August 2021

Oneota Lithic Economy and Tool Function at the Schmeling Site (47JE833) in Southeastern Wisconsin

Megan Catherine Harding
University of Wisconsin-Milwaukee

ONEOTA LITHIC ECONOMY AND TOOL FUNCTION AT THE SCHMELING SITE (47JE833) IN SOUTHEASTERN WISCONSIN

by

Megan Catherine Harding

A Thesis Submitted in

Partial Fulfillment of the

Requirements for the Degree of

Master of Science

in Anthropology

at

The University of Wisconsin-Milwaukee

August 2021

ABSTRACT

ONEOTA LITHIC ECONOMY AND TOOL FUNCTION AT THE SCHMELING SITE (47JE833)
IN SOUTHEASTERN WISCONSIN

by

Megan Catherine Harding

The University of Wisconsin-Milwaukee, 2021
Under the Supervision of Robert J. Jeske PhD RPA

The perceived homogeneity of Oneota lithic assemblages has often provided a challenge for archaeologists to extrapolate broader conclusions about Oneota tool economies beyond their preference for speed and efficiency. Using standardized methods, lithic materials recovered from the 2006 and 2008 excavations at the Schmeling site (47JE833) are examined to determine if the lithic economy is indicative of day-to day activity or reflects a particular cultural function like that of a mortuary precinct. The results of this analysis are then contrasted against the Crescent Bay Hunt Club site (47JE0904), Koshkonong Creek Village site (47JE0379), and the Carcajou Point site (47JE0002) in order to examine procurement, manufacturing strategies and assemblage diversity across Oneota sites in southcentral Wisconsin.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGMENTS

I am forever grateful to have been surrounded by a community of thoughtful friends, encouraging colleagues, and patient family throughout this process. My graduate career has been punctuated with a million small acts of kindness that have supported and sustained me to the finish line. This achievement is sweeter knowing it is shared- I truly cannot thank you all enough. I would be remiss if I did not acknowledge the immense role my committee members have played in the completion of this research. Dr. Katherine Sterner – your work was my bible and I'm so grateful to have had it as a guide. Dr. Richard Edwards IV, thank you playing my therapist and oracle – you preserved my sanity. A very special thank you goes to my advisor, Dr. Robert Jeske, for being steadfast with advice and guidance – cheers to your well-deserved retirement!

And to Ken – thank you from the bottom of my heart.

CHAPTER 1: INTRODUCTION AND BACKGROUND REVIEW

Distinctive ceramic variation is generally relied upon to denote the widespread boundaries of the Oneota cultural tradition (Berres 1998; Boszhardt 1994; Carter 2002; Carpiaux 2018; Gibbon 1972; Green and Rodell 1994; Griffin 1946; Hall 1962; Jeske 2003a; Jirasek 2002; Kotwasinski 2011;McKern 1945; Neumann 2017; Overstreet 1997; Parshall 2013;Schneider 2015; Schurr 2017; Twinde 1994). However, the perceived lack of stylistic variation among Oneota lithic assemblages has resulted in a lack of archaeologists' attention.

The relatively low recovery rate of formal stone tools from late prehistoric Midwestern sites is a well-known frustration (Hall 1962; Jeske 1992; Jeske and Sterner-Miller 2015; Mason 1981). Formal tool types are generally limited to triangular tools – known as Madison points, small steep-edged unifaces - inferred to be scrapers, unmodified protrusions (gravers) or modified protrusion (drills), and modified or unmodified pieces of debitage (Jeske and Sterner-Miller 2015; Justice 1995; Overstreet 1976; Rodell 1989; Sterner 2014, 2018). In southeastern Wisconsin, these small tools are typified by local, glacially-deposited, poor to fair quality chert and are notoriously ambiguous when it comes to identifying their use(s) (Gibbon 1986; Jeske 1992; Jeske and Sterner-Miller 2015; Sterner 2012, 2018; Sterner and Jeske 2017; Wilson 2016). Despite this difficulty, there have been several lithic analyses conducted on Oneota collections throughout Wisconsin in recent years.

Initially, the trend of these lithic studies was to rely on morpho-functional typology to assume a tool's function or bypass assigning definitive function all together (Anderson et al. 1995; Gibbon 1969; O'Gorman 1995; Hall 1962; Overstreet 1976; Padilla and Ritterbush 2005;

Rodell 1989; Salkin 1989).) The economic relationship between lithic technology and subsistence has long been acknowledged by archaeologists (e.g., Hammerstedt and Hughes 2015; Jeske 1992; Sassaman 1992; Sterner 2018) but the multifaceted diversity of the lithic toolkit has often been undercut by this heavy reliance on morpho-functional typology. The morpho-functional approach generally under-infers the range of tool and diversity of tool functions and the activities that they represent.

The focus of this project is a description and interpretation of the procurement, manufacture, use, and discard of stone tools and debris found at the Schmeling site (47JE8033), a 13^{th}-14^{th} century Oneota site in the Koshkonong Locality. This study is part of an extensive, long-term research program and is contextualized by previous research concerning Oneota sites in the region (e.g. Carpiaux 2018; Edwards 2010, 2017; Edwards and Jeske 2015, Edwards et al 2017; Foley Winkler 2006, 2008, 2011; Jeske 2001, 20032003b, 2017, 2020; Jeske et al 2003; Jeske and Winkler 2008; McTavish 2019; Musil 1987 ; Schneider 2015, Sterner 2012, 2014; Sterner 2018; Stout and Skavlem 1908; Wilson 2015; Winkler 2004, 2011).

Using standardized macroscopic and microscopic methods, lithic materials recovered from the 2006 and 2008 excavations at the Schmeling site (47JE833) are examined to determine which lithic resources were utilized, what methods of tool production were employed, and the functional applications of stone tools. The summarized findings will be contrasted against three other Oneota sites from the Lake Koshkonong. Particular focus will be paid to the lithic technology employed at the adjacent Crescent Bay Hunt Club site (47JE0904) (Jeske et al 2003; Jeske and Sterner-Miller 2015; Sterner 2012, 2018; Sterner and Jeske 2017; Van Beckum and Jeske 2001). The Koshkonong Creek Village site (47JE0379) and the Carcajou Point site (47JE0002) will also be examined in order to investigate patterns of procurement, manufacturing strategies and assemblage diversity across Oneota sites in southcentral Wisconsin

All four sites discussed in the following chapters have been interpreted as village or seasonal habitation sites (e.g., Jeske et al 2020). However, McTavish's (2019) conclusions about the Schmeling site suggested that the activities that took place there could be indicative of a funerary function rather than a strictly habitation site. Review of the lithic tools, their respective use-wear, and comparisons between the other Oneota sites will assist in determining the function the Schmeling site served for the people living around Lake Koshkonong. This research will determine if the lithic economy is indicative of day-to day activity or that the site could be a mortuary camp or potentially a mortuary district within the larger habitation complex of surrounding Oneota sites. The comparison here is similar to Jeske's (1987) comparison of the Late Woodland Kuhlman Mound and Deer Track habitation sites in Illinois and his comparison of mound versus midden contexts at the Ohio Hopewell Mound City National Monument site (Jeske 1989).

ONEOTA CULTURAL BACKGROUND

Since coined by Keyes in 1927, the term Oneota has broadened from its original designation for archaeological sites in northeastern Iowa to encompass a geographically far-reaching phenomenon (see Figure 1.1) (Benchley et al. 1997; Brown and Sasso 2001; Buikstra et al 1994; Griffin 1960; Hall 1962; Hart 1990; Henning 1998; Keys 1927, McKern 1942, 1945; Overstreet 1997; Rodell 1983, Sasso 2003a, 2003b; Schneider 2015).

The term Oneota is used to signal the shared subsistence practices and social complexity inferred from material culture identified across much of the northern Midwest. In the traditional Midwestern Taxonomic Method, Oneota was an Aspect of the Upper Mississippi Phase, and associated with Middle Mississippi in the Mississippi Pattern (McKern 1945:118). More recently, Oneota is described as a Tradition (Overstreet 1976). Within Wisconsin, Oneota Tradition material cultural clusters at a number of geographic locations, referred to as localities (Hall 1962; Overstreet 1997) (see Figure 1.2). These localities are dispersed across the state and demonstrate clear relationships to each other but also contain their own respective distinctions (Boszhardt 1994; Edwards et al. 2017; Jeske and Sterner-Miller 2015; Overstreet 1997; Schneider 2015; Sterner 2012, Sterner and Jeske 2017; Theler and Boszhardt 2000, 2006).

Hall's 1958-1959 excavations at Carcajou Point (47JE0002) established the seminal Oneota pottery classification scheme used today (Hall 1962, Schneider 2015). Wisconsin Oneota settlements are most generally identified within the archaeological record by their distinctive globular vessels with a wide mouth, constricted neck, trailed or punctate shoulder decorations, and tempering (Overstreet 1997; Schneider 2015) (Figure 1.3). Variation within Oneota ceramics is often relied upon to differentiate and define Oneota sites from other regionally contemporaneous sites (Boszhardt 1994; Brown and Sasso 2001; Hall 1962; Schneider 2015; Staeck 1995; Stevenson 1985).

Oneota sites can also be identified by expedient chipped stone lithic assemblages largely composed of locally occurring raw materials (Boszhardt 1994; Boszhardt and McCarthy 1999; Gibbon 1986; Jeske and Sterner-Miller 2015; Sterner 2018, 2020; Sterner and Jeske 2017; Wilson 2016). The majority of formal tools are triangular-shaped tools (often, but not always, bifaces), also referred to as Madison points, as well as steeply retouched unifacial pieces, generally referred to as thumbnail or Oneota end-scrapers (Figure 1.4). The number of specialized formal tools that are recovered are often dwarfed in comparison to the number of expedient modified or unmodified flakes, which are used for a variety of tasks (Sterner 2018).

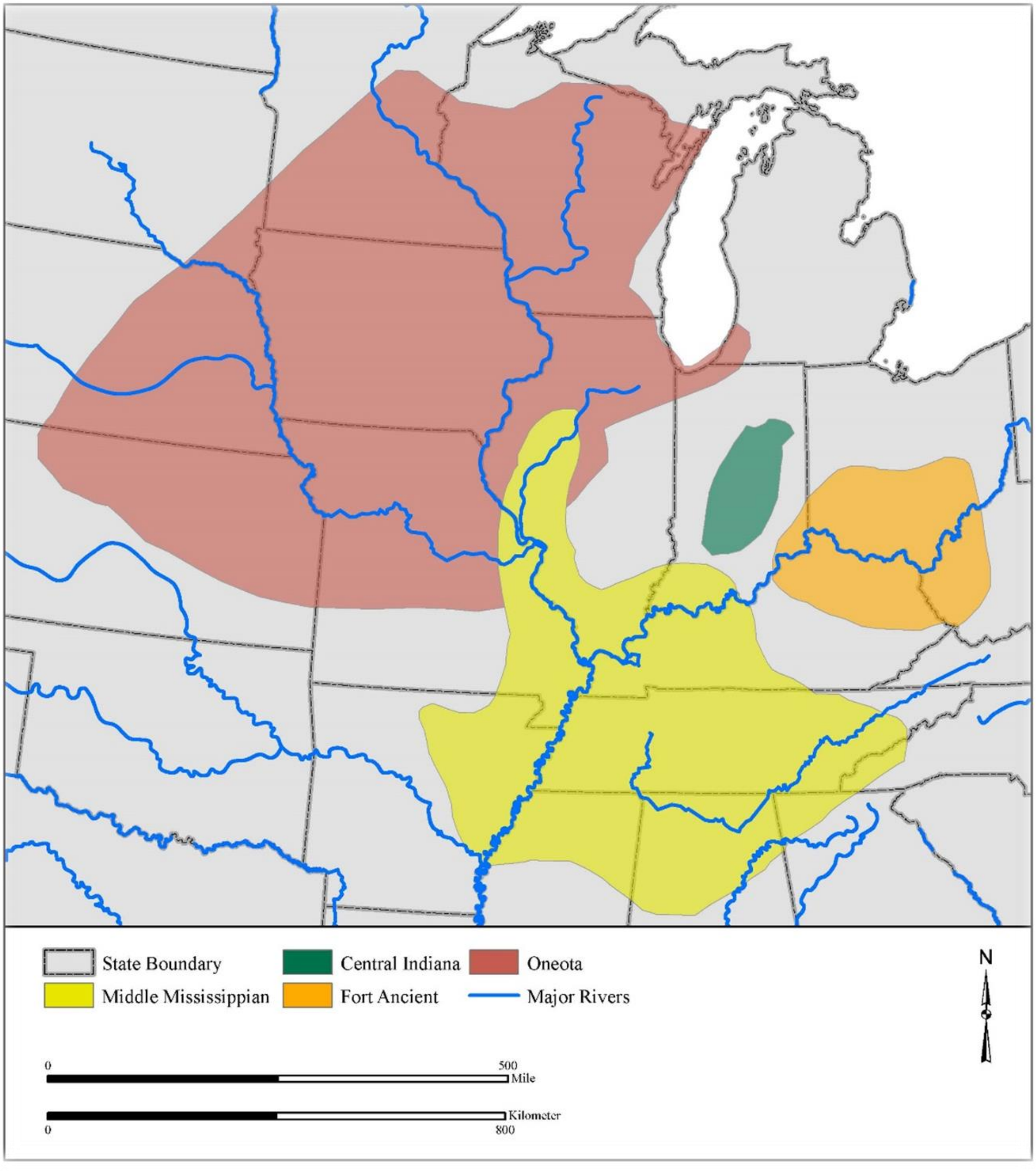


Figure 1.1. Spread of Oneota Cultural Tradition across Midwest with other Upper and Middle Mississippian Cultures (adapted from Sterner 2018).

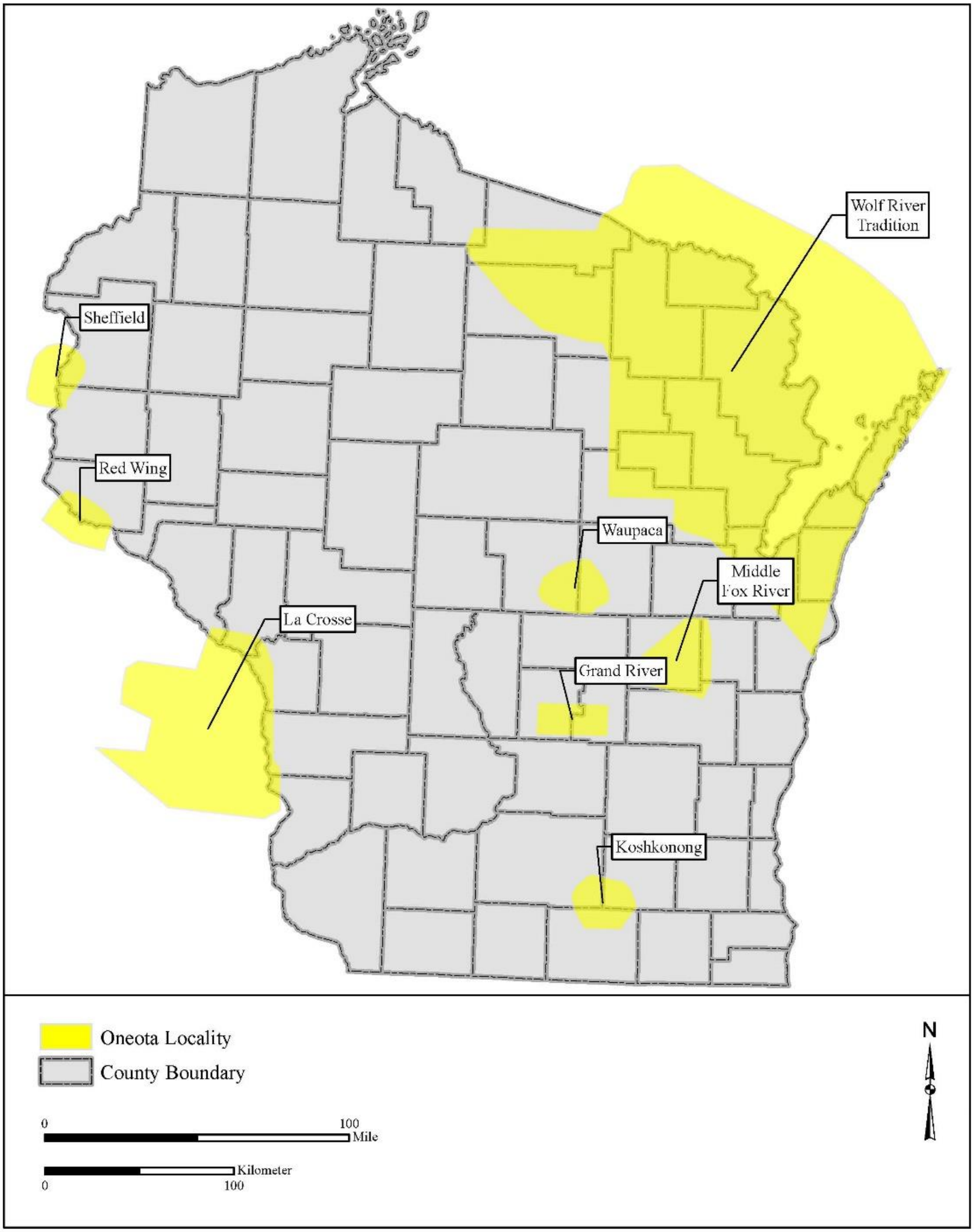


Figure 1.2. Oneota Cultural Tradition Localities (adapted from Edwards 2017)

Figure 1.3. Example of a Grand River Vessel (Schneider 2015)

Additionally, ground stone celts, grooved sandstone abraders, grinding stones, galena cubes, and wedge-shaped pieces usually called bipolar cores, wedges, or *pièces esquillées*, are also found within Oneota lithic assemblages (Goatley 1995; Hall 1962; Jeske et al. 2017; Jeske and Sterner-Miller 2015; Sterner 2018, 2020). Other typical cultural material recovered from eastern Oneota sites includes copper artifacts inferred to be fish hooks, beads and a variety of awls and piercers (Boczkiewicz 2011; Hall 1962; Overstreet 1997; Pozza 2016.)

Figure 1.4. Examples of typical Oneota chipped stone tools. (Sterner 2018)

Diverse archaeobotanical and archeozoological data from Oneota groups indicate that a wide variety of subsistence resources from multiple ecological zones were exploited, along with a heavy reliance on maize (Arzigian 1989, 2000; Arzigian and Boszhardt 1989; Brown and Asch 1990; Edwards 2010, 2017, 2020b; Edwards et al. 2017; Egan-Bruhy 2014; Emerson et al. 2010; Hunter 2002; Olsen 2003; Overstreet 1976, 1995, 1997, 2000; Styles and White 1995; Theler 1989; Tiffany 1998; Tubbs and O'Gorman 2005; Van de Pas et al 2015). Oneota village sites, while regionally variable, were generally semi-permanent or permanent habitations with constructions consisting of long houses, sub-rectangular post hole structures, or rectangular trench wall structures (Hall 1962; Hollinger 1995; Sterner and Jeske 2017; McKusick 1973; Moss 2010; O'Gorman 1995; Overstreet 1997; Sterner 2018).

THE LAKE KOSHKONONG LOCALITY

Out of the several Wisconsin Oneota localities, the Lake Koshkonong locality draws attention due to its tightly concentrated position in southwestern corner of Jefferson County (Overstreet 1997) (Figure 1.5). With approximately 70 km separating it from other surrounding localities (Jeske 2020, Sterner 2018), the cluster of Oneota sites surrounding Lake Koshkonong appears to be spatially isolated from contemporaneous Oneota settlements but within close proximity of Middle Mississippian Aztalan (47JE0001) (Jeske 2020).

The unique spatial placement of the Lake Koshkonong locality combined with osteological evidence of violence (Jeske 2014, 2020) has prompted research regarding inter-site and locality interaction, violence, and subsistence based on the excavations and survey at sites including Crescent Bay Hunt Club (47JE0904) (CBHC), Crab Apple Point (47JE0093), Carcajou Point (47JE0002), and Schmeling (47JE0833) within the past few years (Carpiaux 2018; Edwards 2010, 2017, 2020a, 2020b; Edwards and Jeske 2015, Edwards et al 2017; Foley

Winkler 2004, 2006, 2008, 2011; Jeske 2001, 2003b, 2017, 2020; Jeske et al 2003; Jeske and Winkler 2008; Karsten, et al 2019; McTavish 2019; Musil 1987 ; Schneider 2015, Sterner 2012, 2014, 2018, 2020; Stout and Skavlem 1908; Wilson 2015; Winkler 2004, 2011).

According to Jeske et al. (2020:9-14):

> Lake Koshkonong is a large, shallow impoundment of the Rock River… Covering 43 km2, it is the eighth largest lake in Wisconsin, but it is very shallow, with a mean depth of only 1.5 m and a maximum depth of roughly 2 m, although in past times portions of the lake were deeper (Lapham 1855:34)…It is underlaid by loess and calcareous glacial till of varying thicknesses but averaging approximately 100 m (Alhakimi 2002; Black et al. 1970)… Overall, the region is poor in exposures of lithic raw material. Several small outcrops of limestone and dolomites are exposed along the western shore of Lake Koshkonong, and there is an exposure of Waterloo quartzite 20 km north. A number of small outcrops exposing members of the Galena, Platteville, and Oneota Formations are located 40–60 km to the west, southwest, and northwest (Ostrom 1970, 1978). Maquoketa shale and Niagaran limestone outcrop in small areas 70 km to the northeast (Allen 1980; Stieglitz and Allen 1980; Young and Batten 1980)… On the west, a long limestone ridge rises 8 m above the marshes and shoreline of the lake, although the rock is only exposed in a few places…The presettlement vegetation of the region was a mixed set of environments and ecological zones. Significant areas of wetlands surrounded the lake, prairie dominated as one moved west, and mixed deciduous forests were interspersed with oak savanna across the landscape. Accessible plant resources included wild rice, bulrush, cattail, acorns, hickory and hazel nuts, numerous greens and seed-bearing plants such as chenopodium, and a wide variety of fruits. Significant areas of the region are well suited to maize, squash, and bean agricultural production. Animal resources included deer, elk, bison, raccoon, squirrel, otter, muskrat, and other mammals; waterfowl, passerines, and other birds; and multiple species of turtles, amphibians, fish, and small reptiles (Edwards 2010, 2017; Goldstein and Kind 1983; Jeske 1999a; Jeske and Hunter 2000).

The Schmeling site lies approximately 300 meters west of the marsh that borders Lake Koshkonong (Figure 1.5) (Edwards 2010, Foley Winkler 2011, Jeske et al 2003; Jeske 2020; Jeske et al 2020; Jeske and Winkler 2008; Sterner 2018). This site will be described in more detail in the next chapter.

Similarly fortified by the same limestone ridge, the Crescent Bay Hunt Club site (CBHC) lies approximately 150 meters south of the Schmeling site with a steep ravine providing a natural division between the two contemporaneous habitations (Figure 1.5). CBHC was excavated by the students and staff of the UWM Archaeological Field School for 10 field seasons between 1998-2017 (Jeske et al. 2020). The site had been under cultivation since the mid-19th century, and was reported upon by Stout and Skavlem (1908). The site has been a land

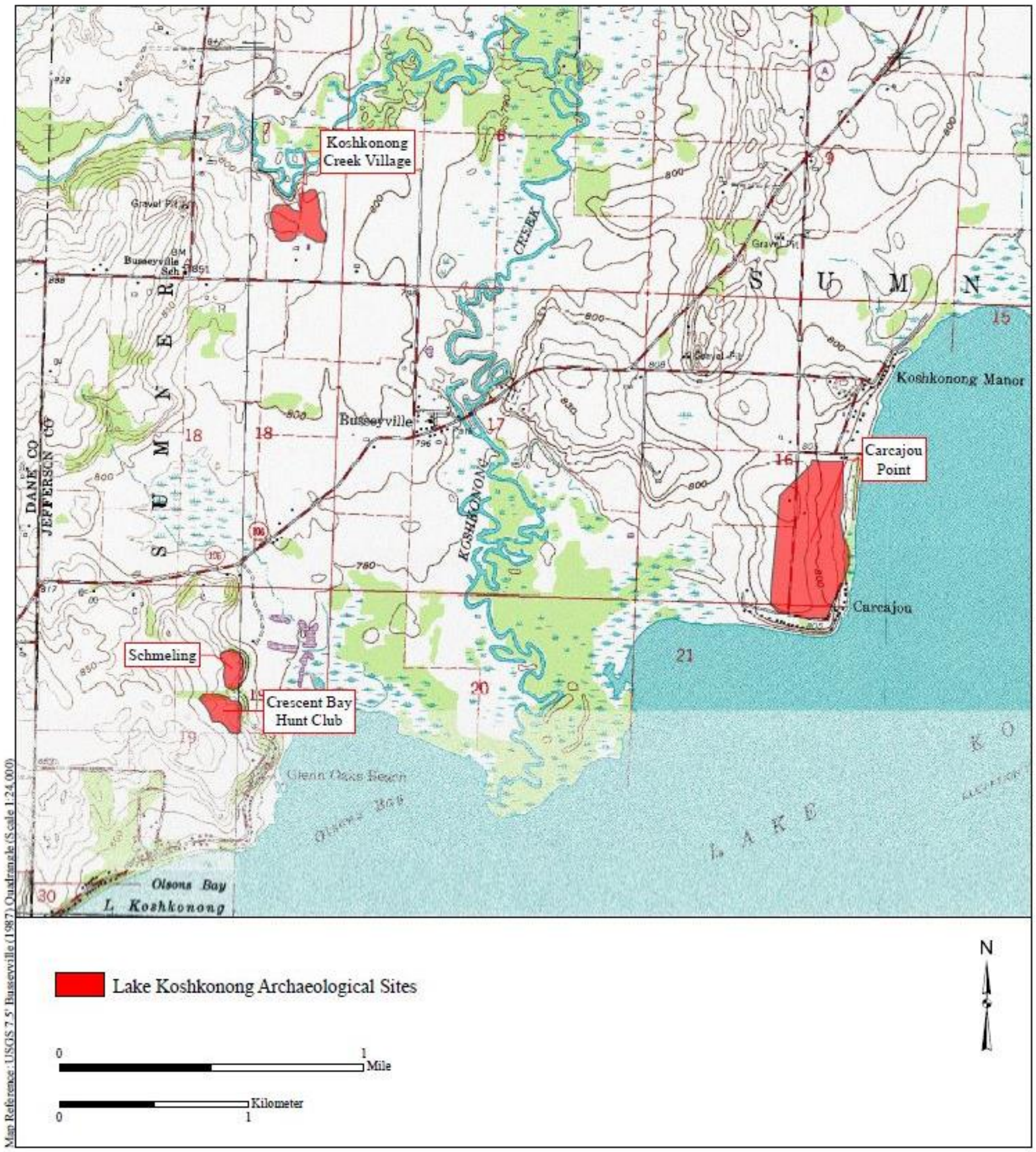


Figure 1.5. Location of Oneota sites along Lake Koshkonong

preserve and hunt club with a few small lawns and cultivated areas since 1941. Most of the landscape is now forested stands with prairie/wetland/savanna environments. After removing the former plowzone, features were clearly definable. Most features were bisected by a trench, with one half screened through 6.3mm mesh and the other half taken for flotation (Jeske 2000).

Data from multiple sources indicate that occupation at CBHC began circa A.D. 1100 and ended circa A.D. 1430 (Jeske et al. 2020). The site appears to have been occupied continuously, or in regular cycles, as a village. There are both wigwam style and longhouse structures around a plaza as well as over 600 features, including postmolds, pits, and hearths. The site does not appear to have a formal, organized area for burials, but there are a number of individuals interred within and around houses, or scattered as isolated bone within pit features (Foley Winkler 2004, 2011). Approximately 36% of individuals exhibit some form of evidence for interpersonal violence (Jeske 2020). A total of 539 chipped stone tools and 3,453 pieces of debitage were examined from this site (Sterner 2018).

Approximately 2.5 km north of the Schmeling site lies the Koshkonong Creek Village site (KCV) which is situated on a bluff above a small tributary of the Rock River (Figure 1.5). The Koshkonong Creek Village site was surveyed and excavated by UWM Archaeological Field School students and staff for six field seasons between 2008-2017 (Carpiaux 2018; Edwards 2017). Originally identified by Stout and Skavlem (1908), the site boundaries were clarified by pedestrian survey within a cultivated field, and shovel probes along wooded areas near Koshkonong Creek. Several blocks were excavated in an area of near-exclusive Oneota ceramic distribution. As at CBHC, once the plowzone was removed, features were clearly definable (Carpiaux 2018). The site contained a high density of large pits, post molds indicating subrectangular structures, and hearth features. KCV is considered a village or habitation site and was occupied from as early as ca A.D. 1100 (Jeske et al 2020). A total of 425 chipped stone tools and 1,916 pieces of debitage were examined (Doyle 2021;Sterner 2018;Wilson 2016).

The final site included within this Koshkonong comparison is Carcajou Point. Carcajou Point is located approximately 3.5 km northeast of the Schmeling site on a terrace overlooking the marshy shore of Lake Koshkonong (Figure 1.5). The Carcajou Point site is largely composed of cultivated areas except for partially covered by residential lots bordering the shore, and partially by agricultural fields inland (Hall 1962).

The site contains Paleoindian, Archaic, Woodland, Oneota and Historic HoChunk (aka Winnebago) occupations (Hall 1962; Jeske et al. 2002; Richards et al.1998; Rosebrough and Broihahn 2005; Winkler 2004, 2011). A total of 21 tools and 451 pieces of debitage were examined from this site (Sterner 2018). The site has been investigated by many archaeologists, with very different methods of excavation and analyses (e.g., Gaff 1998; Goldstein 1994; Hall 1962; Jeske et al 2002; Richards et al. 1997; Rosebrough and Broihahn 2005). Because of this variation, the data from Carcajou Point will not be included in the statistical analysis but will be included for discussion purposes in the Results chapter.

After over 20 years of excavation and analyses, the University of Wisconsin–Milwaukee faculty and students have produced a framework for understanding the Lake Koshkonong locality. This framework has made it possible to contextualize individual sites as well as make intersite and inter-locality comparisons possible (Carpiaux 2018; Edwards 2010, 2017, 2020a; Edwards and Jeske 2015, Edwards et al 2017; Foley Winkler 2006, 2008, 2011; Jeske 2001, 2003b, 2017, 2020; Jeske et al 2003, 2020; Jeske and Winkler 2008; Karsten, et al 2019; McTavish 2019, 2020; Schneider 2015, Sterner 2012, 2014; Sterner 2018, 2020; Wilson 2015; Winkler 2004, 2011). This analysis of the Schmeling site will investigate the lithic economy of people who lived near Lake Koshkonong during the 13th-15th centuries and seek to contribute meaningfully to this extensive, long-term research program.

The primary purpose of the present analysis is to determine the way in which lithic tools were used by inhabitants of this site and interpret the economic decisions essential in structuring the Schmeling lithic assemblage composition. Schmeling, Crescent Bay Hunt Club, Koshkonong Creek Village, and Carcajou Point were all originally interpreted as villages or at the very least seasonally occupied habitation sites by the range of artifacts recovered (Carpiaux 2018; Edwards 2010; Foley-Winkler 2010, Hall 1962, Jeske et al 2020; Richards et al.1998, Schneider 2015, Sterner 2012, 2018). Through this reassessment, the Schmeling assemblage can also be utilized to (1) determine if this is an accurate representation, (2) interpret the site's function within the surrounding cultural landscape, and (3) discern if any patterns within the lithic economies emerge between communities.

CHAPTER 2: THE SCHMELING SITE (47JE833)

The Schmeling site was originally recorded in a survey conducted by Stout and Skavlem in 1908 and was re-recorded by UW-Milwaukee in 1987 following a survey of the Lake Koshkonong region by the Southeast Wisconsin Archaeology Program (Musil 1987; Stout and Skavlem 1908). The site is largely contained within a modern agricultural field; most artifacts from the site have been exposed to significant amounts of soil erosion and farming activity (Figure 2.1). However, a portion of the site lies within a wooded section immediately adjacent to the limestone bluff on the north and eastern flanks of the site. Although the currently wooded area has previously been plowed, it has seen much less disturbance than the fields still in agricultural production.

The site sits on well-drained high ground around the head of small drainage, which affords excellent views down the ridge toward the lake to the south, east, and northeast, as well as across the rolling upland topography to the west. Following the trend of other Lake Koshkonong Oneota sites, the Schmeling site is situated at the apex of several ecotones that maximize the potential for resource extraction (see Figure 2.2) (Edwards 2010; Goldstein and Kind 1987). The richness of resources, particularly in terms of arable land and aquatic proximity, is not relied upon solely by the occupants of the Schmeling site. Several other Oneota habitations dot the landscape within close proximity to this desirable, subsistence-rich environment.

Figure 2.1. Location of the Schmeling site (Edwards 2010)

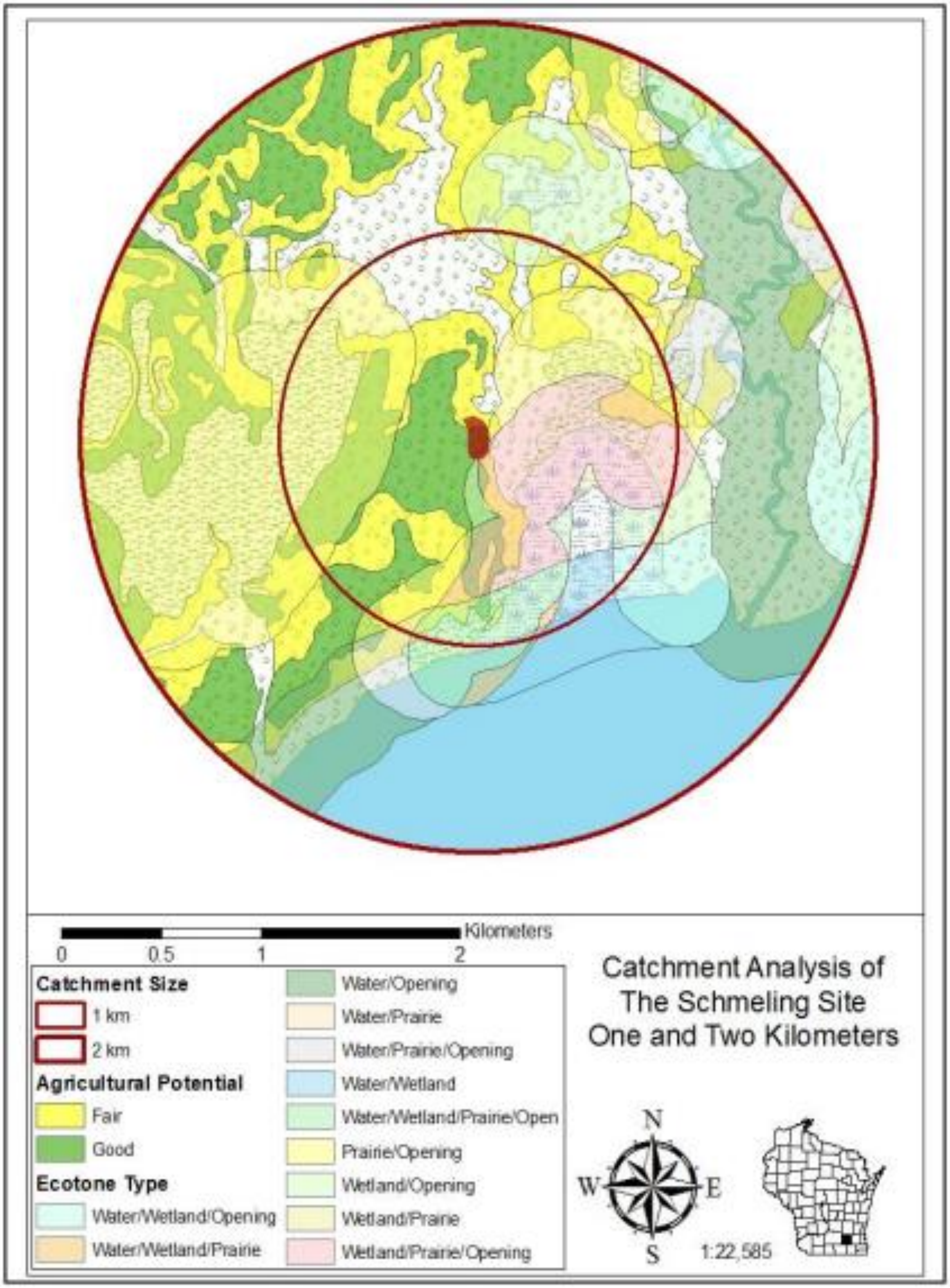


Figure 2.2. Catchment analysis of the Schmeling site (Edwards 2010)

RESEARCH HISTORY

Mr. Kevin Schmeling has been recovering artifacts for over 60 years on the property and has found materials representing Paleoindian, Middle Archaic, Late Archaic, Late Woodland, Oneota, and Historic occupations (Foley Winkler 2011; Jeske and Winkler 2008). His collection, and more recent systematic UWM surveys, demonstrate that the site is stratified horizontally. The Paleoindian component appears to be a cache of a least 13 Clovis points discovered at the western edge of the site, at the head of the draw that divides the Schmeling site from CBHC. In the extreme northeast corner of the site, which was removed by quarrying of limestone in the 1960s, there was a concentration of 18th-19th century Euro-American materials. Nearly all of the cultural material from excavated contexts is identified as Oneota, but there is also a small number of Middle and Late Woodland ceramics, primarily from the agricultural field (Schneider 2015).

The Schmeling site was surveyed and excavated by archaeologists and students during two seasons of field schools from the University of Wisconsin-Milwaukee. There were four general areas of recovery from the site; the agricultural field, the northern wooded field edge, eastern wooded field edge, and southern wooded field edge. Shovel testing was conducted within the forested portions bordering the field. Pedestrian survey took place within the field of recently planted corn with 90% visibility and was divided into northern and southern halves.

Recovery from the southern edge of the field yielded very little in terms of cultural material but the underlying soil demonstrated the erosional activity of the nearby ravine. Within the field, two areas of artifact concentration were identified; Concentration A and Concentration B. Excavation units were placed near these concentrations and adjacent to the positive shovel tests within the northern wooded field edge (see Figure 2.3).

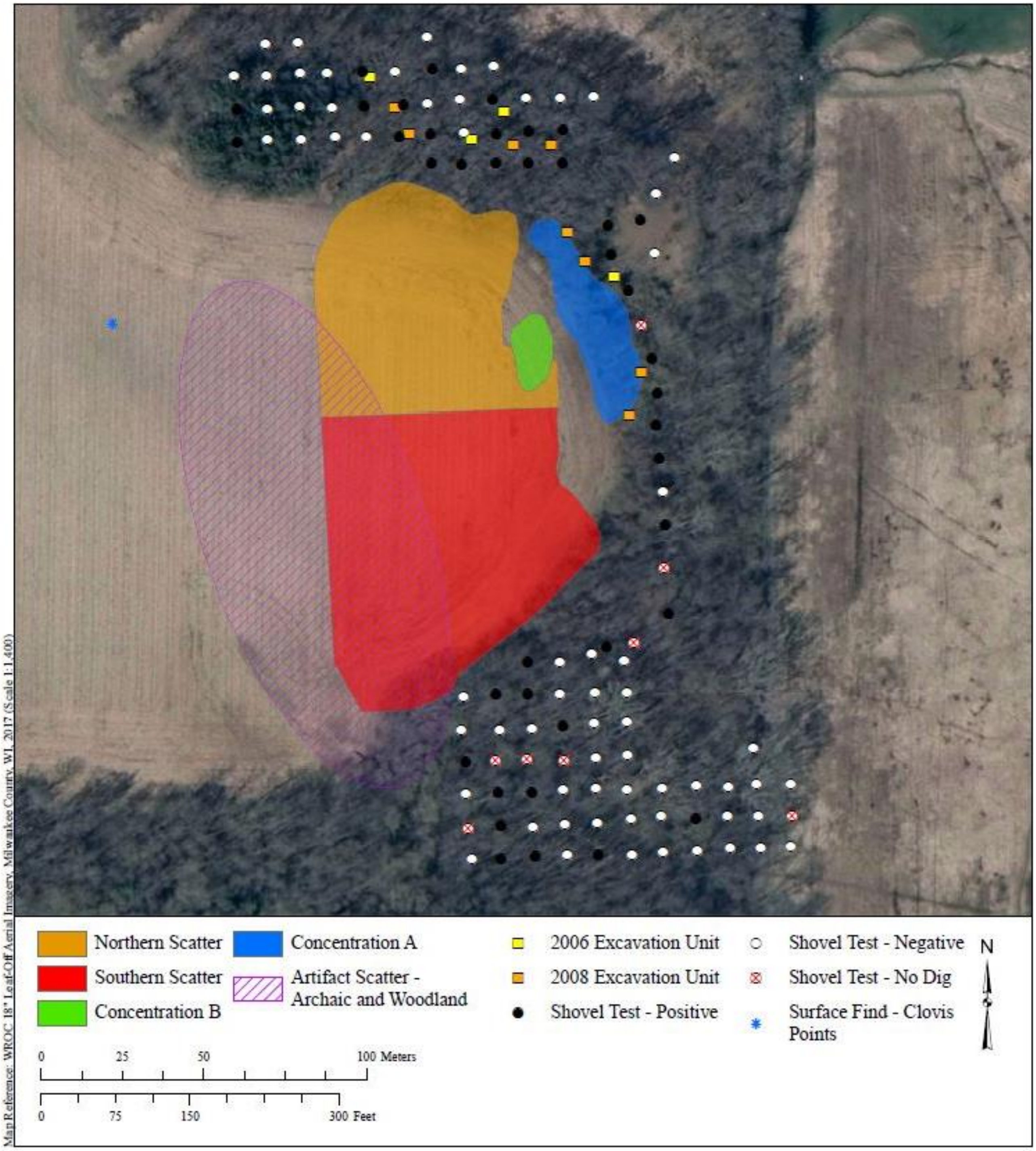


Figure 2.3. Artifact distribution from survey and location of excavations units at the Schmeling site.

