

**Report on the Archaeology  
of the Shiawassee National Wildlife Refuge:  
The 2009 Field Season.**

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## ABSTRACT

This report summarizes the results of the eleventh 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 7), included both limited archaeological survey/salvage and test excavations. Five volunteers and the project director contributed a combined total of 150 person days (approximately 900 hours) of fieldwork.

Consistent with the goals of the survey/salvage portion of this project, surface collections, totaling eleven objects, were made from three of the eight sites that were monitored during the 2009 field season. One previously unrecorded site was found. The location was reported to the Michigan Office of the State Archaeologist and assigned site number 20SA1367.

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. Ten square meters were excavated at 20SA722 during the 2009 field season. These excavations yielded 11,109 catalogued objects. In addition, 218 samples, containing a total of 1,203.5 liters of sediment, were saved for flotation and 6 soil samples (877.0 g dry weight) were collected for possible future geological analysis.

Excavated material from site 20SA722 dates primarily to the Late Prehistoric period (ca. A.D.1400-1650). A portion of the excavated area was stratified with early Late Woodland material (ca. A.D. 500-1000) 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 eleventh 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 7 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). Five volunteers and the project director contributed a combined total of 150 person days (approximately 900 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 2009 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 unvegetated riverbank was present, but no actual slumping of the riverbank was observed. Severe erosion indicates that portions of the riverbank, at least 30-50 cm thick, have slumped down to the waters edge. Erosion described as moderate would be somewhere between these two extremes.

Surface survey was limited to seven previously recorded sites and one newly discovered locale. Surface collections, totaling eleven objects, were made from three of the eight sites that were monitored during the 2009 field season. The location of the newly found site was reported to the Michigan Office of the State Archaeologist and assigned site number 20SA1367.

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.

The 10 square meters excavated at 20SA722 during the 2009 field season are divided between Excavation Blocks B and C. Each of these Excavation Blocks was expanded from a four square meter block originally excavated in 2006. An additional six square meters were added to Excavation Block B and four square meters were added to Block C (Appendix C). Excavation of Block B exposed a large, multi-use storage pit/hearth/trash pit (Feature 5) and a large hearth feature (Feature 18). The edge of Feature 5 was partially exposed during the 2006 excavation. Excavation of Block C revealed part of an artifact scatter (Feature 8), a portion of which was previously excavated in 2006, and a large trash pit (Feature 19). The 2009 excavations yielded 11,109 catalogued objects. In addition, 218 samples, containing a total of 1203.5 liters of sediment, were saved for flotation and 6 soil samples (877.0 g dry weight) were collected for possible future geological analysis. Material derived from the flotation samples has not yet been analyzed or catalogued.

Of the 39 archaeological sites/findspots monitored during the eleven field seasons of this project (eight during the 2009 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 farm units, one (20SA1304) is findspot of a single flake, one (20SA1305) is a scatter of late 19<sup>th</sup> / early 20<sup>th</sup> 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 19<sup>th</sup> / early 20<sup>th</sup> century debris. 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-19<sup>th</sup> to early 20<sup>th</sup> 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.

Prehistoric artifacts recovered from the various sites on the refuge represent primarily Middle and early Late Woodland occupations (ca A.D. 1 - 1000). However, a few Late Archaic/Early Woodland period (ca. 3000-100 B.C.) artifacts and several later Late Woodland and Late Prehistoric (ca. A.D. 1000-European contact) items are also present in the recovered assemblages. Site 20SA722 is an exception in that most of the material appears to date to the Late Woodland to Late Prehistoric period. Historic period artifacts date primarily from the mid-19<sup>th</sup> century through the 20<sup>th</sup> century, though a few earlier historic items have also been recovered. A thin scatter of mid to late 20<sup>th</sup> 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, 20SA1251, and 20SA1367 and from the test excavations at 20SA722, 11,120 objects were catalogued during the 2009 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 11 ft<sup>3</sup> of artifacts and samples and less than one linear foot of notes and other documentation were produced during the 2009 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 2003).

The 2000 field season was started with the same goals in mind. However, the project was expanded slightly to include shovel testing. Shovel testing is necessary to better assess the nature, state of preservation, and extent of the archaeological deposits. Due to constraints of time and personnel, shovel testing was limited to two sites, 20SA1251 and 20SA1254.

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

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

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

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

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

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 a 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).

### *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 2009 field crew included Shaun Aldrich, Dave Hamilton, Ken Kosidlo, Mike Mauer, and Adam Parker.

## 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 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  $-4.5^{\circ}\text{C}$  with an average daily minimum of  $-8.75^{\circ}\text{C}$ . The average summer temperature in Saginaw was  $20.9^{\circ}\text{C}$  with an average daily high of  $27.4^{\circ}\text{C}$ . 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 (Brantner 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 18<sup>th</sup> century Native American cemetery (Mainfort 1979). The Cater site in Midland County is a good example of both an early 19<sup>th</sup> century Native American occupation and a mid 19<sup>th</sup> 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, 2004:12). Site 20SA361 was reported as a Late Woodland site located adjacent to the Cass River (Fitting 1977:37). This site was relocated during the 2002 field season and a Late Woodland temporal placement was confirmed.

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

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

## METHODS

### *Field Methods*

The limited surface survey conducted during the 2009 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 and walking transects, spaced three to five meters apart, over a plowed portion of a former farm unit on the north side of the refuge. 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 10 square meters excavated at 20SA722 during the 2009 field season are divided between Excavation Blocks B and C and were set up contiguous with the Block B and C units previously excavated in 2006 (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, many of the levels between 30 and 55 cm were screened with 1/8" mesh screen. Non-feature material below the 55 cm level 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 generally continued down until culturally "sterile" (absent, or very low artifact density) sediment was reached. In non-feature areas, this generally occurred around 70-85 cm below the surface datum. The specific methods used in feature excavation varied depending on the size and nature of the feature. In general, features were divided into two or more sections with parallel or perpendicular

profile lines labeled A-A', B-B' etc. The resulting sections were labeled Area 1, Area 2 etc. Excavation within each feature Area proceeded by excavating with trowels, brushes and/or small plastic putty or paint knives. Within each Area, features were excavated in 5 cm levels, or, when possible, by stratigraphic levels referred to as Zones. 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 2009 field season of this project were catalogued under Accession F09-1, F09-2, and F09-3. Each artifact was assigned a catalogue number according to the provenience and type of object. Several objects may be assigned the same catalogue number if they are same type of object and are from the same provenience. A Catalogue Record was filled out for each object recovered during this project. These records include the Catalogue #, Provenience, and Description of each artifact.

All of the objects recovered from the surface survey portion of the project have been catalogued. Except for the flotation samples 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. Charcoal from feature contexts was likewise not catalogued. Although the cultural origins of the charcoal is not in doubt, it has not been catalogued because at least some is intended for radiocarbon analysis and will thus be destroyed.

Diagnostic artifacts, formal tools, and ceramic rimsherds have been labeled with their catalogue number. Non-diagnostic artifacts will be labeled as time permits. Catalogue numbers are written with permanent black or white ink on a layer of clear Acryloid B-72, and sealed with a layer of clear B-72. Artifacts are labeled prior to being photographed. Digital photographs have been taken of a representative sample of artifacts, including most of the diagnostic artifacts recovered during the 2009 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 2009 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

One newly discovered and seven previously recorded sites were surveyed/monitored during the 2009 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 2009 revealed moderate erosion over much of the site area. High water and extensive vegetation on the bank resulted in poor surface visibility. Two FCR were observed but not collected. Even in the absence of periodic high water (currently annual in spring), continued erosion of the fairly high, steep bank is expected. Diagnostic artifacts recovered in 1999, 2002, and 2004 indicate that Late Woodland and Historic period components are present (Sommer 2000:10, 2003:12, 2005:12). A 1955 aerial photograph of the site area shows that it was under active cultivation at that time.

### 20SA722 *Clunie Site*

This large site extends for approximately 960 meters along the bank of the Tittabawassee River (Appendix B). In 2000 a site datum was driven into the ground, which also serves as the beginning of Segments 1 East and 1 West. Wooden stakes were placed every hundred meters to the west, marking the beginning point of each segment (Sommer 2001:14). Because most, or all, of the stakes have been lost due to flooding and/or erosion, surface finds since 2002 have been plotted by GPS or have been given grid coordinates based on the Shovel Test grid set up in 2004 (Sommer 2005). The relatively high and steep riverbank was subject to moderate to severe erosion over much of the site area in 2005, 2006 and again in 2007. After noticing reduced erosion during the 2008 field season, moderate to severe erosion was again present in 2009.

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 2009, 83 square meters were excavated.

Both surface survey and limited test excavations were conducted at 20SA722 in 2009. A total of 11,112 objects were catalogued from 20SA722 during the 2009 field season. These items are included in Accession F09-1 and were assigned Catalogue Numbers F09-1-1 through F09-1-888. These items include three objects derived from the surface, and 11,109 items derived from test excavations. Data from the test excavations will be discussed in a subsequent section of this report.

The surface collected material includes one shell-tempered rimsherd one retouched flake projectile point, and one celt/adze. The rimsherd has a smooth exterior surface and is decorated with tool impressions along the exterior of the lip and three horizontal rows of cord impressions on the exterior rim (Figure 1, #886). The tool impressions are spaced 9.3 mm apart on the exterior of the flattened lip. The cord impressions begin roughly 6-8 mm below the lip. They are approximately 2.0 mm wide and are spaced 6.3 mm apart. The projectile point is made from a bifacially retouched Bayport chert flake (Figure 1, #887). Length, width, and thickness measurements are 25.11 mm, 15.13 mm, and 2.80 mm

respectively. The celt/adze is made of porphery and is well smoothed over most of its surface (Figure 1, #888).

Based on the 2009 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 in 2009 all probably date to the Late Woodland through Late Prehistoric periods, supporting previous estimates based on surface survey and shovel testing, that the most intensive occupations occurred during these times.



**Figure 1:** 20SA722, artifacts from surface.

#### 20SA1251 *Shiawassee #2*

This site consists of a scatter, dense in places, of FCR and other artifacts, which extends along the Shiawassee River for over a kilometer (Appendix B). It is bordered on either end by low marshes. Most of the riverbank along the site has become covered with vegetation 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 2009. In 2009 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, 2003:23-28). Work in 2009 was confined to surface survey.

A visit to the site in April 2009 revealed numerous flakes, grit-tempered pottery sherds, FCR, and two bifacially flaked stone tools. Only the bifaces were collected. These items are included in Accession F09-2 and were assigned catalogue numbers F09-2-1 and F09-2-2. The bifaces are each made of Bayport chert. The first specimen is a straight-stemmed projectile point (Figure 2, #1; Table 1). Except for the lack of grinding on the stem and base, this point closely resembles an Early Woodland Kramer point (Justice 1987:184-187; Ozker 1982:91-96). Ozker regards lateral stem grinding as a critical trait for the Kramer type and refers to specimens lacking grinding as Schultz Straight Stemmed Points (Ozker 1982:96). The second specimen is an ovate biface that would be referred to as a preform except for the presence of heavy, drill-like, grinding/usewear on the tip (Figure 2, #2; Table 1). The proximal end of this biface exhibits a plano/convex cross section reminiscent of an endscraper. However, there is no macroscopic evidence of usewear on the proximal end.



**Figure 2:** 20SA1251, bifaces from surface.

**Table 1:** 20SA1251, biface metrics from surface.

Catalogue Number	Type	Length (mm)	Width (mm)	Thickness (mm)
F09-2-1	Straight stemmed	38.35	19.07	11.24
F09-2-2	Ovate preform/drill	56.74	29.04	13.78

Based on material from this and previous field seasons, this site appears to contain Late Archaic/Early Woodland, Middle to early Late Woodland, Late Woodland and historic components. However, diagnostic artifacts indicate that the majority of the occupation debris found on the surface is

probably derived from the Middle to early Late Woodland component. A Middle Woodland age AMS radiocarbon date of 1960 $\pm$ 40 BP (2 Sigma cal. BC 40 to AD 120) was obtained from a sample of charred organic residue scraped from the interior of a Green Point Incised, Cross Hatched vessel excavated from this site in 2002 (Sommer 2004). 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.

#### 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 2009. 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, 2003:18). The biface fragment exhibits a heavy patina and appears to be slightly water-rolled. This sherd may date to the Middle or Late Woodland periods. Interpretation of site function must await the recovery of additional artifacts through additional surface survey and subsurface testing.

#### 20SA1274 *Tittabawassee #2*

This site consists of a loose cluster of pottery and a thin scatter of FCR and other artifacts extending approximately 150 meters along the Tittabawassee River (Appendix B). Heavy vegetation covers much of the riverbank and no artifacts were observed or collected from this site during a visit in April 2009. 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 2009. 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. One active burrow was observed during a visit to the site in April 2009. A few FCR were the only artifacts observed on the surface in the vicinity of the burrow. The FCR were noted, but not collected.

One hundred and nineteen 50X50 cm shovel test pits (STPs) were dug on the site between 2001 and 2006 in order to ascertain the nature and extent of intact site deposits, and to identify an appropriate area for more extensive test excavations (Sommer 2002, 2003, 2005, 2007). Test excavations, totaling 65.25 square meters, were conducted in 2001, 2003 and again in 2004 (Sommer 2002, 2004a, 2005). The shovel test pits indicated that the main site area is flanked on the west by a low swale that appears to be an old channel or drain running north/south between the Shiawassee and Tittabawassee Rivers. We have been prevented from fully testing this assumption by high water levels, though decreasing artifact density near the edge of the swale supports the assumption. An eastern boundary was determined along the 520N line at approximately 580E, at 560N the eastern boundary is at 590E, and 600N the eastern boundary is at 620E. The eastern boundary varies from approximately 580E at 680N to 560E at 760N. Shovel testing has revealed that the northern boundary at the 540E line is approximately 830N. Along the 500E line, the southern boundary is at approximately 430N. Therefore, the site extends for approximately 400 meters in a north/south direction, and up to 130 meters in an east/west direction, covering a total of around 2.54 hectares.

