

**Report on the Archaeology
of the Shiawassee National Wildlife Refuge:
The 2010 Field Season.**

Jeffrey D. Sommer

Historical Society of Saginaw County, Inc.

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ABSTRACT

This report summarizes the results of the twelfth 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 8), included both limited archaeological survey/salvage and test excavations. Six volunteers and the project director contributed a combined total of 93 person days (approximately 558 hours) of fieldwork.

Consistent with the goals of the survey/salvage portion of this project, surface collections, totaling 10 objects, were made from two of the thirteen sites that were monitored during the 2010 field season. 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. Eleven square meters were excavated at 20SA722 during the 2010 field season. These excavations yielded 8,288 catalogued objects. In addition, 13 samples, containing a total of 83 liters of sediment, were saved for flotation.

Radiocarbon dating conducted in 2010 and previous years and artifact typology indicate that excavated material from site 20SA722 dates primarily to the Late Prehistoric period (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 twelfth 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 8 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). Six volunteers and the project director contributed a combined total of 93 person days (approximately 558 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 erosion, farming, or other cultural processes, and to investigate by shovel-testing if, and to what extent, intact portions of the sites remain. Erosion, whether by natural or cultural means, exposes artifacts making them vulnerable to removal by persons untrained in archaeological recording techniques and unmindful of the irreparable damage that is caused by removing artifacts from their archaeological context. This project aims to limit such damage by recording the provenience of exposed artifacts and collecting them for future study. An assessment of the amount of erosion observed at each of the sites monitored in 2010 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 thirteen previously recorded sites. Surface collections, totaling 10 objects, were made from two of the thirteen sites that were monitored during the 2010 field season. No previously unrecorded sites were detected during the 2010 field season.

Test excavations were conducted at site 20SA722. These excavations were conducted primarily to: 1) assess site stratigraphy and the nature of buried archaeological deposits; 2) obtain a representative sample of artifacts to assess site use through time and to relate site components to the broader local and regional culture history; 3) obtain material suitable for radiocarbon dating; and 4) obtain floral and faunal remains to assess site seasonality and subsistence practices.

Eleven contiguous square meters were excavated at 20SA722 during the 2010 field season. They are referred to as Excavation Block G (Appendix C). Excavation of Block G exposed a single, relatively intact, hearth feature (Feature 20). Stratigraphic placement, feature contents, and associated artifacts indicate a Middle Woodland temporal placement for this feature. Probable evidence for a late Prehistoric hearth feature, including ash and reddened soil, was noted in several units. Unfortunately, the feature must have been completely destroyed by plowing so a feature number was not assigned. Thirteen samples, containing a total of 83 liters of sediment, were saved for flotation, including 53 liters from Feature 20 and an additional 30 liters from a zone containing highly comminuted bone in the 45-60 cm level of unit 585N 457E. The stratigraphic location of these latter samples suggests a Middle Woodland to early Late Woodland age for the deposit. The Block G excavations yielded 8,288 catalogued objects. Materials derived from flotation samples and items <1/4" from 1/8" screened samples have not yet been analyzed or catalogued and so are not included in the above total.

Of the 39 archaeological sites/findspots monitored during the twelve field seasons of this project (twelve during the 2010 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 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.

Combining the materials recovered from the surface of 20SA722 and 20SA1251 and from the test excavations at 20SA722, 8,298 objects were catalogued during the 2010 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 2010 field season.

Project History

The initiation of this project can be traced to concerns about the erosion of archaeological sites on Shiawassee NWR property voiced by local avocational archaeologist Robert R. Clunie. As early as 1995, Clunie noted the presence of prehistoric and historic archaeological materials eroding into the Tittabawassee River on refuge property. In 1999, in an effort to address this problem, we proposed to monitor archaeological sites in the refuge. Site monitoring was to include: 1) looking for evidence of illegal collecting/looting activities and reporting any such evidence to refuge managers; 2) recording provenience information for exposed archaeological remains; and 3) collecting exposed artifacts to

prevent their removal by non-authorized individuals" (Sommer 1999). The proposed project was 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).

Eight sites were monitored during the 2008 field season, with collections being made only at site 20SA722. Excavations totaling 30 square meters from Excavation Blocks E and F at site 20SA722 were the main focus of the 2008 efforts (Sommer 2009).

During 2009, the focus was once again on the Clunie site (20SA722) where an additional 10 square meters were excavated in Blocks B and C. Surface survey resulted in a new site (20SA1367) being recorded in one of the farm units on the refuge (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 Steve Kahl, and Edward DeVries. Their continuing concern for the archaeological resources of the refuge is appreciated. This project could not have been conducted without the dedication and hard work of numerous volunteers. The 2010 field crew included, Melanie Coughlin, Dave Hamilton, Allison Hoff, John Klumpp, Mike Mauer, and Gary

Schmidt. Most of the field crew also assisted in the lab, as did John Heintz, Steven Spencer, 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 (Iaquinta 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 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 (Sommer 2000:10, 2001:10, 2004a:12). Site 20SA361 was reported as a Late Woodland site located adjacent to the Cass River (Fitting 1977:37). This site was relocated during the 2002 field season and a Late Woodland temporal placement was confirmed.

A third project involving minimal field survey and library research was conducted within the Shiawassee NWR in 1978. This project was designed to "provide only a general impression of the refuge's cultural resources" (Whittier 1978). This project relocated 20SA361, and recorded several historical sites, including one located at 20SA722. However, no prehistoric materials were noted for this

location. In 1980, a small-scale test investigation by the Saginaw Archaeological Commission, failed to locate any archaeological remains (Brunett 1980).

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

METHODS

Field Methods

The limited surface survey conducted during the 2010 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. Site locations were plotted on 7.5' U.S.G.S. topographic maps using the DeLorme 3-D Topoquads computer program. Topographic maps used include the Alicia, Saginaw, and Shields quadrangles.

Test excavations were conducted at 20SA722 using the site grid set up for shovel testing in 2004 (Sommer 2005). 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 shovel test grid. The 11 square meters excavated at 20SA722 during the 2010 field season were set up in a contiguous block (Excavation Block G) (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 for each excavation unit. The surface datum location is noted on the square level sheet for each unit. Because the surface is relatively level at this location, the below datum measurements are essentially the same as below surface elevations across each unit. A single point was chosen from which to measure the depth of each unit to facilitate keeping the excavation floors level.

General excavation sediment was screened through ¼" or 1/8" mesh hardware cloth. The 0-30 cm (plowzone) level, was always screened through ¼" 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, in 10 of the 11 excavation units from 2010, all of the levels between 30 and 50 cm were screened with 1/8" mesh screen (in one unit the 50-55 cm level was also screened with 1/8" mesh). Non-feature material below the 50 cm level (or in one case below 55 cm) was screened through ¼" mesh screen.

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 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.

Excavation in each unit was completed down to 90 cm, a depth at which culturally "sterile" (absent or very low artifact density) sediment was reached. The portion of Feature 20 present in unit 585N 453E was excavated in two five centimeter levels (65-70 cm and 70-75 cm) yielding three liter and

two liter flotation samples respectively. These were later combined into a single five liter flotation sample. This portion of Feature 20 is equivalent to Feature 20, Zone 4 and Feature 20A in unit 586N 453E. The portion of Feature 20 present in unit 586N 453E was bisected by profile A-A' running from the southwest corner of the unit to the northeast corner. The southeast side of Profile A-A' is Area 1; the northwest side is Area 2. Based on varying concentrations of ash and reddened soil, Feature 20 was divided into four Zones. After excavation of the 65-70 cm level of Area 1, it became apparent that Feature 20 was comprised of two overlapping basins. One basin in the southwest corner of the unit and extending into the previously excavated unit 585N 453E was labeled Feature 20A. The other basin, more centrally located in unit 586N 453E, was labeled Feature 20B. 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 by Zone in 5 cm levels. 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. The feature fill was thoroughly air-dried before being processed by flotation.

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

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 1/8" mesh screen were size-sorted into fractions $>1/4$ " and $<1/4$ " by passing the material through $1/4$ " mesh screen. In this way there are comparable samples from all levels whether screened with $1/4$ " or $1/8$ " 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 2010 field season of this project were catalogued under Accession F10-1 and F10-2. 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 $<1/4$ " size fraction of the $1/8$ " 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 $1/2$ " 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 2010

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. After drying, the light and heavy fractions from the 2010 flotation samples were size sorted by passing the material through nested geological sieves of 4mm and 2mm. This process yielded size categories of >4mm, 2<4mm, and <2mm. Weights for each size category were recorded in grams. Although some have been sorted, none of the flotation samples has yet been analyzed or catalogued.

Analysis and Evaluation

Thirteen previously recorded sites were surveyed/monitored during the 2010 field season. This section will present an analysis and evaluation of the materials obtained through the surface survey portion of this project. 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 April of 2010 revealed only minor erosion over much of the site area. Low water level and lack of extensive vegetation at the water's edge resulted in good surface visibility. Several FCR and a ceramic sherd were observed but not collected. The sherd was actually in the river, out of reach. 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.

20SA214 *Shiawassee #6*

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

With the overall relatively low water levels of the last several years, vegetation has covered much of the low riverbank along this site. The low banks and the vegetation offer a degree of stability to the site and only minimal bank erosion was noted in the site area in the years 2004 – 2007. This continued to be the case in 2010. However, higher water levels, especially if accompanied by ice flows in the early spring, could reverse this situation. Indeed, significant erosion of the site has clearly occurred over the last several decades.

During the 2000 field season, a temporary site datum (a wooden stake) was driven into the ground near the eastern edge of the central portion of the site. The site datum also marks the beginning of Segment 1 West (and simultaneously 1 East). Wooden stakes were also placed every 100 meters to the west, marking the locations of the beginning of Segments 2 West through 9 West. Stakes were not placed to the east of the datum, nor were any artifacts collected from this portion of the site. None of the wooden stakes west of the datum was relocated during fieldwork in 2007 and no attempt was made to find any stakes during the 2010 field season.

A visit to this site in April 2010 revealed the continued presence of dense vegetation over much of the site area. Despite the poor surface visibility, many FCR and a few flakes were observed in the small areas of exposed ground. No diagnostic artifacts were observed and no artifacts were collected.

