

**Report on the Archaeology
of the Shiawassee National Wildlife Refuge:
The 2012 Field Season.**

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ABSTRACT

This report summarizes the results of the fourteenth season of archaeological investigations carried out by the Historical Society of Saginaw County, Inc., in the Shiawassee National Wildlife Refuge (NWR), Saginaw County, Michigan. The field investigations, conducted under Federal Archaeological Permit No. 2002-MI/3-2 (Amendment 10), included both limited archaeological survey/salvage and test excavations. Nine volunteers and the project director contributed a combined total of 107 person days (approximately 642 hours) of fieldwork.

Consistent with the goals of the survey/salvage portion of this project, surface collections, totaling 23 objects, were made from two of the eight sites that were monitored during the 2012 field season. One additional artifact was recovered on the surface of site 20SA1252 by a USFWS employee. No previously unrecorded sites were located.

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. Twelve square meters were excavated at 20SA722 during the 2012 field season. These excavations yielded 10568 catalogued objects. In addition, 42 samples, containing a total of 259 liters of sediment, were saved for flotation.

Previously reported radiocarbon dates and artifact typology from this and previous years indicate that excavated material from site 20SA722 dates primarily to the Late Prehistoric and protohistoric periods (ca. A.D.1400-1650). An AMS date obtained in 2010 and typological analyses indicate that a portion of the excavated area was stratified with Middle Woodland to early Late Woodland material (ca. BC 10 – AD 1000) below the Late Prehistoric component. 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 the fourteenth season of archaeological investigations carried out by the Historical Society of Saginaw County, Inc. in the Shiawassee National Wildlife Refuge (NWR), Saginaw County, Michigan. The field investigations, conducted under Amendment 10 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). Nine volunteers and the project director contributed a combined total of 107 person days (approximately 642 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. 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 2012 is presented in the Analysis and Evaluation section of this report. Erosion is described using somewhat subjective terms such as minor/minimal, moderate and severe. Along this continuum, minor/minimal indicates that non-vegetated 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 eight previously recorded sites. Surface collections, totaling 23 objects, were made from two of the eight sites that were monitored during the 2012 field season. An additional artifact was recovered by USFWS personnel at site 20SA1252 while conducting routine maintenance. This artifact is described below and will be curated with the rest of the material collected during 2012. Although site 20SA1252 has been subject to archaeological survey/monitoring in the past, a site visit was not conducted by the author in 2012. No previously unrecorded sites were detected during the 2012 field season.

Test excavations were conducted at the Clunie 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.

Twelve square meters were excavated at 20SA722 during the 2012 field season. They are contiguous with 4 square meters excavated in 2011 and together are referred to as Excavation Block H (Appendix C). The 2012 excavation of Block H exposed portions of three hearth features (Features 23, 25, and 26), one trash pit (Feature 27), and two pit features that appear to have functioned as both hearths and trash pits (Features 24 and 28). Stratigraphic position, feature contents, and associated artifacts indicate a Late Prehistoric/Protohistoric temporal placement for these features. Forty-two samples, containing a total of 259 liters of sediment, were saved for flotation, including 58 liters from Feature 23, 119.5 liters from Feature 24, 6 liters from Feature 25, 5 liters from Feature 26, 36 liters from Feature 27, and 34.5 liters from Feature 28. The Block H excavations yielded 10568 catalogued objects. Materials derived from flotation samples and items <math><1/4''</math> from

Of the 39 archaeological sites/findspots monitored during the 14 field seasons of this project (eight during the 2012 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, at least 90 meters along a north/south transect (Sommer 2002), but site boundaries have not yet been determined. Of the five sites identified in the refuge’s 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 (Sommer 2002, 2003a). The fifth site located in a farm unit is 20SA1367, newly located in 2009. The entire area surveyed, ca. three hectares, contains a low-density scatter of prehistoric and mid-19th to early 20th century debris. However, the surveyed area did not define the boundaries of the site, which almost certainly extends over a much wider area. The surveyed area has now been planted as part of a habitat restoration program which should prevent future erosion and exposure of archaeological material (Sommer 2010).

Prehistoric artifacts recovered from the various sites on the refuge represent primarily Middle and early Late Woodland occupations (ca BC 100 – AD 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-20th century to modern debris is present on all of the sites (as well as on non-site areas). This recent material is not considered archaeologically significant and in most instances was neither noted nor collected.

Combining the materials recovered from the surface of 20SA722, 20SA1251, and 20SA1252 and from the test excavations at 20SA722, 10592 objects were catalogued from the 2012 field season. The number of catalogued artifacts will rise dramatically in the future when material from fine-screened and flotation samples are processed. 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 3 ft³ of artifacts and samples and less than one linear foot of notes and other documentation were produced during the 2012 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 2000). The proposed project was 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 2003a).

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 2003a).

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).

The 2007 field season included survey/monitoring of 13 sites, with collections being made at five sites. A 50 X 50 cm column sample was taken from site 20SA1276. The column sample consisted of 10 flotation samples totaling 141.5 liters. The majority of the 2007 field season was spent excavating 27 square meters at site 20SA722 (Sommer 2008).

Excavations at the Clunie site (20SA722) continued to be the focus of fieldwork throughout the 2008-2011 seasons. Fifty-five square meters were excavated at this site over this four year span. Surface survey was also conducted to a limited extent and one additional site (20SA1367) was recorded in 2009 (Sommer 2010).

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 Refuge Manager Steve Kahl. 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. The 2012 field crew included, Andrea Butler, Chantelle Cook, Polly Anna Egan, Dave Hamilton, John Heintz, John Klumpp, Ken Kosidlo, Mike Mauer, and Elise Widmayer. Most of the field crew also assisted in the lab, as did Amber Golembiewski and Bernie Spencer.

PROJECT SETTING

The Shiawassee NWR encompasses portions of James, Saginaw, Spaulding, Swan Creek, and Bridgeport Townships, Saginaw County, Michigan. It contains over 9,500 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. This region 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). In the following discussion, 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 which 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.). Other 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 4,200 B.P., this recession was interrupted by a brief transgression referred to as Nipissing II. The Nipissing II level reached an elevation of approximately 181 m. 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 181 m 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 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 primarily of 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 wetlands, 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, the dispersed nature of these resources may have caused logistic problems for prehistoric people attempting to utilize them.

The Saginaw Valley spans the northern edge of the Carolinian biotic province and 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). Using General Land Office surveys, Comer and Albert (1997) have mapped the vegetation of Saginaw County as it existed circa 1800, prior to widespread land clearing activities. For the immediate project area, their map indicates mixed hardwood swamp, beech-sugar maple forest, shrub swamp/emergent marsh, and a small amount of wet prairie. 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 Paleo-Indian 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, Paleo-Indians probably utilized a variety of plant species. Paleo-Indian sites are recognized by the presence of diagnostic flake stone tools (especially fluted projectile points) and their manufacturing debris. Examples of Paleo-Indian 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 Paleo-Indian 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 associate tribal names with specific Native American groups living 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, Golson, 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 1950s and 1960s. 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 1970s, '80s, and '90s 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, at least six contract reports 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. 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 2012 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. Where artifacts were collected, their locations were either recorded using a GPS device or plotted according to their site coordinates. All site locations had been previously plotted on 7.5' U.S.G.S. topographic maps using the DeLorme 3-D Topoquads computer program. Topographic maps used include the Saginaw and Shields quadrangles.

Excavation units at 20SA722 use the same datum and generally follow the site grid set up for shovel testing in 2004 (Sommer 2005). However, rather than using a hand-held compass, an autolevel 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 original shovel test grid. The 12 square meters excavated at 20SA722 during the 2012 field season were set up by measuring off the corners of the four previously excavated units in Excavation Block H (Appendix C). Individual excavation units (1X1 meter) are labeled according to the grid coordinates of their SW corner. Prior to laying out the actual excavation units, surface vegetation was removed as close as possible to the ground level.

Excavation commenced by removing and screening the top 30 centimeters (plowzone) in each unit as a single level. Subsequent levels were removed in five centimeter increments. The depth of the plowzone varied across the units, but in all cases appeared to be greater than 30 cm. Usually there was no clear distinction between the plowzone and subplowzone sediment, so it was not possible to remove the entire plowzone in one level and keep it totally separate from material below. Depth measurements were taken as centimeters below datum (b.d.), which was arbitrarily chosen as the surface of one of the corners of the excavation unit. In some cases one surface datum was used for two or three adjacent units. 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 and, indeed, below surface (b.s.) and below datum (b.d.) designations were used interchangeably in the field. 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 $\frac{1}{4}$ " or $\frac{1}{8}$ " mesh hardware cloth. The 0-30 cm level (plowzone), was always screened through $\frac{1}{4}$ " mesh screen. In order to recover a sample of smaller-sized artifacts from the main occupation zone, and to insure that certain artifact classes were not being missed, or underrepresented, all of the levels between 30 and 50 cm were screened with $\frac{1}{8}$ " mesh screen. Non-feature material below the 50 cm level was screened through $\frac{1}{4}$ " mesh screen. Excavation in each unit was completed down to 80 cm, a depth at which culturally "sterile" (absent or very low artifact density) sediment was reached.

To reduce damage to fragile artifacts while they were being screened, 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. This most frequently occurred with $\frac{1}{8}$ " screened samples. The screen contents were bagged by provenience and assigned a Field Sample (F.S.) number. The F.S. 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.

Six features including three hearths, one trash pit, and two hearths that were also used as trash pits were encountered in 2012 excavations in Block H. Features were excavated separately from the

surrounding matrix and all feature fill was saved, thoroughly air-dried, and later processed by flotation. 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. Excavation within each feature Area proceeded by excavating with trowels, brushes, and/or small plastic putty or paint knives. Within each Area, features were excavated in 5 cm levels, or, when possible, by stratigraphic levels referred to as Zones. All depths are recorded as centimeters (cm) below datum (b.d.), using the same surface datum as the rest of the excavation unit containing the feature. Plan views of each 5 cm level and profiles were drawn and photographed with a digital camera. All feature fill was saved, the volume of fill was recorded in liters, and the material was bagged and assigned an F.S. number.

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.

Lab Methods

After being collected, all artifacts were taken to the archaeological laboratory at the Historical Society of Saginaw County, Inc. for processing. Samples recovered in $\frac{1}{8}$ " mesh screen were size-sorted into fractions $>\frac{1}{4}$ " and $<\frac{1}{4}$ " by passing the material through $\frac{1}{4}$ " mesh screen. In this way there are comparable samples from all levels whether screened with $\frac{1}{4}$ " or $\frac{1}{8}$ " mesh screen. The next 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 2012 field season of this project were catalogued under Accession F12-1, F12-2, and F12-3. 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 catalogued 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 and the $<\frac{1}{4}$ " size fraction of the $\frac{1}{8}$ " screened 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 $\frac{1}{2}$ " 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 and then, with the exception of FCR derived from feature contexts, discarded. 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.

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 2012 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 one 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. Prior to sorting and cataloguing, the dried the light and heavy fractions from the 2012 flotation samples will be size sorted by passing the material through nested geological sieves of 4mm and 2mm. This process yields size categories of >4mm, 2<4mm, and <2mm.

Analysis and Evaluation

Eight previously recorded sites were surveyed/monitored during the 2012 field season. This section will present an analysis and evaluation of the materials obtained through the surface survey portion of this project. In addition, a ground stone celt recovered from the surface of site 20SA1252 by a USFWS employee is described below. 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). Yearly monitoring since 1999 has shown that a light scatter of FCR, flakes, Late Woodland pottery and Historic period material covers the site. A visit in May of 2012 revealed moderate erosion over much of the site area. Nine FCR and three Bayport chert flake were observed but not collected. 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, 2003a:12, 2005:12). A 1955 aerial photograph of the site area shows that it was under active cultivation at that time.

20SA722 *Clunie Site*

This large site extends for approximately 960 meters along the bank of the Tittabawassee River (Appendix B). During the 2000 field season, 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 all of the stakes have now 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 – 2007, 2009, and again in 2011. Only minor to moderate erosion was noted during the 2008, 2010, and 2012 field seasons.

Eighty-five 50X50 cm shovel-test pits were dug on this site between 2004 and 2005 (Sommer 2005:13-15, 2006:14-18). These shovel-tests demonstrated that, at least in the area tested, the site extends inland from the riverbank 40-60 meters. In addition to the shovel-tests, between 2006 and 2012, one hundred and ten square meters were excavated in seven Excavation Blocks. Of these, 12 square meters were excavated in Block H in 2012.

