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Stone Tools and Agricultural Communities: Economic, Microwear, and Residue Analyses of Wisconsin Oneota Lithic Assemblages

Katherine Sterner
University of Wisconsin-Milwaukee

STONE TOOLS AND AGRICULTURAL COMMUNITIES:
ECONOMIC, MICROWEAR, AND RESIDUE ANALYSES OF WISCONSIN ONEOTA LITHIC ASSEMBLAGES

by

Katherine M. Sterner

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ABSTRACT

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Katherine M. Sterner

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Under the Supervision of Professor Robert J. Jeske

This dissertation is an investigation into community organization as an approach to understanding the shift from typologically complex to a simpler lithic technology after circa A.D. 500 in the Prairie Peninsula. The research compares Oneota lithic practice in western Wisconsin (A.D. 1400-1700) at the La Crosse locality to that in eastern Wisconsin (A.D. 1100-1450) at the Koshkonong locality to develop a model for communities in two different geographic and temporal contexts.

Three types of lithic analyses were conducted on nine different Wisconsin Oneota sites to achieve research goals. Assemblage analysis was conducted on all nine assemblages. The goal of this approach is to produce datasets that enable researchers to address questions about settlement patterns, procurement systems, social networks and other issues that affect raw material acquisition, tool production, tool use and tool discard. Microwear analysis was conducted on a sample of four site assemblages. This represents the first comprehensive microwear analysis to be conducted on any Oneota lithic assemblage. This dataset provides critical information on stone tool use. Finally, a small sample of lithic tools from one site was tested for protein residue. This third analysis technique provided more specific information on lithic tool function.

The data indicate that the Koshkonong Oneota tradition was characterized by a tightly knit multi-village community while evidence of such a community unit at La Crosse does not exist. Evidence from microwear analysis indicates that both men and women used lithic tools and that women produced some, if not most of the lithic tools. The decline in formal lithic tool complexity and diversity through time was likely the result of a shift in the gendered division of labor of producing stone tools.

To my grandparents.

Especially my grandfather, James Nevin Sterner.

Thanks for waiting.

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The support I have received from my parents, for my entire life, defies description. I am truly without the prose to describe how much their confidence and love means to me. My mother and father taught me all of the social and intellectual skills that graduate school allowed me to hone. The example provided by two Navy Chiefs who were also dedicated parents provided me with the self-discipline I needed to manage my professional and personal responsibilities while writing this dissertation. Thanks Mom and Dad.

Finally, this dissertation is dedicated to my grandparents. Most of my grandparents did not live to see me start my Ph.D., much less finish it. Althea, Marie, and Ralph: I miss you. Jim Sterner's impatience for me to finish provided some of the impetus I needed to complete this project. He passed away four days before I turned this document in to the Graduate School. Words cannot express how grateful I am for how long he waited. You are missed, Grandpa.

CHAPTER ONE:

INTRODUCTION

Archaeologists have long known that stone tool technology in the Prairie Peninsula (Figure 1.1) underwent a shift from typologically complex to a simpler lithic technology after circa A.D. 500 (Bettarel and Smith 1973; Fitting 1975; Griffin 1983; Jeske 1992; Kelly et al. 1984; Mason 1981; McGimsey and Conner 1985; Park 2004; Parry and Kelly 1987). This dissertation is an investigation into community organization as an approach to understanding this shift in technology. Using multiple lines of evidence, the analysis of stone tools can contribute to a broad understanding of how human communities are represented in the archaeological record. In particular, lithic assemblages from nine sites in Wisconsin are examined to show that geographically isolated concentrations of villages built and maintained economic, social and religious communities between A.D. 1050-1650.

By circa A.D. 1000, many people living throughout the western Great Lakes region adopted a sedentary lifestyle, settled primarily in small villages, and sustained themselves through a combination of maize agriculture and food collecting (Griffin 1960a; Hall 1962; McKern 1942; Overstreet 1997). One archaeological culture identified by this type of settlement and subsistence system, as well as globular, shell-tempered ceramic jars, is referred to as Oneota (Gibbon 1970a; Hall 1962; Overstreet 1976). Oneota is historically classified as an Upper Mississippian Tradition, associating similar groups that existed concurrently with the more elaborate Middle Mississippian Tradition of the Mississippi River and adjacent regions (Griffin 1943; McKern 1945).

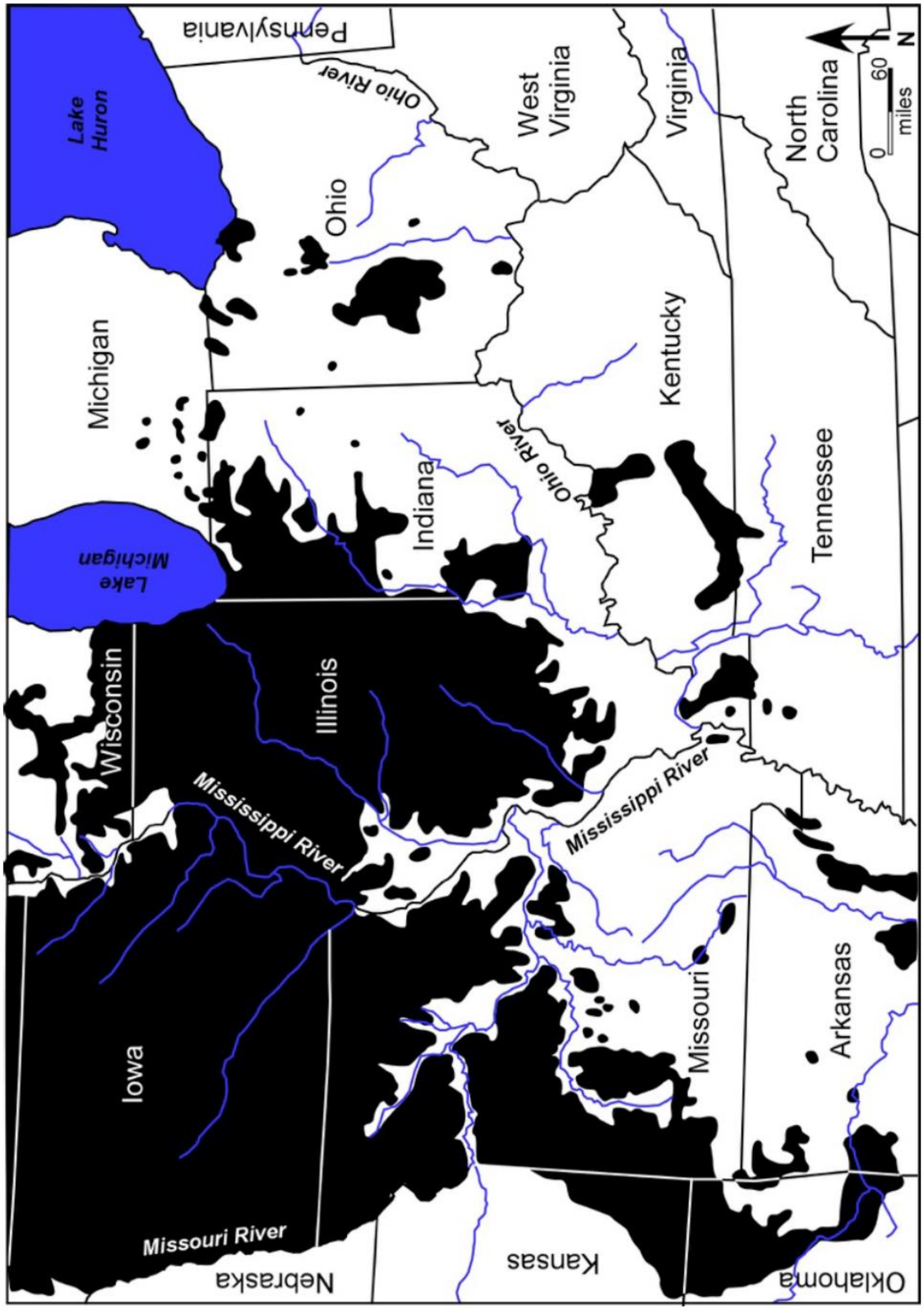

Figure 1.1. The Prairie Peninsula shaded in black extending into Illinois, Indiana, and Wisconsin with pockets in Michigan, Ohio, and Kentucky.

These Upper Mississippian archaeological cultures have often been linked to Middle Mississippian archaeological cultures, concentrated at Cahokia in the American Bottom (Berres 2001; Emerson 1999; Griffin 1943, 1960; Goldstein and Richards 1991; Jeske 1999; Overstreet 2000; Richards 1992; Rodell 1991, 1997; Stoltman 1991). Scholars have examined this relationship through use of World Systems Analysis or core-periphery models (e.g., Dincauze and Hasenstab 1989; Jeske 1999; Peregrine 1991), peer polity interactions (Cook 2008; Schneider 2015), and traditional culture-historical models of diffusion (Emerson 1999), economic power (Jeske 1999), and/or immigration (Goldstein and Richards 1991; Griffin 1960a). While recognizing the presence of Middle Mississippian populations in the Midwest, this dissertation builds on the work of Schneider (2015) and others (e.g., Fleming 2009; O'Gorman 2010; Rodell 1997) to focus on identity and interaction among Oneota groups using the concept of community (Anderson 1983; Yaeger and Canuto 2000; Cohen 1985; Murdock 1949; Redfield 1955).

Oneota tradition archaeological sites are found in spatially discrete areas that have been termed localities (Hall 1962; McKern 1945; Overstreet 1997, 2000) (Figure 1.2). The way the people living at these sites related to their neighbors within the locality and structured their community identity is still unclear. Some previous analyses (e.g., Fleming 2009; Rodell 1997; Schneider 2015) have used various artifact classes to identify levels of interaction in specific Oneota localities. In this dissertation, the diversity of lithic practice in two Oneota localities is used to develop a model for Oneota community, and to highlight temporal changes in community structure.

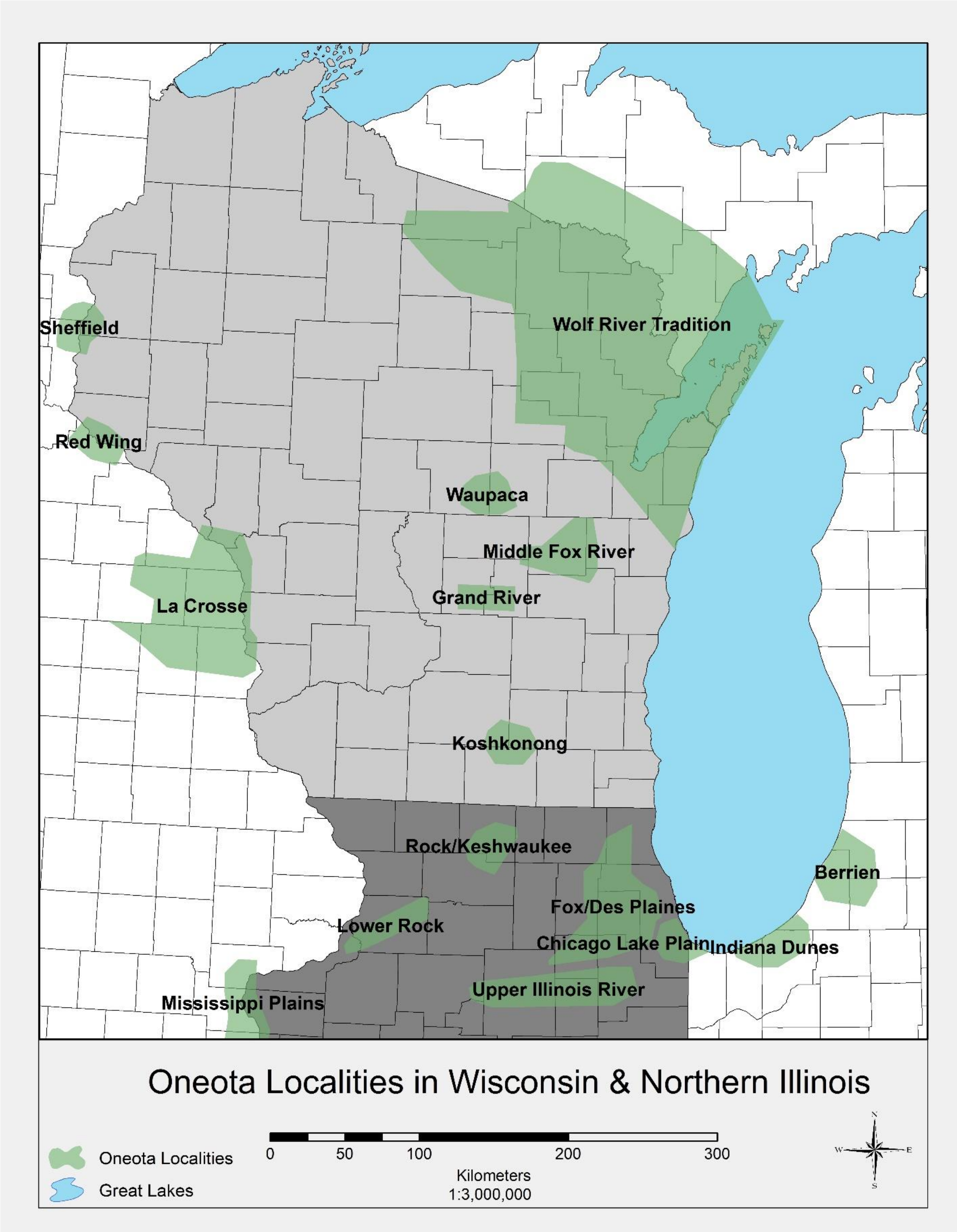

Figure 1.2. Oneota localities in Wisconsin, Illinois, Minnesota, Indiana, and Iowa (adapted from Edwards 2017).

Archaeological studies of Native American community have historically focused on semi-sedentary foragers (e.g., Charles and Buikstra 2006; Dancey and Pacheco 1997; Lazazzera 2009; Prufer 1961, 1964; Ruby et al. 2005; Smith 1992, 2006) or socially stratified maize agriculturalists (e.g., Betzenhauser 2011; Kelly 1996; Mollerud 2016; Rogers and Smith 1995). In the present study, a model for the organization of mixed agriculturalist/hunter-gatherer communities is produced and tested, using the acquisition of lithic raw material, tool production, and tool use to explore similarities and differences in these behaviors between two localities.

Patterns in lithic procurement, production, use, and discard are a form of habitus, indicative of the shared dispositions of individuals who participated in these activities (Bourdieu 1977). Similarities in lithic practice are used to delineate community boundaries. In this study, lithic patterns are examined at three levels:

1. Intra-site, in order to provide a discrete model for Oneota lithic economy; and to help identify the relationship between lithic practice and community identity.
2. Intra-locality, in order to identify the commonalities of lithic practice that are indicative of close, community relationships; and to develop a model for communities in two different geographic and temporal contexts.
3. Inter-locality, in order to identify the commonalities of lithic practice that are indicative of more distant connections. This consists of a comparison of Oneota lithic practice in western Wisconsin (A.D. 1400-1700) at the La Crosse locality to that in eastern Wisconsin (A.D. 1100-1450) at the Koshkonong locality, resulting in a more comprehensive model of Wisconsin Oneota lithic economy.

Three types of lithic analyses were conducted on nine different Wisconsin Oneota sites to achieve these research goals (Figures 1.3, 1.4; Table 1.1). Assemblage analysis was conducted on all nine assemblages. This analysis has been commonly used on assemblages from multiple geographic and temporal contexts (cf. Blodgett 2004; Epstein 2016; Jeske 1987, 1989; Lurie 1982; O'Gorman 1993, 1994, 1995; Park 2004; Rosebrough and Broihahn 2005; Sterner 2012; Wilson 2016; Winkler 2004, 2011). The goal of this approach is to produce datasets that enable researchers to address questions about settlement patterns, procurement systems, social networks and other issues that affect raw material acquisition, tool production, tool use and tool discard (Lurie and Jeske 1990). Microwear analysis (cf. Beyin 2010; Brass 1998; Clemente and Gibaja 1998; Jeske 2002; Jeske and Sterner-Miller 2015; Kamminga 1982; Keeley 1980; Odell 1977; Odell and Odell-Vereecken 1980; Sterner and Jeske 2017; Vaughan 1985) was conducted on a sample of four site assemblages. A comprehensive microwear analysis has not yet been conducted on any Oneota lithic assemblage and this dataset provides critical information on stone tool use. Finally, a small sample of lithic tools from one site was tested for protein residue (cf. Allen et al. 1995; Högberg et al. 2009; Seeman et al. 2008; Yohe et al. 1991). This third analysis technique provided more specific information on lithic tool function. Correspondence analysis was used to identify patterns in lithic economy (cf. Alberti 2013; Greenacre 1981; Lockyear 2013; Smith and Neiman 2007).

Table 1.1 Types of lithic analyses conducted on sample assemblages for this dissertation.

Site Name	Site No.	Locality	Assemblage	Microwear	Residue
Crescent Bay Hunt Club	47JE0904	Koshkonong	X	X	X
Koshkonong Creek Village	47JE0379	Koshkonong	X	X	
Schmeling	47JE0833	Koshkonong	X		
Carcajou Point	47JE0002	Koshkonong	X		
Tremaine	47LC0095	La Crosse	X	X	
Pammel Creek	47LC0061	La Crosse	X	X	
OT	47LC0262	La Crosse	X		
Filler	47LC0149	La Crosse	X		
State Road Coulee	47LC0176	La Crosse	X		

Figure 1.3. Four sites examined for this dissertation from the Koshkonong locality.

Figure 1.4. Five sites examined for this dissertation from the La Crosse locality.

Previous Research on Mixed Agriculturalist Communities

Many scholars of community have noted that there is an unfortunate tendency for archaeologists to conflate community with site and community organization with settlement patterns (e.g., Yaeger and Canuto 2000; Isbell 2000; Ruby et al. 2005). There have been numerous models of Oneota settlement patterns (e.g., Edwards 2010; Gallagher and Stevenson 1982; Hollinger 1995; Overstreet 1976; Richards and Jeske 2002; Rodell 1983; Sasso 1989). These models tend to vary depending on whether their data are from eastern or western Wisconsin. Western settlement systems are more complex, with functionally distinct site types and varied placement on the landscape based on site function (Gallagher and Stevenson 1982; Sasso 1989). Non-village Oneota sites in eastern Wisconsin are rare and villages are usually smaller than most of those identified in western Wisconsin. Both eastern and western sites are generally located at the intersection of multiple ecotones so that multiple environmental zones could be exploited to support a diversified subsistence system (Edwards 2010; Overstreet 1976; Rodell 1983; Sasso 1989).

Studies of Oneota community that go beyond equating site and community are rare. Berres (2001) and Schneider (2015) discuss Oneota community interaction in a way that does not explicitly define what is meant by community, but they do note that there are multiple levels on which interaction takes place. Berres (2001:187) identifies this interaction as reciprocal feasting while Schneider identifies marriage alliances (2015:340-346). Schneider uses ceramic compositional data to demonstrate that pottery vessels with exotic designs were actually made locally and, thus, are more likely to represent exogamous marriage than trade. So, while he models interaction between communities, he does not articulate community structure. His analysis also only examines eastern Wisconsin Oneota localities.

Rodell (1997) examined communities in the Red Wing locality, focusing on the Late Woodland to Oneota transition. He utilized Hayden's (1995:19) categories of "Reciprocator" and "Entrepreneur" communities to distinguish between Late Woodland emphasis on household production and exchange as the main avenue to wealth and power and the Oneota-period rise of aggrandizers, public exchanges, increased population and profits.

Fleming (2009) also developed a model for community in the Red Wing locality using data on lithic raw materials, pottery production, mound construction, and the presence of exotic ceramics and portable art objects. Fleming used Ruby et al.'s (2005) tri-partite division of residential, sustainable and symbolic communities to describe community at Red Wing. Assemblage differences between the sites he examined led him to identify the sites as residential communities. He identified the Mero and Bryan villages as centers of aggregation in the region and a location for maintenance of sustainable community relationships within and outside of the immediate region (2009:297). While Fleming (2009:298-299) explicitly rejected the notion of Red Wing as a site-unit Middle Mississippian intrusion, all elements of the Red Wing symbolic community that he identified are "Mississippian-inspired" (e.g., ceramic motifs, discoidals, and mortuary activities). The overtly Mississippian symbolism that Fleming used to delineate the Red Wing symbolic community are mostly absent from other Oneota localities though.

O'Gorman (2010) uses data from the Tremaine site in the La Crosse locality of western Wisconsin to identify five kinds of community: longhouse, natal, marital, village, and regional longhouse. O'Gorman does a good job of demonstrating how community identities may have overlapped and interacted. However, her model of community is largely based on residence in longhouses, of which Tremaine is the primary, and possibly only example in the La Crosse locality. Additionally, even if longhouses are the norm at Oneota sites in western Wisconsin and

Iowa, extensive excavations at earlier sites in eastern Wisconsin have demonstrated that is not the case there (Jeske and Sterner 2018).

In Iowa, where Oneota manifestations may be more closely tied to historic and protohistoric Native American tribes, scholars have been better able to reconstruct Oneota social structure, kinship, and residency patterns (e.g., Benn 1995; Henning 1995, 1998; Hollinger 1993b, 1995; Staeck 1993, 1994). These features are directly connected to formation and maintenance of residential and sustainable communities. Hollinger (1993, 1995) proposes a temporal shift from matrilocal to patrilocal residence patterns from late prehistory to protohistory, evidenced in the shift from multi-lineage longhouse residence to nuclear family wigwam residence. Staeck (1993, 1994) and Radin (1923) also find evidence for matrilocality in the Winnebago oral traditions. Benn (1995) draws on these approaches, as well as other artifact evidence to emphasize the transition from the likely patrilineal/patrilocal Late Woodland to the matrilineal/matrilocal Oneota manifestation. While all three of these authors focus on factors that directly impact the size and composition of communities, they do not address the boundaries of or variation in the formation of those communities.

In general, studies of community among societies practicing mixed agriculture and hunting and gathering are rare. One other key transitional example worldwide is the European Neolithic. However, conceptions of community here also tend toward the settlement patterning perspective (e.g., Amkreutz et al. 2009; Claßen 2009; Verhart 2000). As with New World examples, more nuanced studies of Neolithic community focus more on well-established agricultural sites rather than transitional ones (e.g., Bentley et al. 2008; Verhoeven 1999) or take a diachronic view of the Neolithic rather than a synchronic one (e.g., Rasteiro and Chikhi 2008).

Previous Research on Mixed Agriculturalist Lithics

Descriptive lithic analyses have been undertaken at Oneota sites throughout Wisconsin (Anderson et al. 1995; Boszhardt and McCarthy 1999; Gibbon 1969; Hall 1962; Jeske et al. 2003; O'Gorman 1995; Overstreet 1976; Padilla and Ritterbush 2005; Rodell 1989; Salkin 1989). With only a few exceptions (e.g. Boszhardt and McCarthy 1999), virtually all Oneota lithic analyses rely on morphofunctional typology to extrapolate tool function and though some studies identify large quantities of informal "flake tools," (O'Gorman 1995:154) no function has been attributed to these tools. However, previous analyses have suggested that these informal tools represented an important part of the Oneota toolkit and that the function of Oneota formal tools may be less than clear cut (Jeske and Sterner-Miller 2015; Sterner 2012; Sterner and Jeske 2017).

In North America, the discrepancy in the number of lithic studies of hunter-gatherer groups to agriculturalists is stark. A decline in formal lithic tool complexity and diversity through time has long been noted in the Midwest (e.g., Bettarel and Smith 1973; Fitting 1975; Griffin 1983; Kelly et al. 1984; Mason 1981; McGimsey and Conner 1985; Park 2010; Parry and Kelly 1987) and has been related to an increased reliance on agriculture or horticultural economies (Jeske 1992). This decline resulted in large quantities of informal or expedient tools at many late prehistoric sites, particularly at late prehistoric sites where access to good quality lithic raw materials was often restricted (Jeske 2003b; O'Gorman 1995; Sterner 2012). This shift in lithic technological organization coincident with the shift to plant production makes tool function particularly contentious and important. However, the shift away from formal tools by agriculturalists appears to have made such studies less interesting to lithic analysts.

Research on lithic assemblages from early agriculturalist sites in North America has focused primarily on descriptive analyses (e.g., Evans et al. 2014; Jeske 2002; Padilla and Ritterbush 2005) and refining formal tool typologies (e.g., Bradbury et al. 2011; Bradbury and Richmond 2004; Carmean 2009; Cook and Comstock 2014; Pollack et al. 2002). Examples of other information gleaned from lithic analyses include questions about intra-site activity areas (Robertson 1984), inter-site interaction (Giles and Knapp 2015; Sterner-Miller 2015), raw material selection and expediency (Ensor 2009; Jeske 2003b), energetic efficiency as a response to increasing social complexity (Jeske 1987, 1992), and agricultural practices (Hammerstedt and Hughes 2015). However, comprehensive lithic analyses that compare both tools and debitage from multiple sites within the same cultural complex to examine the role that lithics played in the multifaceted subsistence strategies of early agriculturalists are difficult to find. Studies that address tool function are particularly rare.

The early Neolithic in Europe and Asia is perhaps the most thoroughly studied example of the transition from hunting and gathering to agriculture (e.g., Bogaard 2004; Cohen 2011; Fort et al. 2012; Zeder 2011). Lithic research in this period is also conspicuously underrepresented. Some studies have examined the dynamic shift in toolkit composition brought on by the social and economic changes of the Neolithic transition (e.g., Devriendt 2008; Gatsov 2003; Niekus 2009). These mostly focus on the technological and typological composition of assemblages, although functional analyses do appear in some cases (e.g., Devriendt 2008; Goodale et al. 2010; Pique 2015; Yerkes et al. 2014). The vast majority of Neolithic stone research is concentrated on raw material procurement for chipped stone tools (e.g., Dimitrovska 2012; Klindzic 2011; Kuca et al. 2009; Terradas et al. 2014) and functional analysis of groundstone tools explicitly associated with the grinding of cereals considered central to the Neolithic transition (e.g., Hamon 2008; Teo et al. 2011).

Functional analyses focused on early agriculturalists are particularly underrepresented in lithic analyses as a whole. At Neolithic sites, functional analyses are almost always confined to one morphological tool type and rarely generate inferences about overall site economy (Niekus 2009; Pique 2015; Yerkes et al. 2014). The vast majority of such studies in North America have focused on craft specialization (e.g. Pope 1986; Prentice 1985; Yerkes 1983) and ceremonialism (Vermilion et al. 2003) at Middle Mississippian sites. Functional analysis at Upper Mississippian sites is practically nonexistent in the literature, although there are a few exceptions (e.g., Boszhardt and McCarthy 1999; Hohol 1985; Jeske 2002; Nass 1987).

Organization of this Dissertation

Chapter Two presents theoretical methods for conceptualizing communities. It discusses how archaeologists have defined communities in the past, the relationships that communities have with household and regional units of organization, and how communities are understood in this study. Models of Hopewell and Mississippian communities are used as case studies and previous research on Oneota community is presented. This chapter concludes with a discussion of the relationship between lithic practice and community identity.

Chapter Three provides a brief overview of the culture history of the study region, including information on Oneota taxonomy, chronology, origins, historic affiliations, settlement patterns, subsistence system, material culture, and social and community organization.

Chapter Four presents background information on the nine sample sites utilized in this analysis. There is a description of site’s location, the excavation history, radiocarbon dates, and an overview of structures, features, burials, and types of material culture identified. The lithic samples examined from each site are also detailed in this chapter.

Chapter Five describes the methods of analysis used in this project. The first section of this chapter explains the reasoning behind the sites sampled for this dissertation and the sampling strategy for the lithic assemblages examined. The three types of lithic analysis used (assemblage analysis, microwear analysis and protein residue analysis) are explained in detail. This consists of a history of the method, rationale for the use of this method, and a step-by-step description of the process used in this particular study. There is also a description of the procedures for the creation of the experimental lithic assemblage used in blind tests and as a comparative for the microwear portion of the project. Finally, a description of correspondence analysis (CA), the primary statistical method used in this analysis is offered.

Chapter Six presents the results of the analyses described in Chapter Five. First, data sources for lithic data used in comparative analyses but not collected by the author are presented. Then, the results from each analysis are presented by locality. First, the Koshkonong and La Crosse locality debitage analysis results are described. A comparison of the debitage results from the two localities follows. Next, the Koshkonong and La Crosse lithic tool assemblage analysis results are provided. These results are also compared between the two localities. The results from the microwear analyses are presented next. The Koshkonong and La Crosse microwear results are presented separately and then a comparison is provided. The chapter concludes with a description of the protein residue analysis results from the Crescent Bay Hunt Club site assemblage.

Chapter Seven provides an analysis of the results presented in Chapter Six and discusses its implications for the research questions presented in this chapter.

Chapter Eight concludes the dissertation, summarizes the implications of the research, and suggests directions for future research.

CHAPTER TWO:

CONCEPTUALIZING COMMUNITIES

Introduction

Using lithic data to identify communities among the people occupying southern Wisconsin during late prehistory requires a meaningful definition of what is meant by the term community. This chapter includes an examination of how archaeologists have defined communities in the past, how communities have previously been studied in the American Midwest, and how Oneota communities have been understood in the literature. In addition, the definition of community used for this dissertation is explained. Finally, how we may link information derived from lithic analyses to understanding Oneota communities is justified.

Theoretical Conceptions of Community

Canuto and Yaeger (2000) note that, although archaeologists frequently refer to communities in research designs and interpretations, a well-developed concept of community has yet to emerge. Most archaeologists directly associate the social connections in a community with the spatial representation of a site. However, this is an overly simplistic perspective that has resulted in an impoverished methodological and theoretical framework for studying past communities (Canuto and Yaeger 2000: xiii).

Yaeger and Canuto (2000:2) identify four historical approaches to understanding community, termed structural-functionalist, historical-developmental, ideational, and interactional. They characterize structural-functionalist research as focused primarily on the function of a community within a social structure. Structural-functionalists and functionalists portray community as the principal unit of biological and cultural reproduction in a society (e.g., Arensberg 1961). Murdock (1949) depicts community as a co-residential collection of individuals or households connected by day-to-day interaction, shared experiences, and common culture. Murdock (1949:79) identified community to be a human universal and Redfield (1955:156) considered community to be "man's natural state" and a "human whole." The universal community unit was seen as homogenous, slow-changing, and small enough for anthropologists to treat any individual as representative of all of the members of the same age and sex. The community was seen as an integrated whole without segmentation or factionalism (Isbell 2000:246-247). The natural view of community in structural-functionalism meant that little attention was given to the mechanisms for the origination and maintenance of communities.

Historical-developmental approaches to understanding community filled this void. Researchers asked how communities came into existence and argued that different conditions would produce distinct types of communities (Gould 1959; Marriott 1955; Mintz 1956; Wolf 1955, 1956). These researchers stressed the roles of external forces in determining a community's internal structure, using political economy and world systems analyses. Wolf and Mintz demonstrated that seemingly isolated communities were, in fact, participants in a vast world system (Wolf 1969, 1982; Wolf and Mintz 1957). Lewis (1951) found that the Mexican village of Tepoztlan was characterized by factionalism and disagreement, as well as complex connections to the outside world. These new cases made the continued use of the homogenous, integrated community model untenable.

Yaeger and Canuto's (2000) depictions of structural-functionalist and historical-developmental conceptions of community both fall under the umbrella of what Isbell (2000:245-248) refers to as the "natural community." Natural communities are bounded and develop along a relatively homogenous trajectory. Isbell (2000:248) notes that this conceptualization has fallen mostly out of use in socio-cultural anthropology but that it is still the preferred model for processual, evolutionary archaeologists. Johnson and Earle (1987) present the household and the community as the natural units of human society, on which the pressures of cultural evolution operate to produce adaptive change. In fact, the correlation of community with site has promoted the use of an evolutionary progression from bands to village communities, to chiefdoms, to states in place of the traditional ordering of band, tribe, chiefdom, state (Isbell 2010; cf. Service 1962). This conceptualization of culture history is still the default in models of cultural development in the American Midwest (e.g., Benchley et al. 1997; Mason 1981).

An alternative to the natural community is the "imagined community" (Isbell 2000:249-252). This concept arose out of the post-processual and post-modern shift to viewing identity as continually and situationally changing (Cohen 1994). Identities are based on qualities that people see as connecting them with some individuals who share those qualities and distinguishing them from individuals who do not (Anderson 1983; Cohen 1985). Community membership is one aspect of this form of identity. Yaeger and Canuto (2000:2-3) distinguish between ideational and interactional approaches to imagined communities. Ideational perspectives focus on how people perceive themselves and their place in a community. Interactional approaches ask how people create communities through their relationships. Yaeger and Canuto (2000:3) distinguish this approach from earlier models of social organization focusing on interaction (e.g., Barth 1966; Murdock 1949) by emphasizing practice theory. Instead of seeing the community as the locus for social interaction and reproduction, all social institutions, including communities are viewed as social constituted and agent-oriented (Anderson 1991; Giddens 1984; Moore 1994).

The imagined community (Isbell 2000:249) is fluid, changing and populated with individuals who behave like interested agents. Isbell notes that the advantage of this perspective is that it promotes the study of contingent change within individual cultures rather than the study of universal cultural evolution based on cross-cultural comparisons. The imagined community concept emphasizes power, human difference, intentions and strategies, and unexpected consequences in prehistory. Proponents of this perspective believe that a correspondence between a socially interacting group, a bounded territory, economy, politics, reproductive pool, intergenerational education, desires and sentiments can only exist in an ideal model, not in the real world.

Isbell (2000:242) finds natural and imagined communities to be mutually exclusive, irreconcilable positions. However, other authors have used both concepts together (e.g., O'Gorman 2010; Ruby et al. 2005). The importance of the imagined community model is that is recognizes cross-cutting identities that affect an individual's experience of community, such as gender, occupation, age, and social status. A natural community perspective is valuable as it actually provides a bounded concept of what the term community means. This is necessary if one is to recognize communities from evidence in the archaeological record.

In the American Midwest, two archaeological cultural manifestations have been the primary foci for community-level research: Hopewell and Middle Mississippian. Conceptualizations of community have changed with the addition of new archaeological data, as well as the shifting theoretical viewpoints of the day. The trajectory of community research in both the Hopewell and Mississippian case studies will be discussed here, as both provide historical context and are relevant to the way that community is used in this study.

Midwest Case Studies in Community

Thorne Deuel wrote "The Hopewellian Community" in 1953. While Deuel uses the term community frequently in this concluding chapter of his edited volume on *Hopewellian Communities in Illinois*, he never does articulate how he conceptualizes communities. In fact, the term community seems to be synonymous with people. He describes subsistence practices, settlement patterns, social organization, and dress for Hopewellian people, and takes a decidedly historical-developmental approach to culture. Deuel (1953:263) notes that referring to culture as an active agency is used only as "a convenient figure of speech" and that individuals are the ones who screen, modify, accept, or reject cultural innovations or additions.

Community was a topic broached late in the discussion of Mississippian in the literature. Mississippian was understood first as a pottery style (Holmes 1903), then as a cultural tradition (Caldwell 1958) or a set of artifact complexes (Griffin 1967), and later as an adaptive strategy (Smith 1978). Because the Mississippian phenomena was so widespread and variable, community did not enter the conversation until scholars began to focus on settlement patterns.

Settlement Patterns as Community

In the 1960s, Olaf Prufer borrowed from the Mesoamerican Vacant Ceremonial Center-Dispersed Agricultural Hamlet settlement model to characterize Ohio Hopewell community organization as based in dispersed households clustered around areas containing burial mounds and ceremonial earthworks (Prufer 1961, 1964). Dancey and Pacheco's (1997) volume on *Ohio Hopewell Community Organization* further examined and tested Prufer's model. However, it still uncritically associated the term community with settlement pattern.

Smith (1992) developed one influential model of Hopewellian communities. Smith's model was based on data drawn primarily from three regions: the Upper Duck River valley of south-central Tennessee, the lower Illinois River valley of west-central Illinois, and the American Bottom region of the central Mississippi River valley. He emphasized the spatial and functional division of Hopewellian communities into two contexts: the corporate-ceremonial and domestic spheres of Hopewellian life. The corporate-ceremonial sphere was the locus of corporate action and ceremonial integration; the sphere of symbolism, ritual, politics, and status. The domestic sphere was the stage for everyday life, consisting primarily of subsistence production and consumption. Smith argued convincingly for a pre-maize household farming economy in each of his study regions. His model of Hopewellian communities was set along this economic baseline.

Smith's corporate-ceremonial sphere was manifested in mounds, mortuary facilities, geometric earthwork centers, and numerous nonresidential buildings. Community integration occurred at these corporate-ceremonial centers through investments of corporate labor, participation in ritual and ceremony, and potentially through redistribution and feasting. In the domestic sphere, the base unit was the Hopewellian household. This included a single-wall-post structure that housed a nuclear or extended family, food storage and processing pits, warm-season open-sided shelters, scattered post patterns, shallow sheet middens, terrace edge or gully trash dumps, and, in rare cases, isolated human burials (Ruby et al. 2005:126). Domestic units were dispersed around corporate-ceremonial centers, in settlements of one to three households. Smith's overarching model represents Hopewellian communities as composed of small, dispersed, river valley farming settlements that were integrated through corporate and ceremonial activities focused on centers marked by mounds and earthworks. His Hopewell community model views communities as natural (*sensu* Isbell 2000) units of human organization. Smith characterizes Hopewell domestic units as primarily single household settlements, with some examples of clusters consisting of two or three household units (1992:240). He notes that where these household clusters exist, there is no real evidence, other than spatial proximity, to suggest that the households were particularly connected to one another. Therefore, Smith concludes that the primary locus for the integration of these households was not at the houses themselves but at ceremonial mound centers. Smith does not provide any suggestions for if, how, or why these households were connected in the domestic sphere. In fact, he draws attention to the contrasting evidence for differential status or social ranking at domestic sites, where it is completely absent, and ceremonial centers, where there is evidence for elaborate systems of social ranking and community-scale social integration in the form of corporate labor efforts (Smith 1992:243). While Smith lays some of the foundational elements for describing Hopewell settlement organization, later studies of Hopewell go on to provide a more nuanced understanding of what is meant by Hopewell community (e.g., Dancey and Pacheco 1997; Ruby et al. 2005).

Smith (1978) also contributed a great deal to the discussion of Mississippian settlement patterns. In his edited volume, *Mississippian Settlement Patterns*, the wealth of geographic variation in Mississippian settlement patterning is highlighted. Unlike the Hopewell model of dispersed hamlets and ceremonial mound centers, there is much more variety in the types of Mississippian settlements. The Central Illinois River Valley contains fortified temple towns related to adjacent hamlets, farmsteads and hunting camps (Harn 1978:245); in southwestern Indiana, a six-fold functional and spatial division of Mississippian sites into towns, large villages, small villages, hamlets, farmsteads, and camps has been used (Green and Munson 1978:310); and in the Lower Mississippi River Valley, sites are categorized as primary centers, secondary centers, tertiary centers or settlements based on the number and size of the mounds there (Brain 1978:341). To accommodate these variants, Smith (1978) portrays Mississippian culture as an adaptive niche. He proposes the redefinition of Mississippian from a trait list to "those prehistoric human populations existing in the eastern deciduous woodlands during the time period A.D. 800-1500 that had a ranked form of social organization, and had developed a specific complex adaptation to linear, environmentally circumscribed floodplain habitat zones." (Smith 1978:486) The main commonality he identifies between different geographic manifestations of Mississippian is that sites are almost all located in valleys containing meandering rivers. However, Smith does not discuss communities in conjunction with regional Mississippian settlement patterns. Discussion of community is reserved for a more detailed level of examination (e.g., Rogers and Smith 1995).

Interaction and Community

More recent studies of Hopewell community have pulled from evolutionary archaeology and world systems theory to describe the Hopewell Interaction Sphere. All of these studies have used Smith's (1992) model of Hopewell communities as a jumping off point. Charles and Buikstra's (2006) volume on *Recreating Hopewell* included perspectives on Hopewell community from numerous geographic contexts. The authors in this volume use both natural and imagined (*sensu* Isbell 2000) approaches to community.

Greber (2006:77) examines the way in which economic, political and social aspects of the worldview of people occupying Hopewell communities are visible in variation in earthen enclosures. The variation she documents is in architectural details such as size, strata, ground plan, geographic and topographic location, cultural context based on archaeological finds, and chronological relationships. Greber notes that enclosures were located in places that were used for many generations. This physical or social commitment to a place would associate people who may have lived locally, nearby, or far away, enjoining them in community membership. This conception of community is more akin to Isbell's (2000) imagined community, where face-to-face interaction is limited and variable and integration occurs through participation in symbolic enterprises that themselves were not thoroughly integrated into the context of daily domestic life.

Bruce D. Smith (2006) provides a commentary on the contributions to Charles and Buikstra's volume in his chapter on *Household, Community, and Subsistence in Hopewell Research*. However, his only mention of community is in discussing what he calls the "zone of intersection" between the household/domestic and corporate/sacred spheres of Hopewell (Smith 2006:503). Smith's reference to "Hopewell community" as non-co-resident individuals who came together in "community building projects" (Smith 2006:503) has been a common, and somewhat unexamined theme in studies of Hopewell community.

Jeske (2006) uses a core-periphery model of social interaction to explain connections between sites identified as the Waukesha phase (e.g., Stevenson et al. 1997) and the Havana Hopewell phase of the lower Illinois River valley. In the core-periphery approach, the system itself is the fundamental unit of analysis (Jeske 2006:288). There are three key components of world systems theory: (1) societies are constrained and affected by their interactions with one another, (2) a core develops when one group gains an economic advantage to the point that it draws other groups into economic relationships that fundamentally restructure their internal political and social structures, and 3) cores-peripheries can be hierarchical, where the core dominates peripheral groups ecomomically and/or militarily; or they can be differential (i.e., heterarchical), where the core exerts an economic pull that brings resources into the core and sends out value added resources to the periphery without overt coercion. Jeske follows Hall's (1997) use of community and sees Illinois Havana Hopewell communities as forming a differential core of economic, social, and biological reproductive resources that attracts the attention of elites from communities in the peripheral regions. He uses community to mean individuals connected through daily interaction, represented by spatial proximity of households, although this definition is never explicitly stated. The term community is used to provide a frame of reference for the participants in the Hopewell Interaction Sphere through their use of common "mortuary ritual, manipulation of symbolic artifacts, and ritual adoption" (Jeske 2006:289).

Jeske (1999) takes a world systems approach to understanding Mississippian interaction as well. His approach is based on Peregrine's (1991) examination of the Mississippian world system in which he concludes that the Mississippian world system is based on the trade and manufacture of exotica within the existing kinship structure. In 1995, Peregrine went further to propose that the world system is defined by a hierarchical economic interdependence, core/periphery differentiation, and competition between differentiated areas (1995:257-258). Jeske concludes that there is not a compelling case for a hierarchical model of core-periphery interaction in the Mississippian world; mostly due to the lack of evidence for a highly integrated core for more than a short period of time and the difficulty of bounding core/periphery interactions (Jeske 1999:216). He also notes that the data necessary to demonstrate elite control of economic resources are not present in the archaeological record. However, he does find support for differential core-periphery interaction. He suggests framing the concepts of gateway communities and prestige-goods exchange in this light to develop a more comprehensive approach to understanding Mississippian society. Jeske uses the word community frequently to discuss "community control by a central power" (1999:210) or first-line, second-line, third-line, and fourth-line communities within a hierarchical settlement organization (1999:204-205). His usage is suggestive of Isbell's (2000) category of a natural community, rather than an imagined one. Community, as used by Jeske, is simply a co-residential group of individuals, a term synonymous with site, archaeologically.

Richards (1992) uses ceramic and stratigraphic data from the Aztalan site to examine temporal changes in site occupancy and structure and identify the site's external relationships in the larger Mississippian world. Richards' usage is similar to Jeske's, in that he references "potters marrying into the Aztalan community" (1992:386) and the site's anomalous status in the region "whether part of a larger settlement system or simply an isolated community" (1992:113). Richards works to reconcile the relationships of Late Woodland, Mississippian, and Oneota groups occupying the Crawfish-Rock River valley at the same time. Cahokian elements of the Aztalan ceramic assemblage convince Richards that the individuals who built and occupied the Mississippian iteration of the site immigrated from Cahokia, not another peripheral Mississippian locality. He characterizes the Crawfish-Rock River valley as a closed static frontier (*sensu* Dennell 1985), marked archaeologically by a lack of evidence for exchange between Late Woodland, Mississippian, and Oneota groups and by evidence for warfare and defensive structures. Richards (1992:420) concludes that the rise and fall of the Mississippian presence in the Crawfish-Rock River valley may be connected to the rise and fall of the Cahokian polity or may be the result of destruction by hostile neighbors, settlement failure due to climactic deterioration, or simple abandonment. Richards and Jeske (2002) return to this topic to examine environmental influences on the placement of Late Woodland, Mississippian and Oneota sites in southeastern Wisconsin. They conclude that Aztalan's presence was more closely connected to Cahokia's rise and fall than an environmental adaptation to a particular place. "The people using

Mississippian pottery at Aztalan did not choose a physical environment similar to the environment surrounding Cahokia or other sites in the American Bottom, but lived with a resident population using an environment broadly suited to both Mississippian and Late Woodland subsistence strategies and technologies" (Richards and Jeske 2002:47). Richards and Jeske use the term community to reference both "human communities" (2002:39) and "vegetational communities" (2002:38), emphasizing the versatility of the term, and its roots in biological categorization.

Fluid Communities

After Peregrine (1991, 1995), and Jeske (1999, 2006) discussed a world systems approach to understanding Mississippian society, Pauketat (2001) used the ideas of agency and practice theory to make sense of Mississippian interconnectedness. Pauketat (1998, 2000) asserted that community results from formation processes that promote group identification. A sense of community is socially produced and plays an active role in an individual's experience and the construction of their identity. Pauketat is only interested in changes in settlement systems from the Late Woodland to Mississippian period insofar as those changes must have produced comparably profound changes in actors' identities and senses of community. Thus, he conceives of community not as an unchanging essence, but a phenomenon that changes from time to time and place to place (Pauketat 2000). Historically, this is the first characterization of community in the Midwest to fit Isbell's (2000:249) description of an imagined community. All prior uses of the term community in Mississippian and Hopewell studies used it to refer to a natural, bounded entity or group.

Pauketat’s approach to imagined communities has yet to gain a foothold in Hopewell studies of community. Lazazzera’s (2009) discussion of Hopewell community developed out of a critique of neoevolutionary theory and incorporates process and agency in interpretations of Hopewell settlement, as well as local and regional interaction. She studies social inequality in Hopewell society by “modeling community interaction” through an examination of households at the Fort Ancient site (Lazazzera 2009:138). Lazazzera’s critique of neoevolutionary ideas and her discussion of the reproduction of inequality and social change are interesting, but her representation of community is still synonymous with settlement patterns.

Multiscalar Studies of Community

Acknowledgement of the need for a multiscalar approach to understanding community existed well before multiscalar models were developed. Peregrine (1995:258) noted that “if we want to examine Native American interactions in any form we will need a multiscalar research agenda, one that can take us from an individual site to the relations between sites, to macroregional relations within some larger entity.” Peregrine argued that this larger entity should be conceived of as a world system. Some authors have taken this approach to understanding multiscalar community interaction (see Schneider 2015). Other have opted to take a multiscalar approach to viewing interaction without relying on the precepts of a world systems model.

Ruby et al. (2005) introduced a more nuanced understanding of community to Hopewell studies. The authors discuss three types communities: residential, sustaining, and symbolic. They critique the pan-Woodland model of Hopewellian community as a group of dispersed households associated with a single mounded cemetery or earthwork complex as simplistic (cf. Prufer 1964; Smith 1992). Like Yaeger and Canuto (2000), they note that this oversimplification arises largely from an uncritical use of the concept of community. Ruby et al. (2005:122) suggest "that models of Hopewellian community organization must consider the various ways in which these different kinds of places were used to negotiate, define, and display membership in and boundaries among communities of several kinds."

Their tripartite division of community types allows for the examination of community at multiple theoretical levels. Even residential communities are more nuanced than a one to one correlation with sites or settlements. There is considerable variation in the spatial organization of residential communities; a residential community may equate to a single archaeological site or it may be expressed as a cluster of sites within close spatial proximity to each other, allowing frequent, daily interaction (Ruby et al. 2005:123). When residential communities are spatially restricted to a significant degree there may not be enough members to ensure the availability of marriageable individuals. Incest prohibitions and random variation in sex ratios at birth can limit the number of potential mates available in small residential communities, such as a single village or a cluster of dispersed households. The possibility of marriage partner restriction requires a distinction between residential and sustainable communities (Mahoney 2000). Accordingly, "the minimum spatial and demographic scales of social interaction necessary to maintain a sustainable community of the long term exceed those of the residential community." (Ruby et al. 2005:123)

There are reasons besides mating restrictions that may require individuals to build and maintain relationships with others outside of their residential community as originally conceived by Murdock. Military needs, labor for large tasks, land and resource accessibility and external trading partners would necessitate people to participate in a sustainable community (Abbott 2000; Netting 1993). Ruby et al. (2005:123) recognize that "individuals and households actively construct and negotiate group identities and affiliations that may cross-cut residential units and be quite fluid in membership and duration."

Maintaining the sustainable community leads to the construction of the symbolic community. Symbolic communities arise as a way to "define, communicate, and negotiate membership in a social group that transcends or crosscuts local residential groups (Charles 1995) for common political, economic, social, and/or religious purposes" (Ruby et al. 2005:123). Ornamentation, dress, public architecture and other expressions are ways to signal inclusion within such a transcendent group. Symbolic communities may be highly variable in geographic extent, stability and membership. However, Ruby et al. (2005:124) distinguish the "local symbolic community" as "circumscribed geographically, either practically or by a common goal of owning, maintaining, or using a territory" from symbolic communities as a whole, which are often not concerned with the possession of territory.

Using these three conceptions of community, the authors describe Hopewellian communities based on the archaeological evidence in the Central Scioto, Lower Wabash, and Lower Illinois River valleys. Their study identifies significant interregional variability in community organization that had previously gone unrecognized (cf. Smith 1992). The main loci of this variation are: household aggregation, intensity of occupation, and ceremonial center complexity. This last category is characterized by differences in the kinds of ceremonies and activities (e.g., mortuary, nonmortuary, or both) that occurred in them, and the size and composition of the social units engaged therein (Ruby et al. 2005:169). Each of the three study regions exhibited evidence of communities of multiple scales (e.g., residential, local symbolic, and sustainable). The authors find support for the standard interpretation of Ohio Hopewellian societies as more socio-politically complex than Havana Hopewell ones in the higher correspondence of local symbolic and sustainable community boundaries in the Illinois valley than in the Scioto. They identify four ways in which the ceremonial landscapes in Illinois, Indiana and Ohio differed: (1) territoriality, (2) fluidity of membership in local symbolic communities, (3) whether single ceremonial centers served as the focus of communities of more than one kind, specifically, a local symbolic community and a sustainable community, and (4) the number, and spatial arrangement of sites that may be interpreted as ceremonial centers.

Ultimately, Ruby et al.'s 2005 approach is that that individuals were organized into residential communities defined by co-residence or close residence, but "at the same time, individuals participated in wider symbolic and sustainable communities that served social, political, economic, and demographic ends beyond those that could be met by the local residential community" (Ruby et al. 2005:172). Their residential community designation easily fits the mold of previous natural community models. Symbolic and sustainable communities masquerade as imagined communities, but in fact still revolve around regular face-to-face interaction and the maintenance of geographic boundaries. The medium and purpose of interaction simply shifts to mortuary ceremonialism in local symbolic communities and ceremonial performance or participation in sustainable communities.

Ruby et al. (2005) is similar to Rogers' (1995) notion of community, and benefits from ten years of additional data and theoretical development. Additionally, the two models differ significantly in their focus: Rogers (1995) describes a complex chiefdom and Ruby et al. do not. Rogers (1995) develops a three-fold division of spatial relationships in the Harlan and Spiro Middle Mississippian phases: supra-community, community, and domestic. Supra-community refers to the spatial relationships among groups at the settlement pattern scale (cf. Smith 1978) to infer economic, social and cultural interaction. Community refers to the local group of households that interact frequently and share some type of decision-making process. Domestic refers to the activity locus for the basic social group, characterized by coresidential groups occupying a single building (Rogers 1995:92). This conception of community is directly tied to the settlement pattern of a village mound center surrounded by hamlets and homesteads. Rogers notes a decrease in the size of buildings from the Harlan to Spiro phase implying a decrease in the size of coresidential groups. He links this to the compartmentalization of social groups during the development of complex chiefdoms (1995:95). There are two main reasons that social segmentation correlates with a decrease in household size: (1) there is a decline in the significance of kinship as an integrative mechanism due to the expansion of complex hierarchies; and (2) labor requirements decrease to a level that can be met by a nuclear rather than extended family due to agricultural intensification (Rogers 1995:95-96). Rogers concludes that research at the domestic level is necessary to fully understand the impact of economic and social changes on higher tiers of social organization.

The differences in Rogers' and Ruby et al.'s datasets are evident in the differences in their tripartite systems. Rogers' domestic sphere most closely corresponds to Ruby et al.'s residential community. However, as Hopewell domestic sites consists primarily of one to three houses, Rogers' domestic unit and community unit are essentially the same in Ruby et al.'s case. There are also implicit functional differences in the organizational categories the authors use. Ruby et al.'s categories of residential, sustainable, and symbolic communities all have different functional reasons for existence, in additional to hierarchical differences in their extent. Rogers' supra-community, community, and domestic categories are indicative of differences primarily in spatial extent. Because of the complexity of social interaction of Mississippian groups studied by Rogers, the inherent flexibility built into supra-community scale to infer "economic, social, and cultural interactions" (Rogers 1995:92) is necessary. Despite this flexibility, Rogers' supra-community is still typified by the use of mound sites for "ceremonial/elite activities" (Rogers 1995:92), just as Ruby et al.'s symbolic community is. At their core, the two systems are more alike than they are different, identifying multiscalar systems of interaction based on archaeological artifact and spatial data and ethnographic analogy. The primary difference is that Rogers uses a strictly hierarchical model while Ruby et al.'s community categories overlap and interact at multiple levels. This reflects the differences in the social and political structure of the two archaeological cultures under study.

Comstock (2017) also used a multiscalar approach to study Fort Ancient communities. Comstock's interests lie specifically in the identification of ethnic communities within the Turpin site, evidenced by intra-site settlement patterns and artifact symbolism, to determine if Turpin represents a community of immigrants. Comstock uses chronology, household architecture, and material culture to address both synchronic and diachronic questions about the Late Woodland and Fort Ancient occupations at Turpin. His definition of community is "a social institution reflecting shared ideals that is created and enacted through human interaction, incorporating contingent histories as well as external influences" (2017:26). Comstock adheres to the imagined community concept (*sensu* Isbell 2000) in one key area: he eschews "adherence to standard gradual models of cultural change" (Comstock 2017:349) focusing instead on rapid changes in cultural systems. Comstock succeeds in demonstrating that migration in the Middle Ohio Valley, as illustrated at the Turpin site, was a punctuated event that catalyzed change. However, despite his clear community definition, something often lacking in studies of community, he often falls into the same pattern as earlier scholars of community, mentioning "community established at Turpin" (2017:350), that "House 1 and House 2 reflect the communities of which they are a part"

(2017:350), and “Mississippian communities” (2017:350). Here the term community is used in three different ways, describing the Turpin site as a single bounded community, highlighting multiple ethnic communities within the site, and referencing Mississippian communities of an indeterminate scale. If we are to use community as an archaeological unit of analysis, then a clear and consistent meaning must be established.

Oneota Community Research

The occupants of sites classified as Oneota in the archaeological record have previously been characterized as having a tribal level of organization (O’Gorman 2010; Schroeder 2004). The term tribal has been used primarily to highlight a lower level of social complexity than Middle Mississippian society and less intensive use of corn agriculture. However, there has been little research focused on what this tribal designation would have meant for the daily lives of the people living at sites archaeologically classified as Oneota (see Pauketat 2007). More importantly, recent research has called into question the relationship of agricultural intensification and social hierarchy (Edwards 2017) so the entire notion of tribe in this context itself is problematic.

Settlement Patterns as Community

The majority of discussion on Oneota community, like with the Mississippian and Hopewell examples, has focused on settlement patterns. There have been numerous models of Oneota settlement patterns (e.g., Edwards 2010; Gallagher and Stevenson 1982; Hollinger 1995; Overstreet 1976; Richards and Jeske 2002; Rodell 1983; Sasso 1989). An overview of these models is presented in Chapter Three of this dissertation. These models tend to vary depending on whether their data are from eastern or western Wisconsin. Both eastern and western sites are generally located at the intersection of multiple ecotones so that multiple environmental zones could be exploited to support a diversified subsistence system (Edwards 2010; Overstreet 1976; Rodell 1983; Sasso 1989).

Interaction and Community

Berres (2001) and Schneider (2015) discuss Oneota community interaction in a way that does not explicitly define what is meant by community but does note that there are multiple levels on which interaction takes place. Berres (2001:187) identifies this interaction as reciprocal feasting while Schneider identifies marriage alliances (2015:340-346). Schneider uses ceramic compositional data to demonstrate that pottery vessels with exotic designs were actually made locally and, thus, are more likely to represent exogamous marriage than trade. So, while he models interaction between communities, he does not articulate community structure. His analysis also only examines eastern Wisconsin Oneota localities.

Rodell (1997) examines communities in the Red Wing locality, focusing on the Late Woodland to Oneota transition at the Diamond Bluff site. He utilizes Hayden's (1995:19) categories of "Reciprocator" and "Entrepreneur" communities to distinguish between Late Woodland emphasis on household production and exchange as the main avenue to wealth and power and the Oneota-period rise of aggrandizers, public exchanges, increased population and profits. Specifically, Rodell attributes the emergence of the Oneota tradition to increased competition in feasting that incorporated a regional exchange network, an increase in population density, a greater dependence on maize, adoption of shell-tempered pottery, involvement in a Middle Mississippian exchange network, and the adoption of new symbolism (Rodell 1997:iv).

This understanding of communities as incrementally evolving entities with changes influenced largely by outside factors is exactly what Isbell (2000) means when he describes a natural community.

Multiscalar Studies of Community

Fleming (2009) develops a model for community in the Red Wing locality using data on lithic raw materials, pottery production, mound construction, and the presence of exotic ceramics and portable art objects. Fleming uses Ruby et al.'s (2005) tri-partite division of residential, sustainable and symbolic communities to describe community at Red Wing. Assemblage differences between the sites he examined lead him to identify the sites as residential communities. He identifies the Mero and Bryan villages as centers of aggregation in the region and a location for maintenance of sustainable community relationships with from within and outside of the immediate region (2009:297). While Fleming (2009:298-299) explicitly rejects the notion of Red Wing as a site-unit Middle Mississippian intrusion, all elements of the Red Wing symbolic community that he identifies are "Mississippian-inspired" (e.g., ceramic motifs, discoidals, and mortuary activities). The overtly Mississippian symbolism that Fleming uses to delineate the Red Wing symbolic community are mostly absent from other Oneota localities. Rodell (2000), Boszhardt (1994), and others (e.g., Dobbs and Gibbon 1991) have presented convincing ceramic and radiocarbon evidence to support the assertion that people from the Red Wing locality moved to the La Crosse locality circa A.D. 1300 and established a new settlement system there. O'Gorman (2010) suggests that people living in the La Crosse locality switched from using earthen mounds to using longhouses and villages to express belonging, clan membership, and territoriality.

O’Gorman uses an imagined community (*sensu* Isbell 2000) perspective and data from the Tremaine Oneota site in the La Crosse locality of western Wisconsin to examine the “dynamic and multilocation nature of community” (2010:591). Using ethnographic examples from the Dayak and Iroquois, she identifies five kinds of community operating in longhouse-using tribal societies: longhouse, natal, marital, village, and regional longhouse communities. She suggests that in longhouse-using societies, the longhouse is critical to individual and group identity and is a distinctive type of household that is, itself, a community. The individuals and families living in the longhouse share everyday interactions and experiences that form a community all its own. The longhouse also serves as the location for ritual events that shape community relationships beyond the residence (O’Gorman 2010:592). In the Oneota example, the significance of longhouse communities is expressed through burial within the structure.

O’Gorman (2010) also suggests that other kinds of community exist at the same spatial nexus as the longhouse community. The natal and marital communities within longhouses would have created connections between the longhouses and larger village. In addition, she places gender as a central aspect of community, since men and women likely experienced community very differently. Everyday life experiences took place in distinct spatial realms that varied by gender. Particularly among the presumed matrilineal/matrilocal Oneota, kinship-based obligations and relationships would have varied by gender, resulting in different conceptions of community for men and women (O’Gorman 2010:592).

O’Gorman does a good job of demonstrating how community identities may have overlapped and interacted (Figure 2.1). For instance, in a matrilineal, matrilocal society, men would have felt a part of their natal community, even though they no longer lived there, and their marital community. They likely would have retained ties to their natal community post-marriage.

Whether or not their identification of marital community and longhouse community would have differed is debatable. If the entire matrilineage was living in the longhouse, then those two categories should be one and the same. In addition to their marital and natal community identity, they would also identify as members of the village; another, broader locus for daily interaction. However, O'Gorman's (2010:588) largest category of community, the regional longhouse community, proves somewhat problematic. There is very limited evidence for longhouses, particularly on the scale of those identified at Tremaine, at other sites in the La Crosse locality. One such site exists (see Arzigian et al. 1994; Hollinger 1993b) but the limited excavations undertaken at it provide less than definitive evidence of longhouses (Figure 2.2). It is impossible to tell if the Tremaine site is the rule for villages in the La Crosse locality, or the exception. Additionally, even if longhouses are the norm at Oneota sites in western Wisconsin and Iowa, extensive excavations at earlier sites in eastern Wisconsin have demonstrated that is not the case there (Jeske and Sterner 2018).

O'Gorman's analysis of Oneota community is particularly valuable though in that it provides a nuanced method for combining the natural and imagined community concepts. O'Gorman admits that "village communities are a staple of the natural community approach" (2010:577). For her, the village community is simply a "group of longhouse communities whose members chose to arrange themselves in close physical proximity to one another" (2010:586). She demonstrates the importance of understanding the variable experiences of the people living in a village community by drawing attention to the impact of gender and marital residence on an individual's community identity and the time they spent in a particular longhouse or village. She also demonstrates the utility of using ethnographic observations to inform on archaeological data, although the practical corollary of the Dayak use of longhouses in a climate with winter temperatures averaging 80°F and people of the Oneota tradition using longhouses in Wisconsin with an average winter temperature of 30°F is debatable.

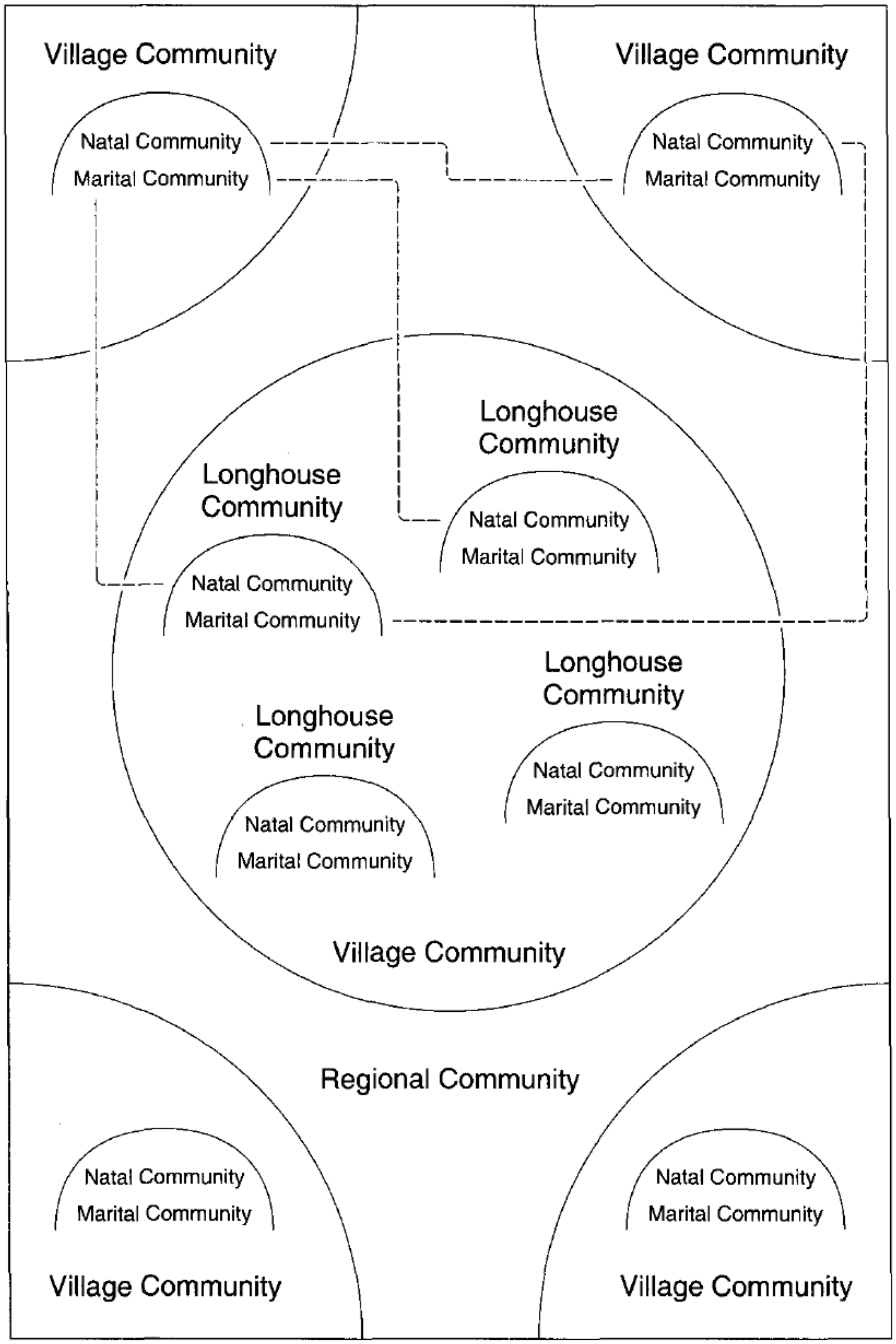

Figure 2.1. O'Gorman's (2010) spatial network of the kinds of community expected for the Oneota tradition.

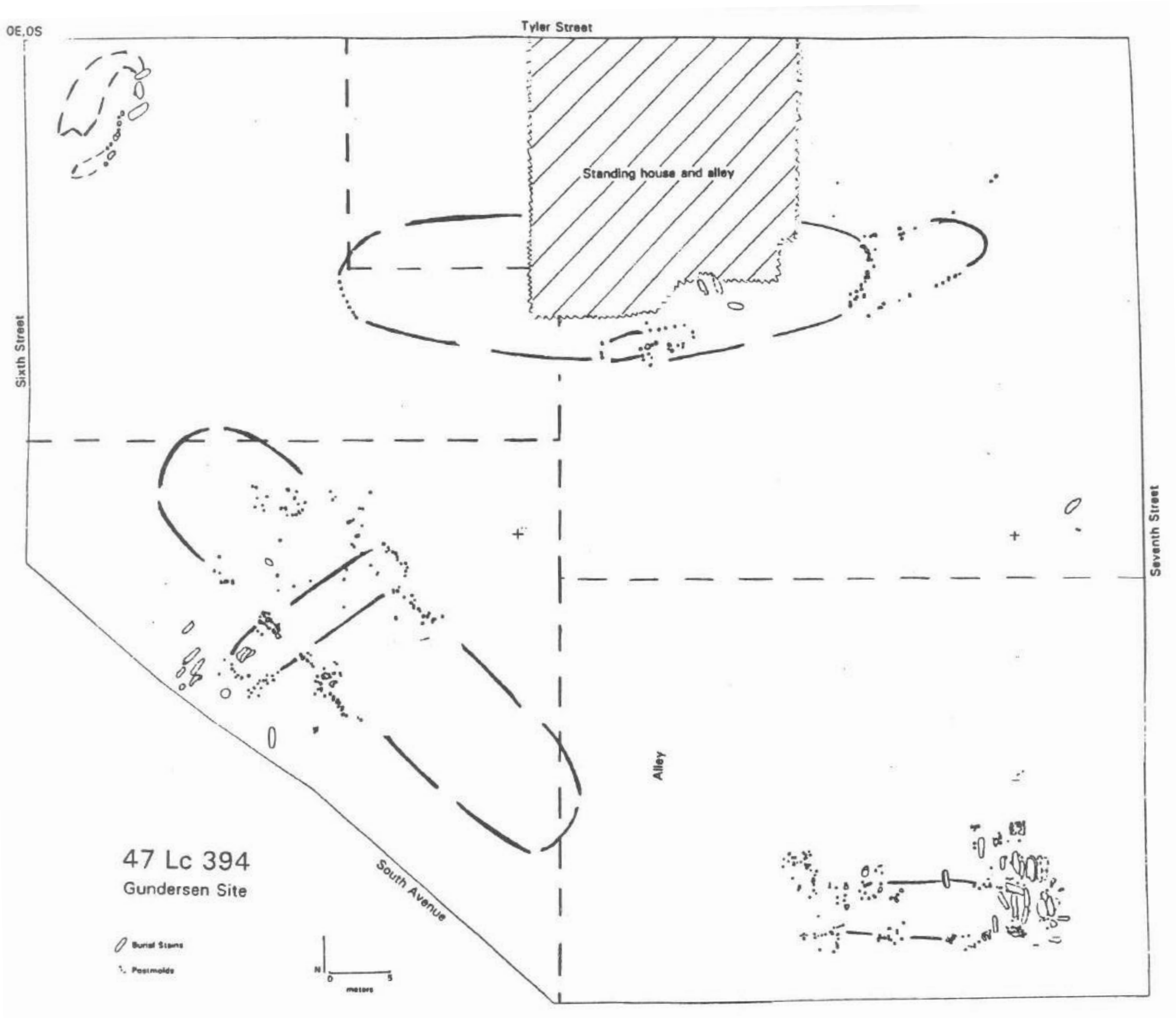

Figure 2.2. Halverson's interpretation of postmold patterns at the Gundersen site (after Hollinger 1993b).

Ethnographic Contributions

The social and political structure of the people occupying Oneota sites has been inferred using ethnographic analogy, corroborated with archaeological data (Benn 1989; Berres 2001; Gibbon 1972, 1982; Green 1995; Griffin 1960a; Hall 1962; Overstreet 1997). The primary source for this ethnographic documentation in eastern Wisconsin is Radin's (1923) work on the social organization of the Ho-Chunk. The historic Ho-Chunk were divided into twelve clans, all of which were separated into two phratries (Table 2.1). Clans were either members of the upper phratry, "those who are above" or *waŋgeregi herera*, or the lower phratry, known as "those who are on earth" or *manegi herera* (Radin 1923:185-186). Membership in these phratries was indicated by the animal totem representing the clan and functioned to regulate marriage. This division was also said to be visible in the organization of villages with *waŋgeregi* clan lodges in one half of the village and *manegi* lodges in the other half (Figure 2.3). Each clan had a specific political function. For instance, the Thunderbird clan, from which the chief was chosen, was charged with the preservation of peace. Unsurprisingly, the Warrior clan was connected to war. The Bear clan was involved with the policing and disciplining of the village and maintaining order while on the hunt. The Buffalo clan was awarded the office of public crier and served as an intermediary between the chief and other tribe members (Radin 1923:200).

Table 2.1 Ho-Chunk clans (after Radin 1923).

Waŋgeregi herera	**Manegi herera**
wakandja, thunderbird	*huntc*, bear
wonayire uaŋkcik, war-people	*cuŋktcuŋk'*, wolf
tcaxcep, eagle	*waktcexi*, water spirit
rutcge, pigeon	*tca*, deer
	hu^{n}*wa*^{n}, elk
	tce, buffalo
	ho, fish
	wak'a^{n}, snake

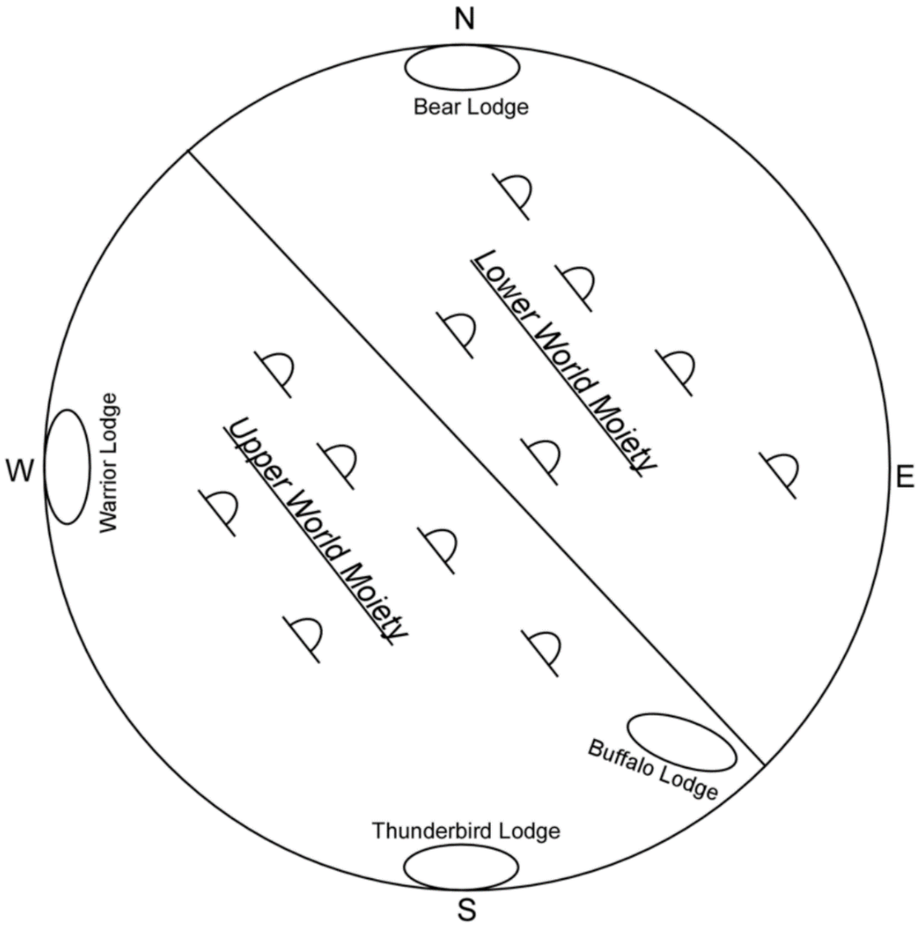

Figure 2.3. Illustration of a Ho-Chunk village layout (after Radin 1923; Schneider 2015).

Radin (1923) notes that the division between upper and lower world clan lodges was not always consistent in Ho-Chunk villages. When the group was hunting or moving from one site to the next, no division was present (Radin 1923:189). However, the twofold divide was expressed in the location of hearths when people were engaged in warfare. If the people living at prehistoric Oneota sites did follow similar settlement patterns as did the historic Ho-Chunk, one would not expect to consistently see a twofold village structure in the archaeological record.

The physical representation of Ho-Chunk cosmology may be seen in the rectilinear, curvilinear, spiral, zig-zag, wavy line and interlocking scroll decorative motifs on Oneota ceramics (Berres 2001; Hall 1962; Overstreet 1997). Chevrons and nested chevrons bordered by lines and dots have been interpreted as stylized representations of the wings and tail of a raptor, possibly the peregrine falcon associated with the Thunderbird (Benn 1989).

The loyalty of clan members to their leader could be expressed through symbols like the thunderbird motif (Benn 1989). Village leaders obtained labor-value through real and fictive kinship relationships with clan and lineage members (Schneider 2015). Use of symbolism to reify clan ties would have played a key role during the transition from Late Woodland mobile family band lifeways to Oneota large, sedentary villages (Benn 1989).

Radin (1923:104) identifies eight types of lodges at Ho-Chunk villages: “the round lodge, the long lodge, the tipi, the grass lodge, the gable lodge, the platform lodge, the ceremonial lodge, and the sweat lodge.” P.V. Lawson (1907) describes two types of wigwam structures used by the Ho-Chunk that were typically used in the summer. Additionally, Fletcher (1854:57) describes bark-covered lodges twelve to forty feet in length used in the summer. This makes for a confusing variety of structures used by the Ho-Chunk. Since the spatial relationships of individuals to each other plays a large part in their community identity, generalizations about Ho-Chunk, and by extension, Oneota community identity are difficult to make.

Hollinger (1995) posits that there is a chronological shift at Oneota sites from matrilocal to patrilocal resident patterns, evidenced in the move from primary residence prehistoric longhouses to historic wigwams in western Wisconsin. He notes that matrilocal residence is correlated with external warfare and agriculture, both of which manifest at Oneota sites. Benn (1995:125) takes a longer view of this shift, noting the evidence of a matriarchal structure during the Late Woodland that shifts to a social atmosphere dominated by male archetypes during the period of historic Ho-Chunk occupation. He identifies an inverse relationship between the intensification of women's contributions to subsistence and their social status. The hunting, warfare, and trading activities that prohibited men from contributing as heavily to agricultural subsistence were imbued with higher status (Ember 1983:300). Both male and female labor intensified with increasing sedentism and population size, but women's labor intensified inside the domestic sphere where their skills and labor were not as likely to be considered politically valuable (Ember 1983:301).

Radin (1948:45) also concluded that "internal evidence, myth, tradition, custom, all point to a period in Winnebago [Ho-Chunk] history where descent was reckoned in the female line". This shift from relatively egalitarian, matriarchal societies to a social structure in which the language of myths cast women as subordinate (Benn 1995:126) would have occurred primarily during the time of Oneota manifestations and would have significantly affected the stability of community structure in this period of flux.

The Ho-Chunk are not the only historic tribe that has been linked to the Oneota tradition. Overstreet (1981, 2009) has argued that the Menominee are equally likely to be the historic Oneota in eastern Wisconsin. Spindler (1978) notes that early documents and origin myths of the Menominee point to the existence of a dual moiety system of organization similar to that practiced by the Ho-Chunk. Likewise, a system of exogamous marriage existed, also characterized by polygyny and patrilocality (Keesing 1939). Keesing (1939) also noted that, at contact, gendered division of labor was such that men hunted and fished; conducted warfare; performed ceremonies; prepared sacred artifacts; manufactured canoes, weapons, tools, nets, snares, and wood bowls; and cut and chopped wood. Women cooked; managed the household and children; gathered berries, nuts, and firewood; carried water; dressed skins; made clothing; wove mats and bags; and prepared household utensils (Keesing 1939:33). However, there was enough flexibility in this system that women could perform many male tasks if they excelled at them. The spatial differentiation of men's and women's roles emphasizes how they would have conceptualized community differently (O'Gorman 2010). But the flexibility in gender roles is a cautionary reminder to consider individual agency in models of community identity, even when such agency is not easily visible in the archaeological record.

Other tribes also historically occupied the areas in eastern Wisconsin following Oneota occupations. In many ways their settlement structure and social organization followed the same general pattern of a dual moiety system with exogamous, patrilocal marriage and residence in villages composed of nuclear family homes with larger structures for communal activities. However, there are some variations on this theme. For instance, the Fox used large summer dwellings to house an extended family in villages containing up to 35 different lodges (Forsyth 1912; Marston 1912). In the winter, they resided in smaller dwellings and in groups consisting of fewer families. The Sauk, Potawatomi, and Mascouten also alternated between smaller winter and larger summer dwellings (Marston 1912; Skinner 1924). The Kickapoo followed a similar practice, although they placed both dwelling types in the same village compound (Callender et al. 1978).

These ethnographic examples provide a foundation for developing ideas about how the people using Oneota material culture were connected to each other through community links. There is evidence for both natural community, in the form of villages and houses, and imagined community, in the form of clans and phratries in the ethnographic record. Therefore, one may assume that both types of community (*sensu* Isbell 2000) are real. The visibility of both types of community in the archaeological record is another matter.

Approach to Community Used In This Dissertation

O'Gorman (2010:573) distinguishes between the imagined and natural community approaches by saying "Where a natural community approach might identify a village as a community and proceed from that basis to ask questions of community economics or methods of integration, an imagined community approach might first ask what relationships define community in this particular case and what dynamics led to or may have changed this configuration." One does not have people who are members of imagined communities or natural communities, these categories are purely theoretical perspectives used by archaeologists to design their research questions. A community is, always has been, and should continue to be, a social institution reflecting shared ideals that is created and enacted through regular, face-to-face human interaction. The degree to which participating individuals articulate their community identity is variable and impossible to pinpoint, even in modern populations (see Isbell 2000:264). Nevertheless, their participation in the system is a social act, implying the acceptance of a common social world order or doxa (Bourdieu 1977).

I suggest that we forsake the terms natural and imagined community but value and utilize the two approaches as O'Gorman defines them. Both approaches are essential to developing a well-founded understanding of community that does not make assumptions about community boundaries or relationships; and they must be used in a logical progression. As with all components of archaeological research, one must first identify the elements that define the unit of study (the community in this case) and then proceed to ask questions about that unit. One does not ask questions about a village layout before defining the spatial boundaries of the village. Rather than simply equating the face-to-face interaction of a community with a village site, we must critically examine settlement systems, artifact distributions, and ethnographic corollaries to identify community boundaries. As Ruby et al. (2005) note, a community may consist of a single site or more than one.

The multiscalar types of communities (symbolic, sustainable, marital, natal, longhouse, village, regional, supra-, domestic, and ethnic) considered by other scholars (e.g., Comstock 2017; O'Gorman 2010; Rogers 1995; Ruby et al. 2005) complicate the concept further. Certainly, interaction occurs at different levels. However, I would argue that all of these levels do not need to be designated as communities. Residential/domestic (*sensu* Rogers 1995; Ruby et al. 2005) interaction and connections exist. Ethnic (e.g. Comstock 2017) identities exist. Natal, marital and longhouse (*sensu* O'Gorman 2010) connections and relationships exist. Some of these relationships may not exist in some societies (for instance, those without longhouses), and many other relationships and loci of interaction beyond those mentioned here may exist. The point is that interactional relationships that are internalized as a part of an individual's identity do not need to be called communities.

For those scales of interaction and connection beyond what is called the community level in this dissertation, such as symbolic, sustainable, regional and supra-community (Rogers 1995; Ruby et al. 2005), a different term is also warranted. The types of connections that tie people together through sporadic and/or symbolic interaction are likely the vestiges of what was, many generations before, a community. The traditions that continued to be upheld by the descendants of this community form the basis for defining groups by overarching similarities in their symbolism (e.g. Fleming 2009; Rodell 1997). These similarities are what led archaeologists to define archaeologically identified groups as traditions (*sensu* Henning 1998; Overstreet 1997).

Therefore, in this dissertation, I rely on a more straightforward definition of community. I use an imagined (*sensu* O'Gorman 2010) approach toward defining a social institution reflecting shared ideals that is created and enacted through regular, face-to-face human interaction. I then pursue a natural (*sensu* O'Gorman 2010) approach toward asking questions about what the economic and social modes of integration within this community were. I compare a community in the La Crosse locality to one in the Koshkonong locality. Comparison of these two temporally and geographically distinct communities provides insight into the lives of people who produced, used, and discarded Oneota material culture.

Connecting Lithics to Community

One identifying element of a community is Bourdieu's (1977) concept of habitus. Habitus is defined as the routines of daily life or dispositions; a habitual state or predisposition. In the context of community identity, habitus is the shared disposition of individuals who belong to a community deriving from shared daily practices. Patterns in lithic procurement, production, use, and discard are a form of habitus indicative of the shared dispositions of individuals who participated in these activities. Similarities in lithic practice may be used to delineate the boundaries of a community.

The viewpoint used here is that, within the discrete temporal and spatial context under study, patterns of lithic production and use are more indicative of a community sharing similar practices than they are of functional differentiation. The goal here is different from the Binford (1966, 1969) versus Bordes (1953, 1961) debate about whether differences in lithic assemblages represent ethnic identities or functional variation. Rather, lithic data are used to examine variation in how Oneota communities were organized. Examination of the lithic practices at Oneota localities, consisting of villages occupied relatively contemporaneously, will determine whether or not there is significant variation intra-locality. Significant intra-locality variation suggests that village residents did not interact on a close enough level to share the same practices in lithic production, use, and discard. A lack of significant intra-locality variation would suggest that village residents were interacting almost as regularly with residents of other villages as residents of their own village. The common practices of lithic production, use, and discard are indicative of a community with broadly similar habitus. It is expected that these practices will vary less among individuals who are part of a community than those who are not.

The comparison of lithic practice and community in two Oneota localities informs on larger questions about the social, political, and economic changes seen in people living in the Midwest during late prehistory. Initially, archaeologists suggested that the decline in formal lithic tool types and use of exotic raw materials during the Middle to Late Woodland transition was the result of technological devolution or social decline (Griffin 1960b; McGregor 1958:188-190; Wray and MacNeish 1961:66). Jeske (1987, 1992) has argued that this shift to more informal tools was the result of reallocating time and energy previously spent on stone tool production to new subsistence, ceremonial, social, and political activities congruent with a more sedentary, agricultural lifestyle. However, his analyses did not specify what the mechanism and medium for this shift was. Consideration of Oneota community structure and lithic economy illustrates that a shift in the division of labor coincident with a shift in social, subsistence, and settlement practices during late prehistory is the most applicable explanation for these visible changes in lithic technology and economy.

CHAPTER THREE:

ONEOTA CULTURAL BACKGROUND

Introduction

Oneota is classified as an Upper Mississippian culture, associating it with other northern groups that existed concurrently with the more elaborate Middle Mississippian complex (Fowler and Hall 1978; Griffin 1960a; Hall 1962; Henning 1998; McKern 1939, 1945). The name Upper Mississippian dates as far back as McKern's (1931) proposed use of the term to refer to a particular ceramic ware typical of sites near Grand River and Grand Lake in Green Lake County, Wisconsin. Later, the Oneota classification was extended to cover many of the cultures McKern originally classified as Upper Mississippian. The term Upper Mississippian was then used to include a number of previously defined archaeological cultures, including the Oneota, Fort Ancient, Oliver Phase and Langford groups, which were considered to be marginally related to the Middle Mississippian groups (Brown 1961; Brown and Asch 1990; Hall 1962). The classification of Upper Mississippian serves the purpose of recognizing the similarities and interactions linking people during the later prehistoric time period while at the same time providing a convenient division among distinct material cultural complexes.

In the western Great Lakes, Upper Mississippian occupations overlap geographically (Figure 3.1) and temporally (Figure 3.2) with both Middle Mississippian and Late Woodland groups. The Upper Mississippian tradition begins circa A.D. 1000, while Late Woodland groups persist in the western Great Lakes until ca. A.D. 1100-1400 (cf. Clauter 2012; Richards and Jeske 2002; Salkin 2000; Stoltman and Christiansen 2000) and Middle Mississippian manifestations are present from A.D. 1000-1350 (Dobbs and Gibbon 1991; Goldstein and Richards 1991; Hall 1967; Richards and Jeske 2002).

Upper Mississippian occupations are considered to be more similar to those of Middle Mississippians because of evidence of increased reliance on maize horticulture and the use of shell tempering in pottery (Schneider 2015). Fort Ancient (ca. A.D. 1000-1700) and Oliver Phase (ca. A.D. 1400-1650) manifestations are considered to be more closely tied to Middle Mississippian cultural traits than Oneota and Langford, exhibiting planned, circular, often palisaded villages, elaborate burial goods indicating formal social differentiation, and pottery decorated with curvilinear and rectilinear guilloches (Cook 2007, 2008; Cook and Fargher 2007; Drooker 1997; Griffin 1992; McCullough 2000; Redmond and McCullough 2000; Schneider 2015; Schulenburg 2011). Oneota and Langford sites display broad similarities to Middle Mississippian sites but encompass more variation in their settlement patterns, burial practices, and ceramic temper and decoration than do their southern Upper Mississippian counterparts (Bird 1997; Gibbon 1970a; Hall 1962; Wilson 2016).

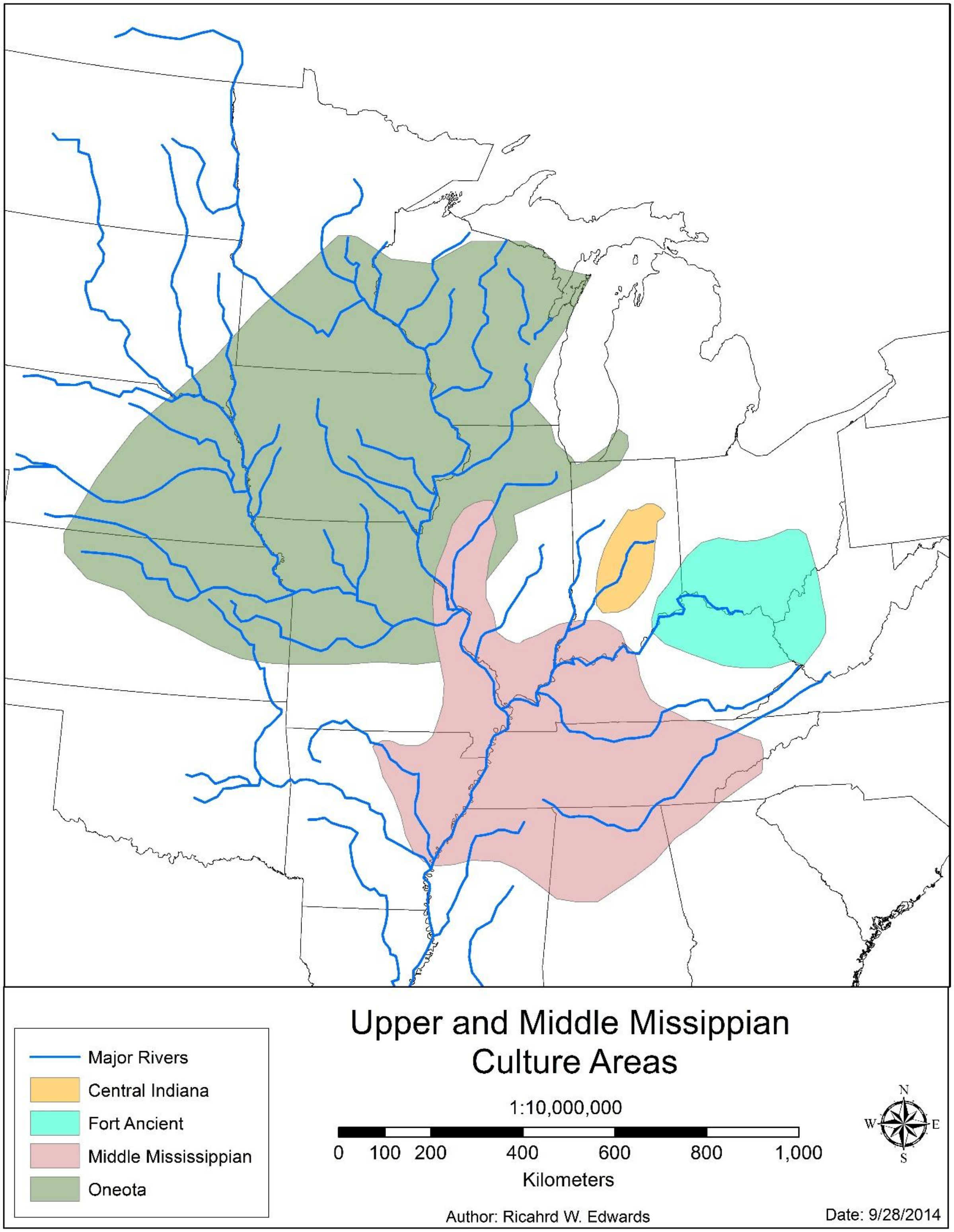

Figure 3.1. Upper and Middle Mississippian culture areas in the Midwest.

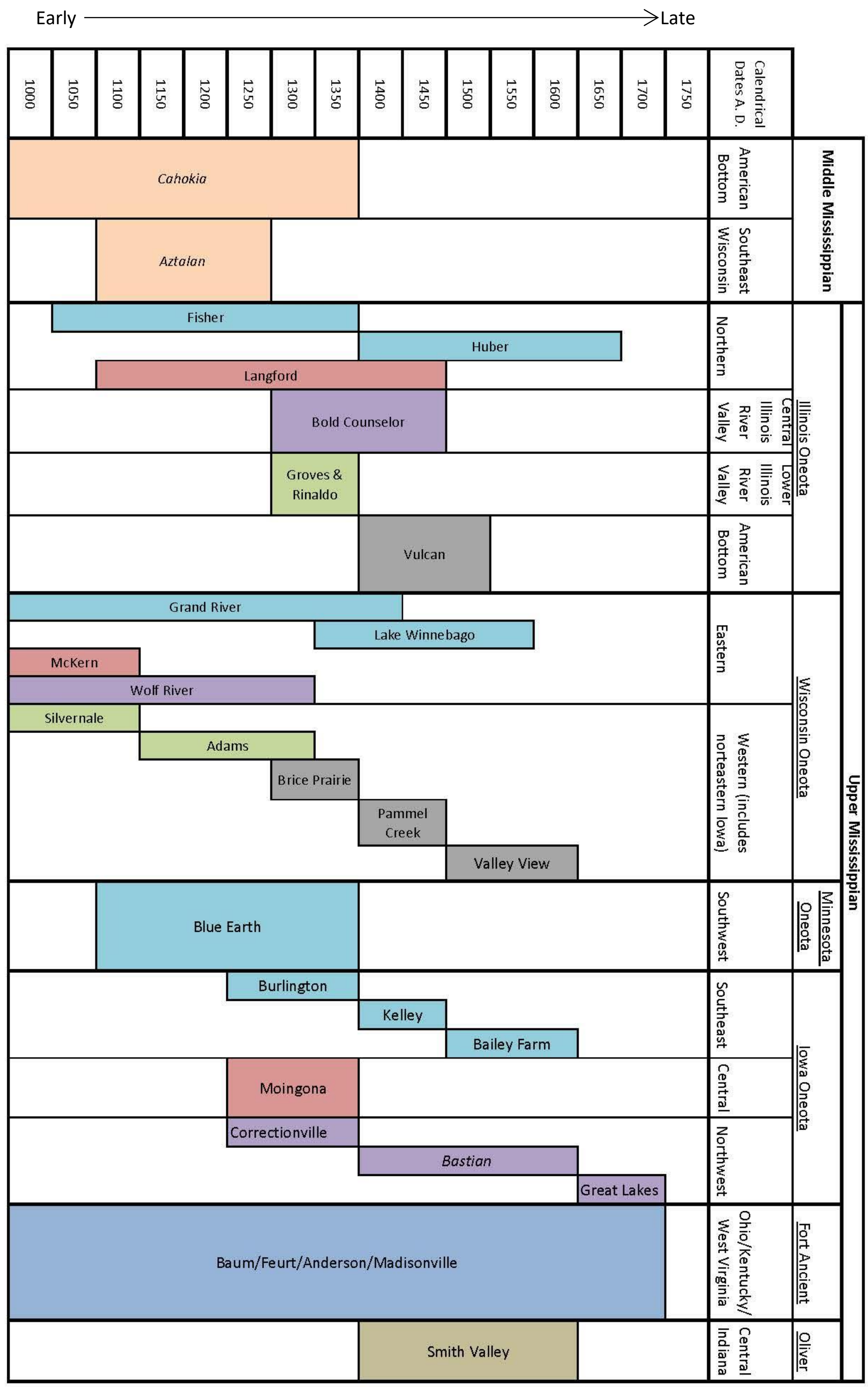

Figure 3.2. Upper and Middle Mississippian chronology (after Schneider 2015)

Oneota Tradition

The Oneota tradition is a geographically and temporally widespread phenomenon, including a large degree of interregional variation (Figure 3.3). Dates for Oneota tradition sites range from A.D. 1000 to post-A.D. 1650 (Gibbon 1970a; Henning 1998; Overstreet 1997). The expansive nature of the Oneota taxon has resulted in debates over chronology (cf. Boszhardt 1998; Brown and Sasso 2001; Overstreet 1976), models of development (cf. Emerson 1999; Gibbon 1982; Jeske 1992; Theler and Boszhardt 2000) and cultural affiliations (cf. Mason 1993; Overstreet 1995, 1997; Richards 1993). Although these large-scale questions are beyond the scope of this study, a description of the concept of Oneota is necessary to provide context for the examination of inter-locality interaction and differentiation, as well as intra-locality community definition discussed in this dissertation.

Taxonomy

The term Oneota was coined by Keyes (1929) in reference to archaeological sites that were likely associated with a historic group in Iowa. Keyes declared Oneota distinct from other groups due to their shell-tempered ceramics and triangular bifaces. Oneota was initially designated as an aspect in McKern's (1939, 1945) Midwestern Taxonomic System. McKern's classificatory categories were, ordered from smallest to largest: component (i.e. site), focus, aspect, phase, and pattern. The focus is a class type used when a set of traits present at multiple sites are suggestive of cultural identity, like that of a tribe. An aspect is a group of foci where the preponderance of trait units are similar. For instance, the type of decorative pattern on pottery may serve as a determinant of aspect while the actual motifs used may serve to differentiate one focus from another (McKern 1939:308). A phase may be characterized by a "general burial procedure, general pottery attributes, and general house-type features" (McKern 1939:309). Phases are largely defined as a pattern of determinants that differ when compared with another phase. Lastly, the pattern exists where several phases share a small set of broadly general traits. Typically, these traits will be evidence of adaptations of people to their environment, as modified by tradition (McKern 1939:309). McKern included the Oneota Aspect as part of the Upper Mississippi Phase and broader Mississippi Pattern, which also included the Middle Mississippi Phase. Later, as use of the Midwestern Taxonomic System declined, archaeologists began to refer to Oneota as a tradition rather than an aspect (Hall 1962:106). Taxonomy within the Oneota tradition has generally followed the system of tradition, horizon, phase and locality defined by Willey and Phillips (1958). The divisions between horizons were based on ceramic cross correlations and some radiocarbon dates. Horizons are temporally and geographically constrained and may not overlap spatially and temporally with other horizons (Henning 1998). Hall (1962) proposed three horizons for Wisconsin Oneota: Emergent (ca. A.D. 950-1150), Developmental (ca. A.D. 1150-1350), and Classic (ca. A.D. 1350-1650). Overstreet (1976) added the Historic horizon (post A.D. 1650) to this. However, because of the wide geographic expanse of the Oneota occupation, the construction of chronological and locality designations varies significantly.

Ever since McKern (1945), archaeologists have recognized that Oneota sites in eastern and western Wisconsin are broadly similar but show significant differences in most aspects of material culture, including ceramic styles, architecture, settlement patterns, and subsistence patterns (Boszhardt 1994; Hall 1962; McKern 1945; Overstreet 1997). These differences are often explained as change through time, with eastern sites generally dating earlier than western sites.

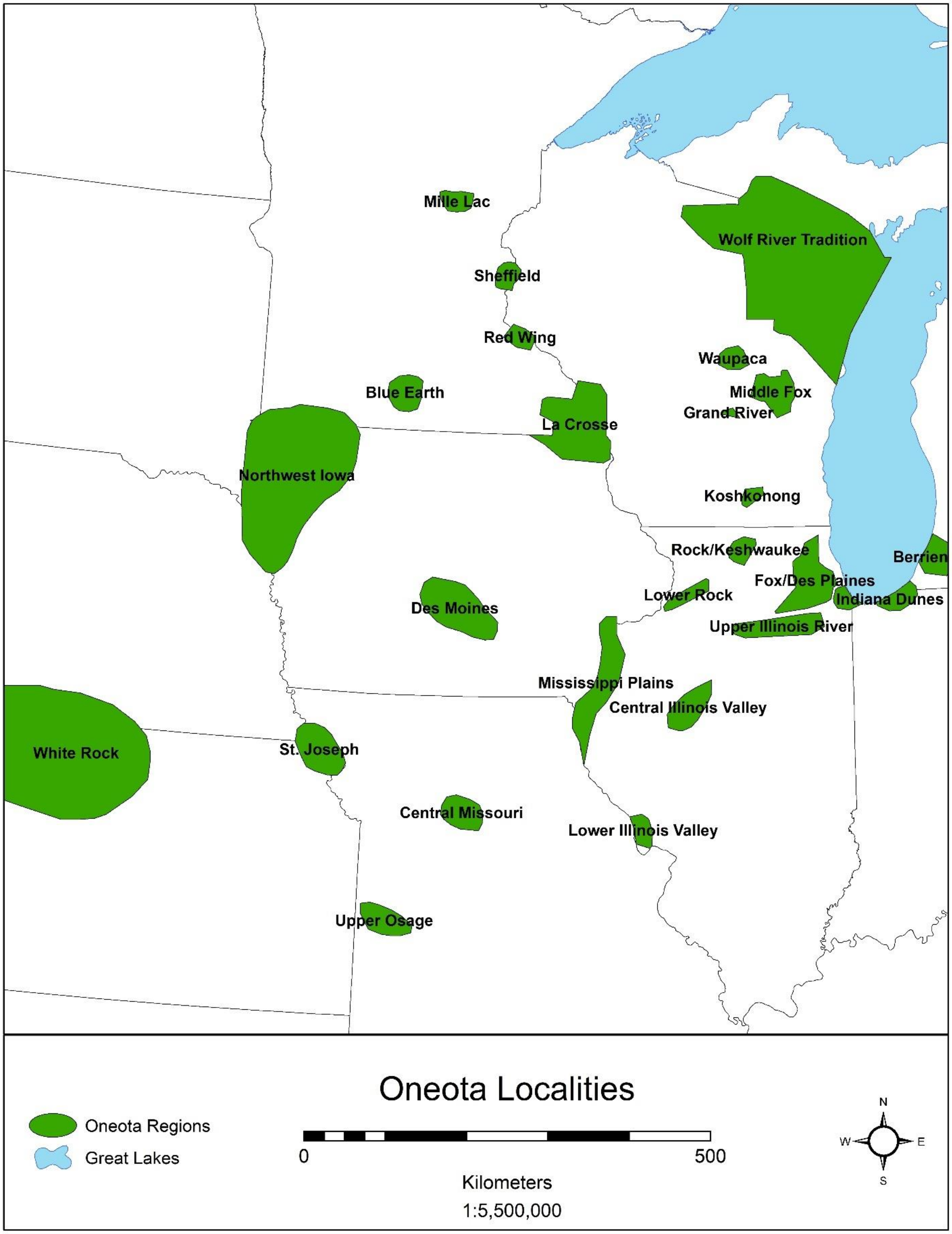

Figure 3.3. Oneota localities (map by Richard W. Edwards).

Chronology

The foundational chronology constructed by Hall (1962:106) divided Oneota into three chronological horizons: Emergent, Developmental, and Classic. These horizons were based primarily on radiocarbon dates and stylistic variation in ceramics. Overstreet (1976) added the Historic Horizon to this chronology (Table 3.1). Regional variation has led to adaptations of this chronology, as in Boszhardt (1998) (Table 3.2), Tiffany (1998) (Table 3.3), and Brown and Sasso (2001) (Table 3.4). However, the amount of regional and temporal variation in materials from Oneota sites across the state makes clear that the horizon concept has no explanatory utility and is not useful for understanding the prehistory of the region (Schneider 2015).

Table 3.1 Oneota horizons and associated calendric dates (after Overstreet 1997).

Oneota Horizon	**Relative Calendric Dates**
Emergent	A.D. 950-1150
Developmental	A.D. 1150-1350
Classic	A.D. 1350-1650
Historic	Post A.D. 1650

Table 3.2 Oneota horizons and relative calendric dates (after Boszhardt 1998).

Oneota Horizon	**Relative Calendric Dates**
Early I	A.D. 900-1100
Early II	A.D. 1100-1300
Middle I	A.D. 1300-1400
Middle II	A.D. 1400-1500
Late I	A.D. 1500-1600
Late II	A.D. 1600-1750

Table 3.3 Oneota horizons and relative calendric dates (after Tiffany 1998).

Oneota Horizon	**Relative Calendric Dates**
Early Period	A.D. 1250-1400
Middle Period	A.D. 1400-1500
Late Period	A.D. 1500-

Table 3.4 Oneota horizons and relative calendric dates (after Brown and Sasso 2001).

Oneota Horizon	Relative Calendric Dates
Emergent	A.D. 1000-1150
Developmental	A.D. 1150-1400
Developmental/Classic	A.D. 1400-1500
Early Classic	A.D. 1500-1600
Late Classic	A.D. 1600-1750

Although these precise schemes are unsupportable, there are broad chronological shifts that do appear to happen circa A.D. 1000-1100 and ca. 1400-1450 (Boszhardt 1998; Brown and Sasso 2001; Gibbon 1972; Hall 1962; Hollinger 2005; Overstreet 1995, 1997). For the purposes of this project, regional and site comparisons will be drawn between broad chronological time frames: early (A.D. 1000-1450) and late (post-A.D. 1450), without regard to horizon or other taxonomic concepts. A.D. 1450 marks the end of Oneota occupation at Lake Koshkonong, and in most of eastern Wisconsin, and also marks the beginning of intensive Oneota occupation in La Crosse and west of the Mississippi.

Oneota Origins

Arguments for the origins of Oneota and other Upper Mississippian populations in the upper Midwest typically fall into one of two categories: *in situ* development (Benn 1995; Boszhardt 2012; Theler and Boszhardt 2000) and migration (Emerson 1999; Gibbon 1982, 1991; Overstreet 1997). The Late Woodland to Oneota transition is most obviously evidenced in the shift from grit-tempered collared and uncollared, cordmarked ceramic vessels to shell-tempered, globular jars with flared to everted rims and smooth body surfaces (Schneider 2015:75). The use of shell tempering and interlocking scroll motifs on many post-A.D. 1000 ceramics has been inferred to be indicative of Middle Mississippian influence and, by some scholars, as evidence of Middle Mississippian migration (e.g., Griffin 1943, 1960; McKern 1945).

There are a limited number of Middle Mississippian sites located in the northern periphery in close geographic proximity to Oneota sites, such as Aztalan, Trempealeau, and the Lundy site in the Apple River focus of northwestern Illinois (Emerson 1991). The presence of a semi-subterranean wall trench style house at the Carcajou Point site on Lake Koshkonong has been used to suggest Middle Mississippian interaction with Oneota groups (Hall 1962:20). Excavations at Carcajou Point also recovered a rim sherd interpreted as a Middle Mississippian Powell Plain sherd (Richards et al. 1998:79). However, there is no evidence of Oneota material culture from Aztalan, the closest Middle Mississippian site to Carcajou Point (Richards 1992). Instead, a single Langford sherd at Aztalan (Brown et al. 1967) and a small number of Langford sherds at Carcajou Point (Hall 1962:70) indicates the possibility of some interactions with people from Illinois. The radiocarbon evidence indicates that many Oneota and Middle Mississippian groups were coeval, calling into question the idea of diffusion of Mississippian traits from Cahokia as an explanation for the emergence of Oneota material culture (Dobbs 1982; Munoz et al. 2015; Richards and Jeske 2002).

Proponents of *in situ* interpretations base their arguments on shell-tempered antecedents of Oneota, intensified maize production and consumption, and sites with evidence for both Late Woodland and Oneota material culture (e.g., Gibbon 1972; Overstreet 1976, 1981). Overstreet (1981:498-499) cites Hurley's (1975) documentation of 45 Oneota shell-tempered pottery vessels in association with Late Woodland vessels at the Sander I site. There is some potential for other transitional examples, but these are limited to sites in northeastern Wisconsin, where Oneota ceramics exhibit both grit and shell tempering (e.g., Bruhy 2002; Mason 1966) and possibly at the Blue Heron site in southeastern Wisconsin, where both grit and shell tempered sherds have been recovered (Jeske 2003a). Unfortunately, the degree of modern disturbance of the Blue Heron site makes a determination of the contemporaneity of these occupations impossible.

Shell tempering in Oneota ceramics is central to both *in situ* and migration interpretations of Oneota origins. Shell tempering is closely connected to maize agriculture in that shell tempering permits potters to make thinner vessel walls than grit temper (Mason 1981:357), a feature ideal for boiling corn (Skibo 2013; Steponaitis 1980). Gibbon (1972) proposed that as people at Oneota sites began producing more maize, they shifted to shell-tempered ceramics. Overstreet (1981) has argued that there is insufficient evidence for maize intensification of the degree that would warrant a shift to shell tempering. However, more recent floral and isotope data (Edwards 2017) indicates that maize contributed anywhere from 50-70% of the calories consumed by Oneota site residents, similar to reported values from Middle Mississippian sites in the American Bottom. In addition, Hall (1962) noted that there are Middle Woodland antecedents for shell tempering in Wisconsin, suggesting that this adaptation need not have come from an external source migrating into the area. As of this writing, it has not been demonstrated that the increase in maize consumption itself was tied to any type of contact with Middle Mississippians. Moreover, contemporary Langford groups used grit tempered pottery and consumed the same amount of maize as Middle Mississippians (Edwards 2017; Emerson et al. 2010).