Although no diagnostic artifacts were observed or collected during the 2009 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 two radiocarbon dates indicate that the main period of occupation occurred during the Middle Woodland time period.

#### 20SA1367

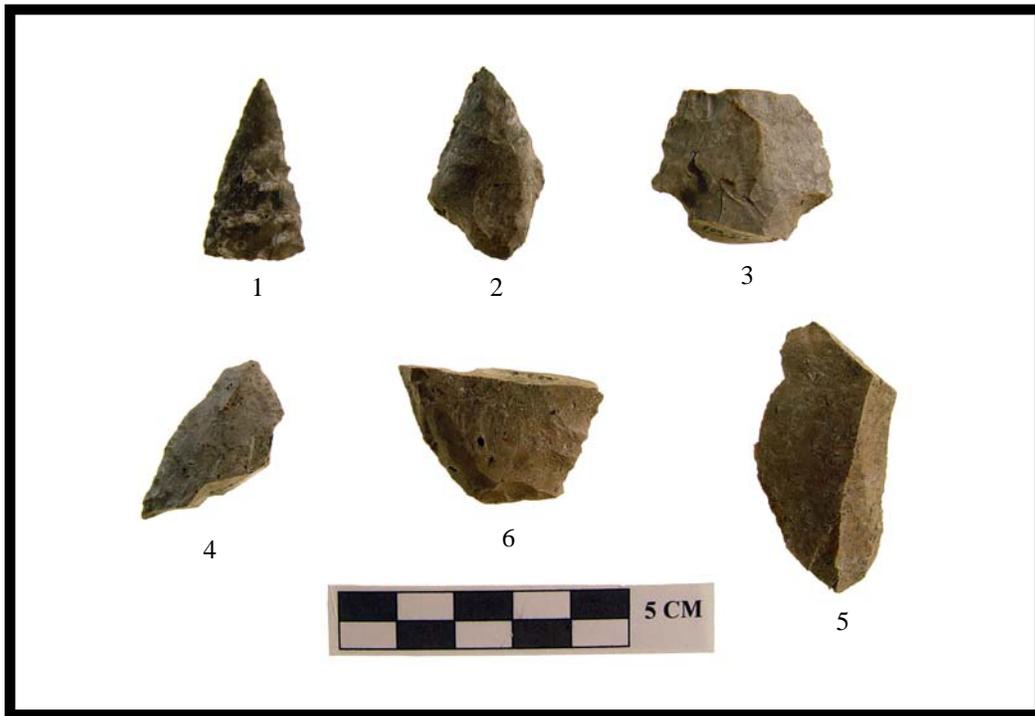
This site is located approximately 500-800 meters north of the Shiawassee River at an elevation of between 178.3 and 179.8 meters (585-590') amsl. A 1955 aerial photograph shows that the site area was being farmed at that time. An area covering approximately 3 hectares was surveyed over two days in late April and early May. The entire surveyed area contains a low-density scatter of prehistoric and mid-19<sup>th</sup> to early 20<sup>th</sup> 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.

Six artifacts, including five bifacial implements and one flake, were collected from this site. These artifacts are included in Accession F09-3 and were assigned Catalogue Numbers F09-3-1 through F09-3-6. The artifacts collected from this site are all made of Bayport chert. One biface is a well-made, triangular example that likely dates to the Late Woodland/Late Prehistoric period (Figure 3, #1). A second example appears heavily resharpened (Figure 3, #2). This contracting-stemmed form is

reminiscent of an Early Woodland Adena stemmed point (Justice 1987:191-196). A third biface from this site is a fragmentary corner-notched point missing both its tip and base (Figure 3, #3). This point could date from either the Late Archaic or Middle Woodland period. The two remaining bifaces from the site are too fragmentary to determine a type or age. One is a tip fragment from a knife (Figure 3, #4) and the other is a base fragment from a preform (Figure 3, #6). The flake is lightly stained brown and is from an early stage in the reduction sequence as indicated by the presence of cortex on its distal end (Figure 3, #5). In addition to the artifacts that were collected, a number (100-200 each) of flakes, FCR, and Historic period items were observed.

**Table 2:** 20SA1367, biface metrics from surface.

Catalogue Number	Type	Length (mm)	Width (mm)	Thickness (mm)
F09-3-1	Triangular	33.37	18.00	4.90
F09-3-2	Contracting stemmed	34.49	21.00	6.26
F09-3-3	Corner notched	-----	32.24	9.73



**Figure 3:** 20SA1367, flaked stone artifacts from surface.

## 20SA722 Excavation Analysis and Evaluation

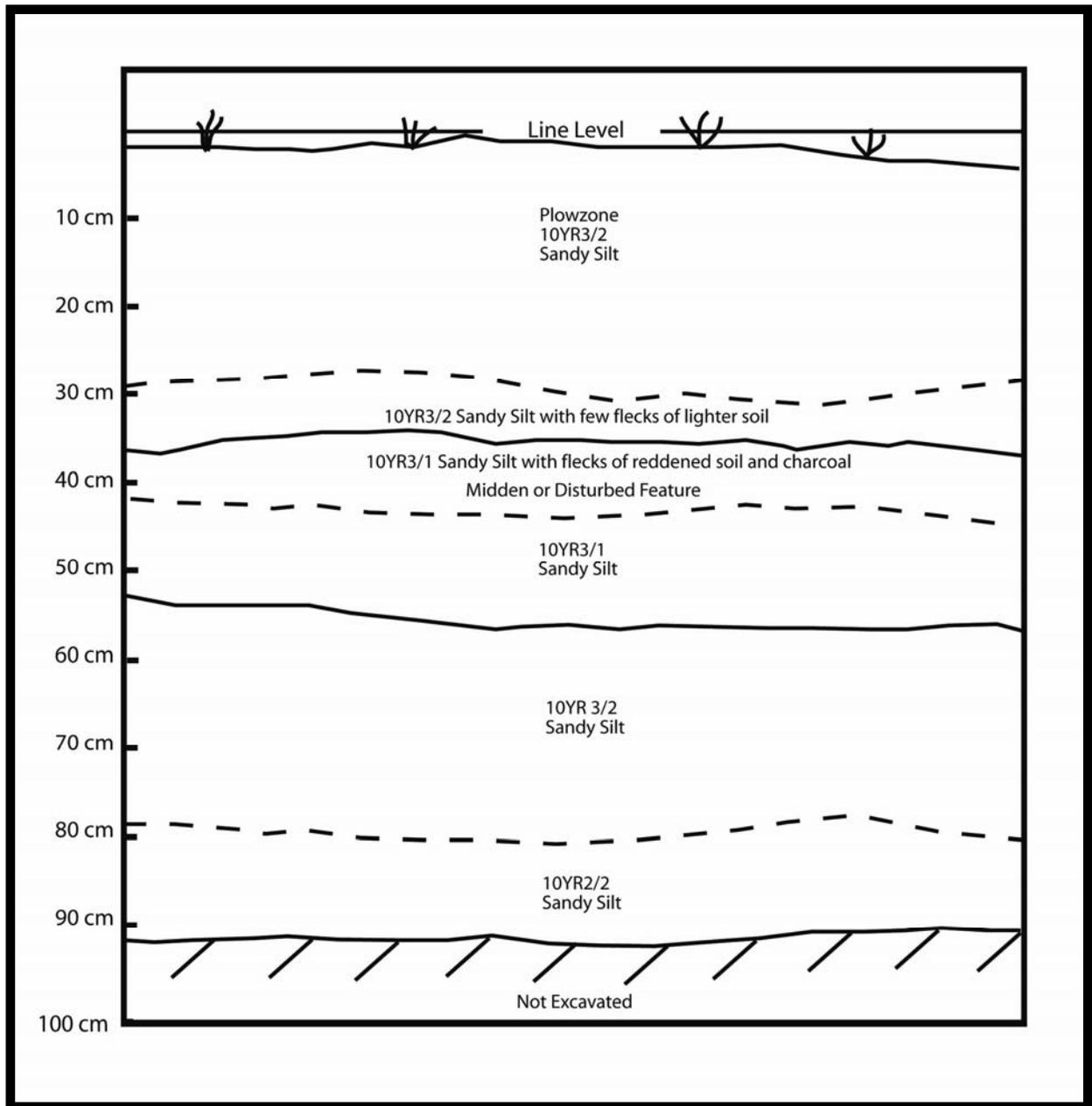
### *Excavation Characteristics*

Ten square meters were excavated at 20SA722 during the 2009 field season. The 10 square meters are contiguous with two previously existing Excavation Blocks. Excavation Block B includes six square meters excavated in 2009, bringing the total to 10 square meters for the Block. Excavation Block C includes four square meters excavated in 2009, bringing the total to eight square meters for the Block (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.

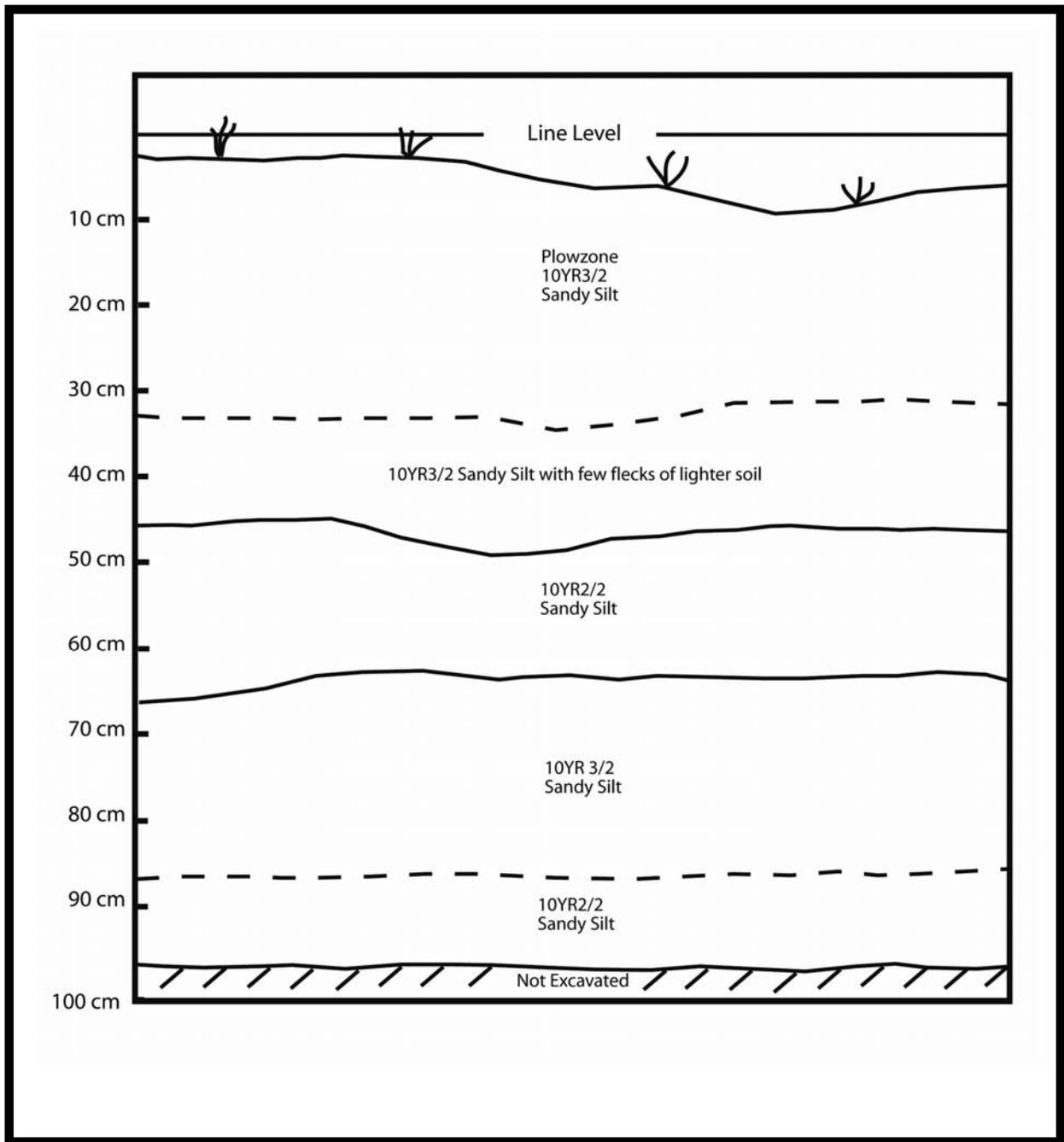
Soil profiles for the portions of Excavation Blocks B and C excavated in 2009 are very similar to each other, to the soil profiles previously described for these Blocks, and to the other Excavation Blocks reported previously from this site (Sommer 2006, 2007, 2008, 2009). Excavation Block B is represented by the south wall profile of unit 556N 499E (Figure 4). A representative profile for Excavation Block C is shown by the east wall profile of unit 540N 522E (Figure 5).

A generalized description of the soil profiles of Excavation Blocks B and C follows. 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 very dark gray (10YR3/1) or very dark brown (10YR2/2) sandy silt. This darker zone, which is 15-20 cm thick, is probably a paleosol (buried A-horizon) that denotes a relatively stable former land surface during a period of reduced flooding. Between the plowzone and the paleosol, many units in Excavation Blocks B and C show a 5-10 cm thick zone of plowzone-colored sandy silt mottled with lighter (10YR4/2) flecks. Plowscars were frequently visible in this zone which, presumably, represents a partially disturbed zone at the base of the plowzone. The base of this zone is also the level in which several Excavation Blocks begin to show evidence of (disturbed) shallow surface hearths. In much of Excavation Block B this zone was followed by a 5-10 cm thick zone, occurring at around 35-45 cm, containing abundant flecks of reddened soil and charcoal. This material is likely associated with Feature 18 in Block B, but it is unclear whether it was plowed out of the feature, or spread about during the occupation period of the site, perhaps a result of using, or reusing, the hearth. At around 55-65 cm the soil is again a slightly lighter (10YR3/2) sandy silt which continues down to a depth of approximately 80-85 cm. Below this level, extending down to around 90-95 cm, was a darker (10YR2/2) sandy silt. Though not shown in the wall profiles illustrated here, below these relatively organic-rich zones, across the 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.

