

**Report on the Archaeology
of the Shiawassee National Wildlife Refuge:
The 2007 Field Season.**

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This document contains sensitive archaeological site location information. This information is intended for Cultural Resource Management purposes. Appendices B and C should be removed before distributing this document to unauthorized personnel.

ABSTRACT

This report summarizes the results of a ninth season of archaeological investigations carried out in the Shiawassee National Wildlife Refuge (NWR), Saginaw County, Michigan. The field investigations, conducted under Federal Archaeological Permit No. 2002-MI/3-2 (Amendment 5, 8 March 2007), included both limited archaeological survey/salvage and test excavations. Eight volunteers and the project director contributed a combined total of 160 person days (approximately 960 hours) of fieldwork.

Consistent with the goals of the survey/salvage portion of this project, surface collections, totaling 17 objects, were made from five of the 13 sites that were monitored during the 2007 field season. These objects were collected to further document and salvage artifacts from archaeological sites that are being exposed through processes of erosion. No previously unrecorded sites were found.

Test excavations were conducted at site 20SA722. Goals of the test excavations included: 1) assess site stratigraphy and the nature of buried archaeological deposits; 2) obtain a representative sample of artifacts to assess site use through time and to relate site components to the broader local and regional culture history; 3) obtain material suitable for radiocarbon dating; and 4) obtain floral and faunal remains to assess site seasonality and subsistence practices. Twenty-seven square meters were excavated at 20SA722 during the 2007 field season. These excavations yielded 19,745 catalogued objects. In addition, 90 samples, containing a total of 609.75 liters of sediment, were saved for flotation.

Finally, a single 50 cm X 50 cm column sample was excavated at site 20SA1276. Ten flotation samples, totaling 141.5 liters, were saved for analysis. Although analysis is incomplete, 1,307 objects from this column sample have been catalogued. The catalogued objects are derived from the 0-10 cm level, which was not subject to flotation, and the >4 mm size heavy fraction material from the flotation samples.

Excavated material from site 20SA722 dates primarily to the Late Prehistoric period (ca. A.D.1400-1600). A portion of the excavated area was stratified with early Late Woodland material below the Late Prehistoric component. Other sites yielded material from Middle and Late Woodland occupations (ca. A.D. 1 - 1400). This project continues to demonstrate that significant archaeological resources are present within the boundaries of the Shiawassee NWR.

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INTRODUCTION

This report summarizes the results of a ninth season of archaeological investigations carried out in the Shiawassee National Wildlife Refuge (NWR), Saginaw County, Michigan. The field investigations, conducted under Amendment 5 of Federal Archaeological Permit No. 2002-MI/3-2, included both limited archaeological survey/salvage (surface survey and shovel-testing) and test excavations (Appendix A). Eight volunteers and the project director contributed a combined total of 160 person days (approximately 960 hours) of fieldwork.

The goals of the survey/salvage portion of this project continued to be to document and collect artifacts from archaeological sites that are being exposed through processes of erosion and to investigate by shovel-testing, if, and to what extent, intact portions of the sites remain. Erosion, whether by natural or cultural means, exposes artifacts making them vulnerable to removal by persons untrained in archaeological recording techniques and unmindful of the irreparable damage that is caused by removing artifacts from their archaeological context. This project aims to limit such damage by recording the provenience of exposed artifacts and collecting them for future study. An assessment of the amount of erosion observed at each of the sites monitored in 2007 is presented in the Analysis and Evaluation section of this report. Erosion is described using terms such as minor/minimal, moderate and severe. Along this continuum, minor/minimal indicates that unvegetated riverbank was present, but no actual slumping of the riverbank was observed. Severe erosion indicates that portions of the riverbank, at least 30-50 cm thick, have slumped down to the waters edge. Erosion described as moderate would be somewhere between these two extremes.

Surface survey was limited to 13 previously recorded sites. Surface collections, totaling 17 objects, were made from five of the 13 sites that were monitored during the 2007 field season. No previously unrecorded sites were found.

Test excavations were conducted at site 20SA722. These excavations were conducted primarily to: 1) assess site stratigraphy and the nature of buried archaeological deposits; 2) obtain a representative sample of artifacts to assess site use through time and to relate site components to the broader local and regional culture history; 3) obtain material suitable for radiocarbon dating; and 4) obtain floral and faunal remains to assess site seasonality and subsistence practices. Twenty-seven square meters were excavated at 20SA722 during the 2007 field season. The 27 square meters are contiguous and connect previously excavated Blocks A and D (Sommer 2005, 2007) (Appendix C). These excavations exposed several trash pits and/or hearth features, including what was left of Feature 1, most of which was previously excavated in Block A, and Feature 9, most of which was previously excavated in Block D. Two additional features include Feature 10, a hearth/trash pit, and Feature 11, a trash pit. The 2007 excavations at 20SA722 yielded 19,745 catalogued objects. In addition, 90 samples, containing a total of 609.75 liters of sediment, were saved for flotation.

Finally, a single 50 cm X 50 cm column sample was excavated at site 20SA1276 (Appendix C). Ten flotation samples, totaling 141.5 liters, were saved for analysis. Although analysis is incomplete, 1,307 objects from this column sample have been catalogued. The catalogued objects are derived from the 0-10 cm level, which was not subject to flotation, and the >4 mm size heavy fraction material from the flotation samples.

Of the 38 archaeological sites/findspots monitored during the nine field seasons of this project (13 during the 2007 field season), 30 of them are being exposed by fluvial erosion. Because subsurface testing has been conducted on only six sites, and in most cases this testing has been only minimal, site areas for most cannot be reliably calculated. However, the 24 sites that are being exposed by fluvial

erosion extend for over 7,200 meters along the Cass, Tittabawassee and Shiawassee rivers. It is not known how far inland from the rivers most of these sites extend. Shovel testing at 20SA722 has shown that site deposits extend at least 40-60 meters inland over a portion of the site. Shovel testing at 20SA1251 has revealed that, at least along one part of its length, this site extends over 100 meters inland. Previously recorded sites/findspots that are not currently eroding in the river include 20SA1257 (Shiawassee #9), 20SA1276 (Shiaw. #13), and 20SA1277 (Shiaw. #14). Artifacts from these sites were originally found exposed in the "backdirt" of animal burrows and/or "tree throws". Extensive shovel testing at 20SA1276 has identified apparent site boundaries indicating a site area of approximately 2.54 hectares. Shovel testing at 20SA1277 has shown that this site is quite large (Sommer 2002), but site boundaries have not yet been determined. Of the four sites identified in the farm units, one (20SA1304) is findspot of a single flake, one (20SA1305) is a scatter of late 19th / early 20th century debris that covers a fairly large area but is concentrated in a roughly 30X30 meter area, one (20SA1306) includes a 10X24 meter cluster of flakes and findspots of three flakes and an FCR scattered over a two hectare area, and one (20SA1307) includes a findspot of a retouched flake and two flakes in the midst of a roughly 30X30 meter area of late 19th / early 20th century debris.

Prehistoric artifacts recovered from the various sites on the refuge represent primarily Middle and early Late Woodland occupations (ca A.D. 1 - 1000). However, a few Late Archaic/Early Woodland period (ca. 3000-100 B.C.) artifacts and several later Late Woodland and Late Prehistoric (ca. A.D. 1000-European contact) items are also present in the recovered assemblages. Site 20SA722 is an exception in that most of the material appears to date to the Late Woodland to Late Prehistoric period. Historic period artifacts date primarily from the mid-19th century through the 20th century, though a few earlier historic items have also been recovered. A thin scatter of mid to late 20th century debris was present on all of the sites (as well as on non-site areas). This material was not considered archaeologically significant and in most instances was neither noted nor collected.

Combining the materials recovered from the surface of monitored sites, from the test excavations at 20SA722 and from the column sample excavated at site 20SA1276, 21,069 objects have been catalogued during the 2007 field season. All artifacts, field notes, and associated materials will be curated in the archaeological repository of the Historical Society of Saginaw County, Inc., per the 1983 Cooperative Agreement (14-16-0003-83-922) between the Historical Society and the United States Fish and Wildlife Service. An estimate of 15 ft³ of artifacts and less than one linear foot of notes and other documentation were produced during the 2007 field season.

Project History

The initiation of this project can be traced to concerns about the erosion of archaeological sites on Shiawassee NWR property voiced by local avocational archaeologist Robert R. Clunie. As early as 1995, Clunie noted the presence of prehistoric and historic archaeological materials eroding into the Tittabawassee River on refuge property. In 1999, in an effort to address this problem, we proposed to monitor archaeological sites in the refuge. Site monitoring was to include: "1) looking for evidence of illegal collecting/looting activities and reporting any such evidence to refuge managers; 2) recording provenience information for exposed archaeological remains; and 3) collecting exposed artifacts to prevent their removal by non-authorized individuals" (Sommer 1999). The proposed project was explicitly *not* intended to be a systematic survey designed to locate new archaeological sites. However, it was recognized that new sites would likely be discovered while trying to relocate previously recorded sites. Indeed, this turned out to be the case and 27 "new" archaeological sites were documented during the 1999 through 2002 field seasons (Sommer 2000, 2002 and 2003).

The 2000 field season was started with the same goals in mind. However, the project was expanded slightly to include shovel testing. Shovel testing is necessary to better assess the nature, state

of preservation, and extent of the archaeological deposits. Due to constraints of time and personnel, shovel testing was limited to two sites, 20SA1251 and 20SA1254.

In 2001, the scope of the project was once again expanded, this time to include exploratory test excavations at 20SA1251 and 20SA1276. A limited amount of shovel testing was also conducted at these two sites, in part to help determine appropriate locations for the test excavations. Because of the focus on test excavations and shovel testing, surface survey was not conducted as intensively as in the two previous field seasons of this project (Sommer 2000, 2001).

In 2002, priority was again given to conducting test excavations at 20SA1251. However, a limited amount of shovel testing was conducted at 20SA214 and 20SA1276, several previously recorded sites were monitored and surface collected, and the survey area was expanded to include portions of the bank of the Cass River and some farm units in sections 21 and 22 in Spaulding Twp. (Sommer 2003).

The 2003 field season included site monitoring and surface survey at several sites and excavations at sites 20SA1276 and 20SA1306. The limited test excavations at 20SA1306 indicated that this site is probably not eligible for inclusion on the National Register of Historic Places. Based on surface survey alone, it was argued that three other sites in the farm units, 20SA1304, 20SA1305 and 20SA1307, were likewise ineligible for the NRHP (Sommer 2004a).

The 2004 field season continued the practice of surface survey and monitoring of known sites on the refuge. Shovel testing was begun at site 20SA722 in order to begin investigating the late Prehistoric component at that site. Finally, additional shovel testing and test excavations were conducted at site 20SA1276 (Sommer 2005).

Priority was given during the 2005 and 2006 field seasons to shovel testing at sites 20SA722 and 20SA1276 and conducting test excavations at 20SA722. Surface survey/site monitoring continued, but to a lesser extent than in previous years (Sommer 2006, 2007).

Acknowledgements

Several individuals directly or indirectly aided in carrying out this project. First, thanks are due to the managers and staff of the Shiawassee NWR, particularly Steve Kahl, and Edward DeVries. Their continuing concern for the archaeological resources of the refuge is appreciated. This project could not have been conducted without the dedication and hard work of numerous volunteers including, Rene Aloyo, Wendy Bailey, Dave Hamilton, John Heintz, Chris Jackson, Ken Kosidlo, Steve Martin, and Mike Mauer.

PROJECT SETTING

The Shiawassee NWR is situated in parts of James, Saginaw, Spaulding, Swan Creek and Bridgeport Townships, Saginaw County, Michigan. It contains over 9,400 acres of marshlands, grasslands, mixed hardwood forest, and croplands. Waterways running through the refuge include the Cass, Flint, Shiawassee, and Tittabawassee rivers, as well as the Birch Run, Bullhead, and Swan Creeks. Water levels on the refuge are intensively managed for wildlife habitat, especially for migrating waterfowl. This is accomplished using a combination of dikes, ponds, dams, and pumps. In addition, a part of the refuge is under cultivation by local farmers who leave standing a portion of their crops for use by wildlife.

The project area is located in part of a region informally known as the Shiawassee Flats. The Shiawassee Flats generally conforms to the area covered by the mid-Holocene Nipissing level of the Great Lakes. Because most of the area lies only a few meters above the present level of the Great Lakes, even minor lake level fluctuations in the past would have had important repercussions for local inhabitants.

Quaternary Geology

Like the rest of the Great Lakes region, the landforms in the project area are a result of geological processes associated with the Quaternary Period. Repeated glacial advances over the last 2.5 million years gouged out the less-resistant bedrock leaving behind the basins of the present Great Lakes. Wasting ice deposited assorted tills and lacustrine sediments were deposited in proglacial lakes. The processes of glacial advances and retreats, lake formation, and lake level fluctuations resulted in the landforms now present in the Saginaw basin. Several authors discuss these glacial and postglacial events (c.f. Butterfield 1986; Dorr and Eschman 1970:164-179; Eschman and Karrow 1985; Larsen 1985a, 1985b, 1987; Monaghan 1995; Monaghan and Lovis 2005; and Shott and Welch 1984:6-20). Dates are presented as radiocarbon years before present (B.P.).

During the latter stages of the Late Wisconsinan glaciation, the Saginaw lobe of the Laurentide ice sheet began to retreat forming a series of arcuate moraines that ring the Saginaw basin. The Port Huron moraine, on which the city of Saginaw is located, was formed when the ice front was temporarily stabilized ca. 13,000-12,800 B.P. The moraine at Bay City was formed slightly later. Meltwater from the retreating glacier collected in the Saginaw basin, giving rise to Lake Saginaw (Dorr and Eschman 1970).

At approximately 11,000 B.P., following a series of advances and retreats of the glacial margin, and the resulting lake level fluctuations, the Main Lake Algonquin stage was reached. The water level at this time is traditionally thought to have been approximately 184 meters above mean sea level (a.m.s.l.). More recent research suggests that it may have been significantly lower (Larsen 1987).

Continued northward retreat of glacial ice exposed a series of progressively lower, isostatically depressed outlets, thus allowing Lake Algonquin to begin draining. The lowest of these outlets was exposed around 10,300 B.P., initiating the Lake Stanley low phase of the Huron Basin sequence. Lake level at this time was more than 100 meters below the present level of 176.5 m. (Eschman and Karrow 1985:90; Monaghan 1995:2.4).

As the isostatically depressed outlets began to rebound, lake level began to rise, reaching its maximum level of 184 m around 4,500 B.P. (Larsen 1985b:68). This is known as the Nipissing I stage of Lake Huron. In the Saginaw Valley, the boundaries of Nipissing I were similar to those of the Main Algonquin stage (Butterfield 1986:106). Incision of the outlet at Port Huron led to a recession of the Nipissing I stage. At approximately 4200 B.P., this recession was interrupted by a brief transgression referred to as Nipissing II. The Nipissing II level reached an elevation of approximately 181m. Following the Nipissing II stage, the water level fell again to a level that has not yet been determined, but by around

3,200 B.P. the lake level rose to the Algoma stage of 179 m (Larsen 1985b, 1987:26). Recent work by Monaghan (1995) and Monaghan and Lovis (2005) in and around the Saginaw Valley has slightly altered the perceived timing of this sequence. They suggest that Nipissing I reached a maximum between 4,800-4,700 B.P., Algoma reached a short-lived maximum of 181m just after 4,000 B.P., with a fall to modern levels by 3,400 B.P. Several minor climate-driven fluctuations of the lake level took place following the Algoma stage including a Post-Algoma low stage during which lake levels fell to as much as three meters below modern around 3,000 B.P; a Post-Algoma high period during which levels rose as much as three meters above modern levels around 1,800 B.P., a Pre-Modern low period beginning after 1,500 B.P. and finally, a Pre-Modern high period with levels once again reaching an altitude up to three meters above modern lasting from around 500-250 B.P.

The Quaternary Geology of the region is included on a map compiled by Farrand (1982). The major sediment/landform illustrated for the project area consists of Lacustrine Clay and Silt. This sediment is typically gray to dark reddish-brown. It generally underlies extensive, flat, low-lying areas, which were formerly inundated by glacial Great Lakes. This landform also includes small areas of lacustrine sand and clay-rich till (Farrand 1982).

Soils

The *Soil Survey of Saginaw County, Michigan* lists five soil types for the project area (Jaquinta 1994). These soil types include the following: Sloan-Ceresco complex, frequently flooded; Chesaning-Cohoctah complex, frequently flooded; Fluvaquents, frequently flooded; Zilwaukee-Mistequay complex, rarely flooded; and Zilwaukee-Mistequay complex, frequently flooded. These are all floodplain soils described as poorly or very poorly drained, nearly level areas on alluvial plains, with 0 to 2 percent slopes.

Paleoecology

The Saginaw Bay drainage basin is that area of Michigan that is drained by the Cass, Tittabawassee, Saginaw, Shiawassee, Flint, Bad, and Kawkawlin Rivers as well as many other smaller rivers and streams. The topography of the drainage basin is comprised of primarily lacustrine deposits exhibiting very little relief. This relatively flat topography is broken by a series of fossil beach ridges and end moraines. Due to the low relief and the often poorly drained lacustrine sediments, the valley contains many sizable wetland areas, including much of the project area.

Dice (1943) designated continuous regions of North America having similar climatic and ecological factors as biotic provinces. In Michigan, the Canadian province covers the upper peninsula and the northern lower peninsula, while the southern lower peninsula is covered by the Carolinian province. A transition zone that contains some elements of each of the larger communities separates these two provinces. Cleland (1966) refers to transition zones such as this as edge communities. He suggests that they contain a number of features that make them favorable habitats for humans and other animals. Egan (1990) points out that this transition zone contains small communities from each of the larger biotic provinces in a patchy configuration, resulting in a wide selection of plant and animal resources available to prehistoric people. However, she also points out that the dispersed nature of these resources may have caused logistic problems for prehistoric people attempting to utilize them.

The Saginaw Valley is located partly in the northern edge of the Carolinian biotic province and partly in the transition area between the Carolinian and Canadian provinces. Cleland (1966) gives a detailed description of both of these provinces. This location, along with the climate, geology, and physiography, combine to create a unique ecosystem in the Saginaw Bay drainage basin, which has been called the Saginaw District (Albert, Denton, and Barnes 1986:18). Because of its location in the transition area between two biotic provinces, the Saginaw Valley can support animals from both provinces and thus has a

wide variety of faunal species. Egan (1990) notes this diversity and points out that 77 percent of the northern coniferous forest mammal species, 87 percent of the southern deciduous forest mammal species, all of the inter-biome species, and 71 percent of the Great Plains grasslands species found in Michigan were historically found in the Saginaw Valley. Baker (1983) and Burt (1957) provide additional information on mammals present in Michigan. Bailey and Smith (1981) and Hubbs, Lagler and Smith (2004) provide information about fish species native to Michigan. The abundance of faunal species available to prehistoric people in Michigan is attested to by the many faunal remains recovered in archaeological sites in Michigan. Cleland (1966) discusses archaeological evidence of the use of animals by prehistoric people in the Great Lakes region.