Historic Affiliations

Post A.D. 1650 Oneota sites have been provisionally linked to the Chiwere-Winnebago (now Ho-Chunk) tribe in eastern Wisconsin and the Ioway further to the west. Griffin (1945) noted that the Ho-Chunk migration stories matched the distribution of archaeological materials identified as Oneota. Based on the correlation of Oneota material culture with historical locations the Chiwere Sioux occupied, Griffin (1945) argued for a strong connection between the Ho-Chunk and Oneota. In central and northeast Iowa, a direct historical connection has linked the Ioway tribe to Oneota archaeological materials (Henning and Thiessen 2004). However, no such direct connection exists in the Prairie Peninsula. The Ho-Chunk and Menominee are the two Native American tribes most often suggested to be associated with Oneota material culture (Hall 1993; Mason 1993; Richards 1993). Unfortunately, there is no material from eastern Oneota sites that can be reliably dated to the historic period. Not only is there a chronological gap between the historic Ho-Chunk sites and the dates for Overstreet's (1997) Historic Oneota Horizon, but there are also stylistic gaps in ceramics from these sites as well (Richards 1993).

Settlement Patterns

Edwards (2010) notes three models of Oneota settlement patterns in Wisconsin: Overstreet's (1976) Homogeneity Model, Rodell's (1983) Diversity Model, and Sasso's (1989) Function and Settlement Model. Both Overstreet (1976) and Rodell (1983) address settlement systems in eastern Wisconsin but while Overstreet (1976:241-247) proposed that Oneota sites were all placed in similar local environments, with soils conducive to horticulture, Rodell (1983:4-5) argued that Oneota sites were not located in a single ecozone but a diverse one. Rodell (1983:107) characterized the exploited environmental zones as wetland-eutrophic lake settings occurring along portions of the Fox-Wolf and Rock Rivers where agriculturally viable soils and oak forest/savannas were present (Edwards 2010:40). Edwards' (2010) catchment analysis of Oneota sites in the Koshkonong locality supports this interpretation. Edwards

(2010:158) states that sites were located to optimize three things: distance to an aquatic environment, distance to ecotones, [and] distance to large amounts of arable land.

Sasso (1989) proposed a settlement model for Oneota in western Wisconsin based on systematic survey of the Coon Creek drainage near La Crosse. Sasso's model is more detailed in that he accounts for seven functionally different types of sites (Table 3.5) and examines their placement on the landscape. Based on the distribution of site types, Sasso argues that in the La Crosse region there is a dichotomy of Oneota subsistence practices, leading site residents to exploit aggregate and dispersed resources seasonally (1989:254-255).

Table 3.5 Oneota site types (after Sasso 1989; Edwards 2010).

Site Type	Site Function
Major Habitation Site (Village)	Large scale, warm weather base camp that housed the majority of all the region's population. Probably occupied from spring into fall.
Minor Habitation Site (Hamlet)	Small, single family base camp/farmstead. Near major habitation sites. Probably occupied from spring into fall.
Minor Habitation Site (Remote)	Small, remote open air base camps.
Rock Shelter Site	Similar to remote base camps, but offered some level of shelter from the elements.
Ephemeral/Extractive	Short term sites, utilized for a single purpose (e.g., kill sites or butchering site).
Defensive Site	Specialized version of the Village and Hamlet sites where evidence of defensive structures is evident (e.g., palisades).
Mortuary Site	Typically take the form of a cemetery or mound, placed on high ground.
Agricultural Site	Sites where there is evidence of Oneota cultivation, typically found archaeologically as garden beds or corn hills.

Structures in Oneota settlements most commonly consist of small sub-rectangular bent pole constructions similar to historic wigwams (Hall 1962; Hollinger 1995). Post-A.D. 1400, longhouses become the dominant structure type at Oneota sites on the La Crosse terrace and further west into Iowa (Hollinger 1995; McKusick 1973; O'Gorman 1995). Recently, long rectangular structures have been identified in conjunction with smaller, subrectangular structures at the Crescent Bay Hunt Club site in eastern Wisconsin (Jeske and Sterner 2018). The nearby Carcajou Point site exhibits smaller rectangular wall-trench structures (Hall 1962) and a unique, semi-subterranean structure was identified at the Crescent Bay Hunt Club (Sterner 2014). Multiple explanations for the differences in Oneota house forms exist. Hollinger (1995) attributes the differences in Oneota houses to a chronological shift from matrilocal to patrilocal residence, with larger, more communal structures being present in later, matrilineal settlements. McKusick (1971) argues for seasonally occupied structures with larger longhouses being used in summer and smaller wigwam type structures in winter. Archaeologists have not yet settled on an explanation for this variation in structure forms and variation has increased with the addition of recent data. There does appear to be a geographic and temporal dimension to the variation, but no concrete pattern has been identified that is applicable to both eastern and western Wisconsin.

Subsistence

Recent data indicate that the occupants of Oneota sites were maize agriculturalists who supplemented their diets with other domesticated plants, wild plants, and animals. Although a number of early models of Oneota subsistence strategies have suggested that maize was a supplement to a hunting/gathering/fishing economy (Arzigian 1989, 2000; Brown and Asch 1990; Edwards 2010; Egan-Bruhy 2014; Hunter 2002; Overstreet 1976, 1995, 1997; Tiffany 1998; Tubbs and O'Gorman 2005) stable isotopic evidence indicates maize was foundational to the diet of groups in northern Illinois and southern Wisconsin (Edwards 2017; Edwards et al. 2017; Emerson et al. 2010). Edwards et al. (2017) used the Canine Surrogacy Approach to obtain stable Carbon and Nitrogen isotope data from canine remains from Oneota and Langford sites in eastern and western Wisconsin and northern Illinois. These data show that approximately 50% of the Oneota diet consisted of maize, although under certain interpretive models that proportion could be as high as 80% (Figure 3.4). Most interpretive models place an additional 20-25% of the diet from other plants, principally wild rice, acorn, and chenopodium, with a large suite of lesser used plants. All of the interpretive models estimate that less than 16% of the diet comes from animals. Despite the fact that Oneota sites are situated close to abundant water, aquatic animal resources contributed very little to the diet-less than 7%. Fish probably represent only 2-5% of the diet. Faunal assemblages from eastern Wisconsin Oneota sites are dominated by sheer numbers of fish bone, but large herbivores—deer, elk and bison—compose the overwhelming amount of animal resources consumed, based on bone weight and nitrogen isotope data (Jeske et al. 2017).

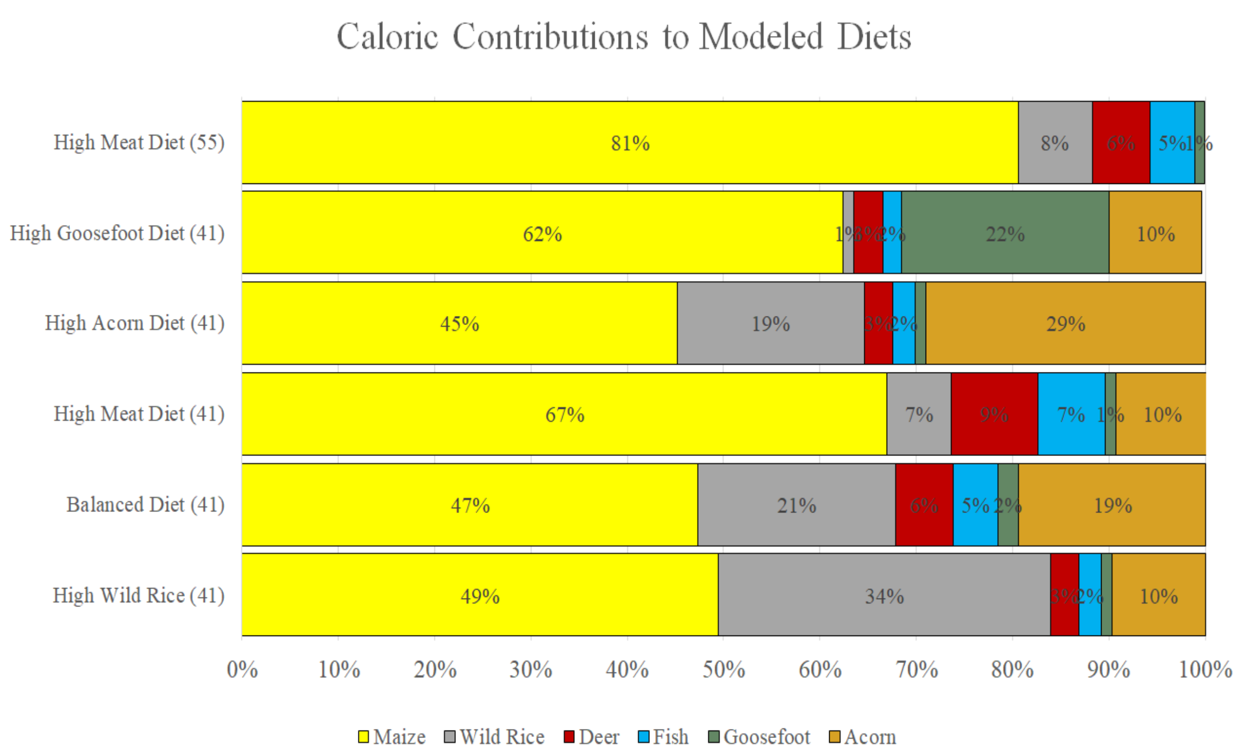

Figure 3.4. Caloric contributions to Oneota diet based on Edwards (2017).

Material Culture

Oneota occupations are most recognizable by their ceramic materials: globular vessels with a wide mouth, shoulder decorations, and typically shell temper with some grit temper used as well (Overstreet 1997; Schneider 2015). Oneota sites are also typified by chipped stone lithic assemblages composed of triangular hafted bifaces, distinctive thumbnail scrapers, and numerous flake tools (Boszhardt and McCarthy 1999; Rodell 1989; Sterner 2012). The most common ground stone implements found at Oneota sites are expedient hammerstones and grooved sandstone abraders although ground stone axes and polishers also occur relatively frequently (Hall 1962; Goatley 1995; Jeske et al. 2017).

Figure 3.5. Typical Oneota chipped stone tool forms. From left to right: thumbnail scraper, triangular biface, and flake tool.

In addition to the use of shell as a tempering agent, Oneota site residents also utilized shell in the production of pendants and numerous other tools such as fishing lures, hoes, spoons, and scrapers (Boczkiewicz 2011; Faulkner 1972; Gibbon 1972; Holtz-Leith 2006). Mammal and bird bones and antlers were formed into awls, knives, needles, projectile points, spoons and ornaments (Boczkiewicz 2011; Faulkner 1972). Assorted copper artifacts with both utilitarian and non-utilitarian functions have also been found at Oneota sites (Hill 2011; Jeske 2003a; Overstreet 1997; Pozza 2016).

CHAPTER FOUR:

SAMPLE SITES AND LOCALITIES

Introduction

In order to examine the relationship of lithic tools and Oneota communities, two Oneota localities were compared; La Crosse and Koshkonong. These localities were chosen based on the number of excavated sites, an established radiocarbon chronology and the availability of lithic datasets. Previous research (e.g., Hall 1962; Boszhardt and McCarthy 1999) indicates that there is systematic variation in the composition of Oneota lithic assemblages from eastern and western Wisconsin. Testing how much of this variation is due to regional variation or to chronological change is one goal of the current study.

I conducted analysis on lithic assemblages from two sites in each locality and used data from up to three sites from each locality for comparison (Table 4.1). I collected data from the Crescent Bay Hunt Club (47JE0904) and Koshkonong Creek Village (47JE0379) sites in the Koshkonong locality and the Tremaine (47LC0095) and Pammel Creek (47LC0061) sites in the La Crosse locality. My data from these sites was contextualized with additional data from the Carcajou Point (47JE0002) and Schmeling (47JE0833) sites in Koshkonong and OT (47LC0262), Filler (47LC0149), and State Road Coulee (47LC0176) in La Crosse.

The Koshkonong and La Crosse localities are approximately 240 km (149 miles) apart. According to the Wisconsin Archaeological Site Index, there are scattered Oneota sites located in the space between La Crosse and Koshkonong but no spatially distinct localities. Based on previous work with the site index, many of these reported Oneota sites are not necessarily Oneota, but are based on the presence of triangular projectile points or nondescript ceramic sherds (Spott 2012). The La Crosse locality is significantly larger than Koshkonong, meaning that some La Crosse sites examined for this study are more far flung than the Koshkonong sample sites.

Table 4.1 Sites examined in this dissertation.

Site Name	Site No.	Locality	Size	C14 Range
Crescent Bay	47JE0904	Koshkonong	28,000 m^2	A.D. 1050-1400 (Jeske et al. 2017)
Koshkonong Creek	47JE0379	Koshkonong	53,000 m^2	A.D. 1200-1400 (Jeske et al. 2017)
Schmeling	47JE0833	Koshkonong	19,000 m^2	A.D. 1200-1300 (Jeske et al. 2017)
Carcajou Point	47JE0002	Koshkonong	271,400 m^2	A.D. 900-1600 (Jeske et al. 2003)
Tremaine	47LC0095	La Crosse	328,000 m^2	A.D. 1250-1650 (O'Gorman 1995)
Pammel Creek	47LC0061	La Crosse	50,000 m^2	A.D. 1380-1570 (Boszhardt 1989)
OT	47LC0262	La Crosse	67,000 m^2	A.D. 1400-1650 (O'Gorman 1993)
Filler	47LC0149	La Crosse	7,500 m^2	A.D. 1450-1680 (O'Gorman 1994)
State Road Coulee	47LC0176	La Crosse	1,750 m^2	A.D. 1460-1610 (Anderson et al. 1995)

Koshkonong Locality

The Koshkonong locality is situated in the southern portion of the Rock River-Lake Winnebago-Green Bay Lowlands region of the Eastern Ridges and Lowland geophysical province (Martin 1965). The locality is part of the Rock River drainage. Lake Koshkonong serves as a reservoir for the river. The Indianford dam built on the Rock River in 1846, increased the surface area of Lake Koshkonong significantly, although the lake still remains shallower than two meters. The bedrock in the region is limestone, buried beneath glacial deposits (Martin 1965).

The area around Lake Koshkonong was first archaeologically surveyed by Stout and Skavlem (1908). They identified Late Woodland Effigy mounds as well as multiple campsites and villages in the area. Charles Brown's (1909) survey of the area also noted several garden bed and burial sites in the region. Systematic archaeological investigations were not undertaken around Lake Koshkonong until the late 1950s. Hall's (1962) excavations at Carcajou Point (47JE0002) were the first to identify an Oneota manifestation in eastern Wisconsin and established the Oneota pottery classification scheme still in use today in eastern Wisconsin

(Schneider 2015:113). David Baerreis directed the first excavations of the Crescent Bay Hunt Club site (47JE0904) by a crew from UW-Madison in 1968 (Gibbon n.d.). Janet Spector (1975) conducted excavations at Crabapple Point (47JE0075), identifying evidence of historic, Oneota and Late Woodland occupations at the site.

The University of Wisconsin-Milwaukee has conducted extensive work around Lake Koshkonong, beginning in the 1970s under the auspices of the Crawfish-Rock Archaeological Project (CRAP) and the Southeast Wisconsin Archaeological Project (SEWAP) (Hanson 1996; Musil 1987; Rodell 1984). Robert Jeske has directed ten seasons (1998-2017) of UW-Milwaukee field schools on the north shore of Lake Koshkonong, conducting survey and excavations at the Crescent Bay Hunt Club, Schmeling, Koshkonong Creek Village, Crabapple Point, Hearthstone, Purnell, and Blue Heron sites, all of which contain Oneota components (Jeske 2001, Jeske et al. 2003; 2017) (Figure 4.1).

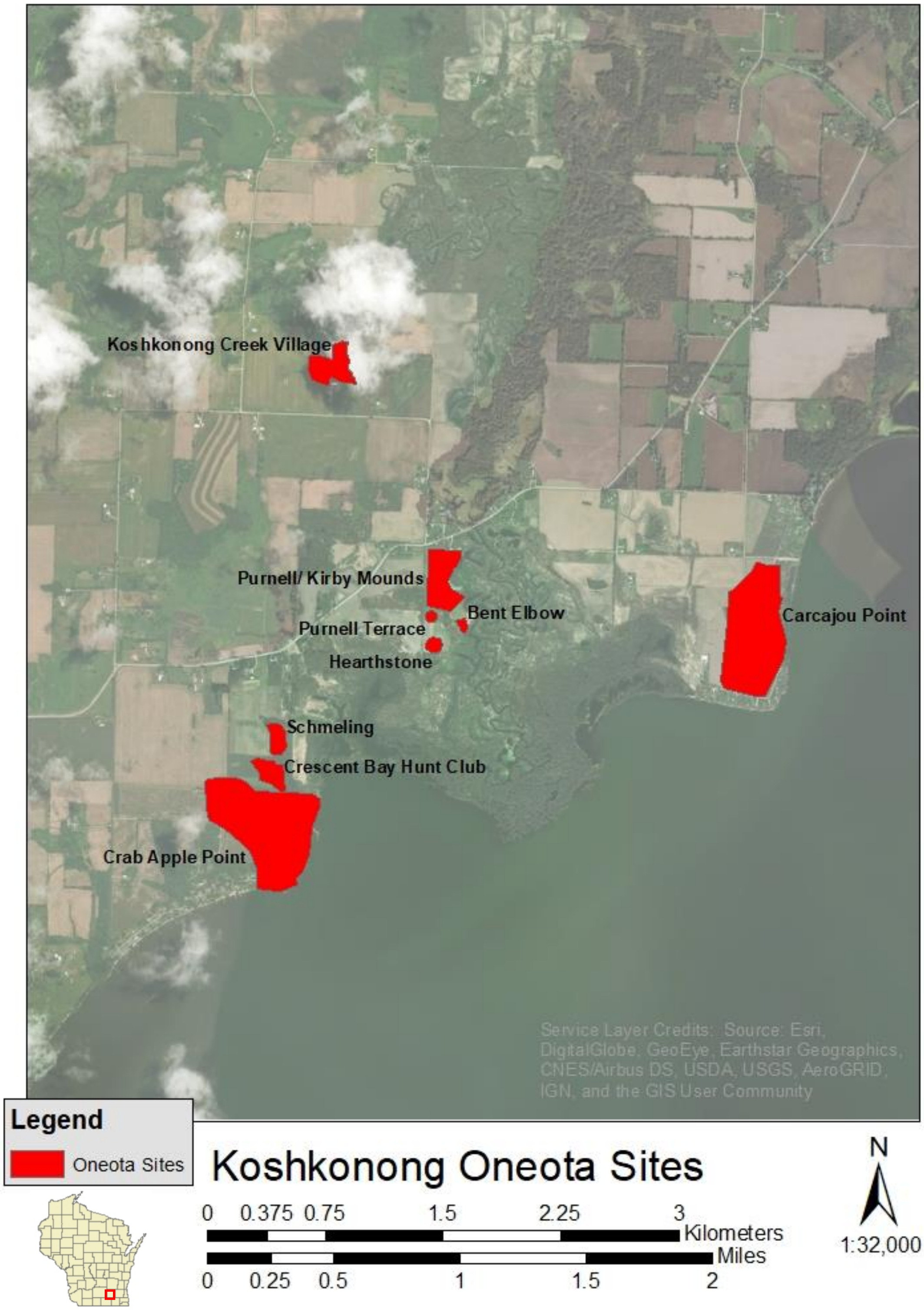

Figure 4.1. Oneota site locations on the northwestern side of Lake Koshkonong.

Crescent Bay Hunt Club Site (47JE0904)

The primary site examined by this analysis is the Crescent Bay Hunt Club Site (47JE0904). The Crescent Bay Hunt Club site is located on the property of the Crescent Bay Hunt Club, in Sumner Township of southwestern Jefferson County, Wisconsin. It is situated atop a ridge of limestone till-covered bedrock that runs parallel to the western shore of Lake Koshkonong, approximately 180 m (625 ft.) northwest of the lake's shoreline. The site is one of a cluster of sites found along the shores of Lake Koshkonong and its tributaries such as Koshkonong Creek. The first mention of the site is in an article by Stout and Skavlem (1908). The site was first excavated by a University of Wisconsin-Madison field school under the direction of David Baerreis in 1968 (Gibbon n.d.). Further work was not undertaken at the site until 1995 when the Southeast Wisconsin Archaeological Project at the University of Wisconsin-Milwaukee conducted a survey of the Hunt Club property (Hanson 1996). Beginning in 1998, the UW-Milwaukee archaeological field school has returned biennially to the Crescent Bay Hunt Club site, under the direction of Robert Jeske.

A suite of 28 radiocarbon dates document an occupation at Crescent Bay Hunt Club beginning circa A.D. 1050-1100 and ending circa A.D. 1400 (Figure 4.5; Table 4.2). The occupants of the site left behind an Oneota ceramic assemblage dominated by shell tempered, olla shaped jars. More than 1500 vessels have been recovered, all of which are Oneota types except two Late Woodland vessels (Jeske et al. 2017). Represented pottery types include Grand River Plain, Grand River Trailed, Carcajou Plain, Busseyville Grooved Paddle, Allamakee Trailed, Perrot Punctate, Crescent Bay Punctate, and Fisher (Schneider 2015). Other tools recovered include ground stone celts, abraders, grinding stones, galena cubes, hematite, bone tools such as piercers and elk scapula hoes, and a variety of copper tools including awls, celts, and fishhooks (Jeske et al. 2017; Pozza 2016; Sterner-Miller 2014; Sterner and Moriarity 2017).

Spatial, faunal, and floral data indicate that the site was occupied in all seasons of the year (Edwards 2017). The inhabitants grew corn and several species of *Chenopodium*, harvested wild rice, sunflowers, and a wide variety of fruits, seeds, and nuts (Olsen 2003). A very wide array of animal species are represented in the faunal assemblage, including deer, elk, bison, raccoon, small mammals, turtle, waterfowl, large and small bodied fish, and several varieties of mussels (Edwards 2017; McTavish 2013). More than 600 pits are located throughout the site, both within and around defined structures. Two types of houses were used at the site, both a wigwam style structure and a longhouse form (Jeske et al. 2017; Moss 2010) The most recent excavations at the site indicate the presence of three longhouses on the northern side of the site and three wigwams on the southern side (Figures 4.2 and 4.3). These longhouses appear to differ significantly in size, construction, and function to those identified at the Tremaine site in the La Crosse locality (Figures 4.4 and 4.5). A small, semi-subterranean structure of unknown function was identified in 2014 (Sterner-Miller 2014). There appears to be no organized cemetery area. Human remains are found scattered across the site in multiple forms and types, including flexed, supine, bundle, and isolated bone (Foley Winkler 2011).

Evidence for interpersonal violence is supported with skeletal, archaeological, and chemical data (Jeske 2014). Bone damage on several individuals indicate violent death, patterns of several burials suggest non-typical disposal of human remains, and blood residues on several triangular tools indicate human blood.

In sum, it appears that people occupied this site for approximately 300 years, exploiting a rich and diverse environment using a foraging, fishing and agricultural economy.

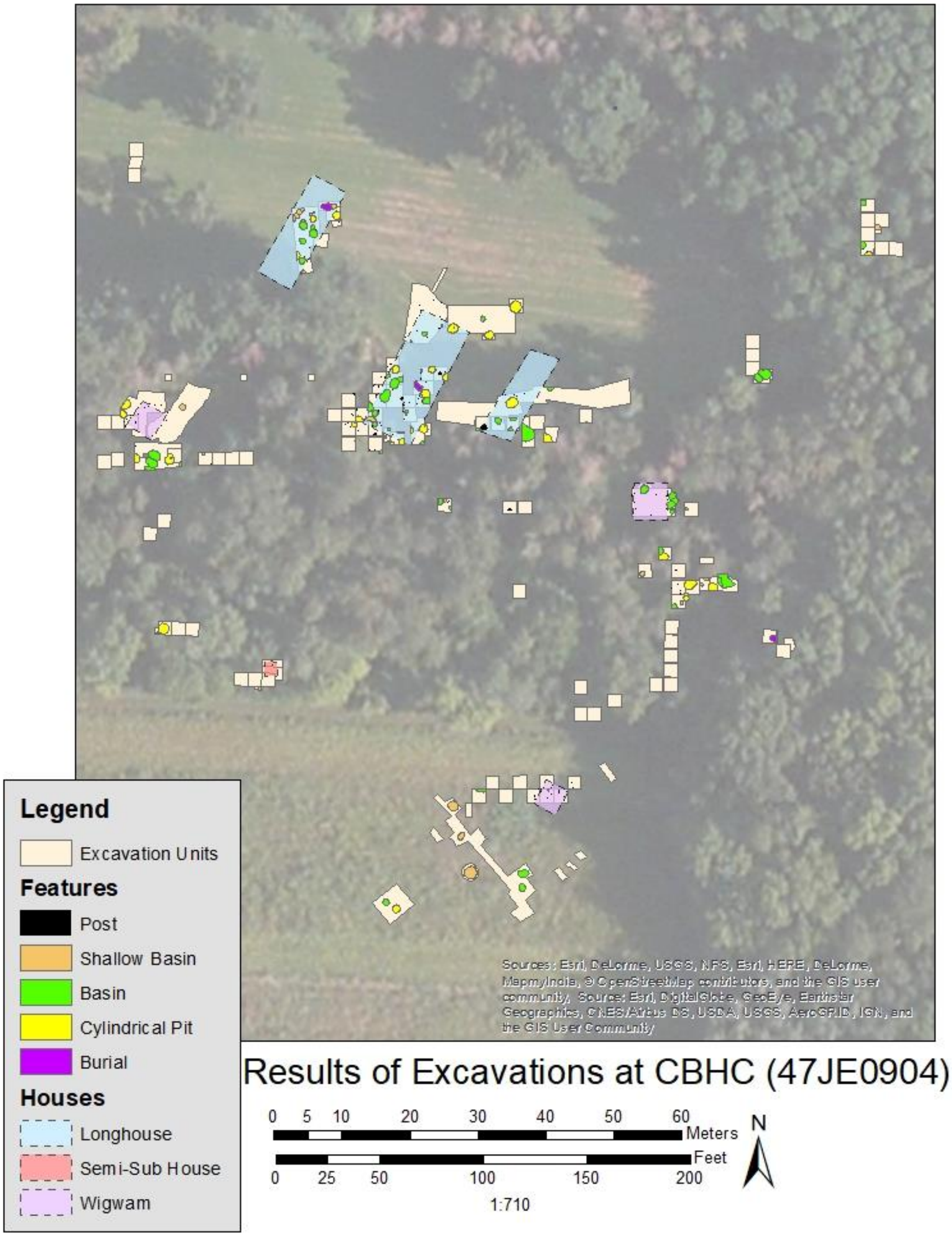

Figure 4.2. Map of UWM excavations at Crescent Bay Hunt Club, as of 2017.

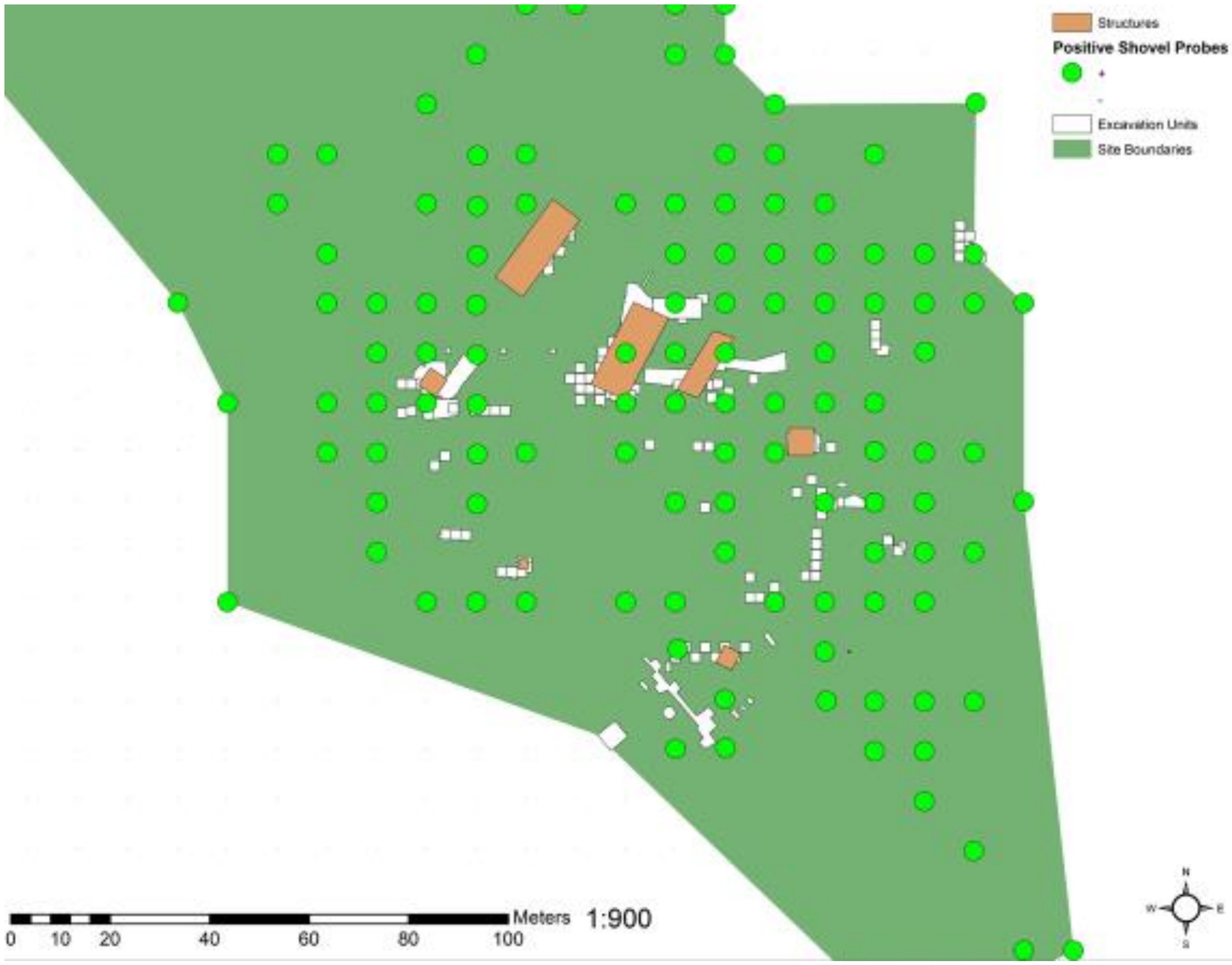

Figure 4.3. UWM shovel probe results at Crescent Bay Hunt Club, as of 2017 (map by Richard W. Edwards).

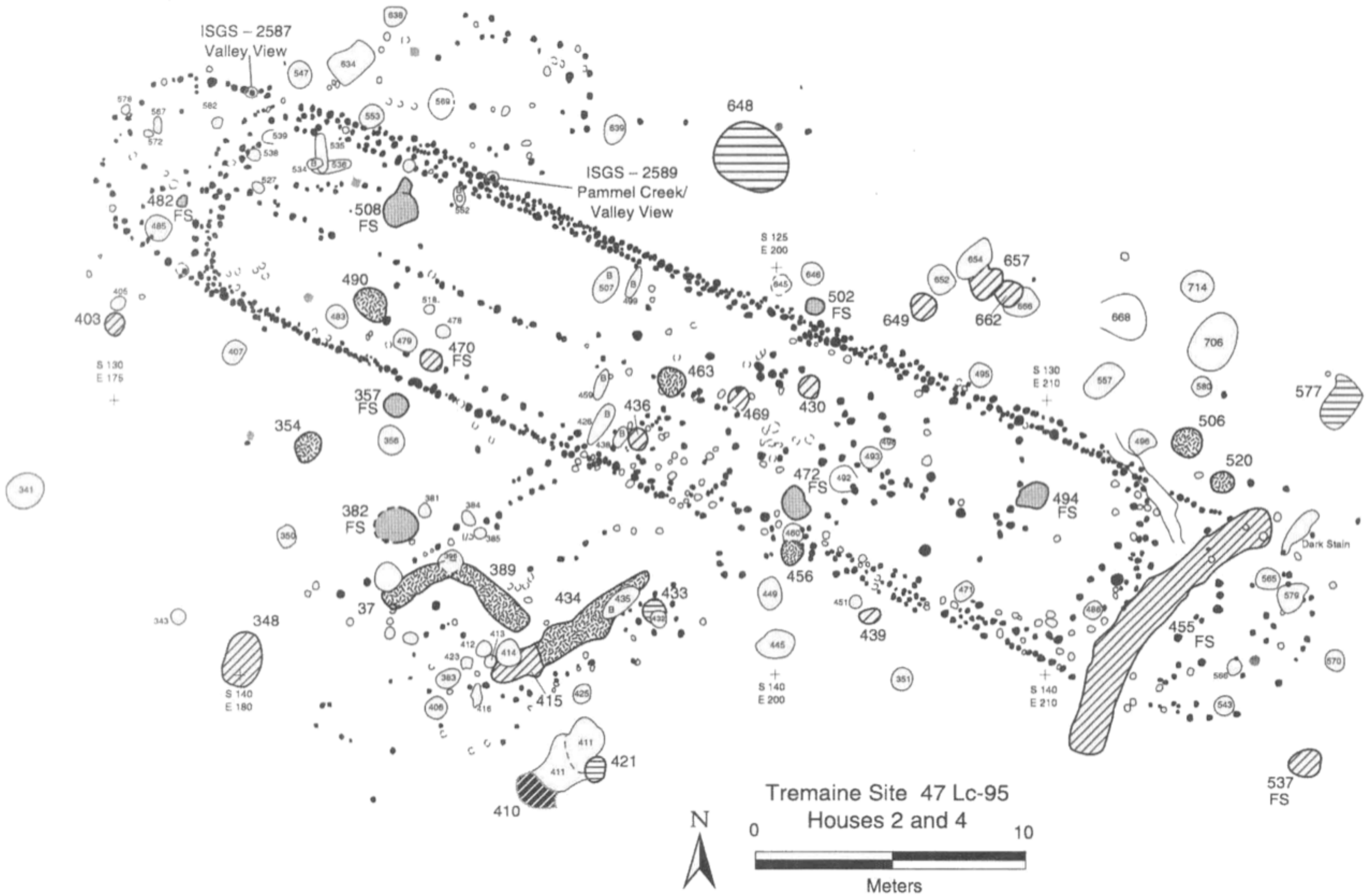

Figure 4.4. Floor plans of longhouses from the Tremaine site (after O'Gorman 1995). Image reproduced with permission from the Wisconsin Historical Society and the Museum Archaeology Program.

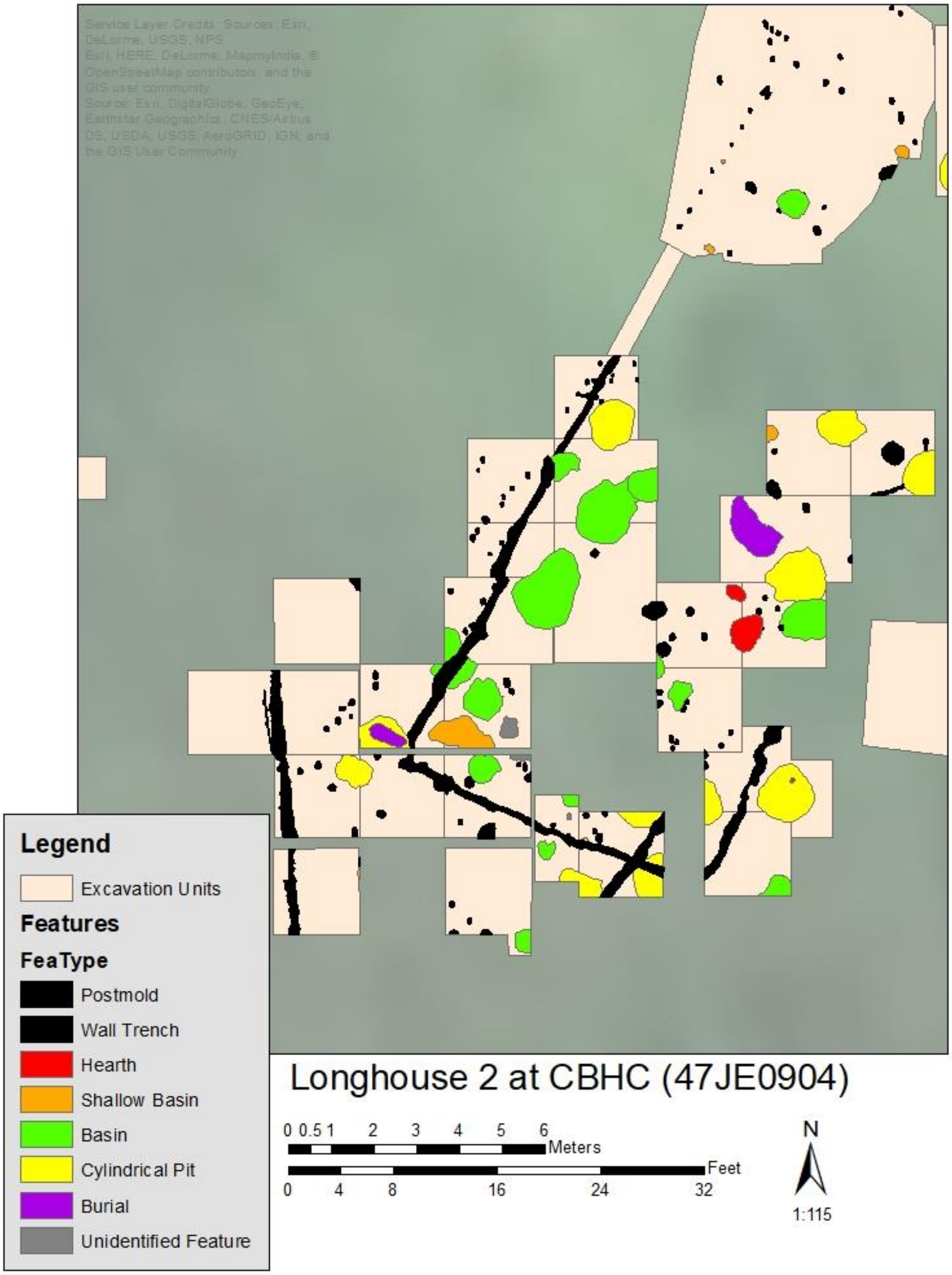

Figure 4.5. Floor plan of Longhouse 2 at Crescent Bay Hunt Club.

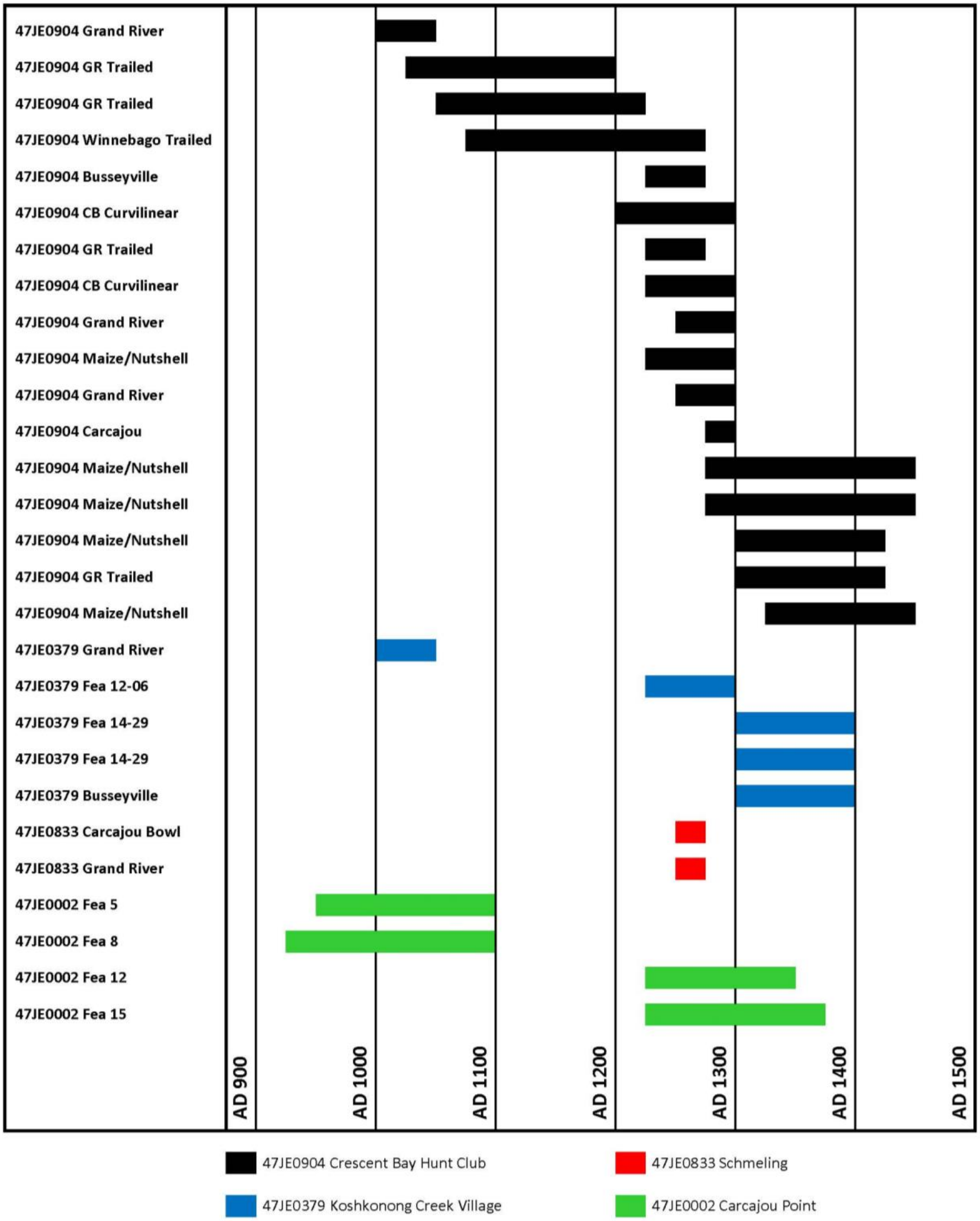

Figure 4.6. Koshkonong locality radiocarbon dates (after Sterner and Jeske 2017).

Table 4.2 Koshkonong radiocarbon (updated from Edwards 2017).

Site	Context	Material	Age BP	Error Term	1σ AD	%	2σ AD	%	Reference
KCV	F12-06 zL	Bean	520	20	1410-1427	100%	1399-1438	100%	Edwards 2016
CBHC	F04-14 Z2	Maize/ Nut	530	40	1329-1340	17%	1312-1359	30%	Richards and Jeske 2015
					1369-1434	83%	1387-1444	70%	
CBHC	F12-53	Maize Cob	580	15	1322-1347	72%	1314-1357	68%	Jeske et al 2017
					1392-1403	28%	1388-1409	32%	
KCV	F12-06 zB	Residue	605	20	1307-1328	41%	1299-1370	78%	Edwards 2014
					1341-1362	40%	1380-1403	22%	
					1385-1395	19%			
CBHC	F04-14 z6	Residue	590	40	1310-1360	73%	1296-1415	100%	Richards and Jeske 2015
					1387-1405	27%			
KCV	F14-29 zb	Residue	610	30	1302-1328	40%	1296-1403	100%	Edwards 2016
					1341-1367	40%			
					1382-1395	20%			
CBHC	F00-15	Maize	595	15	1315-1331	38%	1306-1363	77%	This dissertation
					1338-1355	42%	1385-1404	23%	
					1389-1397	20%			
CBHC	F14-01	Maize	595	15	1315-1331	38%	1306-1363	77%	This dissertation
					1338-1355	42%	1385-1404	23%	
					1389-1397	20%			
CBHC	F02-27	Maize	595	15	1315-1331	38%	1306-1363	77%	This dissertation
					1338-1355	42%	1385-1404	23%	
					1389-1397	20%			
CBHC	F00-06	Maize/ Nut	600	40	1306-1363	79%	1294-1411	100%	Richards and Jeske 2015
					1385-1400	21%			
CBHC	F00-11	Maize/ Nut	600	70	1300-1368	74%	1279-1432	100%	Richards and Jeske 2015
					1381-1406	26%			
CBHC	F00-26	Maize/ Nut	620	80	1294-1333	39%	1262-1438	100%	Richards and Jeske 2015
					1337-1398	61%			
Carcajou	F15	Wood	660	80	1275-1327	50%	1222-1423	100%	Richards et al. 1998
					1342-1395	50%			
CBHC	F17-05 zA	Maize	665	15	1287-1299	58%	1282-1307	56%	This dissertation
					1370-1380	42%	1362-1385	44%	
Carcajou	F3	Maize	680	40	1276-1305	63%	1263-1325	60%	Birmingham 2006
					1363-1385	37%	1344-1394	40%	
CBHC	F02-01	Residue	690	15	1280-1292	100%	1275-1299	93%	Richards and Jeske 2015
							1370-1380	7%	
CBHC	F0-14	Residue	700	20	1277-1290	100%	1269-1299	95%	Richards and Jeske 2015
							1370-1379	5%	
Carcajou	F12	Wood	700	70	1255-1318	65%	1195-1195	<1%	Richards et al. 1998
					1352-1390	35%	1206-1410	99%	

Site	Context	Material	Age BP	Error Term	1σ AD	%	2σ AD	%	Reference
CBHC	F00-21	Maize/ Nut	720	40	1257-1297	99%	1222-1308	89%	Richards and Jeske 2015
					1375-1375	1%	1361-1386	11%	
CBHC	F04-35	Residue	745	20	1264-1278	100%	1247-1286	100%	Richards and Jeske 2015
KCV	F14-29	Residue	740	25	1263-1281	100%	1226-1232	2%	Edwards 2016
							1244-1290	98%	
CBHC	F04-14	Residue	730	40	1254-1296	100%	1218-1304	94%	Richards and Jeske 2015
							1365-1384	6%	
SCH	-	Residue	765	15	1257-1273	100%	1224-1234	6%	Richards and Jeske 2015
							1242-1278	94%	
CBHC	F10-29	Residue	765	15	1257-1273	100%	1224-1234	6%	Jeske 2010
							1242-1278	94%	
CBHC	F02-40	Residue	750	40	1227-1231	6%	1208-1298	99%	Richards and Jeske 2015
					1245-1284	94%	1371-1378	1%	
CBHC	F04-03	Residue	785	15	1225-1232	21%	1222-1269	100%	Richards and Jeske 2015
					1224-1264	79%			
SCH	-	Residue	785	20	1224-1234	28%	1220-1271	100%	Richards and Jeske 2015
					1242-1265	72%			
CBHC	F68-01	Wood	760	50	1224-1280	100%	1166-1299	98%	Bender et al. 1970
							1370-1379	1%	
CBHC	F10-98	Residue	795	15	1224-1235	37%	1219-1265	100%	Richards and Jeske 2015
					1241-1259	63%			
CBHC	F68-06	Wood	780	50	1217-1277	100%	1159-1293	100%	Bender et al. 1970
CBHC	F06-63	Residue	800	40	1213-1268	100%	1166-1277	100%	Richards and Jeske 2015
CBHC	F68-10	Wood	800	50	1192-1997	4%	1055-1076	2%	Bender et al. 1970
					1205-1272	95%	1153-1287	98%	
CBHC	F68-09	Wood	810	50	1189-1266	100%	1051-1082	4%	Bender et al. 1970
							1128-1133	1%	
							1151-1284	95%	
CBHC	F10-14	Dog bone	854	21	1169-1177	20%	1156-1228	96%	Edwards 2017
					1181-1214	80%	1231-1247	5%	
CBHC	F10-11	Dog bone	856	24	1168-1216	100%	1058-1065	1%	Edwards 2017
							1066-1074	1%	
							1154-1252	98%	
CBHC	F04-14	Residue	880	40	1050-1082	27%	1037-1225	98%	Richards and Jeske 2015
					1228-1135	5%	1234-1243	2%	
					1151-1216	68%			
Carcajou	-	Wood	890	80	1043-1103	38%	1016-1271	100%	Hall 1962

Site	Context	Material	Age BP	Error Term	1σ AD	%	2σ AD	%	Reference
					1118-1216	61%			
CBHC	F04-15	Residue	920	40	1043-1104	60%	1026-1192	98%	Richards and Jeske 2015
					1118-1158	40%	1197-1205	2%	
KCV	F12-01	Residue	1000	20	999-1001	3%	989-1044	93%	Edwards and Spott 2012
					1013-1035	97%	1100-1119	6%	
							1144-1145	0%	
Crabapple	Oneota Feature	Wood	980	55	999-1002	1%	909-911	<1%	Spector 1975
					1012-1053	38%	969-1190	99%	
					1079-1152	61%	1198-1203	<1%	
CBHC	F04-22	Residue	990	20	1016-1040	92%	994-1047	78%	Richards and Jeske 2015
					1110-1115	8%	1089-1122	19%	
							1139-1148	3%	
Carcajou	F17	Wood	990	250	777-791	3%	581-1428	100%	Hall 1962
					804-842	7%			
					860-1259	90%			
Carcajou	F5	Wood	1010	70	969-1053	60%	887-1190	99%	Richards et al. 1998
					1079-1152	40%	1199-1202	<1%	
Carcajou	F8	Wood	1020	80	900-921	9%	778-790	1%	Richards et al. 1998
					950-1051	61%	810-810	<1%	
					1082-1128	22%	826-840	1%	
					1134-1115	8%	863-1211	98%	

Koshkonong Creek Village Site (47JE0379)

The Koshkonong Creek Village site (KCV) is also located in the Koshkonong locality, approximately 3 km (1.6 miles) north of the Crescent Bay Hunt Club site. The site is situated appproximately 100 meters back from the edge of a nine-meter bluff overlooking Koshkonong Creek, a small tributary of the Rock River that flows directly into Lake Koshkonong. KCV was documented by Stout and Skavlem in 1908 and was identified as a village site where the plow contacted several pits, hearths, and burials and unearthed artifacts including mussel shell, hafted bifaces, and fire cracked rock (Edwards IV and Spott 2012). There were two mounds that may have been associated with this site, but no mention is made of material culture (Stout and

Skavlem 1908:58). KCV was surveyed by the University of Wisconsin-Milwaukee in 1986 under the supervision of Jennifer Musil (1987) and recorded as the Twin Knolls site. The UW-Milwaukee field school returned to KCV under the supervision of Robert Jeske in 2008 and 2010 to conduct further survey (Doyle 2012). A Late Woodland component was identified and tested in 2010 (Jeske et al. 2011) but the primary occupation appears to be the Oneota component, excavated in 2012, 2014, 2016, and 2017 (Edwards et al. 2017; Jeske et al. 2013; Jeske et al. 2015).

There are currently only five radiocarbon dates from KCV, although more dates are forthcoming. Four dates are from food residue on ceramic sherds found in feature contexts and the fifth date is from a bean. Most of the dates fall between A.D. 1210-1430 but a single date has a calibrated, two sigma range of A.D. 990-1045 (see Figure 4.2). The UWM excavations at the site identified three potential structures, as well as more than 40 pit features (Edwards 2017) (Figure 4.7). Isolated human remains were recovered from three separate features (Edwards 2017). No formal burials have been excavated at KCV.

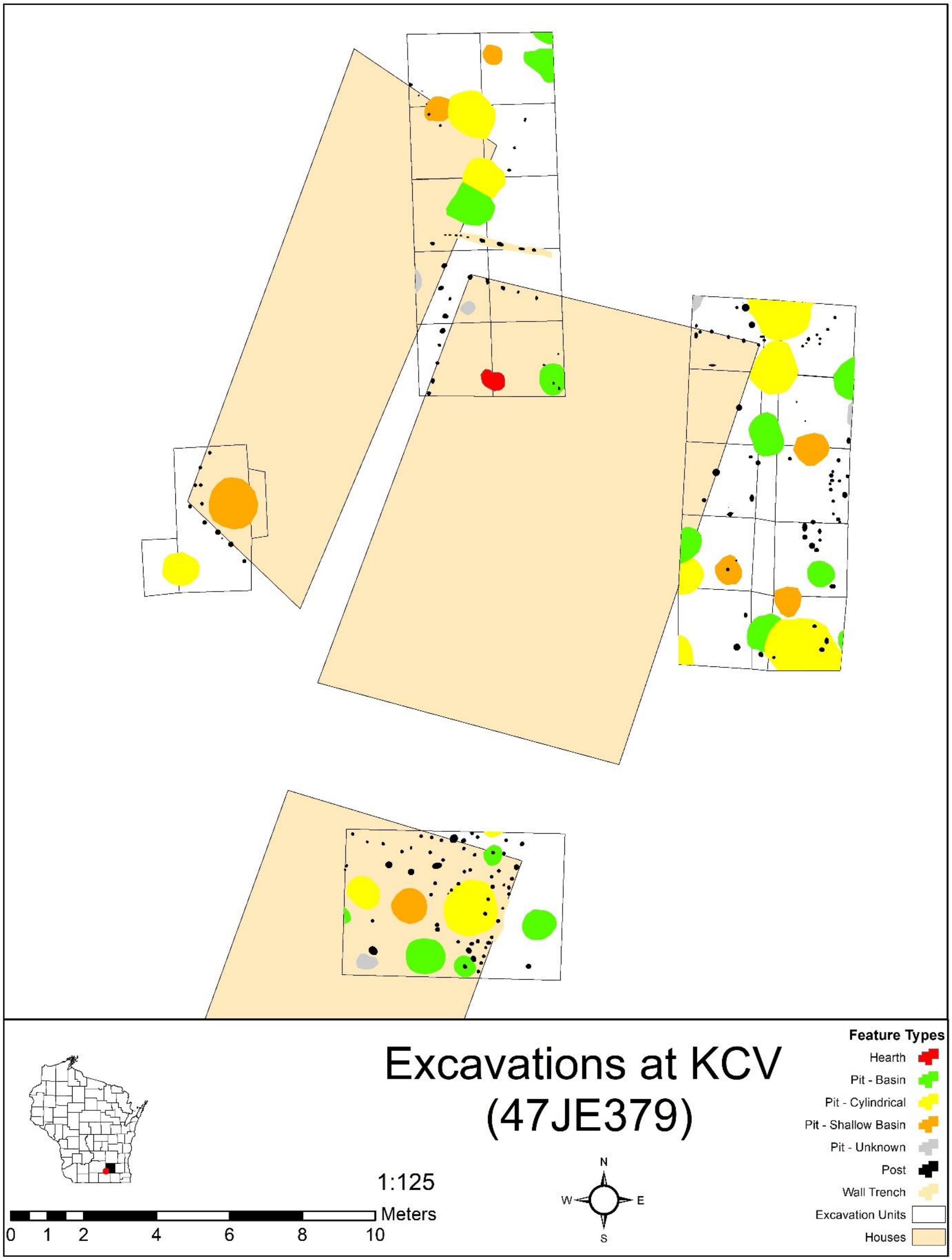

Figure 4.7. Map of UWM excavations at Koshkonong Creek Village, as of 2017.

Schmeling Site (47JE0833)

The Schmeling site is located on the Schmeling family farm, 200 m (656 ft.) north of the Crescent Bay Hunt Club, along the same limestone ridge. The two sites are separated by an erosional cut, created by a spring-fed stream (Schneider 2015). The site was also recorded by Stout and Skavlem (1908) and was recorded by UW-Milwaukee in 1987 following a survey of the Lake Koshkonong region by SEWAP (Musil 1987). The site was recorded as having both Late Woodland and Oneota occupations. Artifacts recovered from surface survey of the site include typical Oneota lithic debris and tools, numerous decorated and undecorated shell tempered and grit tempered ceramics. In addition, Mr. Kevin Schmeling has identified a Clovis occupation in the field immediately adjacent to an erosional cut west of the Oneota occupation (Jeske and Winkler 2008).

Excavations in the wooded areas at the edge of the site in 2006 and 2008 revealed a series of Oneota features and burials (Foley Winkler 2011). Ceramic types represented include Grand River Plain, Busseyville Grooved Paddle, and Carcajou Plain (Schneider 2015). Mammal remains include deer and rodent as well as possible elk, and fish. Shell is also prevalent (Foley Winkler 2011).

Residue on a Grand River sherd and a Carcajou sherd yielded two radiocarbon dates (Figure 4.2). Calibrated, the two sigma range of these dates is A.D. 1240-1270 and A.D. 1260-1280. Three formal burials were excavated at the site in 2006. Both compound and semi-flexed burials were present. Both males and females were represented in the burial population (Foley Winkler 2011).

Carcajou Point Site (47JE0002)

The Carcajou Point site is a multicomponent site, containing Woodland, Oneota and Historic components. It is located on a terrace near a marsh on the shores of Lake Koshkonong, approximately 2 km (1.2 miles) northeast of Crescent Bay Hunt Club. The site was first identified by Peet (1898) and Stout and Skavlem (1908) and was recorded by Brown (1909). The first extensive excavations at the site were conducted by Robert Hall (1962). Hall excavated an Oneota component consisting of 79 pit features, burials, a wall trench structure and two other structures. Based on this work, Hall (1962) defined the Koshkonong focus and defined five new Oneota ceramic types. UW-Milwaukee's Southeastern Wisconsin Archaeological Project performed an intensive surface survey of the site in 1983, identifying Oneota and Late Woodland occupations (Rodell 1984). They also conducted salvage excavations in 1989 and 1990 (Brubaker and Goldstein 1991; Goldstein 1991). These excavations revealed a further 16 pit features and additional postmold alignments, all of which are part of the Oneota component at the site. UWM's Historic Resource Management Services (HRMS) excavated another 20 features in 1998 and radiocarbon dated four of those features. All four dates were between A.D. 1015-1300 (Richards et al. 1998). Middle Archaic and Late Woodland components were uncovered in the northern portion of the site by UWM (Jeske et al. 2003). Compliance work in 2005 returned a radiocarbon date of A.D. 1260-1394 on a Grand River vessel, further refining the Oneota chronology at the site. Additional compliance work in 2012 and 2013 identified a post-contact Euro-American kiln and an Early and Middle Woodland midden at the site as well (Shillinglaw 2012). Ignoring Hall's (1962) dates with 250-year error terms, radiocarbon dates indicate that the Oneota occupation at the site dates to pre-A.D. 1450 (Table 4.2).

Lithic Samples from Koshkonong Sites

Detailed analyses of the lithic assemblages from the Crescent Bay Hunt Club and Koshkonong Creek Village sites were undertaken for this dissertation. Data from previous lithic analyses conducted on the assemblages from Schmeling and Carcajou Point using a comparable recording schema were utilized for comparison. The composition of these lithic assemblages is displayed in Table 4.3.

Table 4.3 Lithics examined for this dissertation from the Koshkonong locality.
* These counts are solely from the 2004 WHS excavations as they used the Jeske and Lurie 1990 recording schema

Site Name	Site No.	Lithic Tools	Lithic Debris
Crescent Bay Hunt Club	47JE0904	539	3,453
Koshkonong Creek Village	47JE0379	425	1,916
Schmeling	47JE0833	43	776
Carcajou Point*	47JE0002	21	451
Total		**1,028**	**6,596**

La Crosse Locality

The La Crosse locality is located in the Western Uplands geographical province of Wisconsin (Martin 1965). The locality is approximately 6 to 11 km (3.7 to 6.8 miles) wide and 64 km (39.8 miles) long, stretching from Winona, Minnesota to Stoddard, Wisconsin (O'Gorman 1995) (Figure 4.8). The Western Uplands province is within the Driftless Area, a region that lacks direct evidence of Pleistocene glaciation (Mickelson et al. 1982). The uplands of this region are dissected by the dendritic drainage systems of the Mississippi and Wisconsin Rivers and their tributaries. This drainage system carved steep, narrow valleys referred to as coulees through the sedimentary bedrock (Arzigian and Boszhardt 1989). Coulees and the streams they contain are rich in floral and faunal resources and provide soil and water conditions conducive to supporting the sedentary lifestyle evidenced at Oneota sites (O'Gorman 1995).

Numerous surveys of the La Crosse locality occurred between 1850 and 1920, focusing primarily on recording mounds (Brown 1912; Lapham 1855; Putnam 1887; Squier 1905). Salvage excavations of the Farnam Street Cemetery (47LC0013) during the construction of the city of La Crosse yielded Oneota materials (Sanford 1914). Sanford went on to conduct small-scale excavations at the Midway village site (47LC0019), uncovering several burials and shell-tempered pottery (Arzigian and Boszhardt 1989:9). William McKern (1931, 1945) led crews from the Milwaukee Public Museum in the excavation of several sites in the locality. McKern (1945) incorporated these results in his definition of the Upper Mississippian Aspect, where he developed the first description of distinctive Oneota traits.

Further archaeological investigations in the locality did not occur until the late 1950s and early 1960s when the State Historical Society conducted surveys and test excavations for the proposed I-90 corridor along the La Crosse River valley (Arzigian and Boszhardt 1989:10). In 1964, Gibbon (1970b) conducted test excavations at the Midway site, producing the first radiocarbon dates for an Oneota occupation in western Wisconsin. These dates placed the Oneota occupation in the La Crosse locality between A.D. 1400 and 1600 (Table 4.4). In 1995, Boszhardt et al. compiled all of the Oneota radiocarbon dates that had been run up to that point. Table 4.4 displays the dates they compiled for the five La Crosse locality sites included in this study. All radiocarbon assays were run on carbonized wood. Two calibration methods were used. Both were determined using CALIB 3.0, developed by Stuiver and Reimer (1993). Both are listed at the 2σ (95.4%) level in order to be more inclusive. Method A produces the 2σ date range based on all calibration curve intercepts. Method B calculated the probability distribution around the calibrated year intercepts. Probabilities range from 55% to 100%. The probability is stated in parentheses after the dates in the column for Method B. All dates are A.D.

Table 4.4 Radiocarbon dates from the La Crosse locality (after Boszhardt et al. 1995).

Site	Uncorrected Date (A.D.)	Error Term	Method A (2σ)	Method B (2σ)	Reference
Pammel Creek	1380	50	1294-1439	1301-1374 (55)	Boszhardt 1989
Pammel Creek	1420	50	1317-1447	1381-1451 (67)	Boszhardt 1989
Pammel Creek	1430	70	1298-1491	1293-1502 (97)	Boszhardt 1989
Pammel Creek	1440	70	1301-1611	1295-1519 (96)	Boszhardt 1989
Pammel Creek	1470	70	1406-1646	1408-1642 (100)	Boszhardt 1989
Pammel Creek	1480	70	1327-1631	1388-1533 (74)	Boszhardt 1989
Pammel Creek	1505	50	1410-1625	1407-1527 (82)	Boszhardt 1989
Pammel Creek	1520	70	1335-1645	1407-1643 (100)	Boszhardt 1989
Pammel Creek	1570	70	1415-1660	1428-1653 (100)	Boszhardt 1989
State Coulee	1530	70	1407-1648	1412-1642 (100)	Anderson et al. 1995
State Coulee	1550	70	1415-1648	1430-1639 (100)	Anderson et al. 1995
Tremaine	1190	70	1157-1390	1153-1331 (87)	O'Gorman 1995
Tremaine	1210	60	1208-1410	1190-1130 (85)	O'Gorman 1995
Tremaine	1230	50	1218-1391	1217-1329 (79)	O'Gorman 1995
Tremaine	1270	60	1258-1410	1257-1411 (99)	O'Gorman 1995
Tremaine	1310	60	1277-1424	1279-1417 (100)	O'Gorman 1995
Tremaine	1320	80	1260-1438	1261-1438 (100)	O'Gorman 1995
Tremaine	1340	80	1264-1442	1276-1442 (99)	O'Gorman 1995
Tremaine	1340	70	1279-1439	1284-1433 (100)	O'Gorman 1995
Tremaine	1350	50	1288	1294-1421 (100)	O'Gorman 1995
Tremaine	1360	70	1283-1442	1288-1438 (100)	O'Gorman 1995
Tremaine	1360	70	1283-1442	1288-1438 (100)	O'Gorman 1995
Tremaine	1360	50	1290-1436	1297-1426 (100)	O'Gorman 1995
Tremaine	1370	70	1285-1444	1288-1441 (100)	O'Gorman 1995
Tremaine	1380	70	1287-1446	1287-1446 (100)	O'Gorman 1995
Tremaine	1390	60	1292-1444	1296-1441 (100)	O'Gorman 1995
Tremaine	1400	70	1291-1476	1290-1454 (97)	O'Gorman 1995
Tremaine	1410	70	1293-1484	1291-1486 (100)	O'Gorman 1995
Tremaine	1430	70	1298-1491	1293-1502 (97)	O'Gorman 1995
Tremaine	1440	60	1318-1488	1299-1495 (99)	O'Gorman 1995
Tremaine	1450	70	1304-1618	1299-1523 (99)	O'Gorman 1995

Site	Uncorrected Date (A.D.)	Error Term	Method A (2σ)	Method B (2σ)	Reference
Tremaine	1470	60	1329-1635	1388-1525 (82)	O'Gorman 1995
Tremaine	1480	90	1301-1645	1385-1641 (88)	O'Gorman 1995
Tremaine	1490	70	1329-1635	1391-1535 (72)	O'Gorman 1995
Tremaine	1500	40	1412-1611	1409-1519 (94)	O'Gorman 1995
Tremaine	1500	70	1331-1639	1394-1638 (98)	O'Gorman 1995
Tremaine	1500	70	1331-1639	1394-1638 (98)	O'Gorman 1995
Tremaine	1550	70	1411-1653	1421-1646 (100)	O'Gorman 1995
Tremaine	1570	50	1433-1648	1441-1535 (51)	O'Gorman 1995
Tremaine	1570	70	1415-1660	1428-1653 (100)	O'Gorman 1995
Tremaine	1570	70	1415-1660	1428-1653 (100)	O'Gorman 1995
Tremaine	1580	70	1422-1664	1429-1657 (100)	O'Gorman 1995
Tremaine	1590	70	1427-1667	1430-1665 (100)	O'Gorman 1995
Tremaine	1600	60	1436-1664	1442-1653 (100)	O'Gorman 1995
Tremaine	1600	70	1430-1952	1434-1667 (99)	O'Gorman 1995
Tremaine	1650	70	1442-1954	1443-1681 (87)	O'Gorman 1995
Tremaine	1670	60	1453-1954	1467-1683 (79)	O'Gorman 1995
Tremaine	1680	70	1450-1954	1447-1700 (71)	O'Gorman 1995
OT	1420	80	1291-1611	1287-1519 (97)	O'Gorman 1993
OT	1440	50	1327-1478	1386-1488 (82)	O'Gorman 1993
OT	1450	50	1329-1485	1386-1494 (96)	O'Gorman 1993
OT	1470	190	1210-1954	1211-1713 (73)	O'Gorman 1993
OT	1480	70	1327-1631	1388-1533 (74)	O'Gorman 1993
OT	1480	70	1327-1631	1388-1533 (74)	O'Gorman 1993
OT	1490	50	1407-1618	1395-1524 (88)	O'Gorman 1993
OT	1500	50	1409-1623	1412-1642 (100)	O'Gorman 1993
OT	1530	70	1407-1648	1412-1642 (100)	O'Gorman 1993
OT	1535	50	1417-1637	1422-1532 (67)	O'Gorman 1993
OT	1550	60	1415-1648	1430-1639 (100)	O'Gorman 1993
OT	1560	50	1429-1645	1438-1534 (55)	O'Gorman 1993
OT	1570	70	1415-1660	1428-1653 (100)	O'Gorman 1993
OT	1590	70	1427-1667	1430-1665 (100)	O'Gorman 1993

Site	Uncorrected Date (A.D.)	Error Term	Method A (2σ)	Method B (2σ)	Reference
OT	1600	50	1439-1656	1449-1646 (100)	O'Gorman 1993
OT	1610	50	1441-1660	1451-1650 (100)	O'Gorman 1993
OT	1640	50	1449-1952	1467-1667 (97)	O'Gorman 1993
OT	1640	70	1440-1954	1440-1680 (90)	O'Gorman 1993
OT	1650	50	1453-1953	1469-1671 (94)	O'Gorman 1993
OT	1680	60	1480-1954	1471-1690 (73)	O'Gorman 1993
OT	1680	50	1490-1954	1488-1682 (77)	O'Gorman 1993
OT	1690	70	1453-1954	1469-1703 (63)	O'Gorman 1993
OT	1710	50	1523-1954	1725-1814 (37)	O'Gorman 1993
OT	1730	50	1531-1954	1718-1820 (45)	O'Gorman 1993
OT	1740	50	1638-1954	1716-1822 (48)	O'Gorman 1993
Filler	1580	50	1436-1650	1444-1639 (100)	O'Gorman 1994
Filler	1600	80	1442-1954	1420-1675 (96)	O'Gorman 1994
Filler	1605	55	1439-1662	1446-1651 (100)	O'Gorman 1994
Filler	1630	60	1442-1953	1444-1669 (98)	O'Gorman 1994
Filler	1630	60	1442-1953	1444-1669 (98)	O'Gorman 1994
Filler	1640	50	1449-1952	1467-1667 (97)	O'Gorman 1994
Filler	1650	60	1446-1954	1445-1678 (92)	O'Gorman 1994
Filler	1680	50	1490-1954	1488-1682 (77)	O'Gorman 1994
Filler	1690	50	1494-1954	1610-1686 (36)	O'Gorman 1994
Filler	1690	50	1494-1954	1610-1686 (36)	O'Gorman 1994
Filler	1720	60	1519-1954	1716-1822 (38)	O'Gorman 1994
Filler	1730	50	1531-1954	1718-1820 (45)	O'Gorman 1994

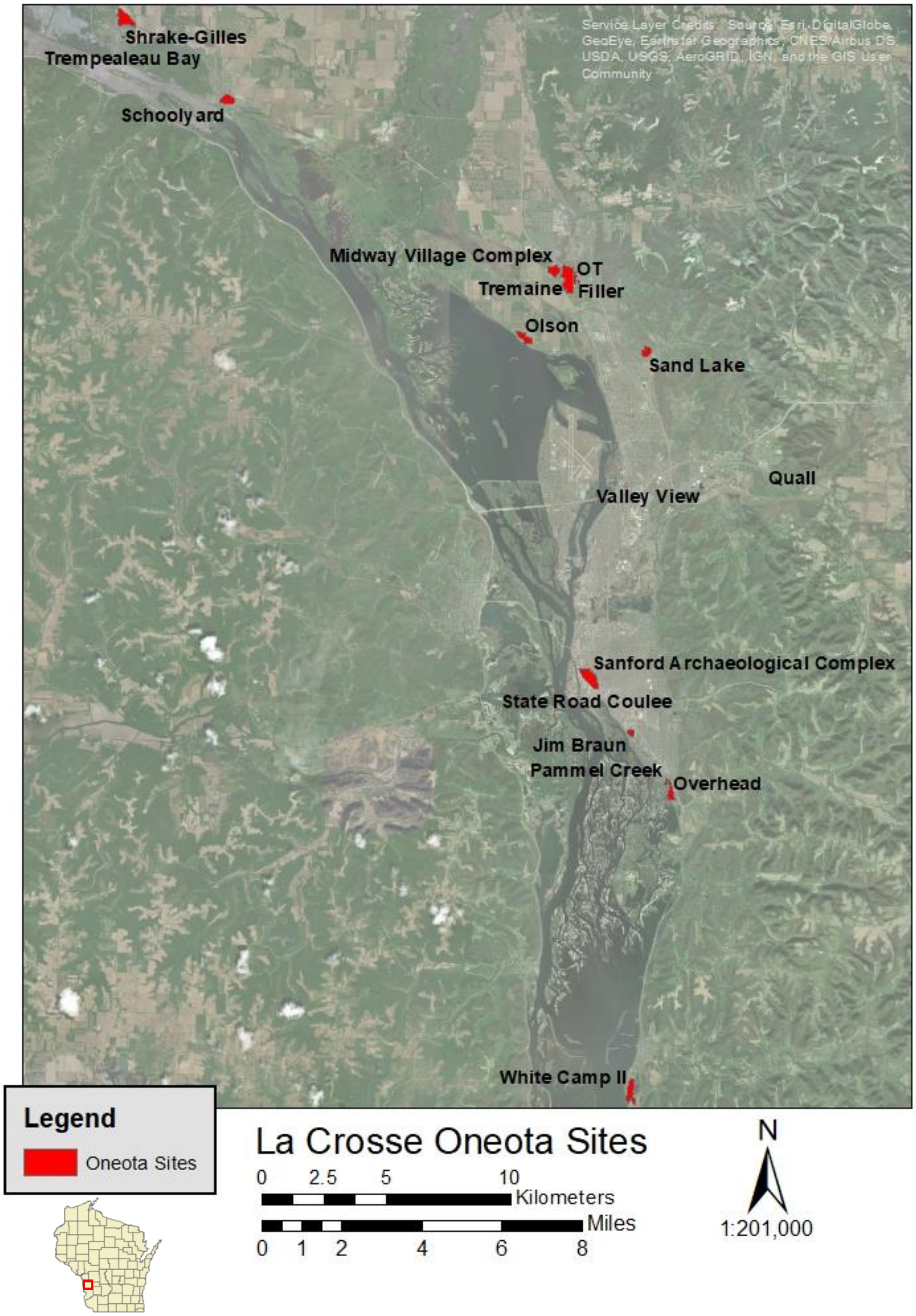

Figure 4.8. Oneota sites in the La Crosse locality.

Beginning in the late 1970s, the La Crosse locality experienced a surge in archaeological investigations, largely due to the development of an archaeology program at the University of Wisconsin-La Crosse and the formation of the Mississippi Valley Archaeology Center (MVAC) in 1982. By 1995, MVAC had conducted survey and excavations at more than twenty Oneota sites in the La Crosse locality (e.g., Arzigian and Boszhardt 1989; Gallagher and Stevenson 1980; Sasso 1989). Numerous excavations were also conducted by the State Historical Society's Highway Archaeology Program (O'Gorman 1993, 1994, 1995; Penman 1984). The pace of excavation at Oneota sites in the La Crosse locality slowed after the 1990s, although MVAC continues to produce information about Oneota occupations in the region, driven by compliance and field school projects (David Anderson, personal communication).

Tremaine Site (47LC0095)

The Tremaine site complex contains three sites: Tremaine (47LC0095), OT (47LC0262), and Filler (47LC0149). All three sites are located on a Pleistocene outwash terrace in the La Crosse locality called the Onalaska Terrace (O'Gorman 1995:9). The terrace is situated nine meters above the Black River floodplain and Brice Prairie. The nearest water source to the site is Halfway Creek, which flows past the site at the base of a fifteen-meter embankment on the western edge of the site. Gallagher and Stevenson (1982) utilized historic records to reconstruct the prehistoric environment of the La Crosse area and identified six economic resource zones that would have been available to Tremaine site residents: dry uplands, sandy prairie, oak savanna, dry bottomlands, wet bottomlands, and open water.

The site was first documented by Charles Brown in 1906 when it was added to the county site file system. The site was documented again during the Great River Road archaeological survey by the Mississippi Valley Archaeological Survey (MVAC) in 1981 (Silha and Gallagher 1983). MVAC continued various construction related excavations in the early 1980s until the beginning of the USH 53 Expressway project in 1986. The Museum Archaeology Program (MAP) conducted excavations on a complex of three Oneota sites as part of this project during the years of 1986-1991. O'Gorman (1993, 1994, 1995) produced three volumes detailing the information derived from those excavations. Several areas of the site were excavated during that time, but the most extensive excavations were undertaken in Area H where a total of 916 features were excavated and at least seven longhouses were documented (O'Gorman 1995:7) (Figure 4.9).

Tremaine is a multi-component site, with evidence for occupations during the Paleoindian, Early and Late Archaic, Early, Middle and Late Woodland and Oneota periods (O'Gorman 1995; Penman and Hamilton 1990). A total of 42 radiocarbon dates from the site indicate an Oneota occupation from circa A.D. 1300-1650 (O'Gorman 1995:30) (Figure 4.10).

The MAP excavations uncovered seven longhouses, ranging in size from 100 m^2 to 300 m^2. All of the houses exhibited traces of numerous rebuilding and expansion episodes. The remains of 86 individuals were associated with 79 primary and secondary internments, all but four of which were located within structures. Within the structures, the most common placement for burials was within the long axis of the grave perpendicular to the side walls and the one end of the grave near the outer wall (O'Gorman 1995:179). A total of 963 features were excavated at Tremaine, 871 of which were non-burial features (O'Gorman 1995:89-90).

Pammel Creek Site (47LC0061)

The Pammel Creek Site is located on a low terrace at the south end of the city of La Crosse, Wisconsin, approximately 20 km (12.4 miles) south of Tremaine (Arzigian and Boszhardt 1989). The first survey of the Pammel Creek site took place in 1975 but located no sites on either bank of Pammel Creek. Therefore, a subsurface survey was sponsored by the St. Paul District in 1980 (Arzigian and Boszhardt 1989). This survey included shovel testing, bank cutting and coring along the banks of Pammel Creek and in the adjacent city park. While the eastern half of the park was disturbed, the western half yielded several intact deposits containing diagnostic Oneota ceramics.

Proposed construction resulted in further excavation in 1983 and 1985 by MVAC. Then in response to the proposed installation of a sedimentation basin, mitigation excavations were undertaken by MVAC again in 1988-1989. Additional features discovered during these last excavations brought the site total of excavated prehistoric features to 202 (Figure 4.11). There were no structures located by any of the MVAC excavations. However, the 1985 excavations identified a continuous distribution of features between Pammel Creek and the Overhead site (47LC0020), linking them as a single settlement. Probable structures have been identified at Overhead but stripping methods during excavation made it impossible to confirm structure size or type (Gallagher et al. 1981).

A total of 11 radiocarbon dates have been collected from the site, ranging from circa A.D. 1380-1570 ± 50 (Figure 4.12). However, the majority of dates cluster between A.D. 1400 and 1450. This, as well as the lack of feature superimposition at the site suggests a fairly short-term Oneota occupation.

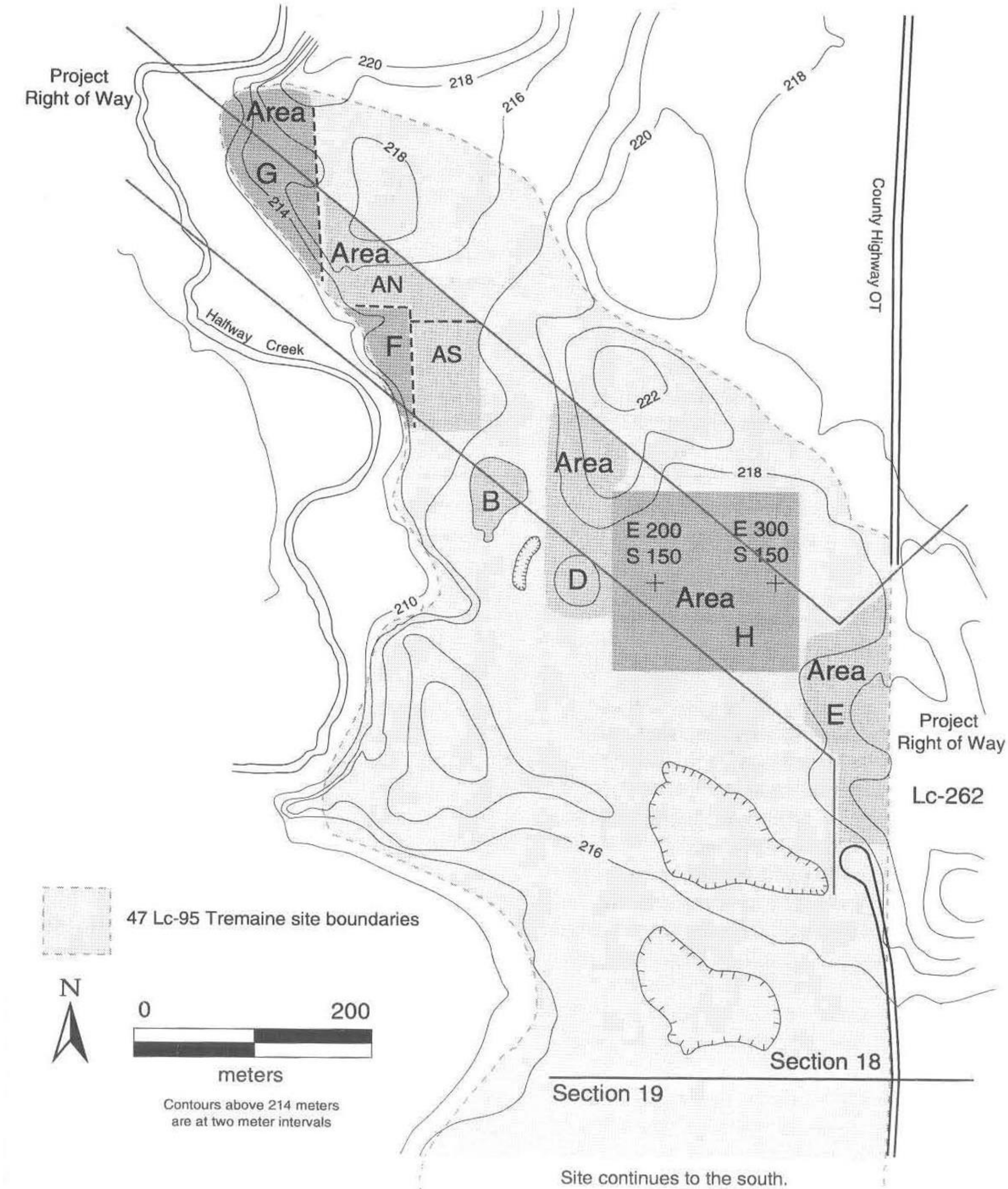

Figure 4.9. Map of 1986-1991 MAP excavations at the Tremaine site (after O'Gorman 1995). Image reproduced with permission from the Wisconsin Historical Society and the Museum Archaeology Program.

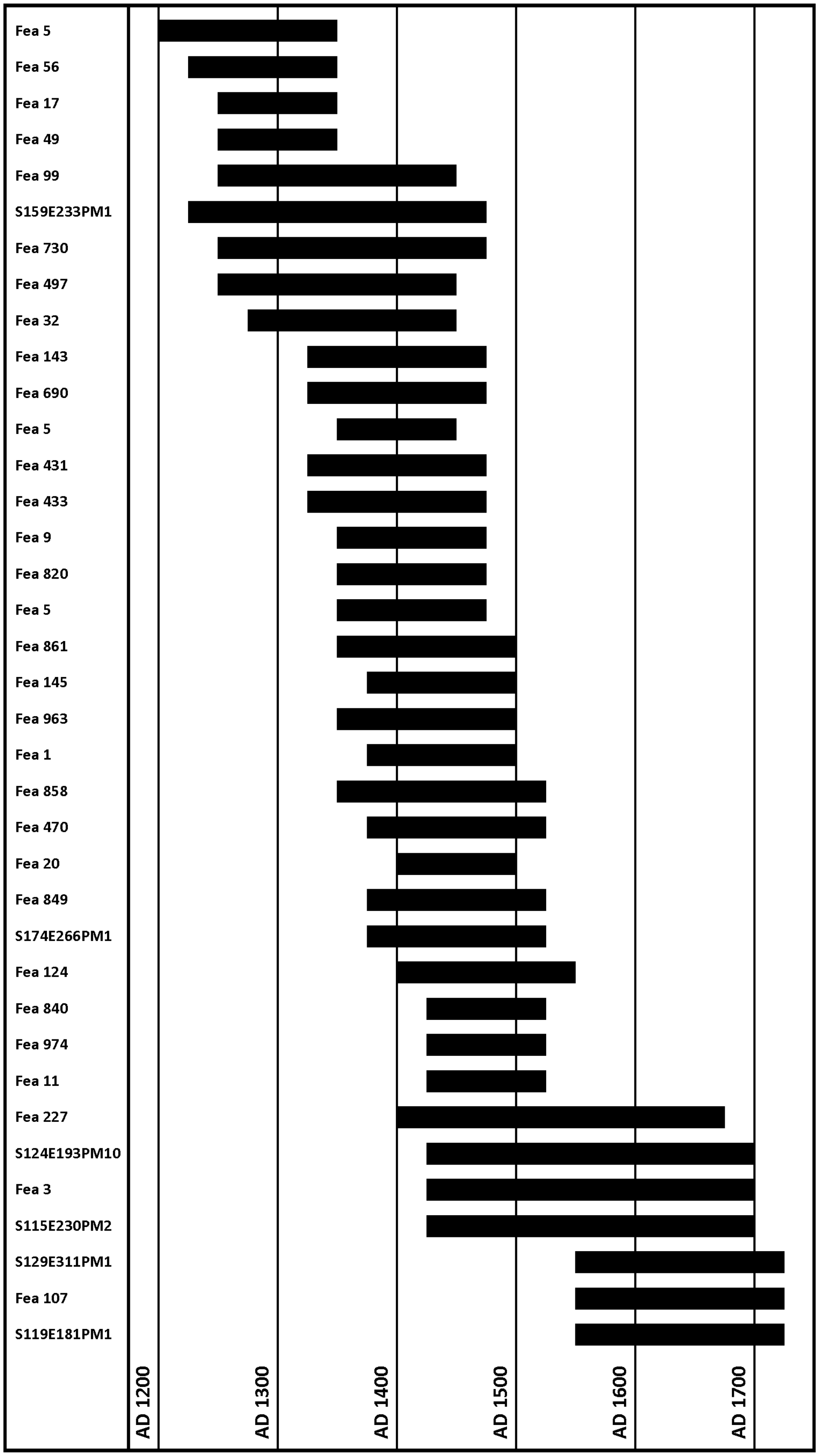

Figure 4.10. Oneota period radiocarbon dates from the Tremaine site.

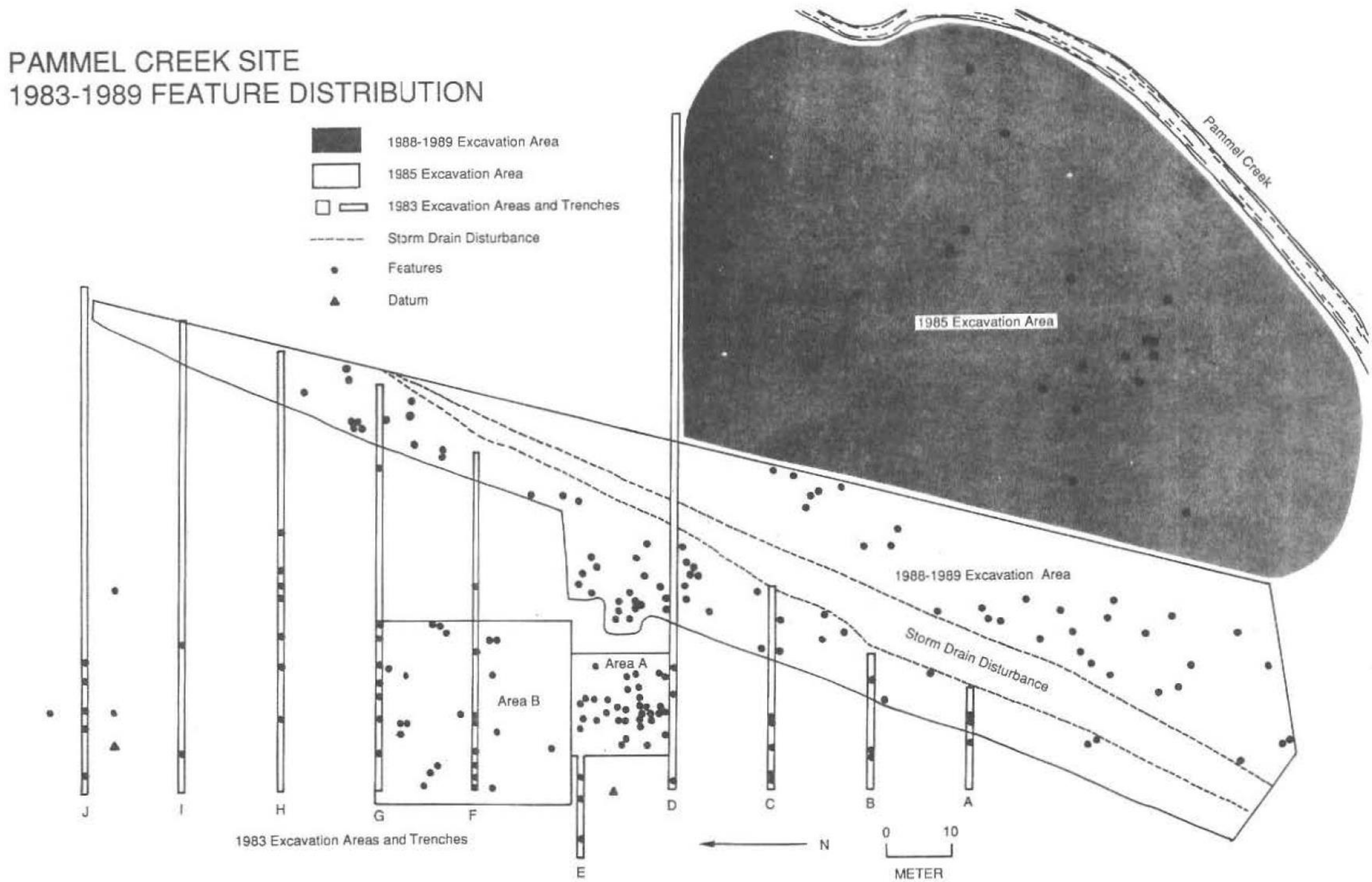

Figure 4.11. Results of 1983-1989 MVAC excavations at the Pammel Creek site (from Arzigian and Boszhardt 1989).

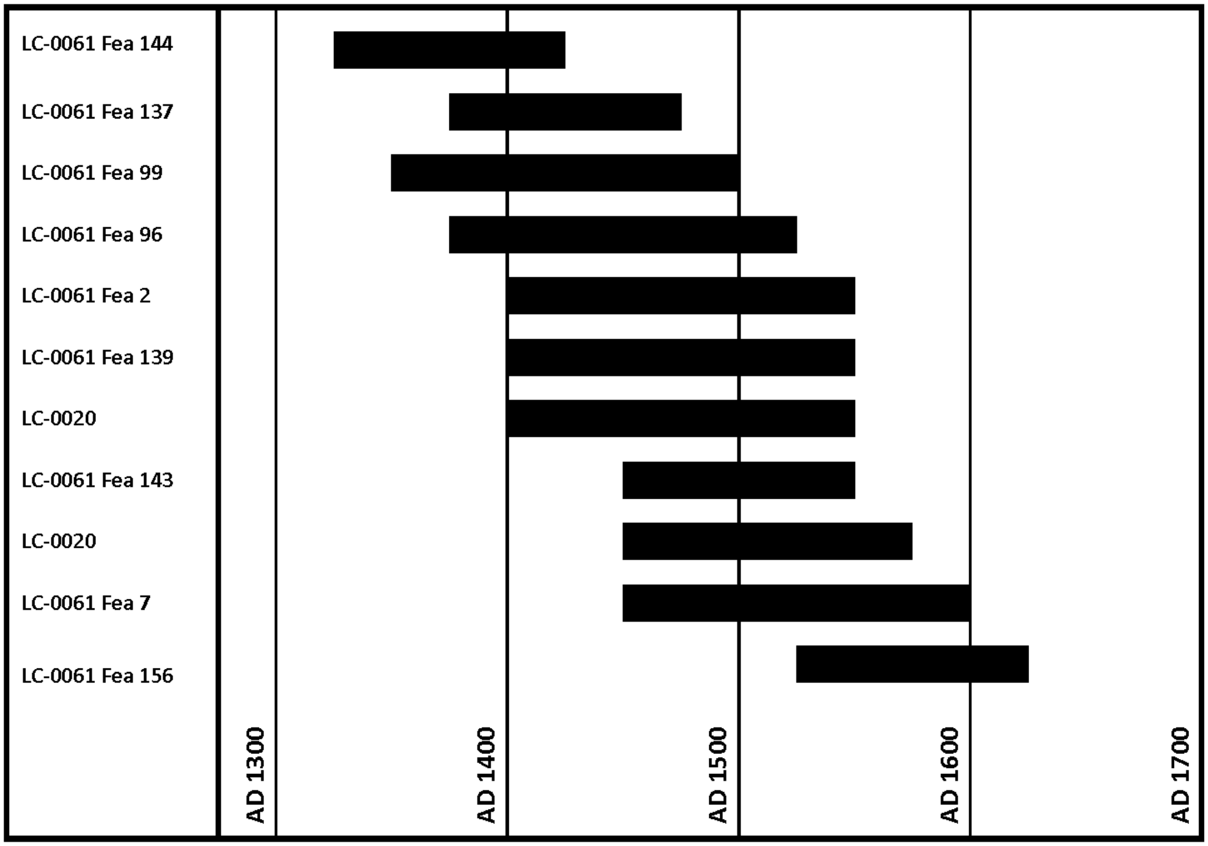

Figure 4.12. Radiocarbon dates from the Pammel Creek site (after Boszhardt 1989).

OT Site (47LC0262)

The OT site is part of the Tremaine Complex, excavated by MAP from 1987 to 1989. It is located directly east of the Tremaine site, on the other side of State Highway 35. This arbitrary, modern site boundary makes it likely that OT is part of the same site as Tremaine. However, OT is a single component Oneota occupation. The site covers approximately 67,225 m^2. OT was identified by archaeologists from MVAC in 1986 and then excavated by the Museum Archaeology Program as part of the mitigation project for U.S. Highway 53. A total of 192 pit features were excavated and six burial features were identified (O'Gorman 1993:3). MAP collected 25 radiocarbon dates from the site, with an uncorrected span of A.D. 1420-1740. However, due to the lack of European trade goods recovered from the site, the dates after A.D.

1650 are somewhat suspect (O'Gorman 1993:16). O'Gorman's (1993) report calibrates the dates using Stuiver and Becker's (1986) scheme, correcting all of the dates but four to pre-A.D. 1650 (Figure 4.13).

Filler Site (47LC0149)

The Filler site is also part of the Tremaine complex, located immediately southeast of the OT site. The site is bordered on the northeast by U.S. Highway 53 and on the east by State Highway 35. Filler's northwestern boundary, which separates it from OT was based on the limit of cultural material found on the surface of a plowed field (O'Gorman 1994; Penman and Hamilton 1990). A survey for the Great River Road Archaeology Project initially identified the Filler site in 1984 (Penman 1984). Crop cover limited the survey area, resulting in a conservatively estimated site area of approximately 12,000 m^2 (Penman 1984; Penman and Hamilton 1990). The site area identified by MAP's 1989 excavations covers approximately 7,558 m^2 (O'Gorman 1994). A total of 108 features were excavated (O'Gorman 1994:8). Twelve radiocarbon dates were also calibrated using Stuiver and Becker's (1986) scheme, the vast majority of dates falling between A.D. 1500 and 1680 (Figure 4.14). This, along with the material culture from the site, supports the interpretation of Filler as a Valley View phase Oneota occupation (O'Gorman 1994:18).

State Road Coulee Site (47LC0176)

The State Road Coulee site is located in the Onalaska Trough, a lowland along the foot of the bluffs, approximately 2 km (1.9 miles) northeast of the Pammel Creek site. State Road Coulee is located on the north side of Pammel Creek. Prehistorically, streams like Pammel Creek were blocked from drainage into the Mississippi River by terrace dune migration, causing them to drain into the lowlands (Anderson et al. 1995). This led to the development of organically rich soils with high horticultural potential.

The State Road Coulee site was identified during a Phase I survey for the Pammel Creek Flood Control Project in 1983 (Boszhardt and Gallagher 1983). This was followed by Phase II excavations in 1984 (Boszhardt and Gallagher 1984) and Phase III investigations in 1991 (Anderson et al. 1995). The Phase II testing identified an Oneota midden, covering approximately 1950 m^2. Woodland ceramics found during testing suggested a Woodland component of the site, but the two radiocarbon dates from the midden (A.D. 1530±70 and A.D. 1550±70) indicate that the midden was associated only with the Oneota component.

Lithic Samples from La Crosse Sites

Detailed analyses of the lithic assemblages from the Tremaine and Pammel Creek sites were undertaken for this dissertation. Data from previous lithic analyses conducted on the assemblages from OT, Filler, and State Road Coulee using a comparable recording schema were utilized for comparison. The composition of these lithic assemblages is displayed in Table 4.5.

Table 4.5 Lithics examined for this dissertation from the La Crosse locality.
* These numbers are only the analyzed sample from Tremaine, composing only 31.6% of the total assemblage

Site Name	**Site No.**	**Lithic Tools**	**Lithic Debris**
Tremaine*	47LC0095	1,709	17,121
Pammel Creek	47LC0061	1,016	9,874
OT	47LC0262	452	49,424
Filler	47LC0149	356	23,149
State Road Coulee	47LC0176	1,556	67,812
Total		**5,089**	**167,380**

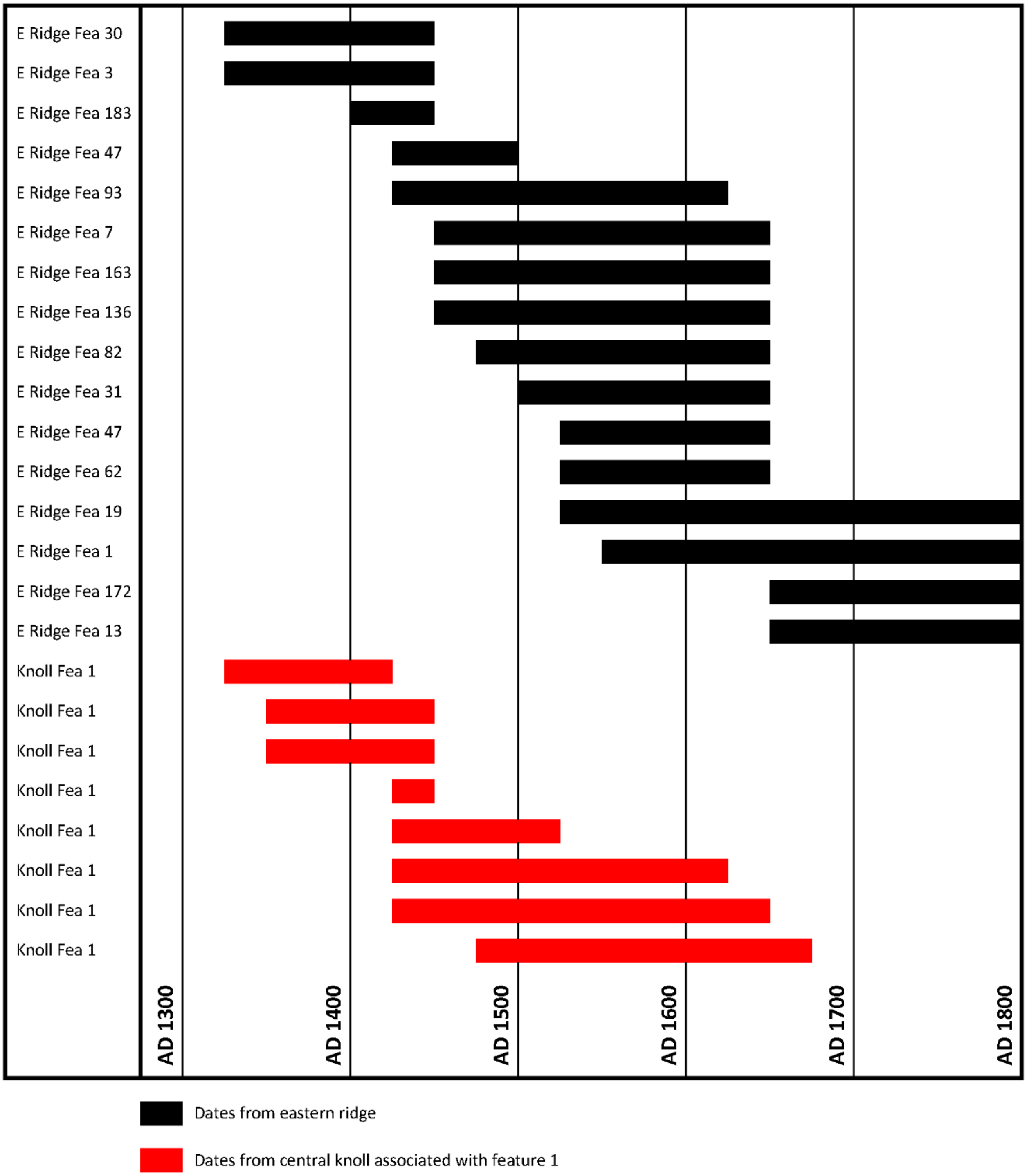

Figure 4.13. Radiocarbon dates from the OT site (after O'Gorman 1993).

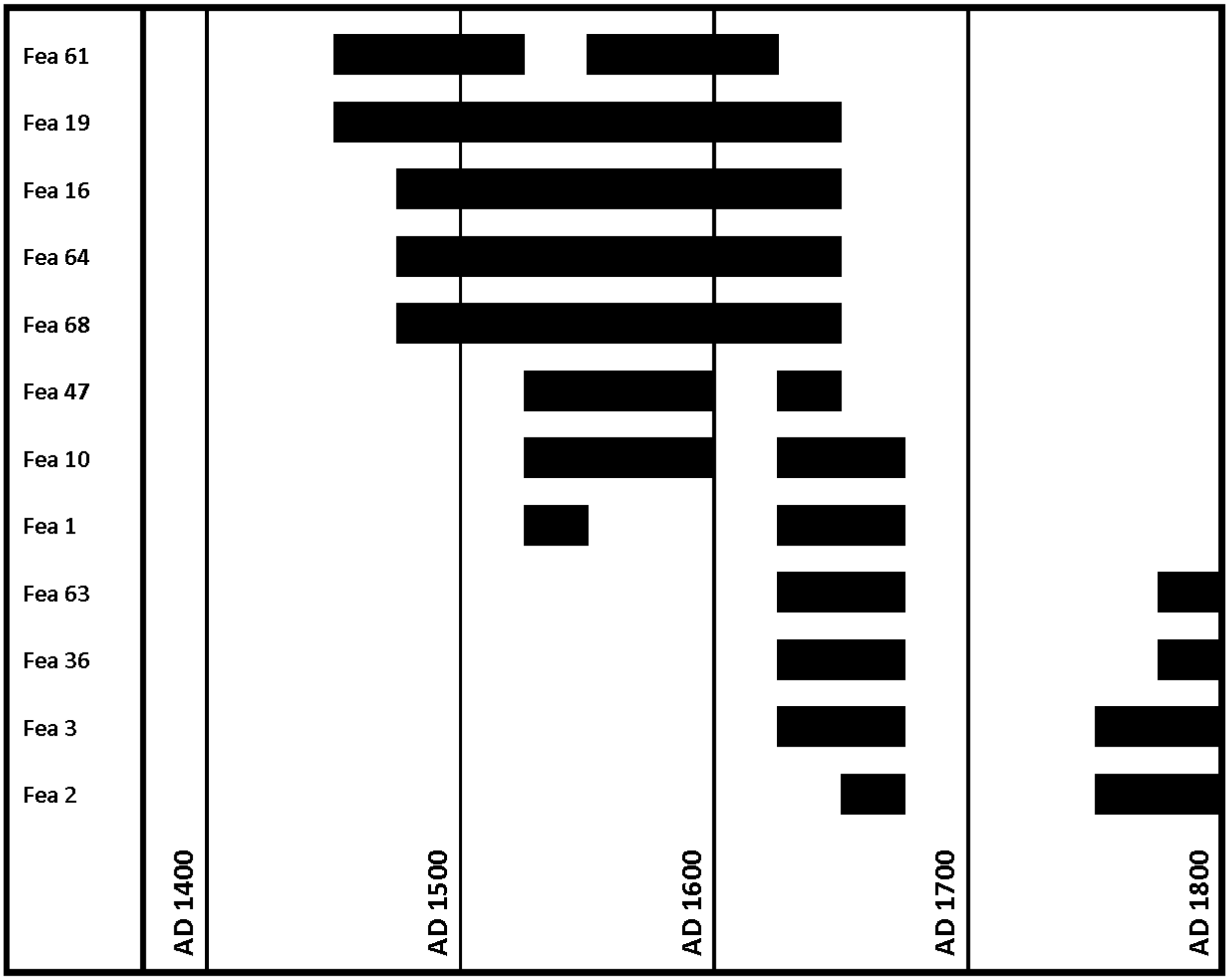

Figure 4.14. Radiocarbon dates from the Filler site (after O'Gorman 1994).

CHAPTER FIVE

METHODS OF ANALYSIS

Introduction

Multiple methods of analysis were used to elucidate information about the functional and economic aspects of the lithic assemblages under study. Assemblages from four sites (tools=964, debitage=5,369) were analyzed in this study and were supplemented by published data from five studies (tools=4,125, debitage=162,011). Microwear analysis was conducted on samples (n=600) of the lithics from four of the nine sample sites, two from each locality. Additional functional information was derived from a small sample (n=41) of lithics from the Crescent Bay Hunt Club site that were tested for protein residue.

Data from the assemblage and microwear analyses were examined for inter- and intra-site spatial patterning using a combination of GIS and correspondence analysis. A discussion of the rationale for the sample selection, lithic analysis methods and statistical methods utilized in this dissertation follows.

Sampling Strategy

The nine lithic assemblages chosen for this study were selected largely because analysis of the assemblages from all of the sites except Crescent Bay had been completed prior to this dissertation project (see Anderson et al. 1995; Doyle 2012; Goatley 1995; Hollinger 1993; Rodell 1989; Wilson 2016). The assemblages were analyzed using the Lurie and Jeske (1990) schema or a schema with some comparable attributes. All tools and debitage included in those analyses were included in the dataset for this dissertation.

Six hundred tools were examined for microwear: 300 from Crescent Bay, 100 from KCV, 100 from Pammel Creek, and 100 from Tremaine. A larger sample was taken from Crescent Bay to provide a deeper understanding of tool function at one of the sites that could then be used to make inferences about the others. The Crescent Bay microwear sample was stratified based on spatial context. All tools from feature contexts were analyzed and some tools from plowzone contexts were also analyzed to provide a well-rounded representation of all spatial components of the site. All tool forms were examined. The 100 tool comparative samples from KCV, Tremaine and Pammel Creek were stratified based on the proportional prevalence of basic tool forms at that site. Basic tool forms are described in Appendix A.

The 41-tool protein residue sample was selected from the Crescent Bay assemblage as part of a separate pilot project (see Sterner and Jeske 2017). All tools except one were morphofunctionally identified as triangular points or scrapers. They were all chosen from feature contexts and were selected to evaluate the efficacy of these morphofunctional labels.

Assemblage Analysis

The method described here as an assemblage analysis developed out of a desire to characterize the aspects of lithic technology that reflect social and economic adaptations to the environment (Jeske 1992:467). The use of this approach in the literature was launched by Binford's (1966, 1969) understanding of lithic variation as indicative of functionally associated toolkits rather than distinct ethnic groups or cultures (Bordes and DeSonneville Bordes 1970; Mellars 1970). This shift in the way lithic tool function was used to explain larger cultural characteristics was an outgrowth of the discussion of variation in Mousterian stone tool forms (Binford and Binford 1966; Binford 1969; Bordes 1953). Binford and Binford (1966; 1969) used the correlation of tool forms to infer correlated tool functions (i.e., tool kits)–and by extension–site function. Bordes (1953, 1961) and Bordes-DeSonneville Bordes (1969) argued that the relationships of tool proportions among occupations resulted from cultural traditions, or ethnicity. Ironically, both the Binford camp and the Bordes camp assumed that there was an identifiable relationship between tool function and tool form—an assumption neither camp tested. Nevertheless, Binford's processual approach to relating stone tool use to other aspects of cultural systems defined many of the questions asked by a new generation of lithic analysts, who began to focus on topics such as subsistence, economy, settlement, mobility, and efficiency. Two major outgrowths of this work were the examination of lithic technological organization as it relates to subsistence strategies and mobility.

Archaeologists had long been interested in the relationship of stone tools to subsistence, but the Binford/Bordes debate emphasized the complex relationship between lithic technology, group mobility, and subsistence strategies. Archaeologists became more attuned to the idea that variation in tool form and toolkit composition was a function of obtaining energy in different cultural and physical environmental contexts. However, most models of lithic form and function were focused on hunting-based subsistence strategies. Bleed's (1986) foundational article contended that the characteristics of maintainability and reliability were alternatives designed into prehistoric weapons in order to optimize specific resources. His generalized framework for understanding the connection between technology and subsistence strategies enabled others to explain more specific differences in weapon morphology through time (e.g., Buchanan et al. 2011; Comstock and Cook 2014; Kelly 1988; Shott 2003b).

The role of chipped lithic tools in agriculture-based subsistence systems has seen relatively little theoretical debate, in both New and Old World contexts. For example, Dimitrovska (2012:425) notes: “Although the number of Neolithic sites excavated in the territory of the Republic of Macedonia is considerable, the stone tools pertinent to these sites are still less known because they have never interested investigators.” While there is a significant canon of Neolithic stone tool articles, it is dwarfed by those of the Paleolithic and Mesolithic periods. Where Neolithic stone tools are examined within the framework of subsistence strategies, specific morphological tool types are considered evidence of hunting (e.g., Niekus 2009; Pique 2015; Yerkes et al. 2014) while others indicate cereal processing (e.g., Goodale et al. 2010; Hamon 2008; Teo et al. 2011), with little consideration of the larger overarching composition of lithic assemblages at sites occupied during this transitional period.

