Archaeology in Minnesota
Annual Report of the State Archaeologist
Fiscal Year 2008

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Mission Statement

The mission of the State Archaeologist is to promote archaeological research, share archaeological knowledge, and protect archaeological resources for the benefit of all of the people of Minnesota.

Abstract

In fiscal year 2008, the Office of the State Archaeologist (OSA) was involved in a wide variety of activities in order to fulfill legal obligations, protect archaeological sites, and support the advancement of Minnesota archaeology.

Chapter 1 of the Annual Report provides a brief history of the OSA and lists the principal duties and responsibilities of the State Archaeologist.

Chapter 2 summarizes OSA activities and other archaeological activities in FY 2008 by program area. Major FY 2008 OSA accomplishments include: reviewing 251 site inventory forms, reviewing 118 development projects, field research on 20 major MS 308.08 burial cases, organizing another successful Minnesota Archaeology Week including producing a high quality poster, developing digital image standards for curating photographs and documents, developing written procedures for OSA implementation of the Private Cemeteries Act (MS 307.08), and continuing revisions and sponsoring stakeholder meetings on the Field Archaeology Act (MS 138.31 - .42). Other notable archaeological accomplishments for FY 2008 include MnDOT's completion of the Woodland Multiple Property Documentation Form (MPDF) and the University of Minnesota – Minneapolis hiring a new North American archaeologist who will lead field schools and the Heritage Management advanced degree program.

Basic OSA Fiscal Year (FY) 2008 and Calendar Year (CY) 2008 statistics are:

	FY08	CY08
Licenses approved:	53	61
Site Forms Reviewed:	251	424
Site Numbers Assigned:	208	365
Reports Added:	128	136
Projects Reviewed:	118	-
Major Burial Cases:	20	-
Burial Authentications:	11	-

Chapter 3 provides an assessment of the current state of Minnesota archaeology including recent developments and a plan for FY 2009.

A glossary of common archaeological terms used in Minnesota and the OSA Digital Image Standards are appended at the end of the report.

Acknowledgements

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Cover Illustration: Archaeology Week poster image for 2008. Vessel image courtesy of Science Museum of Minnesota. Design by Emily Anfinson.

Chapter 1: Introduction

This report summarizes the activities of the Office of the State Archaeologist (OSA) for Minnesota State Fiscal Year 2008, the period from July 1, 2007 through June 30, 2008. It also includes some statistics for the 2008 Calendar Year.

The State Archaeologist is a civil service employee of the Department of Administration and resides within the Division of Geographic and Demographic Analysis (GDA). The OSA has two staff members, the State Archaeologist and an assistant. The OSA leases office space from the Minnesota Historical Society (MHS) at the Ft. Snelling History Center. The OSA receives a biennial appropriation from the state legislature for salaries and operating expenses. The funding level has remained at $196,000 annually since 2001.

Minnesota Statutes (MS) 138.38 requires that the State Archaeologist complete annual reports. The law states that the reports must be sent to the Commissioner of Administration with copies to the Minnesota Historical Society and the Minnesota Indian Affairs Council. Copies are also sent to the Minnesota Legislative Reference Library, the Council for Minnesota Archaeology, the Department of Transportation, the Department of Natural Resources, and to other organizations and individuals upon request. The annual report will also be made available on the OSA website (http://www.osa.admin.state.mn.us/).

The Office of State Archaeologist – Historical Background

The Field Archaeology Act (MS 138.31 - .42) established the Office of the State Archaeologist (OSA) in 1963. Initially, the Director of the Minnesota Historical Society (MHS) appointed the State Archaeologist for a four-year term and the State Archaeologist was required to be a staff member at the University of Minnesota. These requirements have been altered several times over the last 35 years. In 1996, the State Archaeologist became a state civil service employee of the Department of Administration and is now appointed by the Commissioner of Administration.

Elden Johnson, an archaeologist and professor of anthropology at the University of Minnesota, was appointed the first State Archaeologist in 1963 and served until his resignation in 1978. Christy Hohman-Caine, a student of Johnson's and a staff member of the Anthropology Department at Hamline University, was appointed State Archaeologist in 1978 and served until her resignation in late 1992. Johnson and Hohman-Caine were not paid a salary for their service as State Archaeologist and it was thus necessary for them to maintain other employment.

From December of 1992 through January of 1995, there was no State Archaeologist. Mark Dudzik was appointed State Archaeologist in February 1995 and became the first to be paid a salary. Dudzik, a Wisconsin native, had been working as a highway survey archaeologist for the MHS and then as an archaeologist for the Institute for Minnesota Archaeology (IMA) prior to his appointment. Dudzik hired Bruce Koenen as the first full-time assistant to the State Archaeologist in June 1995.

Following Dudzik's resignation in July 2005, Scott Anfinson was appointed Acting State Archaeologist in mid-August 2005 and State Archaeologist in January 2006. Anfinson had been the archaeologist for the Minnesota State Historic Preservation Office (SHPO) of the MHS from May 1990 through December 2005. Koenen continues to serve as the assistant to the State Archaeologist.

Duties of the State Archaeologist

The principal duties of the State Archaeologist are assigned by two state laws, the Field Archaeology Act (MS 138.31-.42) and the Private Cemeteries Act (MS 307.08). The State Archaeologist is given some additional duties in rules implementing Minnesota Water Law (MS 103) and the Minnesota Environmental Policy Act (MS 116D) and also carries out traditional duties that have evolved since 1963. In all, the State Archaeologist has about 30 discrete duties under law and almost 10 traditional duties

Field Archaeology Act (MS 138.31 – 138.42)
While the Field Archaeology Act has been revised 10 times since 1963, the duties of the State Archaeologist specified in that law have not changed. These duties can be summarized as:
- acts as the agent of the state to administer and enforce the act
- sponsors, engages in, and directs fundamental archaeological research
- cooperates with agencies to preserve and interpret archaeological sites
- encourages protection of archaeological sites on private property
- retrieves and protects artifacts and data discovered on public property
- retrieves and protects archaeological remains disturbed by agency construction
- helps preserve artifacts and data recovered by archaeological work
- disseminates archaeological information through report publication
- approves the licensing of archaeologists to work on public property
- formulates licensing provisions for archaeological work on public property
- issues emergency licenses for archaeological work on public property
- revokes or suspends archaeological licenses due to good cause
- approves curation arrangements of artifacts and data from state sites
- repossesses artifacts from state sites that are not being properly curated
- consults with MHS and MIAC regarding significant field archaeology
- completes annual reports about OSA and licensees' activities
- reviews and comments on agency development plans that may affect state sites

Private Cemeteries Act (MS 307.08)
In 1976, the Private Cemeteries Act was amended and the State Archaeologist was given additional duties including the "authentication" of unmarked cemeteries. This law has been amended eight times since 1976, most recently in 2007.

The State Archaeologist's duties under MS 307.08 are:
- grants permission for alterations of or removals from non-Indian cemeteries

- allows posting and approves signs for authenticated non-Indian cemeteries
- authenticates all unrecorded burial sites over 50 years old
- maintains unplatted cemetery data
- provides burial sites data to the Land Management Information Center (LMIC)
- determines the ethnic identity of burials over 50 years old
- helps determine tribal affiliation of Indian burials
- determines if osteological analysis should be done on recovered remains
- helps establish provisions for dealing with unaffiliated Indian remains
- reviews development plans that may impact unplatted burials

Minnesota Water Law (MS 130) - **Rules 6120.250, Subpart 15a**
The State Archaeologist has one duty specified in Minnesota Water Law Rules, which implement MS 103. Under these rules the State Archaeologist can determine if sites are eligible to the state or national historic registers.

Minnesota Environmental Policy Act (MS 116D) – Rules 4110.1500
Responsible Governmental Units (RGUs) for Environmental Assessment Worksheets (EAWs) are required to provide a copy of all EAWs to the State Archaeologist. The State Archaeologist has 30 days to comment on the EAW.

Traditional Duties
Besides performing the duties assigned by Minnesota law listed above, the State Archaeologist also carries out a number of "traditional" duties:
- designs archaeological site inventory forms and reviews completed forms
- assigns official state site numbers to archaeological sites
- maintains an archaeological site inventory
- maintains archaeological research and report files
- organizes the annual Minnesota Archaeology Week
- consults with Indian tribes and federal agencies about archaeological activities
- works closely with MIAC to help develop Indian cemetery management procedures
- provides archaeological information and comments on private developments

Summary of Duties
The most important function of the State Archaeologist is to act as the principal archaeologist for the State of Minnesota. On a day-to-day basis, this involves six major task areas:

1) approving license applications in a careful yet timely manner and monitoring the activities of the licensees
2) editing site forms, issuing official inventory numbers, maintaining the inventory of known and suspected sites, and organizing submitted archaeological reports
3) reviewing development plans submitted by government agencies and private entities to evaluate the potential for harm to archaeological sites
4) promoting and undertaking research in Minnesota archaeology
5) providing public education and answering archaeological questions from the public
6) ensuring burial sites protection through careful record keeping, development plan review, interaction with MIAC, consultation with experts, and doing fieldwork

Minnesota State Archaeologist Scott Anfinson at the historic Ft. Ridgely Cemetery.

Chapter 2: Summary of OSA Activities – FY 2008

Licensing and Activities of Licensees

As specified in MS 138.36, the State Archaeologist approves the qualifications of an archaeologist applying for a license and forwards approved applications to the director of the Minnesota Historical Society (MHS). While the MHS technically "issues" the license under MS 138.36, the OSA is the entity that develops licensing procedures, reviews license applications, handles all correspondence with licensees and prospective licensees, and monitors the activities of the licensees.

Beginning in the 1960s, licenses were typically issued to qualified archaeologists on a project-by-project basis or as yearly licenses to large agency-specific survey programs such as the Trunk Highway Archaeological Survey (1968 – 1994). In response to public comments, the newly appointed State Archaeologist undertook a review of the licensing process in FY 2006. A revised licensing procedure was implemented in May of 2006, which issued yearly (calendar) licenses to individuals for the purposes of reconnaissance (Phase I) or evaluative (Phase II) archaeological surveys on non-federal public property. Licensees are required to notify the OSA of each project to be surveyed under their license, provide a separate report for each survey project, and provide a brief yearly summary of all archaeological work conducted under their license. Separate licenses are required for intensive excavation projects (Phase III) and for burial authentication work.

The licensing totals for Fiscal Year (FY) 2008 and Calendar Year (CY) 2008 are:

License:	FY08	CY08
Survey (yearly):	48	59
Excavation:	2	0
Authentication:	3	2
Total:	53	61

Most licensed projects involve reconnaissance surveys of relatively small areas and most of these surveys do not locate archaeological sites, although a few of these surveys can involve large areas and locate multiple sites. Evaluation surveys investigate the importance of individual sites located by reconnaissance surveys. Excavations involve intensive site investigations that usually involve opening large formal units at specific sites and usually produce the most valuable information about Minnesota's archaeological past.

The majority of archaeological work done in Minnesota is not subject to state licensing, as work done on federal lands and private lands (non-burial) is excluded. The OSA is not required to receive reports on non-licensed archaeological activities. A few of the notable licensed projects carried out in FY 2008 are summarized below.

An example of a significant licensed survey in FY 2008 was Summit Envirosolutions (Andrea Vermeer, Principal Investigator) survey of the Northern Natural Gas Proposed Zone EF Pipeline Project. This involved work in eight counties: Anoka, Carver, Dakota, Freeborn, Hennepin, Rice, Washington, and Wright. Licensing was required because the project

crossed public lands and involved several know burial mound sites. The Area of Project Effect (APE) included 2,146 acres of land. Twenty (20) previously identified archaeological sites were in the APE and 11 previously unrecorded sites were located by field survey. The State Archaeologist attended several meetings on this project, principally because of the burial mound sites.

The Department of Natural Resources (DNR) continues to fund archaeological programs in several divisions and the archaeological personnel for these programs are provided through contracts with MHS. Dave Radford assisted by LeRoy Gonsior and Doug George run State Parks Archaeology. Tim Tumberg runs the Trails and Waterways program. Mike Magner assisted by Stacy Allan handle DNR Forestry/Wildlife and Fisheries Program. These DNR archaeological programs do Phase I, Phase II, and occasional Phase III work and provide a yearly summary in an annual report. In 2009, the Trails and Waterways program may be combined with the State Parks program.

There were 3 mitigation (Phase III) excavations subject to OSA licensing during FY 2008. These licenses were for St. Cloud State University (Debra Gold) excavations at the Shoemaker site (21SN164) and the Talahi Woods site (21BNbi) and for Duluth Archaeological Center (Steve Mulholland) excavation at the Rice River Bridge site (21AK105).

Records Maintenance

Archaeological Site File
Elden Johnson started a state archaeological site file at the University of Minnesota Department of Anthropology in 1957. Johnson began the file "to facilitate future problem-oriented research" (Johnson 1957:14). The file was kept on 5" x 8" cards organized by county and containing basic locational, descriptive, and reference information. Site numbers were assigned using the Smithsonian Institution's trinomial system with a numerical prefix based on state alphabetical position (Minnesota was 21 in 1957), then a two letter county abbreviation (e.g., AN for Anoka), and finally a one-up unique number for each site in a county. The initial compilation of sites was based on the field notes of archaeologist Lloyd Wilford and the T.H. Lewis-surveyed mound sites contained in Newton Winchell's *The Aborigines of Minnesota* (1911). Archaeologists who found previously unrecorded sites were asked to fill out a standard form and submit it to the University's Archaeology Lab. The University of Minnesota's file became the official state site file with the appointment of Johnson as the first State Archaeologist in 1963.

A major change in site file record keeping occurred in the late 1970s with the initiation of the Statewide Archaeological Survey (SAS) by the Minnesota State Historic Preservation Office (SHPO) at MHS. SAS personnel made photocopies of the State Archaeologist's site file cards and created a separate folder for each site, organizing the folders in file cabinets by county. Because so many new sites were recorded by the SAS-sponsored surveys, the SAS took over assigning the official state site numbers from 1978 through 1981. In 1981, the Minnesota Land Management Information System (MLMIS) at the State Planning Agency created a computerized version of SAS site file, although this "data bank" was never utilized

for state planning purposes and was not available to archaeologists as it had to be accessed through a main frame computer. The MLMIS computerized data was not updated after 1981. With the demise of the SAS in late 1981, the assignment of official site numbers reverted to the State Archaeologist.