The vegetation sequence following deglaciation can be divided into four periods. The following description of this sequence was derived from maps of the vegetation history of the "Thumb area" of Michigan (Shott and Welsh 1984: figures 10-14). A spruce forest dominated the period lasting from 11,200 to 10,400 B.P. A pine-fir-spruce forest followed this and lasted until 8,000 B.P. From 8,000 B.P. until 4,000 B.P. an elm-maple-beech forest characterized the vegetation. A mixture of elm-maple-beech and oak-pine forests dominated much of the region until historic period land clearing activities. Prior to logging and agriculture, the clay soils of the Saginaw District supported beech and sugar maple forests, with wetter areas supporting hemlock, white pine, bur oak, swamp white oak, red ash and American elm (Albert, Denton, and Barnes 1986:18). Yarnell (1964) discusses the use of plants by the aboriginal inhabitants of the Great Lakes region.

Climate

The present climate of the Saginaw Valley is relatively mild and fairly uniform, and with a growing season of up to 153 days, it is comparable to southern portions of the state (Albert, Denton, and Barnes 1986:18). Iaquina (1994:2) summarizes climatic conditions for Saginaw for the period 1955-1980. The average daily winter temperature in Saginaw for this period was -4.5°C with an average daily minimum of -8.75°C . The average summer temperature in Saginaw was 20.9°C with an average daily high of 27.4°C . The climate in the Saginaw region is considered to have been sufficient for prehistoric agriculture (Yarnell 1964).

Culture History

Because of the large-scale interactions that obtained between human groups in the past, culture history must be viewed at a regional rather than local level. Several reviews of the regional cultural developmental sequence have been prepared (cf. Cleland 1992; Fitting 1975; Halsey 1999; Mason 1981). The cultural history presented below is discussed in terms of discrete chronological stages. In reality, the stages grade into one another and there are no distinct boundaries between them.

The initial human colonization of the Great Lakes region occurred during Paleoindian period (ca. 11,500 - 10,000 B.P.). These nomadic hunters and gatherers lived in small bands following herds of large game animals such as caribou and mastodon. In addition to hunting, Paleoindians probably utilized a variety of plant species. Paleoindian sites are recognized by the presence of diagnostic flake stone tools (especially fluted projectile points) and their manufacturing debris. Examples of Paleoindian sites in the Saginaw Valley region include the Gainey and Butler sites in Genesee County (Simons 1997; Simons et al 1984; Simons and Wright 1992) and the Barnes site in Midland County (Wright and Roosa 1966).

Coincident with the end of the Pleistocene Epoch and the beginning of the Holocene Epoch, the Archaic period inhabitants of the Great Lakes region began to exploit a wider variety of plant and animal resources. The Archaic period is divided into Early (ca. 10,000 - 8,000 B. P.), Middle (ca. 8,000 - 5,000 B. P.) and Late (ca. 5,000 - 3,000 B. P.) phases. In comparison to their Paleoindian predecessors, Archaic bands may have moved over somewhat restricted territories. However, they continued to be

highly mobile, periodically moving in order to exploit seasonally available resources. Towards the end of the Late Archaic period, people in the Great Lakes region began experimenting with horticultural practices as is shown by the presence of wild *Cucurbita* (squash) at around 3840 B.P. at the Marquette Viaduct site in Bay County, Michigan, and domestic *Cucurbita* by around 2820 B.P. at the Green Point site in Saginaw County, Michigan (Monaghan et al. 2006). Archaeological sites of this period are identified by a variety of diagnostic flaked stone artifacts including a variety of notched and stemmed projectile points. The Archaic period also saw the first use of copper and ground stone technologies. Early Archaic sites are not well known in the Saginaw Valley and none have been excavated and reported on. Middle Archaic sites are also little known from this region, with the Weber I site probably the best known excavated example in Saginaw County (Lovis 1989). Two other Saginaw County sites with excavated Middle Archaic Components include the Ebenhoh (Dobbs and Murray 1993) and Bear Creek sites (Branstner and Hambacher eds. 1994). Late Archaic sites are well known in the Saginaw Valley and include locations such as the Andrews site (Papworth 1967), Schmidt site (Fairchild 1977; Harrison 1966) and Feeheley site (Taggart n.d.).

The first use of fired-clay ceramics marks the beginning of the Woodland period in the Great Lakes region. Like the Archaic, the Woodland period is divided into Early (ca. 3,000 - 2100 B.P.), Middle (ca. 2,100 - 1,600 B.P.), and Late (ca. 1,600 - European contact) phases. The period from 600 B.P. until European contact is sometimes referred to as the Late Prehistoric Period. Throughout the Woodland period, mobility continued to decrease and cultigens such as squash, maize, and a variety of native seed plants became more important in the diet. By the latter part of the Late Woodland period permanent agricultural villages were established in many parts of the Great Lakes region. Woodland period archaeological sites are identified by the presence of diagnostic flaked and ground stone tools including a variety of notched, stemmed and triangular projectile points, fired-clay ceramics, and cultivated plant remains. The Schultz site, located immediately adjacent to the present project area, is the best example in the state of a stratified site spanning the entire Woodland period (Fitting 1972a).

The initial contact between Native Americans and Europeans marks the end of the Late Woodland period and the beginning of the Historic period. It is during the historic period that we can first speak of actual named Native American groups that lived in the Great Lakes region. Groups living in this region between the 17th and 19th centuries included, among others, the Ojibway, Sauk, Fox, Potawatami, Miami, and Ottawa (Cleland 1992; Tanner 1987). France claimed much of the Great Lakes region in the 17th century. As a result of the French and Indian War, in 1763 the area fell under British rule. The British period was relatively short-lived, and by the end of the 18th century control of the Great Lakes region was established by the United States. Early Historic period habitation sites are not well known in the Saginaw Valley. The Fletcher site in Bay County is an example of an 18th century Native American cemetery (Mainfort 1979). The Cater site in Midland County is a good example of both an early 19th century Native American occupation and a mid 19th century European Settler occupation (Beld 2002).

History of Archaeological Research

The Saginaw Valley has more documented archaeological sites than any other comparable region in Michigan. For over a century, the richness of the archaeological resources in this region has drawn considerable attention from avocational and professional archaeologists alike. During the late 19th century, William R. McCormick, a local pioneer settler, made and recorded the first known observations of archaeological remains found in the Saginaw Valley (McCormick 1883). Between 1891 and 1906 Eliza Golson collected hundreds of "indian relics" near her home in Saginaw County and meticulously described her finds in her diary (Klisch and Klisch 1980). A portion of her collection is still intact and is curated at the Historical Society of Saginaw County. Professional archaeology also got its start in the

late 19th century when Saginaw native Harlan I. Smith became the first professional archaeologist to conduct research in the region (cf. Smith 1894, 1901a, 1901b, 1901c). Although, Smith's earliest archaeological interests and studies focused on the Saginaw Valley, his attention soon turned to other regions.

Despite the significance of earlier archaeological contributions by McCormick and Smith, it is Fred Dustin who must be considered the founder of Saginaw Valley archaeology (Peebles 1978:86). In addition to his extensive and well-documented collection of artifacts from the region and his numerous publications, notes, and manuscripts, Dustin was an inspiration and a model for other avocational archaeologists and historians of his and later generations (cf. Fitting 1968). It is largely through his efforts and influence that much of the early history and archaeology of the Saginaw Valley has been preserved.

In addition to the long history of contributions by avocational archaeologists, professional archaeologists have shown considerable interest in the Saginaw Valley. Professional interest in the Saginaw Valley peaked during the late 1950's and 1960's. Several sites were excavated during this period including Andrews (Papworth 1967), Stroebel (Papworth 1967), Hodges (Binford 1963), Feeheley (Taggart n.d.), Green Point (Wright 1964), Schultz (Fitting 1972a; Ozker 1982), Schmidt (Fairchild 1977; Harrison 1966), Bussinger (Halsey 1976), Mahoney (Bigony 1970:167-192), Stadelmeyer (Bigony 1970:115-166) and several others. Field crews from the University of Michigan excavated all of these sites, usually with assistance from several local amateur archaeologists. Most archaeological fieldwork in the Saginaw Valley during the 1970's, 80's, and 90's was directed not so much by research interests, but primarily by cultural resource management concerns. Notable projects during these more recent decades include work at the Weber I and Weber II sites in Frankenmuth Township (Lovis 1989), the Bridgeport Township site (O'Shea and Shott 1990), site 20SA1034 (Dobbs et al. 1993), The Shiawassee River and Bear Creek sites (Branstner and Hambacher 1994) and the Casassa Site (Branstner and Hambacher 1995).

In addition to the projects listed above, six contract reports have been found that discuss archaeological surveys conducted within Shiawassee NWR boundaries. The first of these was an "Archaeological Survey of the Saginaw Reservoir Area" (Papworth 1959). The purpose of Papworth's survey "was to discover the presence of historic houses or other historic structures of significance, and to locate prehistoric aboriginal occupational sites, monuments, or pictographs of such nature that they would merit archaeological investigation and salvage by recording prior to the flooding of the land by reservoir waters." Papworth's project map depicts the location of 23 sites, seven of which are within the present boundaries of the Shiawassee NWR.

A second survey was designed to assess the impact of dike construction and other flood control measures proposed for the Shiawassee flats (Fitting 1977). Although, through a combination of field and library research, 89 archaeological sites were located, most of the survey areas were outside of the Shiawassee NWR boundaries. However, two sites within the refuge boundary, 20SA15 and 20SA361 were recorded. Site 20SA15 was surveyed during this and previous field seasons of the present project (Sommer 2000:10, 2001:10, 2004:12). Site 20SA361 was reported as a Late Woodland site located adjacent to the Cass River (Fitting 1977:37). This site was relocated during the 2002 field season and a Late Woodland temporal placement was confirmed.

A third project involving minimal field survey and library research was conducted within the Shiawassee NWR in 1978. This project was designed to "provide only a general impression of the refuge's cultural resources" (Whittier 1978). This project relocated 20SA361, and recorded several historical sites, including one located at 20SA722. However, no prehistoric materials were noted for this location. In 1980, a small-scale test investigation by the Saginaw Archaeological Commission, failed to locate any archaeological remains (Brunett 1980).

In 1993, Commonwealth Cultural Resources Group, Inc. (CCRG) contracted with the United States Fish and Wildlife Service to complete a “Baseline Artifact Inventory Survey of Museum Property and Indian Interests in National Wildlife Refuges Located in Michigan” (Robertson et al. 1993). This survey noted 14 archaeological sites within the Shiawassee NWR. The results of a second contract between CCRG and the U.S. Fish and Wildlife Service are presented in “Overview Study of Archaeological and Cultural Values on Shiawassee, Michigan Islands, and Wyandotte National Wildlife Refuges in Saginaw, Charlevoix, Alpena, and Wayne Counties, Michigan” (Robertson et al. 2000). This project was designed to identify and describe the known archaeological and cultural values of the three Wildlife Refuges listed in the title. Regarding the Shiawassee NWR, the study area included lands within the current refuge boundary, lands within the proposed expansion areas, and adjacent areas. In all, 244 archaeological sites are discussed for the Shiawassee NWR study area, most of which are not within the current boundaries of the refuge. Discrepancies between the data reported by CCRG and the data derived from previous field seasons of this project are discussed in Sommer (2001).

METHODS

Field Methods

The limited surface survey conducted during the 2007 field season consisted of walking along portions of the banks of the Shiawassee and Tittabawassee Rivers looking for exposed artifacts and noting the extent of erosion in site areas. In general, only diagnostic artifacts or tools were collected. Artifact locations were recorded using a GPS device, or, in the case of some materials from site 20SA722, by noting their coordinates relative to the shovel testing/excavation grid previously established at the site (Sommer 2005:9). Site locations were plotted on 7.5' U.S.G.S. topographic maps using the DeLorme 3-D Topoquads computer program. Topographic maps used include the Alicia, Bridgeport, Saginaw, and Shields quadrangles.

Test excavations were conducted at 20SA722 using the site grid set up for shovel testing in 2004 (Sommer 2005). A transit and steel tape were used to lay out the excavation units. This provided for more accurate measurement in laying out the excavation units, but resulted in a slight incongruence between the excavation grid and the shovel test grid. The 27 square meters excavated at 20SA722 during the 2007 field season are contiguous with, and connect, Excavation Blocks A and D, which were excavated during previous field seasons (Sommer 2005, 2007). The 2007 excavation units were laid out by pulling a steel tape between the corner stakes of the Excavation Blocks A and D. Individual (1X1 meter) excavation units are labeled according to the grid coordinates of their SW corner. The resulting block of units, which encompasses Excavation Blocks A and D, is now labeled Excavation Block A/D. Prior to laying out the actual excavation units, surface vegetation was removed as close as possible to the ground level.

Excavation of commenced by removing and screening the top 30 centimeters (plowzone) in each unit as a single level, with subsequent levels removed in five-centimeter increments. The depth of the plowzone varied across the units, but in all cases appeared to be greater than 30cm. Usually there was no clear distinction between the plowzone and subplow sediment, so it was not possible to remove the entire plowzone in one level and keep it totally separate from material below the plowzone. Depth measurements were taken as centimeters below datum (b.d.), which was arbitrarily chosen as the surface of one of the corners for each excavation unit. The surface datum location is noted on the square level sheet for each unit. Because the surface is relatively level at this location, the below datum measurements are essentially the same as below surface elevations across each unit. A single point was chosen from which to measure the depth of each unit to facilitate keeping the excavation floors level.

General excavation sediment was screened through ¼" mesh hardware cloth. To reduce damage to fragile artifacts, care was taken to remove them as soon as they were exposed rather than leaving them in the screen until all of the sediment was removed. Occasionally, rather than forcing all of the sediment through the screen, the small, resistant lumps were bagged up with the rest of the screen contents and were later water screened in the lab. The screen contents were bagged by provenience and assigned a Field Sample (FS) number. The FS numbers were assigned sequentially as samples were collected. They serve as a redundant record of provenience information to guard against accidental loss of this important information.

Excavation generally continued down until culturally "sterile" sediment was reached. In non-feature areas, this generally occurred around 60-70 cm below datum. The specific methods used in feature excavation varied depending on the size and nature of the feature. In general, features were divided into two or more sections with parallel or perpendicular profile lines labeled A-A', B-B' etc. The resulting sections were labeled Area 1, Area 2 etc. Plan views and profiles were drawn and photographed with a digital camera. Excavation within each feature Area proceeded by excavating with

trowels, brushes and/or small plastic putty or paint knives. All feature fill was saved, the volume of fill was recorded in liters, and the material was bagged and assigned an FS number. The feature fill was thoroughly air-dried before being processed by flotation.

Excavation data, including information about soil characteristics, artifacts, excavation problems etc. for each excavation level were recorded on standardized Square Level sheets. Additional information was recorded in the project director's field notes. Representative wall profiles and floor plans were drawn on graph paper and were recorded with digital photographs.

A single 50X50 cm column sample, labeled Column Sample #2, was excavated from site 20SA1276 in 2007. The column sample was located in the SW ¼ of excavation unit 516N 501E (the remaining three quarters of this unit were not excavated). The 0-10 cm level was screened as usual through ¼ inch mesh hardware cloth. All sediment from the 10-15 cm through 55-60 cm levels was saved for flotation. Each of the 10 flotation samples included approximately 14-16 liters of sediment, for a total of 141.5 liters. Excavation was halted at 60 cm below the surface.

Lab Methods

After being collected all artifacts were taken to the archaeological laboratory at the Historical Society of Saginaw County Inc. for processing. The first stage of artifact processing was to conduct a preliminary sort of the objects, separating them into material types. This sorting was done so that fragile objects such as bone and ceramics could be handled with extra care while cleaning. After sorting, the artifacts were carefully washed and fully air-dried prior to analysis. Artifacts from the 2007 field season of this project were catalogued under Accessions F07-1 through F07-6. Each artifact was assigned a catalogue number according to the provenience and type of object. Several objects may be assigned the same catalogue number if they are same type of object and are from the same provenience. A Catalogue Record was filled out for each object recovered during this project. These records include the Catalogue #, Provenience, and Description of each artifact.

All of the objects recovered from the surface survey portion of the project have been catalogued. Except for the flotation samples, all of the material recovered from the test excavations has been sorted, washed and catalogued. Ceramic sherds and FCR were size sorted using an approximately ½" mesh screen. Ceramic sherds that pass through the screen are referred to as "sherdlets", and in the initial analysis only counts and weights are being recorded. Fire-cracked rocks were counted and weighed according to each of the two size categories. Because of their non-cultural origin, snail shells from the excavations at 20SA722 were not catalogued, but they have been saved for possible future environmental studies. Some charcoal from feature contexts was likewise not catalogued. Although the cultural origins of the charcoal is not in doubt, it has not been catalogued because at least some is intended for radiocarbon analysis and will thus be destroyed.

Diagnostic artifacts, formal tools, and ceramic rimsherds have been labeled with their catalogue number. Non-diagnostic artifacts will be labeled as time permits. Catalogue numbers are written with permanent black or white ink on a layer of clear Acryloid B-72, and sealed with a layer of clear B-72. Artifacts are labeled prior to being photographed. Digital photographs have been taken of a representative sample of artifacts, including most of the diagnostic artifacts recovered during the 2007 field season. Any refitting of broken artifacts is accomplished using clear B-72 as an adhesive. Artifacts will be stored in the archaeological repository at the Historical Society of Saginaw County, Inc., in roughly one cubic foot, acid-free, boxes.

Initial processing has been completed for all of the flotation samples collected to date. Prior to processing, flotation samples were thoroughly dried to increase buoyancy of charred material. The soil was slowly dumped into a screen with window screen sized mesh immersed in a hundred gallon tub.

Water jets spraying up from the bottom of the tub into the screen provided gentle agitation, which was aided by hand mixing. Agitating the water in this way helped the sediment fall through the screen where the heavy fraction- ceramics, stone artifacts, bone etc., were collected. The light fraction- buoyant objects such as charcoal, seeds, etc., flowed out through a two-inch pipe located near the top of the screen and were collected in a very fine-mesh paint filter. The light and heavy fractions were labeled with their provenience information and dried. After drying, the light and heavy fractions from the 2007 flotation samples were size sorted by passing the material through nested geological sieves of 4mm and 2mm. This process yielded size categories of >4mm, 2<4mm, and <2mm. Weights for each size category were recorded in grams. None of the flotation samples has yet been analyzed.

Analysis and Evaluation

This section will present an analysis and evaluation of the materials obtained through the surface survey portion of this project and from the column sample excavation at site 20SA1276. Analysis and evaluation of excavated materials from 20SA722 will be presented in a subsequent section.