The results of the 2006 excavations uncovered a series of prehistoric features containing well-preserved faunal remains, Oneota ceramics (Figure 2.5, Figure 2.6), and three human bundle burials (Figure 2.7) (Foley Winkler 2008, 2011). Faunal remains include deer, rodents, fish, shell, and possible elk (Foley Winkler 2011). Human remains were recorded on-site following consultation with the Wisconsin Historical Society Burial Office in compliance with WS 157.70 and subsequently reburied in place. The burials were in extremely shallow pit features and all three are appeared to be associated with the Oneota occupation of the site.

Figure 2.4. Edgerton Punctate pot from Schmeling excavation (Schneider 2015)

During the 2008 field season, four additional excavation units were added (see Figure 2.4) (Edwards 2010; Foley Winkler 2006, 2008; Schneider 2015). Two features were identified immediately adjacent to the plowed field approximately 100 meters southeast from the burial area. These pits appear to be similar to features at CBHC that are interpreted as wild rice threshing pits that were subsequently filled with fish and shell refuse. Unfortunately, deflation by previous plowing has left only the bottom 20cm of these features at Schmeling (Foley Winkler 2008).

Figure 2.5. Profile of Pit Feature F06-06.

Figure 2.6. Profile of Pit Feature F08-01.

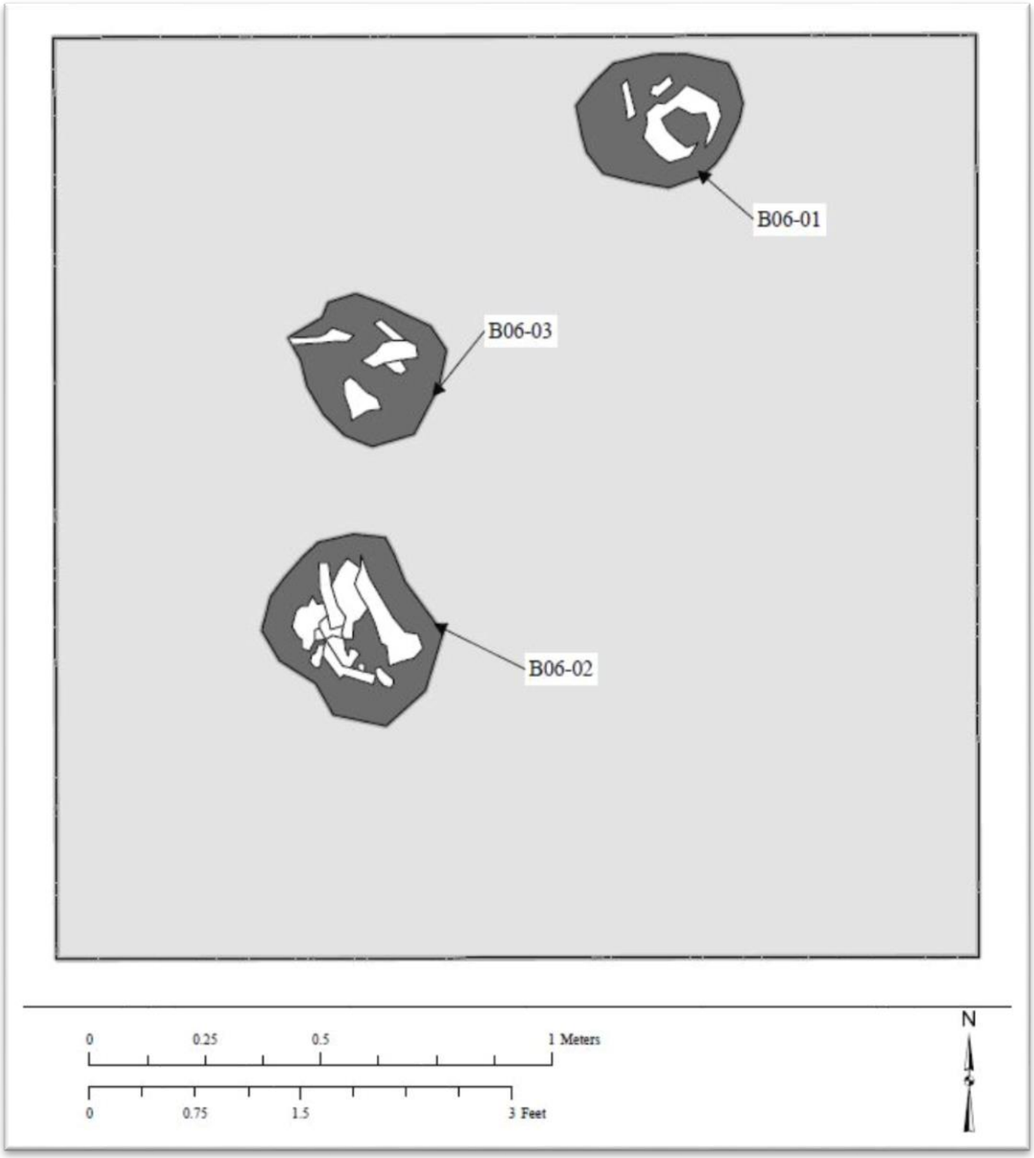


Figure 2.7. Distribution of the Human Remains from Unit 06-01 (adapted from Foley Winkler 2011)

In addition to the materials found within the feature excavations, numerous artifacts stylistically typical of Oneota occupation were collected from the site. These artifacts included lithic debris, formal and informal stone tools, and numerous decorated and undecorated shell tempered ceramics. Of the ceramics collected from the site, several styles of ceramics were identified, including Grand River Plain, Busseyville Grooved Paddle, and Carcajou Plain

(Schneider 2015). Charred food residue from the interiors of a Grand River vessel and two Carcajou ware vessels produced three radiocarbon dates that, when calibrated, yielded a pooled mean date of occupation for the site of A.D. 1235-1295 (two-sigma) (see Table 2.1) (Foley Winkler 2008; Jeske et al. 2020). Floral and faunal remains were also recovered from flotation samples. The diverse concentration of fauna, ceramics, and lithics provided the basis for the original operating hypothesis that the Schmeling site functioned as a village or habitation site placed strategically within the landscape to take advantage of ecotones and, in effect, mirror Crescent Bay Hunt Club (Edwards 2010, Foley-Winkler 2011, Schneider 2015, Sterner 2018).

Table 2.1. Radiocarbon Dates of Lake Koshkonong Sites (Jeske et al 2020)

Site Number	Site Name	Material	Age BP	Error Term	1σ AD	%	2σ AD	%	Reference
47JE833	Schmeling	Residue	670	20	1284-1299	65%	1279-1310	59%	Jeske et al 2020
					1369-1380	35%	1360-1387	41%	
47JE833	Schmeling	Residue	765	15	1257-1273	100%	1224-1234	6%	Richards and Jeske 2015
							1242-1278	94%	
47JE833	Schmeling	Residue	785	20	1224-1234	28%	1220-1271	100%	Richards and Jeske 2015
					1242-1265	72%			

SITE INTERPRETATION

Although no structures were documented during excavations, a dark oval stain within the agricultural field, the concentration of artifacts along the northern wooded field edge, and the presence of burials have prompted the Schmeling site to be interpreted as a village or multi-seasonal habitation (e.g., Foley-Winkler 2006, Jeske et al 2020, Sterner 2018). Lithic tools and pottery similar to CBHC have solidified this conclusion. However, recent conclusions produced by McTavish (2019) have suggested that the faunal remains recovered from the Schmeling site could be indicative of a mortuary precinct. According to McTavish (2019:195):

> The Schmeling assemblage has an even species distribution, among a varied range of animals, more so than any year-round village site. The assemblage is also very highly fragmented and shows the highest amount of thermal alteration - specifically calcination within the locality. The species present are the same as those recovered from villages but are not deposited or processed in the same manner. The uselife of these resources and the actual food consumed at the site shows a different series of habitual behaviors than a typical Koshkonong Oneota village. Furthermore, Schmeling has a disproportionately large number of fawns. While the species is not atypical, their age makes them atypical fauna. So, as expected for a cemetery/mortuary site, Schmeling has a relatively high species richness, but its composition is different than the general diet (exemplified by village assemblages). There is a much higher proportion of fish at Schmeling compared with CBHC and KCV. Further, the Schmeling site shows a higher emphasis on fawns and yearlings with no evidence of prime-age deer.

McTavish suggests that the Schmeling site served a distinct purpose for the people living around Lake Koshkonong. Mortuary camps and burial sites tend to have a very narrow range of activities that take place within them such as mound building, burial/interment, ancestor veneration, and feeding those performing mortuary activities (Styles and Purdue 1991). If the Schmeling site was a mortuary area, the lithic assemblage would to reflect the parameters these cultural activities set upon economic choice and manufacture strategy and mirror McTavish's results. While the accepted levels of return for investment will not be uniform in all aspects of cultural activity, ceremonial or ritual activities are likely to have higher acceptable levels of energy expenditure than daily chores and should be distinctive when compared against a village site (Jeske 1987).

Jeske (1987) was able to document differences in lithic procurement, use, and discard between the Late Woodland Kuhlman Mounds and nearby Deer Track habitation sites in West-Central Illinois. In examining lithics deposited within a midden vs. burial mounds at the Ohio Hopewell Mound City site, Jeske (1989) was also able to demonstrate that economical and functional differences could be distinguished between the two contexts. Modeling these comparisons, if Schmeling is a mortuary precinct, the lithics may be expected to differ from the materials present at a village site such as CBHC.

It should be noted that non-uniform burial programs are common within southern Wisconsin, as demonstrated by the CBHC and KCV sites, where the dead are intermingled within the village structures. Given this fluidity, it may be difficult to clearly define the Schmeling site as either a habitation or mortuary site (Charles 1995; Emerson and Hargrave 2000; Foley Winkler 2011; Goldstein and Richards 1991; Jeske 2014; Milner et al. 1991; O'Gorman 2001; Sterner and Jeske 2017).

If the activities taking place within the site are of a mortuary nature, these would most likely be relatively short episodes of use in which manufacturing of tools would be infrequent and/or unlikely. In keeping with this, the expectation for the Schmeling site would be little evidence for the initial stages of manufacturing and more likely that the presence of formal tools or tools with a high energy input would dominate the assemblage.

Without being able to fully know the context in which economical selections were being made regarding mortuary procedure, it seems we can generally expect tools associated with ritual or funerary activities to allow for a higher level of acceptable cost for raw material and that tools manufactured on local and/or poor-quality materials would be more expediently discarded. Since good quality materials allow for more refinement, tools from the Schmeling site would be likely to appear more standardized or formalized. We might expect these tools to be utilized extensively, resulting in a difference in the amount of use-wear. Additionally, we expect that tools manufactured on good quality chert would be recycled and/or used until broken more often than tools manufactured on poor quality materials. However, it also possible that given the relatively short episodes of use associated with funerary activities, reworked or broken tools may be absent within the site's assemblage.

As noted previously, Koshkonong appears to be spatially isolated from other Oneota settlements but within close proximity of the contemporaneous Middle Mississippian occupation at the Aztalan site (47JE0001) (Jeske 2020). The placement of the Lake Koshkonong locality combined with osteological evidence of violence (Jeske 2014, 2020) could also require a reliance on poorer quality local materials as a result of avoiding interpersonal conflict. The presence of any high-quality material or materials that required long-distance travel or exchange could be indicative of the cultural importance the resulting tool held within the site or community. Even materials that we may think are not located far away may have been considered relatively expensive–or even risky– by the sites' occupants when contextualized within the increasing violence across the landscape. If greater effort was expected to be expended in funerary activities, that expectation may have been achievable with less distant materials than in generations past.

CHAPTER 3: METHODOLOGY

The analysis here combines several approaches to understanding stone tools, including economic, morpho-functional, and microwear, to investigate the role of lithic technology in fulfilling a group's diverse social and physical needs. Binford's concept of curation (Binford 1977, 1979) has often provided a foundation for the theoretical framework of lithic research. By examining the different modes of procurement, manufacture, use, and discard of tools in correlation with mobility patterns, changing social organization, and/or environmental factors, the context in which the lithic assemblage was generated can be identified (Bamforth 1986, 1991; Goodyear 1993; Lurie 1989; Shott 1996).

Economical choices regarding time and energy allocation can be deciphered from the level of expediency within the lithic assemblage. Expedient technologies are centered on the immediate task, while formally distinct and/or technological sophisticated tools suggest the anticipation of activity and the allowance for a higher accepted level of effort in material procurement and manufacture. Expedient tools are also manufactured in association with the activity taking place, resulting in tools and debris that provide insight to specific tasks and inferences about the spatial organization of activity within a site. Curated toolkits are likely to experience longer use-lives, and may not be deposited at their place of manufacture and use. Recognizing the differences between expedient and curated tools is crucial for understanding the role of technology in people's lives.

We also know that assigning tool function based solely on form can be misleading since repair, reuse, and recycling often obscure tool function (e.g., Barton 1990; Flenniken and

Raymond 1986; Hardy et al. 2008; Jeske 1987, 1989; Jeske and Sterner-Miller 2015; Sterner 2012, 2014, 2018; Sterner and Jeske 2017; Vierra 1975; Walker 1978). As Tringham points out:

> The most important principle to remember when dealing with the function of prehistoric chipped stone implements (or bone and polished stone implements for that matter), is that an implement which looks, on the basis of ethnographic parallels of its shape, as though it should have had a certain function need not necessarily have had that function. (Tringham 1971:143)

In order to capture the dynamic use-life of both curated and expedient tools, functional interpretation must be framed within the context of mobility, environment, and societal structure. Oneota groups in southern Wisconsin were positioned within a period of increased pressure from both physical and social environmental factors, including the Little Ice Age, and a rise in violent social interactions (Baerreis and Bryson 1965; Baerreis et al. 1976; Edwards 2020a; Griffin 1960; Jeske and Sterner-Miller 2015; Jeske et al 2020; Kuznar and Jeske 2006; Milner 2007; Milner et al. 1991; VanDerwarker and Wilson 2016). The effects of these conditions may have forced some groups to significantly modify their subsistence regimes, mobility patterns, and group organization, resulting in systemic changes to their everyday life.

With these factors in mind, to accurately portray the functional variation within the toolkits at Schmeling, this analysis will apply several avenues of investigation meant to gain a clearer understanding of the "economic-oriented variables [that] can be used to explore the relationship between social organization and technology" (Jeske 1987:9). Research conducted by Jeske and Sterner has shown that through assemblage-based analyses of raw materials, manufacturing techniques, tools, and debitage; low- and high-power microscopy; and chemical analysis, inferences can be made about the toolkit of southern Wisconsin Oneota groups in relation to these factors. Their multipronged approach to Oneota lithic analysis has demonstrated that there is a repeated pattern in lithic-resource acquisition, tool production, and tool use (Jeske 2003c, Jeske et al 2020; Jeske and Sterner-Miller 2015; Sterner 2012, 2014, 2018; Sterner-Miller and Jeske 2017; Wilson 2016). Specifically, within the Lake Koshkonong locality, the strong preference for crude/expedient tool types created from local raw materials suggests that 1) there was an abundance of readily available resources; 2) stone tools no longer held societal importance seen in earlier societies, and/or; 3) social or environmental risk was high enough to discourage acquiring higher quality or non-local materials. The conclusions Jeske and Sterner have put forth provide a base-line assumption for the lithic economy at the Schmeling site and will be the driving line of inquiry for the mass analysis of the assemblage.

A key piece of this research will revolve around the macro and micro analysis of the assemblage's tools and will involve a similar line of inquiry to the debitage. Given that the bulk of the formal tool types recovered from southeastern Wisconsin Oneota sites are typically limited to triangular hafted bifaces (aka Madison points), small, steep-edged unifacial pieces (usually thought of as scrapers), and debitage that has been modified and/or used only on their edges, it seems reasonable to expect that the Schmeling lithics will exhibit artifacts that reflect a largely expedient and energy efficient tool kit (Lambert 2001; O'Gorman 1995; Overstreet 1997, Sterner 2012, 2018, 2020). Therefore, utilized or edge-only, unifacial, and bifacial tools that are composed of local, poor quality materials should make up the bulk of the Schmeling assemblage. Based off the inferences formed in considering the Schmeling debitage, the source location and general quality of raw materials of the tools should demonstrate a similar correlation to the debitage for the presence of heat treatment, cortex, and bipolar reduction. The presence of broken artifacts and any evidence of reuse, reworking, and/or recycling will also be recorded in order to assess if any additional energy efficient economic strategies are being used at the site.

ASSEMBLAGE BASED APPROACH

In order to answer broad questions about Oneota lithic economies, multiple lines of evidence are used. An assemblage-based analysis using an updated analysis of Lurie and Jeske 1990 will be applied to the Schmeling assemblage in order to gather a comprehensive inventory of both functional and morphological traits. Through functional analysis, the characteristics of production, physical use, and discard of a tool can be considered more carefully for the complex contextual impacts of climate, subsistence, inter- and intragroup relationships, ideology, and other cultural nuances (Binford 1962).

Debitage data was recorded under the guidelines of Jeske and Lurie's Mass Analysis Schema for Debitage (Appendix B). Mass analysis is a technique designed to record data by processing large amounts of debitage quickly. This method is preferred in comparison to an individual analysis which requires a considerably longer amount of time to inspect a broader list of categories (Odell 2004:121). Stone tools will be assessed following Jeske and Lurie's Lithic Schema and Documentation for Stone Tools (Appendix A). In this study, tools were defined as any piece of stone that showed evidence of modification by humans.

MASS ANALYSIS OF LITHIC DEBITAGE

Analysis of the lithic material from the 2006 and 2008 excavations at the Schmeling site began with a mass analysis of all lithic debitage. All debitage was removed from their original field bag and was re-bagged separately according to year and provenience. Then the contents of each bag underwent an initial macroscopic separation in which tools were identified by evidence of chipping, battering, and/or use-wear and then set aside for further examination. The remaining contents of each bag were then divided into three categories: flake, flake-like, or non-flake. Flake were identified as having a striking platform, a bulb of percussion, and a clear termination. Flake-like pieces were identified as having at least one of these features but not all of them. Non-flake pieces have none of these features but exhibit evidence of cultural modification like heat-treatment.

Once divided by debitage type, the type was placed in one of four size grades: less than 8 mm, 8 to 12.5 mm, 12.5 to 25 mm, or greater than 25 mm and a count was recorded for each size. Following the record of count and size grade, the debitage was weighed on an Ohaus Scout Pro Portable Digital Balance and recorded in grams. The presence of cortex and evidence of heat treatment were recorded as additional variables. Data for each variable was entered into a Microsoft Excel Database.

If the Schmeling site was permanently occupied it can be assumed that the types of debitage present would most likely be small size grade flakes related to later-stage tool production and maintenance. However, since modified flakes are a favored utilization, their manufacture could increase the presence of non-flakes as a result. As knapping is a reductive process, recording the size grade of the Schmeling debitage is crucial to determine the phases of production that took place within the site. A high percentage of larger debitage at a site could imply that the lithic assemblage was in the earlier stages of reduction perhaps reflecting seasonal expediency. Smaller size grade debitage, on the other hand, suggest refined reduction indicative of a long-term occupation with a curation of tools and/or resources.

Previous research has indicated that local raw materials dominate Oneota assemblages (Gibbon 1986; Jeske 1992, 2003c; Jeske et al 2020; Jeske and Sterner-Miller 2015; O'Gorman

1995; Overstreet 1997; Overstreet and Richards 1992; Rosebrough and Broihahn 2005, Sterner 2012, 2014, Sterner 2018, 2020; Sterner and Jeske 2017; Wilson 2016). If the inhabitants of Schmeling followed the trend of other nearby Oneota sites, it is very likely that the raw materials used will be poor to fair quality cobbles of local chert. A high percentage of cortex present suggests that raw materials were brought to the site in rough cobble form with little modification prior to lithic reduction at the site. However, a low percentage of cortex would imply that lithic production was taking place prior to arrival at the site.

If the inhabitants of the Schmeling site used local, poor materials then there is likely to be a high prevalence of heat treatment and bipolar reduction seen the assemblage. Debitage and tools that have undergone the process of heat alteration make them more amenable to knapping and require less energy to be expended in the pursuit of higher quality materials (Andrefsky 2005; Rick 1978). While bipolar production is often associated with the production of flakes from small pieces of chert and is considered a particularly energetically efficient mode of production as it removes more flakes at one time than free-hand reduction cobbles (Jeske 1992; Jeske and Lurie 1993; Overstreet 1997). If the Schmeling site exhibits a high prevalence of heat treatment and bipolar production it suggests that the inhabitants are focused on energetically efficient methods of tool production. These manufacturing techniques could reflect poor quality raw materials that require more effort to produce useable tools but could also reflect the energy allowances associated with mortuary ritual.

LITHIC SCHEMA AND DOCUMENTATION FOR STONE TOOLS

Tools were subjected to a comprehensive macroscopic analysis for the purpose developing a greater understanding of the economy in place at the site. Pieces that showed evidence of modification was initially separated from the debitage sample and then examined for 27 variables (Appendix A). For the purposes of this study, a tool was defined as an artifact with at least three contiguous flakes (from use or intentional retouch) inferred to represent a functional unit (Knudsen 1973). Following the designation of a piece as a tool, these pieces were then labeled with their provenience and assigned a tool number. Tools were then examined to determine the raw material type used in production, the quality of the material, the amount of cortex present, and the presence/absence of heat alteration. Raw material type and quality was established using comparative samples from the UWM laboratory collection. Inclusions, fossils and grain size were utilized to determine quality and eliminate material types. Cortex was recorded in staggered percentages to represent the amount of patina present. The presence or absence of heat treatment was compared to the UWM Archaeological Research Lab reference collection was recorded based on the following variables: luster contrast, degree of luster, heat fracture scars, conchoidal ripples, and changes in color (Rick 1978).

Tools were then examined for their methods of manufacture and basic morphology. Basic forms were assigned as follows; edge or functional unit only, unifacial, bifacial, multifacial, nonfacial, prismatic blade or bladelet, or unknown. The most likely manufacturing process – free hand or bipolar- was assigned to each tool type and any modification to the edge(s) or body of the tool was recorded. Then the level of energy input (or craftmanship) of the tool was scored for as refinement.

Once the basic composition of the tool was recorded, the condition of the tool and its usewear history was compiled by examining the completeness of the functional unit. Any reworking, re-sharpening, or abrupt changes in shape were recorded. The distal end of the tool was also examined in order to identify blunt, pointed, or indeterminable morphology. Evidence of obvious intentional hafting on the tool was also recorded as well as clearly defined projections.

Several variables relating to the dimensions of the tool were recorded. The number of edges and their respective angles were noted as well as their configuration; smooth, serrated, denticulate, notched, or not applicable. Additionally, metric measurements of length, width, thickness, and weight were taken unless the tool was considered broken. Once all attributes were examined detailed notes regarding each tool were recorded and a traditional morphofunctional typology was assigned.

A key piece of this research revolved around the macro and micro analysis of the assemblage's tools. Given that the bulk of the formal tool types recovered from southeastern Wisconsin Oneota sites are typically limited to triangular or Madison points, small scrapers, and modified or unmodified pieces, it seems a safe bet to hypothesis that the Schmeling lithics should exhibit artifacts that reflect a largely expedient and energy efficient tool kit (Lambert 2001; O'Gorman 1995; Overstreet 1997, Sterner 2012, 2018, 2020). Therefore, utilized or edge-only, unifacial, and bifacial tools that are composed of local, poor quality materials should reign supreme within the Schmeling site. Based off the assumptions formed in considering the Schmeling debitage, the source location and general quality of raw materials of the tools should demonstrate a similar correlation to the debitage for the presence of heat treatment, cortex, and bipolar reduction. The presence of broken artifacts and any evidence of reuse, reworking, and/or recycling were also recorded in order to determine if any additional energetically efficient and/or economizing strategies are being used at the site.

MICROSCOPIC METHODS OF ANALYSIS

Lithic use-wear analysis allows for an examination of the relationship between artifact and activity; it builds a bridge between the behaviors of a site's inhabitants to the function of their stone tools (Bamforth 1986; Kamminga 1982; Keeley 1980; Odell 1977, 1981, 1986; Rau 1869; Spurrell 1892, Vaughn 1985). The microscopic abrasions on the surface of an object like micropolish, striations, microchipping, and rounding are compared to experimental and ethnographic tools of known function to infer the motion in which an artifact was employed and what materials it came in contact with. In order to truly understand the dynamic use life of the Schmeling lithics, executing a suitable microscopic analysis is crucial to this research.

By identifying the appearance and spread of polish along utilized edges, alongside the presence of rounding, chipping, and striations, the type of contact material can be approximated (see Figure 3.1). In this analysis, attributing the hardness of a contact material will be determined following the flowchart Sterner (2018) used in her analysis. Traces of hard, medium and soft substances accrue incrementally, allowing for ambiguous polishes to develop. Generic weak polish can be the initial traces of virtually any substance, but smooth pitted is an intermediate stage of polish developed from contact with hard substances like wood, bone or antler. Since tools can be used against multiple surfaces, a gradient of soft through hard is used to allow for overlapping attributes.

Use-wear analysis can be approached from two different methods, each with their own advantages and disadvantages: low-power or high-power. Low-power analysis requires access to a microscope with 10-100x magnification, with a typical assessment taken at 40X (Odell and Odell-Vereecken 1980) in order to observe the location and degree of rounding and type of microflaking. This method is relatively quick and efficient for observing use-wear but does not

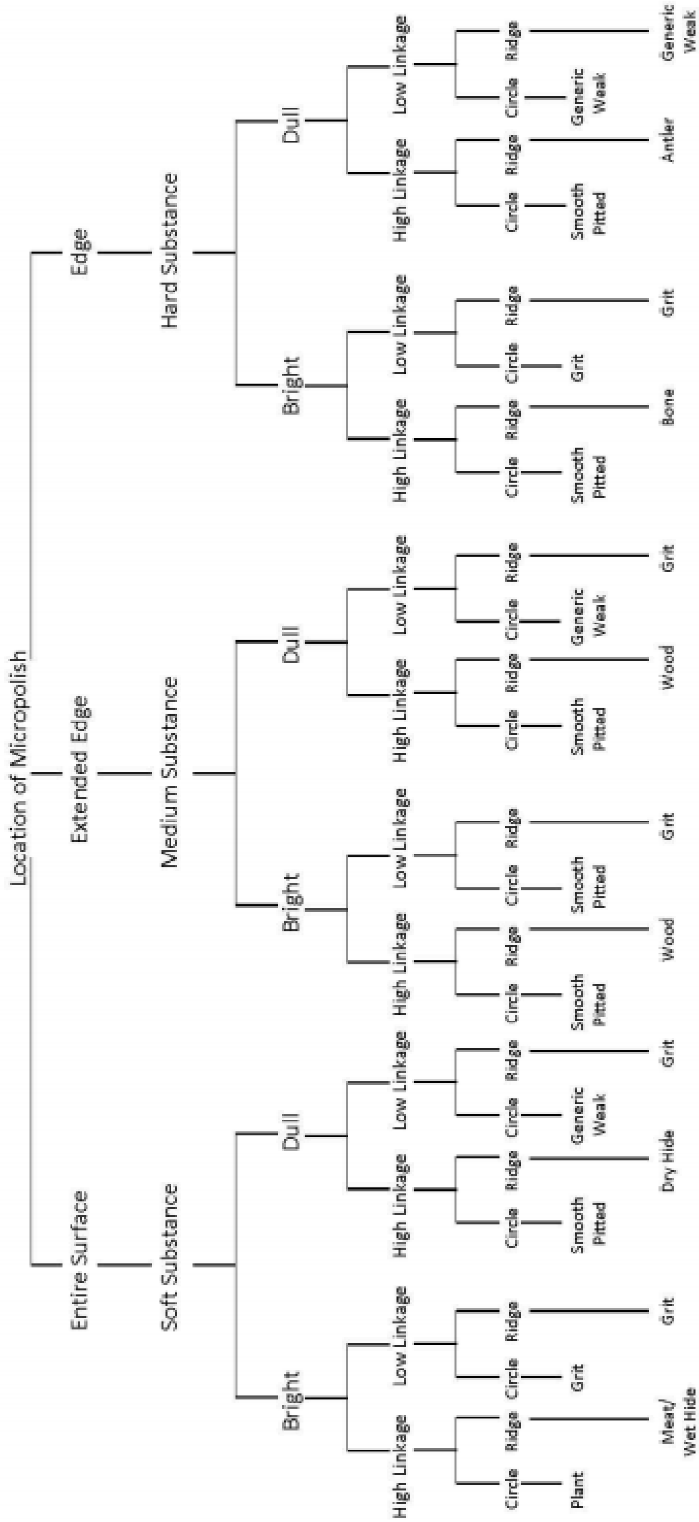


Figure 3.1. Micropolish Identification Flowchart (Sterner 2018)

allow for the degree of detail and the precision of materials identification gained through high power analysis.

High-power analysis (50-500x), on the other hand, provides much more precise information on the types of materials used, but requires significantly more preparation, training, and observational time (Kamminga 1982; Keeley 1980; Newcomer and Keeley 1979; Odell 1977, 1981, 1986; Odell and Odell-Vereecken 1980; Vaughan 1985). High-power analysis requires an incident lighting metallurgical microscope and involves more preparation than low-power to examine specimens. High-power examination makes it possible to distinguish changes in surface topography caused by abrasive forces and can identify polish associated with specific materials or activities (Keeley 1980). For the present study, the information gained concerning materials and function was deemed worth the effort expended.

In order to build confidence and bolster accuracy in assessing the microwear of the Schmeling tools, blind tests were conducted with practice materials produced from the UWM Experimental Archaeology Working Group and previously analyzed tools from Sterner's 2018 dissertation. Blind tests gauge an analyst's ability to make precise and accurate designations of: 1) which tools or tool edges were used, 2) the tool motions employed, and 3) the contact materials on which tools were used (Bamforth 1986; Brink 1978; Evans 2014; Kamminga 1982; Keeley 1980; Keeley and Newcomer 1977; Newcomer and Keeley 1979; Odell and Odell-Vereecken 1980; Vaughan 1985). These blind tests were repeated until a satisfactory level of accuracy which was reached (Table 3.1).

Table 3.1 Accuracy Benchmarks via Sterner (2018)		
Identification Tests	**Sterner Accuracy Rate**	**Harding Accuracy Rate**
Motion of Use	82%	80%
Specific Contact Material	81%	82%
Contact material Soft-Hardness	95%	95%
Area of Use	97%	97%

Upon completion of the blind tests, lithic tools were washed in an ultrasonic cleaner using warm water and dish soap for approximately 30 minutes and then washed again in clean water (see Sterner 2018). In order to avoid potential damage and preserve residue for future research, chemical cleaners were avoided in the preparation of these specimens (Moss 1986; Plisson and Mauger 1988 Juel Jensen 1994; Moss 1983; Pope 2005). Tools examined for microwear included all edge-only tools and triangular bifaces, steep-edged unifaces, and/or multifacial cores that exhibited all of the morphological characteristics that typify their morpho-functional category for a total 66 of 67 tools. One dubiously cultural non-facial tool was set aside for this portion of the analysis.

Tools were placed on a glass slide and examined at up to 200x magnification using an Olympus BH-2 upright microscope. Both the dorsal and ventral sides of the tool were analyzed to determine the contact material and primary motion of use. Tools were also examined for the presence/absence, location, and orientation of microchipping, striations, rounding, and micropolishes.

All observations were recorded on an adapted version of Sterner's 2018 Use Wear Data Recording Sheet as a guideline (Appendix C). A 10MP Amscope USB digital camera was used for the collection of photomicrographs that were manipulated through the associated ToupView software.

RESEARCH EXPECTATIONS

Based on previous analyses of Oneota lithics (e.g., Sterner 2018), and operating under the original interpretation of the Schmeling site as a village (e.g., Jeske et al 2020), these analyses were expected to confirm the following hypotheses:

1. Formal tool types will be limited and crude/expedient tool forms will make up the majority of the assemblage.
2. Materials present within the assemblage will be composed primarily of locally sourced material of poor to fair quality.
3. The relatively mediocre quality of local materials will result in a high frequency of heat treatment to improve knapping characteristics.
4. A range of size grades and types of debitage would be present. Flakes of the smallest size grade may occur in greater numbers than other site types due to later-stage tool production and maintenance taking place.
5. If there is a high proportion of high quality materials or heat altered tools, we expect the presence of broken and recycled artifacts.
6. If not, we expect mostly likely expedient tool forms. Any evidence of reuse, reworking, and/or recycling would be unlikely.
7. Microwear analysis will confirm a range of contact materials and heavy use signaling daily routines. Expedient tools will be likely to have multiple contact materials exemplifying their flexible function within the site.

However, if the site was used for mortuary purposes, we can expect a very different set of conditions to be present. Jeske (1987, 1989) outlines a series of expectations for late Woodland and middle Archaic technology based on site function and mobility. While his studies focus on groups who differ significantly from Oneota manifestations, the theoretical discussion of raw material procurement, use, and discard should be generally applicable for identifying/interpreting site variance between the Lake Koshkonong sites. Following the parameters outlined by Jeske, the Schmeling assemblage should generally reflect the following:

1. There should be a large percentage of good quality material.
2. The large amount of good quality material should result in a large percentage of high energy-input tools.
3. If there is a large percentage of high-quality material, there should be a weak relationship between the quality of raw material and the amount of energy put into tool manufacture.
4. For bifaces, the relationship between quality of raw material and tool refinement should be weak.
5. We will expect to find few broken tools due to relatively short use episodes involved in ritual activity.
6. There should be little difference in artifact size between good and poor-quality materials at a ritual site.
7. There should be little artifact manufacturing occurring at the site because of its presumed task-specific (e.g., mortuary) nature.

How closely the lithics from this assemblage mirror these respective interpretations are discussed in the following chapters.

CHAPTER 4: DESCRIPTION OF THE LITHIC ASSEMBLAGE

The chipped stone assemblage collected from survey and excavation at the Schmeling site is composed of 1,127 lithic pieces that collectively weighs 2433.2 grams. There were 1,060 pieces of debitage and 67 chipped stone tools; a ratio of 15.8 pieces of debitage to each tool. The majority of the assemblage was recovered through pedestrian survey of the agricultural field (49.4% of total assemblage) with Concentration A containing the greatest combined amount of debitage and lithic tools (n=224, 19.9% of the total assemblage) (Table 4.1). Of the excavated materials, (559 pieces of debitage and 27 tools) 13.8% were found within feature context (Table 4.2).

Table 4.1. Distribution of Debitage and Tools Across Schmeling Site

Lithic Artifact Distribution		Total Debitage	Total Tools	Total
Concentrations	Concentration A	217	7	224
	Concentration B	26	2	28
Pedestrian Survey	General Collection	51	5	56
	Isolated Finds	5	0	5
	Northern Half Scatter	66	8	74
	East Cornfield	8	2	10
	Southern Half Scatter	128	16	144
Shovel Tests	East	57	2	59
	South	6	0	6
	North	7	1	8
2006 Excavation Units	TU 06-01	26	0	26
	TU 06-02	42	1	43
	TU 06-03	70	10	80
	TU 06-04	56	8	64
2008 Excavation Units	TU 08-05	19	0	19
	TU08-06	65	1	66
	TU 08-07	40	0	40
	TU 08-08	171	4	175

Table 4.2. Schmeling Debitage and Tools within Feature Context		
Lithic Artifact Distribution	**Total Debitage**	**Total Tools**
2006 Excavation Units	193	19
In Feature Context	29	1
Outside Feature Context	164	18
2008 Excavation Units	296	5
In Feature Context	48	3
Outside Feature Context	248	2

The eastern wooded section and northern wooded section each contained 25% of the total lithic assemblage respectively. The southern wooded section contained the least amount of lithic material with only 0.5% of the total assemblage recovered from that area. Considering that the site area generally slopes toward the southern wooded section and there is a steep drainage bordering it, the distribution of artifacts suggests that the focus of the site was likely be within the northern portion of the site area. Artifacts within the southern wooded section, while possibly deposited via cultural activity, appear to be primarily the result of erosion and runoff.

The majority of the lithic materials from this site are most likely related to the Oneota component. A total approximately 53% of the assemblage was recovered from excavated contexts (units and shovel test combined) and can be securely attributed to Oneota cultural activities. However, it should be noted that since a large portion of the assemblage was collected from the surface; a small percentage could also be attributed to Archaic or Woodland contexts. A light scatter of Archaic and Woodland artifacts was found among Oneota materials within the agricultural field near the main artifact scatter. Despite the close proximity, the presence of these materials does not appear to significantly overlap the areas of Oneota habitation and are unlikely to impact the general conclusions of this research.

Soil profiles from the excavation units and shovel tests demonstrate a horizontally stratified site that has been heavily impacted by the effects of agricultural activity and soil erosion. Due to this level of disturbance, pedestrian survey was the main method of collection and artifact recovery at the Schmeling site. The effects of collector bias during pedestrian survey, inclusion or exclusion of plowzone material, flotation, methods of analysis, and the number of formal excavation units affect the accuracy of interpretation for each assemblage. Each Koshkonong site compared in the following chapter exhibited different environments, levels of disturbance, and subsequent methods of artifact recovery.

DEBITAGE SUMMARY

When divided into the three debitage types, the Schmeling assemblage was composed of approximately 35% flakes, 46% flake-like pieces, and 18% non-flakes (Table 4.3). There are four size grades: 1 (Less than 8 mm), 2 (8 mm to 12.5 mm), 3 (12.5 mm to 25 mm), and 4 (greater than 25 mm). The majority of the debitage recovered fell into the 12.5mm-25mm size grade - the second largest. Debitage that was larger than 25 mm and debitage that fell between 8-12.5mm were recovered at similar rates but debitage from the smallest size grade exhibited a notably smaller recovery (Table 4.4). There were 4.49 flakes to every one piece of debitage that was not a flake.

Table 4.3 Schmeling Assemblage by Debitage Type and Tool Count

	Flake	Flake-Like	Non-Flake	Tools	Total
Schmeling	373	494	193	67	1127

Of the total debitage, 33.6% displayed cortex and 37.9% showed evidence of heat treatment (Table 4.5, Table 4.6). Regardless of whether the assemblage is divided by size grade or debitage type, the percentage of cortex decreased with reduction. Non-flakes exhibited the

Table 4.4. Debitage Types and Size Grades						
Schmeling	Size 4	Size 3	Size 2	Size 1	Type Total	Type Percent
Flake	76	242	53	2	373	35.19%
Flake-Like	52	336	98	8	494	46.60%
Non-Flake	68	110	15	0	193	18.21%
Size Totals	196	688	166	10	1060	
Size Percent	18.49%	64.91%	15.66%	0.94%		

highest rate for the presence of cortex at 60 % (Table 4.7, Table 4.8). Pieces of debitage that were less than 8mm in size exhibited the lowest amount of cortex at 13.9% and the highest percentage of heat treatment at 60%. The percentage of heat treatment increased for all debitage as the size grade decreased. It is unclear if the high rate of heat treatment amongst the smallest size of debitage is the result of the increased knappability derived from this manufacturing strategy, or if these small pieces were simply easier to identify during survey/excavation due to their increased color and luster.