The first widely available computerization of the archaeological site file occurred in 1982 when the current State Archaeologist, then head of the MHS Municipal - County Highway Archaeological Survey, undertook an extensive literature search and review of the archaeological site file. The purpose of the project was to compile a more comprehensive and accurate list of archaeological sites that were recorded in basic archaeological sources so potential effects to "known" sites could immediately be considered during highway construction plan review. A major result of the project was word processor files that included five major tables: Numbered Sites, Numbered Sites Corrections, Unnumbered Sites, Unconfirmed Sites, and Find Spots. The tables were compiled in a report that was submitted to the State Archaeologist in early 1983 (Anfinson 1983). Anfinson's word processor files were then converted into a database file combining the various tables and a few new data fields. Under the Site Number field, unnumbered and unconfirmed site were assigned "alpha" numbers (e.g., 21ANa). Over the next decade, additional fields were added to the database mainly to foster Elden Johnson's 1957 site file research goals.

When Anfinson became the SHPO archaeologist in May of 1990, his computerized database became the SHPO's official archaeological site database. In 1994, MnDOT provided the SHPO with a grant to refine and augment the computerized site file. Under the direction of Homer Hruby, the SHPO completed the project in 1996. The project not only expanded and made corrections to the electronic site database, it cleaned-up and added materials to the SHPO's hard copy folders and added folders for each "alpha" (officially unnumbered) site. Universal Transverse Mercator (UTM) locational fields using approximate site centers were added to the database to facilitate Geographic Information System (GIS) applications like MnDOT's MnModel project that began in 1995 (www.mnmodel.dot.state.mn.us/).

A new database procedure was also implemented during the Mark Dudzik tenure as State Archaeologist. Field archaeologists submitted newly completed state site forms to the OSA. The OSA carefully reviewed the forms, assigned an official site number, and sent copies of the numbered forms to the SHPO. SHPO staff added the information to the master archaeological site database and filed the paper copy in their site file. The SHPO then provided a copy of the electronic database to the OSA. The database was also made available to appropriate state and federal agencies (e.g., MnDOT, DNR, NRCS).

Because SHPO staff also maintain extensive historic building records, there was often a significant time delay in updating the archaeological site database following the assignment of new site numbers. On January 1, 2007, the OSA took over updating the master electronic archaeological site database. This means that the database is now quickly updated following the OSA review of new site forms and the assignment of new site numbers. The OSA provides copies of the database to SHPO and other appropriate government agencies.

It should be stressed that the site database maintained by the OSA is not entirely accurate or consistent with respect to certain fields of information. There are four common sources of error: 1) the original data reported on the site form may be inaccurate, 2) the data reported on the site form may be a unique interpretation or have inconsistent interpretations by archaeological investigators, 3) correct data from a site form may have been incorrectly entered into the database, and 4) different data input personnel may have used inconsistent codes for the data. A great effort has been made by the OSA, the SHPO, and MnDOT to ensure that the locational data is as accurate as possible, but fields such as Site Function and Cultural Context have significant accuracy and consistency problems.

Besides the site database, the OSA also maintains extensive paper site files. There are several major differences between OSA and SHPO paper files besides the presence of unique data in each entity's folders. The OSA does not have individual folders for the alpha sites, although an intern project began in 2007 seeks to make copies of the SHPO alpha files, which will be filed in a single OSA folder for each county. The SHPO does not have most of the data contained in the OSA burial site files and the OSA Burial Sites database is not shared with the SHPO, although this database does not include any burial sites not contained in the SHPO archaeological site database. The SHPO also depicts both numbered and unnumbered sites on a set of 7.5' USGS maps, while the OSA depicts numbered site locations on a set of county maps. In 2007, the OSA began work to produce a set of USGS maps with site locations depicted and now puts newly recorded sites on a master set of USGS maps.

The *SHPO Manual for Archaeological Projects in Minnesota* (Anfinson 2005) and OSA/MHS licensing requirements specify that professional archaeologists must submit site forms when previously unrecorded sites are located or significant new information is obtained for previously recorded sites. OSA Research Assistant Bruce Koenen takes primary responsibility for the review of submitted site forms and assignment of official state site numbers. Site forms are required when sites are found on public or private land.

During 2008, the OSA performed the following site file actions:

	FY08	CY08
New Forms Reviewed and Site Numbers Assigned:	208	365
Revised Forms Reviewed:	43	59
Total Forms Reviewed:	251	424

As of June 30, 2008 there were 17,320 archaeological sites listed in the archaeological site database. Of these, only 10,493 (61%) were assigned official state site numbers. The majority of unnumbered sites (alpha sites) are federal land sites in Chippewa and Superior National Forests. Some are Post-Contact Period sites documented on early historic maps (e.g., Trygg, Andreas), but as of yet unconfirmed in the field by archaeologists. As of December 31, 2008 there were 17,518 total sites in the site database of which 10,773 (61%) were numbered. The site database is constantly being corrected so adding this year's figures from the table above to the previous year's totals does not always match current database totals.

If we compare current site totals to previous years, in 1964 there were 1,160 archaeological sites (all numbered, all prehistoric) in the OSA files and in 1983 there were 3,208 (2,999 numbered, some historic). The SHPO files in 1990 had 5,871 sites of which 3,838 were numbered. The current total of 17,518 sites represents a tripling of the database since 1990, some of which is due to the addition of federal land inventories. An average of about 300 new site forms are submitted to OSA each year.

It is conservatively estimated that less than 1% of the total archaeological sites in the state are known and contained in the site database. This estimate is obtained by multiplying 10 groups of people making 10 unique sites per year by 10,000 years, which equals 1,000,000 sites divided by the 10,000 currently numbered sites. If we add potential historical archaeological sites that are currently unnumbered, we could include 200,000 farmsteads and hundreds of thousands of house lots in cities.

Total intensively investigated sites in 1963 were 170 (15% of the total numbered sites), 440 (14%) in 1983, 491 (8%) in 1990, and 1,563 (9%) in 2008 (426 Phase III; 1137 Phase II). Intensively investigated sites include sites that have been the subject of university field school excavations and those subject to extensive investigations for CRM purposes, including both Phase II (Evaluation) and Phase III (Data Recovery) projects.

There are about 300 Minnesota archaeological sites listed on the National Register of Historic Places (NRHP). Individual site nominations account for 104 of these listings with perhaps another 200 sites included within 17 archaeological districts. Archaeological sites account for only about 6% of the total NRHP listed historic properties in Minnesota. Perhaps 10 times as many archaeological sites have been considered eligible to the NRHP through the federal Section 106 process. Only one archaeological site was added to the NRHP in FY 2008: the Benjamin Noble shipwreck in Lake Superior; the nomination was co-authored by the State Archaeologist. There are 63 archaeological sites listed on the State Register of Historic Places (MS 138.57).

Burial Site File
State Archaeologist Christy Hohman-Caine started a separate burial site file in the early 1980s. This file now contains detailed information on burial sites examined by or subject to inquiries by State Archaeologists Hohman-Caine, Dudzik, and Anfinson. It includes both numbered and unnumbered sites. The file also contains some information on unconfirmed burial sites that have been reported to the State Archaeologist over the last 30 years. These unconfirmed sites have either not been field checked by an archaeologist or field checked but not found. The Burial Site File is not open to the general public as the data are considered *security information* (see MS 13.37) as specified in MS 307.08, Subd. 11.

In the late-1990s, the OSA parsed burial site information from the master archaeological site database and created the separate Burials Site Database. This database does not contain information on all of the unconfirmed sites in the OSA's paper burial site files, only those sites that have OSA-assigned official state site numbers or SHPO-assigned alpha numbers.

The OSA makes the Burials Site Database partially available to local governmental agencies on a webpage maintained by the Land Management Information Center (LMIC). This webpage went on-line in September 2003. At that time, a letter was sent to all county governments and assigned them a password to access the site. The site provides a graphic interface allowing local governments to determine if a burial site exists within a specific quarter-quarter section of land (40 acres). If a site does exist within the quarter-quarter, the agency can contact the OSA to get more specific information about a particular burial.

As of June 30, 2008, there were 2,871 burial sites listed in the OSA's Burial Sites Database. (The end of December 2008 total was 2,879.) This includes about 12,500 mounds in over 1,600 discrete sites. Over 350 of the non-mound burials date to post-1837, the beginning of intensive White settlement. There are 580 known or suspected burial sites that do not have an official site number, although a few of these may be duplicates of numbered sites. A compilation of post-White settlement burials in Minnesota by Pope and Fee (1998) lists about 6,000 cemeteries, the majority of which are not contained in the OSA burials database. Many of these cemeteries are officially recorded and managed by active cemetery associations and thus are not under the jurisdiction of the State Archaeologist per MS 307.08.

Archaeological Report Files
The OSA maintains a file of archaeological reports. Archaeologists conforming to the requirements of state licensing have submitted most of these reports. The SHPO also maintains an archaeological reports file that mainly includes reports have been submitted as part of the federal Section 106 process. As not all SHPO-reviewed projects require state archaeological licensing and not all MS 138 licensed projects require SHPO review, the OSA and SHPO report files are far from identical, although there is some overlap. Both the OSA and SHPO maintain databases of the reports they have on file.

In FY 2008, 128 reports were added to the OSA files. A total of 136 reports were added in CY 2008. As of the end of December 2008, the OSA had 5,014 reports listed in its files.

Since 1998, the OSA has published yearly (calendar) compilations of abstracts of reports submitted to the OSA. They are produced by Bruce Koenen, the OSA research assistant. They can be found at the OSA website (http://www.osa.admin.state.mn.us/research.html).

Development Plan Review

Development plan review by the OSA is principally done under three Minnesota statutes:

1) Under MS 138.40, Subd. 3, *agencies* must submit plans to the State Archaeologist and the Minnesota Historical Society (MHS) for developments on their lands where archaeological sites are known or scientifically predicted to exist. The State Archaeologist and MHS have 30 days to comment on the plans. "Agency" refers all to all units of government in Minnesota, not just *state* agencies.

2) MS 116d requires that an Environmental Assessment Worksheet (EAW) be prepared whenever there is a government action (e.g., building permit) that could result in significant environmental effects. If the EAW determines that there is good potential for significant effects, a more detailed Environmental Impact Statement (EIS) is prepared. The state or local agency controlling the action is designated the Responsible Governmental Unit (RGU). The RGU determines if an EAW or EIS is necessary and what actions should be carried out based on an analysis of the documents. Rules (Mn Rules 4410) for implementing the EAW/EIS process are developed by the Environmental Quality Board (EQB) and the EQB monitors EAW/EIS activities. Any citizen can comment as part of this process. Large area, multi-phased projects can be dealt with under an Alternative Urban Areawide Review (AUAR) rather than multiple EAWs. The OSA was added to the official EAW/EIS contact list in FY 2007.

3) MS 307.08, Subd. 10, as revised in the Spring of 2007, requires that state agencies, local governments, and private developers submit development plans to the State Archaeologist when known or suspected human burial may be affected by developments on their lands. Plans must also be sent to the Minnesota Indian Affairs Council (MIAC) if the burials are thought to be Indian. OSA and MIAC have 30 days to review and comment on the plans.

The State Historic Preservation Office (SHPO) at the Minnesota Historical Society (MHS) acts as the principal environmental review agency for the state with regard to assessing the impacts of developments on historic properties. Historic properties include both standing structures and archaeological sites. While the SHPO's focus is on federal undertakings as specified in Section 106 of the National Historic Preservation Act, the SHPO also acts for the MHS with regard to Minnesota Statutes 138.40 and 116d. Because the SHPO has well-established systems and experienced staff dedicated to environmental review, the OSA has traditionally deferred to the SHPO for commenting on development projects under MS 138.40 and 116d. This allows the OSA to focus on MS 307.08 reviews and other duties.

Due to budget and staff cuts, in May 2004 the SHPO stopped reviewing EAWs submitted by local government RGUs. Thus in FY 2006, the State Archaeologist requested to be added to the EAW official comment list and this was implemented by the Environmental Quality Board (EQB) as of January 2007.

The State Archaeologist also reviews plans and reports based on informal agency or developer requests, although no official OSA action is required if the development is on private land or does not threaten burial sites. Citizens often ask the State Archaeologist for information regarding potential impacts to archaeological resources by developments in their neighborhood. This information is provided as necessary. Some of the requests result in field visits by the State Archaeologist.

During FY 2008, the OSA completed substantial review of 118 development projects, of which 108 were part of the state EAW/AUAR/EIS process. One of the non-EAW/AUAR/EIS

project reviews was a request from DNR for the purposes of MS 138.40. The other requests were part of federal environmental review processes

Because the State Archaeologist has many duties and is short-staffed, replies to EAW submittals are sent only if an archaeological survey is recommended or a known archaeological site should be avoided within the Area of Project Effect (APE). Furthermore, if the project will be reviewed under federal Section 106 or will otherwise be reviewed by the SHPO (e.g., State Agency RGU), the OSA defers review and comment to the SHPO unless unplatted burials are involved.

Of the 118 FY 2008 substantial project reviews, archaeological surveys or site avoidance were recommended by letter on seventeen (17) projects. These projects are:

Project	Agency/RGU	County	Type
Trails RV Park	Cass County	Cass	EAW
Roosevelt Shores	City of Emily	Crow Wing	EAW
Northern Lights	City of Emily	Crow Wing	EAW
Timber Shores	Clay County	Clay	EAW
Little Mary Estates	Douglas County	Douglas	EAW
Lakes and Hills	Douglas County	Douglas	EAW
Wedgewood Cove	City of Albert Lea	Freeborn	EAW
Anderson Lakes	Watershed District	Hennepin	EAW
Presbyterian Homes	City of Eden Prairie	Hennepin	EAW
Park Construction	Athens Township	Isanti	EAW
Elk Run	City of Pine Island	Olmsted	AUAR
Deer Park	Pope County	Pope	EAW
TH 60 Commercial	City of Faribault	Rice	EAW
Mn River Valley Indus.	Scott County	Scott	EAW
CSAH 21	Stearns County	Stearns	EAW
Nelson Mine	City of Cottage Grove	Washington	EAW
Montrose AUAR	City of Montrose	Wright	AUAR

Archaeological Research

OSA - MHS Joint Research Area – In 2006, the OSA and the Archaeology Department of the Minnesota Historical Society established a Joint Research Area at the Ft. Snelling History Center. The OSA purchased shelving and provided computer equipment for the facility and the MHS donated the space. The initial core elements of this facility were the Elden Johnson Library, the Institute for Minnesota Archaeology (IMA) Library, the Minnesota Archaeological Society (MAS) Library, and the OSA Library.

