Trimble Juno® or Garmin eTrex® model GPS units. Features and diagnostic artifacts were individually plotted with the GPS as were the boundaries of all land parcels examined. These data were subsequently plotted on 1:24,000-scale topographic quadrangle maps and smaller scale aerial orthoimagery maps.

Descriptions of documented cultural resources along with general environmental descriptions of each land parcel were recorded in field journals, including: artifact specimen inventories identifying type, modification, raw material utilized, and count, as well as additional site feature descriptions and measurements. In most instances, cultural material documented was left in situ; only those artifacts determined to hold culturally or functionally diagnostic value were collected for subsequent laboratory analysis. Minnesota archeological site forms were completed for all cultural resources identified or revisited during the course of the project.

Laboratory analyses of recovered/loaned cultural material were conducted between June and December of 2018. Standardized procedures aimed at the production of readily comparable datasets were utilized in the analyses. Diagnostic artifacts were subjected to both macroscopic and microscopic identification procedures for the purposes of determining material typology, manufacture techniques, usewear patterning, and source material locations. Representative samples of lithic and ceramic material were photographed. Diagnostic artifacts were subjected to various dimensional measurements based upon ascribed individual typology, and technical descriptions were provided. Per request, diagnostic artifacts collected from the field were returned to property owners following laboratory analysis.

As a final note, through the month of October, 2018 precipitation readings from the St. James area (central Watonwan County) totaled over 44 inches, which is approximately 16 inches more than the annual average for the county. These precipitation totals make 2018 the second wettest year in the area’s climate history (Seeley 2018). In addition, snow cover persisted through April of 2018 and arrived again by mid-November of that year. February of 2019 continued the trend, again bringing record snowfall amounts to Minnesota (Douglas 2019). Following the thaw, a combination of snowmelt and significant, repeated rains led to months of flooding through March, April, and into May. These conditions both shortened the field season considerably and restricted access to many fields and properties because of flooding.
DOCUENTED ARCHEOLOGICAL PROPERTIES

On-the-ground pedestrian surface survey in the study area culminated in the investigation of 4,326.78 acres and the documentation of 16 previously unrecorded archeological properties. This brings the total number of confirmed sites in the county to 30. Two previously recorded sites were also revisited during the course of the study. Both revisited sites (see also Table 3) and newly identified properties are discussed below (Table 6). The chapter does not address previously recorded sites that field personnel were unable to revisit.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Cultural Affiliation (Context)</th>
<th>Site Type</th>
<th>Previously Recorded/Revisited</th>
<th>Setting/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>21WW4</td>
<td>Late Archaic or Initial Woodland (Fox Lake)</td>
<td>Cemetery and Artifact Scatter/Burial</td>
<td>Yes (Lothson 1983)</td>
<td>Glacial Esker above Lakeshore/No Evidence</td>
</tr>
<tr>
<td>21WW5</td>
<td>Late Woodland (Lake Benton) and Euroamerican</td>
<td>Artifact Scatter/Habitation</td>
<td>Yes (Nystuen 1972)</td>
<td>River Terrace</td>
</tr>
<tr>
<td>21WW18</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW19</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>No</td>
<td>River Bluff</td>
</tr>
<tr>
<td>21WW20</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW21</td>
<td>Precontact</td>
<td>Single Artifact</td>
<td>No</td>
<td>General Upland</td>
</tr>
<tr>
<td>21WW22</td>
<td>Precontact</td>
<td>Single Artifact</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW23</td>
<td>Precontact</td>
<td>Single Artifact</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW24</td>
<td>Precontact</td>
<td>Single Artifact</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW25</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW26</td>
<td>Precontact</td>
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<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW27</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW28</td>
<td>Precontact</td>
<td>Single Artifact</td>
<td>No</td>
<td>Lakeshore</td>
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<tr>
<td>21WW29</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW30</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW31</td>
<td>Precontact</td>
<td>Single Artifact</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW32</td>
<td>Precontact</td>
<td>Single Artifact</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW33</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>No</td>
<td>General Upland</td>
</tr>
</tbody>
</table>

In general, documented artifact assemblages from newly recorded sites were extremely limited in both size and scope. Seven of the 16 newly documented sites, nearly 44 percent, consist of single lithic artifacts. Of the remaining nine sites, all of which are lithic scatters, seven are comprised of either two or three artifacts. No artifacts or features associated with site 21WW4 were observed when the site was revisited. However, numerous artifacts were observed within the mapped boundaries of previously recorded site 21WW5. Artifacts associated with both precontact and postcontact components were observed; however, the majority of observed specimens were historic. Of the 18 total sites investigated, 14 are located in lakeshore settings, two are in stream valley settings, and two were discovered in uplands several hundred meters removed from water (see Table 6).
Site 21WW4

Site Number: 21WW4
Site Type/Function: Cemetery, Artifact Scatter/Burial
Landscape Position: Glacial Esker above Lakeshore
Elevation Above Mean Sea Level (ft): 1,030
Cultural Affiliation: Precontact
USGS 7.5' Quadrangle(s): Madelia 1965

Site Name: Alton Anderson
Legal Location:
Site Area (ac): 16.45
Previously Recorded?: Yes (Lothson 1983)
Site Condition: Destroyed
Archaeological Subregion: 2s

Research History

Site 21WW4 is a previously recorded series of precontact burials located on a deflated glacial esker overlooking the northern shore of a lake. The site was first brought to the attention of the Minnesota Historical Society (MHS) in 1970 when the landowner uncovered burials atop the ridgeline of the esker while quarrying gravel. MHS conducted excavations at the site in 1970 and 1971 (Lothson 1983). Arzigian and Stevenson (2003:519–520) summarize the work and findings at the site.

Salvage excavations recovered a minimum of 69 individuals from 17 burials at the site. Individuals were recovered from shallow subsurface pits at six localities (a–f) along the east and west ridges of the esker (Figure 24). The majority of the burials were primary interments in flexed or semiflexed positions; a number were heavily disturbed from prior cultivation and gravel operations. One group of four individuals was interred as a bundle burial (Arzigian and Stevenson 2003:519). No earthen mound superstructures were observed at the site; however, Lothson (1983:16) suggested that mounds may originally have been present and were subsequently destroyed by farming practices. The site was initially classified as a Late Plains Archaic Besant-Avonlea ossuary based on diagnostic projectile points and observed burial form (Lothson 1983; National Park Service 1999). Subsequent analyses classified the site as possible Fox Lake phase or an untyped Initial/Middle Woodland assemblage based on projectile point styles (Myster and O’Connell 1997:281). A bone fragment from the site yielded a radiocarbon age of 4760 ± 100 yr BP, which predates the above-listed historic context. However, Lothson (1983:65) rejected the date, suggesting that the sample was contaminated.

Figure 24. Site 21WW4 profile (top) and planview (bottom) illustrations prepared by Douglas Birk in 1970 (from Lothson 1983:10).
Description

Augustana revisited the mapped 21WW4 site area on November 13, 2018 (Figure 25). The property was in a recently harvested and tilled soybean field at the time of the Augustana investigation; it afforded approximately 70 percent visibility. The ridge along which the site was mapped is heavily deflated on the east and west ends where the burial pits were originally mapped. Light subsoil is present on the field surface in these areas and numerous large, medium, and small cobbles, as well as some large boulders, are strewn across the field at these higher spots. No artifacts or cultural features were observed during the investigation. The deflated nature of the ridgetop and the combination of previous excavations and disturbance from quarrying suggest that the discovery of additional cultural resources associated with this site is unlikely.

Figure 25. Overview of site 21WW4, facing north.
Site 21WW5

<table>
<thead>
<tr>
<th>Site Number: 21WW5</th>
<th>Site Name: Neuman</th>
</tr>
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<tbody>
<tr>
<td>Site Type/Function: Artifact Scatter/Habitation</td>
<td>Legal Location:</td>
</tr>
<tr>
<td>Landscape Position: River Terrace</td>
<td>Site Area (ac): 27.30</td>
</tr>
<tr>
<td>Elevation Above Mean Sea Level (ft): 983</td>
<td>Previously Recorded?: Yes (Nystuen 1972)</td>
</tr>
<tr>
<td>Cultural Affiliation: Precontact and Postcontact</td>
<td>Site Condition: Disturbed</td>
</tr>
<tr>
<td>USGS 7.5' Quadrangle(s): Madelia 1965</td>
<td>Archaeological Subregion: 2s</td>
</tr>
</tbody>
</table>

**Research History**

Site 21WW5 is a multicomponent precontact and postcontact artifact scatter located on a low (T-0) terrace of the Watonwan River. It was first documented by MHS personnel in 1971 during a survey for the proposed reroute of Trunk Highways 15 and 60 (Figure 28). Nystuen (1972:45) describes the site as: “A possible butchering or habitation site...on the south edge of the Watonwan River. Numerous animal bones and associated pot sherds and stone artifacts were recovered.” In 1973, MHS personnel returned to site 21WW5 to conduct evaluative testing. Following these efforts, Peterson (1974:28) provided the following summary: “Although some prehistoric and historic cultural materials are present at this site, destruction by flooding and agricultural activity has left it in a state of little scientific value. Therefore, no further consideration need be given this site.” No details are provided in either report as to the specific historic contexts associated with the site; GIS shapefile data are similarly vague about this.

**Description**

Augustana revisited the mapped 21WW5 site area on November 16, 2018 (Figures 26 and 27). At the time of the investigation, the field was predominantly fallow from spring and summer floods; however, it had been planted to corn and small areas of unharvested stalks were present throughout the field. Ground surface visibility averaged 40 percent. The site is located on a T-0 terrace above the right bank of the Watonwan River. The field is clearly prone to episodic flooding and survey personnel observed recent overbank deposits throughout portions of the site area. The soils associated with the 21WW5 landform are characterized by gleyed B- and C-horizons; they are flood-prone and/or poorly drained. This information, coupled with the findings from prior evaluative testing (Peterson 1974) and disturbance from previous flooding and farming, suggests either limited or no potential for buried, intact cultural deposits associated with the site.

![Figure 26. Overview of site 21WW5, facing northeast.](image-url)

Augustana personnel observed both precontact and historic-period artifacts exposed on the surface within the mapped 21WW5 site boundary. The historic specimens consisted of brick, metal, and crockery in various fragmentary states. All of these items appeared to be of a post-1900 timeframe; therefore, they were neither inventoried nor photodocumented. The observed precontact artifact assemblage consisted of five items, including four lithic specimens.
and one ceramic rimsherd (see Figure 27). Precontact artifacts were collected from the site to allow for a more detailed analysis of the lithic tools and rimsherd; artifact specimens were returned to the property owner following documentation.