20SA15

Site 20SA15 extends approximately 154 meters along the Tittabawassee River (Appendix B). A light scatter of FCR, flakes, Late Woodland pottery and Historic period material covers the site. A visit to the site in late April of 2007 revealed only minor erosion over most of the site area. Extensive vegetation on the bank resulted in poor surface visibility. Three FCR and one destroyed, grit-tempered potsherd were observed, but not collected. Based on qualities of the temper and paste, the potsherd appeared most consistent with local Late Woodland ceramics. Even in the absence of periodic high water (currently annual in spring), continued erosion of the fairly high, steep bank is expected. Diagnostic artifacts recovered in 1999, 2002 and 2004 indicate that Late Woodland and Historic period components are present (Sommer 2000:10, 2003:12, 2005:12). A 1955 aerial photograph of the site area shows that it was under active cultivation at that time.

20SA214 *Shiawassee #6*

Shiawassee #6 is a large site extending over 1,500 meters along the Shiawassee River (Appendix B). It is flanked on either end by low marshes. The main site area extends for approximately 900 meters in the central portion of the site. A low-density scatter of FCR and flakes characterizes the eastern and western ends of the site. The main site area consists of a very dense scatter of FCR, flakes, stone tools, faunal remains, and other artifacts. A scatter of primarily 20th century refuse covers much of the site. Aerial photographs indicate that the main site area was under active cultivation in 1955.

With the overall relatively low water levels of the last several years, vegetation has covered much of the low riverbank along this site. The low banks and the vegetation offer a degree of stability to the site and only minimal bank erosion was noted in the site area in 2004, 2005, and 2006. A visit to the site in 2007 revealed no change in the amount of erosion over the previous year. Higher water levels, especially if accompanied by ice flows in the early spring, could reverse this situation. Indeed, significant erosion of the site has clearly occurred over the last several decades.

During the 2000 field season, a temporary site datum (a wooden stake) was driven into the ground near the eastern edge of the central portion of the site. The site datum also marks the beginning of Segment 1 West (and simultaneously 1 East). Wooden stakes were also placed every 100 meters to the west, marking the locations of the beginning of Segments 2 West through 9 West. Stakes were not placed to the east of the datum, nor were any artifacts collected from this portion of the site. None of the wooden stakes west of the datum was relocated in 2007. Artifact locations were marked using a GPS unit (Appendix B).

Two artifacts were collected from this site during the 2007 field season. They were assigned to Accession F07-3 and include Catalogue Numbers F07-3-1 and F07-3-2. The two artifacts are bifaces made on Bayport chert (Table 1). They include the base of an ovate/lanceolate knife or perform, and an ovate preform/knife (Figure 1, #1 and 2 respectively).

Table 1: 20SA214, biface metrics.

Catalogue Number	Length (mm)	Width (mm)	Thickness (mm)
F07-3-1	63.29	44.06	13.29
F07-3-2	-----	21.97	6.12

Neither of these artifacts is particularly diagnostic. However, based on materials recovered during previous field seasons, this site appears to be predominately Middle to early Late Woodland in age. A small amount of transitional Late Archaic/Early Woodland, Early Woodland, Late Woodland, and historic 19th and 20th century debris is also present. The projectile points and knives recovered from this site suggest a variety of hunting and butchering tasks were carried out. Scrapers and other retouched and utilized flakes indicate hide and food preparation and perhaps the working of bone or wood. Fishing is hinted at by the presence of probable net sinkers. The large quantities of preforms, cores, flakes and other debitage indicate that all stages of stone tool manufacturing were conducted at this location. Overall, the material recovered from the surface of this site suggests that it represents a series of base camp occupations by groups mixed in terms of age and sex.



Figure 1: 20SA214, bifaces from surface.

20SA722 *Clunie Site*

This large site extends for approximately 960 meters along the bank of the Tittabawassee River (Appendix B). In 2000 a site datum was driven into the ground, which also serves as the beginning of Segments 1 East and 1 West. Wooden stakes were placed every hundred meters to the west, marking the

beginning point of each segment (Sommer 2001:14). Because most, or all, of the stakes have been lost due to flooding and/or erosion, surface finds since 2002 have been plotted by GPS or have been given grid coordinates based on the Shovel Test grid set up in 2004 (Sommer 2005). The relatively high and steep riverbank was subject to moderate to severe erosion over much of the site area in 2005, 2006 and again in 2007, a situation that is likely to continue.

Both surface survey and limited test excavations were conducted at 20SA722 in 2007. A total of 19,731 objects were catalogued from 20SA722 during the 2007 field season. These items are included in Accession F07-4 and were assigned Catalogue Numbers F07-4-1 through F07-4-1595. These items include six objects derived from the surface, and 19,725 items derived from test excavations. Data from the test excavations will be discussed in a subsequent section of this report.

The surface collected material includes one expanding-stemmed biface made of Bayport chert (Figure 2, #1593; Table 2), one biface tip, also made of Bayport chert (Figure 2, #1594), and four ceramic sherds. The ceramic sherds include two grit-tempered and two shell-tempered specimens.

Table 2: 20SA722, biface metrics.

Catalogue Number	Length (mm)	Width (mm)	Thickness (mm)
F07-4-1593	38.23	22.02	10.79

The shell-tempered ceramics collected from the surface in 2007 include one body sherd with a cord-roughened exterior and one neck sherd exhibiting a smooth exterior with a horizontal groove (finger trail?) bordered by a row of punctates (Figure 2, #1592). One of the grit-tempered sherds has a destroyed exterior surface. The other is a rimsherd with a smoothed-over cord-roughened exterior, with oblique cord-wrapped stick impressions on both the interior and exterior of the rim (Figure 2, #1595).



Figure 2: 20SA722, ceramics and bifaces from surface.

Based on the 2007 and previous season's fieldwork, this site represents a series of occupations that occurred during the Woodland, Late Prehistoric and Historic periods, with a possible earlier Late Archaic occupation. The style of the biface found in 2007 indicates that it likely dates to the Early or Middle Woodland period. The ceramics all probably date to the Late Woodland through Late Prehistoric periods, supporting previous estimates based on surface survey and shovel testing, that the most intensive occupations occurred during the Late Woodland and Late Prehistoric periods.

20SA1251 *Shiawassee #2*

This site consists of a scatter, dense in places, of FCR and other artifacts, which extends along the Shiawassee River for over a kilometer (Appendix B). It is bordered on either end by low marshes. Most of the riverbank along the site has become covered with vegetation over the last several years resulting in increased surface stability and minimal bank erosion. However, moderate to severe erosion was observed along some portions of the site (especially some of the higher density site areas) in 2004, 2005, 2006, and again in 2007. In 2007, for several meters along the highest density portion of the site, the sod along the riverbank appeared to have been peeled up and flipped over by ice flows, exposing numerous flakes, and FCR. The 1955 aerial photograph of this site indicates that it was cleared, and under cultivation at that time. According to the state site map, this site overlaps with the eastern portion of 20SA125. Papworth's (1959) project map shows almost a complete overlap between 20SA125 and 20SA1251. A new site number was assigned because of the lack of precise information on the location of 20SA125.

Thirty-one 50X50cm shovel test pits (STP 1-STP 31) were dug on this site during the 2000 and 2001 field seasons (Sommer 2001:17-20, 2002:13-14). In addition, 50 square meters were excavated at this site between 2001 and 2002 (Sommer 2002:25-27, 2003:23-28). Work in 2007 was confined to surface survey. Four objects were recovered from this site in 2007. They were assigned to Accession number F07-1 and were given catalogue numbers F07-1-1 through F07-1-4.

The four objects collected from the surface of this site in 2007 are prehistoric artifacts. They include three bifaces (Table 3), and one grit-tempered ceramic sherd. The bifaces include a base fragment from a corner-notched point, a complete corner-notched point with an unfinished base, and a larger, corner-notched knife with a rounded tip caused by heavy resharpening (Figure 3, #2, 3, and 4 respectively). The one grit-tempered ceramic sherd recovered from this site in 2007 exhibits dentate stamping and nodes on the exterior (Figure 3, #1). The exterior nodes were formed by interior punctates.

Table 3: 20SA1251, biface metrics.

Catalogue Number	Length (mm)	Width (mm)	Thickness (mm)
F07-1-2	-----	-----	9.06
F06-1-3	40.41	25.14	9.87
F06-1-4	47.02	31.18	12.44



Figure 3: 20SA1251, ceramic sherd and bifaces from surface.

Based on material from this and previous field seasons, this site appears to contain Late Archaic/Early Woodland, Middle to early Late Woodland, Late Woodland and historic components. However, diagnostic artifacts indicate that the majority of the occupation debris found on the surface is probably derived from the Middle to early Late Woodland component. The diagnostic material recovered in 2007 support this age assessment. All three of the corner-notched bifaces are typical styles of the Middle Woodland period. The noded, dentate-stamped sherd is stylistically consistent with Middle Woodland Tittabawassee Ware ceramics (Fischer 1972). A Middle Woodland age AMS radiocarbon date of 1960 \pm 40 BP (2 Sigma cal. BC 40 to AD 120) was obtained from a sample of charred organic residue scraped from the interior of a Green Point Incised, Cross Hatched vessel excavated from this site in 2002 (Sommer 2004). Shovel testing has revealed that large areas of relatively intact site deposits exist away from the eroding edge of the riverbank. Artifacts collected from this site indicate that a variety of prehistoric activities were conducted ranging from flaked stone tool and ceramic manufacturing and use, to woodworking, food storage and/or preparation, and probably hunting and fishing and on-site butchery. Finally, the presence of fairly large quantities of FCR indicates that fire was being used for heat, and/or food preparation.

20SA1257 *Shiawassee* #9

This is one of the few sites discussed in this report that is not currently being eroded by fluvial action (Appendix B). As noted during the previous field seasons (Sommer 2000:25, 2001:24, 2002:18-

19), an interesting aspect of this site is that it is located in a large area of small irregular mounds or hummocks. The hummocky or mounded area covers at least two hectares (the entire area has not been walked, mapped, or measured). The mounds/hummocks are irregularly shaped and haphazardly oriented. Most are less than one meter high, two to three meters wide, and less than five meters long. The origin of these mounds/hummocks is presently unknown, although it is likely that they represent a combination of tree throws and flood erosion that has not been leveled off by plowing. The 1955 aerial photograph of the area indicates that it was not plowed at that time. It also clearly shows an old road cut, still visible, which borders the northern edge of the hummocky area and then makes a sharp turn to the north where it parallels Bullhead Creek. It is possible, though probably unlikely, that this hummocky area represents a cultural feature. Three artifacts were collected from this site in 2007, including two bipolar cores made of Bayport chert and one grit-tempered ceramic sherd (Figure 4). The potsherd has a cord-roughened exterior. In addition to artifacts collected in 2007, several flakes and fire-cracked rocks were observed on the surface. The artifacts collected in 2007 were assigned to accession F07-5 and were given catalogue numbers F07-5-1 and F07-5-2. Based on the artifacts observed on the surface in this and previous years, this site extends for at least 250 meters in a north/south direction along Bullhead Creek.



Figure 4: 20SA1257, bipolar cores and ceramic sherd from surface.

Due to the small sample of artifacts recovered from this site in previous field seasons the function of this site cannot be inferred. The large area from which artifacts have been observed suggests that the site was repeatedly occupied, probably over a long period of time. The potsherds recovered may indicate food storage and/or preparation activities. The flakes previously recovered indicate that flake

stone tools were being manufactured and/or used at the site. Based on paste attributes of the potsherds, they have been tentatively assigned to the Late Woodland period.

20SA1273 *Tittabawassee #1*

This site is a findspot of two artifacts located on the bank of the Tittabawassee River (Appendix B). The 1955 aerial photograph of the site area shows a road adjacent to the river where the find was made. It does not indicate that the site area was cleared for farming. Heavy vegetation covered the riverbank and no artifacts were observed or collected from this site during a single visit in 2007. Due in large part to the heavy vegetation, only minimal erosion of the riverbank was observed in the vicinity of the site. Artifacts reported previously include a grit-tempered ceramic body sherd with smooth exterior that was recovered in 2002 and the tip of a Bayport chert biface that was recovered in 2000 (Sommer 2001:25, 2003:18). The biface fragment exhibits a heavy patina and appears to be slightly water-rolled. This sherd may date to the Middle or Late Woodland periods. Interpretation of site function must await the recovery of additional artifacts through additional surface survey and subsurface testing.

20SA1274 *Tittabawassee #2*

This site consists of a loose cluster of pottery and a thin scatter of FCR and other artifacts extending approximately 150 meters along the Tittabawassee River (Appendix B). Heavy vegetation covered the riverbank and no artifacts were observed or collected from this site during a single visit in 2007. Due in large part to the heavy vegetation, only minimal erosion of the riverbank was observed in the vicinity of the site. Based on artifacts recovered in 2002 and 2000, this site appears to represent one or more Late Woodland components. This assessment is based on the presence of multiple Late Woodland ceramic vessels and a triangular projectile point. The artifact assemblage suggests a variety of activities, including food processing or storage, flaked stone tool use and production, and using fire for heat and/or food preparation.

20SA1275 *Tittabawassee #3*

This site was originally recorded as a findspot of several small, grit-tempered pottery fragments located in a tree throw on the edge of an old road cut approximately 40 meters south of the Tittabawassee River (Sommer 2001:26, 2002:19-20). In 2006, three additional grit-tempered ceramic sherds were located on the riverbank approximately 70 meters east of the original findspot. Despite the distance between them, given the disturbed nature of the sediment around each of the findspots, it is thought best to lump them together under a single site designation (Appendix B). Future work may necessitate splitting the locations into two separate sites. The 1955 aerial photograph of the site area shows it to have been heavily wooded. The road cut is not clearly visible on the photograph, but the large trees growing in the area may have obscured it. Heavy vegetation covered the riverbank and no artifacts were observed or collected from this site during a single visit in 2007. Due in large part to the heavy vegetation, only minimal erosion of the riverbank was observed in the vicinity of the site.

Based on differences in their temper and paste, the three ceramic sherds recovered in 2006 probably represent at least two vessels, at least one of which is probably best described as Wayne ware. Wayne ware vessels are typically associated with the early Late Woodland period in the Saginaw Valley (Brashler 1981; Lovis 1990).

20SA1276 *Shiawassee #13*

This site is located approximately 250 meters north of the Shiawassee River (Appendix B). The site was originally located by observing artifacts in the backdirt piles from several animal burrows (Sommer 2001:26). These burrows are primarily located on and adjacent to an east/west trending linear ridge that crosscuts the site roughly around the 480-490 N line. The ridge itself is cut through by an old road that runs roughly north/south at approximately the 515-520 E line (Appendix C). One hundred and nineteen 50X50 cm shovel test pits (STPs) were dug on the site between 2001 and 2006 in order to ascertain the nature and extent of intact site deposits, and to identify an appropriate area for more extensive test excavations (Sommer 2002, 2003, 2005, 2007). Test excavations, totaling 65.25 square meters, were conducted in 2001, 2003 and again in 2004 (Sommer 2002, 2004a, 2005). The shovel test pits indicated that the main site area is flanked on the west by a low swale that appears to be an old channel or drain running north/south between the Shiawassee and Tittabawassee Rivers. We have been prevented from fully testing this assumption by high water levels, though decreasing artifact density near the edge of the swale supports the assumption. An eastern boundary was determined along the 520N line at approximately 580E, at 560N the eastern boundary is at 590E, and 600N the eastern boundary is at 620E. The eastern boundary varies from approximately 580E at 680N to 560E at 760N. Shovel testing has revealed that the northern boundary at the 540E line is approximately 830N. Along the 500E line, the southern boundary is at approximately 430N. Therefore, the site extends for approximately 400 meters in a north/south direction, and up to 130 meters in an east/west direction, covering a total of around 2.54 hectares.

In 2007, a single 50 cm X 50 cm column sample, labeled Column #2, was excavated at site 20SA1276. Column #2 is located in the SW $\frac{1}{4}$ of unit 516N 501E (the other three quarters of this unit have not been excavated). Ten flotation samples, totaling 141.5 liters, were saved for analysis. Although analysis is incomplete, 1,307 objects from this column sample have been catalogued. The catalogued objects are derived from the 0-10 cm level, which was not subject to flotation, and the >4 mm size heavy fraction material from the flotation samples.

The 1,307 catalogued objects include 311 grit-tempered ceramic sherds, one biface tip fragment made of Flint Ridge chalcedony, one utilized/edge-damaged Bayport chert flake, 162 additional flakes, 214 bone fragments, and 618 FCR (2,167.4g).

The ceramic assemblage derived from Column #2 is highly fragmented. Of the 311 grit-tempered sherds, 307 are classified as sherdlets, or destroyed, meaning that they are too small or too damaged to determine the nature of the exterior surface treatment or any decorative elements. The remaining four sherds include three with smooth exteriors and one with a cord-roughened exterior.

A majority (n=150) of the catalogued flakes are Bayport chert. Non-Bayport chert examples include eight specimens of Flint Ridge chalcedony, an additional flake that is either Flint Ridge or Burlington chert, two Onondaga chert flakes, and one flake of a pebble chert.

The faunal remains are generally highly fragmented and none have been identified to the species level. They include unidentified turtle, fish, frog/toad, and medium to large mammals. Approximately half of the catalogued faunal remains are calcined.

20SA1277 *Shiawassee #14*

This site is situated on a relatively high terrace (585'-590' amsl) flanked by a marsh to the south, and a low swale to the east (Appendix B). The swale may be part of an old channel connecting the

Shiawassee and Tittabawassee Rivers. The 1955 aerial photograph of the site area does not indicate any historic disturbance in the immediate site area. However, it appears that the low swale adjacent to the site was clear-cut. In 2001, eight 50X50cm shovel tests (STPs) were dug along a 90 meter long north/south transect, at 10-20 meter intervals, roughly paralleling the low swale to the east) (Sommer 2002:22). Prehistoric artifacts were recovered from every one of the STPs, so site boundaries have not been established. While monitoring the site in 2007, two grit-tempered ceramic sherds were collected. They were assigned to Accession F07-6 and catalogued as F07-6-1. One of the sherds exhibits a cord-roughened exterior, the other a smooth exterior. In addition, several flakes and FCR were observed, but not collected.

Based on the material recovered in 2001 and 2007, this site is thought to date from the Middle through early Late Woodland periods. The faunal remains recovered from the site indicate that animals were butchered and/or cooked at the site. The ceramics also indicate activities related to cooking or storage. The flakes and shatter indicate that flaked stone tools were made and probably used on the site. Furthermore, the presence of Upper Mercer chert, which naturally occurs in Ohio, indicates at least indirect ties to the south.

20SA722 Excavation Analysis and Evaluation

Excavation Characteristics

Twenty-seven square meters were excavated at 20SA722 during the 2007 field season. The 27 square meters are contiguous and connect Excavation Block A, previously excavated in 2005 (Sommer 2006), and Excavation Block D, previously excavated in 2006 (Sommer 2007). The resulting excavated area will be referred to as Excavation Block A/D (Appendix C). Individual (1X1 meter) excavation units are labeled according to the grid coordinates of their SW corner. Details of the field methods employed during the test excavation of this site are provided above in the *Methods* section of this report. An overall site description is also provided above, under 20SA722 in the *Survey Analysis and Evaluation* section.