Both surface survey and limited test excavations were conducted at 20SA722 in 2012. A total of 10585 objects were catalogued from 20SA722 during the 2012 field season. These items are included in Accession F12-1 and were assigned Catalogue Numbers F12-1-1 through F12-1-785. These items include 17 objects derived from the surface and 10568 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 coin, a 1937 U.S. Mercury Dime, one retouched flake, and 15 grit-tempered ceramic sherds. The ceramic sherds include three rimsherds and 12 body/neck sherds. The first rimsherd exhibits a smoothed-over exterior and is decorated on the exterior with short (10.4 mm), vertical cord-wrapped stick impressions located just below a thickened rim (Figure 1, #780). The impressions are spaced 3.4 mm apart. The lip of this vessel is flattened. The second rimsherd recovered from the surface is from a castellated vessel with a slight collar and a flattened lip (Figure 1, #784). The collar is decorated on the exterior with vertical cord, or cord-wrapped paddle, impressions. The exterior neck is smooth below the collar. Collars and castellations are vessel traits that

generally post-date A.D. 1000 in Michigan, placing this vessel in the late Late Woodland to Late Prehistoric time frame (Brashler 1981:322). The third rimsherd is from a vessel with an undecorated cord-roughened exterior and a thickened lip crossed by oblique cord-wrapped stick impressions (Figure 1, #782).

The remaining 12 grit-tempered sherds are neck/body sherds, four of which are decorated. One of the decorated sherd exhibits two oblique rows of punctate-like tool impressions on a smooth exterior. The other three decorated sherds are all from one vessel and two of them conjoin. These sherds have a shallow, 2.9 mm wide, trailed line on a smoothed-over surface. Other neck/body sherds include six examples with cord-roughened exterior surfaces, one of which has a striated interior surface, one with a smoothed-over cord-roughened exterior, and one with a smoothed-over, possibly fabric impressed, exterior. The 12 body/neck sherds likely span the Middle through Late Woodland periods.

The only flaked stone tool recovered from the surface of 20SA722 in 2012 is a large retouched quartzite flake (Figure 1, #778). The flake is bifacially retouched and likely functioned as a knife.

Based on the 2012 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 prehistoric artifacts recovered from the surface in 2012 all probably date to the Middle Woodland through Late Prehistoric periods.

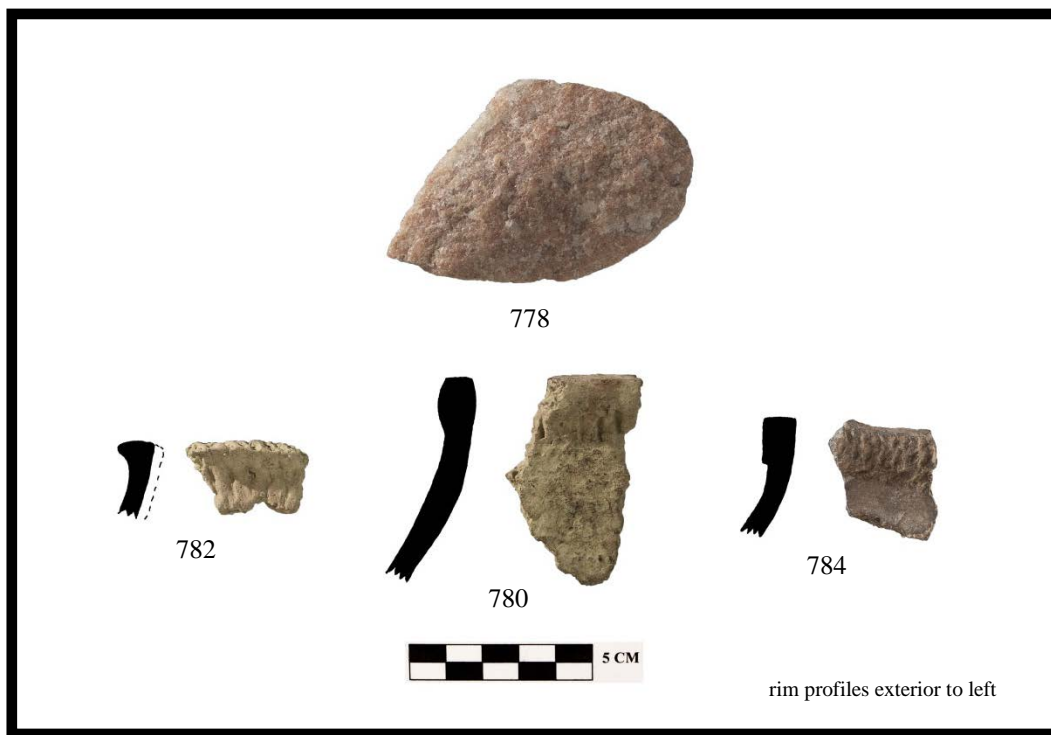


Figure 1: 20SA722, retouched flake and rimsherds from surface.

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 in recent years resulting in increased surface stability and minimal bank erosion in some areas of the site. However, moderate to severe erosion was observed along some portions of the site each year from 2004 through 2012. During most years, including 2012, the moderate to severe erosion was located primarily along the highest density portion of the site.

A 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 50X50 cm 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). Shovel testing has revealed that large areas of relatively intact site deposits exist away from the eroding edge of the riverbank. In addition, 50 square meters were excavated at this site between 2001 and 2002 (Sommer 2002:25-27, 2003a:23-28). Work in 2012 was confined to surface survey.

Visits to the site in May and October 2012 revealed numerous flakes, grit-tempered pottery sherds, FCR, and a few flaked stone tools. Six artifacts were collected including three grit-tempered ceramic sherds, two bifaces, and a core. These items are included in Accession F12-2 and were assigned catalogue numbers F12-2-1 through F11-2-5.

One of the ceramic sherds collected in 2012 is neck sherd with a smooth exterior and zoned rocker stamping (Figure 2, #2a). This decorative motif is one of the hallmarks of Middle Woodland period Green Point Ware ceramics (Fischer 1972). A second sherd also exhibits a smooth exterior, but lacks any decoration (Figure 2, #4). In terms of temper and paste, however, even this plain sherd can be confidently assigned to a Middle Woodland temporal position. The third grit-tempered sherd, also a body sherd, has a cord-roughened exterior surface and is otherwise undecorated (Figure 2, #2b). This sherd could date to either the Middle or early Late Woodland time periods.

The two bifaces collected from 20SA1251 in 2012 include a small fragment made of Upper Mercer Chert (Figure 3, #3) and a triangular knife/preform made of Bayport chert (Figure 3, #5). Crushing on the edges of the small fragment may indicate either that it is a remnant of a bipolar core, or that an attempt was made to split a biface using bipolar percussion. Upper Mercer chert is a raw material which occurs naturally in east/central Ohio, approximately 300 miles south of the Shiawassee National Wildlife refuge (DeRegnaucourt and Georgiady 1998:80-81). It occurs most frequently in the Saginaw Valley on early Late Woodland Jacks Reef Corner-notched points and correlates, several of which have been recovered from this site (Sommer 2002:15, 2003:24). The triangular biface may have served as a knife in its current configuration, or it may be a preform for a notched/stemmed projectile point or knife. Measurements of the triangular preform are as follows: length 60.38 mm; width 32.45 mm; thickness 9.97 mm; and weight 16.7 grams. This appears to be a very common style in local Middle Woodland assemblages and several were recovered from Middle Woodland levels at the Schultz site (Fitting 1972b: 196, 212).

The final flaked stone tool recovered from the surface of 20SA1251 in 2012 is a pebble chert core (Figure 3, #1). Flake scars indicate that relatively long, narrow blade-like flakes were the intended product of this core. Blades, or blade-like flakes, are common components of Middle Woodland lithic assemblages at sites such as Schultz in the Saginaw Valley and elsewhere (Fitting 1972b:215-217).



Figure 2: 20SA1251, ceramics from surface.

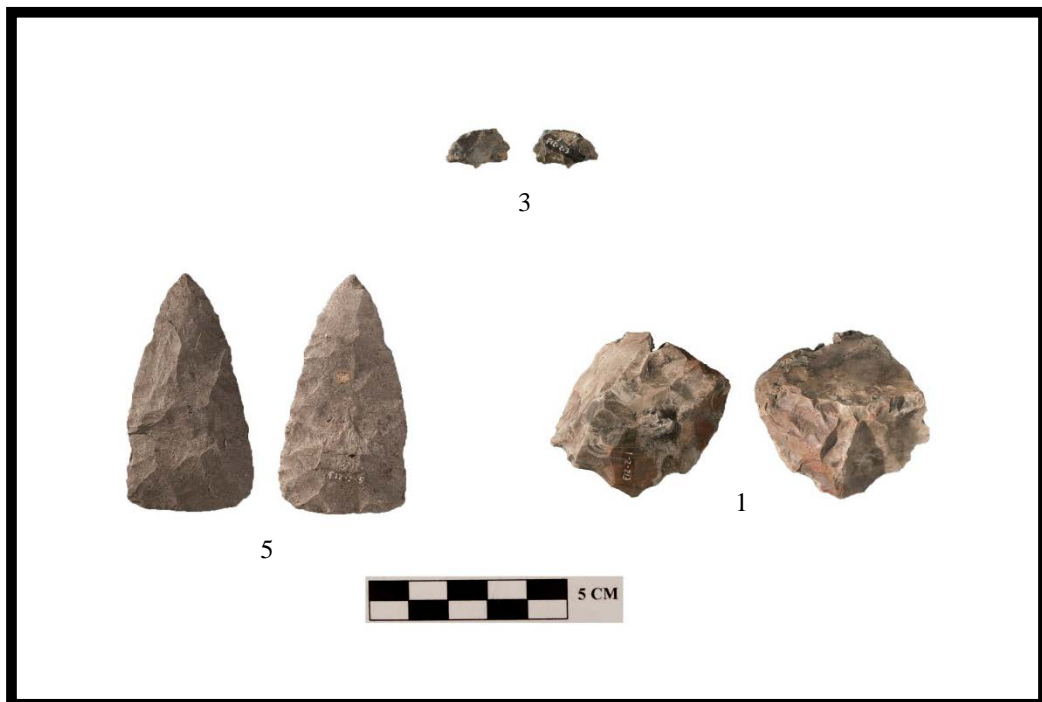


Figure 3: 20SA1251, bifaces and core from surface.

Based on material from this and previous field seasons, 20SA1251 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. 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 2003b, 2004b). 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.

20SA1252 *Shiawassee #7*

Extending approximately 200 meters along the Shiawassee River (Appendix B), this site is flanked on both ends by low marshes. Unfortunately, 20SA1252 appears to have been heavily impacted by dike construction. A 1955 aerial photograph shows that the dike was already in existence at that time. A prehistoric ground stone (diabase) celt was collected from this site by a USFWS employee who encountered it while conducting routine invasive species control activities. It was turned over, along with precise location coordinates, to be included with the rest of the material from the 2012 field season. This item is included in Accession F12-3, and was assigned catalogue numbers F12-3-1 (Figure 4, #1). Measurements for the celt are as follows: length 142.57 mm; width 60.62 mm; thickness 29.92 mm; and weight 393.1 grams.

Based on material recovered during previous field seasons, this site is interpreted as a multi-component, primarily Middle to Late Woodland, occupation site. Probable 18th century (gunflint) as well as 19th and 20th century material is also present on this site.



Figure 4: 20SA1252, celt from surface.

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 covers much of the riverbank and no artifacts were observed or collected from this site during a single visit in May 2012. Despite heavy vegetation, pockets of moderate erosion of the riverbank were observed in the site's vicinity. 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, 2003a: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 covers much of the riverbank and no artifacts were observed or collected from this site during a single visit in May 2012. Despite the heavy vegetation, moderate erosion of the riverbank was observed in the vicinity of the site. Based on artifacts recovered in 2000 and 2002, 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 covers the riverbank and no artifacts were observed or collected from this site during a single visit in 2012. Despite the heavy vegetation, moderate erosion of the riverbank was observed in the site's vicinity.

Based on differences in their temper and paste, the three ceramic sherds recovered in 2006 represent at least two vessels, at least one of which is 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.

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, 2003a, 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.

Two visits to the site in May and October 2012 revealed heavy vegetation covering the ground and no recent burrow disturbance. No artifacts were observed or collected.

Previous work at 20SA1276 indicates that this site dates between the Late Archaic and Late Woodland periods. The great majority of the previously recovered artifacts and three radiocarbon dates indicate that the main period of occupation occurred during the Middle Woodland time period.

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. One visit was made to the site in May 2012. The surface was covered with vegetation and no recent disturbance was noted. No artifacts were observed or 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

Twelve square meters were excavated at 20SA722 during the 2012 field season. They are contiguous with the four square meters excavated in 2011 and together comprise Excavation Block H (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 Block H are very similar to the soil profiles described for the other Excavation Blocks reported previously from this site (Sommer 2006, 2007, 2008, 2009, 2010, 2011, 2012). Excavation Block H is represented by the west wall profile of unit 554N 488E (Figure 5). A generalized description of the soil profile in Excavation Block H follows. Soil colors are described using Munsell® Soil Color Chart designations.