It was previously noted (Sommer 2007) that Excavation Blocks B and C showed two zones of relatively high artifact density separated by a 20 cm thick zone with a very low artifact density. The upper, more recent, high density zone occurred between 40 and 50 cm. The lower, earlier, high density zone was located between 70 and 80 cm below surface/datum.



**Figure 4:** 20SA722, Excavation Block B, 556N 499E south wall profile. Dashed lines indicate indistinct transitions.



**Figure 5:** 20SA722, Excavation Block C, 540N 522E east wall profile. Dashed lines indicate indistinct transitions.

In total, 11,112 objects were catalogued from 20SA722 during the 2009 field season. These items include three objects derived from the surface (described above in *Analysis and Evaluation* section), and 11,109 items derived from Excavation Blocks B and C. 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 2009 from non-feature contexts is 370<0.5" (207.3g) and 159>0.5" (2,788.5g). Because they may be subject to radiocarbon analysis and thus destroyed, charcoal samples, mostly from Feature contexts, were not catalogued. The charcoal samples have, however, been retained.

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, 218 samples, containing a total of 1,203.5 liters of sediment, were saved for flotation. Although this material has not yet been analyzed, it is clear that faunal and floral remains are abundant in many of these flotation samples. Other artifacts including lithics and ceramics are also present in the flotation samples.

Of the 11,109 catalogued objects recovered from the excavation units, 8,419 are derived from Excavation Block B and 2,690 are from Excavation Block C. The catalogued material from each Excavation Block will be considered separately.

#### *Artifact Summary for Excavation Block B*

The 8,419 catalogued items from Excavation Block B include 71 historic objects, 5,468 prehistoric objects, and 2,880 items of an undetermined origin. The latter group includes 2,879 pieces of charcoal and one possible sandstone abrader fragment. Most of the charcoal is wood charcoal. However, the charcoal assemblage also includes 20 hickory nut shells (*Carya* sp.), five walnut shells (*Juglans* sp.), four unidentified nut shell fragments, one fragment of unidentified nut meat, three maize kernels, and one unidentified seed. Most of the charcoal is certainly a product of cultural activity, but some could represent natural forest fires.

Historic items from Excavation Block B include 38 brick fragments, 37 yellow and one red brick; one clay marble with no trace of either paint or glaze on the surface (Figure 6, #619); two fragments of ceramic vessels; six coal/cinders/slag; four glass vessel fragments; one fragment of a white glass canning jar lid; four nail fragments, at least two of which are square nails; 11 scraps of iron; two lead bullets (Figure 6, #621); one .22 cal. shell casing (Figure 6, #721); and one fragment of saw-cut mammal bone. The ceramic vessel fragments include one plain white/destroyed white paste earthenware fragment (Figure 6, #620), and one sherd of yellow-paste earthenware (Figure 6, #720). The glass vessel fragments are clear glass and at least one fragment is from a jar. Most of the historic items probably date to the mid-nineteenth through twentieth centuries.

The 8,419 prehistoric items from Excavation Block B include 804 ceramic sherds, one of which is a fragment of a shell-tempered clay pipe or miniature vessel; 3 fragments of waste clay, or possibly daub; 3,100 unmodified vertebrate faunal remains, including fish, reptile, bird, and mammal remains; 357 unmodified bivalve mollusk remains; four modified bone fragments; 16 bifacial tools (Table 3); 10 bipolar cores; four additional cores/core fragments; 1,043 lithic flakes and shatter; five retouched chert flakes; nine utilized/edge-damaged chert flakes; two sandstone abraders (Figure 7, #811, 878); one copper bead (Figure 8, #331); one copper scrap (Figure 8, #748); and 109 pieces (5,929.5g) of FCR from Features 5 and 18.



**Figure 6:** 20SA722, Excavation Block B, Historic period artifacts.



**Figure 7:** 20SA722, Excavation Block B, sandstone abraders.

The copper bead measures 7.3 mm long with a width ranging from 3.2 mm to 3.7 mm (Figure 8, #331). The ends of the bead are corroded or rough, indicating that it may be fragmentary. The copper scrap may be a blank, or preform, for making a bead (Figure 8, #748). It measures approximately 23.2 mm long and 7.5-8.6 mm wide. Similar copper beads were recovered 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).

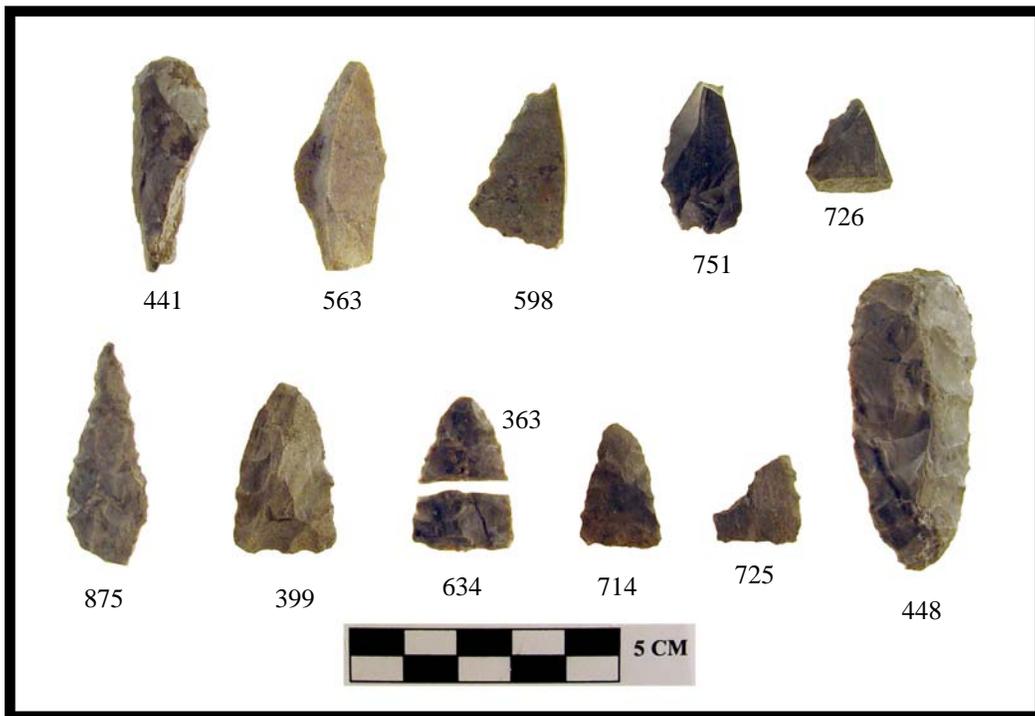


**Figure 8:** 20SA722, Excavation Block B, copper bead and scrap.

The 16 bifacial flaked stone implements recovered from Excavation Block B include one bifacial core/preform made of either bedded Bayport or a pebble chert; one bifacial endscraper made of either bedded Bayport or a pebble chert (Figure 9, #448); a heavily resharpened ovate biface made of either bedded Bayport or a pebble chert (Figure 9, #875); four complete or fragmentary triangular (Madison-like) projectile points; and nine additional biface fragments including three made of Bayport chert, and six made of either bedded Bayport or pebble chert. One of the latter fragments is a tip that fits onto the base of a triangular projectile point (Figure 9, #363). The triangular (Madison-like) projectile points include three Bayport chert examples (Figure 9, #399, 714, 725) and one example made of either bedded Bayport chert or pebble chert (Figure 9, #434). Measurements for the complete, or nearly complete, examples are provided in Table 3.

**Table 3:** 20SA722, biface metrics from excavation units.

Catalogue Number	Excavation Block	Type	Length (mm)	Width (mm)	Thickness (mm)
F09-1-363&434	B	Triangular, Madison	27.04	19.35	3.75
F09-1-399	B	Triangular, Madison	32.51	19.53	8.16
F09-1-714	B	Triangular, Madison	23.38	15.85	3.80
F09-875	B	Ovate/contracting-stemmed	43.26	17.48	5.82
F09-1-15	C	Triangular	28.33+	15.84	5.55
F09-1-93	C	Triangular, Madison	16.79	14.68	3.08
F09-1-268	C	Ovoid Preform	25.02	16.83	6.38

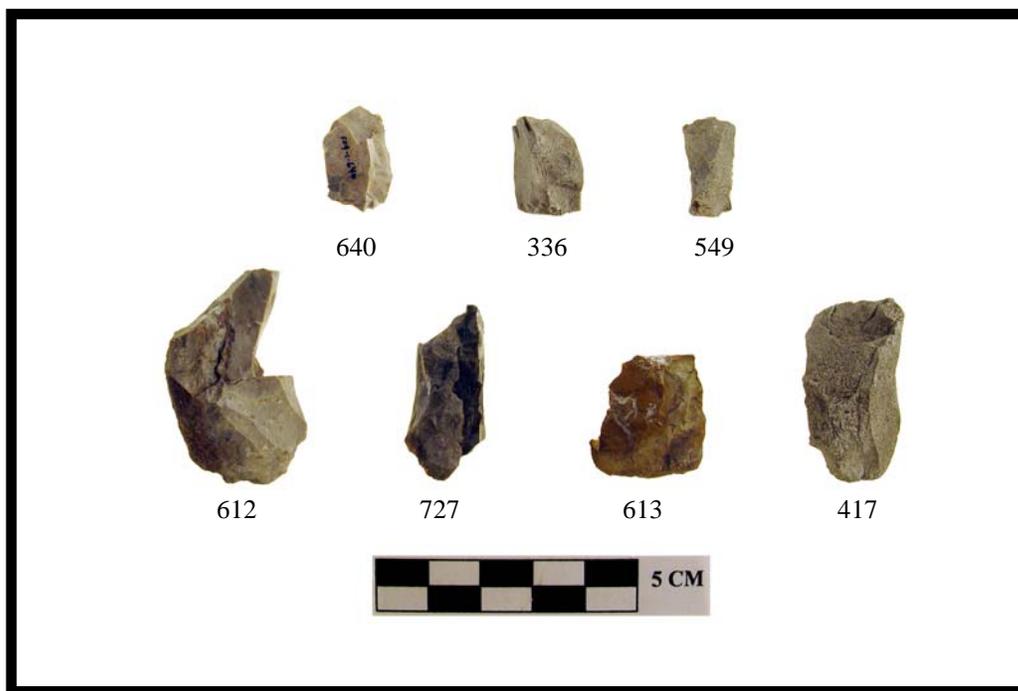


**Figure 9:** 20SA722, Excavation Block B, retouched flakes and bifaces.

Other flaked stone tools, or probable tools, include five unifacially retouched flakes and nine utilized/edge-damaged flakes. The 5 retouched flakes include four specimens made of Bayport chert (Figure 9, #563, 598, 751, 726) and one endscraper made of either bedded Bayport or a pebble chert (Figure 9, #441). The utilized/edge-damaged flakes include seven Bayport chert examples, one example made of a pebble chert, and one unidentified chert flake that may be Kettle Point.

Ten bipolar cores were recovered from the 2009 Block B excavations at the Clunie site. The bipolar cores from Excavation Block B include three Bayport chert examples (Figure 10, #336, 417, 549), two pebble chert examples (Figure 10, #613), and five examples that are either bedded Bayport or pebble chert (Figure 10, #640).

Four additional cores or core fragments were also recovered from Excavation Block B. These cores include one Bayport chert example, two bedded Bayport chert examples (Figure 10, #727), and one example that is either bedded Bayport or a pebble chert (Figure 10, #612).



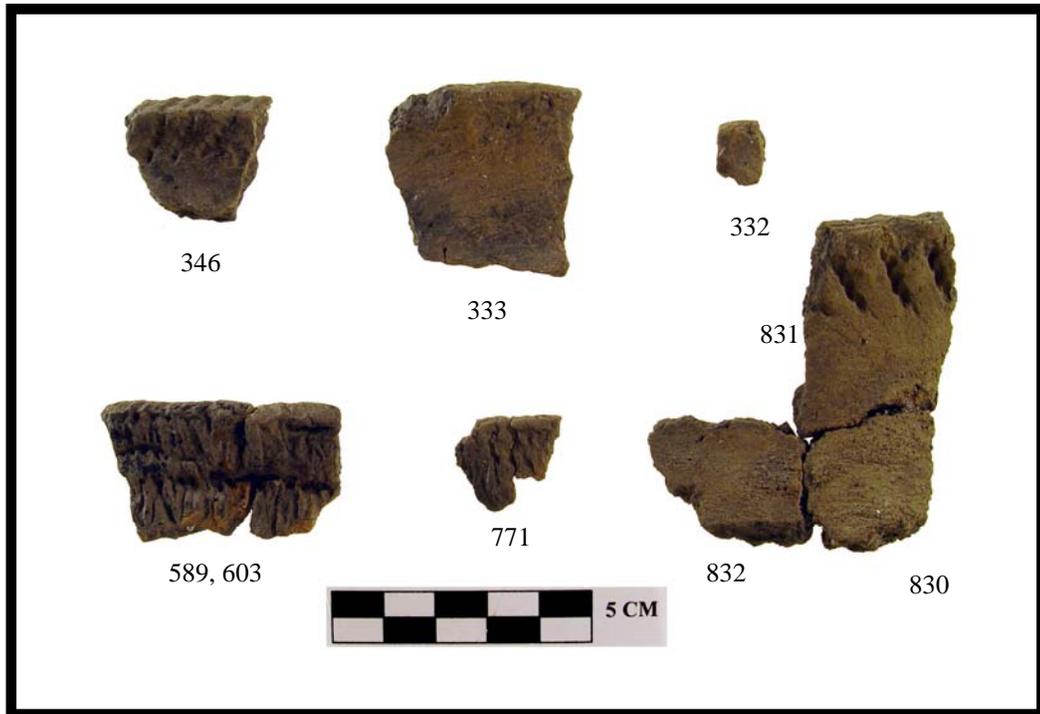
**Figure 10:** 20SA722, Excavation Block B, bipolar cores and cores.