Based on materials recovered during previous field seasons, this site appears to be predominately Middle to early Late Woodland in age. A small amount of transitional Late Archaic/Early Woodland, Early Woodland, Late Woodland, and historic 19th and 20th century debris is also present. The projectile

points and knives recovered from this site suggest a variety of hunting and butchering tasks were carried out. Scrapers and other retouched and utilized flakes indicate hide and food preparation and perhaps the working of bone or wood. Fishing is hinted at by the presence of probable net sinkers. The large quantities of preforms, cores, flakes and other debitage indicate that all stages of stone tool manufacturing were conducted at this location. Overall, the material recovered from the surface of this site suggests that it represents a series of base camp occupations by groups mixed in terms of age and sex.

20SA722 Clunie Site

This large site extends for approximately 960 meters along the bank of the Tittabawassee River (Appendix B). In 2000 a site datum was driven into the ground, which also serves as the beginning of Segments 1 East and 1 West. Wooden stakes were placed every hundred meters to the west, marking the beginning point of each segment (Sommer 2001:14). Because most, or all, of the stakes have been lost due to flooding and/or erosion, surface finds since 2002 have been plotted by GPS or have been given grid coordinates based on the Shovel Test grid set up in 2004 (Sommer 2005). The relatively high and steep riverbank was subject to moderate to severe erosion over much of the site area in 2005 – 2007 and again in 2009. Only minor to moderate erosion was noted during the 2008 and 2010 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 2010, 94 square meters were excavated.

Both surface survey and limited test excavations were conducted at 20SA722 in 2010. A total of 8,292 objects were catalogued from 20SA722 during the 2010 field season. These items are included in Accession F10-1 and were assigned Catalogue Numbers F10-1-1 through F10-1-737. These items include three objects derived from the surface, and 8,289 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 two grit-tempered ceramic sherds and one biface. The larger of the ceramic sherds is a neck sherd found at the far eastern end of the site and is likely Late Woodland in age (Figure 1, #735). The smaller sherd and the biface were found upstream from the excavated portion of the site, near the western end. The body sherd also exhibits a cord-roughened exterior with no decoration (Figure 1, #736). The biface is a well-made triangular projectile point missing its tip (Figure 1, #737). It is made of either bedded Bayport chert or a pebble chert. Length, width, and thickness measurements of the surviving portion are 16.39 mm, 13.30 mm, and 4.21 mm respectively.

Based on the 2010 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 artifacts recovered from the surface in 2010 all probably date to the Late Woodland through Late Prehistoric periods, supporting previous estimates based on surface survey, shovel testing and excavation that the most intensive occupations occurred during these times.



Figure 1: 20SA722, biface and ceramics from surface.

20SA1250 *Shiawassee #1*

This site has a low density of FCR and other artifacts scattered over approximately 240 meters along the Shiawassee River near its confluence with the Tittabawassee River (Appendix B). The western edge of this site is flanked by a low marsh. The 1955 aerial photograph of the site area does not depict any obvious historical disturbances.

Despite fairly low water levels during a visit to the site in April 2010, no artifacts were observed or collected. Only minimal to moderate bank erosion was observed in the site area.

Based on artifacts recovered during previous field seasons (Sommer 2000, 2001, 2004a), this site is interpreted as an early Late Woodland to Late Woodland occupation, at which a variety of food processing/storage and stone tool manufacturing activities took place.

20SA1251 *Shiawassee #2*

This site consists of a scatter, dense in places, of FCR and other artifacts, which extends along the Shiawassee River for over a kilometer (Appendix B). It is bordered on either end by low marshes. Most of the riverbank along the site has become covered with vegetation over the last several years resulting in increased surface stability and minimal bank erosion. However, moderate to severe erosion was observed along some portions of the site (especially some of the higher density site areas) each year from 2004 through 2010. During most years, 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 2010 was confined to surface survey.

Visits to the site in April and September 2010 revealed numerous flakes, grit-tempered pottery sherds, FCR, and a few flaked stone tools. Seven artifacts were collected including three ceramic sherds, two bifaces, a bipolar core, and a core fragment/shatter. These items are included in Accession F10-2 and were assigned catalogue numbers F10-2-1 through F10-2-7.

The ceramic sherds collected in 2010 are all grit-tempered and include one rimsherd and two body sherds. The rimsherd exhibits a distinct collar with a tool-impressed, cord-roughened exterior (Figure 2, #1). The tool impressions, probably applied in a drag/jab technique, are present over the cord-markings and are partially obscured by smoothing. The interior also shows 8+ rows of drag/jab tool impressions partially smoothed over. The presence of a collar on this vessel strongly suggests a Late Woodland temporal placement, probably after AD 1000. Both of the body sherds are decorated. One sherd has a smooth exterior with faint incised, possibly rocker-stamped, lines (Figure 2, #2). Based on its paste, surface treatment, and decoration, this sherd is clearly associated with the Middle Woodland component at this site. The final ceramic sherd collected in 2010 has a cord-roughened exterior with cord-wrapped stick impressions (Figure 2, #3). This sherd may date to either the Middle Woodland or Late Woodland period.

One of the bifaces collected in 2010 is a triangular/lanceolate specimen missing its tip and made of Upper Mercer chert (Figure 3, #4; Table 1). The other, made of Bayport chert, is a hafted scraper made from a heavily reworked, corner-notched, Snyders-like biface (Figure 3, #5; Table 1). The bipolar core is a wedge-like specimen made of Bayport chert (Figure 3, #6). The core/shatter specimen is made of Kettle Point chert, an uncommon raw material at this site (Figure 3, #7).

Table 1: 20SA1251, biface metrics from surface.

Catalogue Number	Type	Length (mm)	Width (mm)	Thickness (mm)
F09-2-4	Triangular/Lanceolate	-----	24.91	7.17
F09-2-5	Corner-notched	32.10	36.65	12.31



Figure 2: 20SA1251, ceramics from surface. (profile interior to right)



Figure 3: 20SA1251, flaked stone artifacts 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±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.

20SA1255 *Shiawassee #4*

This site extends approximately 140 meters along a small point extending into the Shiawassee River (Appendix B). It is flanked on either end by low marshy areas. The last time this site was monitored was in 2005 (Sommer 2006). At that time, fairly dense vegetation covered the riverbank at this location and only minimal erosion was observed. These conditions obtained also during a visit in September 2010. Although vegetation obscured surface visibility over a portion of the site, several flakes and FCR were observed in 2010. No diagnostic artifacts were observed, and no artifacts were collected.

Based on work from the previous field seasons (Sommer 2000:22-24, 2001:23, 2002:17-18). This site appears to represent two or more components, including Terminal/Late Archaic and Middle to early Late Woodland occupations. A variety of activities are represented including flaked stone tool production and use, food preparation and/or storage, hunting, fishing, and processing of game, wood and bone working, ground stone tool production and use, and the use of fire for heating and/or food preparation.

20SA1256 *Shiawassee #5*

This site extends approximately 220 meters along a small point extending into the Shiawassee River (Appendix B). It is flanked on either end by low marshy areas. Only minimal erosion was noted at this site in 2005, which was the last time this site was monitored (Sommer 2006). These conditions remained the same during a visit in September 2010. Although vegetation covered much of the site, several flakes and FCR were observed during the 2010 visit. No diagnostic artifacts were observed and no artifacts were collected during the 2010 field season.

Based on work from previous field seasons, this site is thought to contain early Late Woodland and transitional Late Archaic/Early Woodland age material.

20SA1257 *Shiawassee #9*

This is one of the few sites discussed in this report that is not currently being eroded by fluvial action (Appendix B). As noted during the previous field seasons (Sommer 2000:25, 2001:24, 2002:18-19), an interesting aspect of this site is that it is located in a large area of small irregular mounds or hummocks. The hummocky or mounded area covers at least two hectares (the entire area has not been walked, mapped, or measured). The mounds/hummocks are irregularly shaped and haphazardly oriented. Most are less than one meter high, two to three meters wide, and less than five meters long. The origin of these mounds/hummocks is presently unknown, although it is likely that they represent a combination

of tree throws and flood erosion that has not been leveled off by plowing. The 1955 aerial photograph of the area indicates that it was not plowed at that time. It also clearly shows an old road cut, still visible, which borders the northern edge of the hummocky area and then makes a sharp turn to the north where it parallels Bullhead Creek. It is possible, though probably unlikely, that this hummocky area represents a cultural feature. Based on the artifacts observed on the surface in previous years, this site extends for at least 250 meters in a north/south direction along Bullhead Creek. A visit to this site in September 2010 revealed that it was completely covered by vegetation, mostly wood nettles. No artifacts were observed or collected.

Due to the small sample of artifacts recovered from this site in previous field seasons the function of this site cannot be inferred. The large area from which artifacts have been observed suggests that the site was repeatedly occupied, probably over a long period of time. The potsherds recovered may indicate food storage and/or preparation activities. The flakes previously recovered indicate that flake stone tools were being manufactured and/or used at the site. Based on paste attributes of the potsherds, they have been tentatively assigned to the Late Woodland period.

20SA1258 *Shiawassee #10*

This site was initially described as extending for at least 250 meters along the Shiawassee River. Monitoring of this site in 2003 revealed a low-density scatter of flakes and FCR extending an additional 300 meters east (Appendix B). It is flanked on its western end by a low marsh. Only the western edge of the site was visited in 2010, at which time a few FCR were observed, but not collected. During previous field seasons, a biface, ceramics, a light scatter of FCR and flakes was observed across the entire site area, as was a possible fish weir (Sommer 2000:25, 2001:24, 2002:19, 2004a). The biface and ceramics recovered previously are consistent with Middle Woodland to early Late Woodland forms.

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 visit in April 2010. Despite heavy vegetation, pockets of moderate erosion of the riverbank were observed in the vicinity of the site. Artifacts reported previously include a grit-tempered ceramic body sherd with smooth exterior that was recovered in 2002 and the tip of a Bayport chert biface that was recovered in 2000 (Sommer 2001:25, 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 visit in April 2010. Despite the heavy vegetation, moderate erosion of the riverbank was observed in the vicinity of the site. Based on artifacts recovered in 2002 and 2000, this site appears to represent one or more Late Woodland components. This assessment is based on the presence of multiple Late Woodland ceramic vessels and a triangular projectile point. The artifact assemblage suggests a variety of activities,

including food processing or storage, flaked stone tool use and production, and using fire for heat and/or food preparation.