The upper A-horizon includes an approximately 35 cm thick plowzone consisting of very dark grayish brown (10YR3/2) sandy silt. No significant change in color or texture is noted until approximately 40-45 cm when the soil becomes a very dark grey (10YR3/1) sandy silt. In some areas this zone is even darker (10YR2/1 black). This darker zone, which is approximately 10 cm thick, is probably a paleosol (buried A-horizon) that denotes a relatively stable former land surface during a period of reduced flooding. This appears to have been the ground surface on which the late Prehistoric inhabitants of this site lived. Between the plowzone and the paleosol, all of the units in Excavation Block H (and most across the entire site) show a 5-15 cm thick zone of plowzone-colored sandy silt mottled with lighter (10YR4/2) and darker (10YR2/1) flecks. Plowscars were frequently visible in this zone which, presumably, represents a partially disturbed zone at the base of the plowzone. This zone is also the level in which several Excavation Blocks, including Excavation Block H, begin to show evidence of (disturbed) shallow surface hearths. At around 45-55 cm the soil is again a slightly lighter (10YR3/1) sandy silt to clayey silt which continues down to a depth of approximately 70 cm. Below this level, extending down to 80+ cm in Excavation Block H, was a darker (10YR2/2) sandy silt. Finally, below the lower dark zone, across the entire site, there is a massive deposit of medium/fine sand ranging in color from 10YR5/4 to 10YR4/2 and mottled with iron staining. The transition to this level is typically marked by numerous burrows and other forms of bioturbation. Snail and bivalve shells are present throughout this zone and show some tendency to occur in lenses of higher density. Our excavations in Block H ended at a depth of 80 cm, so we were just beginning to see the transition to the sand deposit.

In total, 10585 objects were catalogued from 20SA722 during the 2012 field season. These items include 17 objects found on the surface (described above in *Analysis and Evaluation* section) and 10568 items derived from Excavation Block H. The excavated items will be described in this section. The catalogued material from the excavation units represents only a portion of the cultural material actually present. As described in the *Methods* section above, fire-cracked rock (FCR) from non-feature contexts was size sorted, counted, weighed, and discarded. The total amount of FCR excavated in 2012 from non-feature contexts is 496<0.5" (707.0g) and 210>0.5" (3624.9g). Prior to cataloguing, $\frac{1}{8}$ " screened samples were size sorted into fractions $> \frac{1}{4}$ " and $< \frac{1}{4}$ ". Only the $> \frac{1}{4}$ " size fractions have been catalogued to date. In addition, 42 samples, containing a total of 259 liters of sediment, were saved for flotation. This material has not yet been analyzed.

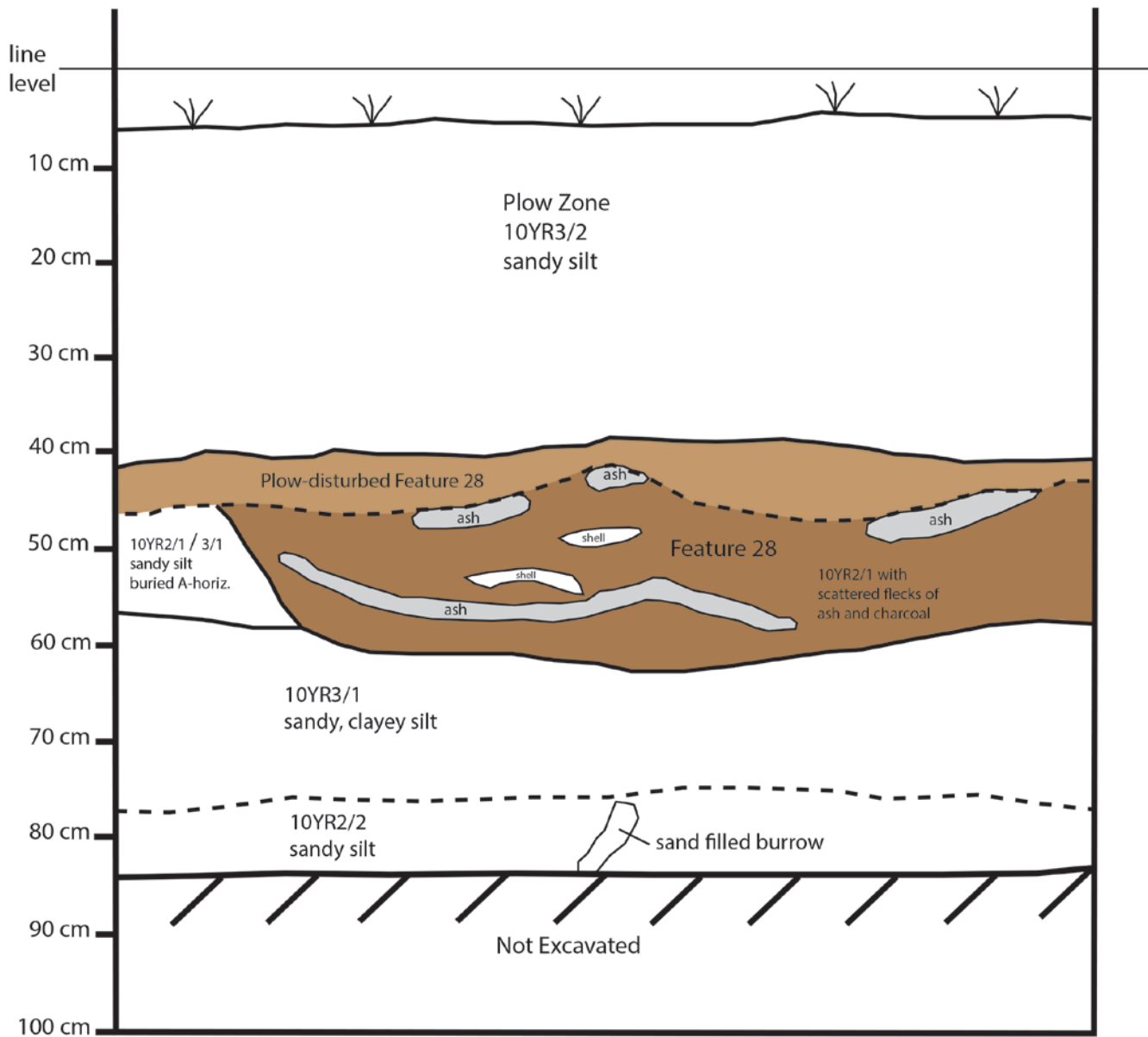


Figure 5: 20SA722, Excavation Block H, 554N 488E, West Wall profile showing Feature 28.

Artifact Summary for Excavation Block H

The 10568 catalogued items from Excavation Block H include 181 historic objects, 7977 prehistoric objects, and 2410 items of an undetermined origin. The latter group includes an unmodified piece of what appears to be cannal coal from Feature 24 and 2409 pieces of charcoal. Most of the charcoal is wood charcoal. However, the charcoal assemblage also includes one *Carya* sp. nutshell, five *Juglans* sp. nutshells, one *Quercus* sp. nutshell, one unidentified nutshell, and two possible tuber fragments. Most of the charcoal is certainly a product of cultural activity, but some could represent natural forest fires. Whereas most bivalve fragments from the site are assumed to represent prehistoric cultural activities, it is possible that some from the lower levels of the excavation could be natural inclusions in the soil. There are relatively few demonstrably cultural artifacts from depths below approximately 70 cm and starting around this depth we begin to encounter the sandy “sterile” subsoil, which at this site is known to contain numerous mussel and gastropod shells.

Historic items from Excavation Block H include 24 cinders/slag; 24 pieces of coal; one yellow brick fragment; three pieces of concrete/mortar; three stoneware ceramic fragments with salt-glazed exteriors and dark brown glazed interiors; two plain white/destroyed white paste earthenware fragments; 31 glass vessel fragments; 14 clay pigeon fragments; 11 nail fragments, at least nine of which are from square nails; 64 metal scraps including three scraps of barbed wire, two other corroded wire fragments, 17 scraps of non-ferrous metal, and 42 corroded scraps of iron; one .22 cal. short shell casing; a 1910 U.S. Penny; and a steel hunting knife with a brass and leather handle (Figure 6, #304). The glass vessel fragments include nine brown/amber bottle fragments, one of which is the base of a bottle embossed [REGISTERED] (Figure 6, #300); 14 aqua jar/bottle fragments; two amethyst-colored fragments; and six clear glass fragments. Most of the historic items probably date to the mid-nineteenth through twentieth centuries.



Figure 6: 20SA722, Excavation Block H, bottle fragment and knife.

The 7977 catalogued prehistoric items from Excavation Block H include one small fragment of a grit-tempered ceramic smoking pipe; 2239 ceramic sherds; four fragments of fired waste clay, or daub; 63 fish scales; 3883 unmodified bones and bone fragments, including fish, bird, reptile, and mammal remains; one unidentified coprolite fragment; 821 unmodified bivalve mollusk remains; eight modified bone fragments; one modified shell (bead); one rolled copper bead; one unidentified ring-shaped object (earring?) made of copper; 18 bifacially flaked stone tools; 21 bipolar cores; five additional chert cores/core fragments; two bayport chert shatter/core fragments; 846 lithic flakes; one modified chert flake; 27 utilized/edge-damaged chert flakes; 2 flakes/chips of ground stone; 13 sandstone abrader fragments; and 19 FCR. The 19 catalogued FCR were saved because they were derived from feature contexts. They are all larger than 0.5" and total 972.9g. Combined with the previously mentioned non-feature FCR, which have been discarded, there is a total of 496 FCR<0.5" (707.0g) and 229 FCR>0.5" (4597.8g) from Excavation Block H.

Of the 2239 ceramic sherds recovered in Excavation Block H, 40 are rimsherds and 2199 are body/neck sherds. A minimum of 21 vessels is represented. The body/neck sherds include 380 shell-tempered examples, 1808 grit-tempered specimens, and 11 sherds with both shell and grit temper. Of the 380 shell-tempered body/neck sherds, 341 are either sherdlets or destroyed and were not further analyzed. The shell-tempered neck and body sherds complete enough to be analyzed include 16 with cord-roughened exterior surfaces, 15 with smoothed over cord-roughened exteriors, eight have exterior surfaces that are smooth. One sherd with a cord-roughened exterior surface is decorated with tool impressions and one smooth-surface sherd is decorated with tool impressions and horizontal trailing. Of the 1808 grit-tempered sherds, 1508 are either sherdlets or destroyed. Of the grit-tempered body/neck sherds with intact surfaces that are large enough to be analyzed, 143 exhibit cord-roughened surfaces, 99 have cord-roughened surfaces that were subsequently smoothed-over, 22 have exterior surfaces that are smoothed over to the point that the original surface treatment is obscured, and 36 sherds have smooth exteriors. Two of the smooth sherds are decorated with incising and one smooth sherd has tool impressions. The 11 sherds with both shell and grit temper include five sherdlets, one sherd with a cord-roughened exterior, one example with a smoothed over cord-roughened surface, three sherds smoothed over to the point that the original surface treatment is obscured, and one sherd with a smooth exterior surface. None of the mixed shell and grit-tempered sherds exhibits any decorative elements.

The 40 rimsherds recovered from 2012 excavations in Block H represent at least 21 vessels, including four shell-tempered vessels, two mixed shell and grit-tempered vessels, and 15 grit-tempered vessels. The shell-tempered vessels are represented by fairly small rimsherds making the decorative motifs difficult to discern. One vessel is represented by three sherdlets that do not conjoin. The vessel has a slightly thickened, rounded lip and has tool impressions along the exterior upper rim (Figure 7, #191). The tool impressions are approximately 7.6+ mm long, 3.0 mm wide and are spaced more than 5.9 mm apart. A second shell-tempered vessel is represented by a single rimsherd with a smoothed-over exterior and a slightly thickened, flattened lip (Figure 7, #384). Decoration consists of dentate-stamping across the lip. Three square tooth impressions cross the lip, with the teeth measuring approximately 1.8 mm wide. A third shell-tempered vessel is represented by a rimsherd with a smooth exterior surface, slightly oblique cord or tool impressions around the upper exterior rim, and oblique tool/fingernail impressions across the lip (Figure 7, #601). The lip decorations are spaced 7.3 mm apart. The impressions around the upper rim are approximately 7.1 mm long, 2.5 mm wide, and are spaced 5.9 mm apart. There are also traces of vertical incised lines/scratches on the exterior, but it is not clear if these are intentional decorative elements, or imperfections in the surface treatment. The final shell-tempered vessel is represented by a rimsherd with destroyed interior and exterior surfaces. The lip is also damaged, but appears to be crossed by oblique cord-wrapped stick impressions.