Table 4.5. Heat Treated Debitage by Size Grade				
Schmeling	HT Present		HT Absent	
	N	%	N	%
Size Grade 4	60	30.61%	136	69.39%
Size Grade 3	261	37.94%	427	62.06%
Size Grade 2	75	45.18%	91	54.82%
Size Grade 1	6	60%	4	40%
Overall	402	37.92%	658	62.08%

The presence of larger size-grade debitage and similar rates for the presence of cortex and heat treatment suggest that earlier stages of manufacture took place within the site. However, given the potential for collector bias during pedestrian survey, smaller size grade debitage could also be inaccurately represented.

Table 4.6. Heat Treatment by Debitage Type				
Schmeling	HT Present		HT Absent	
	N	%	N	%
Flake	177	47.45%	196	52.55%
Flake-Like	180	36.44%	314	63.56%
Non-Flake	45	23.32%	148	76.68%
Overall	402	37.92%	658	62.08%

Table 4.7. Debitage with Cortex by Size Grade				
Schmeling	Cortex Present		Cortex Absent	
	N	%	N	%
Size Grade 4	124	63.27%	72	36.73%
Size Grade 3	209	30.38%	479	69.62%
Size Grade 2	23	13.86%	143	86.14%
Size Grade 1	0	0%	10	100%
Overall	356	33.58%	704	66.42%

Table 4.8. Presence of Cortex by Debitage Type				
Schmeling	Cortex Present		Cortex Absent	
	N	%	N	%
Flake	111	29.76%	262	70.24%
Flake-Like	129	26.11%	365	73.89%
Non-Flake	116	60.10%	77	39.90%
Overall	356	33.58%	704	66.42%

MACRO TOOL SUMMARY

There were several basic tool types recovered from the Schmeling site with the majority being bifacially modified (n=32, 47.76%) (Table 4.9). Twenty-two edge-only tools were identified - e.g., no attempt was made to shape the body of the piece but an edge was used or retouched (Jeske and Lurie 1993). Ten unifacial tools, two multifacial (aka cores) and one dubiously cultural non-facial tool were also collected. Nearly the entire assemblage was produced by one of two methods of manufacture; 66% were produced from intentional flaking and 33% were the result of use-wear only.

Table 4.9. Basic Tool Forms of Schmeling Site						
Basic Form	Edge Only	Biface	Uniface	Multiface	Nonfacial	Total
Total	22	32	10	2	1	67
	32.84%	47.76%	14.92%	2.99%	1.49%	

Unifaces that conform to morpho-functional type scraper were a common formally shaped tool recovered from the site. Pieces with steeply retouched edges on both end and sides were the most common variation. Tools that conform to Madison Triangular style projectile points (Justice 1995) were also one of the most common tools found within the site. A fragmented biface that could not be typified but was possibly a Levanna point was also recovered (Justice 1995). Overall, bifacial tools dominated the assemblage and were followed by edge only tools at a rate of approximately 1.5:1. Generally, the tools from this site are fairly small and relatively uniform across all of the basic forms (See Table 4.10, Figure 4.1). Edge only tools were found on average to be the longest tools found and bifacial tools were the smallest but the difference is within a few millimeters and was not statistically significant.

The source locality of materials at the Schmeling site were determined based off the 40 km distance decay model calculation Sterner (2018) used in examining the Crescent Bay Hunt Club site. Following this catchment measurement, the inhabitants of the Schmeling site show a clear preference for local raw materials with over 70% of their tools locally sourced (Table 4.11). Galena chert was the most common material chosen for the manufacture of tools at 35.82% (Table 4.12). Apart from Galena, other local raw materials were represented in smaller quantities: two varieties of Prairie du Chien chert, Silurian chert, and unidentified glacially deposited cherts. It was noted during the initial survey of the site that readily available “pebble

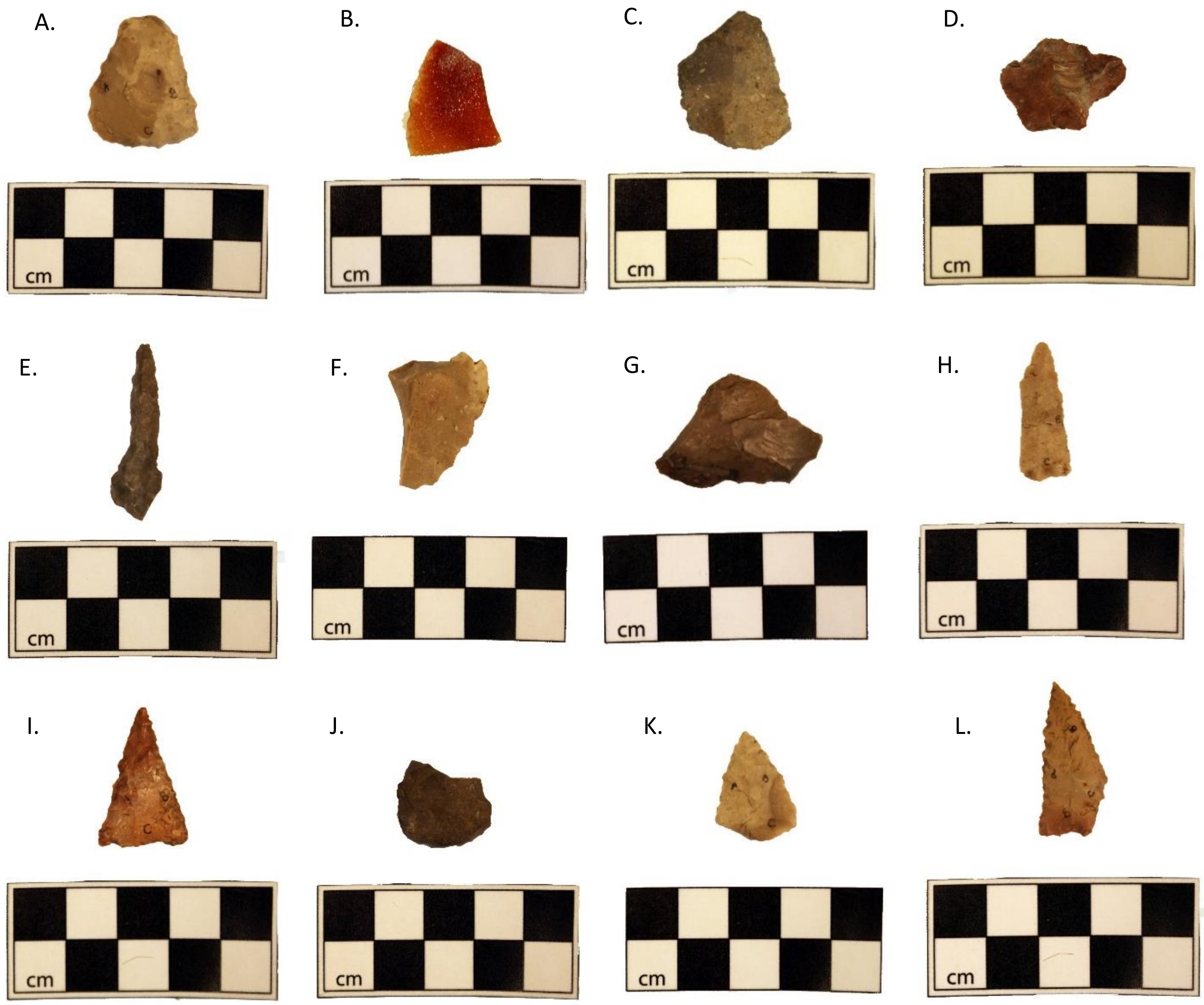


Figure 4.1. Tools of relatively similar size from the Schmeling assemblage *(A. Tool 4, B. Tool 55, C. Tool 54, D. Tool 6, E. Tool 24, F. Tool 60, G. Tool 49, H. Tool 44, I. Tool 33, J. Tool 30, K. Tool 1, L. Tool 32)*

chert" was abundantly distributed across the agricultural field and is reflected in the substantial amount of the debitage and tools recovered from the Schmeling site (Foley Winkler 2006, 2008; Schneider 2006). Non-local materials included Burlington chert, Platteville formation chert, Baraboo quartzite, Arcadia Ridge silicified sandstone, Hixton silicified sandstone, and basalt.

Of these material types, over 75% (n=49, 74.24%) were of fair quality and nearly 23% (n=15, 22.73%) were considered poor quality. Only 3% were considered good quality (Table 4.18). Over 50% of the tools had no cortex remaining and approximately 40% of the tools had less than 50% cortex. Heat treatment of raw material was fairly common, with 36% of the tools from the site exhibiting evidence for heat treatment - which roughly aligns to the rate at which the debitage that was heat-treated, 38% (Table 4.5, Table 4.6). Tools manufactured from Galena chert exhibited the highest frequency of heat alteration - over half of the tools produced from this material were thermally altered. While tools with the basic form of edge only/functional made up a considerable portion of the assemblage, the majority did not exhibit any evidence of heat treatment. Bifaces, on the other hand, were the tool form most often exposed to heat alteration.

Table 4.10. Means and standard deviations for tool dimensions by basic form

Basic Form	Measurement	Combined Total	Mean	Standard Deviation
Edge Only	Length (mm)	655	29.77	6.8
	Width (mm)	477	21.68	5.01
	Thickness (mm)	132	6.6	2.52
	Weight (g)	98.9	4.5	3.31
Unifacial	Length (mm)	217	27.13	6.37
	Width (mm)	165	20.63	2.5
	Thickness (mm)	56	7	1.8
	Weight (g)	28.2	3.53	1.45
Bifacial	Length (mm)	527	25.1	6.38
	Width (mm)	396	18.86	4.38
	Thickness (mm)	118.5	5.93	2.26
	Weight (g)	66.5	3.33	2.64

Table 4.11. Raw Materials Represented at the Schmeling Site			
Raw Materials	Count		Locality
Arcadia	1	1.50%	Non-Local
Baraboo	1	1.50%	Non-Local
Basalt	1	1.50%	Non-Local
Burlington	2	3%	Non-Local
Galena	24	35.80%	Local
Hixton	3	4.50%	Non-Local
PDC- Oneota	7	10.4	Local
PDC- Shakopee	3	4.40%	Local
Platteville	6	9%	Non-Local
Silurian	1	1.50%	Local
Unknown	18	26.90%	Local
Total	67		

Table 4.12. Overview of Raw Materials by Basic Tool Form							
Material Type	Basic Form					Total	
	Biface	Uniface	Edge Only	Multiface	Nonfacial		
Arcadia	1	-	-	-	-	1	1.49%
Baraboo	-	-	1	-	-	1	1.49%
Basalt	-	-	-	-	1	1	1.49%
Burlington	1	1	-	-	-	2	2.99%
Galena	12	6	6	-	-	24	35.82%
Hixton	1	-	2	-	-	3	4.48%
PDC- Oneota	3	1	3	-	-	7	10.45%
PDC- Shakopee	2	1	-	-	-	3	4.48%
Platteville	4	-	2	-	-	6	8.95%
Silurian	-	1	-	-	-	1	1.49%
Unknown	8	-	8	2	-	18	26.87%

After performing several Chi-squares tests (with results noted for significance at .05) to evaluate the relationships between raw material quality and locality against other production variables, it appears that neither the locality nor the quality of the raw material directly reflects in production choices (Table 4.13-Table 4.18). Materials of good and fair quality were combined in several instances to see if any significance could be observed since these materials would likely be chosen interchangeably over the poor-quality materials (Tables 4.17-18).

Table 4.13. Raw Material Quality by Basic Tool Form					
Raw Material Quality	Edge Only	Uniface	Biface	Total	%
Good /Fair	15	9	26	50	78.13%
Poor	7	1	6	14	21.87%
Total	22	10	32	64	100%
Chi-Square: 1.08, df: 2, p-value: 0.58					
Multifacial and Nonfacial tools removed.					

Table 4.14. Raw Material Quality by Basic Tool Form					
Raw Material Quality	Edge Only	Uniface	Biface	Total	%
Good	1	0	1	2	3.13%
Fair	14	9	25	48	75.00%
Poor	7	1	6	14	21.87%
Total	22	10	32	64	100%
Chi-Square: 1.64, df: 4, p-value: 0.80 *Multifacial and Nonfacial tools removed.*					

Table 4.15. Chi-square of raw material quality and source at the Schmeling Site				
Raw Material Source	Raw Material Quality			Row Total
	Good	Fair	Poor	
Local	1	38	14	53
Non-Local	1	11	1	13
Column Total	2	49	15	66
Chi-square: 1.02, df=2, p-value: 0.60				

Table 4.16. Chi-square of raw material quality and source at the Schmeling Site			
Raw Material Source	Raw Material Quality		Row Total
	Good /Fair	Poor	
Local	39	14	53
Non-Local	12	1	13
Column Total	51	15	66
Chi-square=1.15, df=1, p-value: 0.28			

Table 4.17. Chi-square results for raw material locality and other production variables at the Schmeling site

PRODUCTION VARIABLE	DF	CHI-SQ	P-VALUE	SIGNIFICANT?
Amount of cortex	2	0.62	0.43	no
Heat treatment	2	1.64	0.20	no
Basic tool form	3	0.20	0.98	no
Method of modification	4	0.30	0.99	no
Completeness	2	2.14	0.35	no
Hafting	2	2.44	0.30	no

Table 4.18. Chi-square results for raw material quality and other production variables at the Schmeling site

PRODUCTION VARIABLE	DF	CHI-SQ	P-VALUE	SIGNIFICANT?
Amount of cortex	4	0.26	5.30	no
Heat treatment	2	2.40	0.30	no
Basic tool form	3	1.10	0.78	no
Method of modification	4	2.03	0.73	no
Completeness	4	2.74	0.60	no
Hafting	2	0.10	0.95	no

The absence of any significance between these variables could suggest that emphasis on economic choice in lithic production may not be a defining factor or directly pertain to the site's activities. Perhaps the materials had met an unknown criteria or significance prior to arriving to the site that is not discernable. However, given the relatively small sample size, the absence of any clear relationship between these variables could also simply be the result of a sampling error.

While the quality of material does not appear to correlate to the frequency of tools that were broken, this could be a result of the fact that, overall, tools were generally found to be complete (Table 4.19). However, of the tools that were incomplete, bifacial tools were found to be broken most often. They also exhibited the most numerous examples of reuse/recycling (Table 4.19). Tools that morpho-functionally conform to projectile points were often missing an element. Out of these broken points, two were clearly reused; one as a scraper and the other potentially as a drill. These results conform well to the idea that energy input into tool manufacture results in increased tool use life and recycling; i.e., curated tools. The fluidity surrounding the function of these tools will be discussed further in the microwear analysis.

Table 4.19. Tool reuse, completeness and refinement by basic form

Reuse	Edge Only		Unifacial		Bifacial		Total	
	N	%	N	%	N	%	N	%
Present	1	4.50%	1	10.00%	2	6.30%	4	6.30%
Possible	2	9.10%	1	10.00%	7	21.90%	10	15.60%
Absent	19	86.40%	8	80.00%	23	71.90%	50	78.10%
Chi-Square: 0.36, df=2, p-value: 0.94								

Completeness	Edge Only		Unifacial		Bifacial		Total	
	N	%	N	%	N	%	N	%
Broken	0	-	2	20.00%	11	34.40%	13	20.30%
Complete	20	90.90%	8	80.00%	16	50.00%	44	68.8%
Indeterminate	2	9.10%	0	-	5	15.60%	7	10.90%
Chi- Square: 10.89, df=2, p-value: 0.00								

Refinement	Bifacial	
	N	%
Crude	9	30%
Medium	18	60%
Refined	3	10%

MICROWEAR SUMMARY

Microwear analysis was conducted on 66 of the 67 tools collected from the Schmeling site; the dubious nonfacial tool was set aside during this analysis. Tools were recorded by examining microflaking, rounding, and the extent of polish across tool edges to determine what kind of material was being manipulated. All tools that exhibited use-wear were examined at up to 200x magnification and are photographically documented in Appendix C. Of these tools, 48 exhibited polish from use, 12 appear to be unused, and 6 tools were composed of materials that prevented the identification of polish or made it impossible to assign a contact material (see Figure 4.2). If we set aside the 6 indeterminate tools, 80 % of the tools recovered from the site showed signs of utilization. If we exclude the multifacial tools because of their low sample number, bifacial and unifacial tools appear to be favored within the assemblage (Table 4.20, Table 4.21). However, the absence of statistical significance, paired with the small sample and the short spans of use for edge-only tools, limits how confidently the affinity for flaked technology can be affirmed at the Schmeling site.

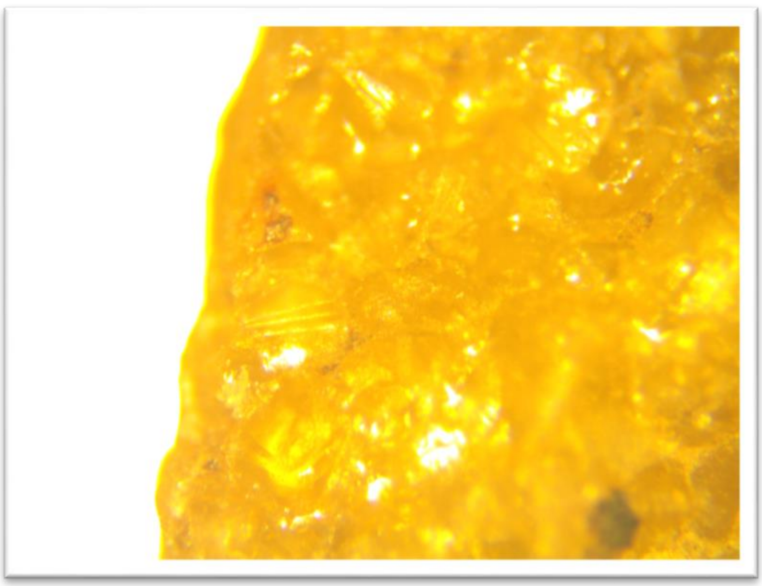


Figure 4.2. Example of a tool composed of silicified sandstone with possible striations. Unfortunately, the material's characteristics makes it difficult to discern polish vs. the tool's natural surface *(Tool 27)*

Direction of use was very difficult to determine with the majority of the tools, which may also be due to the number of tools recovered from plowzone context. By analyzing the direction of striations and the location of polish, thirteen tools were identified as having been used in a longitudinal motion (i.e., chopping), three tools were recorded as being used in a transverse motion (i.e., slicing).

Table 4.20. Number of basic tool forms with use-wear present								
Utilization	Edge Only		Uniface		Biface		Total	
	N	%	N	%	N	%		
Used	13	59.09%	8	80%	26	81.25%	47	73.44%
Not used	5	22.73%	2	20%	3	9.40%	10	15.63%
Indeterminate	4	18.18%	0	-	3	9.40%	7	10.93%
Chi Square=4.80, df = 4, p-value: 0.31								

Table 4.21. Flaked vs. Edge Only Use-wear				
Utilization	Edge Only		Uniface/Biface	
	N	%	N	%
Used	13	59.00%	34	81%
Not used	5	23.00%	5	12%
Indeterminate	4	18.00%	3	7%
Chi Square: 3.63, df = 2, p-value: 0.16				

Six different contact materials were identified during microwear analysis of the Schmeling assemblage; meat/wet hide, bone/antler, dry hide, plant, wood, and grit. Two lightly developed polishes that could not be directly tied to a specific contact material were also observed during analysis; weak generic -which accrues during initial use, and smooth pitted -which is often associated with the early stages of use on a hard material (Vaughan 1981:135-136). Of the 48 used tools, 9 tools exhibited two or more respective contact materials (Table 4.22, Table 4.23, Figure 4.3). Over a third of the tools from the Schmeling assemblage were used against a soft material with meat/wet hide being the most common (Table 4.22, Table 4.24). The presence of this polish suggests that butchering and/or processing of meat was one of the foremost uses for stone tools at this site. There were few instances that wood or bone could be definitively identified as a contact material, but generally, 16% of tools exhibited evidence of use against a hard material.

Table 4.22. Contact materials identified at the Schmeling site		
Contact Material	Schmeling N	%
Bone	0	0%
Dry Hide	1	2%
Smooth Pitted	10	15%
Unable to Determine	6	9%
Met/Wet Hide	14	21%
Plant	6	9%
Weak Generic	8	12%
Wood	0	0%
Multiple	9	14%
No Use-Wear	12	18%

Table 4.23. Schmeling tools with multiple types of polish present		
Basic Form	Count	Polish Types
Bifacial	1	Dry Hide and Wood
	1	Weak Generic, Wood and/or Bone
	1	Bone and Smooth Pit
	1	Meat/Wet Hide and Dry Hide
	1	Meat/Wet Hide and Smooth Pit
Unifacial	1	Weak Generic, Meat/Wet Hide, and Dry Hide
Edge Only/Functional	1	Meat/Wet Hide and Smooth Pit
	1	Bone and Meat/Wet Hide
	1	Weak Generic and Dry Hide

Table 4.24. Basic tools forms and the hardness of contact materials present

(* Represents Multiple Contact Materials)

Contact Material Hardness	Edge Only		Unifacial		Bifacial		Total	
Soft	4	18%	4	40%	16	50%	24	37%
Soft/Medium*	1	5%	0	0%	2	6%	3	5%
Soft/Hard*	2	9%	0	0%	1	3%	3	5%
Medium	1	5%	2	20%	1	3%	4	6%
Medium/Hard*	0	0%	0	0%	2	6%	2	3%
Hard	5	23%	3	30%	2	6%	10	16%
Indeterminate	4	18%	1	10%	5	16%	10	16%
Not Used	5	23%	0	0%	3	9%	8	12%

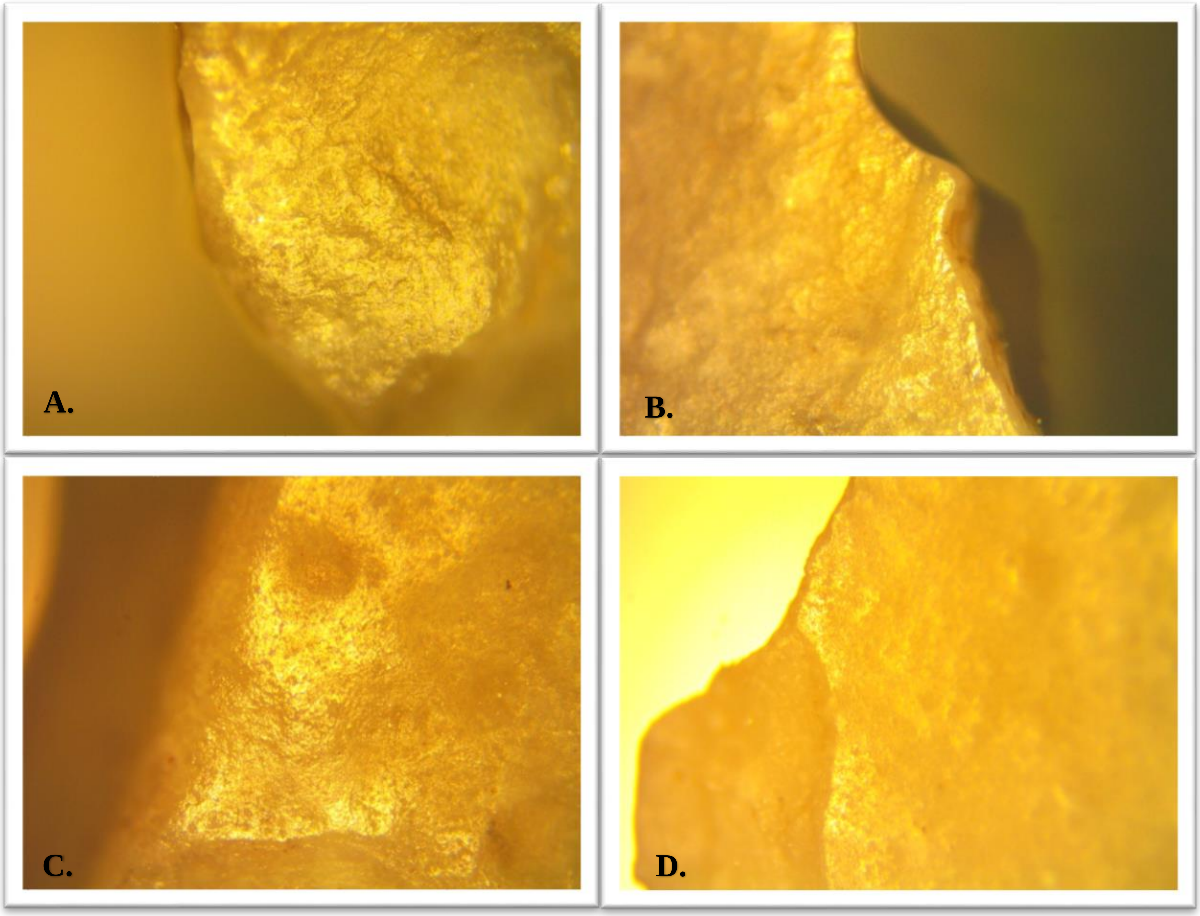


Figure 4.3. Examples of tools with traces of multiple contact materials.

(A.& B. Tool 28 at x100 with Smooth Pit and Bone, C. & D. Tool 59 x100 with Meat/Wet Hide and Bone)

Several examples of grit polish were also identified within the assemblage. Since many of the tools recovered from the Schmeling site were found within the agricultural field, it is very possible that modern agricultural activity contributed to the production of faux polish from years of disturbance. However, of the 27 tools recovered from excavated contexts, only 6 (22%) did not exhibit any use-wear. All of the tools found within feature context exhibited use-wear with only one of them having generic weak polish present. Approximately 78% of the tools from excavated contexts exhibited use-wear, which is close to the site's overall rate of use

(84%). It seems that lightly developed polished most likely represents actual tool use, but this inference should be treated conservatively in the overall analysis.

Additionally, the presence of grit polish is also often found in association with tools that were used to "work wood, bone, and fresh and tanned hides onto which varying amounts of loamy soil were added" (Vaughan 1985:39).The presence of grit polish alongside meat/wet hide polish and dry hide polish could lend credence to the idea that the processing of meat was the focal activity of the site. Blood residue testing, unfortunately not possible as part of this project, would be especially helpful in deciphering some of the ambiguity associated with the grit polish and the other weakly developed polishes.

The majority of the tools from this site seem to have been used very lightly as the traces of contact materials was very slight; however, it is possible that the tools exhibiting weak or inconsistent polish were not utilized enough to leave the trace of a distinct contact material. On the other hand, several tools appeared to be used quite heavily to the point of breaking and then reworked. Inconsistent areas of use were noted on eleven tools, which suggests resharpening, recycling, and/or a change in the function of the tool (see Figure 4.4). Tools that conform to the type Madison style projectile point were the most common to exhibit signs of resharpening and/or reshaping, which seems to be reflected in the large standard deviations for both length and width (Table 4.19).

Designating these tools morpho-functionally as projectile points does not capture the fact that their use-wear displays a dynamic history of use. Areas of use and recycling suggest that their function likely goes beyond strictly hunting and/or warfare and were likely used in a domestic sphere to scrape, cut, and puncture as well. Additionally, several unifaces that conformed to morpho-functional end and side scrapers were visually deceptive, as polish was only identified along one end of the tool. It is clear from these examples, alongside the number of tools with multiple contact materials, that the morpho-functional tool types are misleading and are unable to fully capture the function(s) of a tool.

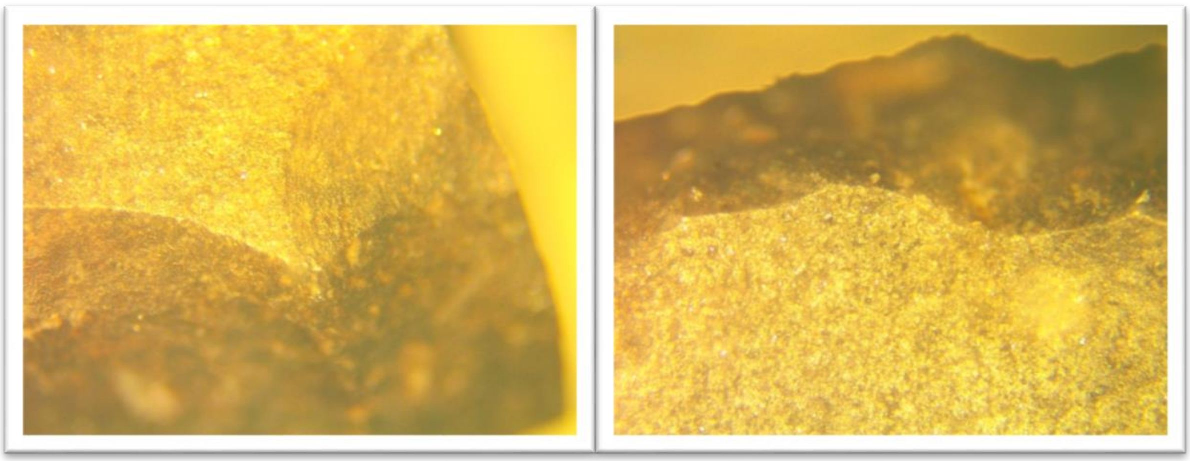


Figure 4.4. Example of a tool with areas that have been broken/resharpened

LAKE KOSHKONONG INTERSITE COMPARISONS

The primary purpose of this analysis is to determine the way in which lithic tools were used by inhabitants of the Schmeling site and interpret the economic decisions essential in structuring the Schmeling lithic assemblage composition. By comparing Schmeling against Crescent Bay Hunt Club, Koshkonong Creek Village, and Carcajou Point we can determine if any patterns within the lithic economies emerge between communities and across the landscape.

In 2018, a portion of the Schmeling debitage and tools were compared to assemblages from the Lake Koshkonong locality and the La Crosse locality (Sterner 2018). Within the Koshkonong locality, Sterner contrasted three assemblages against the Schmeling site; Crescent Bay Hunt Club, Koshkonong Creek Village, and Carcajou Point (see Table 4.25). In the following section this data will be used to examine if the Schmeling site appears similar to these established habitation sites or if it aligns more closely with McTavish's mortuary interpretation.

Table 4.25. Sources of Lithic Datasets for Comparison					
Site Name	**Site Number**	**Tools**	**Debitage**	**Debitage/Tool**	**Data Source**
CBHC	47JE0904	539	3456	6.4	Sterner 2018
KCV	47JE0379	425	1916	4.5	Wilson 2016, Doyle 2012
Carcajou Point	47JE0002	21	541	21.5	Rosebrough and Broihahn 2005
Schmeling	47JE0833	67	1060	15.8	This Thesis
Total		1052	6973	6.6	

DEBITAGE SUMMARY

A total of 5,913 pieces of debitage from the other Lake Koshkonong sites were examined by Sterner (2018) and used for comparison in this study (Table 4.25). While CBHC and KCV debitage broke into a relatively even split between flakes and non-flakes, the Schmeling assemblage exhibited a significantly higher frequency of flakes to shatter (Table 4.26). The ratio of debitage to tools also seems to diverge, with CBHC and KCV displaying a relatively comparable ratios and Schmeling exhibiting a much higher frequency of debitage (Table 4.27). These differences indicate different activity or different stage(s) of manufacturing took place at the Schmeling site versus the other sites.

With over 50% of the debitage exhibiting the presence of cortex, CBHC is anomalous when compared to the other Koshkonong sites (Table 4.28). Cortex was identified on only 33-36% of debitage from the Schmeling and KCV sites. The statistically significant amount of cortex at CBHC could be indicative of the initial reduction of locally available cobbles or materials brought to the site. This variation continues to highlight the different activities taking place between the sites.

Table 4.26. Debitage types in the Koshkonong locality assemblages.						
Site Name	Site No.	Flake		Non-Flake		Total
		N	%	N	%	
CBHC	47JE0904	1,479	43%	1,974	57%	3,453
KCV	47JE0379	1,192	62%	724	38%	1,916
Schmeling	47JE0833	867	82%	193	18%	1,060
Total		3,538	55%	2,891	45%	6,429
Chi-square: 554, df=4, p-value: 0.00						

Table 4.27. Ratio of Debitage to Tools				
Site Name	Site No.	Tools	Debitage	Debitage/Tool Ratio
CBHC	47JE0904	539	3456	6.4: 1
KCV	47JE0379	425	1916	4.5: 1
Schmeling	47JE0833	67	1060	15.8: 1
Chi-Square: 96, df=2, p-value = 0.00				

Table 4.28 Debitage cortex in the Koshkonong locality assemblages.				
Site Name	Site No.	Cortex Present		Total Debitage
		N	%	
CBHC	47JE0904	1,748	50.60%	3,453
KCV	47JE0379	687	35.90%	1,916
Schmeling	47JE0833	356	33.58%	1,060
Total		2,947	42.83%	6,880
Chi-square: 159, df=2, p-value: 0.00				

Table 4.29. Debitage heat treatment in the Koshkonong locality assemblages.				
Site Name	Site No.	Heat Treatment Present		Total Debitage
		N	%	
CBHC	47JE0904	1,207	35.00%	3,453
KCV	47JE0379	562	29.30%	1,916
Schmeling	47JE0833	402	37.92%	1,060
Total		2,394	34.8%	6,430
Chi-Square: 27, df:4, p-value: 0.00				

MICROWEAR SUMMARY

Lithic material from KCV and CBHC were examined previously by Sterner (2018) and were contrasted against the Schmeling assemblage. Immediately noticeable was the amount of use-wear present within the Schmeling assemblage vs. the other Koshkonong sites (Table 4.30).

Table 4.30. Tool Utilization at the Koshkonong Sites (Adapted from Sterner 2018)

Site Name	Site Number	Used		Unused		Total
KCV	47JE0379	61	61%	39	39%	100
CBHC	47JE0904	191	64%	164	36%	300
Schmeling	47JE0833	47	85%	9	15%	56
Chi-Square: 18.4, df=2, p-value: 0.00						

The Schmeling site also had the lowest percentage of tools where the polish was deemed indeterminable and had the highest rate of tools with multiple contact materials. The processing of meat and wet hide was common at all three sites but dry hide scraping at CBHC was much more prominent than either of the other sites (Table 4.31). Plant polish at KCV and Schmeling seem to be slightly higher than Crescent Bay, which could be indicative of a more diverse diet (Edwards 2010, Sterner 2018).

Table 4.31. Contact materials identified at Koshkonong sites (adapted from Sterner 2018)

Contact Material	KCV		CBHC		Schmeling	
	N	%	N	%	N	%
Bone	1	1%	7	2%	0	0%
Dry Hide	1	2%	18	6%	1	2%
Smooth Pitted	5	5%	22	7%	10	15%
Unable to Determine	25	25%	68	23%	6	9%
Met/Wet Hide	15	15%	48	16%	14	21%
Plant	9	9%	9	3%	6	9%
Weak Generic	0	0%	4	1%	8	12%
Wood	5	5%	9	3%	0	0%
Multiple	0	0%	6	2%	9	14%
No Use-Wear	39	39%	109	36%	12	18%
	100	100%	300	100%	66	100%

In order to further compare these three sites, methods often employed in the analysis of floral and/or faunal assemblages were applied to the identified contact materials. Because of the finite number of contact materials, the Simpson's Diversity Index was used as it can more accurately access low-density assemblages (Marston 2014). Simpson's Diversity Index assesses the heterogeneity of an assemblage by producing an index ranging from 0, being composed of a single variable, to 1, maximum diversity (Lyman 2008).

Additionally, the Simpson's Reciprocal Index quantifies diversity by taking into account richness and evenness (i.e., how evenly the contact materials are distributed across the assemblage) (Lyman 2008). This index is dependent on the number of variables being examined, with 0 being skewed to one variable, and with 8 being a completely even distribution.

Overall, CBHC exhibits the most diverse and the most evenly distributed representation of contact materials across the three sites (Figure 4.5, Figure 4.6). Moreover, the contact materials from CBHC appear to reflect the fluidity of tool function indicative of the diverse day-to day activities present within a village site. CBHC and Schmeling are similar for both indices, although Schmeling exhibits a slightly less even distribution of contact materials (e.g., meat/wet hide). These patterns suggest that similar activities took place across the two sites. Given their close proximity to each other, it may be argued that the Schmeling site is an extension of CBHC.

Based on the microwear data, it appears that the processing of meat is an integral activity across all three sites, and this pattern is reflected in the relatively low evenness exhibited in the Simpson's Reciprocal indices. KCV has the least amount of diversity and the most uneven distribution of contact materials, which is mirrored in the significant number of tools that were identified exhibiting traces of meat/wet hide. In sum, although a relatively diverse set of activities is represented at all three sites, suggesting long term residential activities of village life, hide processing appears to be more a bit more concentrated at KCV compared to Schmeling and CBHC.

Figure 4.5 Simpson's Diversity Index (1-D) of Contact Materials at the Koshkonong Sites

Excludes Unable to Identify and No Usewear

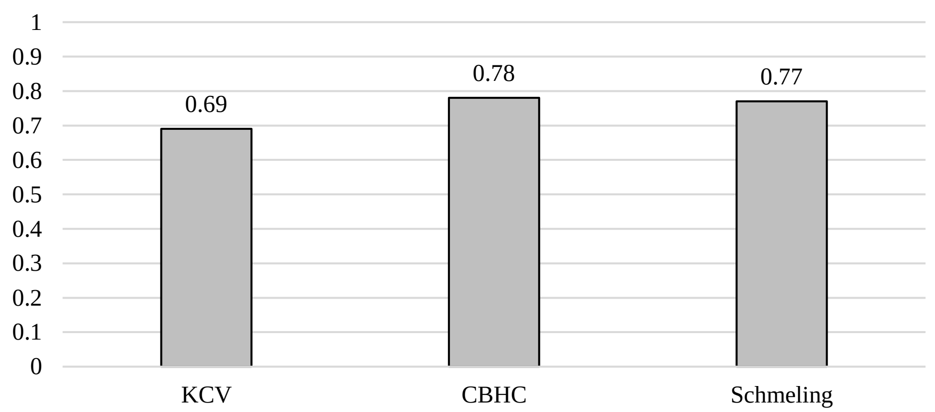
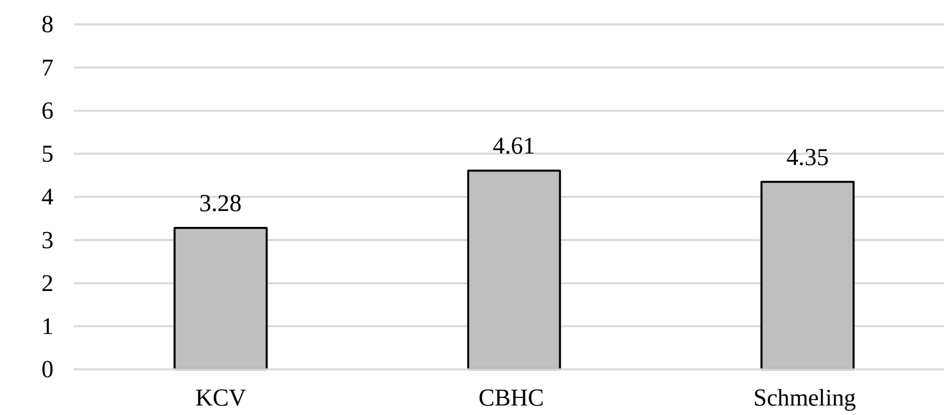


Figure 4.6 Reciprocal Simpson Index (1/D) of Contact Materials at the Koshkonong Sites

Excludes Unable to Identify and No Usewear



ASSEMBLAGE ANALYSIS SUMMARY

A total of 1,052 artifacts classified as chipped stone tools were compared from the Koshkonong locality (Table 4.25). As is typical of Oneota sites, fair or poor-quality materials were used to produce tools from overwhelmingly local sources (Table 4.32). This preference for readily available poor-quality cherts bolsters the notion that Oneota lithic assemblages reflect a preference for energy efficiency in obtaining raw materials. However, the Schmeling site demonstrated the least discriminating use of chert with over 20% of the materials requiring more energy to be exp ended to obtain them. CBHC also shows a higher presence of non-local materials and mirrors Schmeling in the prevalence of galena within the assemblage (Table 4.33).