The Joint Research Area is made up of the Johnson/MAS/IMA collections and the OSA library, as well as copies of Minnesota theses and dissertations, and journals to which the OSA subscribes (adjacent state's and province's archaeological journals as well as several national and international archaeological journals). A number of file cabinets house

manuscript collections that are organized by author or topic (e.g., Historical Archaeology). The research area also has two computer stations, one with image scanning and mass storage capabilities and the other with historic property inventory databases.

The research area is open to use by the archaeological community, although only professional archaeologists are granted access to site database files stored in one of the computers. All materials must be used on-site as this is not a lending library, although facilities exist for limited scanning and photocopying of materials. In FY 2008 donations were received from MIAC, David Mather, and the estate of Kim Breakey. It is hoped that other archaeologists will donate written materials and images to the research area and the facility will become a principal research resource for Minnesota archaeologists.

The OSA began a major effort in FY 2007 to scan site and artifact images from 35mm slide collections and prints of black/white and color photographs. Several hundred images have been scanned and placed on a large external hard drive. These files are available for public use. In FY 2008, the OSA developed Digital Image Standards for scanning slides, negatives, photographs, line drawings, and documents. These standards are included in Appendix B of this report.

Radiocarbon Dates File and Database – When the current State Archaeologist was the SHPO Archaeologist, he developed and maintained a database of Minnesota radiometric dates. This database is now housed and maintained at the OSA. Along with the electronic database are paper copies of articles and laboratory reporting sheets for radiocarbon dates (also known as ^{14}C dates) from Minnesota archaeological sites.

The database currently contains 446 dates from 129 sites. The best-dated site in the state is the Bryan site (21GD4) with 26 dates. Other sites with reported dates in double digits are: Hannaford (21KC25) with 23, McKinstry (21KC2) with 21, Smith (21KC3) with 15, Donarski (21MA33) with 12, and Mooney (21NR29) and J Squared (21RW53) both with 10. Forty-two (42) sites have only a single date. The oldest reasonably accurate date from a Minnesota archaeological site is 10,390 RCYBP $\pm$ 120 from the J Squared site (21RW53), followed by 9220 RCYBP $\pm$ 75 from Bradbury Brook (21ML42) and 9049 RCYBP $\pm$ 82 from Browns Valley (21TR5).

In FY 2008, 15 new radiocarbon dates from two Late Prehistoric sites in Goodhue County (21GD3, 21GD158) were added to the radiocarbon database. Ron Schirmer of Minnesota State University - Mankato provided these dates.

The OSA encourages archaeologists who have obtained radiocarbon dates to submit their laboratory reporting sheets to the OSA so all researchers can share in this critical information. Laboratory sheets for radiocarbon dates should always be included in final reports when contractors or agencies obtain dates as part of the environmental review process or research-driven archaeology.

Institutional Field Research - Historically, colleges, universities, and museums have been principally responsible for archaeological research in Minnesota. This began to change in the

1970s with the rapid ascent of government-mandated cultural resource management (CRM) archaeology and increased institutional sensitivity to ethnic or politically charged aspects of archaeological work.

Currently, there are five university-based archaeological programs in Minnesota affiliated with majors in Anthropology. These are at the University of Minnesota – Minneapolis, Hamline University, Moorhead State University, St. Cloud State University, and Minnesota State University - Mankato. The University of Minnesota-Duluth has no full-time archaeological faculty, but offers field schools in association with Superior National Forest or private contractors. Normandale Community College also offers courses in archaeology. The University of Minnesota, St, Cloud, and Mankato offer graduate programs in archaeology, with only the University of Minnesota-Minneapolis offering a PhD track in archaeology.

In FY 2008, the following university-based field research was undertaken:

University of Minnesota – Minneapolis
- no formal field school in Minnesota
- assisted with urban archaeology at Elliot Park in Minneapolis (Kent Bakken)

Moorhead State University
- no field school at a Minnesota site
- archaeological field school at the Beisterfeldt site in North Dakota

St. Cloud State University (Debra Gold)
- Field school at Shoemaker (21SN164) and Talahi Woods (21SHbi) sites

Minnesota State University – Mankato (Ron Schirmer)
- Field school at Barton site (21GD3) and site 21NO11

Hamline University
- no field school

University of Minnesota – Duluth (Susan Mulholland)
- Field school at Whiskey Row (21LA541), Bay View (21SL1015), and Fish Lake (21SL15)

Mike Michlovic of Moorhead State University inspects a test unit at the Beisterfeldt site.

Other Research - A significant amount of archaeology is done in Minnesota each year that is not reviewed by the OSA, licensed by the OSA, or sponsored by the OSA. Most of these projects are carried out by federal agencies or otherwise reviewed by federal agencies and the SHPO under Section 106 of the National Historic Preservation Act due to federal licenses, land, or funding. The OSA occasionally receives complementary reports on these projects or is asked for advice on the projects. The OSA is not aware of any major Minnesota federal excavations in FY 2008.

David Mather, the SHPO archaeologist, and Jim Cummings, an archaeologist/naturalist for Kathio State Park, continued their research at the Petaga Point site (21ML11). In 2008, they excavated a 1x1 meter unit.

Public Education

Archaeology Week - The OSA has served as the major sponsor of Minnesota Archaeology Week since 1998. The first Archaeology Week was held in 1995. Major financial assistance is provided by the Minnesota Archaeological Society and the Council for Minnesota Archaeology as well as a number of state and federal agencies including the Minnesota Department of Transportation, the Minnesota Historical Society – Archaeology Department, the Minnesota Indian Affairs Council, the US Army Corps of Engineers – St. Paul District, the USDA Natural Resource Conservation Service, and the US Fish and Wildlife Service.

Minnesota Archaeology Week 2008 was held May 3-11. There were over 30 officially sponsored events in 20 counties. Over 1,300 people attended the events, although inclement weather significantly restricted many of the outdoor events. Featured events included excavations at a farmstead in Benton County, a simulated dig for children at the Sibley Historic site in Dakota County, a canoe excursion at the confluence of the Mississippi and Minnesota rivers, a bus tour of Lake Mille Lacs, a pottery making workshop in Cottonwood County, and the annual Ft. Snelling Archaeology Fair. The annual Elden Johnson Distinguished Lecture was presented by Dr. Susan Myster of Hamline University at the Ft. Snelling History Center. The OSA sponsored an open house at our offices at Ft. Snelling.

Archaeologists Craig Johnson, Eve Terrell, and Michelle Terrell attend the Elden Johnson lecture at Ft. Snelling.

A major effort was made in 2008 to produce an Archaeology Week poster that was striking and innovative. The poster was designed by Emily Anfinson and featured a famous Minnesota pottery vessel enclosing what was perhaps the most important

game animal of prehistoric times, the bison. That centerpiece of the poster appears on the cover of this annual report.

Public Presentations – During FY 2008, the State Archaeologist was a guest lecturer in anthropology classes at the University of Minnesota and Hamline University. In January 2008, the State Archaeologist discussed the role of his position in a formal presentation to the American Association of University Women in Minneapolis. In June 2008, the State Archaeologist made a presentation on the Private Cemeteries Act to the Minnesota Association of County Recorders annual meeting in Grand Rapids.

Bruce Koenen presented a poster entitled *Red Wing's Stone Cairn's* at the Plains Anthropology Conference poster session in Rapid City, South Dakota.

OSA Archaeology in the Schools – Assistant to the State Archaeologist Bruce Koenen takes the lead in this initiative and has assembled a teaching kit of artifacts that he takes with him on school visits. In FY 2008 he made presentations at three secondary schools –Eden Lake Elementary School in Eden Prairie, Kimball Elementary in Kimball, and Hope Academy in Minneapolis. Koenen also put on a flintknapping workshop at Normandale Community College and talked to students at Hamline University on completing site inventory forms.

The State Archaeologist continues to serve as an Instructor in the University of Minnesota Department of Anthropology. In FY 2008, he taught one course on Midwestern Archaeology. He also serves on a number of graduate student committees.

Internships – The OSA sponsors internships to not only train students of archaeology in practical skills, but to accomplish needed work within the office. In FY 2008, OSA had three interns, Jon Stone from St. Cloud State University, Steven Blondo from the University of Minnesota, and Kelly Wolff from Hamline University.

Media Exposure - The State Archaeologist typically receives a certain amount of media exposure every year not only due to the controversial nature of some of the duties, but because the public has an intensive interest in archaeology and history. Thus most media contacts with the State Archaeologist are either media reaction to a newsworthy situation or are generated by the media due to a perceived or real public interest. In many cases, the State Archaeologist simply provides background information, but in some cases he is interviewed and becomes part of the story.

Major print exposure for the State Archaeologist was in an article on Minneapolis riverfront historic disasters in the April 2008 issue of *Mpls-St. Paul* magazine. Major electronic media exposure for the OSA included a live interview with Cathy Wurzer of Minnesota Public Radio for Archaeology Week 2008 on the *Morning Show*.

Professional Development –The State Archaeologist attended the following professional conferences in FY 2008: the Plains Anthropological Conference in Rapid City, South Dakota; the Gales of November Shipwreck Conference in Duluth; the University of Minnesota Early Humans conference in Minneapolis; and the State Historic Preservation

Office (SHPO) Review and Compliance Workshop in Chanhassen; and the Society for American Archaeology (SAA) and National Association of State Archaeologists (NASA) meeting in Vancouver, British Columbia. The State Archaeologist serves on the SAA's Committee on Government Archaeology.

Bruce Koenen attended a course on Crime Scene Recovery at Mankato State University in July 2007. Koenen also attended the Plains Anthropology Conference, the U of M Early Humans conference, the SHPO workshop, and the Pine City Knap-In.

Burial Sites Protection

A major aspect of the day-to-day work of the OSA is spent dealing with the duties assigned to the State Archaeologist by the Private Cemeteries Act (MS 307.08). These duties principally involve maintaining a file of unrecorded burial site locations, answering public and agency inquiries about known or suspected burial sites, coordination with the Minnesota Indian Affairs Council (MIAC) when Indian burials are threatened, formally determining the presence or absence of burial grounds through field work in particular areas (authentication), reviewing development plans submitted by agencies and developers, and advising landowners on management requirements of burial grounds.

Minnesota law basically treats human burials and cemeteries two ways: as Public Cemeteries under MS 306 and as Private Cemeteries under MS 307. These laws were initially passed in the first decade of the 20th century. Public cemeteries are not restrictive regarding who can be buried there and tend to be active (i.e., open to new burials). Local units of government usually own public cemeteries.

Private cemeteries are those with restricted use governed by procedures established by a private association and they exist on private property. Most private cemeteries are affiliated with religious groups. Lands containing private cemeteries are exempt from public taxes and assessments. Some well-known and well-marked private cemeteries are no longer active primarily due to church closure.

The Public Cemeteries Law includes a section on "abandoned" cemeteries (306.243) that applies to both public and private cemeteries. An abandoned cemetery is one where the cemetery association has disbanded or the cemetery is neglected and contains graves dating prior to 1875 or graves of war veterans. County boards are in charge of abandoned cemeteries.

In 1985, State Archaeologist Hohman-Caine and MIAC developed formal burial ground management procedures. These procedures were revised several times, but had not been revised after a major change in the MS 307 legislation occurred in 1993. That change involved only the addition of one word, "grounds", in 308.07, Subd. 2, but it had major implications for authentication, management, and enforcement. It is now a felony to willfully disturb a "burial *ground*" not just a burial. This requires that the State Archaeologist define burial ground limits during the authentication process, that all land within those limits be

properly treated, and that human remains do not have to be directly disturbed to represent a violation of the law.

In FY 2008, after careful agency consultation, the OSA issued new burial site procedures that address all recent revisions of MS 307.08, including the 2007 revisions. The major difference between the new procedures and the ones developed by State Archaeologist Hohman-Caine in the 1980s is that the new procedures apply only to the OSA and not to other "appropriate authorities" including MIAC. This is consistent with the MS 307.08 revisions signed into law in 2007, which further separated the duties of the State Archaeologist and the MIAC and gave the MIAC the principal responsibility for managing Indian cemeteries once the State Archaeologist had authenticated them. The procedures are available on the OSA webpage.

MS 307.08 FY 2008 Activities - The OSA dealt with 20 major burial cases in FY 2008. "Major" is defined as a case where substantial OSA review is required as indicated by the need for fieldwork, extensive research, and/or official correspondence. Not all major cases result in formal authentication as defined in MS 307.08. Formal authentication involves either proving to a reasonable degree there is a burial in a particular location or proving to a reasonable degree there is not. When a burial ground is found, mapped, and an affiliation determined, it is considered to be "authenticated." There is no standard term for a negative authentication finding.

The OSA typically receives several email or telephone inquiries every week relating to possible burial cases, but most of these can be dealt with quickly and without the need for fieldwork. Individually "minor" cases do not cause a significant expenditure of OSA time or resources, although as a whole and with the addition of the major cases, burial site protection accounts for over half the workload of the OSA.

Of the 20 major burial cases in FY 2008, 14 involved OSA fieldwork and 11 of these resulted in formal authentication (5 positive and 6 negative). Authentication involves four steps: 1) determining if the site is indeed a burial ground, 2) defining the limits of the burial ground, 3) attempting to determine ethnic identity, and 4) sending official correspondence with an authentication conclusion to the landowner as well as the zoning authority and/or county recorder. All FY 2008 major cases are discussed below. Five of the cases resulted in the discovery of previously unrecorded sites. Fourteen (14) of the sites involve Indian burials, five involve White burials, and one is of unknown affiliation.

The State Archaeologist also makes an effort to re-check known burial sites or look for reported but unthreatened burial sites when it is convenient and they are in the vicinity of current projects. The known sites can be either sites that were originally recorded in the distant past or sites that have been involved with recent authentication or development projects. In FY 2008, the State Archaeologist field examined 12 sites that were not directly involved with current review projects; 21AK1, 21HE17, 21HE88, 21KA22, 21KH8, 21ML128, 21PO1, 21SC94, 21TO9, 21WB1, 21WB35, and 21WR33.

21BL228 – The Pines Development, Beltrami County

In June of 2007, a homeowner on the east side of Lake Bemidji noticed a human mandible in a backdirt pile adjacent to her newly constructed home in a development called The Pines. The Bemidji police were contacted and they sent the mandible to Hamline University forensic anthropologist Sue Myster. Dr. Myster determined that the human remains were over 50 years old and of probable Indian affiliation so the OSA and MIAC were called in. MIAC personnel visited the location and determined that multiple burial mounds appeared to be present within the development area. MIAC then began screening backdirt piles associated with two houses already constructed. No additional human remains were recovered by the screening.