Soil profiles for Excavation Blocks A and D are presented in previous reports and will not be repeated here (Sommer 2006, 2007). It was also previously noted (Sommer 2007) that Excavation Blocks B and C showed two zones of relatively high artifact density separated by a 20 cm thick zone with a very low artifact density. The upper, more recent, high density zone occurred between 40 and 50 cm. The lower, earlier, high density zone was located between 70 and 80 cm below surface/datum. This pattern was not repeated in Excavation Blocks A and D. However, the 2007 work in Excavation Block A/D, particularly in units 569-570N 454E and 569N 455E, showed a noticeable increase in grit-tempered ceramic density in the 45-60cm levels. Most of these sherds have cord-roughened or fabric impressed exteriors and several show coil breaks (Figures 17 and 18, #431, 514, 519). These traits are consistent with earlier ceramic styles, similar to material recovered from the lower levels of Excavation Blocks B and C. The 2007 material from Excavation Block A/D could all be derived from a single vessel.

Artifact Summary for Excavation Block A/D

A total of 19,751 objects were catalogued from 20SA722 during the 2007 field season. These items include six objects derived from the surface (described above in *Analysis and Evaluation* section), and 19,745 items derived from Excavation Block A/D. The excavated items will be described in this section. The catalogued material from the excavation units represents only a small portion of the cultural material actually present. In addition to the catalogued items, 90 samples, containing a total of 609.75 liters of sediment, were saved for flotation. Although this material has not yet been analyzed, it is clear that faunal and floral remains are abundant in most of these flotation samples. Other artifacts including lithics and ceramics are also present in the flotation samples.

The 19,745 catalogued items from Excavation Block A/D include 280 historic objects, 17,241 prehistoric objects, and 2,224 items of an undetermined origin. The latter group includes three possible fire-cracked rocks and one possible sandstone abrader fragment that may be prehistoric, culturally produced items, or natural inclusions in the soil; one large quartzite pebble that appears unmodified, but is larger than other naturally occurring pebbles in these flood plain deposits; and 2,219 charcoal fragments. Most of the charcoal is wood charcoal. However, the charcoal assemblage also includes six hickory nut shells (*Carya* sp.), 12 walnut shells (*Juglans* sp.), 15 unidentified nut shell fragments, and three possible maize kernels. Additional maize cob and kernel fragments are present in some of the flotation samples, but these have not yet been analyzed or catalogued. Most of the charcoal is almost certainly a product of cultural activity, but some could represent natural forest fires.

Historic items from Excavation Block A/D include nine clay pigeon fragments; three fragments of ceramic vessels; one white clay pipe bowl fragment; 74 coal/cinders/slag; two shards of flat glass (probably window glass); 131 glass vessel fragments; one square nail; one wire nail; one iron button; 48

scraps of iron; four lead bullets; one .22 cal. short shell casing; and one 12 Gauge shot gun shell casing. The ceramic vessel fragments include one white paste earthenware fragment, and two plain-white porcelain fragments. Most, possibly all, of the glass vessel fragments are bottles. The assemblage includes 54 clear glass fragments, 31 amethyst-tinted, 47 brown, one aqua, and one green glass fragment. Most of the historic items probably date to the mid-nineteenth through twentieth centuries.

The 17,241 prehistoric items from Excavation Block A/D include one grit-tempered clay pipe fragment; 3,715 ceramic sherds; one fragment of waste clay, or possibly daub; 8,659 unmodified vertebrate faunal remains, including fish, reptile, and mammal remains; 2,210 unmodified bivalve mollusk remains; 34 modified bone/antler fragments; two shell beads (Figure 12, #1227); 29 bifacial tools (Table 4); 13 bipolar cores; 16 additional cores/core fragments; 1,734 lithic flakes and shatter; one modified flake blank/perform made of Bayport chert; 25 retouched chert flakes; 59 utilized/edge-damaged chert flakes; three sandstone abraders (Figure 5, #680, 832) (Figure 6, #1451); two hammerstones (Figure 6, #1323, 1398), one of which may be a netsinker (Figure 6, #1398); and 737 pieces of fire-cracked rock (FCR).



Figure 5: 20SA722, Excavation Block A/D, abraders.



Figure 6: 20SA722, Excavation Block A/D, Feature 11, abrader and hammerstones.

The 29 bifacial flaked stone implements recovered from Excavation Block A/D include one biface/bipolar core made of Bayport chert (Figure 7, #1530); one bifacial endscraper made of Bayport chert (Figure 7, #1441); 10 bifacial preforms or unfinished tools; one base fragment from a lanceolate shaped projectile point made of bedded Bayport chert (Figure 8, #683); 10 triangular (Madison-like) projectile points made of Bayport chert (Figure 7, #1322, 1556) (Figure 8, except #683) (Figure 9); six additional biface fragments (Figure 7, #1376). The biface preforms include eight Bayport chert examples, one example made of bedded Bayport chert, and one example made of Wyandotte chert. Two of the Bayport chert preforms appear to be unfinished triangular projectile points.

Table 4: 20SA722, biface metrics from excavation units.

Catalogue Number	Type	Length (mm)	Width (mm)	Thickness (mm)
F07-4-418	Madison-like	27.91	12.64	4.41
F07-4-440	Madison-like	20.99	11.44	3.51
F07-4-550	Madison-like	24.30+	15.44	3.98
F07-4-683	Madison-like	-----	20.81+	6.53+
F07-4-700	Madison-like	31.51	17.35	5.94
F07-4-897	Madison-like	30.55	15.04	4.73
F07-4-905	Madison-like	-----	13.79	3.44
F07-4-990	Preform	26.82	17.30	4.94
F07-4-1052	Preform	24.41	-----	3.40



Figure 7: 20SA722, Excavation Block A/D, Feature 11, flaked stone artifacts.

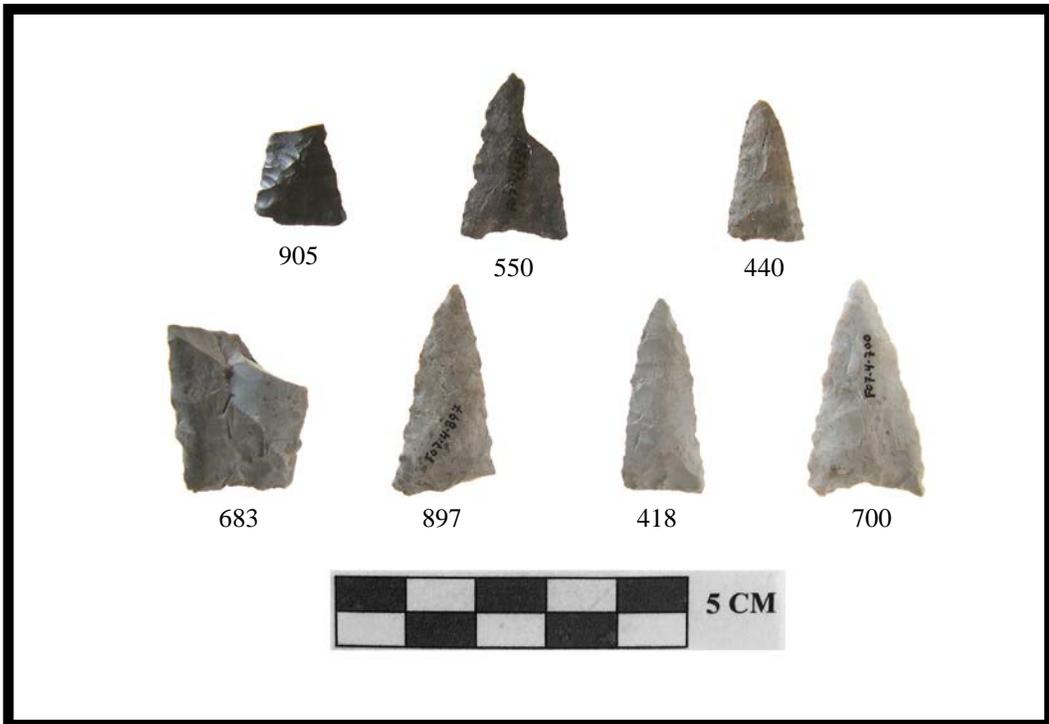


Figure 8: 20SA722, Excavation Block A/D, bifaces.



Figure 9: 20SA722, Excavation Block A/D, Feature 10, biface.

Other flaked stone tools, or probable tools, include 25 retouched flakes and 59 utilized/edge-damaged flakes. Three of the retouched flakes exhibit at least some bifacial retouch, the rest show only unifacial retouch. The 25 retouched flakes include 17 specimens made of Bayport chert (Figure 10, #2 and top row), (Figure 11, #1203), and (Figure 12, #1242), four examples of bedded Bayport chert (Figure 10, #340, 485), three examples made from either bedded Bayport or a pebble chert (Figure 10, #1012), and one specimen made from Kettle Point chert (Figure 10, #695). The utilized/edge-damaged flakes include 51 Bayport chert examples, two additional specimens made of a bedded Bayport chert, and six examples made of either bedded Bayport or a pebble chert.

In addition to the biface/bipolar core described above, 13 bipolar cores were recovered from the 2007 excavations at the Clunie site. The bipolar cores from Excavation Block A/D include 8 Bayport chert examples (Figure 13, #573, 629, 906) (Figure 7, #1390), three bedded Bayport chert examples (Figure 7, #1342), one example that is either bedded Bayport or a pebble chert (Figure 13, #486), and one Wyandotte chert example (Figure 13, #1053).

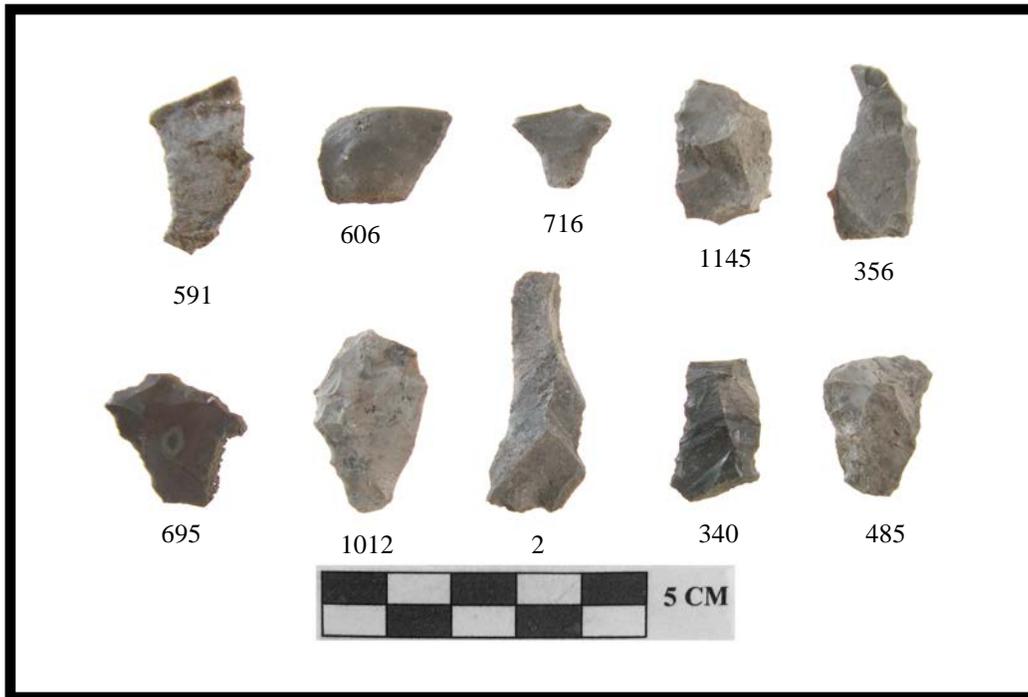


Figure 10: 20SA722, Excavation Block A/D, retouched flakes.

Sixteen additional cores or core fragments were also recovered from Excavation Block A/D. These cores include five Bayport chert examples (Figure 11, #1214) (Figure 14, #184, 1064), eight bedded Bayport chert examples (Figure 12, #1223) (Figure 14, #404, 826, 898), one pebble chert specimen, and two examples that are either bedded Bayport or a pebble chert (Figure 7, #1339).

The final flaked stone artifact category from Excavation Block A/D is waste material, including flakes and shatter. The vast majority of the 1,734 flakes and shatter recovered from Excavation Block A/D is locally available material including Bayport chert, bedded Bayport chert, pebble cherts, and material that is either bedded Bayport or a pebble chert. Only 23 specimens don't appear to fall into the above chert types. Several of these are likely also locally derived materials including four flakes of unidentified chert, two limestone flakes, two quartzite flakes, two flakes of an unidentified coarse grained rock, and one possible slate flake. These materials could all have been found in local glacial till deposits. The only probably non-local materials represented in the flake assemblage include six Wyandotte chert flakes, three additional possible Wyandotte chert flakes, two Kettle Point chert flakes, and one additional possible Kettle Point chert flake. The likely non-local component therefore comprises less than 1 % of the flake and shatter assemblage.



Figure 11: 20SA722, Excavation Block A/D, Feature 1, retouched flake and core.



Figure 12: 20SA722, Excavation Block A/D, Feature 9, shell beads, retouched flake, and core.



Figure 13: 20SA722, Excavation Block A/D, bipolar cores.

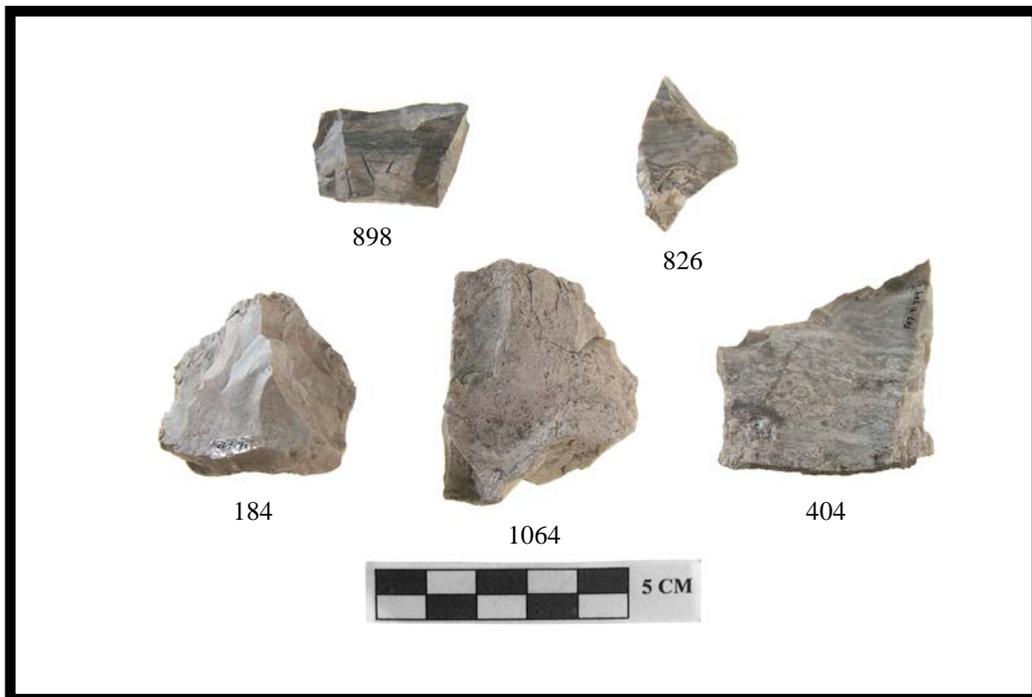


Figure 14: 20SA722, Excavation Block A/D, cores.

Of the 3,715 ceramic sherds, 33 are rimsherds and 3,682 are body/neck sherds. The body/neck sherds include 684 shell-tempered examples, 2,996 grit-tempered specimens and two sherdlets with both grit and shell temper. Of the 684 shell-tempered body/neck sherds, 596 are either sherdlets or destroyed and were not further analyzed. The shell-tempered sherds complete enough to be analyzed include 66 with cord-roughened exterior surfaces, 11 with smoothed over cord-roughened exteriors, and 11 have exterior surfaces that are smooth or smoothed over to the point that the original surface treatment is obscured. One of the cord-roughened sherds also exhibits a cord impressed decoration. The smooth or smoothed over shell-tempered sherds include one with a tool impression and one with a possible finger trailed decoration. Of the 2,996 grit-tempered sherds, 2,537 are either sherdlets or destroyed. Of the grit-tempered sherds with intact surfaces that are large enough to be analyzed, 338 exhibit cord-roughened surfaces, 27 have cord-roughened surfaces that were subsequently smoothed over, 86 have exterior surfaces that are smooth or smoothed over to the point that the original surface treatment is obscured, seven sherds have what appears to be a fabric impressed exterior, and one sherd exhibits a brushed exterior with a cord-impressed decoration (Figure 20, #1402). One of the cord roughened sherds also exhibits a tool-impressed decoration, as does one of the smooth sherds. Other decorated sherds with smooth exterior surfaces include one with a stamped decoration, one with a cord-impressed decoration, and five with a possible finger trailed decoration. One of the probable fabric-impressed sherds has a cord-wrapped stick impression.



Figure 15: 20SA722, Excavation Block A/D, ceramic rimsherds.

The 33 rimsherds recovered from Excavation Block A/D represent a minimum of 16 vessels, including at least one shell-tempered vessel, one vessel with both shell and grit-temper, and 14 grit-tempered vessels. Six small shell-tempered sherds could easily represent more than one vessel, but they are too small and homogenous to justify separating. The shell-tempered vessel exhibits a smooth, or well-smoothed over exterior. The only decoration is consists of small, tool impressions or notches along the exterior lip of the vessel (Figures 15 and 16, #383, 763) (Figures 19 and 21, #1361). A vessel with both shell and grit-tempered is represented by a single, small rimsherd with punctates in the exterior lip (Figures 15, #438). The exterior surface of this small sherd is destroyed.