In North America, the discrepancy in lithic studies of hunter-gatherer groups to agriculturalists is stark. A decline in formal lithic tool complexity and diversity through time has long been noted in the Midwest and has been related to an increased reliance on agricultural or horticultural economies (e.g., Jeske 1992, 2003). This decline resulted in large quantities of informal or expedient tools at many late prehistoric sites, particularly at late prehistoric sites where access to good quality lithic raw materials was often restricted (Jeske 2003b; Hollinger 1993a; Sterner 2012; Yerkes 1987). This shift in lithic technological organization coincident with the shift to plant production makes tool function particularly contentious and important. However, the shift to informal tools by agriculturalists appears to have made such studies as interesting to Midwestern lithic analysts as they are to Dimitrovska’s (2012) colleagues studying Neolithic sites.

A second major outgrowth of the toolkit/cultural tradition debate was Binford’s subsequent ethnographic investigations, from which he proposed a heuristic dichotomy between logistical and residential mobility systems in hunter-gatherer societies (Binford 1980). Since then, a large number of studies have examined stone tools and debris in relation to mobility systems among prehistoric hunter-gatherers (e.g., Amick 1994; Bamforth 1986; Blades 2003; Carr 1994; Cowan 1999; Goodyear 1989; Jeske 1987; Kuhn 1994; Lovis et al. 2005; Lurie 1982, 1989; Morrow and Jefferies 1989; Odell 1994). Some of these studies follow Binford's lead explicitly. Lurie (1982, 1989) examined mobility and tool assemblages from the Middle Archaic in the Lower Illinois River Valley. Others (e.g., Carr 1994; Bamforth 1986; Jeske 1989; Odell 1994) used mobility as an important parameter when modeling technological organization in other regions.

However, Torrence (1994) rightly pointed to the danger in overemphasizing mobility, as it likely obscures the complex mix of strategies utilized by cultural groups. Other factors that influence lithic technological organization include site or area function (e.g., secular vs ritual), the nature of resources exploited, the accessibility to raw material sources, seasonal or other time constraints, territorial boundaries, violence, and energy expenditure and efficiency (e.g., Bamforth 1986; Ensor 2009; Goodyear 1993; Jeske 1987, 1992).

Processual approaches to understanding lithic technology emphasized that lithic technology needed to be understood as a process, consisting of raw material acquisition, production, use and reuse, and discard. This meant that the examination of all components of a lithic assemblage, rather than just the formal tools, was necessary to understand the dynamics of behavior represented by lithic technology (Binford 1979). Several different approaches to documenting variation in these different components of lithic assemblages have been developed, all of which require recording multiple variables intended to capture information about the processes of lithic production, use, and discard (e.g., Andrews et al. 2014; Bamforth 1986; Barham 1987; Binford 1979; Briz et al. 2005; Cahen et al. 1979; Cahen and Keeley 1990; Carr

1994; Clarkson et al. 2014; Ditchfield 2015; Goodyear 1993; Hiscock 2007; Jeske 1987, 1992, 2003; Jeske and Lurie 1993; Kujit 1995; LeBlanc 1992; Lurie 1982; Odell 1981; Shott 1989b, 1989b, 1994, 1999, 2003a; Sullivan and Rozen 1985).

Lurie and Jeske 1990 Recording Scheme

The assemblage recording schema used in this dissertation was originally developed for the analysis of lithic material from the Koster site in the lower Illinois River valley and Mound City, in Chillicothe, Ohio between 1980 and 1982 (Jeske 1987, 1989; Lurie 1982). An early version of this schema was published as an appendix to Brown and O'Brien's (1990) *At the Edge of Prehistory: Huber Phase Archaeology in the Chicago Area*. Since this publication, it has been used in numerous dissertations, theses, and compliance reports (e.g., Blodgett 2004; Epstein 2016; O'Gorman 1993, 1994, 1995; Park 2005; Rosebrough and Broihahn 2005; Sterner 2012; Wilson 2016; Winkler 2004, 2011). The schema has been modified, expanded, and applied to a wide variety of sites from different temporal and geographic contexts.

The goal of this schema is to produce datasets that provide information on stone tool economy, as well as functional and stylistic concerns. It records a suite of variables relating to tool production, function and style to enable researchers to address questions about settlement patterns, procurement systems, social networks and other issues that affect raw material acquisition, tool production, tool use and tool discard. This schema was developed to fill three requirements: (1) reliability and speed in recording data, (2) compatibility with traditional lithic typologies, particularly those used for Midwestern lithic description, and (3) concern for relevant variable selection.

A schema recording 27 quantitative and qualitative variables was used for lithic artifacts identified as tools and an abbreviated schema recording only seven variables was used for lithic debitage. Copies of the schemata for lithic tool assemblage analysis and debitage mass analysis are included in Appendix A. Lithic artifacts were identified as tools if they could be placed in any one of the following three categories:

1. Retouched – there are at least three contiguous flake scars or battering 0.5 mm or more along the edge of a lithic artifact and the scars or battering extends 1 mm or more onto the body of the piece.
2. Used but Unretouched – microflaking, grinding, polishing or rounding extends 0.5 mm along an edge of a lithic artifact and the modification does not extend beyond 1 mm onto the body of the piece.
3. Multifacial Core – the body of the lithic artifact exhibits intentional flake scars creating more than two faces.

A debitage analysis was conducted on the lithic assemblages first. During the sorting process, artifacts meeting the criteria of tools were set aside, assigned a tool number, and analyzed separately using the tool schema. The debitage from the Pammel Creek, State Road Coulee, Tremaine, OT, Filler, and Carcajou Point sites were analyzed by other researchers prior to this dissertation using a detailed individual debitage analysis schema (see Anderson et al. 1995; Goatley 1995; Hollinger 1993a; Rodell 1989; Rosebrough and Broihahn 2005; Vradenburg 1994). These schemata are comparable to, and in most cases adapted from, the individual debitage analysis schema from Lurie and Jeske 1990 in Appendix A of this dissertation. The debitage from the Crescent Bay Hunt Club, Koshkonong Creek Village and Schmeling sites were analyzed for this dissertation using a mass analysis schema (see Appendix A).

Debitage Mass Analysis

Mass analysis is a technique geared to produce data by processing large amounts of debitage quickly. This is in comparison to an individual analysis that requires the consideration of more categories of information and takes considerably more time (Odell 2004:121).

After lithic tools were removed from the debitage sample, the remaining materials were divided into three categories: flake, flake-like or non-flake (Figure 5.1). To be considered a flake in this typology, debitage must exhibit a striking platform, bulb of percussion and clear termination. Flake-like pieces are those that have at least one of these features but not all of them. Non-flake pieces are those that have none of these features. They are often referred to as block shatter. Once the lithic material had been sorted into one of these three categories, it was then further sorted by size grade.

The debitage 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. The number of pieces of debitage in each of the size categories was recorded to get a count of the total amount of debitage as well as the count for each size grade. Following the record of count and size grade, the debitage was weighed by size grade on an Ohaus Scout Pro Portable Digital Balance. The weight of each size grade (within the larger categories of flake, flake-like, and non-flake) was recorded in grams.

Two additional categorical variables were recorded for each piece of debitage: amount of cortex and presence or absence of heat alteration. All data were entered into a Microsoft Access Database.

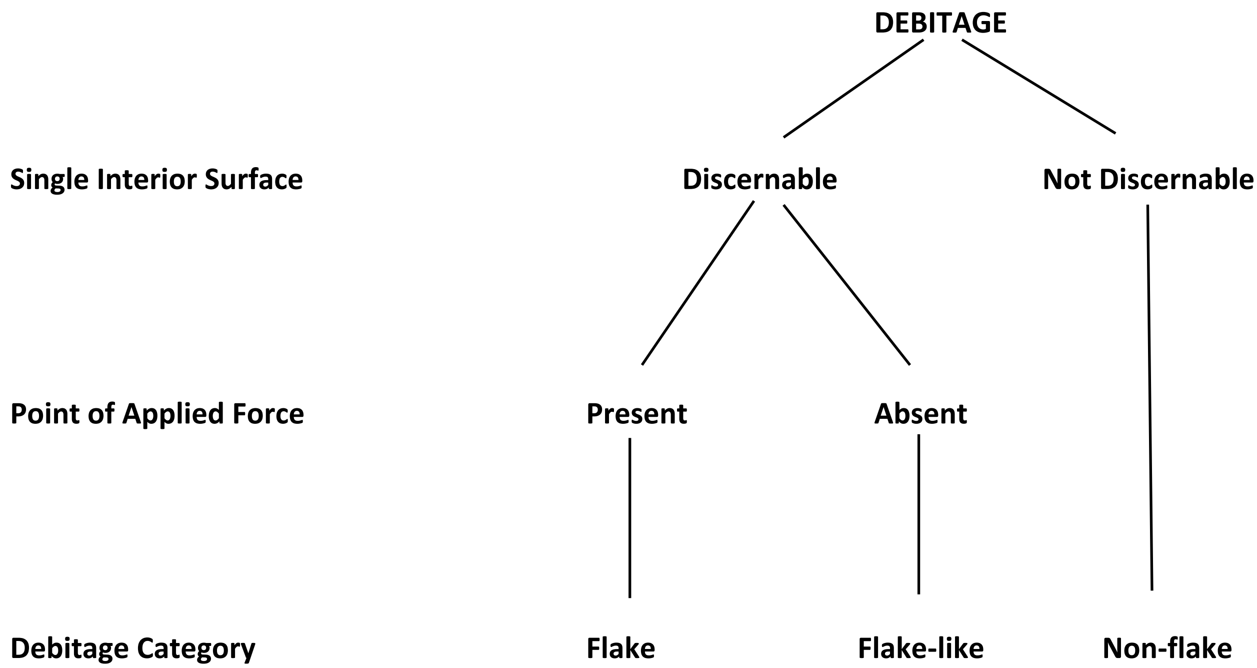

Figure 5.1. Attribute key for debitage categories.

The information acquired from a mass analysis of a lithic assemblage may provide insight into many activities related to lithic economy (Ahler 1989). Often the amount of cortex and size grade categories provide information about the process of reduction taking place at the site (Andrefsky 2005:115-118; Odell 2004:131). Due to the reductive nature of knapping, as the process progresses, the debitage produced becomes increasingly smaller in size. Therefore, if one groups the debitage from a site by size grade, it is possible to draw conclusions about the stage of the knapping process that was taking place at the site. For instance, a high percentage of Size Grade 4 (great than 25 mm) debitage at a site implies that the lithic assemblage was in the earlier stages of reduction. Whereas if there is a larger percentage of Size Grade 1 and 2 (less than 8 mm and 8-12.5 mm) debitage recovered, later reduction stages were likely predominant.

Similar conclusions may be drawn from the number of pieces of debitage still displaying cortex. In the majority of cases, most of the cortex is removed during the early stages of the reduction process. The presence of cortex on a large percentage of debitage suggests that the assemblage was in the initial stages of reduction.

A large quantity of heat treated pieces of debitage may be evidence of raw material economization (Jeske 1992). Heat treatment is a process by which the lithic material is heated to change its structure in an effort to make it more amenable to knapping (Anderson 1979; Crabtree and Butler 1964; Collins and Fenwick 1974; Flenniken and Garrison 1975; Purdy and Brooks 1971; Rick 1978). Significant quantities of heat treated debitage and reliance on local raw materials may suggest constraints on access to good quality knapping material. These constraints may be related to the time available to knappers for raw material procurement, or on the territory they can safely traverse to procure them.

The advantage of using a mass debitage analysis as opposed to the more detailed individual flake analysis (IFA) (Ahler 1989) is that the process is easily replicable and allows for the analysis of a large sample of debitage than is possible with IFA.

Lithic Tool Assemblage Analysis

Tool analysis began with the separation of the tools from the debitage during the mass analysis. Following the designation of an artifact as a tool, each one was assigned a tool number. A tool was defined as an artifact with at least one functional unit. A functional unit is an area with at least three contiguous flakes (from use or intentional retouch) inferred to represent an edge capable of demonstrating its function as a tool. Twenty-seven variables were recorded for each lithic artifact designated as a tool. Provenience and tool catalog numbers were recorded first. The tool number is an arbitrary number assigned to each tool as it was examined for this study.

The next four variables to be recorded relate to the material used in the production of the tool and include: raw material type, raw material quality, amount of cortex present, and the presence/absence of heat alteration. Raw material type was identified mainly by comparison with a reference collection at the UWM Archaeological Research Laboratory, although plates and descriptions from published and unpublished references were also utilized (see DeRegnaucourt and Geogiardy 1998; Luedtke 1992; Winkler et al. 2005).

Raw Material Quality was also defined using comparative samples from the UWM laboratory collection. Features such as inclusions, fossils, fracture planes, and grain size were used to establish the quality of the raw material used. The Amount of Cortex is a record of the percentage of cortex or patina found on the surface of the tool. Cortex amounts were recorded as the percentage of surface area covered with cortex: 0%, less than 50%, between 50% and 100%, and 100%. Patina that had accumulated after the manufacture of the tool, seen as patination covering flake scars, was ignored in this category.

The presence or absence of heat treatment was recorded based on the following variables: luster contrast, degree of luster, heat fracture scars, conchoidal ripples, and changes in color (Rick 1978). Increases in luster and change in color, often to a shade of pink or red, were the most common indicators of heat treatment. The UWM Archaeological Research Lab reference collection was also utilized in the identification of heat altered tools.

The next several variables are concerned with tool morphology and manufacture. Basic form classifies tools as one of several types: edge or functional unit only, unifacial, bifacial, multifacial, nonfacial, prismatic blade or bladelet, or unknown, based on the location of retouch or modification on the piece. Edge modification characterizes the location of retouch or use on a specific edge as unifacial, bifacial, both unifacial and bifacial (for pieces with more than one edge), or not applicable (for pieces without edges).

The category called Method of Modification applies to both the edges and body of the tool and can be categorized as flaked, battered, both flaked and battered, use-wear only, or not applicable (typically used to refer to pieces too small to identify the method of modification). Refinement reflects the quality of workmanship of bifacial tools only and is determined by considering features such as the size of flake scars along the edges, regularity of tool outline, and thickness of the transverse cross-section. The scores for refinement are based on comparison with a reference sample and are as follows: crude, medium, refined, cannot determine (for incomplete pieces), and not applicable (for non-bifacial tools).

Completeness of the functional unit records if a worked edge is interrupted by a break, with the attributes broken, whole, cannot determine (when it is difficult to tell whether a break interrupted the functional unit or the functional unit was created after the break occurred), and not applicable (for fragments without functional units). The variable entitled Element Present refers to the entire tool instead of the functional unit and characterizes artifacts as consisting of the distal end of the tool, mid-section, proximal end, indeterminate end section, all elements, or cannot determine. Reworking or reuse refers to the situation in which tools are resharpened if an edge becomes dull. Sometimes resharpened tools will exhibit flakes scars from the original edge and may become progressively asymmetrical as they are resharpened. Abrupt changes in tool outline or retouch on a broken edge may also be used as indicators of reworking. Retouch is classified as either present, absent or possible in this section.

The Distal End Morphology category refers only to tools with identifiable distal ends. The distal end can be defined in two ways: for flakes the distal end is the termination end, opposite the striking platform; for non-flakes the distal end is simply the working end of the tool. Four categories may be used to describe the distal end morphology: blunt, pointed, not applicable (for pieces without distal ends), and cannot determine (for pieces where the distal end is difficult to identify). The Position of Retouch or Use category may be classified as the end, side, end and side, cannot determine, or not applicable.

The next three variables are related specifically to edge configuration and morphology. The Number of edges is a numeric variable. Edge angles is also a numerical variable measured for all edge functional units. Up to four edge functional units were recorded for each tool. Pieces that had more than four edges were noted in the comments. Measurements were taken with a goniometer and were taken 5 mm back from the edge in order to measure the production angle. Angles were placed in one of four categories: 0-40 degrees, 46-75 degrees, greater than 75 degrees or not applicable (for pieces without edges). The Edge Configuration category was used to record all edges and was described as smooth, serrated, denticulate, notched, or not applicable.

The Hafting Element variable was recorded for all whole or almost whole tools, or those broken pieces with obvious hafting elements. Hafting elements were classified as present, possible, absent, not applicable, or as having modification for hafting by thinning and/or grinding the tool base. Two variables relate to the presence and configuration of projections on lithic tools. Projections are defined by intentional retouch or wear on an unretouched area that extends out from the body of the piece. Projections are categorized as present, absent, or not applicable. The Modification of Projections variable further describes these features. Referring to them as present means that they have been formed by intentional retouch; absent indicates that they have been defined on the basis of wear; and not applicable signifies that there are no projections present.

The remaining variables are metric measurements of length, width, thickness, and weight. Any metric variable that it was possible to measure was recorded. Measurements were not recorded for broken or incomplete pieces. Detailed comments about the tools were included in the next two sections. The type of tool was then identified based on common morpho-functional categories.

A completed assemblage analysis produces not only counts of tool forms, as found in traditional morphofunctional typologies, but a less subjective suite of attributes that can be used to identify morphological, functional, and economic tool categories.

Microwear Analysis

Microwear analysis is a form of use-wear analysis aimed at identifying the way objects were used based on microscopic traces of wear (Bamforth 1988; Kamminga 1982; Keeley 1980; Odell 1977, 1981, 1986; Vaughan 1985). Traces of abrasion on the surface of an artifact, such as micropolishes, striations, microchipping, and rounding, are compared to experimental and ethnographic tools of known function. Based on the comparison, archaeologists can make inferences about how the archaeological artifact was employed and the types of materials upon which it was used.

As early as the middle of the nineteenth century, there were a number of archaeologists who noted the significance of wear traces with regard to interpretation of function. Sven Nilsson, writing in the 1830s, as translated by Olausson (1980), notes that through carefully examining how tools were worn, one can often with certainty conclude how they were used. Many early use-wear studies relied most heavily on ethnographic analogy (e.g., Evans 1987; Nilsson 1838; Vayson 1922; White 1968). However, even in the earliest functional analyses, controlled experimentation was advocated as a way to produce wear patterns comparable to those found on archaeological specimens. Spurrell (1884, 1892) and Curwen (1930) provide use-wear experiments where they attempted to replicate the polish they observed on early sickle blades by sawing various objects; bone, horn, wood, straw, and plant matter, with experimental blades. Curwen (1930) included photographs of the results of his experimentation as well as notation regarding how long he used his experimental flakes.

Archaeologists did not make much progress on use-wear analysis until the publication of Semenov's (1964) monograph. Semenov's comprehensive study of a number of different use-wear patterns was published in the Soviet Union in 1957 but it took seven years before it was translated into English. His systematic approach was the first step in identifying the many variables that may affect edge-wear. Semenov utilized what was called the high-power approach to use-wear analysis, examining tools at 100x or greater magnifications. Keeley (1974, 1980; Keeley and Newcomer 1977) further refined Semenov's high-power approach.

Keeley and Newcomer's (1977) blind tests of experimental use-wear analysis provided proof that functional information could be extrapolated from microwear analysis with the proper controls. Newcomer independently created fifteen tools of Middle or Upper Paleolithic type and then used them in ways suspected to be compatible with that time period. Of 16 trials, Keeley correctly identified the area utilized 14 times, the movement of the tool 12 times, and the material worked in 10 of the cases (Keeley and Newcomer 1977). Keeley's results strongly support the use of experimentation as a viable method for the extrapolation of functional information from edge wear on stone tools.

Tringham et. al.'s (1974) use-wear study was the first to account for factors such as post-depositional forces and number of strokes of use (Olausson 1980). They also provided photomicrographs of the tools taken both before and after use to show the effects of use on the edge of the tool in order to control for issues like manufacturing scars and edge morphology. Tringham et. al. (1974) examined more features of wear than any previous study, providing a thorough background for recording use-wear.

At the same time, two other comprehensive volumes on use-wear analysis were published: Odell's (1977) doctoral dissertation and Kamminga's (1982) functional study of Australian stone tools. However, while Keeley employed a technique called high-power analysis, Tringham, Odell, and Kamminga utilized a strategy termed low-power analysis. Not only do these two methods differ in the type of equipment used but the information derived from the analysis is also different. Following the first Conference on Lithic Use-Wear in Vancouver, British Columbia hosted by Brian Hayden in 1977, the proceedings of which have since been published (Hayden 1979), a rift between practitioners of these two methods began to develop (Odell 2004). The chief concern at the time was to prove the accuracy of the technique—to justify the expenditure of effort involved, to attract practitioners to the field, and to render the results of such studies believable to outsiders (Odell 2004). Both techniques are still used today (Borel et al. 2013; Burroni et al. 2002; Lerner 2014; Lin et al. 2013; Miller 2014; Pilar Babot et al. 2013; Schoville 2013; Stemp et al. 2009, 2013; Stevens et al. 2010; Wiederhold and Pevny 2014).

Low-Power Microwear Analysis

Low-power use-wear analysis typically employs equipment referred to as a stereomicroscope, which is the type of microscope originally utilized by Semenov and was adopted by future use-wear analysts as well. There are numerous types available with a variety of features and they are most commonly employed in biological laboratories as dissecting microscopes (Odell 2004). In a low-power analysis, objects are typically scanned at 10-20x magnification and then assessed at 20-40x magnification (Odell and Odell-Vereecken 1980). Advocates of low-power analysis, of which Odell was one of the strongest, note several advantages of this method. One of its most appealing features is the ease and speed with which analysis is accomplished. In Odell's (1980) blind low-power tests the average observation time was 5 minutes/tool, not including variable recording. However, in a blind high-power test, the average observation time was 1.5 hours/tool (Unrath et. al. 1986:165). The large difference in time expended makes the low-power analysis of large assemblages feasible in a way that high-power is not (Odell and Odell-Vereecken 1980).

Low-power analysis is most often portrayed as focused solely on the variable of microchipping. However, Odell notes "it is dangerous to interpret any pattern of wear traces solely on the basis of fracturing without confirmatory evidence from abrasive damage" (Odell 2004:144). He also brings Johan Kamminga's (1982) work to the fore as an example of a low-power analysis that does adhere to the principle of multiple lines of evidence. Kamminga's study includes notation of striations and two types of polish in addition to diagnostic microchipping. The location and degree of rounding and type of microflaking are the two features most often visible and utilized in low-power analyses, although striations and some types of polish may be visible as well. These variables are most accurate in predicting the dominant motion the tool was engaged in. For a more accurate interpretation of the material with which the tool made contact, even Odell (2004:148) admitted that high-power analysis is the best approach to take.

High-Power Microwear Analysis

The microscope used in most high-power analyses is the binocular incident-light metallurgical microscope (Keeley 1980; Odell 2004; Vaughan 1985). The optimal magnification for these microscopes to view polishes and striations is between 200-300x magnification (Keeley 1980; Vaughan 1985). As the magnification increases, the light intensity increases, meaning that the higher the magnification the better the image quality and clarity. This feature makes the metallurgical microscope ideal for high power analyses.

The greatest strength of metallurgical microscopes lies in their ability to interpret changes in surface topography caused by different abrasive forces (Odell 2004), which means that high-power analyses can discriminate between types of polish associated with specific worked materials. Striations and rounding are also relatively easily identifiable at high magnification. The area in which high-power analysis is lacking is the detection of patterns in microchipping. At magnifications greater than 50x, it is difficult to note and interpret microflaking along an edge. As the image quality of metallurgical microscopes tends to decrease with the magnification, this makes analysis at low magnification difficult.

Recent advances in high-power microscopy have led to the use of laser-scanning confocal microscopy (LSCM) in some recent high-power microwear analyses (Evans and Donahue 2008; Lin et al. 2010; Stemp et al. 2013). This technique is proposed as an alternative to using labor intensive scanning electron microscopy (SEM) to produce extremely high-quality photomicrographs. Proponents of LSCM also suggest that it may be used to better quantify microwear traces in order to help standardize the recognition of micropolishes (Evans and Donahue 2008). Drawbacks to this method are the cost-prohibitive equipment and the steep learning curve required to master the technique.

Microwear Methods in this Dissertation

The solution to the deficiencies of both low-power and high-power microwear methods is to include both in an analysis in order to examine the greatest number of variables. This combination of techniques is the most common approach in recent analyses (Beyin 2010; Brass 1998; Clemente and Gibaja 1998; Jeske 2002) and is the strategy employed in this dissertation.

Two microscopes were utilized for the microwear analysis in this project: the Amscope SE305-AZ-P binocular stereomicroscope was used for low-power analysis and the Olympus BH-1 upright microscope with reflected light fluorescence attachment was used for high-power analysis. The low-power scope has a magnification range of 10-45x and the high-power scope has a range of 50-500x magnification. Artifacts were examined at 10x and 30x magnification for microchipping and rounding using the stereomicroscope. A standard form was used for recording these features and sketches were drawn at both magnification levels. Artifacts were then scanned at 50x, 100x, and 200x magnification with the upright microscope to identify micropolishes (Figure 5.2). A 5MP Amscope USB digital camera compatible with both scopes was used for the collection of photomicrographs that were manipulated through the associated ToupView software. This equipment has been used in previous archaeological analyses (Jeske and Sterner-Miller 2015; Sterner 2016; Sterner and Jeske 2017; Sterner et al. 2013) and in the experimental programs and blind tests that were conducted prior to the archaeological analysis for this dissertation.

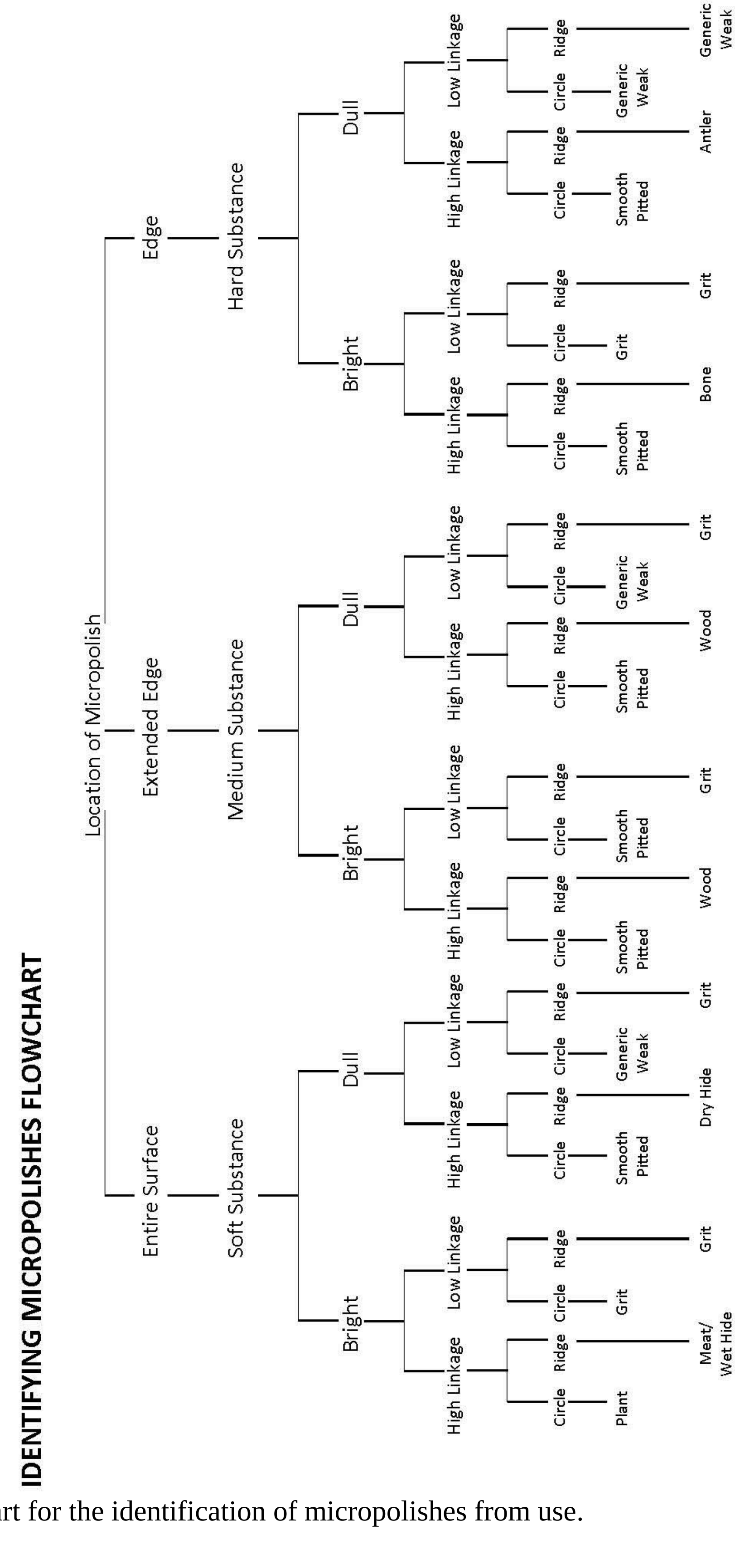

Figure 5.2. Flowchart for the identification of micropolishes from use.

Blind Testing and Experimentation in Microwear Analysis

Not long after the advent of microscopic use-wear analysis, proponents and critics of the method devised ways to test the reliability of the technique. Blind tests, used in other areas of archaeological research such as radiocarbon dating (Olsen et al. 2008) and zooarchaeological analysis (Greenlee and Dunnell 2010), were applied to use-wear. Initially the goal of these tests was solely to assess the accuracy of the identifications made by analysts. However, with the compilation of larger use-wear blind test datasets over time, researchers have been able to expand the questions asked of their data to include topics such as differential wear on varied raw material types (Greiser and Sheets 1979; Lerner 2014), development of wear over time (Ollé and Vergés 2014), the effects of post-depositional forces (Burroni et al. 2002), and methods to better quantify the results of use-wear analysis (Macdonald 2013; Stemp et al. 2009; Stevens et al. 2010).

The myriad of microwear methods now in place makes the comparison of accuracy ratings between blind tests difficult. Using stone tools for blind tests of microwear identification is more akin to an actualistic study than a laboratory experiment. Wear is a multivariate phenomenon affected by time of use, stone raw material, size of tool, force of use, angle of use, material worked, moisture content of worked material, and extraneous environmental factors such as humidity, grit, dust, etc. We are only able to control a few of these variables, which results in a large amount of variation in the ways that microwear analysts construct their controls.

Evans' (2014:6) compilation of 19 blind tests provides an average reported accuracy of 61% for contact material and 77% for motion of use, with standard deviations of 18% and 17% respectively. This variation is the result of a multitude of factors including, but probably not limited to, length of use, analyst experience, equipment used, tool raw materials, diversity of contact materials, small sample size, simulation of post-depositional forces, and differences in reporting procedures. The number of variables that can affect the outcome of use-wear blind tests make it important that the tests be designed with a specific archaeological corollary in mind and designed to test a heavily controlled and documented set of variables. To this end, the blind tests for this dissertation are designed to test the effects of length of use and tool raw materials on the accrual and identification of use-wear traces. Tool raw materials, experimental tasks, and contact materials were chosen to replicate as closely as possible conditions found at Oneota Native American villages in southeastern Wisconsin (Sterner-Miller et al. 2015).

The experimental assemblage used in this project was made to resemble the materials recovered from the Crescent Bay Hunt Club site. Approximately 100 large flakes were struck using two different cherts: Galena and Wyandotte. Galena chert is the most common type identified in the Crescent Bay assemblage, which is why it was chosen for this experiment. Galena chert is nodular, gray to brown, mottled to lightly banded, and contains small fossils and dark worm burrows. Galena cherts outcrop in Middle Ordovician strata of the Galena formation and are most frequently encountered in southwestern Wisconsin (Rosebrough and Broihahn 2005; Winkler et. al 2005). Wyandotte chert is rare in southern Wisconsin Oneota assemblages, but is more common in earlier time periods (Ahlrichs 2013). It is a fine-grained chert, gray or blue-gray in color, and may be found in both nodular and tabular forms. It outcrops in Harrison County, Indiana as part of the Ste. Genevieve formation (Munson and Munson 1984; Seeman 1975). Two different raw material types were used for experimentation to determine if there are significant changes in use-wear signatures based on raw material type.

Following the production of 100 flakes, the tools were individually bagged and then used in a series of experiments carried out by the UWM Experimental Archaeology Working Group under the direction of the author and Robert Ahlrichs. Tools were used for a variety of tasks including butchering a kudu, llama and rabbit, scraping and cutting wet and dry hide, peeling and slicing potatoes, carrots, corn, pumpkin and squash, scraping antler and bone, and whittling and planing both fresh and treated wood. Tools were used for amounts of time ranging from three minutes to seventy minutes. Twelve tools were left unused but were carried around in a plastic bag full of sand for three days to simulate grit wear. Following use, tools were washed in an ultrasonic cleaner using warm water and dish soap for approximately thirty minutes. Chemical or acid cleaning, advocated by many early practitioners in the field (Keeley 1980; Semenov 1964; Vaughan 1985), was not utilized in this analysis. The effects of chemical cleaning on specimens are not well documented (Coffey 1994; Moss 1983; Plisson and Mauger 1988) and recent research indicates that cleaning with soap and water is generally adequate to see microflakes, striations, and polish (Juel Jensen 1994; Kay et al. 2017; Moss 1983; Pope 2005).

After tools were cleaned, they were bagged individually to control for bag wear (Gero 1978). Tools were examined at magnifications of 10x, 30x, and 200x to determine contact material and primary motion. Criteria for these determinations were the presence, location, and orientation of microchipping, striations, rounding, and micropolishes.

The results of the experiments were accuracy rates of 82% for motion of use, 81% for specific contact material, 95% for general contact material hardness/softness, and 97% for area of use. Specific contact material and tool motion were correctly scored 68% of the time. These results are comparable to the averages (77% motion; 68% contact material; 43% total) reported in Evans' (2014:6) compilation of blind test scores. These scores suggest that interpretations of tool use presented in this dissertation are reasonably accurate.

Protein Residue Analysis

Additional information about the function of archaeological tools may be achieved using protein residue analysis. Protein residue analysis developed out of the same interest in tool function that jumpstarted microwear analysis in the 1970s. Some of the earliest proponents of blood residue analysis were Anderson (1980), Briuer (1976), and Loy (1983). Anderson (1980) examined twenty-three experimental tools and thirteen prehistoric tools using a scanning electron microscope (SEM) at magnifications between 500 and 10,000x to identify mineral components of the samples. Briuer's (1976) preliminary analysis of a sample of lithic specimens from two prehistoric rock shelters in northeastern Arizona used a variety of techniques to attempt to identify organic residues. He employed measurement of relative C^{13}/C^{12} values to make taxonomic identifications as well as what he termed crime lab methods such as a benzidine test to identify the presence of blood (1976:482). Loy (1983) relied on methods similar to Anderson's (1980) and utilized high-power microscopy to examine hemoglobin crystals from prehistoric artifacts and compared their structure to hemoglobin crystals from known experimental samples. These qualitative microscopic methods were typical of early approaches to blood residue analysis. However, concerns about the accuracy and replicability of these methods quickly arose (Cattáneo et al. 1993; Downs and Lowenstein 1995; Fiedel 1996; Tuross et al. 1996). While many of the concerns about blood residue analysis methods revolve around the problem of visual identification of residue signatures (see Monnier et al. 2012), concerns have been raised regarding immunological methods of analysis as well (Cattáneo et al. 1993; Hyland et al. 1990; Kooyman et al. 1992; Newman and Julig 1989).

Cross-Over Immunoelectrophoresis (CIEP)

The CIEP method exploits the immune (antibody-antigen) reaction in which antibodies are produced to recognize and bind to foreign antigens as part of the body's defense mechanism. The residue adhering to artifacts after use is considered the antigen in an archaeological context. Antisera containing the antibodies of various known plant and animal species may then be tested against an extract of the residue to determine if the antibodies of the antisera react with the antigen of the residue. CIEP was pioneered in the forensic sciences by Culliford (1964, 1971). It was first used in archaeological contexts by Newman (1990) and the process has been explored extensively (Allen et al. 1995; Fagan 2013; Högberg et al. 2009; Seeman et al. 2008; Yohe et al. 1991).

CIEP originally developed to test animal protein residues. Plant residues can be reliably identified through phytolith and starch analysis (Briuer 1976; Hardy and Garufi 1998; Jahren et al. 1997; Sobolik 1996; Yang et al. 2014), although immunological methods may also be used to identify plant remains (Allen et al. 1995; Yohe et al. 1991). While residue analysis methods have been thoroughly vetted, some concerns have been raised (Cattáneo et al. 1993; Hyland et al. 1990; Kooyman et al. 1992; Newman and Julig 1989). Questions about contamination of residue samples tested using immunological methods can usually be addressed by comparing soil samples from the associated contexts, so as to rule out bacterial and other organic contaminants that may produce false positives (Fagan 2013; Gurfinkel and Franklin 1988; Newman and Julig 1989).

CIEP Methods in this Dissertation

In a pilot study, 41 tools from the Crescent Bay Hunt Club site were tested for protein residues by Archaeological Investigations Northwest, Inc. (AINW) (Fagan 2013). Standard analysis procedures at AINW begin with extracting residues from artifacts with a 5% ammonia solution (cf. Newman 1990). A small amount of the ammonia solution is applied to the artifact in a plastic tray and the tray and artifact are placed in an ultrasonic bath for at least 30 minutes. The artifact in solution is then placed on a mechanical rotator for an additional ten minutes. Residues from soil samples are also extracted using a variant of this method. The extraction solution is then drawn off and stored in an airtight microcentrifuge tube. The extracts are centrifuged to clarify the sample and then placed singly into agarose gels and tested against the antisera select for testing. Artifacts in these tests were run against bovine, deer, dog, human, goat, and rabbit antisera. In addition to the artifact extracts, positive and negative control sera are run with each gel. This is done to determine if there are any contaminants or extraneous proteins that may lead to false positive results. If an anomalous result such as an extract reacting with multiple antisera or to a negative control serum is obtained, the extract solution is mixed with an equal volume of a 1% solution of a non-ionic detergent to increase chemical bonding specificity, and is run through the CIEP process again. If an anomalous reaction still occurs after the addition of the non-ionic detergent, any reactions of these specimens to the antisera are discounted. None of the extracts analyzed for this project reacted with the negative control or with multiple antisera.

Electrophoresis is used to drive the antigens and antibodies together. The gel substrates are placed in acrylic electrophoresis tanks filled with barbital buffer solution, then attached to the regulated H.V. power source. The antibodies move toward the cathode because of the overall negative charge on the molecule, while the antigens move toward the anode. A precipitate line is formed where the proteins meet and bond in the area between the wells. The gel is soaked overnight in saline to stabilize the reaction, then dried and stained with a standard protein stain as a permanent record of the CIEP results. The dried and stained gel is then backlit on the light table and examined under magnification for the presence of precipitate lines, indicating positive reactions. After testing, the extracts are refrozen and stored for one year in case additional testing is requested.

Correspondence Analysis

Correspondence analysis (CA) is described by Greenacre (1981:119) as primarily a technique for displaying the rows and columns of a two-way contingency table as points in corresponding low-dimensional vector spaces. Baxter (2003:137) describes CA as essentially principal component analysis [PCA] for tables of counts, which enables one to obtain a graphical view of the structure of the table. This comparison with PCA has been made by many scholars (Blankholm 1991; Bølviken et al. 1982; Jolliffe 1986; Shennan 1988). In some cases, CA has been touted as superior to PCA (Blankholm 1991; Bølviken et al. 1982) and in others it is regarded as a form of PCA (Jolliffe 1986). However, while the use of PCA is common in archaeological analysis, CA has yet to make the same advances in the field beyond its initial use in the 1980s and early 1990s. Lockyear (2013) attributes some of this neglect to the lack of easily obtained and user-friendly software. When cases of the use of CA in archaeology have surfaced in recent years, they have most frequently been concerned with ceramic seriation (Alberti 2013; Smith and Neiman 2007), although Alberti (2013) has studied intra-site activity areas and Lockyear (2013) has examined case studies of inter-site variation in Roman coin hoards.

The methods used in Lockyear's (2013) analysis of 140 sites examining coins from four coinage phases are particularly relevant to this study. This dissertation uses CA to compare lithic assemblage, functional, and spatial variation within and between the La Crosse and Koshkonong localities (cf. Sterner-Miller 2015). CA was run in both R and Microsoft Excel, using XLSTAT package.

Rationale for Choice of Methods

The three levels of organization (intra-site, intra-locality, and inter-locality) examined in this dissertation required a multifaceted approach to lithic analysis. In order to provide a clear picture of Oneota lithic economy, and the link between lithics and community identity, multiple lines of evidence were necessary. Debitage analysis was used to provide information about lithic raw material procurement, production techniques, and production locations. Tool assemblage analysis was used to characterize the importance of economizing and efficient behavior by village residents in tool production and use. Microwear analysis was used to identify common tasks and work areas within the village. Protein residue analysis was used in conjunction with microwear data to provide more specific information about tool use. Combined, the results of all of these analyses present a holistic picture of lithic habitus at the Crescent Bay Hunt Club village.

Multiple levels of comparison were required to thoroughly explicate differences in lithic practice between the Koshkonong and La Crosse localities, and the communities constructed therein. Debitage analyses were used to consider differences in the types and stages of reduction occurring at villages in the two localities. Debitage were also used to compare economizing behavior at the two localities. Tool assemblage analyses were used to examine variation in raw material procurement, relative prevalence of tool types, and depositional patterns, both within and between the localities. Correspondence analysis was used to better illustrate this variation. Microwear analyses were conducted on samples from both localities to compare patterns of tool use and multifunctionality.

The main purpose served by the examination of inter-locality patterning was to identify traits of lithic practice that are ubiquitous in Oneota assemblages, regardless of differences in geographic or temporal context. Tool assemblage analysis was used to examine trends in raw material acquisition, economization, and efficient tool production. Microwear analysis was used to consider the link between tool form and function.

CHAPTER SIX:

RESULTS OF LITHIC ANALYSES

This chapter contains the results of the lithic analyses conducted for this dissertation. First, the results of the tool assemblage and debitage analyses at the Koshkonong locality sites and La Crosse locality sites are discussed. Then, the results of the use-wear analyses on Koshkonong and La Crosse locality sites are presented. Finally, the results of protein residue analysis are described. Although interpretations of the data will be briefly summarized in this chapter, more detailed interpretations will be provided in Chapter Seven.

Data Sources

Lithic data for nine archaeological sites were utilized for this dissertation. The lithic assemblage data for some of these sites were gathered from previous analyses, while the initial analysis for other sites was conducted specifically for this dissertation (Table 6.1).

Table 6.1 Data sources for lithic assemblage data used in this dissertation.

Locality	Site Name	Site No.	Tools	Debitage	Debitage/Tool	Data Source
Koshkonong	CBHC	47JE0904	539	3,453	6.4	This dissertation
Koshkonong	KCV	47JE0379	425	1,916	4.5	Wilson 2016; Doyle 2012
Koshkonong	Carcajou Point	47JE0002	21	451	21.5	Rosebrough and Broihahn 2005
Koshkonong	Schmeling	47JE0833	43	776	18.0	Norton n.d.
La Crosse	Tremaine	47LC0095	1,709	17,121	10.0	Goatley 1995
La Crosse	OT	47LC0262	452	49,424	109.0	Hollinger 1993a
La Crosse	Filler	47LC0149	356	23,149	65.0	Vradenburg 1994
La Crosse	Pammel Creek	47LC0061	1,016	9,874	9.7	Rodell 1989
La Crosse	State Road Coulee	47LC0176	1,556	67,812	43.6	Anderson et al. 1995
Koshkonong	**All Sites**		**1,028**	**6,596**	**6.4**	
La Crosse	**All Sites**		**5,089**	**167,380**	**32.9**	

Debitage Analysis Results

The type of debitage analysis conducted for most of the assemblages used in this dissertation (e.g., Crescent Bay Hunt Club, Koshkonong Creek Village, Schmeling, and State Road Coulee) was the mass analysis described in Chapter 5 and Appendix A. However, a slightly modified version of this schema was used in the debitage analyses for the Tremaine, OT, Filler, and Pammel Creek assemblages. This format also recorded data for lithic raw material type. However, since those data are not available for all sites in this analysis, they were not used in inter-site comparisons.

Koshkonong Debitage Analysis Results

A total of 6,596 pieces of debitage were analyzed from the Koshkonong locality. The average debitage to tool ratio across the four sites examined was 6.4, ranging from 4.5 to 21.5. Koshkonong site assemblages were relatively evenly split between flake and non-flake (shatter) debitage (Table 6.2). Assemblages containing high proportions of shatter in comparison to flakes are typical of situations where bipolar production was used, in addition to free-hand production (see Jeske 1992; Jeske and Lurie 1993; Jeske and Sterner-Miller 2015; Shott 1989a).

Table 6.2 Debitage types represented 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	599	77%	177	23%	776
Carcajou Pt.	47JE0002	397	88%	54	12%	451
Total		**3,667**	**56%**	**2,929**	**44%**	**6,596**

Cortex was identified on 34-36% of debitage from the KCV and Carcajou Point sites but at much higher frequencies of 51% at Crescent Bay and 77% at Schmeling (Table 6.3). High percentages of cortex indicate that the initial stages of core reduction were undertaken at the site, as opposed to at a distant procurement locality (Ahler 1989; Kooyman 2000; Odell 2004).

Table 6.3 Percentage of debitage displaying cortex in the Koshkonong locality assemblages.

Site Name	Site No.	Cortex (n)	Cortex (%)	Total Debitage
CBHC	47JE0904	1,748	50.6%	3,453
KCV	47JE0379	687	35.9%	1,916
Schmeling	47JE0833	594	76.5%	776
Carcajou Pt.	47JE0002	156	34.6%	451
Total		**3,185**	**48.2%**	**6,596**

Between 29-69% of the debitage from Koshkonong assemblages exhibited evidence of heat treatment (Table 6.4). A high incidence of heat treatment is often correlated with the use of fair- or low-quality knapping materials (e.g., Rick 1978).

Table 6.4 Percentage of debitage displaying heat treatment in the Koshkonong locality assemblages.

Site Name	Site No.	Heat Treated (n)	Heat Treated (%)	Total Debitage
CBHC	47JE0904	1,207	35.0%	3,453
KCV	47JE0379	562	29.3%	1,916
Schmeling	47JE0833	532	68.6%	776
Carcajou Pt.	47JE0002	223	49.4%	451
Total		**2,524**	**38.3%**	**6,596**

Summary

Koshkonong locality lithic assemblages exhibit a very low debitage to tool ratio, high representation of shatter, high proportion of cortex, and high prevalence of heat treatment. One possible interpretation of the low debitage to tool ratio is that the majority of tool manufacturing occurred somewhere other than the village (e.g., Van Beckum and Jeske 2001), although the high percentage of debris exhibiting cortex contradicts this. The low debitage to tool ratio is more likely a result of the high proportion of informal tools that are not likely to be retouched and reused. All of the data from debitage analysis indicate that the residents of Crescent Bay were practicing economizing behavior (e.g., Jeske 1987).

La Crosse Debitage Analysis Results

A total of 167,380 pieces of debitage were analyzed from the La Crosse locality. The average debitage to tool ratio at La Crosse locality sites was 32.9, ranging from 9.7 to 109.0. At all five sites, non-flakes (shatter) composed only 12% of less of the total debitage assemblage (Table 6.5). These data suggest that there was little to no bipolar reduction occurring at the La Crosse sites.

Table 6.5 Debitage types represented in the La Crosse locality assemblages.

Site Name	Site No.	Flake (n)	Flake (%)	Non-flake (n)	Non-flake (%)	Total
OT	47LC0262	45,709	92%	3,715	8%	49,424
Tremaine	47LC0095	15,457	90%	1,664	10%	17,121
Filler	47LC0149	22,651	98%	498	2%	23,149
Pammel Cr.	47LC0061	8,714	88%	1,160	12%	9,874
SR Coulee	47LC0176	63,114	93%	4,698	7%	67,182
Total		**155,645**	**93%**	**11,735**	**7%**	**167,380**

Cortex was only present on 6-28% of debitage from La Crosse locality sites (Table 6.6). The lack of cortex on La Crosse debitage suggests that the primary tool production area was not at the settlement. However, Jeske (1987:100) notes that a lack of cortex may result from the utilization of chert outcrops lacking cortex as much as from tool manufacture. Additionally, relatively high debitage to tool ratios at La Crosse sites indicate that at least some tool manufacture was occurring at all sites and in the case of OT, the settlement may have been the primary locus for tool production and/or maintenance. In fact, the low quantities of cortical debitage and high quantities of flake debitage in comparison to non-flake debitage suggest that tool retouch was the primary focus of knapping activities at these sites, not core reduction.

Table 6.6 Percentage of debitage displaying cortex in the La Crosse locality assemblages.

Site Name	Site No.	Cortex (n)	Cortex (%)	Total Debitage
OT	47LC0262	2,802	5.7%	49,424
Tremaine	47LC0095	4,720	27.6%	17,121
Filler	47LC0149	3,501	15.1%	23,149
Pammel Cr.	47LC0061	1,416	14.3%	9,874
SR Coulee	47LC0176	9,459	13.9%	67,182
Total		**21,898**	**13.1%**	**167,380**

Heat treatment was only reported for debitage from two of the sites in the La Crosse locality: OT and Tremaine. Authors of reports for the other sites note the low incidence of heat treatment in general but do not provide specific figures (Anderson et al. 1995; Rodell 1989; Vradenburg 1994). The two sites for which incidence of heat treated debitage was recorded also display a relatively low occurrence of heat treated debitage (Table 6.7).

Table 6.7 Percentage of debitage displaying heat treatment in the La Crosse locality assemblages.

Site Name	Site No.	Heat Treated (n)	Heat Treated (%)	Total Debitage
OT	47LC0262	8,075	16.3%	49,424
Tremaine	47LC0095	77	0.4%	17,121
Total		**8,152**	**12.2%**	**66,545**

Summary

The high debitage to tool ratios and low representation of cortex indicate that while tool maintenance probably occurred primarily at the settlements, core reduction was mostly restricted to procurement sites. While cores were present in the La Crosse lithic assemblages, the debitage to core ratio was only 158:1 at Tremaine and as low as 68:1 at Pammel Creek. Comparatively, the OT debitage to core ratio was 1,647:1. The much higher prevalence of heart treatment and high debitage to tool ratio at OT, as well as the very low prevalence of cortex indicates that production activities at that site varied significantly from the other La Crosse locality sites. Low prevalence of shatter, cortex, and heat treatment do not suggest that economization of raw materials was important to La Crosse site residents.

La Crosse locality debitage assemblages are characterized as variable. There is wide variation in prevalence of cortex, heat treatment, debitage to tool, and debitage to core ratios. Sites that are spatially more proximate to one another are not any more similar than those more distant from each other. La Crosse site lithic assemblages only seem similar to one another when compared to the Koshkonong assemblages.

Comparison of Koshkonong and La Crosse Debitage Analysis Results

The significant differences in the debitage to tool ratios between the two localities show that knappers had very different strategies in the way they used their lithic resources. La Crosse sites yield nearly five times as many pieces of debitage per tool as Koshkonong sites (Table 6.1). They appear to have differed in both their mode and location of production.

On average, Koshkonong sites had a much more equal flake to non-flake ratio in their debitage assemblages. The Koshkonong sites also had a much higher percentage of debitage with cortex present and higher incidence of heat treatment (Table 6.8).

Table 6.8 Comparison of Koshkonong and La Crosse locality debitage profiles.

Locality	**Flake Avg**	**Flake Std Dev**	**Non-flake Avg**	**Non-flake Std Dev**	**Cortex Avg**	**Cortex Std Dev**	**Heat Average**	**Heat Std Dev**
Koshkonong	68%	20%	32%	20%	49%	20%	46%	18%
La Crosse	92%	4%	8%	4%	15%	8%	8%	11%

All three of these variables have also been shown to correlate with differences in the scarcity of lithic raw materials and the use of economization as a coping mechanism (Jeske 1992). Based on the debitage, Koshkonong locality residents were economizing their raw materials more than those of the La Crosse locality.

The Koshkonong sites also displayed standard deviations at least 10% higher than the La Crosse sites in all categories. This difference may be a result of the much larger samples from the La Crosse sites. However, if it is not, it suggests that there is more inter-site variation in Koshkonong than La Crosse. The higher debitage to tool ratios, greater representation of heat treatment, and higher flake to non-flake ratio at Carcajou Point and Schmeling suggests that more lithic production may have been occurring at these sites than at Crescent Bay and KCV. Practices regarding how much knapping occurred at the village or at a quarry site may have differed between villages in Koshkonong but larger samples from Carcajou Point and Schmeling are necessary before such an explanation can be tested.

Tool Assemblage Analysis Results

All of the chipped stone tools from the Koshkonong locality sites examined for this dissertation were recorded using the most recent version of the Lurie and Jeske 1990 schema in Appendix A of this document. The Tremaine, OT, and Filler lithic assemblages were recorded using a modified version of this schema (O'Gorman 1995:Appendix A). The lithic tool assemblage analyses from Pammel Creek and the State Road Coulee site recorded a different, and much smaller suite of attributes. However, many of these attributes are comparable to those in Lurie and Jeske 1990 and are used for comparison in this dissertation when available.

Koshkonong Tool Assemblage Analysis Results

A total of 1,028 artifacts classified as chipped stone tools were analyzed from the Koshkonong locality. Although twenty-seven variables were recorded for each tool, only a limited number of those variables will be discussed here. The full records for the Crescent Bay

Hunt Club lithic tool assemblage are included in Appendix C. The raw data for the other three Koshkonong sites is attached to in-progress or recently completed Master's theses and is not available for dissemination in this dissertation.

The lithic raw materials utilized by residents of the Koshkonong locality were overwhelmingly local in origin (Figure 6.1). Most of these local raw materials were Galena chert, Oneota formation Prairie du Chien cherts and Silurian chert (Table 6.9). Other local raw materials represented in smaller quantities were undifferentiated quartz and quartzite. Non-local raw materials represented no more than 30% of any Koshkonong lithic tool assemblage. Non-local raw material types present in these assemblages were Barron County Quartzite, Maquoketa chert, Moline chert, Platteville chert, Shakopee formation Prairie du Chien, silicified sandstone, and Wyandotte chert. Unknown or unidentified cherts were excluded from determinations of locality. However, many of these may represent local glacial pebble cherts, raising the prevalence of local cherts as much as 20% at some sites.

There were few differences in the proportions of raw material types utilized between the Koshkonong sites. The only noteworthy difference is the relatively high percentage (9.8%) of silicified sandstone recorded at the Schmeling site. However, this result is likely due to the small sample size (n=43) of tools from that site.

Table 6.9 Lithic raw material types utilized at sites in the Koshkonong locality.

Site Name	Site No.	Burlington	Galena	Maquoketa	Moline	Oneota	Platteville	Shakopee	Quartz	Quartzite	Silicified Sand	Silurian	Unknown	Wyandotte
KCV	47JE0379	2.1%	57.9%	0.2%	0.5%	4.7%	1.4%	6.4%	0.7%	0.5%	0.7%	7.5%	17.4%	0.0%
CBHC	47JE0904	5.9%	46.6%	0.7%	0.0%	7.6%	3.7%	2.4%	0.4%	0.9%	1.5%	8.7%	20.6%	0.9%
Carcajou	47JE0002	0.0%	71.4%	0.0%	0.0%	4.8%	0.0%	14.3%	0.0%	0.0%	0.0%	0.0%	9.5%	0.0%
Schmeling	47JE0833	0.0%	56.1%	2.4%	0.0%	0.0%	2.4%	12.2%	0.0%	0.0%	9.8%	7.3%	9.8%	0.0%
Average		**2.0%**	**58.0%**	**0.9%**	**0.1%**	**4.3%**	**1.9%**	**8.8%**	**0.3%**	**0.3%**	**3.0%**	**5.9%**	**14.3%**	**0.2%**

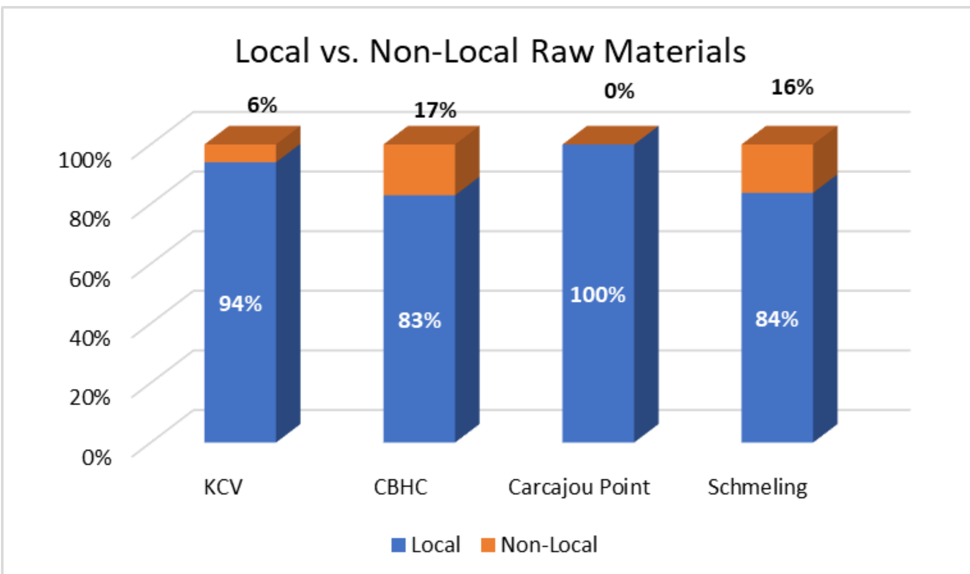

Figure 6.1. Local versus non-local raw materials in lithic tool assemblages from the Koshkonong. locality

Ninety percent of lithic tools from the Koshkonong locality were made from fair or poor quality raw materials. A chi-square test indicates that there is a significant difference in the quality of local versus non-local raw materials (Table 6.10). However, while a higher proportion of non-local raw materials are good quality, a higher proportion of non-local raw materials are also of poor quality, rather than fair quality (Table 6.11).

Table 6.10 Chi-square of raw material quality and source in the Koshkonong locality.

	Raw Material Quality			
Raw Material Source	Good	Fair	Poor	Row Total
Local	38	389	28	455
Non-local	16	53	12	81
Column Total	54	442	40	536

chi-square statistic=19.1396 with 2 df, p-value=<0.00001

Table 6.11 Prevalence of lithic raw material quality based on raw material source in Koshkonong assemblages.

	Raw Material Quality		
Raw Material Source	Good	Fair	Poor
Local	8%	85%	6%
Non-local	20%	65%	15%

Chi-squares testing the relationship between quality (Table 6.12) or raw material type (Table 6.13) and other production variables only indicated two other significant relationships: between raw material quality and amount of cortex and raw material quality and heat treatment. There is a high correlation between raw materials classified as good quality and the presence of heat treatment (Table 6.14), which suggests that many of those raw materials classified as good may have normally been classified as fair or poor prior to heat treatment. Tools made from poor quality raw materials were much more likely to be more than 50% covered with cortex (Table 6.15).

Table 6.12 Chi-square results for raw material quality and other production variables.

Production Variable	df	chi-sq	p-value	Significant at 0.05?
Amount of cortex	4	11.947	0.018	Yes
Heat treatment	2	54.173	<0.001	Yes
Basic tool form	6	8.514	0.203	No
Method of modification	6	6.118	0.410	No
Completeness	2	2.697	0.260	No
Hafting	4	2.077	0.721	No

Table 6.13 Chi-square results for raw material locality and other production variables.

Production Variable	df	chi-sq	p-value	Significant at 0.05?
Amount of cortex	2	1.212	0.571	No
Heat treatment	1	1.139	0.286	No
Basic tool form	3	0.822	0.844	No
Method of modification	3	4.003	0.261	No
Completeness	1	0.870	0.351	No
Hafting	2	1.232	0.540	No

Table 6.14 Presence of heat treatment and raw material quality.

	Heat Treatment	
Raw Material Quality	Absent	Present
Good	20%	80%
Fair	68%	32%
Poor	90%	10%

Table 6.15 Presence of cortex and raw material quality.

	Amount of Cortex		
Raw Material Quality	0	<50%	>50<100%
Good	33%	57%	9%
Fair	48%	44%	8%
Poor	58%	25%	18%

All lithic artifacts classified as tools during the assemblage analysis were characterized as fitting one of the following four basic forms:

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.

2. Unifacial: The body of the piece has been shaped on one side. There must be at least one flake scar that does not originate on the edge of the shaped face.
3. Bifacial: Both faces of the piece have been shaped. There must be at least one flake scar that does not originate on the edge of the piece on both sides of the piece.
4. Multifacial: The body of the piece exhibits intentional flake scares creating more than two faces. These pieces often have a blocky appearance.

These variables, and three others that were not applicable to these assemblages may be found in the schema in Appendix A. In the majority of the Koshkonong assemblages (Crescent Bay, Carcajou Point, and KCV), edge only tools composed the majority (52-73%) of the assemblage (Table 6.16). The Schmeling site assemblage is dominated by bifaces (47%), with a slightly lower representation of edge only tools (37%). However, this result may simply be the result of sampling error. When the counts for all four sites were totaled, edge only tools represented 66% of the total Koshkonong assemblage. Bifaces composed 21% of the locality assemblage, unifaces 10% and multifaces 3%. These numbers emphasize the prevalence of expedient, minimally modified tools in Koshkonong Oneota lithic assemblages.

Table 6.16 Basic forms represented in the Koshkonong locality lithic assemblages.

Site Name	Site No.	Edge (n)	Edge (%)	Uniface (n)	Uniface (%)	Biface (n)	Biface (%)	Multiface (n)	Multiface (%)	Total
KCV	JE0379	310	73%	41	10%	64	15%	10	2%	425
CBHC	JE0904	345	64%	54	10%	119	22%	21	4%	539
Carcajou	JE0002	11	52%	0	0%	8	38%	2	10%	21
Schmeling	JE0833	20	37%	5	12%	16	47%	2	5%	43
Total		**682**	**66%**	**100**	**10%**	**211**	**21%**	**35**	**3%**	**1,028**

Tools were also classified based on typically used morphofunctional categories in order to provide greater comparability with other lithic analyses not using Lurie and Jeske's (1990) schema. The classifications were systematically derived using the other variables documented in the schema in order to provide an objective definition for each tool type. For instance, a knife is a unifacial, bifacial, or edge-only piece with an edge angle of less than 75 degrees, modified by flaking and/or battering. A scraper is a unifacial or bifacial piece with edges modified by flaking and edge angle greater than 75 degrees. Different analysts may subjectively classify the same artifact as a knife, scraper, or projectile point (see the classification of humpbacked bifaces described in Bluhm and Liss 1961; Brown 1961; Fowler 1952; Jeske 1992; Jeske and Sterner-Miller 2015; Munson and Munson 1972). Use of this schema provides a consistent definition for each morphofunctional type. A list of the tool types used in the Koshkonong assemblage analyses may be found in Appendix A. All four site assemblages were analyzed using the same schema and thus have consistent definitions for each morphofunctional category.

The quantity of formal tools (e.g., drills, knives, projectile points, and scrapers) was dwarfed by the quantity of informal tools, classified as modified edge-only tools in this analysis (Table 6.17).

Table 6.17 Morphofunctional tool types represented in Koshkonong locality lithic assemblages.

	Site Names/Numbers							
Tool Types	**KCV JE0379 (n)**	**KCV JE0379 (%)**	**CBHC JE0904 (n)**	**CBHC JE0904 (%)**	**Carcajou JE0002 (n)**	**Carcajou JE0002 (%)**	**Schmeling JE0833 (n)**	**Schmeling JE0833 (%)**
Bipolar Core	3	0.7%	9	1.7%	0	0.0%	1	2.3%
Bipolar Proj. Pt.	0	0.0%	9	1.7%	0	0.0%	7	16.3%
Core	9	2.1%	10	1.9%	2	7.1%	1	2.3%
Corner-Notched Pt.	2	0.5%	0	0.0%	1	3.6%	0	0.0%
Drill	1	0.2%	2	0.4%	1	3.6%	1	2.3%
Knife	2	0.5%	3	0.6%	1	3.6%	0	0.0%
Madison Pt.	47	11.1%	82	15.2%	3	10.7%	7	16.3%
Nodena Pt.	1	0.2%	0	0.0%	0	0.0%	0	0.0%
Scraper	34	8.0%	73	13.5%	1	3.6%	2	4.7%
Side-Notched Pt.	2	0.5%	0	0.0%	0	0.0%	0	0.0%
Stemmed Pt.	3	0.7%	0	0.0%	1	3.6%	0	0.0%
Unclassified Proj. Pt.	23	5.4%	27	5.0%	2	7.1%	1	2.3%
Modified Edge Only	298	70.1%	324	60.1%	9	32.1%	23	53.5%
Total	**425**		**539**		**21**		**43**	

La Crosse Tool Assemblage Analysis Results

A total of 5,089 artifacts classified as chipped stone tools were analyzed from the La Crosse locality. All of these tools were analyzed previously by Goatley (1995), Vradenburg (1994), Hollinger (1993), Rodell (1989) and Anderson et al. (1995). The tools from the Tremaine complex sites (OT, Filler, and Tremaine) were analyzed using a modified version of Lurie and Jeske's 1990 schema and were most comparable with the Koshkonong lithic assemblages. However, the Pammel Creek and State Road Coulee assemblages were analyzed using the procedures established at the Mississippi Valley Archaeology Center (MVAC). This analysis schema has some overlap with Lurie and Jeske's but records far fewer variables. Only variables recorded for all five site assemblages will discussed here.

While residents of all of the La Crosse locality sites used the same raw materials, the proportions of the assemblage those raw materials represent varies significantly across sites (Table 6.18). Local cherts are the most well represented at all five sites, but that representation varies from 56% to 90% (Figure 6.2). OT, Tremaine and Pammel Creek exhibit much more variety in the types of raw materials utilized. However, Pammel Creek stands as an outlier among all sites. OT and Tremaine's residents emphasized the use of Grand Meadow chert (12-13%) and silicified sandstone (14-30%) in addition to local Prairie du Chien cherts. Pammel Creek's lithic assemblage contains high proportions of tools made from non-local Burlington chert (21%) and Galena chert (21%)—more than double the average from the locality.

Table 6.18 Lithic raw material types utilized at sites in the La Crosse locality.

Site Name	Site No.	Burlington	Cedar Valley	Galena	Grand Meadow	Moline	Pebble Chert	Prairie du Chien	Quartz	Root River	Silicified Sandstone	Silurian	Unidentified
OT	47LC0262	5.5%	4.4%	5.0%	12.1%	0.0%	0.0%	52.6%	0.0%	0.0%	14.3%	1.1%	5.0%
Tremaine	47LC0095	5.1%	0.9%	3.8%	13.2%	0.1%	6.5%	35.3%	0.2%	0.2%	30.4%	0.6%	3.6%
Filler	47LC0149	0.7%	2.2%	7.7%	7.0%	0.0%	2.2%	71.3%	0.0%	0.0%	2.9%	2.9%	2.9%
Pammel Creek	47LC0061	21.0%	0.0%	20.7%	1.0%	2.0%	0.0%	48.0%	0.0%	3.4%	3.0%	0.0%	0.9%
State Road Coulee	47LC0176	10.7%	0.2%	9.4%	0.0%	0.4%	0.0%	72.2%	1.2%	0.0%	1.8%	0.0%	4.0%
Average		**8.6%**	**1.5%**	**9.3%**	**6.6%**	**0.5%**	**1.7%**	**55.9%**	**0.3%**	**0.7%**	**10.5%**	**0.9%**	**3.3%**

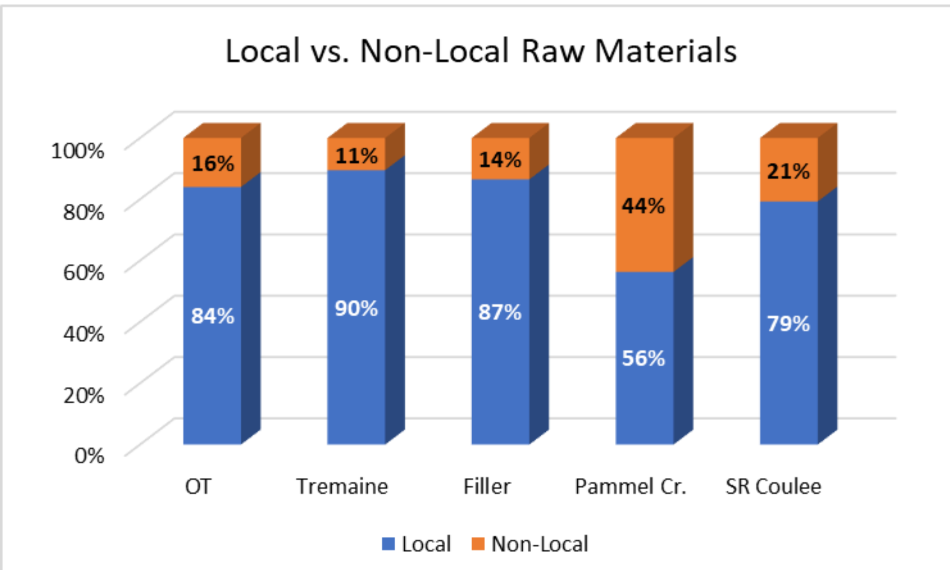

Figure 6.2. Local versus non-local materials in lithic assemblages from the La Crosse locality.

The four basic form categories utilized in the Koshkonong locality assemblage analyses were also recorded for the La Crosse sites (Table 6.19). Prevalence of basic forms also varied significantly between the La Crosse locality sites. No one basic form accounted for more than 50% of the assemblage at any of the sites, but there was at least a 10% variance within each basic form category.

Table 6.19 Basic forms represented in the La Crosse locality lithic assemblages.

Site Name	Site No.	Edge (n)	Edge (%)	Uniface (n)	Uniface (%)	Biface (n)	Biface (%)	Multiface (n)	Multiface (%)	Total
Pammel	LC0061	320	31%	218	21%	354	35%	124	12%	1,016
Tremaine	LC0095	840	49%	444	26%	122	7%	303	18%	1,709
OT	LC0262	107	24%	88	19%	220	49%	37	8%	452
Filler	LC0149	30	8%	110	31%	86	24%	130	37%	356
Coulee	LC0176	603	39%	133	9%	515	33%	305	20%	1,556
Total		**1,900**	**37%**	**993**	**20%**	**1,297**	**25%**	**899**	**18%**	**5,089**

Tools from the La Crosse locality sites were also classified according to typical morphofunctional categories (Table 6.20). There is considerable inter-site variation evident across these categories as well. Some of this variation is no doubt due to differences in analyst category choices and the implicit assumptions made about tool forms. Because of the different methods of analysis used in identifying these tools, comparability of definitions between assemblages is dicey at best. However, it is notable that there is a wide range of variation (12-49%) in the proportions of the assemblages represented by expedient, modified edge-only tools. The low end of this spectrum is the Filler site assemblage, which is dominated by 29% cores. Modified edge-only tools were a catch-all category including Goatley's (1995:152-154) "retouched flakes", "retouched pebbles", and "utilized flakes", as well as Rodell's (1989:99) "utilized flakes," and Anderson et al.'s (1995:74) "modified/utilized flakes."

Table 6.20 Morphofunctional tool types represented in La Crosse locality lithic assemblages.

	Site Names/Numbers									
Tool Type	Pammel LC0061 (n)	Pammel LC0061 (%)	Tremaine LC0095 (n)	Tremaine LC0095 (%)	OT LC0262 (n)	OT LC0262 (%)	Filler LC0149 (n)	Filler LC0149 (%)	Coulee LC0176 (n)	Coulee LC0176 (%)
Biface	294	29%	90	5%	85	19%	41	12%	198	13%
Blade	0	0%	45	3%	9	2%	13	4%	0	0%
Core	144	14%	311	18%	37	8%	105	29%	305	20%
Drill	34	3%	45	3%	24	5%	9	3%	87	6%
Gouge	0	0%	3	0%	0	0%	0	0%	0	0%
Graver	0	0%	20	1%	13	3%	4	1%	8	1%
Knife	13	1%	0	0%	0	0%	5	1%	7	0%
Madison Pt.	24	2%	213	12%	104	23%	43	12%	223	14%
Scraper	101	10%	429	25%	78	17%	81	23%	118	8%
Spokeshave	0	0%	7	0%	0	0%	0	0%	0	0%
Unclassified Proj. Pt	0	0%	47	3%	0	0%	1	0%	7	0%
Uniface	66	6%	20	1%	7	2%	13	4%	0	0%
Wedge	0	0%	13	1%	0	0%	0	0%	0	0%
Modified Edge Only	340	33%	466	27%	95	21%	41	12%	603	39%
Total	**1,016**		**1,709**		**452**		**356**		**1,556**	

Comparison of Koshkonong and La Crosse Tool Assemblage Analysis Results

Residents of both localities were both utilizing primarily local raw materials; 90-100% in the Koshkonong locality and 79-90% in the La Crosse locality. Pammel Creek, is an outlier at only 56% local raw material utilization (Figures 6.1 and 6.2). Since the Koshkonong and La Crosse localities are located approximately 250 kilometers apart, the raw materials that are considered local (with a source less than 40 km away) are expected to differ between localities. A correspondence analysis (CA) was run on the ten raw material types that accounted for at least 3% of the total assemblage from at least one of the sites sampled for this project. Raw materials from the debitage analyses at Carcajou Point and State Road Coulee were included in this analysis to bolster the sample size. The raw material types included were: Burlington chert, Cedar Valley chert, Galena chert, Grand Meadow chert, Moline chert, Prairie du Chien chert (including both Oneota and Shakopee formations), Quartz, Root River chert, Silicified Sandstone, and Silurian chert. The CA indicates that the two localities do indeed separate out based on raw material type. However, significant intra-locality variation is also visible on the CA plot (Figure 6.3).

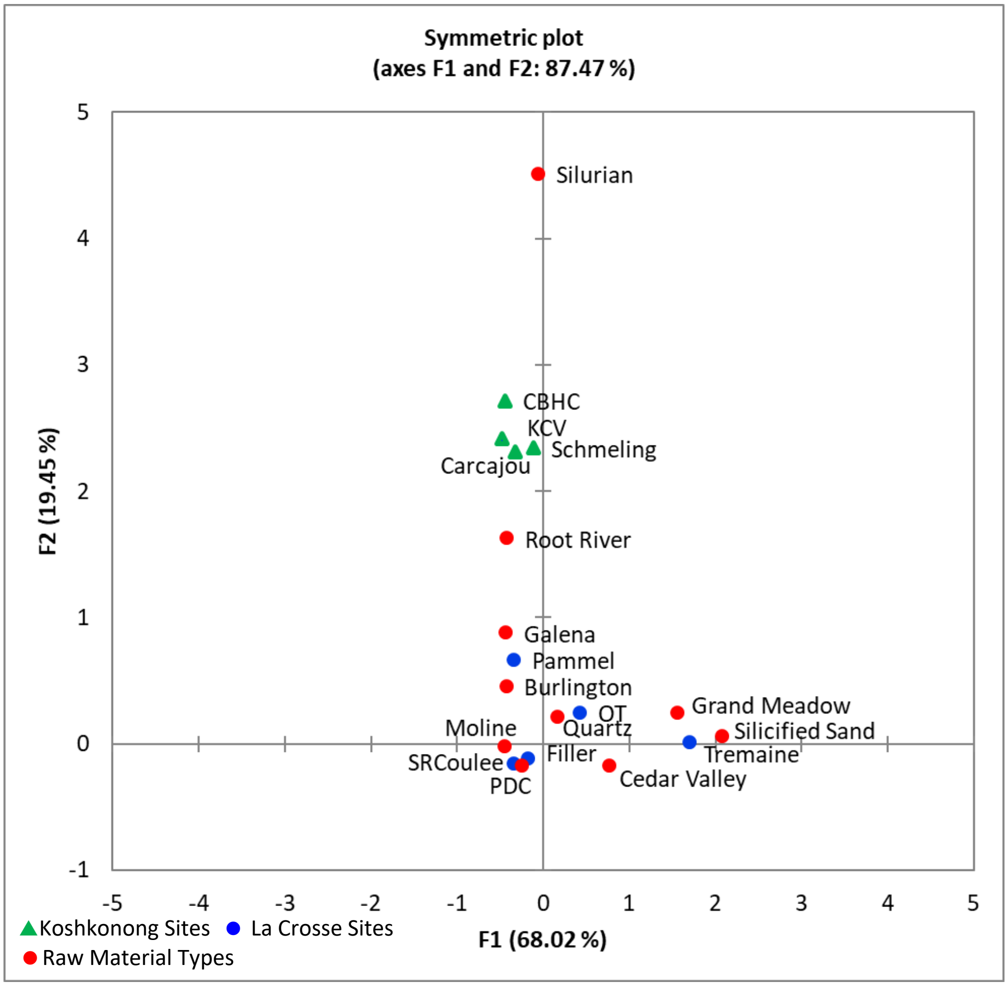

Figure 6.3. CA using ten raw material types and all nine sites from both localities.

The second dimension of the analysis, on the vertical axis, indicates that the two localities separate primarily on the basis of Silurian chert. Silurian composes less than 1% of all of the La Crosse site assemblages but at least 6% of Koshkonong site assemblages. The first dimension, on the horizontal axis, separates Tremaine from the other sites mainly because its assemblage is so dominated by silicified sandstone. The tight clustering of the Koshkonong sites in the CA plot indicates that the raw material composition of these assemblages is less varied than those from La Crosse. A cluster dendrogram illustrates the same thing (Figure 6.4).

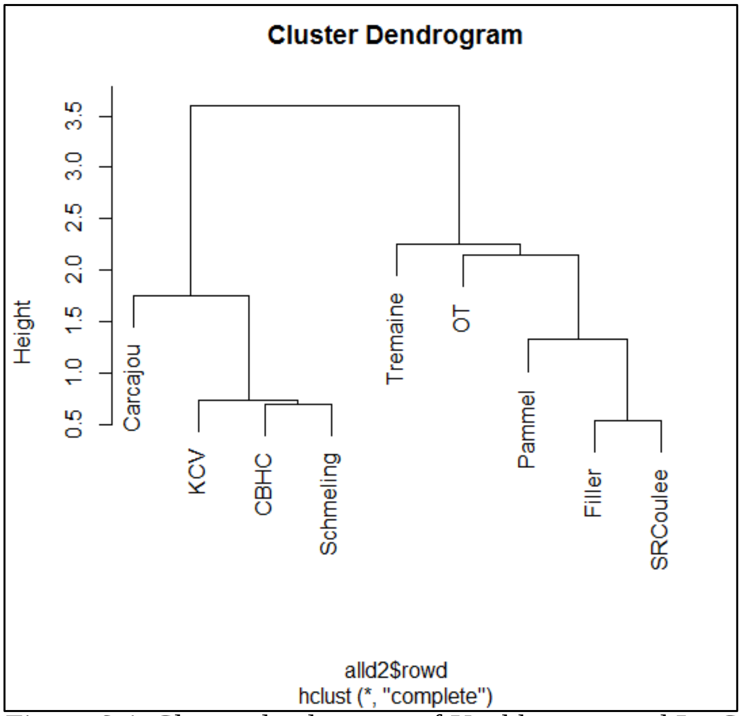

Figure 6.4. Cluster dendrogram of Koshkonong and La Crosse sites.

The cluster analysis joins Carcajou Point to the other three Koshkonong sites last because it contains a slightly higher concentration of Silurian chert than the other sites. Tremaine is added last to the La Crosse sites because of its high proportion of silicified sandstone. Shannon's Entropy Index was calculated for each of the nine sites (Table 6.21). Low values of the Shannon entropy statistic indicate low diversity and a higher value indicates more diversity (Shannon 1948). The entropy scores of these samples show that lithic raw materials used at La Crosse locality sites are more diverse than those used at Koshkonong locality sites. While the high Koshkonong standard deviations observed in the debitage assemblage suggested more variability at Koshkonong, these entropy scores suggest the opposite. This means that the higher debitage standard deviations are likely the result of low sample size, not actual diversity in the assemblages.

Table 6.21 Shannon's Entropy Index for raw materials at Koshkonong and La Crosse sites.

Koshkonong Locality Sites			La Crosse Locality Sites		
Site Name	**Site No.**	**Entropy**	**Site Name**	**Site No.**	**Entropy**
KCV	47JE0379	1.473	Pammel Creek	47LC0061	1.842
CBHC	47JE0904	1.382	Tremaine	47LC0095	2.303
Carcajou	47JE0002	1.151	OT	47LC0262	1.612
Schmeling	47JE0833	0.921	Filler	47LC0149	1.842
			SR Coulee	47LC0176	1.612
Average		**1.232**			**1.842**

CA of basic tool form indicates that there is nearly as much inter-site variation in basic tool form as there is inter-locality variation (Figure 6.5).

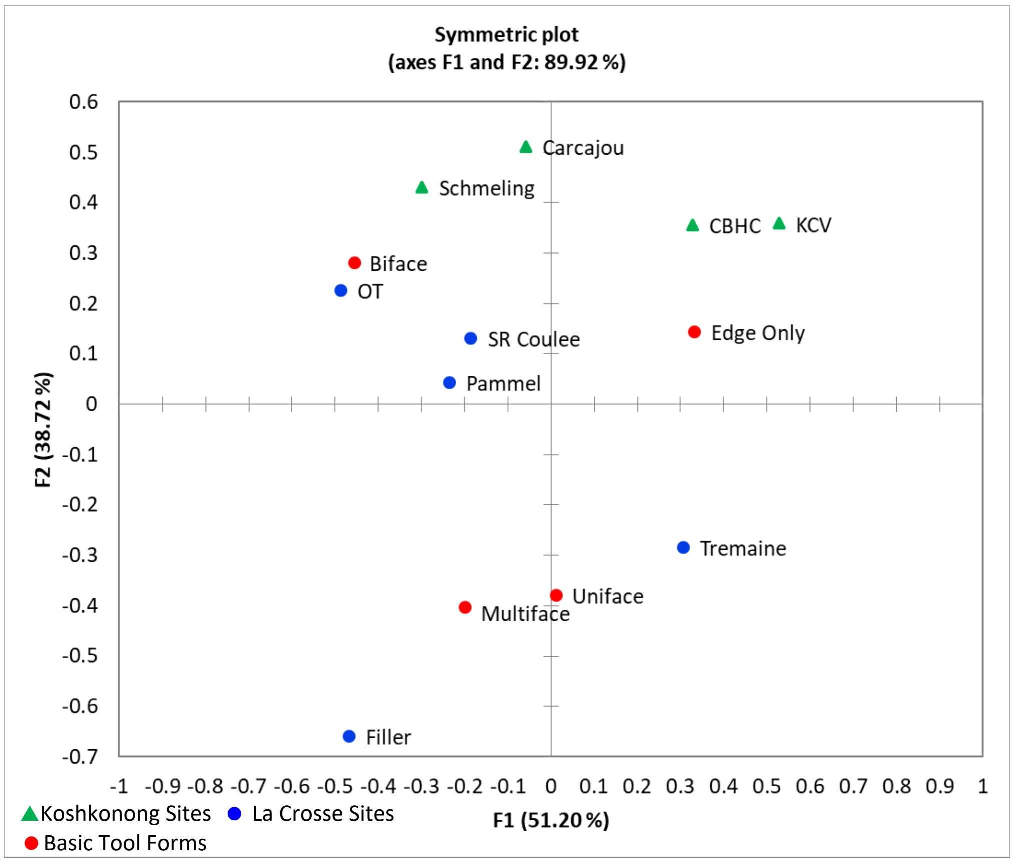

Figure 6.5. CA using four basic forms and all nine sites from both localities.

The first dimension of analysis, on the horizontal axis, separates the sites with a high representation of edge only tools (KCV, Crescent Bay and Tremaine) from those with a high quantity of bifaces (Schmeling, Carcajou, and OT). The second dimension of analysis, on the vertical axis, separates sites with a high quantity of unifacial tools (Tremaine, 26% and Filler, 31%) from those without. The State Road Coulee and Pammel Creek sites cluster closer to the center of the plot because they show a relatively even distribution of the four basic tool forms. The results of this CA suggest that the sites from the Koshkonong locality are slightly less diverse than La Crosse, but the Shannon Index suggest that the difference is not significant.

CA of the morphofunctional tool types represented in two localities provides a bit more separation (Figure 6.6). CA was conducted on the five morphofunctional tool categories that were common to the analyses of all nine site assemblages and had a n greater than one: core, drill, Madison point, scraper, and modified edge-only tool. However, as noted earlier, the definitions of these tool types are subjective and may not be completely comparable.

The CA plot indicates that the sites separate along the first dimension based on those sites with a high percentage of modified edge-only tools: Crescent Bay, KCV, Carcajou Point, Schmeling, State Road Coulee and Pammel Creek. At least 45% of the chipped stone tool assemblage at these sites is made up of modified edge-only tools. The second dimension separates those sites with a high percentage of cores and low percentage of scrapers (Carcajou Point, Pammel Creek, State Road Coulee and Filler) from sites with a more even distribution of these tool types. This separation is more tenuous, due to issues of inter-analyst variability in type identification. This CA, like the one for lithic raw material type, indicates greater diversity in the La Crosse assemblages than the Koshkonong ones. The entropy scores for this variable support this assertion, although Carcajou Point is an outlier in this case (Table 6.22).

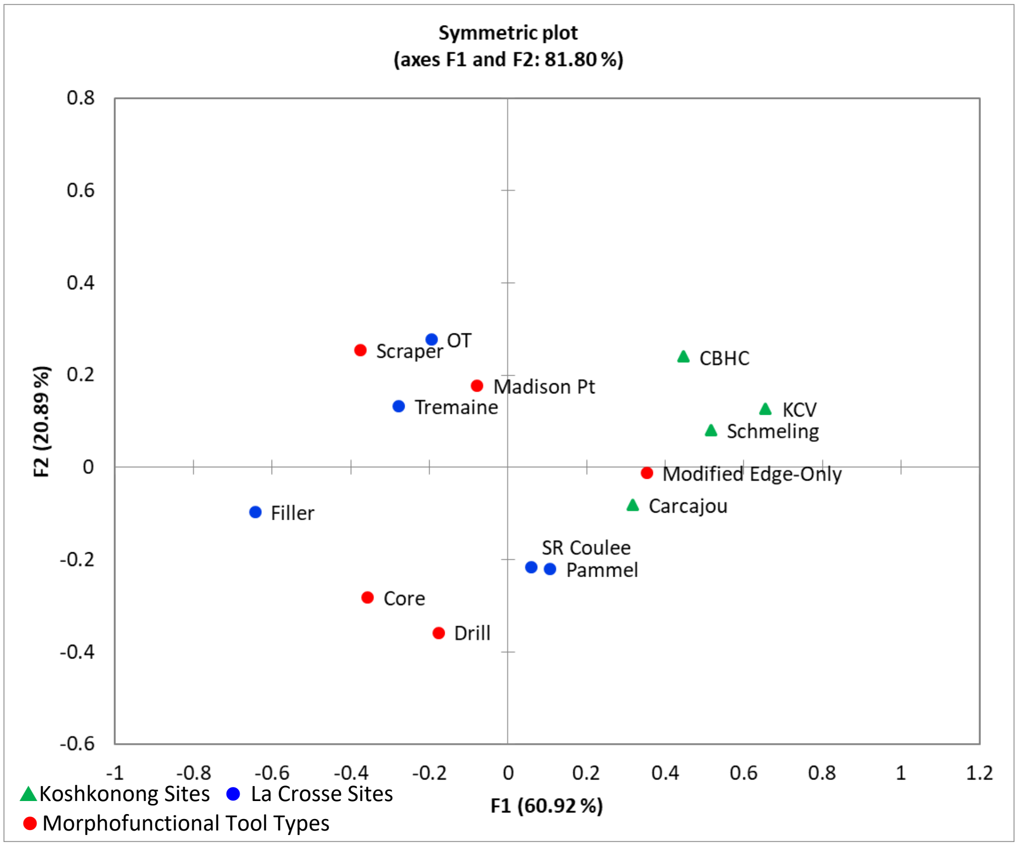

Figure 6.6. CA using five tool types and all nine sites from both localities.

Table 6.22 Shannon's Entropy Index for tool types at Koshkonong and La Crosse sites.

Koshkonong Locality Sites			La Crosse Locality Sites		
Site Name	**Site No.**	**Entropy**	**Site Name**	**Site No.**	**Entropy**
KCV	47JE0379	0.797	Pammel Creek	47LC0061	1.241
CBHC	47JE0904	1.005	Tremaine	47LC0095	1.441
Carcajou	47JE0002	1.244	OT	47LC0262	1.488
Schmeling	47JE0833	1.027	Filler	47LC0149	1.408
			SR Coulee	47LC0176	1.387
Average		**1.018**			**1.393**

The small sample size and multicomponent nature of the occupation at Carcajou Point makes the much higher diversity index less relevant than it might otherwise be. While lithics used in this analysis were only sampled from feature contexts containing shell tempered pottery, a much larger sample from a temporally discrete area of the site is needed before any conclusions about the site's place in the Koshkonong locality can be drawn.

Hall (1962:121-122) noted a pattern in the relationship of end scrapers to triangular projectile points at Oneota tradition sites:

> Seen in broad perspective, end scrapers, for instance, have a distribution in time and space which suggests that they have diagnostic value as an Oneota determinant only in local sequences. The relative frequency of end scrapers is highly variable among components of the Oneota Aspect, and while they are very common on many Oneota sites, their prevalence in those places would seem to be governed to a great extent by the factors of time and location. The tabulation of an "end scraper index" for a variety of sites shows that the proportion of end scrapers relative to triangular points increases toward recent times and toward the Plains area (Table 14). End scrapers are uncommon at Carcajou Point.

Following Hall, Boszhardt and McCarthy (1999) also calculated the scraper/point index at numerous Oneota sites throughout Iowa, Minnesota, Wisconsin and Illinois and like Hall, found a trend toward higher scraper/point indexes at sites further west. Boszhardt and McCarthy (1999:181) noted that high scraper frequencies (greater than 300) were found mostly in the heart of the Plains, there were substantial scraper frequencies over much of the Prairie Peninsula, and that low frequencies (of less than 100) were found at Oneota sites in eastern Wisconsin and northeastern Illinois. Boszhardt and McCarthy used this distribution to support a Plains/bison correlation for high quantities of scrapers. However, the scraper/point indexes at the five La Crosse locality sites sampled for this study vary wildly, ranging from 53 to 421 (Table 6.23). The only site with an index above 200 is Pammel Creek, which has a very different tool profile than the other sites. While the mean of the localities seems large (56-187), the LaCrosse mean has a standard deviation of 146. These data suggest that the correlations between geography, scraper production, and bison processing are not clear cut.

Table 6.23 Scraper/point indexes at Koshkonong and La Crosse locality sites.

Site Name	Site No.	Scraper/Point Index
CBHC	47JE0904	89
KCV	47JE0379	72
Carcajou Point	47JE0002	33
Schmeling	47JE0833	29
Pammel Creek	47LC0061	421
Tremaine	47LC0095	200
OT	47LC0262	75
Filler	47LC0149	188
State Road Coulee	47LC0176	53
Koshkonong Average		**56**
La Crosse Average		**187**
Koshkonong Std. Dev.		**29**
La Crosse Std. Dev.		**146**

Chi-square tests were also run on the entire suite of assemblage data from Crescent Bay and KCV and 100 tool stratified random samples from Tremaine and Pammel Creek analyzed prior to the microwear analysis portion of this project. The chi-square results also demonstrate significant differences between the two localities (Table 6.24). The only variable tested that did not differ significantly between La Crosse and Koshkonong was the proportion of broken to complete tools.

Table 6.24 Chi-square results comparing production characteristics between two localities.

Production Variable	df	chi-sq	p-value	Significant at 0.05?
Raw material quality	2	44.563	<0.0001	Yes
Amount of cortex	2	28.391	<0.0001	Yes
Heat treatment	1	25.172	<0.0001	Yes
Basic tool form	3	52.000	<0.0001	Yes
Method of modification	3	41.523	<0.0001	Yes
Completeness	1	1.999	0.157	No
Hafting	1	104.413	<0.0001	Yes

T-tests were conducted comparing measurements of tool size between the two localities (Table 6.25). There were significant differences between length and thickness of tools in Koshkonong versus La Crosse, but no significant differences in width or weight. The only significant intra-locality differences are the greater length of tools at Pammel Creek in comparison to Tremaine. Pammel Creek tools average 31 mm in length whereas Tremaine tools average only 25 mm. Otherwise, the size of lithic tools appears relatively homogenous, both intra- and inter-locality. However, these results mask the greater intra-locality variability demonstrated by chi-square tests and more nuanced t-tests.

Table 6.25 T-test results comparing tool size in two localities.

Variable	p-value	Significant at 0.05?
Koshkonong versus La Crosse		
Length	<0.0001	Yes
Width	0.0711	No
Thickness	0.0378	Yes
Weight	0.3362	No
Tremaine versus Pammel Creek		
Length	0.0009	Yes
Width	0.0926	No
Thickness	0.0592	No
Weight	0.5790	No
Crescent Bay versus KCV		
Length	0.4526	No
Width	0.7403	No
Thickness	0.7704	No
Weight	0.7857	No

T-tests comparing Pammel Creek and Tremaine tool metrics to Koshkonong metrics demonstrate that the Pammel Creek tools are the ones that account for most of the differences between the two localities. There are no significant differences between Koshkonong and Tremaine site tool metrics (Table 6.26).

Table 6.26 T-test results comparing tool size in two localities.

Variable	p-value	Significant at 0.05?
Koshkonong versus Pammel Creek		
Length	<0.0001	Yes
Width	0.0126	Yes
Thickness	0.0036	Yes
Weight	0.1274	No
Koshkonong versus Tremaine		
Length	0.3951	No
Width	0.8719	No
Thickness	0.7778	No
Weight	0.7917	No

While Koshkonong tools were not significantly smaller than Tremaine tools in most cases, they were significantly smaller than Pammel Creek tools (Table 6.27). This divergence suggests that Koshkonong residents were economizing their lithic raw materials, curating and resharpening their tools. The differences between Tremaine and Pammel Creek, although only statistically significant for tool length, highlight the variability in the locality. The larger size of tools at Pammel Creek is not the result of higher quality raw materials, as good quality materials are much more prevalent at Tremaine. It is also not a result of the high quantity of Burlington at Pammel Creek as the largest tools from the site are not made from Burlington. The most likely explanation is that fewer tools were resharpened and reused at Pammel Creek, probably due to the much shorter occupation at the site—only fifty years according to Boszhardt (1989:84).

Table 6.27 Average metrics for Koshkonong, Tremaine and Pammel Creek tools.

	Koshkonong Avg.	Tremaine Avg.	Pammel Cr. Avg.	Koshkonong Std. Dev.	Tremaine Std. Dev.	Pammel Cr. Std. Dev.
Length (mm)	25.26	26.28	31.39	9.67	9.86	9.59
Width (mm)	18.25	18.37	19.92	6.52	6.29	5.99
Thickness (mm)	5.97	6.06	6.82	3.41	2.84	2.54
Weight (g)	3.91	4.14	4.65	7.33	7.31	3.72

Correspondence analysis indicated a large amount of intra-locality variation in La Crosse. T-tests show that variation in the size of stone tools is relatively minimal, but categorical variation is ubiquitous across all production characteristics (Table 6.28). Clearly, there is a difference in the acquisition and use of raw materials between the two sites.

Table 6.28 Chi-square results comparing production characteristics between Pammel Creek and Tremaine.

Production Variable	df	chi-sq	p-value	Significant at 0.05?
Raw material quality	2	44.058	<0.0001	Yes
Amount of cortex	2	18.536	<0.0001	Yes
Heat treatment	1	12.305	0.0005	Yes
Basic tool form	2	8.231	0.0163	Yes
Method of modification	3	31.647	<0.0001	Yes
Completeness	1	14.991	0.0001	Yes
Hafting	1	46.162	<0.0001	Yes

However, the Koshkonong locality also contains intra-locality variation. The CA plot clusters the Koshkonong sites closely together based on raw material types but the locality is not homogenous in all characteristics. There is significant variation in the amount of cortex, prevalence of basic tool forms, and prevalence of different methods of modification in evidence at Crescent Bay and KCV (Table 6.29).

Table 6.29 Chi-square results comparing production characteristics between Crescent Bay and KCV.

Production Variable	df	chi-sq	p-value	Significant at 0.05?
Raw material quality	2	5.267	0.718	No
Amount of cortex	2	26.301	<0.0001	Yes
Heat treatment	1	0.323	0.570	No
Basic tool form	3	10.751	0.013	Yes
Method of modification	3	9.040	0.028	Yes
Completeness	1	2.687	0.101	No
Hafting	1	0.997	0.318	No

The much greater prevalence of use-wear only tool modification at Crescent Bay (33%) than KCV (19%) may be partially due to analyst experience. The analyst conducting the KCV analysis did not have use-wear experience and while he could observe macroscopic edge damage, he may not have recognized as many unretouched tools.

However, analytic experiences do not explain differences noted for the amount of cortex. The pattern of cortex versus non-cortical flakes may indicate differences in the knapping practices between the two sites. At Crescent Bay, 53% of tools still retain some cortex while only 26% of tools at KCV do, which mirrors the debitage analysis results. A full 50% of Crescent Bay debitage retains cortex while only 35% of debitage from KCV does so. The low debitage to tool ratio at Crescent Bay indicates that the primary production of tools occurred away from the village. The even lower amount of cortex and debitage to tool ratio at KCV suggest that even less production occurred at this village. If economization and expediency were important at Crescent Bay, they were even more so at KCV. It is possible that more intensive agricultural activity at KCV (e.g., Edwards 2017:152) resulted in less emphasis on lithic production (following Jeske 1992). The microwear results support this inference.

Previously, tool production characteristics, raw material types, and ideas about tool function based on formal characteristics have been the main avenues for understanding diversity in Oneota stone tools (Anderson et al. 1995; Boszhardt and McCarthy 1999; Gibbon 1969; Hall 1962; Lambert 2001; O’Gorman 1995; Overstreet 1976; Padilla and Ritterbush 2005; Rodell 1989; Salkin 1989). However, beyond morphological and compositional diversity, functional diversity provides another avenue toward understanding lithic variety in the Oneota world. Microwear and protein residue analyses afford a more representative view of lithic tool function than inferences based on tool form.

Microwear Analysis Results

Microwear analysis was conducted on a sample of 600 lithic artifacts identified as tools during assemblage analysis. Unlike the assemblage analyses, all the microwear analysis was conducted by the author and the methods were uniform across the four sites sampled (Chapter 5). A 300-tool sample was examined from Crescent Bay and 100-tool samples were examined from KCV, Pammel Creek and Tremaine. All tools that exhibited use-wear are photographically documented in Appendix B.

Koshkonong Microwear Analysis Results

A total of 400 tools from the Koshkonong locality were examined for microwear. Of these, 175 (44%) displayed traces of wear from use, 140 (35%) were unused informal (modified edge-only tools in the assemblage analysis) tools, and 85 (21%) were formal tools (able to be placed in a morphofunctional category) exhibiting no use-wear (Table 6.30).

Table 6.30 Use-wear results from the Koshkonong locality assemblages.

Site Name	Site No.	Used (n)	Used (%)	Unused (n)	Unused (%)	Formal (n)	Formal (%)	Total
KCV	47JE0379	39	39%	39	39%	22	22%	100
CBHC	47JE0904	136	45%	101	34%	63	21%	300
Total		**175**	**44%**	**140**	**35%**	**85**	**21%**	**400**

Nine different contact materials were identified during microwear analysis of the Koshkonong locality assemblages: bone, dry hide, wet hide, meat, plant, wood, unidentified hard material (evidenced by the presence of smooth pitted polish), unidentified soft material, and indeterminate materials. Six tools were also identified as having extended contact with multiple materials. The contact material profiles for Crescent Bay and KCV look fairly similar (Table 6.31). The only notable differences are a higher prevalence of dry hide polish at Crescent Bay and a higher prevalence of plant polish at KCV. This latter observation is somewhat surprising given that recent paleobotanical analyses have suggested that more intensive maize processing took place at Crescent Bay than at KCV (Edwards 2017:154). However, Edwards (2017:155) also notes that an alternative explanation for the difference in the ratio of kernels to cupules at the sites may be that site residents used a different technique to remove the kernels from the cobs. Experiments with the UWM Experimental Archaeology Working Group have shown that cutting of kernels from green (or milk stage) sweet corn cobs produces heavy, diagnostic plant polish similar to many of the examples from KCV.

Table 6.31 Contact materials identified at Koshkonong locality sites.

Contact Material	**KCV 47JE0379 (n)**	**KCV 47JE0379 (%)**	**CBHC 47JE0904 (n)**	**CBHC 47JE0904 (%)**
Bone	1	1%	7	2%
Dry Hide	1	1%	18	6%
Hard (Smooth Pitted)	5	5%	22	7%
Indeterminate	25	25%	68	23%
Meat	10	10%	38	13%
Plant	9	9%	9	3%
Soft	0	0%	4	1%
Wet Hide	5	5%	10	3%
Wood	5	5%	9	3%
Multiple	0	0%	6	2%
No Use-wear	39	39%	109	36%
Total	**100**		**300**	

The most common specific contact material at both sites was meat, suggesting that butchering and meal preparation activities were some of the most ubiquitous uses for stone tools in the locality. Wet hide was also common, supporting this interpretation.

Dry hide scraping was much more common at Crescent Bay than at KCV. The proportion of unifacial tools exhibiting use-wear is much higher at KCV (60%) than at Crescent Bay (33%) (Table 6.32). Scrapers are typically unifacially produced and exhibit traces of use in a transverse, as opposed to a longitudinal motion. However, the transverse to longitudinal motion index at

Crescent Bay is 158, much higher than the index of 63 from KCV. Transverse (i.e. scraping) motions were much more common at Crescent Bay. The evidence as a whole indicates that there was significantly more scraping activity at Crescent Bay than at KCV.

Table 6.32 Proportion of basic forms exhibiting use at Koshkonong locality sites.

	KCV (47JE0379)			**CBHC (47JE0904)**		
	n Used	**n Sampled**	**% Used**	**n Used**	**n Sampled**	**% Used**
Biface	7	24	29%	30	65	46%
Edge Only	22	55	40%	94	196	48%
Multiface	1	6	17%	1	6	17%
Uniface	9	15	60%	11	33	33%

Comparison of the use-wear data from Crescent Bay and KCV supports the inference that agricultural activities took precedence over other activities at KCV. The higher prevalence of plant wear and lower prevalence of dry hide wear at KCV support Edwards' (2017:151-152) assertion that Crescent Bay residents had a more diverse diet than KCV residents.

La Crosse Microwear Analysis Results

A total of 200 tools from the La Crosse locality were examined for microwear. Of these, 102 (51%) displayed traces of wear from use, 45 (23%) were unused informal (unidentified tools in the assemblage analysis) tools, and 53 (27%) were formal tools (able to be placed in a morphofunctional category) exhibiting no use-wear (Table 6.33).

Table 6.33 Use-wear results from La Crosse locality assemblages.

Site Name	**Site No.**	**Used (n)**	**Used (%)**	**Unused (n)**	**Unused (%)**	**Formal (n)**	**Formal (%)**	**Total**
Pammel	47LC0061	56	56%	25	25%	19	19%	100
Tremaine	47LC0095	46	46%	20	20%	34	34%	100
Total		**102**	**51%**	**45**	**23%**	**53**	**27%**	**200**

The same nine different contact materials identified at Koshkonong sites were identified during microwear analysis of the La Crosse locality assemblages: bone, dry hide, wet hide, meat, plant, wood, unidentified hard material (evidenced by the presence of smooth pitted polish), unidentified soft material, and indeterminate materials (Table 6.34). There were no tools identified as having extended contact with multiple materials. The contact material profiles for Pammel Creek and Tremaine look relatively similar for meat, hide, and plant contacts, but differ on contact with hard material (wood and bone). Hard material contact was found on 29% of the Pammel Creek sample while only 4% of the Tremaine sample shows traces of use on hard materials, which is a statistically significant difference. If lithic tool function is inferred to reflect site function, these data point to significant differences in the functions of the Pammel Creek and Tremaine sites, or at the very least differences in the activities undertaken at those sites.

Table 6.34 Contact materials identified at La Crosse locality sites.

Contact Material	Pammel Creek 47LC0061 (n)	Tremaine 47LC0095 (n)
Bone	7	0
Dry Hide	2	4
Hard	12	4
Indeterminate	6	9
Meat	7	7
Plant	5	4
Soft	0	7
Wet Hide	7	11
Wood	10	0
No Use-wear	44	54
Total	100	100

Despite the much shorter occupation at Pammel Creek, the faunal assemblage exhibits a higher minimum number of individuals (MNI) in every class except mammals (Styles and White 1995:217). Additionally, more than twice as many bone and antler tools were recovered from Pammel Creek as Tremaine (Theler 1989:218-221). Styles and White (1995:217) note that this may be a reflection of the poor preservation of bone at Tremaine. However, the use-wear data suggests that Pammel Creek residents were using lithics to produce more bone and wood tools than Tremaine residents were. Wear from bone and hard materials may not only be from using stone tools to produce objects from those materials, but also from using those materials to produce stone tools. Experiments conducted by myself and others (e.g., Loebel, personal communication 2018) indicate that antler and bone wear may result from knapping, particularly pressure flaking with bone or antler tools. When combined with the high debitage to core ratio from Pammel Creek, the prevalence of bone and general hard material wear supports the assertion that lithic tool production was much more common at Pammel Creek than at Tremaine.

An examination of the proportion of sampled basic tool forms exhibiting use-wear from the site highlights a discrepancy between the two sites (Table 6.35). Tremaine and Pammel Creek have relatively equal proportions of edge only tools that do not exhibit use-wear but they differ in the proportions of bifacial and unifacial (i.e., formal) tools that were unused. Tremaine has a higher proportion of formal tools that exhibited no traces of use-wear, which is very likely due to the high quantity of silicified sandstone in the Tremaine assemblage. Silicified sandstones and quartzites do not typically display the same use polishes that chert does (Hill et al. 2017). Therefore, unused tools at Tremaine are probably overrepresented due to an inability to discern traces of use-wear on silicified sandstone.

Table 6.35 Proportion of basic forms exhibiting use-wear at La Crosse locality sites.

	Pammel Creek (47LC0061)			**Tremaine (47LC0095)**		
	n Used	**n Sampled**	**% Used**	**n Used**	**n Sampled**	**% Used**
Biface	12	24	50%	3	11	27%
Edge Only	21	42	50%	32	60	53%
Uniface	23	34	68%	11	29	38%

The primary activities conducted at Tremaine appear to be concentrated on food and hide processing, evidenced by the prevalence of hide, meat, and, to a lesser extent, plant polishes. At Pammel Creek, lithic tools were used primarily for the production of objects made from hard materials like wood, antler, or bone. Meat, hide, and plant processing also occurred at Pammel

Creek, but to a slightly lesser extent than at Tremaine. Even though the scraper/point index from Pammel Creek is twice as high as the one from Tremaine, use-wear indicates more hide scraping (both dry and fresh) at Tremaine than Pammel Creek.

Comparison of Koshkonong and La Crosse Microwear Analysis Results

A CA of the contact materials manifested in the use-wear analyses of the four sites from the Koshkonong and La Crosse areas indicates a significant difference between the localities (chi-square=63.835; df=24; p-value=<0.0001) (Figure 6.7). The first dimension of the CA separates sites with a high proportion of soft contact materials (Tremaine) from those with wood and bone contact (Pammel Creek, KCV, and Crescent Bay). The second dimension separates those sites with a high proportion of meat polish (Crescent Bay and KCV) from those with a smaller proportion of the use assemblage represented by meat contact (Tremaine and Pammel Creek). Just as with the tool assemblage analysis results, there appears to be more diversity in the use-wear in the La Crosse assemblages than in the Koshkonong assemblages.