20SA1275 *Tittabawassee #3*

This site was originally recorded as a findspot of several small, grit-tempered pottery fragments located in a tree throw on the edge of an old road cut approximately 40 meters south of the Tittabawassee River (Sommer 2001:26, 2002:19-20). In 2006, three additional grit-tempered ceramic sherds were located on the riverbank approximately 70 meters east of the original findspot. Despite the distance between them, given the disturbed nature of the sediment around each of the findspots, it is thought best to lump them together under a single site designation (Appendix B). Future work may necessitate splitting the locations into two separate sites. The 1955 aerial photograph of the site area shows it to have been heavily wooded. The road cut is not clearly visible on the photograph, but the large trees growing in the area may have obscured it. Heavy vegetation covers the riverbank and no artifacts were observed or collected from this site during a visit in 2010. Despite the heavy vegetation, moderate erosion of the riverbank was observed in the vicinity of the site.

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

20SA1276 *Shiawassee #13*

This site is located approximately 250 meters north of the Shiawassee River (Appendix B). The site was originally located by observing artifacts in the backdirt piles from several animal burrows (Sommer 2001:26). These burrows are primarily located on and adjacent to an east/west trending linear ridge that crosscuts the site roughly around the 480-490 N line. The ridge itself is cut through by an old road that runs roughly north/south at approximately the 515-520 E line. No active burrows were observed during a visit to the site in April 2010. A return visit in September revealed one active burrow with freshly disturbed ground. One FCR, noted, but not collected, was the only artifact observed on the site in 2010.

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.

Although no diagnostic artifacts were observed or collected during the 2010 field season, artifacts recovered during previous work indicate that this site dates between the Late Archaic and Late

Woodland periods. The great majority of artifacts and three radiocarbon dates indicate that the main period of occupation occurred during the Middle Woodland time period.

20SA722 Excavation Analysis and Evaluation

Excavation Characteristics

Eleven square meters were excavated at 20SA722 during the 2010 field season. The 11 square meters are contiguous and comprise Excavation Block G (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 G are very similar to the soil profiles described for the other Excavation Blocks reported previously from this site (Sommer 2006, 2007, 2008, 2009). Excavation Block G is represented by the north wall profile of unit 585N 453E (Figure 4). A generalized description of the soil profile in Excavation Block G follows. Soil colors are described using Munsell® Soil Color Chart designations.

The upper A-horizon includes an approximately 30 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 black (10YR2/1) sandy silt. 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 Blocks G (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 units 584-585N 454-455E in Excavation Block G, begin to show evidence of (disturbed) shallow surface hearths. At around 45-55 cm the soil is again a slightly lighter (10YR3/2) sandy clay silt which continues down to a depth of approximately 70 cm. This is the zone in which Feature 20, described below, occurred in units 585-586N 453E. A sample of charred organics scraped from the interior of a ceramic sherd recovered in this zone has been submitted for AMS analysis (see below). Below this level, extending down to around 90-95 cm, was a darker (10YR3/2 or 10YR2/1) sandy clay silt. In most of the other Excavation Blocks previously excavated at this site, the proportion of clay in these lower zones was much lower. 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.

In total, 8,291 objects were catalogued from 20SA722 during the 2010 field season. These items include three objects derived from the surface (described above in *Analysis and Evaluation* section), and 8,288 items derived from Excavation Block G. 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 2010 from non-feature contexts is 178<0.5" (128.0g) and 131>0.5" (2,469.5g). Prior to cataloguing, 1/8 inch screened samples were size sorted into fractions >1/4 inch and <1/4 inch. Only the >1/4 inch size fractions have been catalogued to date. In addition, 13 samples, containing a total of 83 liters of sediment, were saved for flotation. This material has not yet been analyzed.

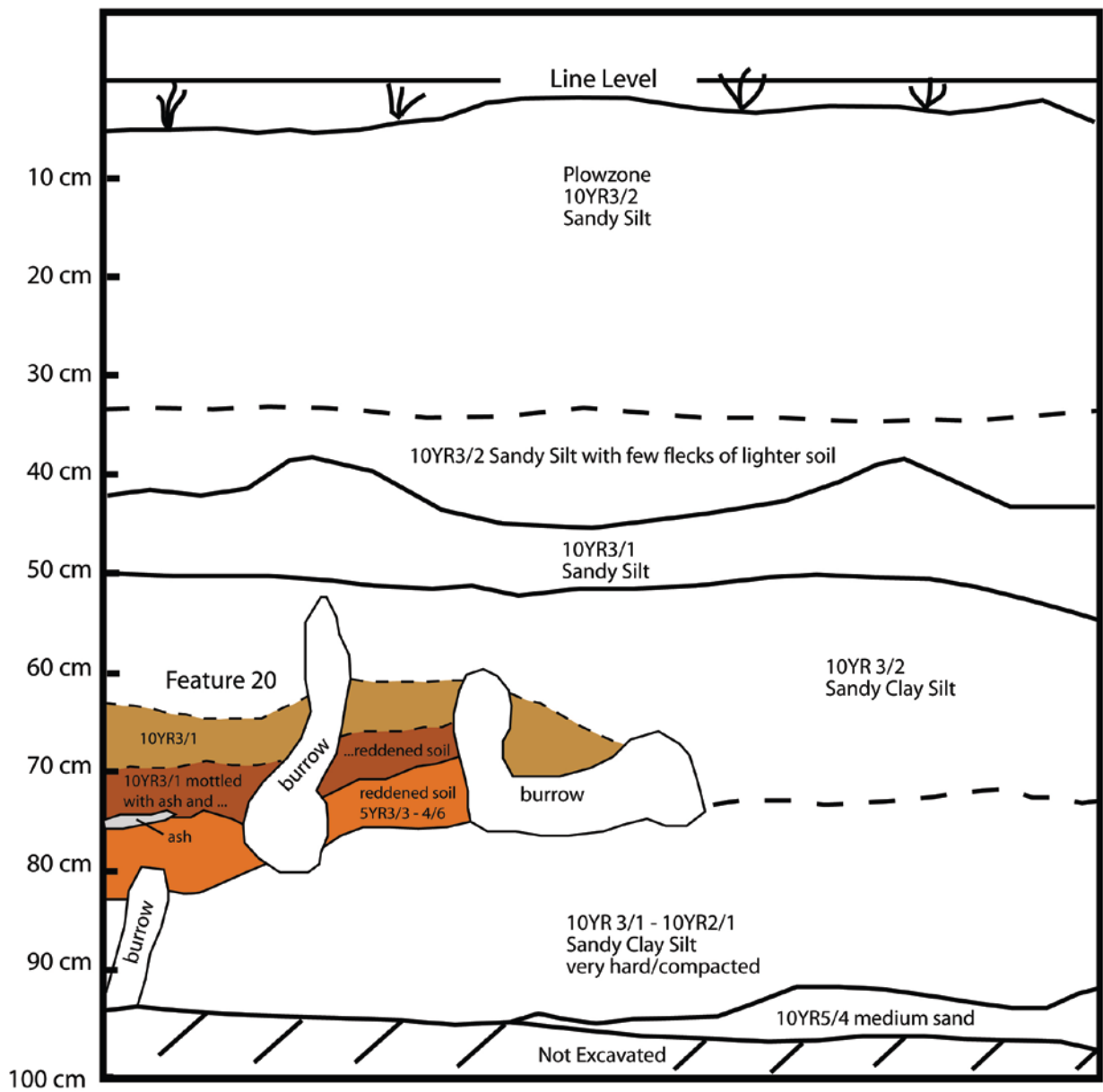


Figure 4: 20SA722, Excavation Block G, 585N 453E, North Wall profile showing Feature 20.

Artifact Summary for Excavation Block G

The 8,288 catalogued items from Excavation Block G include 226 historic objects, 7,340 prehistoric objects, and 722 items of an undetermined origin. The latter group includes 33 bivalve fragments, 686 pieces of charcoal, two possible sandstone abrader fragments and one hematite pebble. Most of the charcoal is wood charcoal. However, the charcoal assemblage also includes 25 tuber, or possible tuber fragments, four hickory nut shells (*Carya* sp.), two walnut shells (*Juglans* sp.), and one unidentified nut shell fragment. 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, those from depths greater than 70 cm are classified as undetermined origin. The reasons for this is are twofold. First, there are relatively few demonstrably cultural artifacts from this depth, and second, starting around this depth we begin to encounter the sandy “sterile” subsoil, which at this site is known to contain numerous mussels and gastropods.

Historic items from Excavation Block G include two brick fragments; three fragments of asphalt shingles; four fragments of plain-white/destroyed ceramic vessels; 34 coal/cinders/slag; two pieces of flat glass; 39 glass vessel fragments; eleven clay pigeon fragments; two small pieces of concrete; 10 square nail fragments (Figure 5, #314); 115 scraps of iron, at least four of which are probably corroded nail fragments; two .22 cal. shell casings (Figure 5, #317) and one Winchester Repeater 12 gauge shotgun shell (Figure 5, #292); and one piece of plaster. The glass vessel fragments include 10 brown/amber bottle fragments, one of which is embossed [...N...] (Figure 5, #673); three aqua fragments, one of which is embossed [...UI...] (Figure 5, #481a); one pale green fragment; three amethyst-colored pieces; and 22 clear glass fragments. The clear glass includes four very thin specimens and five pieces that may be from a lamp chimney (Figure 5, #481b). Most of the historic items probably date to the mid-nineteenth through twentieth centuries.



Figure 5: 20SA722, Historic period artifacts.

The 7,340 prehistoric items from Excavation Block G include two small ceramic pipe fragments with no visible temper; 2,289 ceramic sherds; 2 fragments of waste clay, or possibly daub; 1,778 unmodified vertebrate faunal remains, including fish, reptile, bird and mammal remains; 1,068 unmodified bivalve mollusk remains; four modified bone fragments; one shell bead, probably from a marine shell; 34 bifacially flaked stone tools (Table 2); 15 bipolar cores; eleven additional cores/core fragments; 2,061 lithic flakes and shatter; 15 retouched chert flakes; 52 utilized/edge-damaged chert flakes; one small (69.0g) flaked quartzite cobble (Figure 6, #340); two sandstone abraders (Figure 6, #501); three rolled copper beads; one copper scrap; and one quartzite hammerstone (Figure 6, #27). The hammerstone is an irregularly-shaped broken cobble weighing 158.1g and showing battering around the margins.