The lithic specimens include one light gray (10YR 7/1) oolitic Prairie du Chien chert tertiary flake, one pinkish white (10R 8/1) thermally altered Swan River chert expended core, one very dark brown (7.5YR 2.5/2) chalcedony ovoid biface, and one incomplete light gray (10YR 7/1) oolitic Prairie du Chien chert triangular unnotched projectile point (see Figure 27, left image). The ovoid biface measures 51.40 mm in maximum length (broken), 42.90 mm in maximum width, and 11.27 mm in maximum thickness. The distal portion of the specimen was removed via a hinge fracture. Both lateral margins of the tool exhibit limited evidence of retouch and edge damage consistent with heavy or prolonged use-wear. The projectile point is a small, triangular unnotched arrowhead. It measures 17.58 mm in maximum length (broken), 16.65 mm in maximum width, and 3.13 mm in maximum thickness. The point exhibits a straight to slightly excursive base and blade margins. The distal tip was removed from a transverse break consistent with impact damage. The projectile point is indicative of a Late Prehistoric timeframe subsequent to the introduction of bow-and-arrow technology.

The ceramic specimen is a small, straight rim fragment measuring 22.87 mm in maximum length, 16.46 mm in maximum width, and 6.05 mm in maximum thickness (see Figure 27, right image). It was tempered with crushed granite and exhibits a pale brown (10YR 6/3) interior and exterior surface. The interior surface is smooth while the exterior surface is cordmarked; no decorative markings are evident on the specimen. The relatively small size and absence of any decorative motifs make it difficult to typologically classify the piece with precision. The cordmarked exterior and crushed granite temper are characteristic of Terminal Woodland (late Lake Benton) groups in the Prairie Lake Region. Although the flaring of the shoulder is a little higher than the norm for most Lake Benton vessels, it is not as abrupt as is typical on the more globular early Plains Village types like Great Oasis or Cambria. Finally, the relative thinness of the sherd is quite dissimilar from that of earlier initial Woodland Fox Lake and early Lake Benton varieties. The specimen likely relates to a terminal Lake Benton or very early Plains Village association (Scott F. Anfinson, personal communication 2018). Characteristics of this specimen are largely consistent with those of a small collection of ceramic bodysherds previously recovered from the site (see Figure 18).
Site 21WW18

<table>
<thead>
<tr>
<th>Site Number: 21WW18</th>
<th>Site Name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Type/Function: Lithic Scatter</td>
<td>Legal Location:</td>
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<tr>
<td>Landscape Position: Lakeshore</td>
<td>Site Area (ac): 0.79</td>
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<tr>
<td>Elevation Above Mean Sea Level (ft): 1,060</td>
<td>Previously Recorded: No</td>
</tr>
<tr>
<td>Cultural Affiliation: Precontact</td>
<td>Site Condition: Disturbed</td>
</tr>
<tr>
<td>USGS 7.5’ Quadrangle(s): Godahl 1967</td>
<td>Archaeological Subregion: 2s</td>
</tr>
</tbody>
</table>

Research History

Site 21WW18 was first documented during the current study.

Description

Site 21WW18 is a small lithic scatter located in a cultivated field. Augustana personnel investigated the site area on May 7, 2018. The site is situated on a deflated hilltop above the southeastern shore of a drained upland lakebed; it measures approximately 86 m north-south by 50 m east-west. The field was in soybean stubble at the time of the investigation; it afforded approximately 80 percent ground surface visibility (Figure 28).

The site consists of 26 lithic artifacts (Figure 29). Specimens recorded include: one pecked, spherical dark grayish brown (10YR 4/2) granitic cobble measuring ca. 15 cm in diameter; one primary flake; five secondary flakes; 12 tertiary flakes; four pieces of shatter; two pieces of reddish brown (5YR 4/3) granitic fire-cracked rock; and one end scraper produced on a secondary flake. Excepting the fire-cracked rock and pecked cobble, specimens were produced from Swan River chert, the majority of which is white (10YR 8/1) to light gray (10YR 7/2) in color with dark gray (10YR 4/1) inclusions. Four of the Swan River chert flakes exhibit a light reddish brown (5YR 6/4) coloring and waxy appearance consistent with thermal alteration. Artifacts were not collected from the site during the current investigation; photographed specimens were returned to their in situ positions following documentation.
Site 21WW19

Site Number: 21WW19
Site Type/Function: Lithic Scatter
Landscape Position: River Bluffs
Elevation Above Mean Sea Level (ft): 1,070
Cultural Affiliation: Precontact
USGS 7.5' Quadrangle(s): Godahl 1967

Site Name: Legal Location:
Site Area (ac): 0.10
Previously Recorded?: No
Site Condition: Disturbed
Archaeological Subregion: 2s

Research History
Site 21WW19 was first documented during the current study.

Description
Site 21WW19 is a small lithic scatter located in a cultivated field. Augustana personnel investigated the site area on May 9, 2018. The site is situated on upland bluffs overlooking the left bank of the North Fork Watonwan River; it measures approximately 18 m in diameter. At the time of the investigation, the site was in a field with corn stubble; the field afforded approximately 50 percent ground surface visibility (Figure 30).

Site 21WW19 is limited to three pieces of lithic debitage (Figure 31). Artifacts documented at the site include one pinkish gray (5YR 6/2) quartzite tertiary flake and two pieces of white (10YR 8/1) chert shatter. The quartzite flake exhibits two negative pressure flake scars along one lateral margin indicative of minor retouch. Artifacts were not collected from the site during the current investigation; photographed specimens were returned to their in situ positions following documentation.

Figure 30. Overview of site 21WW19, facing north.

Figure 31. Lithic artifacts documented at site 21WW19.
Site 21WW20

<table>
<thead>
<tr>
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</thead>
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<td>Landscape Position: Lakeshore</td>
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<td>Cultural Affiliation: Precontact</td>
<td>Site Condition: Disturbed</td>
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<td>USGS 7.5’ Quadrangle(s): St. James East 1979</td>
<td>Archaeological Subregion: 2s</td>
</tr>
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</table>

Research History

Site 21WW20 was first documented during the current study.

Description

Site 21WW20 is a small lithic scatter located in a cultivated field. Augustana personnel investigated the site area on May 10, 2018. The site is situated on an upland hilltop above the southwest shore of a wetland. It was discovered on the surface of a soybean field that afforded approximately 85 percent ground surface visibility (Figure 32).

Site 21WW20 is extremely sparse, consisting of two pieces of lithic debitage. Artifacts comprising the site include one dark yellowish brown (10YR 4/6) chert tertiary flake fragment and one light gray (10YR 7/2) Swan River chert tertiary flake (Figure 33). Artifacts were not collected from the site during the current investigation; photographed specimens were returned to their in situ positions following documentation.

Figure 32. Overview of site 21WW20, facing northeast.

Figure 33. Lithic artifacts documented at site 21WW20.
Site 21WW21

**Site Number:** 21WW21  
**Site Type/Function:** Single Artifact  
**Legal Location:**  
**Site Area (ac):** 0.10  
**Previous Recorded:** No  
**Cultural Affiliation:** Precontact  
**Site Condition:** Disturbed  
**Archaeological Subregion:** 2s

**USGS 7.5’ Quadrangle(s):** St. James East 1979

---

**Research History**

Site 21WW21 was first documented during the current study.

**Description**

Site 21WW21 is an isolated lithic item located in a cultivated field. Augustana personnel investigated the site area on May 10, 2018. The site is situated approximately 0.25-mile south of a wetland lake and about 0.33-mile south-southeast of site 21WW20. Site 21WW21 lies immediately above an intermittent, upland drainageway in a soybean field that afforded approximately 75 percent ground surface visibility (Figure 34).

![Figure 34. Overview of site 21WW21, facing east-southeast.](image)

Site 21WW21 consists of a single, isolated piece of lithic debitage. The artifact is a light brownish gray (10YR 6/2) Swan River chert tertiary flake fragment (Figure 35). The item was not collected from the site during the current investigation; rather, it was photographed and then returned to its in situ position following documentation.

![Figure 35. Lithic artifact documented at site 21WW21.](image)
Site 21WW22

<table>
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<tr>
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<tr>
<td>Site Area (ac): 0.10</td>
<td>USGS 7.5’ Quadrangle(s): Mountain Lake SE 1977</td>
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<tr>
<td>Previously Recorded?: No</td>
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</tr>
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</table>

Research History

Site 21WW22 was first documented during the current study.

Description

Site 21WW22 is an isolated lithic artifact located in a cultivated field. Augustana personnel investigated the site area on May 21, 2018. The site is positioned on the edge of an intermittent, upland drainageway above the southeastern shores of a lake. At the time of the investigation, site 21WW22 was located in a recently planted soybean field that afforded 95 percent ground surface visibility (Figure 36).

The site 21WW22 artifact inventory consists of one pale red (10R 6/4) thermally altered Swan River chert secondary flake (Figure 37). The item was not collected from the site during the current investigation; rather, it was photographed and then returned to its in situ position following documentation.
Site 21WW23

<table>
<thead>
<tr>
<th>Site Number: 21WW23</th>
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<td>Elevation Above Mean Sea Level (ft): 1,210</td>
<td>Previously Recorded?: No</td>
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<td>Cultural Affiliation: Precontact</td>
<td>Site Condition: Disturbed</td>
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<tr>
<td>USGS 7.5' Quadrangle(s): Butterfield 1977</td>
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</tr>
</tbody>
</table>

Research History

Site 21WW23 was first documented during the current study.

Description

Site 21WW23 is an isolated lithic artifact located in a cultivated field. Augustana personnel investigated the site area on May 21, 2018. The site was discovered in uplands above the northeastern shoreline of a lake; it is located approximately 0.41-mile northwest of site 21WW22 and 149 meters southeast of site 21WW24. Site 21WW23 is situated in a recently planted soybean field that afforded approximately 95 percent ground surface visibility (Figure 38).

![Figure 38. Overview of site 21WW23, facing north.](image)

The isolated artifact comprising site 21WW23 is a pale red (10R 7/2) thermally altered Swan River chert secondary flake (Figure 39). The item was not collected from the site during the current investigation; rather, it was photographed and then returned to its in situ position following documentation.

![Figure 39. Lithic artifact documented at site 21WW23.](image)
Site 21WW24

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<tr>
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<td>USGS 7.5’ Quadrangle(s): Butterfield 1977</td>
<td>Archaeological Subregion: 2s</td>
</tr>
</tbody>
</table>

Research History

Site 21WW24 was first documented during the current study.