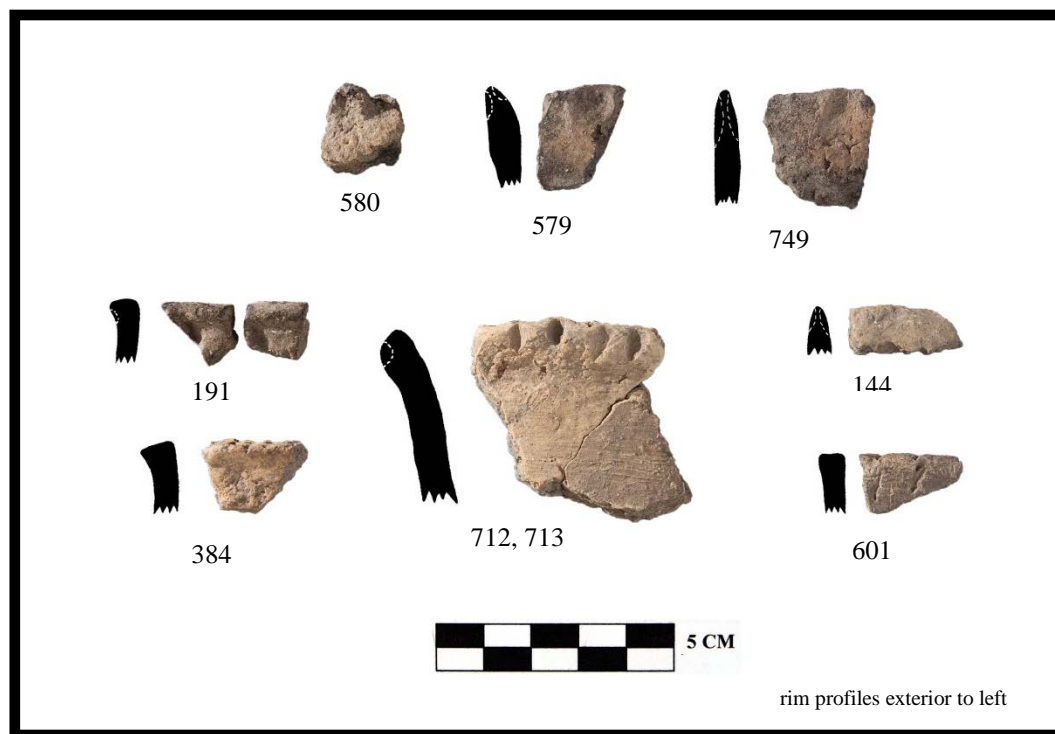


Figure 7: 20SA722, Excavation Block H, shell, mixed shell and grit, and grit-tempered rimsherds.

Two sherds with a mix of grit and shell temper conjoin to form a single rimsherd from Feature 23 (Figure 7, #712, 713). An additional rimsherd from the same vessel was recovered in the plowzone. This vessel exhibits a smoothed-over (wiped) exterior. The lip is slightly thickened and is decorated on the exterior with dowel-like tool impressions. The impressions are 6.1-7.5 mm high, 3.5-4.0 mm wide, and spaced approximately 3.5-5.7 mm apart (edge to edge). Additional sherds from this vessel were recovered in the portion of Feature 23 excavated in 2011 (Sommer 2012:26). A second vessel with a mixture of shell and grit-temper is represented by a small rimsherd with a finger-pinched lip (Figure 7, #144). The exterior surface of this vessel appears to be smooth, or smoothed-over.

At least 15 grit-tempered vessels are represented in the ceramic assemblage from Excavation Block H. One vessel is represented by two conjoined sherds with a plain lip and destroyed exterior surface. A second vessel, also represented by a small sherdlet, appears to have a cord-roughened exterior surface and a smoothed-over lip (Figure 9, 291). Two vessels have finger-pinched lips, but are otherwise undecorated. Each has a smooth exterior surface (Figure 7, #579, 749). A fifth vessel, represented by two rimsherds, appears similar, but with a finger/dowel impressed lip rather than a pinched lip (Figure 7, #580). A sixth vessel has a slight collar (29.3 mm wide) decorated with oblique incised lines (Figure 8, #320). The incised lines are approximately 1.0 mm wide and extend from just below the lip to the bottom of the collar. The lip of this vessel is also finger-pinched. A seventh vessel, also decorated, has a smooth exterior with oblique dentate stamping along the top of the rim (Figure 8, #2). The dentate tool shows two tooth impressions, the lower of which is rectangular and measures approximately 3.8X1.9 mm. The upper tooth impression is variable in size and shape, having been altered by finishing the plain, flat lip.

Two of the grit-tempered vessels are decorated with plain tool impressions around the exterior upper rim. One vessel has a smooth exterior and a thickened upper rim/lip decorated with vertical to slightly oblique tool impressions (Figure 8, #145). The tool impressions measure approximately 12.8 mm

long, 4.0-4.8 mm wide, and are spaced 1.8 mm apart (edge to edge). The other vessel has vertical tool/fingernail impressions measuring 9.7 mm long, 2.0 mm wide, and space 3.8-4.7 mm apart (Figure 8, #328). This vessel also exhibits a slightly channeled lip.

Four of the grit-tempered vessels are decorated with cord-wrapped stick impressions along the rim exterior. One vessel is represented by eight sherds recovered during the 2012 field season and one sherd recovered during the 2011 work in Excavation Block H (Sommer 2012:27-28). This vessel exhibits a thickened, channeled lip and a smooth exterior decorated with oblique impressions (Figure 8, #120). The cord-wrapped stick impressions show seven twists of cord and measure 14.8-17.9 mm long, 2.9 mm wide, and are spaced approximately 1.8-5.2 mm apart (edge to edge). A similar vessel also exhibits oblique cord-wrapped stick impressions on a smooth exterior surface (Figure 8, #146). The lip on this vessel is variably square to rounded and is not channeled. The impressions show five twists of cord and measure approximately 10.6 mm long, 2.3 mm wide, and are spaced 1.5-1.9 mm apart (edge to edge). A third vessel is represented by a fragment of an exfoliated collar with vertical cord-wrapped stick impressions, oblique cord or cord-wrapped stick impressions on the lip, and additional tool/cord/cord-wrapped stick impressions extending from the bottom of the collar onto the vessel neck (Figure 8, #636). Only the vertical cord-wrapped stick impressions are complete enough to measure. They measure approximately 13.5 mm long, 3.9 mm wide, and are spaced 4.1-5.2 mm apart. The fourth vessel with a cord-wrapped stick decorated exterior is represented by one rimsherd from Feature 23 and three additional rimsherds from outside of the feature. The vessel exhibits a thickened, almost collared, rim with vertical cord-wrapped stick impressions on the “collar” and oblique cord-wrapped stick impressions below the collar (Figure 8, #147). In addition, cord or cord-wrapped stick impressions are present on the top of the lip, but are obscured/smoothed over. Each of the impressions has three twists of cord and each twist has three smaller twists of cord within it. The vertical impressions measure approximately 11 mm long, 2.7 mm wide, and are spaced 2.4-1.7 mm apart. The oblique impressions measure 8.6 mm long, 3.1 mm wide, and are spaced approximately 2.5 mm apart.

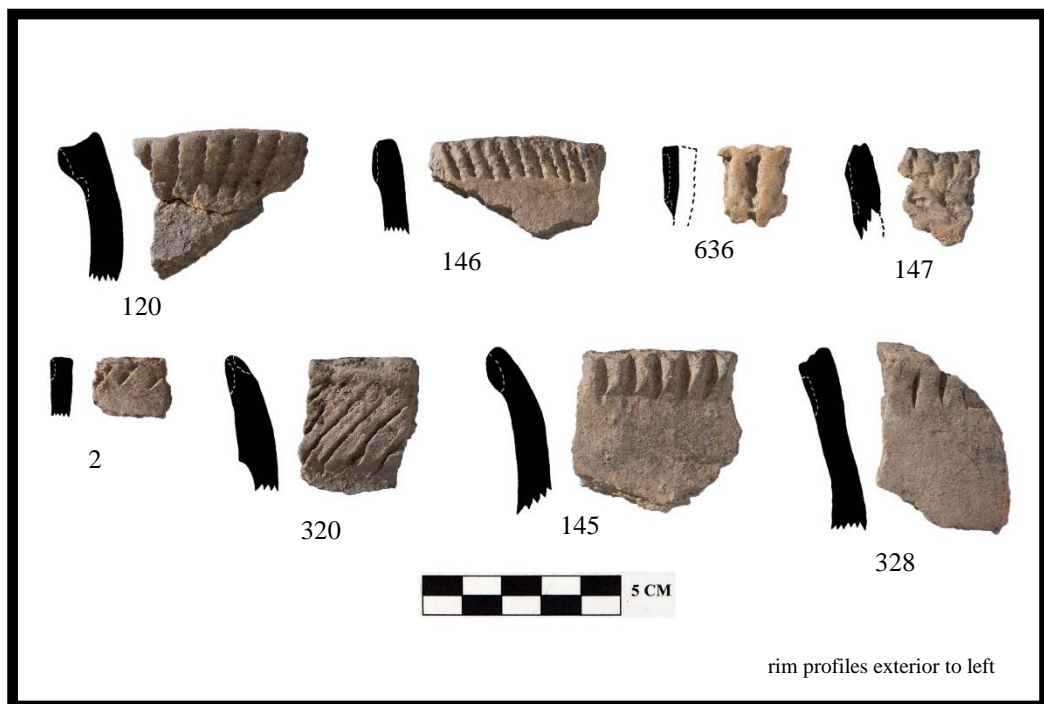


Figure 8: 20SA722, Excavation Block H, grit-tempered rimsherds.

The vessels described to this point are each stylistically and stratigraphically consistent with the late Prehistoric ceramics previously recovered from this site. Two additional vessels recovered during the 2012 field season likely relate to an earlier Late Woodland component. Both vessels exhibit cord-roughened exterior surfaces. On one vessel, the cord-roughening extends to the lip. This vessel also exhibits a rolled over/collared rim (Figure 9, #136). The second vessel, represented by five rimsherds and several body sherds, exhibits a slight castellation. It has cord, or cord-wrapped stick, impressions on the interior and exterior lip and a row of similar impressions along the interior rim, approximately 1.8-3.6 mm below the lip (Figure 9, #430, 501). These vessels are both consistent with later varieties of Wayne ware. The presence of collars and castellations suggests a most likely date after A.D. 1000 (Brashler 1981:322).

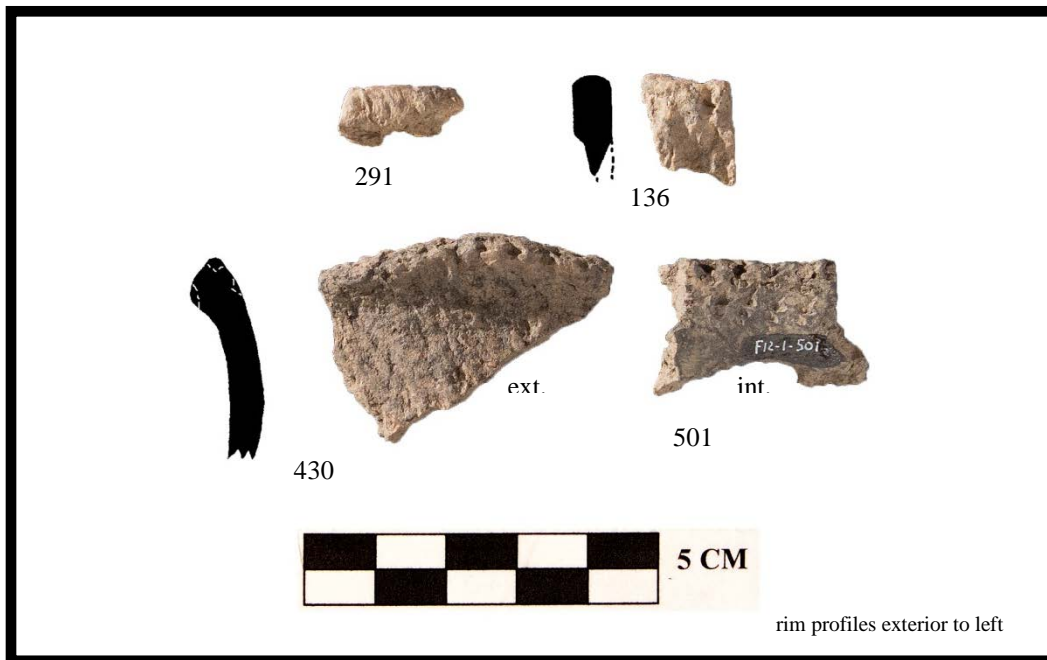


Figure 9: 20SA722, Excavation Block H, grit-tempered rimsherds.

Two copper artifacts were recovered in the 2012 excavations in Block H. They include a rolled copper bead and a ring-shaped object. The ring-shaped object is a hammered copper strip, 2.4 mm wide by 1.3 mm thick, shaped into an incomplete circle with an opening of 6.7 mm between the ends of the strip (Figure 10, #108). The outside diameter of the ring ranges from 16.2 mm to 15.8 mm. The overall appearance is similar to that of a hoop earring. The copper bead is made from a rolled piece of 0.5 mm thick sheet copper (Figure 10, #605). The bead is 9.6 mm long and has an exterior diameter of 5.2 mm.

Eight modified bone objects and one modified shell object were recovered from Excavation Block H. The modified shell object is a circular disk bead made of an unidentified (marine?) species (Figure 10, #219). The bead is 7.0 mm in diameter, 1.48 mm thick, and has a hole diameter of 1.77 mm. The modified bone objects are mostly unidentified small fragments. The assemblage includes one antler fragment with an incised line, two additional antler fragments with ground surfaces, two ground

fragments of a white-tailed deer metatarsal, and two medium-large mammal bone fragments with grinding/polishing on the surface. The final modified bone object is a canine tooth pendant on which the proximal root is incised/scored to facilitate attachment to a cord (Figure 10, #451). The size and morphology of the tooth is consistent with a dog canine, but the identification is not certain. The surviving portion of the tooth measures 20.18 mm long, 6.85mm wide, and 4.48 mm thick.



Figure 10: 20SA722, Excavation Block H, shell, bone, and copper artifacts.