Figure 6: 20SA722, hammerstone, abrader, and flaked cobble.

The copper beads are small, fragmentary, and heavily corroded. They are made of thin scraps of copper rolled into a tube shape. None is complete enough to reliably measure. Similar, more complete, copper beads were recovered previously from this site (Sommer 2009; 2010), from the protohistoric Indian Hills Phase component of the Petersen site in northwestern Ohio (Abel 2002:49-52), and from the Late Prehistoric/protohistoric Dumaw Creek site in western Michigan (Quimby 1966:39-42).

The 34 bifacial flaked stone implements recovered from Excavation Block G include one bifacial core/preform made of either bedded Bayport or a pebble chert (Figure 7, #449); one bifacial endscraper made of Bayport chert (Figure 7, #172); one side-notched projectile point made of Bayport chert (Figure 7, #558); 10 complete or fragmentary triangular (Madison-like) projectile points; five triangular projectile point preforms, including four Bayport chert examples (Figure 7, #18, 103, 439) and one specimen made of either Pipe Creek or a pebble chert (Figure 7, #170); six additional biface preforms/preform fragments including two Bayport chert examples, one made of pebble chert, two made of either bedded Bayport or pebble chert, and one specimen that may be Kettle Point chert (Figure 7, #497); and 10 additional biface fragments including six made of Bayport chert, two made of either bedded Bayport or pebble chert, one made of bedded Bayport chert, and one made of Flint Ridge chalcedony. The triangular (Madison-like) projectile points include seven Bayport chert examples and three examples made of either bedded Bayport chert or pebble chert (Figure 8). Measurements for the complete, or nearly complete, examples are provided in Table 2.

Table 2: 20SA722, Block G biface metrics.

Catalogue Number	Material	Type	Length (mm)	Width (mm)	Thickness (mm)
F10-1-18	Ba	Triangular, preform	27.62	16.35	14.44
F10-1-86	Ba	Triangular	-----	14.05	3.09+
F10-1-97	Ba	Triangular	-----	11.93	3.51
F10-1-103	Ba	Triangular	26.75	17.61	6.61
F10-1-104	Ba	Triangular	27.32	17.90	5.22
F10-1-152	bBa/Pe	Triangular	25.47	14.28	3.59
F10-1-153	Ba	Triangular	31.78	-----	3.52
F10-1-170	PC/Pe	Triangular, preform	27.07	14.41	8.54
F10-1-172	Ba	bifacial endscraper	41.35	23.05	7.90
F10-1-235	Ba	Triangular, reworked	21.36	14.70	4.16
F10-1-301	Ba	Triangular	21.40+	15.65	3.55
F10-1-373	bBa/Pe	Triangular	-----	13.12	3.20
F10-1-374	bBa/Pe	Triangular/Ovoid, preform	21.03	15.65	6.29
F10-1-439	Ba	Triangular, preform	-----	17.71	6.11
F10-1-494	Ba	Triangular, preform	24.15	15.00	5.25
F10-1-497	KP?	Triangular/Lanceolate, reworked fragment?	24.44	9.52	4.66
F10-1-498	PC?	Triangular, retouched flake	-----	15.16	4.01
F10-1-558	Ba	Side-Notched	26.00	16.86	3.68
F10-1-602	bBa/Pe	Triangular	-----	13.94	4.46
F10-1-615	Ba	Triangular	-----	-----	3.62
F10-1-622	Ba	Triangular	22.15	16.32	5.32

Ba=Bayport chert, bBa=bedded Bayport chert, KP=Kettle Point chert, PC=Pipe Creek chert, Pe=pebble chert

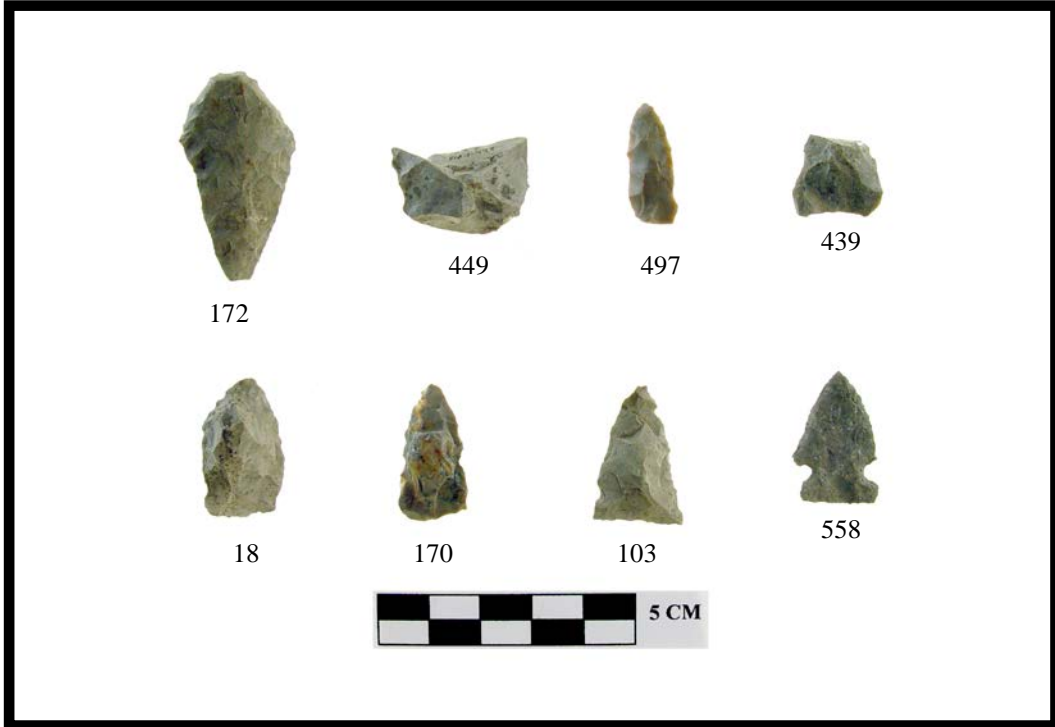


Figure 7: 20SA722, bifaces from Excavation Block G.



Figure 8: 20SA722, triangular projectile points from Excavation Block G.

Other flaked stone tools, or probable tools, include 14 unilaterally retouched flakes, one bifacially retouched flake projectile point (Figure 8, #498; Table 2), 52 utilized/edge-damaged flakes, and one modified (flaked) quartzite cobble (Figure 6, #340). The 14 unilaterally retouched flakes include seven specimens made of Bayport chert (Figure 9, #19, 76, 287), one of which may be a core fragment; one specimen made of bedded Bayport chert (Figure 9, #679); two examples made of either bedded Bayport or a pebble chert (Figure 9, #4); two examples each of Wyandotte chert (Figure 9, #236) and possibly Pipe Creek chert; and one specimen of a Pebble chert (Figure 9, #695). The utilized/edge-damaged flakes include 32 Bayport chert examples, six specimens of bedded Bayport chert, nine examples of either bedded Bayport chert or Pebble chert, one pebble chert, three unidentified chert, and one quartzite flake. The unidentified chert flakes include two that may be Wyandotte and one that is likely a pebble chert.

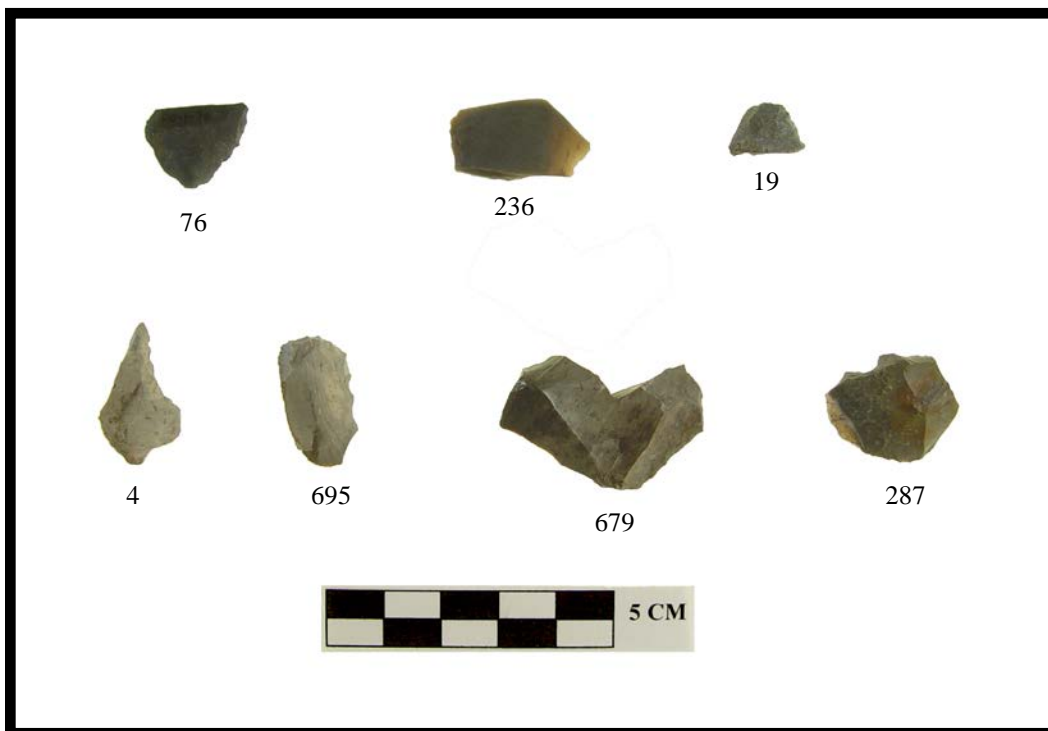


Figure 9: 20SA722, retouched flakes.

Fifteen bipolar cores were recovered from the 2010 excavations at the Clunie site. The bipolar cores from Excavation Block G include 10 Bayport chert examples and five examples that are either bedded Bayport or pebble chert (Figure 10, top row).