Table 4.32. Local vs. Non-Local Materials of Koshkonong Sites (Adapted from Sterner 2018)

Raw Material	KCV		CBHC		Schmeling	
	N	%	N	%	N	%
Local	400	94%	447	83%	53	79%
Non-Local	25	6%	92	17%	14	21%

The Schmeling assemblage is dominated by bifacial tools (48%), with a slightly lower representation of edge only tools (33%), whereas edge only tools prevail as the most popular form present at all other Koshkonong sites (Table 4.34). The large presence of the bifacial tools may be an error as a result of the small sample size but it does distinguish a significant preference for expedient, minimally modified tools at CBHC and KCV.

Tools that conform morpho-functionally to end scrapers and Madison points have been used by previous researchers to infer a relationship to bison utilization at Oneota sites (Hall 1962:121-122). Hall used an end scraper index, which he suggested increases as one moves west geographically and later chronologically--which he then related to bison hunting and hide processing. Boszhardt and McCarthy (1999) did a similar analysis. However, Sterner (2012) demonstrated that such an index was misleading in that there was significant variation among sites between the La Crosse and the Koshkonong region.

However, the Koshkonong scraper/point indexes Sterner (2018) compiled showed that all four sites are under 100 - as typified by Oneota sites in eastern Wisconsin and northeastern Illinois (Table 4.35). The Schmeling scraper/point index is distinctly lower than other Koshkonong sites, which further bolsters the idea that different cultural activities are taking place at the site requiring different tool forms. Interestingly, according to Hall (1962), Aztalan has an index of only 3.8. How much of that difference is due to its Late Woodland or Middle Mississippian occupation proportions is unknown.

Table 4.33. Raw Materials by Site (Adapted from Sterner 2018)

Raw Material Type	KCV 47JE0379		CBHC 47JE0904		Schmeling 47JE0833	
	N	%	N	%	N	%
Burlington	9	2 .1%	32	5.9%	2	3.0%
Galena	246	57.9%	254	46.6%	24	36.4%
Maquoketa	1	0.2%	4	0.7%	0	0.0%
Moline	2	0.5%	0	0.0%	0	0.0%
Oneota	20	4.7%	41	7.6%	7	10.6%
Platteville	6	1.4%	20	3.7%	6	9.1%
Shakopee	27	6.4%	13	2.4%	3	4.5%
Quartz	3	0.7%	2	0.4%	0	0.0%
Quartzite	2	0.5%	5	0.9%	1	1.5%
Silicified Sandstone	3	0.7%	8	1.5%	4	6.1%
Silurian	32	7.5%	46	8.7%	1	1.5%
Unknown	74	17.4%	111	20.6%	19	28.3%
Wyandotte	0	0.0%	3	0.9%	0	0.0%
Total	425		539		67	

Table 4.34. Basic Forms represented in the Koshkonong locality lithic assemblages.										
Site Name	Site No.	Edge Only		Uniface		Biface		Multiface		
		N	%	N	%	N	%	N	%	
CBHC	47JE0904	345	64%	54	10%	119	22%	21	4%	
KCV	47JE0379	310	73%	41	10%	64	15%	10	2%	
Schmeling	47JE0833	22	33%	10	15%	32	48%	2	3%	
Chi-square: 49.01, df=6, p-value: 0.00										

Table 4.35. Scraper/point indexes at Koshkonong sites (Adapted from Sterner 2018)		
Site Name	Site No.	Scraper/Point Index
CBHC	47JE0904	89
KCV	47JE0379	72
Carcajou Point	47JE0002	33
Schmeling	47JE0833	29
Koshkonong Average		*59*
Koshkonong Standard Deviation		*187*
La Crosse Average		*29*
La Crosse Standard Deviation		*146*

CARCAJOU POINT DISCUSSION

While the small sample size from Carcajou Point (Rosebrough and Broihahn 2005) negates statistical certainty, there are several points of commonality and contrast with the Schmeling site that are interesting to note. Both Carcajou Point and Schmeling exhibited a much higher frequency of flakes to shatter within their debitage with both sites composed of over 80% flakes (Table 4.36). The ratios of debitage to tools significantly outpaces the other Koshkonong sites with Schmeling displaying 15.8 to 1 and Carcajou Point with 21.5 to 1 (Table 4.37).

The presence of cortex at Carcajou Point mirrors that of KCV and Schmeling but that is the last attribute that appears similar to Schmeling (Table 4.38). Carcajou Point diverges significantly when examining the presence of heat treatment. The debitage from Carcajou Point exhibits the highest rate of heat alteration followed by the Schmeling and CBHC assemblages (Table 4.39).

Table 4.36. Debitage types in the Koshkonong locality assemblages.

Site Name	Site No.	Flake (n)	Flake (%)	Non-flake (n)	Non-flake (%)	Total
CBHC	47JE0904	1,479	43%	1,974	57%	3,453
KCV	47JE0379	1,192	62%	724	38%	1,916
Schmeling	47JE0833	867	82%	193	18%	1,060
Carcajou Pt.	47JE0002	397	88%	54	12%	451

Table 4.37. Tools and Debitage Totals from the Koshkonong Sites

Site Name	Site Number	Tools	Debitage	Debitage/Tool
CBHC	47JE0904	539	3456	6.4
KCV	47JE0379	425	1916	4.5
Carcajou Point	47JE0002	21	541	21.5
Schmeling	47JE0833	67	1060	15.8
Total		1052	6973	6.6

While all of the sites examined in this research show a preference for locally sourced raw materials, at Carcajou Point, 100% of the materials recovered from the site were noted as locally sourced (Table 4.40). The high rate of heat alteration and the amount of local material present at Carcajou is either illustrative of different manufacturing strategies or a demonstrates a difference in how the assemblage was analyzed. The majority of tools are also expedient edge only pieces –further underlining a different technological preference being employed at Carcajou Point versus the Schmeling site (Table 4.41).

The few overlaps between Carcajou and Schmeling suggest that some of the manufacturing strategies and cultural activities taking place could be similar. However, since the same standardized methodology was not used in the analysis of these four sites, it is difficult to make any confident inferences when differences occur.

Table 4.38. Percentage of debitage displaying cortex in the Koshkonong assemblages

Site Name	Site No.	Cortex (n)	Cortex (%)	Total Debitage
CBHC	47JE0904	1,748	50.60%	3,453
KCV	47JE0379	687	35.90%	1,916
Schmeling	47JE0833	356	33.58%	1,060
Carcajou Pt.	47JE0002	156	34.60%	451
Total		2,947	42.83%	6,880

Table 4.39. Percentage of Koshkonong debitage displaying heat treatment

Site Name	Site No.	HT (n)	HT(%)	Total Debitage
CBHC	47JE0904	1,207	35.00%	3,453
KCV	47JE0379	562	29.30%	1,916
Schmeling	47JE0833	402	37.92%	1,060
Carcajou Pt.	47JE0002	223	49.40%	451
Total		2,394	34.8%	6,880

Table 4.40. Local vs. Non-Local Materials of Koshkonong Sites (Adapted from Sterner 2018)

Raw Material	KCV		CBHC		Carcajou		Schmeling	
	N	%	N	%	N	%	N	%
Local	400	94%	447	83%	21	100%	53	79%
Non-Local	25	6%	92	17%	0	0%	14	21%

Table 4.41. Basic forms represented in the Koshkonong locality lithic assemblages.

Site Name	Site No.	Biface		Uniface		Edge Only		Multiface		Nonfacial	
CBHC	47JE0904	119	22%	54	10%	345	64%	21	4%	0	0%
KCV	47JE0379	64	15%	41	10%	310	73%	10	2%	0	0%
Schmeling	47JE0833	32	48%	10	15%	22	33%	2	3%	1	1%
Carcajou Pt.	47JE0002	8	38%	0	0%	11	52%	2	10%	0	0%

CHAPTER 5: DISCUSSION AND CONCLUSIONS

The focus of this project was to provide a comprehensive inventory of both functional and morphological traits displayed by the stone tools and debris found at the Schmeling site and then contrast these results against the repeated patterns that have been identified at other Oneota sites within the Koshkonong locality. Based on the fact that Schmeling is the only site in the locality with what appears to contain a specialized burial area, plus McTavish's inferences based on the zooarchaeological data, I generated a series of expectations that the Schmeling lithic assemblage should fulfill if it was a village site versus a mortuary district. Below I review each of these expectations in light of the data discussed in the forgoing chapters.

Village Expectations	Confirmed
Materials present within the assemblage will be composed primarily of locally sourced material of poor to fair quality.	**Yes**
The relatively mediocre quality of local materials will result in a high frequency of heat treatment to improve knapping characteristics.	**No**
Mortuary District Expectations	**Confirmed**
There should be a large percentage of good quality material.	**No**

Residents of the Schmeling site appear to have a strong preference for poor to fair local materials, with over 70% of their tools being locally sourced, which coincides with the affinity for poor to mediocre quality materials witnessed at other Oneota sites (Gibbon 1986; Hall 1962; Jeske 1992; Jeske and Sterner-Miller 2015; O'Gorman 1995; Rodell 1989; Rosebrough and Broihahn 2005; Sterner 2012, 2018, 2020; Wilson 2016). Heat treatment of raw material was common but not overwhelmingly present, with 36% of the tools and 38% of debitage exhibiting evidence for heat treatment. In general, Middle and Late Woodland sites in northern Illinois have much better raw material quality than Oneota or other Upper Mississippian sites, so the Koshkonong locality results are not surprising (Jeske 1987, 1989, 2003c).

These observations align with our expectations for a village site; however, the Schmeling site displays a more diversified raw material collection compared to Crescent Bay and KCV, which were sourced predominately from the surrounding local area in rates ranging from 81-87% (Sterner 2018). The presence of several Burlington chert, silicified sandstones and quartzite sourced far to the west of the site indicates that Schmeling inhabitants did occasionally venture far afield, or that individuals from the west visited Lake Koshkonong, or that there existed some network of exchange and interaction among Oneota Localities. Of these material types, over 75% (n=49, 74.24%) were of fair quality and nearly 23% (n=15, 22.73%) were considered poor quality. Only 3% were considered good quality (Table 4.18). Over 50% of the tools had no cortex remaining and approximately 40% of the tools had less than 50% cortex.

Although the quality of raw materials at the Schmeling site do not conform exactly to the expectations set by Jeske, the presence of exotic materials makes it hard to rule the site out as a mortuary district. Koshkonong appears to be spatially isolated from contemporaneous Oneota settlements but within close proximity of Middle Mississippian Aztalan (47JE0001) (Jeske 2020). The placement of the Lake Koshkonong locality combined with osteological evidence of violence (Jeske 2014, 2020) could also explain a reliance on poor quality materials as a result of avoiding interpersonal conflict. The presence of any high-quality material or materials that required long-distance travel or exchange could be indicative of the cultural importance the resulting tool held within the site or community. Even materials we think of as local materials may have been considered relatively expensive by the occupants of the Schmeling site when contextualized within the increasing violence across the landscape. If greater effort was expected to be expended in funerary activities, that expectation may have been achievable with less distant materials than in generations past.

Village Expectations	Confirmed
Formal tool types will be limited and crude/expedient tool forms will make up the majority of the assemblage	**Yes**
Mortuary District Expectations	**Confirmed**
The large amount of good quality material should result in a large percentage of high energy-input tools.	**No**
If there is a large percentage of high-quality material, there should be a weak relationship between the quality of raw material and the amount of energy put into tool manufacture.	**No**
For bifaces, the relationship between quality of raw material and tool refinement should be weak.	**Yes**
There should be little difference in artifact size between good and poor-quality materials at a ritual site.	**Yes**

Since the vast majority of the tools recovered from Wisconsin Oneota sites are expediently knapped from local materials, it was expected that edge only flake tools would be the dominate form present within this assemblage. However, unlike the other Koshkonong sites compared in this study, bifacial tools were the most popular tool form present; rejecting the expectation set for an Oneota village site. The anomalous predominance of bifacial tools and slightly higher percentage of unifacial tools compared to the other Koshkonong sites point to the possibility of a higher accepted level of effort and energy being expelled for lithic production at Schmeling.

If we substitute good quality for diverse raw materials (as outlined above), the Schmeling assemblage conforms to several mortuary site expectations. Despite the fair quality of most materials, flaked technology outweighed expedient tools and the quality of these materials did not appear to affect the level of refinement across the unifacial and bifacial tools. Additionally, all of the tools from the Schmeling assemblage were generally the same size and do not appear to be influenced by the quality of the materials; further confirming the expectations for a mortuary district.

The Schmeling site was subject to decades of surface collection by the Schmeling family. Collector bias with tool forms that are easily recognizable likely occurred over the past 80 years, which makes the fact that there were more refined tools than expedient tools a noteworthy observation that signals a clear difference between Schmeling and the other Koshkonong sites.

Village Expectations	Confirmed
A range of size grades and types of debitage would be present. Flakes of the smallest size grade may occur in greater numbers than other site types due to later-stage tool production and maintenance taking place.	**No**
Mortuary District Expectations	**Confirmed**
There should be little artifact manufacturing occurring at the site because of its presumed task-specific (e.g., mortuary) nature.	**No**

Prompted by the reductive nature of knapping, it was assumed that a range of size grades and types of debitage would be present if Schmeling was a continuously occupied habitation site. A high ratio of flakes to tools would signal early or consistent manufacturing taking place. Flakes of the smallest size grade would occur in greater numbers than other site types due to later-stage tool production and maintenance and a low percentage of cortex would also signal that late-stage lithic production was taking place at the site.

The ratio of flakes to tools at Schmeling is comparatively high when contrasted against nearby sites and lends credence to the idea that more time-consuming manufacture was taking place; confirming a village expectation. Additionally, when comparing KCV, CBHC, and Schmeling, the distribution of debitage size grades differ minimally as the 2nd largest size grade was the most common across all three assemblages (Table 5.1). The most noticeable difference is that CBHC had the largest percentage of the smallest size grade debitage while they are virtually absent at KCV and Schmeling. CBHC also had the most cortex present across the three sites signaling a different phase of tool production/use taking place at CBHC - despite being situated within close proximity of Schmeling.

Table 5.1. Koshkonong Debitage Size Grades

Size Grades	KCV		CBHC		Schmeling	
1: <8mm	19	1%	311	9%	10	1.00%
2: 8-12.5m	326	17%	657	19%	166	16%
3: 12.5-25mm	1169	61%	2039	59%	688	65%
4: >25mm	402	21%	449	13%	196	18%

As noted previously, the methods of recovery varied between the sites in this study and the number of smaller size grade debitage could be potentially skewing the perception of these assemblages. It is also possible, since edge only tools compose a significant portion of the Koshkonong tools, raw materials could have been brought into the site as previously roughed out blanks and then quickly flaked to make efficient functional tools or more refined pieces. Their efficient manufacture could also skew the size grades of the flakes present.

Village Expectations	**Confirmed**
If there is a high proportion of high-quality materials or heat altered tools, we expect the presence of broken and recycled artifacts.	**No**
If not, we expect mostly likely expedient tool forms. Any evidence of reuse, reworking, and/or recycling would be unlikely.	**No**
Microwear analysis will confirm a range of contact materials and heavy use signaling daily routines. Expedient tools will be likely to have multiple contact materials exemplifying their flexible function within the site.	**Yes**
Mortuary District Expectations	**Confirmed**
We will expect to find few broken tools due to relatively short use episodes involved in ritual activity.	**Yes**

The Schmeling site lithic assemblage partially confirmed expectations for both a village and a mortuary district. Microwear analysis of the lithic tools showed that the highest frequency of contact was with meat or wet hide, followed by four other distinct contact materials. The Schmeling faunal assemblage had an even distribution of animals - unlike the other nearby Koshkonong sites - which could be linked to the high number of tools with traces of meat polish (McTavish 2019). The other Koshkonong sites displayed a similar level of diversity among the identified contact materials which would suggest that the Schmeling site confirms the expectations for a village. Microwear analysis in this study noted the limitations of relying on traditional morphofunctional analysis for identifying tool use as function was often not defined by their recognizable forms. Multiple contact materials exemplified the flexible function of tools within the site and the dynamic use-life of the tools that could have been missed otherwise.

Despite the raw materials having a relatively uniform level of fair to poor quality, a range of refined formal tools were present at the site and were largely unbroken. Several tools exhibited instances of reuse/recycling signaling that expedient discard was not favored and suggestive of economic restriction and/or cultural importance. Completeness, in this case, could be considered indicative of a mortuary district because of the relatively short use episodes involved in ritual activity.

Village Expectations	Confirmed
Formal tool types will be limited and crude/expedient tool forms will make up the majority of the assemblage	**No**
Materials present within the assemblage will be composed primarily of locally sourced material of poor to fair quality.	**Yes**
The relatively mediocre quality of local materials will result in a high frequency of heat treatment to improve knapping characteristics.	**No**
A range of size grades and types of debitage would be present. Flakes of the smallest size grade may occur in greater numbers than other site types due to later-stage tool production and maintenance taking place.	**No**
If there is a high proportion of high-quality materials or heat altered tools, we expect the presence of broken and recycled artifacts.	**No**
If not, we expect mostly likely expedient tool forms. Any evidence of reuse, reworking, and/or recycling would be unlikely.	**No**
Microwear analysis will confirm a range of contact materials and heavy use signaling daily routines. Expedient tools will be likely to have multiple contact materials exemplifying their flexible function within the site.	**Yes**
Mortuary District Expectations	**Confirmed**
There should be a large percentage of good quality material.	**Yes***
The large amount of good quality material should result in a large percentage of high energy-input tools.	**Yes***
If there is a large percentage of high-quality material, there should be a weak relationship between the quality of raw material and the amount of energy put into tool manufacture.	**No**
For bifaces, the relationship between quality of raw material and tool refinement should be weak.	**Yes**
We will expect to find few broken tools due to relatively short use episodes involved in ritual activity.	**Yes**
There should be little difference in artifact size between good and poor-quality materials at a ritual site.	**Yes**
There should be little artifact manufacturing occurring at the site because of its presumed task-specific (e.g., mortuary) nature.	**No**

**Substitute non-local materials for good quality*

The Schmeling site appears to be devoid of any structures that would provide evidence of a year-round occupation or any types of specific occupation-related activities in the excavated portions of the site. However, given the foci of artifacts within the field, it is very possible that modern disturbance has destroyed the evidence of a structure(s). Kevin Schmeling (personal communication to R. Jeske) indicated that a rectangular, dark organic soil feature once was apparent in the agricultural field, but has long ago been plowed away. It is possible that this rectangular soil feature was a structure of some sort, but we have no good way to examine the possibility. In comparison, Carcajou Point, KCV, and Crescent Bay, have been confirmed as small villages with structures of multiple types and facilities for disposal of the dead. Apart from this lack of structural evidence, the key difference between the four sites appears to be the amount of energy expended on stone tool production. While the results of this analysis highlight several commonalities across the Koshkonong sites, the number of flaked/refined tools and the use of non-local materials at Schmeling suggest different cultural activities took place and that reinterpretation of the site is appropriate. McTavish (2019) suggested that Schmeling may be a mortuary district and it is the opinion of this researcher that the activities taking place within the site likely revolved around funerary aspects such as mound building, burial/internment, ancestor veneration, and feeding those performing mortuary activities, as opposed to the daily chores that would have been included within a village site.

Mortuary programs within the Koshkonong Locality are highly variable (Foley-Winkler 2004, 2011; Jeske et al. 2013; Jeske et al. 2017; Jeske 2020, Sterner Miller 2020). The pattern of spatially distinct mortuary areas separated from the residential village, in addition to burials within the village, has been seen within other Oneota Localities (O'Gorman 2001). Considering that Crescent Bay Hunt Club, Crab Apple Point and Schmeling are all located atop the same limestone bluff, it is very possible that Schmeling site served as a mortuary precinct separated by natural draws and by ritual use from nearby Koshkonong sites.

The lithic assemblage from the Schmeling site has the potential to contribute to the understanding of the cultural landscape of the people who settled around Lake Koshkonong. The context in which tools were to be used is crucial in understanding the economic choice and functionality of prehistoric tool kits. Therefore, residue analysis should be conducted to present a holistic picture of the role chipped stone tools served within the site and to serve as a check for the conclusions but forth in this thesis. Because of the similarities across their assemblages, further comparisons between the Schmeling site and neighboring Koshkonong sites should be undertaken to observe patterning in their economic choices and cultural activities. To further support the redesignation of the Schmeling site as a funerary area, future research should compare the economic choices and the presence of formal tools across other Oneota sites with separate mortuary districts.

REFERENCES CITED

Anderson, Adrian, Allan Westover, Terrance J Martin, Matthew L Murray, Susan M.T. Myster, Barbara O'Connell and L. Anthony Zalucha

1995 The State Road Coulee Site: 47LC176. *The Wisconsin Archaeologist*, 76 (1-2), 48-230.

Andrefsky, William

2005 *Lithics: Macroscopic Approaches to Analysis*. Cambridge University Press, Cambridge, United Kingdom.

Arzigian, Constance

2000 Middle Woodland and Oneota contexts for wild rice exploitation in southwestern Wisconsin. *Midcontinental Journal of Archaeology*, 25 (2), 245–268.

1989 The Pammel Creek Site Floral Remains. *The Wisconsin Archaeologist*, 70 (1-2), 111- 156.

Arzigian, Constance A and Robert F Boszhardt

1989 Introduction, Environmental Setting and History of Investigations at the Pammel Creek Site. *The Wisconsin Archeologist*, 70 (1-2), 1-40.

Bamforth, Douglas B.

1991 Technological Organization and Hunter-Gatherer Land Use: A California Example. *American Antiquity*, 56 (2), 216-234.

1986 Technological Efficiency and Tool Curation. *American Antiquity*, 51(l), 38-50.

Baerreis, David A., and Reid A. Bryson

1965 Climatic Episodes and the Dating of the Mississippian Cultures. *The Wisconsin Archeologist,* 46 (4), 203–220

Baerreis, David Albert, Reid A. Bryson, and John E. Kutzbach

1976 Climate and Culture in the Western Great Lakes Region. *Midcontinental Journal of Archaeology*, 1(1), 39–57.

Barton, C. Michael

1990 Beyond Style and Function: A View from the Middle Paleolithic. *American Anthropologist*, 92 (1), 57–72.

Benchley, Elizabeth D, Blane Nansel, Clark A Dobbs, Susan M Thurson Myster and Barbara H O'Connell

1997 Archeology and Bioarcheology of the Northern Woodlands. In *Central and Northern Plains Archeological Overview*. Arkansas Archeological Survey Research Series No. 52. Arkansas Archeological Survey, Fayetteville.

Berres, T. E.

1998 O*neota Cultural Interaction in the Prairie Peninsula: A Study of Ceramic Vessels and Faunal Exploitation in Northern Illinois*, PhD Dissertation, Department of Anthropology, University of Illinois, Urbana -Champaign. ProQuest Dissertations Publishing.

Binford, Lewis

1979 Organization and Formation Processes: Looking at Curated Technologies. *Journal of Anthropological Research*, 35 (3), 255-273

1977 Forty-Seven Trips: A Case Study in the Character of Archaeological Formation Processes. In *Stone Tools as Cultural Markers: Change, Evolution, and Complexity*, edited by R. V. S. Wright, pp. 24–36. Australian Institute of Aboriginal Studies, Canberra

1962 Archaeology as Anthropology. *American Antiquity*, 28 (2), 217-225.

Binford, Lewis R and Sally R Binford

1966 A Preliminary Analysis of Functional Variability in the Mousterian of Levallois Facies. *American Anthropologist*, 68 (2), 238-295.

Binford, Sally R and Lewis R Binford

1969 Stone Tools and Human Behavior. *Scientific American*, 220 (4), 70-84.

Boczkiewicz, Roberta

2011 Faunal Analysis. In *Final Report: Archaeological Monitoring and Recovery of Subroadbed Deposits at the Schrage Site, Calumetville, WI*, edited by S. A. Schneider and J. D. Richards, Archaeological Research Laboratory Reports of Investigation 180. University of Wisconsin-Milwaukee, Milwaukee, Wisconsin.

Bordes, Francois

1953 Essai de Classification des industries moustériennes. *Bulletin de la Société Préhistorique de France*, 50 (7-8), 457-466.

Boszhardt, Robert F

1998 Oneota Horizons: A La Crosse Perspective. The *Wisconsin Archeologist*, 79, 196–226.

1994 Oneota group continuity at La Crosse: the Brice Prairie, Pammel Creek, and Valley View phases. The *Wisconsin Archeologist*, 75(3), 173–236.

Boszhardt, Robert F. and Joelle McCarthy

1999 Oneota End Scrapers and Experiments in Hide Dressing: An Analysis From the La Crosse Locality. *Midcontinental Journal of Archaeology*, 24 (2), 177-199

Brink, J. W.

1978 *Experimental study of microwear formation on endscrapers*. M.A. Thesis. University of Alberta.

Brown, James A., and David L. Asch

1990 Cultural Setting: The Oneota Tradition. In *At the Edge of Prehistory: Huber Phase Archaeology in the Chicago Area*, edited by James A. Brown and Patricia J. O'Brien, pp. 145–154. Illinois Department of Transportation, Springfield, Illinois, and Center for American Archaeology, Kampsville, Illinois.

Brown, J. A. and R. F. Sasso

2001 Prelude to History on the Eastern Prairies. In *Societies in Eclipse*, edited by D. S. Brose, R. C. Mainfort and C. W. Cowan, pp. 205-228. Smithsonian Institution Press, Washington D.C

Buikstra, Jane E., Jerome C. Rose and George R. Milner

1994 A Carbon Isotopic Perspective on Dietary Variation in Late Prehistoric Western Illinois. In *Agricultural Origins and Development in the Midcontinent*, edited by W. Green, pp. 155-167. Report 19. Office of the State Archaeologist: The University of Iowa, Iowa City.

Carpiaux, Natalie

2018 *The Koshkonong Creek Village Site (47JE0379): Ceramic Production, Function, and Deposition at an Oneota Occupation in Southeastern Wisconsin*. Masters Thesis, Department of Anthropology, University of Wisconsin-Milwaukee. ProQuest Dissertations Publishing.

Carter, M.

2002 *Prehistoric ceramic production: Raw materials and firing methods of the La Crosse locality Oneota.* Undergraduate Senior Thesis, Department of Sociology and Archaeology, University of Wisconsin-La Crosse.

Charles, Douglas K.

1995 Diachronic Regional Social Dynamics: Mortuary Sites in the Illinois Valley/American Bottom Region. In *Regional Approaches to Mortuary Analysis*, edited by L. A. Beck, pp. 77-99. Plenum, New York, New York.

Edwards IV, Richard W

2020a Risky Landscapes: Agriculture and Risk Management in Upper Mississippian Societies. In *Llife, Death and Landscapes at Lake Koshkonong: Oneota*

Archaeology in Southeastern Wisconsin, edited by Robert J. Jeske, Richard W. Edwards IV and Katherine M. Sterner, pp. 63-82. MidContinental Journal of Archaeology Occasional Publication 4.

2020b *Indigenous Life around the Great Lakes: War, Climate, and Culture*. University of Notre Dame Press, Notre Dame, Indiana.

2017 *The Canine Surrogacy Approach and Paleobotany: An Analysis of Wisconsin Oneota Agricultural Production and Risk Management Strategies*. Doctoral Dissertation, Department of Anthropology, University of Wisconsin-Milwaukee.

2010 *Oneota Settlement Patterns Around Lake Koshkonong in Southeast Wisconsin: an Environmental Catchment Analysis Using GIS Modeling*. Master's Thesis, Department of Anthropology, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin.

Edwards, Richard W., IV, and Robert Jeske

2015 *Lake Koshkonong Locality's Place in the Oneota Cultural Landscape of the Lake Michigan Basin*. Paper presented at the 59th Annual Meeting of the Midwest Archaeological Conference, Milwaukee, Wisconsin.

Edwards IV, Richard W, Natalie Carpiaux and Robert J Jeske

2017 Archaeology Around Wisconsin: University of Wisconsin-Milwaukee Program in Midwestern Archaeology. *The Wisconsin Archeologist*, 98 (1-2), 265-266.

Egan-Bruhy, Kathryn C

2014 Ethnicity as Evidence in Subsistence Patterns of Late Prehistoric Upper Great Lakes Populations. In *Reassessing the Timing, Rate, and Adoption Trajectories of Domesticate Use in the Midwest and Great Lakes*, edited by Maria E. Raviele and William A. Lovis, pp. 53-72. Midcontinental Journal of Archaeology Occasional Papers.

Emerson, Thomas E. and Eve Hargrave

2000 Strangers in Paradise? Recognizing Ethnic Mortuary Diversity On The Fringes Of Cahokia. *Southeastern Archaeology*, *19*(1), 1–23.

Emerson, Thomas E, Kristin M Hedman, Robert E Warren and Mary L Simon

2010 Langford Mortuary Patterns as Reflected in the Material Service Quarry Site in the Upper Illinois River Valley. *The Wisconsin Archaeologist*, 9 (1), 1-78.

Evans, Adrian A

2014 On the Importance of Blind Testing in Archaeological Science: An Example from Lithic Functional Studies. *Journal of Archaeological Science*, 48, 5-14.

Flenniken, J. J. and A. W. Raymond

1986 Morphological Projectile Point Typology: Replication, Experimentation, and Technological Analysis. *American Antiquity*, 51 (3), 603-614.

Foley Winkler, Kathleen M.

2011 *Oneota and Langford Mortuary Practices from Eastern Wisconsin and Northeast Illinois.* PHD Dissertation, Department of Anthropology, University of Wisconsin-Milwaukee.

2008a *Investigations at the Schmeling Site (47JE833)*. Paper presented at the 54th Annual Midwest Archaeological Conference, Milwaukee.

2008b *Field Notes Schmeling Site 47JE833*, 2008 University of Wisconsin-Milwaukee Archaeological Field School. Papers on file at the University of Wisconsin-Milwaukee. University of Wisconsin-Milwaukee, Archaeological Research Laboratory, Milwaukee.

2006a *Excavations at the Schmeling Site (47JE833)*. Paper presented at the Midwest Archaeological Conference, Urbana.

2006b *Field Notes Schmeling Site 47JE833*, 2006 University of Wisconsin-Milwaukee Archaeological Field School. Papers on file at the University of Wisconsin-Milwaukee. University of Wisconsin-Milwaukee, Archaeological Research Laboratory, Milwaukee.

2004 *Oneota Mortuary Practices in Southeastern Wisconsin*. Master's Thesis. Department of Anthropology, University of Wisconsin–Milwaukee.

Gibbon, G. E.

1986 The Mississippian Tradition: Oneota Culture. *The Wisconsin Archeologist*, 67 (2), 314-338.

1972 Cultural Dynamics and the Development of the Oneota Life-Way in Wisconsin. *American Antiquity*, *37* (2), 166-185.

1969 *The Walker-Hooper and Bornick sites; two Grand River phase Oneota sites in Central Wisconsin*. Unpublished Ph.D. dissertation, Department of Anthropology, University of Wisconsin-Madison. Madison, Wisconsin

Goatley, Daniel B

1995 Chipped-stone Analysis. In *The Tremaine Site*, edited by J. O'Gorman, pp. 145-164. Museum Archaeology Program, Archaeology Research Series Number 3, Madison, Wisconsin.

Goldstein, Lynne and Robert Kind

1987 The Early Vegetation. In *The Southeast Wisconsin Archaeological Project: 1982-1983*, edited by Lynne Goldstein, pp. 18-37. Archaeological Research

Laboratory Reports of Investigation 88. University of Wisconsin-Milwaukee, Milwaukee, Wisconsin.

Goldstein, Lynne and John D. Richards

1991 Ancient Aztalan: The Cultural and Ecological Context of a Late Prehistoric Site in the Midwest. In *Cahokia and the Hinterlands*, edited by T. E. Emerson and R. B. Lewis, pp. 193-206. University of Illinois Press, Urbana.

Goodyear, Albert C.

1993 Tool Kit Entropy and Bipolar Reduction: A Study of Interassemblage Lithic Variability among Paleo-Indian Sites in the Northeastern United States. *North American Archaeologist*, 14 (1), 1-23.

Green, William, & Rodell, Roland L.

1994 The Mississippian Presence and Cahokia Interaction at Trempealeau, Wisconsin. *American Antiquity, 59* (2), 334-359.

Griffin, J. B.

1960 A Hypothesis for the Prehistory of the Winnebago. In *Culture in History*, edited by S. Diamond. Columbia University Press, New York, New York.

Griffin, John Wallace

1946 *The Upper Mississippian Occupations of the Fisher Site, Will County, Illinois.* Unpublished Master's Thesis, Anthropology, University of Chicago.

Hall, R. L.

1962 *The Archaeology of Carcajou Point*. University of Wisconsin Press, Madison, Wisconsin.

Hammerstedt, Scott W and Erin R Hughes

2015 Mill Creek Chert Hoes and Prairie Soils: Implications for Cahokian Production and Expansion. *Midcontinental Journal of Archaeology*, 40 (2), 149-165.

Hardy, Bruce L., M. Bolus, and N. J. Conard

2008 Hammer or Crescent Wrench? Stone Tool Form and Function in the Aurignacian of Southwest Germany. *Journal of Human Evolution*, 54, 648-662.

Hart, John P.

1998 Managing Oneota: A Reiteration and Testing of Contemporary Archaeological Taxonomy. *The Wisconsin Archaeologist*, 79 (2), 9-28.

1990 Modeling Oneota Agricultural Production: A Cross-Cultural Evaluation. *Current Anthropology*, 31 (5), 569-577.

Henning, Dale R

1998 Managing Oneota: A Reiteration and Testing of Contemporary Archaeological Taxonomy. *The Wisconsin Archeologist*, 79, 9–28

Hollinger, R. Eric

1995 Residence Patterns and Oneota Cultural Dynamics. In *Oneota Archaeology: Past, Present, Future,* edited by William Green, pp. 141-174. Office of the State Archaeologist, University of Iowa, Iowa City.

Hunter, Chrisie L.

2002 Understanding Upper Mississippian subsistence and settlement through the use of catchment analysis: An Oneota and Langford perspective. *The Wisconsin Archeologist,* 83 (2), 76-97.

Jeske, Robert J

2020 The Social Landscape of 11th to 15th Century Lake Koshkonong. In *Life, Death and Landscapes at Lake Koshkonong: Oneota Archaeology in Southeastern Wisconsin*, edited by Robert J. Jeske, Richard W. Edwards IV and Katherine M. Sterner, pp. 103-118. Midwest Archaeological Conference Occasional Papers 4.

2014 *Violence in the Wisconsin Oneota World: New Evidence from Lake Koshkonong.* Paper presented at the Midwest Archaeological Conference, Champaign, Illinois.

2003a Langford and Fisher Ceramic Traditions: Moiety, Ethnicity or Power Relations in the Upper Midwest? *The Wisconsin Archeologist*, 84 (1&2), 165-180.

2003b *Lake Koshkonong 2002/2003: Archaeological Investigations at Three Sites in Jefferson County, Wisconsin.* University of Wisconsin-Milwaukee.

2003c Lithic Raw Material Procurement and Use Within Mississippian Social Networks. In *Theory, Method and Practice in Modern Archaeology*, edited by R.J. Jeske and D. K. Charles, pp. 223-237. Praeger Publishers, Westport, Connecticut

2001 Crescent Bay Hunt Club: Radiocarbon Dates and Research Summary. In *Program in Midwestern Archaeology (Southeastern Wisconsin Archaeology Program)* edited by R. J. Jeske, pp. 4-12. vol. Number 148.

2000 Continuing Investigations at Crescent Bay Hunt Club Site (47-Je-904), Jefferson County. In *The Southeastern Wisconsin Archaeology Project: 1999-2000*, edited by Robert J. Jeske, pp. 4-44. Archaeological Research Laboratory Report of Investigations 144. University of Wisconsin-Milwaukee, Milwaukee.

1992 Energetic Efficiency and Lithic Technology: An Upper Mississippian Example. *American Antiquity*, 57 (3), 467-481.

1989 Economies in Lithic Use Strategies among Prehistoric Hunter-Gatherers. In *Time, Energy, and Stone Tools*, edited by Robin Torrance, pp. 34-45. Cambridge University Press, Cambridge.

1989 Horticultural Technology and Social Interaction at the Edge of the Prairie Peninsula. *Illinois Archaeology*, 1, 103–120.

1987 *Efficiency, Economy, and Prehistoric Lithic Assemblages in the American Midwest*. Ph.D. dissertation, Department of Anthropology, Northwestern University.

Jeske, Robert J., Katherine M. Sterner and Richard W. Edwards IV (editors)

2020 *Life, Death and Landscapes at Lake Koshkonong: Oneota Archaeology in Southeastern Wisconsin*. Midwest Archaeological Conference Occasional Papers 4.

Jeske, Robert J., Katherine M. Sterner and Richard W. Edwards IV

2020 New Perspectives from Lake Koshkonong. In *Life, Death and Landscapes at Lake Koshkonong: Oneota Archaeology in Southeastern Wisconsin*, edited by Robert J. Jeske, Richard W. Edwards IV and Katherine M. Sterner, pp. 1-26. Midwest Archaeological Conference Occasional Papers 4.

Jeske, Robert J., Richard W. Edwards IV, Katherine M. Sterner-Miller, and Robert Ahlrichs

2015 Archaeology around Wisconsin: University of Wisconsin–Milwaukee-PIMA. *The Wisconsin Archeologist*, 96, 123–125.

Jeske, Robert J., and Kathleen M. Foley Winkler

2001 Analysis of the Crescent Bay Hunt Club Burials. In *Program in Midwestern Archaeology (Southeastern Wisconsin Archaeology Program): 2000–2001*, edited by Robert J. Jeske, pp. 80–94. Archaeological Research Laboratory Reports of Investigation 148. University of Wisconsin-Milwaukee, Milwaukee, Wisconsin.

Jeske, Robert J, Kathleen M Foley Winkler, Timothy Dahlen and Louise C Lambert

2003 Continuing Investigations at the Crescent Bay Hunt Club Site (47Je904), Jefferson County. In *Lake Koshkonong 2002/2003: Archaeological Investigations at Three Sites in Jefferson County, Wisconsin*, edited by R. J. Jeske, pp. 6-94. Archaeological Research Laboratory Reports of Investigation 153. University of Wisconsin-Milwaukee, Milwaukee, Wisconsin.

Jeske, Robert J and Katherine M. Sterner-Miller

2015 Microwear Analysis of Bipolar Tools from the Crescent Bay Hunt Club Site (47Je904). *Lithic Technology*, 40(4), 366-376.

2014 *Report on the Discovery of Human Remains at the Crescent Bay Hunt Club Site (47Je904), Jefferson County, Wisconsin.* Archaeological Research Laboratory Reports of Investigation 248. University of Wisconsin-Milwaukee, Milwaukee, Wisconsin.

Jeske, Robert J., Katherine M. Sterner, David M. Strange, Richard W. Edwards IV, and Robert E. Ahlrichs

2017 R*eport on the Discovery of Human Remains at the Crescent Bay Hunt Club Site (47JE904), Jefferson County, Wisconsin.* Archaeological Research Laboratory Reports of Investigation 454. University of Wisconsin-Milwaukee, Milwaukee, Wisconsin.

Jeske, R. J. and R. Lurie

1993 Archaeological Visibility of Bipolar Technology: An Example From the Koster Site. *Midcontinental Journal of Archaeology*, 18 (2), 131-160.

Jeske, Robert J and Daniel M Winkler

2008 The Clovis Occupation of the Schmeling Site (47JE833) in Jefferson County, Wisconsin*. Current Research in the Pleistocene, 25*, 99-102.

Jeske, Robert J., Daniel M. Winkler and Chrisie L. Hunter

2002 Paleoindian and Archaic Occupations of the Kelly North Tract at Carcajou Point in Southeast Wisconsin. *The Wisconsin Archeologist* , 83, 5-31.