OSA personnel visited the location on 6/26/07 and met with Jim Jones of MIAC. The realtor representing the development also attended the site meeting. The original mandible find location was examined and at least six possible burial mounds were noted within or immediately adjacent to the development area. Two of 10 lots in the development already had residences constructed. A mound site had not been previously recorded at the location, but Jacob Brower had reported prehistoric village materials in the vicinity (Winchell 1911:367). The OSA recommended a full archaeological survey be done of the development prior to construction on any additional lots in the western half (lakeside) of the development.

In May 2008, the Mississippi Valley Archaeological Center (MVAC) with Constance Arzigian as principal investigator conducted a detailed authentication survey of 21BL228. MVAC was able to confirm the presence of two burial mounds on the property and was able to demonstrate that other mound-like features were of natural origin. In a 6/11/08 letter to the realtor representing the landowners, the State Archaeologist officially authenticated the two mounds and established a 20-foot no-development buffer around the base of the mounds. The mounds were then added to the official plat of the Pines Development.

21CP64 – Lac Qui Parle Reservoir Find, Chippewa County

In September 2007, the Chippewa County Sheriffs Department notified the State Archaeologist of human skeletal remains eroding from the riverbank near the Lac Qui Parle Mission historic site. A child walking along the riverbank initially discovered the remains. The Sheriffs Department collected all the eroded remains and brought them to the law enforcement center in Montevideo. The sheriff sent photographs of the bones to forensic anthropologists at Hamline University who confirmed that they were indeed human and probably over 50 years old. The sheriff then contacted the State Archaeologist.

The State Archaeologist and his assistant visited the site several days after the discovery and were able to easily relocate the burial due to additional bones visible in the bank associated with an apparent pit feature assumed to be a grave. An exposed rodent borrow at a depth of 18" contained additional human remains and a vertebra was laying on the bank. There were also bison bones laying on the surface in the vicinity as well as prehistoric lithic artifacts. No

artifacts were in clear association with the human burial. The visible human remains were placed in the rodent borrow and the opening was sealed with a large rock.

OSA personnel then visited the nearby DNR Parks Office to inform them of the find as it appears to be State Park land where the remains were found. The removed remains were picked up at the Sheriff's Office in Montevideo and turned over to Hamline University for analysis. Preliminary findings do not clearly identify the ethnicity of the remains, although they are suspected to be Indian. No skull has been found, which could help make a verifiable ethnic affiliation.

OSA's Bruce Koenen cuts away poison ivy roots to better inspect reservoir-eroded burial at Lac Qui Parle.

Personnel from Upper Sioux Dakota Reservation and the State Archaeologist have continued to monitor the location as there were several high water events in 2008 in Lac Qui Parle Reservoir that caused additional erosion to the grave site. Newly eroded remains continue to be placed back in the exposed rodent borrow and borrow sealed with cobbles. Ultimately, the grave may have to be fully excavated to preserve the remains and all of the remains reburied nearby in a safe location. The entire riverbank in this vicinity needed to be stabilized as it not only threatens the grave site, but the adjacent county road.

21CH4,7,8,10 - Trunk Highway 8 Reconstruction, Chisago County
In August of 2007, a MnDOT archaeologist contacted OSA to request comment on the reconstruction of Trunk Highway 8 through Lindstrom. This project was near four mound sites that had been mapped by T. H. Lewis in 1885: 21CH4 was a group of 5 mounds, while 21CH7, 21CH8, and 21CH10 were all single mound sites. Various archaeological surveys since 1895 had looked for the Lindstrom mound sites (most with negative results). Some of these surveys had been with respect to earlier construction on Highway 8. OSA personnel made a detailed field inspection of the project area in late August 2007 and could only relocate a small remnant of Mound 5 in 21CH4. There was no surficial evidence for the other four mounds in 21CH4 and no surficial evidence for the three lone mound sites. Only the former area of 21CH8 appeared to be threatened by the new Highway 8 construction and this

area had some potential to contain sub-surface burial pits. OSA recommended an archaeological survey in this area.

The survey was carried out by Two Pines Resource Group (Michelle Terrell, Principal Investigator) in November 2007. Two Pines located a previously unrecorded prehistoric habitation site (21CH108), but could find no evidence for any surviving burial features.

21CY76 - Moorhead Park Find, Clay County
On November 22, 2006, the Moorhead Police Department was informed of human skeletal remains eroding from the edge of the Red River in M.B. Johnson Park in north Moorhead. Because the bones appeared to be old, Mike Michlovic, an archaeologist at Moorhead State University, was asked to examine the site. Michlovic's examination of the site suggested that it had originally been a coffin burial exposed by river bank erosion. As there was no evidence for a burial shaft in the soil column, it is assumed that the remains were the result of flood deposition over 100 years ago.

Due to the onset of winter conditions, the burial could not be removed at the time of discovery. At the request of the State Archaeologist, Michlovic took possession of the bones that had been removed and agreed to monitor the site until a complete removal could take place. High water during the spring and early summer of 2007 prevented the removal and eroded most of the skeleton, but the remaining bones were finally removed in August 2007. The skull was not recovered. An 1868 5-cent piece was found with the remains along with several other metal objects. Heather Gill-Robinson, a physical anthropologist at North Dakota State University, is examining the remains. The State Archaeologist greatly appreciates the assistance of Dr. Michlovic and Dr. Gill-Robinson on this project.

21CW10 – Landowner Request for Authentication, Crow Wing County
On June of 1900 and May of 1901, avocational archaeologist Jacob Brower recorded 27 mounds and prehistoric village site at the north end of Upper South Long Lake. Brower reported 27 distinct earthworks. A sketch map of the mound group does not appear in Brower's field notes or publications. University of Minnesota archaeologist Lloyd Wilford visited the site in June 1942, noting that the mounds were "covered with good sized trees" and were "very little, if any, disturbed."

In September 1972 MHS archaeologists Doug Birk and Doug George made the first map of the site, although their published version does not include a scale. They noted that the largest circular mound had been partially cut by an old road and that lake cabins were interspersed with the southernmost mounds. In June 1978, Birk revisited the site during the Statewide Archaeological Survey of the Nokasippi River. Birk's discussions with local residents suggest that several mounds had been disturbed or destroyed.

In September of 1996, several landowners who wished to construct septic systems within the mound group contacted the State Archaeologist (Dudzik). Fieldwork by OSA personnel resulted in the first detailed map of the site and noted that the easternmost third of the

mounds were no longer visible due to cultivation. Eleven (11) mounds were mapped in relation to current structures and features. With the agreement of MIAC, routes for septic lines, septic tanks, and drainfields were laid out between the mounds. MIAC and OSA personnel monitored the excavations for the septic projects in October 1996. No human remains were encountered during the construction.

In June 2006, the landowner whose lot contains the westernmost mounds requested an official authentication of the mounds on his property. The landowner was going to attempt to lower his property taxes due to the mounds making much his lot closed to development. The authentication was completed in September 2006 utilizing the map made in 1996 and additional fieldwork. A map was produced showing a 20-foot boundary beyond the bases of the outermost mounds. This map was sent to all three landowners with an attached letter

informing them of their legal obligations under MS 307. The Crow Wing County Recorder was copied.
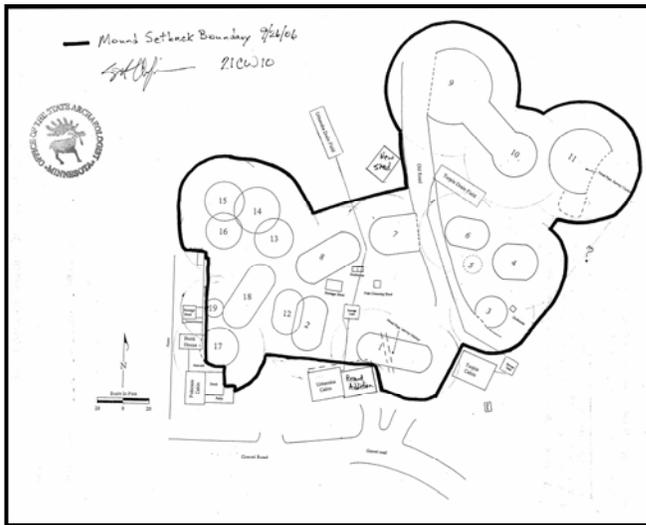
In May 2007, the westernmost landowner of 21CW10 requested that the State Archaeologist physically delimit the burial ground boundary on his property. This was done in July 2007 with the use of pin flags. The landowner was informed of this action by letter on 8/1/07 with a copy going to the Crow Wing County Assessor. The landowners' property taxes were subsequently reduced.

Boundary Map of 21CW10 showing mounds, adjacent buildings, and burial ground boundary (heavy line).

21CW272 – Landowner Damage to Mound, Crow Wing County
In May 2008, an archaeological survey crew from Soils Consulting noticed damage to a mound near Emily while they were working in the vicinity. They also noted two other mounds in the vicinity of the damaged mound. This was a previously unrecorded mound group. The archaeologists informed the State Archaeologist, MIAC, and the Crow Wing County Sheriff. The sheriff immediately restricted further disturbance of the site.

The State Archaeologist visited the site two days after the reported disturbance. There was clear damage to the base of one mound due to the landowner obtaining fill with a backhoe. The other two mounds had been slightly damaged by a small roadway and vandals digging in the mounds. A sketch map was made of the three mounds. The situation was discussed with the landowners and they were asked to avoid all further damage to the mounds. Crow Wing County was provided with the OSA sketch map and the County Surveyor subsequently mapped the mounds as one of the mounds was on county property. The landowner was informed by letter dated 6/23/08 that the site was an authenticated burial ground and that an

official boundary of 20-feet beyond the base of the mounds had been established. A map was provided showing the mounds and the exterior boundary.

21DK63 (Clague Cemetery) – Headstone Removal Request, Dakota County
In April 2008, a relative of people buried in an unplatted pioneer cemetery near Castle Rock requested that the State Archaeologist authorize the removal of his relatives' headstones to a nearby platted cemetery. This cemetery had originally come to the attention of the State Archaeologist in 1999 when the cemetery was threatened by development. The cemetery is the only Manx (British Isle of Man descendants) cemetery in Minnesota and is carefully monitored by the Manx Society of Minnesota, several of whom live in the vicinity. The development did not occur.

After discussing the headstone removal with one of the local officials of the Manx Society, it was apparent that the current landowner denied access to relatives and that the cemetery was not being maintained. This led to the request for headstone removal by one of the relatives. The request has not been granted by the State Archaeologist as the responsibilities of the Dakota County Board with regard to maintenance of an abandoned cemetery are still being determined.

21GD17 – Dayco-Carlisle Loading Docks, Goodhue County
The Silvernale Mounds (21GD17) was the largest mound group in Minnesota, originally containing over 300 mounds. Many of the mounds had been flattened by cultivation by the late 19th century. Because the site now lies within the Red Wing Industrial Park, there have been numerous requests to the State Archaeologist over the last 30 years for authentication activities. A survey sponsored by the State Archaeologist in 1988 could only find nine mounds still visible.

In January 2008, a realtor representing a prospective buyer of the existing Carlisle building within the site requested approval to add loading docks to the building prior to completing the sale. The State Archaeologist requested that an archaeological or geomorphological survey be completed of the construction area to determine if there was potential for subsurface burial pit survival. This survey was completed by Westwood Professional Services (Dean Sather, principal investigator) in May 2008 and demonstrated that the area had been completely disturbed. The project was allowed to proceed.

21GD42 – County Road 1 Construction, Goodhue County
In May of 2006, an archaeologist for MnDOT contacted the State Archaeologist about a federally funded upgrade of County State Aid Highway (CSAH) 1 south of Red Wing. The project was adjacent to a known burial mound group (21GD42) that had been mapped by T.H. Lewis in 1895 and had originally contained 23 mounds. Archaeological surveys in 1995, when roadwork on CSAH 1 was first proposed, had found only one mound (Number 11) partially visible as the others had been plowed down. The State Archaeologist (Dudzik)

had approved preliminary CSAH 1 plans in March of 2000 as there appeared to be no impacts to 21GD42.

The plans submitted to OSA in 2006 had some potential to impact the area of 21GD42 based on the 1995 mapping. The State Archaeologist requested that Goodhue County pull construction limits in slightly to avoid areas where mounds had been mapped. Revised plans were submitted and the area was visually inspected by OSA personnel in November 2007. The OSA still recommended construction monitoring by an archaeologist to insure that no burials were hit. MnDOT decided that they would prefer to complete a pre-construction survey rather than take the chance of construction delays once started.

MnDOT hired 10,000 Lakes Archaeology (Amanda Gronhovd, Principal Investigator) to do intensive testing in the area. In May 2008, a piece of bone, probably human, was found in a shovel test near where Mound 10 originally was located. This was outside the revised construction limits, but during a field meeting it was surprisingly apparent that Goodhue County was still using the initial not the revised plans. At the field meeting, the State Archaeologist required that the revised plans be followed and that additional testing be done within the construction zone. No burial features or humans remains were found by this testing. The State Archaeologist still required construction monitoring. The construction should begin in 2009.

Personnel from OSA, MIAC, MnDOT, Goodhue County, and 10,000 Lakes Archaeology inspect site 21GD42.

21HE27 – County Road 101 Reconstruction, Hennepin County
In January 2008, the State Archaeologist met with Hennepin County Highway personnel and URS personnel to discuss the reconstruction of County Road 101 in Minnetonka. The project included a traffic circle to replace a dangerous curve at the location of 21HE27, a mound site initially mapped by T.H. Lewis in 1883. The mound group originally consisted of 52 mounds that were subsequently impacted by road, railroad, and residential construction. An MHS survey in 1972 noted "some" mounds remaining. An MHS Trunk Highway Archaeology crew plotted the Lewis map of the mounds on a modern map of the area in 1986 when the current county road was Trunk Highway 101, but did not complete a detailed field survey. In August 2000, OSA monitored widening of TH 101, but did not find any human remains and did not examine the site as a whole.