Description

Site 21WW24 consists of a single, isolated precontact lithic artifact. The site was documented by Augustana personnel on May 21, 2018. The site was discovered on the surface of an upland hilltop overlooking the northeastern shore of a lake; it is located approximately 149 meters northwest of site 21WW23. The artifact was observed in a cultivated, recently planted soybean field that afforded approximately 95 percent ground surface visibility (Figure 40).

The artifact comprising site 21WW24 is a red (10R 4/6) thermally altered Swan River chert unifacially modified cutting tool (Figure 41). The specimen exhibited four negative flake scars along its dorsal surface. Edge damage consistent with minor usewear is present along one lateral margin. The specimen is nondiagnostic with respect to cultural or temporal affiliation. The item was not collected from the site during the current investigation; rather, it was photographed and then returned to its in situ position following documentation.

![Figure 40. Overview of site 21WW24, facing north.](image)

![Figure 41. Lithic artifact documented at site 21WW24.](image)
Site 21WW25

- **Site Number:** 21WW25
- **Site Type/Function:** Lithic Scatter
- **Landscape Position:** Lakeshore
- **Elevation Above Mean Sea Level (ft):** 1,220
- **Cultural Affiliation:** Precontact
- **USGS 7.5' Quadrangle:** Mountain Lake SE 1977

**Research History**

Site 21WW25 was first documented during the current study.

**Description**

Site 21WW25 is sparse precontact lithic scatter located in a cultivated field. Augustana personnel investigated the site area on May 22, 2018. The site is situated on an elevated rise overlooking the southwestern shore of a lake; it is located approximately 123 meters northwest of site 21WW26. Site 21WW25 is situated in a cornfield that afforded approximately 60 percent ground surface visibility (Figure 42).

Two artifacts comprise site 21WW25. Items observed include one light gray (10YR 7/2) Swan River chert tertiary flake and one dark reddish brown (5YR 3/4) chert biface distal tip (Figure 43). The biface specimen measures 20.01 mm in maximum length (broken), 18.03 mm in maximum width (broken), and 7.21 mm in maximum thickness (broken); it is lenticular in cross-section. The specimen exhibits an irregular flaking pattern with edge damage indicative of usewear. It broke via a transverse bend fracture, a type of break characteristic of applied force. The tool is nondiagnostic with respect to cultural or temporal affiliation. The biface was collected from the site for detailed laboratory examination. It was subsequently returned to the property owner. The flake was not collected from the site; rather, it was photographed and then returned to its in situ position following documentation.
Site 21WW26

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Research History

Site 21WW26 was first documented during the current study.

Description

Site 21WW26 is a small lithic scatter located in a cultivated field. Augustana personnel investigated the site area on May 22, 2018. The site is situated on a partially deflated, elevated rise above the southern shore of a lake; it is located approximately 123 meters southeast of site 21WW25 and 165 meters west of site 21WW27. Site 21WW26 is positioned immediately above a wooded drainageway that descends northeast down to the lakeshore. The site lies on the surface of a recently tilled cornfield that afforded 70 percent ground surface visibility (Figure 44).

Two pieces of lithic debitage comprise site 21WW26. Items observed include one light gray (5YR 7/1) and pink (5YR 7/4) oolitic Prairie du Chien chert primary flake and one pink (2.5YR 8/3) Swan River chert secondary flake (Figure 45). Both items exhibit the coloring and waxy appearance associated with thermally altered specimens. Artifacts were not collected from the site during the current investigation; rather, they were photographed and then returned to their in situ positions following documentation.

Figure 44. Overview of site 21WW26, facing north-northwest.

Figure 45. Lithic artifacts documented at site 21WW26.
Site 21WW2

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Site Name: | Legal Location: |
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Previously Recorded? | Site Condition: |
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<tr>
<td>No</td>
<td>Disturbed</td>
</tr>
</tbody>
</table>

Archaeological Subregion: 2s

Research History
Site 21WW27 was first documented during the current study.

Description
Site 21WW27 is a lithic scatter located in a cultivated field. Augustana personnel investigated the site area on May 22, 2018. The site is situated on a heavily deflated, elevated rise overlooking the southern shore of a lake; it is located approximately 165 meters east of site 21WW26 and 191 meters north-northwest of site 21WW28. Site 21WW27 lies on the surface of a recently tilled cornfield that afforded 70 percent ground surface visibility (Figures 46 and 47).

![Figure 46. Overview of site 21WW27, facing north-northwest.](image)

Artifacts comprising site 21WW27 include lithic tools, debitage, and fire-cracked rock totaling seven items. Documented specimens include one pink (5YR 7/4), thermally altered Swan River chert biface, one light brownish gray (2.5Y 6/2) chert spokeshave/multitool, one white (10YR 8/1) chert secondary flake, one dusky red (10R 3/4) Tongue River silicified sediment tertiary flake, one white (10YR 8/1) Swan River chert tertiary flake, one heavily
decomposed piece of red (10R 5/6) granite fire-cracked rock, and one pinkish-white (2.5YR 8/2), thermally altered quartzite secondary flake (see Figure 47). The formal tools were collected from the site for detailed laboratory examination. They were subsequently returned to the property owner. The remaining items were not collected from the site; rather, they were photographed and then returned to their in situ positions following documentation.

The quartzite biface specimen is ovoid in shape, measuring 49.08 mm in maximum length, 35.00 mm in maximum width, and 15.00 mm in maximum thickness. The specimen is generally crude, exhibiting an irregular flaking pattern with edge damage indicative of usewear. The spokeshave/multitool measures 40.08 mm in maximum length, 31.00 mm in maximum width, and 12.20 mm in maximum thickness. It appears to have been manufactured from a large secondary reduction flake. Fine pressure retouch and edge damage consistent with usewear characterize the length of both lateral margins, as well as the margin along the distal end of the tool. Neither tool is diagnostic with respect to cultural or temporal affiliation.
Site 21WW28

Site Number: 21WW28
Site Type/Function: Single Artifact
Legal Location:  
Elevation Above Mean Sea Level (ft): 1,220
Previously Recorded?: No
Cultural Affiliation: Precontact
Site Area (ac): 0.10
USGS 7.5’ Quadrangle(s): Mountain Lake SE 1977
Archaeological Subregion: 2s

Research History
Site 21WW28 was first documented during the current study.

Description
Site 21WW28 consists of a single, isolated precontact lithic artifact. The site was recorded by Augustana University on May 22, 2018. The site was discovered on the surface of upland bluffs overlooking the inlet of a lake. The artifact was observed on the surface of a partially deflated cultivated cornfield that afforded approximately 70 percent ground surface visibility (Figure 48). Site 21WW28 was documented about 191 m south-southeast of site 21WW27 and 368 m southeast of site 21WW26.

The observed artifact comprising site 21WW28 is a white (5YR 8/1) and dark grayish brown (10YR 4/2) Swan River chert tertiary reduction flake (Figure 49). The specimen exhibited no evidence of usewear or thermal alteration. It was not collected from the site during the current investigation; rather, it was photographed and then returned to its in situ position following documentation.
Research History
Site 21WW29 was first documented during the current study.

Description
Site 21WW29 is an extremely sparse precontact lithic scatter consisting of two items. The site was recorded by Augustana personnel on May 22, 2018. The site was discovered on an elevated, upland bench overlooking the north shore of a lake. The artifacts were observed on the surface of a cultivated cornfield that afforded approximately 40 percent ground surface visibility. The setting lies approximately 80 meters north of, and 5 meters above, the shoreline, across from a small, wooded island. The site area is nearly level with a southward and southwestward slope toward the nearby lakeshore. Ground cover at the time of the study made it difficult to ascertain the extent to which the landform harboring the site has eroded (Figure 50).

Two items comprise the site 21WW29 artifact assemblage; they include one large, light gray (10YR 7/2) Swan River chert secondary reduction flake and one mottled light gray (10YR 7/1) and gray (10YR 6/1) Swan River chert biface distal tip (Figure 51). No evidence of thermal alteration was observed on either artifact. The biface measures 22.26 mm in maximum length (broken), 20.03 mm in maximum width (broken), and 8.46 mm in maximum thickness (broken). It exhibits an irregular flaking pattern with minor retouch along one lateral margin. The specimen displays a slightly asymmetrical blade form and lenticular cross-section. Minor step fracturing along one margin suggests some degree of usewear. It
broke via a transverse bend fracture, a type of break characteristic of applied force. The specimen is nondiagnostic with respect to cultural or temporal affiliation. The biface tool was collected from the site for detailed laboratory examination. It was subsequently returned to the property owner. The remaining item was not collected from the site; rather, it was photographed and then returned to its in situ position following documentation.
Site 21WW30

<table>
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<tr>
<th>Site Number: 21WW30</th>
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<td>Site Type/Function: Lithic Scatter</td>
<td>Legal Location:</td>
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<td>Elevation Above Mean Sea Level (ft): 1,000</td>
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<td>Cultural Affiliation: Precontact</td>
<td>Site Condition: Disturbed</td>
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<td>USGS 7.5' Quadrangle(s): Madelia 1965</td>
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Research History
Site 21WW30 was first documented during the current study.

Description
Site 21WW30 is a sparse precontact lithic scatter consisting of three items. The site was recorded by Augustana personnel on November 15, 2018. It was discovered on a small hill that is an old shoreline remnant of a now-drained lakebed. The site is a surface scatter positioned above the northwestern shoreline at an approximate elevation of between 993 and 1,006 feet amsl. The landform harboring the site is heavily deflated; it is presently an agricultural soybean field that was recently harvested and tilled; it afforded approximately 30 percent ground surface visibility at the time of the investigation (Figure 52). Across the drained lakebed, approximately 467 meters to the southeast, is previously recorded site 21WW8. Site 21WW8 is a precontact habitation with Early, Middle, and possible Late Woodland components, as well as a Late Prehistoric Cambria phase component.

Three items comprise the site 21WW30 artifact assemblage. They include one white (2.5Y 8/1) chert cortical shatter, one mottled white (10R 8/1) and pink (10R 8/4) quartzite bifacially flaked tool, and one mottled light gray (10R 7/1) and pale red (10R 7/2) quartzite secondary flake (Figure 53). The tool and flake exhibit evidence of thermal alteration. The bifacially flaked tool was expeditiously produced, with evidence of only minimal working along the distal margin. It exhibits an irregular flaking pattern with no retouch or clear usewear evident; only seven total flake scars were observed on the item. The specimen is nondiagnostic with respect to cultural or temporal affiliation. Artifacts were not collected from the site; rather, they were photographed, mapped and then returned to in situ positions following documentation.

Figure 52. Overview of site 21WW30, facing north. Red oval outlines the general extent of the site.

Figure 53. Lithic debitage (left two) and bifacially worked tool (right), site 21WW30.
Site 21WW31

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<thead>
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<td>Archaeological Subregion: 2s</td>
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</table>

**Research History**

Site 21WW31 was first documented during the current study.