Jirasek, Rachel Marie.

2002 *Statistic and Visual Patterns within Oneota Pottery.* Masters Thesis, Department of Anthropology, University of Wisconsin-La Crosse.

Juel Jensen, Helle

1994 *Flint Tools and Plant Working*. Aarhus University Press, Aarhus, Denmark.

Justice, Noel D

1995 *Stone Age Spear and Arrow Points of the Midcontinental and Eastern United States*. Indiana University Press, Bloomington, Indiana.

Kamminga, Johan

1982 *Over the Edge: Functional Analysis of Australian Stone Tools.* Occasional Papers in Anthropology 12. Anthropology Museum, University of Queensland, Queensland, Australia.

Karsten, Jordan K., Robert J. Jeske, Richard W. Edwards, David Strange, Kayla Kubehl and Jeffery A. Behm

2019 Assessing Subsistence and Its Relationship to Cultural Complexity in the Late Prehistoric Upper Midwest: A New Perspective Provided by Dental Health. *American Journal of Physical Anthropology* 168:750-763.

Keyes, Charles Reuben

1927 Some Methods and Results of the Iowa Archaeological Survey. *The Wisconsin Archeologist,* 8 (4), 135-143.

Keeley, Lawrence H

1980 *Experimental Determination of Stone Tool Uses: a Microwear Analysis*. University of Chicago Press, Chicago, Illinois.

Keeley, Lawrence H and Mark H Newcomer

1977 Microwear Analysis of Experimental Flint Tools: a Test Case. *Journal of Archaeological Science,* 4, 29-62.

Kawasaki, J. M.

2011 *Analysis of stylistic attributes on Oneota pottery from the Pammel Creek site, La Crosse, Wisconsin*. Undergraduate Senior Thesis, Department of Sociology and Archaeology, University of Wisconsin-La Crosse.

Kuznar, Lawrence A., and Robert J. Jeske

2006 Analogic Reasoning, Ethnoarchaeology, and the Impact of Canines on the Archaeological Record. *Integrating the Diversity of Twenty-First Century Anthropology: The Life and Intellectual Legacies of Susan Kent*, edited by Christopher Pool, pp. 37–46. Archaeological Papers of the American Anthropological Association 16. American Anthropological Association, Arlington, Virginia.

Lambert, Louise and Robert J. Jeske

2001 Analysis of Stone Tools from the 1998 Crescent Bay Hunt Club Excavations. In *Program in Midwestern Archaeology (Southeastern Wisconsin Archaeological Program*), edited by R. J. Jeske, pp. 84-104. vol. Number 148. Archaeological Research Laboratory, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin.

Lambert, Patricia M.

2002 The Archaeology of War: A North American Perspective. *Journal of Archaeological Research,* 10, 207-241.

Lurie, Rochelle

1989 Lithic Technology and Mobility Strategies: The Koster Middle Archaic. In *Time, Energy and Stone Tools,* edited by R. Torrence, pp. 46-56. Cambridge University Press, Cambridge.

Lurie, Rochelle and Robert J Jeske

1990 Appendix 1: Lithic Recording Scheme. In *At the Edge of Prehistory: Huber Phase Archaeology in the Chicago Area,* edited by J. A. Brown and P. J. O'Brien, pp. 284-290. Center for American Archaeology, Kampsville, Illinois.

Lyman, R.

2008 *Quantitative Paleozoology (Cambridge Manuals in Archaeology).* Cambridge: Cambridge University Press.

Marston, J.

2014 Ratios and simple statistics in paleoethnobotanical analysis: data exploration and hypothesis testing. In *Marston JM, D'Alpoin Guedes, J. Warinner C (eds) Method and Theory in Paleoethnobotany*. University Press of Colorado, Boulder.

Mason, R. J.

1981 *Great Lakes Archaeology*. Academic Press, New York, New York.

McKern, W. C

1945 *Preliminary Report on the Upper Mississippi Phase in Wisconsin.* Milwaukee Public Museum.

1942 The First Settlers of Wisconsin. *The Wisconsin Magazine of History*, 26 (2), 153-169.

1931 Wisconsin Pottery. *American Anthropologist*, 33 (3), 383-390.

McKusick, Marshall

1973 *The Grant Oneota Village Report 4*. Office of the State Archaeologist, Iowa City, Iowa.

McTavish, Rachel C.

2019 *Foodways, Sustainability, and a Violent Landscape: A Comparative Study of Oneota and Langford Human-Animal-Environmental Relationships.* PhD dissertation. Department of Anthropology, University of Wisconsin–Milwaukee.

Milner, George R.

2007 Warfare, Population, and Food Production in Prehistoric Eastern North America. In *North American Indigenous Warfare and Ritual Violence*, edited by Richard J. Chacon and Rubén G. Mendoza, pp. 182–201. University of Arizona Press, Tucson.

Milner, George R., Eve Anderson, and Virginia G. Smith

1991a Conflict, Mortality, and Community Health in an Illinois Oneota Population. In *Between Bands and States*, edited by Susan A. Gregg, pp. 245–264. Center for Archaeological Investigations Occasional Paper 9. Center for Archaeological Investigations, Southern Illinois University, Carbondale.

1991b Warfare in Late-Prehistoric West Central Illinois. *American Antiquity*, 56, 81–603.

Moss, Emily H

1986 What Microwear Analysts Look At. In *Technical Aspects of Microwear Studies on Stone Tools*, edited by L. R. Owen and G. Unrath, pp. 91-96. Early Man News 9/10/11, Tübingen, Germany.

1983 *The Functional Analysis of Flint Implements: Pincevent and Pont d' Ambon: Two Case Studies from the French Final Paleolithic*. BAR International Series 177, Oxford, England.

Moss, James

2010 *Intrasite Feature Analysis of the Crescent Bay Hunt Club (47Je904).* Master's Thesis, Department of Anthropology, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin.

Musil, Jennifer L

1987 The Lake Koshkonong Region: Survey and Effigy Mound Research. In *The Southeastern Wisconsin Archaeology Project: 1986-87 & Project Summar*y, edited by L. Goldstein, pp. 121-181. Reports of Investigations 88. University of Wisconsin Milwaukee Archaeological Research Laboratory, Milwaukee, Wisconsin.

Newcomer, M. H. & Keeley, L. H.

1979 Testing a method of microwear analysis with experimental flint tools. In (B. Hayden, Ed.) *Lithic Use-wear Analysis*. New York: Academic Press, pp. 195-205.

Neumann, M. K.

2017 *A Stylistic Analysis Using Multivariate Statistics of Oneota Pottery from the Upper Mississippi, Blue Earth, and St. Croix River Valleys*. ProQuest Dissertations Publishing.

Odell, George H

2004 *Lithic Analysis*. Kluwer Academic/Plenum Publishers, New York, New York.

1986 Review of Use-Wear Analysis of Flaked Stone Tools. *Lithic Technology*, 15, 115-120.

1981 The Mechanics of Use-Breakage of Stone Tools: Some Testable Hypotheses. *Journal of Field Archaeology*, 8 (2), 197-209.

1977 *The Application of Micro-Wear Analysis to the Lithic Component of an Entire Prehistoric Settlement: Methods, Problems and Functional Reconstruction.* Doctoral Dissertation, Department of Anthropology, Harvard University.

Odell, G. H. and F. Odell-Vereecken

1980 Verifying the Reliability of Lithic Use-Wear Assessments by 'Blind Tests': The Low-Power Approach. *Journal of Field Archaeology*, 7 (1), 87-120.

O'Gorman, Jodie

2001 Life, Death, and the Longhouse: A Gendered View of Oneota Social Organization. In *Gender and the Archaeology of Death*, edited by B. Arnold and N. L. Wicker, pp. 23-49. AltaMira Press, Walnut Creek, California.

1995 *Volume III: The Tremaine Site. The Tremaine Site Complex: Oneota Occupation in the La Crosse Locality, Wisconsin*. State Historical Society of Wisconsin, Madison, Wisconsin.

1994 *Volume II: The Filler Site. The Tremaine Site Complex: Oneota Occupation in the La Crosse Locality, Wisconsin*. State Historical Society of Wisconsin, Madison, Wisconsin.

1993 *Volume 1: The OT Site. The Tremaine Site Complex: Oneota Occupation in the La Crosse Locality, Wisconsin*. State Historical Society of Wisconsin, Madison, Wisconsin.

Olsen, M. L.

2003 *Oneota Subsistence on Southern Wisconsin: Agriculture and Plant Domestication at the Crescent Bay Hunt Club Site*. Master's Thesis, Department of Anthropology, University of Wisconsin-Milwaukee.

Overstreet, D. F.

2000 Cultural Dynamics of the Late Prehistoric Period in Southern Wisconsin. In *Mounds, Modoc, and Mesoamerica: Papers in Honor of Melvin L. Fowler,* edited by M. L. Fowler and S. R. Ahler, pp. 405-438. Illinois State Museum Scientific Papers, Vol. XXVIII, Springfield, Illinois.

1997 Oneota Prehistory and History. *The Wisconsin Archaeologist,* 78 (1-2), 250-296.

1995 The Eastern Wisconsin Oneota Regional Continuity. In *Oneota Archaeology: Past, Present, and Future,* edited by W. Green. vol. Report 20. Office of the State Archaeologist, Iowa City, Iowa.

1976 *The Grand River, Lake Koshkonong, Green Bay, and Lake Winnebago Phases: Eight Hundred Years of Oneota Prehistory in Eastern Wisconsin*. Department of Anthropology, University of Wisconsin-Milwaukee.

Overstreet, David F and Patricia B Richards (editors)

1992 *Archaeology at Lac des Puans*. Great Lakes Archaeological Press, Milwaukee, Wisconsin.

Padilla, Matthew J and Lauren W Ritterbush

2005 White Rock Oneota Chipped Stone Tools. *Midcontinental Journal of Archaeology,* 30 (2), 259-297.

Parshall, O.

2013 *Oneota ceramic continuity: Analysis of metric and symbolic attributes*. Undergraduate Senior Thesis, Department of Sociology and Archaeology, University of Wisconsin-La Crosse.

Plisson, Hugues and Manuelle Mauger

1988 Chemical and Mechanical Alteration of Microwear Polishes: An Experimental Approach. *Helinium*, 28, 3-16.

Pope, Melody K

2005 *Chipped Stone, Tools, and Towns: An Archaeological Study of Uruk Period Lithic Production and Use at Abu Salabikh, Iraq.* Doctoral Dissertation, Department of Anthropology, University of Binghamton.

Pozza, Jacqueline

2016 *Investigating the Functions of Copper Material Culture from Four Oneota Sites in the Lake Koshkonong Locality of Wisconsin*. Unpublished Master's Thesis, Department of Anthropology, University of Wisconsin-Milwaukee.

Rau, Charles

1869 A Deposit of Agricultural Flint Implements in Southern Illinois. *Annual Report of the Smithsonian Institution*, 401-407.

Richards, John D. and Robert J. Jeske

2015 *Preliminary Results of Accelerator Mass Spectrometry Dating of Food Residues on Prehistoric Ceramics from the Western Great Lakes and Prairie Peninsula Regions of the Midcontinent*. Archaeological Research Laboratory Reports of Investigation 370. University of Wisconsin-Milwaukee, Milwaukee, Wisconsin.

Rick, John W

1978 *Heat-Altered Cherts of the Lower Illinois Valley Research Records 2.* Northwestern University Archaeological Program, Evanston, Illinois.

Rodell, Roland L.

1989 The Pammel Creek Site Lithic Artifacts. In Human Adaptation in the Upper Mississippi Valley: A Study of the Pammel Creek Oneota Site (47 LC-61) La Crosse, Wisconsin. *The Wisconsin Archeologist,* 70 (1 & 2), 95-110.

1983 *The Late Prehistory of Eastern Wisconsin: A Survey of the Archaeological Research and Interpretations Pertaining to Oneota Settlement and Subsistence.* Unpublished Master's Thesis, Department of Anthropology, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin.

Rosebrough, Amy L and John H Broihahn

2005 *A Conundrum at Carcajou Point*. Office of the State Archaeologist, Wisconsin Historical Society, Madison, Wisconsin.

Salkin, Philip H

1989 *Archaeological Mitigation Excavations at Fox Lake, Dodge County, Wisconsin Report 500.* Archaeological Consulting Services, Madison, Wisconsin.

Sassaman, Kenneth E

1992 Lithic Technology and the Hunter-Gatherer Sexual Division of Labor. *North American Archaeologist,* 13, 249-262.

Sasso, Robert F.

2003a Agricultural Places and the Oneota Lifeway in Wisconsin. In *Theory, Method, and Practice in Modern Archaeology,* edited by R. Jeske and D. K. Charles, pp. 252-265. Praeger, Westport.

2003b Vestiges of Ancient Cultivation: The Antiquity of Garden Beds and Corn Hills in Wisconsin. *Midcontinental Journal of Archaeology*, 48, 195-231.

Schneider, Seth A.

2015 *Oneota Ceramic Production and Exchange: Social, Economic, and Political Interactions in Eastern Wisconsin between A.D. 1050 – 1400.* Masters Thesis, Department of Anthropology, University of Wisconsin-Milwaukee.

2006 *Field Notes Schmeling Site 47JE833*, 2006 University of Wisconsin-Milwaukee Archaeological Field School. Papers on file at the University of Wisconsin-Milwaukee. University of Wisconsin-Milwaukee, Archaeological Research Laboratory, Milwaukee.

Schurr, M. R.

2017 The Upper Mississippian Occupation at the Collier Lodge Site (12PR36): Ceramics and Chronology on the Eastern Edge of Oneota. *Midcontinental Journal of Archaeology,* 42 (1), 87-110.

Shott, Michael J.

1996 An Exegesis of the Curation Concept. *Journal of Anthropological Research*, 52, 259–281.

Spurrell, Flaxman

1892 Notes on Early Sickles. *Archaeological Journal,* 49, 53-59.

Staeck, John

1995 *Archaeology, Identity, and Oral Tradition: A Reconsideration of Late Prehistoric and Early Historic Winnebago Social Structure and Identity as see through Oral Traditions.* Unpublished Doctoral Dissertation, Department of Anthropology, New Brunswick Rutgers, The State University of New Jersey.

Sterner, Katherine M.

2020 Upper Mississippian Stone Tools and Community Organization. In *Life, Death and Landscapes at Lake Koshkonong: Oneota Archaeology in Southeastern Wisconsin*, edited by Robert J. Jeske, Richard W. Edwards IV and Katherine M. Sterner, pp. 27-46. MidContinental Journal of Archaeology Occasional Publication 4.

2018 *Stone Tools and Agricultural Communities: Economic, Microwear, and Residue Analyses of Wisconsin Oneota Lithic Assemblages*. Ph.D. Dissertation, Department of Anthropology, University of Wisconsin-Milwaukee.

2014 *Another Piece of the Puzzle: Ongoing Excavations at the Crescent Bay Hunt Club Oneota Site (47Je904).* Paper presented at the 60th Annual Meeting of the Midwest Archaeological Conference, Champaign, Illinois.

2012 *Oneota Lithics: A Use-Wear Analysis of the Crescent Bay Hunt Club Assemblage from the 2004 Excavations*. Master's Thesis, Department of Anthropology, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin.

Sterner, Katherine M. and Robert J. Jeske

2017 A Multi-Method Approach to Inferring Early Agriculturalists' Stone Tool Use at the Crescent Bay Hunt Club Site. *Midcontinental Journal of Archaeology*, 42 (1), 1-27.

Stevenson, Katherine P.

1985 *Oneota Subsistence-Related Behavior in the Driftless Area: A study of the Valley View Site Near La Crosse, Wisconsin*. Unpublished Ph.D. Dissertation, Anthropology, University of Wisconsin-Madison, Madison.

Stout, A B and H T Skavlem

1908 The Archaeology of the Lake Koshkonong Region. *The Wisconsin Archaeologist*, 7 (2), 1-102.

Styles, Bonnie W., and James R. Perdue

1991 Ritual and Secular Use of Fauna by Middle Woodland Peoples in Western Illinois. In *Beamers, Bobwhites, and Blue-Points: Tributes to the Career of Paul W. Parmalee,* edited by James R. Purdue, Walter W. Klippel, and Bonnie W. Styles, pp. 421–436. Scientific Papers 23, Illinois State Museum, Springfield.

Styles, Bonnie W and Karli White

1995 Analysis of Faunal Remains. In *The Tremaine Site (47Lc-95*), edited by J. O'Gorman, pp. 197-224. State Historical Society of Wisconsin, Madison, Wisconsin.

Theler, James L

1989 The Pammel Creek Site Faunal Remains. *The Wisconsin Archeologist*, 70 (1-2), 157- 242.

Theler, James L and Robert F Boszhardt

2006 Collapse of Crucial Resources and Culture Change: A Model for the Woodland to Oneota Transformation in the Upper Midwest. *American Antiquity*, 71, 433-472.

2000 The End of the Effigy Mound Culture: The Late Woodland to Oneota Transition in Southwestern Wisconsin. *Midcontinental Journal of Archaeology*, 25 (2), 289-312.

Tiffany, Joseph A

1998 Southeast Iowa Oneota: A Review. The Wisconsin Archeologist 79(2):147-164

Tringham, Ruth

1971 *Hunters, fishers and farmers of Eastern Europe, 6000-3000 B.C.* (3 Fitzroy Sq., W. 1), Hutchinson and Co. (Publishers) Ltd.

Tringham, Ruth, Glenn Cooper, George Odell, Barbara Voytek and Anne Whitman

1974 Experimentation on the Formation of Edge Damage: A New Approach to Lithics. *Journal of Field Archaeology*, 1 (1-2), 171-196.

Tubbs, Ryan M and Jodie O'Gorman

2005 Assessing Oneota Diet and Health: A Community and Lifeway Perspective. *Midcontinental Journal of Archaeology*, 30 (1), 119-163.

Twinde, V.

1994 *An analysis of the Oneota ceramics recovered from the Midway Site (47Lc19) in 1988*. Undergraduate Senior Thesis, Department of Sociology and Archaeology, University of Wisconsin-La Crosse.

Van Beckum, Jon and Robert J Jeske

2001 Analysis of Lithic Debris from Flotation Samples at the Crescent Bay Hunt Club Site. In *Program in Midwestern Archaeology (Southeastern Wisconsin Archaeology Program): 2000-2001*, edited by Robert J. Jeske, pp. 105-112. Archaeological Research Laboratory Reports of Investigation 148. University of Wisconsin-Milwaukee, Milwaukee, Wisconsin.

VanDerwarker, Amber M., and Gregory D. Wilson

2016 War, Food, and Structural Violence in the Mississippian Central Illinois Valley. In *The Archaeology of Food and Warfare: Food Insecurity in Prehistory*, edited by Amber M. VanDerwarker and Gregory D. Wilson, pp. 75–105. Springer, New York.

Vaughan, Patrick C

1985 *Use-Wear Analysis of Flaked Stone Tools*. University of Arizona Press, Tucson, Arizona.

Van de Pas, Lucienne, Rachel C. McTavish and Amy Klemmer

2015 *The Role of Animals in Oneota Subsistence and Agricultural Technology: A Case Study from the Lake Koshkonong Locality.* Paper presented at the Midwest Archaeological Conference, Milwaukee.

Vierra, R. K.

1975 *Structure versus Function in the Archaeological Record*. Unpublished Ph.D. dissertation, Department of Anthropology, University of New Mexico, Albuquerque.

Walker, Philip L.

1978 Butchering and Stone Tool Function. *American Antiquity,* 43, 710–715.

Wilson, Stephen W

2016 *A Comparison of Oneota and Langford Lithic Assemblages in Southern Wisconsin and Northern Illinois*. Unpublished Master's Thesis, Department of Anthropology, University of Wisconsin-Milwaukee.

Winkler, Daniel M.

2011 *Plainview Lithic Technology and Late Paleoindian Social Organization in the Western Great Lakes*. Department of Anthropology, University of Wisconsin-Milwaukee.

2004 *Kelly North Phase: Transitional Middle to Late Archaic Lithic Technology at Carcajou Point in Southeastern Wisconsin*. Master's Thesis, Department of Anthropology, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin.

Winkler, Daniel M, Dustin Blodgett and Robert J Jeske

2005 *The Lithic Resources of Wisconsin: A Guide to Lithic Materials that are Recovered on Archaeological Sites in Wisconsin.* University of Wisconsin-Milwaukee Archaeological Research Laboratory.

APPENDIX A:
Chipped Stone Recording Scheme

A. Provenience: All artifacts are given a unique number which identifies site and location within the site.

B. Catalogue Number: The catalogue number is an arbitrary number assigned as a short code for the provenience.

C. Tool Number: Each tool is given a unique number within its provenience.

D. Raw Material: Raw material is identified using the comparative collection at the UWM archaeological laboratory. Identification is done by visual comparison, with low power magnification (if necessary) to aid in fossil identification. See Ferguson and Warren (1992 (Illinois Archaeology) for an excellent resource for northern Illinois cherts.

1. Unknown
2. Galena Chert
3. Silurian Chert (Niagara Formation)
4. Maquoketa Chert
5. Upper Prairie du Chien Chert (Shakopee Formation, oolitic)
6. Lower Prairie du Chien Chert (Oneota Formation)
7. Platteville Formation Chert
8. Cochrane / Chocolate Chert
9. Unknown Silicified Sandstone
10. Hixton Silicified Sandstone
11. Alma Silicified Sandstone
12. Arcadia Ridge Silicified Sandstone
13. Baraboo Quartzite
14. Barron County Quartzite
15. Barron County Pipestone
16. Quartz
17. Rhyolite
18. Basalt

19. Knife River Flint
20. Burlington Chert
21. Unknown Quartzite
22. Moline Chert
23. Wyandotte Chert
24. Unknown Chalcedony
25. Flint Ridge Chert
26. Pecatonica Chert
27. Excello Shale
28. Silurian (Joliet Formation)\

E. Raw material quality: This variable is also defined using comparative samples. Inclusions, fossils, fracture planes, and grain size are used to determine quality.

1. Good
2. Fair
3. Poor
4. Can't Determine.
5. Not Applicable for non-chert flaked artifacts

F. Amount of Cortex: For flake artifacts this variable refers to the percent of the dorsal surface which is covered with cortex or patina. For bifacial and multifacial artifacts the variable refers to the percent of cortex or patina on all surfaces. Patina which has accumulated since the manufacture of the artifact, that is, patination covering flake scars is ignored.

1. 0
2. <50
3. >50, <100
4. 100

G. Heat-Alteration: This variable is recorded for all artifacts. The criteria used to identify heat altered chert are taken from Rick, 1978. It should be noted that Rick's experiments were primarily done with Burlington chert, and that his criteria may not apply to all types of chert. In assessing heat-alteration it is necessary to have samples of both the unaltered and altered materials for comparison. Rick's criteria are as follows:

Luster Contrast. "On an artifact with flaked surfaces produced both before and after heating, a contrast will appear in the luster of the two surface types. Presence of such a luster contrast is near- certain evidence of heat treatment." (p. 57) This criterion is considered most reliable for scoring Burlington chert.

Degree of Luster. An increase in luster is often a result of heat alteration (p. 57).

Heat Fracture Scars. These include crazing and pot lid fractures (p. 58).

Conchoidal Ripples. Conchoidal ripples are more prominent on heat-altered pieces (p. 58).

Color. Pink-red coloration was used as an indicator of heat-alteration. Comparative collections are used to indicate the range of variation in non-heat-altered

Heat- Alteration attributes were scored as follows :

1. Heat Treatment Present.

2. Heat Treatment Possible.

3. Heat Treatment Absent.

4. Burned

5. Can't Determine

H. Basic Form: This variable is recorded for each artifact. Attributes are usually assigned with 10X magnification. Medium power magnification (40x) is used if use wear is suspected.

1. Edge or Functional Unit Only. No attempt has been made to shape the body of the piece, but one or more edges have been retouched and or used. Occasionally a small surface area rather than an edge will be modified through use (usually battering or polish).

2. Unifacial. The body of the piece has been shaped on one side. There must be at least one flake scar which does not originate on the edge on the shaped face. Torrence (personal communication) has suggested the extent of flake scar invasion as an alternate means of assessing body modification.

3. Bifacial. Both faces of the piece have been shaped. There must be at least one flake scar which does not originate on the edge of the piece on both sides of the piece. This flaking usually produces items with lenticular cross-sections.

4. Multifacial. The body of the piece exhibits intentional flake scars creating more than two faces. These pieces often have a blocky appearance. They may or may not have functional units.

5. Nonfacial. These are rounded pieces with no well-defined faces or edges. They are usually produced by battering and are often formed through use rather than intentional modification.

6. Prismatic Blade or Bladelet. Flake with parallel edges and at least one ridge running the length of the dorsal surface of the piece. It is usually much longer than it is wide. The piece may or may not show use wear.

7. Unknown. These are fragments that have been flaked or battered on a face of edge, but are too incomplete to assign to any of the above categories.

I. Edge Modification: This variable characterizes the location of retouch or use on an edge. Pieces are considered retouched if: 1.) there are at least three contiguous flake scars or battering 0.5mm or more along the edge of a tool, and 2.) the scars or battering extend more than I mm onto the body of the piece. Pieces are considered used when 1.) microflaking, grinding, polishing or rounding extend 0.5mm along an edge, and 2.) modification does not extend beyond 1mm onto the body of the piece. The extent of use on a projection may be less than 0.5mm. Bag wear and shovel or trowel modification scars are usually recognized by their fresh appearance and acute angle to the edge (Odell 1977, Knudson 1973).

1. Unifacial. Retouch scars, battering or use appear on one side of an edge or edge segment.

2. Bifacial. Retouch scars or use are on both sides of an edge or edge segment. Modification must occur on both sides of the same edge or edge segment for pieces with more than one edge or edge segment.

3. Unifacial and Bifacial. The piece has more than one edge or edge segment. At least one is unifacially modified and one bifacially modified.

4. Not Applicable. Pieces without edges are scored not applicable.

J. Method of Modification: Applies to both the edges and bodies of all pieces.

1. Flaked. The piece has been intentionally flaked on the body or edge of the piece (See variable J for definition of retouch).

2. Battered. An edge or surface has been altered by pounding. It may have been pounded upon or used to pound something else. Pounding will produce flake scars and crushing. When flake scars are not distinct, the alteration is considered battering. Many battered edges have directionality to the remnants of visible flake scars, and it is possible to determine if an edge is unifacially or bifacially modified. Edges formed by battering are often not well defined. There may be a zone of non-directional crushing between the sides of an edge. If there are 2mrn or less separating directional pounding on both sides of an edge, the edge is considered bifacial; if there are more than 2mm separating directional battering along a tool segment, the alteration is considered two distinct edges.

3. Flaked and battered. The piece has been altered by both flaking (leaving distinct flake scars) and by battering.

4. Use-wear Only. A functional unit (usually an edge) shows traces of use-microflaking, edge grinding, polishing, or rounding. Microflaking will not extend more than 1mm onto the face of the pieces (See variable J).

5. Retouched and used.

6. Not Applicable. Small problem pieces are scored here.

K. Refinement: This variable applies to pieces scored 3 (bifacial) for Basic Form. Scores for refinement are based on comparison with sample pieces chosen by the author. Size of flake scars along edges, regularity of tool outline and thickness of transverse cross-section were basic criteria for the selection of sample pieces.

1. Crude

2. Medium.

3. Refined.

4. Can't Determine. Pieces are too incomplete to be scored.

5. Not Applicable. Pieces scored something other than 3 for Basic Form.

L. Completeness of Functional Unit: For some studies, particularly functional analysis of tools, the appropriate unit of inquiry is the functional unit rather than the whole tool. This variable records the condition of functional units.

1. Broken. One or more functional units on a tool is interrupted by a break.

2. Whole. All functional units are complete. If there are two functional units, one whole and one broken, the piece is scored as broken.

3. Can't Determine. Sometimes a functional unit will end at a break, but the break may not have interrupted the functional unit; i.e., the functional unit was created after the break occurred and is whole. This situation is difficult to determine in practice. This attribute is assigned to questionable pieces.

4. Not Applicable. fragments without functional units are not scored for this variable.

M. Element Present: This variable focuses on the entire tool rather than the functional unit. The first three attributes apply to flakes and rectangular-ovoid pieces that have ends. Essentially whole, square pieces, and many small or blocky fragments will be scored as attributes 5, or 4 and 6, respectively.

1. Distal End. The distal end of a flake is the termination end, the end opposite the striking platform and bulb of percussion. For non-flakes the distal end is the working end of the tool if this can be determined. The distal end may contain part of the mid-section.

2. Mid-Section. There is no end present.

3. Proximal End. The proximal end of a flake is the end which contains the striking platform or bulb of percussion. Hafting elements and butt ends of bifaces (if this can be determined) are considered proximal ends. Proximal ends may contain part of the mid-section.

4. End Section. An end section is present, but it is not possible to determine if it is the distal or proximal end.

5. All elements Present. The tool is essentially whole. Small edge sections may be missing, but the entire outline of the piece can be determined without guess work.

6. Can't Determine.

N. Reworking or Reuse: Tools are often resharpened if an edge becomes dull, or reworked and reused if the tool is broken. Resharpened tools may have remnants of flake scars from the original edge. Tools may become progressively asymmetrical as they are resharpened. Retouch or use on a broken edge and abrupt change in tool outline are also used as indicators of reworking and reuse.

1. Present

2. Possible

3. Absent

O. Distal End Morphology. This variable applies only to those pieces with identifiable distal ends (See variable N for definition of distal end).

1. Blunt. The major portion of the distal end is perpendicular to an axis drawn through the striking platform and bulb of percussion or perpendicular to the longest axis of the piece if platform and bulb are absent.

2. Pointed. Pointed ends may be rounded or accumate.

3. Not Applicable. Pieces without distal ends are scored not applicable.

4. Can't determine.

P. Position of Retouch or Use: Applies to edge modified only and unifacially modified pieces with modified edges. The tools must be complete enough to determine two axes.

1. End. The retouched or used edge is perpendicular to an axis drawn through the striking platform and bulb of percussion or through the longest axis of the piece if platform and bulb are absent.

2. Side. The retouched or used edge is parallel to an axis drawn through the striking platform and bulb of percussion, or parallel to the longest axis if platform and bulb are not present.

3. End and Side. A continuous modified edge is both perpendicular and parallel to the axis. If more than one edge exists, at least one perpendicular and one parallel to the axis.

4. Can't Determine.

5. Not Applicable. Pieces scored other than 1 or 2 for Basic Form.

Q. Number of Edges: Records the number of distinct edges identified on the piece. Each edge must conform to the definition given in Edge Modification

R. Edge Angle: Edge angles are measured for all edge functional units. Edges on hafting elements are not measured. If only the hafting element is present, no edge angle is recorded. A piece may have more than one edge functional unit. Three measurements are taken for each functional unit and the mode is taken to represent the edge as a whole. Measurements are taken with a goniometer. Measurements are taken 5mm back from the edge, measuring what Knudsen(1973) has termed the production angle. To assign specific locations for each edge measured, the piece is oriented with the long axis vertical and the short axis horizontal. Starting from the top of the piece (the distal end) and moving clockwise around the piece, each edge is given a letter. Up to four distinct edges can be measured on the form. For pieces with more than four edges, a note is made in Comments.

1. 0-45 degrees.

2. 46-75 degrees.

3. Greater than 75 degrees.

4. Not Applicable. Pieces without edges are scored not applicable.

S. Edge Configuration: Edge configuration in plan view is recorded for all edges except edges on hafting elements. Location assignment for each edge on the piece is done exactly the same as in Edge Angle. Thus, Edge Angle A and Edge Configuration A for any piece refer to the same place on the artifact.

1. Smooth. There are no regular indentations or projections in plan view.

2. Serrated. There are regular indentations along the edge; the indentations are up to 2mm. deep and up to 2mm apart. There must be at least 2 1/2 indentations present.

3. Denticulate. There are regular indentations along the edge; the indentations are greater than 2mm deep and more than 2mm apart. There must be at least 2 1/2 indentations present.

4. Notched. There is a single indentation or a series of non-contiguous indentations on an edge. The indentation(s) must show retouch or use within their boundaries. Notches for hafting are not scored here.

5. Not Applicable. Pieces without edges are scored not applicable.

T. Hafting Element: This variable applies to whole or almost whole pieces (See variable K), and broken pieces with obvious hafting elements.

1. Present. Hafting elements are defined by marked constrictions or notches.

2. Possible. Possible hafting elements are defined by slight constrictions, or wear or polish on the lateral margins toward the base. Pieces with suspected hafting elements were examined v microscopically.

3. Absent. There are no indications of hafting.

4. Not Applicable. Fragments without obvious hafting elements are scored not applicable.

5. Modification for hafting by thinning and/or grinding the tool base.

U. Projections: This variable applies to whole pieces, broken pieces with projections. or projections alone (i.e. broken drill bits). The projections are defined by intentional retouch or by wear on an unretouched area that extends out from the body of the piece.

1. Present.

2. Absent.

3. Not Applicable. Tool fragments without projections are scored not applicable.

V. Modification on Projection: Applies only to pieces with projections (see variable T).

1. Present. Projections have been formed by intentional retouch.

2. Absent. Projections have been defined on the basis of wear.

3. Not Applicable. Pieces without projections are scored not applicable.

The following metric variables are recorded for whole pieces only. Whole pieces are those that were scored 2 for variable J and 5 for variable K. Length, width and thickness were measured to the nearest millimeter.

W. Length: The longest axis of the piece regardless of orientation was measured as length.

X. Width: The longest axis perpendicular to the long axis was measured as width.

Y. Thickness: The greatest axis perpendicular to both length and width was measured as thickness.

Z. Weight: Weight was recorded to the nearest gram.

AA. Comments: Written comments accompany unusual pieces. The comments have been grouped into six categories.

1. Thinning Flake. Thinning flakes are flakes exhibiting dorsal flake scars and some sort of edge preparation. These items are usually products of bifacial manufacture and not in themselves shaped for an intentional use. The platforms often have remnants of bifacial edges or are ground. These bifacial edge remnants are not recorded as a working edge on the thinning fake.

2. Unusual Raw Material. Any comment about raw material that is not covered in the main body of the scheme is recorded as a written comment on the original recording forms.

3. Dubious Artifact. Flake scars may have been caused by some natural agent, and therefore, the item may not be an artifact.

4. Unusual Artifact Form, General. The artifact shape is in some way unique. A written descriptive comment can be found on the original recording sheet.

5. Unusual Artifact Form, Specific. The artifact shape is similar to a particular form which is in some way characteristic of the site. A written comment can be found on the original recording sheet.

6. Association. The item under consideration is linked to another item. This link may be refitting, items from the same core, or spatial relationship.

7. More than four edges. Edge angle and configuration records for these artifacts can be found on the original recording sheet.

8. Other.

BB. Comment 2: Written comments.

Note for limestone, sandstone, and igneous materials: Heat altered limestone is characterized by a grayish to pink powdery exterior. Pieces are friable and disintegrate into small fragments and powder. Heat altered sandstone and igneous material is often blackened on the surface, giving a smoked appearance. Outer surfaces sometimes exhibit yellow, pink, or red discoloration. Broken surfaces often exhibit crazing similar to heat-cracked chert.

CC. Projectile Point and Lithic Tool Type:

List those commonly found in your region. Justice (1995) is a good source for references.