The final flaked stone artifact category from Excavation Block B is waste material, including flakes and shatter. 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 of the 1,043 flakes and shatter recovered from Excavation Block B is locally available material including Bayport chert, bedded Bayport chert, pebble cherts, and material that is either bedded Bayport or a pebble chert. Only 80 specimens don't appear to fall into the above chert types. Several of these are likely also locally derived materials including nine flakes of unidentified chert. These materials could all have been found in local glacial till deposits. The only probably non-local materials represented in the flake assemblage include 44 Wyandotte chert flakes, six additional possible Wyandotte chert flakes, one Upper Mercer chert flake, One Pipe Creek chert flake, nine possible Pipe Creek flakes, one Kettle Point chert flake and nine possible Kettle Point chert flakes. The likely non-local component therefore comprises less than 8 % of the flake and shatter assemblage.

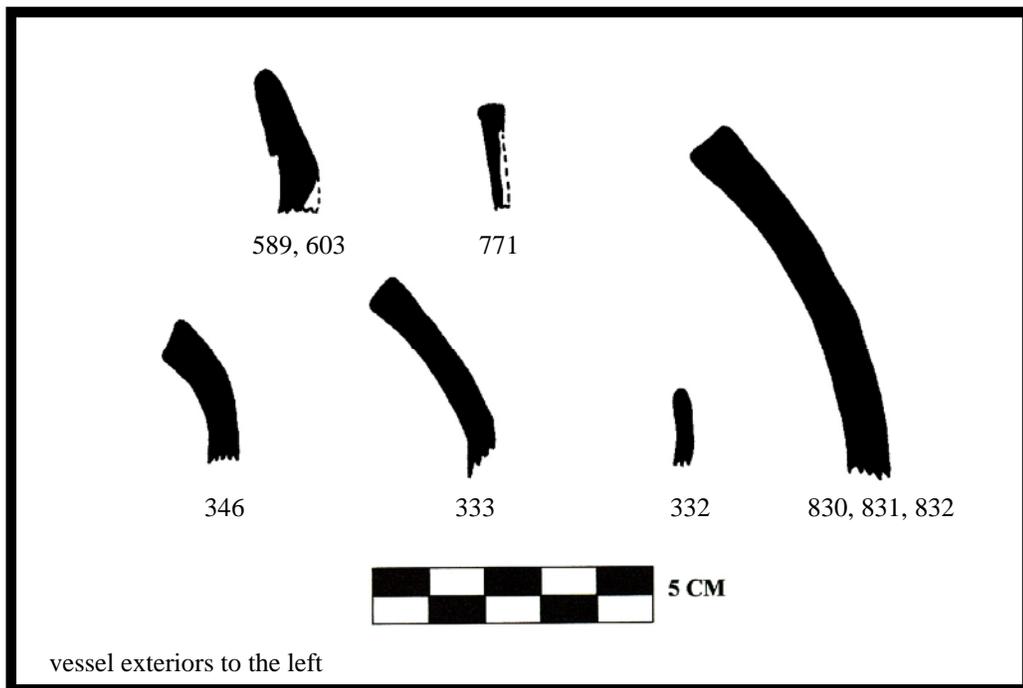
Of the 804 ceramic sherds recovered in Excavation Block B, 11 are rimsherds and 793 are body/neck sherds. The body/neck sherds include 159 shell-tempered examples, 631 grit-tempered specimens and three specimens with both grit and shell temper. Of the 159 shell-tempered body/neck sherds, 135 are either sherdlets or destroyed and were not further analyzed. The shell-tempered neck and body sherds complete enough to be analyzed include 15 with cord-roughened exterior surfaces, four with smoothed over cord-roughened exteriors, and five 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 three decorated with tool impressions. Of the 631 grit-tempered sherds, 547 are either sherdlets or destroyed. Of the grit-tempered body/neck sherds with intact surfaces that are large enough to be analyzed, 64 exhibit cord-roughened surfaces, nine have cord-roughened surfaces that were subsequently smoothed-over, and 11 have exterior surfaces that are smooth or smoothed over to the point that the original surface treatment is obscured. One of the cord roughened sherds exhibit a cord-wrapped stick impressed decoration, one has an incised decoration, and one has a broad finger trailed decoration. Decorated sherds with smooth exterior surfaces include three with cord-wrapped stick impressions and one with a broad finger-trailed decoration. The three specimens with both shell and grit temper include two sherdlets and one sherd with a smooth exterior.

The 11 rimsherds recovered from Excavation Block B represent one probable pipe bowl and at least five additional vessels, including two shell-tempered vessels and three grit-tempered vessels. The three sherds described above, having both shell and grit temper, imply the presence of at least one additional vessel from which no rimsherds were recovered. One small shell-tempered rimsherd with a smooth exterior probably represents a pipe bowl, but may be from a miniature vessel (Figures 11 and 12, #332). One shell-tempered vessel is represented by a smooth sherd with oblique dentate stamping on the upper rim and lip (Figures 11 and 12, #346). The stamped impression is approximately 10.4 mm long with four “teeth”. A second rimsherd with a damaged exterior and destroyed lip is probably also from this vessel. A second shell tempered vessel is represented by a rimsherd with a smoothed over exterior and a smoothed over cord-roughened lip (Figures 11 and 12, #333). A second rimsherd, not shown, with a smooth exterior and smoothed over lip may also be from this vessel. However, this second sherd has a possible tool impression on the exterior of the lip, which may indicate the presence of a third shell-tempered vessel.

One grit-tempered vessel is represented by a rimsherd with a smooth exterior decorated with oblique cord-wrapped stick impressions on the upper rim and lip. This rim refits with two conjoining body/neck sherds with smooth exteriors (Figures 11 and 12, #830, 831, 832). The cord-wrapped stick impressions on the upper rim are approximately 12.9 mm long and up to 2.2 mm wide. The impressions on the lip are indistinct. The two remaining grit-tempered vessels each exhibit cord-roughened exteriors and lips. One vessel, comprised of two conjoining sherds and a third sherd that does not refit, has a narrow folded-over rim, which forms an incipient collar (Figures 11 and 12, #589, 603). The thickness of this vessel ranges from 6.1 mm to 7.2 mm. This maximum thickness is attained both at and below the collar. The second cord-roughened vessel shows no trace of a collar (Figures 11 and 12, #771). At 4.2 mm just below the lip, this vessel is also quite a bit thinner. Stylistically, these two cord-roughened vessels can be attributed to early Late Woodland Wayne Ware ceramics (Brashler 1981). The depths at which they were found, 60-75 cm and 75-80 cm below the surface datum respectively, support the interpretation that they are derived from the earlier occupation at the Clunie site. However, the presence of a collar, or rolled rim, suggests a late placement within the Wayne ceramics series (Brashler 1981).



**Figure 11:** 20SA722, Excavation Block B, ceramic rimsherds.



**Figure 12:** 20SA722, Excavation Block B, ceramic rimsherd profiles.

Four modified vertebrate faunal remains were recovered from Excavation Block B, two of which conjoin. The conjoining pieces are burnt and highly polished fragments of a medium/large mammal long bone shaft (Figure 13, #420, 428). This specimen is likely a fragment of an awl. The second modified bone artifact is a cut section of a large bird bone (Figure 13, #814). The complete specimen would have formed a bone tube of unknown function. The third and final modified bone artifact from Excavation Block B is an awl made from a splinter of a large mammal long bone shaft (Figure 13, #857).



**Figure 13:** 20SA722, Excavation Block B, modified bone objects.

Unmodified faunal remains from Excavation Block B have not yet been fully analyzed. However, some preliminary identifications have been made. Vertebrate fauna tentatively identified include nine species of fish - lake sturgeon (*Acipenser fulvescens*), walleye (*Sander vitreous*), bowfin (*Amia calva*), channel catfish (*Ictalurus punctatus*), bullhead/catfish (Ictaluridae), gar (*Lepisosteus* sp.), freshwater drum (*Aplodinotus grunniens*), sucker (Catostomidae), and northern pike (*Esox lucius*); at least three reptiles – spiny softshell turtle (*Apalone spinifera*), snapping turtle (*Chelydra serpentina*), and unidentified turtle; at least one unidentified bird; and 8 mammals –vole (*Microtus* sp.), muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), beaver (*Castor canadensis*), bobcat (*Lynx rufus*), dog (*Canis lupus familiaris*), white-tailed deer (*Odocoileus virginianus*), black bear (*Ursus americanus*). Up to five species of freshwater mussels have been tentatively identified, including threeridge (*Amblema plicata*), black sandshell (*Ligumia recta*) and/or spike (*Elliptio dilatata*), elktoe (*Alasmidonta marginata*), and pimpleback (*Quadrula pustulosa*). Of these, threeridge mussels are by far the most numerous and are the only species positively identified at this time.

*Artifact Summary for Excavation Block C*

The 2,690 catalogued items from Excavation Block C include 75 historic objects, 2,175 prehistoric objects, and 440 items of an undetermined origin. The 440 items of undetermined origin are all fragments of charcoal. Most of the charcoal is wood charcoal. However, the charcoal assemblage also includes one walnut shell (*Juglans* sp.) and one maize kernel. Most of the charcoal is certainly a product of cultural activity, but some could represent natural forest fires.

Historic items from Excavation Block C include two yellow brick fragments (Figure 14, #139); eight fragments of ceramic vessels; 11 coal/cinders/slag; one fragment of flat glass (probably window glass); one biconvex glass lens (eyeglass or magnifying glass) measuring approximately 25 mm in diameter and 4 mm thick (Figure 14, #7); 19 glass vessel fragments; nine nail fragments, at least two of which are from square nails (Figure 14, #83); one iron rod or pin perforated on each end for the insertion of a cotter pin; one piece of multi-strand wire; 17 scraps of iron; three .22 cal. shell casings, one of which is impressed US on the end; and two saw-cut bones. The ceramic vessel fragments include five white paste earthenware fragments and three yellow paste earthenware fragments. These latter specimens exhibit a probable Rockingham glaze. The white paste earthenware fragments are all plain white/destroyed. The glass vessel fragments are pieces of bottles and/or jars. The assemblage includes five clear glass fragments, five aqua fragments, and seven brown glass fragments (Figure 14, #63). Three of the glass vessel fragments are partially melted. Most of the historic items probably date to the mid-nineteenth through twentieth centuries.



**Figure 14:** 20SA722, Excavation Block C, Historic period artifacts.

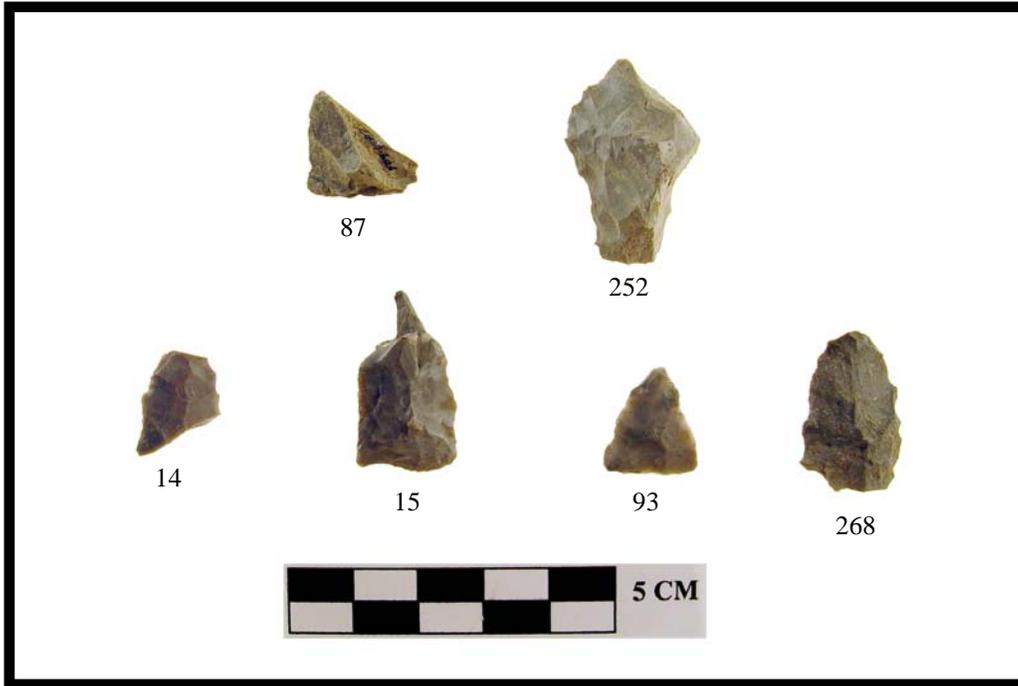
The 2,175 catalogued prehistoric items from Excavation Block C include 369 ceramic sherds; three fragments of waste clay, or possibly daub; 1,159 unmodified vertebrate faunal remains, including fish, reptile, amphibian, bird, and mammal remains; three coprolite fragments; 107 bivalve mollusk remains; two modified bone/tooth fragments; six bifacial tools (Table 3); one bipolar core; four additional cores/core fragments; 473 lithic flakes and shatter; four retouched chert flakes; seven utilized/edge-damaged chert flakes; two small hammerstones; and one small copper scrap.

Weighing only 44.0 grams, one of the small hammerstones is heavily pitted over much of its surface (Figure 15, #270). The other hammerstone is even smaller, weighing only 32.1 grams. It is much less heavily pitted, with only a few peck marks providing evidence of use (Figure 15, #310).