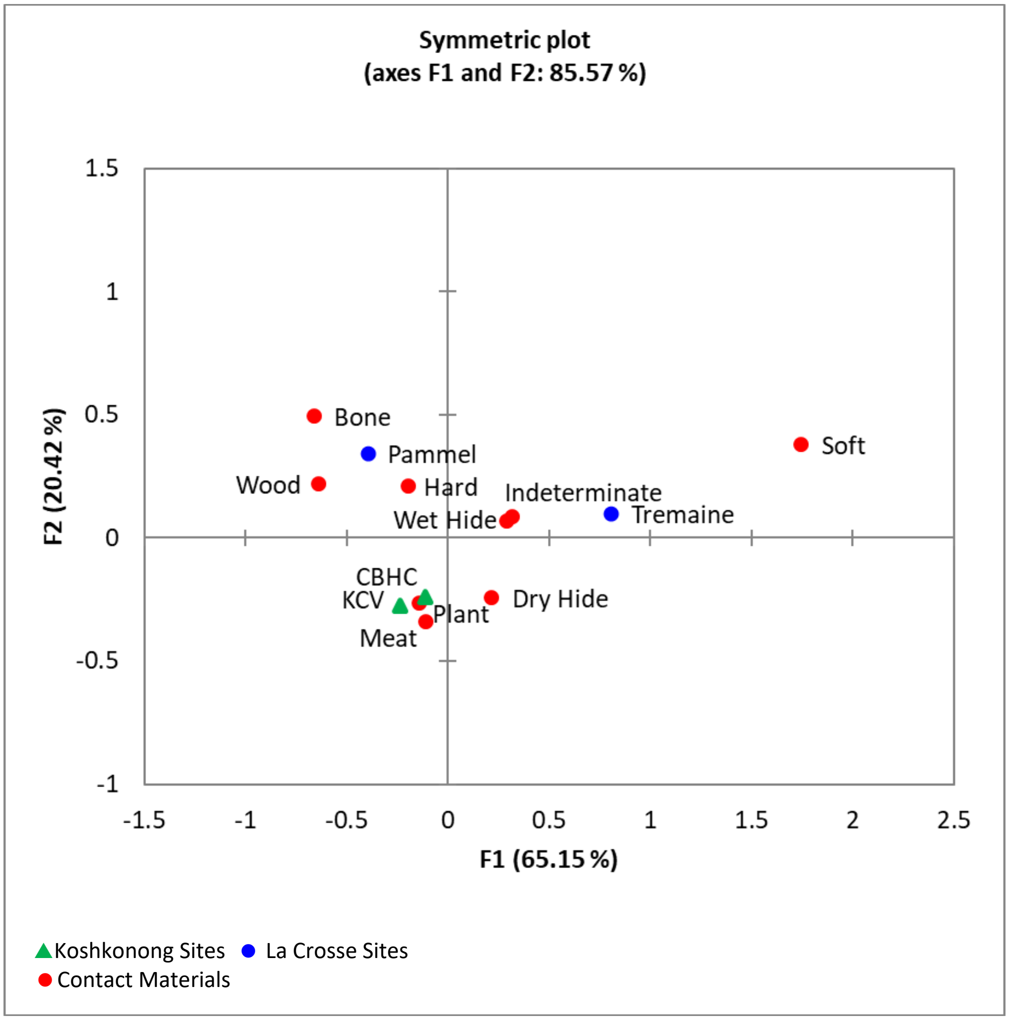

Figure 6.7. CA using nine contact materials and four sites from both localities.

A calculated Shannon's Entropy Index for the sites using the use-wear variable indicates no difference between in the indices for the two localities (Table 6.36).

Table 6.36 Shannon's Entropy Index for contact materials at Koshkonong and La Crosse sites.

Koshkonong Locality Sites			**La Crosse Locality Sites**		
Site Name	**Site No.**	**Entropy**	**Site Name**	**Site No.**	**Entropy**
KCV	47JE0379	1.724	Pammel Creek	47LC0061	1.849
CBHC	47JE0904	1.856	Tremaine	47LC0095	1.712
Average		**1.790**			**1.781**

This lack of differentiation is not surprising given the relatively small sample sizes and the diversity of contact materials in all four of the sample tool assemblages. However, the proportions of the contact material types at the Koshkonong sites are much more similar to each other than the profiles of the La Crosse sites (Figure 6.8). While all four sites have diverse assemblages when it comes to the contact material types represented, the two sites from the La Crosse locality diverge from each other more than the Koshkonong sites do. In fact, Pammel Creek more closely resembles KCV and Crescent Bay than it does Tremaine, a fact that is visible on both the CA plot (Figure 6.7) and the bar graph (Figure 6.8). A series of t-tests indicates that the high proportion of wet hide and indeterminate soft materials at Tremaine makes it different from the other three sites (Table 6.37).

Table 6.37 Results of t-tests comparing proportions of soft and wet hide wear at Tremaine and other sample sites.

Sites Tested		p-value	Interpretation
Tremaine	Crescent Bay	<0.0001	Difference of means
Tremaine	KCV	<0.0001	Difference of means
Tremaine	Pammel Creek	<0.0001	Difference of means

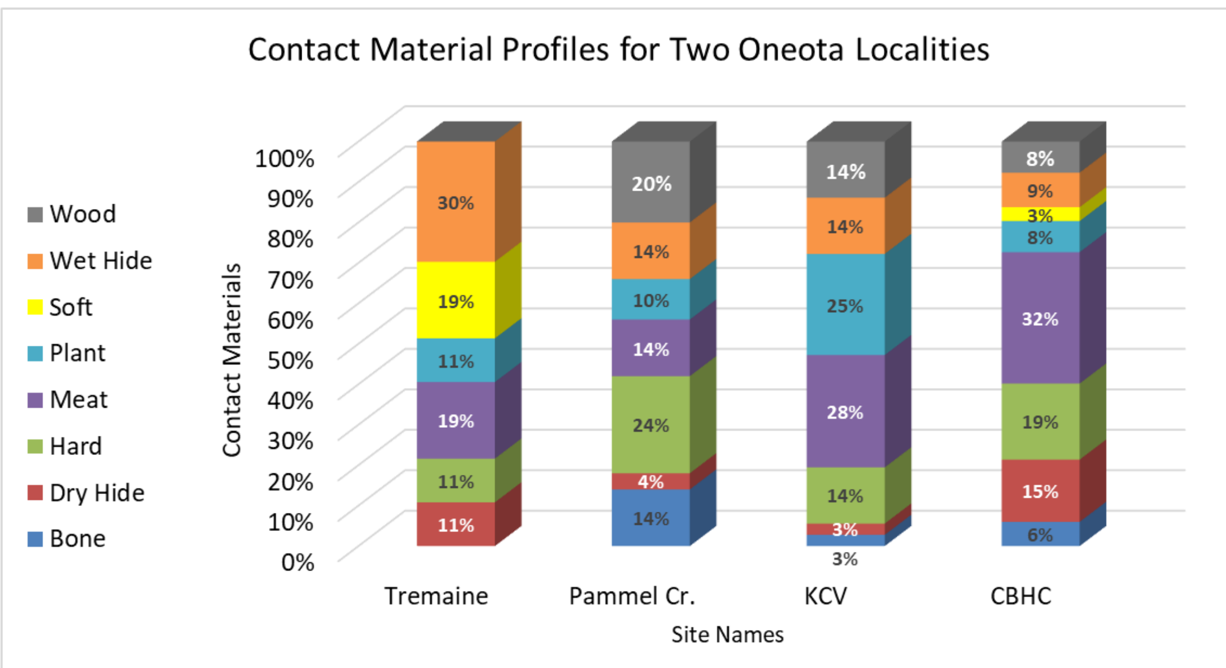

Figure 6.8. Contact materials represented in the lithic assemblages from sites in the Koshkonong and La Crosse localities.

The data from the lithic tool assemblage analysis, debitage analysis and use-wear analysis all support the assertion that there is as much inter-site variation in the lithics from Oneota sites in La Crosse as there is inter-locality variation. The higher proportion of general soft materials at Tremaine is likely indicative of more meat or hide polish that was not diagnostic due to the lithic raw materials in use. If that is the case, the prevalence of meat and hide polish is much higher at Tremaine than at Pammel Creek or the Koshkonong sites. Higher prevalence of meat and hide wear at Tremaine is probably the result of greater emphasis on meat consumption than maize consumption (Edwards 2017:211).

While Pammel Creek's lithic assemblage is different from both the Tremaine and Koshkonong lithics based on the assemblage analysis, the use-wear data highlight similarities between Pammel Creek and the Koshkonong sites. However, despite similarities in the general variety of types of wear evident at Pammel Creek and Koshkonong sites, the only type of wear that displays comparable proportions across the localities is wet hide polish. All other contact materials differ in ubiquity not just between Pammel Creek and Koshkonong but between the two Koshkonong sites as well. Wear from meat, bone, and general hard materials are comparably represented at KCV and Crescent Bay, but the prevalence of all other types of wear differs by 5-17 percentage points. The continuity displayed among Koshkonong sites in the assemblage analysis is not evident in the microwear analysis.

Caveats on Microwear Analysis

Three conclusions may be drawn from these results. First, macroscopic identification of lithic artifacts as tools does not mean that they will exhibit microscopic evidence allowing someone to identify specific use as a tool. Fifty-six percent of Koshkonong lithic artifacts and

44-58% of La Crosse artifacts identified as tools according to the criteria in the assemblage analysis schema, did not show evidence for microscopic wear patterns.

Second, microwear analysis did not identify functionality on 85 tools with morphofunctional categories from Koshkonong, and 68 from LaCrosse. These tools were intentionally modified by their makers, suggesting an intended function, but there is no wear to suggest what this function may have been. Or, they may have been used, retouched, and not reused, resulting in a lack of use-wear. Thus, functional analysts cannot rely solely on microwear analysis for functional information, contextual and formal evidence must also be used to form a balanced picture of the way in which lithic objects were, or were not, used.

Finally, the author was able to attribute functions to 116 lithic artifacts from Koshkonong, and 30 from LaCrosse, previously categorized only as modified edge-only tools in the assemblage analysis. So, while microwear analysis is not a panacea for identifying lithic tool function, it does provide an opportunity to fill significant gaps in our knowledge. Further information on tool function can be gained using newer techniques, such as protein residue analysis.

Protein Residue Analysis Results

A pilot study using protein residue analysis documented additional details about Oneota lithic tool use at the microscale (Sterner and Jeske 2017). Forty-one lithic tools from the Crescent Bay Hunt Club were sent to Archaeological Investigations Northwest, Inc. (AINW) for protein residue using cross-over immunoelectrophoresis (CIEP). Tools were tested against six forensic grade antisera: deer, dog, bovine, goat, human and rabbit. The tests returned eight positive results (Figure 6.9; Table 6.38). All of the tools tested for protein residue were also included in the microwear sample from Crescent Bay, allowing the two methods to serve as a check for one another.

Tool number 390 is made from Galena chert and was used in a transverse motion—that is, a scraping motion. This tool reacted positively to goat antiserum. Goat antiserum reacts to bovid subfamilies and to cervids. Since 390 tested negative against bovine antiserum, it most likely represents deer or another cervid (John Fagan, personal communication 2013). Elk remains have been recovered from Crescent Bay (Van de Pas and McTavish 2015). Tool 390 appears to have been was used to scrape fresh deer or elk hide. Tool 390 is a steep-edged uniface and would be categorized in most morphofunctional typologies as a probable scraper. In this case, three separate lines of evidence come together to indicate tool function.

Figure 6.9. Lithic tools from Crescent Bay with positive CIEP reactions. From upper left to lower right, tool numbers: 14-01, 106, 107, 114, 241, 390, 408, and 429.

Table 6.38 Lithic tools with positive CIEP reactions from Crescent Bay Hunt Club.

Tool No.	Basic Form	Reactant	Micropolish	Motion of Use
107	Uniface	Bovine	Meat	Projectile
429	Biface	Bovine	Wet hide	Transverse
408	Biface	Canid	Bone	Longitudinal
390	Uniface	Goat (Cervid)	Wet hide	Transverse
114	Biface	Deer	None	Indeterminate
14-01	Biface	Deer	Wet hide	Longitudinal
241	Biface	Human	Meat	Projectile
106	Uniface	Human	Wood	Indeterminate

Tool 429 is made from an unknown pebble chert and fits the morphofunctional description of a Madison triangular projectile point. However, the presence of wet hide polish on the proximal end and the transverse motion indicated by microwear suggests that the tool was probably also used as a scraper. Tool 429's positive reaction with bovine antiserum, coupled with the microwear evidence, indicates it was used as a scraper on fresh bison hide.

Tool 408 is made from Galena chert and displays bone polish from use in a longitudinal motion. It most closely matched an experimental tool that had been used to disarticulate limb bones. Tool 408 reacted positively to canid antiserum.

Tool 107 is made from Oneota formation Prairie du Chien chert and also fits the morphofunctional designation of a Madison point. Use wear from the piece provides support for its designation as a projectile. Microflaking on the distal end and dry hide polish on the proximal end indicate that the tool was probably hafted and served as an arrow point. The presence of bovine protein residue, and meat polish on the body of the piece, indicates it was used successfully to shoot a bison. Since meat polish takes a significant amount of use to be detectable under a microscope, the tool was probably lodged in bison muscle for a significant period of time.

Tool 106 is made from Silurian chert and is a triangular biface that appears to have been heavily reworked. One small patch of wood polish or weakly developed plant polish was evident on the dorsal hump of the tool, but no other polish was present. Human blood residue was detected on this tool. The polish on the hump probably represents hafting, and it is likely that this tool served as a knife or projectile. However, the conflicting use signatures along with the heavilyretouched edges of the tool indicate multiple uses and possible recycling of the tool. Although there are human remains at Crescent Bay that show evidence for trauma inflicted by stone tools (Jeske 2015), this tool did not come from a context associated with human bone.

Tool 241 is made from an unknown pebble chert and also exhibited human protein residue. This piece is a small triangular bifacial tool. Heavy microflaking near the distal end of the tool is consistent with its use as a projectile point (Odell 1981:206). There is also meat polish on both the dorsal and ventral sides of the distal end of the tool, indicating that the projectile was lodged in the flesh for some time before removal. However, it should be noted that it is not necessarily certain that the meat polish and the human protein residue are from the same use-event. Although positive for human blood, Tool 241 was not directly associated with human remains.

Tool 114 is a triangular bifacial piece made from Galena chert and displays faint dry hide polish on the proximal end and much more developed dry hide polish on the distal end. One side of the proximal end is heavily rounded. There are also faint traces of meat polish on the other side of the tool's midsection, but no polish is present on its lateral margins. Deer protein residue was identified on the tool. The many wear patterns on this tool suggest multiple uses, both as a point or knife and as a scraper.

Tool 14-01 also reacted positively for deer residue. The tool is a relatively large side-notched biface. Edge rounding was present on both the dorsal and the ventral sides of the distal end of the tool. Wet hide polish and meat polish are both present on this tool, suggesting that it was most likely used as a knife for butchering deer.

Thirty-three tools did not react positively with the antisera selected for these tests. These tools were examined as part of the larger use-wear analysis. Of these artifacts, 18 (44%) displayed no traces of use at all (Figure 6.10; Table 6.39), while 14 (34%) displayed traces of use on meat or wet hide, 2 (5%) were used on plant matter, and 5 (12%) were used on hard substances such as wood, bone or antler. One (2%) uniface exhibit dry hide polish and one (2%) biface displayed both meat and plant polish (Figure 6.11; Table 6.39). The lack of a positive reaction at this time on the tools showing use wear suggests that they may test positive for other antisera from animals whose bones are found at the site (e.g., other mammals, fish, or birds). Future research using protein analysis is warranted for a more complete picture of the specific resources utilized by the Crescent Bay inhabitants.

Table 6.39 Microwear results for non-reactive tools.

Polish Type	n	%
Used		
Dry Hide	1	3%
Plant/Meat	1	3%
Plant	2	6%
Smooth Pitted	3	9%
Meat	9	27%
Total Used	**16**	**48%**
Unused		
Generic Weak	1	3%
Grit	2	6%
No Polish	14	43%
Total Unused	**17**	**52%**

Figure 6.10. Seventeen tools with no visible use-wear. From upper left to lower right, tool numbers: 04, 13, 123, 147, 148, 183, 281, 326, 386, 389, 392, 397, 416, 426, 430, 447, and 546.

Figure 6.11. Sixteen tools with use-wear but with negative CIEP reactions. From upper left to lower right, tool numbers: 544, 219, 545, 60, 208, 385, 409, 02, 35, 83, 93, 387, 388, 407, 427, and 428.

The protein residue results follow expectations for sites occupied by people using a relatively sedentary settlement system in a mixed agricultural/foraging subsistence economy (Jeske 1987:137–138). Crescent Bay occupants produced only a few easily reworked, recyclable, and curated formal tool forms (Sterner 2012). The CIEP and microwear results show that these economically and efficiently produced artifacts are not specialized but are generic tools capable of being used for multiple tasks.

Protein residue results also provide details into the subsistence strategies of Crescent Bay residents beyond what can be inferred from microwear analysis. The results show a surprisingly high proportion of tools used on bison (three of eight). While sample size is a clear issue here, the presence of bison proteins on these locally made and deposited tools is surprising enough.

Based on archaeozoological data, Jeske (2003) has suggested that bison were hunted locally earlier and farther east than is commonly thought. The bison protein residue indicates that it is likely that bison were being hunted locally in southeastern Wisconsin. Bison remains have been recovered at Crescent Bay, including economically valuable and not easily transported bones (Jeske 2003a; Sterner-Miller 2014). Both the protein residue and microwear evidence from this sample indicate that the animals were probably processed at or near the site. It is important to note that all three of the tools used to process bison are indistinguishable from other tools in the assemblage in terms of raw materials used, method of manufacture, or depositional context. It is the blood protein residues that provide the indicator that the tools were used on bison.

One tool yielding dog protein residue was recovered less than 10 meters from two ritual dog burials. The dog skeletal evidence indicates that these dogs were not butchered for food. Despite the fact that this tool does not stand out from the general pattern of tools at the site, there is substantial evidence that it was used for the ritual butchering of dogs. The lithic raw material it is made from is local, and there is nothing in a manner of production, tool morphology, or depositional context of the tool to indicate a special status as a tool used for ritual purposes.

Human protein residues on projectile points provide additional support for recent inferences about Oneota violence (Jeske 2014; Karsten 2015). The sample of two projectile points with human blood on them is not conclusive evidence of interpersonal violence but, coupled with the osteological and other archaeological evidence, the sample does suggest that violence was a significant part of Oneota life in eastern Wisconsin.

Using a combination of residue and microwear evidence not only affords the most complete picture of tool function but it also offers an opportunity to cross-check the information about use provided by each method. In some cases, residue analysis provides information about tool use, whereas microwear analysis offers none. In other cases, microwear and residue analyses present conflicting use signatures, indicating multiple functions or incidental contact with blood. Without the complement of microwear analyses, the protein residues on artifacts are largely devoid of direct contextual information about use and may be interpreted in a variety of ways. Without the complement of residue analysis, even high-power microscopy provides little information on the actual resource processed by the tool-user.

CHAPTER SEVEN:

DISCUSSION

This chapter is an interpretation of Oneota habitus and community identity based on an examination of lithic economy. These interpretations are applied at three levels: intra-site, intra-locality, and inter-locality. In the first section, lithic data are added to existing spatial, floral, and faunal data from the Crescent Bay Hunt Club site to develop a model for Oneota habitus in the Koshkonong locality. The second section examines community structure in the La Crosse and Koshkonong localities, as expressed through the diversity of resident dispositions with regard to lithic procurement, production, use, and discard. The third section lays out the elements of Oneota lithic traditions that crosscut the geographic and temporal boundaries of localities.

Lithic Practice at the Crescent Bay Hunt Club Village Site

An examination of the diversity of practice in lithic raw material acquisition, production, use, and discard within a single village site allows us to identify those features of lithic practice that typify the practices common to all village residents and those that owe more to individual agency than habitus. The first step in this examination is to characterize the lithic assemblage from Crescent Bay.

Lithic Raw Material Procurement

The lithic raw materials used by the occupants of Crescent Bay were primarily local. However, there are degrees of locality that may be teased out (Table 7.1).

Table 7.1 Lithic raw materials in the Crescent Bay assemblage.

Raw Material Type	n	%	Local/Non-local
Galena Chert	254	47.1%	Local
Unknown Chert	111	20.6%	Unknown
Silurian Chert	46	8.5%	Local
Oneota PDC Chert	41	7.6%	Local
Burlington Chert	32	5.9%	Non-local
Platteville Chert	20	3.7%	Non-local
Shakopee PDC Chert	13	2.4%	Local
Hixton Silicified Sandstone	5	0.9%	Non-local
Maquoketa Chert	4	0.7%	Non-local
Barron Co. Quartzite	3	0.6%	Non-local
Wyandotte Chert	3	0.6%	Non-local
Quartz	2	0.4%	Local
Unknown Silicified Sandstone	3	0.3%	Non-local
Baraboo Quartzite	1	0.2%	Non-local
Unknown Quartzite	1	0.2%	Local
Total	**539**		

According to this categorization, 83% of the lithic tools from Crescent Bay are made of local raw materials. The proximity of these resources to the site range from 0 km to 700 km (Figures 7.1 and 7.2). The WHS map (Figure 7.1) is not particularly useful for detailed analysis but gives a very general idea of the regions where particular resources may be located. The Winkler et al. map (2005) (Figure 7.2) is based on a combination of literature reports and field expeditions by the authors and represents a more realistic picture of where prehistoric occupants of Crescent Bay may have found materials.

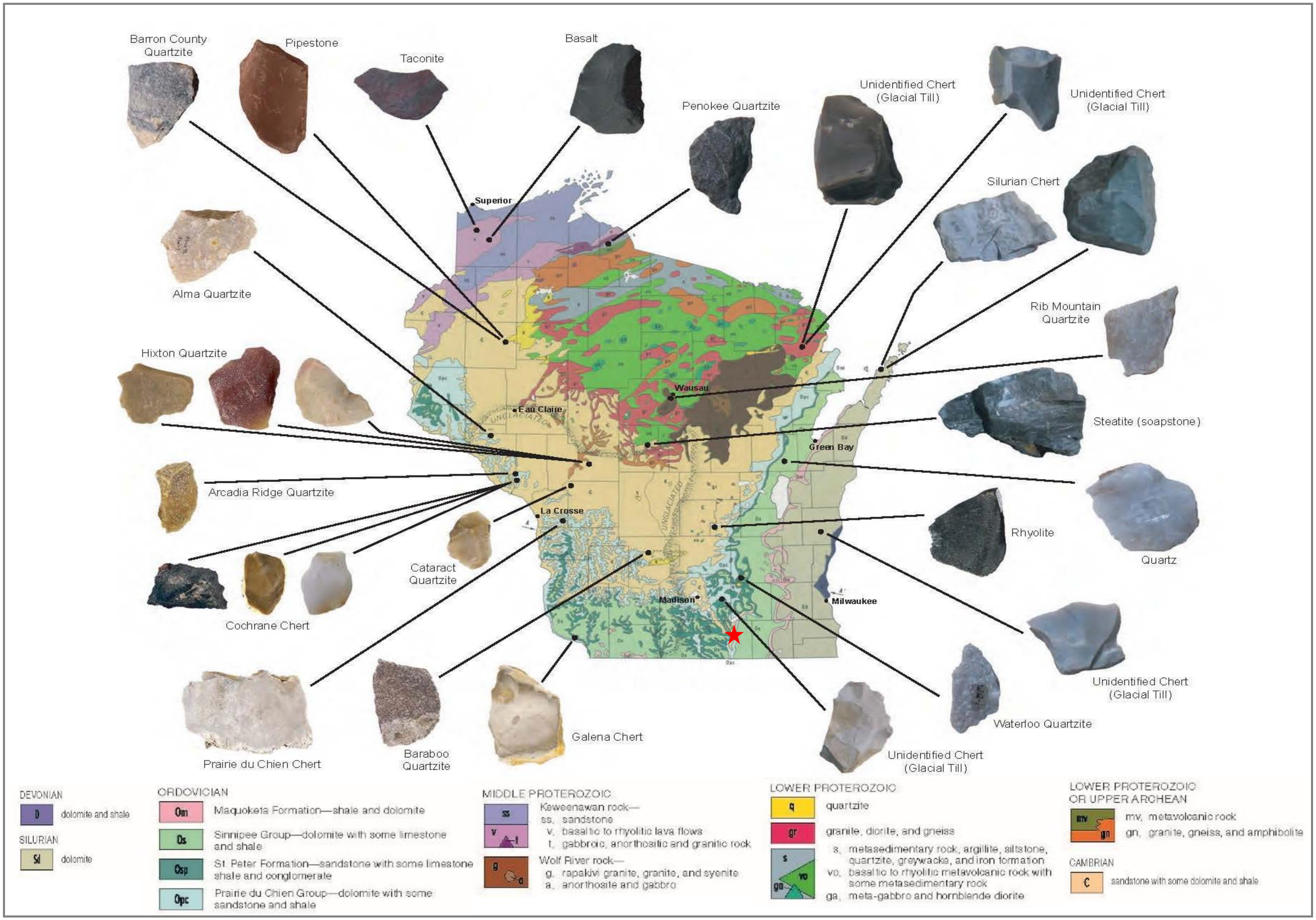

Figure 7.1. Wisconsin lithic resources (after Wisconsin Historical Society n.d.).

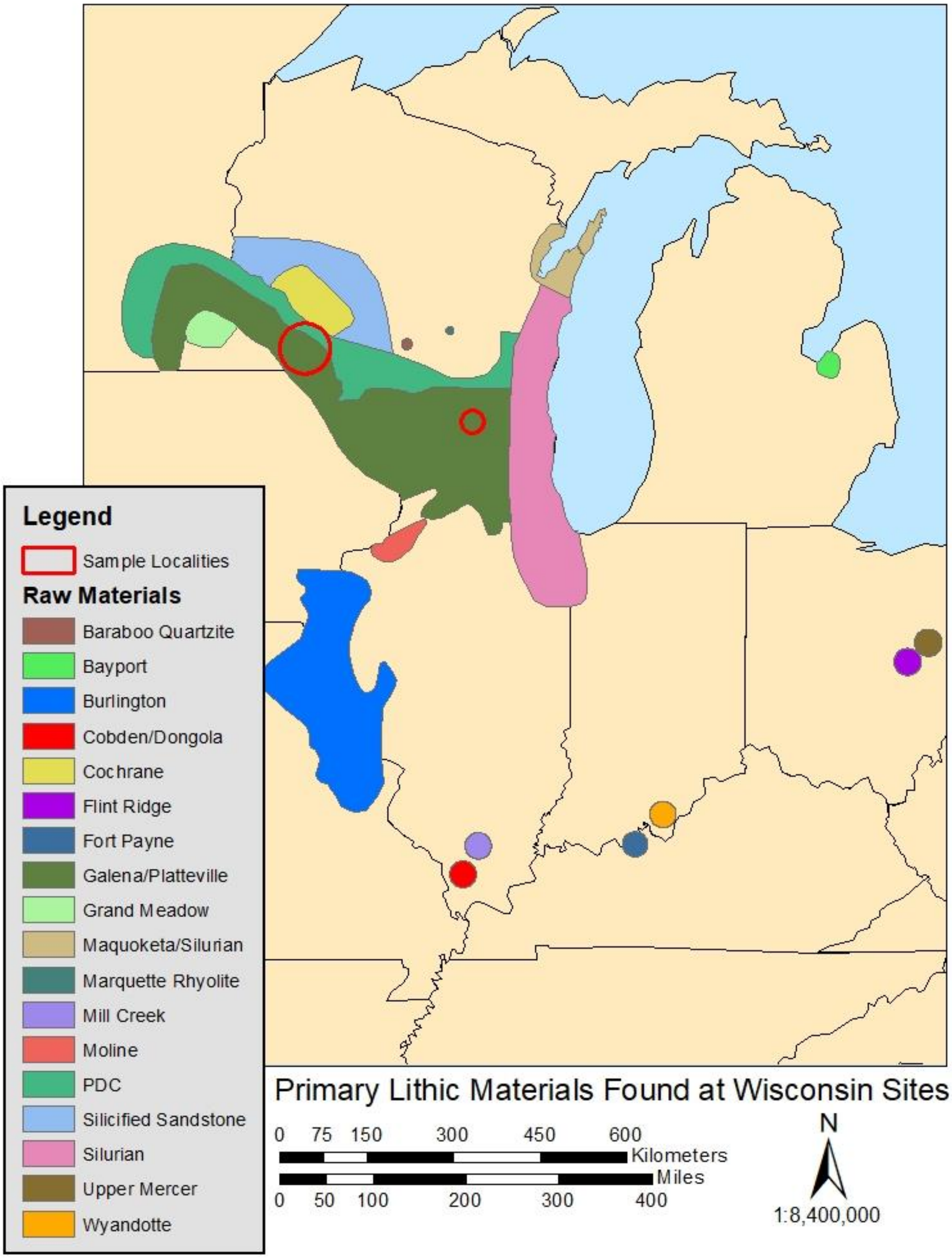

Figure 7.2. Prehistorically available outcrops and glacial till ranges of cherts native to Wisconsin (after Winkler et al. 2005).

Distance decay models have previously been used to examine lithic exchange and procurement (Ericson 1977; Torrence 1986). Most of these models suggest that the quantity fall-off is exponential and proportional to the deposition site's distance from the source. There is also a threshold distance at which there is a sudden drop-off in quantity, often interpreted as the difference between an area of direct access and the more widespread area of indirect access through trade (Kooyman 2000:138) (Figure 7.3). Plots for hunter-gatherers generally show an area up to 300 km from the source where the drop-off occurs. However, the distance for agriculturalists is much shorter. Jeske has estimated the proximity for materials to be considered local to be more like 35 (Jeske 2003b) or 25 (Jeske 1989) kilometers. These estimates are based on landscape features and the location of outcrops. Schneider (2015:262) notes that ethnographic studies indicate that potters travel up to 5-7 km to procure clay for pottery production (Arnold 1985). It is unlikely that people would have traveled much further for lithic raw materials on a regular basis. Changing the catchment size for what materials are considered local changes our interpretations of procurement strategies. The bedrock locations of materials classified as local to Crescent Bay fall within a 40 km catchment of the site (Figure 7.4). While this may be a greater distance than was usually traveled to procure lithic materials, materials available within that catchment were also all available within 5 km of the site in the glacial till. It should also be noted that Figure 7.4 only shows the bedrock in that area, not the accessibility of outcrops.

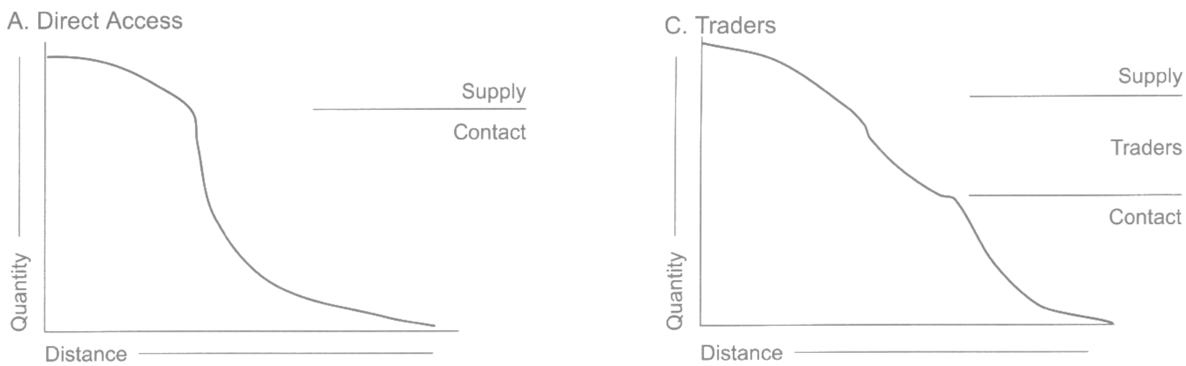

Figure 7.3 Fall-off models for direct and indirect acquisition (after Torrence 1986).

Nearly half of all the tools from Crescent Bay are made from Galena chert. Galena chert may occur in the form of elliptical or irregularly shaped nodules, as bedded chert, or as residual chert in soils and streambeds (Withrow 1983; Winkler et al. 2005). Nodules range in size from 10-35 cm in diameter. The chert contains numerous fossils, consisting of shell particles, brachiopods, fossils burrows, and/or sponge spicules (Morrow and Behm 1985). The texture of Galena chert is medium-fine to fine and it is usually classified as fair quality in Lurie and Jeske's (1990) schema. Based on Galena chert's geographic extent and its high representation in the Crescent Bay assemblage, it was likely the most available lithic raw material for site residents. In fact, Galena chert accounts for half of all lithic raw materials recovered from Koshkonong locality sites. It outcrops at Lake Koshkonong.

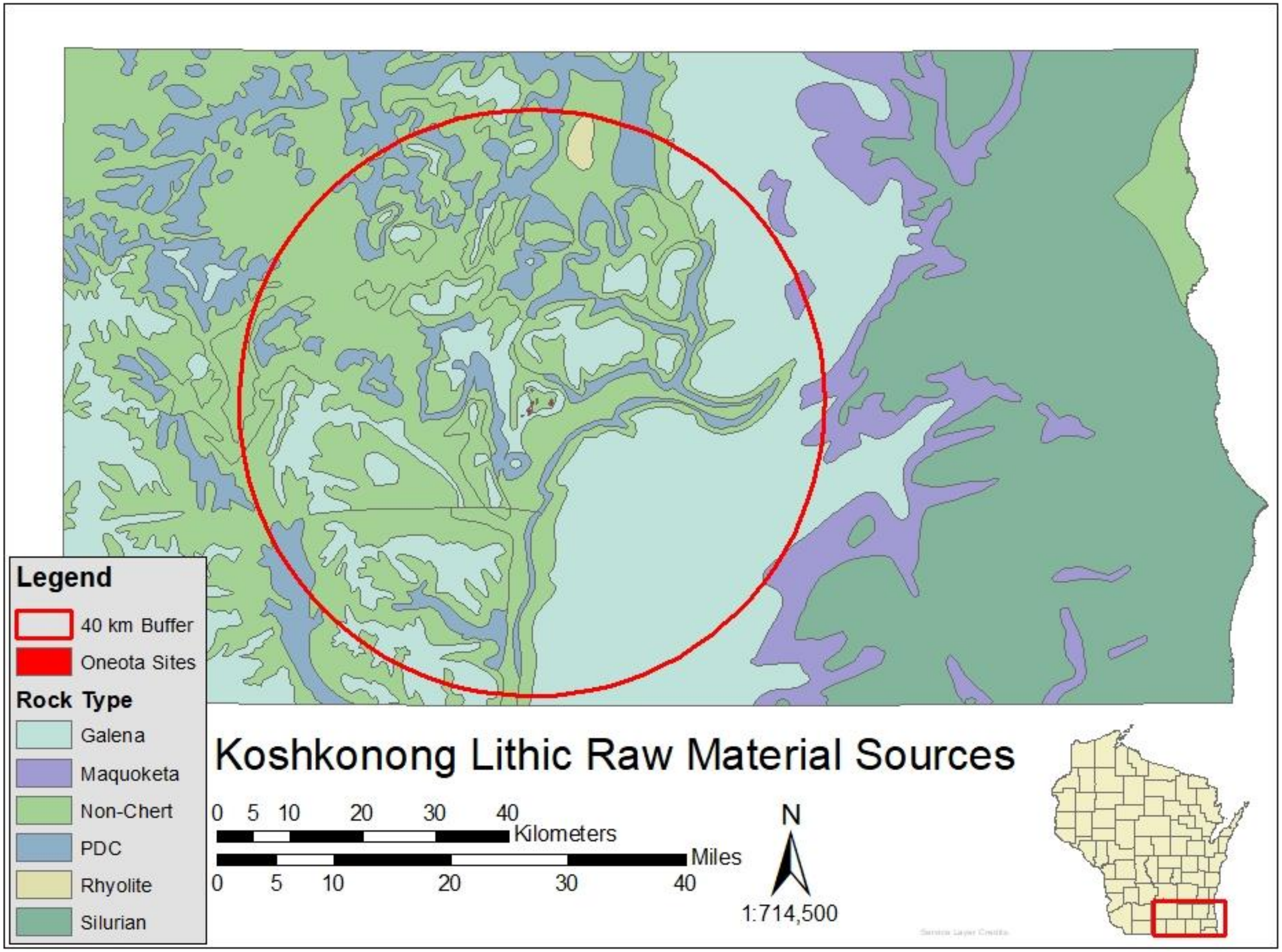

Figure 7.4. Local lithic raw materials within a 40 km catchment of Crescent Bay.

Prairie du Chien (PDC) cherts compose 10% of the Crescent Bay tool assemblage. PDC chert occurs in spherical nodules, bedded chert, or as residual chert in soils, streambeds or glacial till. It outcrops over a large area that encompasses a swath from Winnebago County in east-central Wisconsin to Dane County in south-central Wisconsin and most of the southwestern portion of the state (Winkler et al. 2005) (see Figure 7.2). PDC cherts also outcrop in southeastern Minnesota, northeastern Iowa, and in a small area of northwestern Illinois. The two main chert-bearing formations in the PDC group are the Oneota and Shakopee formations (Morrow 1984). The Shakopee Formation composes the upper portion of the PDC group, while the Oneota Formation is in the lower portion. PDC cherts range in color from gray to white to orange. Shakopee formation PDC usually contains numerous oolites while Oneota formation chert is usually mottled and swirled, with a marbled appearance (Morrow 1984; Morrow and Behm 1985). PDC cherts that are orange in color tend to be more common in the eastern part of its range while gray PDC cherts are more common in the western part of its range (Winkler et al. 2005). PDC cherts are not known to outcrop within 30 km of Crescent Bay; the PDC chert outcrop area is likely the extreme extent of Crescent Bay occupants' local procurement system (see Jeske 1989, 2003). It is also possible that at least some of the PDC found at Crescent Bay comes from glacial till and is local material. However, most glacial till-borne cherts are very poor quality and difficult to work.

Silurian chert accounts for 8% of the Crescent Bay tool assemblage. Silurian chert occurs in nodules and nodular bands in the bedrock, as well as isolated nodules in the glacial till in Wisconsin. It outcrops in the bedrock of eastern Wisconsin, northern Illinois and northeastern Iowa (Morrow 1994; Morrow and Behm 1985). Silurian chert is also available as nodules in the glacial till in eastern and southeastern Wisconsin and northeastern Illinois (Winkler et al. 2005).

This chert is chalky white or gray and may contain small crinoid fossils (Ferguson and Warren 1992). Silurian chert usually does not outcrop further west than Waukesha County, approximately 40 km east of Crescent Bay. Like PDC, the Silurian chert outcrop area is likely the extreme extent of Crescent Bay occupants' local procurement system (see Jeske 1989, 2003).

Most of the non-local raw materials in the Crescent Bay assemblage occur in frequencies of less than 1% of the total assemblage. The exceptions to this is Platteville chert, which accounts for approximately 4% of the total assemblage and Burlington chert, representing 5% of the assemblage. Platteville chert occurs in nodules and in bedded form in south-central Wisconsin. It also occurs in east-central Wisconsin, southwestern Wisconsin, northwestern Illinois and northeastern Iowa (Winkler et al. 2005). Platteville chert is usually gray, orange or white in color with a dull, chalky or waxy luster. The chert typically contains numerous fossils, such as sponge spicules, corals, bryozoans, brachiopods, and trilobites (Ferguson and Warren 1992). It co-occurs with Galena chert in many places but outcrops below the Galena. There are no known outcrops of Platteville within 40 km of the site, and it is possible that at least some of the Platteville chert found at Crescent Bay comes from glacial till.

Burlington chert occurs as nodules or nodular beds in southeastern Iowa, west-central Illinois, and eastern Missouri. The closest source of Burlington chert to Crescent Bay is approximately 300 km away near Burlington, Iowa (Van Tuyl 1923) as the crow flies. Burlington chert is often much higher in quality than many cherts that occur in Wisconsin (Winkler et al. 2005). However, there is no indication that the Burlington tools were any more refined or served any different purpose than those made from other local or non-local materials. An examination of the morphofunctional tool types represented in the total site lithic assemblage and the Burlington subset of the assemblage displays comparable prevalence of tool forms

(Table 7.2). Microwear analysis was conducted on twelve tools made from Burlington chert and there were no significant divergences from the patterns of the overall assemblage. So, there is no evidence that Burlington tools were being created or used in a way that differed from the rest of the assemblage. It should be noted that Burlington cherts were incorporated into the Wisconsin lithic economy for millennia (Winkler et al. 2005) so there may have been material left over from earlier time periods and/or a regularized strategy for procurement in place.

Excepting the use of Burlington, the residents of the Crescent Bay Hunt Club site focused almost exclusively on using raw materials found within 40 km of the site. Possible reasons for this behavior are discussed later in this chapter as part of the comparison between La Crosse and Koshkonong site assemblages.

Table 7.2 Tool types in the overall Crescent Bay assemblage and Burlington subset.

Tool Type	**Overall Assemblage (n=539)**	**Burlington Subset (n=32)**
Bipolar Core	1.7%	0.0%
Bipolar Proj. Pt.	1.7%	0.0%
Core	1.9%	3.1%
Drill	0.4%	3.1%
Knife	0.6%	0.0%
Madison Point	15.2%	21.9%
Scraper	13.5%	15.6%
Unclassified Proj. Pt.	5.0%	3.1%
Modified Edge-Only Tool	60.1%	53.1%

Lithic Tool Production

Since the vast majority of the tools recovered from Crescent Bay were knapped from local materials, one would expect that tools, particularly expedient tools, were produced primarily on site rather than at an extraction site or specialized production site. Some evidence from the site supports this expectation. Some degree of cortex was present on 50% of the debitage from Crescent Bay. The presence of cortex is indicative of the initial stages of the reduction process, suggesting that residents began the knapping process at the village, rather than transporting blanks to the village after roughing them out somewhere else previously. However, Jeske (1987:55) has noted that some chert—particularly Burlington—can provides large chunks of cortex-free material. Additionally, the probable use of bipolar reduction at procurement sites may also result in the misrepresentation of production strategies if interpretations are based on the prevalence of cortex alone.

The debitage to tool ratio at Crescent Bay is only 9:1, considerably lower than most Oneota sites (Table 7.3). Van Beckum and Jeske (2001:112) note that the low debitage to tool ratio indicates that tool manufacture, maintenance and repair was not being conducted at the village in any significant way. However, the debitage to tool ratio may not be as significant for talking about economics at agricultural sites because of the higher prevalence of flake tools. The high quantity of expedient, flake tools at Koshkonong changes the meaning of the debitage to tool ratio at these sites. The amount of debitage required to produce a flake tool is negligible in comparison to a biface or uniface. The average Koshkonong debitage to tool ratio shifts from 13:1 to 37:1 when only edge-only tools are excluded from the sample. However, the ubiquity of fair-quality, local raw materials in the assemblage, the low debitage to tool ratio, the overall low quantity of lithics at the site, the low diversity of tool forms, the evidence for bipolar reduction, and the generally small size of tools (tools at Koshkonong are significantly smaller than those from Pammel Creek: length p-value=<0.0001; width p-value=0.0126; thickness p-value=0.0036) all indicate that Crescent Bay residents were restricted in their access to lithic raw materials.

Table 7.3 Debitage to tool ratios for Oneota sites sampled in this dissertation.

Site Name	Site #	Locality	# Debitage	# Tools	Debitage/Tool Ratio
KCV	47JE0379	Koshkonong	1,916	425	4:1
CBHC	47JE0904	Koshkonong	4,674	539	9:1
Schmeling	47JE0833	Koshkonong	776	43	18:1
Carcajou Pt	47JE0002	Koshkonong	451	21	21:1
Pammel Creek	47LC0061	La Crosse	9,874	1,016	10:1
Tremaine	47LC0095	La Crosse	17,121	1,709	37:1
SR Coulee	47LC0176	La Crosse	67,812	1,556	43:1
Filler	47LC0149	La Crosse	23,149	356	65:1
OT	47LC0262	La Crosse	49,424	452	109:1

One of the primary ways of distinguishing different production tasks is through the size grades of debitage produced. Ahler (1989) performed numerous experiments at different stages in the reduction sequence and documented the debitage profile produced during each stage. The size grades that Ahler used were >25.4 mm, 25.4-12.7 mm, 12.7-5.66 mm, and <5.66 mm. These are similar to the size grades used in this analysis: >25 mm (G4), 25-12.5 mm (G3), 12.5-8 mm (G2), and <8 mm (G1). However, the 6.33 mm inch mesh used during excavation is unlikely to recover debitage smaller than 6 mm in diameter. An examination of the size grades present in the total Crescent Bay lithic debitage assemblage and those represented in the portion of the assemblage recovered through flotation highlights the significance of this sampling bias (Table 7.4).

Table 7.4 Size grade distribution of debitage based on recovery method.

Total Lithic Debitage Assemblage			**Debitage Recovered via Flotation**		
Size Grade	**n**	**%**	**Size Grade**	**n**	**%**
<8mm	315	7%	<8mm	189	26%
8-12.5mm	847	18%	8-12.5mm	94	13%
12.5-25mm	2,865	61%	12.5-25mm	351	49%
>25mm	647	14%	>25mm	87	12%
Total	**4,674**		**Total**	**721**	

Ahler (1989:92-93) represented his size grade data as a ratio of the G1:G2-G4 counts. He distinguished between core reduction and early stage biface reduction, which had ratios of 1.62

to 4.00, and biface thinning through pressure flaking, which had a ratio of 6.09 to 34.25. The flotation sample from Crescent Bay produces a ratio of 2.81, suggesting very little late stage production. However, fewer than half of the flotation samples from Crescent Bay have been sorted as of this writing, resulting in a very small sample of debitage recovered via flotation. For this reason, as well as the variation resultant from raw material type, knapper skill, and technological mixing (Odell 2004), size grade ratios may not provide the best representation of the types and stages of reduction taking place at Crescent Bay.

Sullivan and Rozen (1985) categorized debitage based on their degree of breakage, rather than size grade. They established four categories of debitage: (1) complete flake: unbroken; (2) broken flake: striking platform intact but margins fractured; (3) flake fragment: striking platform absent but ventral surface discernable; and (4) debris: ventral surface not discernable (i.e., shatter of blocky fragments). The purpose of this technique was to distinguish core reduction from tool production in debitage assemblages. However, the independent tests that followed demonstrated that trampling (Prentiss and Romanski 1989), raw material differences (Amick and Maudlin 1997), and knapper expertise (Shelley 1990) affected the distribution of debitage types more so than reduction trajectory. Morrow (1997) noted that while the higher frequency of flakes and flake fragments in tool production assemblages was not significant, the presence of a high quantity of shatter (or debris in Sullivan and Rozen's typology) correlated meaningfully with early reduction stages.

The categories of flake, flake-like and non-flake were used in the analysis conducted for this dissertation. Table 7.5 indicates that 55% of the debitage assemblage was composed of non-flakes (shatter or debris). This lends further support to the interpretation from debitage size grades that core reduction was taking place on site. Ten free-hand cores and nine bipolar cores were recovered from the site, consisting primarily of the same local cherts that make up most of the assemblage (Table 7.6). One Burlington core was identified, suggesting that site residents either procured the Burlington directly or traded for nodules of the material rather than blanks.

Table 7.5 Debitage types in the Crescent Bay lithic assemblage.

Debitage Type	**n**	**%**
Flake	1,010	22%
Flake-like	1.087	23%
Non-flake	2,577	55%
Total	**4,674**	

Table 7.6 Cores in the Crescent Bay lithic assemblage.

	Free-Hand Cores		**Bipolar Cores**	
Raw Material Type	**n**	**%**	**n**	**%**
Galena	5	50%	2	22%
Oneota PDC	3	30%	2	22%
Platteville	0	0%	1	12%
Silurian	0	0%	2	22%
Burlington	1	10%	0	0%
Unknown	1	10%	2	22%
Total	**10**		**9**	

The presence of bipolar cores and pieces esquillées in the assemblage indicates that bipolar reduction was taking place at the site (Jeske and Sterner-Miller 2015). Jeske and Lurie (1993:140) also note that bipolar debitage assemblages usually contain a lower percentage (ca. 50%) of debitage with flake characteristics and a higher percentage of non-flakes. The debitage distribution from Crescent Bay (Table 7.4), coupled with the core data supports the inference that both bipolar and free-hand core reduction occurred at the site. Even though sampling bias in the collection of small debitage does not paint a clear picture of tool production at the village, the high percentage of minimally modified flake tools in the assemblage (60%) suggests that tool production at Crescent Bay would have resulted in a lower number of small finishing flakes than expected anyway. Additionally, it must be stressed that relatively little lithic production took place at the village at all, as indicated by the low debitage to too ratio.

In their efforts to economize raw material use at Crescent Bay, site residents seem to have resorted to using more flake tools, rather than reusing the bifacial and unifacial tools. While reuse and resharpening was probably common, it was no more evident at Crescent Bay than at other Oneota sites. The Madison triangular points from Crescent Bay were quite small, suggesting that they were probably reused and resharpened, but they are not significantly smaller than Madison points from other Oneota sites examined in this analysis (Table 7.7).

Table 7.7 Average Madison point metrics from Oneota sites in this dissertation.

				Average Madison Point Metrics (mm/g)			
Site Name	**Site #**	**Locality**	**n**	**Length**	**Width**	**Thickness**	**Weight**
KCV	47JE0379	Koshkonong	47	19.84	12.72	3.31	0.73
CBHC	47JE0904	Koshkonong	82	19.57	14.36	3.94	1.15
Schmeling	47JE0833	Koshkonong	3	20.67	14.40	3.67	0.98
Carcajou Pt	47JE0002	Koshkonong	7	21.58	15.06	3.63	0.87
Koshkonong Average				*20.42*	*14.14*	*3.64*	*0.93*
Pammel Creek	47LC0061	La Crosse	24	28.91	15.16	5.08	2.07
Tremaine	47LC0095	La Crosse	213	21.70	14.90	3.60	1.11
SR Coulee	47LC0176	La Crosse	223	25.10	11.50	3.50	1.61
Filler	47LC0149	La Crosse	43	23.80	15.80	3.70	1.04
OT	47LC0262	La Crosse	104	22.40	14.90	3.60	1.21
La Crosse Average				*24.38*	*14.45*	*3.90*	*1.4*
Standard Deviation				**2.96**	**1.35**	**0.51**	**0.41**
Standard Deviation without Pammel Cr.				**1.90**	**1.41**	**0.18**	**0.26**

In fact, Pammel Creek is the only outlier in this sample. The standard deviations among the metrics from the other eight sites are negligible. T-tests indicate significant differences between the length, width, and thickness of Koshkonong tools and Pammel Creek tools, as well as length of Tremaine and Pammel Creek tools (Table 7.8). T-tests for Koshkonong versus La Crosse were significant for length (p=<0.0001) and thickness (p=0.04) but not for weight and width. When

Pammel Creek was removed from the La Crosse sample, there were no significant differences in the size of La Crosse and Koshkonong Madison points.

Table 7.8 Results of t-tests for tool size at Pammel Creek and other Oneota sites.

Variable	**p-value**	**Significant at 0.05?**
Koshkonong versus Pammel Creek		
Length	<0.0001	Yes
Width	0.0126	Yes
Thickness	0.0036	Yes
Weight	0.1374	No
Tremaine versus Pammel Creek		
Length	0.0008	Yes
Width	0.0926	No
Thickness	0.0592	No
Weight	0.5790	No

It appears that Crescent Bay residents were also restricted in the amount of time and energy they dedicated to tool production. Edge only modified tools were much more common (64%) than bifacially (22%) or unifacially (10%) modified tools. Additionally, 51% of these edge-only tools were modified only through use-wear, with no retouch evident at all. Bifacially modified tools were assessed for degree of refinement based on features such as the size of flake scars along the edges, regularity of tool outline, and thickness of the transverse cross-section. Comparative samples were used to identify categories of crude, moderate, or refined. Crude and moderately refined bifaces made up a much larger proportion of the assemblage than refined bifaces (Table 7.9).

Table 7.9 Categories of biface refinement at Crescent Bay.

Refinement	**n**	**%**
Crude	46	39%
Moderate	51	43%
Refined	6	5%
Indeterminate Fragment	15	13%
Total	**118**	

One measure of crudeness is Jeske's (1992:475-476) index dividing tool width by thickness. Jeske did this to compare humpback bifaces and Madison triangular points from the Langford tradition Washington Irving site. Despite many of the Madison points from Crescent Bay being classified as crudely or moderately refined based on comparative samples, Jeske's index indicates that Madisons from Tremaine and OT are even moreso (Table 7.10).

Table 7.10 Madison Triangular crudeness index (after Jeske 1992).

Site Name	Site #	Locality	Crudeness Index
Washington Irving Humpbacks (Jeske 1992)			2.48
OT	47LC0262	La Crosse	2.98
Tremaine	47LC0095	La Crosse	3.29
CBHC	47JE0904	Koshkonong	3.64
KCV	47JE0379	Koshkonong	3.84
Schmeling	47JE0833	Koshkonong	3.92
Washington Irving Madisons (Jeske 1992)			3.96
Filler	47LC0149	La Crosse	4.13
Carcajou Pt	47JE0002	Koshkonong	4.14
Pammel Creek	47LC0061	La Crosse	4.14
SR Coulee	47LC0176	La Crosse	4.27

Within the site boundaries, there does not appear to have been any spatial restriction of knapping. Including both tools and debitage, 1,458 lithics were recovered from *in situ* feature contexts (Figure 7.5). There were 559 lithic pieces recovered from features located within the boundaries of houses, 131 of which were tools, creating a debitage to tool ratio of 4:1 in houses; significantly lower than the overall site ratio of 9:1.

Lithic Tool Use

There is evidence for spatial segregation of activities based on depositional context of lithic material. Out of the 187 tools from feature contexts examined for microwear from the Crescent Bay assemblage, only 69 of them exhibited identifiable wear from use. However, within this relatively small sample, the spatial distribution of lithics in structures and non-structural features provides insight into the use of space at the site. Three forms of structures have been identified at Crescent Bay, two of which have been interpreted as houses: wigwams and longhouses. For the purposes of this analysis, any feature within the lines of posts demarking the structure walls was considered to be associated with that structure. While some of these features may be palimpsests, the discrete categories of use-wear identified in these contexts suggests otherwise.

CA of the types of contact materials identified through microwear analysis indicates a significant relationship between a tool's contact material and its deposition in wigwam, longhouse, or non-house features (chi-square=25.981, df=14, p-value=0.026).

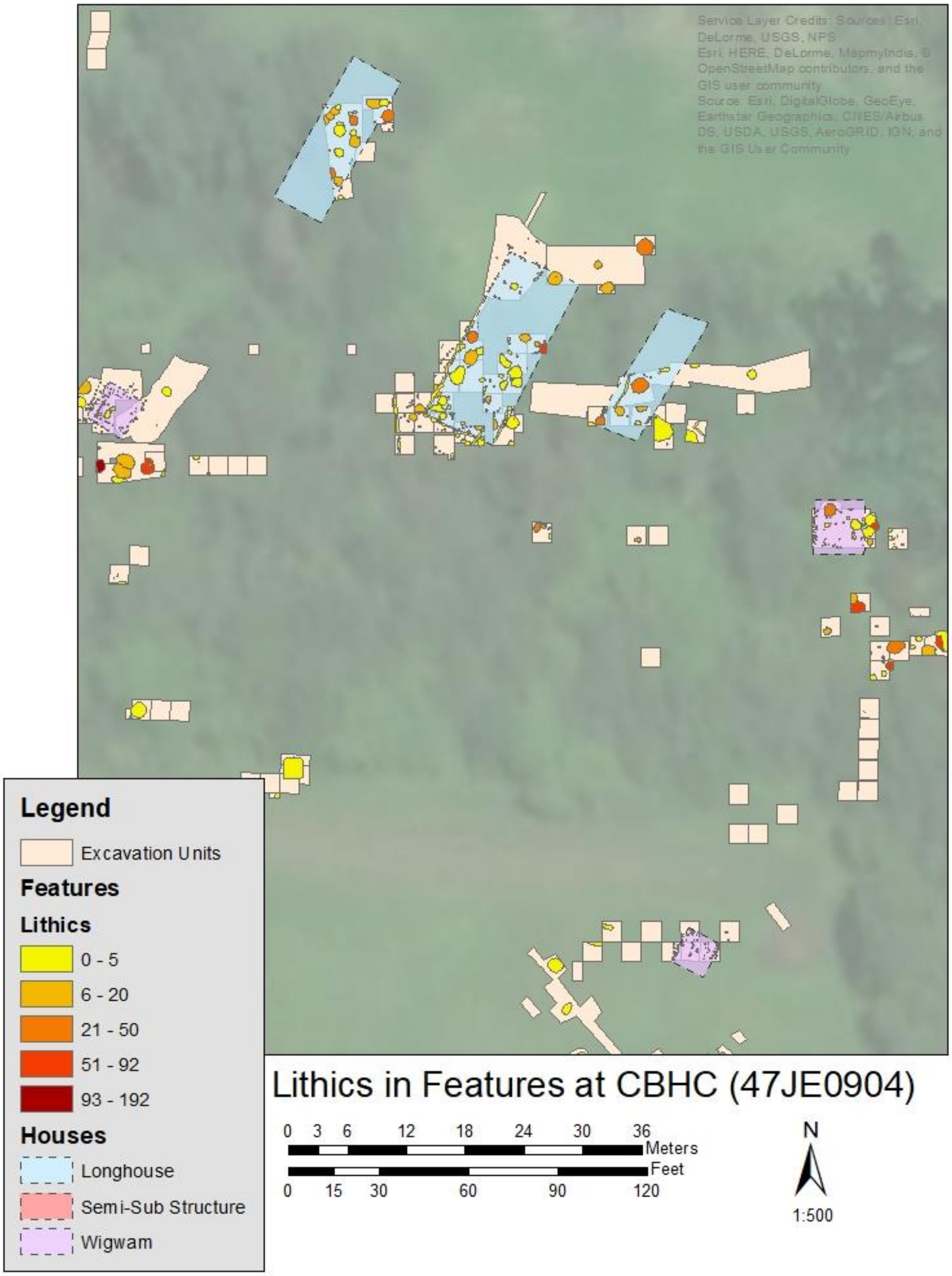

Figure 7.5. Distribution of lithics in features at the Crescent Bay Hunt Club site.

The first dimension in this CA explains 91% of the variation in the data (Figure 7.6). This dimension separates those contexts with a high proportion of meat processing (wigwams; 38% and non-house features; 42%) from those without (longhouses; 9%). The point for wigwams is closer to the vertical axis in the plot because smooth pitted polish, indicative of use on an indeterminate hard material like wood, bone, or antler, and plant polish are much more common in wigwam contexts than non-house features. The contact material profile for wigwams much more closely resembles the one for non-house features than the one for longhouses (Table 7.11). These data suggest a functional difference in the two structures at Crescent Bay.

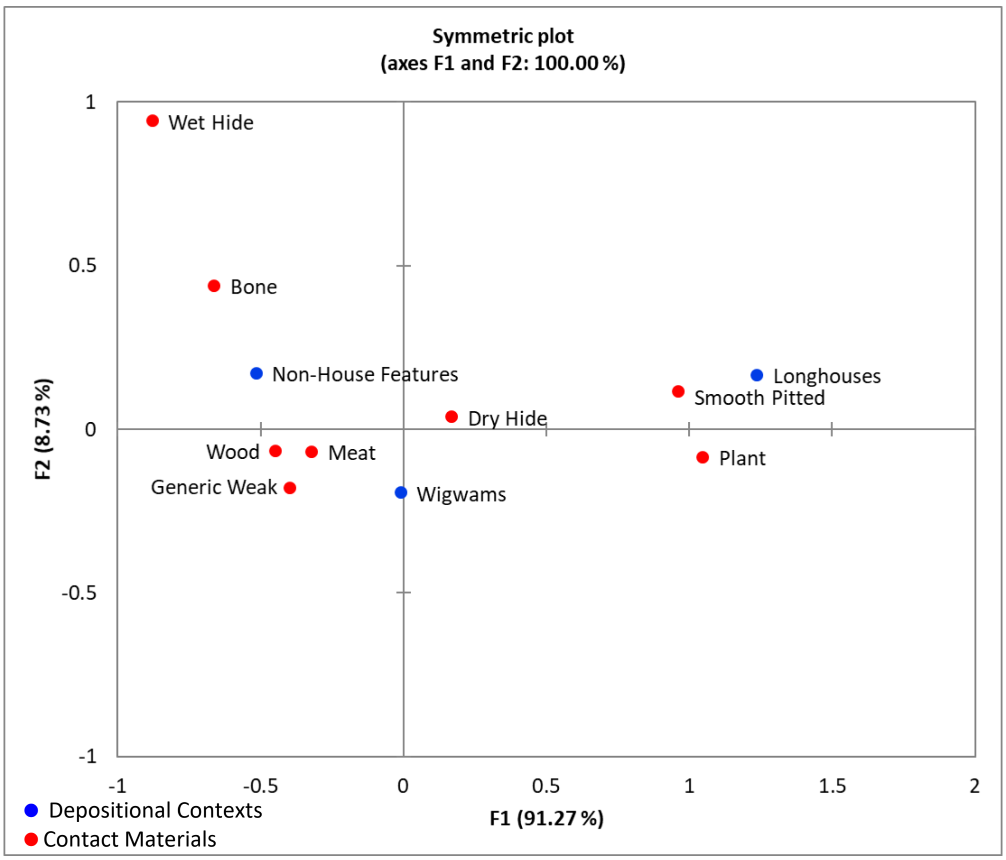

Figure 7.6. CA using eight contact materials and three contexts at Crescent Bay.

Table 7.11 Prevalence of contact materials based on depositional context.

	Bone	Dry Hide	Generic Weak	Meat	Plant	Smooth Pitted	Wet Hide	Wood
Longhouses	0%	18%	0%	9%	27%	45%	0%	0%
Wigwams	3%	13%	16%	38%	9%	13%	0%	9%
Non-House	12%	12%	15%	42%	0%	4%	4%	12%

An initial examination of the spatial distribution of lithics in features (Figure 7.5) also appears to support this assertion. Inspection of the numbers of lithic artifacts from feature contexts indicates that 488 lithic artifacts (tools and debitage) were recovered from features within longhouse walls while only 71 lithic pieces were recovered from features within wigwam walls. However, the debitage to tool ratio in wigwams is 0.6:1 and 6:1 in longhouses.

In sum, there is a significant difference among the debitage to tool ratio in wigwams, longhouses, and at the site overall. The higher debitage to tool ratio in longhouses provides support for the assertion that there was a higher frequency of lithic reduction in longhouses and a higher frequency of lithic tool use in wigwams. Microwear data further supports this interpretation, as 32 lithic tools from wigwams displayed definitive use-wear but only 11 from longhouses did.

Radiocarbon dates from the subrectangular structures indicate overlap with the longhouses. Pits within or in close proximity to the subrectangular have returned some of the earliest dates at the site (calibrated 2 sigma ca. A.D. 1043-1158, A.D. 1213-1268, A.D. 1224-1259, and A.D. 1257-1273) (Figure 7.7). Several dates from features associated with the longhouses suggest that they were in use generally later. However, dates from Longhouse 1 indicate it was rebuilt and reused throughout the occupation of the site.

Floral and faunal data suggest that the longhouses may, in fact, not have been houses at all. There are lower quantities of charcoal, floral, and faunal material in the features associated with these structures than in others at the site (Edwards 2017). The lithic data also support this assertion. The lithic data also suggest that the longhouses may have been a communal place to gather and flintknap, as well as conduct other group activities. Meanwhile, butchering and hide working were activities that were either confined to wigwams or other areas of the site. These types of activities were not taking place in the longhouses.

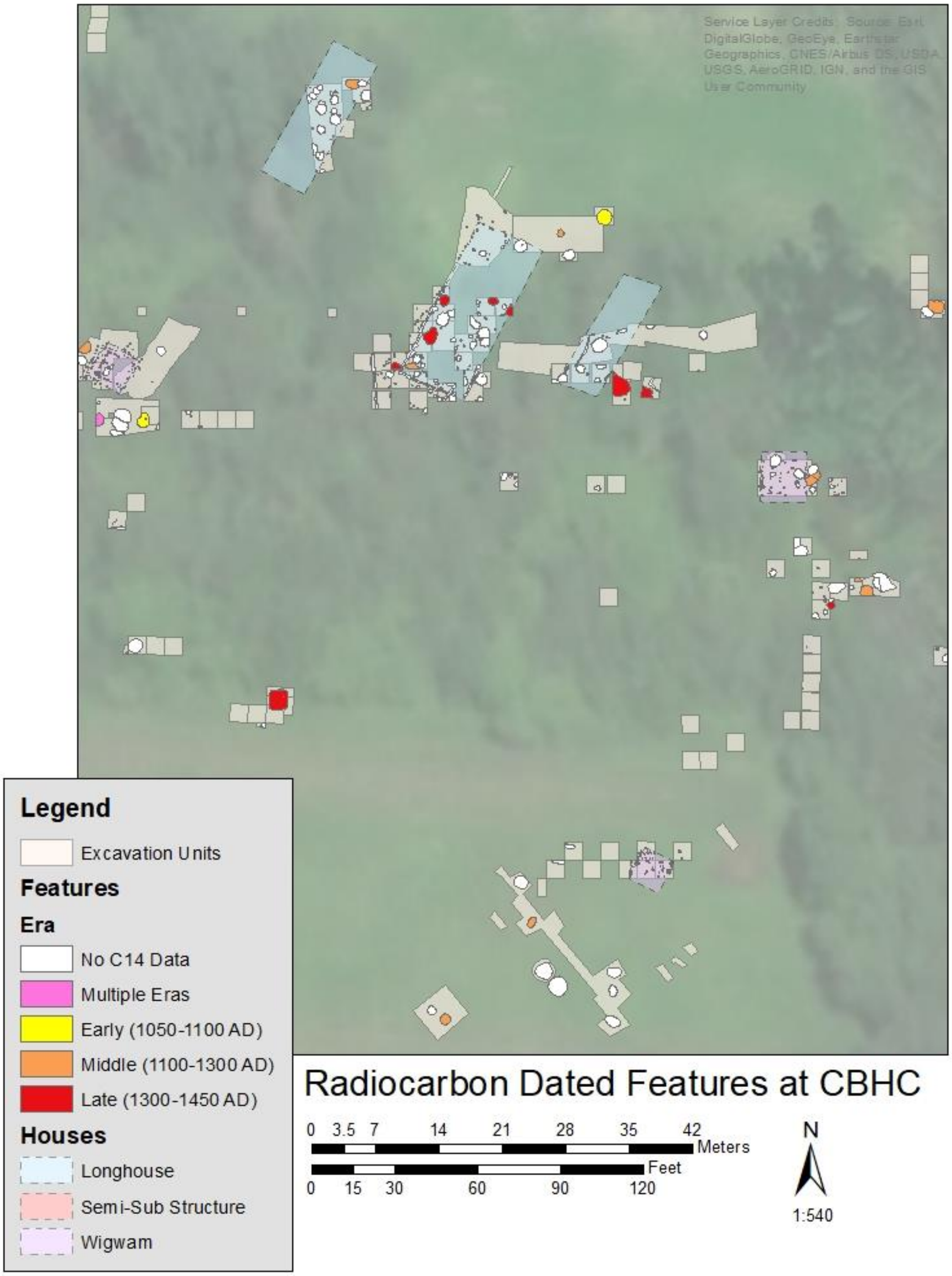

Figure 7.7. Spatial representation of radiocarbon dates from Crescent Bay Hunt Club.

The question of who was producing, using, and discarding lithic materials at Crescent Bay is one that requires serious scrutiny. O'Gorman (1996, 2001) notes that tradition-wide Oneota mortuary data and ethnographic accounts from Radin (1923) indicate there was a separation of gender activities. There is no clear-cut boundary in activities but women were typically involved in agriculture and gathering, while men participated in hunting and warfare (O'Gorman 1996; Skinner 1926; Wedel 1986). Although, since women also did most of the meat and hide processing, differentiating tool use by gender is difficult.

O'Gorman (2010) suggests that most women at Oneota sites spent more of their daily life in the village and fields (see Tooker 1984), whereas men would be away from the village for extended periods of time. If the majority of activities performed in domestic areas were conducted by women, then it is likely that most of the tools found in these locations would have been used by women. However, this model is based on analogy to historic, longhouse-centric, matrilocal/matrilineal societies that may not be applicable to a 12^{th}-14^{th} century Oneota site. Exactly how gender impacted tool use at Oneota sites has seen little theoretical or empirical study. The lack of experimentation on tools likely associated with female-centric activities makes lithic functional evidence of gender in the archaeological record extremely difficult to identify. As Owen (2000:202) notes:

> preconceived ideas of prehistoric life and tool use have limited experimentation…both the experimental program directed towards lithic use-wear analysis and reconstructions of tool use…concentrate on typical male activities, such as the production and use of hunting weapons, and on the processing and utilization of large animal resources by men.

Since production of lithic tools has been traditionally represented as a male activity in ethnographic accounts (Lee and DeVore 1969; Murdock and Provost 1973), the relatively high concentrations of knapping debris in longhouse structures at Crescent Bay may have been used primarily by men. However, there is also ample evidence for food processing. Burials associated with the longhouses also complicate the picture. One structure contains two burials: a burial of an adult male and a second burial of an adult male holding an adolescent child and an infant. Interestingly, these two burials may represent foundational burials for two building episodes (Figure 7.8). A second longhouse structure contains the burial of an older female. There does not appear to have been a clear-cut gendered division of space at Crescent Bay.

Similarly, there is little evidence for spatial segregation of ritual and domestic activities at the site. Evidence for ritual is present in the form of formal interments of individuals under the longhouse floors (Jeske and Sterner 2018), the formal interment of a dog (Figure 7.9), and a deposit containing a complete dog skull, a set of articulated deer legs, and portions of bear facial bones (Sterner and Jeske 2017). A crude biface made of local Galena chert with wear patterns indicating use disarticulating bones and traces of canid protein residue was found less than 10 meters from these canine deposits (Figure 7.10).

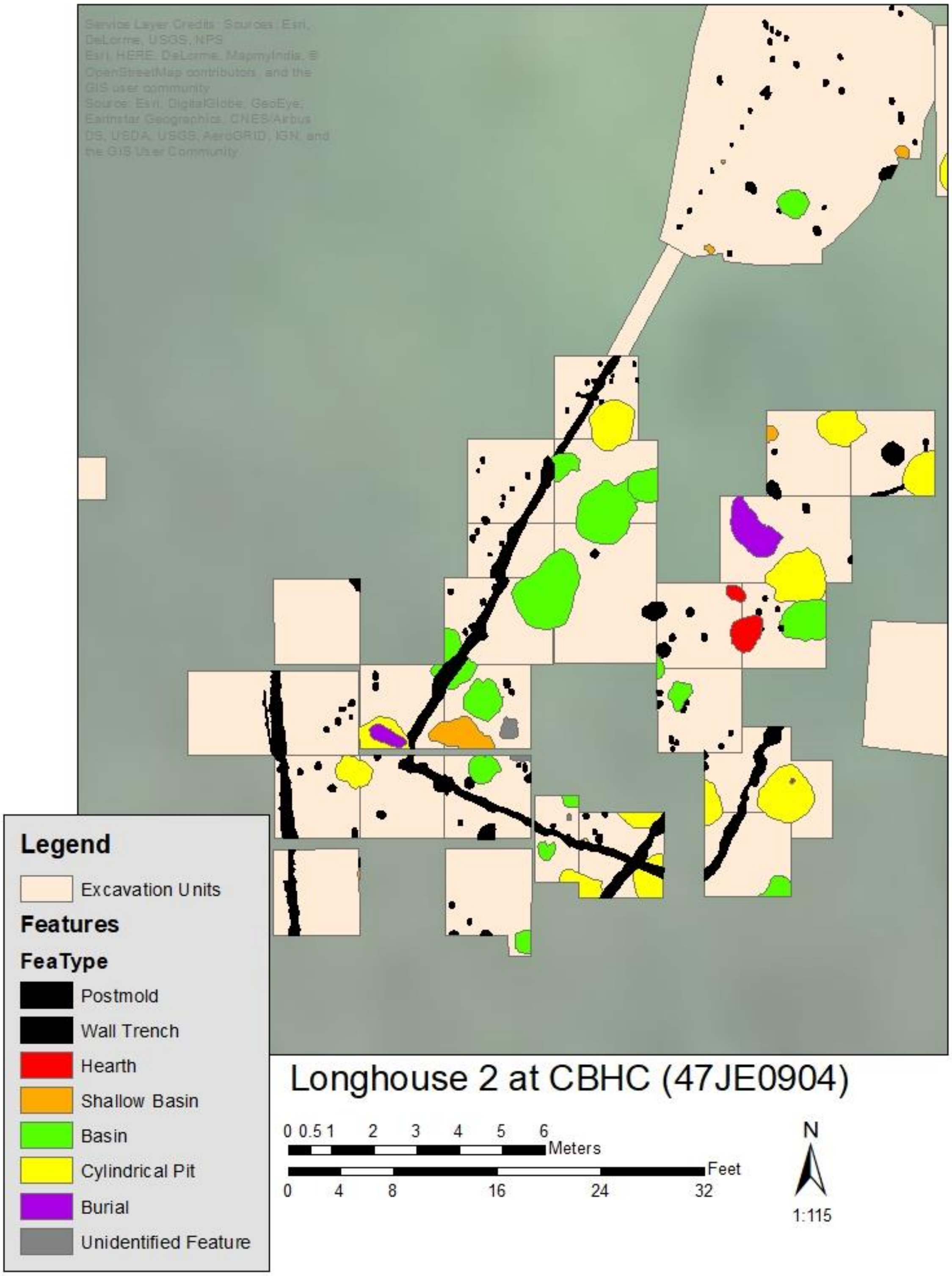

Figure 7.8. Burials from Longhouse 2 at Crescent Bay Hunt Club.

Figure 7.9. Dog interment in Feature 10-14 at Crescent Bay Hunt Club.

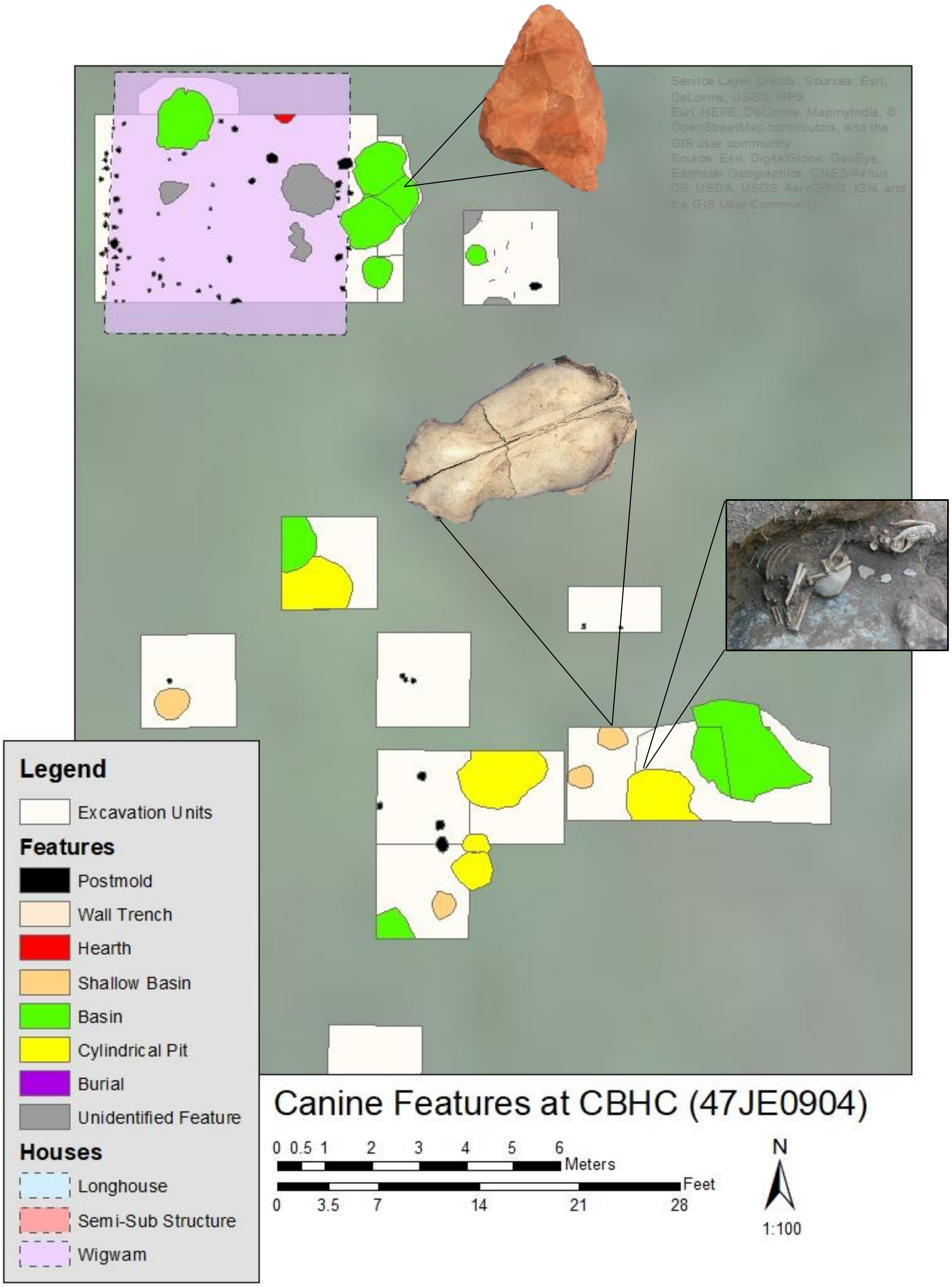

Figure 7.10. Locations of canine burial and tool used to disarticulate dog at Crescent Bay.

There has not yet been any attempt to match the cut marks on the bones with the edge of the biface and there is no other evidence that this tool was used on the buried dog specifically. However, it is evident that this tool was most likely used to deflesh and/or disarticulate dogs. Moreover, the dog skeletal evidence and archaeological contexts indicate that these dogs were not butchered for food. Multiple lines of evidence—microwear, protein residue, and spatial proximity to ritually buried dog remains—suggest that this biface was used to process dogs for ritual purposes, even though in most ways it does not stand out from the general pattern of tools at the site. The material is local, and there is nothing in the manner of production, tool morphology, or depositional context of the tool to indicate a special status as a tool used for ritual purposes. This lack of clearly non-utilitarian tools is also true for the rest of the Crescent Bay tool assemblage. There are no stone tools that stand out as being earmarked for a special purpose based on their production characteristics or deposition.

Lithic Discard and Depositional Context

It appears that there were some differences in the deposition of lithic debris and tools. In features, the debitage to tool ratio is 6:1, whereas in non-feature contexts the ratio is 9:1. The overall site ratio is also 9:1. Overall, 42% of lithic tools were recovered from feature contexts, whereas only 31% of debitage was recovered from feature contexts. While these numbers may be impacted by disturbance due to plowing, the ratios are an accurate representation of feature versus non-feature contexts. Features and the original prehistoric ground surface would have been plowed equally, resulting in equal artifact displacement between the two areas. Even considering post-depositional artifact movement, the relative difference between the two ratios should be representative of prehistoric depositional patterns, as experiments have shown that there is no correlation between artifact size and displacement (Cowan and Odell 1990; Dunnell 1990; Odell and Cowan 1987; Yorston 1990).

The difference in the debitage to tool ratios suggests that tools were more likely to be deposited in features than debitage. This difference is expected due to site clean-up practices that one can reasonably assume were conducted at a village site such as Crescent Bay where larger debris and tools made from sharp chert would have been removed to trash pits rather than left underfoot. However, there is little evidence for clean-up in the debitage profiles of feature versus non-feature contexts (Table 7.14). If clean-up was happening, larger debitage should have made it into the pits while smaller debitage may have been overlooked and left behind. The size grade profile for screened feature contexts and non-feature contexts is identical though.

One might expect that debitage was more likely to be left in place after knapping, whereas tools were curated and used before being discarded in a pit later (e.g., Kimball 1993). However, there was no significant difference between the tool forms found in feature versus non-feature contexts (Table 7.12). An examination of bifacial, unifacial, and multifacial tools found that relatively the same proportion of whole and broken tools were found in feature and non-feature contexts (Table 7.13). Site residents were just as likely to dispose of their informal edge-only tools on the surface with the debitage as they were in pits. Formal tools were not significantly more common in features than in non-feature contexts.

Table 7.12 Tool forms in feature and non-feature contexts.

	Features		**Non-Features**	
Tool Types	**n**	**%**	**n**	**%**
Biface	55	24%	64	21%
Edge-Only	139	61%	206	66%
Multiface	8	3%	13	4%
Uniface	27	12%	27	9%
Total	**229**		**310**	

Table 7.13 Completeness of formal tools in feature and non-feature contexts.

	Features		Non-Features	
Completeness	**n**	**%**	**n**	**%**
Whole	56	36%	55	43%
Broken	32	64%	41	57%
Total	**88**		**96**	

It does not appear that the debitage deposited in features is the result of specific clean-up events. An examination of the debitage from feature and non-feature contexts indicates that the representation of the four size grades is relatively comparable between the two types of contexts (Table 7.14). So as not to bias the results toward features, only debitage recovered from screened feature contexts, not floted ones, was counted in this analysis. If site residents had been purposefully cleaning up debitage after knapping, one would expect to see a higher proportion of small debris from non-feature contexts, as these pieces would likely be overlooked during clean-up efforts. There is, however, no difference between feature and non-feature contexts.

Table 7.14 Debitage size grades from feature and non-feature contexts.

	Features		Non-Features	
Size Grade	**n**	**%**	**n**	**%**
<8mm	16	2%	110	3%
8-12.5mm	145	20%	665	21%
12.5-25mm	480	65%	2,034	63%
>25mm	94	13%	415	13%
Total	**753**		**3,224**	

There is also no evidence that specific areas of the site (e.g., structures) were cleaned up more than others. Plowzone frequencies of debitage are not any lower inside houses than outside of them.

Summary

The residents of Crescent Bay primarily used lithic raw materials that they could procure themselves from locations within 10 km of the village. However, the relatively high representation of Burlington and Silurian cherts in their lithic assemblage indicates that site residents were traveling or trading for some materials over distances ranging from 40 to 300 or more kilometers. Despite the fact that these materials were more difficult to procure and often of higher quality, there is no evidence in production, use, or deposition to indicate that these materials were valued more highly than their local counterparts (Table 7.15). While all stages of tool production occurred at the village, the low debitage to tool ratio (9:1) at the site indicates that it was probably not the primary locus for lithic production. In a controlled experiment by Fischer et al. (1979), the hard hammer direct percussion reduction of 15 cores produced 18,046 pieces of debitage. This equates to roughly 1,200 pieces of debitage per core. Including both bipolar and free hand cores, the debitage to core ratio at Crescent Bay is 180:1. Even if the bipolar cores are excluded this ratio is only raised to 345:1. Although the cores at Crescent Bay were likely small in many cases, the minimal amount of debitage present cannot account for all of the tools and cores represented in the assemblage. Pond's (1930) bulletin describing the knapping experiments of Halvor Skavlem indicates that there was a chert source in the limestone cliffs of Carcajou Point on Lake Koshkonong. Erosion has now covered this cliff face, but it is likely that the late prehistoric village residents found it just as convenient a location to knap as Skavlem did.

Lithic raw materials and the tools produced from them appear to have been seen as purely utilitarian. Village residents valued all lithic raw materials equally and economized them through the use of bipolar reduction, both of local cobbles and exhausted multifaces, unifaces and bifaces; the production of relatively small formal tools; and the heavy use of unmodified debitage for daily tasks. Tools were also curated and usually used to their maximum potential, being disproportionately deposited in pits in comparison to lithic debitage.

Table 7.15 Results of Chi-squares comparing raw material type and quality to other production variables.

Production Variable	**df**	**chi-sq**	**p-value**	**Significant at 0.05?**
Local versus non-local raw material				
Amount of cortex	2	1.1212	0.5709	No
Heat treatment	1	1.1392	0.2858	No
Basic tool form	3	0.8219	0.8442	No
Method of modification	3	4.0028	0.2611	No
Completeness	1	0.8703	0.3509	No
Hafting	2	1.2315	0.5402	No
Poor versus good quality raw material				
Amount of cortex	4	11.9471	0.0177	Yes
Heat treatment	2	54.1734	<0.0001	Yes
Basic tool form	6	8.5144	0.2028	No
Method of modification	6	6.1182	0.4101	No
Completeness	2	2.6983	0.2596	No
Hafting	4	2.0773	0.7215	No

Lithic tools were used for a variety of tasks, and often for more than one. Tasks included plant working, butchering, hide preparation, and the production of bone, antler, and wooden tools. Tools used for butchering were not deposited in longhouses after use, suggesting that this activity was relegated to other areas of the site. Evidence from microwear analysis indicates that both men and women used lithic tools at Crescent Bay. Patterns of tool use and discard do not suggest that there was a clear-cut gendered division of space in the village, as evidence of both masculine and feminine tasks is found in both wigwam and longhouse structures. Ritual and domestic space also largely overlapped. Formal human and dog inhumations were found in the lower levels of trash pits and a lithic tool used to deflesh dogs was not any more refined than the general tool population at the village.

Oneota Community Organization

It is possible to identify community boundaries in the La Crosse and Koshkonong localities. The examination of lithic raw material types, morphofunctional tool types, and patterns of tool use indicates that the sites examined in the La Crosse locality exhibit much greater lithic diversity than those in the Koshkonong locality, which suggests that there is a difference in how community was constructed in the two localities. While differences in lithic habitus may indicate differences in site function, rather than community practices (e.g., Binford and Binford 1966, 1969), the use of data from nine village sites suggests that site function is not likely to be a major factor in the current analysis.

Identifying Community in the Koshkonong Locality

Correspondence analysis indicated very little diversity in the raw materials used or morphofunctional tool types produced at sites in the Koshkonong locality. There was also only minimal diversity in the activities for which tools were used at Koshkonong sites. The four sites examined in this study are located less than 3 km from each other. There are additional Oneota sites within that 3 km radius (e.g., Purnell Terrace, Purnell, Bent Elbow, Hearthstone, Blue Herron, Crab Apple Point,) and still others listed in the Wisconsin ASI files that may or may not be related to Oneota occupation around the lake (e.g., Skavlem Mounds, Hunn Farm, Bingham Corn Hills, McKelvy Knoll, and Saunders Corn Hills). These sites, however, are not necessarily Oneota sites. Previous experience has shown that sites listed in the ASI as Oneota often have little or no evidence of Oneota material culture (Jeske, personal communication; Jeske et al. 2011; Spott 2012). It will require future testing of these sites to see if and how they fit into the human landscape of the 11th-15th centuries.

Three of the sites examined in this dissertation (Carcajou Point, KCV, and Crescent Bay) are small villages with confirmed evidence for structures of multiple types, and with facilities for disposal of the dead. The number of structures identified at each site ranges from two at KCV to six at Crescent Bay, although at Crescent Bay not all of the structures were occupied contemporaneously. No structures have been identified at Schmeling yet, but the high concentration of cultural debris at the site makes it likely that it was a village. The radiocarbon dates from Koshkonong locality sites indicate that they were occupied by related groups contemporaneously—or sequentially over very short periods of time. That is, there may have been some people at all sites at the same time, or a group that moved among the sites every few years over the course of several centuries.

The lithic data suggest that residents of these villages shared a similar habitus. Ceramic data also suggest as much (Carpiaux 2017; Schneider 2015). Mortuary data also support this interpretation, although mortuary programs exhibit a fairly large degree of variation (see Foley Winkler 2011). Schmeling appears to have an associated mortuary facility comprising bundle burials (Foley Winkler 2011). Crescent Bay has yet to yield a separate mortuary area, but multiple forms of interment are demonstrated at the site, including primary burials and isolated human remains (Foley Winkler 2011; Jeske and Sterner-Miller 2014; Jeske et al. 2017). To date, KCV has produced only isolated human remains within features (Jeske and Edwards 2014).

These data indicate that the people living at the four villages examined in this study were all members of one community. There is variation in structure types seen within and across these villages. While this variation is not completely explained, the lithic data presented here support paleobotanical data that indicate that longhouses and wigwam structures at Crescent Bay served different functions (see also Edwards 2017). The similarity in ceramic and lithic production, use and discard, suggests shared daily experiences. Burial data suggest similar mortuary programs. Although the radiocarbon evidence does not demonstrate conclusively that all four villages were occupied at the same time for their entire occupations, there is certainly a period of overlap between ca. A.D. 1250 and 1350 when all were occupied. As Isbell (2000) notes, communities are fluid and changing, and it is likely that people moved about the landscape at Lake Koshkonong in different ways at different times. Nonetheless, it appears that individuals were connected through a tightly knit multi-village community along the northwest shore of the lake for at least 300-400 years.

Identifying Community in the La Crosse Locality

The situation in the La Crosse locality is more complex than that in Koshkonong. There is more diversity in the settlement patterns and chronology as well as lithic utilization. Most of the five La Crosse locality sites have radiocarbon dates ranging between ca. A.D. 1400-1650 but Tremaine has produced some dates as early as A.D. 1250 and the dates for Pammel Creek indicate a much briefer occupation ca. A.D. 1380-1570. However, the vast majority of dates at La Crosse sites come from wood, which can often return early dates (see discussion in Shott 1992). At all five sites, the heaviest occupation appears to occur between ca. A.D. 1400 and 1550.

Although all five sites are interpreted as villages, evidence of structures has only been found at the Tremaine site. Additionally, at least the OT site and possibly the Filler site was likely part of the same village as Tremaine during part of the occupation at that site. The sites in La Crosse are also spaced further from one another than are sites at Koshkonong. With the exception of Tremaine, OT, and Filler, which are immediately adjacent to one another, La Crosse sites in this analysis may be as close as 2 km apart or as distant as 16 km apart.

It is not surprising, given the degree of spatio-temporal variation in the La Crosse locality, that there is corresponding variability in lithic habitus. What is somewhat surprising is the degree of variation. All of the La Crosse locality sites are more different from Koshkonong sites than they are from each other in terms of lithic utilization, but only barely. The most surprising observation is that three sites in the Tremaine Complex exhibit almost as much variation among themselves as they do in comparison with the other two sites from the locality. O'Gorman (1995) interprets the Tremaine occupation as earlier than Filler, and OT as a functionally distinct portion of the relatively contemporary Tremaine village. The radiocarbon sequence from the Tremaine Complex indicates that Filler and OT were primarily occupied between ca. A.D. 1450-1650, while Tremaine shows evidence of an earlier occupation beginning ca. A.D. 1250. Portions of all seven longhouses at Tremaine were constructed prior to A.D. 1400, suggesting that Tremaine represents the original Oneota tradition village settlement in the area. Filler and OT elements appear to be later occupations. Lithic data support this interpretation, given the much higher proportion of Silicified Sandstone at Tremaine, considered indicative of earlier sites (Goatley 1995:155), with higher proportions of Prairie du Chien cherts at Filler and OT.

The other two La Crosse sites included in this analysis are located approximately 16 km south of the Tremaine Complex. The State Road Coulee and Pammel Creek sites are only 2 km from each other, but radiocarbon and ceramic evidence suggests that State Road Coulee post-dates Pammel Creek. The lithics from the two sites are more similar to each other than they are to the Tremaine Complex. Both State Road Coulee and Pammel Creek exhibit atypically high proportions of Burlington chert (11% and 21% respectively). The basic tool forms and morphofunctional tool types identified at State Road Coulee and Pammel Creek are also comparable. Use-wear data are not available for State Road Coulee, but comparison of the Pammel Creek use-wear data with Tremaine and the two Koshkonong sites indicates that the activities being undertaken at Pammel Creek differed from the typical pattern of butchery and hide processing seen at Koshkonong.

The lack of contemporaneity and the differences in lithic habitus indicate that the construction of community in La Crosse differed from that at Koshkonong. Moreover, the variation in lithic habitus among sites within the La Crosse locality suggests that there may been multiple communities—either through time or contemporaneously within the region. State Road Coulee and Pammel Creek are geographically more distant within the locality, and differ from Tremaine, Filler and OT in raw material type and quality, basic tool forms represented, and manufacturing sequence in ways that Koshkonong sites do not differ. OT and Filler differ from Tremaine in a way that suggests chronological variation. It appears that a close-knit, contemporaneous multi-village community of the type constructed in Koshkonong did not exist in La Crosse. Whether or not community in La Crosse consisted purely of single villages or of some other unit of organization requires the examination of more data from more fully excavated sites within the locality.

Comparison of Community Constructions

There were probably several differences in the way that people living in La Crosse and Koshkonong constructed and construed their communities. Some of these were likely related to differences in marital residence patterns, village size and population density, prevalence of violence, and social differentiation. Similarities in gender roles between the two localities may also be inferred from the available data.

Village Size and Population Density

The number and size of structures and quantity of artifacts recovered from sites in Koshkonong and La Crosse are vastly different. The longhouses at the Tremaine site are much larger than the structures at Crescent Bay (Table 7.16, Figure 7.11). O'Gorman (1995:88) provides population estimates for each of the longhouses that vary based on rebuilding episodes, resulting in a core and maximum estimate (Table 7.17). She states that the initial population of the site was over 56 persons and that number increased to over 360 persons at the height of occupations. Those estimates are based on Casselberry's (1974) formula for calculating longhouse population based on house floor area. Casselberry (1974:119) notes that this formula is only accurate for multi-family dwellings, and even then there is the potential to over- or underestimate population due to differences in the way different groups respond to crowding.

Table 7.16 Longhouse dimensions at the Tremaine site (after O'Gorman 1995).

House	Core Length (m)	Core Width (m)	Max Length (m)	Max. Width (m)	Core Area (m^2)	Max. Area (m^2)
1	14	6	47.4	7.5	84	355.5
2	31.6	7	48.2	7.6	221.2	366.3
3	Unknown	6	40	8.5	Unknown	340
4	23	7	26	7	161	182
5	16.6	5.6	49.4	7.4	92.96	365.56
6	Unknown	6	>25	7.5	Unknown	>187.5
7	Unknown	Unknown	65	8.5	Unknown	552.5

Table 7.17 Tremaine longhouse population estimates (after O'Gorman 1995).

House	Core Pop. Estimate	Max. Pop. Estimate
1	14	60
2	37	61
3	Unknown	56
4	27	30
5	15	61
6	Unknown	>31
7	Unknown	92

Later studies (e.g. Brown 1987; Porcic 2011) have found an average of 6 m^2 dwelling space per person to apply cross-culturally, regardless of the dwelling type. Extreme variation has been noted, ranging anywhere from 0.3 m^2 to 18.5 m^2 (Brown 1987:31). Milner (1986) derived estimates of 2.5 m^2 of living space per person at Cahokia and Sandstrom (1991) identified an average of 3.7 m^2 per person in an ethnographic study of the maize-growing Nahuatl speakers of northern Vera Cruz. Jeske (1990) used these values to calculate population estimates for the Langford tradition Washington Irving site. Using these same values, population values were calculated for Tremaine and Crescent Bay Hunt Club, the two most completely excavated sites in each locality. As the evidence suggests that longhouses were not residential structures at Crescent Bay, and because excavations of the longhouses there are far from complete, only wigwam data and that from one longhouse was used in these calculations. Unsurprisingly, the population calculated for Tremaine is much higher than that of Crescent Bay (Table 7.18).

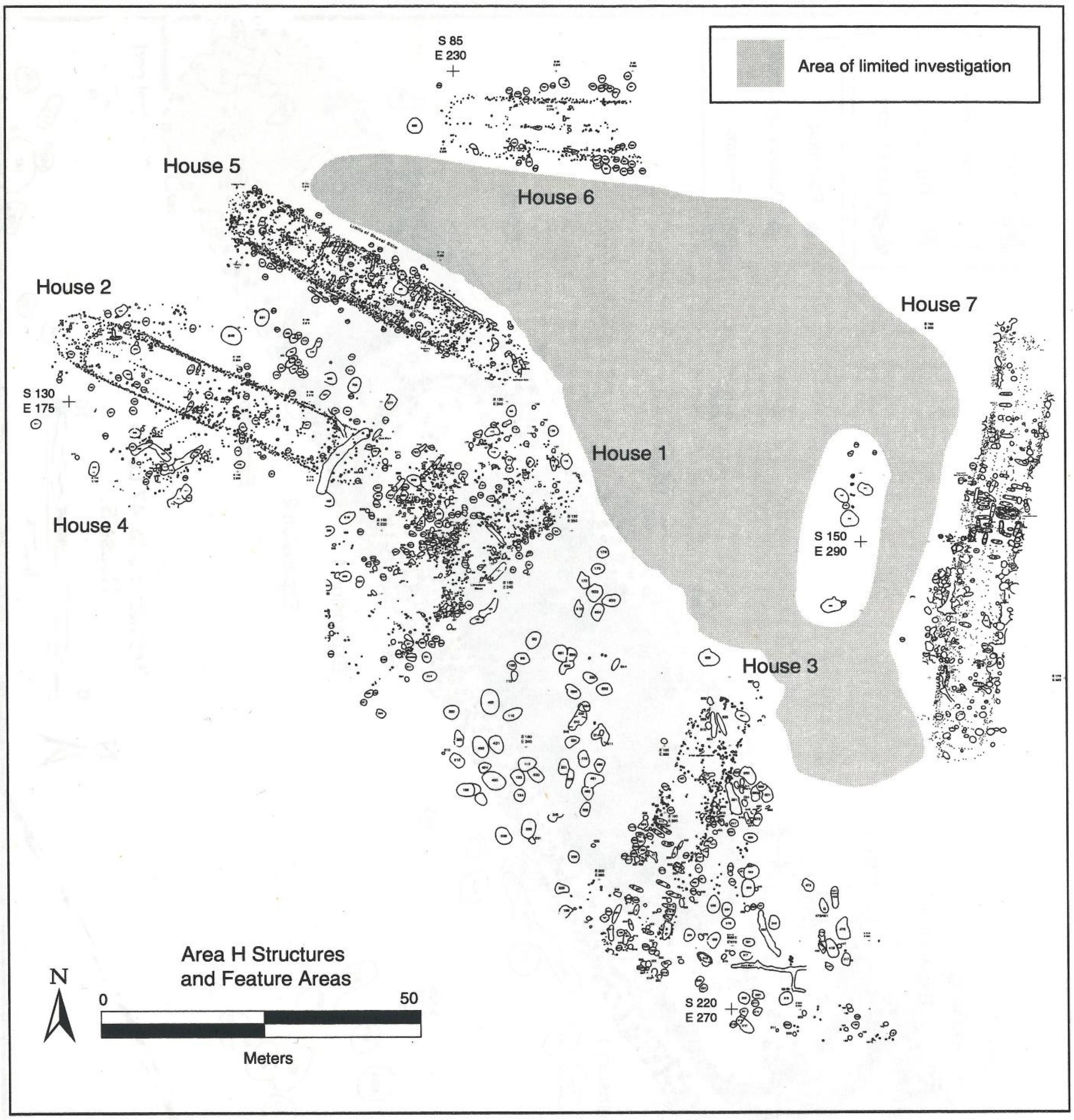

Figure 7.11. Tremaine longhouses (from O'Gorman 1995). Image reproduced with permission from the Wisconsin Historical Society and the Museum Archaeology Program.

Table 7.18 Population estimates for Tremaine and Crescent Bay based on house floor size. Tremaine estimates from O'Gorman 1995. Crescent Bay minimum using Sandstrom 1991, maximum using Milner 1986.

Site Name	Site No.	House	House Area (m^2)	High Population	Low Population
Tremaine	47LC0095	1	355.5	76	47
Tremaine	47LC0095	2	366.3	78	49
Tremaine	47LC0095	3	340	72	45
Tremaine	47LC0095	4	182	39	24
Tremaine	47LC0095	5	365.56	78	49
Tremaine	47LC0095	6	>187.5	40	25
Tremaine	47LC0095	7	552.5	118	74
Tremaine	**47LC0095**	**Total**		**501**	**313**
CBHC	47JE0904	W1	13.8	7	4
CBHC	47JE0904	W2	17.2	8	5
CBHC	47JE0904	W3	27.9	13	8
CBHC	47JE0904	L1	142.6	67	38
CBHC	**47JE0904**	**Total**		**80**	**55**

A high population and low population were calculated using data from (Milner 1986) and ethnographic data from (Sandstrom 1991). Following Jeske's (2000) work at the contemporaneous Langford site of Washington Irving:

> It is possible to estimate, tentatively, the population of the site using estimates of 2.5 m^2 of living space per person from Milner's investigations at Cahokia (Milner 1986) and Sandstrom's average of 3.7 m^2 per occupant based on his ethnographic data from maize growing Nahuatl speakers of northern Vera Cruz (Sandstrom 1991).

The difference between the two localities is stark. A single longhouse at Tremaine may have housed more people than lived in the entire village at Crescent Bay. However, the population estimate for Crescent Bay is artificially low because we have no estimates for the other two known longhouses. Moreover, less than 10% of the site area has been excavated—although it is apparent from shovel probe data and subsequent excavations that significant portions of the site appear to be plazas, with few or no features or structures (Jeske 2001). Remote sensing activities are planned for the future at both Crescent Bay and KCV (Jeske, personal communication, 2018). Altogether, it is reasonable to think that Crescent Bay was not as densely occupied as the later occupations at La Crosse.

However, it is not clear whether Tremaine is representative of most La Crosse locality sites or not. Longhouses have only been found at Tremaine, Overhead, and Gundersen (Hollinger 1993b; O'Gorman 1995; Sasso and Gallagher 1984). In addition, there are no known structures at any of the other La Crosse locality sites examined in this study. Combined, these data suggest that Tremaine may be an outlier. However, other characteristics such as artifact and feature density and frequency do suggest more intensive occupations at La Crosse sites than in Koshkonong. This information further supports the interpretation of community in Koshkonong as a multi-village organization. Economically and socially sustaining the population would have required more people than would be found in just one Koshkonong village. In La Crosse, villages were large enough to supply most of the economic and social resources required by the population.

The higher concentration of people in single, large villages, as opposed to dispersed small villages, led to a much higher population density in areas of the La Crosse locality. The space between villages was greater, providing a buffer zone between areas of high population. The population nucleation in La Crosse also appears to be correlated with evidence of social differentiation not present at Koshkonong villages.

Social Differentiation

O'Gorman (1995) notes evidence for social differentiation in the knoll burials at the OT site, which are contemporaneous with the lowland burials in longhouses at Tremaine. The abundance of grave goods in one of these knoll burials is also suggestive of differential social ranking (O'Gorman 1995:242). O'Gorman finds little evidence for status differentiation among the burials in the Tremaine longhouses. She notes that there is a greater representation of exotic materials deposited in graves in House 3 than any of the other houses, but this is the only possible evidence for differential resource access among the houses. The OT knoll burials, one adolescent burial in particular, seem to be different from those in the longhouses. This adolescent was buried with 24 Madison projectile points and 12 copper cylinders (Sullivan and Penman 1990). The goods included in this interment represent "more than all the copper recovered in both domestic and mortuary contexts at Tremaine, and more projectile points than were interred with any other burial" (O'Gorman 1995:194). Contrary to previous findings (e.g., Kriesa 1993; Halverson 1994), O'Gorman does not find a bias toward males in the receipt of grave goods at Tremaine. Patterning in burial practices at Tremaine appears to vary primarily along the lines of longhouse affiliation.

Staeck (1999) finds evidence for both achieved and ascribed status in Ho-Chunk oral traditions. In the examples he uses, matrilocality was the prevailing system, more closely fitting practices evident in the La Crosse locality than at Koshkonong. He proposes the presence of an implicit social hierarchy that is particularly important for women, as the marriages of high-status females (e.g., chief's daughters) determines which man will become the next political leader. Both male and female actors manipulate implicit social rules in order to increase social status and prestige. For men, these manipulations take the form of marriage, prowess in hunting, spiritual power, and success in warfare (Staeck 1999:78). Staeck suggests that this form of organization is more indicative of Hayden's (1995) transegalitarian organization than egalitarian. The former is also how Rodell (1997) characterizes social organization in the Red Wing locality based on "the expansion of surplus-based residence, which includes an abundance of storage pits; an increased importance of maize; the adoption of shell tempering in pottery manufacturing;

the construction of community structures; and…the continued construction and use of mounds" (1997:470). However, none of these authors find systematic mortuary evidence for status differentiation in the ethnohistoric or archaeological record.

In eastern Wisconsin, Foley Winkler (2011:199) finds "virtually no evidence for ranked or hierarchical burial treatment." In fact, she notes more variation within Oneota and Langford manifestations than between the two. She does make the inference that these groups were likely egalitarian due to the increased grave inclusions for adults in comparison to sub-adults. This egalitarianism does not preclude the importance of horizontal social positioning, rather than vertical positioning. Foley Winkler suggests that the types of grave goods present within burials appear to represent divisions like clan affiliation, gender, or age, rather than social status or hierarchy (Foley Winkler 2011:206).

Benn and Thompson (2014) discuss social differentiation in the context of the process of tribalization evidenced in Iowa Late Woodland and Oneota sites. They note that while gift exchange seems to have expanded during the time of the Oneota tradition, there was never an "accumulation of surplus production that support an 'elite' within late and terminal Late Woodland and Oneota societies" (Benn and Thompson 2014:36). There is no evidence for elite housing or monumental ceremonial structures used by the elite; rather, special structures appear to have been communal facilities. Benn and Thompson (2014:36) state that "only personalized power could be achieved within the Oneota tribal system." They differentiate this type of power from that evidenced at Middle Mississippian sites by drawing on ethnographic interviews with Siouan speakers to illustrate that no living speaker (e.g. Walker 1980, 1983) would ever take on the persona of a powerful spirit being like Red Horn, Turtle, or Storms-as-he-walks (Hall 1997:148). Shamans and warriors would routinely entice such spirits to assist them in their endeavors on earth, but the spirits remained "above," and accessible to all Siouans (Benn and Thompson 2014:38). This differs from the Cahokia "Beaded Burial" (Fowler 1991:10-11), where the buried individual embodied spiritual power, enough so that he had power over his retainers.

In sum, evidence from mortuary practices indicate that evidence for structurally organized status differentiation at Oneota sites was significantly less visible than it was among Middle Mississippians. Evidence from oral tradition in ethnographic and ethnohistorically known groups of the region also show little structural hierarchy. Nonetheless, a comparison of the Koshkonong and La Crosse burial practices indicates that La Crosse social structures may have been more formal than Koshkonong. At Tremaine, burials are located either under longhouse floors or on the central knoll at OT, although some miscellaneous skeletal elements were also recovered from five non-mortuary features and another disturbed provenience at OT. There is evidence for more standardization in both mortuary patterns and settlement organization. These differences suggest that while social differentiation at Oneota sites, whether early or late, did not exist on the order of magnitude seen at Middle Mississippian sites, there is evidence for increasing formalization and standardization of social organization through time. Mortuary formalization may have resulted from aggrandizing behavior (e.g. Rodell 1997) and increased exchange of non-local items. Benn and Thompson (2014:35) proposed that the primary stimulus for this increased gift giving was to form marriage alliances between tribal leaders.

Marital Residence Patterns and Gender Roles

Previous research has suggested that marital residence patterns at early Oneota sites were patrilineal/patrilocal (Hollinger 1995; Overstreet 1976; Overstreet and Richards 1992; Schneider 2015) while later sites show evidence of matrilocal residence/matrilineal descent (Hollinger

1995; O'Gorman 2010). These assertions have been based primarily on house size (e.g., Hollinger 1995) and variable standardization in ceramics (Overstreet 1976:273; Schneider 2015:342). Ho-Chunk oral traditions (Griffin 1960a; Lurie 1960, 1978; Radin 1923) and Siouan kinship terminology (Aberle 1974) have also been used to support prehistoric matrilineal descent for these groups. Although this study is the first to apply lithic data to the question of Oneota marital residence, it is not the first use of lithic data for this purpose in other cultural contexts. Deetz (1968) and Binford (1962) have both used standardization (or a lack thereof) in lithic projectile points to infer marital residence and endogamy or exogamy. Interpretations of lithic assemblages are the inverse of ceramics: standardization in ceramics and not in lithics is interpreted as indicative of exogamy and matrilocality (Deetz 1968); standardization in lithics and not ceramics is interpreted as indicative of exogamy and patrilocality (Schneider 2015).

There are several issues with these interpretations: the assumption of homogeneity in the individual practice of marital residence (e.g. Allen and Richardson 1971:51), the variety of social and economic processes acting on the formation of archaeological assemblages (e.g., Allen and Richardson 1971; Schiffer 1987), and the assumption of the inherently gendered quality of lithic and ceramic assemblages. This last assumption must be addressed before consideration of the others may even begin.

There has been extensive ethnoarchaeological (Arnold 1985; Skibo and Schiffer 1995; Skibo 2013), ethnological (Murdock and Provost 1973; Rice 1987; Wright 1991), and archaeological (Benn 1995; Berres 2001; Henning 1970) evidence presented to support the assertion that prehistoric Native American pottery production and use took place at the household level, where women were the primary producers and consumers. Corresponding evidence to support the primary production and use of stone tools by men is lacking. The implicit consideration of “Man the Tool-Maker” (Oakley 1949) has been a staple of archaeological analysis (see Gero 1991; Sassaman 1992). However, feminist critiques of lithic analysis have noted that not only did women make and use stone tools in many societies, but that variation in which tools were made by whom was probably widespread (Gero 1991; Sassaman 1992). Ethnohistoric and ethnographic literature from multiple geographic contexts indicate that many women did make stone tools (Brandt et al. 2006; Estioko-Griffin and Griffin 1981; Goodale 1971:155; Gould 1977:166; Hamilton 1980:7; Hayden 1977:183, 185; Tindale 1972:246). Holmes (1919:316) even describes Native American women “chipping flakes into small arrow points, holding the flake in their left hand, grasped between a piece of bent leather, and chipping off small flakes by pressure, using a small pointed bone in the right hand.” Gero (1991) notes that an inherent bias in what is considered to be a tool, who participates in modern lithic replication, and the types of activities that stone tools are stereotypically associated with all contribute to the Man the Tool-Maker paradigm.