1. Madison
2. Levanna
3. Fort Ancient
4. Nodena Elliptical
5. Contracting Stemmed Point
6. Unclassified (or Unidentified) Projectile Point
7. Bipolar Projectile Point (or Biface)
8. Bipolar Core
9. Drill
10. Awl (or Piercer)
11. Unidentified Tool (Broken or Dubious)
12. End Scraper
13. Side Scraper
14. End and Side Scraper
15. Edge Modified Tool

APPENDIX B:
Mass Analysis Schema for Debitage

A. Provenience

B. Additional Provenience

C. Type

1. Flake
2. Flake-like
3. Non-flake

D. Size Grade

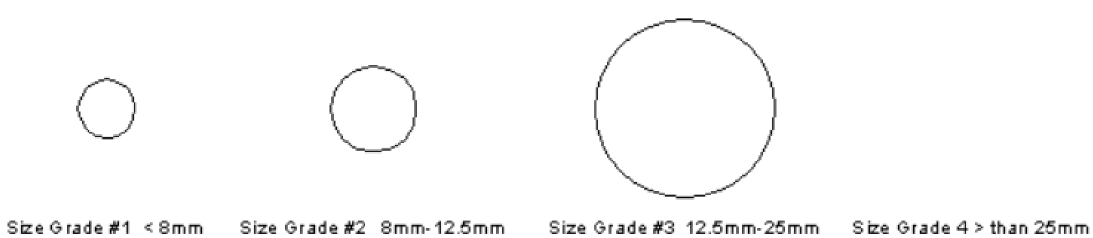
1. Less than 8 mm
2. 8 mm to 12.5 mm
3. 12.5 mm to 25 mm
4. Greater than 25 mm

E. Count per Size Grade

F. Weight per Size Grade

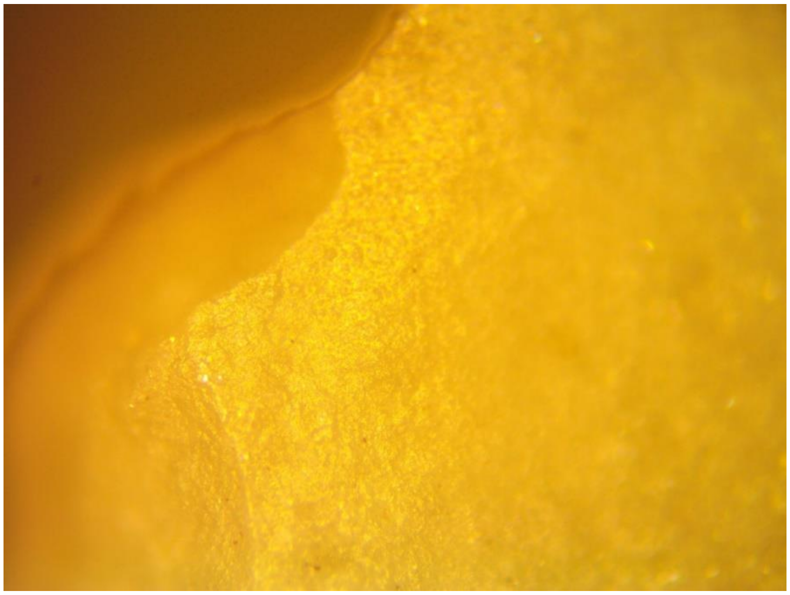
G. Number of Pieces with Cortex per Size Grade

H. Heat Alteration



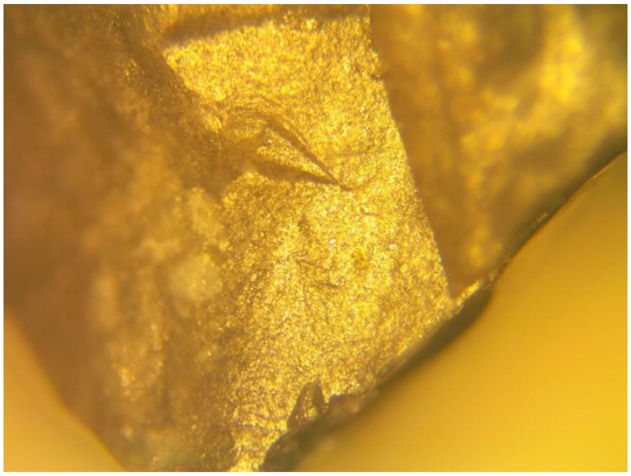
APPENDIX C:
Microwear Data Sheets

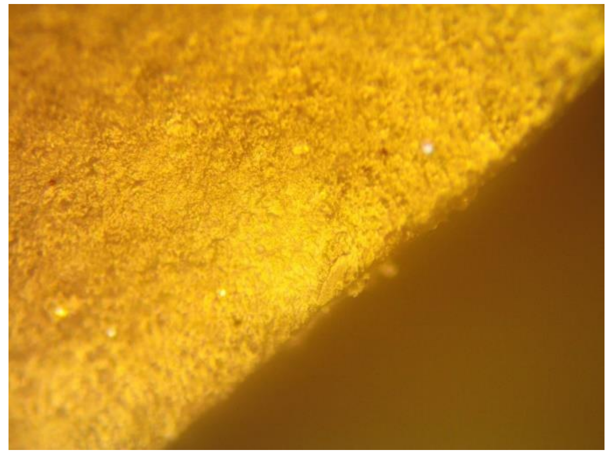
Artifact #: 0001 Basic Form: Bifacial
Site #: 47JE833



USE WEAR PRESENT?:		DIRECTION OF USE:	COMMENTS:
Yes		Indeterminate	
USE WEAR LOCATION:		STRIATIONS PRESENT?:	
DORSAL:	VENTRAL:	No	
Distal, Proximal, Lateral	Distal, Proximal, Lateral	STRIATION LOCATION:	
		N/A	
POLISH TYPE:	POLISH TYPE:	FLAKING/CHIPPING PRESENT?	
Generic Weak	Generic Weak	Yes	
		ROUNDING PRESENT?	MATERIAL HARDNESS:
		No	Indeterminate

Artifact #: 0002 Basic Form: Bifacial
Site #: 47JE833



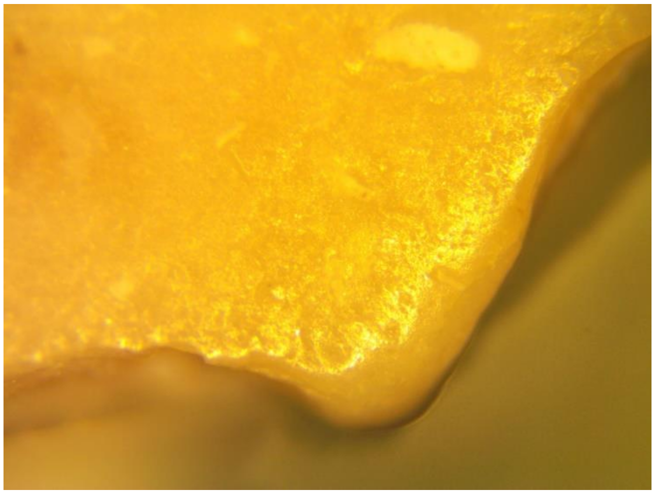


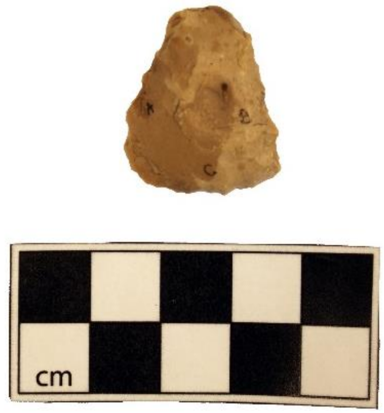
<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">tool seems to have continued to be utilized after break, the area of the break has usewear present</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Distal, Proximal, Lateral</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Meat/Wet Hide</td><td rowspan="3">Meat/Wet Hide</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Soft</td></tr>
</table>

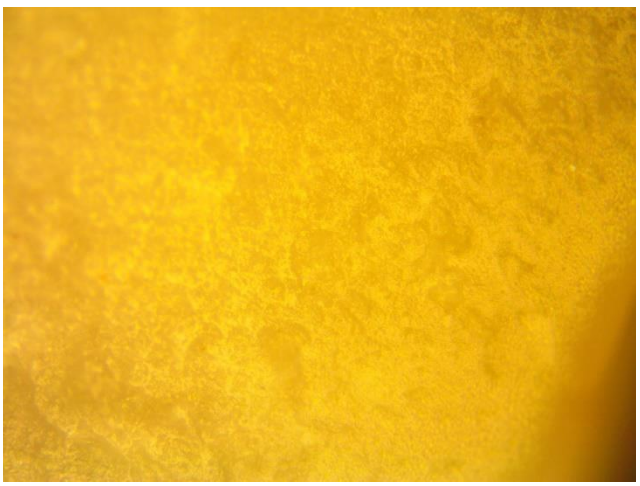
Artifact #: 0003 Basic Form: Edge Only/Functional
Site #: 47JE833

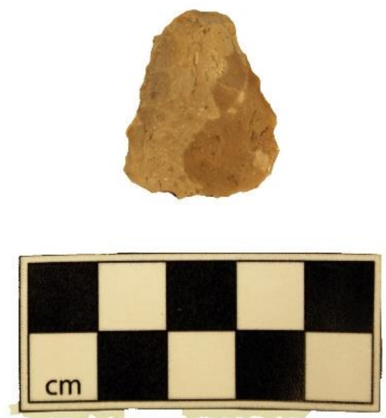
<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">No</td><td>N/A</td><td rowspan="7">This tool appears to be unused or was not used enough to acquire polish.</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">N/A</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">N/A</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>N/A</td></tr>
</table>

Artifact #: 0004 Basic Form: Bifacial
Site #: 47JE833



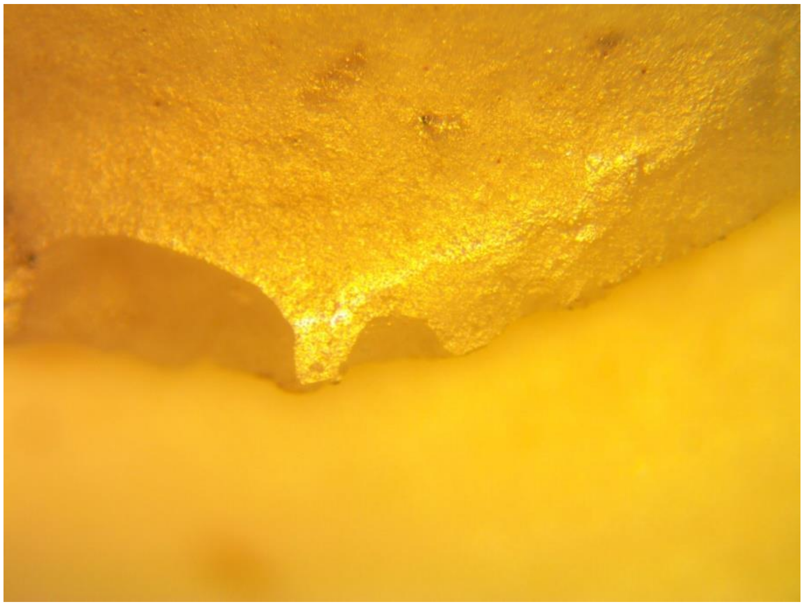






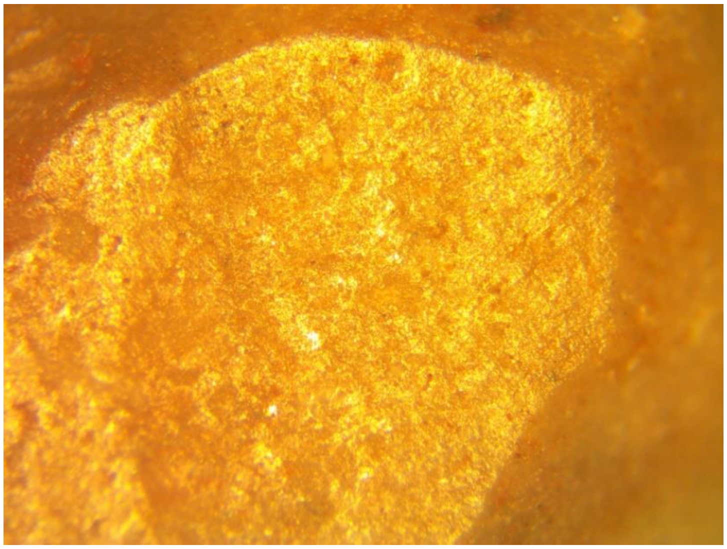
<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">Majority of polish at distal end, some where the bottom meets the sides. Maybe not end& side type?</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">Distal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">Plant</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td></td></tr>
</table>

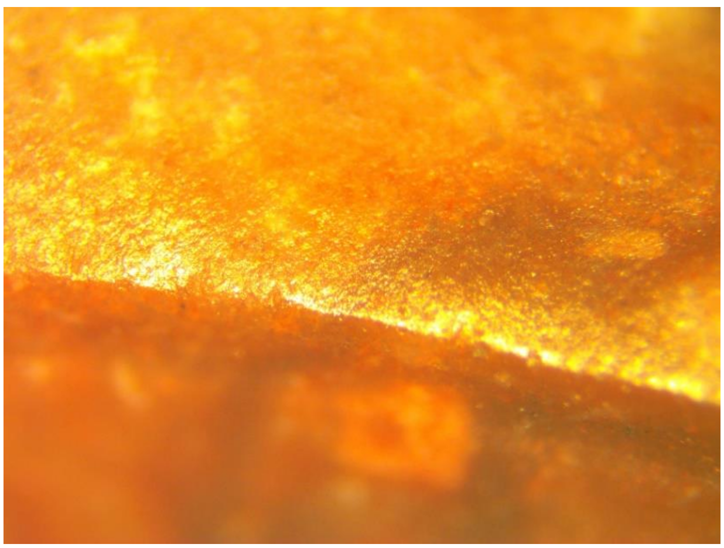
Artifact #: 0005 Basic Form: Unifacial
Site #: 47JE833

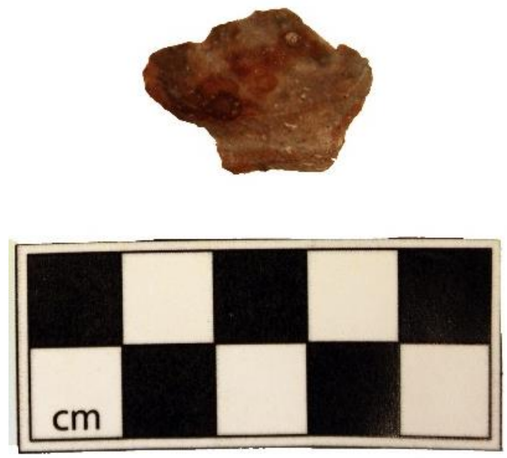


USE WEAR PRESENT?:		DIRECTION OF USE:	COMMENTS:
Yes		Transverse	
USE WEAR LOCATION:		STRIATIONS PRESENT?:	
DORSAL:	VENTRAL:	Yes	
Distal Lateral	Lateral	STRIATION LOCATION:	
		Dorsal - Lateral	
POLISH TYPE:	POLISH TYPE:	FLAKING/CHIPPING PRESENT?	
Plant	Plant	Yes	
		ROUNDING PRESENT?	MATERIAL HARDNESS:
		Yes	Soft

Artifact #: 0006 Basic Form: Unifacial
Site #: 47JE833



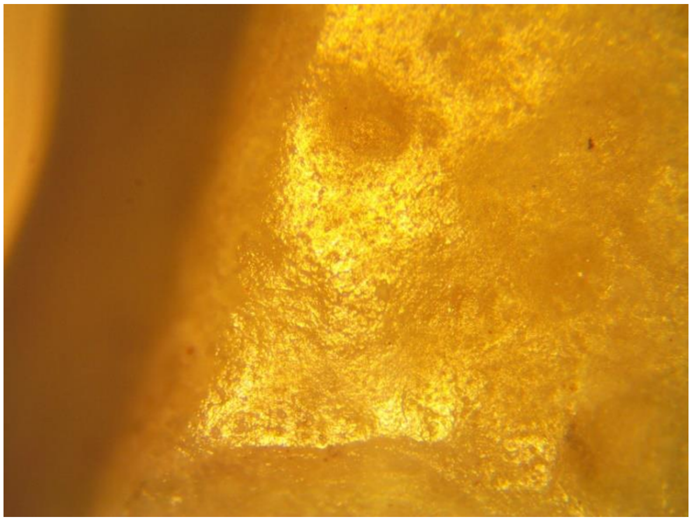


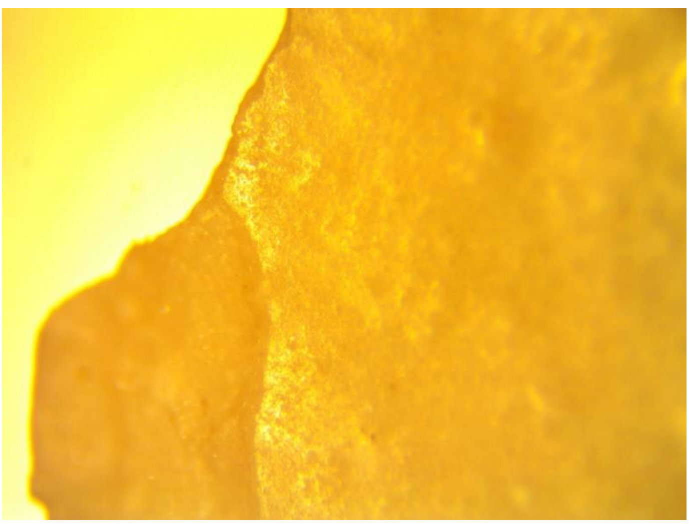


<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">tool has been repurposed and continued to be used, inconsistent areas of use indicative of changing shape/use</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>Yes</td></tr>
<tr><td rowspan="2">Distal</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>Ventral</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Smooth Pit</td><td rowspan="3">Smooth Pit, Grit</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Soft/Medium</td></tr>
</table>

Artifact #: 0007
Site #: 47JE833

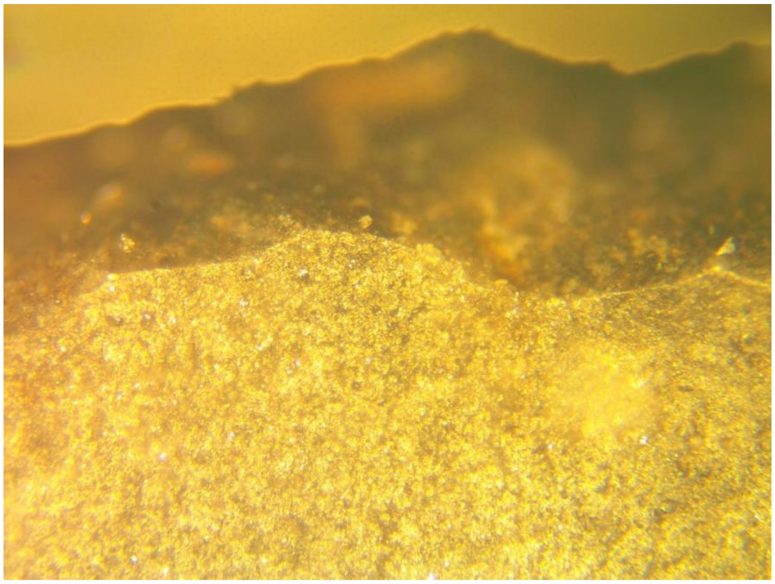
Basic Form: Bifacial





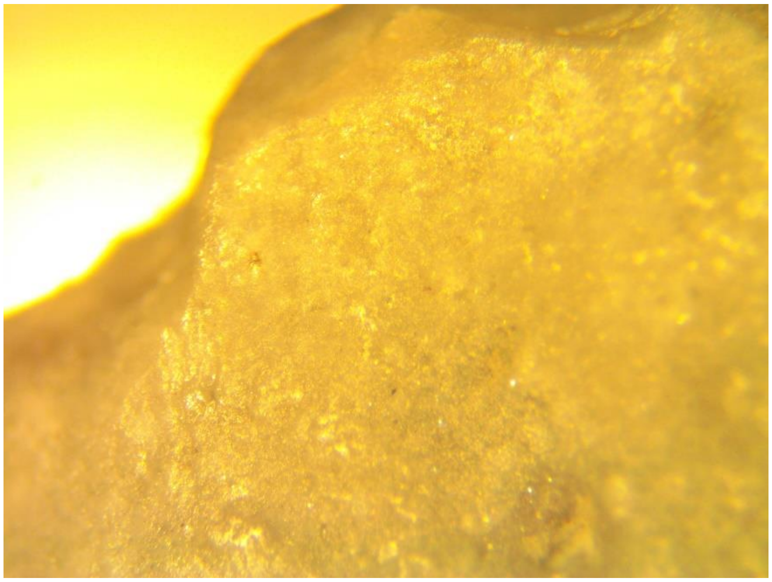
<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Longitudinal</td><td rowspan="7">majority of polish on ventral side</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>Yes</td></tr>
<tr><td rowspan="2">Proximal, Lateral</td><td rowspan="2">Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>Ventral</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Plant</td><td rowspan="3">Plant</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Soft</td></tr>
</table>

Artifact #: 0008 Basic Form: Bifacial
Site #: 47JE833



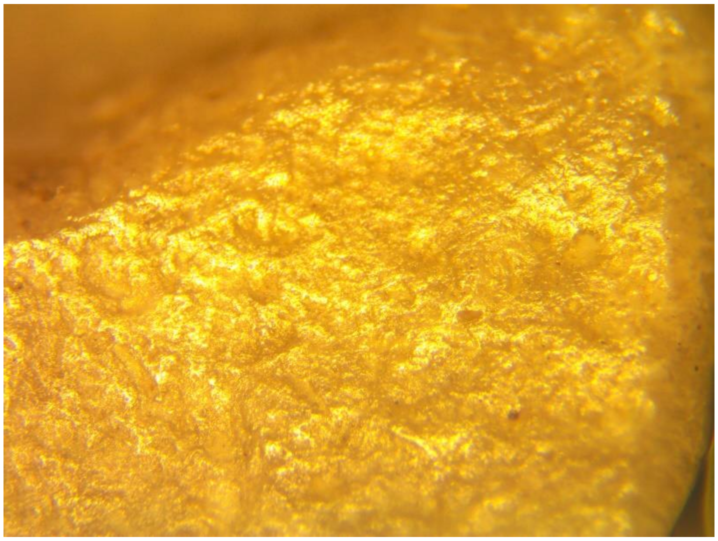
USE WEAR PRESENT?:		DIRECTION OF USE:	COMMENTS:
Yes		Indeterminate	possibly was a larger tool at one time that broke/resharpened into usable again until broken (again?)
USE WEAR LOCATION:		STRIATIONS PRESENT?:	
DORSAL:	VENTRAL:	No	
Proximal, Lateral	Proximal, Lateral	STRIATION LOCATION:	
		N/A	
POLISH TYPE:	POLISH TYPE:	FLAKING/CHIPPING PRESENT?	
Meat and/or Wet Hide	Meat and/or Wet Hide	No	
		ROUNDING PRESENT?	MATERIAL HARDNESS:
		Yes	Soft

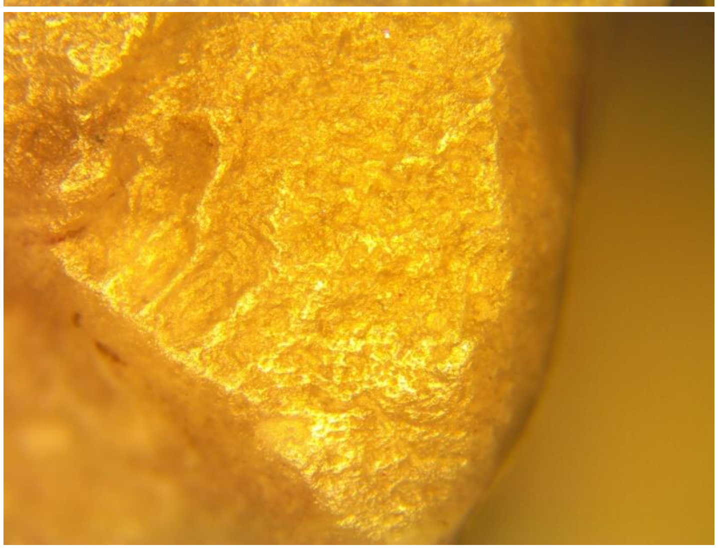
Artifact #: 0009 Basic Form: Edge Only/Functional
Site #: 47JE833



<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7"></td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">Meat/Wet Hide</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Soft</td></tr>
</table>

Artifact #: 0010 Basic Form: Bifacial
Site #: 47JE833





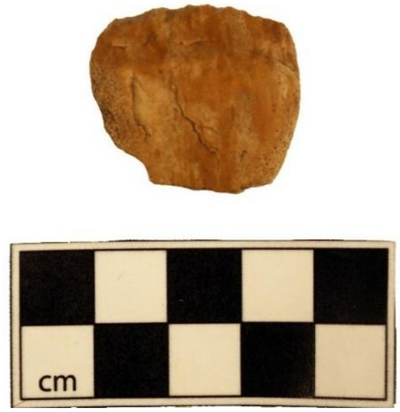
<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">edges see to have been reworked- some areas of polish not as developed</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Lateral</td><td rowspan="2">Distal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Plant</td><td rowspan="3">Plant</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Soft</td></tr>
</table>

Artifact #: 0011
Site #: 47JE833

Basic Form: Edge Only/Functional

<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">No</td><td>N/A</td><td rowspan="7">unused -dubious?</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">N/A</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">N/A</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>N/A</td></tr>
</table>

Artifact #: 0012 Basic Form: Edge Only/Functional
Site #: 47JE833



<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Longitudinal</td><td rowspan="7"></td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">Distal, Proximal</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">Dry Hide</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Soft</td></tr>
</table>

Artifact #: 0013
Site #: 47JE833

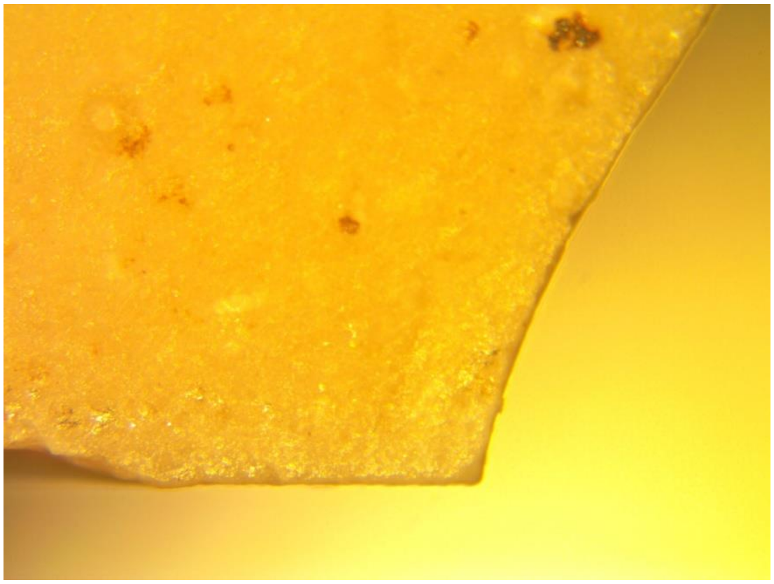
Basic Form: Bifacial

<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Indeterminate</td><td>Indeterminate</td><td rowspan="7">material type prevents identification of microwear</td></tr>
<tr><th colspan="2">USE WEAR LOCATION:</th><th>STRIATIONS PRESENT?:</th></tr>
<tr><th>DORSAL:</th><th>VENTRAL:</th><td>Indeterminate</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">N/A</td><th>STRIATION LOCATION:</th></tr>
<tr><td>N/A</td></tr>
<tr><th>POLISH TYPE:</th><th>POLISH TYPE:</th><th>FLAKING/CHIPPING PRESENT?</th></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">N/A</td><td>Unknown</td></tr>
<tr><th>ROUNDING PRESENT?</th><th>MATERIAL HARDNESS:</th></tr>
<tr><td>Unknown</td><td>Unknown</td></tr>
</table>

Artifact #: 0014

Basic Form: Edge Only/Functional

Site #: 47JE833

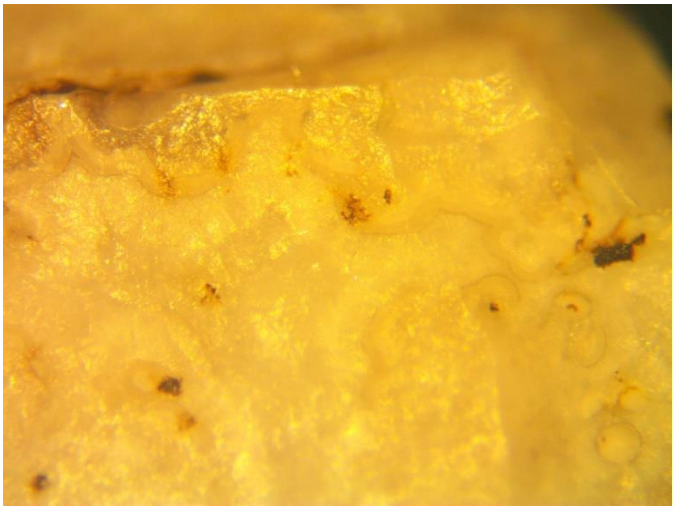


<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Indeterminate</td><td>Indeterminate</td><td rowspan="7"></td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Lateral</td><td rowspan="2">Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Possible Generic Weak</td><td rowspan="3">Possible Generic Weak</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Medium</td></tr>
</table>

Artifact #: 0015 Basic Form: Bifacial
Site #: 47JE833

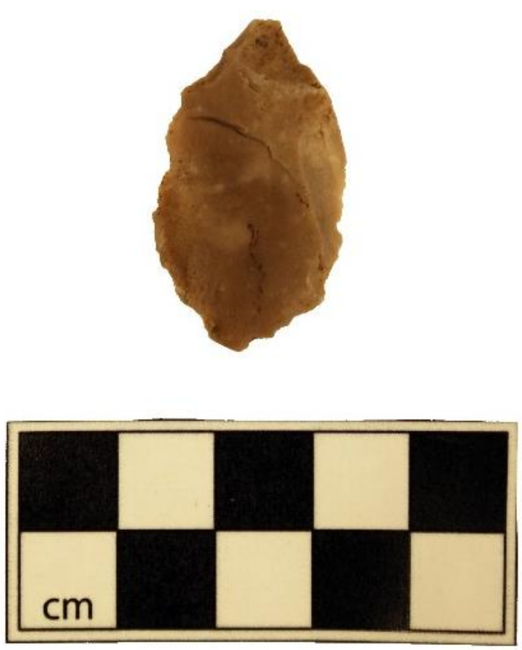
<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">No</td><td>N/A</td><td rowspan="7">This tool appears to be unused or was not used enough to acquire polish.</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">N/A</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">N/A</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td></td></tr>
</table>

Artifact #: 0016 Basic Form: Bifacial
Site #: 47JE833



<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">perhaps was hafted?</td></tr>
<tr><th colspan="2">USE WEAR LOCATION:</th><th>STRIATIONS PRESENT?:</th></tr>
<tr><th>DORSAL:</th><th>VENTRAL:</th><td>No</td></tr>
<tr><td rowspan="2">Distal, Proximal, Lateral</td><td rowspan="2">Distal, Proximal, Lateral</td><th>STRIATION LOCATION:</th></tr>
<tr><td>N/A</td></tr>
<tr><th>POLISH TYPE:</th><th>POLISH TYPE:</th><th>FLAKING/CHIPPING PRESENT?</th></tr>
<tr><td rowspan="3">Dry Hide, Wood</td><td rowspan="3">Dry Hide</td><td>Yes</td></tr>
<tr><th>ROUNDING PRESENT?</th><th>MATERIAL HARDNESS:</th></tr>
<tr><td>No</td><td>Soft/Medium</td></tr>
</table>

Artifact #: 0017 Basic Form: Edge Only/Functional
Site #: 47JE833



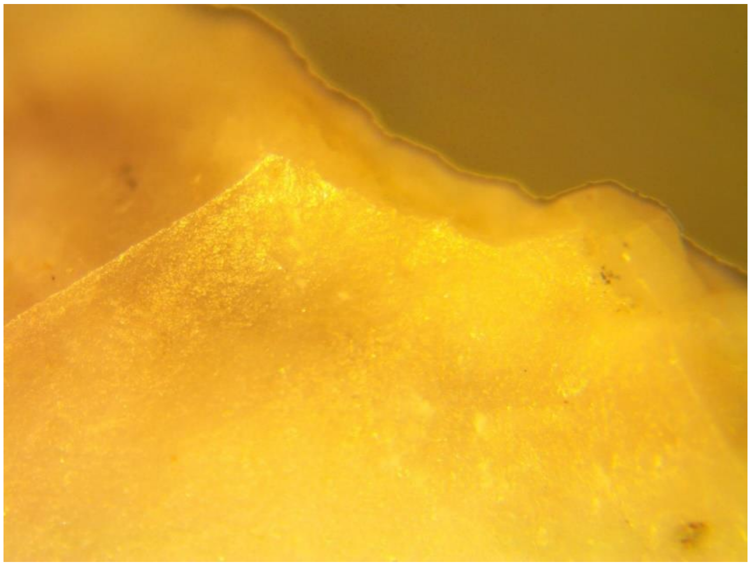
<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">No</td><td>N/A</td><td rowspan="7">This tool appears to be unused or was not used enough to acquire polish.</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">N/A</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">N/A</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>N/A</td></tr>
</table>

Artifact #: 0018 Basic Form: Edge Only/Functional
Site #: 47JE833

<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="10"></td></tr>
<tr><th colspan="2">USE WEAR LOCATION:</th><th>STRIATIONS PRESENT?:</th></tr>
<tr><th>DORSAL:</th><th>VENTRAL:</th><td>No</td></tr>
<tr><td rowspan="2">Distal, Proximal, and Lateral</td><td rowspan="2">Distal</td><th>STRIATION LOCATION:</th></tr>
<tr><td>N/A</td></tr>
<tr><th>POLISH TYPE:</th><th>POLISH TYPE:</th><th>FLAKING/CHIPPING PRESENT?</th></tr>
<tr><td rowspan="3">Smooth Pit</td><td rowspan="3">Possible Generic Weak</td><td>Yes</td></tr>
<tr><th>ROUNDING PRESENT?</th></tr>
<tr><td>No</td></tr>
</table>

MATERIAL HARDNESS:	Hard

Artifact #: 0019 Basic Form: Unifacial
Site #: 47JE833



USE WEAR PRESENT?:		DIRECTION OF USE:	COMMENTS:
Yes		Indeterminate	
USE WEAR LOCATION:		STRIATIONS PRESENT?:	
DORSAL:	VENTRAL:	No	
N/A	Lateral, Distal	STRIATION LOCATION:	
		N/A	
POLISH TYPE:	POLISH TYPE:	FLAKING/CHIPPING PRESENT?	
N/A	Grit	Yes	
		ROUNDING PRESENT?	MATERIAL HARDNESS:
		Yes	Medium

Artifact #: 0020 Basic Form: Edge Only/Functional
Site #: 47JE833

USE WEAR PRESENT?:		DIRECTION OF USE:	COMMENTS:
No		N/A	does not appear to have been used
USE WEAR LOCATION:		STRIATIONS PRESENT?:	
DORSAL:	VENTRAL:	No	
N/A	N/A	STRIATION LOCATION:	
		N/A	
POLISH TYPE:	POLISH TYPE:	FLAKING/CHIPPING PRESENT?	
N/A	N/A	No	
		ROUNDING PRESENT?	MATERIAL HARDNESS:
		No	N/A

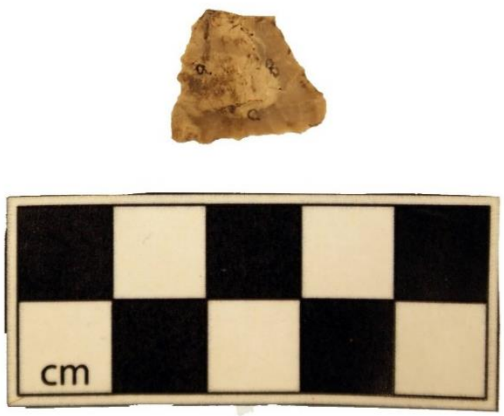
Artifact #: 0021 Basic Form: Edge Only/Functional
Site #: 47JE833

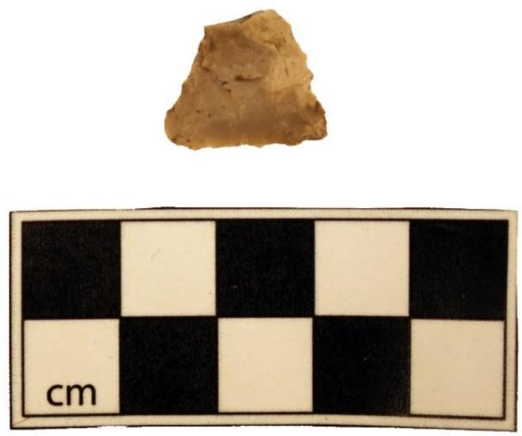
<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Indeterminate</td><td>Indeterminate</td><td rowspan="7">Cannot determine if this tool was utilized due to the type of material</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">N/A</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">N/A</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Indeterminate</td></tr>
</table>

Artifact #: 0022

Basic Form: Bifacial

Site #: 47JE833

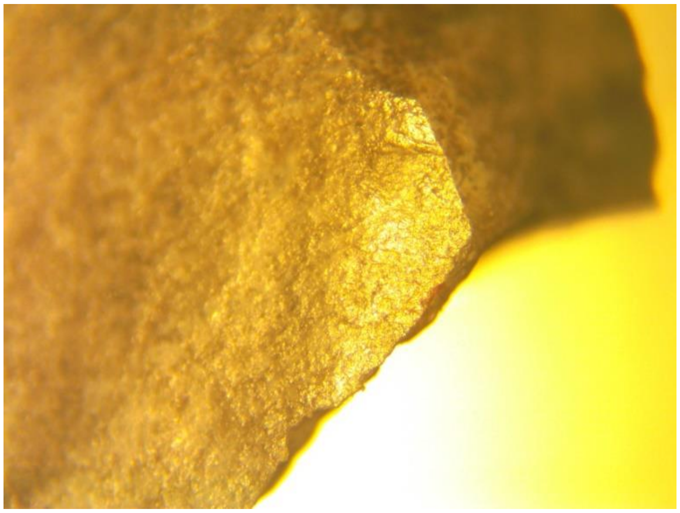


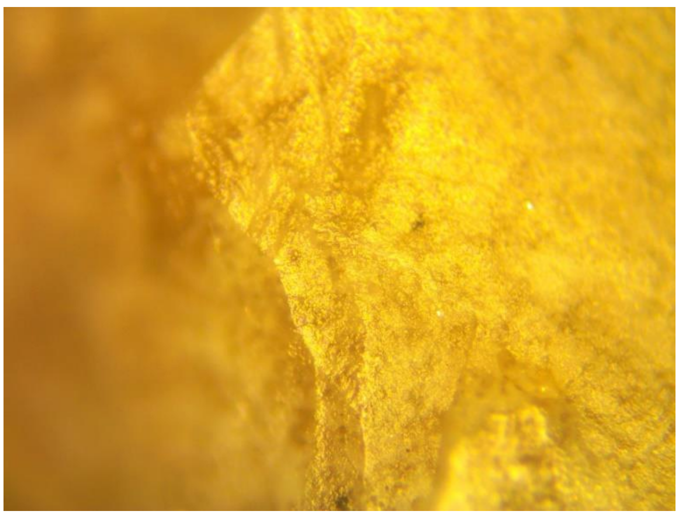


<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">No</td><td>N/A</td><td rowspan="7">appear to be unused</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">N/A</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">N/A</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td></td></tr>
</table>

Artifact #: 0023
Site #: 47JE833

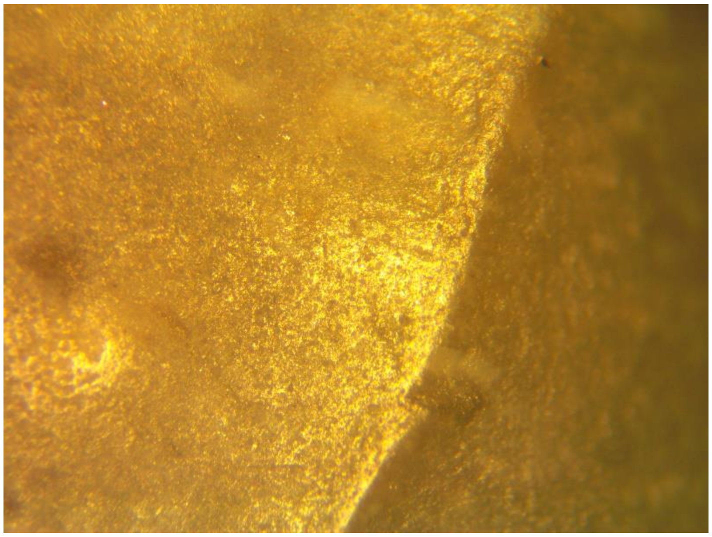
Basic Form: Bifacial

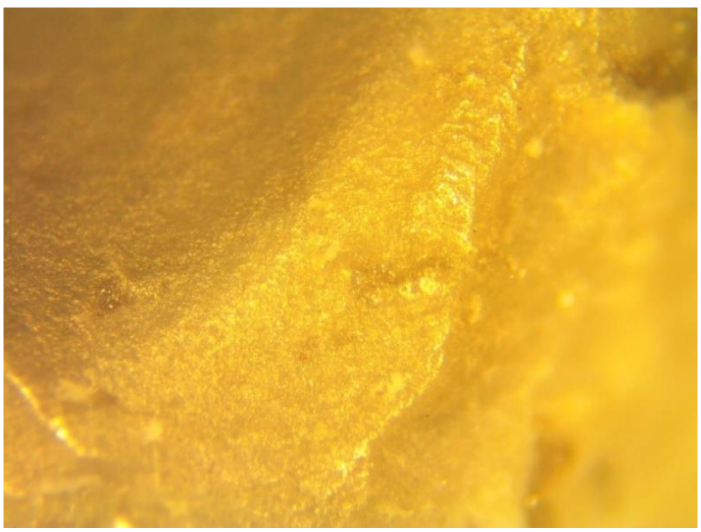




<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Longitudinal</td><td rowspan="8">edges seem to have been reworked polish missing, areas of new polish developing</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>Yes</td></tr>
<tr><td rowspan="2">Distal, Lateral</td><td rowspan="2">Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>Ventral - Distal</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Gen Weak, Meat/Wet Hide</td><td rowspan="3">Meat/Wet Hide</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Soft</td></tr>
</table>

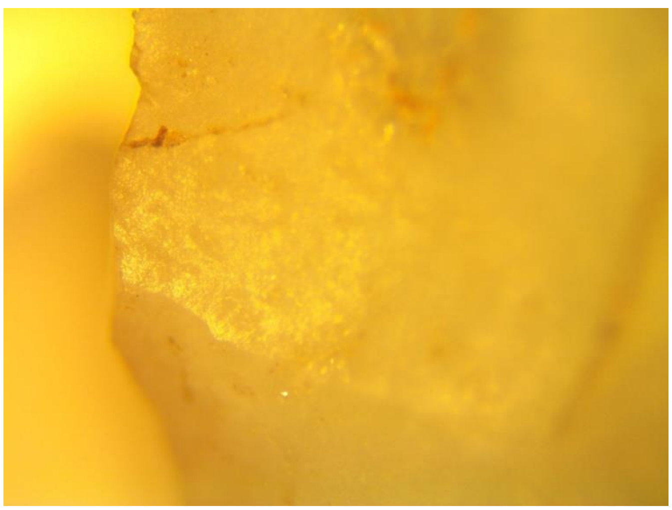
Artifact #: 0024 Basic Form:
Site #: 47JE833

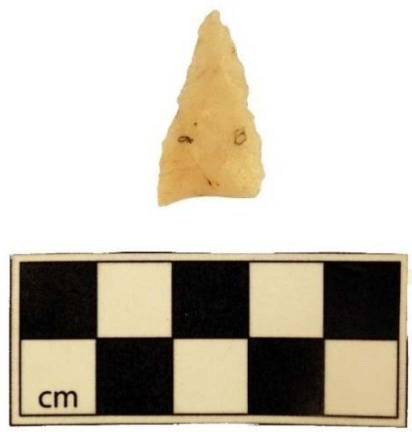




<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7"></td></tr>
<tr><th colspan="2">USE WEAR LOCATION:</th><th>STRIATIONS PRESENT?:</th></tr>
<tr><th>DORSAL:</th><th>VENTRAL:</th><td>No</td></tr>
<tr><td rowspan="2">Distal, Lateral</td><td rowspan="2">Distal, Lateral</td><th>STRIATION LOCATION:</th></tr>
<tr><td>N/A</td></tr>
<tr><th>POLISH TYPE:</th><th>POLISH TYPE:</th><th>FLAKING/CHIPPING PRESENT?</th></tr>
<tr><td rowspan="3">Generic Weak</td><td rowspan="3">Wood or Bone</td><td>Yes</td></tr>
<tr><th>ROUNDING PRESENT?</th><th>MATERIAL HARDNESS:</th></tr>
<tr><td>Yes</td><td>Medium/Hard</td></tr>
</table>