Unmodified faunal remains from Excavation Block H have not yet been fully analyzed. However, some preliminary identifications have been made. Vertebrate fauna tentatively identified include eight species of fish - lake sturgeon (*Acipenser fulvescens*), walleye (*Sander vitreous*), bowfin (*Amia calva*), gar (*Lepisosteus* sp.), northern pike (*Esox lucius*), freshwater drum (*Aplodinotus grunniens*), catfish (Ictaluridae), and sucker (Catostomidae); three species of turtle – spiny soft-shelled turtle (*Apalone spinifera*), snapping turtle (*Chelydra serpentina*) and unidentified turtle; at least one unidentified bird; and eight mammals – muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), beaver (*Castor canadensis*), mink (*Mustela vison*), river otter (*Lontra Canadensis*), dog (*Canis lupus familiaris*), white-tailed deer (*Odocoileus virginianus*), and elk/wapiti (*Cervus canadensis*). At least two unidentified mammal bone fragments exhibit cutmarks. Four additional specimens, three white-tailed deer and one unidentified large mammal, show evidence of carnivore gnawing. At least three species of freshwater mussels were recovered in the 2012 excavations including threeridge (*Amblema plicata*) and at least two unidentified species. Threeridge mussels are by far the most numerous.

The 18 bifacial flaked stone implements recovered from Excavation Block H include one preform/core made of Bayport chert (Figure 11, #309), a preform fragment made of either Pipe Creek or a pebble chert (Figure 11, #150), three additional preform fragments made of Bayport chert, two of which refit (Figure 11, #447, 478), four biface tip fragments made of Bayport chert, one edge fragment made of Bayport chert, one edge fragment made of either Bayport or a pebble chert, a fragmentary projectile point missing its base and made of either Bayport or a pebble chert, a knife-like biface with a constricted blade made of either Bayport or a pebble chert (Figure 11, #553), and five triangular projectile points. The triangular projectile points include one example made of either Bayport or a pebble chert and four specimens made of Bayport chert (Figure 11, #308, 464, 476, 477). Measurements for the knife-like biface and the triangular projectile points are provided in Table 1.

Table 1: 20SA722, Excavation Block H, biface metrics.

Catalogue Number	Material	Type	Length (mm)	Width (mm)	Thickness (mm)
F12-1-308	Ba	Triangular	-----	11.40	4.16
F12-1-464	Ba	Triangular	-----	18.93	4.98
F12-1-553	Ba/Pe	Lanceolate, constricted blade	35.47	21.46	5.63
F12-1-476	Ba	Triangular	21.89	15.66	4.65
F12-1-477	Ba	Triangular	20.77	14.17	3.93

Ba=Bayport chert, Ba/Pe= Bayport chert/Pebble chert

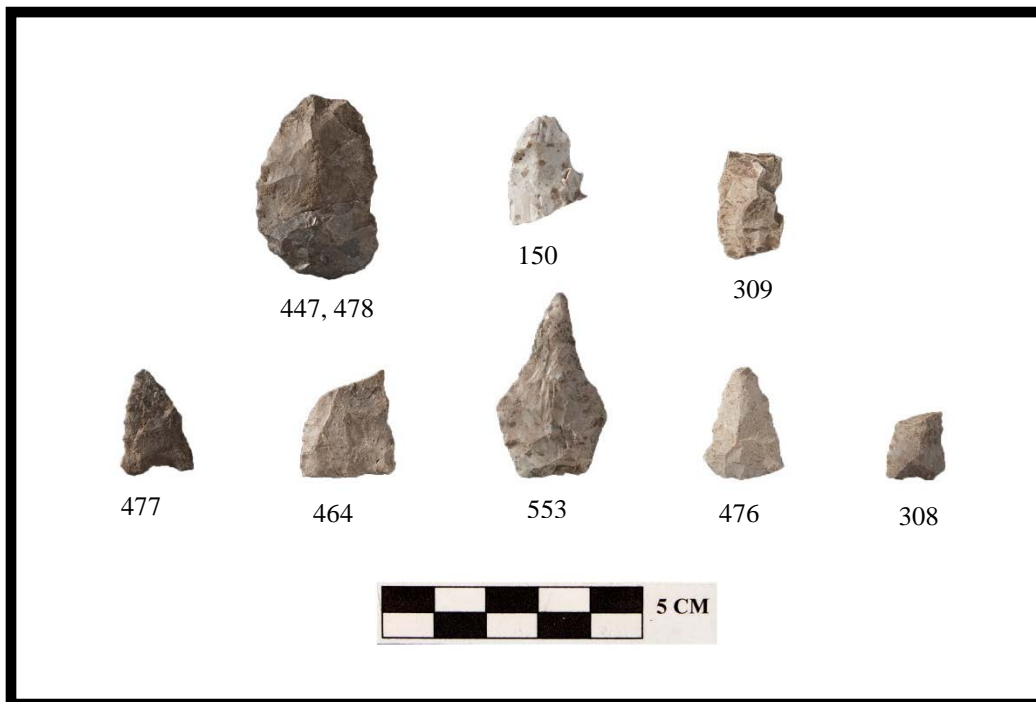


Figure 11: 20SA722, Excavation Block H, bifaces.

Bipolar cores are a result of a lithic reduction technique in which a small core is split by placing it on a stone anvil and striking it from above with a hammerstone (Binford and Quimby 1963). This action results in damage (crushed edges) on opposite sides of the core. Some bipolar cores may have functioned as wedges or similar tools. Of the 21 bipolar cores recovered in Excavation Block H, 15 are made of Bayport chert (Figure 12, #194, 248, 533, 652), five are either Bayport or a pebble chert (Figure 12, #58, 448), and one bipolar core is possibly Kettle Point chert. Five additional core or core fragments were recovered from the site including two Bayport chert examples (Figure 13, #95, 273) and three specimens that may be Bayport chert or a pebble chert (Figure 13, #318). One final specimen may be a core or preform fragment, but it is classified as a modified flake. It is a flake, or spall, of an unidentified chert (most likely a pebble chert) that had two or three flakes removed subsequent to its detachment from a larger core or preform.

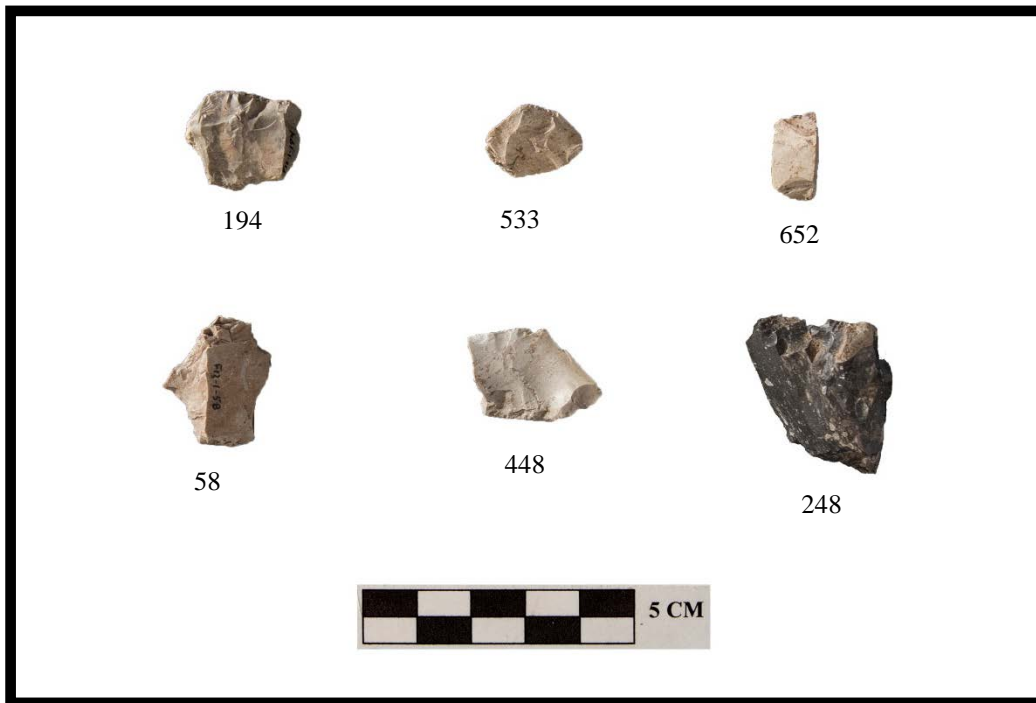


Figure 12: 20SA722, Excavation Block H, bipolar cores.

Utilized/edge-damaged flakes are flakes which exhibit damage in the form of minute flake scars, often in an irregular pattern, along one or more edges of the flake. This damage is often a result of using the flake for cutting or scraping purposes, but could, on occasion, result from unintentional damage during the flint knapping process, by trampling, or other means. Utilized/edge-damaged flakes are distinguished from retouched flakes by the more diminutive size of the flake scars (damage), the less regular pattern of the flake scars, and the generally unmodified overall shape of the original flake. The 27 utilized/edge-damaged flakes recovered from Excavation Block H include 20 Bayport chert examples (Figure 13, #59, 353), five specimens that are either Bayport or a pebble chert, one Wyandotte chert example, and one unidentified chert. Four of the Bayport/pebble chert examples are blades/blade-like flakes (Figure 13, #542, 582, 603, 665).

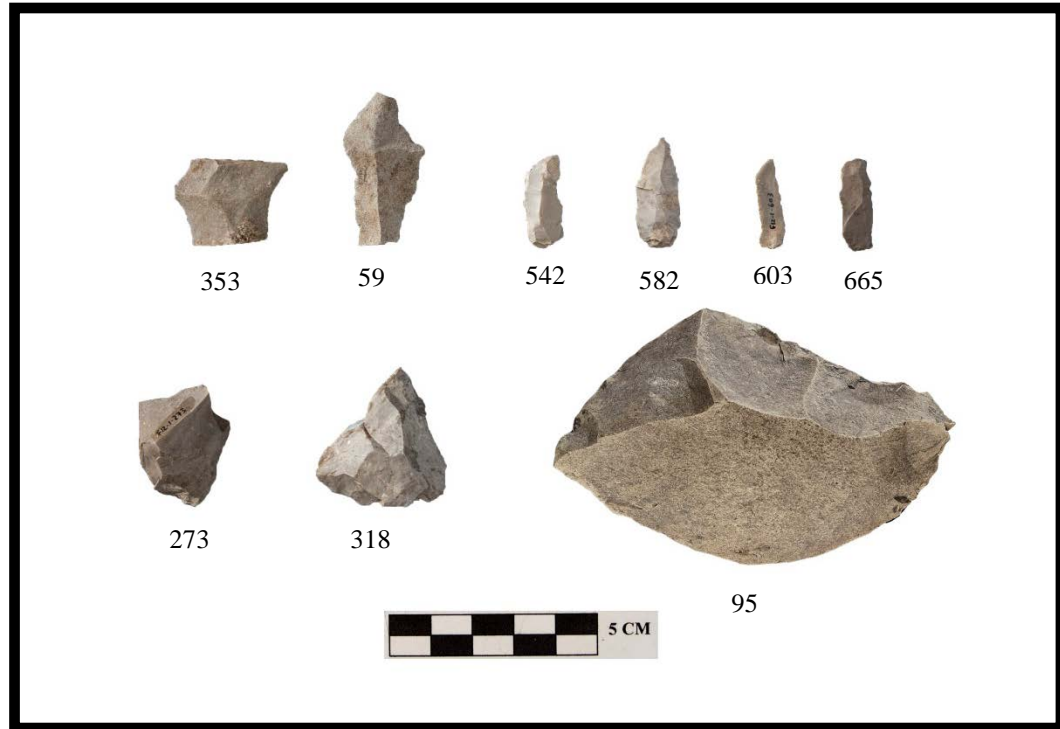


Figure 13: 20SA722, Excavation Block H, utilized flakes and cores.

The final category of flaked stone artifacts from Excavation Block H is waste material, including flakes and shatter. As with the flaked stone materials already described, raw material identification is made difficult for this assemblage by the great variability represented and the relatively small sizes of the individual pieces. The identifications listed below should be considered tentative at best. The vast majority (92% or more) of the 848 flakes and shatter recovered from Excavation Block H is locally available material including Bayport chert (n=598), bedded Bayport chert (n=35), pebble cherts (n=19), material that is either Bayport or a pebble chert (n=125), quartzite (n=4) and other coarse-grained rock (n=2). Only 65 specimens don't appear to fall into the above chert types, many of which may also be locally derived materials. Non-local materials represented in the flake assemblage include 15 Wyandotte chert flakes, two Kettle Point chert flakes, and one Pipe Creek chert flake. Other potential non-local materials include six specimens that may be Kettle Point chert, four possible Wyandotte chert flakes, eight possible Pipe Creek flakes, one possible Flint Ridge flake, and 27 other unidentified chert flakes. The non-local component therefore comprises between 2% and 8 % of the flake and shatter assemblage.