In April 2008, OSA personnel examined the area of the proposed county highway construction, but could see no obvious remnants of mounds in the area. Soils probes were inconclusive as to the survival of mound fill or burial pits. The OSA recommended that a private archaeological contractor be hired to complete intensive testing in the proposed construction limits. The first phase of this testing was carried out in June 2008 by the Mississippi Valley Archaeological Center (Connie Arzigian, principal investigator). This testing involved shovel tests and 1x1 m units. This testing did not find any definitive prehistoric features or artifacts, but suggested that a few areas contained intact soil horizons. The State Archaeologist recommended additional testing including trenching the areas with the most potential. This testing will be completed in FY 2009.

21HE65 – Sewer Line Break and Land Appraisal, Hennepin County
In July of 2005, a landowner in Mound had contacted the MIAC asking about requirements concerning a garage reconstruction adjacent to a burial mound. The MIAC forwarded the request to the OSA. The site in question was the Bartlett Mounds (21HE65). Bruce Koenen visited the site in late July and met with the landowner. The project was put on hold as the State Archaeologist (Dudzik) had just resigned.

In October 2005, Acting State Archaeologist Scott Anfinson visited the site and confirmed that the existing garage indeed abutted a burial mound. There were originally 18 mounds mapped at 21HE65 in 1883, but the area has been subjected to intensive residential development over the last 120 years. Four mounds were originally present on the lot in question, but only the mound (Mound 1) adjacent to the existing garage was still visible in 2005. Two other mounds (Mounds 6-7) were apparent just to the west on another lot, but no attempt was made to map other possible surviving mounds even further to the west. The landowner was informed by an OSA letter on 10/11/05 that disturbance of the mound was prohibited under MS 307.08. MIAC and the City of Mound were copied on the letter.

In July 2007, the landowner informed the State Archaeologist that a sewer line previously installed through Mound 1 had broken in or near the mound. The landowner said he would inform OSA when the repair crew arrived to fix the line and OSA planned to monitor the repair work. No call was received by OSA and when the site was examined in August 2007, the repair work had already been completed with obvious excavation backfilling and a new cleanout pipe evident along the eastern edge of Mound 1. No artifacts or bones were obvious on the disturbed surface and the work appeared to have been confined to the existing sewer line trench.

In February 2008, the Hennepin County Assessor called OSA to inquire about the burial mounds on the property, as there had been a petition by the landowner to lower the assessed value due to the presence of the mounds. Subsequently, the landowner filed a lawsuit against a title insurance company for not informing him of the mounds when he had purchased the property. The outcome of the assessment revision and the lawsuit are unknown to OSA.

21HE74, HE81, HE82, HE83, HEr – Pipeline/Trail Reconstruction, Hennepin County
In 1881, T.H. Lewis completed mound surveys along the Crow River in western Hennepin County. He mapped a series of mounds and mound groups from Rockford to Delano. These sites included: 21HE74, group of 13 mounds; 21HE81, a lone mound; 21HE82, a group of four mounds, 21HE83, a group of two mounds. In addition, there was an unconfirmed report of two mounds east of 21HE83 that had been assigned an index number of 21HEr.

In 1971, an MHS resurvey of the area failed to find any surviving mounds as they had apparently been destroyed by cultivation and roadwork. In the winter of 1988, LeRoy Gonsior, an archaeologist for the MHS who lives in Delano, noticed that snow sloping along County Road 50 had damaged the area where two of the mound groups had been mapped by Lewis (21HE74 and 21HE84). The Municipal-County Highway Archaeologist (Scott Anfinson) had not been given this project to review, but examined the area in the field in the spring of 1989. Both Gonsior and Anfinson found prehistoric lithic scatters along the damaged area, but no evidence for any mounds or burial disturbances.

In 1995, the Institute for Minnesota Archaeology (IMA) was hired by Northern Natural Gas to survey construction of the Rockford Loop pipeline. The project went through the areas of sites 21HE74 and 21HE82, but IMA surface reconnaissance and electronic soil resistivity failed to find any evidence for the mounds. (The OSA has subsequently determined that the IMA had searched for 21HE74 in the wrong location.) Construction monitoring in the winter of 1996 failed to find any evidence for burials, but the frozen ground was removed in large chunks providing poor visibility.

In the spring of 2008, OSA was independently informed of both pipeline reconstruction and trail reconstruction in the vicinity of the Crow River mound sites. Northern Natural Gas was planning to upgrade their pipeline as part of the Zone EF expansion and Three River Park District was going to rebuild their Lake Rebecca Park trail. The pipeline had originally been built in the 1960s and the trail originally built in the late 1980s, although neither had been surveyed for archaeological impacts. The Zone EF pipeline project was required by federal regulations to assess cultural resource impacts and the trail reconstruction was reported to OSA by local resident and MHS archaeologist LeRoy Gonsior.

Because the pipeline and the trail paralleled each other in close proximity, it was determined that detailed survey of the pipeline construction would be able to assess potential impacts of the trail reconstruction. Summit Envirosolutions (Andrea Vermeer, principal investigator) undertook the pipeline survey. This survey was completed in June 2008. It included intensive shovel testing of all mound areas within the pipeline corridor, but no burial pits or mound features were apparent.

The OSA is still awaiting final construction plans for the pipeline prior to issuing findings on impacts to the burial sites and the non-burial sites on public property. Archaeological construction monitoring of the pipeline work will need to be completed in the mound site areas. The OSA will monitor Lake Rebecca Park trail reconstruction.

21HE86 – Mountain Bike Trail, Hennepin County
In May 2008, the OSA was informed that Three Rivers Park District planned to construct a mountain bike trail in the vicinity of 21HE86, a group of 26 mounds mapped by T.H. Lewis in 1883. A field meeting was held at the site in June 2008, which included personnel from OSA, MIAC, Three Rivers Park District, 10,000 Lakes Archaeology, and Summit Envirosolutions. Most of the mounds are still clearly visible along a ridge top. The Park District was asked to keep their trail off the crest of the ridge within the mound group and to block assess to an informal trail along the ridge top. They were also asked to perform an archaeological survey of areas with site potential off the ridge. This survey was to be completed in FY 2009.

21HEbi - Hermitage Shores Development, Hennepin County
In March of 2006, the City of Minnetrista contacted the OSA regarding the Heritage Shores Development and the possible presence of an early historic settler's grave within the development. Several neighbors also contacted OSA about the development. Based on historical research, George and Frank Halsted were supposedly buried near their cabin on Lake Minnetonka and this spot is supposedly marked with a flagpole in front of a late 20th century residence. The State Archaeologist visited the site in May of 2006, located the flagpole, and photographed the vicinity. There was no obvious surface evidence for a gravesite or any marker denoting one.

The State Archaeologist recommended that an archaeological survey be done of the entire development parcel because it was located on Lake Minnetonka, although such a survey was not mandatory as it was a private development on private land. Archaeological Research Services (ARS) completed this survey in July of 2007, but no archaeological materials were recovered. ARS sub-surface testing was just beyond a 20-buffer of the flagpole, but no features or artifacts were noted. The State Archaeologist has recommended that a 20-foot no-development setback be maintained from the flagpole in case there are indeed burials there. Subsequent OSA monitoring of the development has confirmed that the 20-foot setback from the flagpole has been maintained.

21KA21 – Landowner Request, Kanabec County
In early November 2007, a property owner on Knife Lake near Mora requested an examination of his property for burial mounds as he wanted to do some landscaping in his yard. Burial mounds were first reported in this vicinity by Jacob Brower in 1901. An MHS survey of Knife Lake in 1973 did not make a careful examination of the location, but filled out a site form based on reports of mounds and habitation materials; the number 21KA21 was assigned. A note on the form states: "mounds apparently destroyed by summer cabins." An OSA survey (Hohman-Caine) of Knife Lake in 1989 reported a group of six mounds in the vicinity, but provided no map or details.

OSA personnel examined the location on November 7, 2007 and mapped six mounds at 21KA21, two which were in the yard of the landowner requesting the survey. In a letter dated December 11, 2007, the State Archaeologist informed the landowner of the mounds' presence, provided a sketch map of the mounds, and detailed the landowner's responsibilities under MS 307.08.

OSA's Bruce Koenen examines an earthen mound at 21KA21 to confirm its ancient and artificial origin.

Tietje Cemetery – Public Report of Disturbance, Martin County

In May 2008, a local resident called the OSA to reported the disturbance of a small pioneer cemetery near Wilbert in Martin County. The cemetery was in the middle of a farm field and the farmer reportedly took down headstones and then plowed and planted the area as part of the surrounding field. The State Archaeologist called the county sheriff and determined that the cemetery was still owned by the church, but may be considered an "abandoned: cemetery under MS 306. County Boards have some jurisdiction over abandoned cemeteries. The sheriff said the landowner had permission from one relative to move a headstone and had previous permission from the church board to plow to the edge of the graves. The landowner did not have permission to remove all the headstones or plow the entire area.

The Tietje Cemetery had originally been affiliated with a German Evangelical Church in the 1890s. Some of the graves in the cemetery were moved when the church relocated to Ceylon in 1905. At least three headstones and perhaps eight occupied graves remained in place until May 2008. The Martin County Board had the area resurveyed in 2008 and determined that the area in question had an earlier survey error and that the farmer actually owned the cemetery area. The final disposition of the cemetery has not been reported to the State Archaeologist, but the Martin County Attorney is monitoring the situation.

21ML11 – Buckmore Dam Reconstruction, Mille Lacs County

In December 2007, DNR informed the state Archaeologist that safety improvements were needed on the Buckmore Dam on the Rum River in Kathio State Park. This project was adjacent to the Petaga Point site (21ML11), an important prehistoric habitation and mound burial site. On January 16, 2008, a meeting was held at the Mille Lacs Ojibwe Reservation to discuss possible impacts to 21ML11 by the proposed dam work. Although no construction excavations were planned within the known site limits, a haul road across the site posed some threat to the site through tire rutting and perhaps compaction. DNR was asked to minimize

effects to the site through road underlayment preparation, construction monitoring, and careful removal of the haul road. The haul road has subsequently been moved to the other side of the river and should pose no threat to the site.

Savage "Mima" Mounds – Dan Patch Trail Development, Scott County
In July 2007, the State Archaeologist received several reports from the public about a proposed housing development threatening mounds in Savage. This project was extremely controversial in the local community. The State Archaeologist examined the location on 8/13/07 and located a number of earthen mounds. A more detailed examination of these features in November 2007 by OSA personnel included soil coring of several of the mounds.

Based on the results of the soil cores and the location in a wetland, it was determined that the features were not burial mounds. Mounds are almost always located in upland areas and have a view of the surrounding terrain. While expedient or accidental burials are occasionally found in lowland areas, formal cemeteries (mound groups included), never are. Mounds found in lowland areas are often referred to as "mima" mounds and can be constructed by burrowing toads, sedges, and other natural processes. The State Archaeologist is attempting to have a soil scientist examine the Savage mima mounds in more detail to better understand the natural process that built them.

21TR15 – Animal Disturbance, Traverse County
In August 2007, the State Archaeologist was informed by a member of the Sisseton Dakota Reservation of South Dakota that human remains were visible on the surface of a burial mound designated 21TR15. It was also reported that survey stakes near the mound suggested a possible development threat. This mound was first mapped by T.H. Lewis in 1883.

On August 9, 2007 the State Archaeologist examined the site and found that a rodent borrow had indeed intruded into a human burial resulting in some bone being exposed. The State Archaeologist, after an on-site cell phone consultation with Jim Jones of MIAC, reburied the remains in a shallow hole excavated into the rodent borrow. There were no evident survey stakes near the mound, although several nearby boulders had been marked with red ochre or paint. There were also recent ATV tracks in the vicinity, hence the need to immediately rebury the exposed remains. Following the State Archaeologist visit to the mound, the Sisseton Dakota and MIAC conducted a ceremony at the mound appropriate for the reburial of the remains.

21WA2 – Sale of and Development of Property, Washington County
In November 2007, the clerk of Grey Cloud Township informed the State Archaeologist that the landowner of the Koukal Mounds (21WA2) was planning to sell his property. The new owner wanted to demolish the existing house on the property and build a new one. Jacob Brower originally described the mounds in 1902. MHS archaeologists mapped the mound group in 1971, documenting five mounds of which two had been partially damaged by access road construction to the Koukal residence.

A field examination by the State Archaeologist in November 2007 determined that the mounds were in the same basic condition as reported by the 1971 MHS survey. The State Archaeologist sent a copy of the 1971 map to the realtor handling the sale of the mound property. She was asked to inform the prospective buyer of the mound presence and to maintain a 20-foot setback from the mounds. The new owner could request an official authentication by the State Archaeologist. No additional correspondence has been received on this site since November 2007.

Chapter 3: The Status and Future of Minnesota Archaeology in 2008

In the 2006 and 2007 OSA Annual Reports, the State Archaeologist discussed in detail the status of Minnesota archaeology highlighting some recent improvements and current problems and suggesting courses of action that could improve Minnesota archaeology. In FY 2008 the status of archaeology in Minnesota has not changed greatly, although there have been some improvements and are some continuing problems.

Current Status

Archaeologists

There are currently perhaps 100 archaeologists living and working in Minnesota. More than 60 of these archaeologists have advanced degrees and practice archaeology full-time in the state. Over 50 of the advanced degree archaeologists work in cultural resource management (CRM) with 12 at Federal agencies, 11 at State agencies, 1 at an Indian reservation (Bois Forte), and 30 at private contracting firms based in Minnesota. A number of out-of-state contracting firms also occasionally do archaeological work in Minnesota. Advance degree archaeologists generally meet federal and state standards required to be a principal investigator on a public archaeological project and to obtain a state license.

There are perhaps an equal number of BA level archaeologists living in Minnesota who make up the CRM field crews and do much of the analysis and record keeping for contracting firms and agencies. Some of these jobs are seasonal.

There are 11 full-time academic archaeologists in Minnesota who have advanced degrees and practice North American Archaeology. The University of Minnesota – Minneapolis has eight staff archaeologists in the Anthropology Department, but only two are North American (Guy Gibbon, Katherine Hayes). There are three North American archaeologists at Moorhead State

(Mike Michlovic, George Holley, Rinita Dalan), two at St. Cloud State (Mark Muniz, Debra Gold), two at Hamline University (Skip Messenger, Brian Hoffman), and one at Mankato State (Ron Schirmer). There is also one North American archaeologist at the Science Museum of Minnesota (Ed Fleming), although his duties are primarily curational. Several recent graduates of advanced degree archaeology programs also reside in the state

Moorhead State University archaeologist George Holley presents a poster at the Society for American Archaeology (SAA) meeting in Vancouver.

and do not have full-time employment as archaeologists, although they have intermittent teaching and contract archaeology jobs.