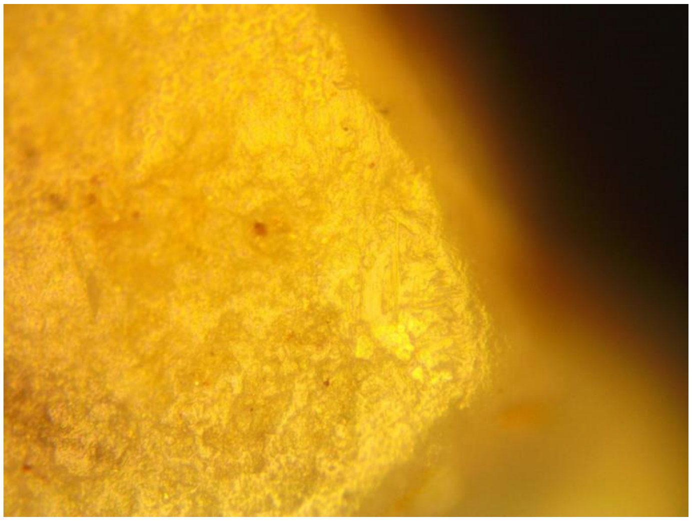
Artifact #: 0025 Basic Form: Bifacial
Site #: 47JE833

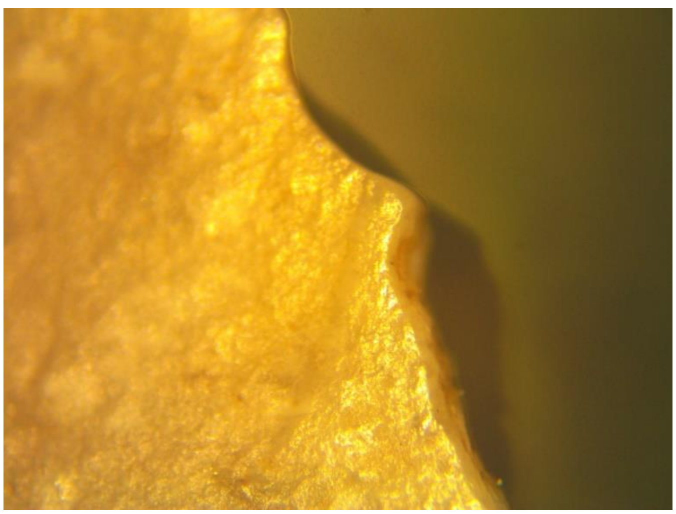




<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">seems to have been reshaped and areas of polished removed</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Proximal, Lateral</td><td rowspan="2">N/A</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Smooth Pit</td><td rowspan="3">N/A</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Indeterminate</td></tr>
</table>

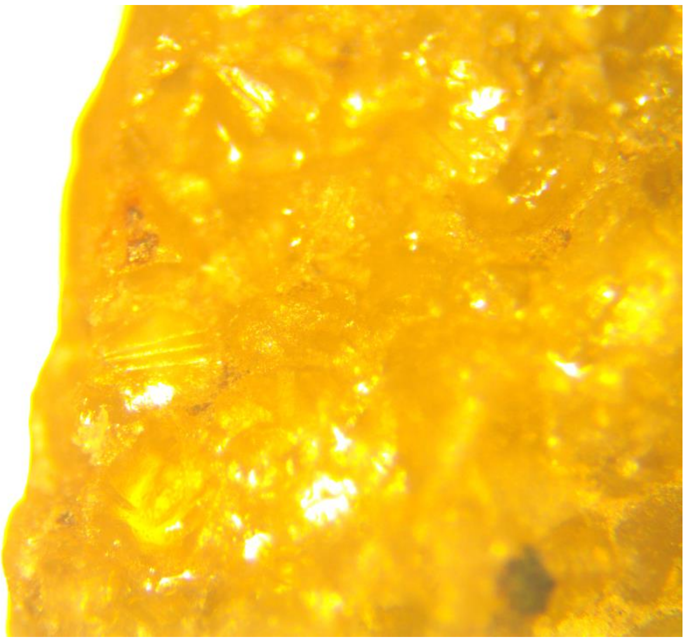
Artifact #: 0026 Basic Form: Unifacial
Site #: 47JE833





USE WEAR PRESENT?:		DIRECTION OF USE:	COMMENTS:
Yes		Longitudinal	
USE WEAR LOCATION:		STRIATIONS PRESENT?:	
DORSAL:	VENTRAL:	Yes	
N/A	Distal, Lateral	STRIATION LOCATION:	
		Ventral - Lateral	
POLISH TYPE:	POLISH TYPE:	FLAKING/CHIPPING PRESENT?	
N/A	Smooth Pit	Yes	
		ROUNDING PRESENT?	MATERIAL HARDNESS:
		No	Medium/Hard

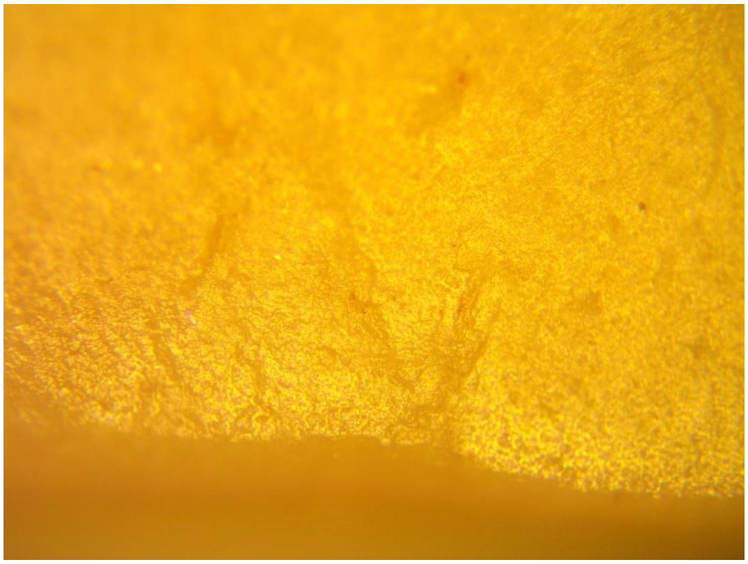
Artifact #: 0027 Basic Form: Bifacial
Site #: 47JE833



<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Indeterminate</td><td>Longitudinal</td><td rowspan="7">material type prevents identification of microwear - but possible striation along edge</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>Yes</td></tr>
<tr><td rowspan="2">Indeterminate</td><td rowspan="2">Indeterminate</td><td>STRIATION LOCATION:</td></tr>
<tr><td>Ventral- Proximal</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Indeterminate</td><td rowspan="3">Indeterminate</td><td>Indeterminate</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Indeterminate</td><td>Indeterminate</td></tr>
</table>

Artifact #: 0028
Site #: 47JE833

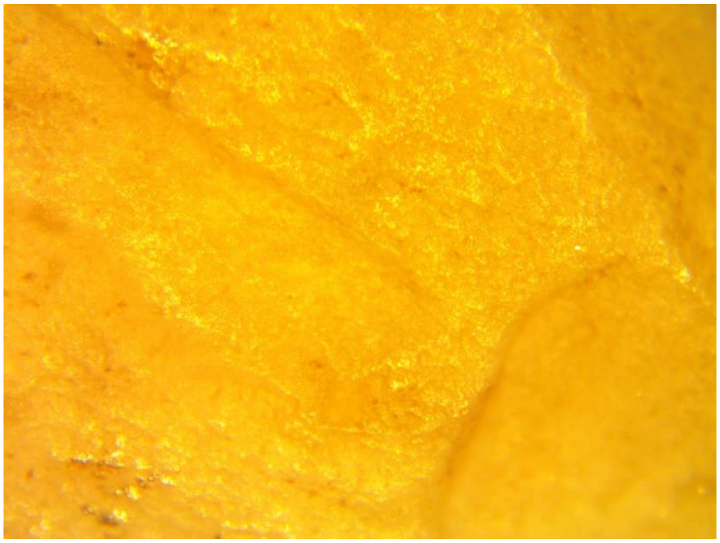
Basic Form: Bifacial



USE WEAR PRESENT?:		DIRECTION OF USE:	COMMENTS:
Yes		Indeterminate	
USE WEAR LOCATION:		STRIATIONS PRESENT?:	
DORSAL:	VENTRAL:	No	
Lateral	Lateral	STRIATION LOCATION:	
		N/A	
POLISH TYPE:	POLISH TYPE:	FLAKING/CHIPPING PRESENT?	
Wood or Antler?	Smooth Pit	Yes	
		ROUNDING PRESENT?	MATERIAL HARDNESS:
		Yes	Medium

Artifact #: 0029
Site #: 47JE833

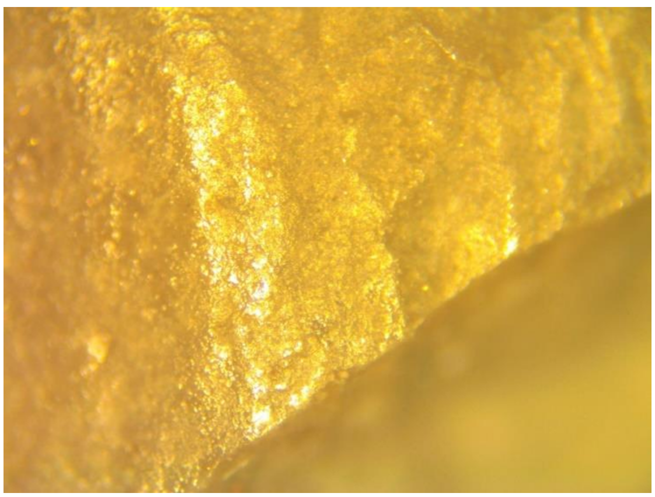
Basic Form: Edge Only/Functional



USE WEAR PRESENT?:		DIRECTION OF USE:	COMMENTS:
Yes		Longitudinal	
USE WEAR LOCATION:		STRIATIONS PRESENT?:	
DORSAL:	VENTRAL:	Yes	
Proximal, Lateral	Proximal	STRIATION LOCATION:	
		Ventral - Proximal	
POLISH TYPE:	POLISH TYPE:	FLAKING/CHIPPING PRESENT?	
Smooth Pit	Grit	Yes	
		ROUNDING PRESENT?	MATERIAL HARDNESS:
		Yes	Soft/Medium

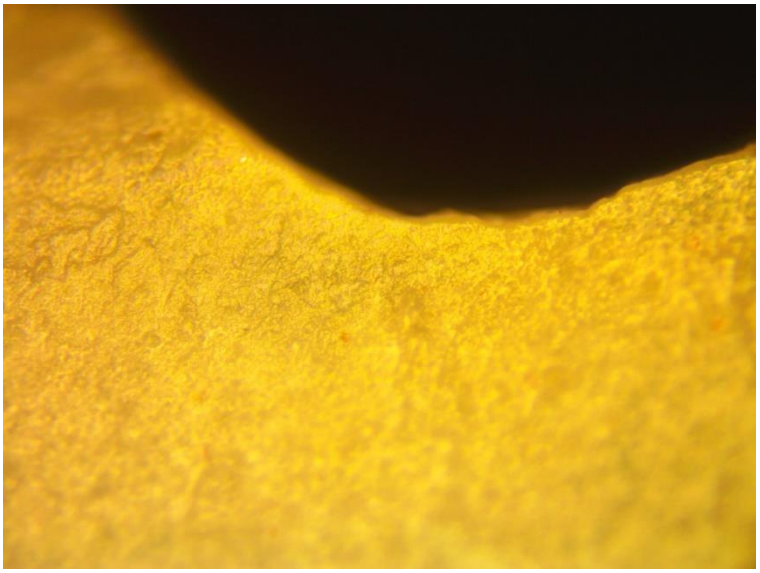
Artifact #: 0030 Basic Form: Bifacial

Site #: 47JE833



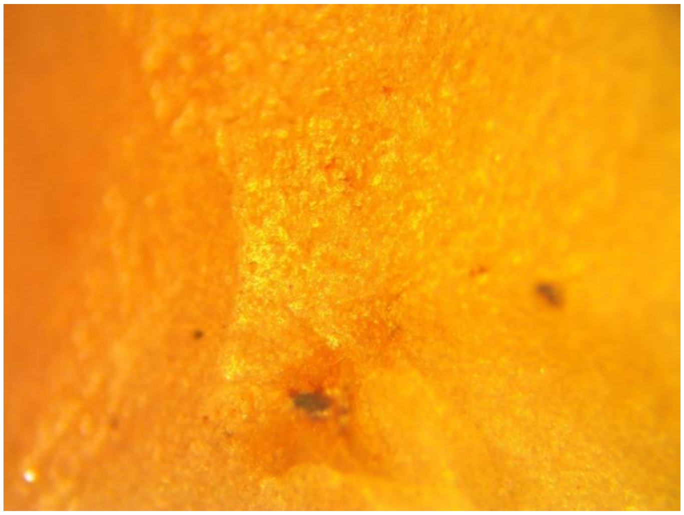
<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">Heavy Plant Polish</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Distal, Proximal, Lateral</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Plant</td><td rowspan="3">Plant</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Soft</td></tr>
</table>

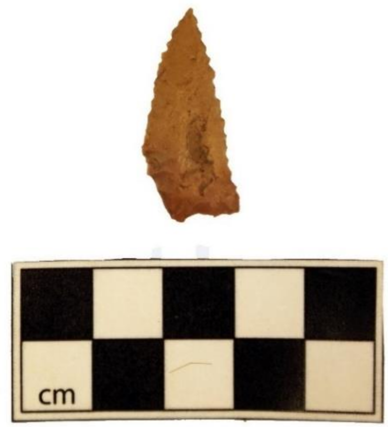
Artifact #: 0031 Basic Form: Unifacial
Site #: 47JE833



<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7"></td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Lateral</td><td rowspan="2">N/A</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Grit</td><td rowspan="3">N/A</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Medium</td></tr>
</table>

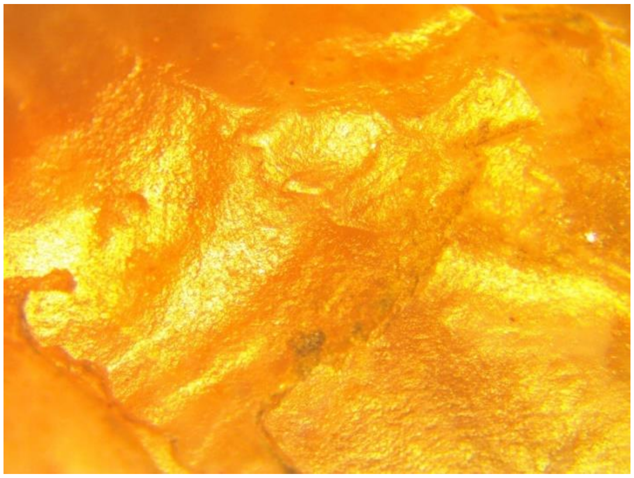
Artifact #: 0032 Basic Form: Bifacial
Site #: 47JE833

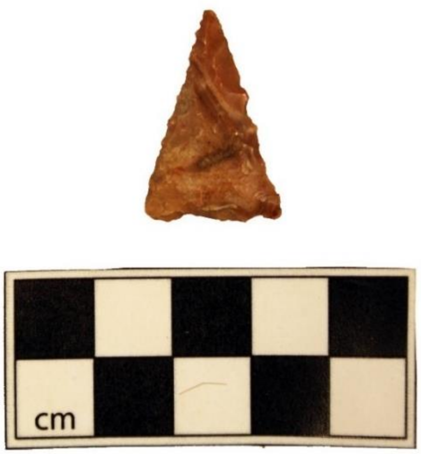




<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">Very weakly developed polish</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Lateral</td><td rowspan="2">N/A</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Meat/Wet Hide</td><td rowspan="3">N/A</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td></td><td>Medium</td></tr>
</table>

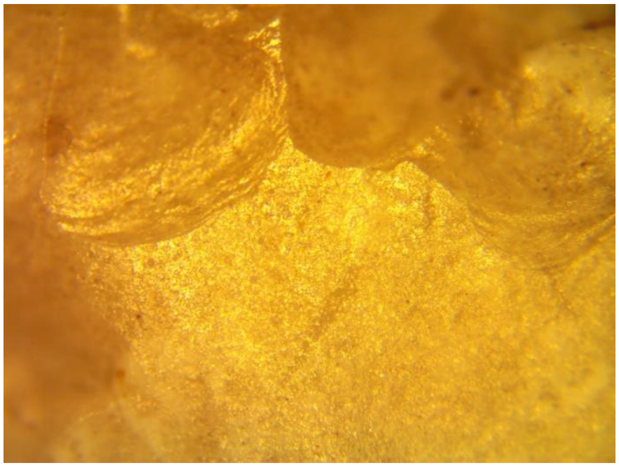
Artifact #: 0033 Basic Form: Bifacial
Site #: 47JE833

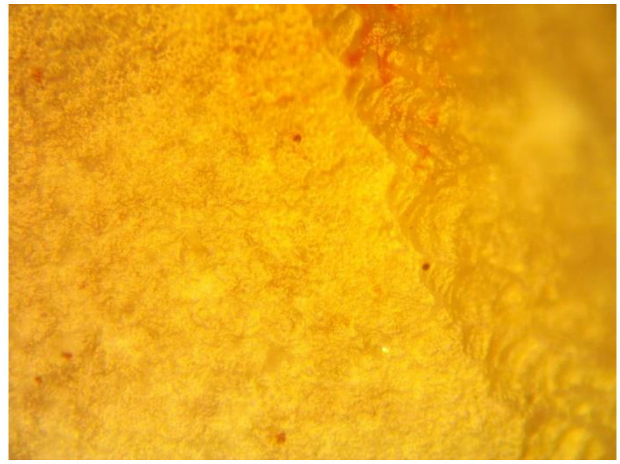




USE WEAR PRESENT?:		DIRECTION OF USE:	COMMENTS:
Yes		Indeterminate	lots of usewear across both sides of tool but tip and along edges have been resharpened
USE WEAR LOCATION:		STRIATIONS PRESENT?:	
DORSAL:	VENTRAL:	No	
Distal, Lateral	Distal, Lateral	STRIATION LOCATION:	
		N/A	
POLISH TYPE:	POLISH TYPE:	FLAKING/CHIPPING PRESENT?	
Meat/Wet Hide	Meat/Wet Hide	Yes	
		ROUNDING PRESENT?	MATERIAL HARDNESS:
		No	Soft

Artifact #: 0034 Basic Form: Bifacial
Site #: 47JE833





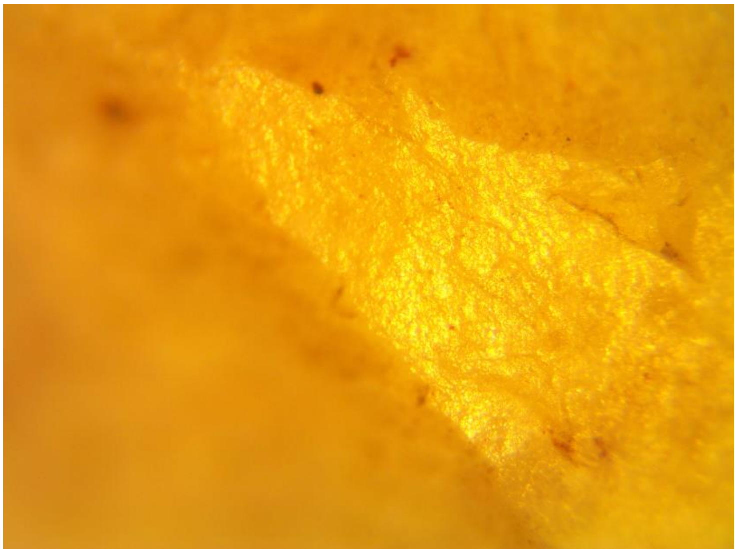
<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">Very weak/Early development of polish</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Distal, Proximal, Lateral</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Generic Weak</td><td rowspan="3">Generic Weak</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Soft</td></tr>
</table>

Artifact #: 0035 Basic Form: Bifacial
Site #: 47JE833

<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">lightly used on the one end of the tool</td></tr>
<tr><td colspan="2" rowspan="1">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">Proximal</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">Smooth Pit</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Medium</td></tr>
</table>

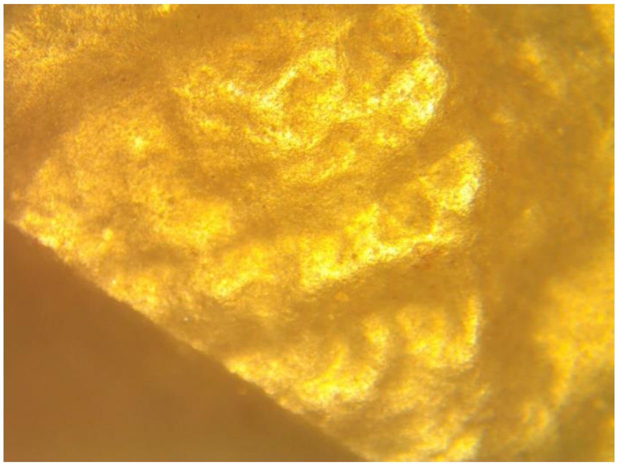
Artifact #: 0036
Site #: 47JE833

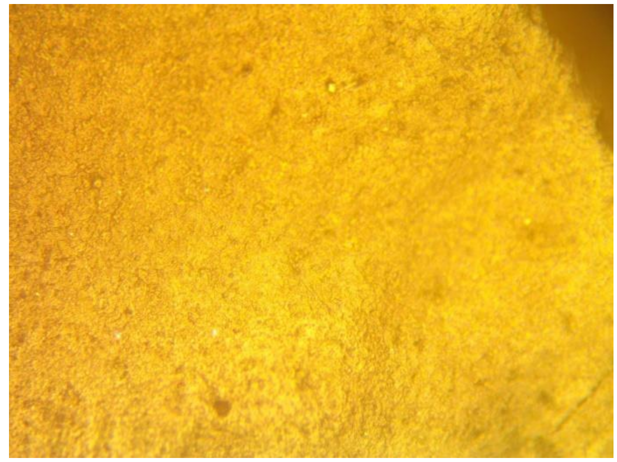
Basic Form: Unifacial



USE WEAR PRESENT?:		DIRECTION OF USE:	COMMENTS:
Yes		Indeterminate	Seems ventral side broke at one point more use on the dorsal side
USE WEAR LOCATION:		STRIATIONS PRESENT?:	
DORSAL:	VENTRAL:	No	
Distal, Proximal, Lateral	Proximal, Distal	STRIATION LOCATION:	
		N/A	
POLISH TYPE:	POLISH TYPE:	FLAKING/CHIPPING PRESENT?	
Meat/Wet Hide, Dry Hide	Meat/Wet Hide, Dry Hide, Gen Weak	Yes	
		ROUNDING PRESENT?	MATERIAL HARDNESS:
		No	Soft

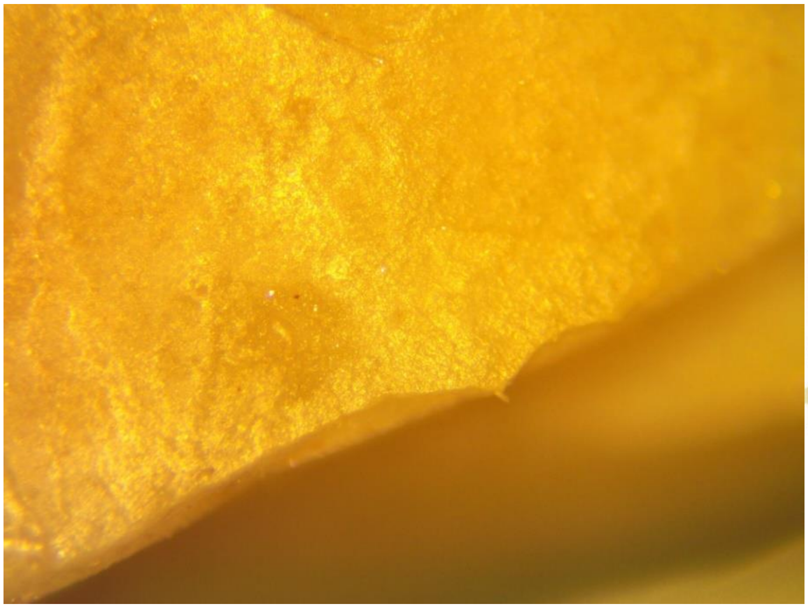
Artifact #: 0037 Basic Form: Unifacial
Site #: 47JE833

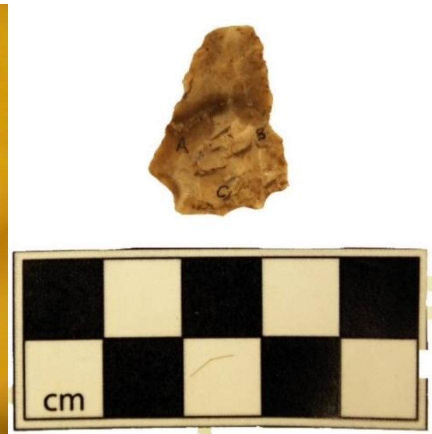


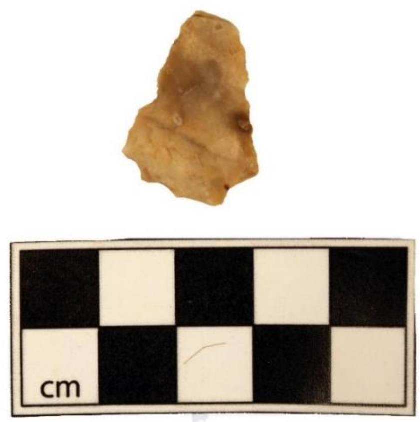


<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">Major use/polish on the dorsal side. Breakage on the distal end of tool. Perhaps used like a knife?</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Distal, Proximal, Lateral</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Meat/Wet Hide</td><td rowspan="3">Meat/Wet Hide</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Soft</td></tr>
</table>

Artifact #: 0038 Basic Form: Bifacial
Site #: 47JE833

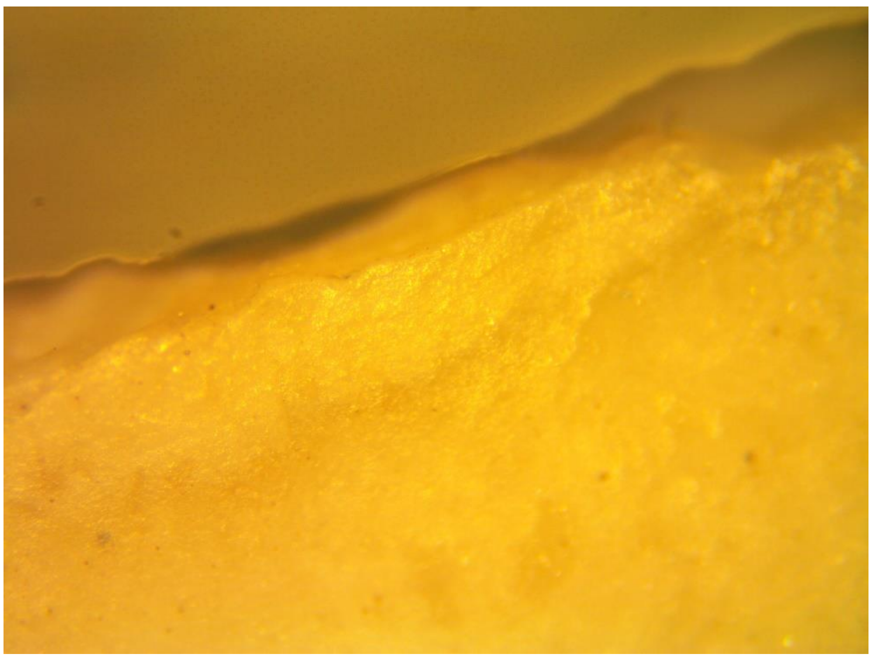






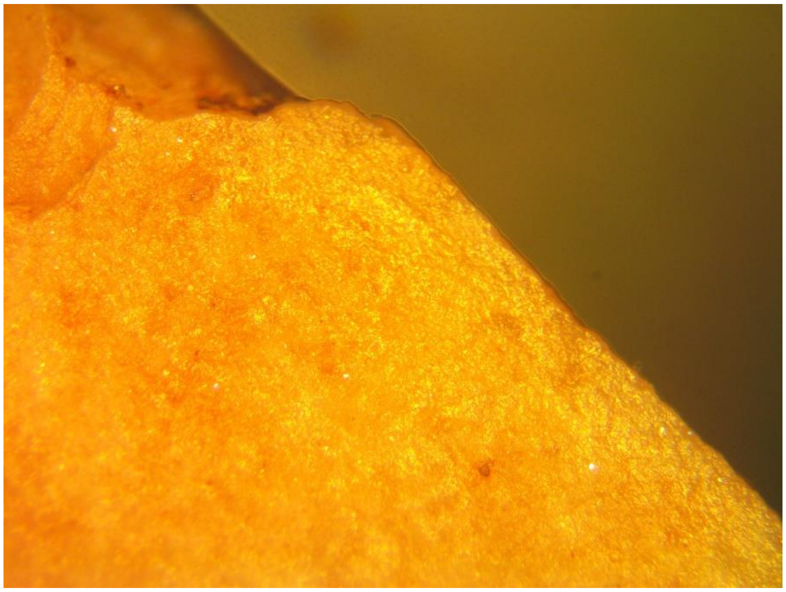
<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7"></td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Distal, Proximal, Lateral</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Smooth Pit</td><td rowspan="3">Meat/ Wet Hide</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Indeterminate</td></tr>
</table>

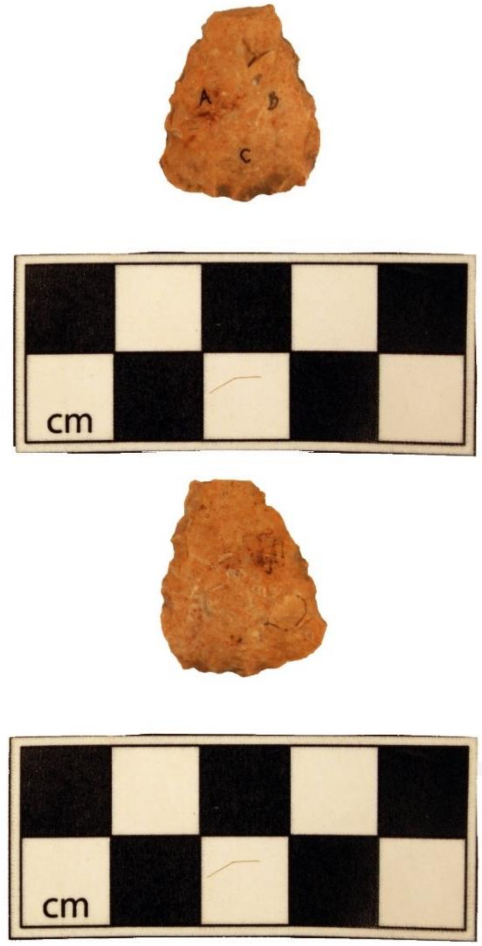
Artifact #: 0039 Basic Form: Edge Only/Functional
Site #: 47JE833



<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Longitudinal</td><td rowspan="8">areas of sporadically developed polish</td></tr>
<tr><th colspan="2">USE WEAR LOCATION:</th><th>STRIATIONS PRESENT?:</th></tr>
<tr><th>DORSAL:</th><th>VENTRAL:</th><td>No</td></tr>
<tr><td rowspan="2">Distal, Proximal</td><td rowspan="2">Distal, Proximal, Lateral</td><th>STRIATION LOCATION:</th></tr>
<tr><td>N/A</td></tr>
<tr><th>POLISH TYPE:</th><th>POLISH TYPE:</th><th>FLAKING/CHIPPING PRESENT?</th></tr>
<tr><td rowspan="3">Generic Weak</td><td rowspan="3">possible dry hide or grit</td><td>Yes</td></tr>
<tr><th>ROUNDING PRESENT?</th></tr>
<tr><td>No</td><th>MATERIAL HARDNESS:</th></tr>
<tr><td></td><td></td><td></td><td>Soft/Medium</td></tr>
</table>

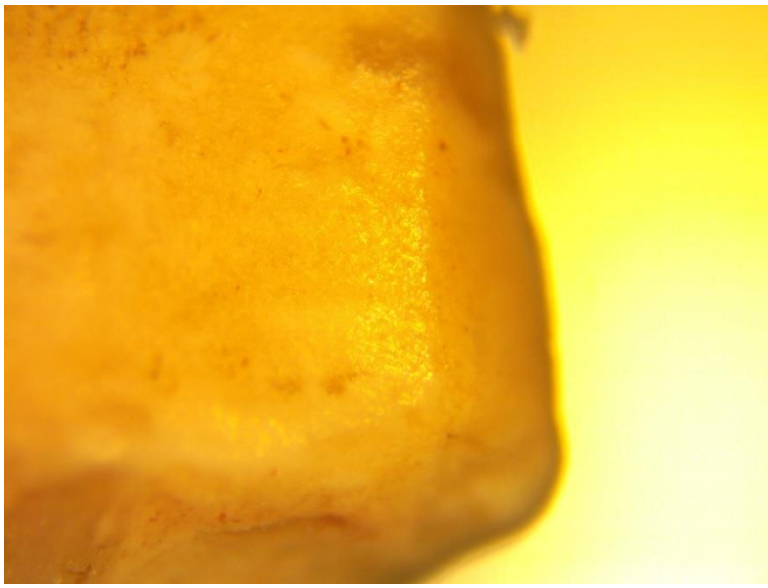
Artifact #: 0040 Basic Form: Bifacial
Site #: 47JE833





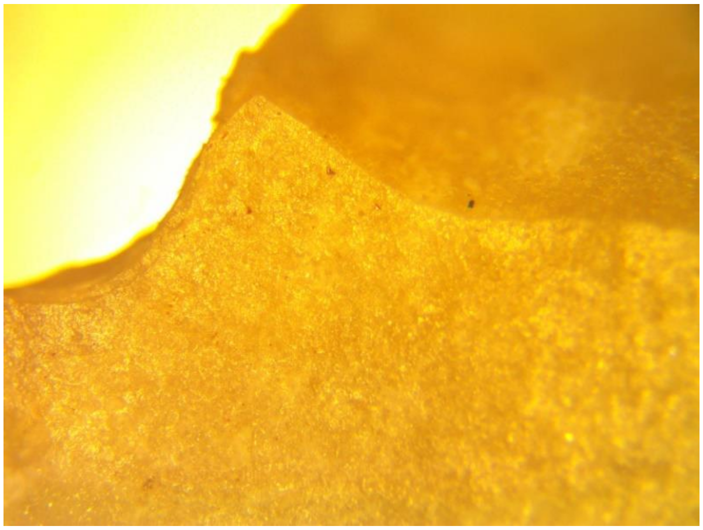
<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">majority of polish is on the ventral side of the tool dorsal side seems to have been resharpened/reshaped and now has less polish</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Lateral, Proximal</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Meat/Wet Hide</td><td rowspan="3">Meat/Wet Hide</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Soft</td></tr>
</table>

Artifact #: 0041 Basic Form: Unifacial
Site #: 47JE833



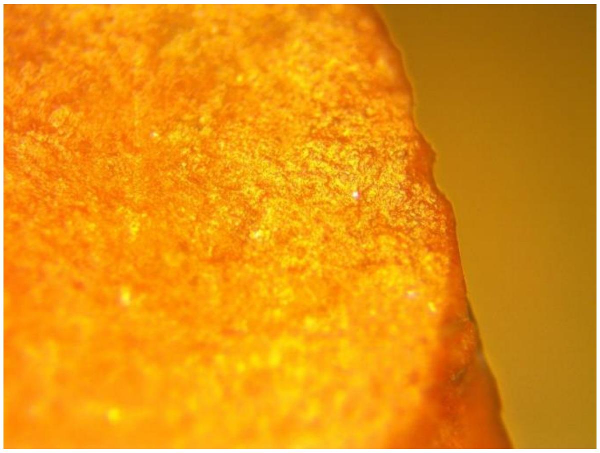
<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">Very weakly developed polish</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Lateral, Distal</td><td rowspan="2">Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Generic Weak</td><td rowspan="3">Generic Weak</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Indeterminate</td></tr>
</table>

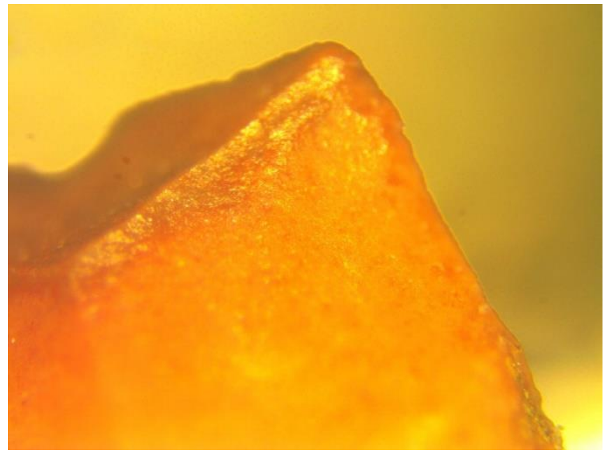
Artifact #: 0042 Basic Form: Bifacial
Site #: 47JE833

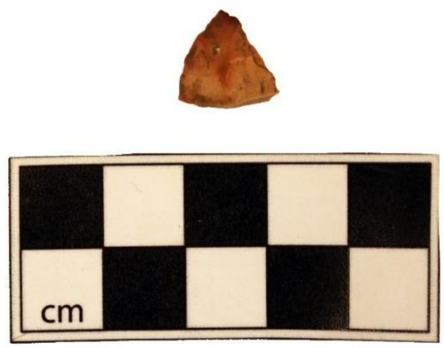


USE WEAR PRESENT?:		DIRECTION OF USE:	COMMENTS:
Yes		Indeterminate	
USE WEAR LOCATION:		STRIATIONS PRESENT?:	
DORSAL:	VENTRAL:	No	
Distal	Distal, Proximal, Lateral	STRIATION LOCATION:	
		N/A	
POLISH TYPE:	POLISH TYPE:	FLAKING/CHIPPING PRESENT?	
Generic Weak	Meat/ Wet Hide	Yes	
		ROUNDING PRESENT?	MATERIAL HARDNESS:
		No	Soft

Artifact #: 0043 Basic Form: Bifacial
Site #: 47JE833

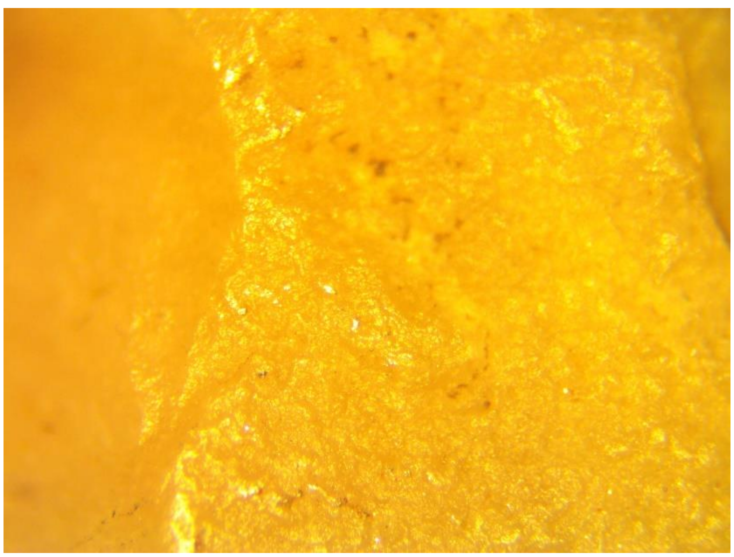






<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7"></td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Distal, Proximal, Lateral</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Meat/Wet Hide</td><td rowspan="3">Meat/Wet Hide</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Soft</td></tr>
</table>