She first notes that lithic tools are primarily classified as those “standardized, classifiable, reproduced forms of worked stone” (Gero 1991:165). Unretouched lithic debris makes up the majority of used stone objects in many ethnographic cases (e.g., Hayden 1977). Unfortunately, they are the lithic objects least likely to be considered as tools from archaeological contexts. Part of this stems from the difficulty in identifying used versus unused lithic debris (Greaves 1999; White 1968; White and Thomas 1972). But even if their presence is recognized, they are often excluded from analyses because “they are not diagnostic and because their quantity is such that they tend to distort the graph” (Binford and Binford 1966:263-264). This phenomenon is well-documented in Oneota lithic analyses (Jeske and Sterner-Miller 2015; Sterner 2012; Sterner and

Jeske 2017). The definition of lithic tools in this dissertation is based on whether or not a lithic artifact was used, not its adherence to morphologically redundant characteristics.

Informal or flake tools are the lithic tool type that is most frequently used by women (Gero 1991:170). Female activities described ethnographically in Wisconsin included gathering and processing wild plants, growing and processing domesticated crops, weaving, tanning hides, house building, pottery production and other household utensil production (Callender 1978b; Skinner 1921; Spindler 1978). There are also accounts of Shawnee women participating in multi-month hunting trips (Callender 1978a) and Fox women accompanying their husbands on raiding trips (Callender 1978b). Many of these tasks, in particular plant processing, hide processing, and wood and bone utensil production would have required stone tools. "Although the kinds of tools women need would clearly vary from culture to culture and from task to task, it is inconceivable that they sat and waited for a flake to be produced, or that they set out each time to borrow one" (Gero 1991:170). It is probable that women produced the majority of tools found in agricultural villages.

Additionally, as Gero (1991:169) notes, women were "especially visible and active in household contexts where they played significant roles in household production and household management." These are the same contexts that archaeologists are most likely to examine: house floors, base camps, and village sites. Prehistoric women are probably overrepresented in these contexts. Most simply, women composed approximately half of all prehistoric populations and were responsible for most productive activities at agricultural village sites.

Ember (1983) has argued that women spend relatively less time planting, tending and harvesting crops in more intensive agricultural societies than in simple agricultural societies. She notes that this shift occurs for multiple reasons. "The time spent processing crops and preparing food increases because of intensive agriculturalists' greater dependence on cereal crops" (Ember 1983:288). Other household work may also increase due to maintenance of more permanent dwellings, increases in the fuel and water required for cooking cereals, and additional preparation of food for storage. Women in intensive agricultural societies are also likely to have more children than women in horticultural societies. Ember (1983:299) describes this shift as an increase in the amount of "inside work" performed by women in agricultural societies, and the same amount of "outside work" as they performed in horticultural societies.

Edwards (2017) has shown that circa 50% of the calories consumed by occupants at Oneota village sites in Wisconsin was composed of maize. By any measure, maize is the foundation of the diet during the 11th-16th centuries in Wisconsin. Ember (1983:300) notes that the shift to more inside work by women may be tied to agricultural intensification, or to something else often associated with it, such as the dependence on cereal crops. Since Ember (1983) does not provide a strict definition of what characteristics define intensive versus simple agriculturalists, we cannot be sure which of these categories would best characterize Oneota groups. Regardless, dependence on domesticated crops is certainly a criterion they fulfill. This implies that, relative to Late Woodland and earlier groups, Oneota women spent more time on inside work. One element of that work was the production of stone tools, all stages of which occurred at villages.

Sassaman (1992) has specifically addressed this temporal shift in subsistence and settlement strategies and its effects on women's labor. He notes that most of the economic changes associated with the shift to increased residential stability are "implicitly attributed to women: the adoption of pottery and the expansion of the food base to include starchy seeds, shell fishing, and incipient horticulture" (Sassaman 1992:257). The increase in women's duties required to cope with economic stresses of decreased mobility would have resulted in a "time and energy crisis for women" (Sassaman 1992:257). Thus, women would have experienced a greater need for technology, including chipped stone technology. Sassaman explains the diachronic shift from formal biface to expedient core technology as a shift in which gender was doing the majority of the flintknapping. Sassaman finds it likely that both women and men equally participated in core reduction at domestic sites and that "the removal of flakes for immediate on-site use and for the manufacture of projectiles for hunting now fell under a single production trajectory" (1992:258).

It is the case at the Crescent Bay Hunt Club site that there is no discernable difference in the production trajectory of Madison Triangular points and other lithic tools from the site. The proportions of raw materials utilized (Table 7.19), amount of heat treatment, and quality of raw materials are all comparable to those of non-Madison point tools. There is no evidence to suggest that men were producing Madison points and women were producing all other tools.

In sum, we should expect that women would have produced many, if not most, of the tools found within Oneota village contexts (Gero 1991:169-170). Unlike in earlier time periods, there is no evidence for ethnic or social differentiation based on lithic tool forms during this time period. This lack of differentiation suggests that one would not expect to see significant differences in lithic habitus based on marital residence patterns. Since men were likely not the ones making many, or most stone tools, they cannot be used as a marker of male natal identity. Women appear to be using ceramic motifs to express their ethnic affiliation at this time (e.g., Schneider 2015), and seem to have treated lithic tools as purely utilitarian, with very little systematic formal variation based on function, location of manufacture, or raw material type.

A decline in formal lithic tool complexity and diversity through time has long been noted in the Midwest and has been related to an increased reliance on agriculture or horticultural economies (Jeske 1987, 2003b). This decline resulted in large quantities of informal or expedient tools at many late prehistoric sites, particularly at late prehistoric sites where access to good quality lithic raw materials was often restricted (Jeske 2003b; O'Gorman 1995; Sterner 2012). While Jeske (1987, 1992) attributed this decline to a shift in energy expenditure away from tool production and towards activities such as agriculture, marriage alliances, and warfare, he did not recognize the possibility that there was a shift in the gendered division of labor of producing stone tools.

Although men in earlier times seem to have used lithic bifaces as a means of social expression and markers of social status, they no longer served as social status markers during the late prehistoric (Sassaman 1992). Men must have relied on other mechanisms to gain prestige and express their social status. One probable avenue by which they did this is through warfare and raiding, which is known to increase during late prehistory. Milner (1999:107) notes that "warfare is commonly seen as a means of enhancing the prestige of high-spirited young men." While men continued to rely on lithic materials to produce weapons for hunting and raiding, the small size of these tools necessitated by the use of arrows instead of spears, as well as the additional demands on their time due to increased population size and agricultural production led to a de-emphasis of stone tool production as a mechanism for increasing social status (see also Jeske 1987, 1992).

Table 7.19 Raw materials used in Madison point and other tool production at Crescent Bay.

Raw Material Type	Madison (n)	Madison (%)	Other (n)	Other (%)
Baraboo Quartzite	0	0%	1	0%
Barron Co Quartzite	1	1%	2	0%
Burlington	7	9%	25	5%
Galena	36	44%	215	47%
Hixton	0	0%	5	1%
Maquoketa	0	0%	4	1%
Oneota	8	10%	33	7%
Platteville	4	5%	16	4%
Prairie du Chien	1	1%	12	3%
Quartz	1	1%	1	0%
Silurian	11	13%	36	8%
Unk. Quartzite	0	0%	1	0%
Unk. Silicified Sand	0	0%	3	1%
Unknown	13	16%	100	22%
Wyandotte	0	0%	3	1%
Total	**82**		**457**	

Violence

Milner (2007:191-199) provides a timeline of warfare in the prehistory of the Eastern Woodlands stretching from the Archaic to Historic times. He notes that during the Late Woodland (ca. A.D. 400-1000) there was a decline in non-local materials and more localized pottery styles, "consistent with diminished contact and sharper distinctions among groups" (Milner 2007:195). Population growth and nucleation led to settlement systems characterized by clusters of settlements separated by no-man's lands. In historic times, hunting game or collecting wild plants in these buffer zones invited attack (Anderson 1994; DePratter 1991; Hickerson 1965). This led to greater pressure on local resources near settlements, as evidenced by lithic raw material use. Reliance on maize would have improved the efficiency and flexibility of food procurement for these increasingly circumscribed groups (Milner 2007:196). Cooling during the Little Ice Age (ca. A.D. 1300-1850) exacerbated uncertainty over anticipated crop yields from one year to the next, resulting in the further devolution of intergroup relations. Milner (2007) convincingly illustrates this trend in the northern Eastern Woodlands by documenting the increasing numbers of palisaded sites (Figure 7.12).

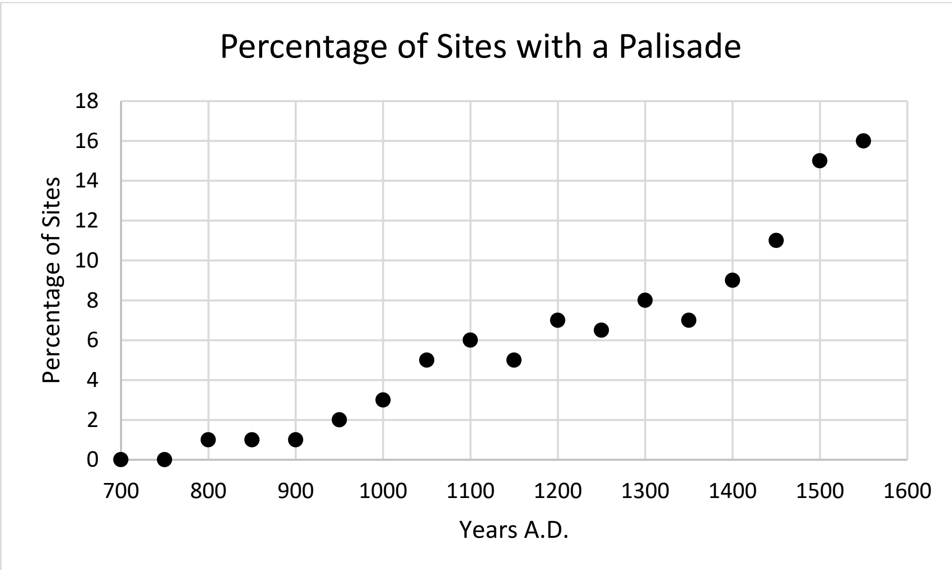

Figure 7.12. Temporal distribution of 231 palisaded sites in the northern Eastern Woodlands (after Milner 2007:198).

Intergroup violence has been well documented at Oneota sites, most famously by Milner et al. (1991), and later by Hatch (2015), Hollinger (2005), Oemig and Karsten (2016), Steadman (2008), and others. There has been some debate regarding the levels of violence exhibited at the sites examined in this dissertation. O’Gorman (1995, 1996) finds very little evidence for violent trauma or trophy taking in her interpretations of the 92 individuals identified at the Tremaine site, instead attributing missing crania to “ancestral worship associated with the corporate group and solidarity of the household” (1996:268). Hollinger (2005:249-251) instead suggests that these six individuals, as well as others displaying scalping, cutmarks, an embedded projectile point, and cranial depression fractures provide evidence that 9.2% of the burial population over age fifteen exhibited signs of violent death (cf. Vradenburg 1993:135). Of the two individuals whose skeletal remains were identified at the State Road Coulee site, a violent death was inferred for one, given the cutmarks on cervical vertebrae and a missing cranium (Anderson et al. 1995:205-206).

Hollinger (2005) incorporates these examples, and numerous others, into broader conclusions about trends in late prehistoric conflict evidenced at Oneota sites. He differentiates between early (ca. A.D. 1100-1400) Oneota warfare and late (ca. A.D. 1400-1650) Oneota warfare. He argues that early warfare took place at relatively short distances while later conflicts went further into buffer zones. Hollinger proposes models of cultural replacement in which "Oneota peoples" (2005:142) replaced extant Middle Mississippian and Late Woodland peoples. There are multiple problems with this interpretation. The foremost issue is the assumption of unity of Oneota peoples. There is no evidence that the people who manifested Oneota tradition traits in the archaeological record acted as a unit, forcing other groups to flee or assimilate. In fact, the wide degree of variation in temporal and geographic manifestations of the Oneota tradition suggests that "Oneota peoples" were as different from each other as they were from Middle Mississippian and Late Woodland peoples in most cases. This is true within localities occupied during the early period (see Schneider 2015 for a comparison of the Walker-Hooper and Bornick sites in the Grand River locality) and the late period, as demonstrated in analysis of La Crosse locality sites in this dissertation. It is even more demonstrable across Wisconsin localities and, to a greater degree, across the Midwest. There was no "Oneota people" in the way that there was an Iroquois Confederation. Particularly in the La Crosse locality, Oneota villages were as likely to be warring amongst themselves as they were with another group.

A second problem with Hollinger's scenario is the question of whom were they fighting? Radiocarbon dates indicate a lack of Middle Mississippian or Late Woodland presence in eastern Wisconsin after A.D. 1250 (Richards and Jeske 2002). But the radiocarbon dates from Oneota sites like Crescent Bay and KCV indicate an occupation lasting through A.D. 1400. If, as Hollinger (2005:142) states, "eastern Wisconsin was securely in the hands of Oneota peoples by A.D. 1300 and Late Woodland and Middle Mississippian populations had abandoned the region," then who were the occupants of Oneota sites fighting? There is ample skeletal evidence for violence at eastern Wisconsin Oneota sites (see Jeske 2014; Oemig and Karsten 2016), and additional evidence for dietary risk management strategies used to cope with structural violence (Edwards 2017). At Crescent Bay, one individual was shot with an antler-tipped arrow, which chipped the iliac crest of the left innominate (Figure 7.13). A cranium recovered from a refuse pit at the site exhibits evidence of blunt force trauma (Figure 7.14) (Jeske and Sterner-Miller 2014). While, as Edwards (2017:285) notes, there is no indication of who the Koshkonong Oneota villagers were fighting, violence was definitely a threat, at least during certain periods.

Figure 7.13. Iliac crest with antler projectile point from Crescent Bay (from Edwards 2017).

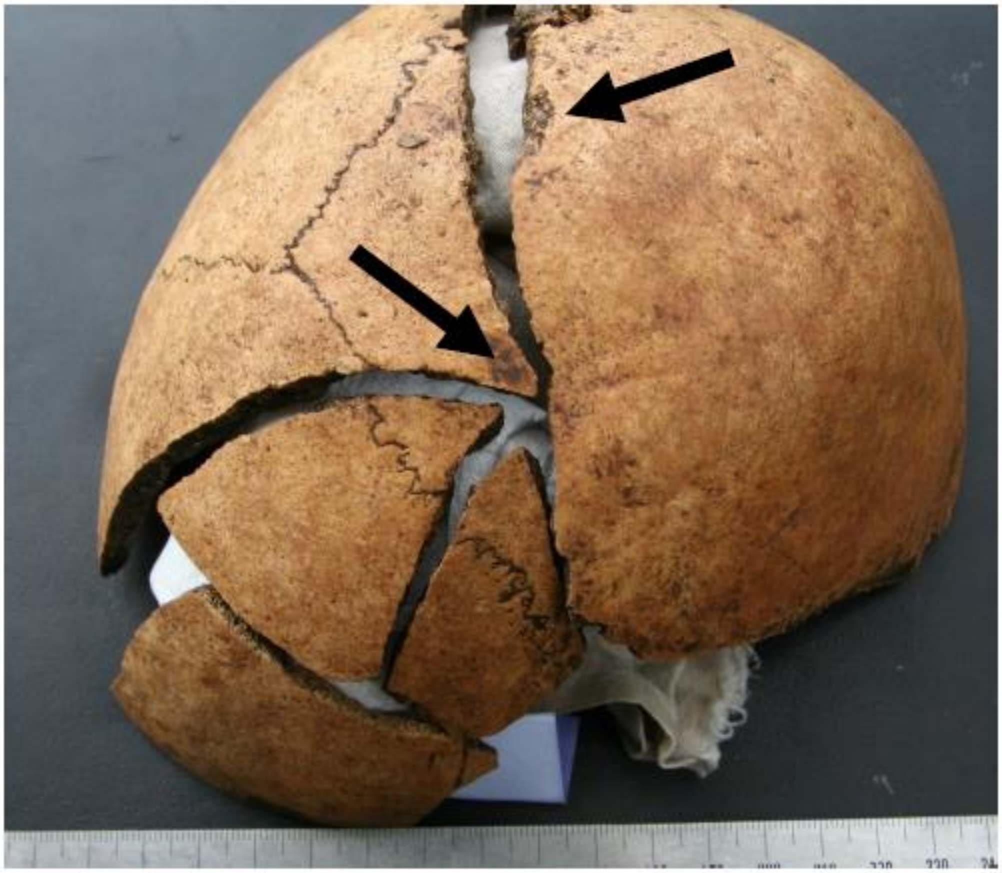

Figure 7.14. Cranial elements recovered from Crescent Bay with evidence of blunt force trauma (from Jeske and Sterner-Miller 2014).

While there are no radiocarbon dates from these specific features, there is no reason to suspect that they are early in the site history, suggesting that violence was still ongoing after Late Woodland and Middle Mississippian groups no longer occupied the area. Edwards (2017) notes that risk management strategies were persistent throughout the length of the Oneota occupation on Lake Koshkonong. His subsistence data supports the assertion advanced in this dissertation, that Koshkonong residents were engaged in inter-village cooperation. Particularly, he notes that although KCV residents had access to backwater and creek resources (Edwards 2010), they still consumed large quantities of fish that came from the lake (McTavish and Edwards 2014). “Occupants of Crescent Bay, Schmeling, Parnell, and Carcajou Point could have kept them from gaining access to the lake—both overland or via the creek—but they did not" (Edwards 2017:309). Perhaps conflict at Koshkonong was between people from Langford villages to the south, or other Oneota localities to the north. Given the degree of interconnectedness among the Koshkonong villages, it is unlikely that intragroup violence among these villages was a concern.

Conflict in the La Crosse locality looks to have taken on a different form than at Koshkonong. Buffer zones between sites were larger, evidence for inter-village interaction is diminished, and violence at these later sites continues unabated. The radiocarbon chronology in La Crosse indicates that the beginning of the Oneota occupation in the locality overlaps the Middle Mississippian and Late Woodland occupations, as in Koshkonong (Theler and Boszhardt 2000). But, as in Koshkonong, by A.D. 1200, archaeological signatures of these other traditions disappear, suggesting that conflict at La Crosse villages may have come from other Oneota localities, or it may have occurred between villages within the locality. However, the larger buffer zones between villages likely have more to do with establishing resource catchment zones for the larger villages, which would have needed more resources than Koshkonong villages to support their larger populations. The close spacing of sites at Koshkonong suggests that these people responded to threats of violence by congregating and concentrating their strength, while in La Crosse, their larger villages were more self-sufficient and had no need for such defense mechanisms.

Violence in Koshkonong or La Crosse does not appear to have been as endemic as it was in the Central Illinois River Valley, where approximately 20% of individuals identified exhibit evidence of violent death (Goodman et al. 1984; Hatch 2015; Hollinger 2005; Milner et al. 1991; Steadman 2008). Edwards (2017) demonstrates that people living in the Koshkonong locality were utilizing multiple risk management strategies to cope with threats of attack. Researchers have demonstrated that when there is a significant and persistent threat of attack, people tend to construct their catchment ranges and take defensive postures, even when it has negative impacts on health and social relationships (e.g., VanDerwarker and Wilson 2016). In La Crosse, the use of hamlets to expand access to arable land, inland extractive camps to procure resources, and the relocation of villages to more sheltered regions in the cold season marks a high degree of logistical mobility and a modest degree of residential mobility (Edwards 2017:294). Each of these outlying settlements would have represented a vulnerable target where people could be killed, and resources stolen or destroyed. "The fact that the La Crosse groups were willing and able to take such risks indicates that the risk level was acceptably low" (Edwards 2017:295).

Edwards is careful to point out that this does not mean that intergroup conflict was not a concern in La Crosse. Rather, it is likely that their response to the threat of conflict was population aggregation that resulted in much greater defensive capabilities than in Koshkonong. In contrast to the dynamic settlement system in La Crosse—and most other Oneota localities (see Edwards 2017:297-298)—Koshkonong residents' labor seems to have been restricted to areas at, or near the villages.

It appears that conflict, and the accompanying risk management strategies employed by Oneota tradition villagers were more prevalent in Koshkonong than La Crosse. The lithic data support this assertion. First, Koshkonong groups used more intensive lithic economization and locally circumscribed raw material acquisition strategies. Second, there is a much higher prevalence of Madison points in the Koshkonong assemblages. Previously, researchers have argued that the scraper/point index calculated for Wisconsin Oneota sites was indicative primarily of the greater prevalence of bison hide processing closer to the plains in La Crosse. Koshkonong sites have an average index of 63 while La Crosse sites average 187. However, hide processing may not be the sole explanation for this. The greater proportion of Madison points in Koshkonong may, in fact, be related to greater prevalence of warfare. The use of Madison points on humans is supported by the human protein residue identified on two Madison points from Crescent Bay (Sterner and Jeske 2017). Thus, the evidence indicates that, in the most general sense, Hollinger's (2005) temporal model for Oneota conflict and culture change may be applicable. Inter-group conflict in the Midcontinent peaked in intensity around A.D. 1300 and then declined for a time before having a resurgence in the 1600s (Hollinger 2005:331).

Summary of Oneota Community Construction

Early Oneota communities in eastern Wisconsin were constructed and maintained very differently than later communities in western Wisconsin. In Koshkonong, community likely consisted of multiple nuclear families from several small villages located in close proximity to one another. In La Crosse, it appears to have consisted of large, extended families living in a few heavily populated villages separated by greater distance. In Koshkonong, post-marital residence was probably patrilocal, contributing to smaller households. In La Crosse, there are several lines of evidence indicating matrilocal residence patterns. The population of villages in La Crosse was ten times as high as villages in Koshkonong. Social and settlement organization was probably more formally structured at La Crosse sites than at Koshkonong, largely owing to the higher population size and density at villages there. Despite the higher population in La Crosse, there was probably more conflict in Koshkonong than La Crosse. Although there are many broad similarities in pottery manufacture, lithic utilization and subsistence practices between the two localities, the way in which people identified their community varied greatly between these two spatial and temporal contexts.

Oneota Lithic Tradition

The broad similarities between the La Crosse and Koshkonong localities exist because of their mutual adherence to Oneota traditions. Some of these traditions endured shifts in subsistence systems, settlement practices, political organization, and geographic location. Examination of lithic utilization at villages from both early and late manifestations of the Oneota tradition allows me to present a holistic description of those characteristics that define Oneota lithic traditions, as opposed to discrete traits that are unique to specific spatial and temporal contexts. This section elucidates those features of lithic economy that represent Oneota traditions, regardless of spatial and temporal context, based on the data examined in this sample. Features that vary within or across the localities are not discussed here.

Local Raw Material Acquisition

The vast majority of lithic raw materials being utilized at Oneota tradition sites are local. There is some variation in how much of the majority—an average of 79% in La Crosse and 95% in Koshkonong—but still more than three-quarters of the assemblages recovered. It is inferred that, due to the proximity of these resources (sometimes less than a kilometer from the village), lithic raw materials were acquired mostly through primary procurement, rather than trade. On the other hand, non-local materials are present in low amounts, suggesting limited intergroup trade or exchange. Schneider argues for a similar pattern of local vs nonlocal associations for Oneota ceramic assemblages in Wisconsin.

Expedient Tool Technology

The use of expedient tool technology is ubiquitous at Oneota tradition sites. At least one-third of the lithic artifacts identified as tools at Oneota sites cannot be categorized according to traditional morphofunctional typologies. These tools are variously referred to as flake tools, informal tools, utilized flakes, and retouched flakes (e.g., Evans et al. 2014; Goatley 1995; Jeske 1992; Padilla and Ritterbush 2005; Rodell 1989). This represents an emphasis on lithic tools as primarily utilitarian items, not indicative of social or political status.

Economization in Production

People adhering to Oneota traditions emphasized the economization of lithic raw materials, probably to avoid risk and expending unnecessary time and energy procuring raw materials further from villages. As a result, they relied heavily on techniques like bipolar reduction—ubiquitous in Oneota tradition assemblages, and heat treatment of poor quality materials, evidenced on one-third of lithic tools and debris.

Utilitarian Tools

Lithic tools were used for a variety of purposes. There are few instances of identifiable special purpose tools or close correlations of formal attributes and function. Artifacts commonly identified in morphofunctional typologies as scrapers always exhibited traces of use-wear indicative of scraping. However, there is no morphological differentiation between wood and hide scrapers. Madison points were used both as projectile points and sometimes as scraping or cutting tools. Informal or flake tools were used for the same tasks as formally retouched scrapers or knives, also represented in the same assemblages. Stone tools were just that; implements used to carry out a particular function, often multiple functions. Many tools used in the Oneota tradition may not have been produced with a particular function in mind but simply used for whatever task was at hand.

Summary

There are relatively few characteristics that holistically represent Oneota tradition lithic assemblages and do not exhibit significant geographic and temporal variation. And many of these characteristics are not unique when examined in the light of contemporaneous traditions. For instance, all four of the traits discussed here—local raw material acquisition, expedient tool technology, economization in production, and utilitarian tools—are in evidence at Langford tradition sites (Jeske 1992, 2000, 2002; Wilson 2016). These traits are also commonly used to typify Late Woodland assemblages (e.g., Billeck 1991; Ensor 2009; Jeske 1987; Redmond and McCullough 2000; Salkin 2000; Vander Heiden and Richards 2015) and Fort Ancient assemblages (Cook and Comstock 2015; Nass 1987; Robertson 1984). The similarities in the archaeological signatures of Langford, Fort Ancient, and Oneota traditions are largely why these aspects were grouped together as the Upper Mississippi phase in McKern's (1939) Midwest Taxonomic Method. However, even Middle Mississippian lithic assemblages exhibit these traits, although to a lesser degree than Late Woodland and Upper Mississippian groups (e.g., Benden 2004; Cobb 2000; Jeske 1987, 2003; Vander Heiden and Richards 2015; Yerkes 1987).

For years scholars have noted the ubiquity of these characteristics of lithic practice during the Late Woodland and Late Prehistoric periods in the Eastern Woodlands (e.g., Carr 1994; Cook and Comstock 2014; Jeske 1989, 1992; Luedtke 1978; Morrow 1999). The lack of lithic criteria differentiating one archaeological tradition from another during this time period has led to a dearth of literature on lithic practice during late prehistory. There has been an implicit assumption that lithic tools have little to tell us because they cannot differentiate between contemporaneous archaeological traditions. The comprehensive analyses in this dissertation demonstrate that lithics cannot, in fact, distinguish between multiple late prehistoric traditions. There is as much variation in lithic practice within traditions as across them. However, detailed examination of this variation within traditions provides valuable information on gender roles, community structure, risk management strategies, social status, settlement patterns, and the daily, lived experience of the people who made and used lithic objects. Far from being irrelevant, late prehistoric lithic analysis allows us to identify more meaningful units of analysis than that of the Oneota tradition, where real differences in people's daily practice and experience can be identified.

CHAPTER EIGHT:

CONCLUSIONS

This dissertation has demonstrated how the analysis of stone tools can contribute to a broader understanding of how human communities are represented in the archaeological record. Three levels of analysis were considered for this project:

1. Intra-site, in order to provide a discrete model for Oneota lithic economy; and to help identify the relationship between lithic practice and community identity.
2. Intra-locality, in order to identify the commonalities of lithic practice that are indicative of close, community relationships; and to develop a model for communities in two different geographic and temporal contexts.
3. Inter-locality, in order to identify the commonalities of lithic practice that are indicative of more distant, symbolic connections. This consists of a comparison of Oneota lithic practice in western Wisconsin (A.D. 1400-1700) at the La Crosse locality to that in eastern Wisconsin (A.D. 1100-1450) at the Koshkonong locality, resulting in a comprehensive model of Wisconsin Oneota lithic economy.

The first level of analysis examined the lithic assemblage from the Crescent Bay Hunt Club village site in the Koshkonong locality. This analysis indicated that village residents procured most of their lithic raw materials from sources within 10 km of the village. However, villagers occasionally also traveled or traded for materials sourced anywhere from 40 to over 300 km away. Regardless of the origins of the lithic raw materials, village residents economized all of their materials through the use of bipolar reduction, the production of relatively small formal tools, and the use of unmodified debitage for daily tasks.

Lithic tools were used for a variety of tasks, and often for more than one. Tasks included plant working, butchering, hide preparation, and the production of bone, antler, and wooden tools. Tools used for butchering were not deposited in longhouses after use, suggesting that this activity was relegated to other areas of the village. Evidence from microwear analysis, when interpreted through the lens of ethnographic analogy, indicates that both men and women used lithic tools at Crescent Bay. If we rely on ethnographic examples of the gendered division of tasks such as: the working of plant materials for food production and mat construction, the butchering of animals brought back to the village, fresh and dry hide preparation and clothing construction, and the production of bone, antler, and wooden tools (Callender 1978b; Skinner 1921; Spindler 1978), then we can reasonably infer that the tasks represented by the Crescent Bay microwear results were performed primarily by women. Thus, women were using most of the stone tools deposited at the village. If we rely on ethnographic literature indicating that women produce the majority of expedient tools used at village sites (Gould 1977:166; Hamilton 1980:7; Hayden 1977:183, 185; Holmes 1919:316; Tindale 1972:246), then we can reasonably infer that women likely produced a large portion of the lithic assemblage at Crescent Bay. Patterns of tool use and discard do not suggest that there was a clear-cut gendered division of space in the village, as evidence of both masculine and feminine tasks is found in both wigwam and longhouse structures. Ritual and domestic space also largely overlapped. Human remains were represented by isolated human bones found with refuse in old storage pits, but also as formal burials within longhouse structures.

These patterns in lithic procurement, production, use, and discard reveal the lithic habitus of village residents. The common practices of lithic production, use, and discard are indicative of a community with broadly similar habitus. It is expected that these practices will vary less among individuals who are part of a community than those who are not. No evidence for intra-village communities—for instance, specialized production or processing groups, or groups divided by age or gender—are evident at Crescent Bay. The lithic habitus at Crescent Bay was then compared to that of other Oneota tradition villages in the Koshkonong locality, as well as the geographically and temporally disparate La Crosse locality, to identify any inter-village communities.

The second level of analysis in this dissertation compared lithic practice evidenced at several sites in the Koshkonong and La Crosse localities. The first goal of this intra-locality analysis was to identify the commonalities of lithic practice that are indicative of close, community relationships. A combination of correspondence analysis and chi-square tests were used to characterize the amount of variation in lithic practice among four Oneota tradition sites in the Koshkonong locality and five sites in the La Crosse locality. All of these tests indicated greater variability in raw material type and quality, basic tool forms and tool functions among the La Crosse locality sites than among the Koshkonong sites. The La Crosse sites also exhibited more temporal variation in time of occupation and were spaced further apart. These factors resulted in an interpretation of the Koshkonong Oneota tradition as characterized by a tightly knit multi-village community while evidence of such a community unit at La Crosse does not exist. Analysis of inter-site lithic habitus at the La Crosse locality is complicated by temporal variation between sites and the possibility that heterogeneity reflects change over time. Settlements are more widely spaced on the landscape, introducing additional factors of travel distance that might impact the construction or maintenance of community. Whether or not community in La Crosse consisted purely of single villages or of some other unit of organization requires the examination of more data from more fully excavated sites within the locality.

The second goal was to identify differences in the construction of community in the two localities. These differences were related to variation in marital residence patterns, village size and population density, prevalence of violence, and social differentiation. In La Crosse, the higher concentration of people in single, large villages, as opposed to the dispersed small villages seen at Koshkonong, led to a much higher population density in areas of the locality. The space between La Crosse villages was greater, providing a buffer zone between areas of high population.

There is also evidence for more standardization in both mortuary patterns and settlement organization at sites in the La Crosse locality. While social differentiation at Oneota sites did not exist on the order of magnitude seen at Middle Mississippian sites, there is evidence for increasing formalization and standardization of social organization through time.

Unlike in earlier time periods, there is no evidence for ethnic or social differentiation based on lithic tool forms during this time period. This lack of differentiation suggests that one would not expect to see significant differences in lithic habitus based on marital residence patterns. Since men were likely not the ones making many, or most stone tools, they cannot be used as a marker of male natal identity. Women appear to be using ceramic motifs to express their ethnic affiliation at this time (e.g., Schneider 2015), and seem to have treated lithic tools as purely utilitarian, with no systematic formal variation based on function, location of manufacture, or raw material type. The lithics do not provide evidence contrary to the interpretation of early Oneota tradition residence as patrilocal and later residence as matrilocal (e.g., Hollinger 1995).

It appears that conflict, and the accompanying risk management strategies employed by Oneota tradition villagers were more prevalent in Koshkonong than La Crosse. Koshkonong groups used more intensive lithic economization and locally circumscribed raw material acquisition strategies. Additionally, there is a much higher prevalence of Madison points in the Koshkonong assemblages. The use of Madison points on humans is supported by the human protein residue identified on two Madison points from Crescent Bay (Sterner and Jeske 2017).

Early Oneota communities in eastern Wisconsin were constructed and maintained very differently than later communities in western Wisconsin. In Koshkonong, community likely consisted of multiple nuclear families from several small villages located in close proximity to one another. In La Crosse, it appears to have consisted of large, extended families living in a few heavily populated villages separated by greater distance. In Koshkonong, post-marital residence was probably patrilocal, contributing to smaller households. In La Crosse, there are several lines of evidence indicating matrilocal residence patterns. The population of villages in La Crosse was ten times as high as villages in Koshkonong. Social and settlement organization was probably more formally structured at La Crosse sites than at Koshkonong, largely owing to the higher population size and density at villages there. Despite the higher population in La Crosse, there was probably more conflict in Koshkonong than La Crosse.

The third level of analysis compared lithic practice in La Crosse and Koshkonong to identify the commonalities of lithic practice that typify the Oneota tradition. These commonalities were relatively few, consisting of: local raw material acquisition, use of expedient tool technology, economization in production, and tools that served a primarily utilitarian function. None of these characteristics are unique to the Oneota tradition and all are common to Late Woodland, Langford, Fort Ancient, and to a lesser degree, Middle Mississippian groups as well. The utility of late prehistoric lithic data is not in distinguishing individual traditions, but in identifying more meaningful units of analysis that actually do display differences in the daily practices and experiences of people.

Broader Impacts of Research

This dissertation has three significant impacts on lithic and Oneota tradition research. (1) It is the first large-scale use-wear analysis of Upper Mississippian lithics and the first inter-locality analysis of Oneota tradition lithics. It provides the first comprehensive examination of Oneota lithic tool function and presents the first direct evidence for the function of informal edge-only tools, and thus produces a more representative picture of the role lithics played in late prehistoric life.

(2) Following in the steps of Sassaman (1992) and others (e.g., Gero 1991; Greaves 1999), the analyses in this dissertation demonstrate the impact of gendered labor on lithic tool production and use. The decline observed in formal lithic tool complexity and diversity during late prehistory is not only related to an increased reliance on agriculture, but the change in gendered labor coincident with such a shift in subsistence strategies. At the same time the primary mechanism for males to garner prestige shifted from hunting and tool production to warfare and raiding, women increasingly needed tools for processing new and larger amounts of cultivated crops. The shift to informal, utilitarian lithic tools during this time suggests that not only were most lithics used by women, but they were made by women as well.

(3) The critical examination of multiple levels of social organization (e.g., village, community, locality, and tradition) at two temporally and geographically distinct manifestations of the Oneota tradition calls to attention temporal shifts in social organization, as well as the limited utility of examining variation at the level of the tradition.

Future Research

Future research should continue to dissect the Oneota tradition, deriving meaningful units of organization and communication from this broad phenomenon. There are five main avenues by which the approaches used in this dissertation may be used to further advance this research: field work, radiocarbon dating, lithic assemblage analyses, microwear analyses, and protein residue analyses.

Field Work

There are few situations in which archaeological research could not benefit from additional field work. However, there are some specific areas where additional fieldwork can be concentrated to address the research topics examined in this dissertation. Edwards (2017:336) notes that Crescent Bay is the only thoroughly excavated Oneota tradition site in the Koshkonong locality. He identifies KCV and Purnell (47JE0185) as the two sites in the locality where environment differences produce the expectation of differential subsistence data. The expansion of excavations at KCV is essential to recovering a sample of lithic materials comparable to that from Crescent Bay.

Additionally, the presence of a prehistoric quarry in the area is evident in documentation of Halvor Skavlem's knapping experiments (Pond 1930). This quarry was supposedly located at the base of the cliffs on Carcajou Point. While this cliff face is now covered in an indeterminate amount of sediment eroded from the top of the cliff, testing of this area may yield invaluable information about the placement of this quarry and the degree to which this source was used throughout the Koshkonong locality.

In the La Crosse locality, all of the sites examined in this study were destroyed by development following mitigation. Portions of the Tremaine complex remain but Pammel Creek and State Road Coulee have been completely disturbed. The Overhead site (47LC0020) and Meier Farm-New Road site (47LC0432), where longhouses have been documented, have been similarly impacted. Additional fieldwork resulting in the documentation of more village sites, needed to contextualize the Tremaine data, are essential for understanding the amount of intra-locality variation in community structure.

Radiocarbon Dating

As with fieldwork, archaeology can always benefit from more radiocarbon dates. In particular, more dates from Koshkonong sites besides Crescent Bay will refine the sequence of overlapping occupations in the locality. Dates from La Crosse on materials other than wood charcoal are needed to test the already existing chronology for that locality.

Lithic Assemblage Analysis

The need for systematic, comparable lithic assemblage analyses at Oneota tradition sites cannot be emphasized enough. Even though assemblages examined for this analysis were documented using fairly similar schema, minor variations in the definition of variables, the process of deriving tool type categories, and the lack of reporting on some variables made comparison difficult. O’Gorman’s (1995) Tremaine site report uses a modified version of Lurie and Jeske’s (1990) schema but still organizes sections of the report under the headings of morphofunctional tool types and contains little information about methods of production. Lithic analysts must not only use the same schema, but also report the same kind of information. The traditional report structure where Oneota lithics are described but not considered analytically is insufficient. This dissertation demonstrates that the apparent lack of formal variation in late prehistoric lithics does not mean that they have no information to provide about prehistoric people. Rather, lithic analysts must look for means other than formal tool variation to extract that information.

In particular, comprehensive lithic analyses from Oneota tradition sites in the Grand River and Middle Fox River Valley localities are needed to contextualize the results from Koshkonong. Additional data from another eastern Wisconsin locality would demonstrate whether the economizing practices in place at Koshkonong were typical of early Oneota manifestations or were unique to that specific geographic context.

Microwear Analysis

Many studies of lithic technology have utilized the concepts of economy and efficiency, but rarely do they integrate direct evidence of tool function in conceptualizations of raw material economy. Similarly, use-wear analysts have produced a body of literature on the function of stone tools but have rarely integrated their results into the larger context of human behavior. Stone tool use-wear is often included as a separate section of archaeological reports and conclusions about tool function arising from use-wear analysis are rarely considered in conjunction with functional conceptions arising from tool morphology, assemblage composition, or spatial distribution. Function is not merely the physical use of a tool, but is contextual and complex, impacted by numerous factors, including climate, subsistence and settlement strategy, inter- and intragroup communication and competition, demography, and ideology. Recognizing the overall role that lithics play in complex economies requires a multifaceted approach to tool function. This dissertation demonstrates the utility of such a multifaceted approach.

While microwear analysis is not entirely new to Oneota lithic analyses (e.g., Boszhardt and McCarthy 1999), this dissertation is the first use of it on a large dataset composed of multiple tool forms. The sampling suggested for lithic assemblage analyses is also true of microwear analyses; assemblages from the Grand River and Middle Fox River Valley should be considered in as much detail as possible. Additionally, a larger sample from Tremaine and Pammel Creek (particularly Pammel Creek given the abnormal use-wear profile exhibited in the use-wear sample in this study) would likely provide a more representative profile of tool use at those sites.

Protein Residue Analysis

Only a very small protein residue sample was tested for this project: 41 tools, 8 of which returned positive results. This small number of positive reactions is typical and the initial tests do not preclude the possibility that they were used on different animals or plants (Fagan 2013; Yohe and Bamforth 2013). Tools may be retested for other species as time and money allow. As it stands, these eight positive reactions have proven very useful in identifying tool function as well as forming a clearer picture of the economic, subsistence, ritual, and martial activities at Crescent Bay. Coupled with detailed zooarchaeological data and with microwear analyses, we can demonstrate that dogs were defleshed and ritually buried at the site. We can also demonstrate that bison were hunted and processed locally, rather than on the western prairie. Taken alone, protein residue is not sufficient evidence of interpersonal violence, as the process of flintknapping itself often causes the loss of human blood as well. However, the human protein residues provide support for recently obtained skeletal trauma data and mortuary patterning that indicate a relatively high level of violence in the Oneota communities in southeastern Wisconsin (Jeske 2014; Foley Winkler 2011; Jeske and Edwards 2014; Jeske and Sterner-Miller 2014; Karsten 2015). The multiple lines of evidence combining macroscopic, microscopic, and chemical lithic data provide strong inferences about tool use and allow us to draw conclusions about the role of stone tools in the economy of everyday life. These approaches have been used by other researchers to establish the prevalence of fauna not represented in the faunal assemblage (Högberg et al. 2009) and to demonstrate multiple use lives for tools (Pilar Babot et al. 2013). A larger sample of tools tested for protein residues from Crescent Bay and/or other Oneota tradition sites will be particularly useful in examining the social and economic practices of the people who occupied these sites and made and used these tools. Utilizing a combination of approaches to late prehistoric lithics will provide a robust dataset on lithic function that can provide answers to anthropological questions about the role of lithics in developing and maintaining group identity and group interaction, through understanding variation in tool function.

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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 a**n 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 indentation 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 (1988) 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**

Mass Analysis Schema for Debitage

A. Provenience

B. Additional Provenience

C. Type

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

C. Size Grade

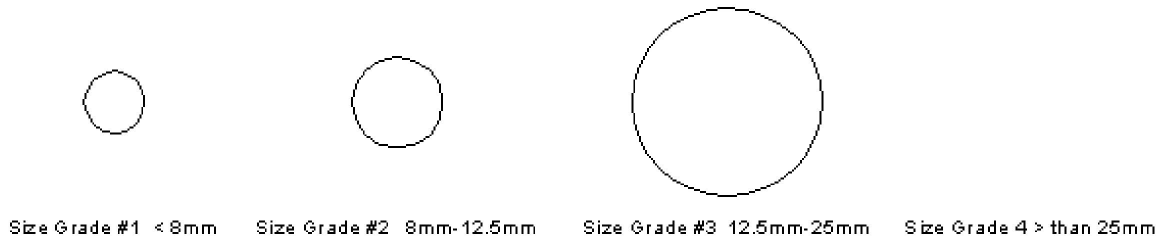
1. Less than 8 mm
2. 8 mm to 12.5 mm
3. 12.5 mm to 25 mm
4. Greater than 25 mm

D. Count per Size Grade

E. Weight per Size Grade

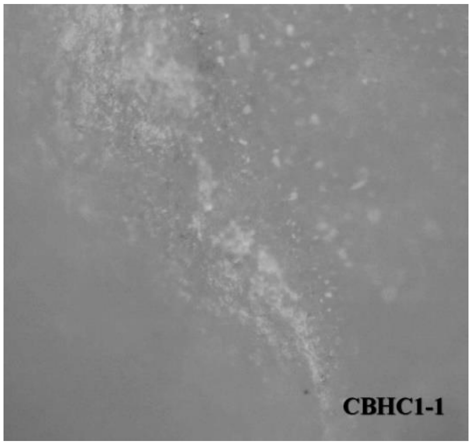
F. Number of Pieces with Cortex per Size Grade

G. Heat Alteration

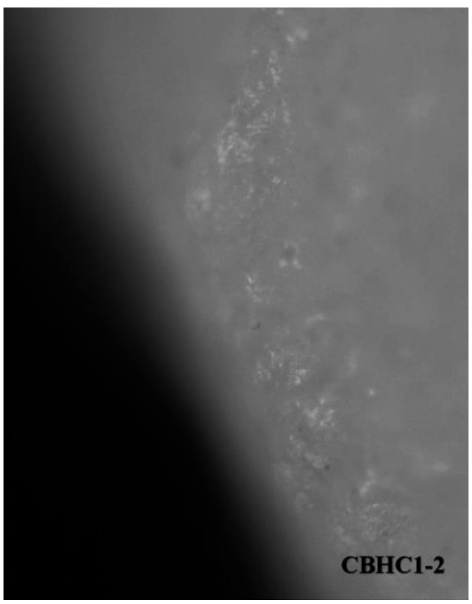


APPENDIX B: MICROWEAR DATA AND PHOTOMICROGRAPHS

Microwear #: 1
Artifact #: 280
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

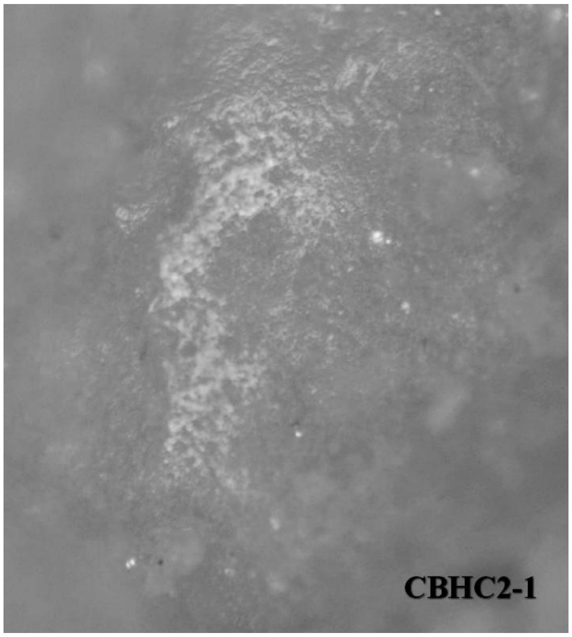


Ventral View

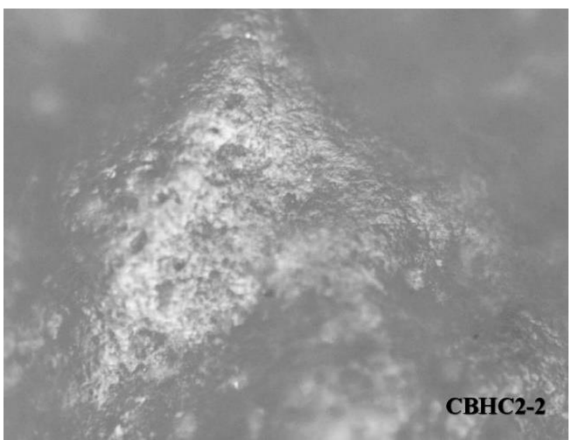
Photo #	**Magnification**	**Feature**	**Location**
CBHC1-1	200x	Dry hide polish	Ventral, Proximal
CBHC1-2	200x	Dry hide polish	Ventral, Distal

Summary: Used in a longitudinal motion on dry hide.

Microwear #: 2
Artifact #: 271
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

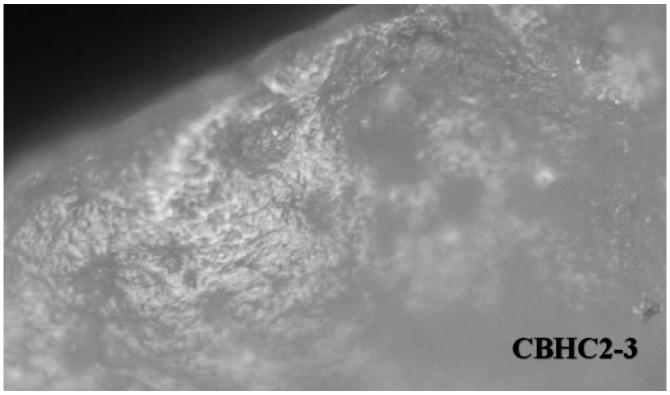


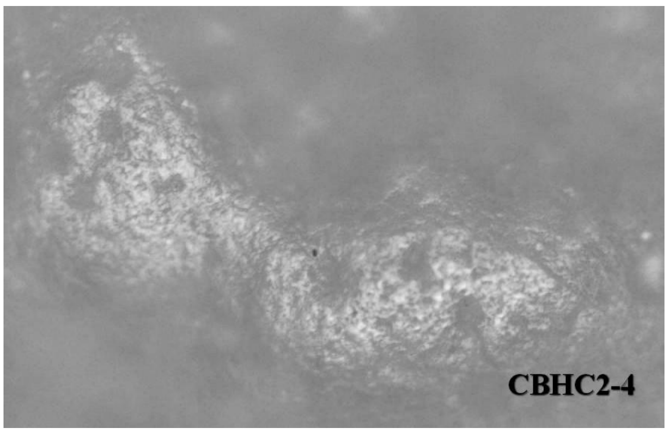
Ventral View

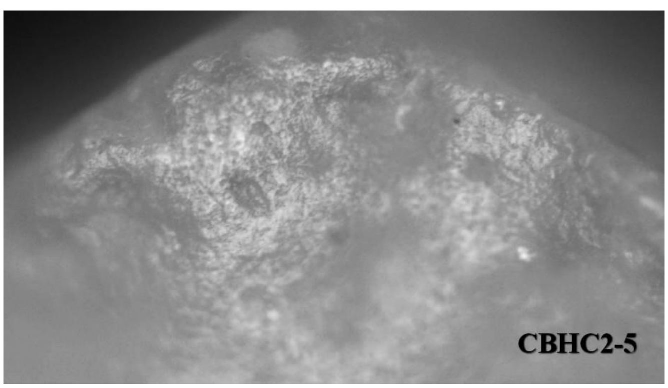
Photo #	**Magnification**	**Feature**	**Location**
CBHC2-1	200x	Dry hide polish	Dorsal, Lateral
CBHC2-2	200x	Dry hide polish	Dorsal, Lateral
CBHC2-3	200x	Dry hide polish	Dorsal, Distal
CBHC2-4	200x	Dry hide polish	Dorsal, Distal
CBHC2-5	200x	Dry hide polish	Dorsal, Distal
CBHC2-6	200x	Dry hide polish	Ventral, Proximal
CBHC2-7	200x	Dry hide polish	Ventral, Proximal
CBHC2-8	200x	Striations	Ventral, Proximal
CBHC2-9	200x	Dry hide polish	Ventral, Lateral
CBHC2-10	200x	Dry hide polish	Ventral, Lateral

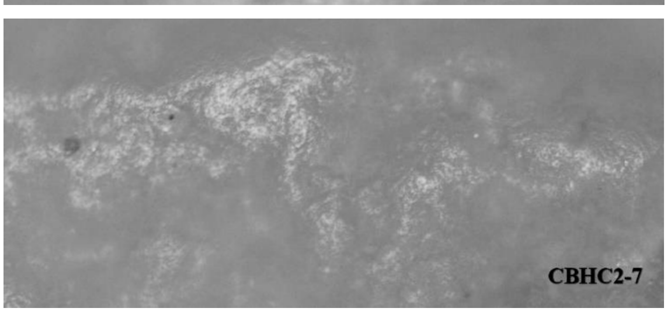
Summary: Used in transverse motion on dry hide.

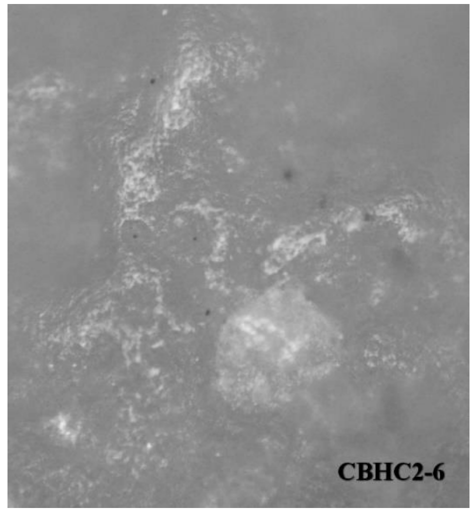
Microwear #: 2
Artifact #: 271
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

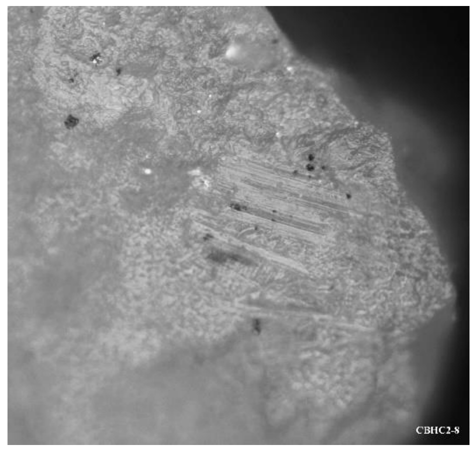

CBHC2-3

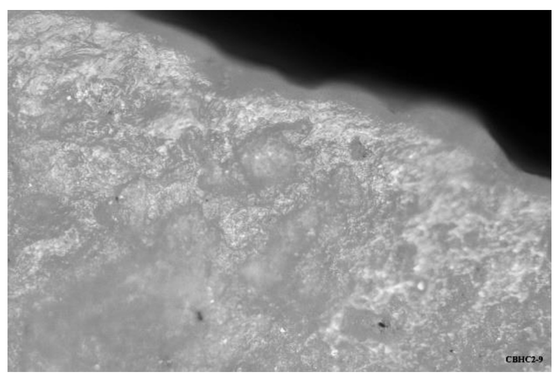

CBHC2-4

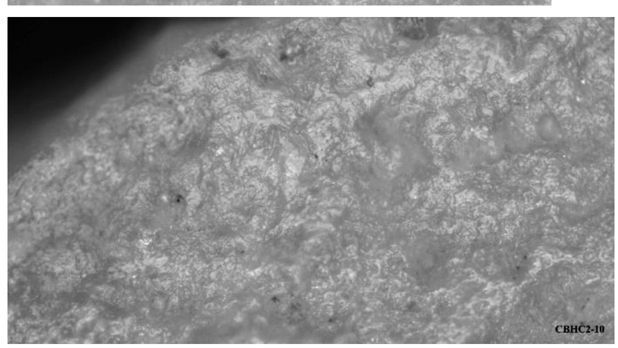

CBHC2-5


CBHC2-7

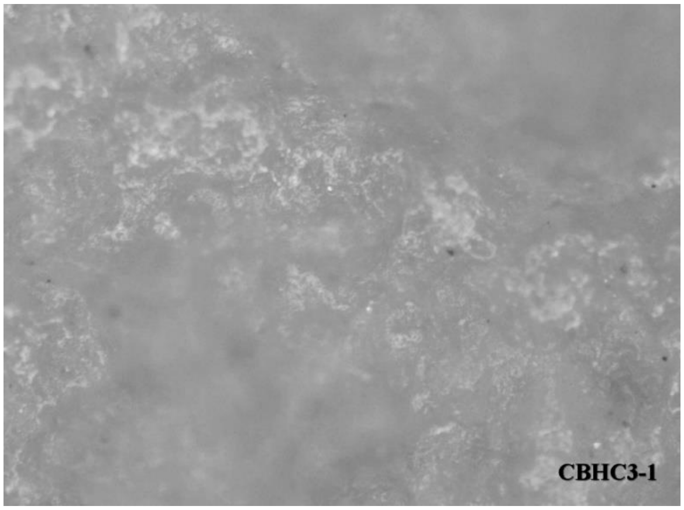

CBHC2-6


CBHC2-8


CBHC2-9


CBHC2-10

Microwear #: 3
Artifact #: 258
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



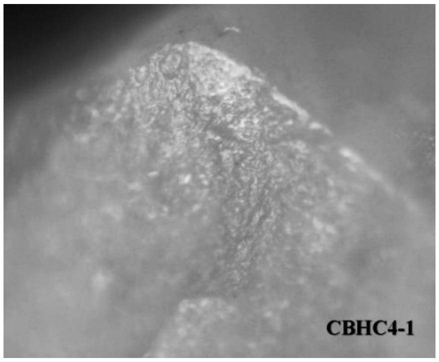
Dorsal View

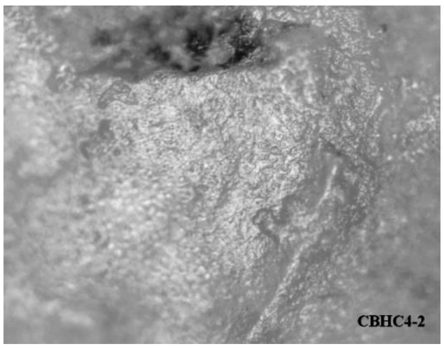
Ventral View

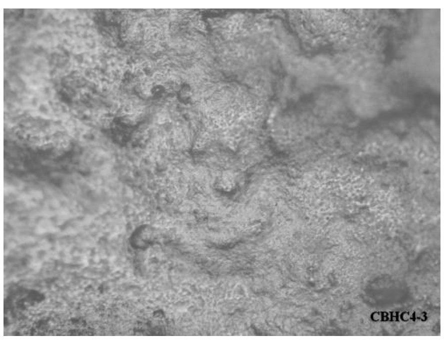
Photo #	Magnification	Feature	Location
CBHC3-1	200x	Rounding	Ventral, Medial

Summary: Unused.

Microwear #: 4
Artifact #: 268
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







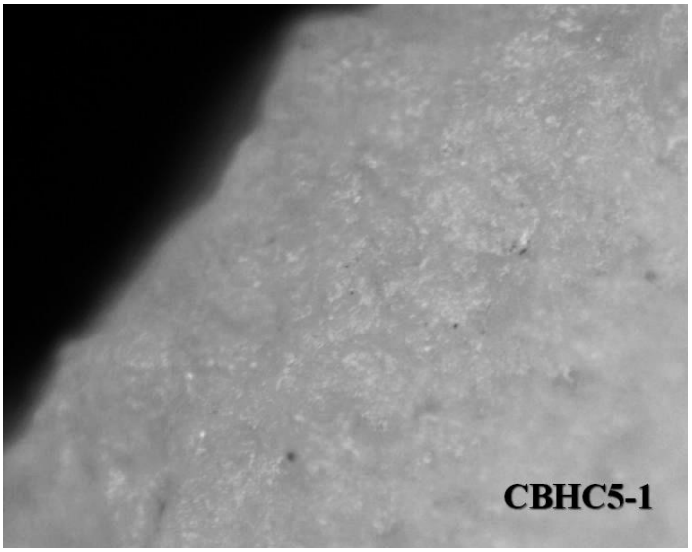
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC4-1	200x	Smooth pitted polish	Ventral, Lateral
CBHC4-2	200x	Heat treated edge	Ventral, Lateral
CBHC4-3	200x	Heat treated surface	Ventral, Medial

Summary: Used in transverse motion on indeterminate hard material.

Microwear #: 5
Artifact #: 265
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



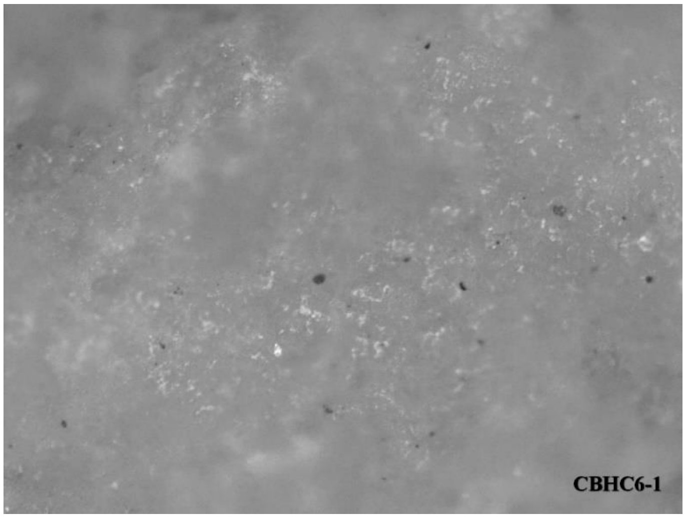
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC5-1	200x	Smooth pitted polish	Ventral, Lateral

Summary: Used in transverse motion on indeterminate hard material.

Microwear #: 6
Artifact #: 277
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



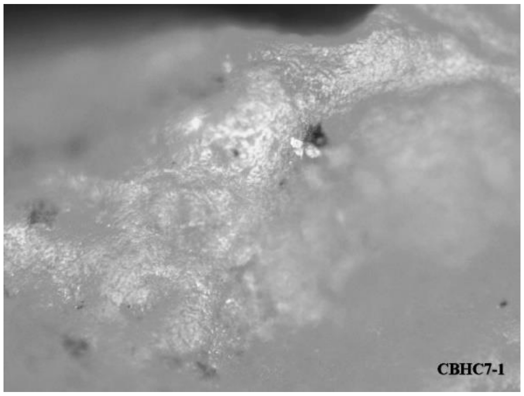
Dorsal View

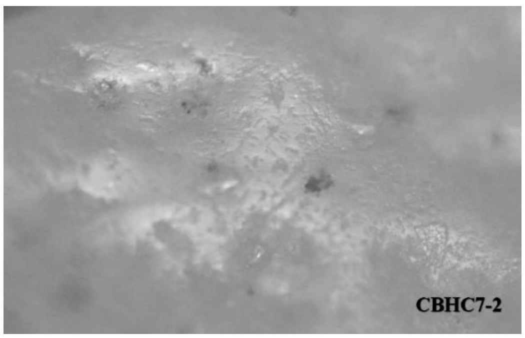
Ventral View

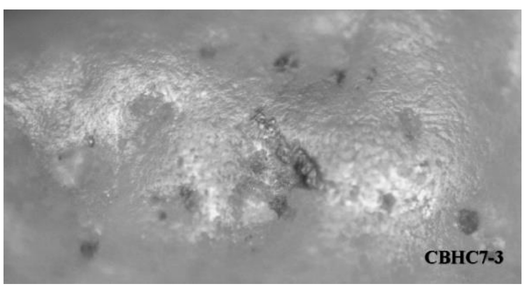
Photo #	Magnification	Feature	Location
CBHC6-1	200x	Unused surface	Ventral, Medial

Summary: Unused.

Microwear #: 7
Artifact #: 266
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







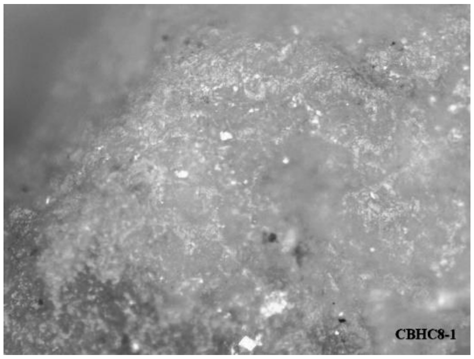
Dorsal View

Ventral View

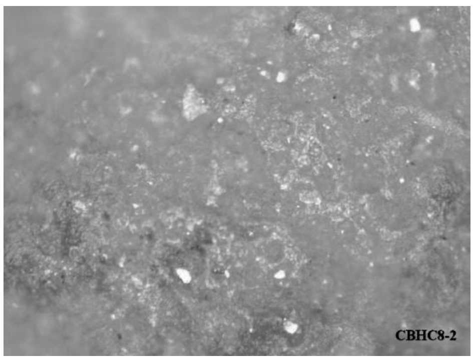
Photo #	**Magnification**	**Feature**	**Location**
CBHC7-1	200x	Meat polish	Ventral, Lateral
CBHC7-2	200x	Meat polish	Ventral, Lateral
CBHC7-3	200x	Meat polish	Ventral, Lateral

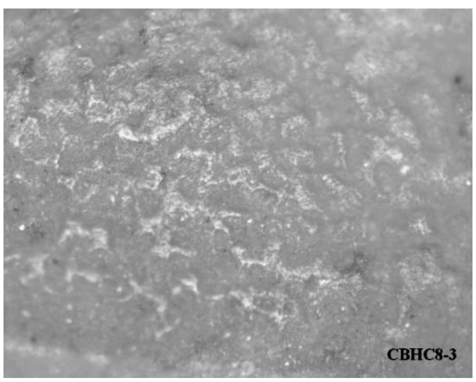
Summary: Used in longitudinal motion on meat.

Microwear #: 8
Artifact #: 261
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View



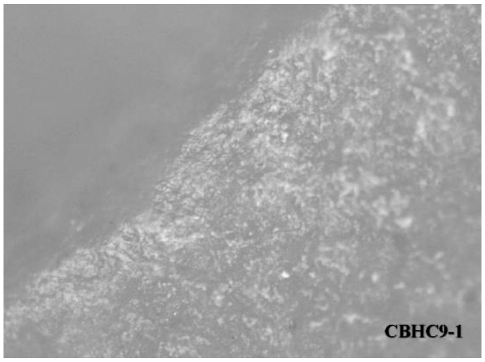


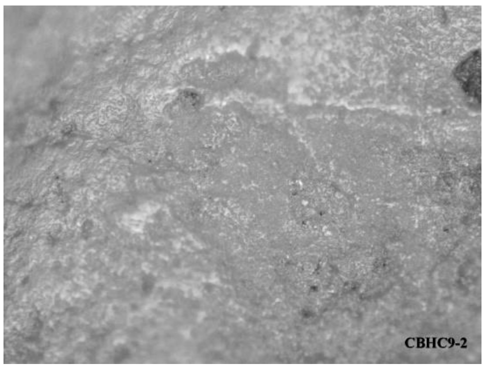
Ventral View

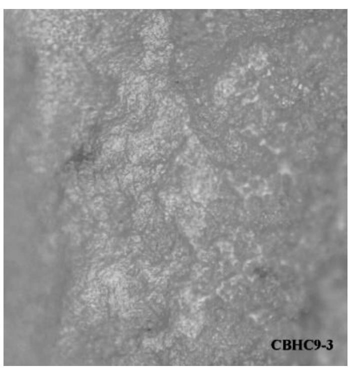
Photo #	Magnification	Feature	Location
CBHC8-1	200x	Dry hide polish	Ventral, Lateral
CBHC8-2	200x	Dry hide polish	Ventral, Lateral
CBHC8-3	200x	Dry hide polish	Ventral, Lateral

Summary: Used in transverse motion on dry hide.

Microwear #: 9
Artifact #: 283
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







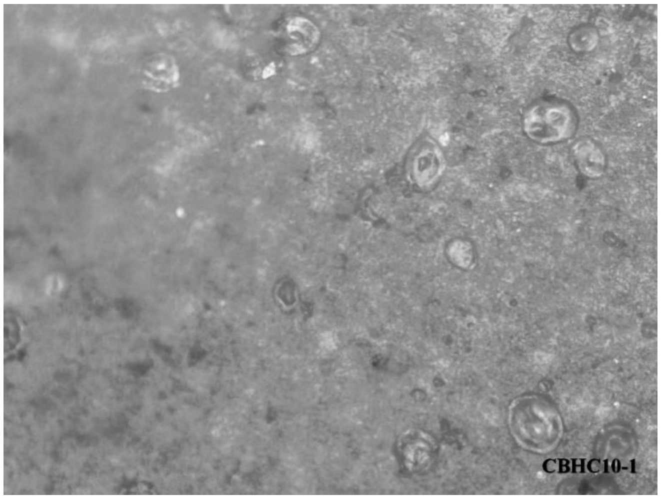
Dorsal View

Ventral View

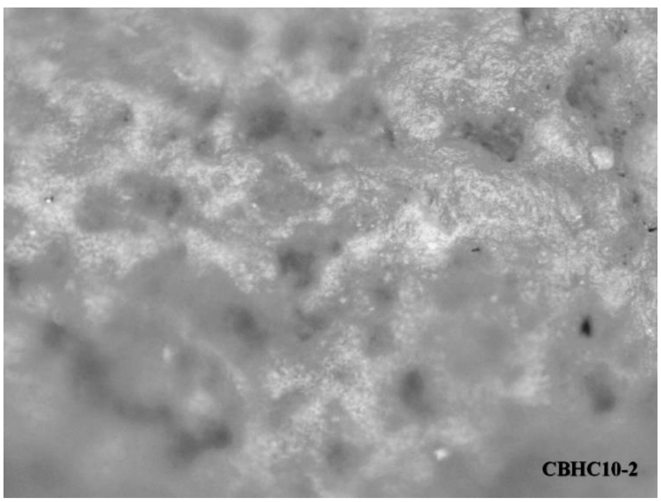
Photo #	**Magnification**	**Feature**	**Location**
CBHC9-1	200x	Generic weak polish	Ventral, Lateral
CBHC9-2	200x	Wood polish	Ventral, Proximal
CBHC10-1	200x	Wood polish	Ventral, Distal

Summary: Used in transverse motion on wood.

Microwear #: 10
Artifact #: 267
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

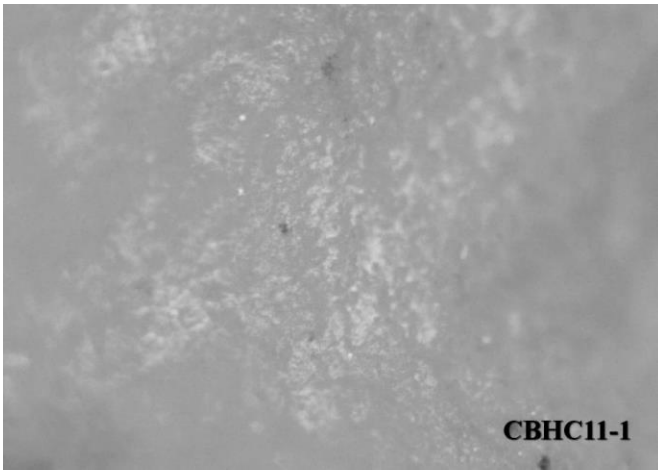


Ventral View

Photo #	Magnification	Feature	Location
CBHC10-1	200x	Heat treated surface	Ventral, Medial
CBHC10-2	200x	Indeterminate polish	Ventral, Distal

Summary: Used in transverse motion on indeterminate soft material.

Microwear #: 11
Artifact #: 269
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



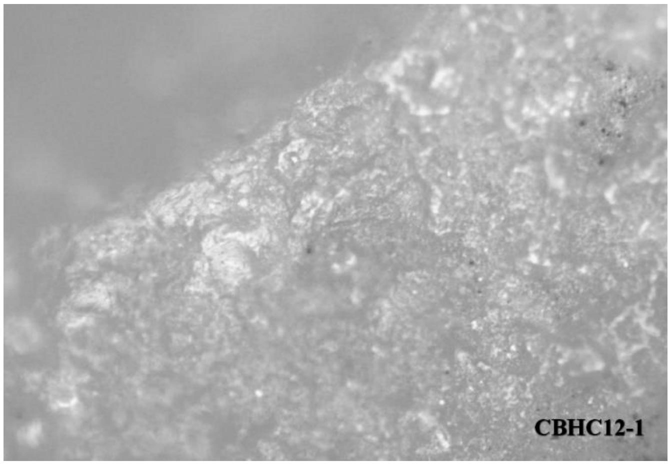
Dorsal View

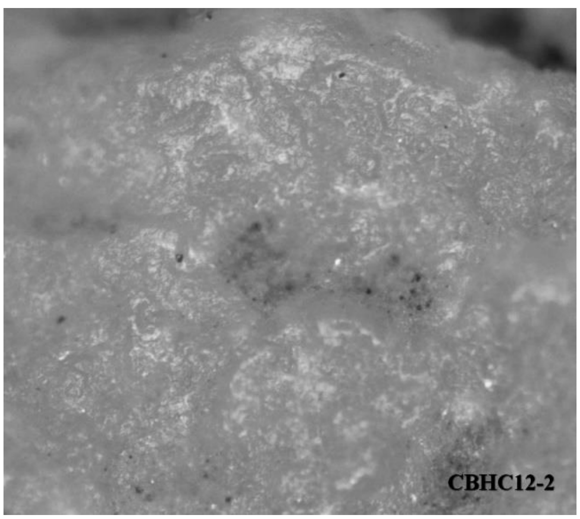
Ventral View

Photo #	Magnification	Feature	Location
CBHC11-1	200x	Wood polish	Ventral, Proximal

Summary: Used in longitudinal motion on wood.

Microwear #: 12
Artifact #: 263
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club





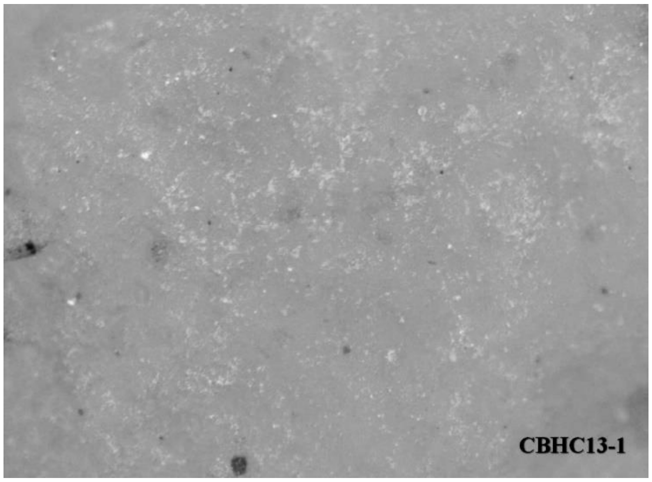
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC12-1	200x	Meat polish	Ventral, Distal
CBHC12-2	200x	Meat polish	Ventral, Distal

Summary: Used in transverse motion on meat.

Microwear #: 13
Artifact #: 275
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



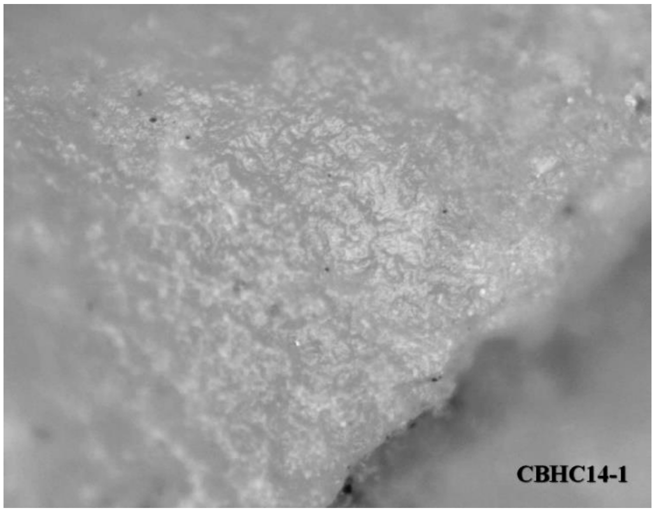
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC13-1	200x	Generic weak polish	Dorsal, Lateral

Summary: Used in transverse motion on indeterminate soft material.

Microwear #: 14
Artifact #: 279
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC14-1	200x	Wood polish	Dorsal, Distal

Summary: Used in indeterminate motion on wood.

Microwear #: 15
Artifact #: 262
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC15-1	200x	Polish and striations	Ventral, Lateral

Summary: Used in transverse motion on dry hide.

Microwear #: 16
Artifact #: 254
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

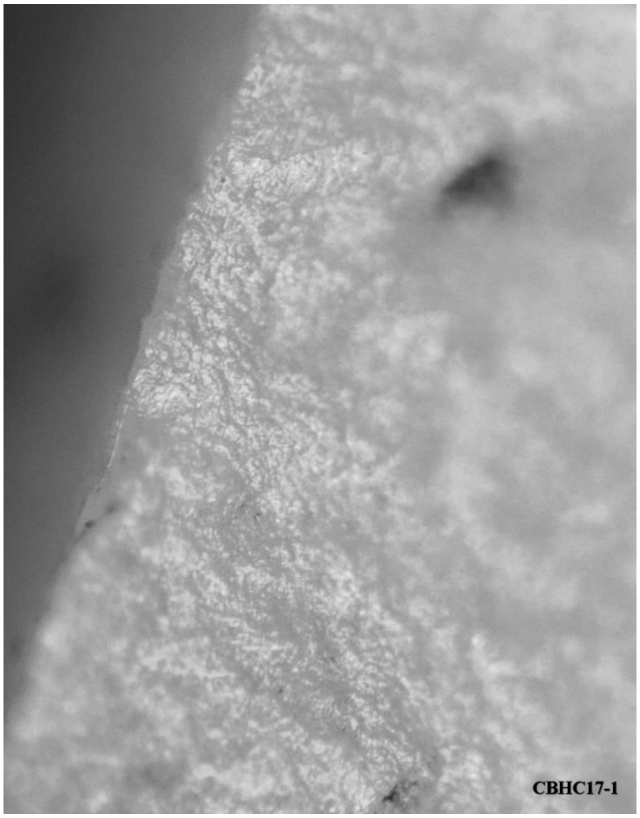
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in longitudinal motion on meat.

Microwear #: 17
Artifact #: 257
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



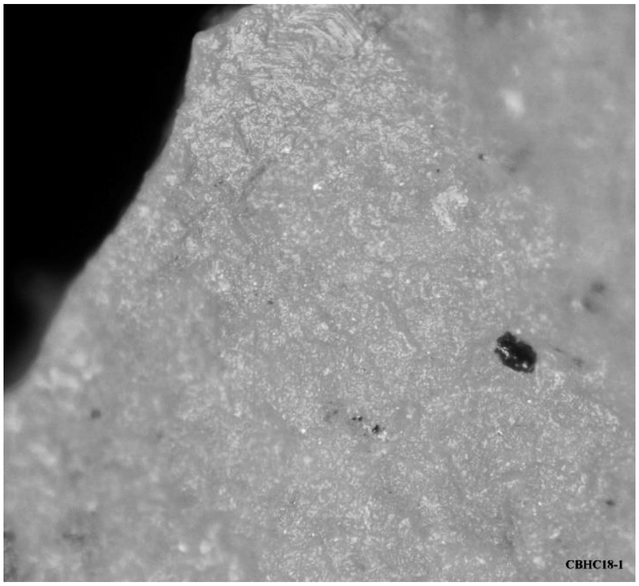
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC17-1	200x	Wet hide polish	Ventral, Distal

Summary: Used in transverse motion on wet hide.

Microwear #: 18
Artifact #: 264
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



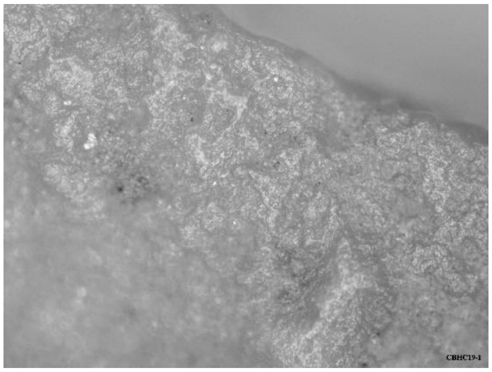
Dorsal View

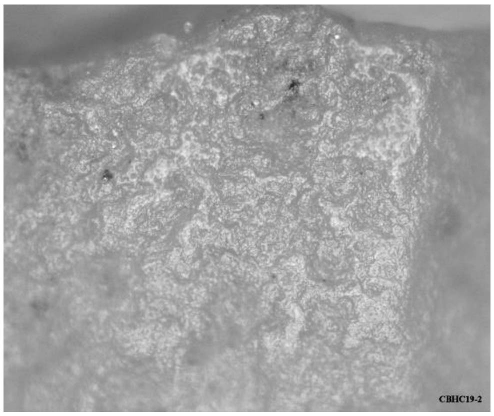
Ventral View

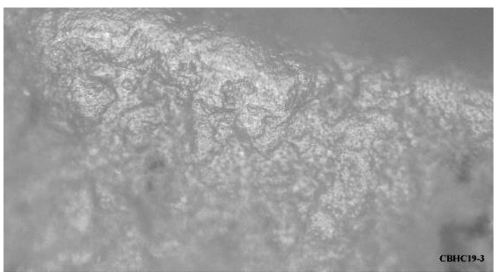
Photo #	Magnification	Feature	Location
CBHC18-1	200x	Meat polish	Dorsal, Lateral

Summary: Used in longitudinal motion on meat.

Microwear #: 19
Artifact #: 256
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC19-1	200x	Dry hide polish	Ventral, Lateral
CBHC19-2	200x	Dry hide polish	Ventral, Lateral
CBHC19-3	200x	Dry hide polish	Ventral, Lateral

Summary: Used in transverse motion on dry hide.

Microwear #: 20
Artifact #: 272
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

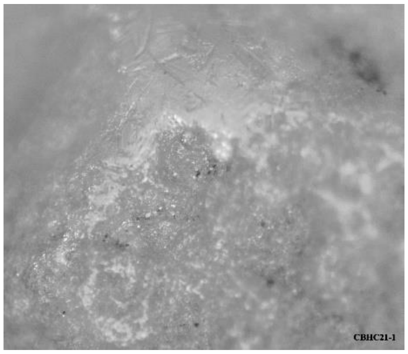
Dorsal View

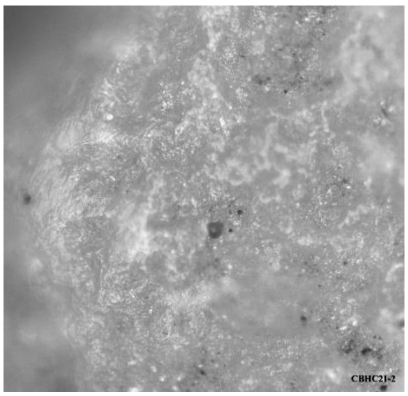
Ventral View

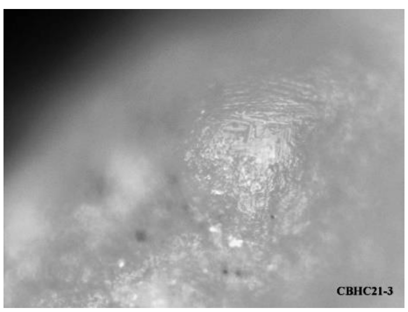
Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 21
Artifact #: 255
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







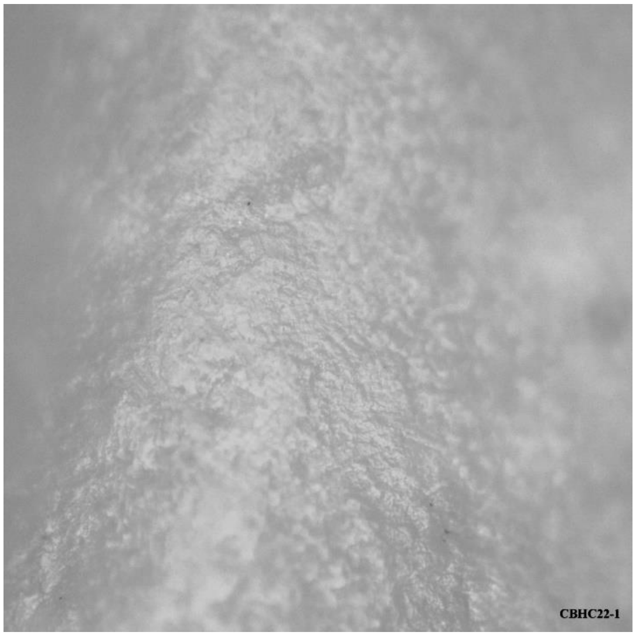
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC21-1	200x	Grit polish and striations	Ventral, Distal
CBHC21-2	200x	Grit polish and striations	Ventral, Distal
CBHC21-3	200x	Grit polish and striations	Ventral, Distal

Summary: Unused.

Microwear #: 22
Artifact #: 273
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC22-1	200x	Plant polish	Ventral, Lateral

Summary: Used in longitudinal motion on plant matter.

Microwear #: 23
Artifact #: 270
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

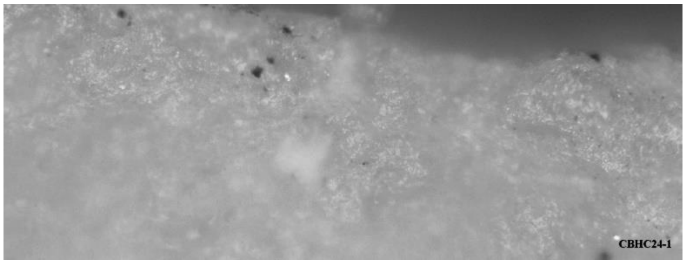
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 24
Artifact #: 276
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



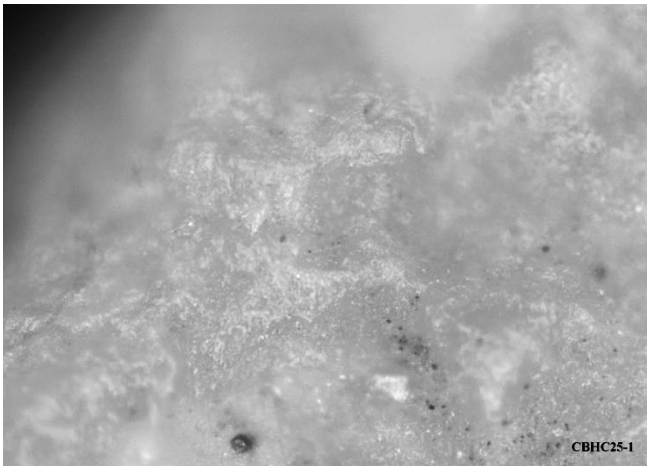
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC24-1	200x	Grit polish	Medial

Summary: Used as a core for flake production.

Microwear #: 25
Artifact #: 274
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC25-1	200x	Dry hide polish	Ventral, Distal

Summary: Used in transverse motion on dry hide.

Microwear #: 26
Artifact #: 282
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on wet hide.

Microwear #: 27
Artifact #: 260
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

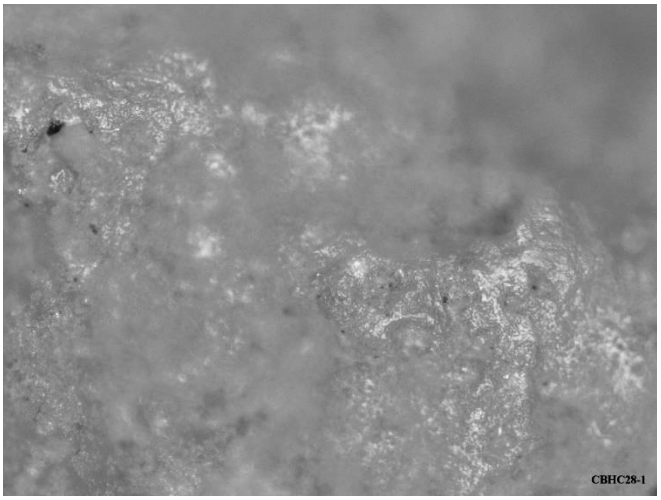
Dorsal View

Ventral View

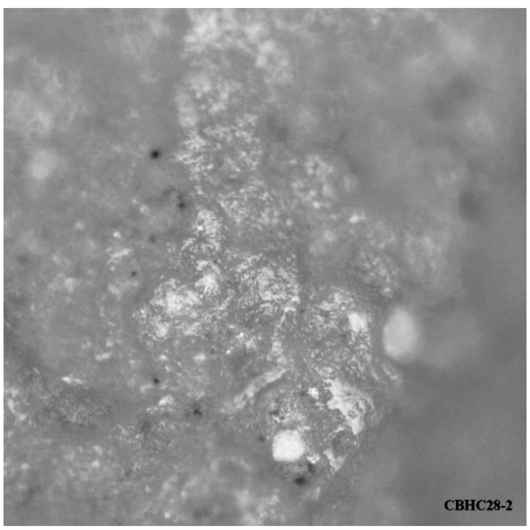
Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 28
Artifact #: 284
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

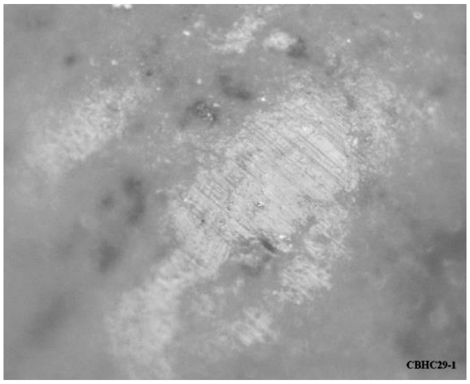


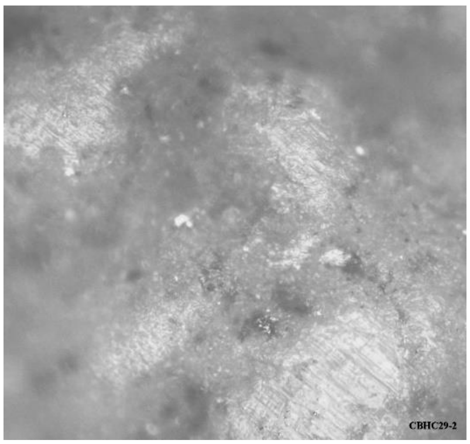
Ventral View

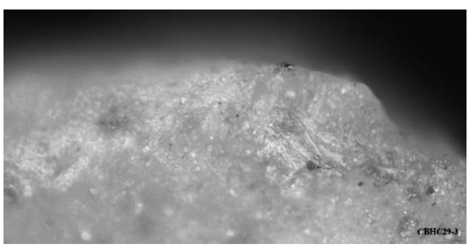
Photo #	**Magnification**	**Feature**	**Location**
CBHC28-1	200x	Meat polish	Distal, Ventral
CBHC28-2	200x	Meat polish	Distal, Ventral

Summary: Used in longitudinal motion on meat.

Microwear #: 29
Artifact #: 259
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC29-1	200x	Striations	Ventral, Lateral
CBHC29-2	200x	Striations	Ventral, Lateral
CBHC29-3	200x	Striations and polish	Ventral, Lateral

Summary: Unused.

Microwear #: 30
Artifact #: 455
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

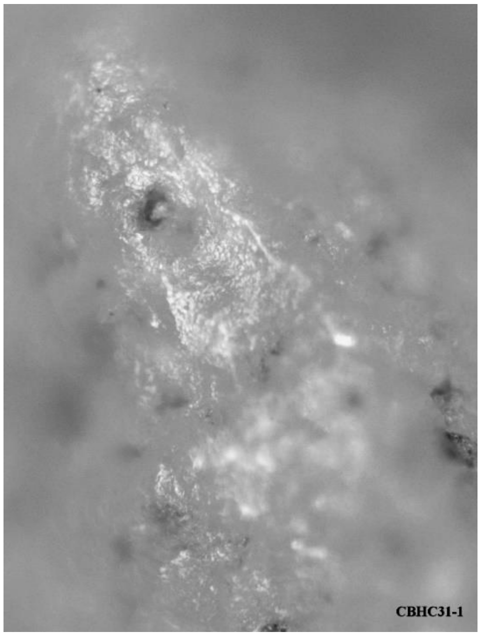
Dorsal View

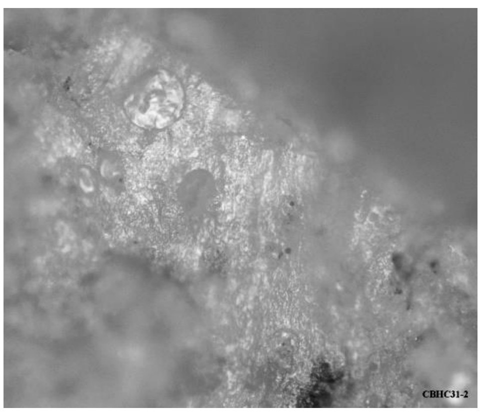
Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on indeterminate soft material.

Microwear #: 31
Artifact #: 466
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club





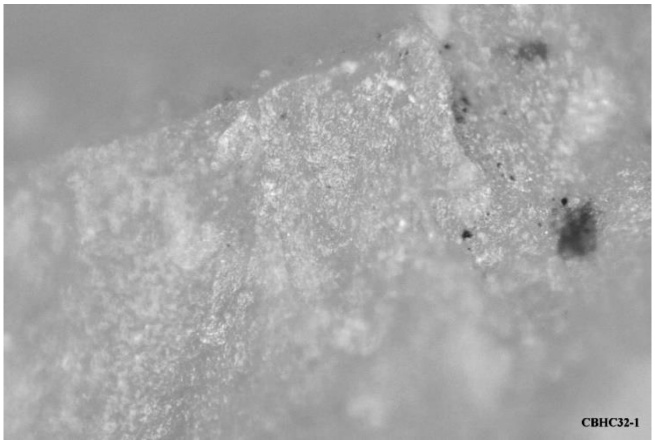
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC31-1	200x	Indeterminate polish	Ventral, Distal
CBHC31-2	200x	Indeterminate polish	Dorsal, Distal

Summary: Used in indeterminate motion on wet hide and/or meat.

Microwear #: 32
Artifact #: 465
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



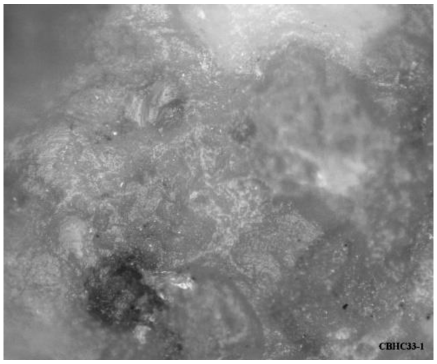
Dorsal View

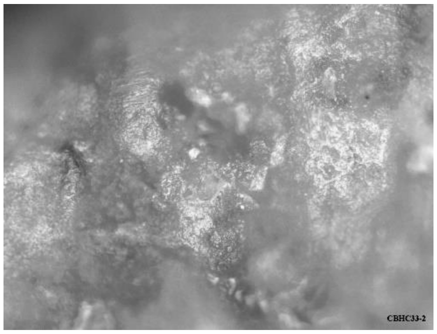
Ventral View

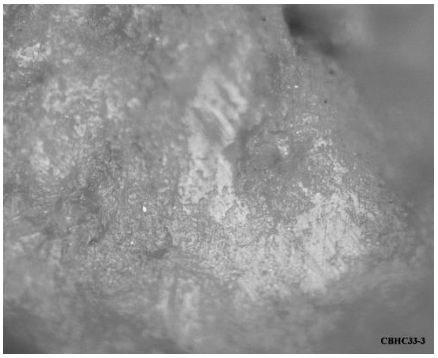
Photo #	Magnification	Feature	Location
CBHC32-1	200x	Generic weak polish	Ventral, Distal

Summary: Used on indeterminate substance in indeterminate motion.

Microwear #: 33
Artifact #: 464
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







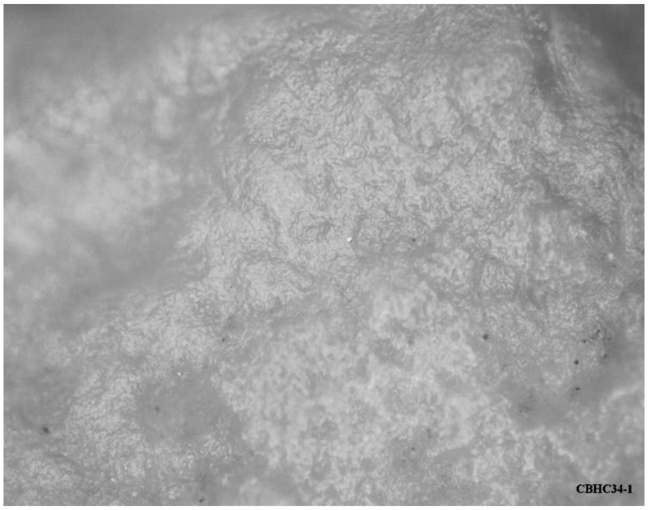
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC33-1	200x	Polish and striations	Ventral, Distal
CBHC33-2	200x	Polish	Ventral, Distal
CBHC33-3	200x	Polish and striations	Ventral, Proximal

Summary: Unused.

Microwear #: 34
Artifact #: 462
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



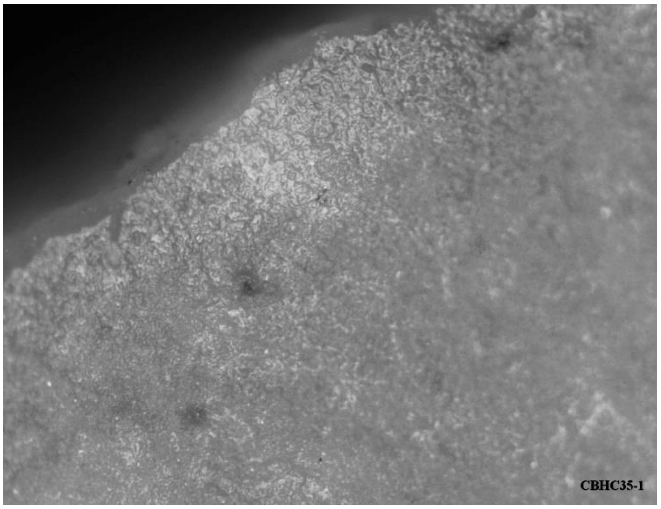
Dorsal View

Ventral View

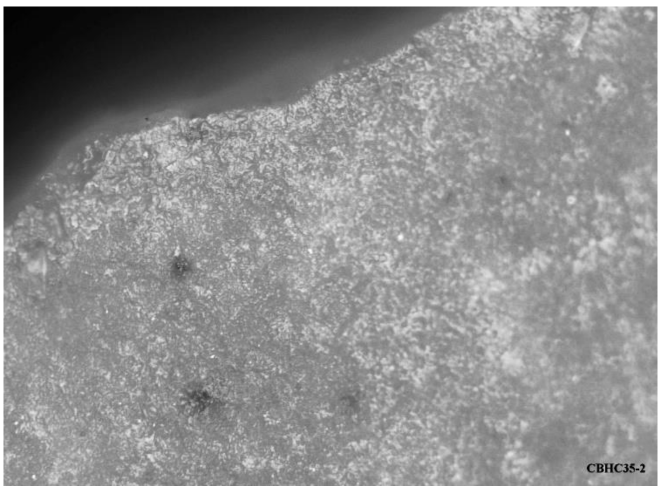
Photo #	**Magnification**	**Feature**	**Location**
CBHC34-1	200x	Wet hide polish	Ventral, Distal

Summary: Used in transverse motion on wet hide.

Microwear #: 35
Artifact #: 461
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

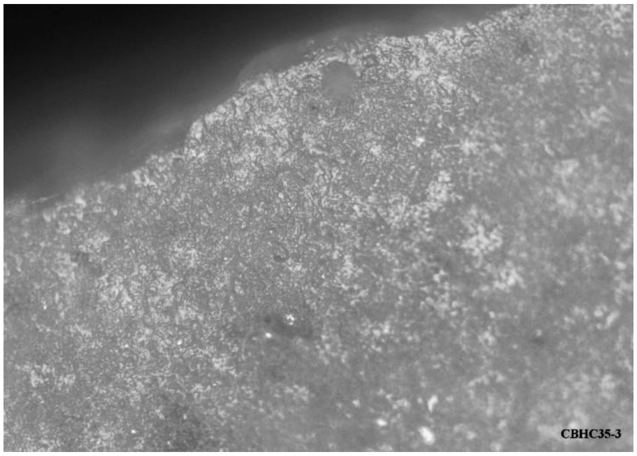


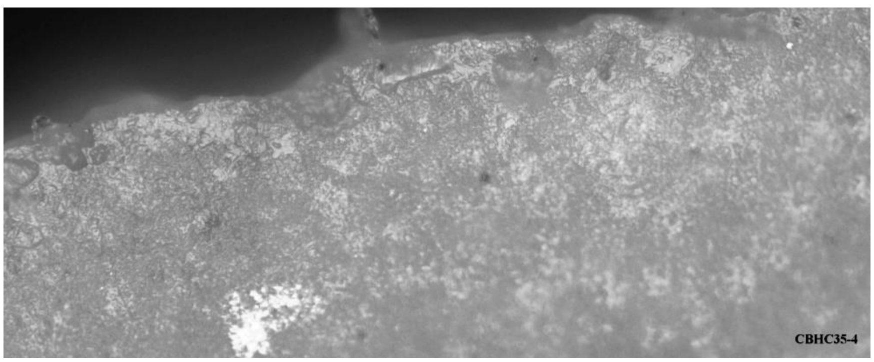
Ventral View

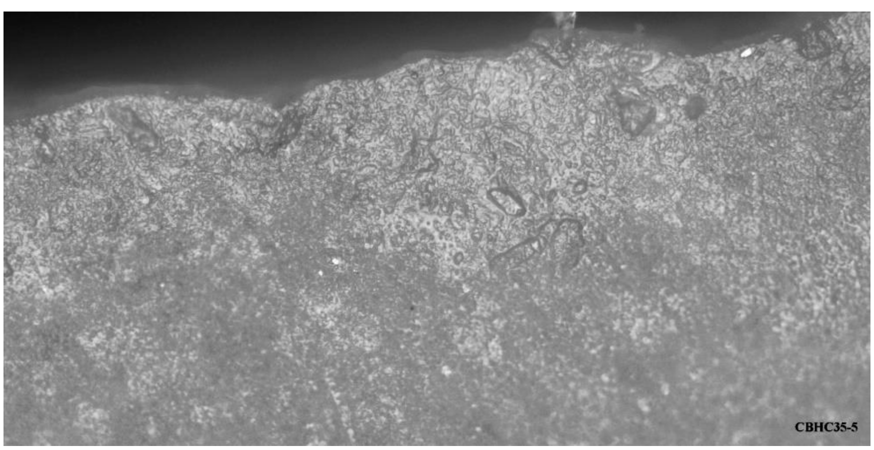
Photo #	Magnification	Feature	Location
CBHC35-1	200x	Bone polish	Ventral, Distal
CBHC35-2	200x	Bone polish	Ventral, Distal
CBHC35-3	200x	Bone polish	Ventral, Distal
CBHC35-4	200x	Bone polish	Ventral, Distal
CBHC35-5	200x	Bone polish	Ventral, Distal

Summary: Used in transverse motion on bone.

Microwear #: 35
Artifact #: 461
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







Microwear #: 36
Artifact #: 460
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Unused.

Microwear #: 37
Artifact #: 459
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

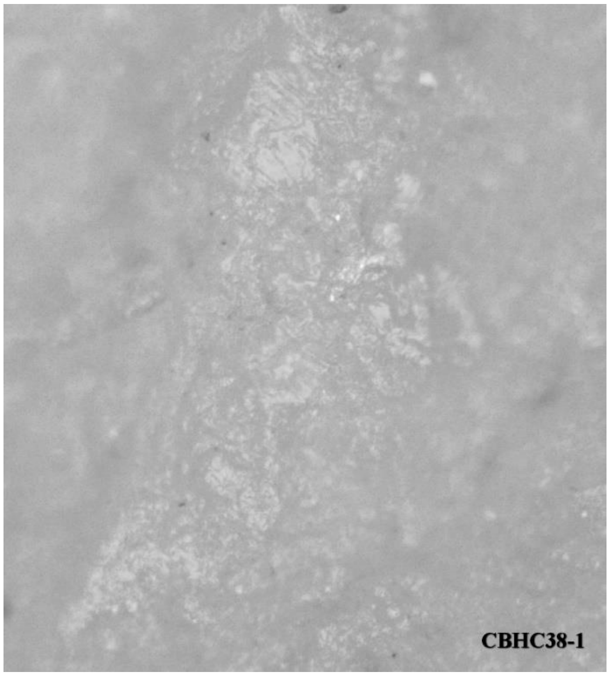
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 38
Artifact #: 458
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



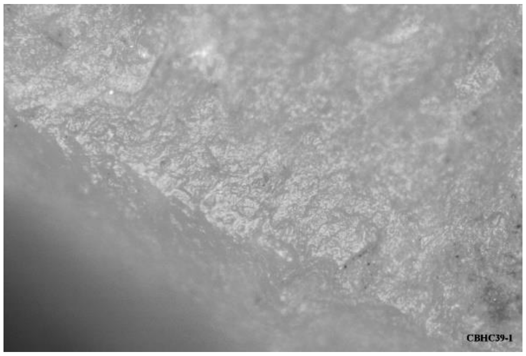
Dorsal View

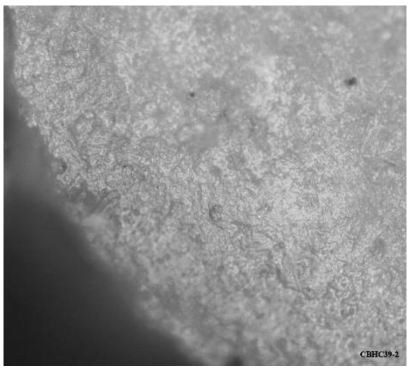
Ventral View

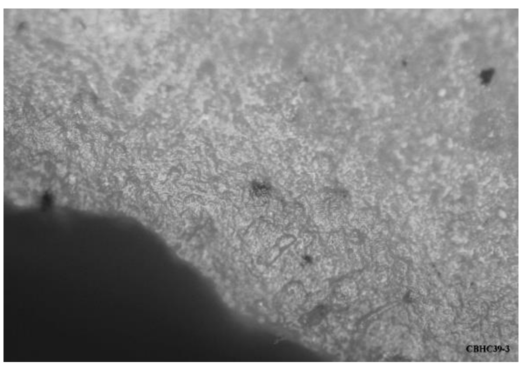
Photo #	Magnification	Feature	Location
CBHC38-1	200x	Polish and striations	Ventral, Lateral

Summary: Unused

Microwear #: 39
Artifact #: 457
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







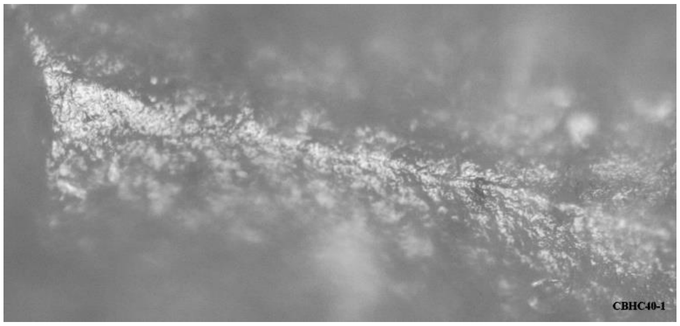
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC39-1	200x	Wood polish	Ventral, Lateral
CBHC39-2	200x	Wood polish	Ventral, Proximal
CBHC39-3	200x	Wood polish	Ventral, Proximal

Summary: Indeterminate use.

Microwear #: 40
Artifact #: 456
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



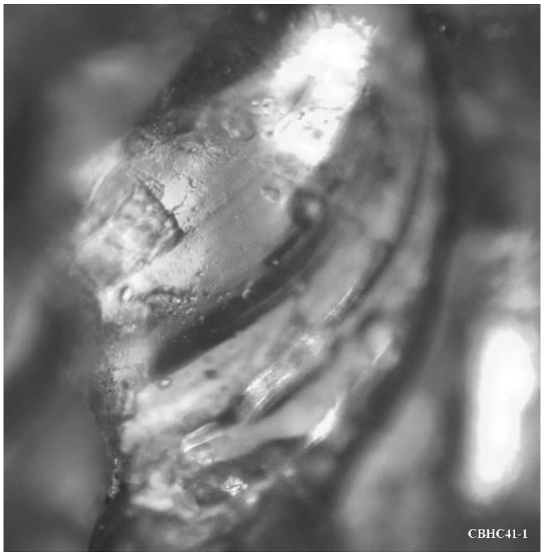
Dorsal View

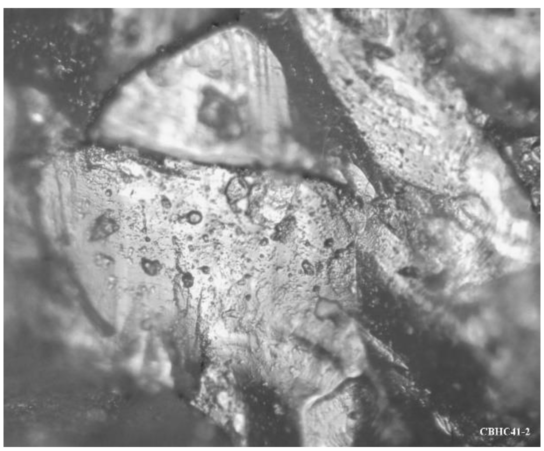
Ventral View

Photo #	Magnification	Feature	Location
CBHC40-1	200x	Meat polish	Dorsal, Distal

Summary: Used in a longitudinal motion on meat.