**Figure 15:** 20SA722, Excavation Block C, hammerstones.

The six bifacial flaked stone implements recovered from Excavation Block C include two bifacial cores/preform fragments made of Bayport chert (Figure 16, #87, 252); one ovoid preform made of Bayport chert (Figure 16, #268); one triangular projectile point made of either bedded Bayport or a pebble chert (Figure 16, #15); a second triangular projectile point made of Pipe Creek chert (Figure 16, #93); and one biface fragment made out of probable Kettle Point chert (Figure 16, #14).



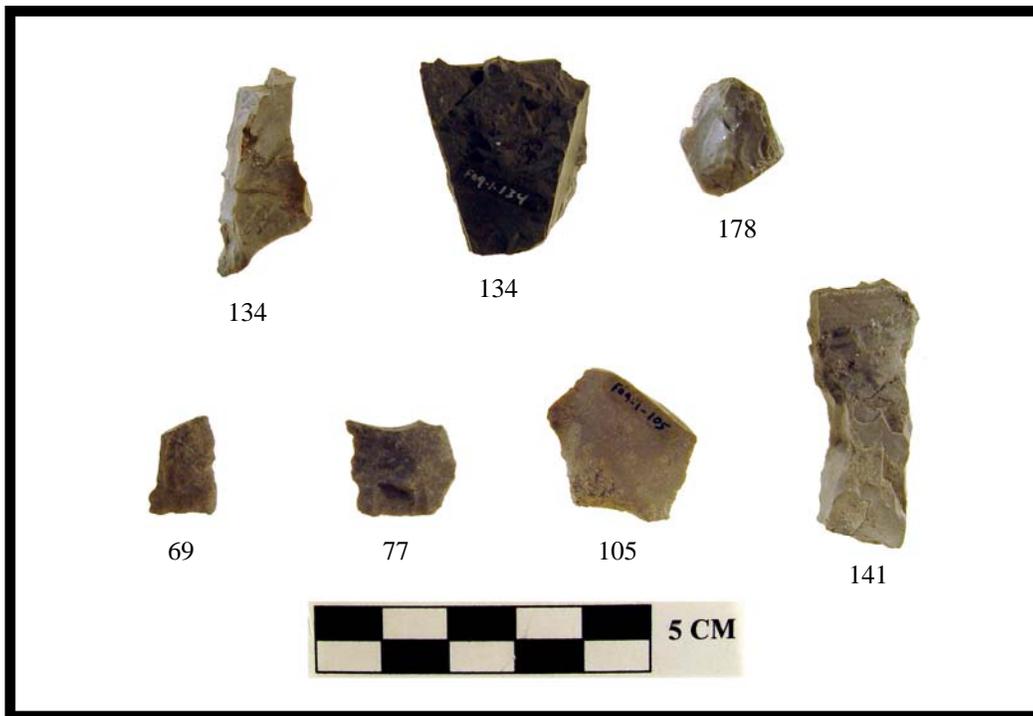
**Figure 16:** 20SA722, Excavation Block C, bifaces.

Other flaked stone tools, or probable tools, include four retouched flakes and seven utilized/edge-damaged flakes. One of the retouched flakes is a bifacially retouched projectile point fragment made of Bayport chert (Figure 17, #69). The other three retouched flakes show only unifacial retouch. They include two specimens made of Bayport chert (Figure 17, #77, 105), and one made of bedded Bayport chert (Figure 17, #141). The utilized/edge-damaged flakes include three Bayport chert examples, two examples made of either bedded Bayport or a pebble chert, one possible Pipe Creek chert example, and one example made from Quartzite.

The only bipolar core from Excavation Block C is an example made from either bedded Bayport or a Pebble chert (Figure 17, #178). The four additional core fragments/shatter include two Bayport chert examples, one core fragment/shatter of either bedded Bayport or pebble chert (Figure 17, #134), and one example made from an unidentified chert.

The final flaked stone artifact category from Excavation Block C is waste material, including flakes and shatter. The vast majority of the 473 flakes and shatter recovered from Excavation Block C is locally available material including Bayport chert (271 flakes), bedded Bayport chert (31 flakes), pebble cherts (18 flakes), and material that is either bedded Bayport or a pebble chert (108 flakes). Only 45 specimens don't appear to fall into the above chert types. A few of these are likely also locally derived materials including two flakes that are probably pebble chert, one flake of unidentified chert, and one flake of an unidentified coarse grained rock. These materials could all have been found in local glacial till deposits. Probable non-local materials represented in the flake assemblage include 15 Wyandotte chert flakes, five additional possible Wyandotte chert flakes, one flake of Kettle Point chert, two flakes that are either Wyandotte or Kettle Point, three additional flakes that may be Kettle Point chert, five

flakes of Pipe Creek chert, four chert flakes that are either Wyandotte or Pipe Creek, five additional flakes that may be Pipe Creek chert, and on flake of Flint Ridge chalcedony. The possible non-local component therefore comprises less than 10% of the flake assemblage from Excavation Block C.



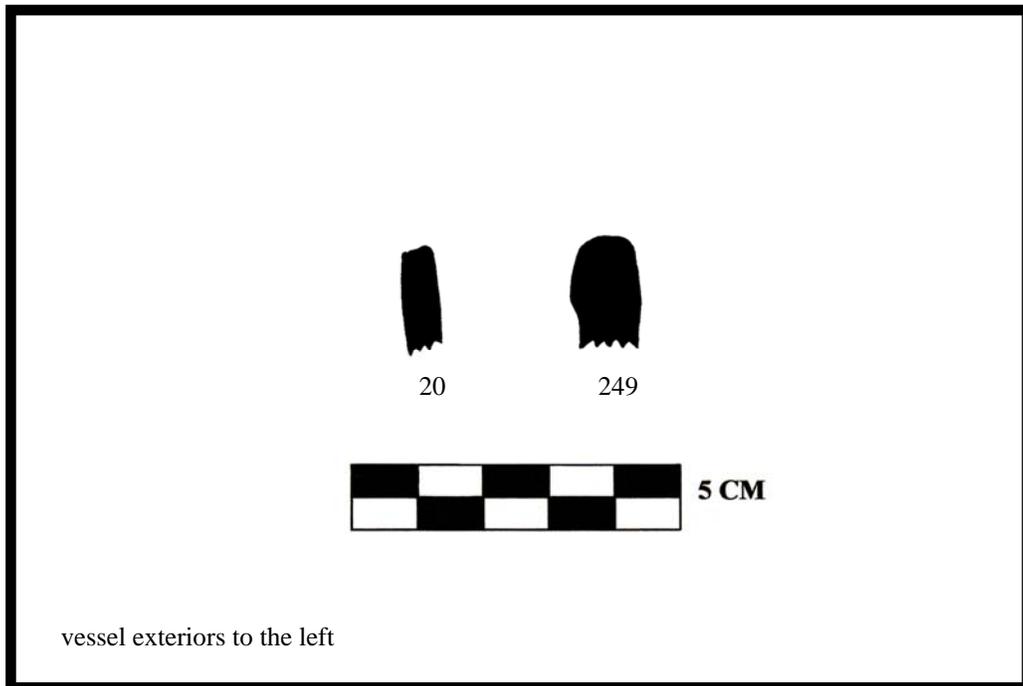
**Figure 17:** 20SA722, Excavation Block C, cores, bipolar core, and retouched flake.

Of the 369 ceramic sherds from Excavation Block C, two are rimsherds and 367 are body/neck sherds. The body/neck sherds include 120 shell-tempered examples, 213 grit-tempered specimens, and 34 specimens with both shell and grit temper. Of the 120 shell-tempered body/neck sherds, 89 are either sherdlets or destroyed and were not further analyzed. The 31 remaining shell-tempered sherds include 27 specimens with cord-roughened exteriors, two with cord-roughened exteriors that were subsequently smoothed over, and two with exterior surfaces that are smoothed over to the point that the original surface treatment is obscured. Of the 213 grit-tempered sherds, 171 are either sherdlets or destroyed. Of the grit-tempered sherds with intact surfaces that are large enough to be analyzed, 19 exhibit cord-roughened surfaces, 6 have cord-roughened surfaces that were subsequently smoothed over, two have striated/brushed exteriors, and 15 have exterior surfaces that are smooth or smoothed over to the point that the original surface treatment is obscured. One of the cord roughened sherds also exhibits a cord-impressed decoration.

The two rimsherds from Excavation Block C are both grit-tempered sherds with smooth exterior surfaces. One of the rimsherds has a probable finger-pinched lip (Figures 18 and 19, #20). The other rimsherd exhibits a rounded and slightly thickened lip (Figures 18 and 19, #249).



**Figure 18:** 20SA722, Excavation Block C, ceramic rimsherds and modified bone objects.



**Figure 19:** 20SA722, Excavation Block C, ceramic rimsherd profiles.

Two modified vertebrate faunal remains were recovered from Excavation Block C. One, a shaft fragment of a white-tailed deer metacarpal with an acute, knife-like, ground edge, is probably a fragment of a beamer (Figure 18, #23). The other modified faunal remain is a beaver incisor with grinding on the distal lingual surface (Figure 18, #287).

Unmodified faunal remains from Excavation Block C have not yet been fully analyzed. However, some preliminary identifications have been made. Vertebrate fauna tentatively identified include six species of fish - lake sturgeon (*Acipenser fulvescens*), walleye (*Sander vitreous*), bowfin (*Amia calva*), catfish (Ictaluridae), gar (*Lepisosteus* sp.), and sucker (Catostomidae); three reptiles – painted turtle (*Chrysemys picta*), unidentified turtle, and an unidentified snake; one amphibian – frog/toad; one bird; and seven mammals – mole (Talpidae), muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), beaver (*Castor canadensis*), mink (*Mustela vison*) white-tailed deer (*Odocoileus virginianus*), and elk (*Cervus canadensis*). Up to three species of freshwater mussels, including threeridge (*Amblema plicata*), black sandshell (*Ligumia recta*), and/or spike (*Elliptio dilatata*) have also been tentatively identified from Excavation Block C. Of these, threeridge mussels are the most numerous and the only species identified with certainty. One of the threeridge mussel shells exhibits possible usewear on its margin.

Finally, faunal remains were recovered in the form of three coprolites, all which were derived from Feature 19 (see below) (Figure 20). Many bone fragments, especially fish bones, are visible within the matrix of the coprolites. The species of origin for these coprolites is not clear. Both humans and dogs seem likely candidates. The abundance of bone fragments within the coprolites may point more towards dogs, but does not rule out humans as the source.



**Figure 20:** 20SA722, Excavation Block C, Feature 19, coprolites.

### Feature Descriptions

Four features were recorded in the 10 square meters excavated at 20SA722 in 2009. Two were located in Excavation Block B and two in Excavation Block C. The features in Block B include Feature 5, a multi-function storage pit/hearth/trash pit, and Feature 18, a multi-use hearth feature. The Features in Block C include Feature 8, an artifact scatter first encountered in the 2006 excavations, and Feature 19, a trash pit with multiple zones indicating different use episodes.

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

Feature #	5
Location	Block B, primarily 558N 500E, extending into 557N 500E (559N 500E excavated in 2006, 558N 501E not excavated)
Plan	circular/oval
Profile	deep, steep-sided, flat-bottomed, basin-shaped
Max. length	130 cm
Max. width	90+ cm
Depth defined	50 cm
Max. depth	126 cm
Volume	600.5 liters
Description	Feature 5 is a large, deep, pit feature which shows evidence of serving at least three separate functions throughout its use-life (Figure 21). The initial function of Feature 5 was as a storage pit. The bottom was lined with thick bark, which was later burned. The burning process no doubt served to sterilize the pit for reuse. A 10-15 cm thick zone containing burnt soil, ash lenses, charcoal, and FCR is evidence for repeated use of Feature 5 as a hearth. The intense heat generated by burning out the bark lining and later use as a hearth caused the walls of Feature 5 to show one to two centimeter thick reddened and blackened layers. The final use of Feature 5, after it was mostly filled in, was as a trash pit. Artifacts recovered in Feature 5 include a sandstone abraded (Figure 7, #811); grit-tempered and shell-tempered ceramics (Figure 11, #830, 831, 832); bones from fish, mammals, and turtles, including sturgeon, white-tailed deer, beaver, and soft-shell turtle; fragments of a cut, bird bone tube (Figure 13, #814); mussel shells including threeridge and spike/black sandshell; chert flakes; a unifacially retouched flake (Figure 9, #751); FCR; and charcoal. The question of what was stored in Feature 5 during its initial phase of use is answered in part by the presences of two or three charred, aquatic tubers, tentatively identified as Fragrant Water-Lily ( <i>Nymphaea odorata</i> ) (Figure 22).



**Figure 21:** 20SA722, Excavation Block B, Feature 5.



**Figure 22:** 20SA722, Excavation Block B, Feature 5 tuber (two views).

Feature # 8  
 Location Block C, 541N 521E (541N520E excavated 2006, 542N 520-521E not excavated)  
 Plan artifact scatter, oval?  
 Profile artifact scatter, profile undetermined  
 Max. length 110+ cm  
 Max. width 40+ cm  
 Depth defined 50 cm  
 Max. depth 58 cm  
 Volume artifact scatter, volume not recorded  
 Description Feature 8 was identified as a scatter of artifacts including grit-tempered and shell-tempered ceramics, flakes, FCR, fish and mammal bone, charcoal, and mussel shell. Tentatively identified faunal species include sturgeon, bowfin, catfish, walleye, turtle, deer/elk, mink, and threeridge mussel. An ash lens was associated with the portion of Feature 8 present in unit 541N 520E excavated in 2006 (Sommer 2007:44-45). Feature 8 represents a trash deposit that was dumped on the surface rather than contained in a pit or depression.