Artifact #: 0044 Basic Form: Bifacial
Site #: 47JE833

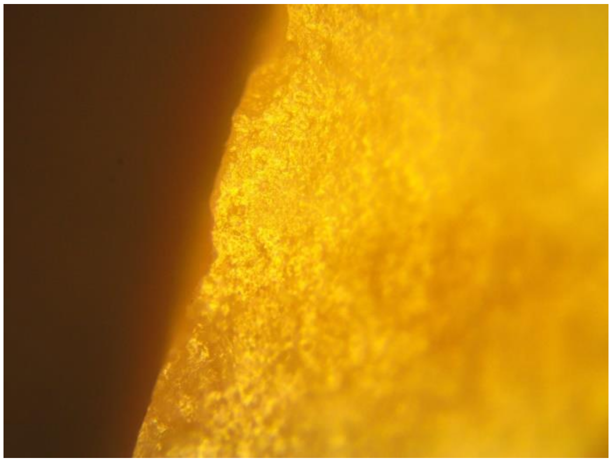


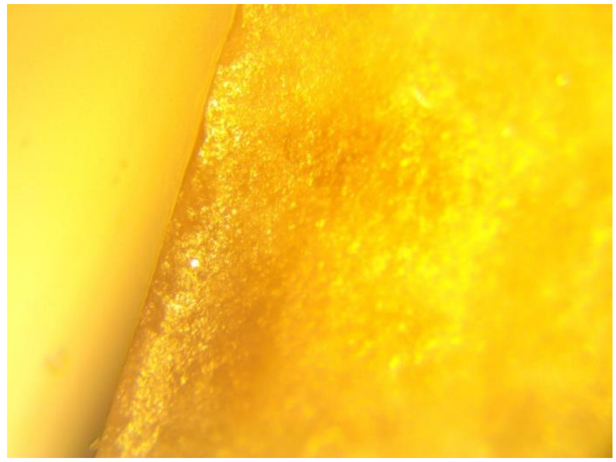
<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">ventral side has more use</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Distal, Proximal, Lateral</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Generic Weak</td><td rowspan="3">Grit, Generic Weak</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Indeterminate</td></tr>
</table>

Artifact #: 0045 Basic Form: Bifacial
Site #: 47JE833

USE WEAR PRESENT?:		DIRECTION OF USE:	COMMENTS:
Yes		Indeterminate	
USE WEAR LOCATION:		STRIATIONS PRESENT?:	
DORSAL:	VENTRAL:	No	
Proximal	Proximal	STRIATION LOCATION:	
		N/A	
POLISH TYPE:	POLISH TYPE:	FLAKING/CHIPPING PRESENT?	
Meat/Wet Hide	Grit	Yes	
		ROUNDING PRESENT?	MATERIAL HARDNESS:
		No	Soft/Medium

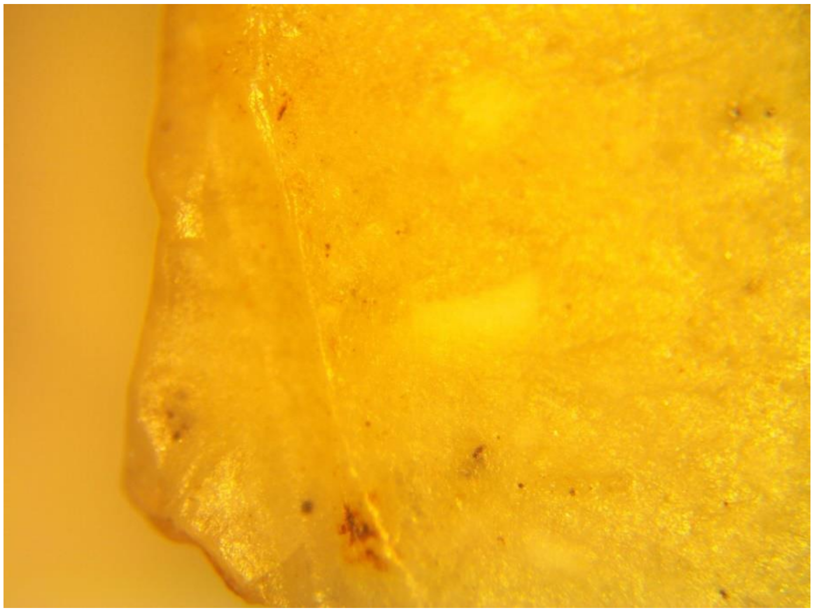
Artifact #: 0046 Basic Form: Bifacial
Site #: 47JE833





<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7"></td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Distal, Proximal, Lateral</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Meat/Wet Hide</td><td rowspan="3">Meat/Wet Hide</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Soft</td></tr>
</table>

Artifact #: 0047   Basic Form: Edge Only/Functional
Site #: 47JE833

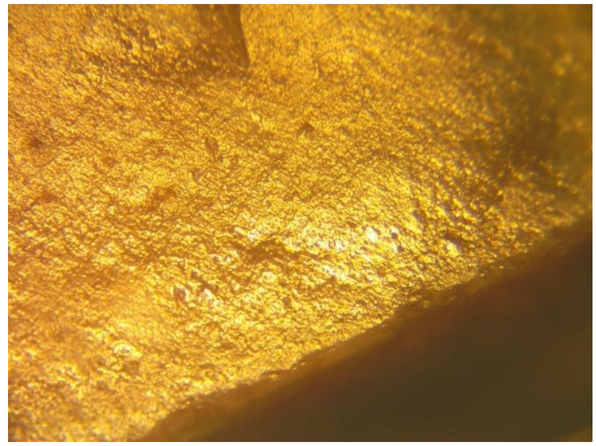


<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">ventral side has significantly more use</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Distal, Proximal, Lateral</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Generic Weak</td><td rowspan="3">Generic Weak, Grit</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Indeterminate</td></tr>
</table>

Artifact #: 0048 Basic Form: Edge Only/Functional
Site #: 47JE833

<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Indeterminate</td><td>Indeterminate</td><td rowspan="7">Unable to determine material or direction of use. Cannot determine if “tool” was ever utilized.</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">N/A</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">N/A</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Indeterminate</td></tr>
</table>

Artifact #: 0049 Basic Form: Edge Only/Functional
Site #: 47JE833

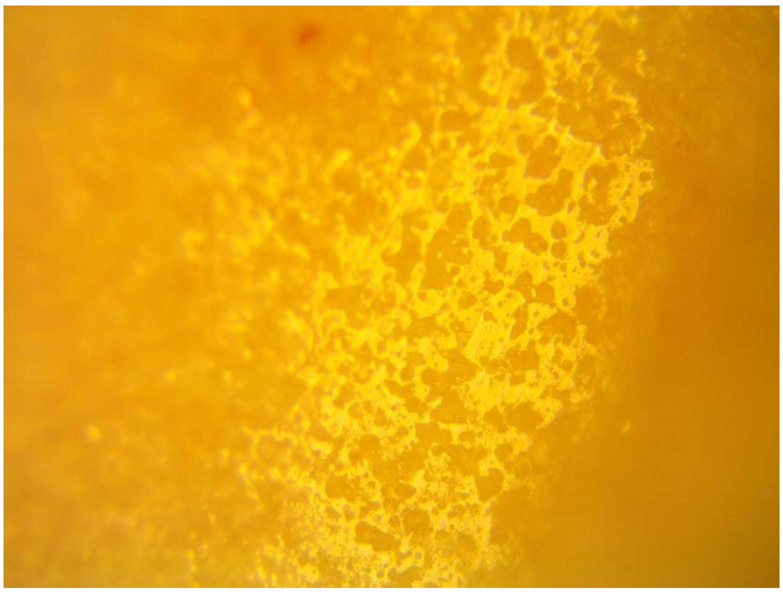


USE WEAR PRESENT?:		DIRECTION OF USE:	COMMENTS:
Yes		Longitudinal	Majority of polish on the ventral side of the tool
USE WEAR LOCATION:		STRIATIONS PRESENT?:	
DORSAL:	VENTRAL:	Yes	
Distal	Distal, Proximal, Lateral	STRIATION LOCATION:	
		Ventral – Distal	
POLISH TYPE:	POLISH TYPE:	FLAKING/CHIPPING PRESENT?	
Plant	Plant	Yes	
		ROUNDING PRESENT?	MATERIAL HARDNESS:
		No	Soft

Artifact #: 0050 Basic Form: Bifacial
Site #: 47JE833

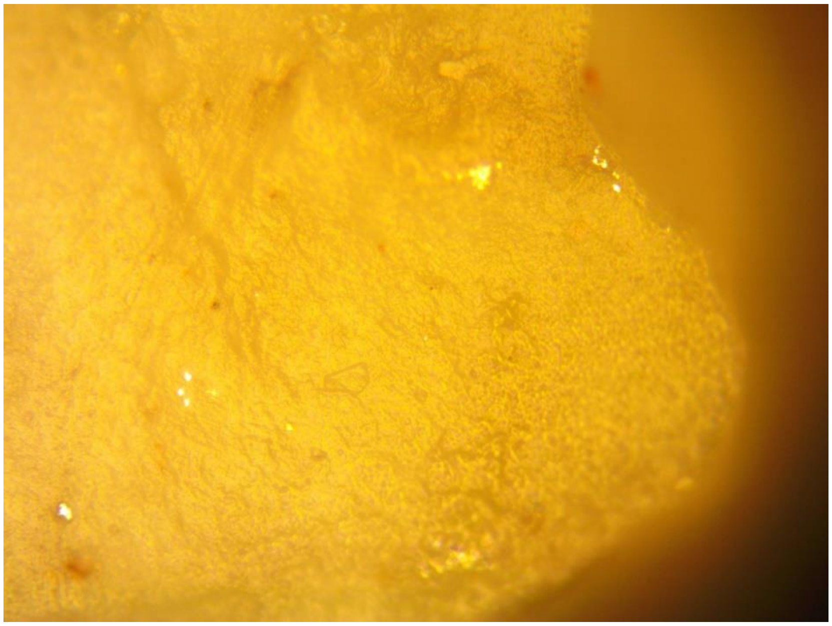
<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">No</td><td>N/A</td><td rowspan="7">appears to be unused</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">N/A</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">N/A</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>N/A</td></tr>
</table>

Artifact #: 0051 Basic Form: Bifacial
Site #: 47JE833



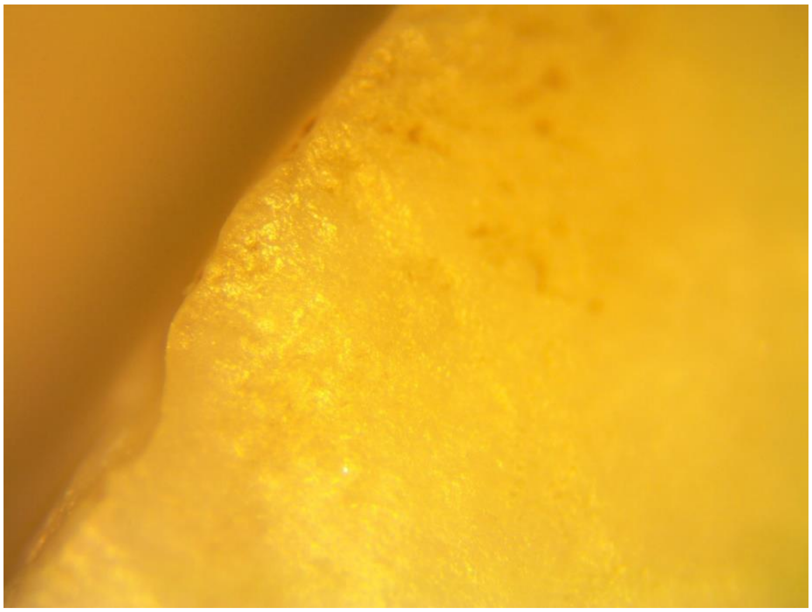
<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Longitudinal</td><td rowspan="7">possible striation near proximal end</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">No</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td></td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">Smooth Pit</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Medium</td></tr>
</table>

Artifact #: 0052 Basic Form: Unifacial
Site #: 47JE833



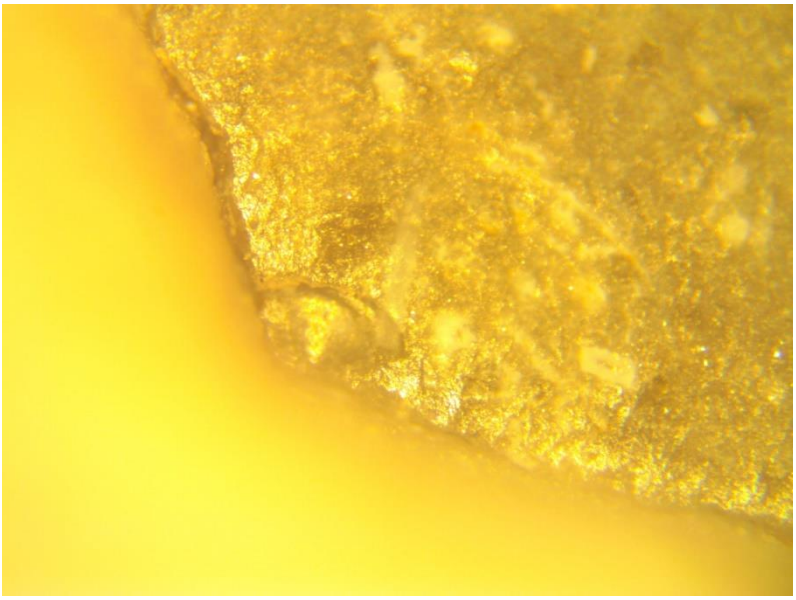
<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Longitudinal</td><td rowspan="7">Majority of polish on the ventral side of the tool</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>Yes</td></tr>
<tr><td rowspan="2">Distal</td><td rowspan="2">Distal, Lateral, Proximal</td><td>STRIATION LOCATION:</td></tr>
<tr><td>Ventral - Distal</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Gen Weak</td><td rowspan="3">Meat- Distal
Gen Weak - Proximal</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Soft</td></tr>
</table>

Artifact #: 0053 Basic Form: Unifacial
Site #: 47JE833



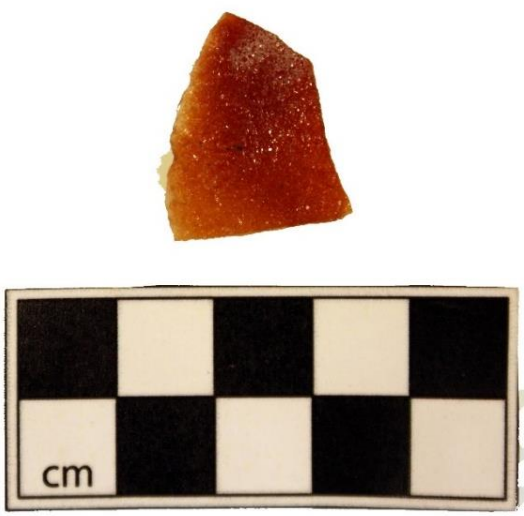
<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Transverse</td><td rowspan="8"></td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>Yes</td></tr>
<tr><td rowspan="2">Distal, Lateral</td><td rowspan="2">Distal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>Ventral - Lateral</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Generic Weak</td><td rowspan="3">Smooth Pit</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td></tr>
<tr><td>No</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td></td><td></td><td></td><td>Medium</td></tr>
</table>

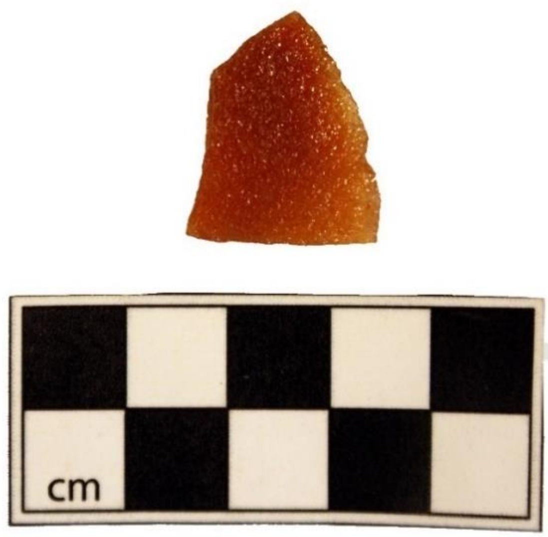
Artifact #: 0054 Basic Form: Edge Only/Functional
Site #: 47JE833



<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Longitudinal</td><td rowspan="7">distal end looks like it broke at one point but continued to be utilized</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">No</td><td rowspan="2">Distal</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">Smooth Pit</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Medium</td></tr>
</table>

Artifact #: 0055 Basic Form: Edge Only/Functional
Site #: 47JE833





<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Indeterminate</td><td>Indeterminate</td><td rowspan="7">Unable to determine material or direction of motion. Appears to have been utilized due to microchipping but could be from tumbling in ag field.</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">N/A</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">N/A</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Indeterminate</td></tr>
</table>

Artifact #: 0056
Site #: 47JE833

Basic Form: Edge Only/Functional

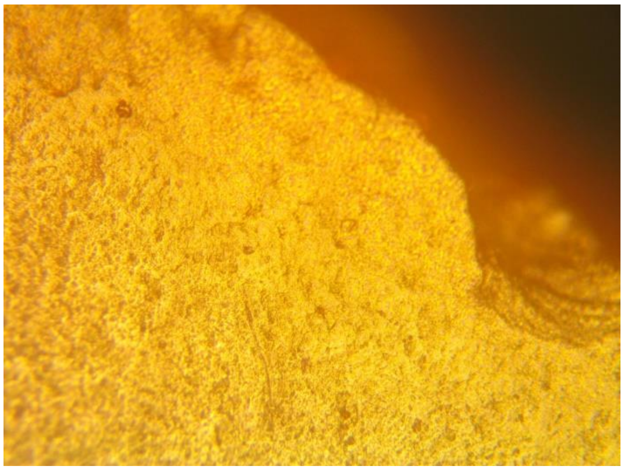
<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Indeterminate</td><td>Indeterminate</td><td rowspan="7">Possibly weak gen polish on very edge of tool but unclear if "tool" was every utilized</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">N/A</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">N/A</td><td>No</td><td></td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Indeterminate</td></tr>
</table>

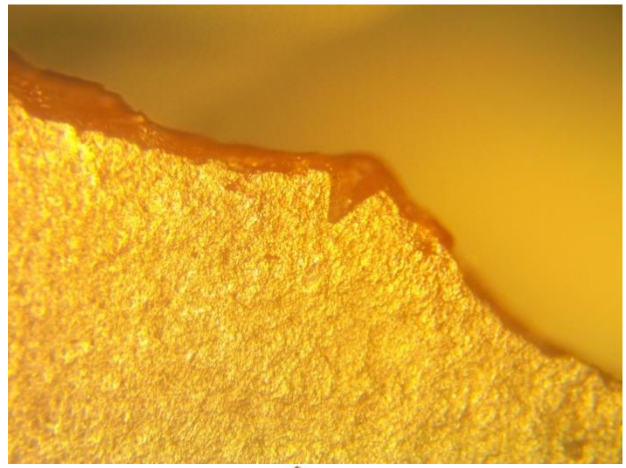
Artifact #: 0057 Basic Form: Multifacial
Site #: 47JE833

<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">No</td><td>N/A</td><td rowspan="7"></td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">N/A</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">N/A</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>N/A</td></tr>
</table>

Artifact #: 0058
Site #: 47JE833

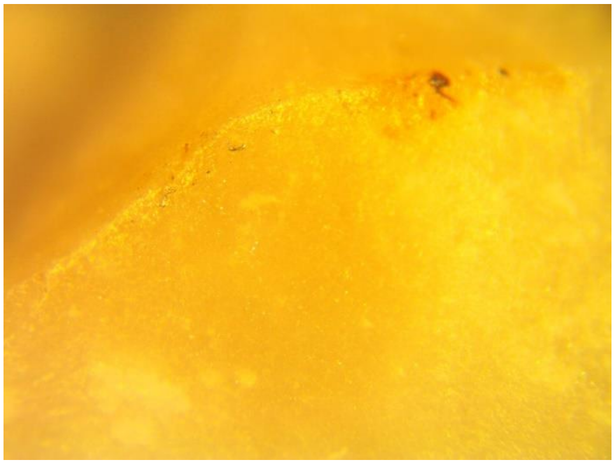
Basic Form: Edge Only/Functional

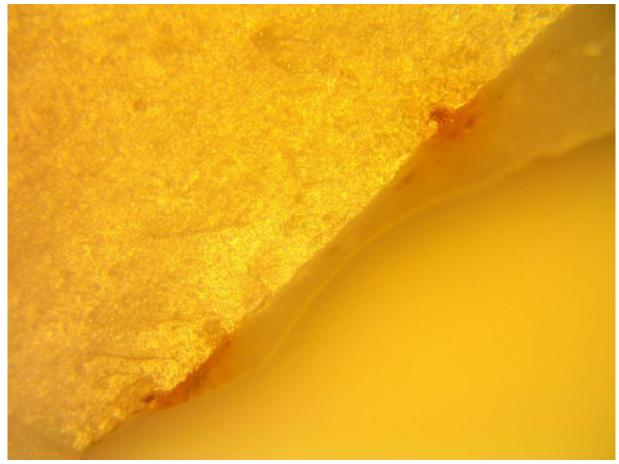




<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Longitudinal</td><td rowspan="7"></td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>Yes</td></tr>
<tr><td rowspan="2">Lateral, Distal</td><td rowspan="2">Lateral, Distal, Proximal</td><td>STRIATION LOCATION:</td></tr>
<tr><td>Dorsal</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Generic Weak</td><td rowspan="3">Generic Weak</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Soft</td></tr>
</table>

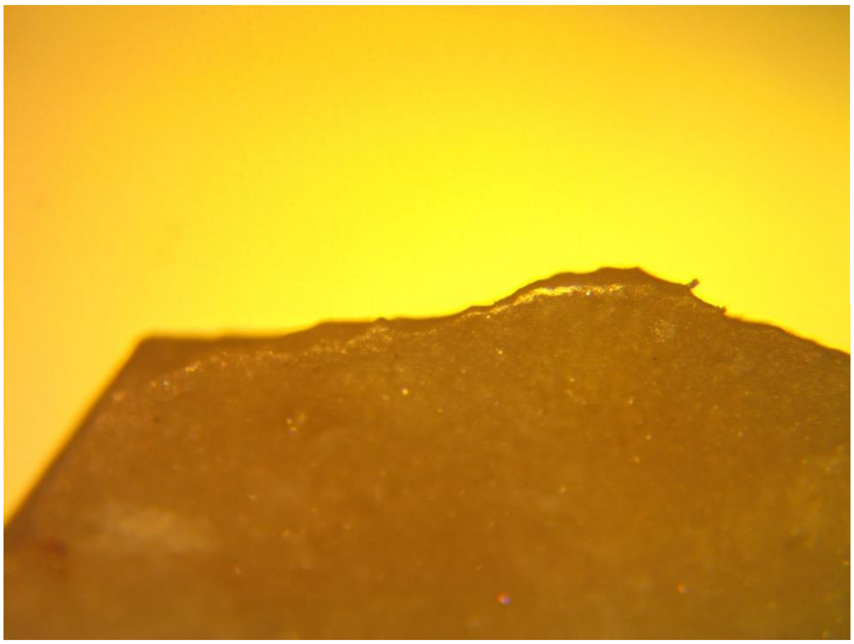
Artifact #: 0059 Basic Form: Edge Only/ Functional
Site #: 47JE833





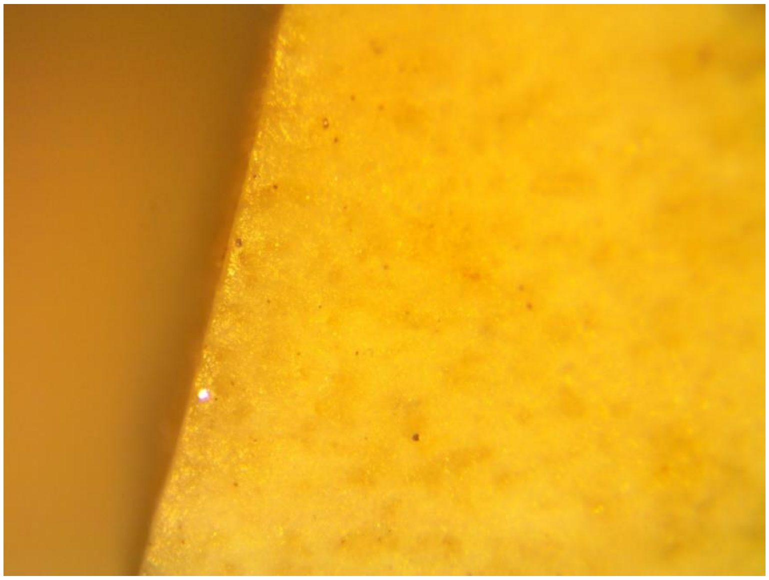
<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">Yes</td><td>Transverse</td><td rowspan="7">seems like this was used perhaps like a knife, bright meat polish on ventral side</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>Yes</td></tr>
<tr><td rowspan="2">Distal, Proximal, Lateral</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>Dorsal</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">possible bone or wood</td><td rowspan="3">Meat/Wet Hide</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Soft/Hard</td></tr>
</table>

Artifact #: 0060 Basic Form: Edge Only/Functional
Site #: 47JE833



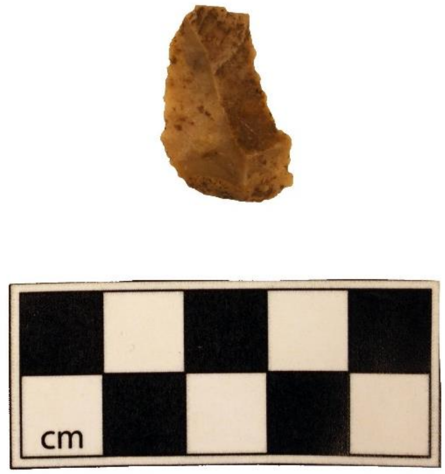
<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Longitudinal</td><td rowspan="7"></td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">Grit</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>Yes</td><td>Hard</td></tr>
</table>

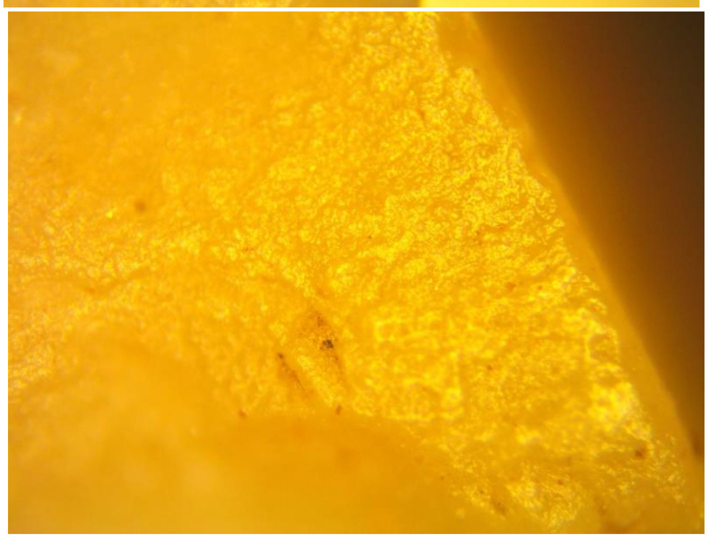
Artifact #: 0062　　Basic Form:
Site #: 47JE833

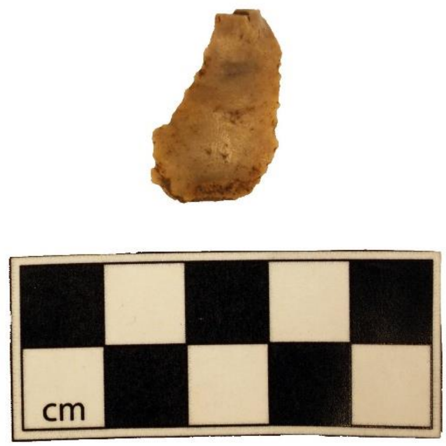


<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">Very weak buildup of polish - maybe broke before lots of use?</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Distal, Proximal, Lateral</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Generic Weak</td><td rowspan="3">Generic Weak</td><td>No</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Indeterminate</td></tr>
</table>

Artifact #: 0063 Basic Form: Edge Only/Functional
Site #: 47JE833





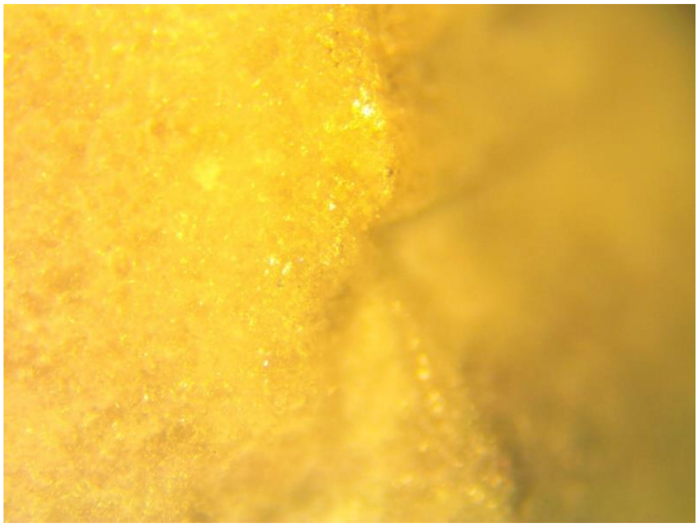


<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">Majority of polish on ventral side - mostly on sides (tip/distal portion broken)</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Distal, Proximal, Lateral</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Wood or Bone</td><td rowspan="3">Wood or Bone, Generic Weak</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Soft</td></tr>
</table>

Artifact #: 0064

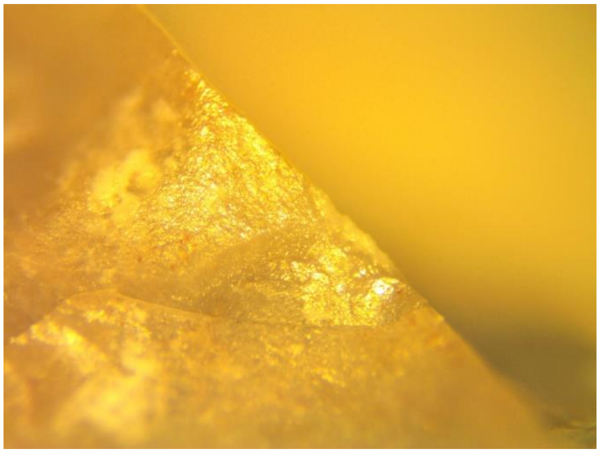
Basic Form: Bifacial

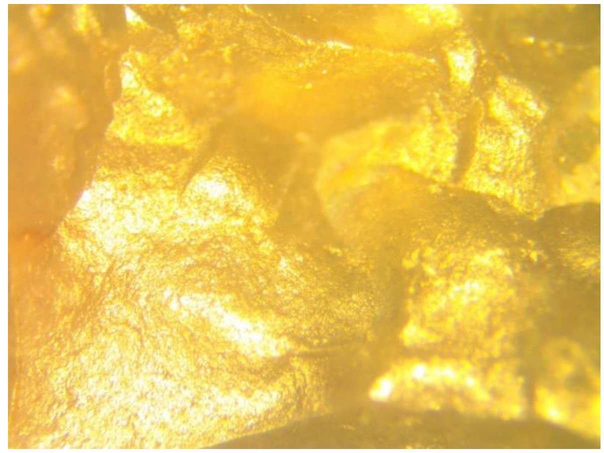
Site #: 47JE833

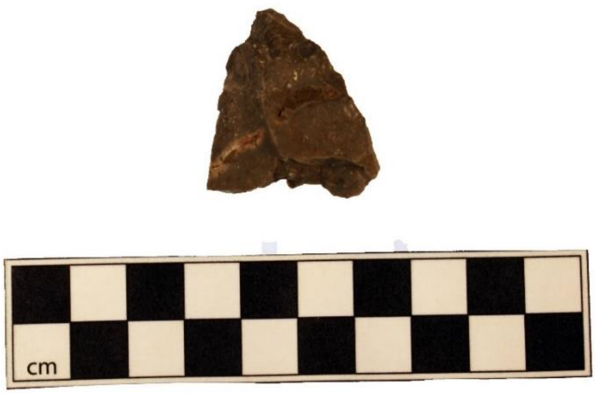


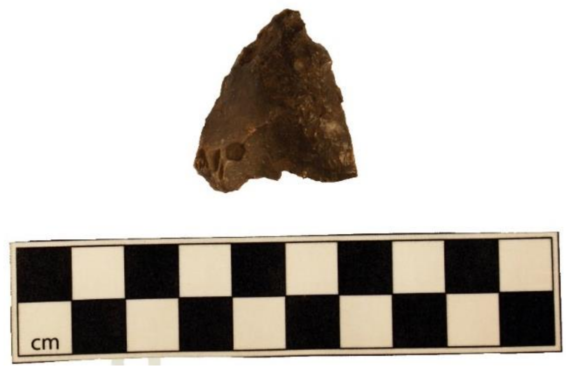
<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td></td><td rowspan="7">Polish is weakly developed – hard to determine</td></tr>
<tr><th colspan="2">USE WEAR LOCATION:</th><th>STRIATIONS PRESENT?:</th></tr>
<tr><th>DORSAL:</th><th>VENTRAL:</th><td></td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">Distal, Proximal, Lateral</td><th>STRIATION LOCATION:</th></tr>
<tr><td></td></tr>
<tr><th>POLISH TYPE:</th><th>POLISH TYPE:</th><th>FLAKING/CHIPPING PRESENT?</th></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">Meat/ Wet Hide, maybe Dry Hide? -Leather, Weak Generic</td><td>No</td></tr>
<tr><th>ROUNDING PRESENT?</th><th>MATERIAL HARDNESS:</th></tr>
<tr><td>No</td><td>Soft/Medium</td></tr>
</table>

Artifact #: 0065 Basic Form: Bifacial
Site #: 47JE833



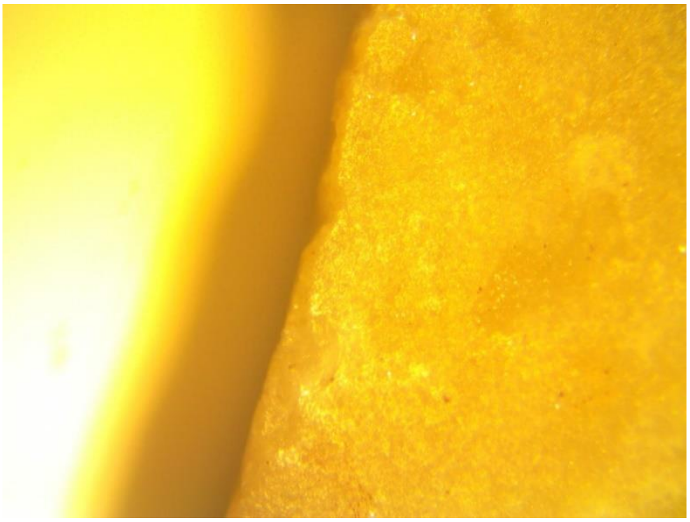


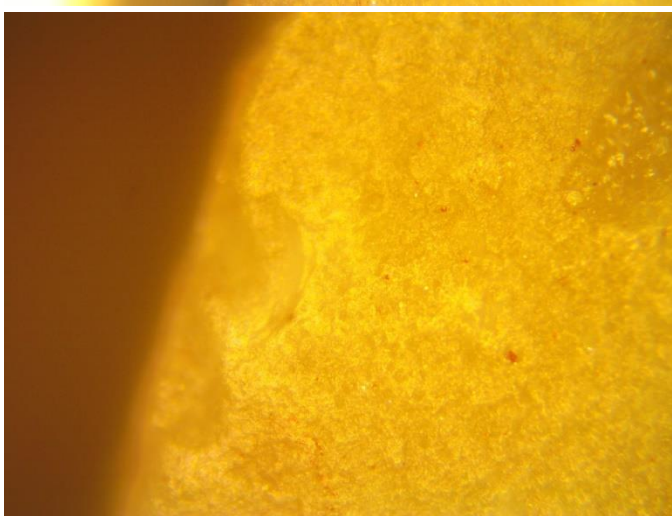




<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7">uneven development of polish - due to resharpening or breakage</td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>Yes</td></tr>
<tr><td rowspan="2">Distal, Proximal, Lateral</td><td rowspan="2">Distal, Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>Ventral</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Meat/Wet Hide</td><td rowspan="3">Meat/Wet Hide</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Soft</td></tr>
</table>

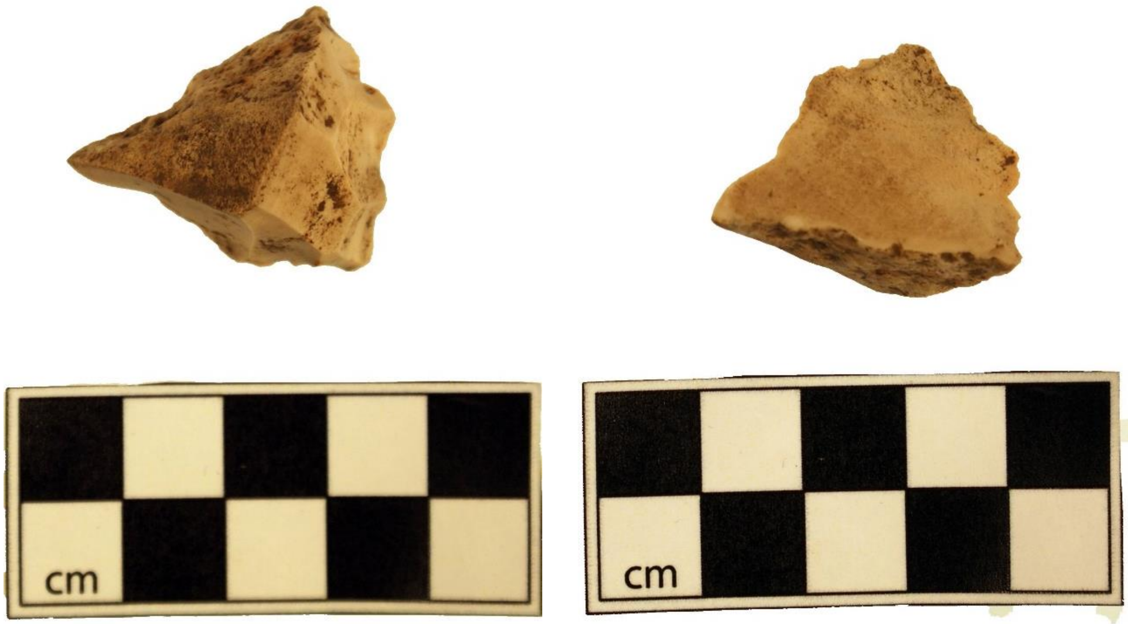
Artifact #: 0066 Basic Form: Edge Only/Functional
Site #: 47JE833





<table>
<tr><th colspan="2">USE WEAR PRESENT?:</th><th>DIRECTION OF USE:</th><th>COMMENTS:</th></tr>
<tr><td colspan="2">Yes</td><td>Indeterminate</td><td rowspan="7"></td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">Distal, Lateral</td><td rowspan="2">Proximal, Lateral</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">Generic Weak, Smooth Pit</td><td rowspan="3">Generic Weak</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>Indeterminate</td></tr>
</table>

Artifact #: 0067 Basic Form: Multifacial
Site #: 47JE833



<table>
<tr><td colspan="2">USE WEAR PRESENT?:</td><td>DIRECTION OF USE:</td><td>COMMENTS:</td></tr>
<tr><td colspan="2">No</td><td>N/A</td><td rowspan="7"></td></tr>
<tr><td colspan="2">USE WEAR LOCATION:</td><td>STRIATIONS PRESENT?:</td></tr>
<tr><td>DORSAL:</td><td>VENTRAL:</td><td>No</td></tr>
<tr><td rowspan="2">N/A</td><td rowspan="2">N/A</td><td>STRIATION LOCATION:</td></tr>
<tr><td>N/A</td></tr>
<tr><td>POLISH TYPE:</td><td>POLISH TYPE:</td><td>FLAKING/CHIPPING PRESENT?</td></tr>
<tr><td rowspan="3">N/A</td><td rowspan="3">N/A</td><td>Yes</td></tr>
<tr><td>ROUNDING PRESENT?</td><td>MATERIAL HARDNESS:</td></tr>
<tr><td>No</td><td>N/A</td></tr>
</table>