Microwear #: 41
Artifact #: 467
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club





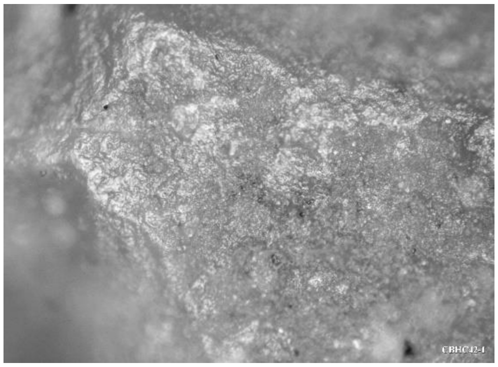
Dorsal View

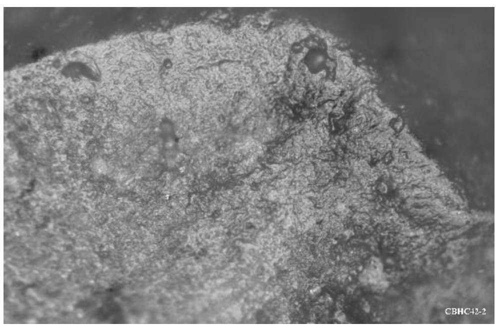
Ventral View

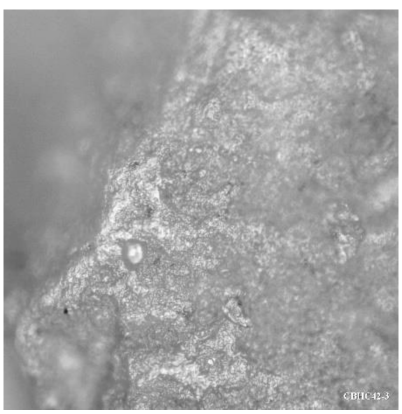
Photo #	Magnification	Feature	Location
CBHC41-1	200x	Hixton crystal faces	Ventral, Proximal
CBHC41-2	200x	Hixton crystal faces	Ventral, Proximal

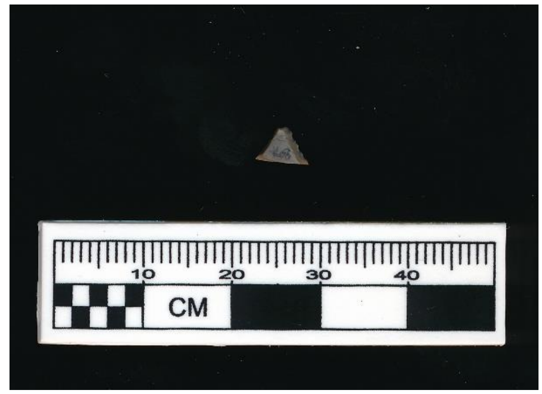
Summary: Indeterminate use.

Microwear #: 42
Artifact #: 468
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

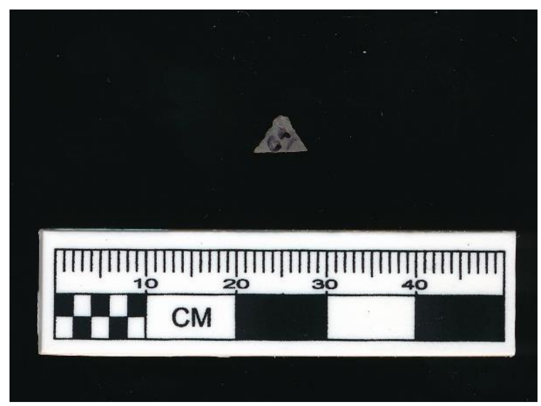








Dorsal View



Ventral View

Photo #	Magnification	Feature	Location
CBHC42-1	200x	Meat/Wet Hide Polish	Dorsal, Lateral
CBHC42-2	200x	Meat/Wet Hide Polish	Dorsal, Proximal
CBHC42-3	200x	Meat/Wet Hide Polish	Dorsal, Distal

Summary: Used in indeterminate motion on meat and/or wet hide.

Microwear #: 43
Artifact #: 469
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

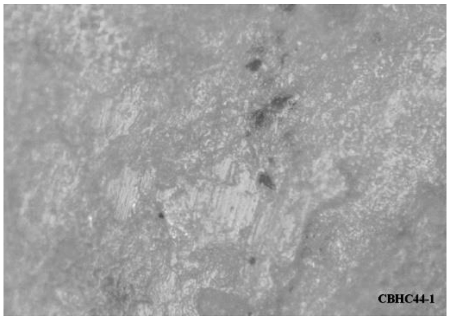
Dorsal View

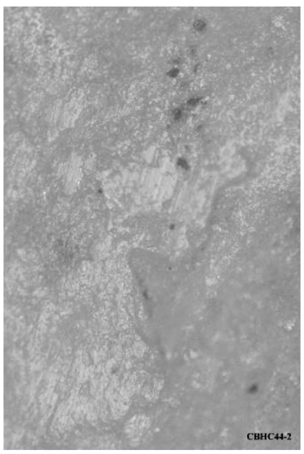
Ventral View

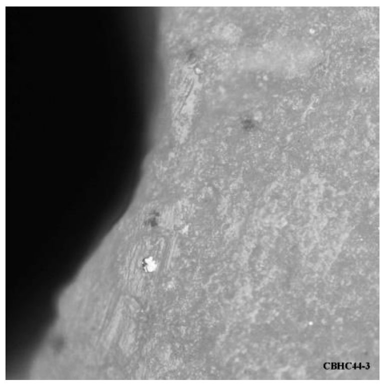
Photo #	Magnification	Feature	Location

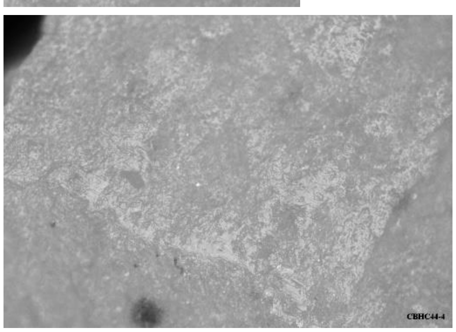
Summary: Used on indeterminate hard material in longitudinal motion.

Microwear #: 44
Artifact #: 470
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club









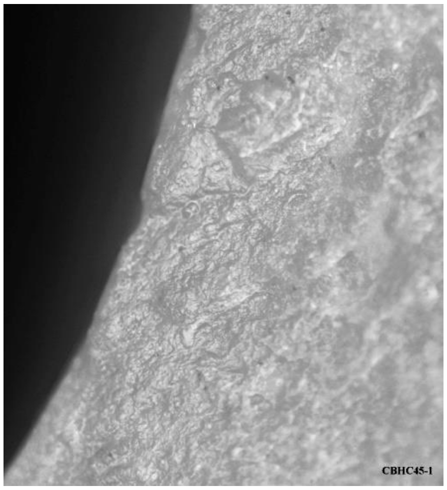
Dorsal View

Ventral View

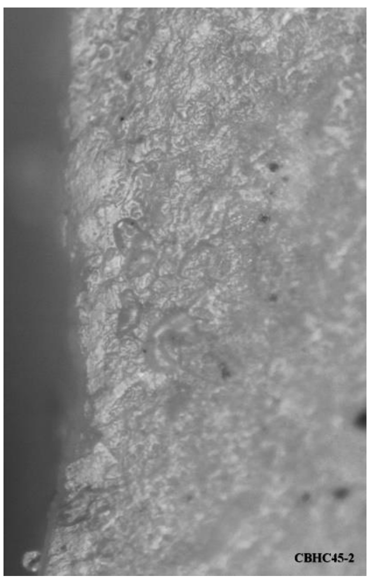
Photo #	**Magnification**	**Feature**	**Location**
CBHC44-1	200x	Parallel striations	Ventral, Lateral
CBHC44-2	200x	Parallel striations	Ventral, Lateral
CBHC44-3	200x	Parallel striations	Ventral, Lateral
CBHC44-4	200x	Wood polish	Ventral, Lateral

Summary: Used in longitudinal motion on wood.

Microwear #: 45
Artifact #: 471
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View



Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC45-1	200x	Smooth pitted polish	Ventral, Lateral
CBHC45-2	200x	Smooth pitted polish	Ventral, Lateral

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 46
Artifact #: 472
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

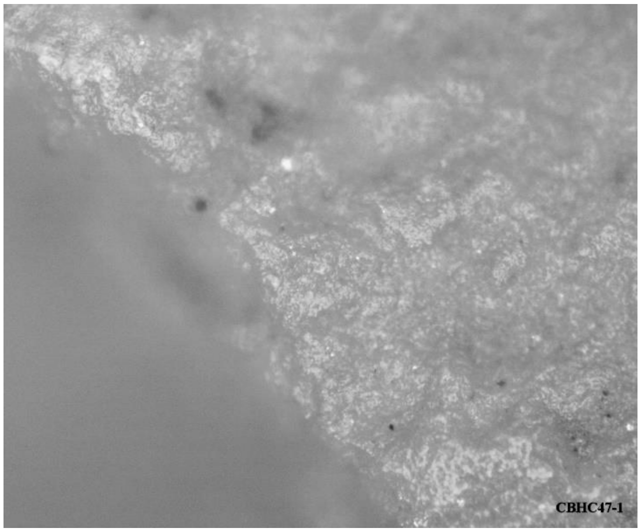
Dorsal View

Ventral View

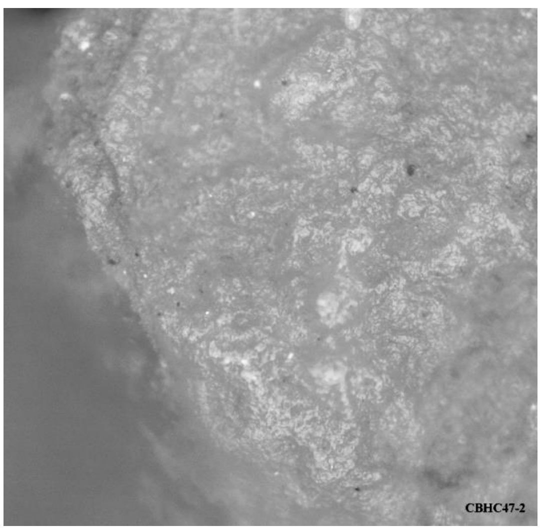
Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 47
Artifact #: 473
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

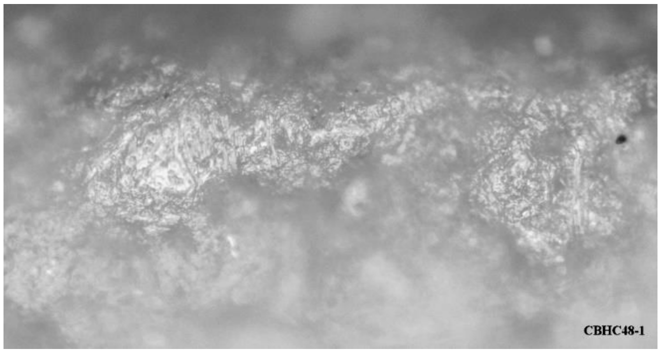


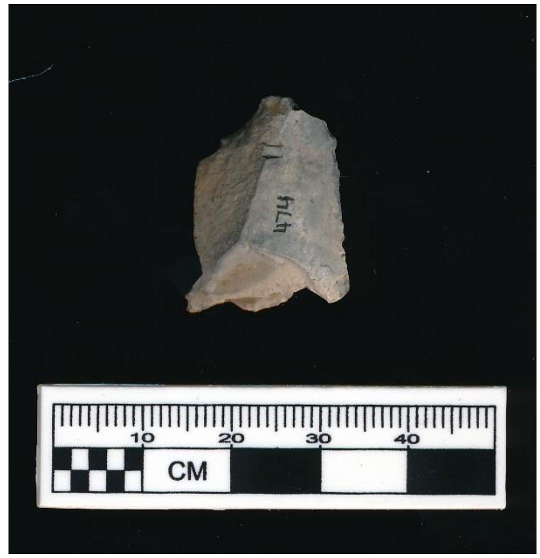
Ventral View

Photo #	Magnification	Feature	Location
CBHC47-1	200x	Smooth pitted polish	Dorsal, Lateral
CBHC47-2	200x	Smooth pitted polish	Dorsal, Lateral

Summary: Used in transverse motion on indeterminate hard material.

Microwear #: 48
Artifact #: 474
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club





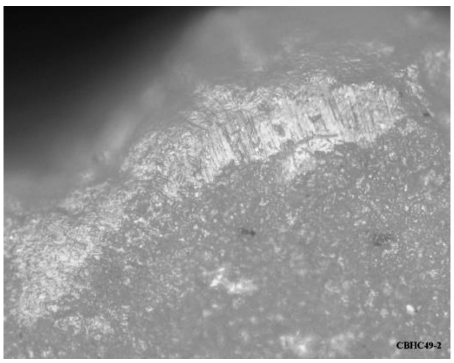
Dorsal View

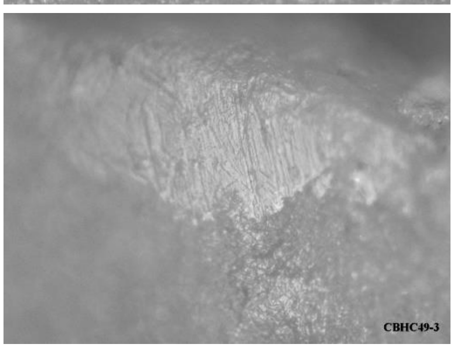
Ventral View

Photo #	Magnification	Feature	Location
CBHC48-1	200x	Striations and polish	Ventral, Lateral

Summary: Used in transverse motion on bone.

Microwear #: 49
Artifact #: 475
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club





Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC49-1	200x	Striations and bone polish	Ventral, Distal
CBHC49-2	200x	Striations and bone polish	Ventral, Distal
CBHC49-3	200x	Bone polish	Ventral, Distal

Summary: Used in transverse motion on bone.

Microwear #: 50
Artifact #: 476
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

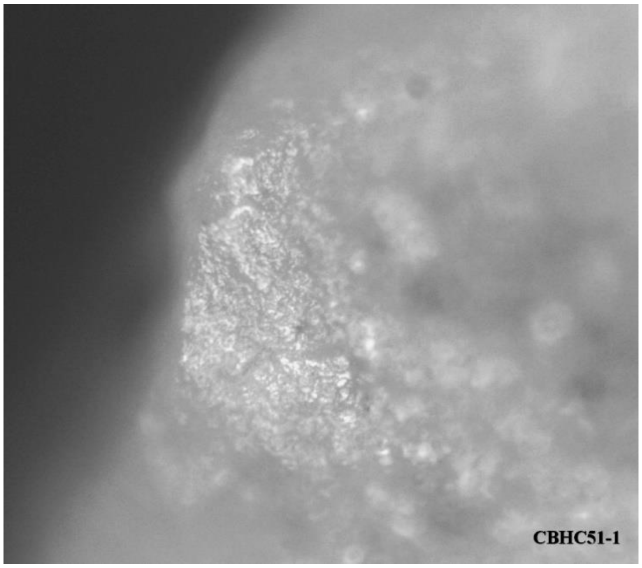
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 51
Artifact #: 477
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



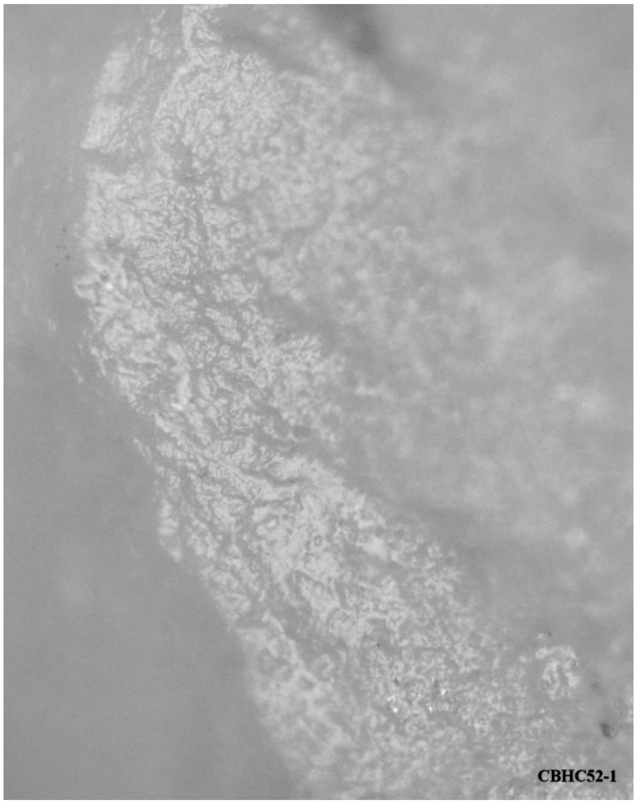
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC51-1	200x	Dry hide polish	Ventral, Proximal

Summary: Use indeterminate.

Microwear #: 52
Artifact #: 478
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC52-1	200x	Meat polish	Dorsal, Medial

Summary: Used in longitudinal motion on meat.

Microwear #: 53
Artifact #: 479
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 54
Artifact #: 480
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

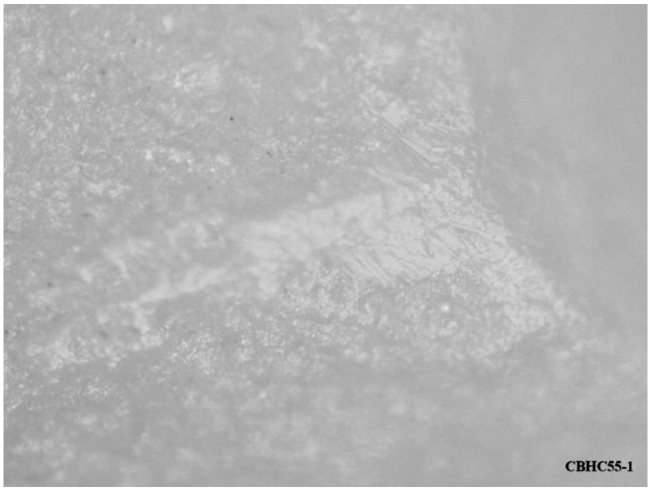
Dorsal View

Ventral View

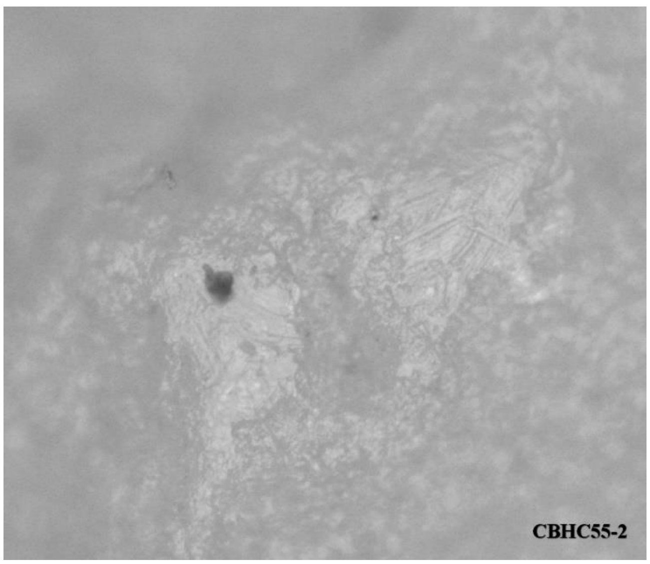
Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on wet hide.

Microwear #: 55
Artifact #: 481
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

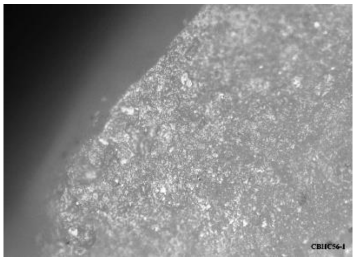


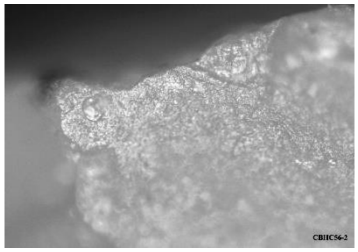
Ventral View

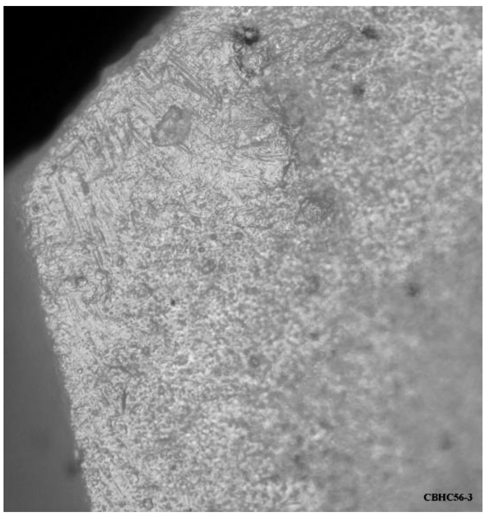
Photo #	Magnification	Feature	Location
CBHC55-1	200x	Striations	Dorsal, Distal
CBHC55-2	200x	Striations	Dorsal, Distal

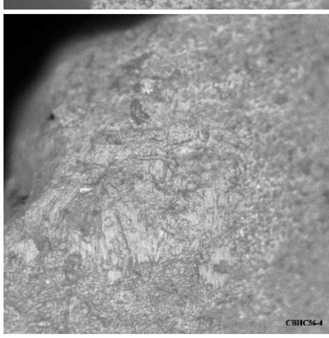
Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 56
Artifact #: 482
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club









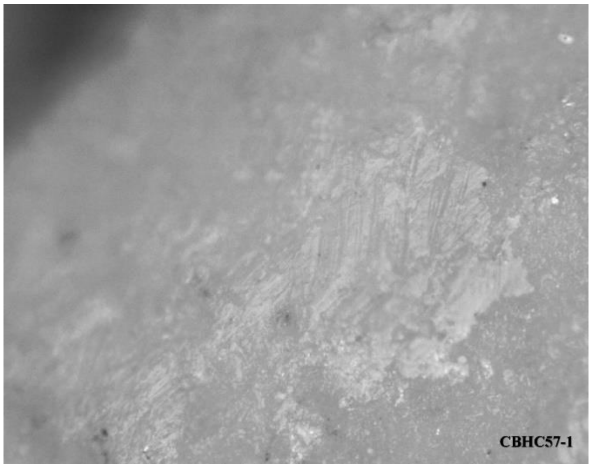
Dorsal View

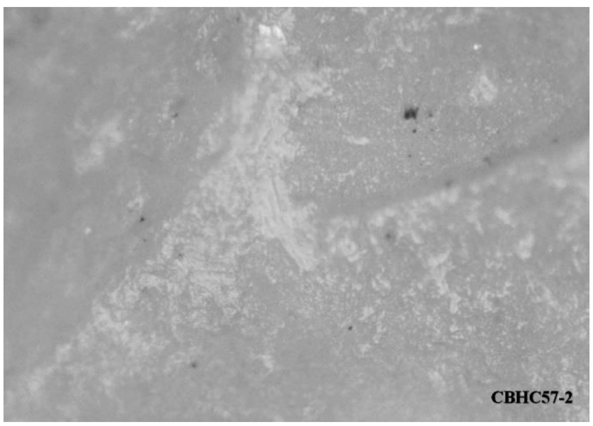
Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC56-1	200x	Generic weak polish	Ventral, Lateral
CBHC56-2	200x	Generic weak polish	Ventral, Lateral
CBHC56-3	200x	Plant polish and striations	Ventral, Lateral
CBHC56-4	200x	Plant polish and striations	Ventral, Lateral

Summary: Used in transverse motion on plant matter.

Microwear #: 57
Artifact #: 483
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club





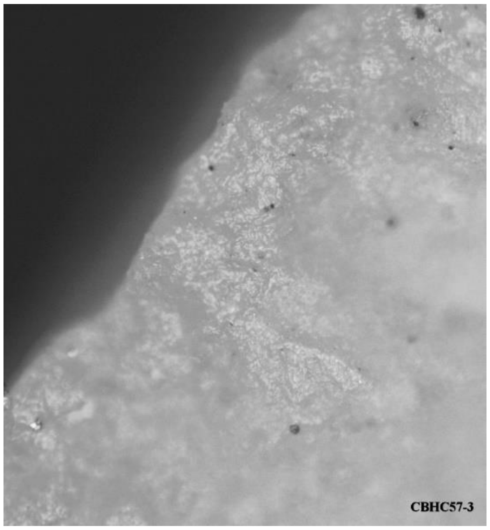
Dorsal View

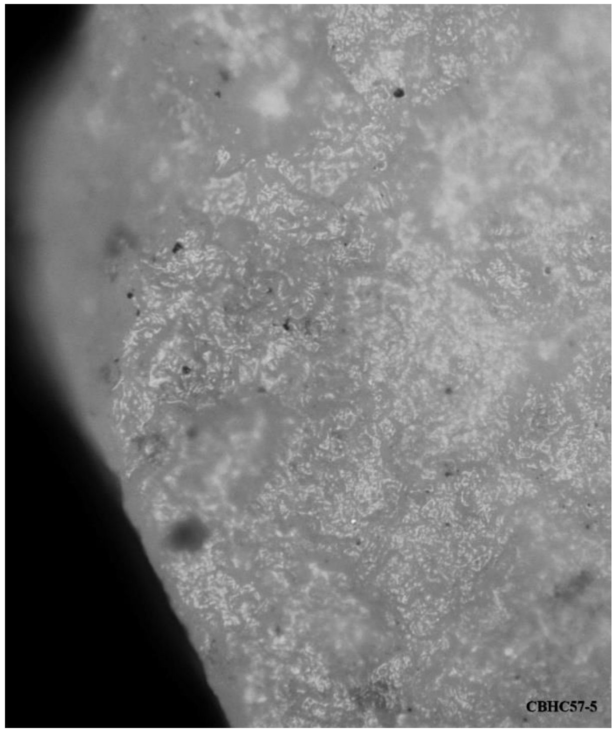
Ventral View

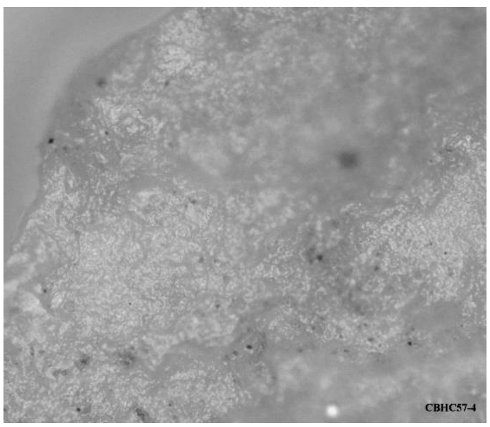
Photo #	**Magnification**	**Feature**	**Location**
CBHC57-1	200x	Striations	Ventral, Lateral
CBHC57-2	200x	Striations	Ventral, Lateral
CBHC57-3	200x	Dry hide polish	Dorsal, Lateral
CBHC57-4	200x	Dry hide polish	Dorsal, Lateral
CBHC57-5	200x	Dry hide polish	Dorsal, Lateral

Summary: Used in transverse motion on dry hide.

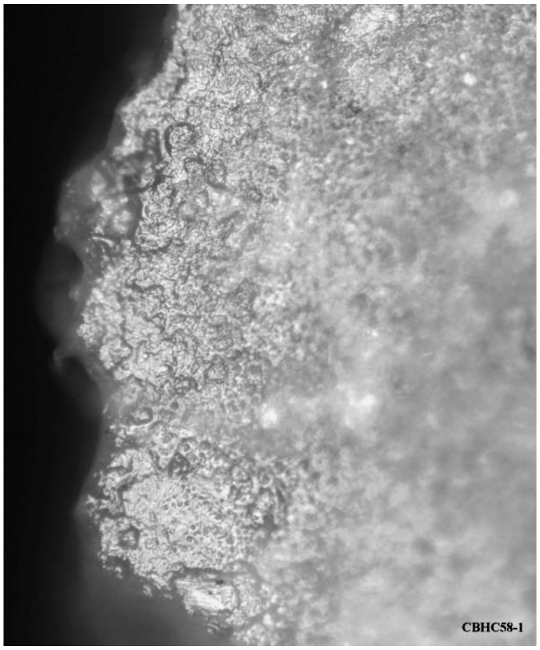
Microwear #: 57
Artifact #: 483
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



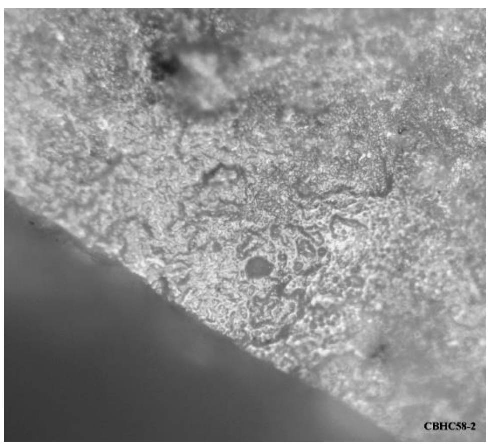




Microwear #: 58
Artifact #: 454
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

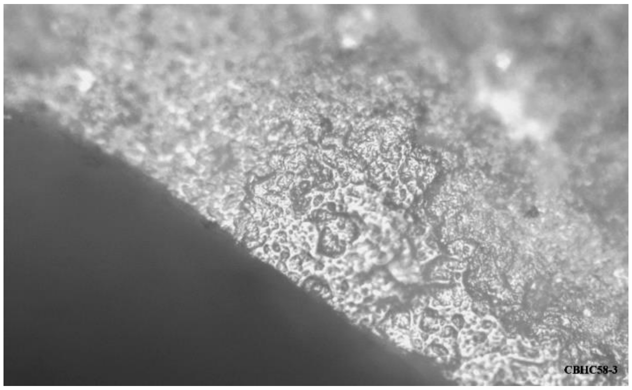


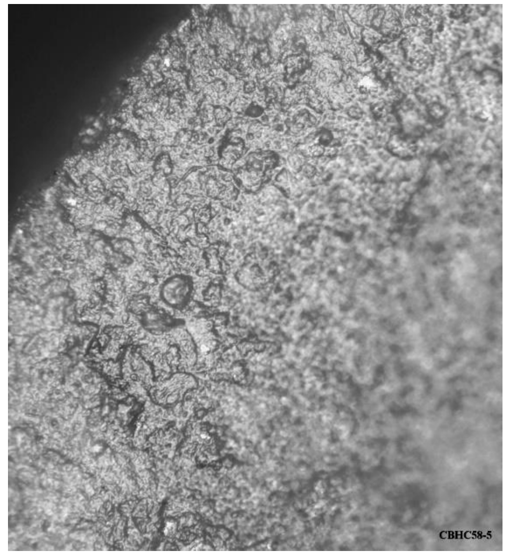
Ventral View

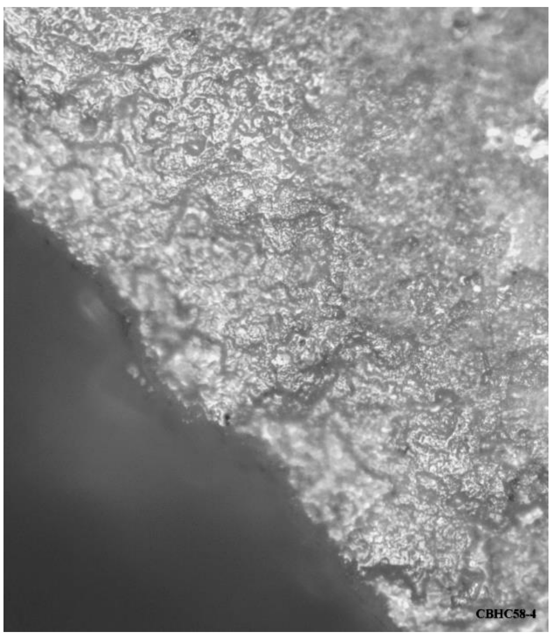
Photo #	**Magnification**	**Feature**	**Location**
CBHC58-1	200x	Plant polish	Ventral, Distal
CBHC58-2	200x	Plant polish	Ventral, Distal
CBHC58-3	200x	Plant polish	Ventral, Lateral
CBHC58-4	200x	Plant polish	Ventral, Lateral
CBHC58-5	200x	Plant polish	Ventral, Lateral
CBHC58-6	200x	Plant polish	Ventral, Distal
CBHC58-7	200x	Plant polish	Ventral, Distal

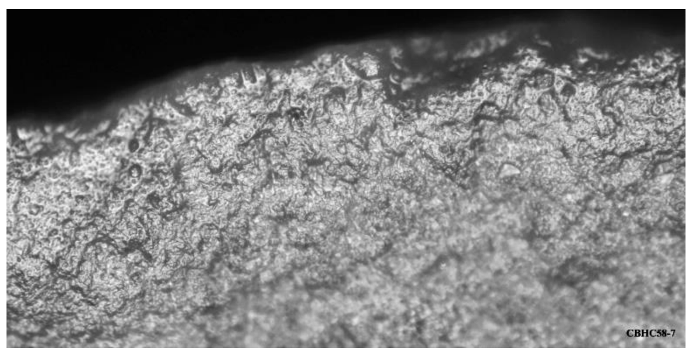
Summary: Used in transverse motion on plant matter.

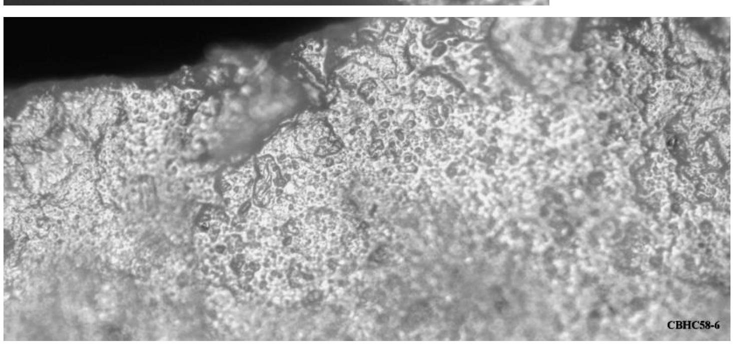
Microwear #: 58
Artifact #: 454
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club











Microwear #: 59
Artifact #: 289
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

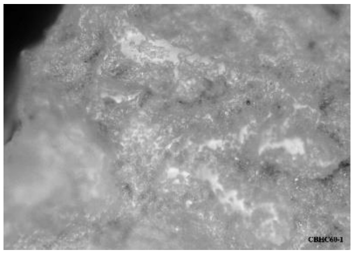
Dorsal View

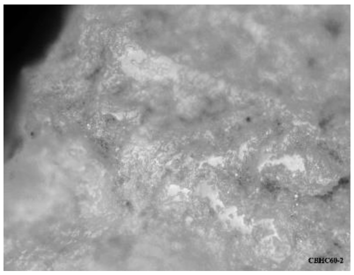
Ventral View

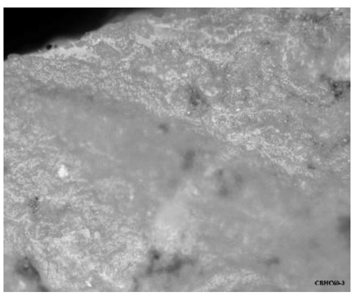
Photo #	**Magnification**	**Feature**	**Location**

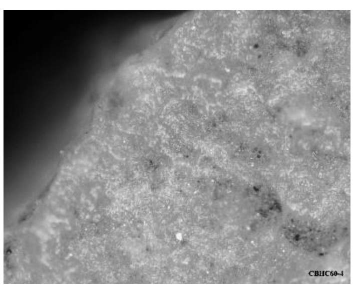
Summary: Unused.

Microwear #: 60
Artifact #: 287
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club









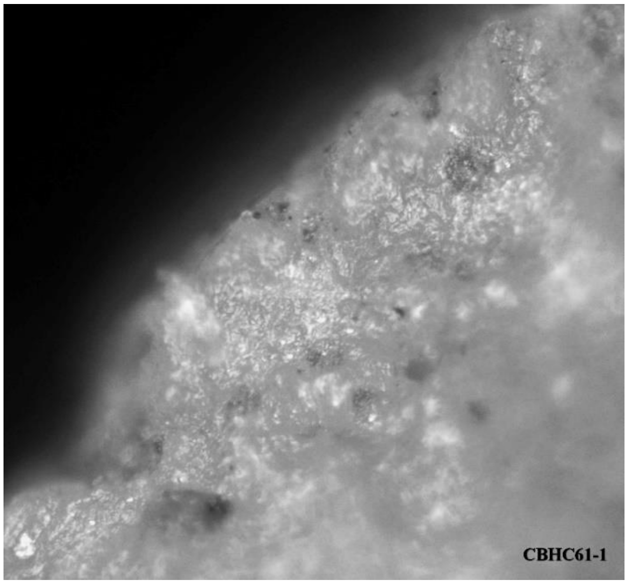
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC60-1	200x	Wet hide polish	Dorsal, Lateral
CBHC60-2	200x	Wet hide polish	Dorsal, Lateral
CBHC60-3	200x	Wet hide polish	Dorsal, Lateral
CBHC60-4	200x	Wet hide polish	Dorsal, Lateral

Summary: Used in transverse motion on wet hide.

Microwear #: 61
Artifact #: 288
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC61-1	200x	Dry hide polish	Ventral, Distal

Summary: Used in transverse motion on dry hide.

Microwear #: 62
Artifact #: 290
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

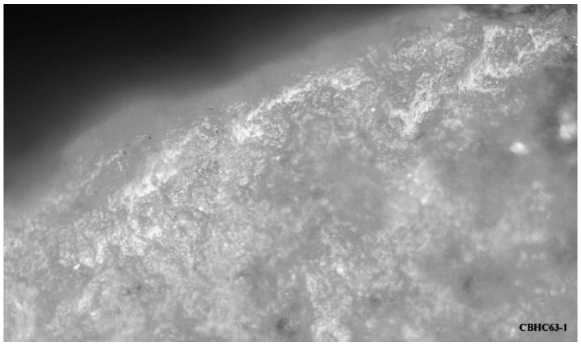
Dorsal View

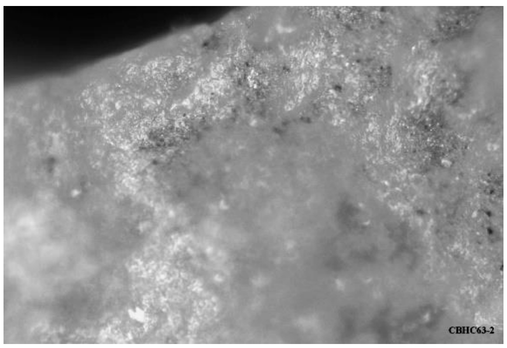
Ventral View

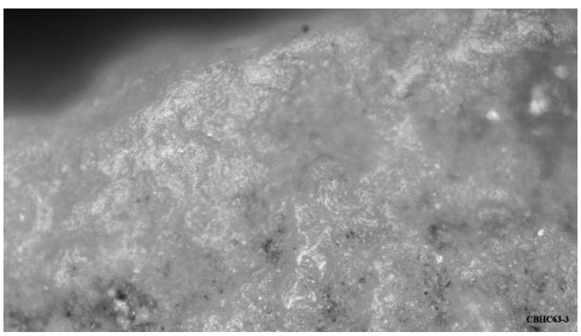
Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on wet hide.

Microwear #: 63
Artifact #: 291
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC63-1	200x	Wood polish	Ventral, Proximal
CBHC63-2	200x	Smooth pitted polish	Ventral, Lateral
CBHC63-3	200x	Wood polish	Ventral, Proximal

Summary: Used in transverse motion on wood.

Microwear #: 64
Artifact #: 292
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

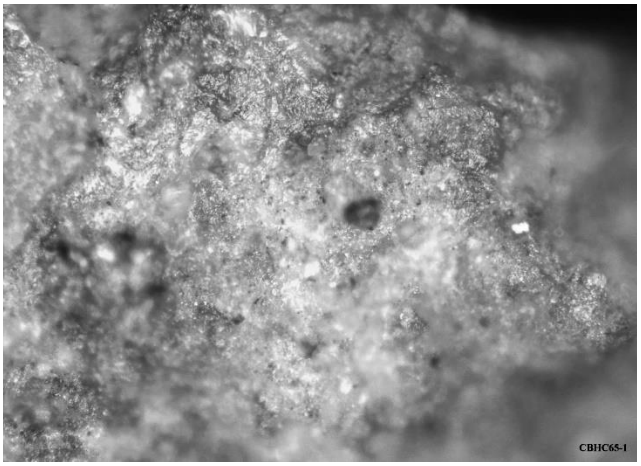
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 65
Artifact #: 294
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



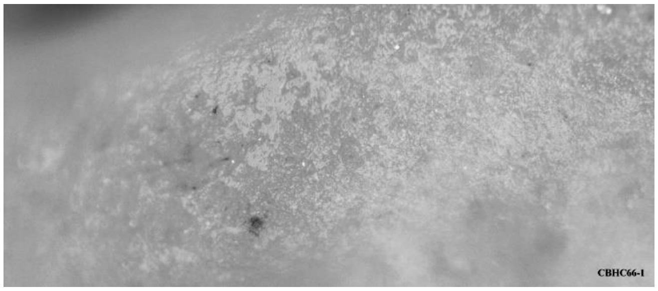
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC65-1	200x	Indeterminate polish	Ventral, Distal

Summary: Indeterminate use.

Microwear #: 66
Artifact #: 293
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



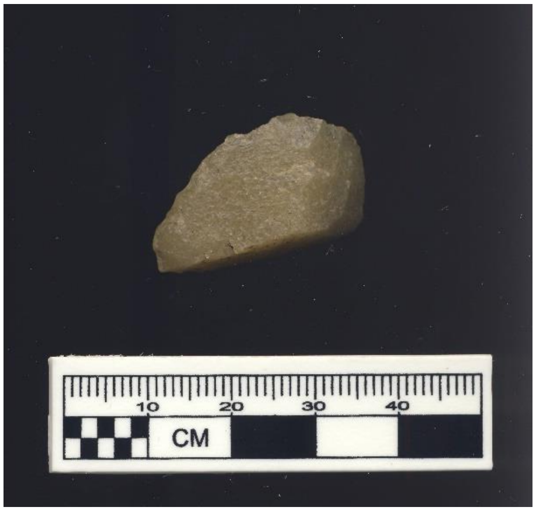
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC66-1	200x	Grit polish	Ventral, Distal

Summary: Unused

Microwear #: 67
Artifact #: 286
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



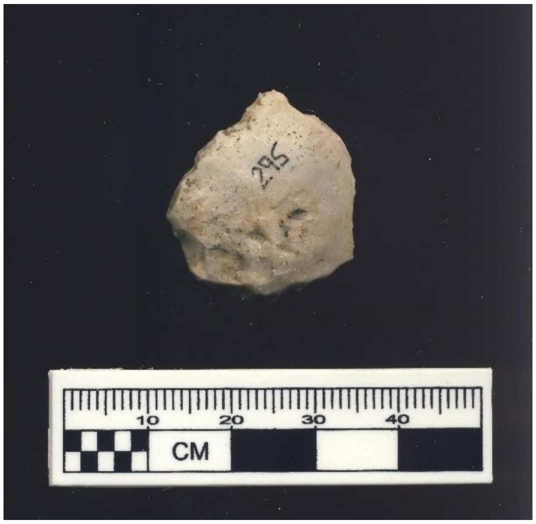
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 68
Artifact #: 295
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



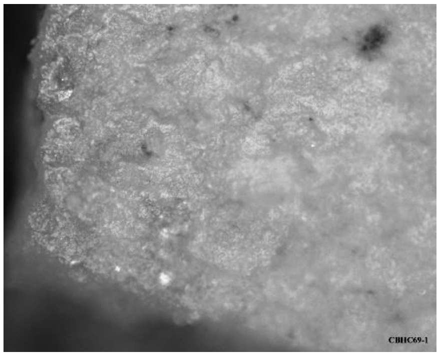
Dorsal View

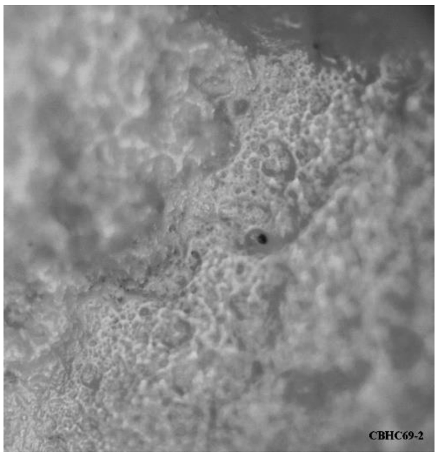
Ventral View

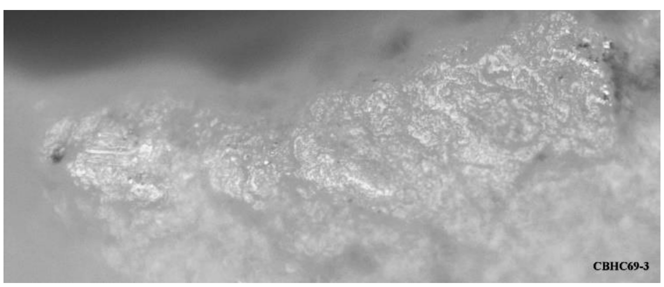
Photo #	Magnification	Feature	Location

Summary: Unused

Microwear #: 69
Artifact #: 298
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC69-1	200x	Wet hide polish	Ventral, Distal
CBHC69-2	200x	Plant polish	Ventral, Distal
CBHC69-3	200x	Wet hide polish	Ventral, Distal

Summary: Used in a transverse motion on wet hide and plant matter.

Microwear #: 70
Artifact #: 297
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

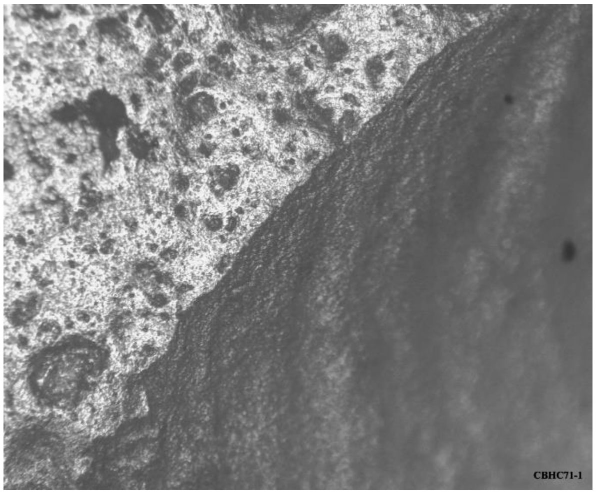
Dorsal View

Ventral View

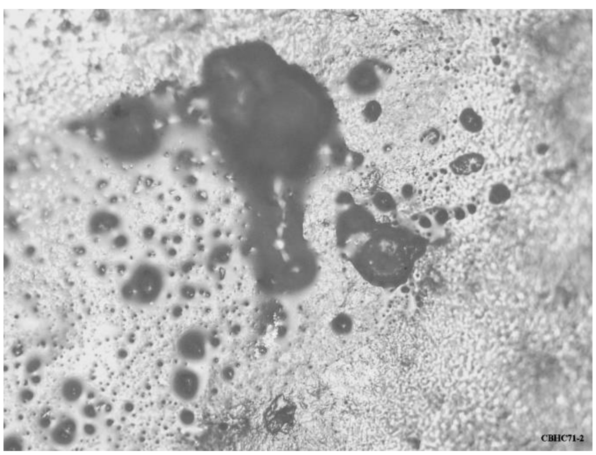
Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 71
Artifact #: 296
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

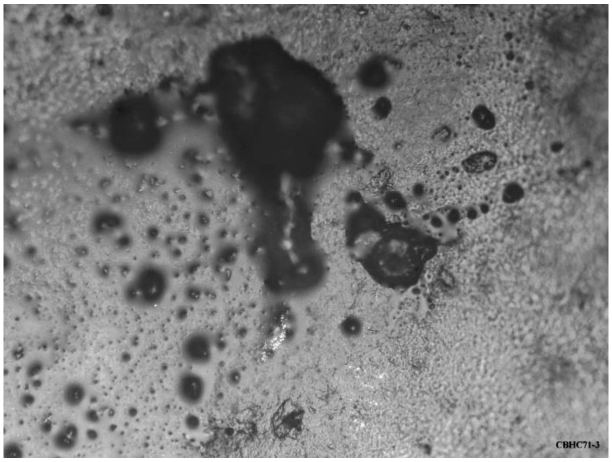


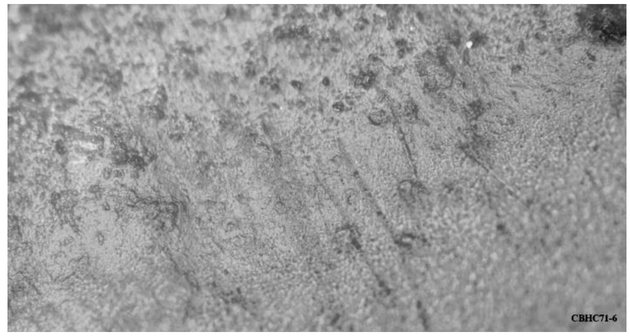
Ventral View

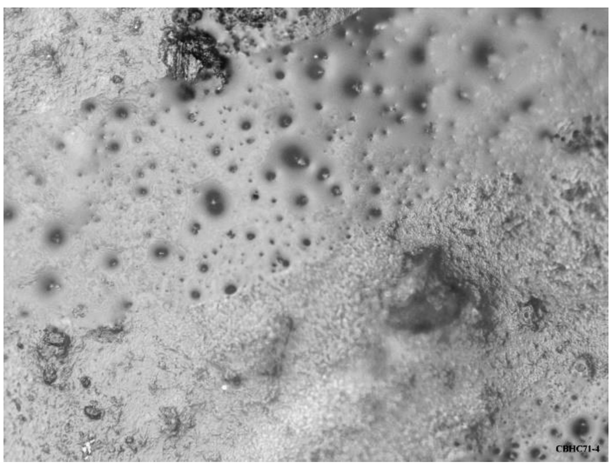
Photo #	**Magnification**	**Feature**	**Location**
CBHC71-1	50x	Plant polish	Dorsal, Distal
CBHC71-2	200x	Plant polish	Dorsal, Distal
CBHC71-3	200x	Plant polish	Dorsal, Distal
CBHC71-4	200x	Plant polish	Dorsal, Distal
CBHC71-5	200x	Plant polish	Dorsal, Distal
CBHC71-6	200x	Striations	Dorsal, Distal
CBHC71-7	200x	Plant polish	Dorsal, Distal

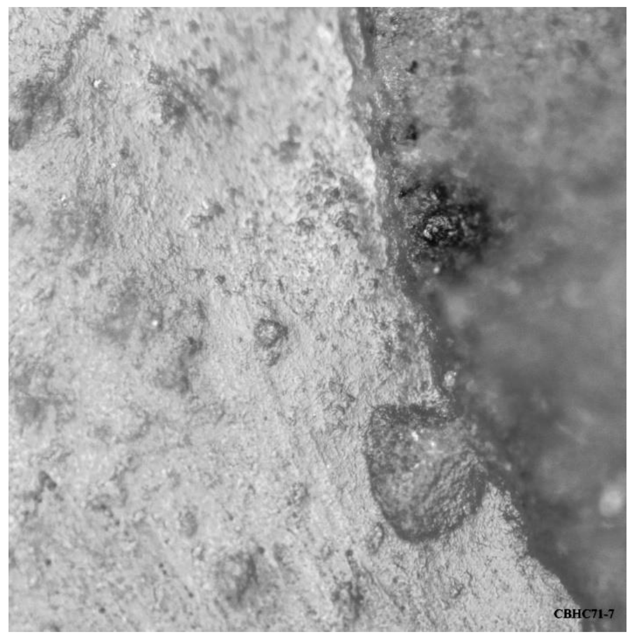
Summary: Used in indeterminate motion on plant matter.

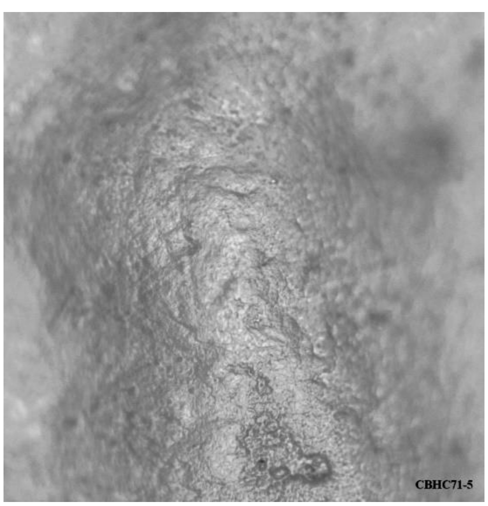
Microwear #: 71
Artifact #: 296
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club











Microwear #: 72
Artifact #: 300
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

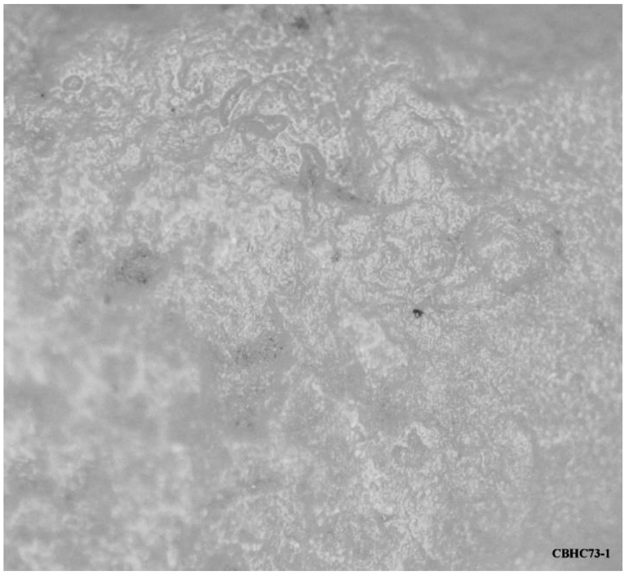
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused

Microwear #: 73
Artifact #: 299
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



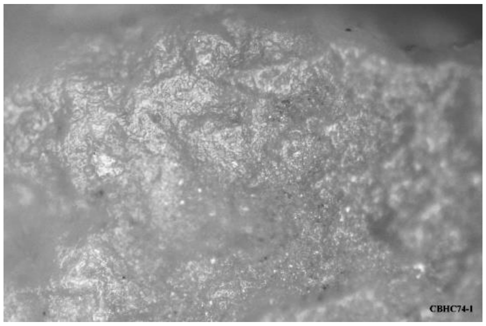
Dorsal View

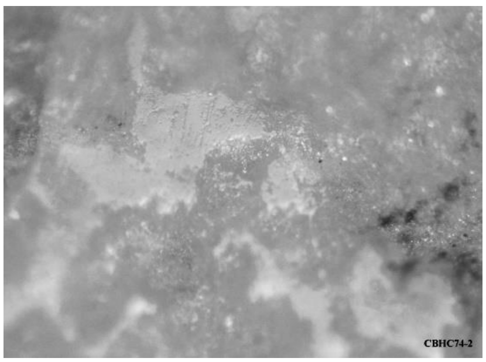
Ventral View

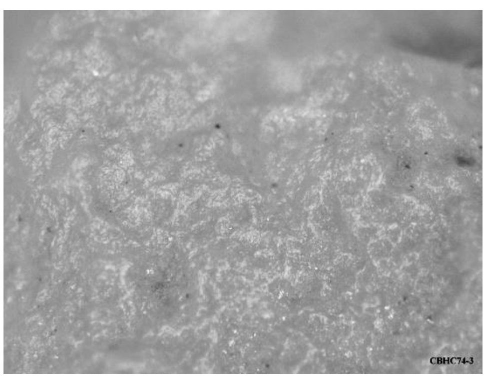
Photo #	Magnification	Feature	Location
CBHC73-1	200x	Meat polish	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 74
Artifact #: 301
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







Dorsal View

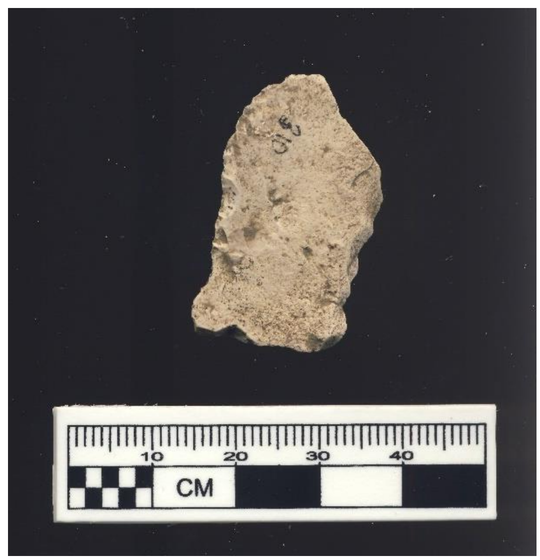
Ventral View

Photo #	Magnification	Feature	Location
CBHC74-1	200x	Dry hide polish	Ventral, Distal
CBHC74-2	200x	Grit polish and striations	Dorsal, Distal
CBHC74-3	200x	Dry hide polish	Dorsal, Distal

Summary: Used in indeterminate motion on dry hide.

Microwear #: 75
Artifact #: 310
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View



Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused

Microwear #: 76
Artifact #: 312
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

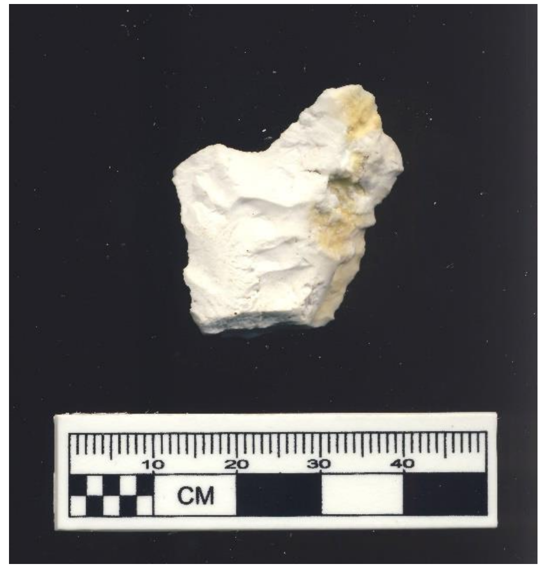
Dorsal View

Ventral View

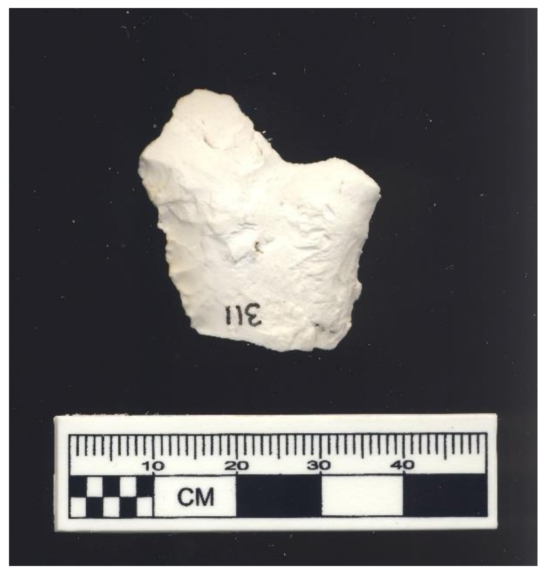
Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on indeterminate hard material.

Microwear #: 77
Artifact #: 311
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View



Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 78
Artifact #: 309
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

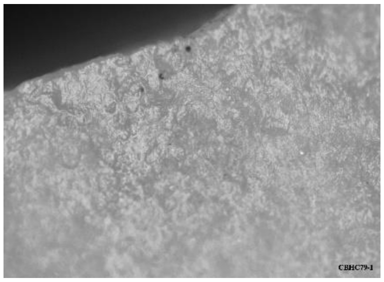
Dorsal View

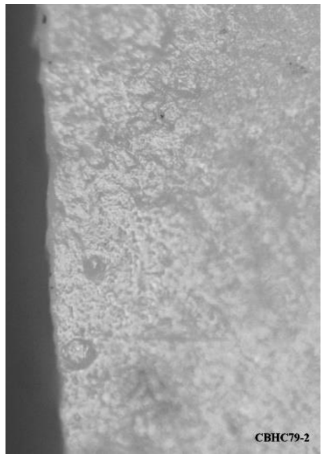
Ventral View

Photo #	Magnification	Feature	Location

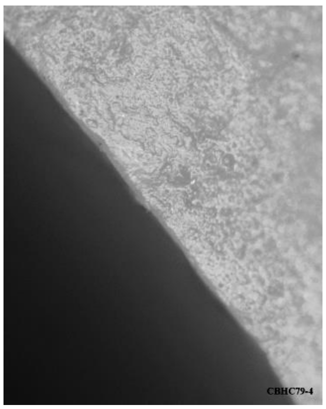
Summary: Unused

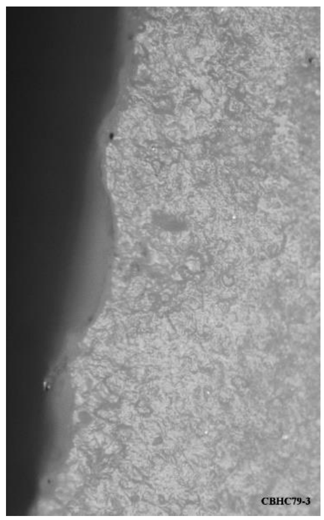
Microwear #: 79
Artifact #: 308
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

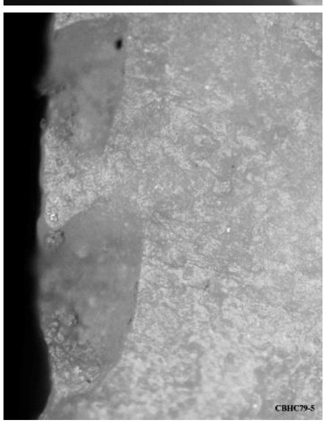




Dorsal View





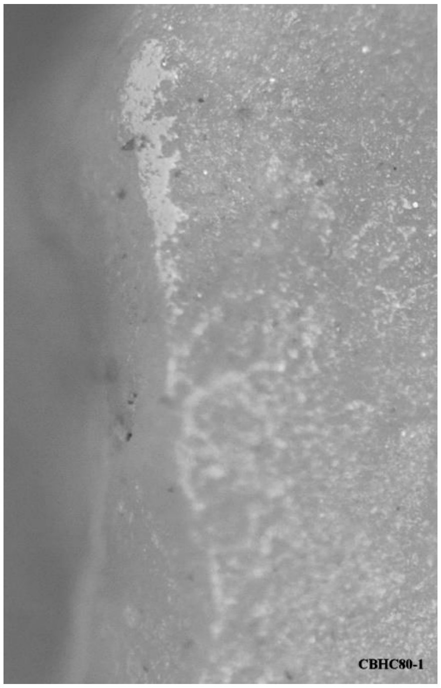


Ventral View

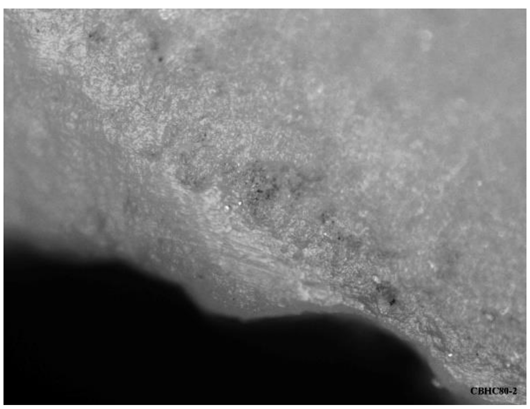
Photo #	**Magnification**	**Feature**	**Location**
CBHC79-1	200x	Plant polish	Ventral, Distal
CBHC79-2	200x	Plant polish	Ventral, Distal
CBHC79-3	200x	Plant polish	Ventral, Distal
CBHC79-4	200x	Plant polish	Ventral, Distal
CBHC79-5	200x	Plant polish	Ventral, Distal

Summary: Used in transverse motion on plant matter.

Microwear #: 80
Artifact #: 304
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

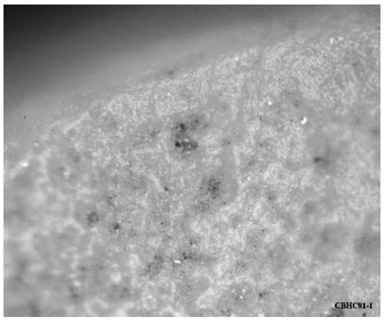


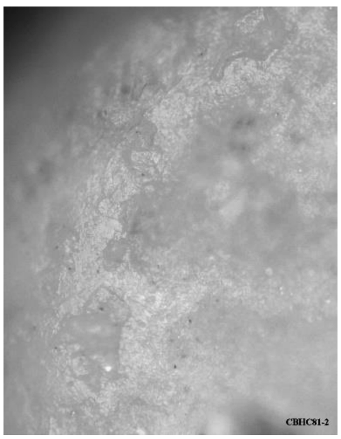
Ventral View

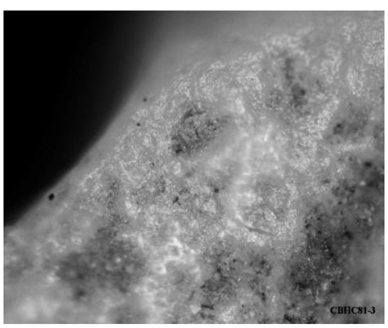
Photo #	**Magnification**	**Feature**	**Location**
CBHC80-1	200x	Grit polish	Dorsal, Distal
CBHC80-2	200x	Grit polish and striations	Dorsal, Distal

Summary: Unused

Microwear #: 81
Artifact #: 306
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







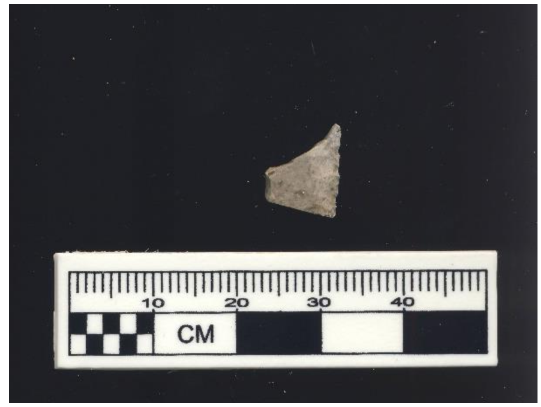
Dorsal View

Ventral View

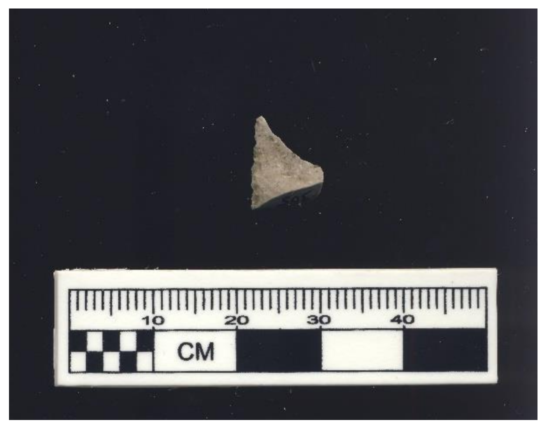
Photo #	**Magnification**	**Feature**	**Location**
CBHC81-1	200x	Wet hide polish	Ventral, Distal
CBHC81-2	200x	Wet hide polish	Ventral, Distal
CBHC81-3	200x	Wet hide polish	Ventral, Distal

Summary: Used in transverse motion to scrape wet hide.

Microwear #: 82
Artifact #: 305
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View



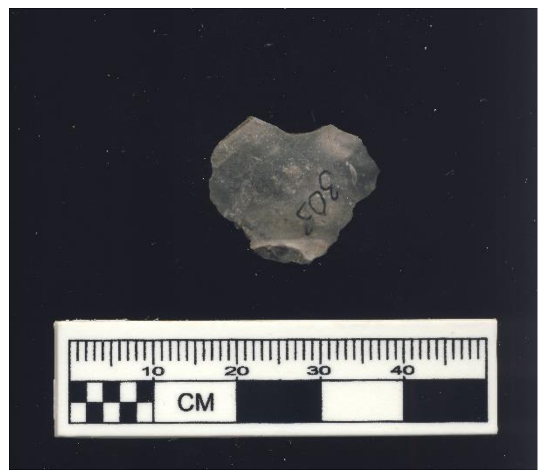
Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 83
Artifact #: 303
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View



Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused

Microwear #: 84
Artifact #: 302
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 85
Artifact #: 313
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Used in indeterminate motion on meat and/or wet hide.

Microwear #: 86
Artifact #: 314
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

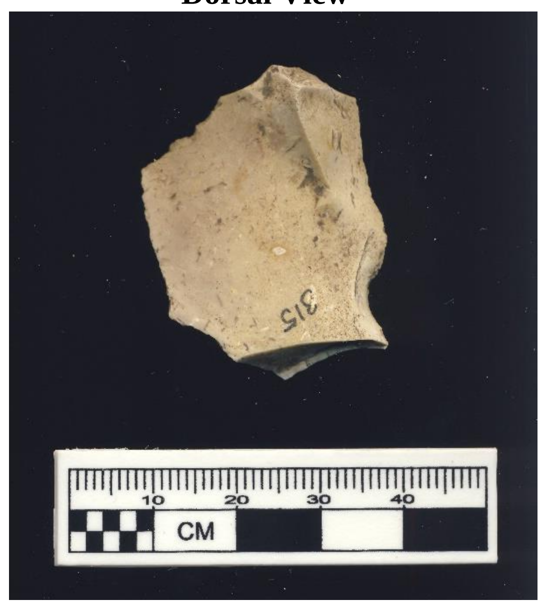
Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on wood.

Microwear #: 87
Artifact #: 315
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

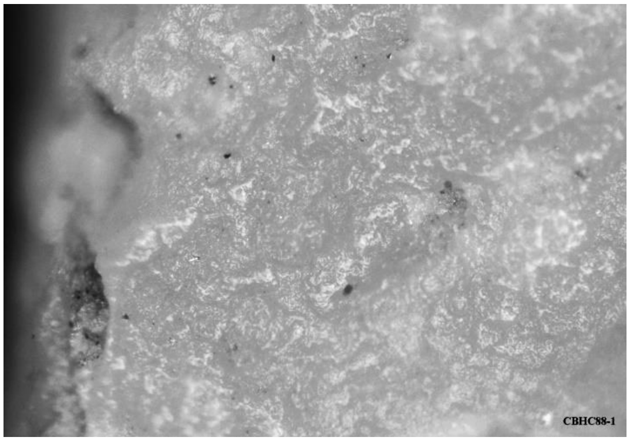


Ventral View

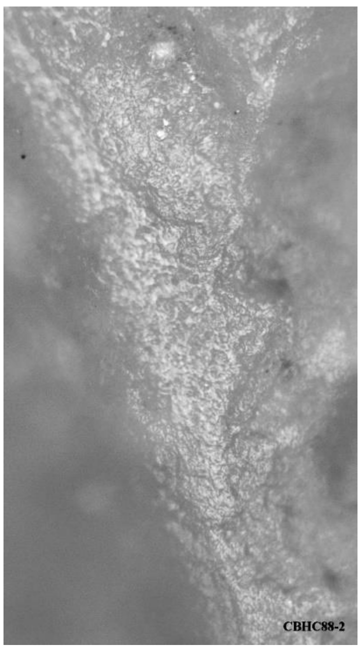
Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on indeterminate hard material.

Microwear #: 88
Artifact #: 325
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

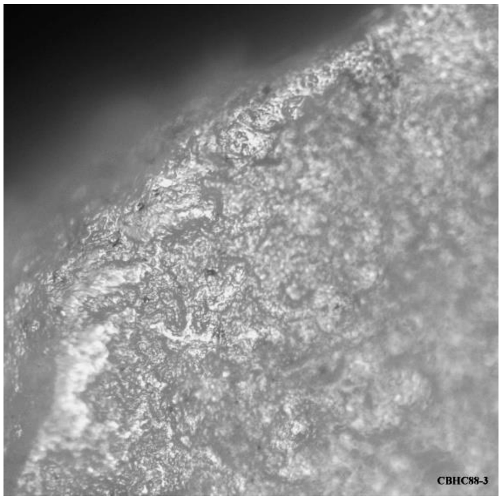


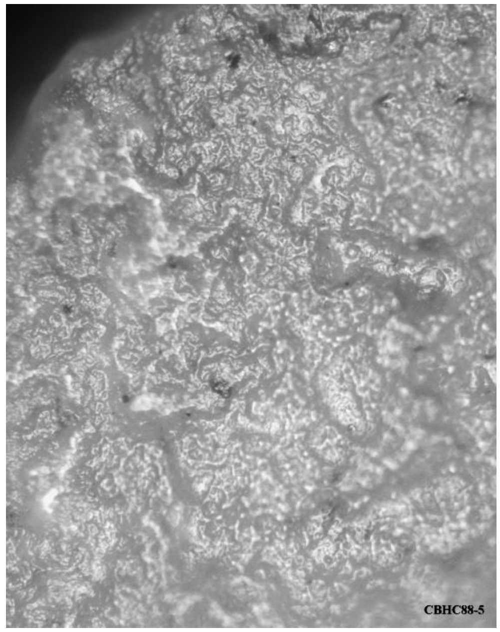
Ventral View

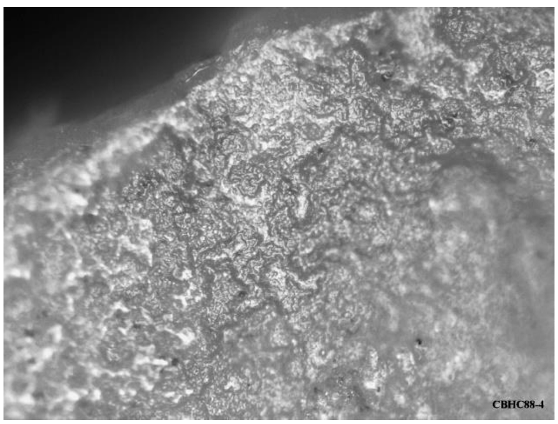
Photo #	Magnification	Feature	Location
CBHC88-1	200x	Dry hide polish	Ventral, Distal
CBHC88-2	200x	Dry hide polish	Ventral, Distal
CBHC88-3	200x	Dry hide polish	Ventral, Distal
CBHC88-4	200x	Dry hide polish	Ventral, Distal
CBHC88-5	200x	Dry hide polish	Ventral, Distal

Summary: Used in indeterminate motion on dry hide.

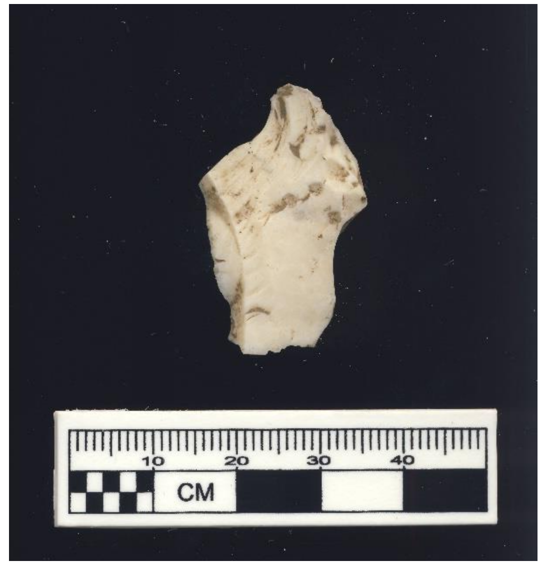
Microwear #: 88
Artifact #: 325
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







Microwear #: 89
Artifact #: 324
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



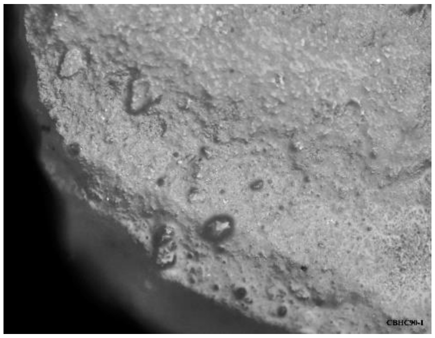
Dorsal View

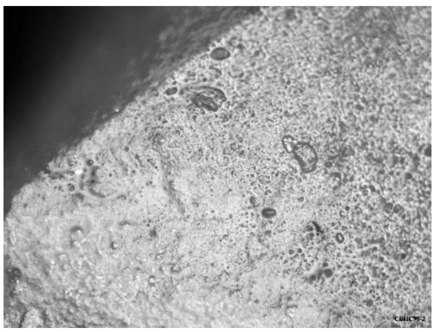
Ventral View

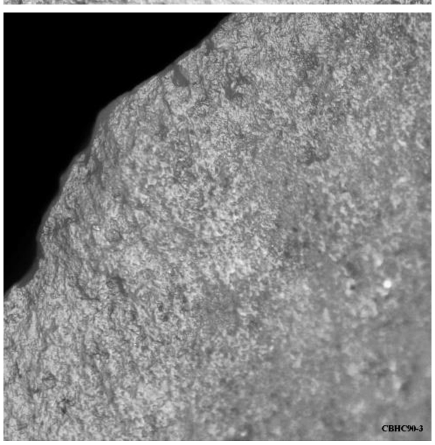
Photo #	**Magnification**	**Feature**	**Location**

Summary: Used in longitudinal motion on indeterminate hard material.

Microwear #: 90
Artifact #: 321
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC90-1	200x	Plant polish	Ventral, Distal
CBHC90-2	200x	Plant polish	Ventral, Distal
CBHC90-3	200x	Plant polish	Dorsal, Distal

Summary: Used in indeterminate motion on plant matter.

Microwear #: 91
Artifact #: 14-01
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in longitudinal motion on wet hide.

Microwear #: 92
Artifact #: 241
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in longitudinal motion on meat.

Microwear #: 93
Artifact #: 107
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in longitudinal motion on meat.

Microwear #: 94
Artifact #: 106
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on wood.

Microwear #: 95
Artifact #: 114
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

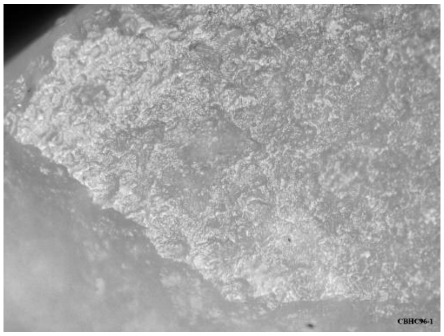
Dorsal View

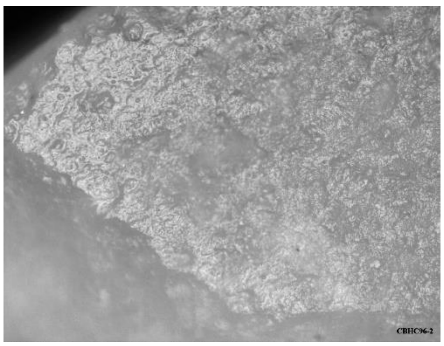
Ventral View

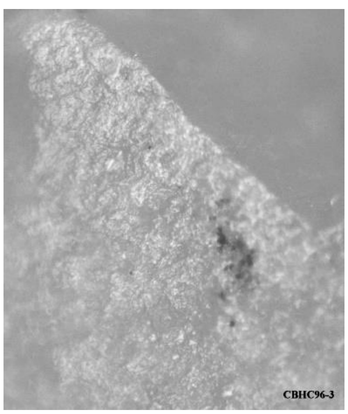
Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 96
Artifact #: 390
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC96-1	200x	Meat polish	Ventral, Distal
CBHC96-2	200x	Meat polish	Ventral, Distal
CBHC96-3	200x	Meat polish	Ventral, Lateral

Summary: Used in indeterminate motion on meat.

Microwear #: 97
Artifact #: 408
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

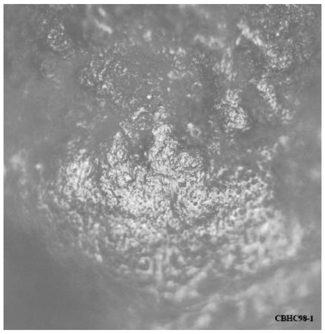
Dorsal View

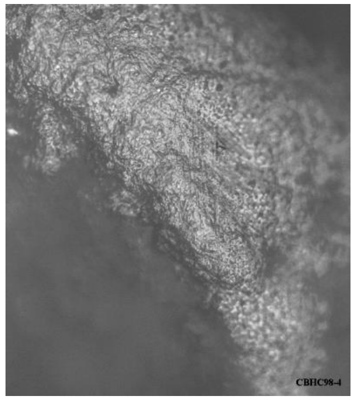
Ventral View

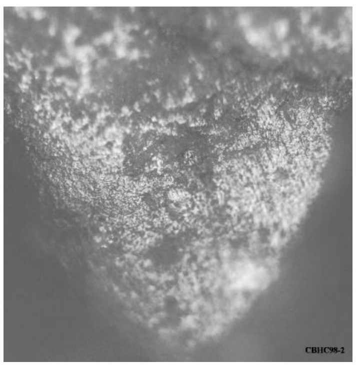
Photo #	Magnification	Feature	Location

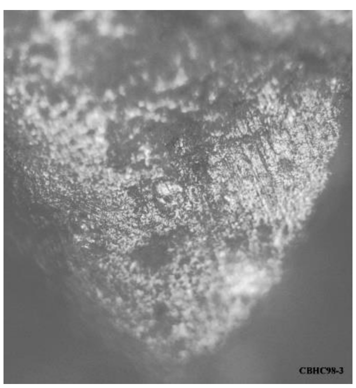
Summary: Indeterminate use.

Microwear #: 98
Artifact #: 429
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club









Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC98-1	200x	Dry hide polish and striations	Ventral, Distal
CBHC98-2	200x	Dry hide polish and striations	Ventral, Distal
CBHC98-3	200x	Dry hide polish and striations	Ventral, Distal
CBHC98-4	200x	Dry hide polish and striations	Ventral, Medial

Summary: Used in transverse motion on dry hide.

Microwear #: 99
Artifact #: 13
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused

Microwear #: 100
Artifact #: 544
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

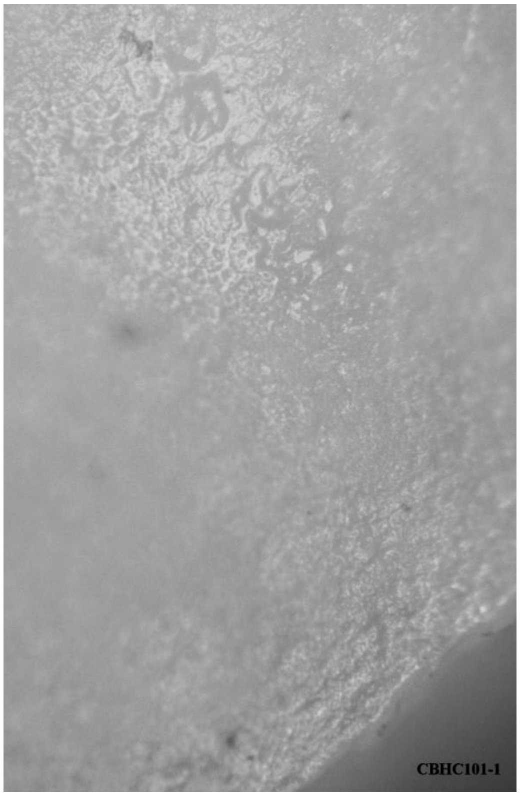
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on meat.

Microwear #: 101
Artifact #: 83
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



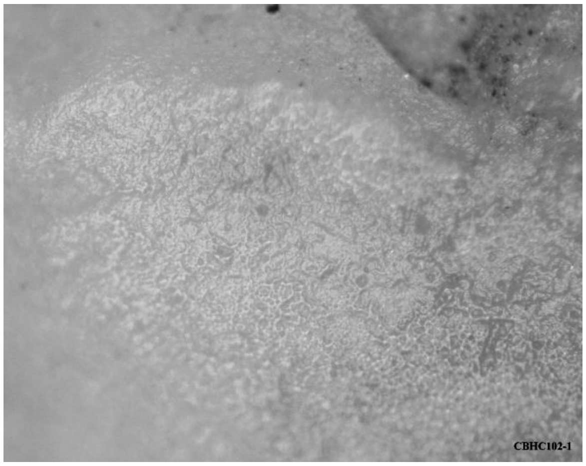
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC101-1	200x	Meat polish	Ventral, Proximal

Summary: Used in indeterminate motion on meat.

Microwear #: 102
Artifact #: 545
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



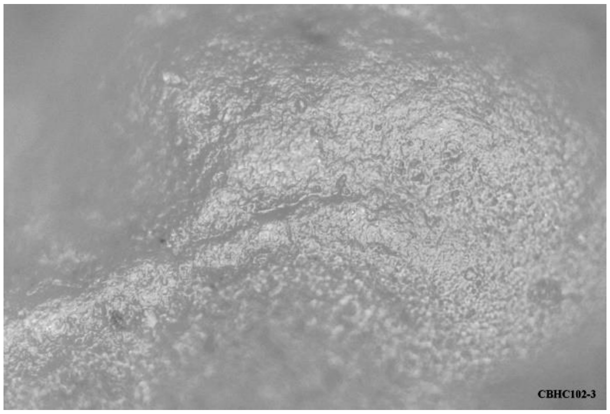
Dorsal View

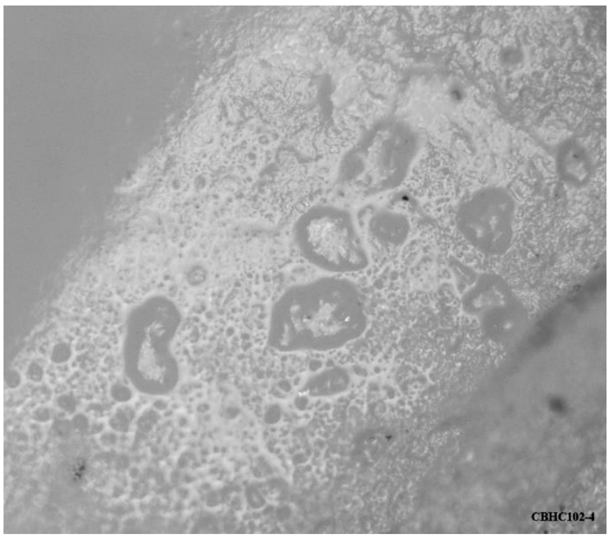
Ventral View

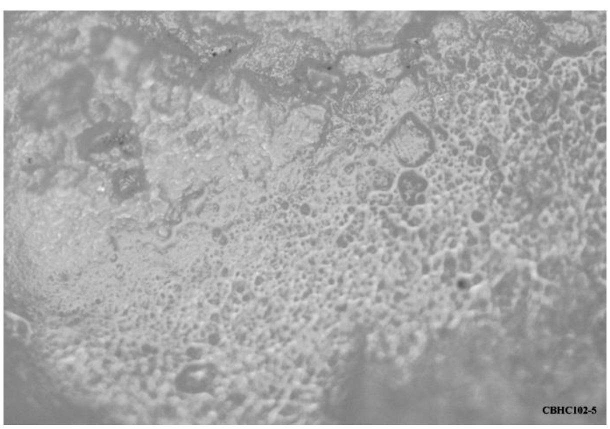
Photo #	**Magnification**	**Feature**	**Location**
CBHC102-1	200x	Plant polish	Dorsal, Medial
CBHC102-2	200x	Plant polish	Dorsal, Medial
CBHC102-3	200x	Plant polish	Dorsal, Medial
CBHC102-4	200x	Plant polish	Ventral, Lateral
CBHC102-5	200x	Plant polish	Ventral, Proximal

Summary: Used in indeterminate motion on plant matter.

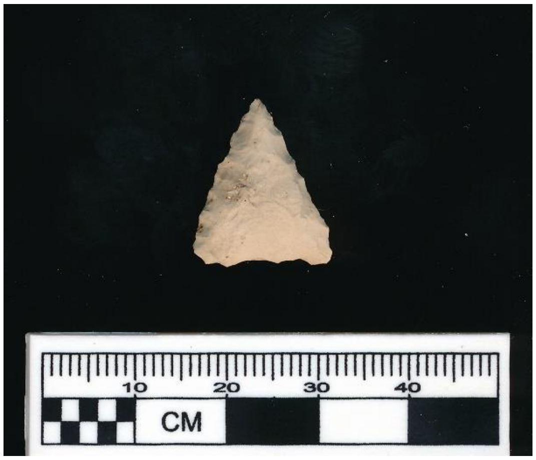
Microwear #: 102
Artifact #: 545
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



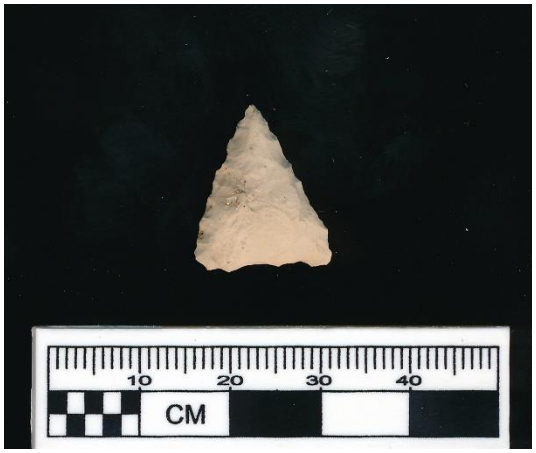




Microwear #: 103
Artifact #: 148
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

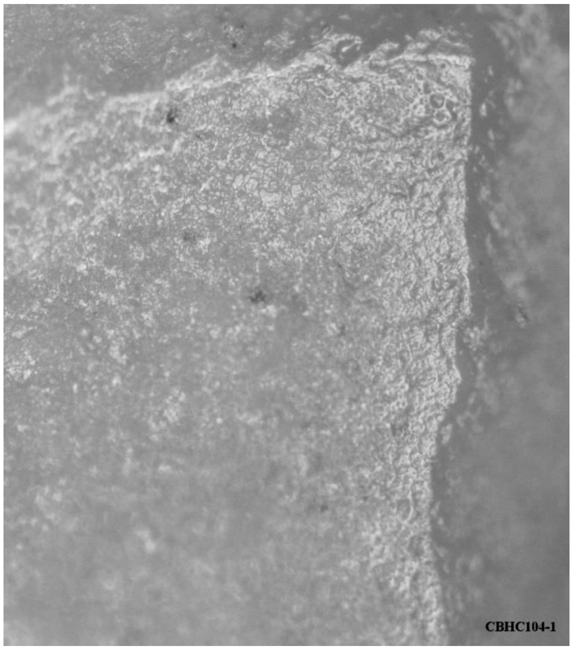


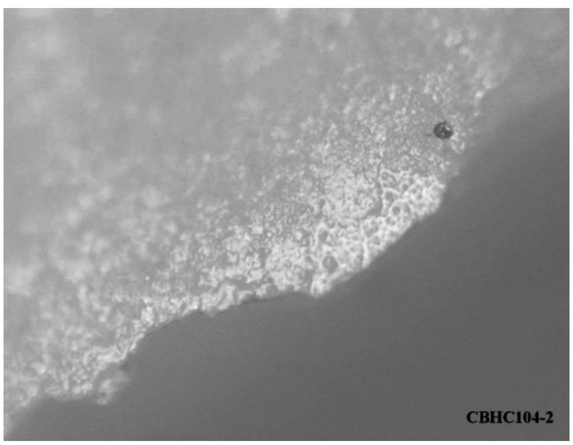
Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 104
Artifact #:
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club





Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC104-1	200x	Plant polish	Ventral, Proximal
CBHC104-2	200x	Plant polish	Ventral, Proximal

Summary: Used in indeterminate motion on meat and plant matter.

Microwear #: 105
Artifact #: 397
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on indeterminate material.

Microwear #: 106
Artifact #: 409
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Used in transverse motion on indeterminate hard material.

Microwear #: 107
Artifact #: 416
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused

Microwear #: 108
Artifact #: 02
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on dry hide.

Microwear #: 109
Artifact #: 326
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

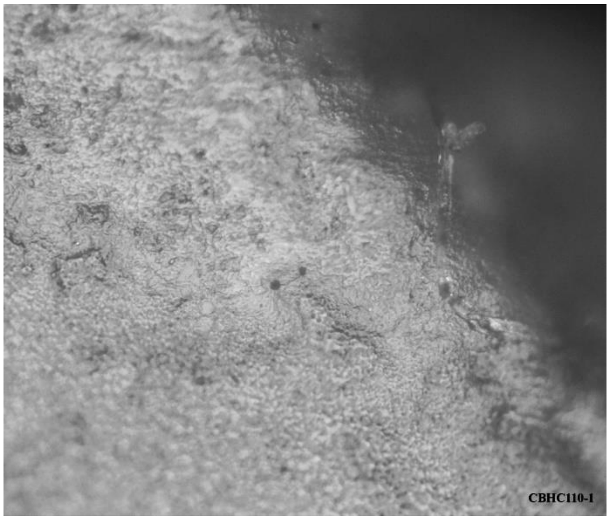
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC109-1	200x	Grit polish	Ventral, Distal

Summary: Indeterminate use.

Microwear #: 110
Artifact #: 183
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC110-1	200x	Grit polish	Ventral, Distal

Summary: Indeterminate use.

Microwear #: 111
Artifact #: 392
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused

Microwear #: 112
Artifact #: 281
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

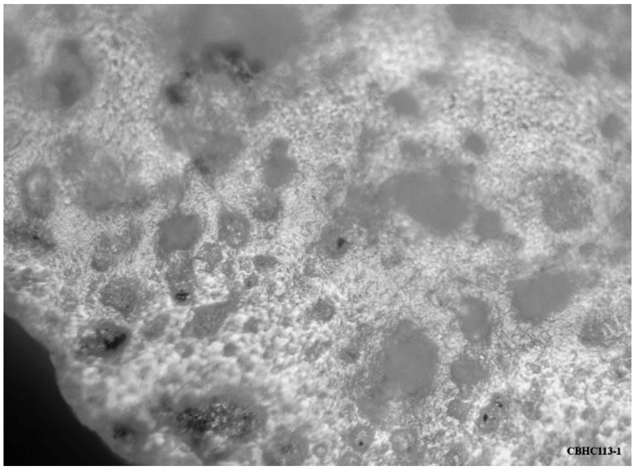
Dorsal View

Ventral View

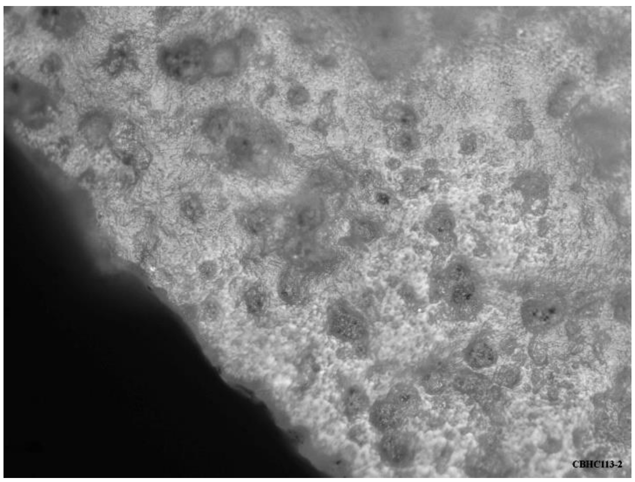
Photo #	Magnification	Feature	Location

Summary: Used in longitudinal motion on indeterminate material.

Microwear #: 113
Artifact #: 219
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

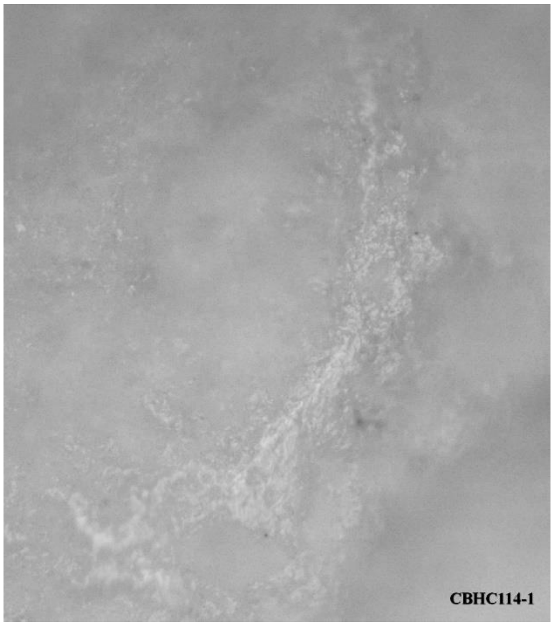


Ventral View

Photo #	Magnification	Feature	Location
CBHC113-1	200x	Plant polish	Ventral, Distal
CBHC113-2	200x	Plant polish	Ventral, Distal

Summary: Used in transverse motion on plant matter.

Microwear #: 114
Artifact #: 407
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC114-1	200x	Meat polish	Ventral, Medial

Summary: Used in indeterminate motion on meat.

Microwear #: 115
Artifact #: 430
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

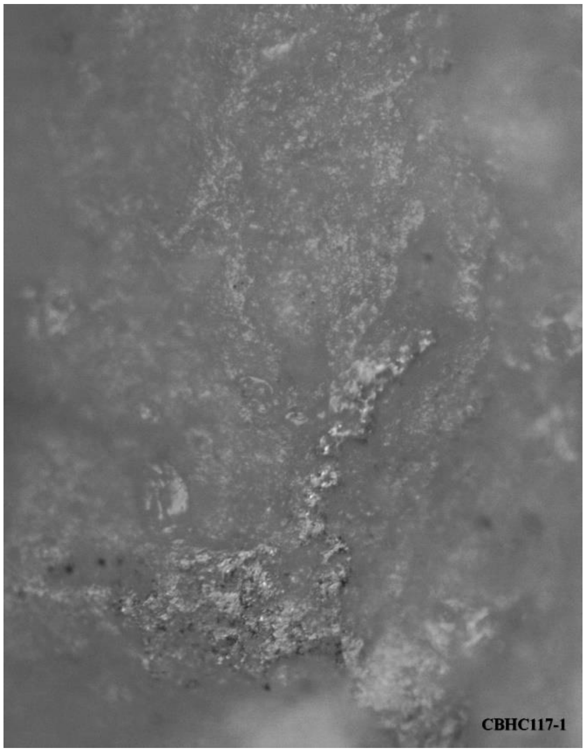
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 117
Artifact #: 387
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



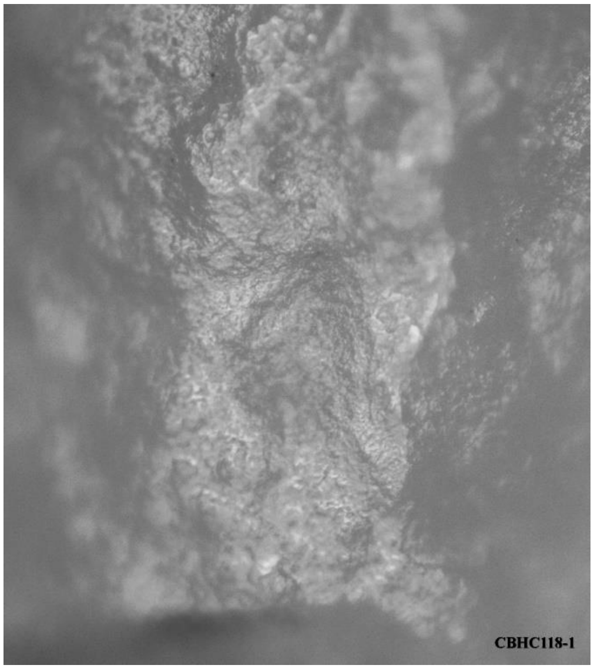
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC117-1	200x	Meat polish	Ventral, Medial

Summary: Used in longitudinal motion on meat.

Microwear #: 118
Artifact #: 388
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC118-1	200x	Meat polish	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 119
Artifact #: 427
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

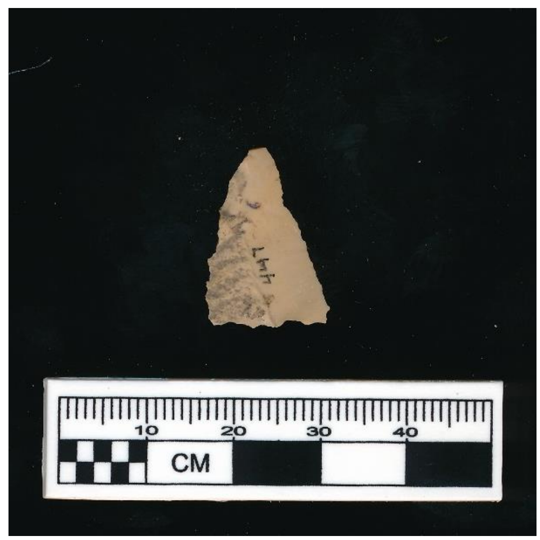
Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on meat.

Microwear #: 120
Artifact #: 447
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View



Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in longitudinal motion on indeterminate material.

Microwear #: 121
Artifact #: 546
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

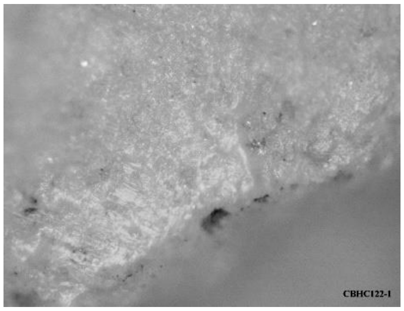
Dorsal View

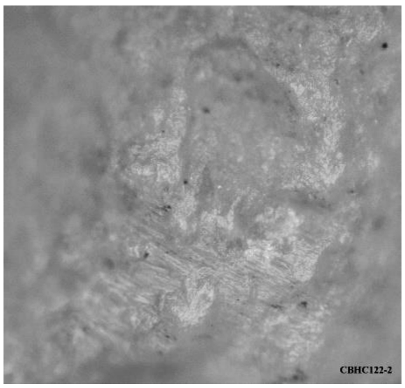
Ventral View

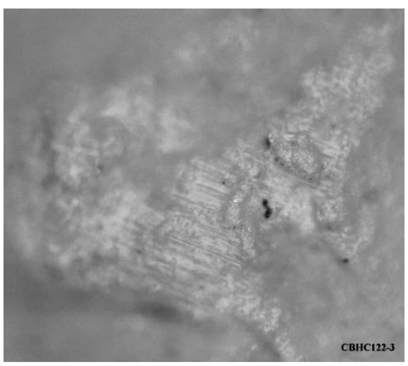
Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 122
Artifact #: 35
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







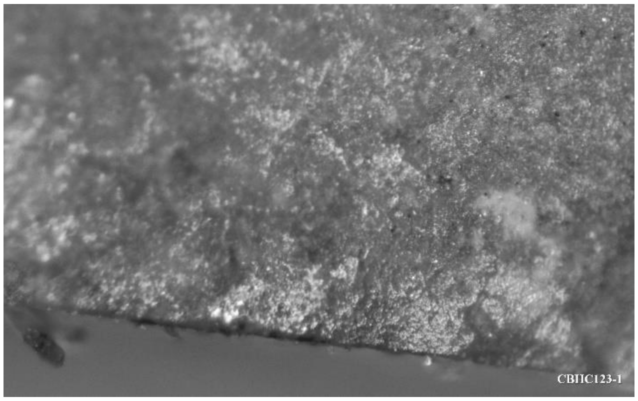
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC122-1	200x	Polish and striations	Ventral, Distal
CBHC122-2	200x	Polish and striations	Ventral, Distal
CBHC122-3	200x	Striations	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 123
Artifact #: 385
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC123-1	100x	Smooth pitted polish	Ventral, Distal

Summary: Used in longitudinal motion on indeterminate hard material.

Microwear #: 124
Artifact #: 544
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

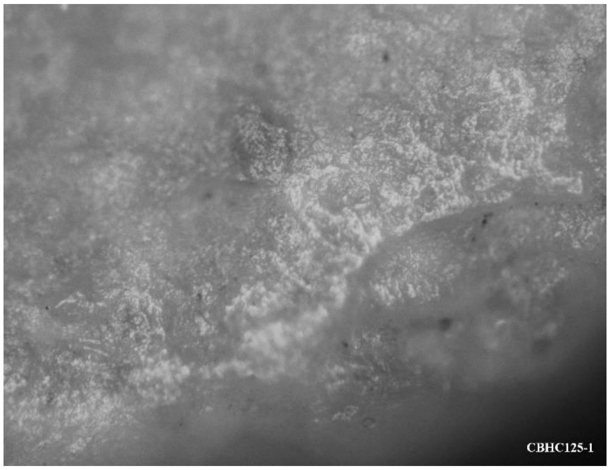
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on meat.

Microwear #: 125
Artifact #: 428
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC125-1	200x	Meat polish	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 126
Artifact #: 386
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

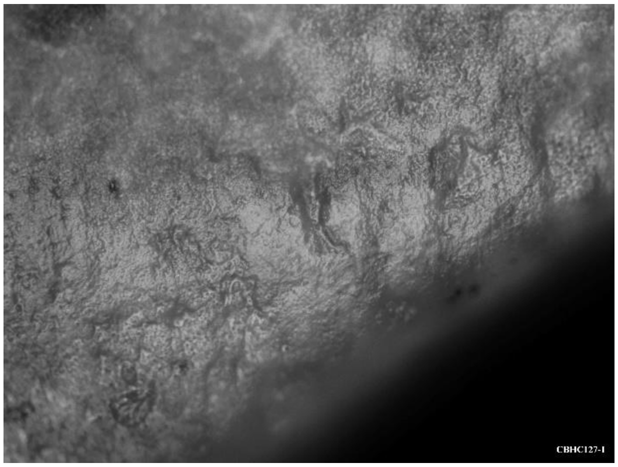
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 127
Artifact #: 208
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



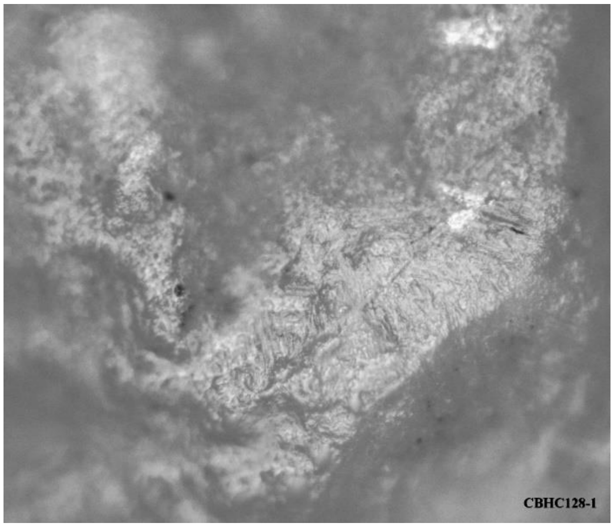
Dorsal View

Ventral View

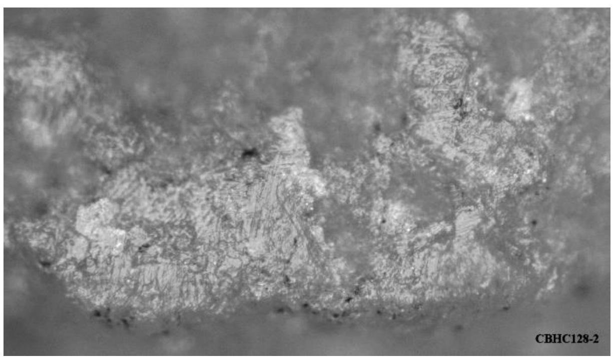
Photo #	**Magnification**	**Feature**	**Location**
CBHC127-1	200x	Smooth pitted polish	Ventral, Distal

Summary: Used in transverse motion on indeterminate hard material.

Microwear #: 128
Artifact #: 93
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

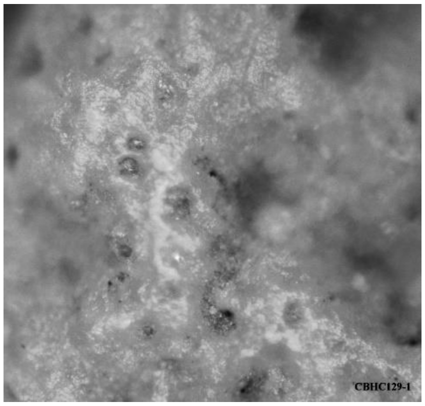


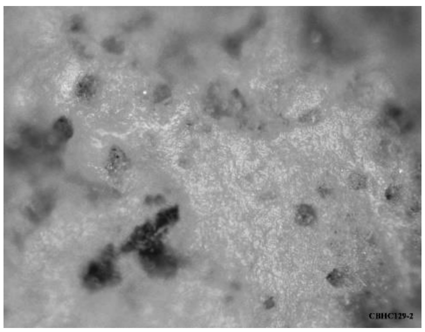
Ventral View

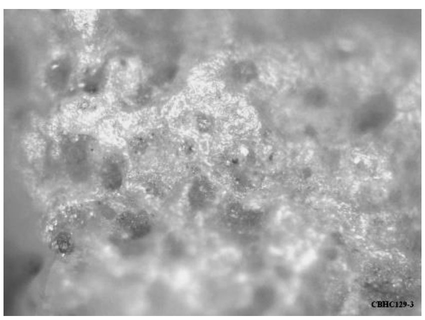
Photo #	Magnification	Feature	Location
CBHC128-1	200x	Meat polish and striations	Ventral, Distal
CBHC128-2	200x	Meat polish and striations	Ventral, Distal

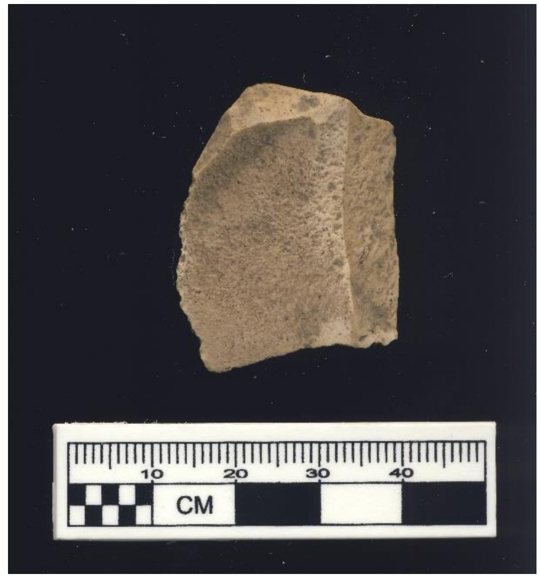
Summary: Used in longitudinal motion on meat.