**Description**

Site 21WW31 is a precontact manifestation consisting of a single artifact. The site was recorded by Augustana personnel on May 1, 2019. It was discovered on gently rolling, glaciated uplands overlooking the northern shoreline of a lake. The site was discovered on the surface of a field at an approximate elevation of 1,070 feet amsl. The landform harboring the site is moderately deflated from prior agricultural practices, as well as wind and water erosion. At the time of the investigation, it was an agricultural cornfield that afforded approximately 60 percent ground surface visibility (Figure 54). Approximately 420 meters to the southeast of site 21WW31, site 21WW32 was documented. Site 21WW32 consists of a single, nondiagnostic lithic cutting tool (see below). Further along the lake’s north shore, about 1,500 meters southeast of site 21WW31, are two surface precontact lithic scatters recorded in the 1996 as sites 21WW12 and 21WW13 (Skaar 1996).

The artifact comprising site 21WW31 is a tertiary reduction flake manufactured from a piece of pale red (2.5YR 6/2), glacially derived Swan River chert (Figure 55). The flake exhibits evidence of thermal alteration. The specimen is nondiagnostic with respect to cultural or temporal affiliation. It was not collected from the site; rather, it was photographed, mapped and then returned to an in situ position following documentation.

**Figure 54. Overview of site 21WW31, facing south. Field crew member marks the approximate site location.**

**Figure 55. Tertiary reduction flake comprising site 21WW31.**
Site 21WW32

Site Number: 21WW32  Site Name:  
Site Type/Function: Single Artifact  Legal Location:  
Landscape Position: Lakeshore  Site Area (ac): 0.10  
Elevation Above Mean Sea Level (ft): 1,070  Previously Recorded?: No  
Cultural Affiliation: Precontact  Site Condition: Disturbed  
USGS 7.5' Quadrangle(s): Darfur 1967  Archaeological Subregion: 2s

Research History
Site 21WW32 was first documented during the current study.

Description
Site 21WW32 is a precontact manifestation consisting of a single artifact. The site was recorded by Augustana personnel on May 1, 2019. It was discovered on gently rolling, glaciated uplands overlooking the northern shoreline of a lake. The site was discovered on the surface of a field at an approximate elevation of 1,070 feet amsl. The landform harboring the site is moderately deflated from prior agricultural practices, as well as wind and water erosion. At the time of the investigation, it was an agricultural cornfield that afforded approximately 60 percent ground surface visibility (Figure 56). Approximately 420 meters to the northwest of site 21WW32, site 21WW31 was documented. Site 21WW31 consists of a single, nondiagnostic lithic flake (see above). About 1,000 meters further southeast on the lake’s north shore are ephemeral, surface precontact lithic scatters previously recorded as sites 21WW12 and 21WW13.

The artifact comprising site 21WW32 is an informal lithic cutting tool manufactured from a piece of pale red (10R 6/3), thermally altered, glacially derived Swan River chert (Figure 57). The proximal end of the specimen is absent, having been previously removed via what appears to be a bend fracture. The specimen is nondiagnostic with respect to cultural or temporal affiliation. It was not collected from the site; rather, it was photographed, mapped and then returned to an in situ position following documentation.
Research History

Site 21WW33 was first documented during the current study.

Description

Site 21WW33 is a precontact lithic scatter consisting of two artifacts. The site was recorded by Augustana personnel on April 30, 2019. It was discovered on gently rolling, glaciated uplands approximately 440 meters southwest of a creek. The site was discovered on the surface of a field at an approximate elevation of 1,030 feet amsl. The landform harboring the site is heavily deflated from prior agricultural practices, as well as wind and water erosion. At the time of the investigation, it was an agricultural cornfield that afforded approximately 80 percent ground surface visibility (Figure 58).

![Figure 58. Overview of site 21WW33, facing south. Left of field crew member marks the approximate site location.](image)

The site 21WW33 artifact assemblage consists of two lithic items: one tertiary reduction flake and one secondary reduction flake. Both specimens were manufactured from white (5YR 8/1), glacially derived chert (Figure 59). The specimens are nondiagnostic with respect to cultural or temporal affiliation. They were not collected from the site; rather, they were photographed, mapped and then returned to their in situ positions following documentation.

![Figure 59. Lithic reduction flakes comprising site 21WW33.](image)
6. GEOMORPHOLOGICAL INVESTIGATION

Rolfe D. Mandel

INTRODUCTION

The record of precontact human occupation in Watonwan County is relatively sparse, with only 29 documented sites, all postdating the Late Archaic tradition. The archeological survey conducted in the present study had a strong focus on stream valleys and lakeshores, which, in most areas of the Midwest, tend to harbor many sites. In the stream valleys of Watonwan County, however, only three precontact sites have thus far been discovered: 21WW5 on the valley floor of the Watonwan River, 21WW10 on the valley floor and adjacent bluffs of the South Fork Watonwan River, and 21WW11 on a sideslope of the valley wall of the South Fork Watonwan River. Although the paucity of recorded precontact sites in Watonwan County may be related to low population densities in the region before the Fifteenth Century, the effects of geomorphic processes on the archeological record must also be taken into account.

The purpose of this chapter is to consider geomorphic factors that may contribute to the paucity of recorded precontact sites in the project area. Bettis and Mandel (2002) stressed that the archeological record is a component of the sedimentary record; hence, physical processes that remove, modify, and bury sediments control the preservation and visibility of the record of the human past. Also, many studies (e.g., Bettis 1990, 1995; Bettis and Littke 1987; Bettis and Mandel 2002; Hudak and Hajic 1999; Mandel 2006; Mandel and Bettis 2001; Thompson and Bettis 1980) have demonstrated that stream valleys in the Midwest have extensive surfaces that are geologically young (often postdating 2000 yr BP), and that most of the existing record of precontact cultures is deeply buried.

In this study, the assessment of the relationship between the archeological record and geomorphic factors was initially going to focus on Holocene and terminal Pleistocene landform sediment assemblages in stream valleys and consider four factors: 1) soil stratigraphic record; 2) age of sedimentary deposits; 3) depositional environment (high energy vs. low energy); and 4) drainage conditions (poorly drained vs. well-drained). Consideration of the first three factors listed above requires subsurface exploration and sampling of alluvial deposits through deep coring and, where possible, inspection of stream cutbanks. However, a combination of excessive rainfall and snowfall through much of 2018 and well into 2019 prohibited access to valley floors to collect cores with a Giddings soil probe, and spring flooding in 2019 submerged all but one streambank that had been targeted for description. Consequently, only one factor, drainage conditions, is assessed in this report.

It is important to take into account drainage conditions whether assessing the potential for surface or buried sites. Wetlands, including bogs, marshes, shallow lakes, swamps, basins and wet meadows, are common in southern Minnesota, and were present at various times in the past. In stream valleys, people undoubtedly visited wetlands for hunting and gathering, but it is unlikely that they would have spent much time in such wet environments, and ephemeral camps rarely produce an abundant material record. By contrast, well-drained landform sediment assemblages, such as alluvial fans, high terraces and colluvial aprons, as well as bluffs overlooking valley floors, would have been attractive locations for long-term human occupations that tend to leave a rich archeological record. Understanding the spatial pattern of well-drained versus poorly drained landscapes is a useful first step in understanding the spatial pattern of the archeological record and determining where precontact sites may occur on or below the surface.

GEOMORPHOLOGY AND QUATERNARY STRATIGRAPHY OF THE PROJECT AREA

The project area is located in Fenneman’s (1931) Central Lowland physiographic province of the Interior Plains region. The Des Moines Lobe of the Laurentide Ice Sheet shaped most of the landscape of the project area. Approximately 14,000 years ago, during the New Ulm Phase of the Wisconsin Glacial Stage, the Des Moines Lobe thickened and flowed south across south-central Minnesota and advanced to what is now Des Moines, Iowa (Clayton and Moran 1982). During that most recent glacial advance, the Des Moines Lobe laid down the New Ulm Till in south-central Minnesota (Matsch 1972). However, by about 13,000 years ago, during the Mankato Phase, the Des Moines Lobe retreated and deposited large amounts of drift in the area of Watonwan County. In the western and
south-central portions of the county, the upland landscape is a till plain characterized by a nearly flat to gently undulating geomorphic surface interspersed with knolls that rise 1–3 m above the plain, as well as shallow depressions, or kettles (Figure 60). The landscape is nearly level near Odin and Ormsby, nearly level to gently undulating near St. James, and gently undulating to rolling near Butterfield and Darfur (Murray 1992). Approaching the major stream valleys, the landscape becomes dissected, with moderate to steep slopes descending to the valley floors.

As the Des Moines Lobe retreated in south-central Minnesota, proglacial lakes, including Lake Minnesota, formed in the region (Matsch 1972). Lake Minnesota actually was a complex of lakes formed in a basin on the Des Moines Lobe mostly south of Mankato. Lacustrine deposits associated with Lake Minnesota occur south of Madelia and around Lewisville. Meltwater deposited sandy and gravelly outwash above lacustrine deposits near the towns of LaSalle and Grogan, and it deposited clayey and fine-silty outwash to form the lake plain between the towns of Madelia and Truman (Murray 1992).

Watonwan County is entirely within the Watonwan River basin. The Watonwan River is a tributary of the Blue Earth River, which joins the Minnesota River at Mankato, Minnesota. The Watonwan River basin has a total area of 227,280 ha (561,620 acres) (Yuan et al. 2017) and the river has two major tributaries: the North Fork Watonwan River and South Fork Watonwan River. The North Fork, which is 63 km long and has headwaters in Cottonwood County, flows east across northern Watonwan County before joining the Watonwan River about 2 km southeast of LaSalle. The South Fork is 117 km long and also has its headwaters in Cottonwood County. The South Fork initially flows eastward into southern Watonwan County, then turns northeast and flows through eastern Watonwan County to its confluence with the Watonwan River immediately upstream of Madelia.

The valley floors of streams in the project area typically consist of one geomorphic surface: a low, broad floodplain (Figure 61). Alluvial terraces do not appear to occur in the valleys, though a more thorough assessment of landforms is needed throughout the Watonwan River drainage network to confirm this. In the USDA’s Soil Survey of Watonwan County, Minnesota, with the exception of the Coland soil series, all of the alluvial soils are designated as occurring only on floodplains (Murray 1992). The Coland soil, however, occurs on floodplains and alluvial fans in the upper Midwest, though in Watonwan County it is mapped only on floodplains, suggesting that large alluvial fans also are absent in the drainage network.
METHODS

The geomorphological investigation began with an attempt to collect cores with a Giddings hydraulic soil probe and profile stream bank exposures along the Watonwan and South Fork Watonwan rivers. However, because fields were flooded, too muddy, or covered with snow during the period of this project, the coring effort failed and only one stream bank originally targeted for profiling was accessible. The lone accessible stream bank exposure, in Eagle’s Nest County Park, was cleaned, profiled, and described using standard procedures and terminology outlined by Birkeland (1999) and Schoeneberger et al. (2002).