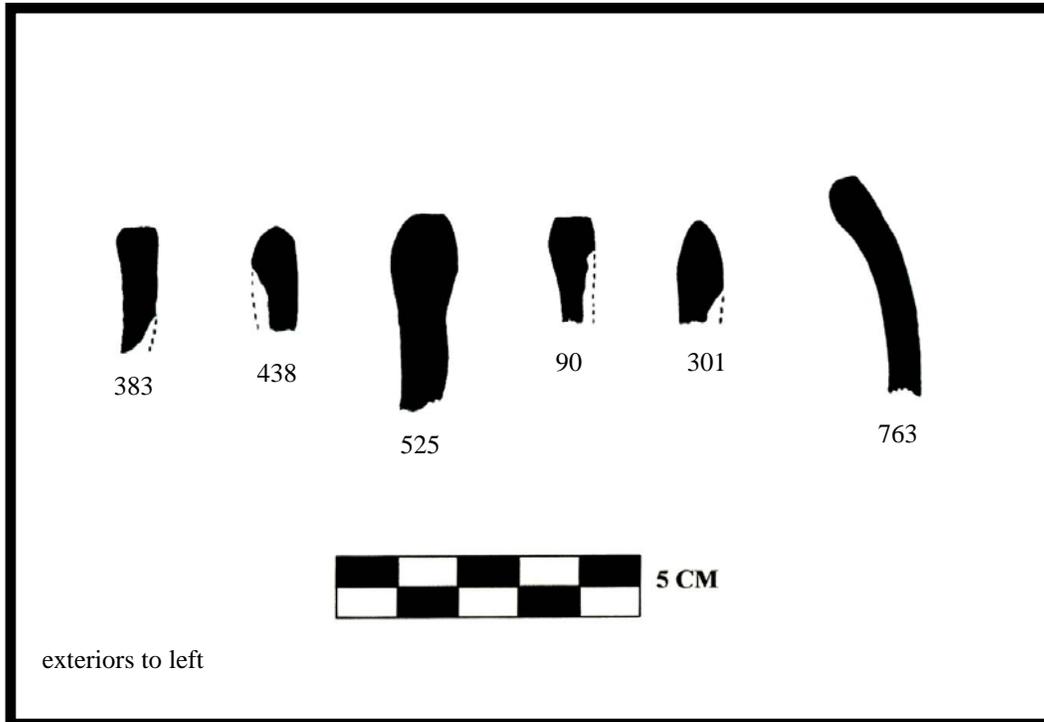


Figure 16: 20SA722, Excavation Block A/D, ceramic rimsherd profiles.

Two of the grit-tempered vessels are represented by sherdlet-size rims, and little can be said of them. One shows a smooth exterior and lip, the other has oblique tool impressions on the top of the lip. A third vessel is represented by a very small sherd with a finger-pinched interior and exterior lip. The exterior surface is smooth, and may have an impression, or possibly finger trail, but is too small to determine with confidence (Figures 15 and 16, #301). A fourth vessel exhibits a slightly thickened, scalloped lip, apparently executed by impressing and pinching the top of the lip with the fingers. This vessel also shows a vertical finger trail on a smooth exterior (Figures 15 and 16, #525). A fifth vessel shows what appears to be a cord-impression along the top of the lip that was distorted by subsequent finger pinching. Oblique tool impressions, made with a sharp-edged tool are present at the top of the exterior rim (Figures 15 and 16, #90). A sixth vessel also shows oblique tool impressions, though these were made with a rounded tool and are positioned on the exterior below a slight collar, or thickened rim (Figures 17 and 18, #302). A seventh vessel is represented by a single rimsherd with a well-smoothed exterior and a cord, or knot, impressed lip (Figures, #741). The lip decoration is smoothed over and very

indistinct. Two vessels are decorated with cord-impressions on the exterior rims. One of these has a horizontal cord-impression on the exterior of its slightly thickened lip and oblique cord-impressions on the exterior below the lip (Figures 17 and 18, #303). The interior lip of this vessel is marked by finger impressions. The second cord-impressed vessel is represented by a small sherd with two horizontal cord-impressions located at the top of the rim, just below the lip (Figures 17 and 18, #915). At least one vessel, possibly two or more, is represented by seven rim/neck sherds with cord roughened, or possibly fabric impressed, exterior surfaces and lips (Figures 17 and 18, #431, 514, 519). On some of the sherds the surface treatment appears more like fabric impressions than simply cord-roughening, but the difference is slight and the temper, paste, and other attributes appear identical. The remaining grit-tempered vessels were all derived from Feature 11. They include a vessel represented by six rim/neck sherds that exhibit a slightly thickened rim with a finger-pinched interior and exterior lip, and a smooth surface with vertical finger trails starting below the thickened rim (Figures 19 and 21, #1496, 1538, 1555). A second, very similar vessel is represented by a single rimsherd. On this vessel the rim thickening is very slight, the finger-pinching is present but indistinct on the exterior, and the finger-trailing is very indistinct (Figures 19 and 21, #1403). The paste is similar to the previous vessel, but seems to have less temper. Another vessel from Feature 11 is represented by four rim/neck sherds (Figures 20 and 21, #1460, 1470, 1499, 1502). This vessel exhibits a very pronounced thickened, folded over, or possibly appliqué lip. The interior and exterior lip is marked with vertical tool impressions. The exterior surface is heavily obscured by charred organic material, but appears to be smoothed over cord-roughened. Another vessel from Feature 11 is represented by a single rimsherd with a slightly thickened lip with oblique tool impressions on the exterior lip (Figures 20 and 21, #1443). A very small castellation is also present. The exterior surface is obscured by charred organics, but appears to be well smoothed over. A final vessel from Feature 11 is represented by neck/body sherd with vertical brushing on the exterior, horizontal brushing on the interior, and oblique cord-impressions on the lower rim/neck (Figure 20, #1402). Since this is not a rimsherd, it is included in the discussion above about the body/neck sherds from this site.



Figure 17: 20SA722, Excavation Block A/D, ceramic rimsherds.

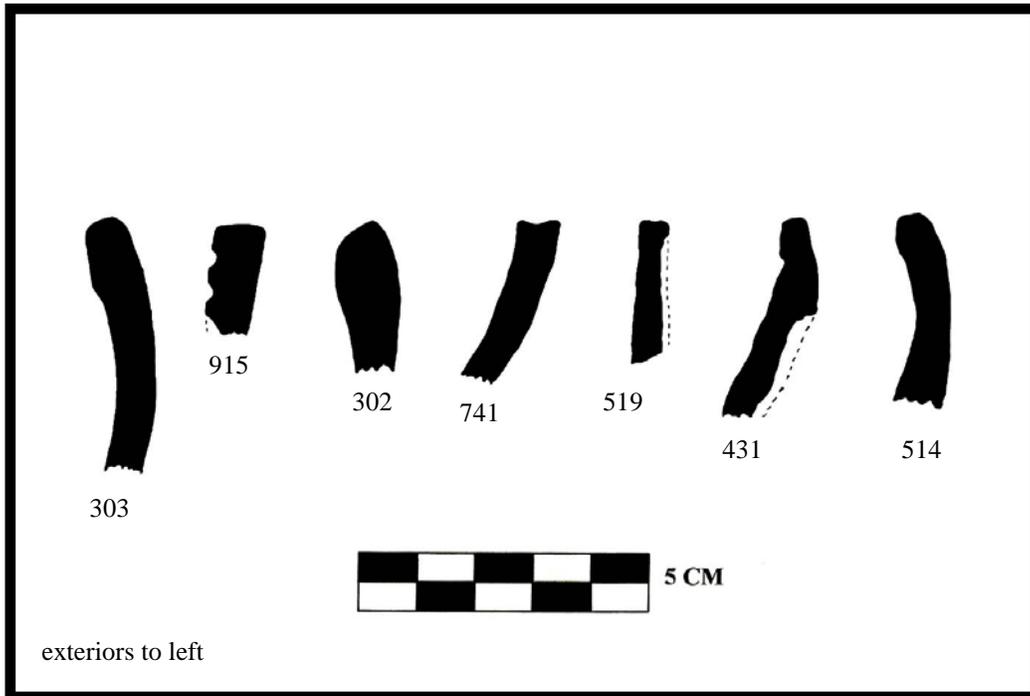


Figure 18: 20SA722, Excavation Block A/D, ceramic rimsherd profiles.



Figure 19: 20SA722, Excavation Block A/D, Feature 11, ceramic rimsherds.



Figure 20: 20SA722, Excavation Block A/D, Feature 11, ceramic rim and neck sherds.

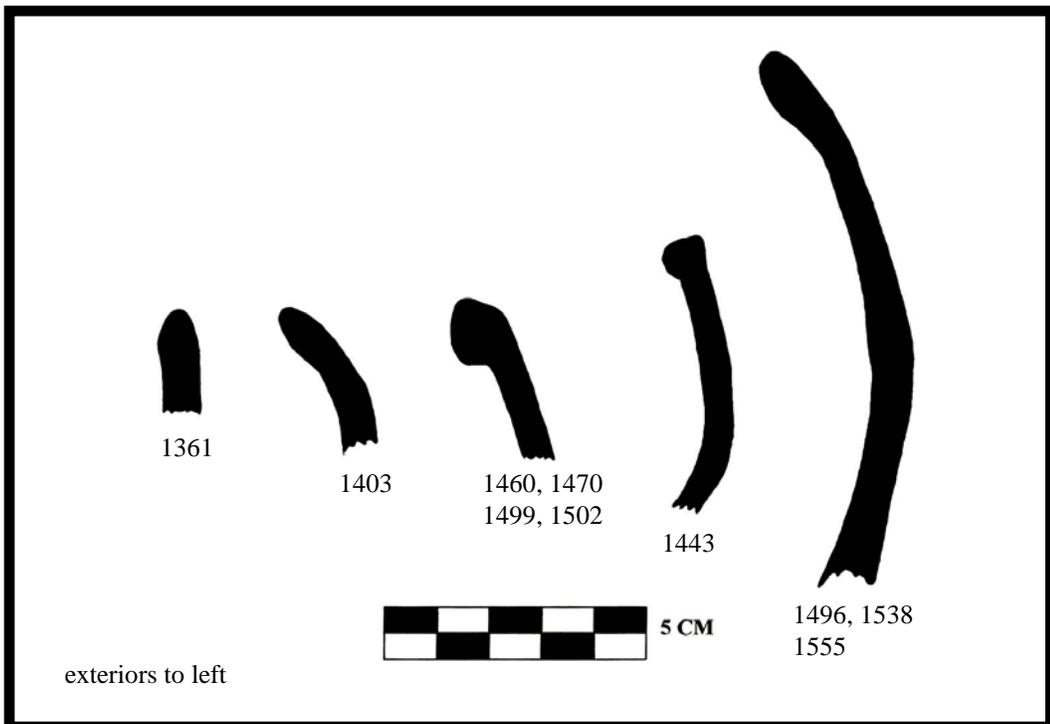


Figure 21: 20SA722, Excavation Block A/D, Feature 11, ceramic rimsherd profiles.

Thirty-four modified vertebrate faunal remains were recovered from Excavation Block A/D. They include seven modified antler fragments, fourteen medium or large mammal bone fragments, one turtle shell fragment, and 12 conjoining fragments of a large bird humerus. The bird humerus has been cut and incised around the circumference of the shaft (Figure 23, #159/1328). The turtle carapace fragment is a costal bone with a ground/scraped rib attachment (Figure 22, #14). This may be a fragment of a turtle shell bowl.



Figure 22: 20SA722, Excavation Block A/D, modified bone.

The modified antler in the assemblage is derived both from white-tailed deer and elk, and was fashioned into a variety of objects. Six of the seven antler artifacts were recovered from Feature 11. They include a naturally shed deer antler from which at least one of the tines had been cut off; a very well-made all with a very fine hook-shaped tip on one end (Figure 23, #1418), a carefully ground antler peg or pin, (Figure 24, #1506); a splinter of antler that has been ground and grooved (Figure 24, #1475); a split section of antler carefully ground, with a drilled perforation on one end, three parallel incised lines/grooves, and nine drilled “dots” (Figure 24, #1468). This latter specimen is broken through three of the “dots” on the end opposite the perforation. The function of this finely decorated object is unknown. The final modified antler artifact from Feature 11 is a large section of elk antler that has been split and ground on the edges forming a wedge-shaped object (Figure 24, #1467). The only modified antler

fragment from Excavation Block A/D that was not recovered from Feature 11 is a split, cut, and ground fragment that appears to be part of an antler harpoon (Figure 22, #1037).

Of the fourteen modified medium or large mammal bone fragments, eight are fragments of beamers made from large mammal long bone shafts. At least six of these are fragments of a white-tailed deer metatarsal (Figure 22, #52, 488). The beamer fragments could all be pieces of a single tool. Two other modified medium or large mammal bone fragments are awl tips made from long bone splinters (Figure 22, #552). A white-tailed deer mandible found in Feature 11 exhibits striations and wear on the inferior and medial surfaces of the anterior portion of the bone (Figure 23, #1473). The cause of this wear pattern, or function of this object, is not known. Also from Feature 11 is the posterior/inferior border of an elk scapula from which the head, spine, and the anterior/superior border has been removed. Wear/grinding is present on the broken edges of the proximal portion and wear, flaking, and striations are evident along the modified edge of the blade (Figure 25, #1411). This specimen resembles similar artifacts that have been referred to as hoes, or possibly bark shredding tools, from the Moccasin Bluff site in Berrien County, Michigan (Bettarel and Smith 1973). However, the form and wear patterns appear slightly different on this specimen and its actual function remains unclear. The two final modified bones from Excavation Block A/D include one fragment of polished bone and one fragment with grinding on its edge.



Figure 23: 20SA722, Excavation Block A/D, Feature 11, modified bone and antler.



Figure 24: 20SA722, Excavation Block A/D, Feature 11, modified antler.



Figure 25: 20SA722, Excavation Block A/D, Feature 11, modified elk scapula.

Unmodified faunal remains from Excavation Block A/D have not yet been fully analyzed. However, some preliminary identifications have been made. Vertebrate fauna tentatively identified include nine species of fish - lake sturgeon (*Acipenser fulvescens*), walleye (*Sander vitreous*), bowfin (*Amia calva*), channel catfish (*Ictalurus punctatus*), gar (*Lepisosteus* sp.), freshwater drum (*Aplodinotus grunniens*), bass (*Micropterus* sp.), sucker (Catostomidae), and northern pike (*Esox lucius*); four reptiles – spiny softshell turtle (*Apalone spinifera*), snapping turtle (*Chelydra serpentina*), painted turtle (*Chrysemys picta*), and an unidentified snake; 12 mammals – mole (Talpidae), muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), beaver (*Castor canadensis*), river otter (*Lutra canadensis*), woodchuck (*Marmota monax*), porcupine (*Erethizon dorsatum*), dog (*Canis lupus familiaris*), black bear (*Ursus americanus*), possibly red squirrel (*Tamiasciurus hudsonicus*), white-tailed deer (*Odocoileus virginianus*), and elk (*Cervus canadensis*); and up to six species of freshwater mussels - threeridge (*Amblema plicata*), black sandshell (*Ligumia recta*), fatmucket (*Lampsilis siliquoidea*), possibly mapleleaf (*Quadrula, quadrula*), possibly mucket (*Actinonaias ligamentina*), and possibly pink heelsplitter (*Potamilus alatus*). Of these, threeridge mussels are by far the most numerous.

Feature Descriptions

Four features were recorded in the 27 square meters excavated at 20SA722 in 2007. Three of the features (1, 9, and 11) are thought to represent trash pits. Feature 10 is interpreted as combination shallow hearth and trash deposits. Feature 10 was clearly truncated to some unknown degree by the plowzone. The others appear only slightly impacted if at all. Large portions of Feature 1 and Feature 9 were excavated in previous field seasons. The descriptions below include information from both the 2007 and earlier seasons. The feature volumes that are recorded below are all minimum values describing the amount of feature fill that was saved for flotation. All depths are recorded as centimeters (cm) below datum (b.d.), which was arbitrarily selected to be the surface of one of the corners of the excavation unit in which the feature is located. The flotation samples that were collected from these features have not yet been catalogued. Therefore, the lists of feature contents provided in the descriptions below should be considered preliminary assessments. The locations of the features within Excavation Block A/D are shown in Appendix C.

Feature #	1
Location	569N 449E, 570N 449E, 569N 450E and 570N 450E. It also extends into units 571N 450E, 571N 451E, 570N 451E and 569N 451E
Plan	irregular shape that appears to be comprised of overlapping circular stains
Profile	shallow, irregular basin shape that appears to result from two overlapping pits
Max. length	220 cm
Max. width	150 cm
Depth defined	45 cm
Max. depth	65 cm
Volume	351 liters
Description	Feature 1 appears to be comprised of two overlapping, shallow, trash pits. Radiocarbon dates support this interpretation. Charcoal from one of the pits produced a calibrated date of A.D. 1440-1660, while charcoal from the other produced a calibrated date of A.D. 1400-1470 (Sommer 2006:26). In terms of contents, each of the pits appears very similar. Each pit contains bone and charcoal-rich deposits, layers of nearly pure bone, ash lenses, and a cap of relatively sterile fill. Artifacts recovered

from Feature 1 include fragments of multiple shell-tempered and grit-tempered ceramic vessels, triangular projectile points, cores and chert debitage, a modified antler tool, and abundant floral and faunal remains.

Feature # 9
Location 568N 458E, 568N 459E, 569N 458E, 569N 459E, 570N 458E, 570N 459E
Plan circular
Profile irregular basin-shaped
Max. length 148 cm
Max. width 130 cm
Depth defined 45 cm
Max. depth 65 cm
Volume 306.5 liters
Description The first indication of Feature 9 during the 2006 field season was a cluster of ash and dark soil in the NE corner of unit 569N 459E at a depth of 35 cm (Sommer 2007:46). At 40 cm, very subtle linear patterns in the soil indicated the presence of plow scars that truncated the top of Feature 9 to an unknown, but probably minimal, extent. The NE portion of Feature 9 has been truncated by a large burrow that collapsed in on itself. Feature 9 contained abundant fish, mammal and turtle bone; at least four species of fresh water mussels; stone tools and manufacturing debris including flakes, cores and triangular Madison points; shell-tempered and grit-tempered ceramics; shell beads; charcoal; ash lenses; and other artifacts and materials. Feature 9 is interpreted as a trash pit. Although ash, charcoal, and some reddened sand was present, there was not clear evidence for in situ burning. Rather, it appears that some of the material was derived from hearths that were cleaned out.

Feature # 10
Location 570N 455E, 570N 456E, (571N 455-456E not excavated), plow dragged portions extend into 569-570N 457E
Plan probably oval
Profile basin shaped
Max. length 120 cm
Max. width 48+ cm
Depth defined 45 cm
Max. depth 69 cm
Volume 76.25 liters
Description Feature 10 was first encountered as a lens of ash, charcoal and other debris in the 40-45cm level of unit 570N 457E. Upon further excavation, it became clear that this material was plow-disturbed and the main part of the feature was further west and north. Feature 10 exhibits a rather complicated profile that appears to be a result of multiple use episodes and functions. Feature 10 probably served both as a hearth and a trash pit. There is ample evidence for in situ burning including lots of ash, fire-reddened sand, and charcoal. The charcoal includes a large mass (log fragment) approximately 15 X 30 cm that is mostly, but not completely charred. Artifacts, including a triangular projectile point, ceramics, and faunal remains were present in Feature 10, but not nearly as abundant as in the other features excavated in 2007.



Figure 26: 20SA722, Excavation Block A/D, Feature 10.



Figure 27: 20SA722, Excavation Block A/D, Feature 10, 570N 455-456E, north wall Profile.