Microwear #: 129
Artifact #: 320
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

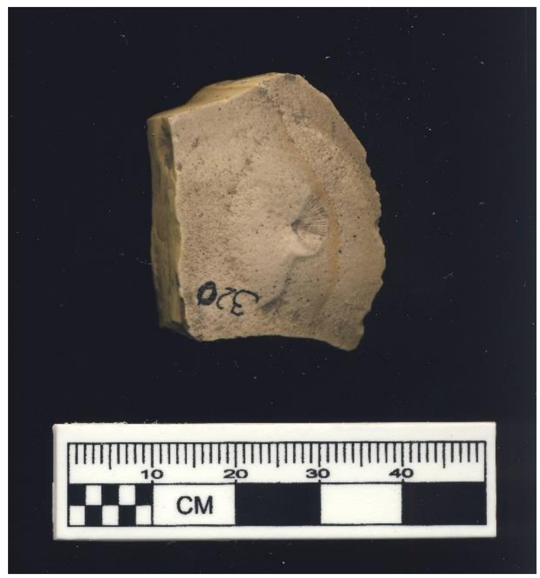








Dorsal View

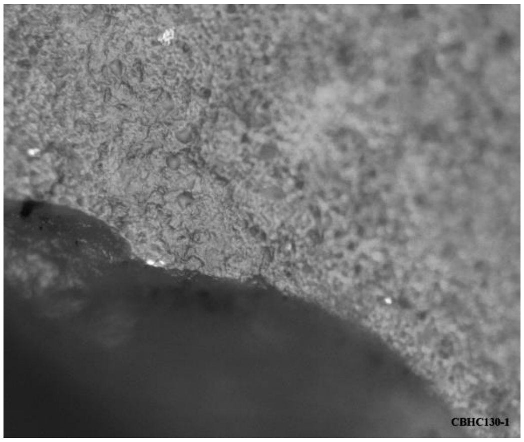


Ventral View

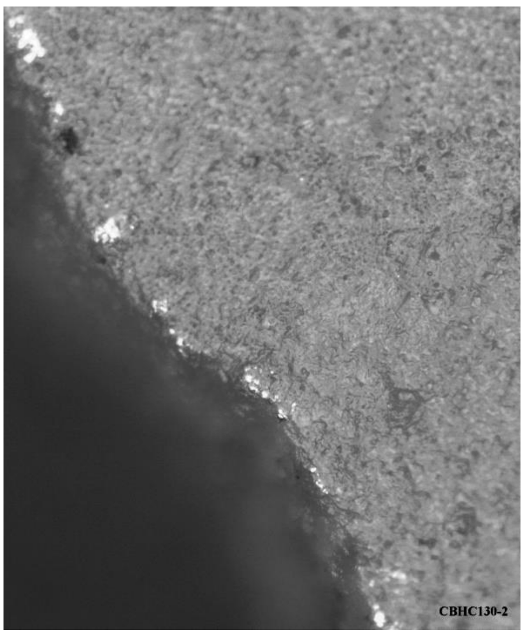
Photo #	**Magnification**	**Feature**	**Location**
CBHC129-1	200x	Dry hide polish	Ventral, Distal
CBHC129-2	200x	Dry hide polish	Ventral, Distal
CBHC129-3	200x	Dry hide polish	Ventral, Distal

Summary: Used in longitudinal motion on dry hide.

Microwear #: 130
Artifact #: 323
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View



Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC130-1	200x	Unused edge – heat treated	Ventral, Distal
CBHC130-2	200x	Grit polish	Ventral, Distal

Summary: Unused

Microwear #: 131
Artifact #: 318
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused

Microwear #: 132
Artifact #: 322
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

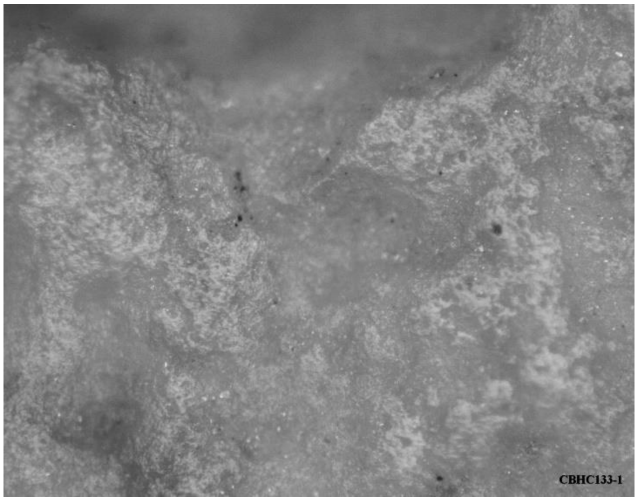
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused

Microwear #: 133
Artifact #: 317
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC133-1	200x	Meat polish	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 134
Artifact #: 319
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused

Microwear #: 135
Artifact #: 316
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

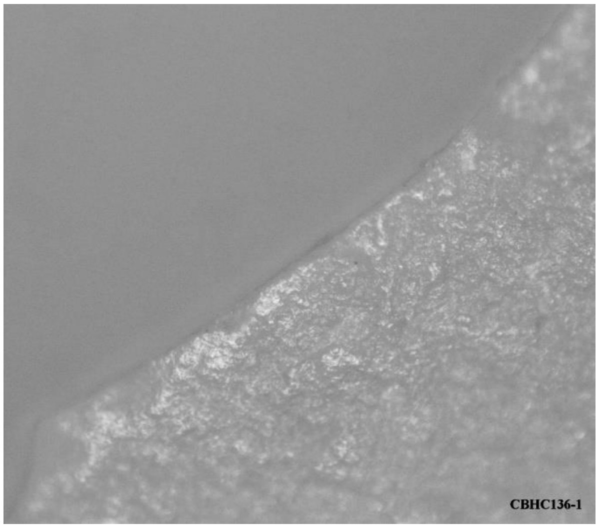
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Unused

Microwear #: 136
Artifact #: 431
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



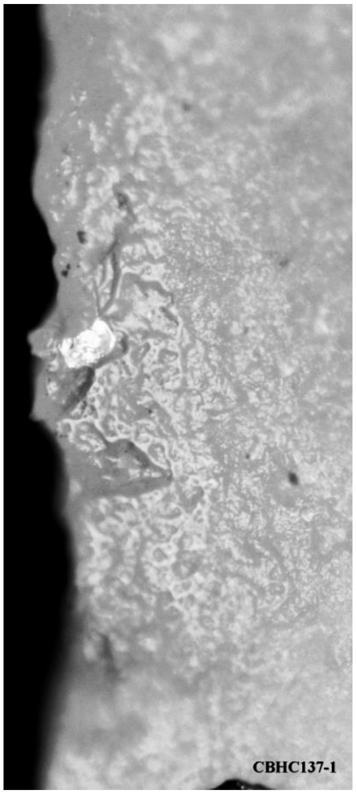
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC136-1	100x	Bone polish	Ventral, Distal

Summary: Used in transverse motion on bone.

Microwear #: 137
Artifact #: 453
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



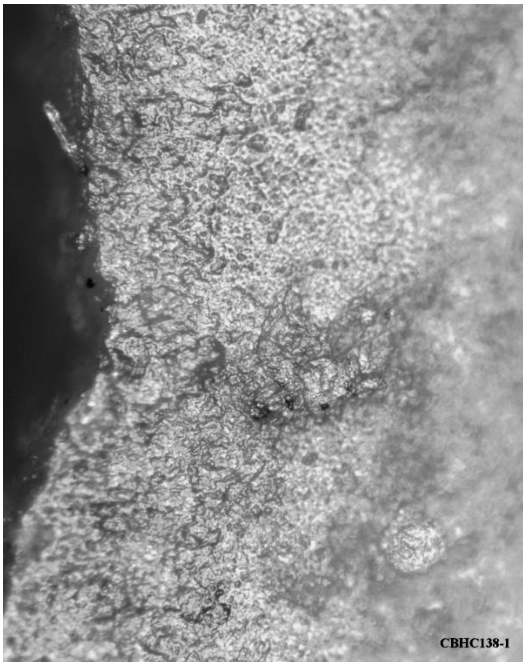
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC137-1	200x	Meat polish	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 138
Artifact #: 413
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



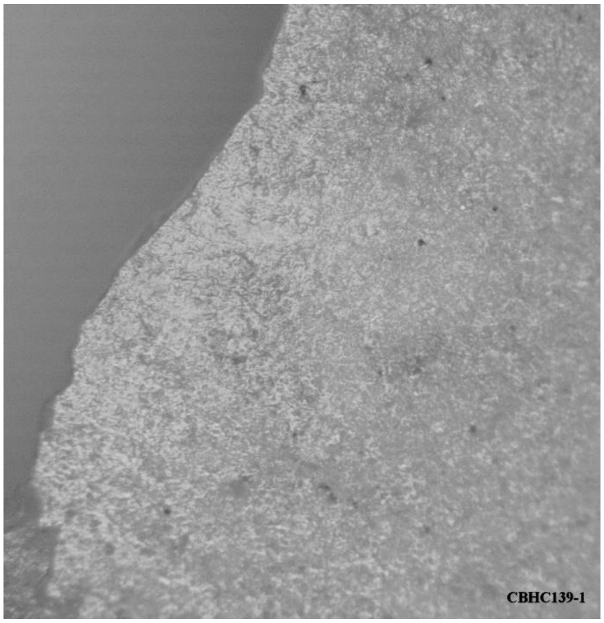
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC138-1	200x	Smooth pitted polish	Ventral, Lateral

Summary: Used in transverse motion on indeterminate hard material.

Microwear #: 139
Artifact #: 391
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC139-1	100x	Plant polish	Ventral, Distal

Summary: Used in indeterminate motion on plant matter.

Microwear #: 140
Artifact #: 393
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

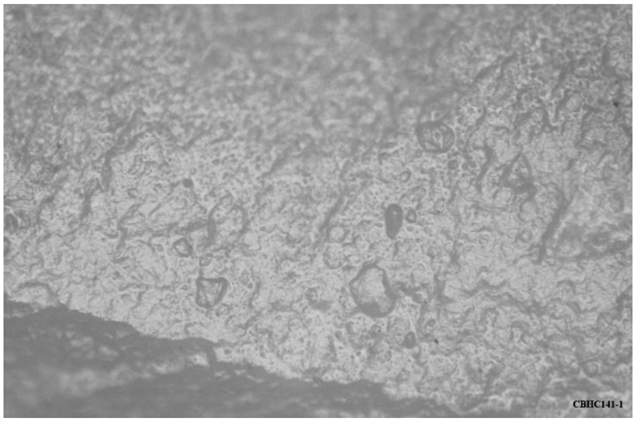
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused

Microwear #: 141
Artifact #: 394
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC141-1	200x	Wet hide polish	Dorsal, Distal

Summary: Used in indeterminate motion on wet hide

Microwear #: 142
Artifact #: 395
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 143
Artifact #: 396
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

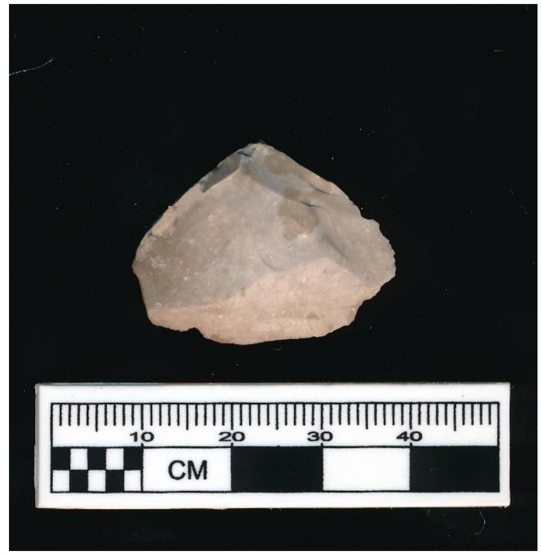
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 144
Artifact #: 398
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



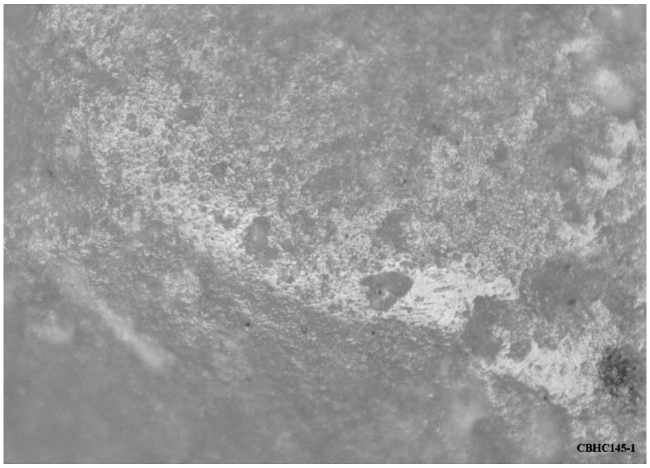
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Unused.

Microwear #: 145
Artifact #: 399
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC145-1	100x	Grit polish	Ventral, Distal

Summary: Indeterminate use.

Microwear #: 146
Artifact #: 400
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 147
Artifact #: 401
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 148
Artifact #: 403
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 149
Artifact #: 404
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 150
Artifact #: 405
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

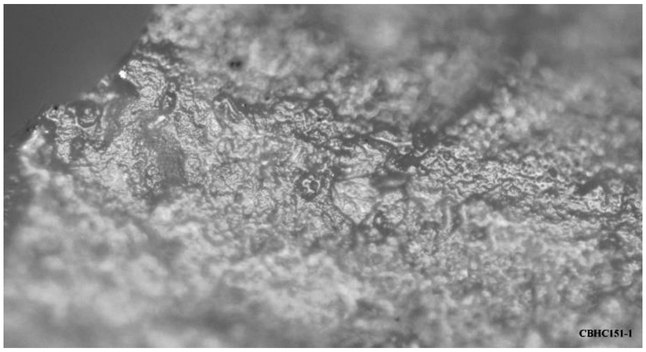
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 151
Artifact #: 419
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC151-1	200x	Dry hide polish	Ventral, Proximal

Summary: Used in indeterminate motion on dry hide.

Microwear #: 152
Artifact #: 421
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 153
Artifact #: 434
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

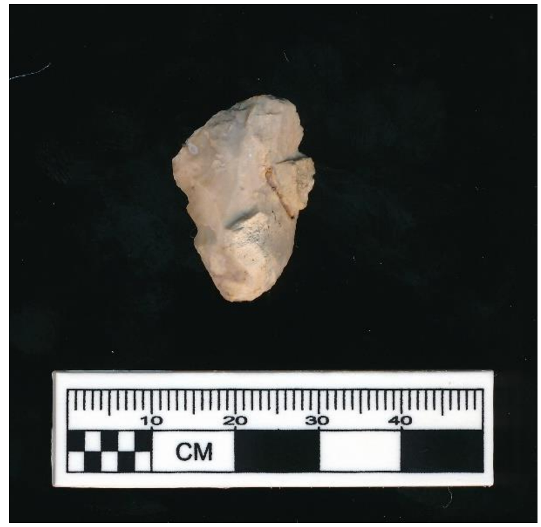
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused

Microwear #: 154
Artifact #: 422
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



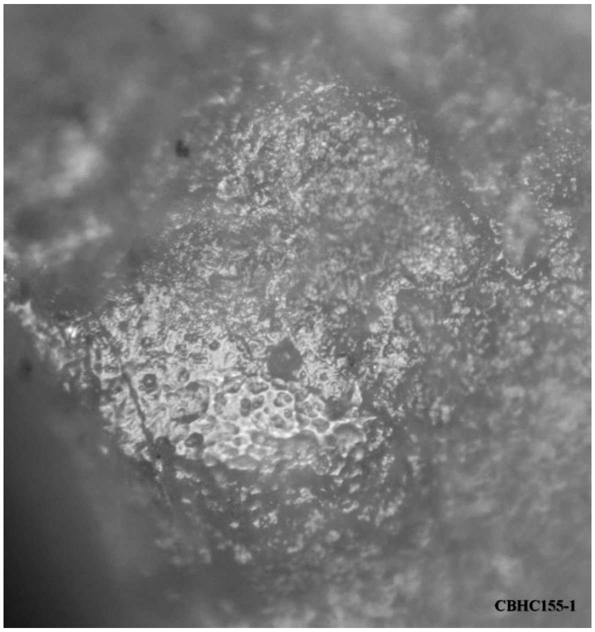
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 155
Artifact #: 435
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC155-1	200x	Meat polish	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 156
Artifact #: 436
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 157
Artifact #: 437
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 158
Artifact #: 440
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 159
Artifact #: 446
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 160
Artifact #: 448
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on indeterminate material.

Microwear #: 161
Artifact #: 444
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 162
Artifact #: 433
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

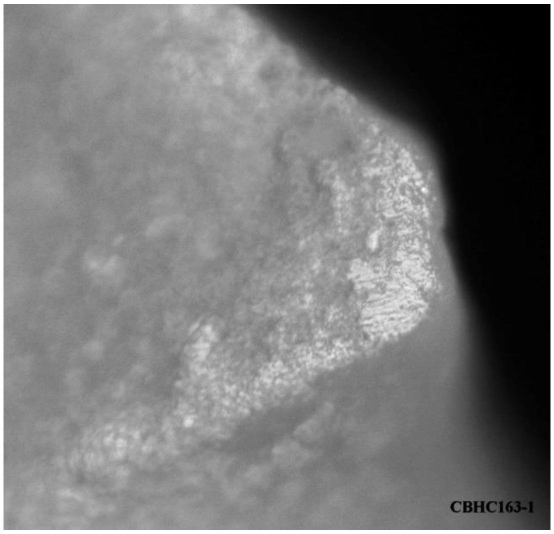
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 163
Artifact #: 432
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC163-1	200x	Bone polish	Ventral, Lateral

Summary: Used in indeterminate motion on bone.

Microwear #: 164
Artifact #: 425
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on wood.

Microwear #: 165
Artifact #: 424
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 166
Artifact #: 423
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 167
Artifact #: 420
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 168
Artifact #: 418
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 169
Artifact #: 417
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

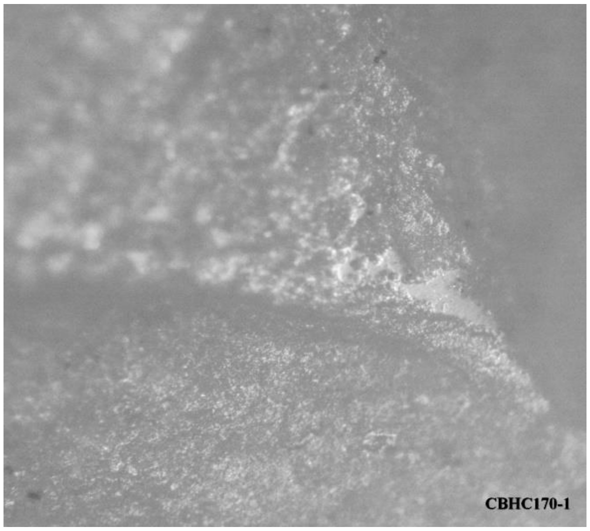
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 170
Artifact #: 415
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC170-1	100x	Grit polish	Ventral, Medial

Summary: Indeterminate use.

Microwear #: 171
Artifact #: 410
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 172
Artifact #: 411
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 173
Artifact #: 412
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 174
Artifact #: 414
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

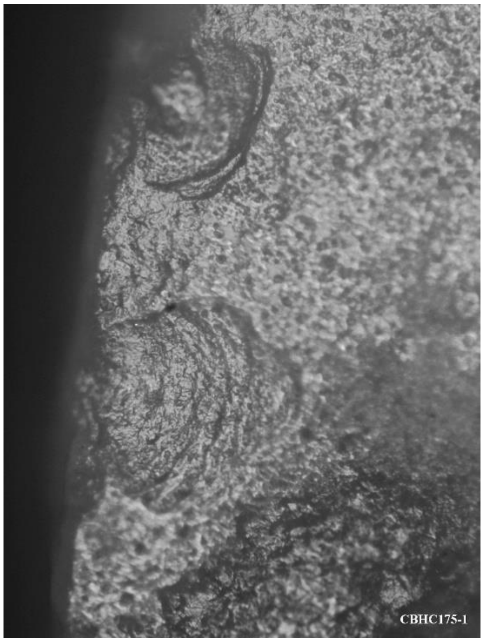
Dorsal View

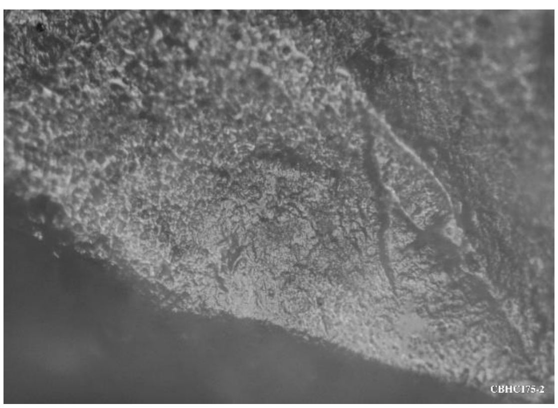
Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Unused.

Microwear #: 175
Artifact #: 438
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club





Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC175-1	200x	Meat polish	Ventral, Lateral
CBHC175-2	200x	Meat polish	Ventral, Lateral

Summary: Used in longitudinal motion on meat.

Microwear #: 176
Artifact #: 439
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 177
Artifact #: 441
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

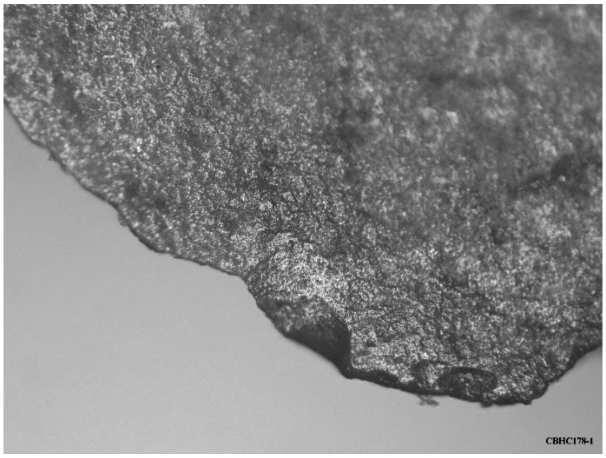
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 178
Artifact #: 442
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC178-1	100x	Meat polish	Ventral, Distal

Summary: Used in longitudinal motion on meat.

Microwear #: 179
Artifact #: 443
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 180
Artifact #: 445
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 181
Artifact #: 451
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 182
Artifact #: 452
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC182-1	200x	Plant polish	Ventral, Distal

Summary: Use in transverse motion on plant matter.

Microwear #: 183
Artifact #: 142
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

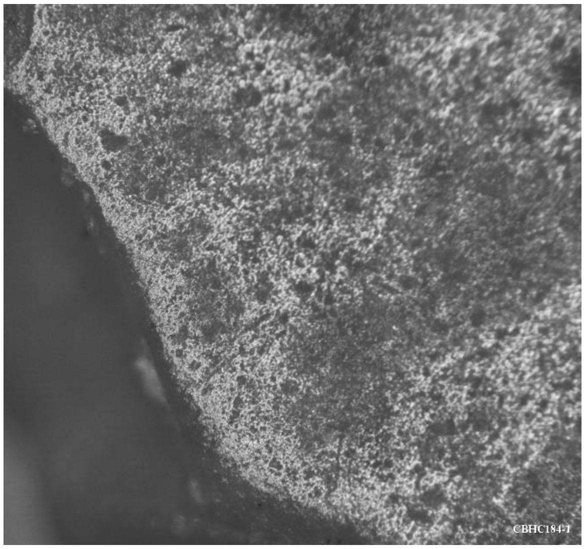
Dorsal View

Ventral View

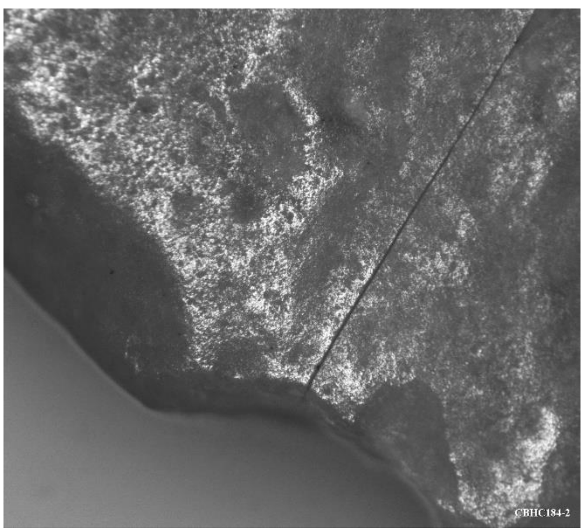
Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 184
Artifact #: 90
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View



Ventral View

Photo #	Magnification	Feature	Location
CBHC184-1	100x	Smooth pitted polish	Ventral, Lateral
CBHC184-2	50x	Fracture and polish	Ventral, Lateral

Summary: Used in longitudinal motion on indeterminate hard material.

Microwear #: 185
Artifact #: 92
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 186
Artifact #: 94
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 187
Artifact #: 89
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 188
Artifact #: 88
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 189
Artifact #: 96
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Unused.

Microwear #: 189
Artifact #: 96
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

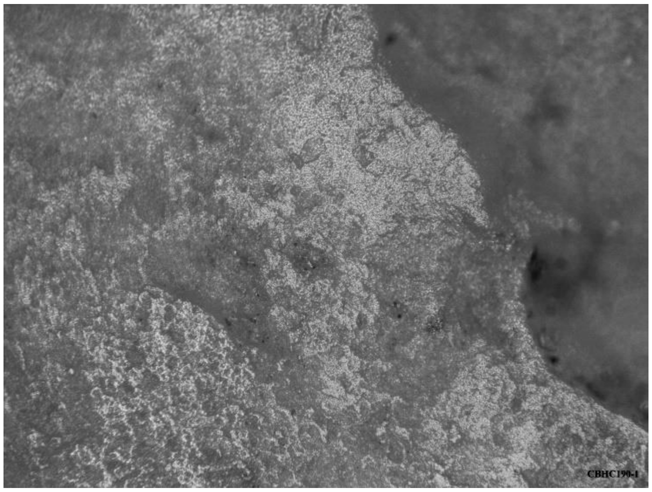
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Unused.

Microwear #: 190
Artifact #: 11
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC190-1	100x	Smooth pitted polish	Ventral, Distal

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 191
Artifact #: 01
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

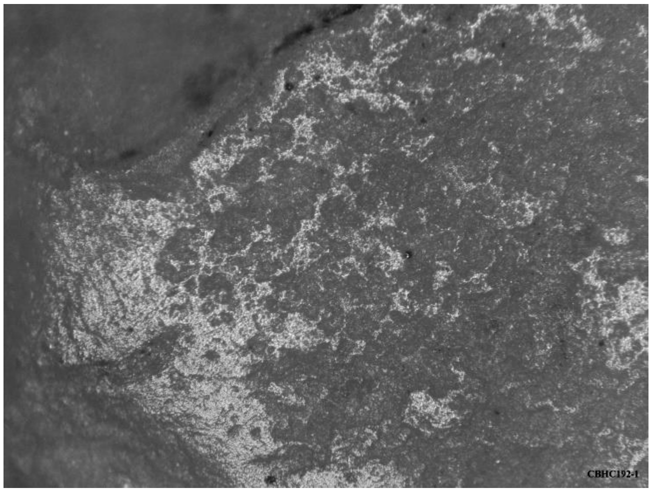
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on dry hide.

Microwear #: 192
Artifact #: 09
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC192-1	100x	Smooth pitted polish	Ventral, Lateral

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 193
Artifact #: 10
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 194
Artifact #: 141
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 195
Artifact #: 140
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 196
Artifact #: 143
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

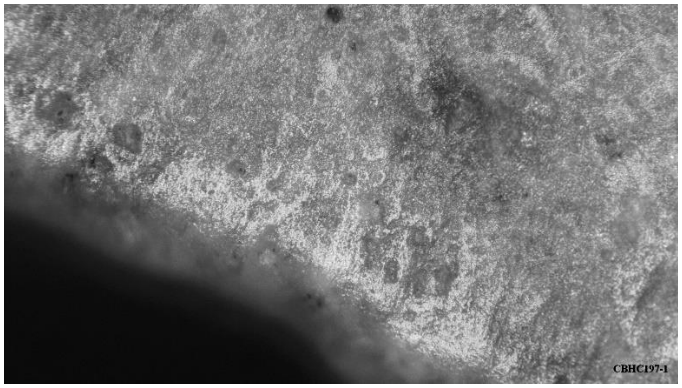
Dorsal View

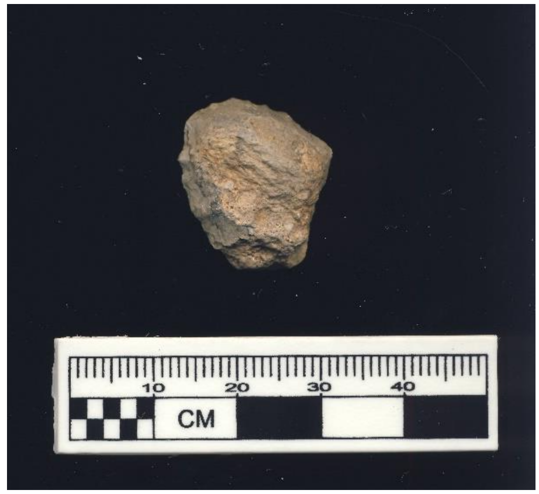
Ventral View

Photo #	Magnification	Feature	Location

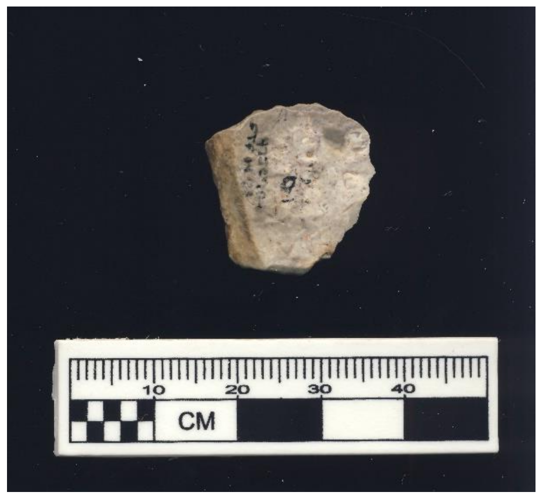
Summary: Unused.

Microwear #: 197
Artifact #: 161
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club





Dorsal View



Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC197-1	100x	Smooth pitted polish	Ventral, Distal

Summary: Used in transverse motion on indeterminate hard material.

Microwear #: 198
Artifact #: 95
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on wet hide.

Microwear #: 199
Artifact #: 08
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

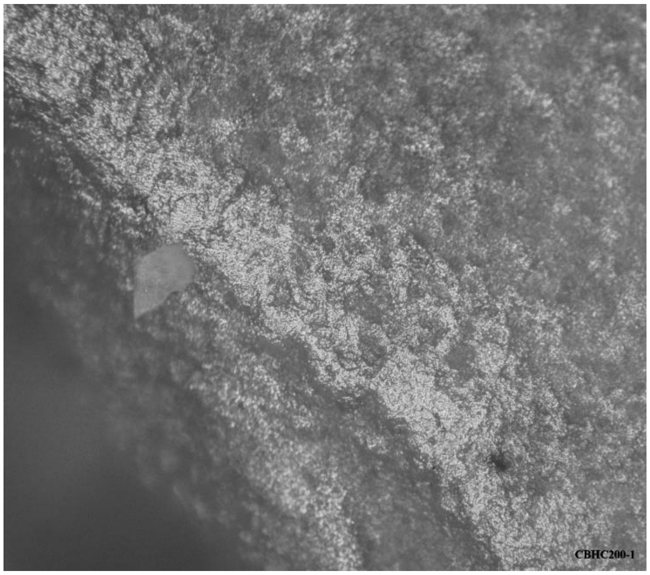
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 200
Artifact #: 95
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC200-1	100x	Generic weak polish	Ventral, Proximal

Summary: Used in longitudinal motion on indeterminate material.

Microwear #: 201
Artifact #: 159
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

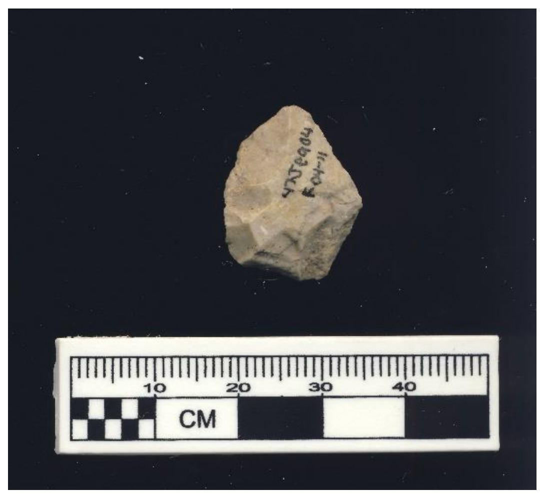
Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 202
Artifact #: 136
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View



Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate substance.

Microwear #: 203
Artifact #: 133
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 204
Artifact #: 06
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 205
Artifact #: 91
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 206
Artifact #: 195
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 207
Artifact #: 196
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

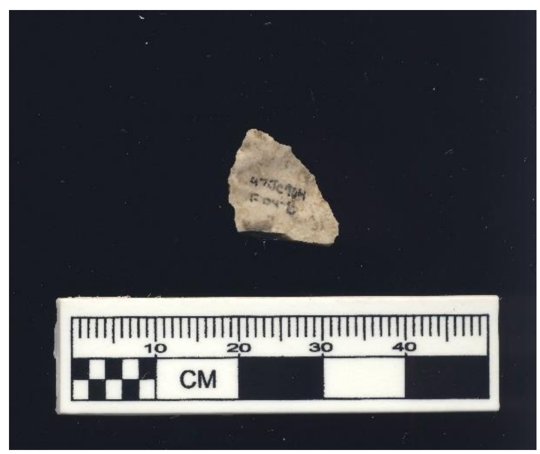
Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 208
Artifact #: 198
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View



Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 209
Artifact #: 158
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 210
Artifact #: 149
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 211
Artifact #: 146
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Used in transverse motion on bone.

Microwear #: 211
Artifact #: 86
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 212
Artifact #: 87
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

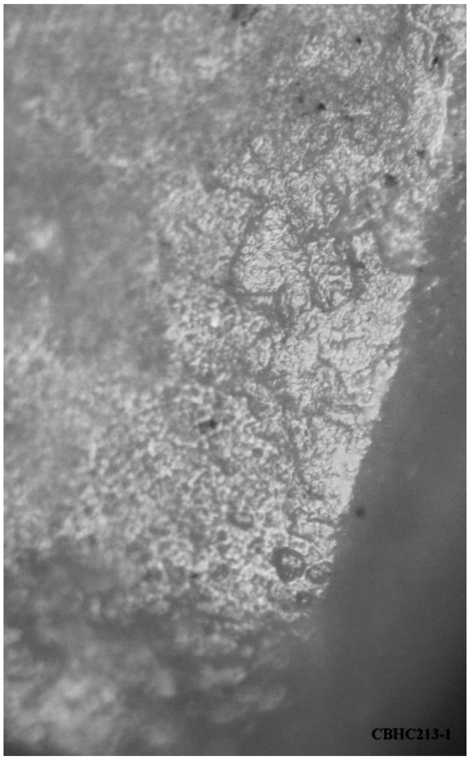
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 213
Artifact #: 154
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC213-1	200x	Meat polish	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 214
Artifact #: 199
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 215
Artifact #: 215
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 216
Artifact #: 239
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 217
Artifact #: 150
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 218
Artifact #: 240
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 219
Artifact #: 19
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 220
Artifact #: 20
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

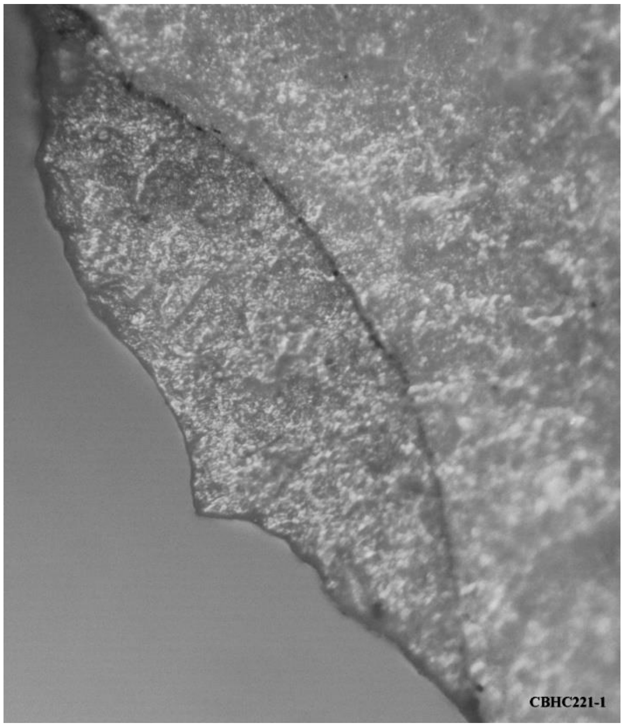
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in longitudinal motion on meat.

Microwear #: 221
Artifact #: 82
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



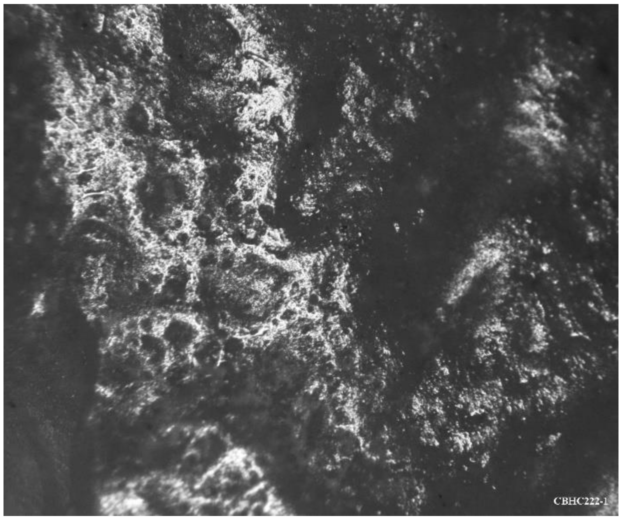
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC221-1	100x	Meat polish	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 222
Artifact #: 81
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC222-1	50x	Heat treated surface	Ventral, Distal

Summary: Unused.

Microwear #: 223
Artifact #: 128
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

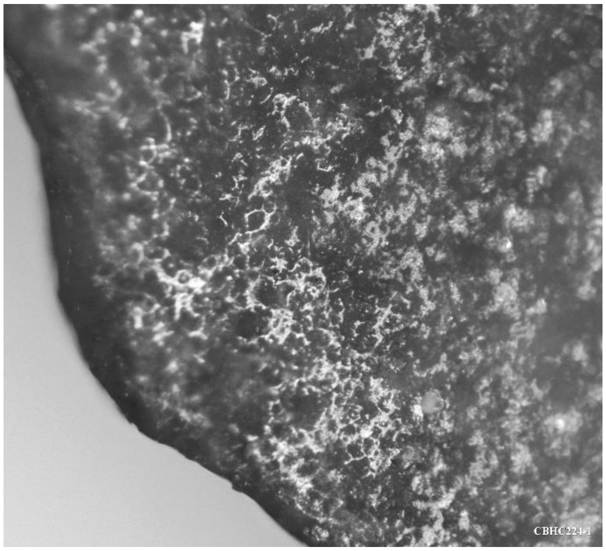
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 224
Artifact #: 206
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC224-1	50x	Weathering and grit polish	Ventral, Distal

Summary: Unused.

Microwear #: 225
Artifact #: 85
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

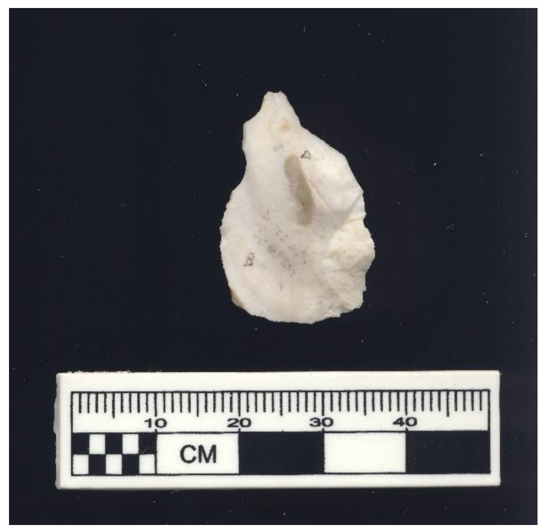
Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 226
Artifact #: 111
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

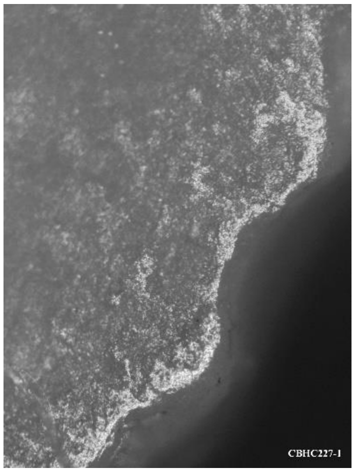


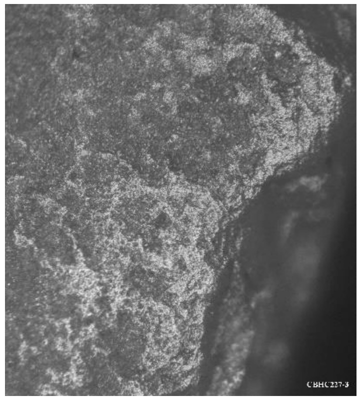
Ventral View

Photo #	Magnification	Feature	Location

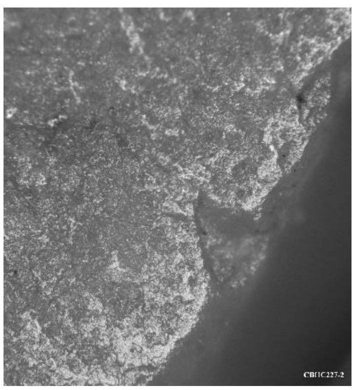
Summary: Unused.

Microwear #: 227
Artifact #: 231
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club





Dorsal View



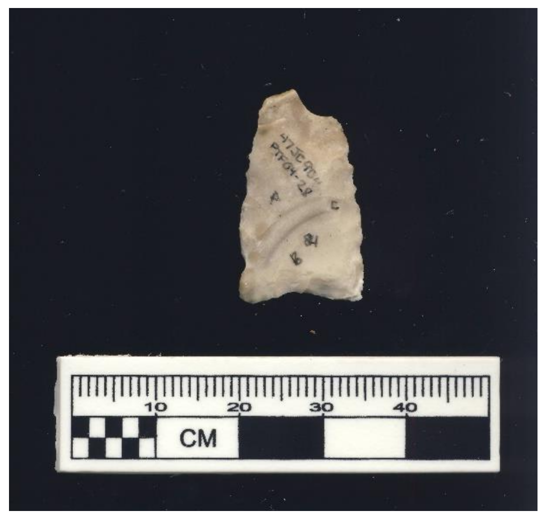
Ventral View

Photo #	Magnification	Feature	Location
CBHC227-1	100x	Bone polish	Ventral, Lateral
CBHC227-2	100x	Wood polish	Ventral, Lateral
CBHC227-3	100x	Wood polish	Ventral, Lateral

Summary: Used in longitudinal motion on wood and bone.

Microwear #: 228
Artifact #: 84
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

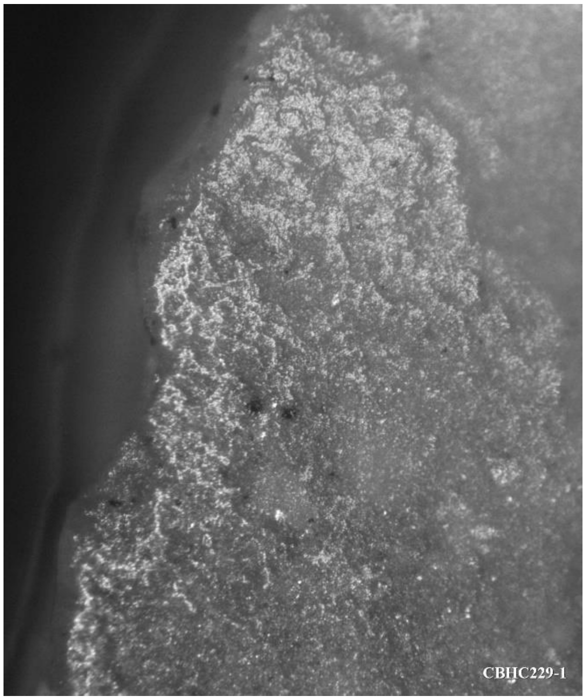


Ventral View

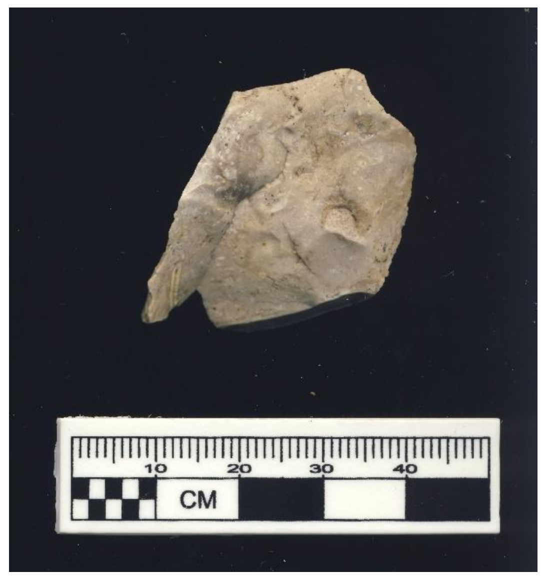
Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 229
Artifact #: 38
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View



Ventral View

Photo #	Magnification	Feature	Location
CBHC229-1	100x	Smooth pitted polish	Ventral, Distal

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 230
Artifact #: 197
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 231
Artifact #: 112
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 232
Artifact #: 110
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

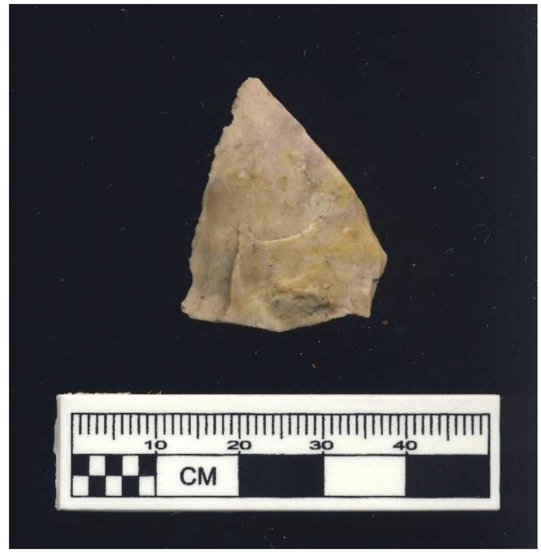
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in longitudinal motion on meat.

Microwear #: 233
Artifact #: 21
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



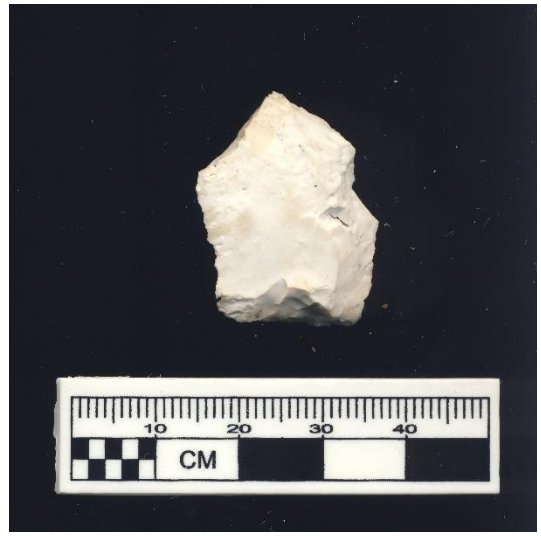
Dorsal View

Ventral View

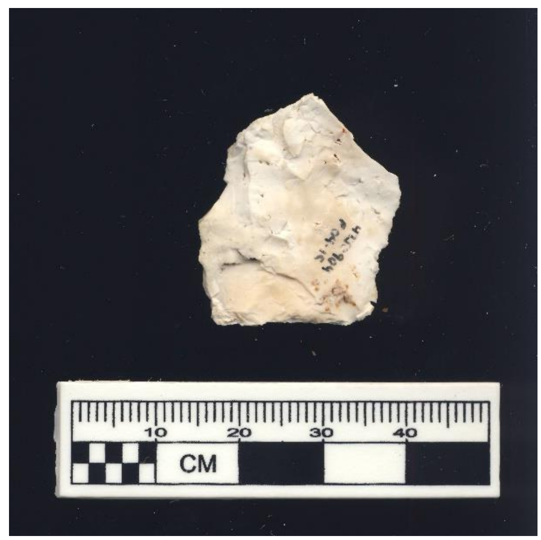
Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 234
Artifact #: 127
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View



Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 235
Artifact #: 29
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on bone.

Microwear #: 236
Artifact #: 238
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 237
Artifact #: 232
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Unused.

Microwear #: 238
Artifact #: 233
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

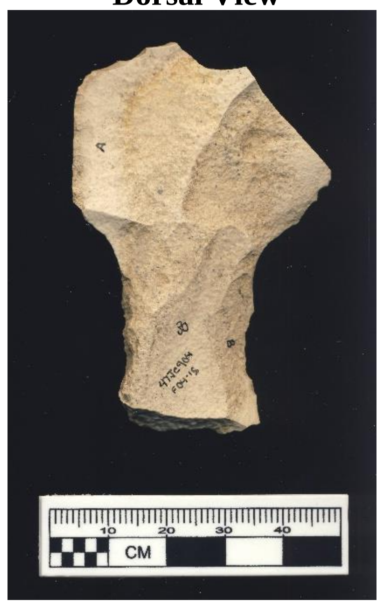
Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 239
Artifact #: 30
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View



Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 240
Artifact #: 218
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 241
Artifact #: 61
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in longitudinal motion on meat.

Microwear #: 242
Artifact #: 25
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 243
Artifact #: 32
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

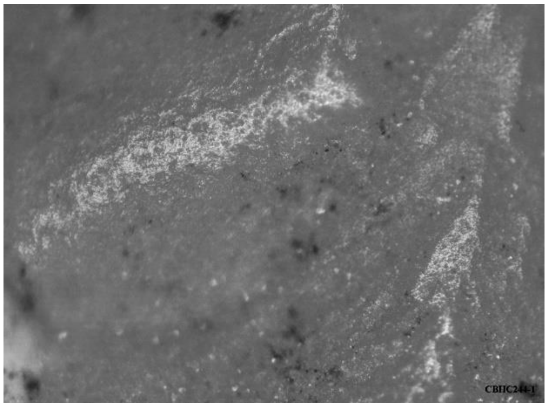
Dorsal View

Ventral View

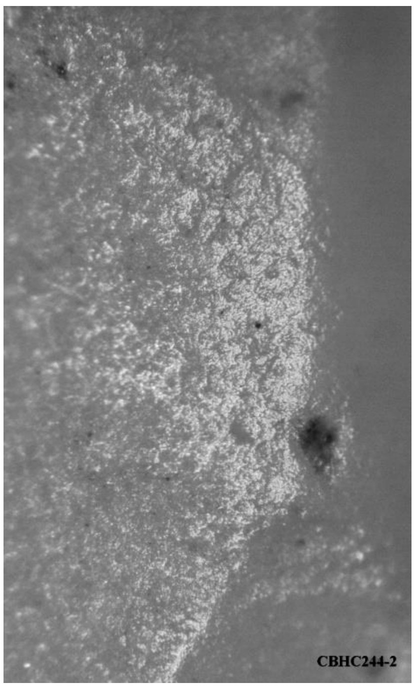
Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 244
Artifact #: 242
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View



Ventral View

Photo #	Magnification	Feature	Location
CBHC244-1	100x	Smooth pitted polish	Ventral, Distal
CBHC244-2	100x	Smooth pitted polish	Ventral, Distal

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 245
Artifact #: 235
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on meat.

Microwear #: 246
Artifact #: 243
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 247
Artifact #: 27
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 248
Artifact #: 227
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

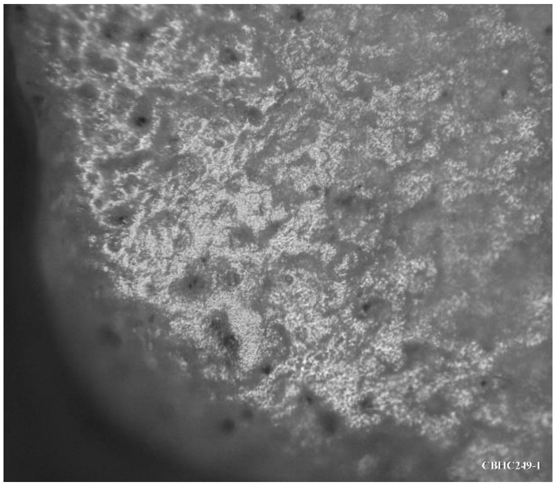
Dorsal View

Ventral View

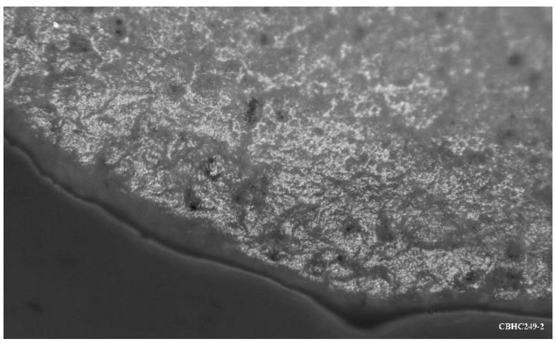
Photo #	Magnification	Feature	Location

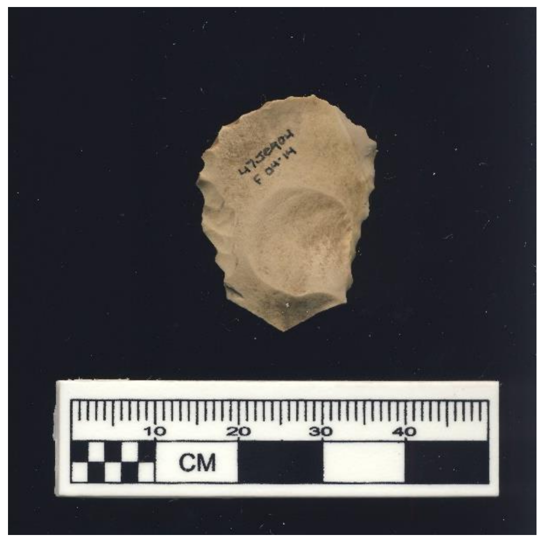
Summary: Indeterminate use.

Microwear #: 249
Artifact #: 165
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View





Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC249-1	100x	Dry hide polish	Ventral, Distal
CBHC249-2	100x	Dry hide polish	Ventral, Distal

Summary: Used in transverse motion on dry hide.

Microwear #: 250
Artifact #: 209
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

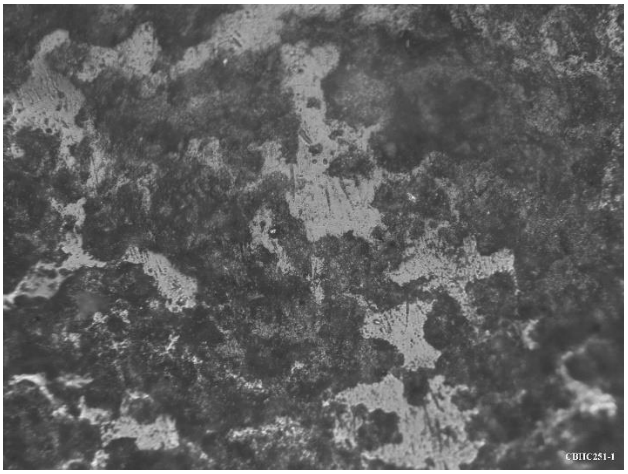
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 251
Artifact #: 205
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
CBHC251-1	100x	Grit polish	Ventral, Distal

Summary: Used as a flake core.

Microwear #: 252
Artifact #: 115
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 253
Artifact #: 108
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

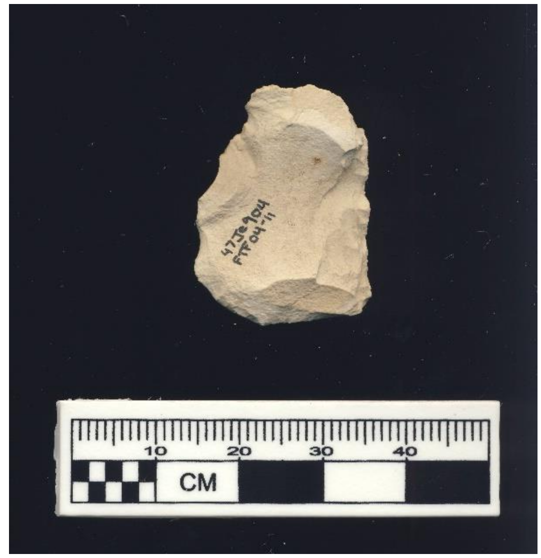
Dorsal View

Ventral View

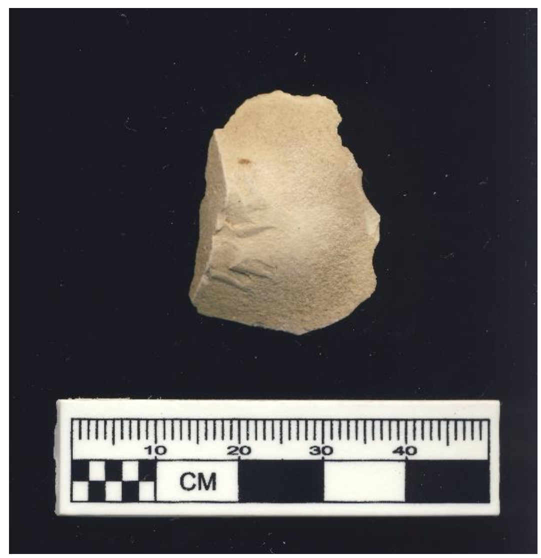
Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on meat.

Microwear #: 254
Artifact #: 109
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View



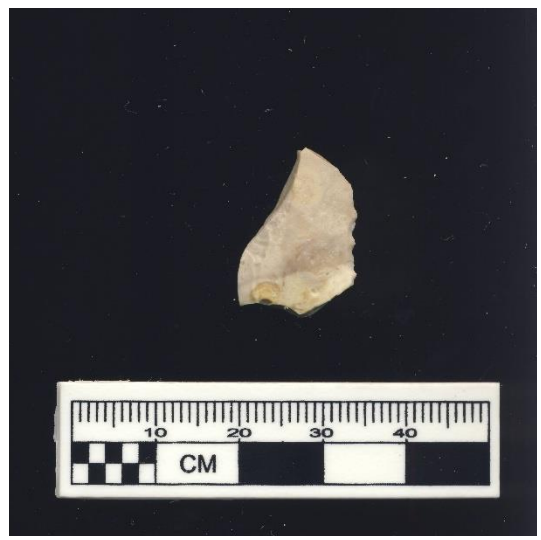
Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 255
Artifact #: 217
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View



Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 256
Artifact #: 225
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on meat.

Microwear #: 257
Artifact #: 23
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

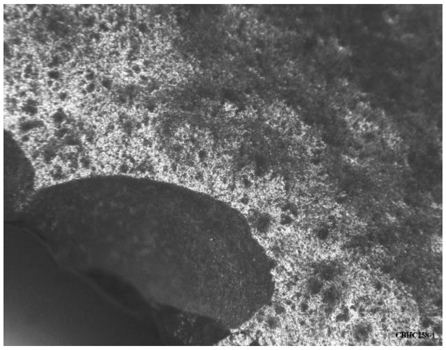
Dorsal View

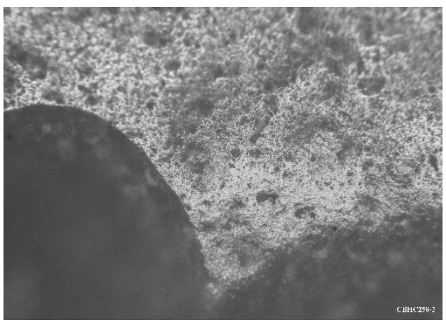
Ventral View

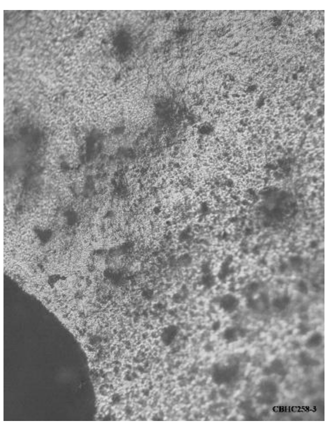
Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 258
Artifact #: 144
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club







Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
CBHC258-1	50x	Polish and microflaking	Ventral, Distal
CBHC258-2	100x	Polish and microflaking	Ventral, Distal
CBHC258-3	100x	Polish and microflaking	Ventral, Distal

Summary: Used in longitudinal motion on wood.

Microwear #: 259
Artifact #: 26
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on meat.

Microwear #: 260
Artifact #: 160
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 261
Artifact #: 116
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 262
Artifact #: 14
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on meat.

Microwear #: 263
Artifact #: 104
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on meat and bone.

Microwear #: 264
Artifact #: 203
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 265
Artifact #: 151
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate material.

Microwear #: 266
Artifact #: 162
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 267
Artifact #: 135
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Unused.

Microwear #: 268
Artifact #: 222
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

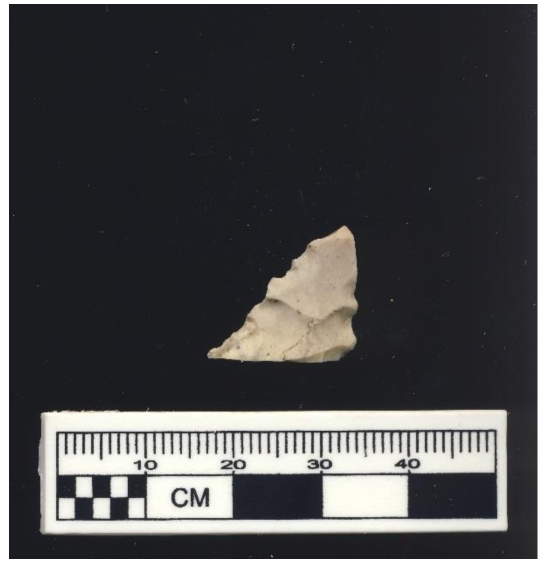
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 269
Artifact #: 33
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Used in indeterminate motion on indeterminate material.

Microwear #: 270
Artifact #: 164
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate material.

Microwear #: 271
Artifact #: 223
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 272
Artifact #: 155
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

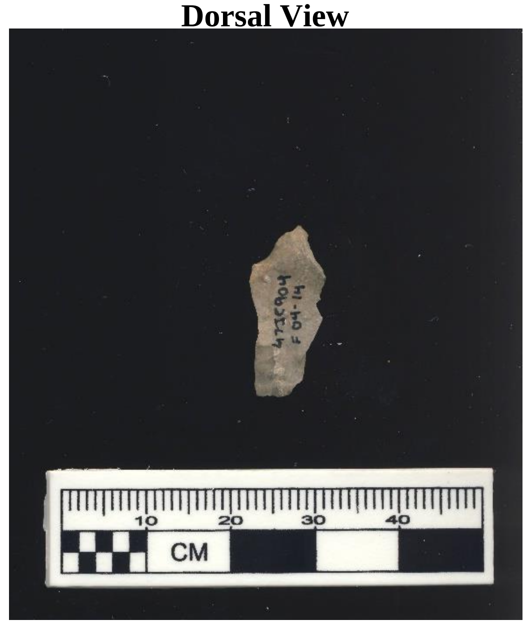
Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate material.

Microwear #: 273
Artifact #: 156
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View



Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate material.

Microwear #: 274
Artifact #: 167
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on indeterminate material.

Microwear #: 275
Artifact #: 193
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate material.

Microwear #: 276
Artifact #: 224
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 277
Artifact #: 157
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 278
Artifact #: 124
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

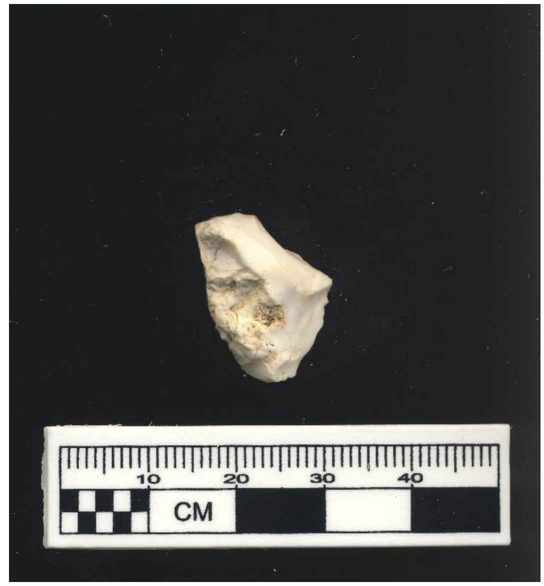
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 279
Artifact #: 166
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on dry hide.

Microwear #: 280
Artifact #: 188
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 281
Artifact #: 28
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

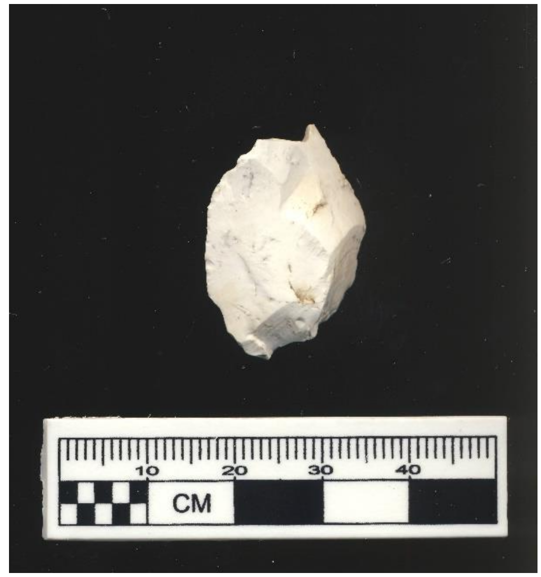
Dorsal View

Ventral View

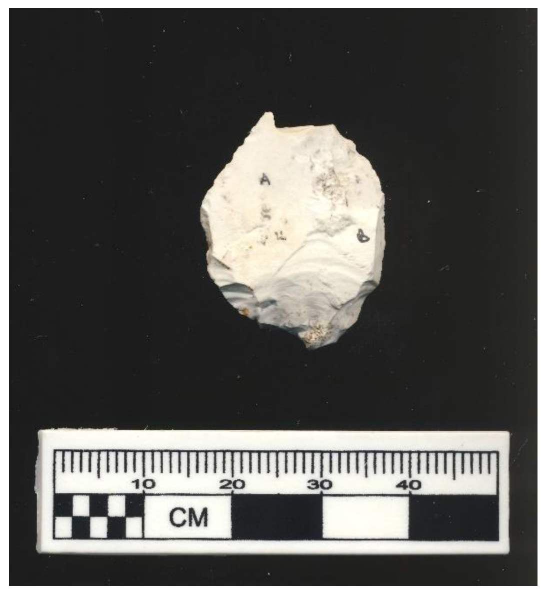
Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 282
Artifact #: 228
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View

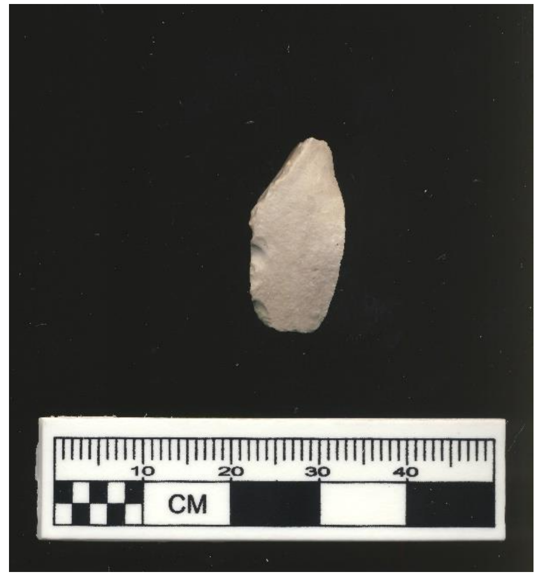


Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate material.

Microwear #: 283
Artifact #: 207
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



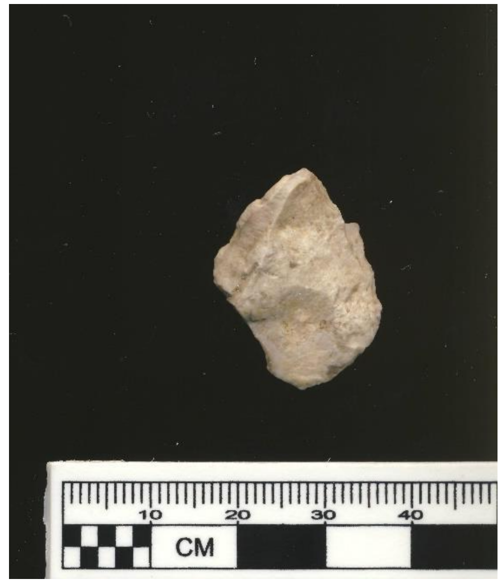
Dorsal View

Ventral View

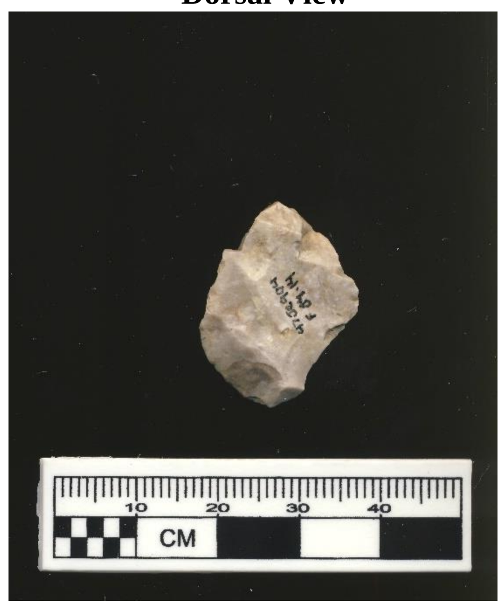
Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 284
Artifact #: 153
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View



Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 285
Artifact #: 187
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

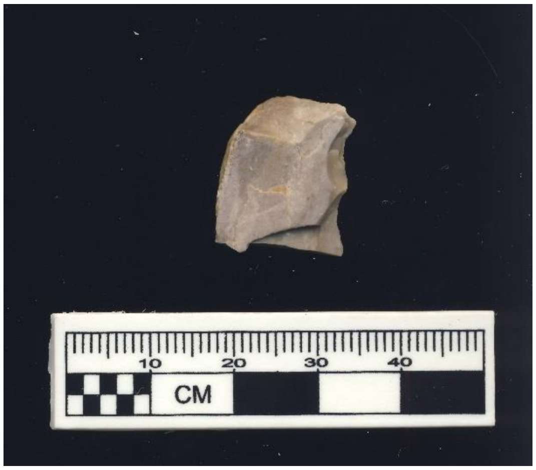
Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 286
Artifact #: 177
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

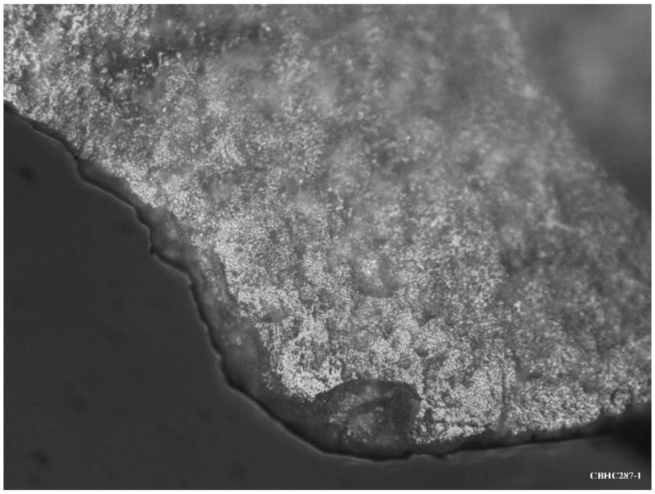


Ventral View

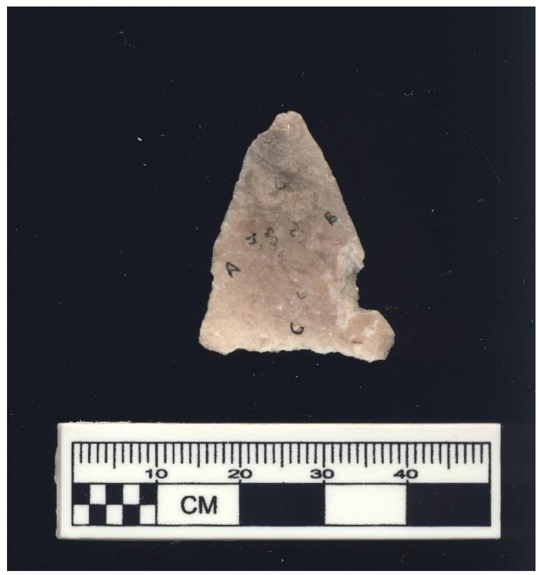
Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 287
Artifact #: 62
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club



Dorsal View



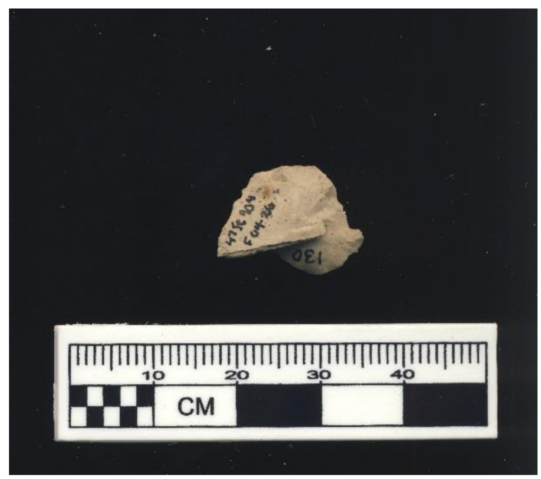
Ventral View

Photo #	Magnification	Feature	Location
CBHC287-1	50x	Wood polish	Ventral, Distal

Summary: Used in longitudinal motion on wood.

Microwear #: 288
Artifact #: 79
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View



Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 289
Artifact #: 40
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 290
Artifact #: 57
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate material.

Microwear #: 291
Artifact #: 125
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 292
Artifact #: 59
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate material.

Microwear #: 293
Artifact #: 58
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate material.

Microwear #: 294
Artifact #: 216
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate material.

Microwear #: 295
Artifact #: 210
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 296
Artifact #: 204
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 297
Artifact #: 202
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 298
Artifact #: 137
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 299
Artifact #: 200
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 300
Artifact #: 201
Site #: 47JE0904
Site Name: Crescent Bay Hunt Club

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 1
Artifact #: 2
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 2
Artifact #: 21
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 3
Artifact #: 4
Site #: 47JE0379
Site Name: Koshkonong Creek Village

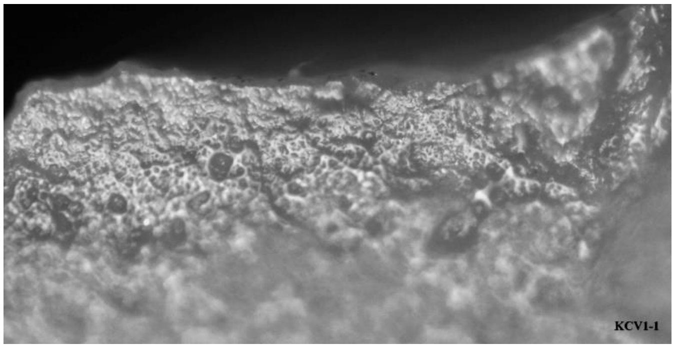
Dorsal View

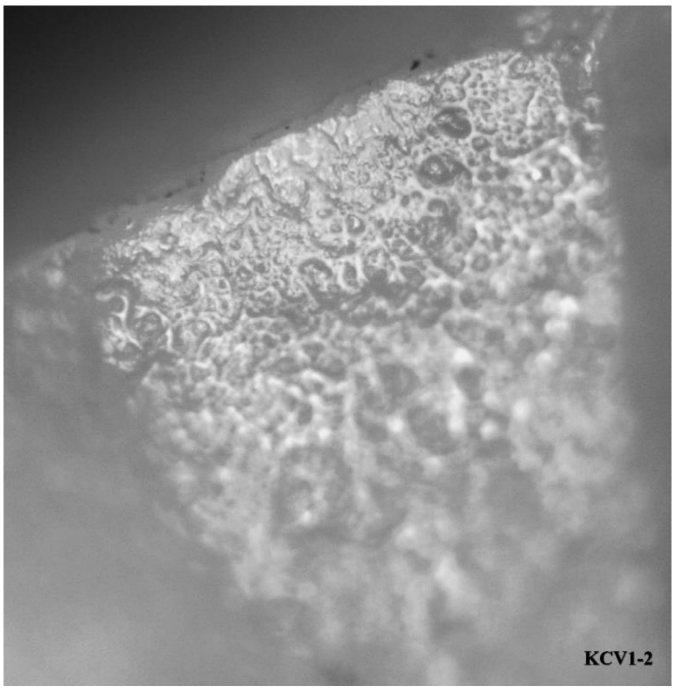
Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in a longitudinal motion on wet hide.

Microwear #: 4
Artifact #: 1
Site #: 47JE0379
Site Name: Koshkonong Creek Village





Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
KCV1-1	200x	Plant polish	Dorsal, Distal
KCV1-2	200x	Plant polish	Dorsal, Distal

Summary: Used in indeterminate motion on plant matter.

Microwear #: 5
Artifact #: 7
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 6
Artifact #: 23
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 7
Artifact #: 20
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 8
Artifact #: 15
Site #: 47JE0379
Site Name: Koshkonong Creek Village

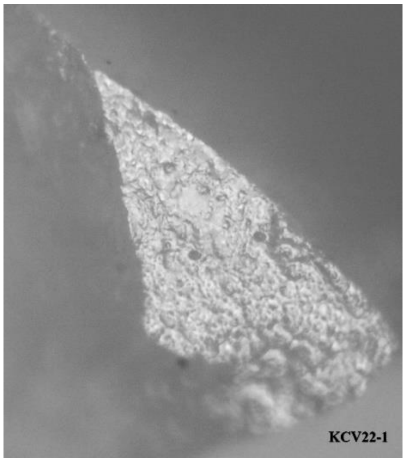
Dorsal View

Ventral View

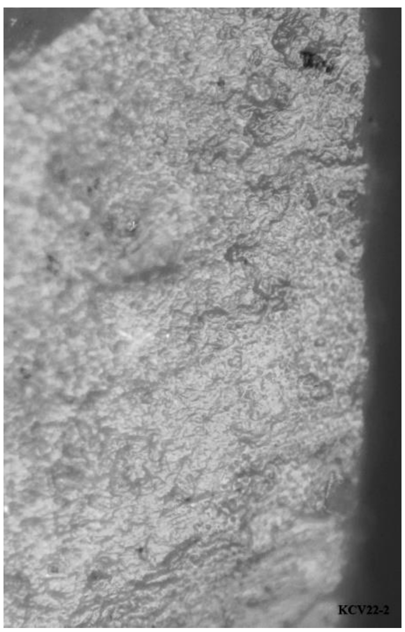
Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 9
Artifact #: 22
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View



Ventral View

Photo #	Magnification	Feature	Location
KCV22-1	200x	Wood polish	Dorsal, Proximal
KCV22-2	200x	Wood polish	Dorsal, Proximal

Summary: Indeterminate use.

Microwear #: 10
Artifact #: 6
Site #: 47JE0379
Site Name: Koshkonong Creek Village

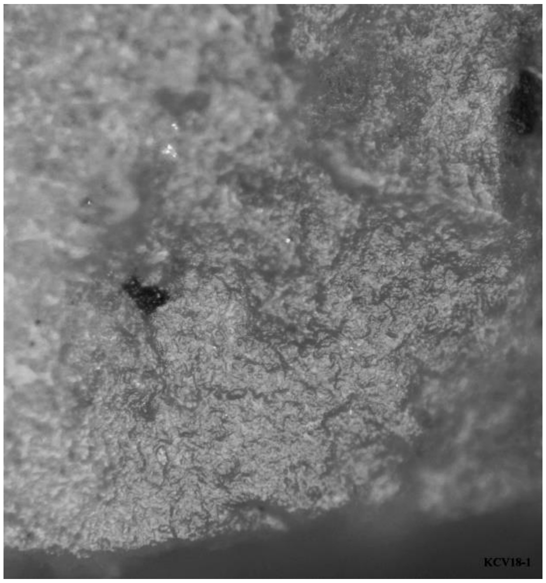
Dorsal View

Ventral View

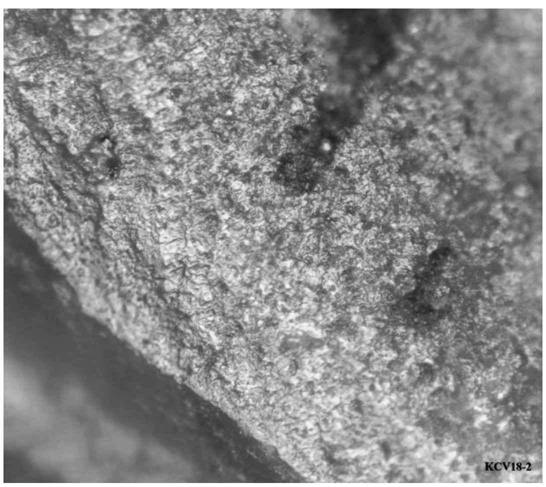
Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 11
Artifact #: 18
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View

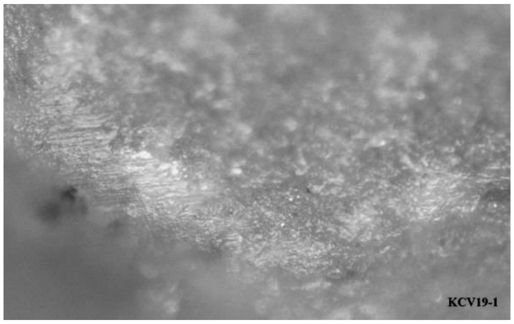


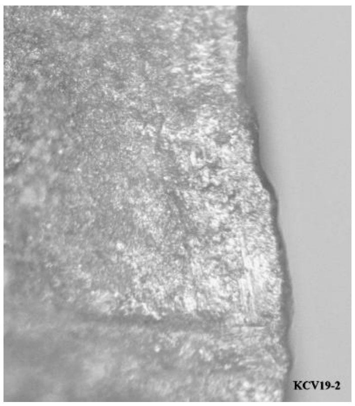
Ventral View

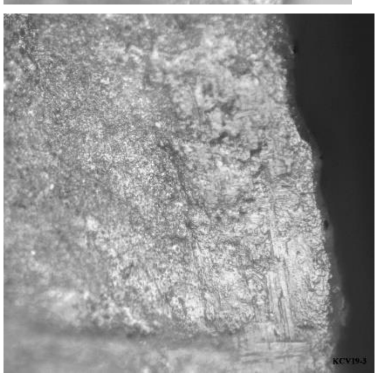
Photo #	Magnification	Feature	Location
KCV18-1	200x	Smooth pitted polish	Ventral, Distal
KCV18-2	200x	Smooth pitted polish	Ventral, Distal

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 12
Artifact #: 19
Site #: 47JE0379
Site Name: Koshkonong Creek Village







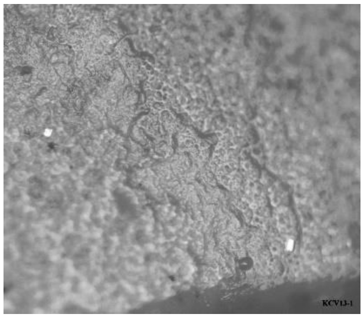
Dorsal View

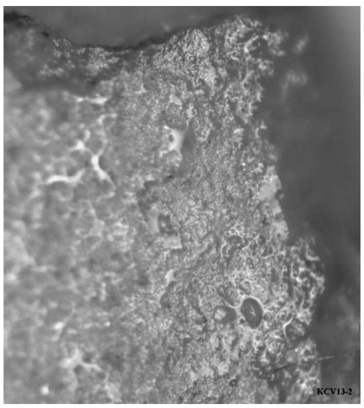
Ventral View

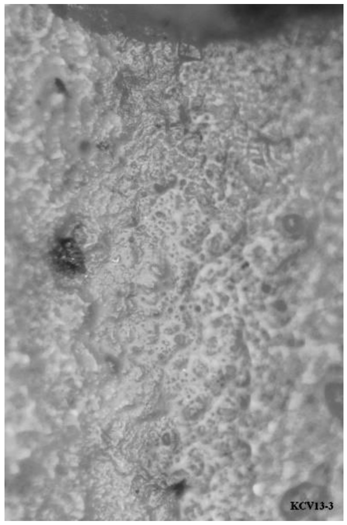
Photo #	**Magnification**	**Feature**	**Location**
KCV19-1	200x	Polish and striations	Ventral, Distal
KCV19-2	100x	Polish and striations	Ventral, Proximal
KCV19-3	200x	Smooth pitted polish and striations	Ventral, Proximal

Summary: Used in multiple motions on indeterminate hard material.

Microwear #: 13
Artifact #: 13
Site #: 47JE0379
Site Name: Koshkonong Creek Village







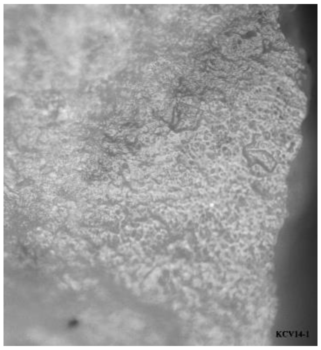
Dorsal View

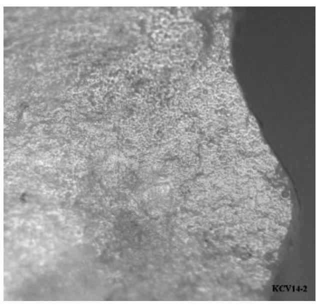
Ventral View

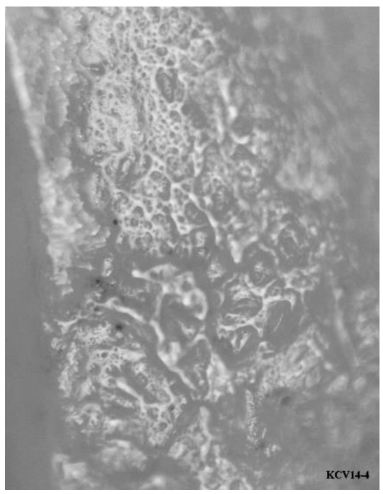
Photo #	**Magnification**	**Feature**	**Location**
KCV13-1	200x	Plant polish	Ventral, Distal
KCV13-2	100x	Plant polish	Ventral, Lateral
KCV13-3	200x	Plant polish	Ventral, Lateral

Summary: Used in indeterminate motion on plant matter.

Microwear #: 14
Artifact #: 14
Site #: 47JE0379
Site Name: Koshkonong Creek Village







Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
KCV14-1	200x	Plant polish	Ventral, Distal
KCV14-2	200x	Plant polish	Ventral, Distal
KCV14-3	100x	Plant polish	Dorsal, Distal
KCV14-4	200x	Plant polish	Dorsal, Distal

Summary: Used in longitudinal motion on plant matter.

Microwear #: 15
Artifact #: 16
Site #: 47JE0379
Site Name: Koshkonong Creek Village

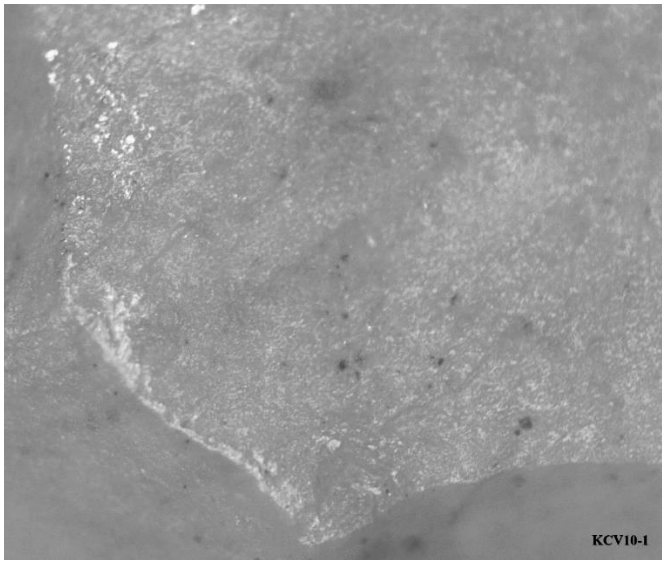
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in longitudinal motion on meat.

Microwear #: 16
Artifact #: 10
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
KCV10-1	100x	Grit polish	Ventral, Distal

Summary: Unused.

Microwear #: 17
Artifact #: 9
Site #: 47JE0379
Site Name: Koshkonong Creek Village

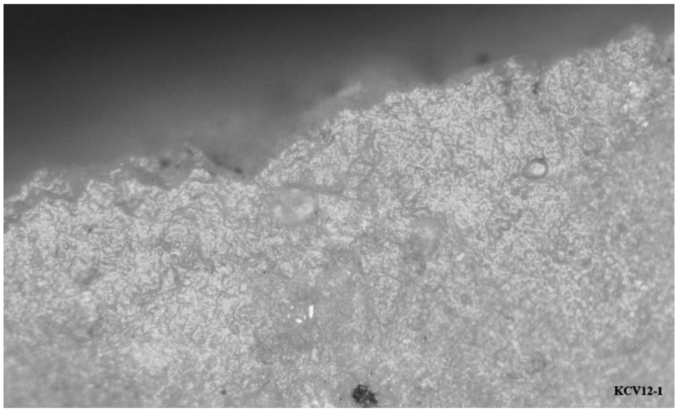
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 18
Artifact #: 12
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
KCV12-1	200x	Wood polish	Ventral, Lateral

Summary: Used in indeterminate motion on wood.

Microwear #: 19
Artifact #: 29
Site #: 47JE0379
Site Name: Koshkonong Creek Village

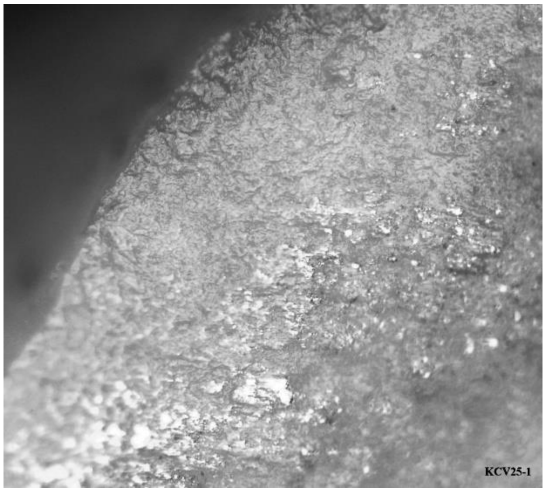
Dorsal View

Ventral View

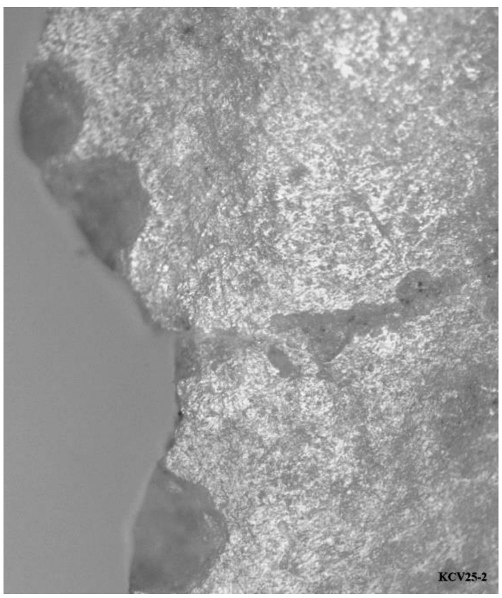
Photo #	**Magnification**	**Feature**	**Location**

Summary: Unused.

Microwear #: 20
Artifact #: 25
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View



Ventral View

Photo #	**Magnification**	**Feature**	**Location**
KCV25-1	200x	Grit polish	Dorsal, Distal
KCV25-2	100x	Grit polish and microflaking	Dorsal, Distal

Summary: Unused.

Microwear #: 21
Artifact #: 31
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 22
Artifact #: 27
Site #: 47JE0379
Site Name: Koshkonong Creek Village

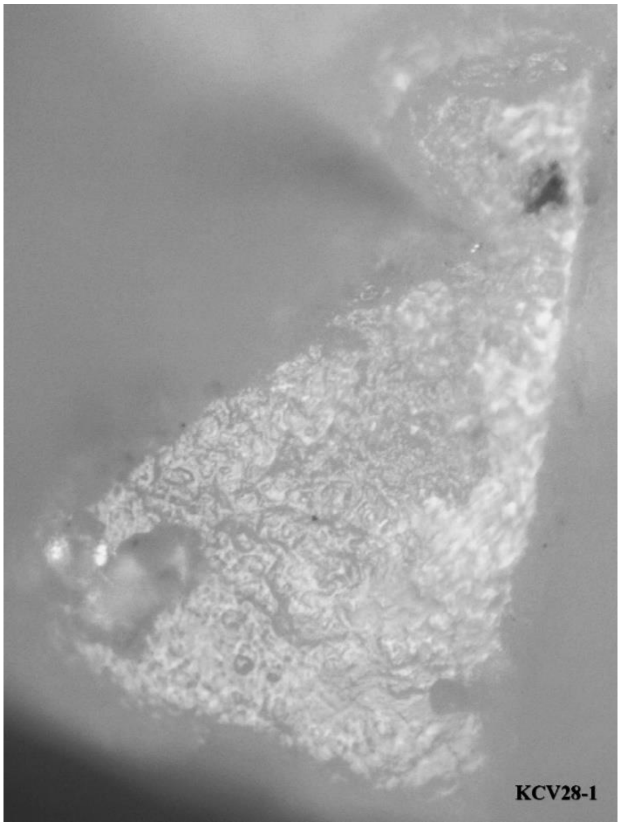
Dorsal View

Ventral View

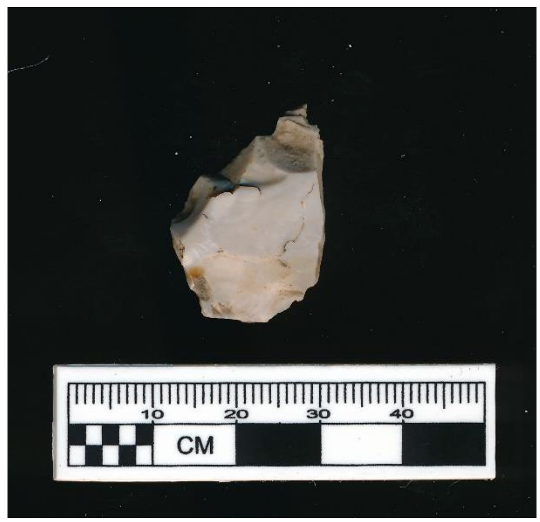
Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 23
Artifact #: 28
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View



Ventral View

Photo #	**Magnification**	**Feature**	**Location**
KCV28-1	200x	Meat polish	Dorsal, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 24
Artifact #: 30
Site #: 47JE0379
Site Name: Koshkonong Creek Village

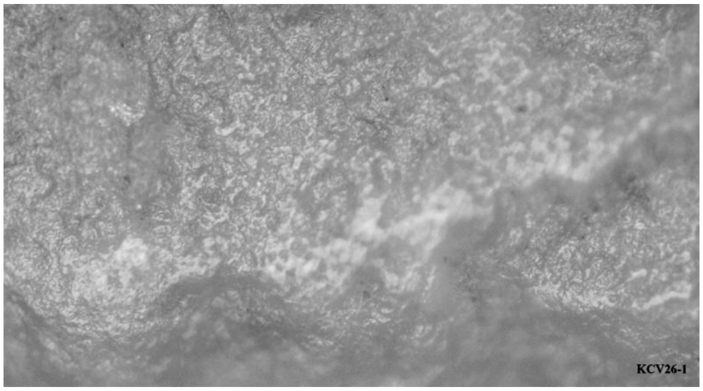
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 25
Artifact #: 26
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
KCV26-1	200x	Meat polish	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 26
Artifact #: 14-07
Site #: 47JE0379
Site Name: Koshkonong Creek Village

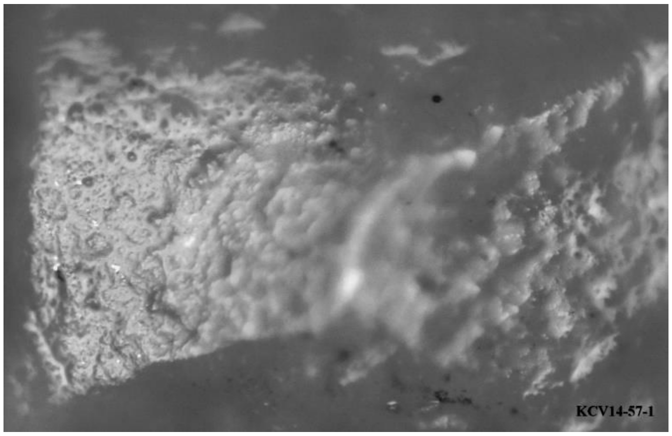
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 27
Artifact #: 14-57
Site #: 47JE0379
Site Name: Koshkonong Creek Village



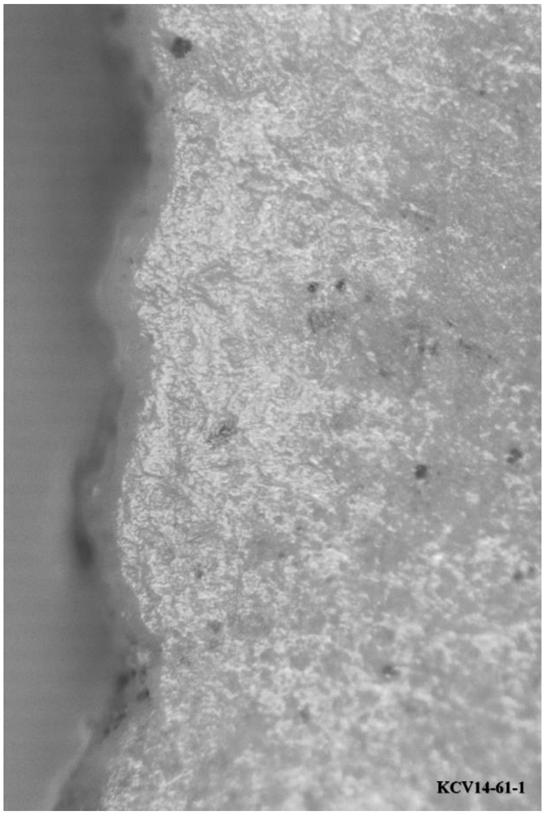
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
KCV14-57-1	200x	Plant polish	Ventral, Distal

Summary: Used in indeterminate motion on plant matter.

Microwear #: 28
Artifact #: 14-61
Site #: 47JE0379
Site Name: Koshkonong Creek Village



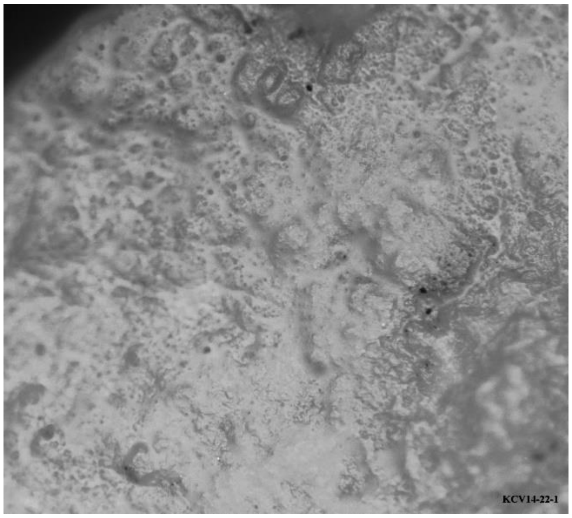
Dorsal View

Ventral View

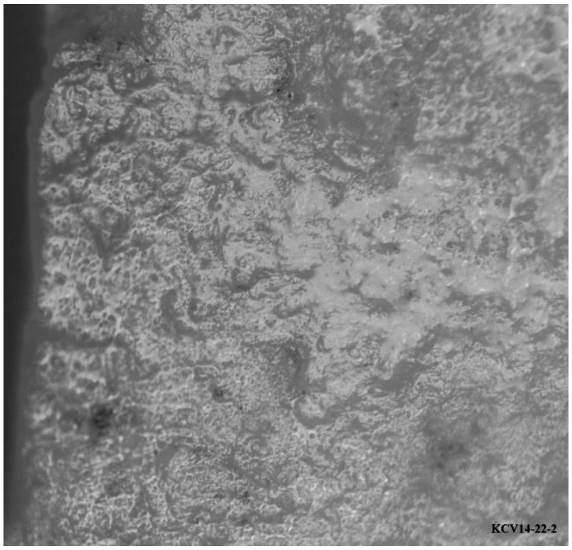
Photo #	Magnification	Feature	Location
KCV14-61-1	100x	Wet hide polish	Ventral, Distal

Summary: Used in transverse motion on wet hide.

Microwear #: 29
Artifact #: 14-22
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View



Ventral View

Photo #	**Magnification**	**Feature**	**Location**
KCV14-22-1	200x	Plant polish	Ventral, Distal
KCV14-22-2	100x	Plant polish	Ventral, Distal

Summary: Used in longitudinal motion on plant matter.

Microwear #: 30
Artifact #: 14-60
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 31
Artifact #: 14-26
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 32
Artifact #: 14-59
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

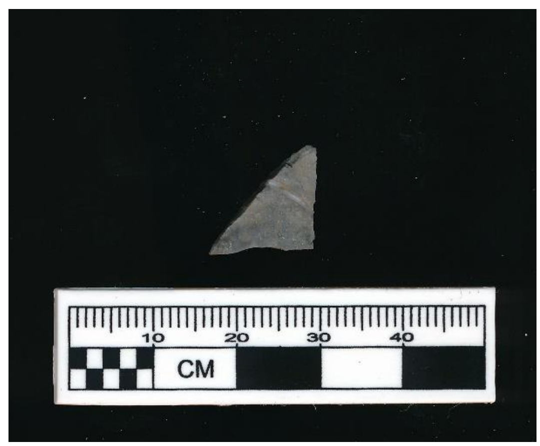
Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 33
Artifact #: 14-01
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

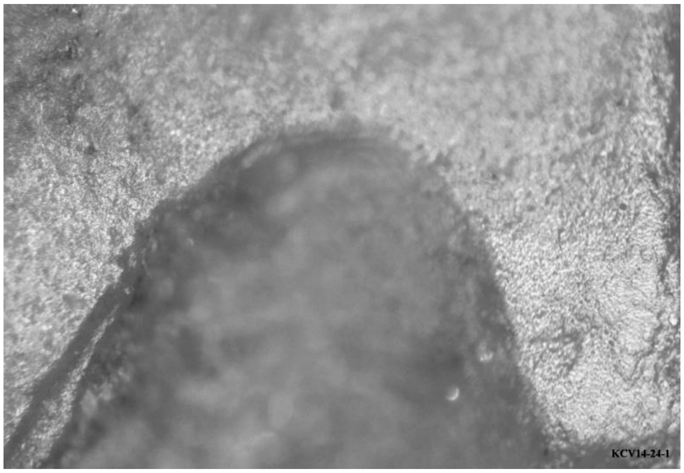


Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 34
Artifact #: 14-24
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
KCV14-24-1	100x	Wood polish	Ventral, Distal

Summary: Used in indeterminate motion of wood

Microwear #: 35
Artifact #: 14-23
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 36
Artifact #: 14-17
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 37
Artifact #: 14-14
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 38
Artifact #: 14-10
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 39
Artifact #: 14-18
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 40
Artifact #: 14-19
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on plant matter.

Microwear #: 41
Artifact #: 14-52
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 42
Artifact #: 14-54
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 43
Artifact #: 14-02
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 44
Artifact #: 14-03
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on meat.

Microwear #: 45
Artifact #: 14-06
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 46
Artifact #: 14-09
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on dry hide.

Microwear #: 47
Artifact #: 14-28
Site #: 47JE0379
Site Name: Koshkonong Creek Village

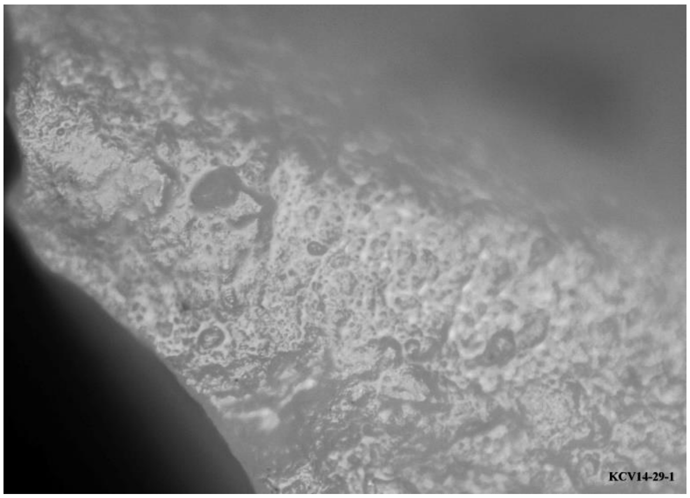
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 48
Artifact #: 14-29
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
KCV14-29-1	200x	Plant polish	Ventral, Distal

Summary: Used in indeterminate motion on plant matter.

Microwear #: 49
Artifact #: 14-30
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 50
Artifact #: 14-35
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 51
Artifact #: 14-36
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 52
Artifact #: 14-40
Site #: 47JE0379
Site Name: Koshkonong Creek Village

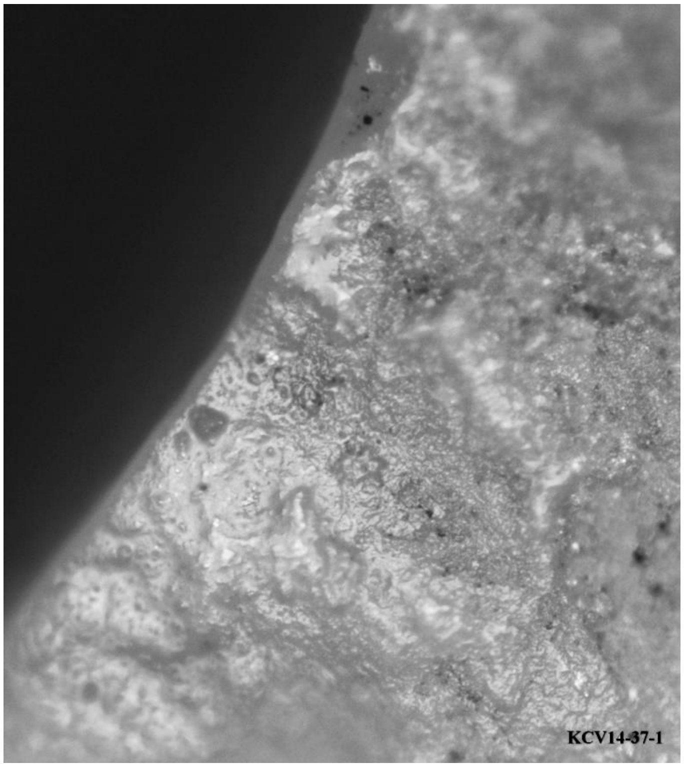
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 53
Artifact #: 14-37
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
KCV14-37-1	200x	Meat polish	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 54
Artifact #: 14-38
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 55
Artifact #: 14-39
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 56
Artifact #: 14-50
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 57
Artifact #: 14-62
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 58
Artifact #: 14-41
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 59
Artifact #: 14-43
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 60
Artifact #: 24
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
KCV24-1	200x	Wood polish	Ventral, Distal

Summary: Used in transverse motion on wood.