Feature # 18  
 Location Block B, primarily 556-558N 499E, extending into 557N 500E (556-558N 498E not excavated)  
 Plan oval  
 Profile overlapping basins  
 Max. length 230 cm  
 Max. width 140+ cm  
 Depth defined 50 cm  
 Max. depth 90 cm  
 Volume 332 liters  
 Description Feature 18 is a large hearth/roasting pit that was used multiple times (Figure 23). In profile it appears as two overlapping pits. Artifacts recovered in Feature 18 include grit-tempered and shell-tempered ceramics (Figure 11, #346); an ovate biface (Figure 9, #875); a sandstone abrader (Figure 7, #878); chert flakes, including one utilized/edge-damaged flake; bones from fish, mammals, and turtles, including sturgeon, channel catfish, snapping turtle, and white-tailed deer; a modified large mammal bone awl (Figure 13, #857); mussel shells including threeridge, spike/black sandshell, possibly elktoe, and possibly pimpleback; FCR, and charcoal.



**Figure 23:** 20SA722, Excavation Block B, Feature 18 (underlined for clarity).

Feature #	19
Location	Block C, primarily 541N 522E (extending into 541N 523E and 542N 522-523E not excavated)
Plan	circular/oval
Profile	deep basin shape
Max. length	80+ cm
Max. width	75+ cm
Depth defined	55 cm
Max. depth	100 cm
Volume	271 liters
Description	Feature 19 was a basin-shaped trash pit the upper portions of which were comprised of relatively sterile fill (Figure 24). The lower half of the feature consisted of mixed layers of ash, charcoal, and abundant faunal remains. Artifacts from Feature 19 include grit-tempered ceramics; fish and mammal bones including walleye, sturgeon, sucker, and white-tailed deer; several coprolite fragments (Figure 20); a modified beaver incisor with grinding on the distal lingual surface (Figure 18, #287); threeridge mussel shells; an ovoid bifacial preform (Figure 16, #268); flakes; two small hammerstones (Figure 15, #270, 310); FCR; and charcoal, including at least one maize kernel.



**Figure 24:** 20SA722, Excavation Block C, Feature 19.

#### *Radiocarbon Dates*

Although suitable material was collected, no radiocarbon dates have been obtained from our 2009 work at the Clunie site. Four dates were obtained on charcoal recovered during previous field seasons from Features 1, 3 and 9 (Sommer 2006, 2007). The results of those analyses are repeated here.

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

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

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

In 2009, an additional radiocarbon 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 is still in progress but involves 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 calibrated date, at 2-sigma, of A.D. 1440-1640 (M. Raviele, pers. comm. 2009).

## DISCUSSION

Although modest, the continuing goals of the surface survey portion of this project, to document and collect artifacts from archaeological sites exposed on Shiawassee NWR property were met during the 2009 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. 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 2009 field season, the earliest period of occupation that we have good evidence for at the refuge is the Late Archaic or transitional Late Archaic/Early Woodland. 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 cancell 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 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).

As reported previously (Sommer 2004a:16, 32), the AMS radiocarbon date of 1960±40 BP (2 Sigma cal. BC 40 to AD 120) that was obtained from the sample of charred organic residue scraped from the interior of this Green Point Incised, Cross Hatched vessel excavated from 20SA1251 has implications for our understanding of the Middle Woodland ceramic chronology and for our understanding of cultural processes in the Saginaw Valley. This vessel type, and the ware group that includes it, were originally defined at the nearby Schultz Site (Fischer 1972:161-165, 279-280) and are generally thought to date from the latter portion of the Middle Woodland period, from AD 300-500 (Kingsley 1999:151). The early Middle Woodland date from 20SA1251 indicates that the stylistic elements characterizing this type

were introduced into the Saginaw Valley on a timeframe consistent with the spread of this style into other parts of Michigan (Sommer 2004b). This early Middle Woodland date also raises questions about local lake level fluctuations. Archaeologists have previously hypothesized that the early part of the Middle Woodland period was a time of relatively high lake levels, possibly as high as two or three meters above the modern mean (Fitting 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 its low elevation, site 20SA1251 would have been inundated under such conditions. The dated ceramics from this site make it clear that although lake levels may have been high during a portion of the Tittabawassee Phase, conditions were dynamic and even low-lying areas were available for occupation during some parts of the early Middle Woodland. The AMS date of 1710 $\pm$ 40 BP (2 Sigma cal. AD 230 to AD 410, intercept AD 330) on a nutshell from Feature 5 at 20SA1276 not only dates a period of the sites occupation, it also suggests that the associated Ruben Linear ceramics may date a couple centuries or more earlier than previously expected. Additional radiocarbon dates are sorely needed to help sort out the complex occupation sequence at both 20SA1251 and 20SA1276 and to continue to refine the ceramic sequence from the Saginaw Valley.

The Late Prehistoric/Upper Mississippian Period is another poorly understood portion of Saginaw Valley prehistory (Halsey 1999:263). Several sites located in the Shiawassee NWR have yielded artifacts that appear to date from this late period. A collared rimsherd with a dowel or finger impressed lip from 20SA15 is stylistically consistent with late Prehistoric ceramics (Sommer 2000:10). Excavations at 20SA1276 yielded a late-looking grit-tempered rimsherd with a possible strap handle attachment (Sommer 2004a). Triangular Madison points were recovered from the surface of 20SA214 in 2003 (Sommer 2004:13), 20SA1251 in 2000, 2001 and 2003 (Sommer 2001:18-19, 2002:15, 2004:15) from 20SA1254 in 2002 (Sommer 2003:17) and from 20SA1274 in 2000 (Sommer 2001:26). The 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 fairly abundant. During the 2009 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, 2004 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. Flotation samples from 2009 have not yet been analyzed. Whether or not the presence of these cultigens implies on-site horticultural practices is debatable. A possible elk scapula hoe recovered in Feature 11 in 2007 may support such an inference (Sommer 2008). 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, and 11 place the occupation(s) in the period of AD 1400-1680. At least two separate occupations are indicated, one in the AD 1400-1470 period and one in the period from 1470-1680. It is likely that the site actually represents a series of many relatively short-term occupations that span much of the 280 year period identified.

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

When they are fully analyzed, the relatively large faunal assemblages derived from the test excavations conducted at 20SA722 in 2005-2009, 20SA1251 in 2001 and 2002, and 20SA1276 in 2001, 2003, and 2004 (Sommer 2002; 2004a), are expected to provide a more complete picture of subsistence practices than has been available from surface and shovel test data. This is particularly true of the faunal remains recovered from the fine-screened and flotation samples taken from features at 20SA722,

20SA1251 and 20SA1276. Preliminary, non-quantitative assessment of a sample of the faunal remains recovered from 20SA1251 and 20SA1276 suggests that while large mammals such as White-tailed Deer probably accounted for the largest percentage of the meat portion of the diet, fish and small aquatic mammals such as muskrat and beaver were also extremely important. Initial assessment of faunal remains from 20SA722 indicates that fish may rival large mammals in importance.

Data from the test excavations at 20SA722, 20SA1251 and 20SA1276, particularly floral and faunal data, are also expected to allow an assessment of season of occupation. The presence of numerous charred hickory nuts and walnuts in several features at 20SA1276, strongly suggests a fall season of occupation. Charred nutshells were also observed in flotation samples and from general excavation contexts at 20SA1251. Large quantities of spring spawning fish such as suckers, walleye and sturgeon have been recognized in the samples from 20SA722, suggesting that this site was occupied during the spring. Turtle and mollusk shells also suggest warm season occupations. Other data, including the presence of shed deer antlers, beaver and other fur-bearing animals, 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, 2003, 2005, 2006); the test excavations conducted at 20SA1276 during the 2001, 2003 and 2004 field seasons, at 20SA1251 during the 2001 and 2002 field seasons and at 20SA722 in 2005-2009, buried or otherwise relatively intact archaeological deposits are probably the rule rather than the exception in the refuge. It is quite possible that Late Archaic/Early Woodland deposits are stratified below Middle and Late Woodland deposits at some of the sites, but this has yet to be demonstrated and it does not appear to be the case for 20SA722, 20SA1251 or 20SA1276. The 2006-2009 excavations at 20SA722 revealed clearly stratified late Prehistoric and 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 eleven years of this project are indicative of interactions with cultural groups in surrounding regions. The presence of small amounts of Norwood chert suggests influence from cultural groups to the northwest. Interactions to the south and west are indicated by the presence of Illinois Havana/Hopewell-inspired Tittabawassee and Green Point Ware ceramics. The presence of Younge or Western Basin Tradition Macomb-like ceramics, of Pipe Creek chert, Upper Mercer Chert and Flint Ridge chalcedony from the Ohio region, Burlington chert from the Illinois/Missouri region, and Wyandotte chert from Indiana, points to southern, southeastern, and southwestern connections. Finally, interactions to the east are suggested by the presence of a small amount of Onondaga and Kettle Point chert from southern Ontario and New York. Sorting out the nature and frequency of the interactions with cultural groups in other regions remains an important area for future research.

In addition to prehistoric components, eleven years of fieldwork on this project have also identified significant 19<sup>th</sup> and 20<sup>th</sup> century historical materials. Many of the 19<sup>th</sup> century artifacts are related to the late 19<sup>th</sup> 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 19<sup>th</sup> and early 20<sup>th</sup> century artifacts along the riverbanks are likely associated with houseboats. Scatters of late 19<sup>th</sup> / early 20<sup>th</sup> 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-20<sup>th</sup> century assemblage associated with a row of “cottages” and house boats that extended along the bank of the Tittabawassee River (Sommer 2000, 2001). Several gunflints, as well as a possible “trade axe” recovered in 1999, offer tantalizing evidence for 18<sup>th</sup> 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 an eleventh season of archaeological investigations carried out in the Shiawassee National Wildlife Refuge (NWR), Saginaw County, Michigan. The field investigations, conducted under Amendment 7 of Federal Archaeological Permit No. 2002-MI/3-2, included both limited archaeological survey/salvage (surface survey) and test excavations. Test excavations were conducted at site 20SA722.

Surface survey was limited to seven previously recorded sites and one newly discovered locale. Surface collections, totaling eleven objects, were made from three of the eight sites that were monitored during the 2009 field season. The location of the newly found site was reported to the Michigan Office of the State Archaeologist and assigned site number 20SA1367.

The 10 square meters excavated at 20SA722 during the 2009 field season are divided between Excavation Blocks B and C. Each of these Excavation Blocks was expanded from a four square meter block originally excavated in 2006. An additional six square meters were added to Excavation Block B and four square meters were added to Block C. Excavation of Block B exposed a large, multi-use storage pit/hearth/trash pit (Feature 5) and a large hearth feature (Feature 18). The edge of Feature 5 had been partially exposed during the 2006 excavation. Excavation of Block C revealed part of an artifact scatter (Feature 8), a portion of which was previously excavated in 2006, and a large trash pit (Feature 19). These excavations yielded prehistoric artifacts including ceramics, stone tools, fire-cracked rock, and a large variety of plant and animal remains. The 2009 excavations yielded 11,109 catalogued objects. In addition, 218 samples, containing a total of 1,203.5 liters of sediment, were saved for flotation and 6 soil samples (877.0 g dry weight) were collected for possible future geological analysis.

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. Late Woodland and Historic period objects were also recovered. In Excavation Blocks B and C, and also in the previously excavated Blocks A/D, E, and F, early Late Woodland artifacts have been found stratified below the Late Prehistoric material.

Prehistoric artifacts recovered from the various sites on the refuge during 2009 and previous field seasons indicate that Middle and early Late Woodland occupations (ca A.D. 1 - 1000) predominate at most sites. However, Late Archaic/Early Woodland period (ca. 3000-100 B.C.) artifacts and several later Late Woodland and Late Prehistoric (ca. A.D. 1000-European contact) items are also present in the recovered assemblages. The Clunie site (20SA722) in particular has an extensive Late Prehistoric component. Historical artifacts date primarily from the mid-19<sup>th</sup> century through the 20<sup>th</sup> century. A few artifacts may date to the 17<sup>th</sup> or 18<sup>th</sup> century. A thin scatter of mid to late 20<sup>th</sup> 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 stratified archaeological deposits. Important research topics that could be addressed by sites in the project area include among others: 1) the nature of the Middle Woodland to Late Woodland transition period in the Saginaw Valley; 2) the nature of Late Prehistoric/Upper Mississippian adaptations in the Saginaw Valley; 3) the nature and frequency of interactions between cultural groups in the Saginaw Valley, and those in other regions; 4) human responses and adaptations to long and short term fluctuations in lake levels; 5)

prehistoric subsistence practices and the role of horticulture/agriculture in resource-rich wetland environments; and 6) human-environmental interactions through time.

### *Recommendations*

The recommendations made in previous reports for this project are still applicable (Sommer 2000-2009). They are repeated below. Based on the results of the past eleven 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.

## BIBLIOGRAPHY

- Abel, T. J.  
2002 *The Petersen Site: a Prehistoric to Historic Occupation in Northwestern Ohio*. Occasional Papers in Northeastern Archaeology No. 11. Copetown Press. Newfoundland.
- Albert, D.A., S.R. Denton, and B.V. Barnes  
1986 *Regional Landscape Ecosystems of Michigan*. School of Natural Resources, University of Michigan. Ann Arbor.
- Bailey, R.M. and G.R. Smith  
1981 Origin and Geography of the Fish Fauna of the Laurentian Great Lakes Basin. In *Canadian Journal of Fisheries and Aquatic Sciences* 38(12).
- Baker, R.H.  
1983 *Michigan Mammals*. Michigan State University Press. East Lansing, MI.
- Beld, S. G.  
1991 *Two Terminal Archaic/Early Woodland Sites in Central Michigan*. University of Michigan Museum of Anthropology Technical Report 22.  
  