Feature # 11
 Location 570N 451E, 570N 452E, 571N 451E, 571N 452E, (572N 451-452E not excavated)
 Plan irregular oval/kidney shaped
 Profile shallow, basin shape
 Max. length 160 cm
 Max. width 130 cm
 Depth defined 50-60 cm
 Max. depth 77 cm
 Volume 453 liters
 Description Feature 11 is a shallow, basin-shaped, trash pit that appears to have been dug into a former ground surface that sloped gently down towards the river (north). Therefore, while the south, especially southwest, portion of Feature 11 was already apparent at a depth of only 45-50 cm, the northern half of Feature 11 was not clearly defined until a depth of approximately 60 cm. In terms of contents, Feature 11 contained fragments of multiple ceramic vessels, both shell and grit-tempered; lithics including debitage, cores, triangular projectile points, biface performs; and multiple modified bone and antler artifacts. Floral and faunal remains are also abundant including maize cobs and kernels, wood charcoal, mussels, and fish, bird, mammal, and turtle bones. The artifacts were concentrated along the bottom and edges of the pit with the top center being filled with relatively sterile fill.

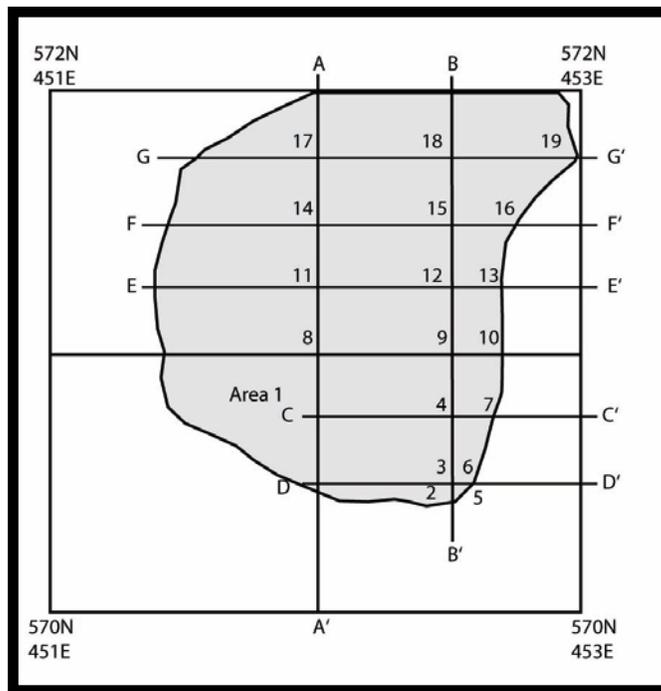


Figure 28: 20SA722, Feature 11, plan view, 60 cm floor, showing profile lines and Areas.



Figure 29: 20SA722, Excavation Block A/D, Feature 11 Profile E-E’.

Radiocarbon Dates

Although abundant suitable material was collected, no radiocarbon dates have been obtained from our 2007 work at the Clunie site. Four dates were obtained on charcoal recovered during previous field seasons from Features 1, 3 and 9 (Sommer 2006, 2007). The results of those analyses are repeated here.

In 2005, two charcoal samples taken from Feature 1 were submitted to Beta Analytic, Inc., for radiocarbon analysis. One sample consisted of six grams of wood charcoal that were collected from a flotation sample taken from Feature 1, Area 4. Assuming our interpretation that Feature 1 consists of two overlapping pits, this sample dates the smaller, circular pit that makes up the southeast portion of Feature 1. The conventional radiocarbon age of this first sample is 340 +/- 50 BP (2 Sigma Calibrated AD 1440-1660). The second sample consisted of 8.8 grams of wood charcoal that was piece-plotted in Feature 1, Area 7. This sample dates the larger (northwestern portion) of the probable overlapping pits that make up Feature 1. The conventional radiocarbon age of this second sample is 490 +/- 50 BP (2 Sigma Calibrated AD 1400-1470).

In 2006, two additional charcoal samples were submitted to Beta Analytic, Inc., for radiocarbon analysis. One sample consisted of 11.5 grams of wood charcoal that were combined from flotation samples and excavated charcoal samples taken from Feature 3, Areas 1, 2, and 4. The conventional radiocarbon age of this first sample is 450 +/- 70 BP (2 Sigma Calibrated AD 1400-1530 AND AD 1550-1630). The second sample consisted of 20.0 grams of wood charcoal that was hand excavated from Feature 9, Area 1. The conventional radiocarbon age of this second sample is 270 +/- 60 BP (2 Sigma Calibrated AD 1470-1680 AND AD 1740-1810 AND 1930-1950). The multiple ranges in the calibrated dates reflect the fact that the conventional radiocarbon age crosses the calibrations curve in multiple

places. In the sample from Feature 9, we can safely reject the two most recent calibrated age ranges on typological grounds of the artifacts contained in the feature.

DISCUSSION

Although modest, the continuing goals of the surface survey portion of this project, to document and collect artifacts from archaeological sites exposed on Shiawassee NWR property were met during the 2006 field season. In addition, the goals of the test excavations, to assess site stratigraphy and the nature of buried archaeological deposits; to obtain a representative sample of artifacts to assess site use through time and to relate site components to the broader local and regional culture history; to obtain material suitable for radiocarbon dating; and to obtain floral and faunal remains to assess site seasonality and subsistence practices were also met for site 20SA722. Nine seasons of fieldwork have clearly demonstrated that significant cultural resources are present within the boundaries of the Shiawassee NWR, including extensive buried archaeological deposits, which, at least in a portion of 20SA722, are stratified.

Although no evidence for it was recovered during the 2007 field season, the earliest period of occupation that we have good evidence for at the refuge is the Late Archaic or transitional Late Archaic/Early Woodland. In addition to the Meadowood related biface recovered from the surface of 20SA722 in 2006, greywacke flakes, found in 1999, provide possible, though certainly not conclusive, evidence for Transitional/Late Archaic occupations at 20SA722, 20SA1254, and 20SA1255. More suggestive is the cannel coal gorget and side-notched/expanding stemmed point with a ground base from 20SA1255, which was found during the 1999 field season (Sommer 2000:22-25). Other Late Archaic/Early Woodland material recovered during previous field seasons include a Meadowood point from 20SA214, Adena and Adena-like stemmed points, two broad-bladed stemmed points, and a Kramer-like point found at 20SA1251 during the 2000 and 2002 field seasons (Sommer 2001); and a possible Meadowood point and a corner-notched/side-notched point with a heavily ground base found at 20SA1251 during the 2001 field season. During the 2003 field season, an additional Meadowood point and a stemmed point increase the Late Archaic/Early woodland assemblage from 20SA214, while the two large stemmed knives and two “Ace of Spades/Ground base” points from the excavations add 20SA1276 to the list of sites with Late Archaic/Early Woodland occupations. An additional “Ace of Spades/Ground base” point was recovered from the surface of 20SA1276 in 2004 (Sommer 2005). The paucity of Late Archaic age material from the refuge is certainly a result of the fact that most of the sites that have been found on the refuge would have been inundated by the Shiawassee embayment from sometime before the Nipissing maximum around 4,800 B.P. to after the Algoma maximum around 3,800 B.P. (Monaghan and Lovis 2005).

Middle and/or Late Woodland occupations are indicated at all of the sites for which diagnostic materials are available. Although initial assessments of the material from 20SA1251 and 20SA1276 stressed that Middle Woodland period artifacts were primarily from the latter half of the period, early Middle Woodland artifacts have also been recognized in the assemblages. The presence of late Middle Woodland, transitional Middle to early Late Woodland, and early Late Woodland artifacts, including Green Point, Ruben Linear, and Wayne Ware ceramics, cut and engraved turtle carapace bowls, and Snyders-like, Jack’s Reef, Raccoon Notched, and a variety of expanding stemmed points, at several sites suggests that the project area holds great potential for research into the poorly understood transitional period between the Middle and Late Woodland Periods (cf. Kingsley 1999:171-172).

As reported previously (Sommer 2004a:16, 32), the AMS radiocarbon date of 1960 \pm 40 BP (2 Sigma cal. BC 40 to AD 120) that was obtained from the sample of charred organic residue scraped from the interior of this Green Point Incised, Cross Hatched vessel excavated from 20SA1251 has implications for our understanding of the Middle Woodland ceramic chronology and for our understanding of cultural

processes in the Saginaw Valley. This vessel type, and the ware group that includes it, were originally defined at the nearby Schultz Site (Fischer 1972:161-165, 279-280) and are generally thought to date from the latter portion of the Middle Woodland period, from AD 300-500 (Kingsley 1999:151). The early Middle Woodland date from 20SA1251 indicates that the stylistic elements characterizing this type were introduced into the Saginaw Valley on a timeframe consistent with the spread of this style into other parts of Michigan (Sommer 2004b). This early Middle Woodland date also raises questions about local lake level fluctuations. Archaeologists have previously hypothesized that the early part of the Middle Woodland period was a time of relatively high lake levels, possibly as high as two or three meters above the modern mean (Fitting 1972:257-258; Monaghan and Lovis 2005; Speth 1972:72-73). This high water stage has been cited as a possible explanation for the distribution of Middle Woodland sites in the Saginaw Valley (Lovis 1993:227; Lovis and Davis 1993:119). Given its low elevation, site 20SA1251 would have been inundated under such conditions. The dated ceramics from this site make it clear that although lake levels may have been high during a portion of the Tittabawassee Phase, conditions were dynamic and even low-lying areas were available for occupation during some parts of the early Middle Woodland. The AMS date of 1710 \pm 40 BP (2 Sigma cal. AD 230 to AD 410, intercept AD 330) on a nutshell from Feature 5 at 20SA1276 not only dates a period of the sites occupation, it also suggests that the associated Ruben Linear ceramics may date a couple centuries or more earlier than previously expected. Additional radiocarbon dates are sorely needed to help sort out the complex occupation sequence at both 20SA1251 and 20SA1276 and to continue to refine the ceramic sequence from the Saginaw Valley.

The Late Prehistoric/Upper Mississippian Period is another poorly understood portion of Saginaw Valley prehistory (Halsey 1999:263). Several sites located in the Shiawassee NWR have yielded artifacts that appear to date from this late period. A collared rimsherd with a dowel or finger impressed lip from 20SA15 is stylistically consistent with late Prehistoric ceramics (Sommer 2000:10). Excavations at 20SA1276 yielded a late-looking grit-tempered rimsherd with a possible strap handle attachment (Sommer 2004a). Triangular Madison points were recovered from the surface of 20SA214 in 2003 (Sommer 2004:13), 20SA1251 in 2000, 2001 and 2003 (Sommer 2001:18-19, 2002:15, 2004:15) from 20SA1254 in 2002 (Sommer 2003:17) and from 20SA1274 in 2000 (Sommer 2001:26). Madison points are associated with Late Woodland/Mississippian cultural phases across much of eastern North America (Justice 1987:224-226). Late Prehistoric items derived from test excavations conducted at 20SA1251 during the 2001 and 2002 field seasons include shell-tempered and limestone-tempered ceramics and triangular Madison Points (Sommer 2002).

Although Late Prehistoric items are present from several sites in the project area, they typically consist of only a few scattered artifacts in predominately earlier assemblages. The Clunie Site (20SA722) appears to be an exception to this. At this site Late Prehistoric material is widespread and fairly abundant (see above). During previous field seasons, several Late Prehistoric artifacts were recovered from the surface of 20SA722, including shell-tempered potsherds with smooth and cord-roughened exteriors, a shell-tempered rimsherd with a strap handle, an additional strap handle from another shell-tempered vessel, grit-tempered rimsherds with finger-pinched lips, and triangular projectile points (Sommer 2000, 2001, 2004 and 2005). The shovel testing conducted at 20SA722 in 2004 and 2005 revealed that Late Prehistoric material is distributed, at a minimum, over an area nearly a hectare in extent (this assessment reflects the size of the area tested, not the boundaries of the Late Prehistoric component). Shovel testing also revealed the presences of several trash pit and possible hearth features. The features encountered in the STPs appeared to contain abundant bone, especially fish bone. The excavation of Feature 1 in 2005 and 2007 (Sommer 2006, this volume), Feature 9 in 2006 and 2007 (Sommer 2007, this volume), and Feature 11 in 2007 confirmed this for at least three trash pit features. The occurrence of specialized trash disposal areas and the abundance of faunal remains present suggest

fairly long-term occupation (perhaps several weeks or months?). However, compared with the amount of faunal remains recovered, other material culture such as flakes, stone tools and ceramics is less abundant, arguing against long-term occupation. The hearth features excavated in 2006, including Features 3, 6 and 7, contain less bone and other artifacts than the trash pits. The intensive burning of the hearths reduced most of the organics to ash and caused oxidation of the surrounding soil. Feature 10, excavated in 2007, appears to have been used both as a trash pit and a hearth. Though apparently not abundant, the presence of maize cobs and kernels was confirmed for Feature 11 in 2007. Whether or not the presence of this cultigen implies on site horticultural practices is debatable. The possible elk scapula hoe may support such an inference. Further analysis of floral remains from the flotation samples will be required to assess the abundance of maize and other possible cultigens at this site. Radiocarbon dates from Features 1, 3 and 9 place the occupation(s) in the period of AD 1400-1680. At least two separate occupations are indicated, one in the AD 1400-1470 period and one in the period from 1470-1680. It is likely that the site actually represents a series of many relatively short-term occupations that span much of the 280 year period identified.

Because surface collections, and collections derived from limited shovel testing, cannot be assumed to provide representative samples of artifacts, it is therefore difficult to assign most sites to functional categories (i.e. base camps, resource extraction locales etc.) However, the wide range of artifact types and faunal remains recovered indicate that the prehistoric inhabitants of these sites participated in multiple activities. Artifacts such as flakes, bipolar cores, and cores, as well as anvils and hammerstones, all clearly indicate that flaked stone tool manufacturing, including early stages of nodule reduction, was an important activity at most of the sites describe above. The manufacture and use of groundstone tools/ornaments at several sites is indicated by the presence of finished and unfinished ground slate, shale, cannel coal, and schist objects and possibly by the presence of the sandstone abraders. Ceramics found at many of the sites suggest activities including ceramic vessel manufacture and food storage and/or preparation. Hunting is indicated by the presence of several of the notched/stemmed and triangular bifaces. FCR is ubiquitous at most of the sites, indicating that fire was being used for heating and/or food preparation. The density of occupation debris, the high degree of artifact fragmentation apparently caused by trampling, the abundant and varied stone tool manufacturing debris and the wide range of tool types recovered from the excavations at 20SA1251 and 20SA1276 all indicate that these sites probably served as base camps that were occupied by family groups, rather than resource extraction camps occupied by specialized task groups such as hunting parties.

Faunal remains, including a wide range of mammal, fish, bird, turtle, and clam/mussel species, were recovered or observed on the surface and in shovel tests at several of the sites. They are especially well preserved and well-represented at 20SA214, 20SA722, 20SA1254, 20SA1255, and 20SA1256. The faunal remains from these sites point to the importance of hunting, trapping, and fishing. Furthermore, based on site locations, fishing may be presumed to have been an important activity at most of the sites discussed here. The faunal remains also point to on-site butchering.

When they are fully analyzed, the relatively large faunal assemblages derived from the test excavations conducted at 20SA722 in 2005 and 2006, 20SA1251 in 2001 and 2002 and 20SA1276 in 2001, 2003 and 2004 (Sommer 2002; 2004a), are expected to provide a more complete picture of subsistence practices than has been available from surface and shovel test data. This is particularly true of the faunal remains recovered from the fine-screened and flotation samples taken from features at 20SA722, 20SA1251 and 20SA1276. Preliminary, non-quantitative assessment of a sample of the faunal remains recovered from 20SA1251 and 20SA1276 suggests that while large mammals such as White-tailed Deer probably accounted for the largest percentage of the meat portion of the diet, fish and small aquatic mammals such as muskrat and beaver were also extremely important. Initial assessment of faunal remains from 20SA722 indicates that fish may rival large mammals in importance.

Data from the test excavations at 20SA722, 20SA1251 and 20SA1276, particularly floral and faunal data, are also expected to allow an assessment of season of occupation. The presence of numerous charred hickory nuts and walnuts in several features at 20SA1276, strongly suggests a fall season of occupation. Charred nutshells were also observed in flotation samples and from general excavation contexts at 20SA1251. Large quantities of spring spawning fish such as suckers, walleye and sturgeon have been recognized in the samples from 20SA722, suggesting that this site was occupied during the spring. Turtle and mollusk shells also suggest warm season occupations. Other data, including the presence of shed deer antlers, beaver and other fur-bearing animals, and even charred maize cobs and kernels may suggest fall and winter occupations. However, assessment of these hypotheses awaits detailed analyses of the floral and faunal remains recovered from flotation samples.

Based on the limited shovel-testing conducted at 20SA214, 20SA722, 20SA1251, 20SA1254, 20SA1276, and 20SA1277 during the 2000-2002, 2004-2006 field seasons (Sommer 2001, 2002, 2003, 2005, 2006), the test excavations conducted at 20SA1276 during the 2001, 2003 and 2004 field seasons, at 20SA1251 during the 2001 and 2002 field seasons and at 20SA722 in 2005, 2006, and 2007, buried or otherwise relatively intact archaeological deposits are probably the rule rather than the exception in the refuge. It is quite possible that Late Archaic/Early Woodland deposits are stratified below Middle and Late Woodland deposits at some of the sites, but this has yet to be demonstrated and it does not appear to be the case for 20SA722, 20SA1251 or 20SA1276. The 2006 excavations at 20SA722 revealed clearly stratified late Prehistoric and Late Woodland components. The relative scarcity of Late Archaic/Early Woodland remains probably reflects the fact that much of the low-lying refuge may have been under water during large portions of these periods. Further, if they are indeed present, deposits of this age are likely deeply buried and less subject to exposure through erosion. Buried archaeological deposits, especially stratified deposits are extremely important because they are relatively undisturbed, often well-preserved, and in the case of stratified deposits, they allow detailed assessment of changing use of a particular landscape through time. Archaeologists have not had many opportunities to investigate buried or stratified deposits in the Saginaw Valley, thus adding to the potential significance of some of the archaeological sites recorded here.

Several of the artifacts recovered during the nine years of this project are indicative of interactions with cultural groups in surrounding regions. The presence of small amounts of Norwood chert suggests influence from cultural groups to the northwest. Interactions to the south and west are indicated by the presence of Illinois Havana/Hopewell-inspired Tittabawassee and Green Point Ware ceramics. The presence of Younge or Western Basin Tradition Macomb-like ceramics, of Pipe Creek chert, Upper Mercer Chert and Flint Ridge chalcedony from the Ohio region, Burlington chert from the Illinois/Missouri region, and Wyandotte chert from Indiana, points to southern, southeastern, and southwestern connections. Finally, interactions to the east are suggested by the presence of a small amount of Onondaga and Kettle Point chert from southern Ontario and New York. Sorting out the nature and frequency of the interactions with cultural groups in other regions remains an important area for future research.