Eleven additional cores or core fragments were also recovered from Excavation Block G. These cores include six Bayport chert examples (Figure 10, #385, 470, 606), one bedded Bayport chert example, two examples that are either bedded Bayport or pebble chert (Figure 10, #244), one specimen made of a pebble chert, and one Wyandotte chert example.

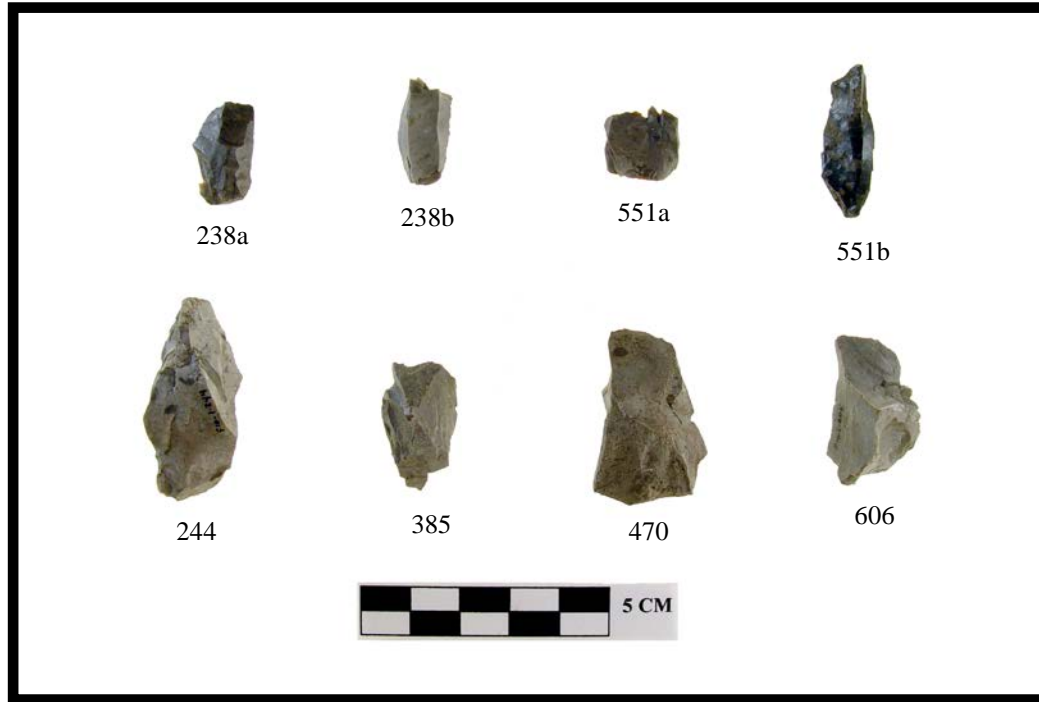


Figure 10: 20SA722, bipolar cores and cores.

The final category of flaked stone artifacts from Excavation Block G 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 (95%) of the 2,061 flakes and shatter recovered from Excavation Block G is locally available material including Bayport chert (n=1211), bedded Bayport chert (n=130), pebble cherts (n=60), material that is either bedded Bayport or a pebble chert (n=542), and quartzite, or other coarse-grained rock (n=8). Only 110 specimens don't appear to fall into the above chert types, several of which may also be locally derived materials. Non-local materials represented in the flake assemblage include 29 Wyandotte chert flakes, one Upper Mercer chert flake, four Pipe Creek chert flakes, and 13 flakes of Flint Ridge chalcedony. Other potential non-local materials include 19 specimens that may be Kettle Point chert, 10 possible Wyandotte chert flakes, six possible Pipe Creek flakes, three possible Flint Ridge, and 25 other unidentified chert flakes. The non-local component therefore comprises between 2% and 5% of the flake and shatter assemblage.

Of the 2,289 ceramic sherds recovered in Excavation Block G, 36 are rimsherds and 2,253 are body/neck sherds. A minimum of 18 vessels is represented. The body/neck sherds include 617 shell-tempered examples and 1,636 grit-tempered specimens. Of the 617 shell-tempered body/neck sherds, 558 are either sherdlets or destroyed and were not further analyzed. The shell-tempered neck and body sherds complete enough to be analyzed include 45 with cord-roughened exterior surfaces, four with smoothed over cord-roughened exteriors, and 10 have exterior surfaces that are smooth or smoothed over to the point that the original surface treatment is obscured. The smooth or smoothed over shell-tempered

sherds include one decorated with tool impressions and one decorated with cord-wrapped stick impressions. Of the 1,636 grit-tempered sherds, 1,428 are either sherdlets or destroyed. Of the grit-tempered body/neck sherds with intact surfaces that are large enough to be analyzed, 123 exhibit cord-roughened surfaces, 43 have cord-roughened surfaces that were subsequently smoothed-over, one shows vertical brushed impressions on the exterior, two have fabric impressed exterior surfaces, and 39 have exterior surfaces that are smooth or smoothed over to the point that the original surface treatment is obscured. Two of the cord-roughened sherds are decorated with cord impressions. Of the 43 smoothed over cord-roughened sherds, one exhibits incised decoration and two are decorated with cord-wrapped stick impressions. Decorated sherds with smooth exterior surfaces include two with cord-wrapped stick impressions, two with cord impressions, and three with broad finger-trailed decoration.

The 36 rimsherds recovered from Excavation Block G represent at least 17 vessels, including three shell-tempered vessels and 14 grit-tempered vessels. One shell-tempered vessel is represented by a sherdlet with vertical dentate stamping (possibly a cord-wrapped stick impression) on a smooth exterior (Figures 11 and 12, #16). The surviving portion of the lip appears smooth and the interior is destroyed. A second shell-tempered vessel is represented by a small rimsherd with a tool impressions on a smoothed exterior and additional tool impressions on the top of a smooth, rounded lip (Figures 11 and 12, #360). A second rimsherd, not shown, with a smooth rounded lip and mostly destroyed exterior may also be from this vessel. A third shell-tempered vessel is represented by a rimsherd with a smooth exterior and a destroyed, possibly folded over or protruding, lip. Two additional shell-tempered rimsherds are mostly destroyed and cannot be assigned to any particular vessel.

The 30 grit-tempered rimsherds recovered in Excavation Block G represent a minimum of 14 vessels. Three grit-tempered vessels are represented by very small rim-sherdlets. One appears to have a smooth exterior with finger/dowel impressions on the top of the lip producing a scalloped effect (Figures 11 and 12, #419). The second exhibits a finger-pinched lip, but the interior and exterior are destroyed (Figures 11 and 12, #599). The third may also have a pinched lip, but in this case with tool impressions/notches across the lip.

Two, slightly larger, conjoining rim/neck sherds with a smooth exterior and broad, vertical finger trails represent a fourth grit-tempered vessel from Block G. The lip is missing, but the rim appears to be thickened (Figures 11 and 12, #473). Two conjoining rimsherds with a thickened rim and lightly finger-pinched lip are probably from this same vessel (Figures 13 and 14, #162, 495). This vessel is nearly identical to a vessel represented by several sherds excavated at this site in 2007 in Feature 11 from Excavation Block A/D (Sommer 2008).

A fifth vessel is represented by two rimsherds with a broadly scalloped lip (Figures 11 and 12, #643). The scalloping effect was achieved by impressing the lip with a rounded, possibly cord-wrapped tool. The exterior surfaces of these two rimsherds are completely exfoliated. A node on the interior of one of the sherds indicates a punctate decoration on the destroyed exterior. Further, numerous cord-roughened body sherds with the same friable paste were found in association with these rims and are likely from the same vessel.

Three small rimsherds and a sherdlet with cord-roughened or smoothed over cord-roughened exterior surfaces and lips represent at least one additional vessel (Figures 11 and 12, #2, 600). Although the thickness of the sherds and the clarity of their cord-roughening varies somewhat, the temper and paste are very similar. Given their small size it is impossible to demonstrate that more than one vessel is represented by this group.

A seventh vessel is represented by two non-conjoining sherds with finger-pinching obscuring a tool-impressed lip. The larger of the two rimsherds also exhibits oblique tool impressions on the smooth rim exterior (Figure 13 and 14, #361). The tool impressions are approximately 14.9 mm long, 3.8 mm wide, and are spaced approximately 3.3 mm apart (edge to edge).

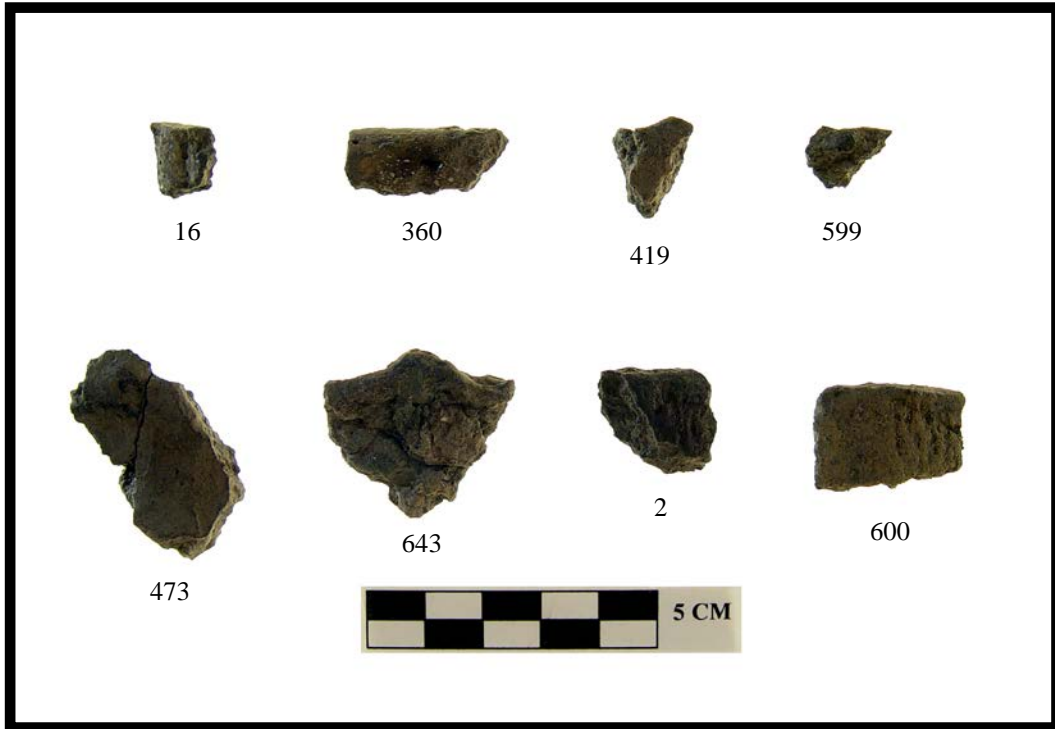


Figure 11: 20SA722, ceramic rimsherds from Excavation Block G.