As a means of augmenting the limited field investigations, the distribution of poorly drained versus well-drained alluvial soils was determined for Watonwan County using the US Department of Agriculture’s (USDA) Soil Survey Geographic (SSURGO) data (after Layzell and Mandel 2019). The SSURGO data were, in turn, used to model the spatial pattern of areas in stream valleys with low potential, no potential, and moderate potential for surficial and buried precontact cultural deposits. The SSURGO data were downloaded from the USDA Geospatial Data Gateway (Natural Resources Conservation Service ([NRCS] 2019) in Esri shapefile format. This dataset was then mapped in ArcGIS Desktop 10.6.1 software where all mapped soils with alluvial designations were isolated. In Watonwan County, only four such soils carry this designation; these soils are addressed in greater detail below.

RESULTS OF INVESTIGATIONS

Eagle’s Nest Park Section

The Eagle’s Nest Park Section is located about 5 miles east of St. James along the left bank of the South Fork Watonwan River at the north edge of Eagle’s Nest County Park (Figure 62). The bank lies at an approximate elevation of 1,000 feet amsl. The river has migrated laterally into the floodplain fill at this locality, creating a vertical cutbank exposure like that depicted in Figure 61, above. A portion of this cutbank, designated the Eagle’s Nest Park Section, was cleaned off and described. The position of the section was subsequently mapped with a handheld GPS device.

At the Eagle’s Nest Park Section, the floodplain fill consists of fine-grained alluvium expressed as a single soil. The profiled exposure measured 125 cm in thickness and exhibited an A-AB-Bg profile with a gleyed B-horizon and common redoximorphic features that are characteristic of hydric soils (Figure 63; Table 7). Significance of the presence of hydric soils documented in the exposure is discussed in greater detail below.
Figure 62. LiDAR imagery of Eagles Nest Park Section depicting the broad, flat floodplain landform comprising the valley bottom.
Watonwan County, Minnesota: An Archeological and Geomorphological Resources Inventory and Appraisal

Table 7. Soil Profile of Section 1, Eagle's Nest County Park.

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<th>Horizon</th>
<th>Description</th>
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</thead>
<tbody>
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<td>A1</td>
<td>Very dark (10YR 5/1) sandy clay loam; weak, fine granular structure; very friable; many fine and very fine roots; many worm casts and open worm and insect burrows; gradual smooth boundary</td>
</tr>
<tr>
<td>51–83</td>
<td>A2</td>
<td>Very dark brown (10YR 2/2) sandy clay loam; weak, fine granular structure; very friable; many fine and very fine and common medium and coarse roots; many worm casts and open worm and insect burrows; gradual smooth boundary</td>
</tr>
<tr>
<td>83–98</td>
<td>AB</td>
<td>Very dark grayish brown (10YR 3/2) sandy clay loam; common fine faint light olive brown (2.5Y 5/3 and 5/4) mottles; weak, medium subangular blocky structure parting to weak fine subangular blocky; very friable; many fine and very fine and common medium and coarse roots; many worm casts and open worm and insect burrows; gradual smooth boundary</td>
</tr>
<tr>
<td>98–125+</td>
<td>Bg</td>
<td>Very dark grayish brown (2.5Y 3/2) sandy clay loam; many fine and medium distinct light olive brown (2.5Y 5/4), common fine faint dark brown (7.5YR 3/2) and few fine distinct olive brown (2.5Y 4/4) mottles; weak medium prismatic structure parting to weak fine subangular blocky; friable; common fine and very fine and few medium and coarse roots; common worm casts and open worm and insect burrows</td>
</tr>
</tbody>
</table>

Hydric Soils and Modeled Site Potential

The USDA's NRCS (2007:10) recently prepared a map depicting the spatial pattern of hydric soils in Watonwan County (Figure 64). Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as "soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part" (US Department of Agriculture, Soil Conservation Service 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation. If soils are wet enough for a long enough period to be considered hydric, they typically exhibit certain properties, such as gleying and other redoximorphic features, that can be easily recognized in the field (see Figure 63 and Table 7). Map units in Figure 64 that largely consist of hydric soils may have small areas, or inclusions, of non-hydric soils in the higher positions on the landform. Also, map units of dominantly non-hydric soils may have inclusions of hydric soils in the lower positions on the landforms. Figure 64 illustrates that hydric soils are common throughout Watonwan County, and they are especially common in stream valleys.
In stream valleys of Watonwan County, four soil series comprise all soils developed in alluvium: Coland, Millington, Hanlon, and Kalmarville (Murray 1992). The Coland soil is a Cumulic Endoaquoll (hydric) developed on poorly drained floodplains and alluvial fans in stream valleys and upland drainageways. This soil typically is characterized by an A-AB-Bg-Cg profile with an overthickened cumulic A horizon. The Millington soil also is a Cumulic Endoaquoll (hydric), but is restricted to poorly drained floodplains in stream valleys. The Millington series has an A-AB-Bg-Cg profile similar to the Coland soil, but the cumulic A horizon of the Millington is not as thick as the A horizon of the Coland series. The Hanlon and Kalmarville soils co-occur as a complex on floodplains, with the Hanlon on well-drained surfaces and the Kalmarville on poorly to very poorly drained surfaces. The Hanlon soil is a Cumulic Hapludoll (non-hydric) with a thick, well-expressed A-Bt-BC-C profile formed in moderately well-drained alluvium. This soil probably represents about 1,000–1,500 years of pedogenesis; where it occurs, the alluvium is late Holocene in age. By contrast, the Kalmarville soil is a Mollic Fluvaquent (hydric) with a weakly expressed A-2Cg profile developed in modern alluvium comprised of silt loam (A horizon) above stratified sand (2Cg horizon).

As previously noted, understanding the spatial pattern of well-drained versus poorly drained landscapes is a useful first step in understanding the spatial pattern of the archeological record and determining where precontact sites may occur on or below the surface. Floodplains where the Coland and Millington soils occur are poorly drained and, therefore, have low potential for surficial and buried precontact cultural deposits. Collectively, the Coland and Millington soils comprise 6,596.82 hectares (16,301.12 acres), or just less than 86 percent of the 7,688.38 hectares (18,998.42 acres) of alluvial soils in Watonwan County. The spatial pattern of low site potential in stream valleys that is based on the distribution of the Coland and Millington soils is shown in Figure 65. The Hanlon and Kalmarville soils form a complex consisting of 1,091.55 hectares (2,697.30 acres), or about 14 percent of the alluvial soils in Watonwan County, but these two soils are strikingly different in terms of their drainage characteristics, horizonation, morphology, and age. Hanlon soils are moderately well-drained and formed in late-Holocene alluvium; therefore, floodplains with Hanlon soils have moderate potential for surficial and buried precontact cultural deposits. Kalmarville soils, however, occur on poorly to very poorly drained floodplains and formed in modern alluvium (less than 200 years old). Hence, floodplains with Kalmarville soils have no potential for surficial or buried precontact cultural resources. Unfortunately, because the Hanlon and Kalmarville soils are mapped as a complex, it impossible to distinguish areas of floodplains with one or the other soil series formed on them. Therefore, floodplains where the Hanlon-Kalmarville complex occurs are designated as having no to moderate potential for surficial and buried precontact cultural deposits (see Figure 65).
Figure 65. Buried and surficial precontact site potential in Watonwan County stream valley settings based on mapped soils drainage characteristics.
SUMMARY AND CONCLUSIONS

Based on the results of this investigation, it is likely that the paucity of recorded precontact archeological sites in Watonwan County is related to poor drainage conditions in this area of south-central Minnesota. The floors of stream valleys, which typically harbor most of the archeological record, are dominated by hydric soils deemed unsuitable for human occupation, except for short-term exploitation of natural resources. Such exploitation rarely produces an abundant material record. In sum, there is no to low potential for surficial and buried precontact cultural deposits in stream valleys of Watonwan County except in the few areas where the moderately well-drained Hanlon soil occurs on floodplains. This predictive model, however, remains to be tested.
7. SYNTHESIS AND RECOMMENDATIONS

RESEARCH OBJECTIVES AND INVESTIGATION RESULTS
The objectives of the current study, as defined on page 3 of the project RFP, were: "...1) to summarize what is known about the prehistoric and early historic past of Watonwan County; 2) to update the State Archaeologist’s site file with regard to the status of known sites; 3) to find as many unrecorded prehistoric and early historic sites as is reasonably possible; and 4) to assist the public and local officials with understanding and interpreting the past." Three primary tasks comprised the project:

1) Assess what is known about the prehistoric human occupation of Watonwan County by reviewing archeological site records and reports, examining institutional artifact collections, interviewing local artifact collectors, and reconstructing the paleoenvironment, including the locations of upland lakes that are now drained. Data obtained from this review should allow for the mapping of known and probable site locations, the assessment of which prehistoric cultural complexes were present in the county, and establishing the focus of a research design for field investigations.

2) Conduct a joint archeological/geomorphological field survey of select localities identified in the research design. Archeological priorities will be previously recorded sites that have not been revisited in over 10 years, alpha sites and areas identified during resident/collector interviews, and areas that are felt to reflect a good sample of various landform settings with high site potential. The archeological component will focus on pedestrian reconnaissance of fields with good surface visibility and high surface/near-surface site potential. All prehistoric and early historic (pre-1837) sites will be documented upon discovery. The geomorphological component will be directed towards the examination of stream valley landforms (alluvial fans, fill terraces, colluvial slopes, etc.) in the study area to assess their potential for harboring buried cultural resources.

3) Complete an analytical and descriptive report that summarizes the literature search, collections research and collector interviews, field survey, geomorphology, and cultural and environmental backgrounds of the county. The report will include a narrative site locational probability model for identifying prehistoric resources as well as a short overview of the human prehistory and early history of the county suitable for public distribution, and will also suggest productive avenues for future archeological research in the county.

In addressing Task 1, site records and reports were reviewed at the OSA and records were requested from SHPO. Records from the U-of-M and IMA were also consulted. Additionally, resources at Augustana University, Sioux Falls, South Dakota and the Watonwan County Historical Society (WCHS), Madelia, Minnesota were consulted. A public meeting to discuss the project with local residents and historical society board members was also held at the WCHS. Brief interviews were conducted with local residents knowledgeable about the history and prehistory of the county. A limited number of newly identified archeological sites were recorded as a direct result of these consultations.