In addition to flaked stone artifacts, the lithic assemblage from Excavation Block H also includes 13 sandstone abrader fragments (10 fragments after refits). The specimens include rounded, faceted, and grooved examples (Figure 14). Sandstone abraders could have been used for a variety of purposes including manufacturing and/or sharpening bone and groundstone tools, edge maintenance while flintknapping, or any manner of sanding, smoothing, or grinding tasks. Sandstone abraders have been found on Paleo-Indian through Late Prehistoric period sites and are not temporally diagnostic.



Figure 14: 20SA722, Excavation Block H, sandstone abraders.

Feature Descriptions

Twenty-eight cultural features have now been recorded at the Clunie site. They generally appear as patterns of soil differentiated from the surrounding matrix by color, texture, and inclusions. Clusters of artifacts, charcoal, reddened/burnt soil, and ash are frequent indications of cultural features (Figure 15). Six features were recorded in the twelve square meters excavated at 20SA722 in 2012. They include portions of three hearth features (Features 23, 25, and 26), one trash pit (Feature 27), and two pit features that appear to have functioned as both hearths and trash pits (Features 24 and 28). Portions of Features 23 and 24 were excavated during the 2011 field season (Sommer 2012:31-34). Stratigraphic position, feature contents, and associated artifacts indicate a Late Prehistoric/Protohistoric temporal placement for these features. The feature volumes that are recorded below are minimum values describing the amount of feature fill that was saved for flotation. All depths are recorded as centimeters (cm) below datum (b.d.) as described in the Methods section above. The flotation samples that were collected from these features have not yet been sorted or 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 H are shown in Appendix C.

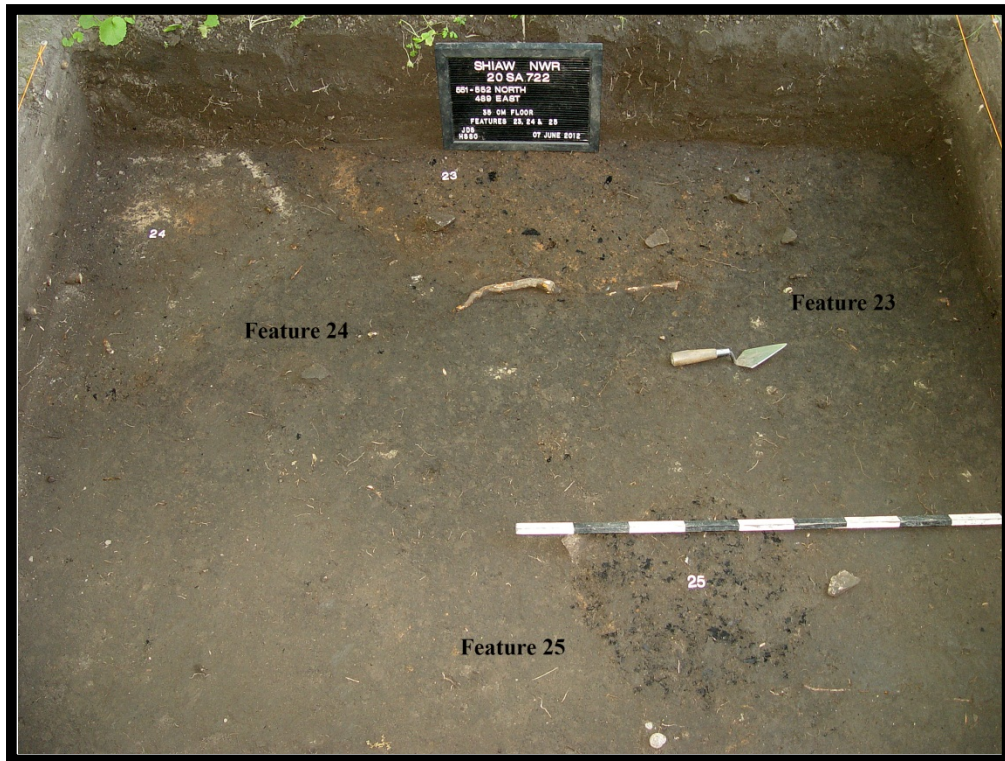


Figure 15: 20SA722, Excavation Block H, Features 23, 24, and 25.

Feature #	23
Location	Block H, primarily 551-552N 488-489E (551-552N 489E excavated in 2012)
Plan	circular/oval
Profile	basin-shaped
Max. length	130 cm (127 cm 2012 excavation)
Max. width	121 cm (46 cm 2012 excavation)
Depth defined	35 cm
Max. depth	55 cm (50 cm 2012 excavation)
Volume	179 liters (58 liters 2012 excavation)
Description	Feature 23 was a relatively shallow hearth feature. In the portion excavated in 2011, the southern edge of Feature 23 slightly overlapped the west basin of Feature 24. Feature 23 was cut through by, and thus pre-dates, Feature 24. The lower portion of the feature is a fuel zone consisting primarily of charred wood, while upper levels were a mix of reddened soil, ash, and dark sandy silt (Figure 16). In some portions of Feature 23, a boundary of burnt and fire-reddened soil is clear evidence of <i>in situ</i> burning. Several items were recovered in Feature 23 including body and rimsherds from a mixed shell and grit-tempered vessel (Figure 7, #712, 713), a rimsherd from a grit-tempered vessel (Figure 8, #147), a Bayport chert flake, white-tailed deer bones including an astragalus with carnivore gnaw marks, mussel shells, and FCR. Although not yet analyzed, flotation samples from the portion of Feature 23 excavated in 2012 also contain numerous items. A cursory examination of the light fractions of the 2011 flotation samples revealed maize cob fragments, a couple of acorn shell fragments, and lots of charred wood. The 2011 heavy fractions include ceramics, flakes, a biface tip, FCR, snail and mussel shells, and a variety of fish, turtle, and mammal bones.



Figure 16: 20SA722, Excavation Block H, Feature 23.

Feature #	24
Location	Block H, 550-551N 488-489E (551N 488E excavated in 2011)
Plan	two overlapping circular/oval
Profile	basin-shaped
Max. length	144 cm (each basin approximately 75-80 cm)
Max. width	90 cm east basin, 83 cm west basin
Depth defined	35 cm
Max. depth	58 cm west basin, 52 cm east basin (excavated in 2011)
Volume	172.5 liters (119.5 liters 2012 excavation)
Description	<p>Feature 24 consisted of two overlapping, basin-shaped pits referred to as the east and west basins (Figure 17). A portion of the west basin was excavated in 2011 and was found to slightly overlap Feature 23. The west basin of Feature 24 cut through, and thus post-dates, Feature 23. The east basin of Feature 24 appears to cut through the west basin and therefore post-dates both the west basin of Feature 24 and also Feature 23. In all likelihood, the east and west basins represent multiple use episodes of the same feature over a short time period – perhaps within the same year. Although both basins contained ash, reddened soil, and charcoal, there is no clear evidence of <i>in situ</i> burning. It appears that Feature 24 served primarily as a trash pit. Items recovered during the 2012 excavation of the west basin of Feature 24 include several grit-tempered ceramic sherds and a FCR. The east basin included sturgeon, drum, snapping turtle, and white-tailed deer bones, grit-tempered sherds, mussel shells, and FCR. Additional bone fragments, FCR and grit-tempered sherds, including a rimsherd with a finger-pinched lip (Figure , #749), were found in the area of overlap between the two basins. Unless present in the flotation samples, no additional fragments of the glass bead recovered in the 2011 excavation were found (Sommer 2012:22, 33). Flotation samples from the 2012 excavation have not yet been sorted or catalogued, but they do contain abundant bone, shell, and other cultural material. In addition, a small, rolled, sheet copper bead was recovered in a sample derived from the east basin (Figure 18). The ends of the bead are rough and it may be fragmentary. Also, it has been slightly flattened. Measurements of the surviving portion (?) are: Length – 5.50 mm, outside diameter – 2.69-3.62 mm, sheet thickness – 0.17 mm. The flotation samples taken from the west basin in 2011 have been subject to a preliminary sort. Materials in the light fraction include charcoal, a few unidentified tuber fragments, and a few acorn shell fragments. Objects noted in the heavy fraction include grit-tempered and a few shell-tempered sherds, flakes, snail and mussel shell fragments, and numerous fish and mammal bone fragments including walleye and sturgeon bones.</p>



Figure 17: 20SA722, Excavation Block H, Feature 24 profile.



Figure 18: 20SA722, Excavation Block H, copper bead from Feature 24.

Feature # 25
Location Block H, 552N 489-490E
Plan circular
Profile shallow basin-shaped
Max. length 43 cm
Max. width 42 cm
Depth defined 35 cm
Max. depth 38 cm
Volume 6 liters
Description Feature 25 was a small, circular, shallow basin-shaped deposit of charcoal and flecks of reddened soil and ash (Figure 19). Two FCR were piece-plotted in the feature. Very few items other than charcoal were recovered in the flotation samples taken from Feature 25. They include several small FCR, a few small fish and mammal bone fragments, one flake, and some snail shell fragments. Charcoal is, of course, plentiful.



Figure 19: 20SA722, Excavation Block H, Feature 25.

Feature #	26
Location	Block H, 550N 489E
Plan	irregular
Profile	shallow, irregular
Max. length	80 cm
Max. width	60 cm
Depth defined	30 cm
Max. depth	32 cm
Volume	5 liters
Description	Feature 26 consisted of a plow-disturbed concentration of charcoal and fire-reddened soil (Figure 20). Feature 26 probably represents a surface hearth, but may simply be material dragged from the top of Feature 24 or an undiscovered feature located in unit(S) 549N 489-490E or 550N 490E. Few cultural items were noted in Feature 26. Like the rest of the flotation samples from 2012, those from Feature 26 have not been sorted or catalogued. However, a cursory examination reveals several FCR, a few calcined bone fragments, snail shell fragments, and charcoal.

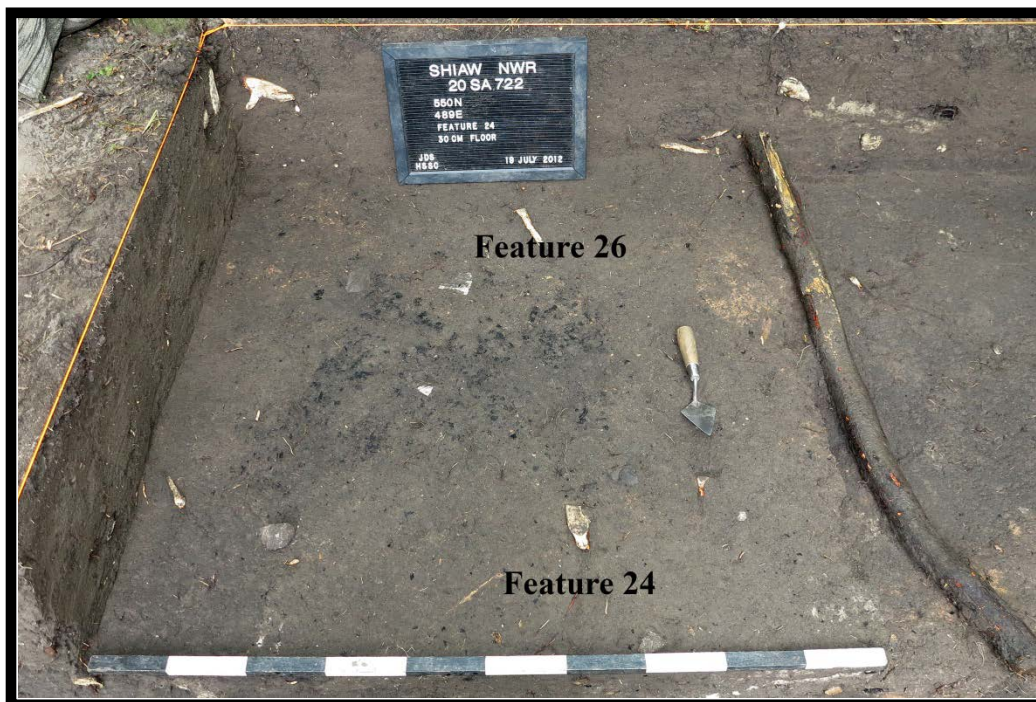


Figure 20: 20SA722, Excavation Block H, Features 24 and 26.

Feature #	27
Location	Block H, 553N 488-489E
Plan	circular/oval
Profile	shallow basin-shaped
Max. length	70 cm
Max. width	60 cm
Depth defined	40 cm
Max. depth	52 cm
Volume	36 liters
Description	Feature 27 was a circular/slightly oval trash pit extending across portions of two units (Figure 21). It was excavated by quarter-sectioning using the line between units 553N 488-489E as a north/south profile and the 30 cm north line as the east west profile. The boundaries of Feature 27 were mostly indistinct, showing up as a lighter zone cutting through the darker, buried A-horizon. Relatively few artifacts were recovered in the feature including a white-tailed deer and a black bear mandible, fragments of two large mammal vertebrae, one of which exhibits carnivore gnaw marks, a shell tempered and grit-tempered ceramic sherds, two flakes, one utilized/edge-damaged flake, and a mussel shell fragment. Flotation samples contain numerous fish and mammal bones, several flakes, a few ceramic sherds, a small fragment of a rolled copper bead, and a probable coprolite fragment.



Figure 21: 20SA722, Excavation Block H, Feature 27.