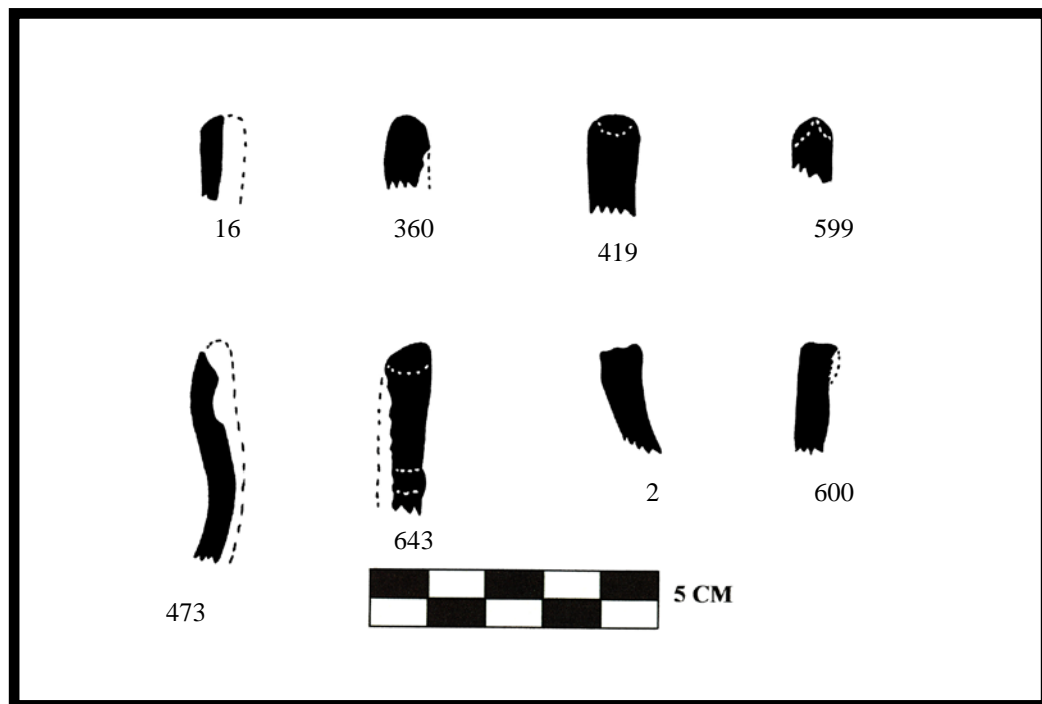


Figure 12: 20SA722, ceramic rimsherd profiles.

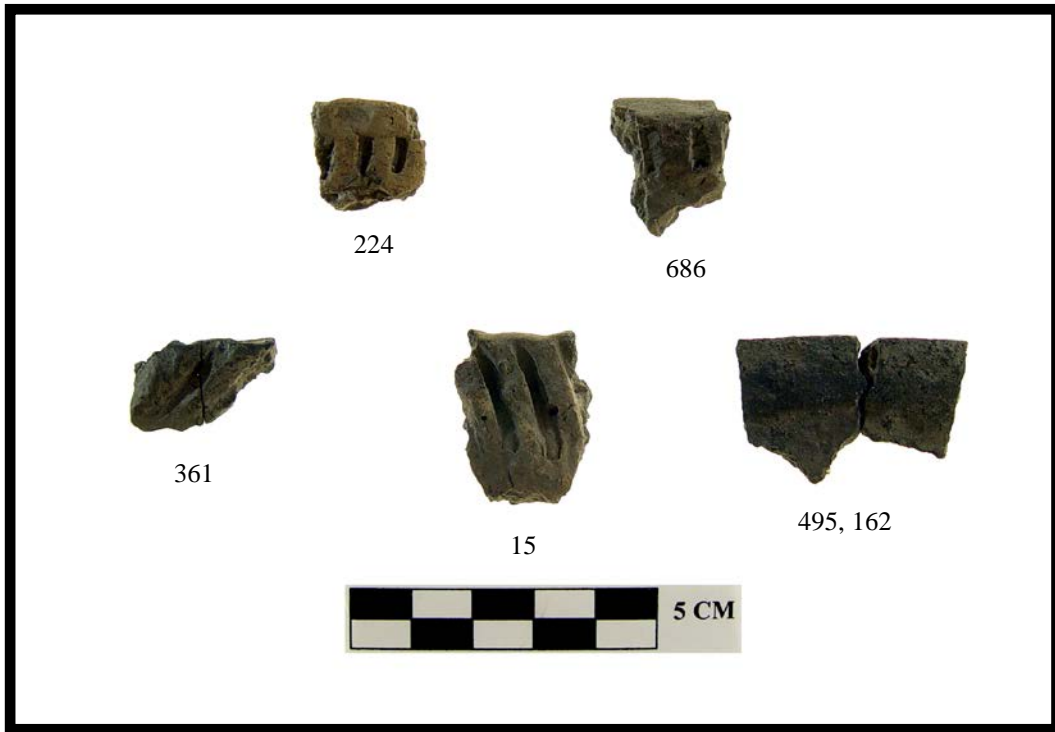


Figure 13: 20SA722, ceramic rimsherds from Excavation Block G.

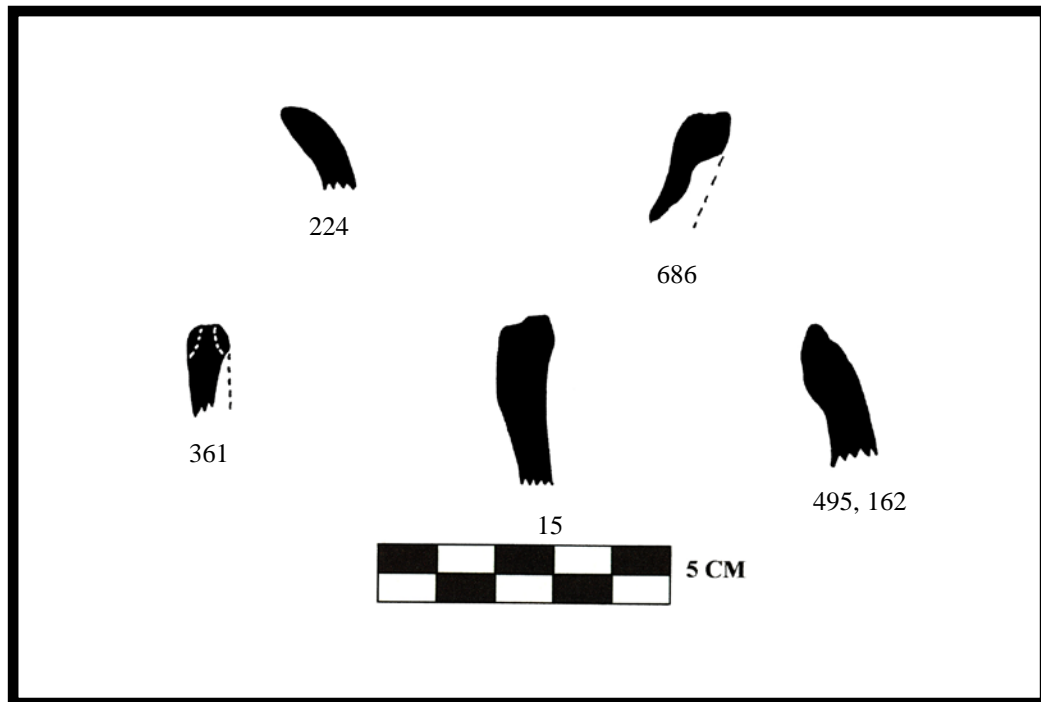


Figure 14: 20SA722, ceramic rimsherd profiles.



Figure 15: 20SA722, ceramic rimsherds and body sherd from Excavation Block G.

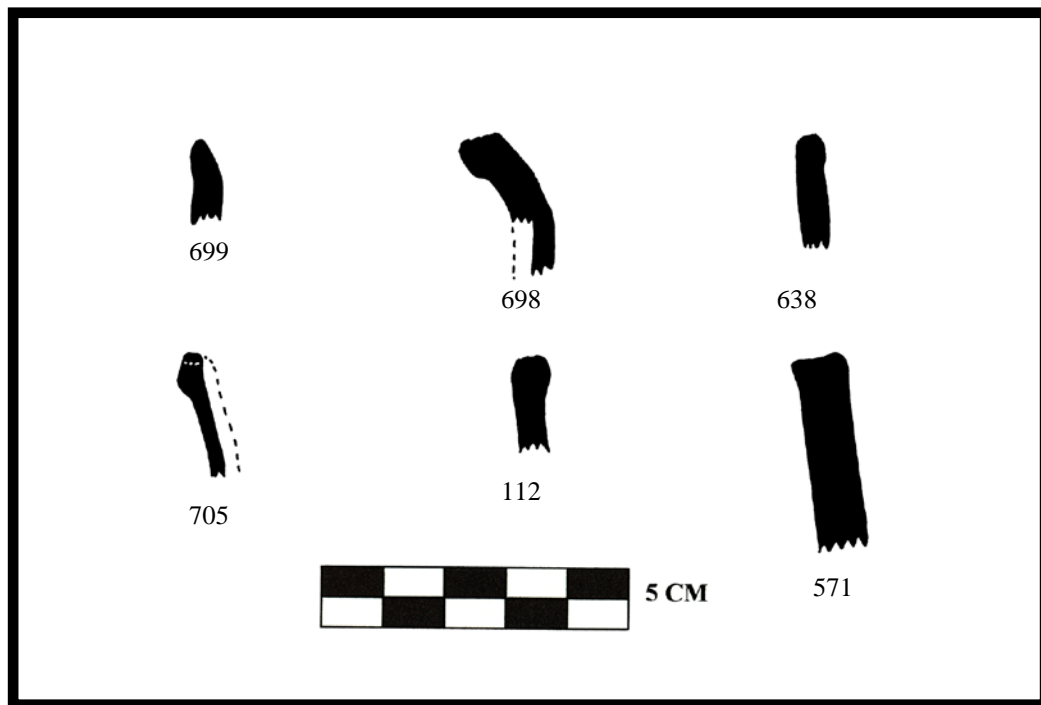


Figure 16: 20SA722, ceramic rimsherd profiles.