With regard to Task 2, complementary archeological and geomorphological field investigations were conducted in Watonwan County during numerous sessions between early May of 2018 and May of 2019. The archeological pedestrian survey examined 4,326.78 acres within the study area. Sixteen previously unrecorded archeological properties were identified and two previously recorded sites were revisited during the investigation. Following completion of this study, the total number of confirmed, numbered archeological sites in Watonwan County is 30; the number of reported alphasites remains three (Figure 66). The project geomorphologist mapped surfaces and landforms, described alluvial fills at one location in the valley of the South Fork Watonwan River, and generated a model of precontact site potential based on the presence of hydric soils in stream valleys throughout the county. This investigation examined terrace fill through the profiling of a stream bank section and the subsequent analysis of soil composition and development. The geomorphological investigation resulted in the identification of no paleosols in the valley fill of the South Fork Watonwan River and confirmed the presence of hydric soils in the valley at the location of the investigated section.
Figure 66. Watonwan County study area depicting documented cultural resources surveys and archeological sites, including 2018–2019 findings.
The following discussion summarizes the results of the investigation and provides a narrative site location predictive model. Recommendations for future research in the county are also provided.

**Survey Parcels and Sampling Probability**

The current pedestrian survey was conducted across multiple land parcels totaling 4,326.78 acres. Although this investigation is the largest systematic archeological survey conducted in Watonwan County to-date, it is noteworthy that the acreage represents just over 1.5 percent of the county's approximately 281,323.34 total acres of land surface. All of the parcels examined are within Anfinson's (1990) Prairie Lake South Archeological Subregion (2s).

Jacob Foss and Andra Mathews, MNDOT, evaluated the distribution of surveyed parcels relative to areas in the county identified by Mn/Model 4 as having unknown, high, and low potential for harboring archeological sites (Table 8; Figure 67). Based largely on a lack of previous survey data, Mn/Model 4 classifies 84.36 percent of Watonwan County as unknown in terms of its archeological site potential. Not surprisingly, then, the majority of land investigated during the current study, amounting to 2,606.57 ac (60.24 percent), is classified as unknown. Results of the evaluation indicate that 8.84 percent of the classified area in the county has low archeological site potential. Of the 4,326.78 acres surveyed during the current investigation, 16.88 percent, or 730.48 acres, were in low probability areas. Mn/Model designates 2.95 percent of the classified area in the county as having high site potential with a “poorly surveyed” designation. Approximately 6.79 percent of the area investigated, or about 293.65 acres, falls within this category. Approximately 3.36 percent of the county’s classified area is designated by Mn/Model as high potential with a “well surveyed” designation; 16.08 percent of Augustana’s surveyed acreage, approximately 695.53 acres, was in this high potential zone. Combined, the two high potential categories mapped by Mn/Model total 19,143.22 acres, or 6.31 percent of the county’s total acreage. This difference in acreage between high and low potential areas in Watonwan County is only about 2.5 percent (5,718.96 acres), a result that appears atypical of most well-refined models which, ideally, would include a very limited amount of high potential area as compared to low potential acreage (see Hobbs et al. 2002). However, in Watonwan County, this disparity is almost certainly the result of the fact that over 84 percent of the entire county remains classified as unknown in terms of its site potential.

### Table 8. Countywide Mn/Model Mapped Archeological Site Potential Relative to 2018–2019 Survey Coverage.

<table>
<thead>
<tr>
<th>Mapped Site Potential</th>
<th>Countywide Acreage</th>
<th>Countywide Percent</th>
<th>Surveyed Acreage</th>
<th>Surveyed Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown/Poorly Surveyed</td>
<td>237,326.52</td>
<td>84.36</td>
<td>2,606.57</td>
<td>60.24</td>
</tr>
<tr>
<td>Low/Well Surveyed</td>
<td>24,862.18</td>
<td>8.84</td>
<td>730.48</td>
<td>16.88</td>
</tr>
<tr>
<td>High/Poorly Surveyed</td>
<td>9,684.56</td>
<td>2.95</td>
<td>293.65</td>
<td>6.79</td>
</tr>
<tr>
<td>High/Well Surveyed</td>
<td>9,458.66</td>
<td>3.36</td>
<td>695.53</td>
<td>16.08</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>281,332.34</strong></td>
<td><strong>99.51</strong></td>
<td><strong>4,326.23</strong></td>
<td><strong>99.99</strong></td>
</tr>
</tbody>
</table>

* There is a 0.55-acre discrepancy between the total acreage surveyed and the sum of site potential acreage in Table 8. This is the result of rounding errors in the analyses at 1m resolution from the GIS raster dataset.

The selection of survey parcels was not foremost a probabilistic venture. Rather, as the RFP requested, it was primarily directed towards the maximization of site discovery. Other factors, such as landowner access permission, crop growth in certain fields, and flooding, also restricted the ability to conduct a truly probabilistic survey. In terms of site density, a previously undocumented site was recorded during the current investigation at a rate of about 1 per every 270.42 acres examined. Results from the current study support prior evidence that precontact archeological site density in Watonwan County is quite low.
Figure 67. Mn/Model of Watonwan County depicting parcels surveyed during the 2018–2019 study relative to modeled site potential (courtesy of Andra Mathews, MNDOT).
Site Distribution and Composition

There are currently 30 numbered and three alpha archeological sites in Watonwan County (Table 9). Sixteen of these properties were documented as a result of the present study. Two previously recorded sites were also revisited during the study.

Table 9. Watonwan County Archeological Sites Identified.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Cultural Affiliation (Context)</th>
<th>Site Type</th>
<th>Visited During 2018–2019 Study</th>
<th>Setting/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>21WW4</td>
<td>Late Archaic or Initial Woodland (Fox Lake)</td>
<td>Cemetery, Artifact Scatter/Burial</td>
<td>Yes</td>
<td>Glacial Esker above Lakeshore/No Evidence</td>
</tr>
<tr>
<td>21WW5</td>
<td>Late Woodland (Lake Benton) and Postcontact (Euroamerican)</td>
<td>Artifact Scatter/Habitation</td>
<td>Yes</td>
<td>River Terrace</td>
</tr>
<tr>
<td>21WW6</td>
<td>Protostoric</td>
<td>Artifact Scatter/Habitation</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW7</td>
<td>Precontact</td>
<td>Artifact Scatter/Habitation</td>
<td>No</td>
<td>River Bluff</td>
</tr>
<tr>
<td>21WW8</td>
<td>Late Archaic (Pelican Lake), Early Woodland (Fox Lake), and Plains Village (Cambria)</td>
<td>Artifact Scatter/Habitation</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW9</td>
<td>Woodland</td>
<td>Artifact Scatter/Habitation</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW10</td>
<td>Precontact</td>
<td>Single Artifact/Core Reduction</td>
<td>No</td>
<td>River Bluff &amp; Floodplain</td>
</tr>
<tr>
<td>21WW11</td>
<td>Precontact</td>
<td>Single Artifact/Core Reduction</td>
<td>No</td>
<td>River Bluff</td>
</tr>
<tr>
<td>21WW12</td>
<td>Precontact</td>
<td>Lithic Scatter/Habitation</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW13</td>
<td>Precontact</td>
<td>Lithic Scatter/Habitation</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW14</td>
<td>Precontact</td>
<td>Lithic Scatter/Temporary Camp</td>
<td>No</td>
<td>General Upland</td>
</tr>
<tr>
<td>21WW15</td>
<td>Precontact and Postcontact (Euroamerican)</td>
<td>Artifact Scatter/Camp</td>
<td>No</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW16</td>
<td>Early Woodland</td>
<td>Lithic Scatter/Workshop</td>
<td>No</td>
<td>General Upland</td>
</tr>
<tr>
<td>21WW17</td>
<td>Precontact</td>
<td>Lithic Scatter/Workshop</td>
<td>No</td>
<td>General Upland</td>
</tr>
<tr>
<td>21WW18</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>Yes</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW19</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>Yes</td>
<td>River Bluff</td>
</tr>
<tr>
<td>21WW20</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>Yes</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW21</td>
<td>Precontact</td>
<td>Single Artifact</td>
<td>Yes</td>
<td>General Upland</td>
</tr>
<tr>
<td>21WW22</td>
<td>Precontact</td>
<td>Single Artifact</td>
<td>Yes</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW23</td>
<td>Precontact</td>
<td>Single Artifact</td>
<td>Yes</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW24</td>
<td>Precontact</td>
<td>Single Artifact</td>
<td>Yes</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW25</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>Yes</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW26</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>Yes</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW27</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>Yes</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW28</td>
<td>Precontact</td>
<td>Single Artifact</td>
<td>Yes</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW29</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>Yes</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW30</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>Yes</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW31</td>
<td>Precontact</td>
<td>Single Artifact</td>
<td>Yes</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW32</td>
<td>Precontact</td>
<td>Single Artifact</td>
<td>Yes</td>
<td>Lakeshore</td>
</tr>
<tr>
<td>21WW33</td>
<td>Precontact</td>
<td>Lithic Scatter</td>
<td>Yes</td>
<td>General Upland</td>
</tr>
<tr>
<td>21WWa</td>
<td>Postcontact (Euroamerican)</td>
<td>Ghost Town/Post Office</td>
<td>No</td>
<td>Antrim Post</td>
</tr>
<tr>
<td>21WWb</td>
<td>Postcontact (Euroamerican)</td>
<td>Ghost Town/Post Office</td>
<td>No</td>
<td>Ashippun Post</td>
</tr>
<tr>
<td>21WWc</td>
<td>Postcontact (Euroamerican)</td>
<td>Ghost Town</td>
<td>No</td>
<td>New London/New Glory</td>
</tr>
</tbody>
</table>

Watonwan County’s 33 total documented and reported archeological resources are largely precontact in cultural affiliation; 29 have at least one precontact component. Only one numbered site, 21WW6, and the three alpha sites (21WWa, 21WWb, and 21WWc) do not have a prehistoric component. Sites 21WW5 and 21WW15 are multicomponent properties with precontact and postcontact components. Site 21WW6 represents the only site with a
protohistoric designation. Twenty-seven properties have only prehistoric components (see Tables 3, 4, and 9). Only nine of the 33 above-listed sites (27 percent) have components assigned to a general cultural tradition. This includes the three Euroamerican alpha sites and sites 21WW4, 21WW5, 21WW8, 21WW9, 21WW15, and 21WW16.

In general, the preliminary nature of this investigation precludes the assignment of specific cultural-historical and site functional affiliations. However, in some cases, diagnostic artifacts offer a degree of cultural and temporal clarification. Table 10 summarizes the documented resources by component and, when possible, by historic context. Figure 68 illustrates these data.