Feature #	28
Location	Block H, 554N 488E (unexcavated portion extends into 554-555N 487E and 555N 488E)
Plan	circular/oval?
Profile	shallow basin-shaped
Max. length	87+ cm
Max. width	65+ cm
Depth defined	40 cm
Max. depth	55 cm
Volume	34.5 liters
Description	Only a portion of Feature 28 was exposed in the 2012 excavations in Block H. An unknown, and perhaps substantial, portion of the feature extends into adjacent units to the west and north. The excavated portion appears to be from a basin-shaped hearth/trash pit, likely oval in plan view (Figure 22). Upper portions of Feature 28 were disturbed by plowing, and above 45 cm, the boundaries of Feature 28 were indistinct and diffuse. It is possible that much of the east/southeast spread of material in the 40-45 cm level was dragged that direction by the plow. Several objects were recovered and piece-plotted during the excavation of this pit. Items include a bipolar core, several mussel shells (including threeridge mussel), and an elk/wapiti phalanx. Additional materials were recovered in flotation samples including numerous fish bones and scales and few mammal bone fragments, several flakes, mussel shell fragments, and snail shells. The light fractions contain abundant charcoal.



Figure 22: 20SA722, Excavation Block H, Feature 28.

Radiocarbon Dates

Although material suitable for Accelerator Mass Spectrometry (AMS) or standard radiocarbon dates was collected from all six features excavated during the 2012 field season, dates have not yet been obtained. The seven dates discussed below have all been previously reported. All of the dates were run by Beta Analytic, Inc.

Two Accelerator Mass Spectrometry (AMS) dates were obtained on material from the Clunie site in 2010 (Sommer 2011:38). The first sample dated consisted of charred organic material scraped from the interior of a ceramic sherd found at 41N 14E 59 cm b.d. in unit 585N 455E (Cat. No. F10-1-193). Additional sherds from what appears to be the same vessel were found at 60 and 62 cm deep in the same unit and at 65-70 cm in unit 586N 453E. The dated sherd exhibits a smoothed over cord-roughened exterior decorated with cord-wrapped stick impressions. Stylistically, the sherds resemble Middle Woodland Tittabawassee ware ceramics (Fischer 1972). The conventional radiocarbon age of the sample is 1930 +/- 40 BP (2 Sigma Calibrated BC 10 – AD 140), a date fully consistent with the stratigraphic location of the sherd and the Middle Woodland ceramic typology.

The second AMS date run in 2010 was obtained on material recovered in a flotation sample from Feature 19 (Feature 19, Area 4, Zone 4, F.S. 668) in 2009 (Sommer 2010). The material consisted of charred organics scraped from the interior of a shell-tempered body sherd with a smoothed over cord-roughened exterior. The conventional radiocarbon age derived from this sample is 460 +/- 40 BP (2 Sigma Calibrated AD 1410-1470).

In 2009 a date was obtained by a graduate student from Michigan State University. The AMS technique was used to date charred organic material scraped from a sherd that, in 2007, was recovered from Feature 11. The sherd is described and pictured in Sommer (2008:32, Figure 20, #1402). The research involved analyzing phytoliths extracted from charred organic material found adhering to ceramics to investigate the origins and role of maize agriculture in the Saginaw Valley. The material from Feature 11 yielded a conventional radiocarbon age of 370 +/- 40 BP (2 Sigma Calibrated AD 1440-1640) (Raviele 2010).

In 2006, two charcoal samples were submitted to Beta Analytic, Inc. for radiocarbon analysis (Sommer 2007:46). 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.

In 2005, two charcoal samples taken from Feature 1 were submitted to Beta Analytic, Inc., for radiocarbon analysis (Sommer 2006:26). 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 piecemealed 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).

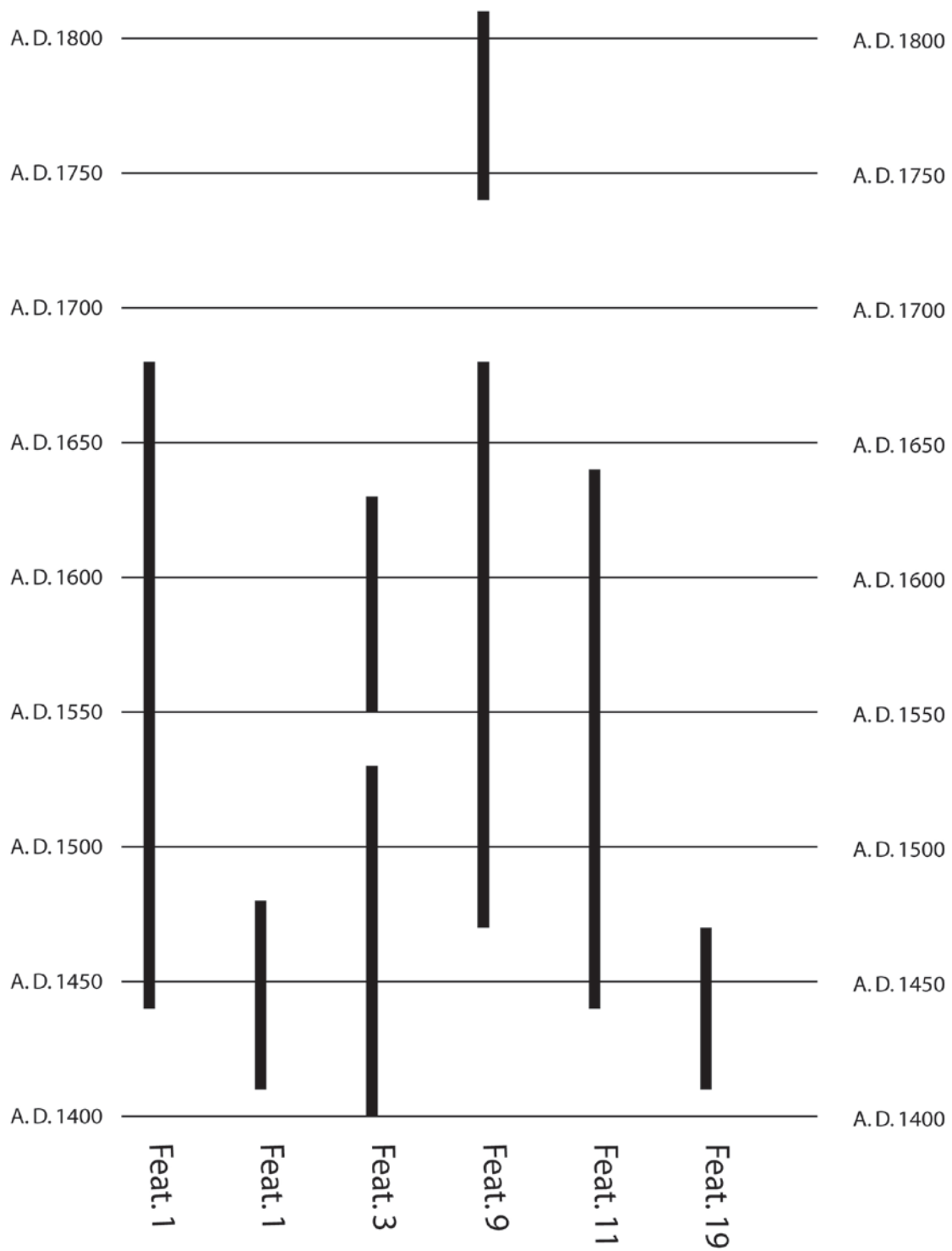


Figure 23: 20SA722 Late Prehistoric Radiocarbon Dates (2 Sigma calibrated).

DISCUSSION

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 2012 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. This season and the previous thirteen 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 conclusive evidence for it was recovered during the 2012 field season, the earliest period of occupation for which we have good evidence at the refuge is the Late Archaic or transitional Late Archaic/Early Woodland. Greywacke flakes found in 1999 provide possible, though certainly not conclusive, evidence for Transitional/Late Archaic occupations at 20SA722, 20SA1254, and 20SA1255 (Sommer 2000). More suggestive is the cancell coal gorget and side-notched/expanding stemmed point with a ground base from 20SA1255 (Sommer 2000), a corner-notched/side-notched point with a heavily ground base found at 20SA1251 (Sommer 2002), and three “Ace of Spades/Ground base” points from the surface and excavations at 20SA1276 (Sommer 2004, 2005). Other Late Archaic/Early Woodland material recovered during previous field seasons include Meadowood bifaces recovered from the surface of 20SA214 and 20SA722 and a corner-notched point made of Onondaga chert from 20SA1251 (Sommer 2002). Comparable Late Archaic/Early Woodland material is discussed by Beld (1991), Garland and Beld (1999), and Granger (1978). 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).

Early Woodland material from the refuge includes Adena and Adena-like stemmed points, two broad-bladed stemmed points, and a stemmed Kramer-like point found at 20SA1251, and two large stemmed knives from the excavations at 20SA1276. The interior cord-roughened sherds recovered in 2011 on the surface of site 20SA722 may also date to the Early Woodland period. No demonstrably Early Woodland material was recovered in 2012.

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. Most of the material recovered from the surface of 20SA1251 in 2012 easily fits into the Middle Woodland period. The cord roughened body sherd (Figure 2, #2b) and Upper Mercer biface fragment (Figure 3, #3) could be slightly later. 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 (cf. Halsey 1966), and Snyders-like, Jack’s Reef, Raccoon Notched, and a variety of expanding stemmed points (cf. Fitting 1972b), 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).

Despite the supposed preponderance of (stylistically) later Middle Woodland artifacts at several of the sites from the refuge, radiometric dating of samples from three sites indicates a strong early Middle Woodland presence. The AMS date of 1930 +/- 40 BP (2 Sigma Calibrated BC 10 – AD 140) on organic

residue scraped from a ceramic sherd recovered in 2010 at the Clunie site (20SA722) falls clearly into the first half of the Middle Woodland time period (Sommer 2011:38). This date also marks the earliest habitation evidence so far obtained at the Clunie site.

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 a 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 2003b, 2004b).

Recently, two AMS dates taken from charred organics found adhering to ceramic sherds recovered from 20SA1276 have been reported. As part of her dissertation research into the introduction of maize into the Saginaw Valley, Raviele (2010) examined food residues on ceramic vessels for the presence of phytoliths and starch grains. Several sherds from 20SA1276 and 20SA1251 were borrowed for this research and two sherds from 20SA1276 were dated. One sherd recovered from Feature 26 (see Sommer 2005) yielded a date of 1920 \pm 40 BP (2 Sigma cal. AD 10-140). Another sherd, recovered from ceramics associated with Feature 27 (see Sommer 2005), yielded a date of 1980 \pm 40 BP (2 Sigma cal. BC 50-AD 90) (Raviele 2010:97, Appendix D). Maize starch, along with wild rice phytoliths, was identified on the sherd associated with Feature 27, making it some of the earliest evidence for the use of maize in the Saginaw Valley, or elsewhere in Michigan. These findings not only demonstrate the archaeological research potential of the Shiawassee National Wildlife Refuge, they highlight the continuing importance of well-curated archaeological collections for future research.

These early Middle Woodland dates also highlight the dynamic nature of 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 1972a: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 their low elevations, sites 20SA722, 20SA1251 and 20SA1276 would have been inundated under such conditions. The dated ceramics from these sites 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.

An 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 later Middle Woodland period of the site's occupation, it also suggests that the associated Ruben Linear ceramics may date a couple centuries or more earlier than previously expected (Sommer 2004a:30). Additional radiocarbon dates are sorely needed to help sort out the complex occupation sequence at 20SA722, 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 2004a:13), 20SA1251 in 2000, 2001 and 2003 (Sommer 2001:18-19, 2002:15, 2004a:15) from

20SA1254 in 2002 (Sommer 2003a:17) and from 20SA1274 in 2000 (Sommer 2001:26). A triangular projectile point recovered from site 20SA1367 in 2009 may also date to this late period (Sommer 2010). 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) is an important exception. At this site, Late Prehistoric material is widespread and abundant. 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, 2004a, 2005, and 2011).

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 presence of several trash pit and possible hearth features. Some of the features encountered in the Shovel Test Pits appeared to contain abundant floral and faunal remains that could be critical for investigating subsistence practices and seasonality of site occupation. Later excavation of some of these features confirmed the presence of these materials.

The excavation of Feature 1 in 2005 and 2007 (Sommer 2006, 2008), Feature 9 in 2006 and 2007 (Sommer 2007, 2008), Feature 11 in 2007 (Sommer 2008), and Feature 19 in 2009 (Sommer 2010) confirmed the presence of at least four trash pit features containing abundant floral and faunal remains, as well as artifacts including ceramics, stone tools, and modified bone artifacts. Features 22, 24, and 27, excavated in 2011 and 2012, are examples of smaller trash pits containing a lower density of material. The hearth features excavated in 2006, 2008, 2009, 2011, and 2012 including Features 3, 6, 7, 12, 13, 16, 17, 18, 21 and 23 contain less bone and other artifacts than the trash pits. Intensive burning in some of the hearths reduced most of the organics to ash and caused oxidation of the surrounding soil. Feature 10, excavated in 2007, and Feature 28 excavated in 2012, appear to have been used both as a trash pits and a hearths. Feature 5, excavated in 2009, is another multi-function feature. It served initially as a storage pit. Charred tubers tentatively identified as Fragrant Water-Lily (*Nymphaea odorata*), were found near the bottom of the pit, providing evidence of one of the materials that were stored. Feature 5 was later used as a hearth before finally serving as a receptacle for trash.