An eighth vessel from Excavation Block G also exhibits a finger-pinched lip and tool impressed exterior rim with a smooth surface (Figures 13 and 14, #224). The tool impressions on this vessel are slightly oblique, smaller, and rectangular in shape. The tool impressions are approximately 5.6 mm long, 1.9 mm wide, and are spaced approximately 3.9 mm apart (edge to edge).

A ninth vessel is similar to the previous two in that it exhibits a finger-pinched lip and tool impressions (Figures 13 and 14, #15). The finger-pinching on this vessel is slightly different in that while the thumb and middle finger applied pressure to the interior and exterior of the lip, the index finger pressed down on the top of the lip resulting in an undulating, nearly scalloped appearance. The tool impressions on the exterior of the rim are nearly vertical and quite large. They measure approximately 20.3 mm long, 2.6 mm wide and are spaced approximately 4.6 mm apart (edge to edge). Unlike the previous two vessels, this vessel also exhibits smaller tool impressions, or possibly fingernail impressions, on the interior lip.

Tool impressions are also present on the exterior rim of a tenth vessel from Block G (Figures 13 and 14, #686). A single rimsherd from this vessel exhibits a flattened squared lip and an incurved rim profile. The rim is slightly thickened with a smooth or smoothed-over exterior surface. Tool impressions are present along the exterior upper rim. The nearly vertical rectangular impressions are approximately 6.8 mm long, 2.8 mm wide, and spaced approximately 2.7-4.3 mm apart (edge to edge).

Three small rimsherds with cord-roughened exteriors and lips are grouped as an eleventh grit-tempered vessel (Figures 15 and 16, #112, 638, 699). These sherds exhibit straight rims and lip shapes ranging from squared to rounded. The sherds are quite thin, measuring 4.6, 4.8, and 5.1 mm thick at 10 mm below the lip. It is quite possible that these sherds actually represent two or three vessels, but given their small size, they must for now be considered a single vessel. Stylistically, these cord-roughened sherds/vessel(s) can be attributed to early Late Woodland Wayne Ware ceramics (Brashler 1981).

Two additional Wayne ware vessels are represented by rimsherds recovered in 2010. One vessel is similar to the previously described vessel in that it exhibits a cord-roughened exterior and lip. However, this vessel has a slightly thickened lip and appears to be somewhat excurvate in profile (Figures 15 and 16, #698). The third Wayne ware vessel is represented by three rimsherds which do not conjoin. The exteriors and lips are deeply cord-roughened and the interiors are destroyed (Figures 15 and 16, #705). The lip is rolled over/thickened and decorated with transverse tool impressions. The tool impressions are approximately 2.4 mm wide and are spaced 1.5-3.0 mm apart (edge to edge).

The fourteenth grit-tempered vessel from Excavation Block G also has a cord-roughened exterior and lip (Figures 15 and 16, #571). At 8.3 mm thick, this vessel is significantly thicker than the previously described Wayne ware vessels. The rim form is straight with a squared lip. Although the temper and paste of this vessel is similar to the Middle Woodland vessel described next, for now this vessel will remain unclassified.

A fifteenth vessel is represented by several body/neck sherds with a smoothed-over cord-roughened exterior surface treatment. Three of the sherds are decorated on the exterior with cord-wrapped stick impressions (Figure 15, #193). In terms of temper, paste, surface treatment, and decorative motif/technique, these sherds strongly resemble Middle Woodland Tittabawassee Ware ceramics (Fischer 1972). Charred organics scraped from the interior of one of these sherds was submitted for AMS analysis and the date obtained confirms the early Middle Woodland assessment (see Radiocarbon Dates section below).

Five modified faunal remains were recovered from Excavation Block G, two of which conjoin. The conjoining pieces are fragments of an awl made from a medium/large mammal long bone shaft (Figure 17, #709, 716). Another ground/polished fragment of medium/large mammal bone may also be part of an awl (Figure 17, #310). The final modified vertebrate faunal remain is a polished, or possibly water-rolled, fragment of a large mammal long bone shaft with distinct cut-marks (Figure 17, #378). The only modified shell artifact is a fragment of a tube-shaped bead made from what appears to be marine shell (Figure 17, #377). The bead was clearly drilled from both ends, as the holes do not line up precisely. The completed hole constricts slightly towards the center of the bead indicating use of a slightly tapered drill. The bead measures 11.2 mm in length and approximately 5.4 mm in diameter. The maximum hole diameter is approximately 3.1 mm at one end (the opposite end is too fragmentary to reliably measure).



Figure 17: 20SA722, shell bead and modified bone artifacts.

Unmodified faunal remains from Excavation Block G 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 vitreus*), bowfin (*Amia calva*), channel catfish (*Ictalurus punctatus*), bullhead/catfish (Ictaluridae), gar (*Lepisosteus* sp.), freshwater drum (*Aplodinotus grunniens*), and sucker (Catostomidae); unidentified turtle; at least one unidentified bird; and up to 9 mammals -vole (*Microtus* sp.), muskrat (*Ondatra zibethicus*), raccoon

(*Procyon lotor*), beaver (*Castor canadensis*), woodchuck (*Marmota monax*) small dog (*Canis lupus familiaris*) and/or fox (*Vulpes vulpes* or *Urocyon cinereoargenteus*), white-tailed deer (*Odocoileus virginianus*), and possibly elk/wapiti (*Cervus canadensis*). Up to four species of freshwater mussels have been tentatively identified, including threeridge (*Amblema plicata*), black sandshell (*Ligumia recta*) and/or spike (*Elliptio dilatata*), and pimpleback (*Quadrula pustulosa*). Of these, threeridge mussels are by far the most numerous and are the only species positively identified at this time.

Feature Descriptions

Two features, only one of which was numbered, were recorded in the 11 square meters excavated at 20SA722 in 2010. The unnumbered feature consisted of a diffuse scatter of ash and reddened soil, likely derived from a completely plow-disturbed shallow hearth feature. Because of the heavy disturbance, no flotation samples were taken and no artifacts could be confidently associated with the hearth. Feature 20, likely also the remnants of a hearth, was located well below the level corresponding to the late Prehistoric occupation of the Clunie site. Although associated diagnostic artifacts are lacking, the depth and presence of Flint Ridge Chalcedony suggest a Middle to early Late Woodland age for this Feature 20. This is only the second (the first relatively intact) feature associated with an earlier component at this site.

The feature volume that is recorded below is a minimum value describing the amount of feature fill that was saved for flotation. All depths are recorded as centimeters (cm) below datum (b.d.), which was arbitrarily selected to be the surface of one of the corners of the excavation unit in which the feature is located. The flotation samples that were collected from this feature have not yet been catalogued. Therefore, the lists of feature contents provided in the descriptions below should be considered preliminary assessments. The locations of the features within Excavation Block G are shown in Appendix C.

Feature #	20
Location	Block G, primarily 585-586N 553E (extending into 585-586N 452E not excavated)
Plan	two overlapping circular/oval
Profile	two overlapping basin-shaped
Max. length	135+ cm
Max. width	60+ cm
Depth defined	65 cm
Max. depth	82 cm
Volume	53 liters
Description	Feature 20 was comprised of two overlapping basin-shaped hearths (Figures 4 and 18). The lower portions of the feature consisted primarily of fire-reddened soil. Very few items were recovered in the flotation samples taken from Feature 20. They include a couple of very small grit-tempered ceramics; several flakes, nearly all of which are Flint Ridge Chalcedony from east central Ohio; burnt and unburned bone fragments, including several muskrat bones; charcoal, including several unidentified seeds and at least one nutshell; and a few snail shells.



Figure 18: 20SA722, Feature 20 plan view at 65 cm floor.

Radiocarbon Dates

Two Accelerator Mass Spectrometry (AMS) dates were obtained on material from the Clunie site in 2010. Both were run by Beta Analytic, Inc. 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).

Four dates have been obtained on charcoal recovered during previous field seasons from Features 1, 3 and 9 (Sommer 2006, 2007). The results of those analyses are repeated here. In 2005, two charcoal samples taken from Feature 1 were submitted to Beta Analytic, Inc., for radiocarbon analysis. One sample consisted of six grams of wood charcoal that were collected from a flotation sample taken from

Feature 1, Area 4. Assuming our interpretation that Feature 1 consists of two overlapping pits, this sample dates the smaller, circular pit that makes up the southeast portion of Feature 1. The conventional radiocarbon age of this first sample is 340 +/- 50 BP (2 Sigma Calibrated AD 1440-1660). The second sample consisted of 8.8 grams of wood charcoal that was piece-plotted in Feature 1, Area 7. This sample dates the larger (northwestern portion) of the probable overlapping pits that make up Feature 1. The conventional radiocarbon age of this second sample is 490 +/- 50 BP (2 Sigma Calibrated AD 1400-1470).

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

Finally, in 2009, an additional 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).

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 2010 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 eleven 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 2010 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. More suggestive is the cannel coal gorget and side-notched/expanding stemmed point with a ground base from 20SA1255, a corner-notched/side-notched point with a heavily ground base found at 20SA1251, and three “Ace of Spades/Ground base” points from the excavations at 20SA1276. Other Late Archaic/Early Woodland material recovered during previous field seasons include Meadowood bifaces recovered from the surface of 20SA214 and 20SA722 and a possible Meadowood point from 20SA1251. 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. 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).