<table>
<thead>
<tr>
<th>Cultural Period/Tradition</th>
<th>Specific Context(s) Identified</th>
<th>Primary Landform Setting(s)</th>
<th>Count (Percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paleoindian</td>
<td></td>
<td></td>
<td>0 (0)</td>
</tr>
<tr>
<td>Archaic</td>
<td>Pelican Lake (n=1)</td>
<td>Lakeshore;</td>
<td>2 (5)</td>
</tr>
<tr>
<td></td>
<td>Unspecified Late Archaic (n=1)*</td>
<td>Lakeshore/Glacial Esker</td>
<td></td>
</tr>
<tr>
<td>Woodland</td>
<td>Fox Lake (n=2)</td>
<td>Lakeshore/Glacial Esker (n=1); Lakeshore (n=1); River Terrace (n=1); General Upland (n=1); Lakeshore (n=1)</td>
<td>5 (13)</td>
</tr>
<tr>
<td></td>
<td>Lake Benton (n=1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unspecified (n=2)</td>
<td>Lakeshore</td>
<td></td>
</tr>
<tr>
<td>Plains Village</td>
<td>Cambria (n=1)</td>
<td>Lakeshore</td>
<td>1 (2.5)</td>
</tr>
<tr>
<td>Unidentified</td>
<td></td>
<td>Lakeshore (n=16); River Bluff (n=4); General Upland (n=4)</td>
<td>24 (63)</td>
</tr>
<tr>
<td>Precontact</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protohistoric</td>
<td></td>
<td>Lakeshore</td>
<td>1 (2.5)</td>
</tr>
<tr>
<td>Postcontact Period</td>
<td>Early Agriculture &amp; River Settlement 1840–1870 (n=1); Railroads &amp; Agricultural Development 1870–1940 (n=4)</td>
<td>Lakeshore; General Upland; River Terrace; River Bluff; Lakeshore</td>
<td>5 (13)</td>
</tr>
<tr>
<td>Total Count</td>
<td></td>
<td></td>
<td>38 (99)</td>
</tr>
</tbody>
</table>

* Based on tenuous radiocarbon date with large standard deviation (Lothson 1983)

The five properties with postcontact components consist largely of late nineteenth and early twentieth century Euroamerican ghost towns/post offices and habitations; three of these localities (60 percent) are alpha sites that have not been field-verified. Twenty-four unaffiliated precontact site components are present in the county. As expected, this site-type dominates the known component assemblage, accounting for over 63 percent of the total identified components and 75 percent of the precontact components. The remaining eight precontact site components that can be attributed to a more specific cultural or temporal affiliation are Archaic (n=2), Woodland (n=5), and Plains Village (n=1). Contact and postcontact site components comprise approximately 15.8 percent (n=6) of the total component assemblage. Note that the total number of identified components (n=38) is greater than the total number of identified sites in the county (n=33). This is due to the fact that some sites possess more than one component.
These data should be interpreted with a degree of caution because they derive from a combination of unverified site reports (alpha sites), field investigations that relied almost entirely on pedestrian surface survey methodology, and an extremely small sample size. Additionally, as was previously mentioned, the survey localities were not selected probabilistically. Because of these factors, it is difficult to offer firm, concrete statements about the location and distribution of archeological resources in the county. Nevertheless, the data do serve as an adequate foundation on which to build, and some broad generalizations concerning the distribution of prehistoric sites across the landscape are posited below.

When 29 sites with precontact components (excluding alpha sites) were analyzed through the use of MN/Model, the following results were obtained: 13.79 percent (n=4) of the analyzed precontact sites are in areas classified as unknown potential by the model. By contrast, the remaining 86.21 percent (n=25) of identified sites are in modeled high probability localities. No sites were mapped in areas of the county modeled as low potential by MN/Model (Figure 69; MN/Model evaluation conducted by Andra Mathews, MN DOT).

Although these percentages validate the model (see Hobbs et al. 2002), it should be remembered that the strategy for sampling survey parcels during the current investigation was biased towards the maximization of site discovery, and the selection of previous survey localities was based almost entirely on the location of roadway and utility corridor projects. For typical models, one would expect the majority of sites to fall within high probability areas. Thus far, site locations in the county validate the model well.

Of particular interest is the relatively low percentage of sites (13.79 percent) in modeled areas of unknown site probability. It was initially anticipated that, based on the large amount of survey coverage in areas of unknown probability (60.24 percent), a significant amount of identified sites would also be in unknown probability areas. However, only four precontact sites (21WW16, 21WW19, 21WW21, and 21WW33) are currently documented in such settings. Of these, two sites are in relatively close proximity to stream valleys and one is in close proximity to a lakeshore setting.

Narrative Site Predictive Model

Archeological site predictive models, particularly short narratives such as this, are simply tools designed to offer some degree of insight into those prehistoric site-types most likely to be located in a given topographical setting. It should be understood that these models do not provide definitive answers in terms of where sites will and will not be located, nor are they ‘magical’ dowsing instruments. The model for Watonwan County is based on a previous model generated for Lac Qui Parle County, which is also within the Prairie Lake South Archaeological Subregion (see Buhta et al. 2017). For modelling purposes, Watonwan County can most conveniently be partitioned into three distinct topographical settings: General Upland, Upland Shoreline, and Stream Valley. Each of these settings will be discussed below in relation to likely site-types and whether the associated cultural deposits are likely to be deeply buried or located at or near the surface.

Defined Site Types and Landscape Settings

Four primary functional site-types can reasonably be expected to occur in association with the precontact occupation of Watonwan County. Based on a given site’s function, we may also expect to recognize certain trends associated with the selection of its location, the frequency with which it was occupied, the number of similar sites present on the landscape, and the way in which it manifests archeologically. A short description of each site-type is provided here.

- **Habitation Sites** include temporary, semi-permanent, and permanent living areas such as villages or base camps, single-use camps, and temporary seasonal or satellite camps. Base camps are large sites located in areas with both abundant and predictable resources; areas such as the confluences of major waterways with their tributaries and lake inlets and outlets are prime localities. These areas likely provided access to known herd migration corridors and/or high elevation observation positions. The different types of camps were occupied for varying durations; larger base camps were occupied repeatedly for extended periods while smaller, satellite camps were only utilized seasonally or even less frequently. The smaller camps would be found in similar settings to those described for the base camps or in close proximity to another predictable potable water supply (e.g., natural springs). These sites may be discovered in buried contexts in stream valley settings.
Figure 69. Mn/Model of Watonwan County depicting precontact site distribution relative to modeled site potential (courtesy of Andra Mathews, MNDOT).
Resource Procurement Sites include lithic quarries or procurement localities, as well as kill/processing areas and other foraging sites where resource gathering activities occurred. Quarries and lithic procurement sites are utilized for the very specific function of obtaining workable lithics for tool manufacture. These sites provide a reliable resource and would likely be revisited fairly regularly, albeit for very brief periods. In Watonwan County, knappable lithic sources are glacial in origin and, therefore, will occur with greatest frequency in the upland till deposits. Such resources are most likely to be confined to those portions of the county harboring ground moraine deposits; areas consisting of glacial lake sediments will, for the most part, be devoid of this material (see Grimm, this report, Figure 4 for a general depiction of Watonwan County's surficial geology). Kill/processing areas are, for the most part, medium- to large-sized sites representative of a single hunting event. However, certain sites that include herding and trapping components like drive lines, arroyo traps, and jumps, may have been utilized multiple times. These sites can represent the taking, butchering, and/or caching of one or more animals and will typically be found in a variety of settings across the landscape. Some of these settings include the heads of steep-sided tributaries adjacent to major waterways, the bases of cliffs or gullies, the edges of lakes, marshes or watering holes, shallow river crossings, and open upland environments. Such sites are almost always identified in buried contexts and very few are likely to be detected in the study area except through deep testing in geographic areas of high probability or by chance (e.g., an erosional event exposing a bonebed in a cutbank). Foraging sites are even more difficult to identify archeologically than kill/processing sites simply because the footprint of human activity is negligible insofar as it relates to the surviving archeological record. Although foraging was presumably a frequent practice prehistorically, and one that likely occurred in relatively close proximity to habitation sites, no foraging sites are likely to be positively identifiable in the archeological record.

Mortuary/Burial sites serve a very specific function, both ceremonially and practically. Sites of this type have been discovered and documented in Watonwan County and it is likely that other such properties remain unrecorded within the study area. Most of these sites were probably initially affiliated with the Woodland tradition, though many may include secondary interments from subsequent groups. They are likely to manifest as earthen burial mounds or the remnants of such features and will primarily be located in areas of greater topographic relief. In Watonwan County, site 21WW4 was discovered atop a glacial ridge overlooking a lakeshore; however, such sites are oftentimes also found in association with prominent bluffs overlooking major waterways or stream confluences.

Unclassified Sites are far more ephemeral in nature and are expected to exist in far greater numbers on the landscape compared to the other three site-types. Though such site areas are more abundant, they are not necessarily more predictable in that they could represent any number of different activities. These sites, which typically consist of isolated artifacts or sparse lithic scatters, may represent small, single-use camps, specialized function areas that may have been reused at various times throughout the year (e.g., fishing or foraging areas, overlooks/animal herd observation areas), a brief rest area where a tool was resharpened or discarded, or an unintended, chance occurrence (e.g., a lost tool). This site type is likely to occur with the greatest frequency in the region and is also most likely to occur in a wide variety of landscape positions.

General Upland

General Upland settings are defined here as any upland landscape located greater than one-half mile from the bluffs of a perennially flowing waterway or otherwise potable water source, and which does not include shoreline deposits adjacent to extant or drained lake basins. It is predicted that the vast majority of sites in this setting will be of the Unclassified type; however, a variety of subsistence-related Resource Procurement sites may also be located here. It is unlikely that sites of the Habitation or Mortuary/Burial types will be located in this setting. Because of the distance from potable water sources, site potential in this setting is, overall, likely to be low. It is predicted that the vast majority of sites will be discovered on the surface; however, the presence of buried sites in upland contexts should not be discounted as previous testing in the Midwest and Plains has identified buried sites in such settings.