2002 A Preliminary Report on the Cater Site, 20MD36, Midland County, Michigan: Early and Mid-Nineteenth Century Occupations in Central Michigan. *The Michigan Archaeologist* 48(1-2):1-86.
- Bigony, B. A.  
1970 Late Woodland Occupation of the Saginaw Valley. *The Michigan Archaeologist* 16(3-4):115-214.
- Binford, L. R.  
1963 The Hodges Site, A Late Archaic Burial Station. In *Miscellaneous Studies in Typology and Classification*, pp. 124-148. Anthropological Papers Museum of Anthropology, The University of Michigan No.19, Ann Arbor.
- Branstner, M. C. and M. J. Hambacher (editors)  
1994 *1991 Great Lakes Transmission Limited Partnership Pipeline Expansion Projects: Phase III Investigations at the Shiawassee River (20SA1033) and Bear Creek Sites (20SA1043), Saginaw County, Michigan*. Natural Resources Group, Inc., Minneapolis, Minnesota, and Great Lakes Transmission Limited Partnership, Detroit, Michigan. GLRA Report No. 94-12.
- Branstner, M. C. and M. J. Hambacher (editors)  
1995 *1991 Great Lakes Transmission Limited Partnership Pipeline Expansion Projects: Phase III Investigations at the Casassa Site (20SA1021)*. Natural Resources Group, Inc., Minneapolis, Minnesota, and Great Lakes Transmission Limited Partnership, Detroit, Michigan. GLRA Report No. 94-12.

- Brashler, J. B.  
1981 *Early Late Woodland Boundaries and Interaction: Indian Ceramics of Southern Lower Michigan*. Publications of the Museum, Michigan State University Anthropological Series 3(3).
- Brunett, F. V.  
1980 A Cultural Inventory Report of a Portion of Section 4 and 8, T.11N. R.4E. within the Boundary of the Shiawassee National Wildlife Refuge. Cultural Resources Inventory Report No. 21380, Saginaw Archaeological Commission, Saginaw Michigan.
- Burt, W.H.  
1957 *Mammals of the Great Lakes Region*. The University of Michigan Press.
- Butterfield, I.W.  
1986 Water Configurations in the Human Environment from the Main Algonquin to the Nipissing I Stages of the Great Lakes in the Saginaw Valley, Michigan. *The Michigan Archaeologist*, 32(3):101-137.
- Cleland, C. E.  
1966 *The Prehistoric Animal Ecology and Ethnozoology of the Upper Great Lakes Region*. Anthropological Papers Museum of Anthropology, University of Michigan No. 29, Ann Arbor.  
  
1992 *The Rites of Conquest: The History and Culture of Michigan's Native Americans*. The University of Michigan Press, Ann Arbor.
- Comer, P. J. and D. A. Albert  
1997 *Vegetation Circa 1800 of Saginaw County, Michigan: An Interpretation of General Land Office Surveys*. Michigan Natural Features Inventory, Lansing, Michigan. [digital map]
- Dice, L.R.  
1943 *The Biotic Provinces of North America*. The University of Michigan Press.
- Dobbs, C. A., and M. L. Murray  
1993 *Ancient Native American Occupation at 20SA596 in the Saginaw Valley, Michigan*. Institute for Minnesota Archaeology, Reports of Investigations Number 209. Prepared for Great Lakes Gas Transmission Limited Partnership under contract with Braun Environmental, Inc., for submission to Federal Energy Regulatory Commission (FERC), Michigan State Historic Preservation Office (File # ER89508), Minneapolis.
- Dobbs, C. A., C. Johnson, K. Parker and T. Martin  
1993 *20SA1034: A Late-Prehistoric Site on the Flint River in the Saginaw Valley, Michigan*. Institute for Minnesota Archaeology, Reports of Investigations Number 229. Prepared for Great Lakes Gas Transmission Limited Partnership under contract with Braun Environmental, Inc., for submission to Federal Energy Regulatory Commission (FERC), Michigan State Historic Preservation Office (File # ER89508), Minneapolis.

- Dorr, J.A., Jr., and D.F. Eschman  
1970 *Geology of Michigan*. The University of Michigan Press, Ann Arbor.
- Egan, K.C.  
1990 *Paleoecology of the Bridgeport Area*. In *The Bridgeport Site: Archaeological Investigation at 20SA620 Saginaw County, Michigan*, edited by, J. M. O'Shea and M. Shott, pp.11-20. Anthropological Papers University of Michigan Museum of Anthropology, 81:11-20. Ann Arbor.
- Eschman, D.F. and P.F. Karrow  
1985 Huron Basin Glacial Lakes. In *Quaternary Evolution of the Great Lakes, Geological Association of Canada Special Paper*, 30, edited by P.F. Karrow and P.E. Calkin, pp. 79-93.
- Fairchild, J. D.  
1977 *The Schmidt Site: A Pre-Nipissing Village in the Saginaw Valley*. Unpublished Master's Thesis, Western Michigan University, Kalamazoo.
- Farrand, W. R.  
1982 *Quaternary Geology of Michigan*. Map, State of Michigan, Department of Natural Resources, Geological Survey Division, Lansing.
- Fischer, F. W.  
1972 Schultz Site Ceramics. In *The Schultz Site at Greenpoint: A Stratified Occupation Area in the Saginaw Valley of Michigan*, edited by J. E. Fitting, pp. 137-190. *Memoirs of the Museum of Anthropology University of Michigan Number 4*. Ann Arbor.
- Fitting, J. E.  
1968 Saginaw Valley Archaeology. *The Michigan Archaeologist* 14(1-2).
- 1972a *The Schultz Site at Greenpoint: A Stratified Occupation Area in the Saginaw Valley of Michigan*. *Memoirs of the Museum of Anthropology University of Michigan Number 4*. Ann Arbor.
- 1972b Lithic Industries of the Schultz Site. In *The Schultz Site at Greenpoint: A Stratified Occupation Area in the Saginaw Valley of Michigan*, edited by J. E. Fitting, pp. 191-224. *Memoirs of the Museum of Anthropology University of Michigan Number 4*. Ann Arbor.
- 1975 *The Archaeology of Michigan: A Guide to the Prehistory of the Great Lakes Region*, (second edition). Cranbrook Institute of Science, Bloomfield Hills, Michigan.
- 1977 Cultural Resources Survey of the Shiawassee Flats Flood Control Project. Report No. 1860, Gilbert/Commonwealth, Commonwealth Associates, Inc., Jackson, Michigan.
- Garland, E. B. and S. G. Beld  
1999 The Early Woodland: Ceramics, Domesticated Plants, and Burial Mounds Foretell the Shape of the Future. In *Retrieving Michigan's Buried Past: the Archaeology of the Great Lakes State*, edited by John R. Halsey, pp. 125-146.

- Granger, J. E., Jr.  
1978 *Meadowood Phase Settlement Pattern in the Niagara Frontier Region of Western New York State*. Anthropological Papers, Museum of Anthropology, University of Michigan, No. 24. Ann Arbor.
- Halsey, J. R.  
1966 Additional Hopewell Engraved Turtle Shells from Michigan. *Papers of the Michigan Academy of Science, Arts, and Letters* 51:389-398.  
  
1976 *The Bussinger Site: a Multicomponent Site in the Saginaw Valley of Michigan with a Review of Early Late Woodland Mortuary Complexes in the Northeastern Woodlands*. Unpublished Ph.D. dissertation, University of North Carolina. Chapel Hill.  
  
1999 (editor) *Retrieving Michigan's Buried Past: The Archaeology of the Great Lakes State*. Cranbrook Institute of Science, Bulletin 64, Bloomfield Hills, Michigan.
- Harrison  
1966 The Schmidt Site (20SA192), Saginaw County, Michigan. *The Michigan Archaeologist* 12(2):49-70.
- Hubbs, C. L., K. F. Lagler and G. R. Smith  
2004 *Fishes of the Great Lakes Region Revise Edition*. University of Michigan Press, Ann Arbor.
- Iaquinta, J. L.  
1994 *Soil Survey of Saginaw County, Michigan*. United States Department of Agriculture, Soil Conservation Service.
- Justice, N. D.  
1987 *Stone Age Spear and Arrow Points of the Midcontinental and Eastern United States*. Indiana University Press, Bloomington.
- Klisch, M. and T. A. Klisch  
1980 Eliza Golson's Diary. Unpublished manuscript on file at the Saginaw Archaeological Commission.
- Kingsley, R. G.  
1999 The Middle Woodland Period in Southern Michigan. In *Retrieving Michigan's Buried Past: The Archaeology of the Great Lakes State*, edited by J. R. Halsey, pp. 148-172. Cranbrook Institute of Science, Bulletin 64, Bloomfield Hills, Michigan.
- Larsen, C.E.  
1985a Geoarchaeological Interpretation of Great Lakes Coastal Environments. In *Archaeological Sediments in Context*, edited by, J.K. Stein and W.R. Farrand, pp. 91-110. Center for the Study of Early Man, Orono, Maine.

- 1985b Lake Level, Uplift, and Outlet Incision, the Nipissing and Algoma Great Lakes. In *Quaternary Evolution of the Great Lakes*, edited by P. F. Karrow and P. E. Calkin, pp.63-77. Geological Association of Canada Special Paper 30, 1985.
- 1987 Geological History of Glacial Lake Algonquin and the Upper Great Lakes. *U.S. Geological Survey Bulletin*, 1801.
- Lovis, W. A.
- 1989 (editor) *Archaeological Investigations at the Webber I and Webber II Sites, Frankenmuth Township, Saginaw County, Michigan*. Michigan Cultural Resource Investigation Series Volume 1. Michigan Department of State and the Michigan Department of Transportation, Lansing.
- 1990 Accelerator Dating the Ceramic Assemblage from the Fletcher Site: Implications of a Pilot Study for Interpretation of the Wayne Period. *Mid-Continental Journal of Archaeology* 15(1):37-50.
- 1993 Discussion and Conclusions. In *The Archaic Woodland and Historic Period Occupations of the Liberty Bridge Locale, Bay City, Michigan*, edited by W. A. Lovis, pp. 225-229. Michigan Cultural Resource Investigation Series, Vol. 3.
- Lovis, W. A. and R. M. Davis
- 1993 The Ceramic Assemblage from Sites 20BY77 and 20BY79, Bay City, Michigan. In *The Archaic Woodland and Historic Period Occupations of the Liberty Bridge Locale, Bay City, Michigan*, edited by W. A. Lovis, pp. 98-123. Michigan Cultural Resource Investigation Series, Vol. 3.
- Mainfort, R. C., Jr.
- 1979 *Indian Social Dynamics in the Period of European Contact: Fletcher Site Cemetery, Bay County*. Publications of the Museum, Anthropological Series Vol. 1(4). Michigan State University, East Lansing.
- Mason, R. J.
- 1981 *Great Lakes Archaeology*. Academic Press, New York.
- McCormick
- 1883 Mounds and Mound-Builders of the Saginaw Valley. *Michigan Pioneer and Historical Collections* 4:379-383.
- Monaghan, G. W.
- 1995 Physiographic Environment. In 1991 Great Lakes Gas Transmission Limited Partnership Pipeline Expansion Projects: Phase III Investigations at the Cassasa Site (20SA1021) Saginaw, Michigan, edited by M. C. Branstner and M. J. Hambacher, pp.2.1-2.22. Great Lakes Research Associates. Report on file at the Saginaw Archaeological Commission.

- Monaghan, G. W. and W. A. Lovis  
 2005 Modeling Archaeological Site Burial in Southern Michigan: A Geoarchaeological Synthesis. Environmental Research Series Vol. 1. Michigan State University Press, East Lansing.
- Monaghan, G. W., W. A. Lovis and K. C. Egan-Bruhy  
 2006 Earliest *Cucurbita* from the Great Lakes, Northern USA. *Quaternary Research* 65:216-222.
- O'Shea, J. M. and M. Shott  
 1990 (editors) *The Bridgeport Township Site: Archaeological Investigation at 20SA620 Saginaw County, Michigan*. Anthropological Papers University of Michigan Museum of Anthropology No.81. Ann Arbor.
- Ozker, D.  
 1982 *An Early Woodland Community at the Schultz Site 20SA2 in the Saginaw Valley and the Nature of the Early Woodland Adaptations in the Great Lakes Region*. Anthropological Papers University of Michigan Museum of Anthropology No.70. Ann Arbor.
- Papworth, M. L.  
 1959 Unpublished notes and drafts of report "Archaeological Survey of the Saginaw Reservoir Area." On file at the University of Michigan Museum of Anthropology.
- 1965 Cultural Traditions in the Lake Forest Region During the Late High-water Stages of the Post-glacial Great Lakes. Unpublished Ph.D. dissertation, University of Michigan. Ann Arbor.
- Peebles, C. S.  
 1978 Of Archaeology and Archaeologists in Saginaw County, Michigan. *The Michigan Archaeologist* 24(3-4):83-129.
- Quimby, G. I.  
 1966 The Dumaw Creek Site: a Seventeenth Century Prehistoric Indian Village and Cemetery in Oceana County, Michigan. *Fieldiana: Anthropology* 56(1). Field Museum Press, Chicago.
- Robertson, J. A., K. C. Taylor, W. A. Lovis, and J. M. McClurken  
 1993 A Baseline Artifact Inventory Survey of Museum Property and Indian Interests in National Wildlife Refuges Located in Michigan. Commonwealth Cultural Resources Group, Inc., Jackson, Michigan.
- Robertson, J. A., K. C. Taylor, M. J. Hambacher, W. A. Lovis, and G. W. Monaghan  
 2000 Overview Study of Archaeological and Cultural Values on Shiawassee, Michigan Islands, and Wyandotte National Wildlife Refuges in Saginaw, Charlevoix, Alpena, and Wayne Counties, Michigan. Unpublished report on file at the Saginaw Archaeological Commission.