Curation

In 2005, the Minnesota Historical Society (MHS) began to charge fees for curating archaeological collections and instituted a complex curational system more suited to art collections than North American archaeological collections. With the transfer of the University of Minnesota Department of Anthropology – Minneapolis archaeological collections to MHS in 1999 and the closure of the UMD Archaeometry Lab in 2001, only MHS and the Science Museum of Minnesota (SMM) maintain federally approved archaeological curation facilities in Minnesota.

Because the SMM facility is not open to general archaeological collections and the MHS facility is expensive and their procedures overly complex for most archaeological applications, contract archaeologists, especially small firms, have had major difficulties in recent years in fulfilling both their legal and ethical curational responsibilities. Furthermore, avocational archaeologists and landowners who want to donate artifact collections, have few viable options.

In FY 2007, the OSA developed curation guidelines for artifacts and data from "state" sites (i.e., non-federal public property). As long as the two principal requirements of MS 138.37, Subd. 1 are fulfilled - *proper care and convenient access* - and the curational institution can provide written procedures demonstrating this, the OSA will approve alternatives to MHS curation. Most of these institutions will be local museums or post-secondary schools with archaeological programs. Currently, three institutions have applied for and met the OSA curation standards for state collections. These institutions are: Moorhead State University, Cass County Historic Society, and Bloomington Historical Society.

Curation is an issue not only for artifacts, but for photographs and documents. A huge number of color slides were taken as archaeological documentation between the early 1960s and the late 1990s. Because color slides typically have a shelf life of less than 50 years, there is an urgent need to preserve important slide images through electronic digitization. Yet scanned images must be of a high enough resolution to somewhat match film reproduction.

With the widespread availability of digital cameras beginning in the late 1990s, many archaeologists switched from film to digital images. Digital camera images like scanned slides need to be stored electronically, but computerized access to storage formats is constantly changing and electronic formats (e.g., compact disks) are vulnerable to degradation or inaccessibility. There is a very real possibility that many critical images of Minnesota archaeology in the modern period will be lost unless they are conserved in a consistent and appropriate manner.

In an effort to deal with the image curation crisis, the State Archaeologist developed digital image standards in May 2008. These standards appear as Appendix B and were based on National Archive guidelines. These standards apply to original digital images as well as

scanned color slides, scanned b/w negatives, scanned photographs, and scans of maps and drawings. The OSA has also established a digital imaging center in the OSA-MHS Joint Research Area. This center has a publicly accessible computer dedicated to digital imaging with two redundant external hard drives. Imaging equipment includes a flatbed scanner, a slide scanner, and a stream-feed document scanner. The document scanner has also proved very useful in efficiently scanning site forms and other documents to be sent via email as PDF files saving staff time, mailing fees, and photocopying fees.

Education
The University of Minnesota Department of Anthropology has hired a tenure-track North American archaeologist, Katherine Hayes. She will replace an existing North American archaeologist (Guy Gibbon) who will retire in 2009. The Department has made a commitment to once again offer *local* summer field schools in archaeology. Professor Hayes is a historical archaeologist and besides leading the summer field schools, will also direct the Heritage Management/Applied Archaeology graduate program.

Archaeological programs at the state universities at Moorhead, St. Cloud, and Mankato continue to have robust archaeological programs and the addition of new faculty members in recent years bodes well for the future of archaeological research and education. This is also true at Hamline University. The recent loss of archaeological programs at Bemidji State University and the University of Minnesota – Duluth leaves a void in post-secondary archaeological education in north central and northeastern Minnesota, although some courses are still offered at UMD utilizing local contract archaeologists and Superior National Forest personnel.

Research
In FY 2006, MnDOT began a study of Woodland historic contexts in Minnesota and the State Archaeologist was appointed to the steering committee. The Mississippi Valley Archaeological Center (MVAC) of La Crosse, Wisconsin was hired to complete the project (Connie Arzigian, principal investigator). The purpose of the project is to prepare a Multiple Property Documentation Form (MPDF) that will greatly assist the significance assessment of Woodland Period sites (500 BC – AD 1000), one of the most common types of prehistoric sites in Minnesota. An MPDF document contains two basic sections: Section E outlines the historic contexts associated with the subject and Section F defines property types and their National Register eligibility requirements.

The final Woodland contexts are:
> *The Brainerd Complex: Early Woodland in Central and Northern Minnesota, 1000 B.C.–A.D. 400*
> *The Southeast Minnesota Early Woodland Complex, 500–200 B.C.*
> *The Havana-Related Complex: Middle Woodland in Central and Eastern Minnesota, 200 B.C.–A.D. 200/300*
> *The Laurel Complex: Middle Woodland in Northern Minnesota, 150 B.C.–A.D. 650*
> *The Fox Lake Complex: Middle Prehistoric in Southwestern Minnesota, 200 B.C.–A.D. 700*

The Lake Benton Complex: Late Middle Prehistoric in Southwestern Minnesota, A.D. 700–1200

The Central Minnesota Transitional Woodland Complex: Middle to Late Woodland in Central Minnesota, A.D. 300–1000

The Southeast Minnesota Late Woodland Complex, A.D. 500–1150

The Blackduck-Kathio Complex: Late [Terminal] Woodland in Northern and Central Minnesota, A.D. 600–1100

The Rainy River Late Woodland Complex: Late [Terminal] Woodland in Northern Minnesota, A.D. 1100–1400

The Psinomani Complex: Late [Terminal] Woodland, Protohistoric, and Early Historic in Northern and Central Minnesota, A.D. 1100–1750

Steering committee meetings were held quarterly to discuss and comment on the individual historic context documents that will be the major component of the MPDF. Other non-MnDOT committee members were David Mather of SHPO and Mike Michlovic of Moorhead State University. Craig Johnson and Beth Hobbs served as the principal MnDOT advisors. The project was completed at the end of FY 2008. Eventually, MnDOT will place the document on their webpage.

Ft. Snelling Visitor's Center
The 2007 Annual Report discussed a proposal by the Minnesota Historical Society (MHS) to build a new visitor's center at Ft. Snelling and demolish the existing facility. The State Archaeologist considered this to be a major threat to archaeology in Minnesota because the current Ft. Snelling Visitor's Center (constructed with federal funds in 1983) houses the MHS Archaeology Department Offices, the MHS Archaeology Library, the MHS Archaeological Research Laboratory, the MHS Archaeological Artifact Comparative Collections, the University of Minnesota Archaeological Collections and Records (transferred to MHS in 2001), the Institute for Minnesota Archaeology collections and records, the Minnesota Archaeological Society Office and Files, the Office of the State Archaeologist (leased space), and the Joint OSA – MHS Research Facility. The proposed Visitor's Center did not include space to house any of these archaeological collections and programs.

After a number of public meetings and a major Legislative effort by MHS in FY 2008, MHS abandoned the Ft. Snelling Visitor's Center initiative due to concerns about adverse impacts to the National Historic Landmark historic site as determined by the National Park Service and a shortage of funding during tight financial times. MHS is still evaluating the condition of the existing building and will move some Historic Site offices to Old Ft. Snelling in FY09.

OSA Budget
The OSA has not had a budget increase since FY2001. The budget is currently $196,000 per annum, which covers two staff members, office rent, and operational expenses. As costs for benefits, salaries, travel, and supplies have steadily increased, the funds available for accomplishing the mandatory duties of the State Archaeologist have decreased. As listed in Chapter 1, the State Archaeologist's duties are of both a regulatory and leadership nature.

These duties cannot be accomplished by sitting in the office answering the telephone, sending emails, and answering letters. Effective site protection, research, and education require traveling around the entire state and active participation in fieldwork, professional meetings, and public events.

Minnesota Statutes 307.08, Subd. 5 states that "the cost of authentication, recording, surveying, and marking burial grounds and the cost of identification, analysis, rescue, and reburial of human remains" on private property "shall be borne by the state." The entity of state government responsible for these costs is not specified in the law, but because *authentication* is clearly the unique responsibility of the State Archaeologist, it is assumed that OSA must bear the costs of this activity. Because authentication of actual remains also involves ethnic identification, this cost too is the responsibility of OSA.

There are instances when OSA staff are unable to complete authentication fieldwork due to the scope of a private lands project, the need for technical expertise and equipment not available at OSA, or due to time constraints. OSA staff are also not forensic anthropologists and thus cannot make ethnic identifications based on subtleties of skeletal morphology. In these instances, the OSA needs the assistance of outside consultants. In the past, OSA has paid for these services, but current budget constraints no longer allow this. Thus if private landowners are not willing to voluntarily pay for independent contractor authentication and identification costs, some private development projects may not be completed.

Minnesota Statutes 138.35, Subd. 2 states that the State Archaeologist shall "sponsor, engage in, and direct fundamental research into the archaeology of this state." Fundamental research cannot just be done by the State Archaeologist, volunteers, and unpaid interns. Fundamental research requires funding for such things as radiocarbon dates, equipment, technical expertise, and large field projects. Research is worthless without public dissemination of the results and publication of monographs also requires funding. Based on the current budget, the State Archaeologist's ability *to further fundamental research* is very limited.

MS 138.40, Subd. 3 requires that the State Archaeologist review public agency plans that may affect archaeological sites on public lands and MS 307.08, Subd. 10 requires that the State Archaeologist review public and private development plans that may affect burial sites. If agencies and private developers fully complied with these laws, the OSA would be overwhelmed. Clearly another full-time staff person would be needed at OSA if agencies and developers fully complied.

It is clear that the ability of the OSA to carry out MS 307 and 138 obligations will continue to be limited and will even decrease if the OSA budget remains at a level established a decade ago. The very survival of a functioning State Archaeologist's Office will be threatened without a budget increase within the next few years.

A Plan for 2009

Legislation: The OSA intended to begin a major legislative initiative in 2009 to address problems with the Field Archaeology Act (MS 138.31 - .42), but the state budget crisis and several unresolved wording issues will require postponement of this initiative until 2010.

The Field Archaeology Act has a number of problem areas including: 1) the *Legislative Intent* section emphasizes regulation of archaeology rather than preservation of sites; 2) the *Definition* section lacks several key concepts such as *agency, paramount right of the state, significant site*, and *undertaking*, as well needing revision of certain words (e.g., *object* should eliminate "skeleton" and add "artifact" and *state site* should only refer to sites on non-federal public land and should eliminate the 1875 bottle/ceramic exclusion); 3) the MHS role in licensing should be eliminated as it unnecessary; 4) environmental review sections should be more consistent with federal legislation (e.g., review of *all* state *sponsored* undertakings that could harm significant sites); 5) it should be coordinated with and refer to other pertinent statutes such as 307 and environmental laws that involve archaeological matters and the State Archaeologist; and 6) the roles of various agencies should be clarified and expanded (e.g., agencies should submit development plans to MHS-SHPO, OSA, and when appropriate to MIAC). This initiative is being done in careful consultation with all major stakeholders including MIAC, MnDOT, DNR, MHS, and the Council for Minnesota Archaeology (CMA). An increase in the OSA budget could also be an element of the legislative initiative.

Development Plan Review: The OSA began officially reviewing Environmental Assessment Worksheets (EAWs) in 2007, but there is still a major deficiency in the environmental review process with respect to archaeological sites on public property. MS 138.40, Subd. 3 requires all public agencies, not just state agencies, to submit their development plans to OSA and MHS if known or scientifically predicted archaeological sites may be affected on lands they control. The majority of local governments do not conform to this requirement unless the project is required to have historic impact review under federal law (e.g., Section 106, NEPA) or under the Minnesota Environmental Policy Act (MS 116d). For instance, counties and cities rarely submit non-federal highway projects for review, although such projects represent the majority of local highway development activity in the state.

The OSA will work with state and local agencies to make them more aware of impacts to archaeological sites by various types of projects and will attempt to help agencies efficiently and effectively fulfill their review obligations. The most effective way to accomplish a basic archaeological project review is to provide secure access to the archaeological site database and to predictive models for unrecorded sites. OSA will work with the Land Management Information Center (LMIC) to accomplish these objectives in FY 2009.

Information Management: Because effective agency plan review, response to calls from the public requesting information, and even many aspects of research rely on accurate and easily accessible knowledge of site distribution and site type, the site databases maintained by the OSA are essential. Yet the current databases are neither comprehensive nor widely accessible.

The *Site* and *Report* databases do not include boundaries of sites and survey areas. The *Burial Site Database* does not include many reported or suspected burial sites contained in OSA paper files if these sites have not been confirmed by professional archaeologists or are not listed in the *Archaeological Site* database. In addition, a compilation of historic era burials by Pope and Fee (1998) lists about 6,000 cemeteries, some unplatted, the majority of which are not contained in the OSA burials database.

Most agencies and all contract archaeologists in Minnesota do not have direct access to the OSA databases. To obtain complete site information they must visit the OSA offices, but OSA has limited ability to handle large numbers of visitors, requests for extensive photocopies, or complicated database searches.

Burials Site Database - As all confirmed burial sites subject to State Archaeologist review are defined as archaeological sites under both state and federal law, an effort will be made in FY 2009 to assign official state site numbers to any confirmed but unnumbered sites. Alpha numbers may be assigned to burial sites that are unconfirmed, but are based on relatively reliable information. All such sites will be added to the database.

Archaeological Site Database - As of January 1, 2007, the OSA took over updating the master archaeological site database that is shared with the SHPO. The OSA is working with the Minnesota Land Management Information Center (LMIC) to attempt to provide access to the site database on-line both for data input and output. This on-line access should be available to appropriate agencies and contract archaeologists. Iowa, South Dakota, and Wisconsin already have access to their site databases on-line. The OSA will also attempt to add site boundaries in GIS format by re-designing the site inventory form.

Archaeological Survey Manual: Agencies and contract archaeologists in Minnesota must follow various guidelines to insure their fieldwork and reporting is completed in a comprehensive and professional manner. Some of these guidelines are agency specific, while others apply to all projects reviewed under federal and state authorities. The current State Archaeologist while at the SHPO wrote the guidelines used in Minnesota for archaeological projects reviewed by the OSA and the SHPO (Anfinson 2005). Due to information that has been obtained from the MnDOT-sponsored Deep Testing, Farmstead, and Woodland Context projects as well other insights and advances over the last few years, the Survey Manual is in need of an update. The State Archaeologist will take the lead in this effort, but will coordinate with the SHPO, state agencies, contract archaeologists, and the CMA.