A number of studies have reported how earthworms bury artifacts and features beneath their castings (Atkinson 1957; Balek 2002; Darwin 1881; Johnson 1990, 1992; Johnson and Watson-Stegner 1990; Rolfsen 1980; Van Nest 2002; Wood and Johnson 1978). Rolfsen (1980) has demonstrated that earthworms are actually capable of burying items to a depth of 45 cm below ground surface in about five years. Hence, worm castings, combined with soil brought to the
surface by ants, burrowing mammals and uprooted trees, form a biomantle that may quickly conceal artifacts and cultural features on "stable" upland surfaces (Johnson 1990, 1992; Van Nest 2002). Any buried sites in upland settings in the study area are predicted to be in near-surface (less than 50 cmbs) contexts. However, given the scarcity of loess-mantled landscapes in this region, the likelihood of buried upland sites in Watonwan County is considered low. One could expect to find sites of all temporal periods in general upland settings in the study area, though stratigraphic integrity of multicomponent sites is almost certain to be compromised. Older and more recent sites are equally likely to be discovered at or near the surface, oftentimes in intermingled contexts.

**Upland Shoreline**

Shoreline settings include all landforms along former shorelines of upland lake, pond, or wetland basins, the majority of which are now reclaimed for agricultural purposes. It is predicted that the majority of site-types in this setting will be Unclassified or Habitation localities; however, both Resource Procurement and Mortuary/Burial site-types may, ostensibly, be located there as well.

Sites from Late Paleoindian times onward could be expected in this setting, although deposits from the peak of the Holocene Climatic Optimum (ca. 7000–5000 14C yr BP) are considered unlikely as the majority of small, shallow basins completely dried-up during this interval. As with other upland settings, the potential for buried sites in the proximity of shorelines is considered possible but unlikely. Cultural deposits in these settings are likely to exist as surface finds, particularly given the degree to which the landscape is cultivated. Similar to general uplands, stratigraphic integrity of multicomponent sites in such settings will probably be compromised. Sites from all periods of antiquity are likely to be discovered at or near the surface in glaciated uplands areas; indeed, multiple components of the same site are oftentimes comingled in these settings.

**Stream Valley**

Stream Valley settings encompass all landforms located in proximity to perennially flowing waterways. This includes those landforms within the valley center and margins, such as terraces, alluvial fans, and floodplains, as well as the bluffs and uplands less than one-half mile from the bluff edge. Each of the four site-types discussed above may be expected in these settings. Unclassified sites and Resource Procurement sites could be located from the floodplain to the uplands beyond the bluffs depending on the type of resource being acquired. Mortuary/Burial sites are likely to be confined to prominent ridges and hilltops along the bluffs overlooking the valley. With stream valleys in the county lacking any appreciable alluvial fan development, habitation sites are most likely to be located on terraces within valley settings. In these areas, it was initially postulated that site potential would vary from medium to high depending on the type of waterway, the presence of stream confluences, and other factors. However, for reasons discussed by Mandel (this report) and reiterated below, potential for both buried and surface-manifested precontact sites in this setting ranges from moderate to none.

Sites of all temporal periods can be expected in stream valleys, although the location of a given site will vary depending on its age. Geomorphological study results from the Eagle’s Nest Park Section corroborate the low modeled site potential for surface and buried precontact sites at the South Fork Watonwan River locality. On a broader scale, Mandel (this report) provides the following insights on precontact site potential in Watonwan County’s stream valleys:

In stream valleys of Watonwan County, four soil series comprise all soils developed in alluvium: Coland, Millington, Hanlon, and Kalmarville (Murray 1992). The Coland soil is a Cumulic Endoaquoll (hydric) developed on poorly drained floodplains and alluvial fans in stream valleys and upland drainageways. This soil typically is characterized by an A-AB-Bg-Cg profile with an overthickened cumulic A horizon. The Millington soil also is a Cumulic Endoaquoll (hydric), but is restricted to poorly drained floodplains in stream valleys. The Millington series has an A-AB-Bg-Cg profile similar to the Coland soil, but the cumulic A horizon of the Millington is not as thick as the A horizon of the Coland series. The Hanlon and Kalmarville soils co-occur as a complex on floodplains, with the Hanlon on well-drained surfaces and the Kalmarville on poorly to very poorly drained surfaces. The Hanlon soil is a Cumulic Hapludoll (nonhydric) with a thick, well-expressed A-ABc-BCC profile formed in moderately well-drained alluvium. This soil probably represents about 1,000–1,500 years of pedogenesis, where it occurs, the alluvium is late Holocene in age. By contrast, the Kalmarville soil is a Mollic Fluvaquent (hydric) with a weakly expressed A-C2g profile developed in modern alluvium comprised of silt loam (A horizon) above stratified sand (Cg horizon). As previously noted, understanding the spatial pattern of well-drained versus poorly drained landscapes is a useful first step in understanding the spatial pattern of the archeological record and determining where precontact sites may occur on or below the surface. Floodplains where the Coland and Millington soils occur are poorly drained and, therefore, have low potential for surficial and buried precontact cultural deposits. Collectively, the Coland and Millington soils comprise 6,596.82 hectares (16,301.12 acres), or just less than
Watonwan County’s stream valley floor complexes are largely comprised of hydric soils that are poorly drained and/or frequently saturated. Such environments are not conducive to any form of extended human occupation. Though precontact inhabitants of the region most certainly executed brief forays into these settings for short-term resource procurement, such exploitation rarely leaves an abundant material record. The majority of soils mapped in Watonwan County’s stream valleys suggest low to no potential for harboring surface or buried precontact archeology. The lone exception is soils of the Hanlon series, which are associated with well-drained floodplain landform positions. These localities retain moderate potential for precontact archeology. The poorly drained nature of the majority of Watonwan County’s stream valleys likely played a significant role in dictating settlement choices among the region’s earliest inhabitants. As water remained a primary necessity, focus was almost certainly directed toward upland lakeshore settings in the county. It is suspected that these variables would alter the precontact site potential depicted by MN/Model (see Figure 93) such that potential along waterways would lessen while potential in lakeshore settings would increase.

RECOMMENDATIONS FOR FUTURE STUDY

Earlier in this report (see page 33), three research questions were posed concerning the prehistoric archeological record of Watonwan County. These questions are discussed below in regard to the findings of the present study.

1) Is the perceived paucity of prehistoric sites in the study area the result of environmental factors restricting the extent and tempo of human occupation, or is it simply the result of the limited amount and scope of previous archeological work? Geomorphological modelling strongly implicates environmental factors as a restricting agent in the paucity of documented precontact sites in Watonwan County, particularly as it pertains to stream valley settings. From a broader perspective, the whole of Watonwan County is geologically young, with poorly drained landscapes and underdeveloped stream drainage networks. Therefore, it is plausible that substantial portions of the county’s land surface were unsuitable for prolonged human occupation during extended periods of prehistory.

2) What is the potential for buried sites in the study area, particularly relative to those sites of greatest antiquity? Overall, the potential for buried archeology in the majority of Watonwan County’s three topographical settings outlined above (see pages 74–76) is quite limited. Typically, on general upland and shoreline settings the potential for such sites is low. Given the recent glacial history of the county, potential for buried sites in these settings should be considered limited to none. The potential for buried sites greatly increases in most stream valley settings of the Plains and Upper Midwest. Reasons for this increased potential relate to the relatively young geologic age of the stream valleys in the county, previous climatic conditions, and resultant streamflow and depositional patterns. Most sites in these settings are associated with the well-drained, elevated landforms positioned along the valley margins. Examples of such landforms include terraces complexes, alluvial fans, and colluvial slopes. However, the majority of Watonwan County’s stream valleys are underdeveloped with little to no terrace establishment above the floodplain and a near total absence of alluvial fan formation. In addition, most of the mapped soils in the county’s stream valleys are poorly drained. This combination of factors greatly limits both buried and surficial site potential in Watonwan County’s stream valleys. The majority of such settings offer low potential for buried archeology, whereas far more limited areas offer moderate to no potential.

3) Where do prehistoric sites tend to be located and why? Results of the current study support previous findings of a strong correlation between precontact site distribution and proximity to freshwater. The majority of sites identified in the county are in high probability localities which, by their designation, are in
closer proximity to water. It should be noted, however, that comparatively little investigation of areas classified by MN/Model as low probability was undertaken, despite no sites being identified in these settings. Interestingly, a low number of sites were also identified in areas of unknown modeled site probability, despite the majority of the county’s total acreage, and the current investigation’s survey coverage, being mapped as such. Of the four sites documented in unknown modeled areas, two are within one mile of waterways and one is within one mile of a current wetland basin. Model refinement following this study will likely result in an even greater percentage of sites in high probability localities. Although preliminary in nature, archeological data obtained from the study area to date demonstrate that the majority of precontact sites are likely to be identified along the shores of one of the current or former lakes, ponds, or wetlands distributed across the county. Proximity to potable water appears to be the most crucial factor in site selection; however, in the case of Watonwan County, there is clear preference given to lakeshore settings rather than stream valley settings (see Mandel, this report).

This study generated several insights into the archeological record of Watonwan County. First, contrary to most other areas throughout the Plains and Upper Midwest, evidence from mapped soils in the stream valleys of Watonwan County suggests an abundance of poorly drained soils with overall low archeological site potential in these settings. This modeled site potential is in need of greater refinement through the sampling and describing of soils from multiple valleys throughout the county. However, evidence obtained during the current study from one section along the South Fork Watonwan River supports the model. Second, the entire county, generally, consists of poorly drained soils, which likely resulted in lower densities of suitable habitation areas throughout prehistory than have been observed elsewhere within the Prairie Lake Region. For instance, a recent study in Lac Qui Parle County (Buhta et al. 2017) determined that low site densities were more closely related to a general lack of prior survey coverage than they were to any overarching environmental constraints. In Watonwan County, however, environmental constraints may well have restricted, at least to some degree, the extent and duration of human settlement during prehistory. It is noteworthy that, of the 16 precontact sites newly documented during the current study, only 12.5 percent (n=2) consist of more than three artifacts; ephemeral traces seem to dominate the county’s precontact archeological record. Third, a MN/Model analysis of 29 precontact sites in the study area identified four archeological properties in parts of the county classified by the model as unknown in terms of precontact site potential. Of these sites, one was discovered in close proximity to a current wetland basin and two others were identified within one mile of a stream valley. With this in mind, refinement of unknown site potential areas in the MN/Model should be possible, thereby improving model reliability.

Finally, some mention should be made regarding the effect of filters on the archeological record, both in terms of precontact site location evidence and modeling the distribution of these properties across the landscape. The archeological record is profoundly impacted by both environmental (e.g., erosion, burrowing animals, flooding, river channel migration) and cultural (e.g., cultivation, construction, artifact collecting) filtering mechanisms. These filters have altered the archeological record in many instances by either displacing or removing evidence of a site in a given location. This issue can directly affect the way that archeologists document and model sites and their distribution, but perhaps more significantly, it can affect our ability to understand the ways in which our predecessors occupied the landscape and interacted with one another. These filters are actively at work in Watonwan County and, although little can be done to stop them, they must nevertheless be acknowledged in our attempts to interpret human prehistory.
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