- Shott, M.J. and P.D. Welch  
1984 Archaeological Resources of the Thumb Area of Michigan. *The Michigan Archaeologist*, 30:1-79.
- Simons, D. B.  
1997 The Gainey and Butler Sites as Focal Points for Caribou and People. In *Caribou and Reindeer Hunters of the Northern Hemisphere*, edited by L. J. Jackson and P. T. Thacker, pp. 105-131. Avebury, England.
- Simons, D. B., M. J. Shott and H. T. Wright  
1984 The Gainey Site: Variability in a Great Lakes Paleo-Indian Assemblage. *Archaeology of the Eastern United States* 12:266-279.
- Simons, D. B. and H. T. Wright  
1992 Butler 1991: Excavations at a Fluted Point Site in the Central Great Lakes Region (20GS104). *Current Research in the Pleistocene* 9:35.
- Smith, H. I.  
1894 Caches of the Saginaw Valley. *Proceedings of the American Association for the Advancement of Science* 42:1-4.
- 1901a Summary of the Archaeology of Saginaw Valley, Michigan. *American Anthropologist* (New Series) 3:286-293.
- 1901b Summary of the Archaeology of Saginaw Valley, Michigan - II. *American Anthropologist* (New Series) 3:501-512.
- 1901c Summary of the Archaeology of Saginaw Valley, Michigan - III. *American Anthropologist* (New Series) 3:726-736.
- Sommer, J. D.  
2000 A preliminary Report on the Archaeology of the Shiawassee National Wildlife Refuge. Report on file at the Saginaw Archaeological Commission of the Historical Society of Saginaw County, Inc.
- 2001 Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2000 Field Season. Report on file at the Saginaw Archaeological Commission of the Historical Society of Saginaw County, Inc.
- 2002 Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2001 Field Season. Report on file at the Saginaw Archaeological Commission of the Historical Society of Saginaw County, Inc.
- 2003 Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2002 Field Season. Report on file at the Saginaw Archaeological Commission of the Historical Society of Saginaw County, Inc.

- 2004a Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2003 Field Season. Report on file at the Saginaw Archaeological Commission of the Historical Society of Saginaw County, Inc.
- 2004b A Middle Woodland AMS Date from Saginaw County, Michigan. *Saginaw Valley Archaeologist* 2004(1):6-12.
- 2005 Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2004 Field Season. Report on file at the Saginaw Archaeological Commission of the Historical Society of Saginaw County, Inc.
- 2006 Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2005 Field Season. Report on file at the Historical Society of Saginaw County, Inc.
- 2007 Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2006 Field Season. Report on file at the Historical Society of Saginaw County, Inc.
- 2008 Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2007 Field Season. Report on file at the Historical Society of Saginaw County, Inc.
- 2009 Report on the Archaeology of the Shiawassee National Wildlife Refuge: the 2008 Field Season. Report on file at the Historical Society of Saginaw County, Inc.
- Speth, J. D.  
1972 Geology of the Schultz Site. In *The Schultz Site at Greenpoint: A Stratified Occupation Area in the Saginaw Valley of Michigan*, edited by J. E. Fitting, pp. 53-75. Memoirs of the Museum of Anthropology University of Michigan Number 4. Ann Arbor.
- Taggart, D. W.  
n.d. The Feeheley Site: A Late Archaic Site in the Saginaw Valley. Unpublished manuscript on file at the University of Michigan Museum of Anthropology. Ann Arbor.
- Tanner, H. H.  
1987 *Atlas of Great Lakes Indian History*. University of Oklahoma Press, Norman, Oklahoma.
- Whittier, H. L.  
1977 Archaeological/Historical Reconnaissance Survey of the Shiawassee National Wildlife Refuge. Report No. R-1911. Commonwealth Associates, Inc. Jackson, Michigan.
- Wright, H. T.  
1963 A Transitional Archaic Campsite at Green Point (20SA1). *The Michigan Archaeologist* 10(1):17-22.
- Wright, H. T. and W. B. Roosa  
1966 The Barnes Site: A Fluted Point Assemblage from the Great Lakes Region. *American Antiquity* 31:850-860.

Yarnell, R. A.

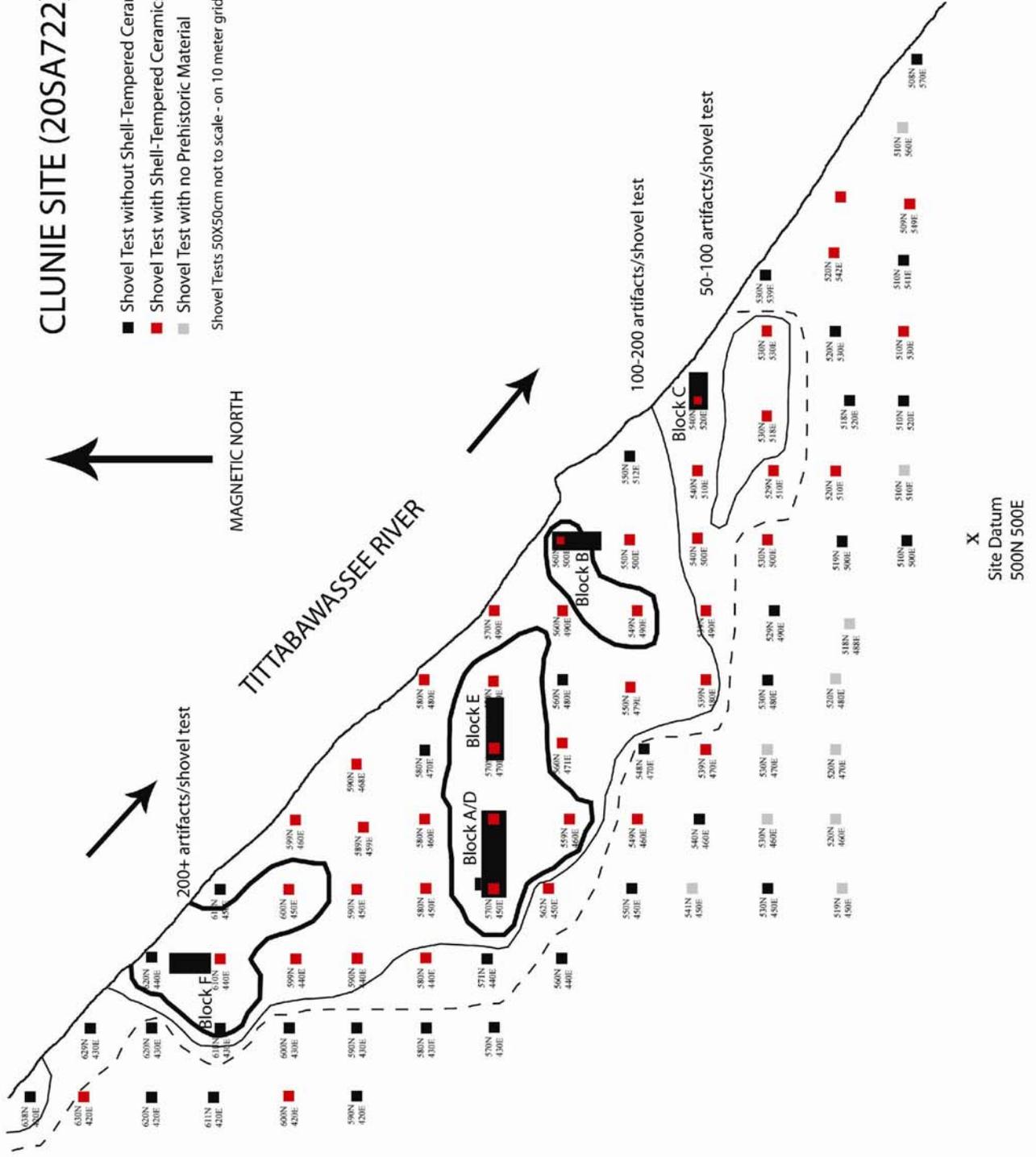
1964 *Aboriginal Relationships between Culture and Plant Life in the Upper Great Lakes Region*. Anthropological Papers Museum of Anthropology, University of Michigan No. 23, Ann Arbor.

## **APPENDIX C: Site Maps**

# 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



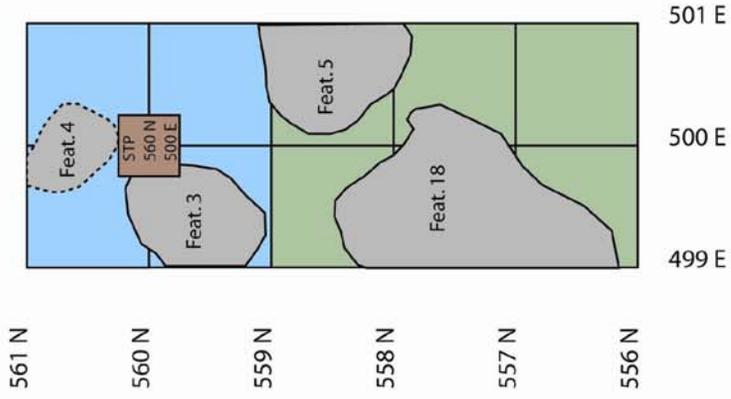
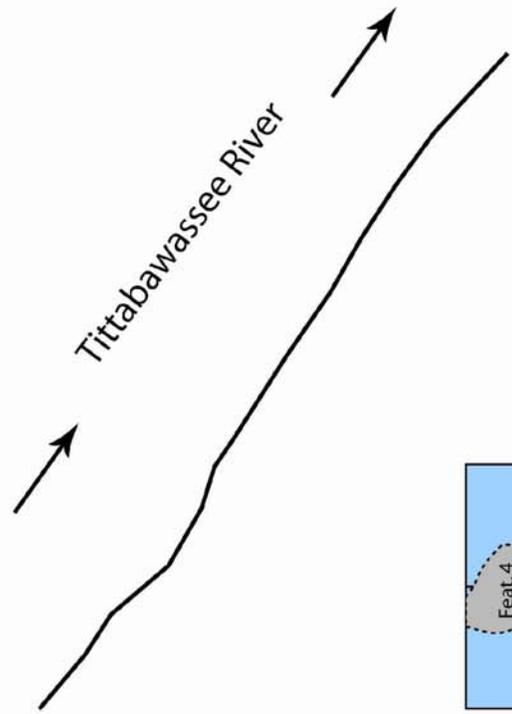
X  
Site Datum  
500N 500E

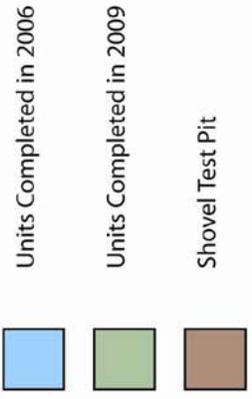
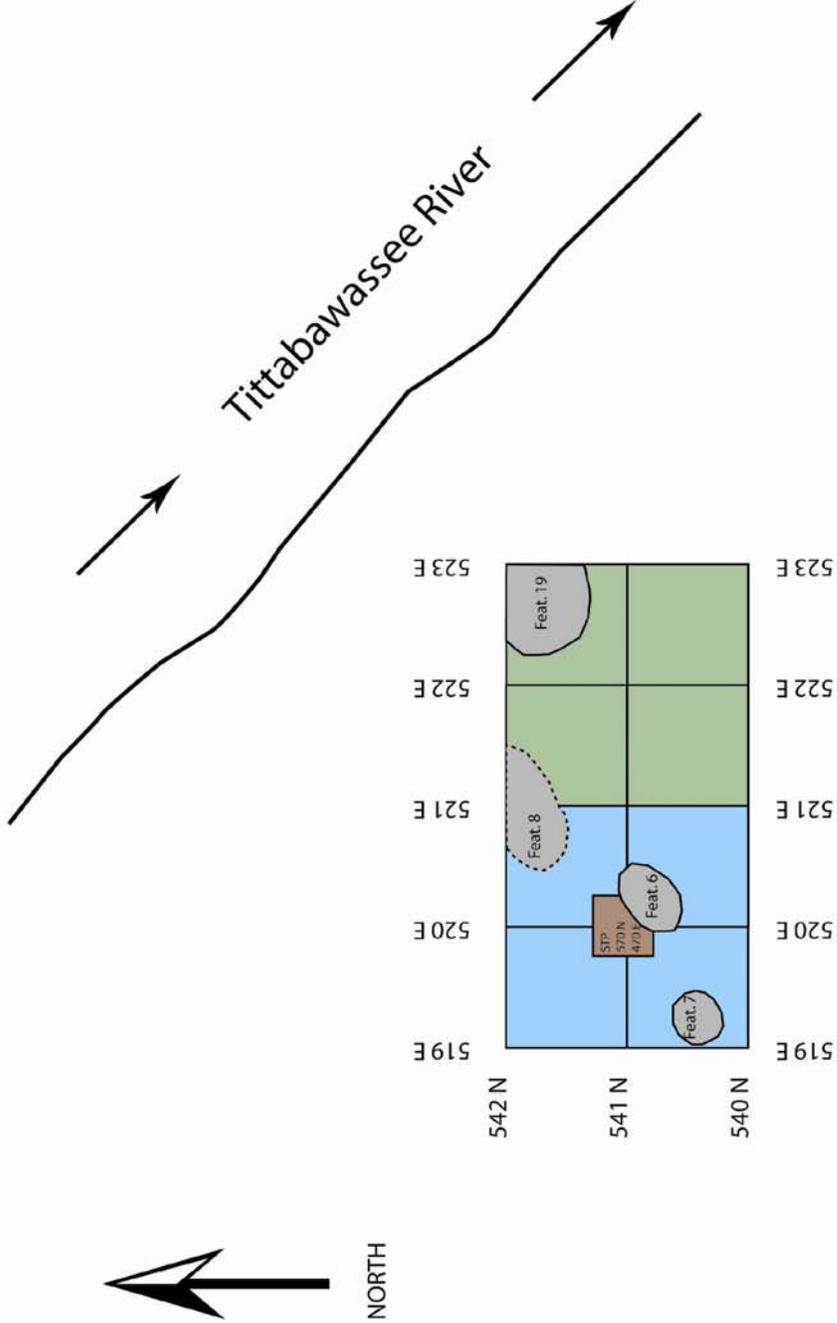
- Units Completed in 2006
- Units Completed in 2009
- Shovel Test Pit

# CLUNIE SITE

## 20SA722

### Excavation Block B





**CLUNIE SITE**  
**20SA722**  
 Excavation Block C