In addition to prehistoric components, nine years of fieldwork on this project have also identified significant 19th and 20th century historical materials. Many of the 19th century artifacts are related to the late 19th century logging industry in the region. Logging artifacts, including a variety of rafting pins and chain dogs, are primarily associated with activities surrounding the rafting of logs to transport them down the rivers. Some of the late 19th and early 20th century artifacts along the riverbanks are likely associated with houseboats. Scatters of late 19th / early 20th century debris are also present at 20SA1305 and 20SA1307, two sites identified in 2002. Site 20SA722 also contains a sizeable early to mid-20th century assemblage associated with a row of “cottages” and house boats that extended along the bank of the Tittabawassee River (Sommer 2000, 2001). Several gunflints, as well as a possible “trade axe” recovered

in 1999, offer tantalizing evidence for 18th century or possibly earlier Historic period occupations in the project area.

Finally, illegal collecting of archaeological materials from sites within the Shiawassee NWR boundaries has been a problem in the past. Footprints observed on several sites in 1999, 2000 and 2004 suggested that it *may be* an ongoing problem. Very troubling was a report by one of the project volunteers that on 4 May 2006 two individuals were observed metal detecting and surface collecting on site 20SA722. The individuals left after being confronted and no evidence was ever found of their return, so it may have been an isolated incident. Although the extent is highly variable, fluvial processes are eroding most of the sites documented during this project. One of the effects of these processes is that occasionally archaeological materials are clearly visible on the river edges, making them susceptible to collection by persons untrained in the methods and importance of archaeological documentation. We are working to alleviate this problem through our outreach/education efforts, whereby local community members are learning of the importance and cultural value of the archaeological record preserved within the wildlife refuge. It is believed that this community education, along with our continued field presence while monitoring these sites, serves as a deterrent.

SUMMARY AND RECOMMENDATIONS

This report summarizes the results of a ninth season of archaeological investigations carried out in the Shiawassee National Wildlife Refuge (NWR), Saginaw County, Michigan. The field investigations, conducted under Amendment 5 of Federal Archaeological Permit No. 2002-MI/3-2, included both limited archaeological survey/salvage (surface survey) and test excavations. Test excavations were conducted at site 20SA722 and a single column sample was excavated from 20SA1276.

Surface collections, totaling 17 objects, were made from five of the 13 sites that were monitored during the 2007 field. No previously unrecorded sites were found.

Twenty-seven square meters were excavated at 20SA722 during the 2007 field season. These excavations yielded a high density of prehistoric artifacts including ceramics, stone tools, fire-cracked rock, a large number and variety of animal remains, and a few maize cobs and kernels. Much of the cultural material from the excavation units was derived from hearth and trash pit features. Based on radiocarbon dates and artifact styles, especially the triangular Madison-like points, the presence of shell-tempered ceramics and the decorative elements and motifs of the shell and grit-tempered ceramics, the primary period of prehistoric occupation appears to be the late Prehistoric period. The presence of shell-tempered ceramics suggests an Upper Mississippian affiliation. Late Woodland and Historic period objects were also recovered. In fact, in Excavation Blocks B, C, and A/D early Late Woodland artifacts were found stratified below the Late Prehistoric material. In addition, 90 samples, containing a total of 609.75 liters of sediment, were saved for flotation.

Prehistoric artifacts recovered from the various sites on the refuge during 2007 and previous field seasons indicate that Middle and early Late Woodland occupations (ca A.D. 1 - 1000) predominate at most sites. However, Late Archaic/Early Woodland period (ca. 3000-100 B.C.) artifacts and several later Late Woodland and Late Prehistoric (ca. A.D. 1000-European contact) items are also present in the recovered assemblages. Site 20SA722 in particular has an extensive Late Prehistoric component. Historical artifacts date primarily from the mid-19th century through the 20th century. A few artifacts may date to the 17th or 18th century. A thin scatter of mid to late 20th century debris is present on all of the sites (as well as on non-site areas). This material is not considered archaeologically significant and in most instances was neither noted nor collected.

This project continues to demonstrate that significant archaeological resources are present within the boundaries of the Shiawassee NWR. It is clear that archaeological sites in the project area hold considerable research potential, augmented by the now demonstrated presence of stratified archaeological deposits. Important research topics that could be addressed by sites in the project area include among others: 1) the nature of the Middle Woodland to Late Woodland transition period in the Saginaw Valley; 2) the nature of Late Prehistoric/Upper Mississippian adaptations in the Saginaw Valley; 3) the nature and frequency of interactions between cultural groups in the Saginaw Valley, and those in other regions; 4) human responses and adaptations to long and short term fluctuations in lake levels; 5) prehistoric subsistence practices and the role of horticulture/agriculture in resource-rich wetland environments; and 6) human-environmental interactions through time.

Recommendations

The recommendations made in previous reports for this project are still applicable (Sommer 2005). They are repeated below. Based on the results of the past nine seasons of fieldwork, the following recommendations are made.

- 1) Many of the sites that have been recorded on the refuge are documented primarily on the basis of artifacts exposed on the surface. Additional shovel testing should be employed to determine the spatial extent of the sites that have been documented. This information is important both for cultural resource management and research purposes.
- 2) In addition to shovel testing to determine site boundaries, additional test excavations are needed to determine the extent of intact site sediments, to look for possible stratified deposits, and to determine whether cultural features are present and preserved. Test excavations will also provide more detailed information about the time periods represented and the nature of the activities conducted at the sites. Larger scale excavations will be needed at several of the sites to address a variety of questions including the potential research topics listed above.
- 3) Varying degrees of fluvial and other forms of erosion continue to impact most of the sites discussed in this report, exposing additional artifacts. For this reason, monitoring of these sites, including collecting and documenting exposed artifacts, should continue.
- 4) Continued survey involving walking exposed river banks and agricultural fields, and shovel testing in wooded areas is recommended in order to locate additional sites on the refuge. Because the processes that expose artifacts are variable even areas where archaeological sites have not been found should be periodically monitored.
- 5) This project has demonstrated that portions of the project area have a high density of archaeological sites. Several sites, including 20SA388, 20SA1252, and 20SA1270 appear to have been significantly impacted by past dike construction. For this reason, all proposed activities that will disturb the ground surface, including the construction of dikes, ditches, trails, roads, restrooms, other buildings, observation decks etc., should be preceded by an archaeological assessment of the area to be disturbed.
- 6) Illegal collecting of archaeological materials from sites within the Shiawassee NWR boundaries continues to be a problem. For this reason, continued efforts should be made to educate people about the irreparable damage that can result from removing artifacts from archaeological sites. A continued field presence, along with a sustained effort to monitor locations with known archaeological sites should reduce the potential of this problem.
- 7) Low-density prehistoric sites such as 20SA1304 and 20SA1306 probably represent single, short-term, task specific occupations. As such, they represent an important aspect of prehistoric cultural systems. Despite the fact that limited test excavations at 20SA1306 and surface survey at 20SA1304 indicated that these sites are probably not eligible for the National Register of Historic Places (because a lack of intact cultural features and the low probability of finding temporally diagnostic artifacts), these sites and others potentially located in the farm units on the refuge should continue to be monitored. Given the nature of these deposits, the only real chance of recovering diagnostic artifacts that would allow us place these sites in a specific cultural context is to search for materials exposed by plowing.

BIBLIOGRAPHY

- Albert, D.A., S.R. Denton, and B.V. Barnes
1986 *Regional Landscape Ecosystems of Michigan*. School of Natural Resources, University of Michigan. Ann Arbor.
- Bailey, R.M. and G.R. Smith
1981 Origin and Geography of the Fish Fauna of the Laurentian Great Lakes Basin. In *Canadian Journal of Fisheries and Aquatic Sciences* 38(12).
- Baker, R.H.
1983 *Michigan Mammals*. Michigan State University Press. East Lansing, MI.
- Beld, S. G.
1991 *Two Terminal Archaic/Early Woodland Sites in Central Michigan*. University of Michigan Museum of Anthropology Technical Report 22.

2002 A Preliminary Report on the Cater Site, 20MD36, Midland County, Michigan: Early and Mid-Nineteenth Century Occupations in Central Michigan. *The Michigan Archaeologist* 48(1-2):1-86.
- Bettarel, R. L. and H. G. Smith
1973 *The Moccasin Bluff Site and the Woodland Cultures of Southwestern Michigan*. Anthropological Papers, Museum of Anthropology, University of Michigan No. 49, Ann Arbor.
- Bigony, B. A.
1970 Late Woodland Occupation of the Saginaw Valley. *The Michigan Archaeologist* 16(3-4):115-214.
- Binford, L. R.
1963 The Hodges Site, A Late Archaic Burial Station. In *Miscellaneous Studies in Typology and Classification*, pp. 124-148. Anthropological Papers Museum of Anthropology, The University of Michigan No.19, Ann Arbor.
- Branstner, M. C. and M. J. Hambacher (editors)
1994 *1991 Great Lakes Transmission Limited Partnership Pipeline Expansion Projects: Phase III Investigations at the Shiawassee River (20SA1033) and Bear Creek Sites (20SA1043), Saginaw County, Michigan*. Natural Resources Group, Inc., Minneapolis, Minnesota, and Great Lakes Transmission Limited Partnership, Detroit, Michigan. GLRA Report No. 94-12.
- Branstner, M. C. and M. J. Hambacher (editors)
1995 *1991 Great Lakes Transmission Limited Partnership Pipeline Expansion Projects: Phase III Investigations at the Casassa Site (20SA1021)*. Natural Resources Group, Inc.,

Minneapolis, Minnesota, and Great Lakes Transmission Limited Partnership, Detroit, Michigan. GLRA Report No. 94-12.

Brashler, J. B.

1981 *Early Late Woodland Boundaries and Interaction: Indian Ceramics of Southern Lower Michigan*. Publications of the Museum, Michigan State University Anthropological Series 3(3).

Brunett, F. V.

1980 A Cultural Inventory Report of a Portion of Section 4 and 8, T.11N. R.4E. within the Boundary of the Shiawassee National Wildlife Refuge. Cultural Resources Inventory Report No. 21380, Saginaw Archaeological Commission, Saginaw Michigan.

Burt, W.H.

1957 *Mammals of the Great Lakes Region*. The University of Michigan Press.

Butterfield, I.W.

1986 Water Configurations in the Human Environment from the Main Algonquin to the Nipissing I Stages of the Great Lakes in the Saginaw Valley, Michigan. *The Michigan Archaeologist*, 32(3):101-137.

Cleland, C. E.

1966 *The Prehistoric Animal Ecology and Ethnozoology of the Upper Great Lakes Region*. Anthropological Papers Museum of Anthropology, University of Michigan No. 29, Ann Arbor.

1992 *The Rites of Conquest: The History and Culture of Michigan's Native Americans*. The University of Michigan Press, Ann Arbor.

Crumley, C. S.

1973 The Kantzler Site (20BY30): a Multi-component Woodland Site in Bay County, Michigan. *The Michigan Archaeologist* 19(3-4):183-291.

Dice, L.R.

1943 *The Biotic Provinces of North America*. The University of Michigan Press.

Dobbs, C. A., and M. L. Murray

1993 *Ancient Native American Occupation at 20SA596 in the Saginaw Valley, Michigan*. Institute for Minnesota Archaeology, Reports of Investigations Number 209. Prepared for Great Lakes

Gas

Transmission Limited Partnership under contract with Braun Environmental, Inc., for submission

to

Federal Energy Regulatory Commission (FERC), Michigan State Historic Preservation Office (File # ER89508), Minneapolis.

Dobbs, C. A., C. Johnson, K. Parker and T. Martin

1993 *20SA1034: A Late-Prehistoric Site on the Flint River in the Saginaw Valley, Michigan*.

Institute for Minnesota Archaeology, Reports of Investigations Number 229. Prepared for Great Lakes Gas Transmission Limited Partnership under contract with Braun Environmental, Inc., for submission to Federal Energy Regulatory Commission (FERC), Michigan State Historic Preservation Office (File # ER89508), Minneapolis.

Dorr, J.A., Jr., and D.F. Eschman

1970 *Geology of Michigan*. The University of Michigan Press, Ann Arbor.

Egan, K.C.

1990 *Paleoecology of the Bridgeport Area*. In *The Bridgeport Site: Archaeological Investigation at 20SA620 Saginaw County, Michigan*, edited by, J. M. O'Shea and M. Shott, pp.11-20.

Anthropological Papers University of Michigan Museum of Anthropology, 81:11-20. Ann Arbor.

Eschman, D.F. and P.F. Karrow

1985 Huron Basin Glacial Lakes. In *Quaternary Evolution of the Great Lakes, Geological Association of Canada Special Paper*, 30, edited by P.F. Karrow and P.E. Calkin, pp. 79-93.

Fairchild, J. D.

1977 *The Schmidt Site: A Pre-Nipissing Village in the Saginaw Valley*. Unpublished Master's Thesis, Western Michigan University, Kalamazoo.

Farrand, W. R.

1981 *Quaternary Geology of Michigan*. Map, State of Michigan, Department of Natural Resources, Geological Survey Division, Lansing.

Fischer, F. W.

1972 *Schultz Site Ceramics*. In *The Schultz Site at Greenpoint: A Stratified Occupation Area in the Saginaw Valley of Michigan*, edited by J. E. Fitting, pp. 137-190. *Memoirs of the Museum*

of Anthropology University of Michigan Number 4. Ann Arbor.

Fitting, J. E.

1968 *Saginaw Valley Archaeology*. *The Michigan Archaeologist* 14(1-2).

1972a *The Schultz Site at Greenpoint: A Stratified Occupation Area in the Saginaw Valley of Michigan*. *Memoirs of the Museum of Anthropology University of Michigan Number 4*. Ann Arbor.

1972b *Lithic Industries of the Schultz Site*. In *The Schultz Site at Greenpoint: A Stratified Occupation Area in the Saginaw Valley of Michigan*, edited by J. E. Fitting, pp. 191-224. *Memoirs of the Museum of Anthropology University of Michigan Number 4*. Ann Arbor.

1975 *The Archaeology of Michigan: A Guide to the Prehistory of the Great Lakes Region*, (second edition). Cranbrook Institute of Science, Bloomfield Hills, Michigan.

1977 *Cultural Resources Survey of the Shiawassee Flats Flood Control Project*. Report No.

- 1860, Gilbert/Commonwealth, Commonwealth Associates, Inc., Jackson, Michigan.
- Garland, E. B. and S. G. Beld
1999 The Early Woodland: Ceramics, Domesticated Plants, and Burial Mounds Foretell the Shape of the Future. In *Retrieving Michigan's Buried Past: the Archaeology of the Great Lakes State*, edited by John R. Halsey, pp. 125-146.
- Granger, J. E., Jr.
1978 *Meadowood Phase Settlement Pattern in the Niagara Frontier Region of Western New York State*. Anthropological Papers, Museum of Anthropology, University of Michigan, No. 24. Ann Arbor.
- Hamilton, T. M. and K. O. Emery
1987 *Eighteenth-Century Gunflints from Fort Michilimackinac and Other Colonial Sites*. Archaeological Completion Report Series. Number 13. Mackinac Island State Park Commission, Mackinac, Island, Michigan.
- Halsey, J. R.
1966 Additional Hopewell Engraved Turtle Shells from Michigan. *Papers of the Michigan Academy of Science, Arts, and Letters* 51:389-398.

1977 The Bussinger Site: a Multicomponent Site in the Saginaw Valley of Michigan with a Review of Early Late Woodland Mortuary Complexes in the Northeastern Woodlands. Unpublished Ph.D. dissertation, University of North Carolina. Chapel Hill.

1999 (editor) *Retrieving Michigan's Buried Past: The Archaeology of the Great Lakes State*. Cranbrook Institute of Science, Bulletin 64, Bloomfield Hills, Michigan.
- Harrison
1965 The Schmidt Site (20SA192), Saginaw County, Michigan. *The Michigan Archaeologist* 12(2):49-70.
- Holman, M. B.
1995 Ceramic Assemblage. In 1991 Great Lakes Gas Transmission Limited Partnership Pipeline Expansion Projects: Phase III Investigations at the Cassasa Site (20SA1021) Saginaw, Michigan, edited by M. C. Branstner and M. J. Hambacher, pp. 8.1-8.65. Great Lakes Research Associates. Report on file at the Saginaw Archaeological Commission.
- Hubbs, C. L., K. F. Lagler and G. R. Smith
2004 *Fishes of the Great Lakes Region Revise Edition*. University of Michigan Press, Ann Arbor.
- Iaquinta, J. L.
1994 *Soil Survey of Saginaw County, Michigan*. United States Department of Agriculture, Soil Conservation Service.
- Justice, N. D.
1987 *Stone Age Spear and Arrow Points of the Midcontinental and Eastern United States*.

Indiana University Press, Bloomington.

Klisch, M. and T. A. Klisch

1980 Eliza Golson's Diary. Unpublished manuscript on file at the Saginaw Archaeological Commission.

Kingsley, R. G.

1989 On the Occurrence of Hacklander Ware in Michigan. *The Michigan Archaeologist* 35(2):61-87.

1999 The Middle Woodland Period in Southern Michigan. In *Retrieving Michigan's Buried Past: The Archaeology of the Great Lakes State*, edited by J. R. Halsey, pp. 148-172. Cranbrook Institute of Science, Bulletin 64, Bloomfield Hills, Michigan.

Larsen, C.E.

1985a Geoarchaeological Interpretation of Great Lakes Coastal Environments. In *Archaeological Sediments in Context*, edited by J.K. Stein and W.R. Farrand, pp. 91-110. Center for the Study of Early Man, Orono, Maine.

1985b Lake Level, Uplift, and Outlet Incision, the Nipissing and Algoma Great Lakes. In *Quaternary Evolution of the Great Lakes*, edited by P. F. Karrow and P. E. Calkin, pp.63-77. Geological Association of Canada Special Paper 30, 1985.

1986 Geological History of Glacial Lake Algonquin and the Upper Great Lakes. *U.S. Geological Survey Bulletin*, 1801.

Lovis, W. A.

1989 (editor) *Archaeological Investigations at the Webber I and Webber II Sites, Frankenmuth Township, Saginaw County, Michigan*. Michigan Cultural Resource Investigation Series Volume 1. Michigan Department of State and the Michigan Department of Transportation, Lansing.

1990 Accelerator Dating the Ceramic Assemblage from the Fletcher Site: Implications of a Pilot Study for Interpretation of the Wayne Period. *Mid-Continental Journal of Archaeology* 15(1):37-50.

1993 Discussion and Conclusions. In *The Archaic Woodland and Historic Period Occupations of the Liberty Bridge Locale, Bay City, Michigan*, edited by W. A. Lovis, pp. 225-229. Michigan Cultural Resource Investigation Series, Vol. 3.

Lovis, W. A. and R. M. Davis

1993 The Ceramic Assemblage from Sites 20BY77 and 20BY79, Bay City, Michigan. In *The Archaic Woodland and Historic Period Occupations of the Liberty Bridge Locale, Bay City, Michigan*, edited by W. A. Lovis, pp. 98-123. Michigan Cultural Resource Investigation Series, Vol. 3.