Middle and/or Late Woodland occupations are indicated at all of the sites for which diagnostic materials are available. Although initial assessments of the material from 20SA1251 and 20SA1276 stressed that Middle Woodland period artifacts were primarily from the latter half of the period, early Middle Woodland artifacts have also been recognized in the assemblages. The presence of late Middle Woodland, transitional Middle to early Late Woodland, and early Late Woodland artifacts, including Green Point, Ruben Linear, and Wayne Ware ceramics, cut and engraved turtle carapace bowls (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. 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 this Green Point Incised, Cross Hatched vessel excavated from 20SA1251 has implications for our understanding of the Middle Woodland ceramic chronology and for our understanding of cultural processes in the Saginaw Valley. This vessel type, and the ware group that includes it, were originally defined at the nearby Schultz Site (Fischer 1972:161-165, 279-280) and are generally thought to date from the latter portion of the Middle Woodland period, from AD 300-500 (Kingsley 1999:151). The early Middle Woodland date from 20SA1251 indicates that the stylistic elements characterizing this type were introduced into the Saginaw Valley on a timeframe consistent with the spread of this style into other parts of Michigan (Sommer 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. 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 the 2010 and 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, and 2005).

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 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. The hearth features excavated in 2006, 2008, and 2009, including Features 3, 6, 7, 12, 13, 16, 17, and 18 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, appears to have been used both as a trash pit and a hearth. Feature 5, excavated in 2009, is another multi-functional 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, and 17. Maize kernels have been identified from in flotation samples from Features 3, 9, 11, 14, and 17. Additional maize kernels and a possible charred bean 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. 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). Flotation samples from 2009 and 2010 have not yet been subject to even preliminary sorting or analysis. 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 and other possible cultigens at this site.

The occurrence of specialized trash disposal areas and the abundance of faunal remains present suggest fairly long-term occupation (perhaps several weeks or months). However, compared with the amount of faunal remains recovered, other material culture such as flakes, stone tools, and ceramics is less abundant, arguing against long-term occupation. Radiocarbon dates from Features 1, 3, 9, 11, and 19 place the occupation(s) in the period of AD 1400-1680. At least two separate occupations are indicated, one in the AD 1400-1470 period and one in the period from 1470-1680. It is 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 indicate that the prehistoric inhabitants of these sites participated in multiple activities. Artifacts such as flakes, bipolar cores, and cores, as well as anvils and hammerstones, all clearly indicate that flaked stone tool manufacturing, including early stages of nodule reduction, was an important activity at most of the sites describe above. The manufacture and use of groundstone tools/ornaments at several sites is indicated by the presence of finished and unfinished ground slate, shale, cannel coal, and schist objects and possibly by the presence of the sandstone abraders. Ceramics found at many of the sites suggest activities including ceramic vessel manufacture and food storage and/or preparation. Hunting is indicated by the presence of several of the notched/stemmed and triangular bifaces. FCR is ubiquitous at most of the sites indicating that fire was being used for heating and/or food preparation. The density of occupation debris, the high degree of artifact fragmentation apparently caused by trampling, the abundant and varied stone tool manufacturing debris, and the wide range of tool types recovered from the excavations at 20SA1251 and 20SA1276 all indicate that these sites probably served as base camps that were occupied by family groups rather than resource extraction camps occupied by specialized task groups such as hunting parties.

When they are fully analyzed, the relatively large faunal assemblages derived from the test excavations conducted at 20SA722 in 2005-2010, 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 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 2005-2010 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 2006-2010 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 may 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 twelve 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, twelve 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. 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 twelfth season of archaeological investigations carried out in the Shiawassee National Wildlife Refuge (NWR), Saginaw County, Michigan. The field investigations, conducted under Amendment 8 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 thirteen previously recorded sites. Surface collections, totaling 10 objects, were made from two of the thirteen sites that were monitored during the 2010 field season. Test excavations were conducted at the Clunie site (20SA722).

The 11 square meters excavated at 20SA722 during the 2010 are contiguous and comprise Excavation Block G. Excavation of Block G exposed Feature 20, a hearth feature thought to date to the Middle Woodland time period. Evidence for a late Prehistoric hearth feature, including ash and fire-reddened soil, was noted in several units. Unfortunately, the feature was completely incorporated into the plowzone.

The 2010 excavations yielded 8,288 catalogued objects. In addition, 13 samples, containing a total of 83 liters of sediment, were saved for flotation. These samples include 53 liters from Feature 20 and an additional 30 liters from a zone containing highly comminuted bone in the 45-60 cm level of unit 585N 457E. The stratigraphic location of these latter samples suggests a Middle Woodland to early Late Woodland age for the deposit. Materials derived from flotation samples and items <1/4" from 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 appears to be 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 2010 excavation and during previous field seasons. In Excavation Block G, and also in the previously excavated Blocks, Middle and/or early Late Woodland artifacts have been found stratified below the Late Prehistoric material.

Prehistoric artifacts recovered from the various sites on the refuge during 2010 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; 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 2000-2010). They are repeated below. Based on the results of the past twelve 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. 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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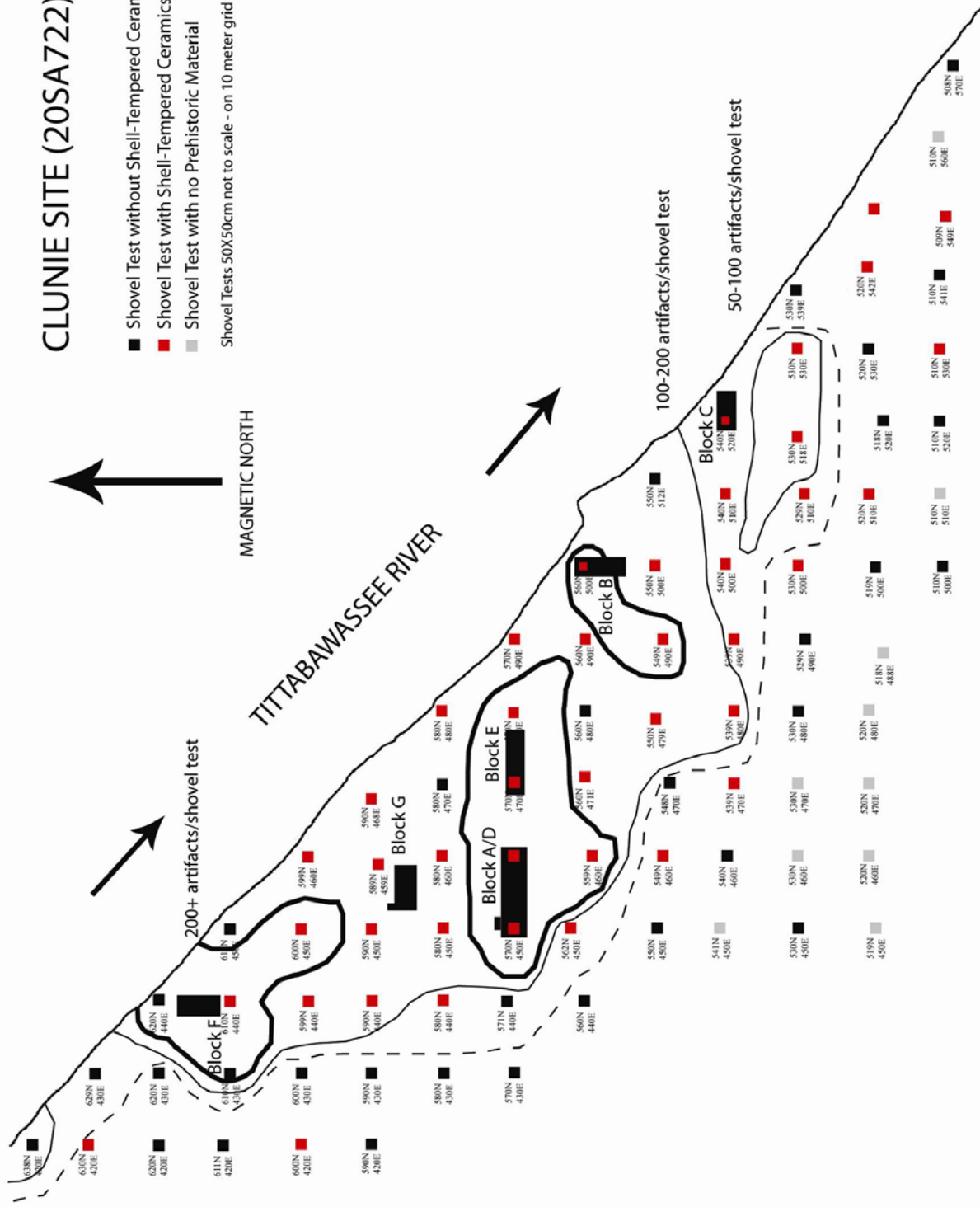
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APPENDIX C: Site Maps

CLUNIE SITE (20SA722)

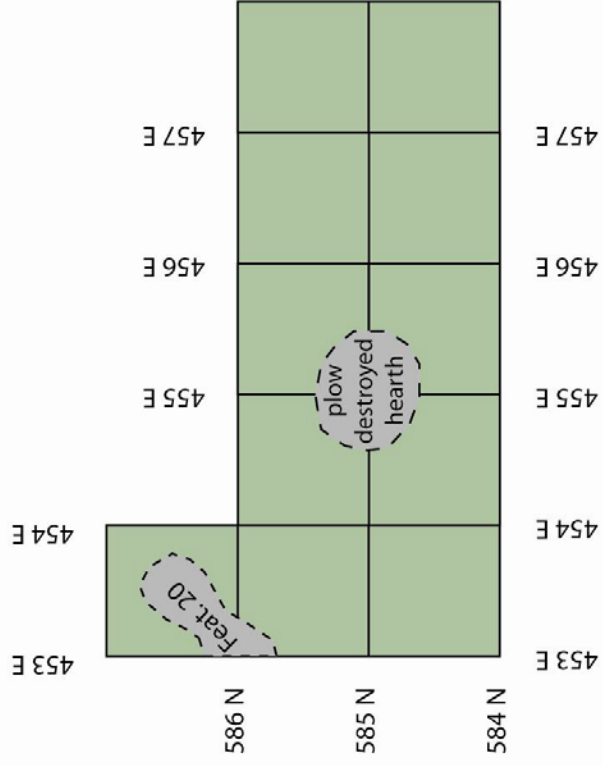
- Shovel Test without Shell-Tempered Ceramics
 - Shovel Test with Shell-Tempered Ceramics
 - Shovel Test with no Prehistoric Material
- Shovel Tests 50X50cm not to scale - on 10 meter grid



X
Site Datum
500N 500E



NORTH



Units In Process



Units Completed in 2010



CLUNIE SITE

20SA722

Excavation Block G