Though not abundant, maize cob fragments have been identified in preliminary analysis of flotation samples taken from Features 1, 9, 11, 17, 22, and 23. Maize kernels have been identified from flotation samples from Features 3, 9, 11, 14, and 17. Additional maize kernels and a charred bean (*Phaseolus* sp.) fragment were recovered in the vicinity of disturbed Feature 13 material in 2008 and additional maize kernels were found in general excavation material from Excavation Blocks B and C in 2009. Recently, paleoethnobotanist Kathryn E. Parker has examined a small amount of material from Features 3 and 11. She confirmed the presence of maize in both features and another domestic bean fragment in Feature 3. In addition, she identified acorn, black nightshade, knotweed, and possibly chenopodium seeds in Feature 11 along with ash, oak, maple, and willow/poplar wood charcoal. Chenopodium seeds were also identified in Feature 3 including a few that appear at ordinary microscopy, to have smoother and thinner seed coats than is typical for wild forms (though they are not the classic domesticated *Chenopodium berlandieri* either). They may represent a regional cultivated variant (K. E. Parker, personal communication 2010). Whether or not the presence of cultigens in several features implies on-site horticultural practices is debatable. Further analysis of floral remains from the flotation

samples will be required to assess the abundance of maize, beans, and other possible cultigens at this site.

The occurrence of specialized trash disposal areas and the abundance of faunal remains suggest fairly long-term occupations (perhaps several weeks or months). However, compared with the amount of faunal remains recovered, other categories of material culture such as flakes, stone tools, and ceramics are less abundant, arguing against long-term occupation. Radiocarbon dates from Features 1, 3, 9, 11, and 19 place the Late Prehistoric 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 possible 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 difficult to assign most sites identified at the refuge to functional categories (i.e. base camps, resource extraction locales, etc.) However, the wide range of artifact types and faunal remains recovered during the past 13 field seasons indicate that the prehistoric inhabitants of these sites participated in multiple activities. Artifacts such as flakes, bipolar and other 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 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 indicate that these sites probably served as base camps occupied by family groups rather than resource extraction camps occupied by specialized task groups such as hunting parties.

When they are fully analyzed, the relatively large faunal assemblages derived from the test excavations conducted at 20SA722 in 2005-2012, 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. This undoubtedly would have varied seasonally and detailed comparisons of the faunal contents of discrete features, or even zones within features, will likely shed much light on this topic.

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. The maize starch and wild rice phytoliths identified by Maria Raviele from cooking residue adhering to ceramic sherds at 20SA1276 also supports this seasonal assessment (Raviele 2010:97). 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, river otter, and other fur-bearing animals, charred acorns, 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, 2003a, 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 2005-2012 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 or 20SA1251. The presence of a few typologically Late Archaic/Early Woodland bifaces at 20SA1276 leaves open the potential for some stratified deposits at this site. Additional analysis of artifact distributions and, perhaps, additional radiocarbon dates may help sort this out. The 2006-2012 excavations at 20SA722 revealed clearly stratified late Prehistoric and Middle/early Late Woodland components. The relative scarcity of Late Archaic remains probably reflects the fact that much of the low-lying refuge would have been under water during large portions of this period. 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 fourteen 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, frequency, and timing of the interactions with cultural groups in other regions remains an important area for future research.

In addition to prehistoric components, fourteen 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 and 20SA1367, identified in 2009. 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, a couple of glass beads, and a possible “trade axe” 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. For example, in May of 2011 there was clear evidence that one or more individuals had been fishing from an actively eroding, high density portion of site 20SA1251. While there is no reason to believe they were searching for artifacts, they were in a location where artifacts are frequently exposed on the surface. We are working to alleviate this problem through our outreach/education efforts, whereby 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 fourteenth season of archaeological investigations carried out in the Shiawassee National Wildlife Refuge (NWR), Saginaw County, Michigan. The field investigations, conducted under Amendment 10 of Federal Archaeological Permit No. 2002-MI/3-2, included both limited archaeological survey/salvage (surface survey) and test excavations. Surface survey was limited to eight previously recorded sites. Surface collections, totaling 23 objects, were made from two of the eight sites monitored during the 2012 field season. An additional artifact, a stone celt, was recovered by USFWS personnel at site 20SA1252 while conducting routine maintenance. Test excavations were conducted at the Clunie site (20SA722).

The twelve square meters excavated at 20SA722 during the 2012 field season are contiguous, and, together with four square meters excavated in 2011, comprise Excavation Block H. Excavation of Block H exposed all or portions of three hearth features (Features 23, 25, and 26), one trash pit (Feature 27), and two pit features that appear to have functioned as both hearths and trash pits (Features 24 and 28). These features are all thought to date to the Late Prehistoric/Protohistoric time period, ca. AD 1400-1650.

The 2012 excavations at the Clunie site yielded 10568 catalogued objects. In addition, 42 samples, containing a total of 259 liters of sediment, were saved for flotation. These samples include 58 liters from Feature 23, 119.5 liters from Feature 24, 6 liters from Feature 25, 5 liters from Feature 26, 36 liters from Feature 27, and 34.5 liters from Feature 28. Materials derived from flotation samples and items $< \frac{1}{4}$ " from $\frac{1}{8}$ " screened samples have not yet been analyzed or catalogued and so are not included in the above total.

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 of 20SA722 was clearly the Late Prehistoric period. The presence of shell-tempered ceramics suggests an Upper Mississippian affiliation. An AMS date on charred organics scraped from the interior of a ceramic sherd recovered in 2010 substantiates the assessment made on typological grounds that a Middle Woodland occupation is also present at this site. Typologically early Late Woodland and Historic period objects were also recovered in the 2012 excavation and during previous field seasons.

Prehistoric artifacts recovered from the various sites on the refuge during 2012 and previous field seasons indicate that Middle and early Late Woodland occupations (ca. B.C. 100 – A.D. 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. The Clunie 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. This potential is heightened by the demonstrated presence of intact archaeological deposits containing cultural features and culturally/temporally discrete deposits, some of which are stratified. 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, including the timing, nature, and impact of the initial Native American and European contact in the region; 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 2000-2012). They are repeated below. Based on the results of the past fourteen 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 concern. 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 (Sommer 2003a, 2004a). 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.

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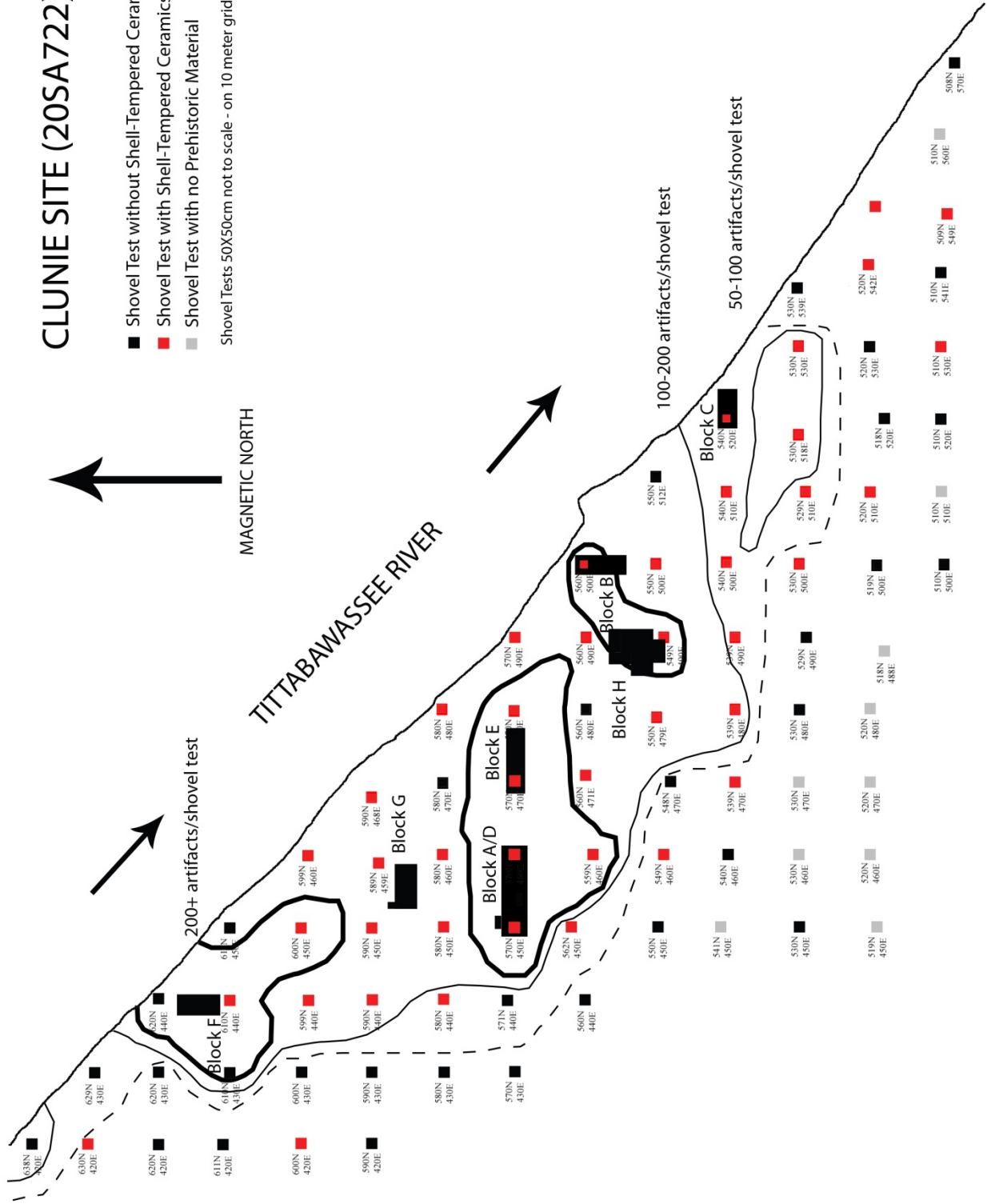
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APPENDIX C: Site Maps

CLUNIE SITE (20SA722)

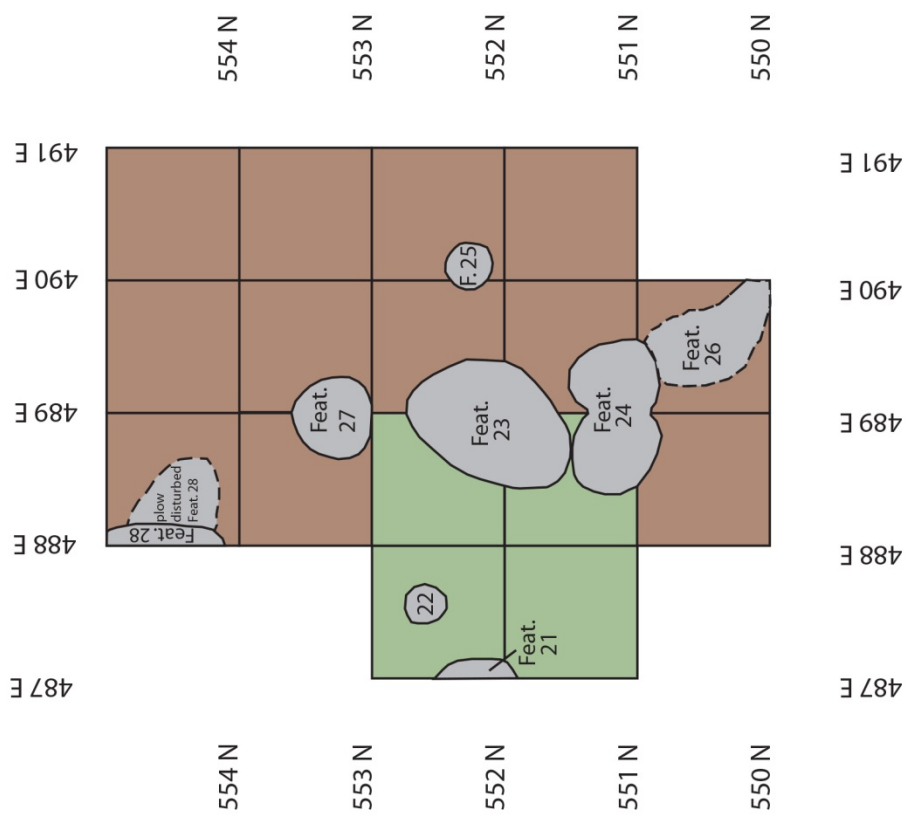
- Shovel Test without Shell-Tempered Ceramics
 - Shovel Test with Shell-Tempered Ceramics
 - Shovel Test with no Prehistoric Material
- Shovel Tests 50X50cm not to scale - on 10 meter grid



X
Site Datum
500N 500E



NORTH



CLUNIE SITE

20SA722

Excavation Block H