Archaeological Research: Critical research needs include radiocarbon dates for certain sites and complexes, a mounds status survey, site locational surveys and site excavations in certain regions to establish the basic cultural sequence and fine-tune predictive models, and

investigations of the Early Prehistoric Period including finding and excavating well-preserved Paleoindian sites. University based research will still have to take the lead in some of these investigations, especially those involving major excavations, but state level initiatives are essential to fulfilling others. The OSA will attempt to contribute staff time and resources to further these research goals.

The most reasonable method of funding these initiatives is through the Minnesota Legacy Amendment passed in November 2008. Of the dedicated sale tax funds, 19.75% will go to a newly created Arts and Cultural Heritage Fund to be spent only for arts, arts education, and arts access, and *to preserve Minnesota's history and cultural heritage*. DNR estimates suggest that approximately $48 million will be available in FY 2010 and $54.5 million in FY 2011. Guidelines as to how this money will be spent have not been worked out yet, but archaeologists must get involved in this process to insure that a reasonable percentage of the funds go to archaeology.

Radiocarbon Date Needs

Elden Johnson first defined Brainerd ceramics following excavations at the Gull Lake Dam site (21CA37). They were originally thought to date between AD 600 – 800, but more recent radiocarbon dates from charred material on Brainerd sherds have suggested that Brainerd may be as old as 1400 BC. This would make Brainerd ceramics some of the oldest in North America. However, there is some evidence that dates taken from pot scrapings may date older than they should due to carbonate contamination. An OSA initiative in 2009 may seek to shed light on the age of Brainerd ceramics and the carbonate contamination question. The OSA Education Fund may be used to obtain a number of radiocarbon dates from features rather than ceramics to help define the chronological limits of Brainerd Ware ceramics.

Mound Status Survey

Another key Minnesota research need is a Mound Status Survey. Theodore Lewis and Jacob Brower first mapped most of Minnesota's 12,500 known burial mounds in the late 19th century. Some of these mound sites have not been visited by an archaeologist in over 100 years. The actual current condition of most mound sites is not known and very few have been officially authenticated by the State Archaeologist. While it is against the law to willfully disturb a burial ground, most land owners are unaware that mounds were mapped on their property and thus they do not know what to avoid disturbing.

A major effort should be undertaken to assess the status of mound sites in Minnesota. While a site by site field assessment of the status would be the preferred method, some basic research can be done without time-consuming and costly field research. Utilizing land use data maintained by the Minnesota Land Management Information Center (LMIC), known mound site locations could be compared to current land use and the probability of various site disturbances evaluated. For instance, if land containing a mound site was in an agricultural field, residential area, or industrial park, it is likely that significant disturbance has taken place. If the land is wooded, the mounds may be in good condition.

Another method of remotely assessing mound condition utilizes recently perfected LIDAR surveys. LIDAR stands for Light Detection and Ranging. It basically is like RADAR except laser light pulses from an airplane are used instead of radio waves. Current LIDAR technology can achieve vertical elevation resolutions of six inches (15 cm) or better thus resulting in Digital Elevation Modules (DEMs) that show surface topography that is accurate to within a foot. Several state agencies and many Minnesota counties have already sponsored LIDAR surveys of many areas in Minnesota. Because most burial mounds in Minnesota were originally higher than one-foot and even mounds in long-cultivated areas can still be evident at this vertical resolution, a fine-scale LIDAR survey could be very useful in remotely and efficiently assessing mound condition. The OSA will investigate cooperative LIDAR ventures in FY 2009 with other units of government.

Statewide Archaeological Survey and Site Locational Models

It is estimated that less than one-tenth of one percent of the archaeological sites in the state have been recorded by archaeologists. Many of the state's sites have already been destroyed or damaged by residential development, highway construction, commercial enterprises, and intensive cultivation. Because archaeological survey can't be required on every project and in every disturbance situation and because recorded sites represent only a small fraction of the states' archaeological resources, it is essential that accurate and comprehensive site locational models be developed to efficiently assist agencies with project reviews. The critical basis for these models is a representative archaeological sample of the entire landscape in every region of the state.

The Northwestern Archaeological Surveys completed by Theodore Lewis in the late 19th century can be considered the first statewide attempt at providing archaeological site information, although this effort was almost exclusively focused on burial mounds. Lloyd Wilford, the first professionally trained archaeologist at the University of Minnesota, also utilized a statewide if unsystematic approach to assist in interpreting the state's prehistory in the mid-20th century.

In 1975, when the current State Archaeologist began directing a statewide county-municipal highway archaeological survey, he utilized a regionally based model to initially assess each project's potential for encountering archaeological sites and determining what types of sites may be involved (Anfinson 1976:5-11). The basic concept of this model was developed for the author's Master Thesis to investigate the subsistence-settlement patterns and cultural change in a single region, the Prairie Lake Region of southwestern Minnesota (Anfinson 1977). It relies on physically mapping known sites, negative surveys, and reconstructions of past environments to determine relationships within nine Minnesota archaeological regions.

The Anfinson Model has been refined and expanded over the years, adding insights from the Statewide Archaeological Survey, the MnModel project, and recent CRM surveys (Anfinson 1984a:170-189, Anfinson 1984b, Anfinson 1989, Anfinson 1990). It is basically a deductive *expert systems model* in narrative form. In 1990, this model became the basis for SHPO-recommended archaeological surveys.

The Minnesota Historical Society's State Historic Preservation Office (SHPO) undertook the first scientific and systematic attempt to find sites and explain archaeological distributions with the LCMR-funded Statewide Archaeological Survey (SAS) in the late 1970s and early 1980s. The SAS conducted field surveys in portions of 26 counties. This survey initially attempted to use a stratified random selection process for choosing survey parcels to build a predictive model, but its application was uneven and field methods were inconsistent. The five-year SAS spent just over a half a million dollars and, despite its flaws, accomplished a great deal. About 1,000 previously unreported archaeological sites were recorded, expanding the number of recorded sites in Minnesota by over a third.

At the conclusion of the project, the SAS developed a simple yet basically accurate narrative model for prehistoric site locations in Minnesota (Lofstrom 1981:60). The model stated:
> 1) Most sites are located near shorelines.
> 2) In lake regions, sites tend to be near lakes rather than near streams.
> 3) In non-lake regions with deep valleys, sites may be relatively farther from water than in lake regions.
> 4) Sites that were located away from shorelines tend to be few and small.
> 5) Southeastern Minnesota has an unexplained site locational pattern not as closely correlated with shorelines

In 1991, the SHPO briefly re-activated the Statewide Archaeological Survey on a small scale to examine areas of Minnesota that were still poorly understood with regard to prehistoric site distributions. Federal Historic Preservation Fund (HPF) monies were used to undertake a probabilistic survey of Traverse County in western Minnesota (Johnson 1991).

With the beginning of the widespread availability of computerized Geographic Information Systems (GIS) in the early 1990s, archaeologists began to envision a way to more effectively model archaeological site locations. In 1993, the SHPO submitted a proposal to the State Legislature to fund surveys of six counties in high development areas to help develop a GIS-based predictive model. At the same time, BRW, Inc., a Minneapolis-based engineering firm and CRM contractor with the support of MnDOT, submitted a proposal to investigate deeply buried site locations in the Minnesota River Valley to assist with bridge replacement assessments. Due to their somewhat similar objectives, the legislature combined the two projects into one, but decided not to fund because the combined project as it was considered too expensive.

Joe Hudak, the chief archaeologist at MnDOT, then suggested that federal ISTEA funds with a MnDOT match might be available to fund a GIS-based archaeological modeling project. The scope of the project was expanded to include the entire state and five million dollars was obtained to fund it (80% federal, 20% state). The principal contract for the project was given to BRW and the project formally began in January of 1995. The project was named *MnModel*.

The first phase of the MnModel project involved basic data accumulation and included archaeological field surveys using more rigorous sampling and site discovery techniques than employed by the SAS, although as with SAS there was no attempt to find deeply buried sites

(i.e., below standard shovel test depth – 3'). Archaeologists utilizing a stratified random parcel selection process examined small portions of seven (7) counties: Nicollet, Beltrami, Stearns, Becker, Wabasha, Cass, and Wright. These surveys examined 15,436 acres and found 196 previously unrecorded sites. Over 90% of the acres surveyed were in cultivated areas of southern Minnesota counties where cheaper, faster surface reconnaissance could be used instead of shovel testing. Detailed geomorphological work was also undertaken in seven river valleys and the eastern Lake Agassiz plain to help determine where prehistoric sites *were unlikely to be located* due to the age of the sediment.

Phase Two of MnModel involved the construction of the first locational models. The SHPO's site database was used as the basic information for the dependent variable (site locations) of the model. The independent variables were over 50 environmental factors (e.g., distance from water, slope). In early 1998, MnModel became decidedly more environmentally deterministic and more focused on the technical aspects of building the GIS framework. The SHPO's regional scheme (Anfinson Model) was dropped in favor of the Department of Natural Resources (DNR) Ecological Classification System (ECS) subsections, thus expanding the potential regional models from 9 to 24.

BRW's work on the MnModel project effectively ended in late 1998 with the production of a draft report and a 3rd stage of the models. The project leader at BRW, geographer and GIS expert Beth Hobbs, was hired by MnDOT to continue working on the project, although funding greatly decreased. An Internet version of the final report for the MnModel project was released in January of 2002 (www.mnmodel.dot.state.mn.us). The complete version of the model is still not available outside of MnDOT and it is effectively utilized only by MnDOT central office CRM staff, although even MnDOT archaeologists do not exclusively rely on MnModel to make day-to-day survey/no-survey decisions.

MnModel is basically an inductive modeling system that uses GIS and statistics to analyze the relationships between known archaeological sites and numerous environmental variables (Gibbon and Hobbs 2002). In its most recent version, there are actually three models; one that predicts site locations and another that assesses the potentials for an environmentally similar area to have been archaeologically surveyed. These two models can be combined to produce a *survey implementation model* or a model that suggests if an archaeological survey should be used on a particular project. MnModel rates the landscape as having High, Medium, Low, or Unknown potential with regard to archaeological sites or previous survey sampling. Because over 50% of the Minnesota landscape is rated Unknown and MnModel is fairly liberal as to what constitutes areas of High and Medium potential, reliance on MnModel will often suggest that an archaeological field survey should be done.

MnModel and all other models used to predict site locations in Minnesota have three principal defects: 1) very few areas of the state have been thoroughly surveyed thus the archaeological site sample size is small, skewed to particular regions and locations, and does not effectively consider deeply buried sites; 2) reconstructions of the environment are limited, not always available in GIS-form, and focused on the Early Historic – Late Prehistoric periods; 3) the environment is complex and difficult to classify in simple terms, especially for computerized models (e.g., what is an isthmus?).

When considering these three problem areas for site locational modeling, it is the first that critically needs our attention. GIS-ready environmental information is constantly being improved and environmental characterization is basically a sophistication problem not a data problem. In order to build more accurate and useful site locational models, we need to obtain less biased field survey samples of all regional settings with archaeological potential. The only way to do this is to reactivate a Statewide Archaeological Survey and send survey crews into the field. This time around, the surveys must include effective deep site recovery techniques.

Once the surveys of poorly known areas are completed, an effort needs to be made to construct an accurate site locational model that is widely accessible and easy to use. This model is essential for agencies to fulfill their obligations under MS 138.40
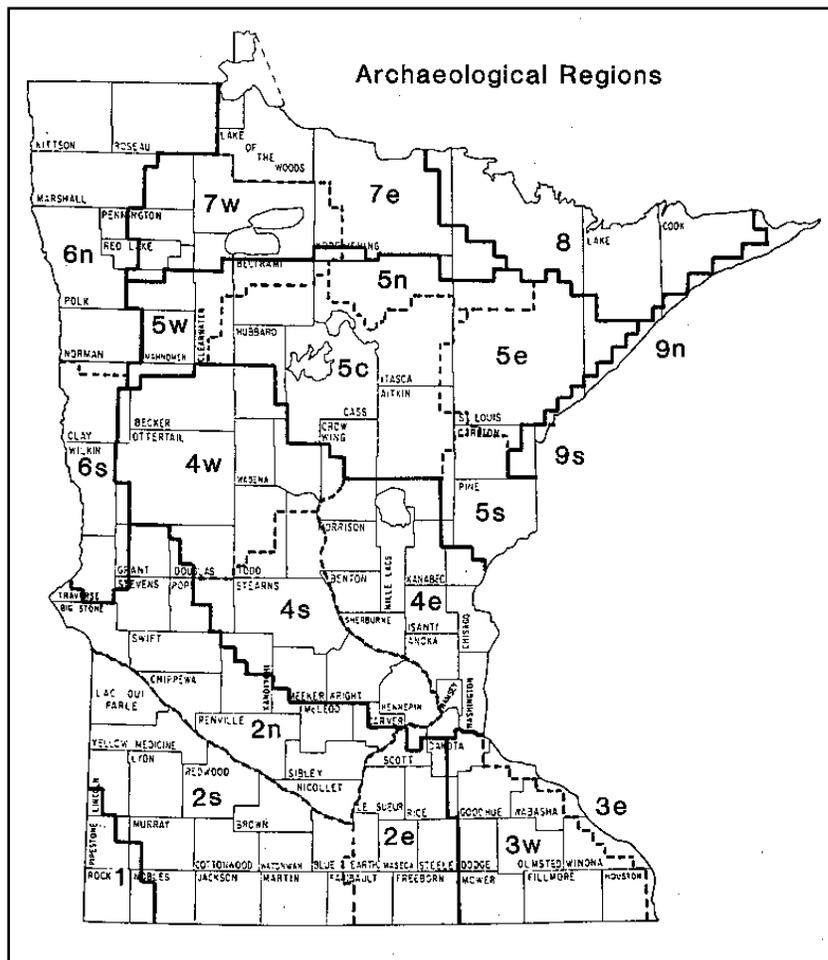
Minnesota's Archaeological Regions used in the Anfinson Model

References Cited

Anfinson, Scott

    1976   *Minnesota Municipal and County Highway Archaeological Reconnaissance Study, First Annual Report, 1975*. Minnesota Historical Society, St. Paul.

    1977   *An Analysis of the Big Slough Site (21MU1) with Particular Emphasis on the Ceramic Body Sherds.* Masters Thesis. Department of Anthropology, University of Nebraska-Lincoln.

    1983   *A Review of Archaeological Sites in Minnesota, 1982: A Report to the State Archaeologist*. Minnesota Historical Society, St. Paul.

    1984a *Minnesota Municipal County Highway Archaeological Reconnaissance Study, Annual Report.* Minnesota Historical Society, St. Paul.