- Mainfort, R. C., Jr.
1979 *Indian Social Dynamics in the Period of European Contact: Fletcher Site Cemetery, Bay County*. Publications of the Museum, Anthropological Series Vol. 1(4). Michigan State University, East Lansing.
- Mason, R. J.
1981 *Great Lakes Archaeology*. Academic Press, New York.
- McAllister, P. W.
1999 Upper Mississippian in Western Lower Michigan. In *Retrieving Michigan's Buried Past: The Archaeology of the Great Lakes State*, edited by J. R. Halsey, pp. 254-262. Cranbrook Institute of Science, Bulletin 64, Bloomfield Hills, Michigan.
- McCormick
1883 Mounds and Mound-Builders of the Saginaw Valley. *Michigan Pioneer and Historical Collections* 4:379-383.
- Monaghan, G. W.
1995 Physiographic Environment. In 1991 Great Lakes Gas Transmission Limited Partnership Pipeline Expansion Projects: Phase III Investigations at the Cassasa Site (20SA1021) Saginaw, Michigan, edited by M. C. Branstner and M. J. Hambacher, pp.2.1-2.22. Great Lakes Research Associates. Report on file at the Saginaw Archaeological Commission.
- Monaghan, G. W. and W. A. Lovis
2005 Modeling Archaeological Site Burial in Southern Michigan: A Geoarchaeological Synthesis. Environmental Research Series Vol. 1. Michigan State University Press, East Lansing.
- Monaghan, G. W., W. A. Lovis and K. C. Egan-Bruhy
2006 Earliest *Cucurbita* from the Great Lakes, Northern USA. *Quaternary Research* 65:216-222.
- O'Shea, J. M. and M. Shott
1990 (editors) *The Bridgeport Township Site: Archaeological Investigation at 20SA620 Saginaw County, Michigan*. Anthropological Papers University of Michigan Museum of Anthropology No.81. Ann Arbor.
- Ozker, D.
1982 *An Early Woodland Community at the Schultz Site 20SA2 in the Saginaw Valley and the Nature of the Early Woodland Adaptations in the Great Lakes Region*. Anthropological Papers University of Michigan Museum of Anthropology No.70. Ann Arbor.
- Papworth, M. L.
1959 Unpublished notes and drafts of report "Archaeological Survey of the Saginaw Reservoir Area." On file at the University of Michigan Museum of Anthropology.

- 1966 Cultural Traditions in the Lake Forest Region During the Late High-water Stages of the Post-glacial Great Lakes. Unpublished Ph.D. dissertation, University of Michigan. Ann Arbor.
- Peebles, C. S.
1978 Of Archaeology and Archaeologists in Saginaw County, Michigan. *The Michigan Archaeologist* 24(3-4):83-129.
- Robertson, J. A., K. C. Taylor, W. A. Lovis, and J. M. McClurken
1993 A Baseline Artifact Inventory Survey of Museum Property and Indian Interests in National Wildlife Refuges Located in Michigan. Commonwealth Cultural Resources Group, Inc., Jackson, Michigan.
- Robertson, J. A., K. C. Taylor, M. J. Hambacher, W. A. Lovis, and G. W. Monaghan
1999 Overview Study of Archaeological and Cultural Values on Shiawassee, Michigan Islands, and Wyandotte National Wildlife Refuges in Saginaw, Charlevoix, Alpena, and Wayne Counties, Michigan. Unpublished report on file at the Saginaw Archaeological Commission.
- Shott, M.J. and P.D. Welch
1982 Archaeological Resources of the Thumb Area of Michigan. *The Michigan Archaeologist*, 30:1-79.
- Simons, D. B.
1997 The Gainey and Butler Sites as Focal Points for Caribou and People. In *Caribou and Reindeer Hunters of the Northern Hemisphere*, edited by L. J. Jackson and P. T. Thacker, pp. 105-131. Avebury, England.
- Simons, D. B., M. J. Shott and H. T. Wright
1984 The Gainey Site: Variability in a Great Lakes Paleo-Indian Assemblage. *Archaeology of the Eastern United States* 12:266-279.
- Simons, D. B. and H. T. Wright
1992 Butler 1991: Excavations at a Fluted Point Site in the Central Great Lakes Region (20GS104). *Current Research in the Pleistocene* 9:35.
- Smith, H. I.
1894 Caches of the Saginaw Valley. *Proceedings of the American Association for the Advancement of Science* 42:1-4.
- 1901a Summary of the Archaeology of Saginaw Valley, Michigan. *American Anthropologist* (New Series) 3:286-293.
- 1901b Summary of the Archaeology of Saginaw Valley, Michigan - II. *American Anthropologist* (New Series) 3:501-512.

1901c Summary of the Archaeology of Saginaw Valley, Michigan - III. *American Anthropologist* (New Series) 3:726-736.

Sommer, J. D.

2000 A preliminary Report on the Archaeology of the Shiawassee National Wildlife Refuge. Report on file at the Saginaw Archaeological Commission of the Historical Society of Saginaw County, Inc.

2001 Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2000 Field Season. Report on file at the Saginaw Archaeological Commission of the Historical Society of Saginaw County, Inc.

2002 Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2001 Field Season. Report on file at the Saginaw Archaeological Commission of the Historical Society of Saginaw County, Inc.

2003 Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2002 Field Season. Report on file at the Saginaw Archaeological Commission of the Historical Society of Saginaw County, Inc.

2004a Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2003 Field Season. Report on file at the Saginaw Archaeological Commission of the Historical Society of Saginaw County, Inc.

2004b A Middle Woodland AMS Date from Saginaw County, Michigan. *Saginaw Valley Archaeologist* 2004(1):6-12.

2005 Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2004 Field Season. Report on file at the Saginaw Archaeological Commission of the Historical Society of Saginaw County, Inc.

2006 Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2005 Field Season. Report on file at the Historical Society of Saginaw County, Inc.

2007 Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2006 Field Season. Report on file at the Historical Society of Saginaw County, Inc.

Speth, J. D.

1972 Geology of the Schultz Site. In *The Schultz Site at Greenpoint: A Stratified Occupation Area in the Saginaw Valley of Michigan*, edited by J. E. Fitting, pp. 53-75. *Memoirs of the Museum of Anthropology University of Michigan* Number 4. Ann Arbor.

Stothers, D. M. and G. M. Pratt

1981 New Perspectives on the Late Woodland Cultures of the Western Lake Erie Region. *Mid-*

Continental Journal of Archaeology 6(1):91-121.

Taggart, D. W.

n.d. The Feeheley Site: A Late Archaic Site in the Saginaw Valley. Unpublished manuscript on file at the University of Michigan Museum of Anthropology. Ann Arbor.

Tanner, H. H.

1987 *Atlas of Great Lakes Indian History*. University of Oklahoma Press, Norman, Oklahoma.

Whittier, H. L.

1978 Archaeological/Historical Reconnaissance Survey of the Shiawassee National Wildlife Refuge. Report No. R-1911. Commonwealth Associates, Inc. Jackson, Michigan.

Wright, H. T.

1963 A Transitional Archaic Campsite at Green Point (20SA1). *The Michigan Archaeologist* 10(1):17-22.

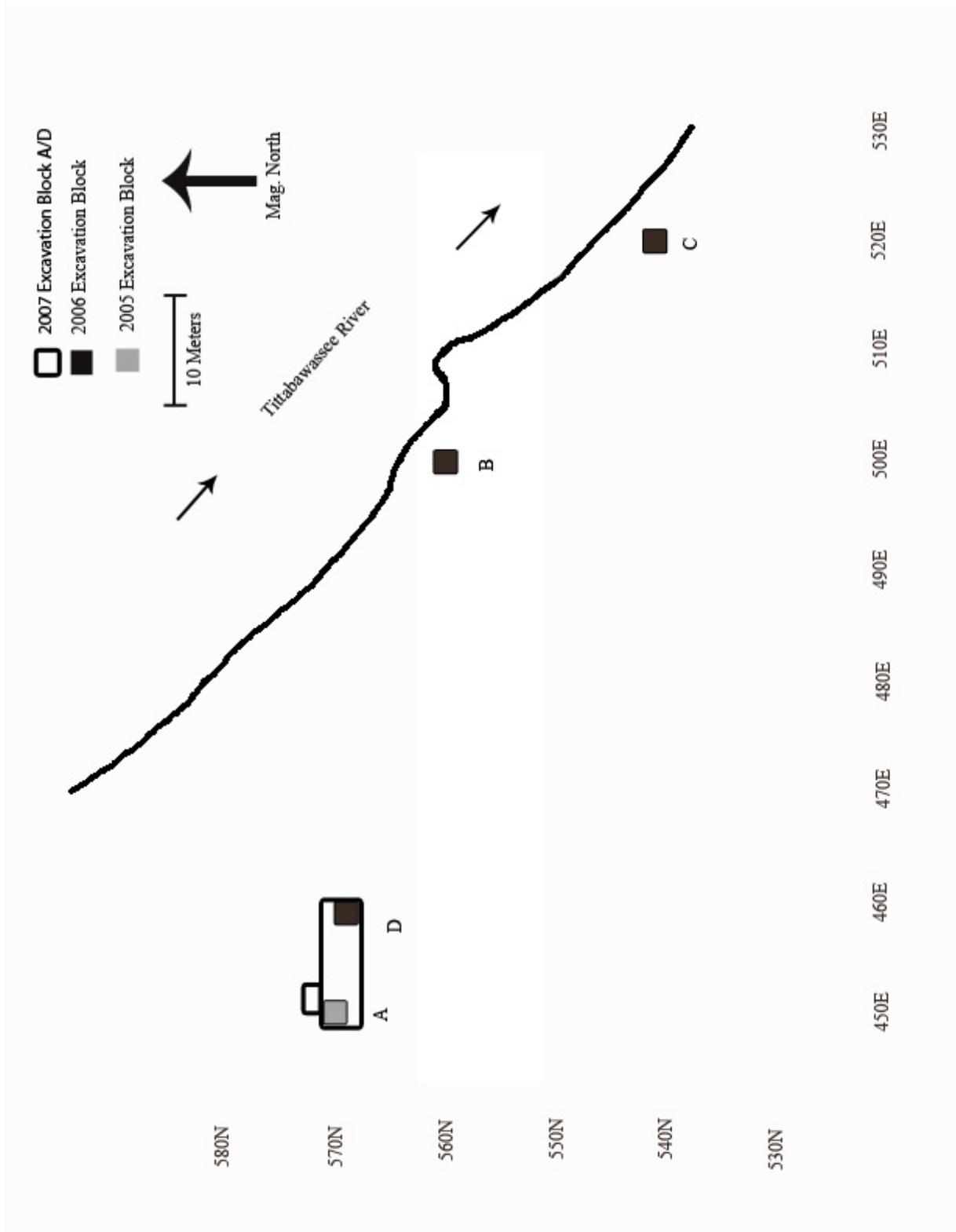
Wright, H. T. and W. B. Roosa

1966 The Barnes Site: A Fluted Point Assemblage from the Great Lakes Region. *American Antiquity* 31:850-860.

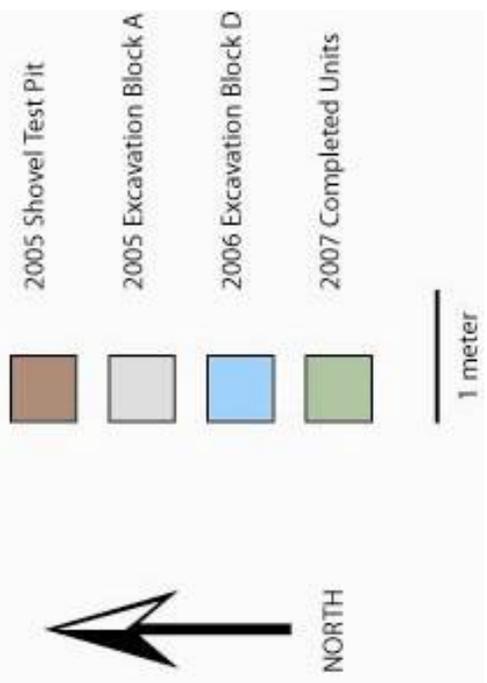
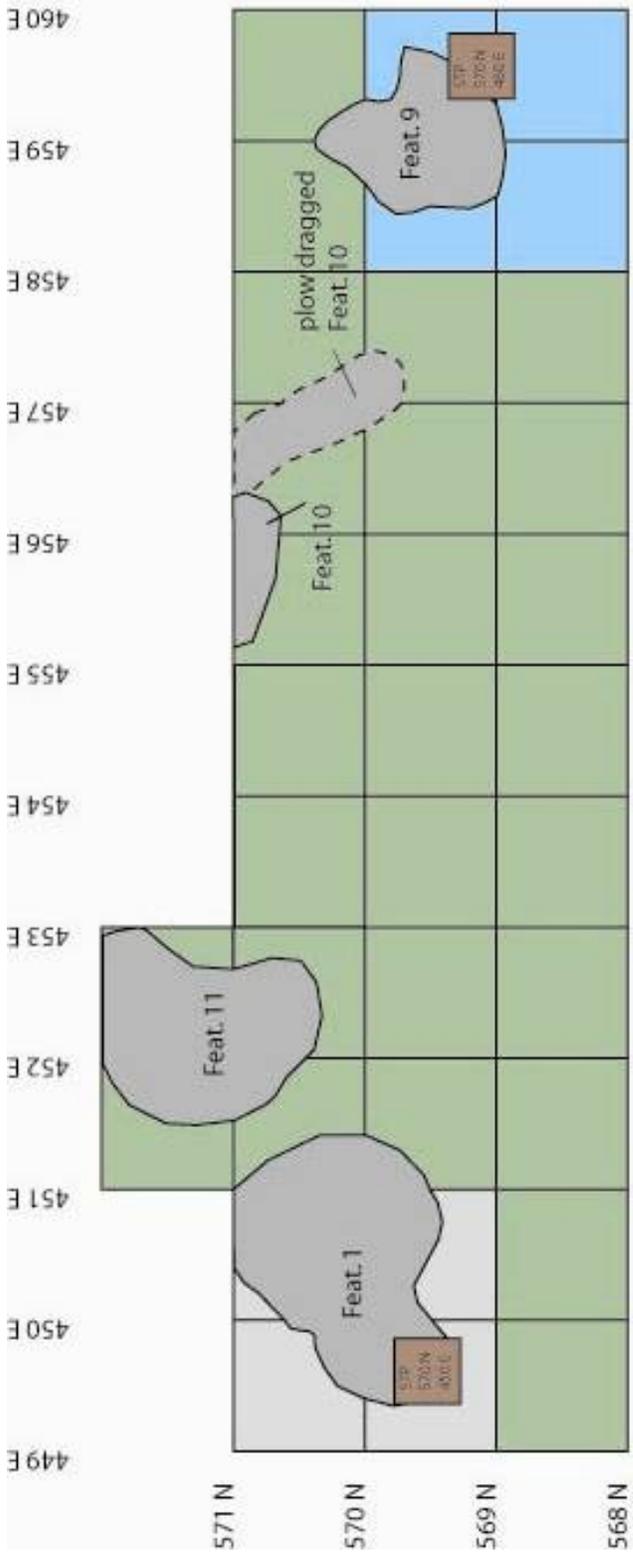
Yarnell, R. A.

1964 *Aboriginal Relationships between Culture and Plant Life in the Upper Great Lakes Region*. Anthropological Papers Museum of Anthropology, University of Michigan No. 23, Ann Arbor.

APPENDIX C: Site Maps



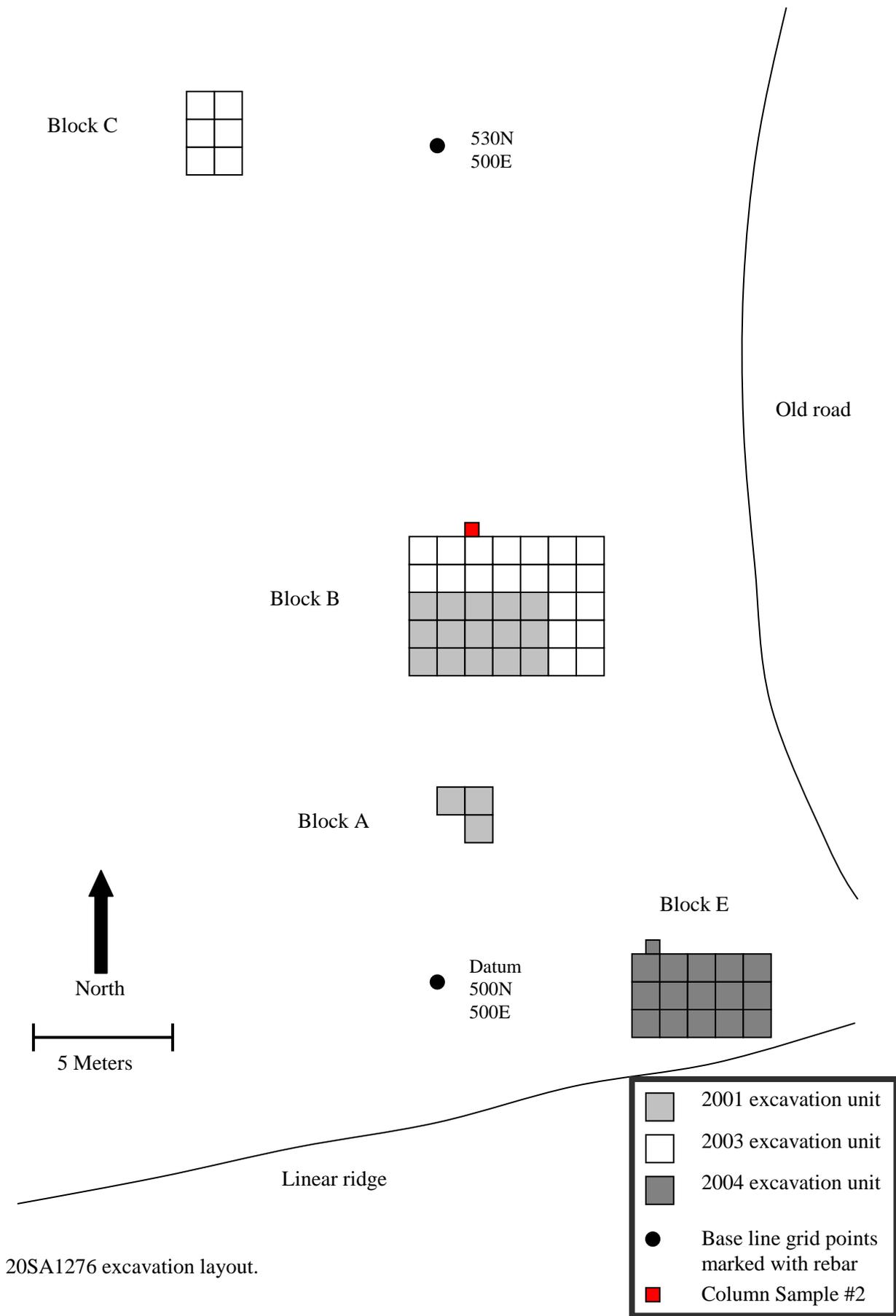
20SA722, Excavation Block Layout.



CLUNIE SITE

20SA722

Excavation Blocks A & D



20SA1276 excavation layout.