    1984b Cultural and Natural Aspects of Mound Distribution in Minnesota. *The Minnesota Archaeologist* 41:53-71.

    1989   Archaeological Regions of Minnesota. In *Minnesota Municipal and County Highway Archaeological Reconnaissance Study, 1988 Annual Report*. Minnesota Historical Society, St. Paul.

    1990   Archaeological Regions in Minnesota and the Woodland Period. In *The Woodland Tradition in the Western Great Lakes*, edited by G. Gibbon, pp. 135-166. University of Minnesota Publications in Anthropology No. 4, Minneapolis.

    2005   *SHPO Manual for Archaeological Projects in Minnesota* (Revised Version). Minnesota State Historic Preservation Office, St. Paul.

    2008   *State Archaeologist's Procedures for Implementing Minnesota's Private Cemeteries Act* (MS 307.08). Office of the State Archaeologist. Available at: http://www.osa.admin.state.mn.us/

Gibbon, Guy and Elizabeth Hobbs

    2002   Research Design and Project Time Line. In *A Predictive Model of Precontact Archaeological Site Location for the State of Minnesota*, edited by G.J. Hudak, E. Hobbs, A. Brooks, C.A. Sersland, and C. Phillips. Available on the Internet at: www.mnmodel.dot.state.mn.us

Johnson, Craig

    1991   *Phase 1 Archaeological Investigation in Traverse County, Minnesota*. Institute for Minnesota Archaeology Reports of Investigations Number 150. Minneapolis.

Johnson, Elden

    1957   The Minnesota Archaeological Site File. *Minnesota Archaeologist* 21:14-16.

Lofstrom, Edward

    1981   *Minnesota Statewide Archaeological Survey Summary: 1977-1980.* Minnesota Historical Society, St. Paul.

Pope, Willey and Sarah Fee

    1998   *Minnesota Cemetery Locations*. (Second Edition) Minnesota Family Trees, St. Paul.

Winchell, Newton

    1911   *The Aborigines of Minnesota*. The Pioneer Company, St. Paul.

Appendix A: Glossary of Minnesota Archaeological Terms

Agency – any agency, department, board, office or other instrumentality of the state, any political subdivision of the state, any public corporation, any municipality, and any other local unit of government (MS 114c.02).

Archaic Tradition – The post-Paleoindian cultural tradition characterized by the disappearance of lanceolate projectile points and the appearance of stemmed and notched points beginning about 8000 B.C. Other Archaic developments include ground stone tools, domestic dogs, cemeteries, copper tools, and diverse hunting-gathering economies. The Archaic lasts until about 500 B.C.

Archaeological Site – a discrete location containing evidence of past human activity that holds significance for archaeologists.

Area of Potential Effect (APE) – the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of archaeological sites.

Archaeology - the scientific study of important physical remnants of the cultural past.

Artifacts - natural or artificial articles, objects, tools, or other items manufactured, modified, or used by humans that are of archaeological interest.

Authenticate - to establish the presence of or high potential of human burials or human skeletal remains being located in a discrete area, to delimit the boundaries of human burial grounds or graves, and to attempt to determine the ethnic, cultural, or religious affiliation of individuals interred.

BP – Before Present; this is an expression of age measured by radiocarbon dating with "present" set at 1950, the first year radiocarbon dating became available. It is more correctly stated as "radiocarbon years before present" or RCYBP. It does not mean the same as "years ago" because raw radiocarbon dates need to be corrected for several inherent errors in order to be converted to actual calendar years.

Burial - the organic remnants of the human body that were intentionally interred as part of a mortuary process.

Burial Ground - a discrete location that is known to contain or has high potential to contain human remains based on physical evidence, historical records, or reliable informant accounts.

Cemetery - a discrete location that is known to contain or intended to be used for the internment of human remains.

Complex - a group of sites or phases linked by trade or behavioral similarities, but not necessarily of the same ethnic, linguistic, or cultural grouping (e.g., Hopewell)

Component - a discrete cultural entity at a particular site; one site can have multiple components (e.g., prehistoric and historic, multiple prehistoric)

Contact Period – the initial period of intensive Euroamerican and Indian interaction prior to the signing of any major treaties (1650 – 1837)

Context – the relationship between artifacts and where they are found, such as depth from surface, association with soil or cultural features, or cultural component assignment. Not the same as *historic context*.

Cultural Resource Management (CRM) – the identification, evaluation, treatment, and management of archaeological sites, historic structures, and other types of cultural heritage properties; synonymous with Historic Preservation and Heritage Management.

Disturb - any activity that significantly harms the physical integrity or setting of an archaeological site or human burial ground.

Feature – non-artifactual evidence of human activity at an archaeological site usually expressed as noticeable soil disturbances such as pits and hearths. It can also refer to masonry walls and other structures at historical archaeological sites.

Field Archaeology - the study of the traces of human culture at any land or water site by means of surveying, digging, sampling, excavating, or removing objects, or going on a site with that intent (MS 138.31).

Geomorphology – the study of the earth's surface and how it has evolved generally with regard to soils and sediments.

Grave Goods – objects or artifacts directly associated with human burials or human burial grounds that were placed as part of a mortuary ritual at the time of internment.

Historic Context – an organizational construct that groups related property types (e.g., *archaeological sites*) together based on a similar culture, geographical distribution, and time period. The Minnesota SHPO has developed a number of statewide historic contexts for the Precontact, Contact, and Post-Contact periods. An example of a Precontact context is Clovis. Not the same as *context* used in a purely archaeological sense.

Historic Period – synonymous with the *Contact* and *Post-Contact* periods when artifacts of Euroamerican manufacture are present or written records available; begins about 1650 in the Upper Midwest.

Horizon - a technological or behavioral attribute with broad geographical distribution, but not necessarily at the same time (e.g., fluted point horizon); also a particular layer within an archaeological site.

Human Remains - the calcified portion of the human body, not including isolated teeth, or cremated remains deposited in a container or discrete feature.

Lithic – made of stone; lithic artifacts are generally manufactured by either chipping or flaking high quality materials (e.g., chert, chalcedony) to produce tools such as knives, scrapers, and projectile points or by grinding or pecking granular rocks (e.g., sandstone, granite) to produce tools such as mauls, hammerstones, or axes.

Lithic Scatter – an archaeological site evidenced almost exclusively by the presence of stone tools or stone tool manufacture.

Mississippian Tradition – A Late Prehistoric cultural tradition associated with developments originating at the Cahokia site on the Mississippi River across from St. Louis. Characteristics include the use of shell-tempered pottery, intensive corn horticulture, settled village life, and small triangular arrowheads. Mainly found in southern Minnesota, it lasts from about A.D. 1000 to A.D. 1650.

Qualified Professional Archaeologist - an archaeologist who meets the United States Secretary of the Interior's professional qualification standards in Code of Federal Regulations, title 36, part 61, appendix A, or subsequent revisions. These standards require that the archaeologist has a graduate degree in archaeology or a closely related field, has at least one year's full-time experience doing archaeology at the supervisory level, and has a demonstrated ability to carry research to completion. There are specific additional standards for prehistoric, historic, and underwater archaeologists.

Paleoindian Tradition – The earliest major cultural tradition in the New World characterized by the use of well-made lanceolate projectile points and the hunting of now extinct animals such as mammoth and giant bison. It is dated to 12,000 B.C. – 8000 B.C.

Period - a temporal span often associated with a particular cultural tradition (e.g., Woodland)

Petroglyph - a design inscribed into a rock face by grinding, pecking or incising; examples can be seen at the Jeffers site in Cottonwood County and Pipestone National Monument.

Phase - a geographically discrete taxonomic unit represented by a group of sites with cultural and temporal similarity (e.g., *Fox Lake* in southwestern Minnesota)

Phase I Survey – synonymous with a reconnaissance survey; a survey whose objective is to find archaeological sites, map the horizontal limits of the sites, and define the basic historic periods present.

Phase II Survey – synonymous with an evaluation survey; intensive fieldwork whose objective is to determine the significance of an archaeological site by assessing the site's research potential as demonstrated by the robustness of the identifiable historic contexts present and the integrity of artifacts and features associated with those contexts. Significance is generally equated with eligibility to the National Register of Historic Places.

Phase III Project – synonymous with a treatment activity or site excavation; very intensive fieldwork generally done to mitigate the adverse effects of development upon a significant archaeological site through data recovery utilizing numerous formal excavation units or other intensive investigative methods.

Pictograph – a design painted or drawn on a rock face.

Plains Village Tradition - A Late Prehistoric cultural tradition associated with the establishment of settled village life along major river valleys in the Great Plains. Characteristics include the use of globular pots that are smooth surfaced and grit tempered as well as intensive corn horticulture and fortifications. Found in western Minnesota, the tradition lasts from about A.D. 1000 to A.D. 1500.

Post-Contact Period – the period of Euroamerican as opposed to Indian dominance in Minnesota beginning with the first major land cession treaties in 1837.

Precontact Period –the time period dating from the earliest human occupation up to the significant incursion of European culture usually dated to about 1650 in the Upper Midwest; synonymous with *Prehistoric Period*.

Prehistoric Period – synonymous with the *Precontact Period* (see above); sometimes divided into Early (12,000 – 5000 B.C.), Middle (5000 B.C. – A.D. 1000), and Late (A.D. 1000 – 1650).

Recorded Cemetery - a cemetery that has a surveyed plat filed in a county recorder's office.

Section 106 – refers to Section 106 of the National Historic Preservation Act of 1966, which states that federal agencies must *consider* the impacts their undertaking have on significant historic properties and *consult* with knowledgeable entities (e.g., SHPO) about these impacts.

State site or state archaeological site - a land or water area, owned or leased by or subject to the paramount right of the state, county, township, or municipality where there are objects or other evidence of archaeological interest. This term includes all aboriginal mounds and earthworks, ancient burial grounds, prehistoric ruins, historical remains, and other archaeological features on state land or on land subject to the paramount rights of the state (MS 138.31).

Tradition - a prehistoric culture based on lasting artifact types or archaeological features (e.g., *Paleoindian*)

Woodland Tradition – The post-*Archaic* cultural tradition first identified in the Eastern Woodlands of the United States. It is characterized by the appearance of pottery and burial mounds. Wild rice use becomes intensive in northern Minnesota with limited corn horticulture eventually appearing in the southern part of the state. Woodland begins about 500 B.C. and lasts until A.D. 1650 in northern Minnesota, but is replaced by Plains Village and Mississippian cultures in southern Minnesota about A.D. 1000.

Appendix B - MnOSA Digital Image Standards

These standards have been developed by the State Archaeologist to promote "permanent" curation of important images of Minnesota archaeological sites, activities, and artifacts as well as facilitating cost-effective, comprehensive, accessible, and environmentally considerate information distribution. As film cameras are increasingly abandoned in favor of digital cameras and as images taken with film cameras (especially color slides) continue to deteriorate, it is essential that film images are transferred to digital formats, that standardized methods are established for insuring digital image quality and identification, and that repositories are made available for long-term curation and easy accessibility. Digital image libraries also facilitate information sharing via email, provide materials for website exhibits, and assist in developing PowerPoint presentations.

The Minnesota State Archaeologist has established a digital image library at the OSA offices at the Ft. Snelling History Center. This facility consists of a work station containing a computer with appropriate software (e.g., *Photoshop*, *Adobe Acrobat*), multiple high capacity external disk drives, a flatbed scanner, a slide scanner, and a sheet-feed scanner. This facility is open for use by the archaeological community for curational, educational, and research purposes. Archaeologists are encouraged to contribute archivally suitable materials to the library and can perform the appropriate digital processes on-site with the OSA equipment or off-site if they have access to equipment of comparable quality. The State Archaeologist must approve all proposed additions to the library. All images in the OSA digital image library are open to public use and are not copyrighted.

Images are stored in an external hard drive in the OSA office and periodically backed-up to a second external hard drive that is stored in another location. Images are put into folders organized by county and site or other general topic folders (e.g., Minnesota ceramics, Minnesota archaeologists). Images are minimally manipulated after scanning or taking originals. Essential indexing and identification of images is embedded in the file name, although archaeologists are encouraged to submit additional image cataloging information in the form of pdf files.

The MnOSA digital image standards generally follow the National Archives guidelines (http://www.archives.gov/preservation/technical/guidelines.html), although the OSA is not considered an official document archive by the state or federal government.

Standards for Permanent Digital Curation at MnOSA

35mm Slide or Negative Scans
- Use slide scanner not flatbed with transparency adapter
- Set resolution at 2400 dpi
- Use the TIFF file format
- Use Preview Scan and crop to picture edge (better white balance; reduces file size)
- Do not use image enhancement software (e.g., Digital Ice)
- Scan at full resolution in 24-bit color (Millions of Colors)
- Label Image File:
    - Sites: Site Number-Direction of View-Month,Year (e.g., AN8-NW-10,2008)
    - Artifacts: Site Number-Artifact Type-Repository (e.g., AN8-pottery-UM)
    - Features: Site Number-Feature Type-Number (e.g., AN8-hearth-F2)
    - People/Events: Location-Principal Person/Event-Month,Year (e.g., AN8-Wilford-5,1934)
- Do not rotate or enhance the image after scanning

Flat Scans: Photographs
- Scan at 600 dpi, crop, and save as TIFF
    - 4"x5": 3000 pixels across the long dimension
    - 5"x7": 4200 pixels across the long dimension
    - 8"x10": 6000 pixels across the long dimension
- Label Image File:
    - Sites: Site Number-Direction of View-Month,Year (e.g., AN8-NW-10,2008)
    - Artifacts: Site Number-Artifact Type-Repository(e.g., AN8-pottery-UM)
    - Features: Site Number-Feature Type-Number (e.g., AN8-hearth-F2)
    - People/Events: Location-Principal Person/Event-Month,Year (e.g., AN8-Wilford-5,1934)
- Do not rotate or enhance the image after scanning

Flat Scans: Maps and Line Drawings
- Scan at 600 dpi and save as TIFF
    - 8.5"x11": 6600 pixels across the long dimension
- Label image file as above
- Image may be rotated and cleaned-up as appropriate

Digital Photographs
- TIFF preferred, but JPEG OK if high quality compression (1:4) used
- 3000 x 2000 pixels (6mp camera)
- Do not rotate or enhance the image after taking

PDF Documents
- When using the sheetfeed scanner, use the default settings
    - Normal image quality, Normal compression, Non-searchable
- When using the flatbed scanner, use the default settings
    - Save As a pdf file (unsearchable) at 300 dpi