Microwear #: 61
Artifact #: 14-08
Site #: 47JE0379
Site Name: Koshkonong Creek Village

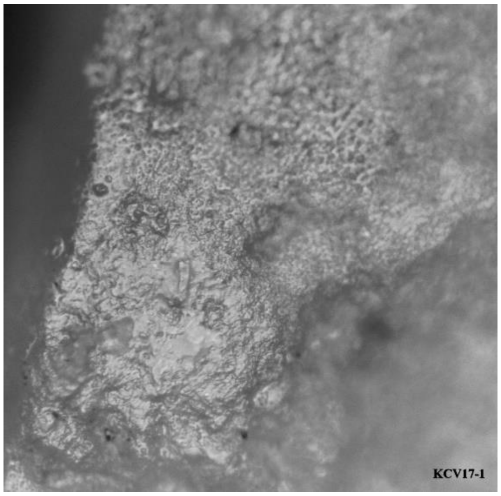
Dorsal View

Ventral View

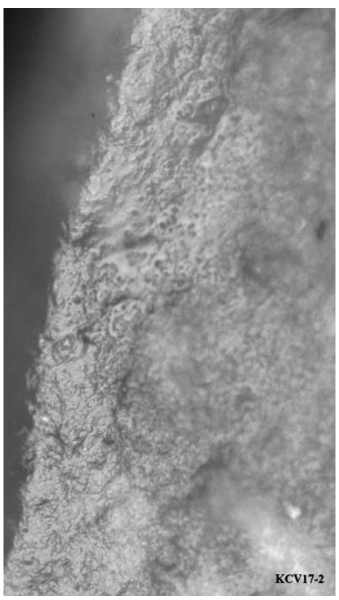
Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 62
Artifact #: 17
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View

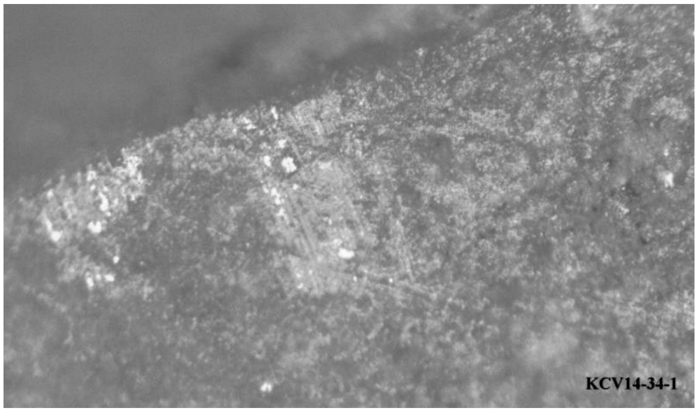


Ventral View

Photo #	**Magnification**	**Feature**	**Location**
KCV17-1	200x	Wet hide polish	Ventral, Distal
KCV17-2	200x	Wet hide polish	Ventral, Distal

Summary: Used in indeterminate motion on wet hide.

Microwear #: 63
Artifact #: 14-34
Site #: 47JE0379
Site Name: Koshkonong Creek Village



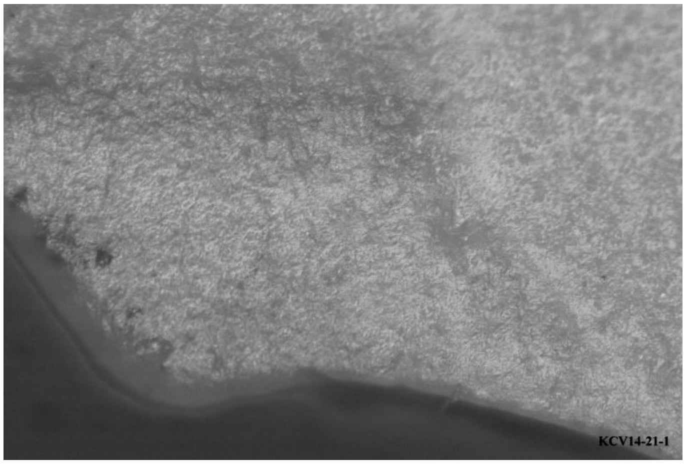
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
KCV14-34-1	100x	Grit polish	Ventral, Distal

Summary: Unused.

Microwear #: 64
Artifact #: 14-21
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
KCV14-21-1	100x	Wet hide polish	Ventral, Distal

Summary: Used in transverse motion on wet hide.

Microwear #: 65
Artifact #: 14-04
Site #: 47JE0379
Site Name: Koshkonong Creek Village

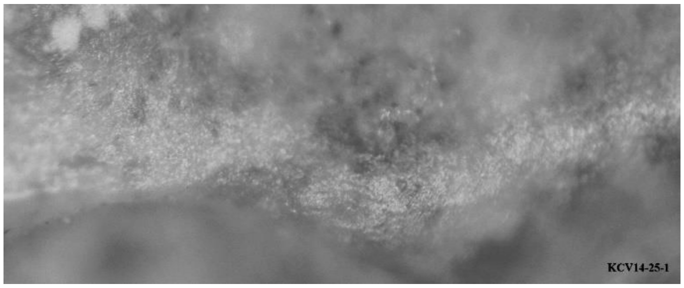
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 66
Artifact #: 14-25
Site #: 47JE0379
Site Name: Koshkonong Creek Village



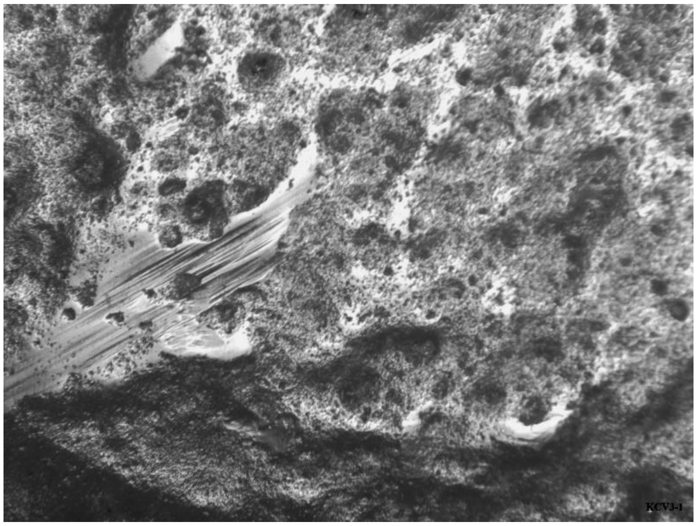
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
KCV14-25-1	100x	Generic weak polish	Ventral, Lateral

Summary: Indeterminate use.

Microwear #: 67
Artifact #: 3
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
KCV3-1	50x	Grit polish	Ventral, Lateral

Summary: Unused.

Microwear #: 68
Artifact #: 8
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 69
Artifact #: 14-32
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 70
Artifact #: 14-56
Site #: 47JE0379
Site Name: Koshkonong Creek Village

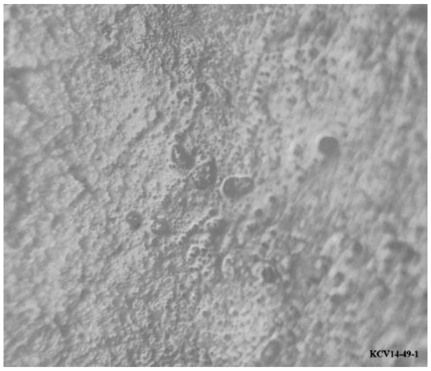
Dorsal View

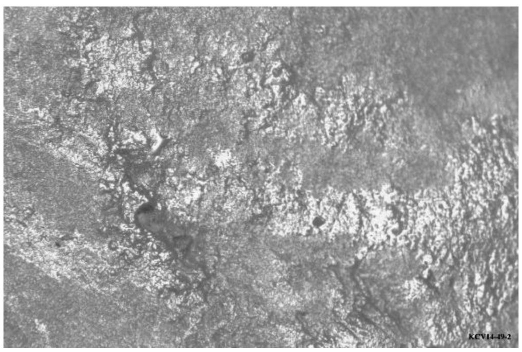
Ventral View

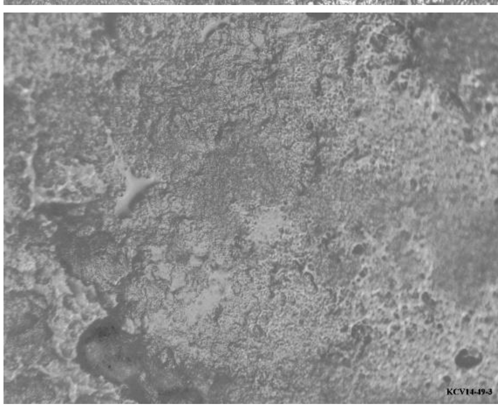
Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 71
Artifact #: 14-49
Site #: 47JE0379
Site Name: Koshkonong Creek Village







Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
KCV14-49-1	100x	Plant polish	Ventral, Distal
KCV14-49-2	50x	Plant polish	Ventral, Distal
KCV14-49-3	100x	Plant polish	Ventral, Distal

Summary: Used in longitudinal motion on plant matter.

Microwear #: 72
Artifact #: 14-53
Site #: 47JE0379
Site Name: Koshkonong Creek Village

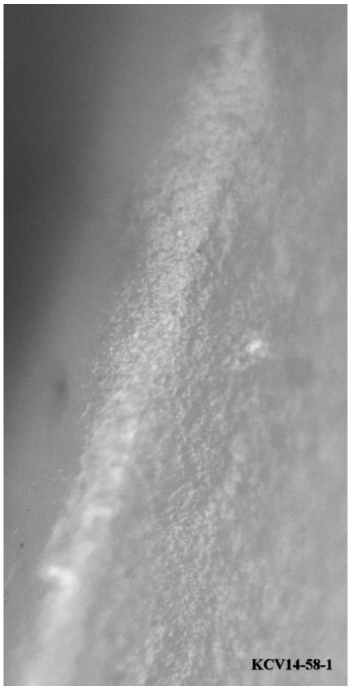
Dorsal View

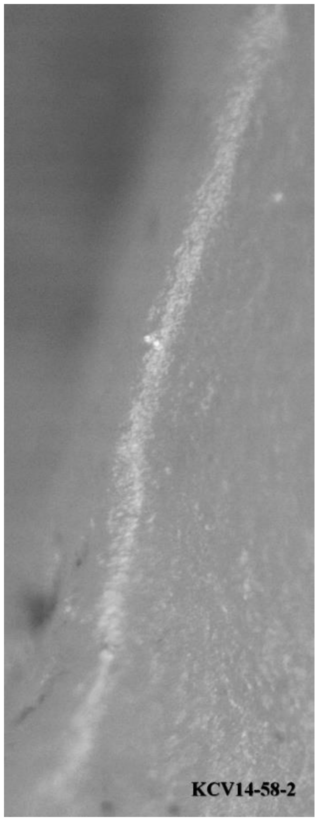
Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 73
Artifact #: 14-58
Site #: 47JE0379
Site Name: Koshkonong Creek Village





Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
KCV14-58-1	200x	Bone polish	Ventral, Distal
KCV14-58-2	100x	Bone polish	Ventral, Distal

Summary: Used in indeterminate motion on bone.

Microwear #: 74
Artifact #: 14-20
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 75
Artifact #: 11
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 76
Artifact #: 14-16
Site #: 47JE0379
Site Name: Koshkonong Creek Village

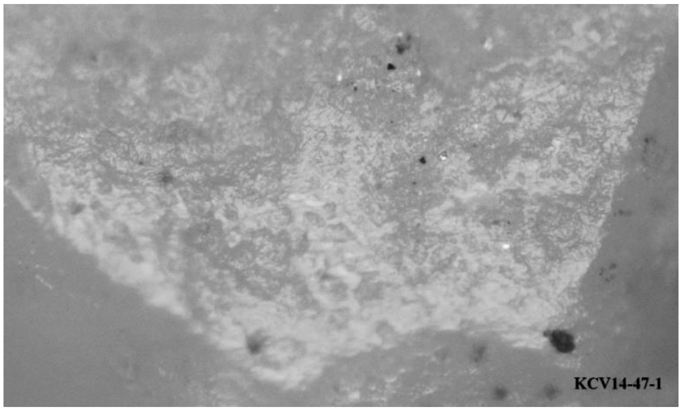
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 77
Artifact #: 14-47
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
KCV14-47-1	200x	Meat polish	Ventral, Distal

Summary: Used in longitudinal motion on meat.

Microwear #: 78
Artifact #: 5
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 79
Artifact #: 14-05
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 80
Artifact #: 14-13
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 81
Artifact #: 14-11
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 82
Artifact #: 14-15
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 83
Artifact #: 14-31
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 84
Artifact #: 14-12
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 85
Artifact #: 14-27
Site #: 47JE0379
Site Name: Koshkonong Creek Village

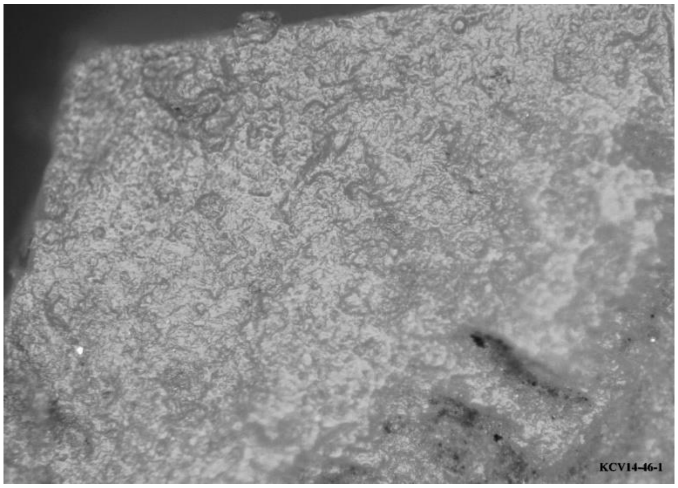
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on meat.

Microwear #: 86
Artifact #: 14-46
Site #: 47JE0379
Site Name: Koshkonong Creek Village



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
KCV14-45-1	200x	Wood polish	Ventral, Proximal

Summary: Used in indeterminate motion on wood.

Microwear #: 87
Artifact #: 14-43
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 88
Artifact #: 14-42
Site #: 47JE0379
Site Name: Koshkonong Creek Village

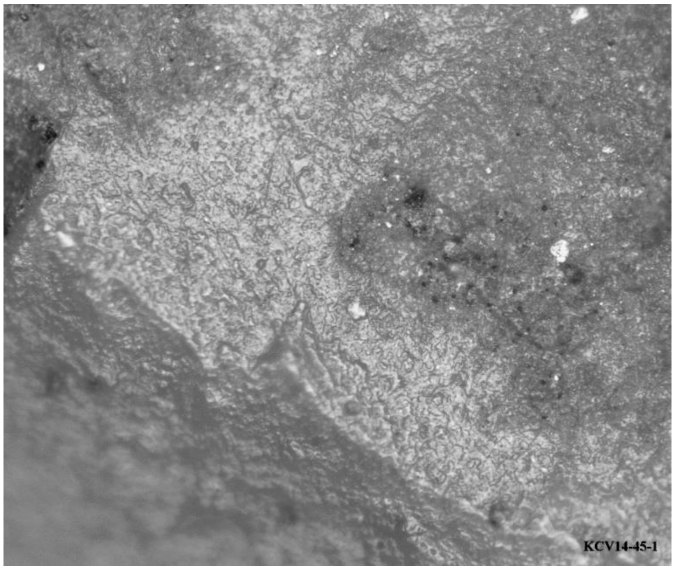
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 89
Artifact #: 14-45
Site #: 47JE0379
Site Name: Koshkonong Creek Village



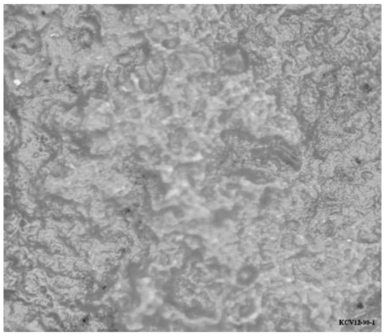
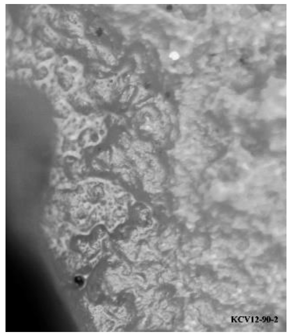
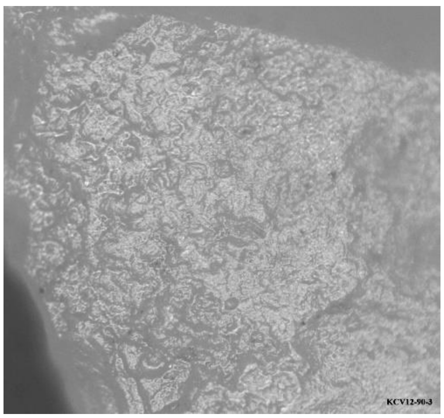
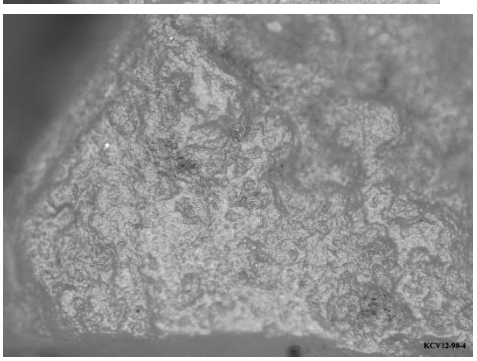
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
KCV14-45-1	200x	Meat polish	Ventral, Lateral

Summary: Used in indeterminate motion on meat.

Microwear #: 90
Artifact #: 12-90
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
KCV12-90-1	200x	Meat polish	Ventral, Lateral
KCV12-90-2	200x	Meat polish	Ventral, Lateral
KCV12-90-3	100x	Meat polish	Ventral, Lateral
KCV12-90-4	200x	Meat polish	Ventral, Lateral

Summary: Used in longitudinal motion on meat.

Microwear #: 91
Artifact #: 12-91
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on indeterminate material.

Microwear #: 92
Artifact #: 12-92
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
KCV12-92-1	200x	Wet hide polish	Ventral, Distal

Summary: Used in transverse motion on wet hide.

Microwear #: 93
Artifact #: 16-01
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 94
Artifact #: 16-02
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Unused.

Microwear #: 95
Artifact #: 16-03
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 96
Artifact #: 16-04
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 97
Artifact #: 16-05
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 98
Artifact #: 16-06
Site #: 47JE0379
Site Name: Koshkonong Creek Village

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 99
Artifact #: 16-07
Site #: 47JE0379
Site Name: Koshkonong Creek Village

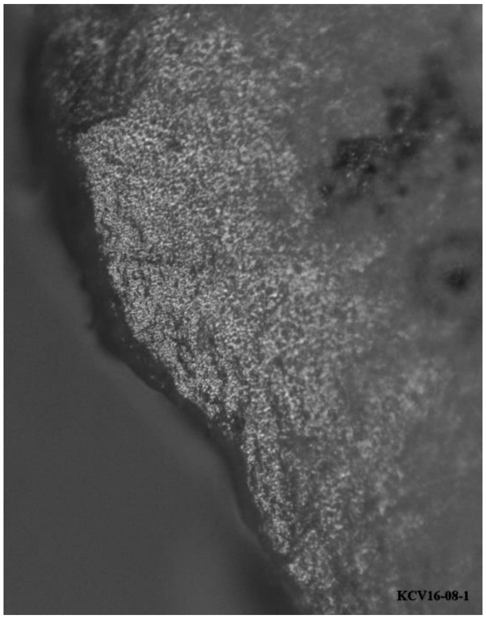
Dorsal View

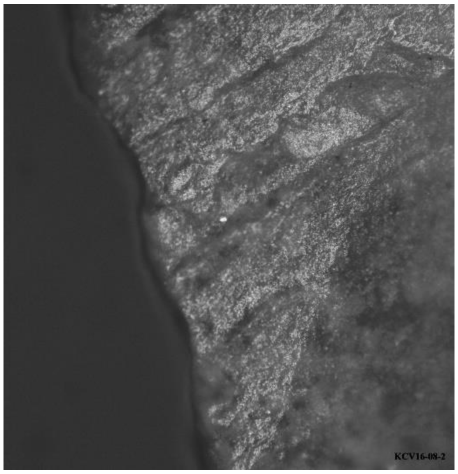
Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 100
Artifact #: 16-08
Site #: 47JE0379
Site Name: Koshkonong Creek Village





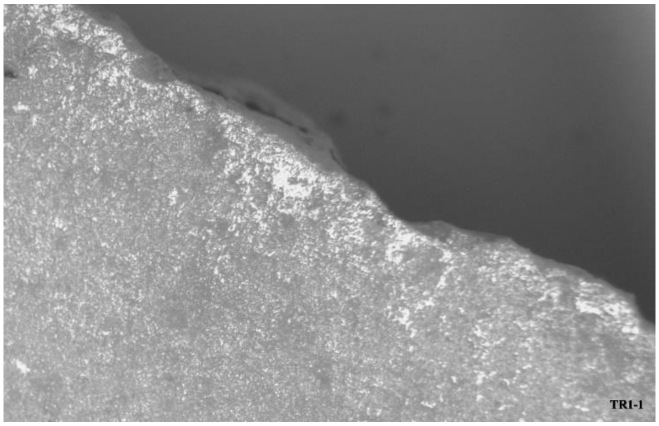
Dorsal View

Ventral View

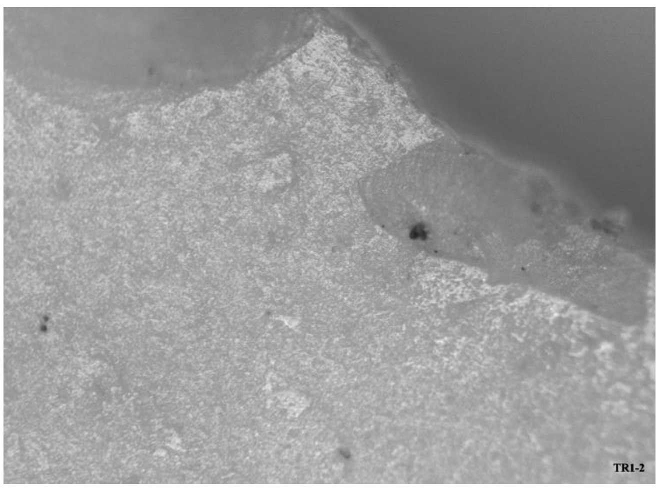
Photo #	Magnification	Feature	Location
KCV16-08-1	50x	Meat polish	Ventral, Lateral
KCV16-08-2	50x	Meat polish	Ventral, Lateral

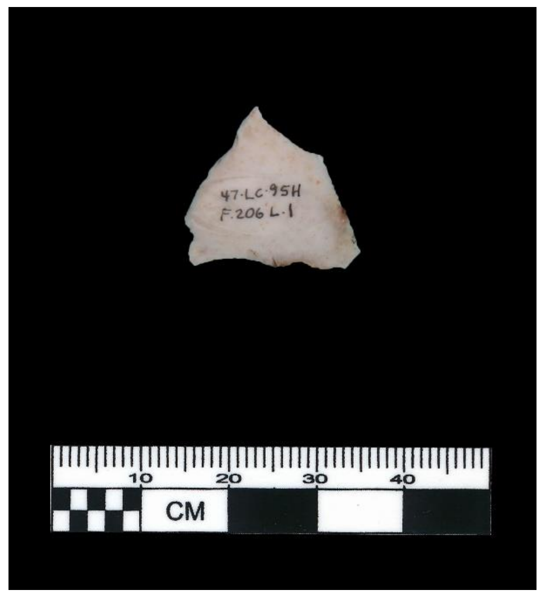
Summary: Used in indeterminate motion on meat.

Microwear #: 1
Artifact #: 001
Site #: 47LC0095
Site Name: Tremaine



Dorsal View



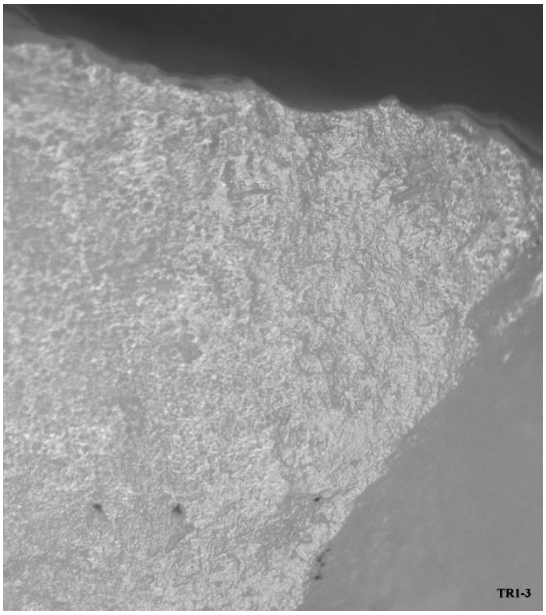


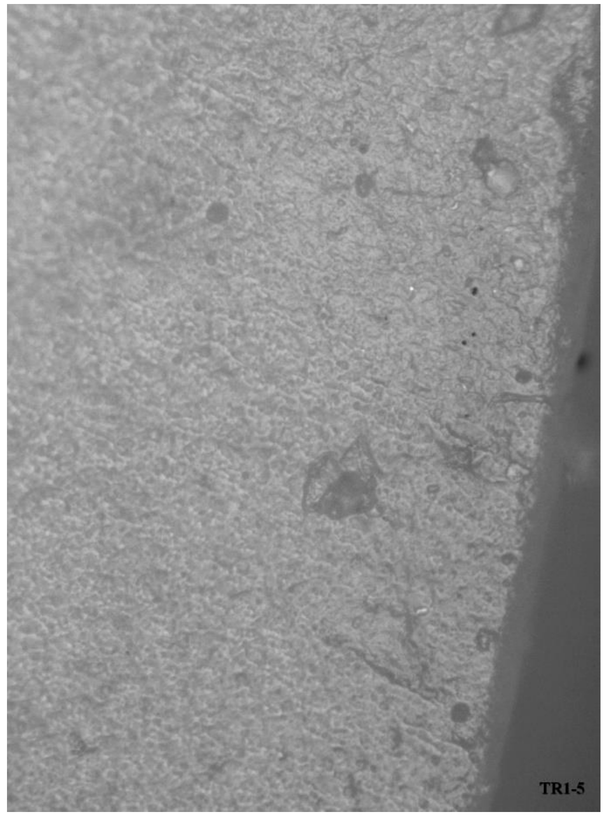
Ventral View

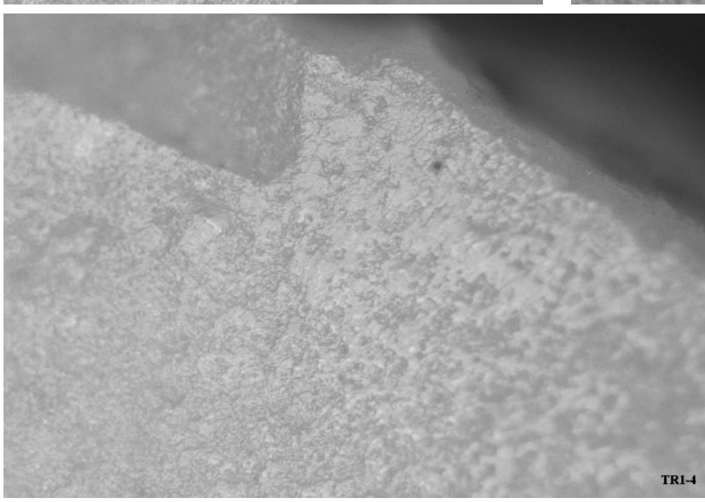
Photo #	**Magnification**	**Feature**	**Location**
TR1-1	50x	Plant polish	Ventral, Distal
TR1-2	100x	Plant polish	Ventral, Lateral
TR1-3	100x	Plant polish	Ventral, Distal
TR1-4	200x	Plant polish	Ventral, Lateral
TR1-5	200x	Plant polish	Dorsal, Lateral

Summary: Used in indeterminate motion on plant matter.

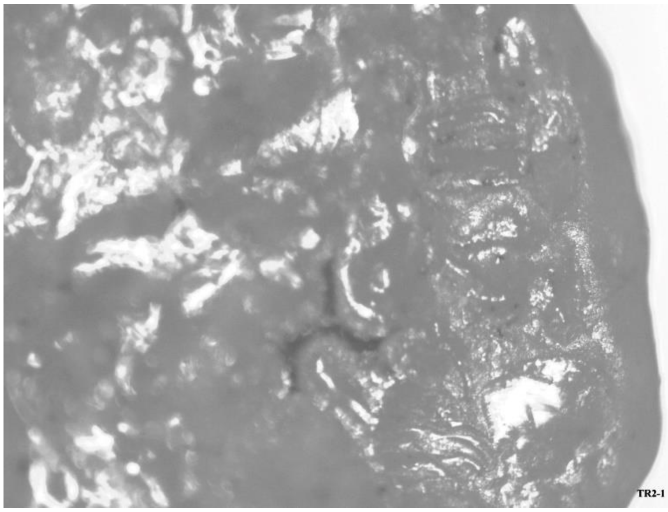
Microwear #: 1
Artifact #: 001
Site #: 47LC0095
Site Name: Tremaine







Microwear #: 2
Artifact #: 002
Site #: 47LC0095
Site Name: Tremaine



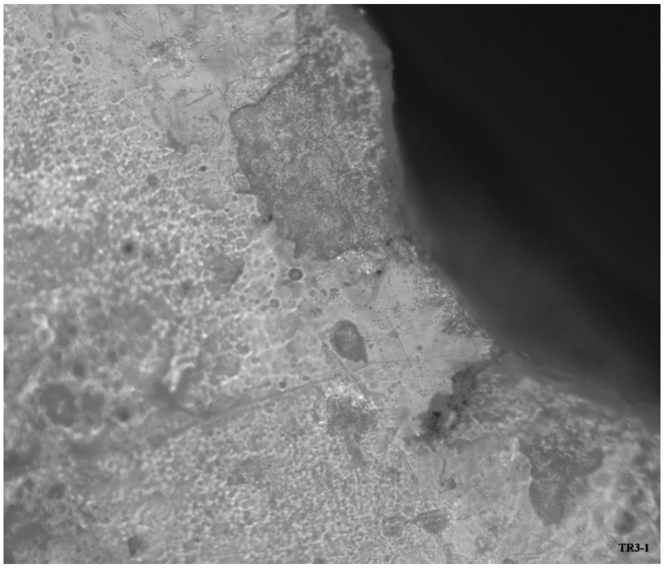
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
TR2-1	50x	Rounding	Ventral, Distal

Summary: Used in transverse motion on indeterminate soft material.

Microwear #: 3
Artifact #: 003
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
TR3-1	200x	Flake scars in polish	Ventral, Distal

Summary: Used in transverse motion on indeterminate soft material.

Microwear #: 4
Artifact #: 004
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 5
Artifact #: 005
Site #: 47LC0095
Site Name: Tremaine

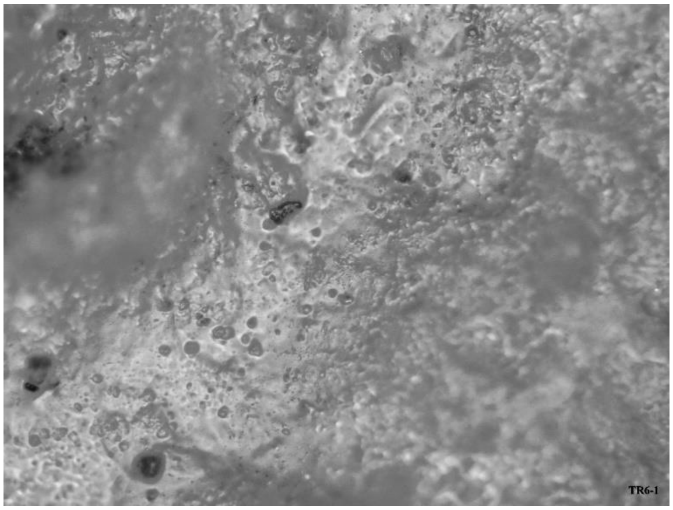
Dorsal View

Ventral View

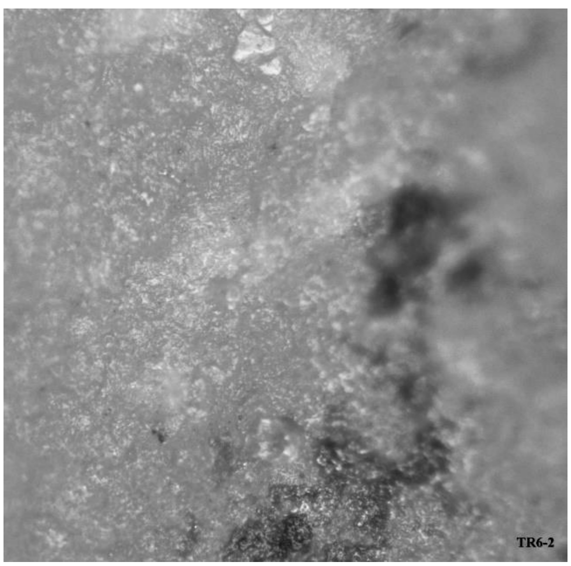
Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 6
Artifact #: 006
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

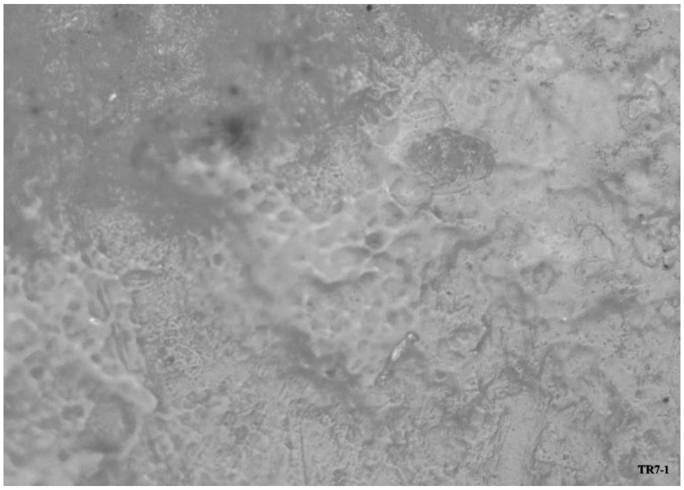


Ventral View

Photo #	**Magnification**	**Feature**	**Location**
TR6-1	200x	Heat treated surface	Ventral, Distal
TR6-2	200x	Heat treated surface	Dorsal, Medial

Summary: Indeterminate use.

Microwear #: 7
Artifact #: 007
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
TR7-1	200x	Nail polish	Ventral, Medial

Summary: Indeterminate use.

Microwear #: 8
Artifact #: 008
Site #: 47LC0095
Site Name: Tremaine

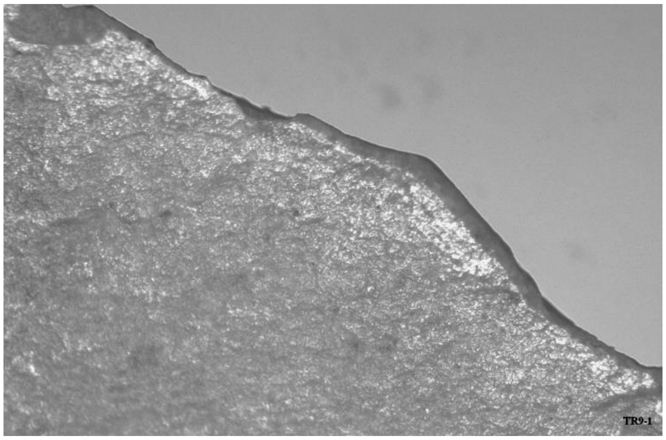
Dorsal View

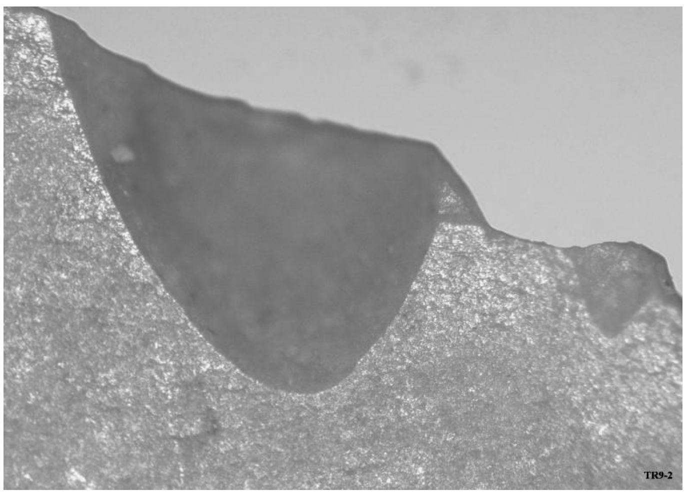
Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 9
Artifact #: 009
Site #: 47LC0095
Site Name: Tremaine





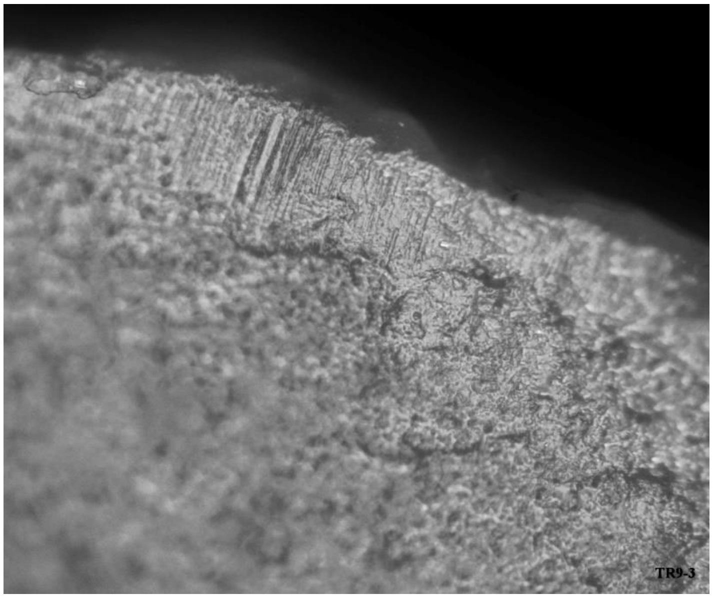
Dorsal View

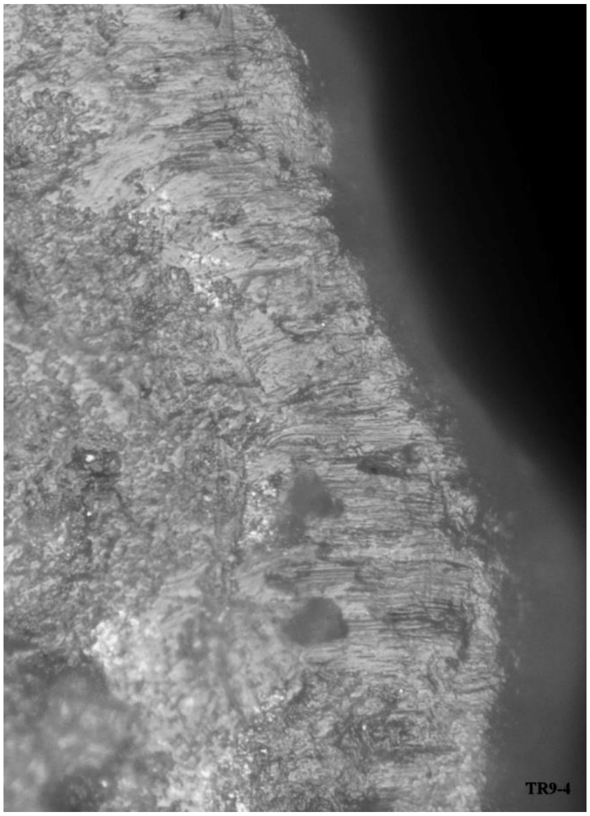
Ventral View

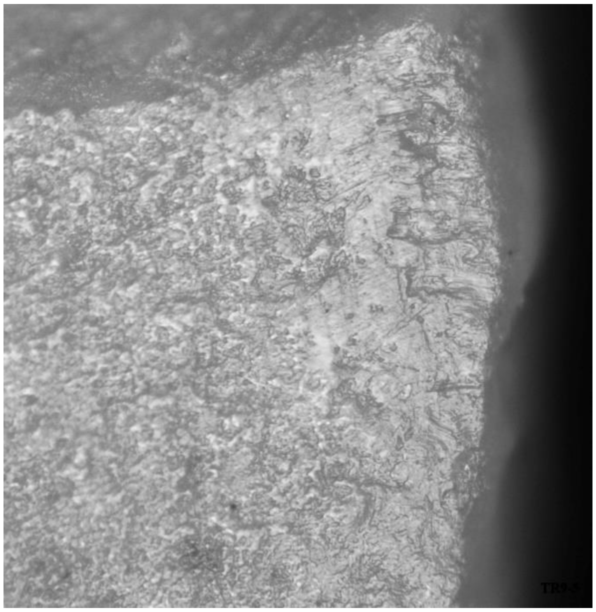
Photo #	**Magnification**	**Feature**	**Location**
TR9-1	50x	Rounding	Ventral, Distal
TR9-2	50x	Microchipping	Ventral, Distal
TR9-3	200x	Striations	Ventral, Distal
TR9-4	200x	Polish and striations	Ventral, Distal
TR9-5	200x	Wet hide polish	Ventral, Distal

Summary: Used in transverse motion on wet hide.

Microwear #: 9
Artifact #: 009
Site #: 47LC0095
Site Name: Tremaine







Microwear #: 10
Artifact #: 010
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Used in transverse motion on indeterminate soft material.

Microwear #: 11
Artifact #: 011
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 12
Artifact #: 012
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 13
Artifact #: 013
Site #: 47LC0095
Site Name: Tremaine

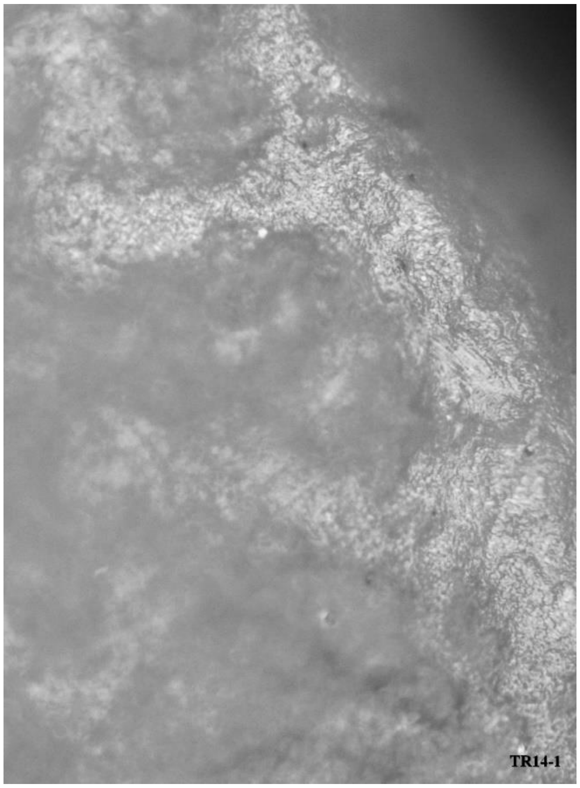
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 14
Artifact #: 014
Site #: 47LC0095
Site Name: Tremaine



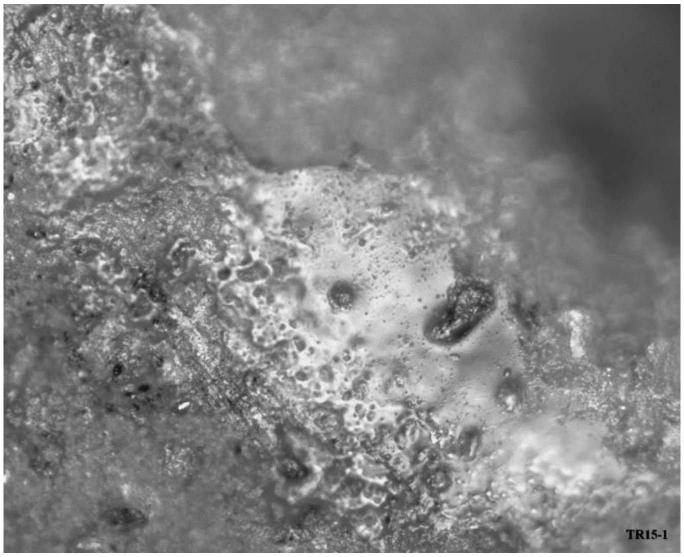
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
TR14-1	200x	Polish	Ventral, Distal

Summary: Used in transverse motion on indeterminate soft material

Microwear #: 15
Artifact #: 015
Site #: 47LC0095
Site Name: Tremaine



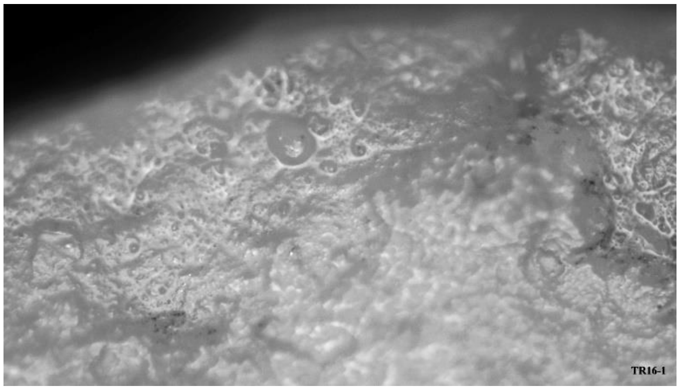
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
TR15-1	200x	Silica polish	Dorsal, Distal

Summary: Indeterminate use.

Microwear #: 16
Artifact #: 016
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
TR16-1	200x	Polish from weathering	Ventral, Distal

Summary: Indeterminate use.

Microwear #: 17
Artifact #: 017
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 18
Artifact #: 018
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 19
Artifact #: 019
Site #: 47LC0095
Site Name: Tremaine

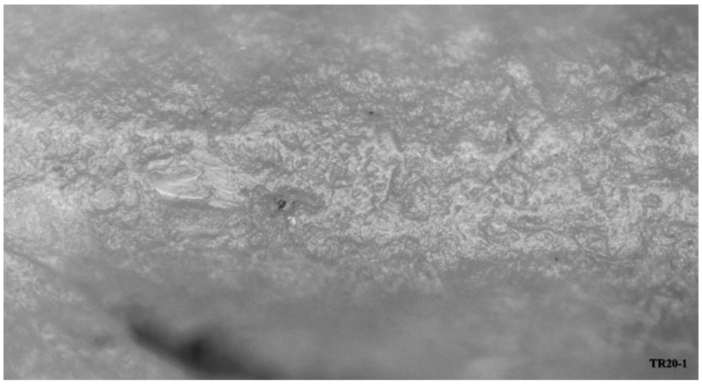
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on indeterminate material.

Microwear #: 20
Artifact #: 020
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
TR20-1	200x	Meat polish	Ventral, Distal

Summary: Used in longitudinal motion on meat.

Microwear #: 21
Artifact #: 021
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on indeterminate material.

Microwear #: 22
Artifact #: 022
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

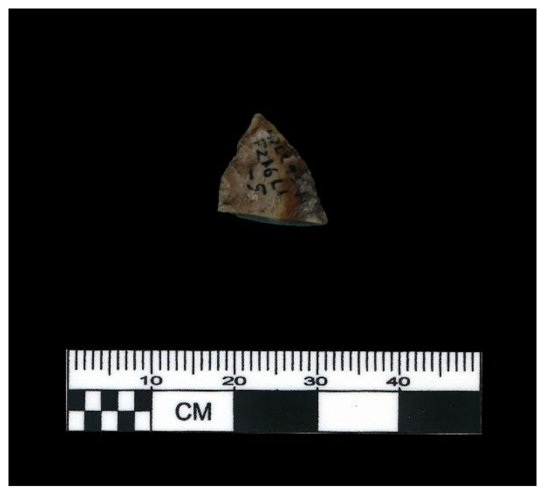
Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 23
Artifact #: 023
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

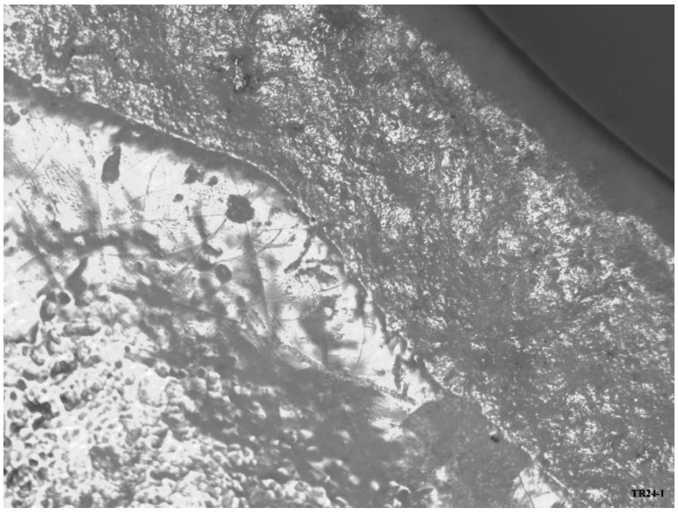


Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 24
Artifact #: 024
Site #: 47LC0095
Site Name: Tremaine



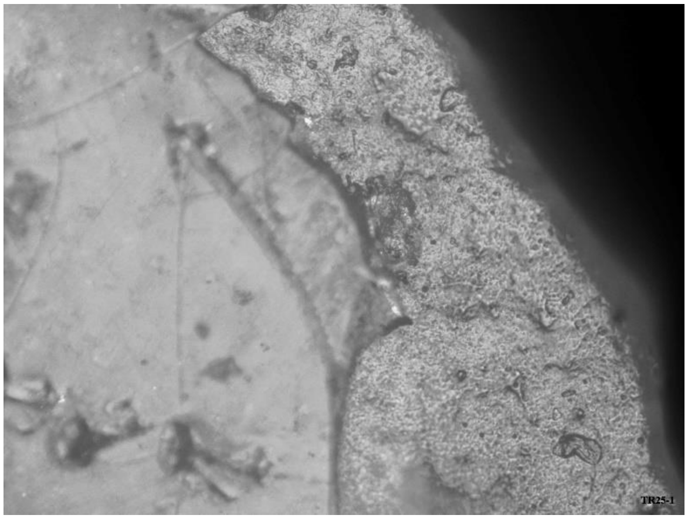
Dorsal View

Ventral View

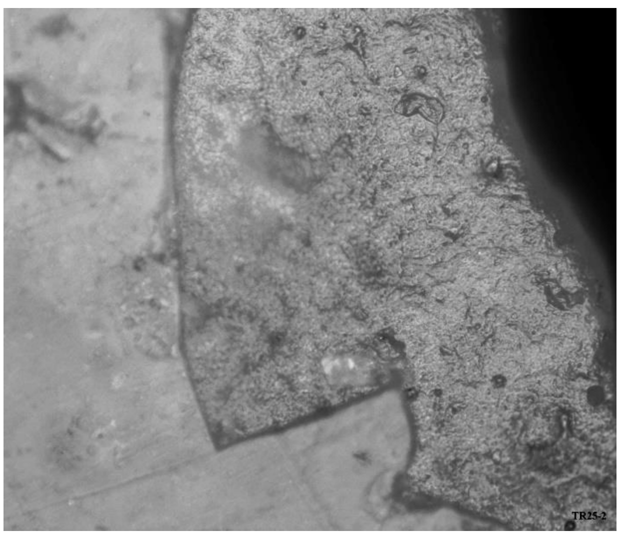
Photo #	Magnification	Feature	Location
TR24-1	50x	Nail polish	Ventral, Distal

Summary: Used in transverse motion on indeterminate material.

Microwear #: 25
Artifact #: 025
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

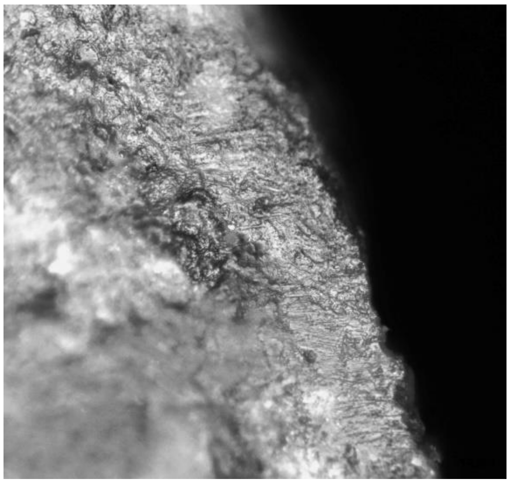


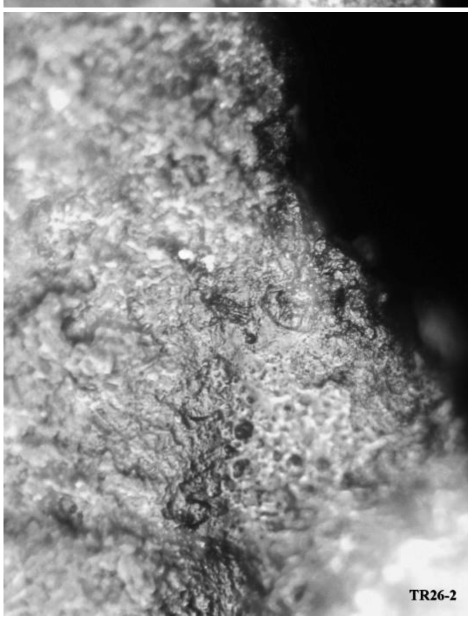
Ventral View

Photo #	**Magnification**	**Feature**	**Location**
TR25-1	200x	Nail polish	Ventral, Distal
TR25-2	200x	Nail polish	Ventral, Distal

Summary: Indeterminate use.

Microwear #: 26
Artifact #: 026
Site #: 47LC0095
Site Name: Tremaine





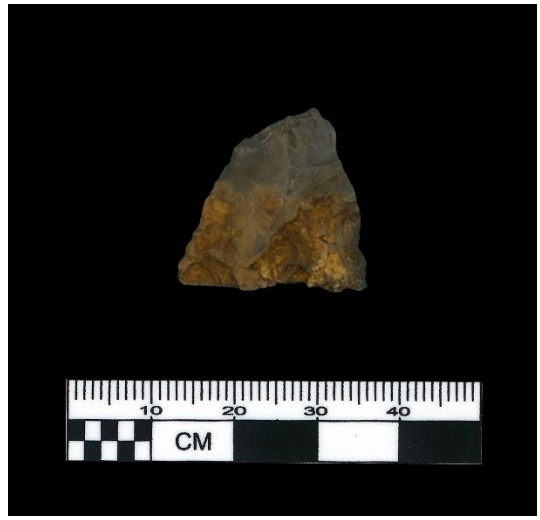
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
TR26-1	200x	Striations	Ventral, Distal
TR26-2	200x	Wet hide polish	Ventral, Distal

Summary: Used in indeterminate motion on wet hide.

Microwear #: 27
Artifact #: 027
Site #: 47LC0095
Site Name: Tremaine



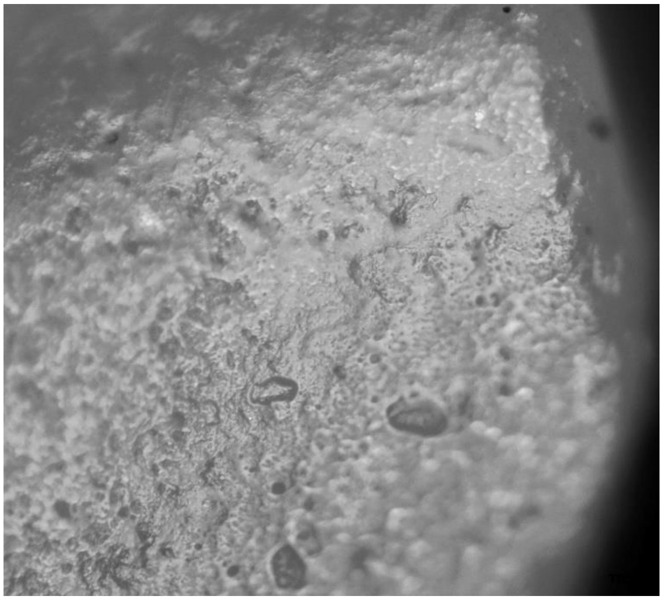
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 28
Artifact #: 028
Site #: 47LC0095
Site Name: Tremaine



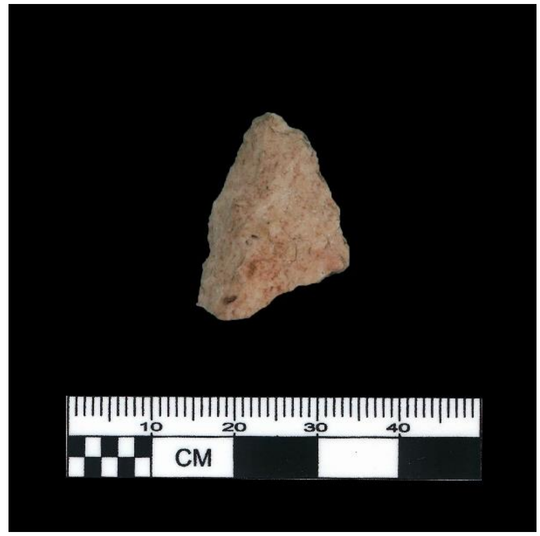
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
TR28-1	200x	Wet hide polish	Ventral, Distal

Summary: Used indeterminate motion on wet hide.

Microwear #: 29
Artifact #: 029
Site #: 47LC0095
Site Name: Tremaine



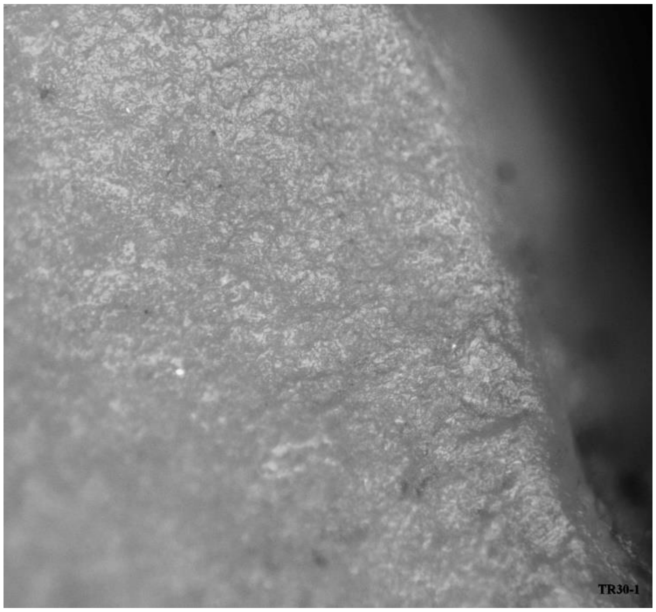
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 30
Artifact #: 030
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
TR30-1	200x	Dry hide polish	Ventral, Distal

Summary: Used in transverse motion on dry hide.

Microwear #: 31
Artifact #: 031
Site #: 47LC0095
Site Name: Tremaine

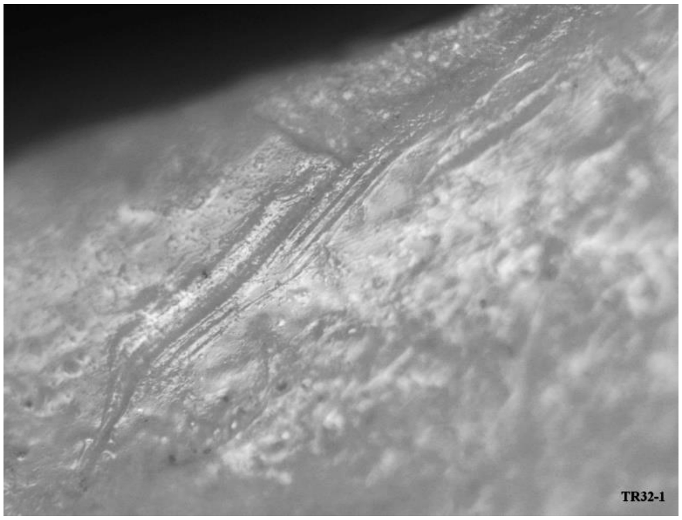
Dorsal View

Ventral View

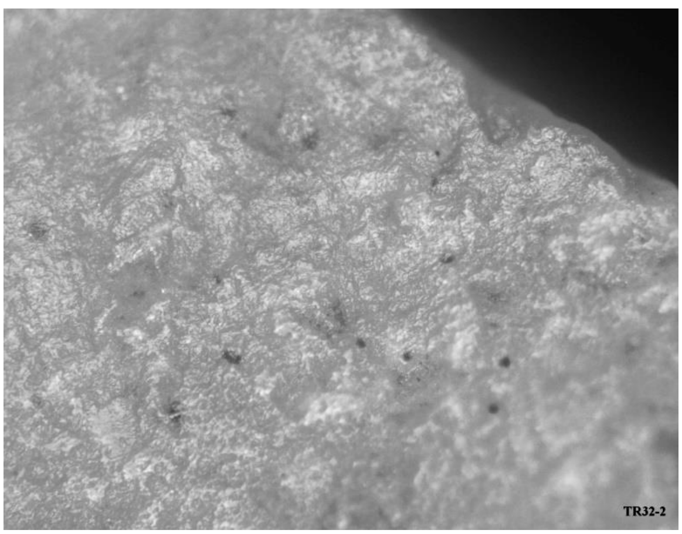
Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 32
Artifact #: 032
Site #: 47LC0095
Site Name: Tremaine



Dorsal View



Ventral View

Photo #	**Magnification**	**Feature**	**Location**
TR32-1	200x	Polish and striations	Ventral, Distal
TR32-2	200x	Wet hide polish	Ventral, Proximal

Summary: Used in transverse motion on wet hide and longitudinal motion on meat.

Microwear #: 33
Artifact #: 033
Site #: 47LC0095
Site Name: Tremaine

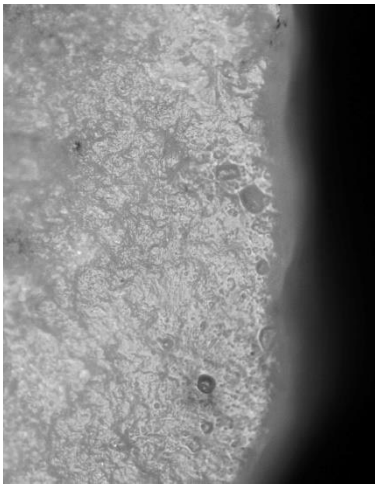
Dorsal View

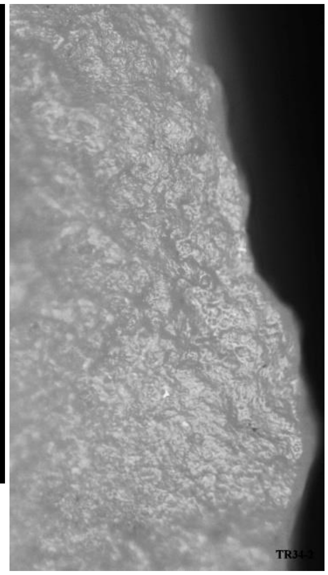
Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 34
Artifact #: 034
Site #: 47LC0095
Site Name: Tremaine





Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
TR34-1	200x	Wet hide polish	Ventral, Distal
TR34-2	200x	Wet hide polish	Ventral, Distal

Summary: Used in transverse motion on wet hide.

Microwear #: 35
Artifact #: 035
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 36
Artifact #: 036
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 37
Artifact #: 037
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 38
Artifact #: 038
Site #: 47LC0095
Site Name: Tremaine

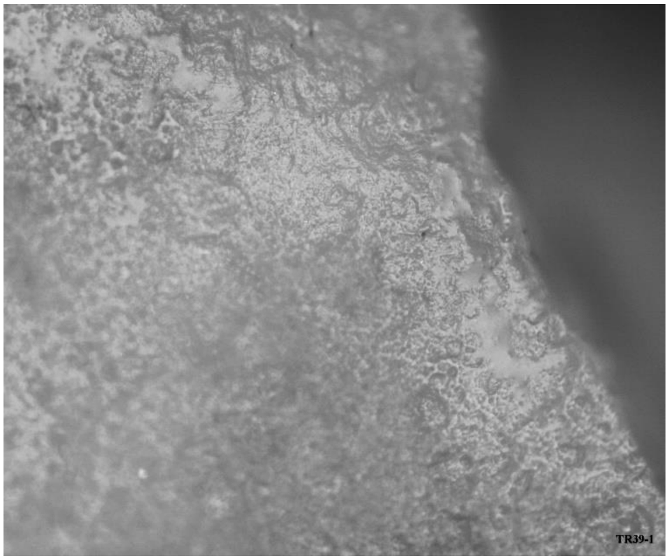
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on indeterminate material.

Microwear #: 39
Artifact #: 039
Site #: 47LC0095
Site Name: Tremaine



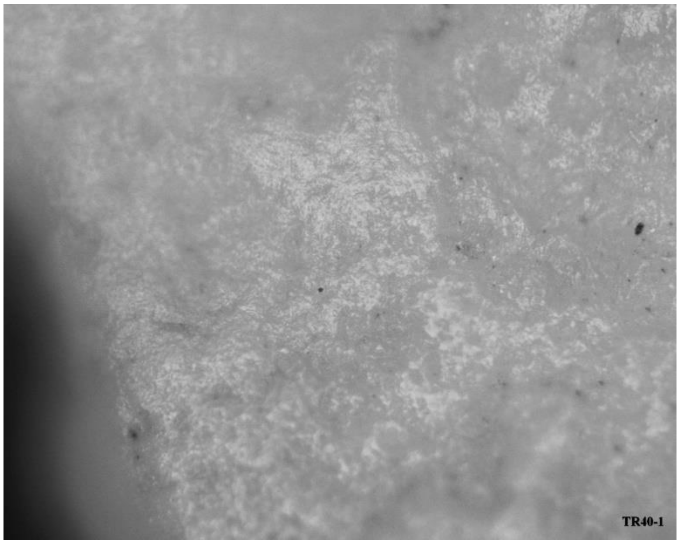
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
TR39-1	200x	Meat polish	Ventral, Proximal

Summary: Used in indeterminate motion on meat.

Microwear #: 40
Artifact #: 040
Site #: 47LC0095
Site Name: Tremaine



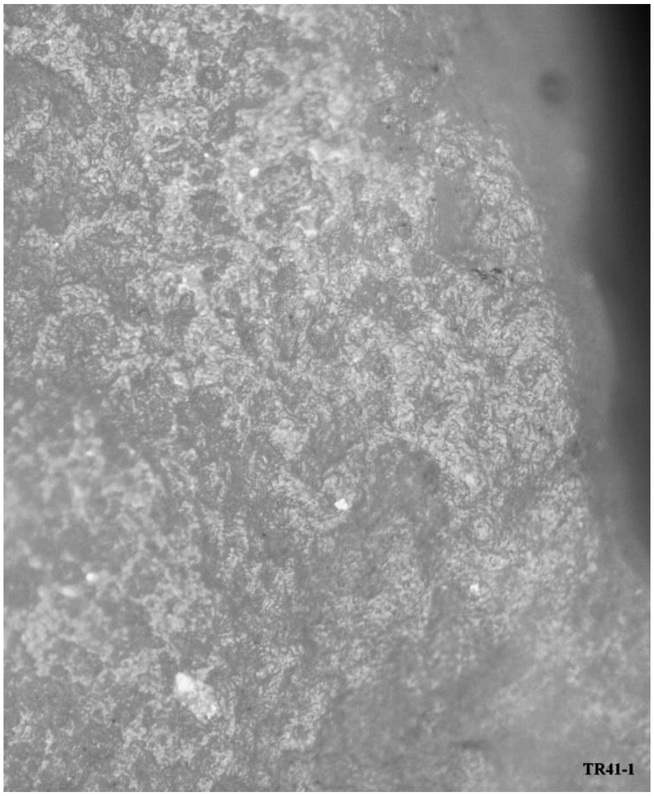
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
TR40-1	200x	Wet hide polish	Ventral, Lateral

Summary: Used in indeterminate motion on wet hide.

Microwear #: 41
Artifact #: 041
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
TR41-1	200x	Smooth pitted polish	Ventral, Distal

Summary: Used in transverse motion on indeterminate hard material.

Microwear #: 42
Artifact #: 042
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 43
Artifact #: 043
Site #: 47LC0095
Site Name: Tremaine

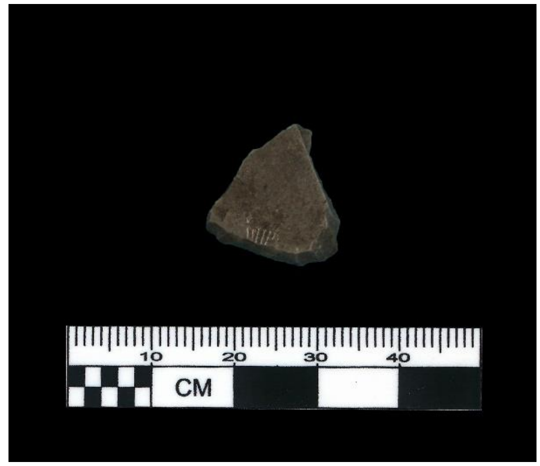
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 44
Artifact #: 044
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 45
Artifact #: 045
Site #: 47LC0095
Site Name: Tremaine

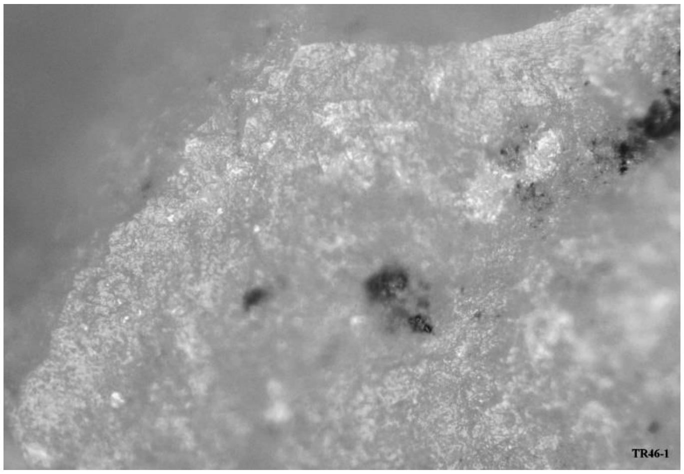
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 46
Artifact #: 046
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
Tr46-1	200x	Smooth pitted polish	Ventral, Distal

Summary: Used in longitudinal motion on indeterminate hard material.

Microwear #: 47
Artifact #: 047
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Used in transverse motion on indeterminate material.

Microwear #: 48
Artifact #: 048
Site #: 47LC0095
Site Name: Tremaine

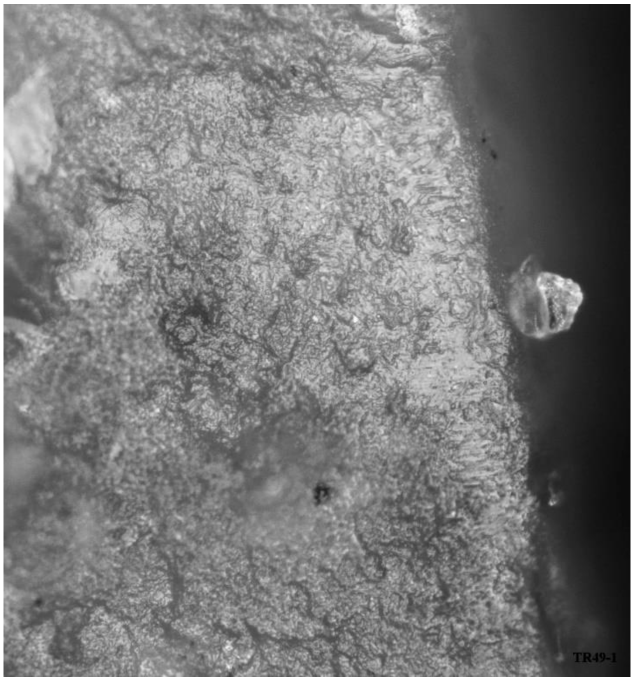
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 49
Artifact #: 049
Site #: 47LC0095
Site Name: Tremaine



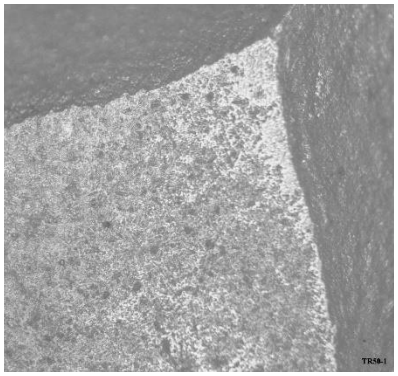
Dorsal View

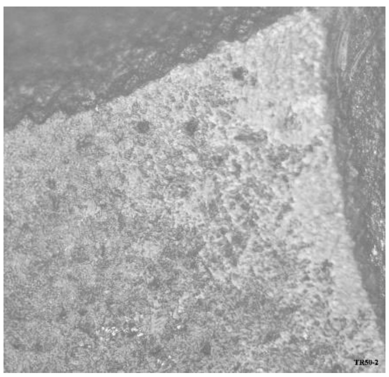
Ventral View

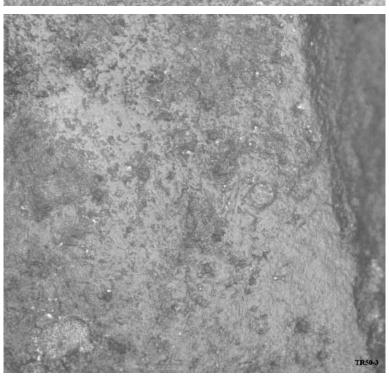
Photo #	Magnification	Feature	Location
TR49-1	200x	Meat polish	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 50
Artifact #: 050
Site #: 47LC0095
Site Name: Tremaine







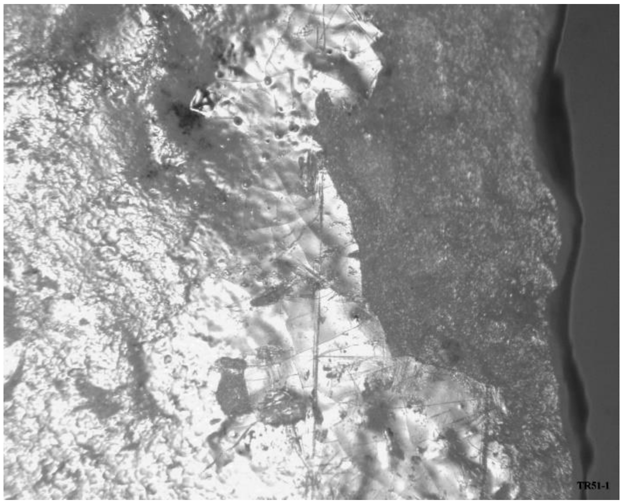
Dorsal View

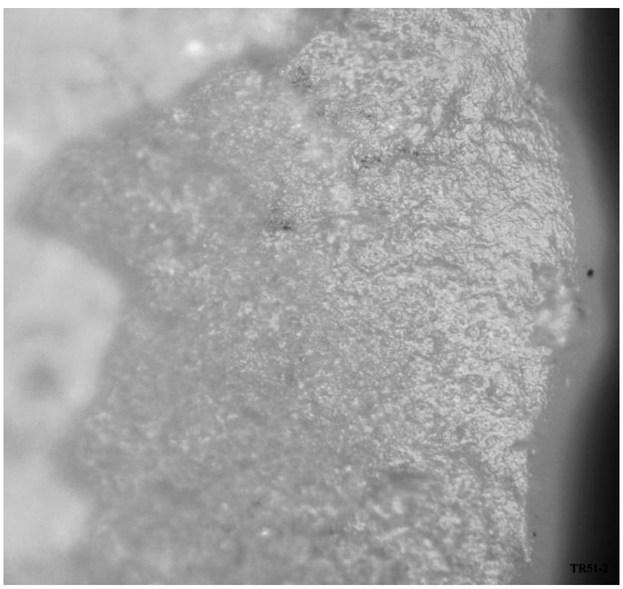
Ventral View

Photo #	Magnification	Feature	Location
TR50-1	100x	Plant polish	Ventral, Distal
TR50-2	200x	Plant polish	Ventral, Distal
TR50-3	200x	Plant polish	Ventral, Distal

Summary: Used in longitudinal motion on plant matter.

Microwear #: 51
Artifact #: 051
Site #: 47LC0095
Site Name: Tremaine





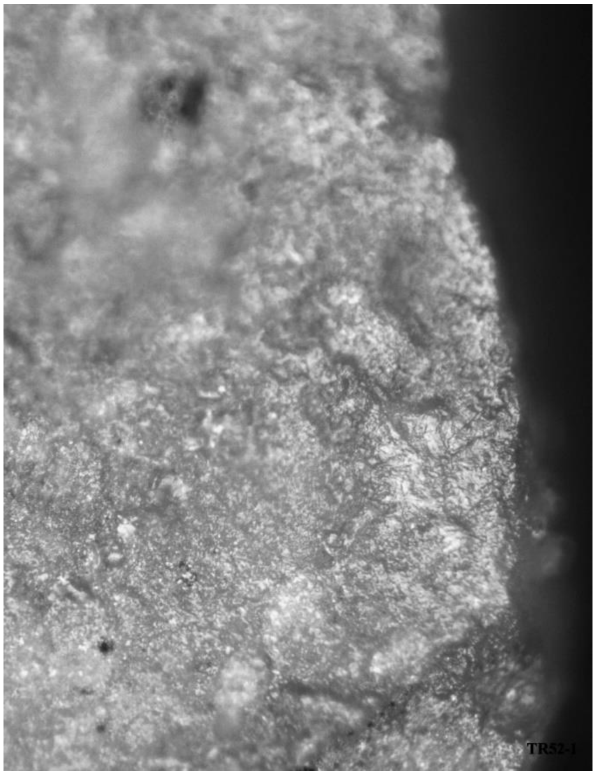
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
TR51-1	50x	Nail polish	Ventral, Distal
TR51-2	200x	Wet hide polish	Ventral, Distal

Summary: Used in transverse motion on wet hide.

Microwear #: 52
Artifact #: 052
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
TR52-1	200x	Smooth pitted polish	Ventral, Distal

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 53
Artifact #: 053
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 54
Artifact #: 054
Site #: 47LC0095
Site Name: Tremaine

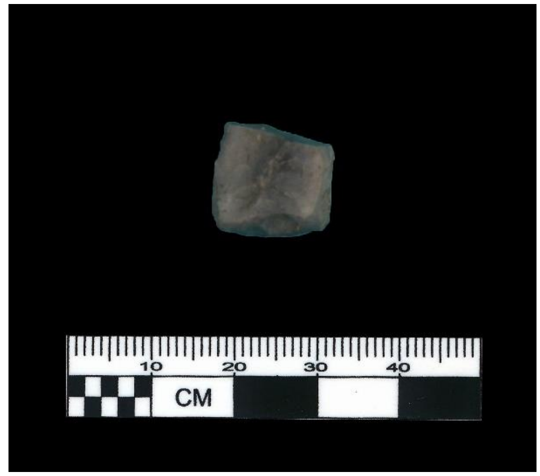
Dorsal View

Ventral View

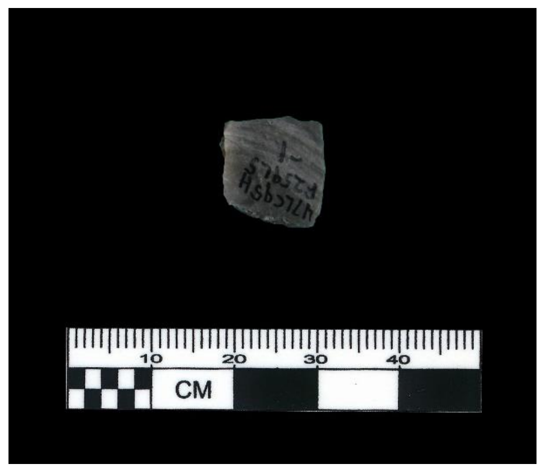
Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 55
Artifact #: 055
Site #: 47LC0095
Site Name: Tremaine



Dorsal View



Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 56
Artifact #: 056
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 57
Artifact #: 057
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 58
Artifact #: 058
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 59
Artifact #: 059
Site #: 47LC0095
Site Name: Tremaine

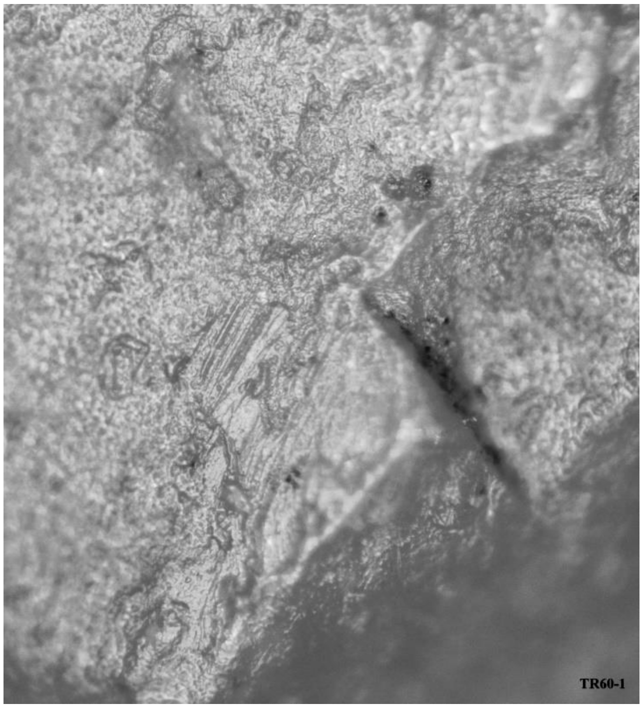
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 60
Artifact #: 060
Site #: 47LC0095
Site Name: Tremaine



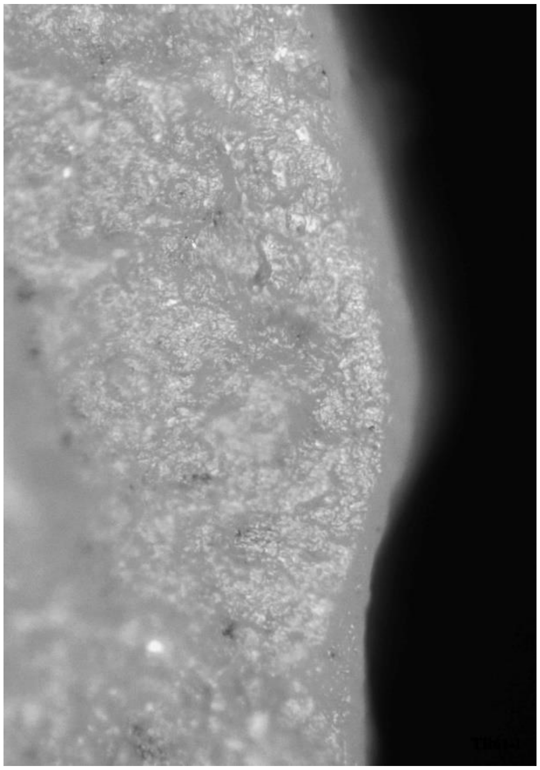
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
TR60-1	200x	Meat polish	Dorsal, Medial

Summary: Used in longitudinal motion on meat.

Microwear #: 61
Artifact #: 061
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
TR61-1	200x	Dry hide polish	Dorsal, Distal

Summary: Used in indeterminate motion on dry hide.

Microwear #: 62
Artifact #: 062
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 63
Artifact #: 063
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 64
Artifact #: 064
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Used in transverse motion on indeterminate material.

Microwear #: 65
Artifact #: 065
Site #: 47LC0095
Site Name: Tremaine

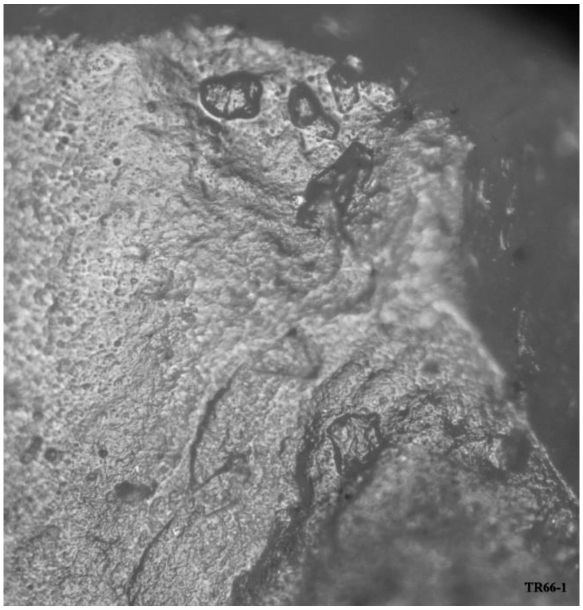
Dorsal View

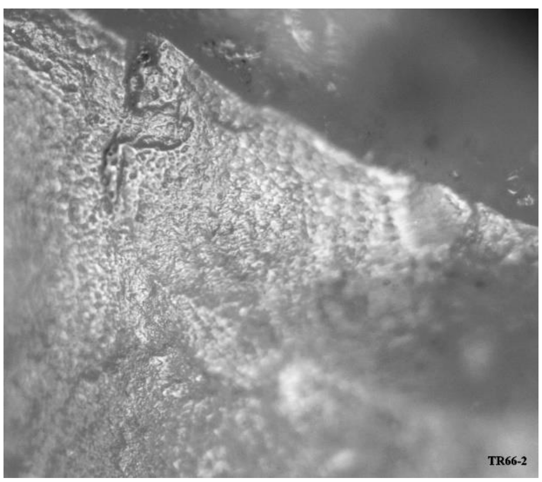
Ventral View

Photo #	Magnification	Feature	Location

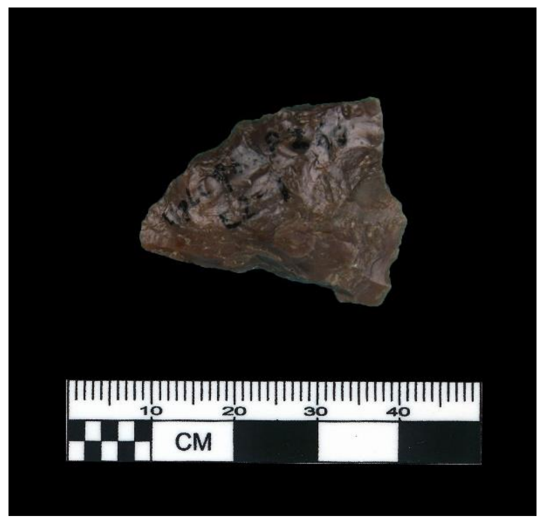
Summary: Indeterminate use.

Microwear #: 66
Artifact #: 066
Site #: 47LC0095
Site Name: Tremaine





Dorsal View

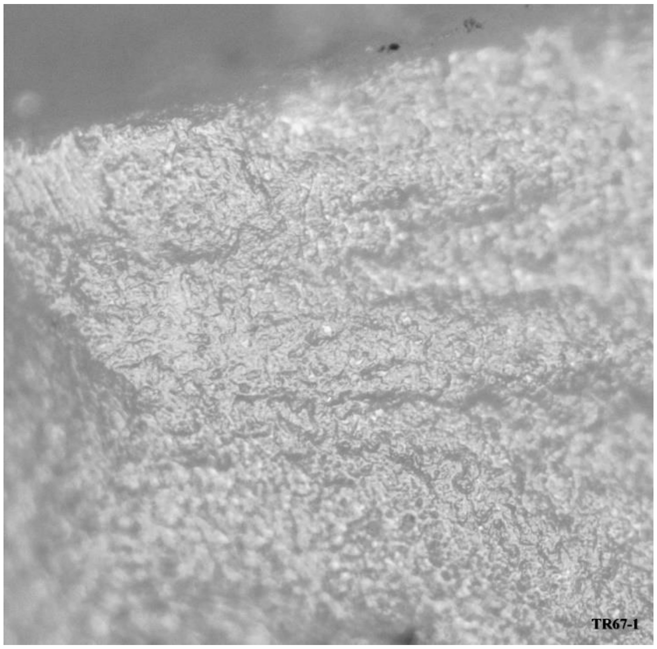


Ventral View

Photo #	Magnification	Feature	Location
TR66-1	200x	Plant polish	Dorsal, Distal
TR66-2	200x	Plant polish	Dorsal, Distal

Summary: Used in indeterminate motion on plant matter.

Microwear #: 67
Artifact #: 067
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
TR67-1	200x	Generic weak polish	Dorsal, Medial

Summary: Used in longitudinal motion on indeterminate material.

Microwear #: 68
Artifact #: 068
Site #: 47LC0095
Site Name: Tremaine

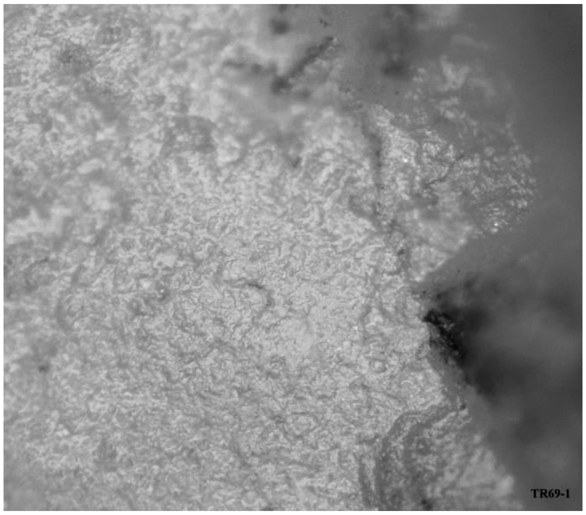
Dorsal View

Ventral View

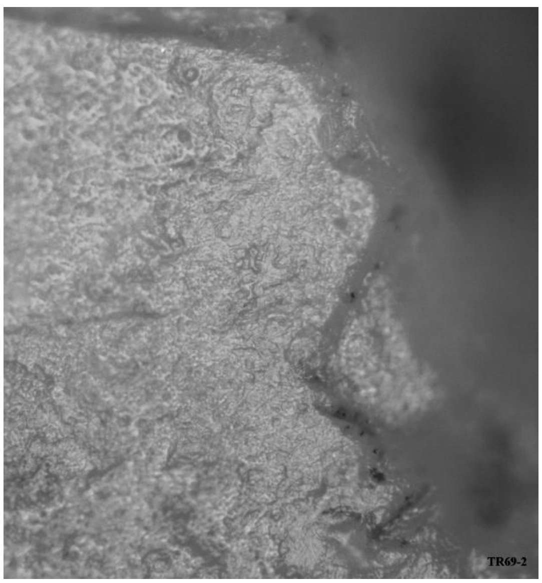
Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 69
Artifact #: 069
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

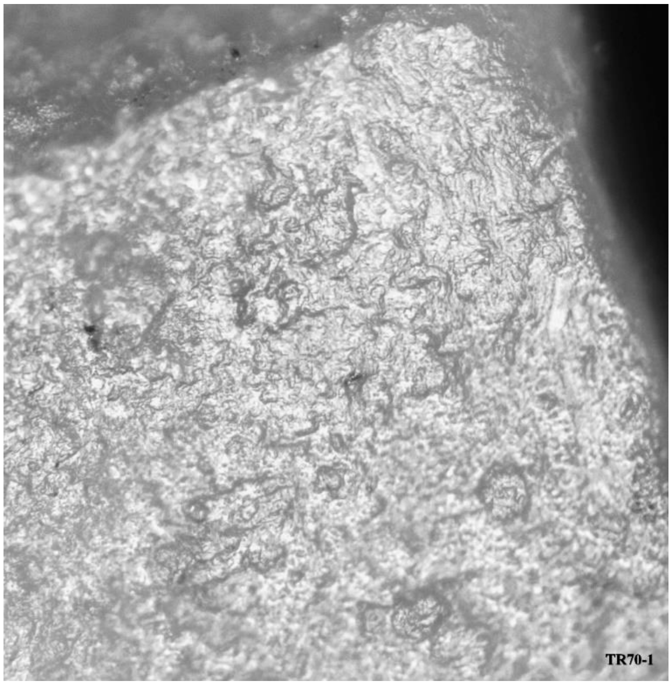


Ventral View

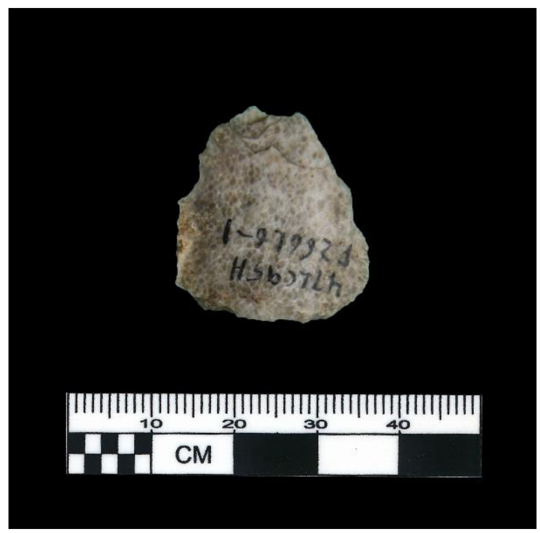
Photo #	**Magnification**	**Feature**	**Location**
TR69-1	200x	Meat polish	Ventral, Lateral
TR69-2	200x	Meat polish	Ventral, Lateral

Summary: Used in indeterminate motion on meat.

Microwear #: 70
Artifact #: 070
Site #: 47LC0095
Site Name: Tremaine



Dorsal View



Ventral View

Photo #	Magnification	Feature	Location
TR70-1	200x	Wet hide polish	Ventral, Distal

Summary: Used in transverse motion on wet hide.

Microwear #: 71
Artifact #: 071
Site #: 47LC0095
Site Name: Tremaine

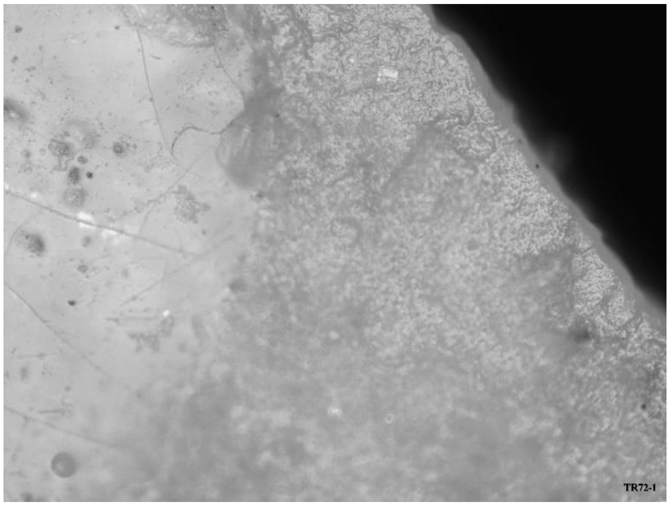
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Used in transverse motion on indeterminate material.

Microwear #: 72
Artifact #: 072
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
TR72-1	200x	Wet hide polish	Ventral, Distal

Summary: Used in indeterminate motion on wet hide.

Microwear #: 73
Artifact #: 073
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 74
Artifact #: 074
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 75
Artifact #: 075
Site #: 47LC0095
Site Name: Tremaine

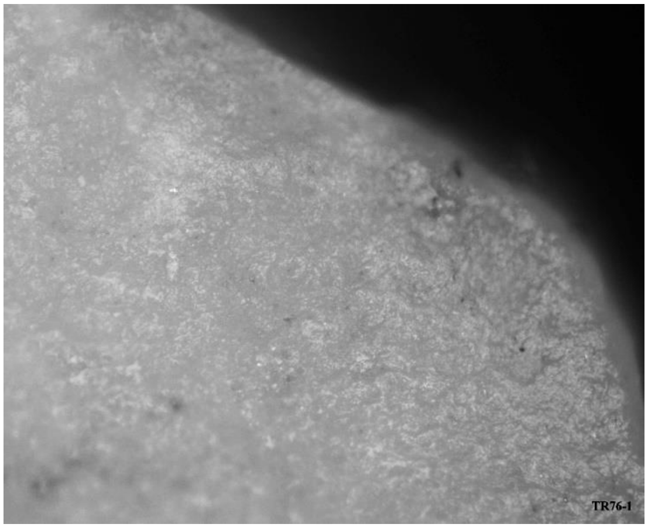
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 76
Artifact #: 076
Site #: 47LC0095
Site Name: Tremaine



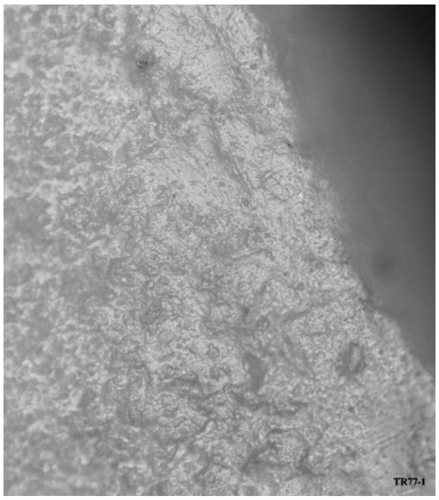
Dorsal View

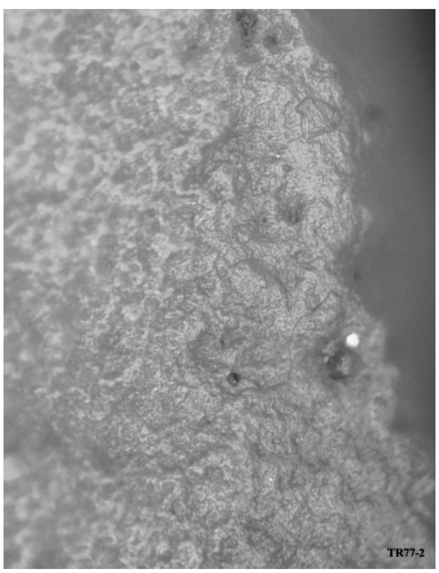
Ventral View

Photo #	**Magnification**	**Feature**	**Location**
TR76-1	200x	Generic Weak Polish	Ventral, Distal

Summary: Indeterminate use.

Microwear #: 77
Artifact #: 077
Site #: 47LC0095
Site Name: Tremaine





Dorsal View

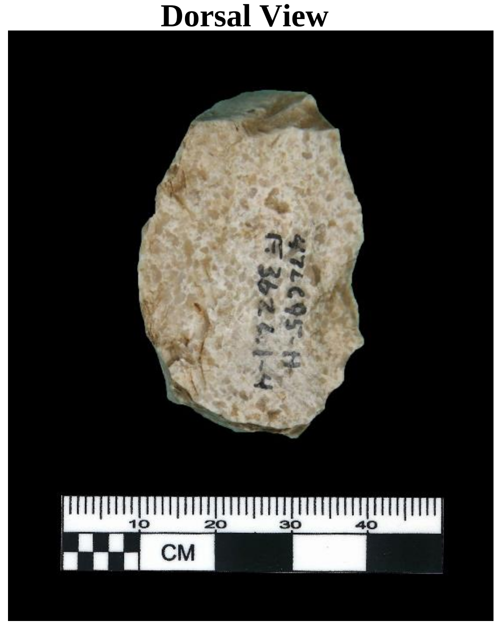
Ventral View

Photo #	Magnification	Feature	Location
TR77-1	200x	Wet hide polish	Ventral, Distal
TR77-2	200x	Wet hide polish	Ventral, Distal

Summary: Used in transverse motion on wet hide.

Microwear #: 78
Artifact #: 078
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

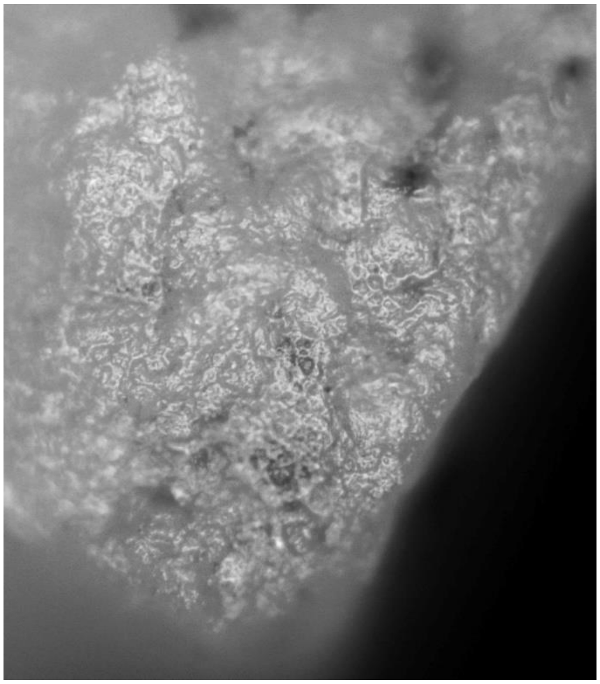


Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 79
Artifact #: 079
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
TR79-1	200x	Meat polish	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 80
Artifact #: 080
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 81
Artifact #: 081
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 82
Artifact #: 082
Site #: 47LC0095
Site Name: Tremaine

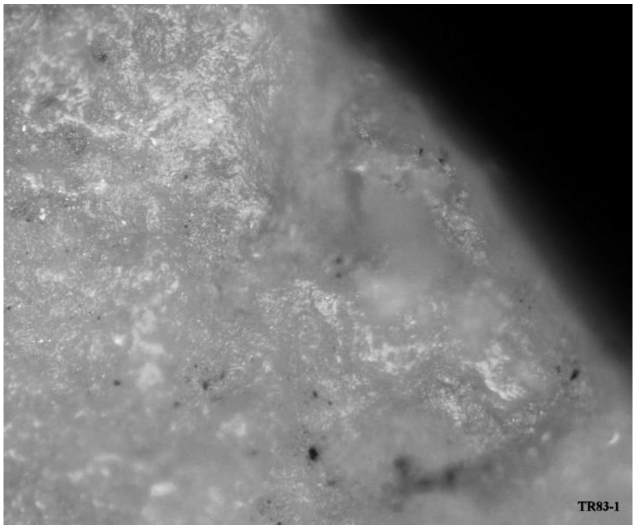
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 83
Artifact #: 083
Site #: 47LC0095
Site Name: Tremaine



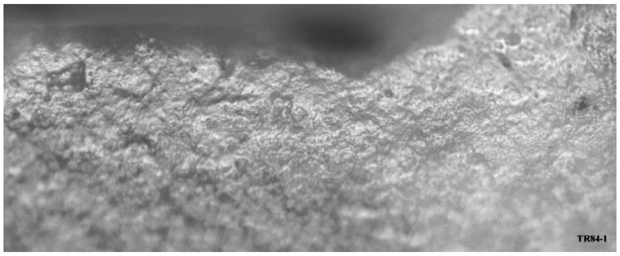
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
TR83-1	200x	Generic weak polish	Ventral, Distal

Summary: Used in transverse motion on indeterminate soft material.

Microwear #: 84
Artifact #: 084
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
TR84-1	200x	Plant polish	Ventral, Lateral
TR84-2	200x	Plant polish	Ventral, Lateral
TR84-3	200x	Plant polish	Ventral, Lateral

Summary: Used in transverse motion on plant matter.

Microwear #: 85
Artifact #: 085
Site #: 47LC0095
Site Name: Tremaine

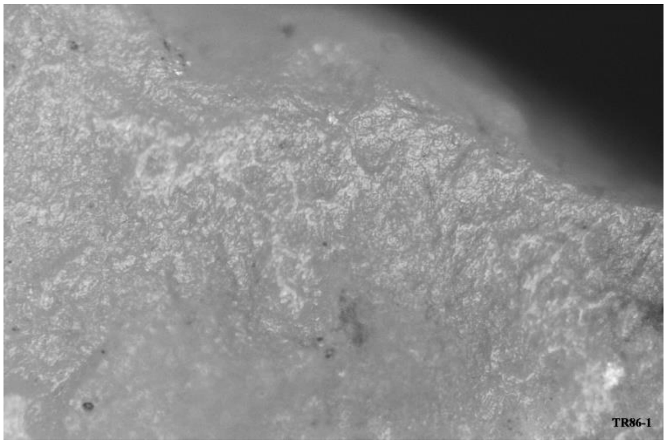
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 86
Artifact #: 086
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
TR86-1	200x	Wet hide polish	Ventral, Distal

Summary: Used in indeterminate motion on wet hide.

Microwear #: 87
Artifact #: 087
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 88
Artifact #: 088
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 89
Artifact #: 089
Site #: 47LC0095
Site Name: Tremaine

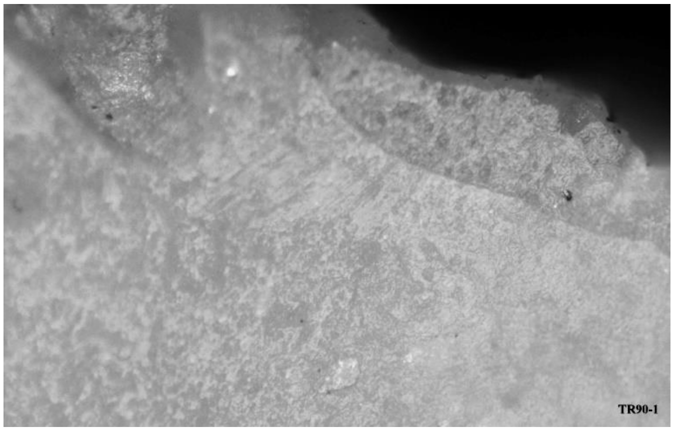
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on indeterminate soft material.

Microwear #: 90
Artifact #: 090
Site #: 47LC0095
Site Name: Tremaine



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
TR90-1	200x	Striations	Ventral, Distal

Summary: Used in transverse motion on wet hide.

Microwear #: 91
Artifact #: 091
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 92
Artifact #: 092
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 93
Artifact #: 093
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Unused.

Microwear #: 94
Artifact #: 094
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 95
Artifact #: 095
Site #: 47LC0095
Site Name: Tremaine

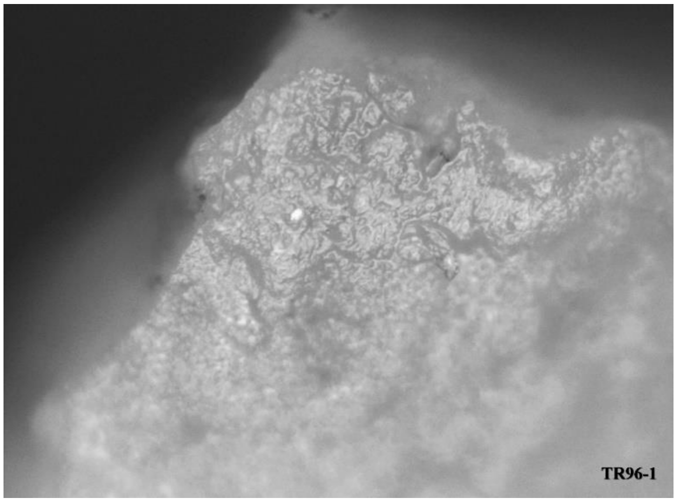
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 96
Artifact #: 096
Site #: 47LC0095
Site Name: Tremaine



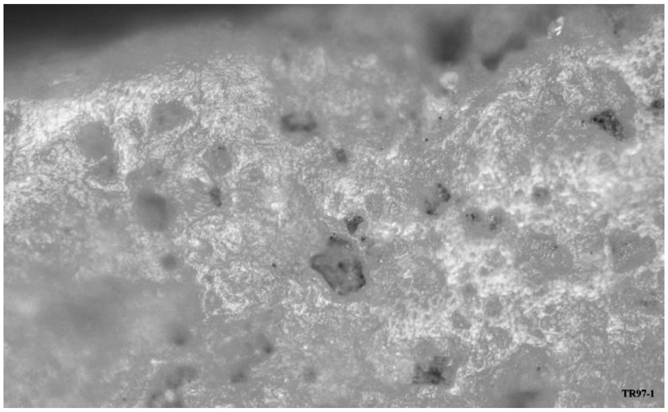
Dorsal View

Ventral View

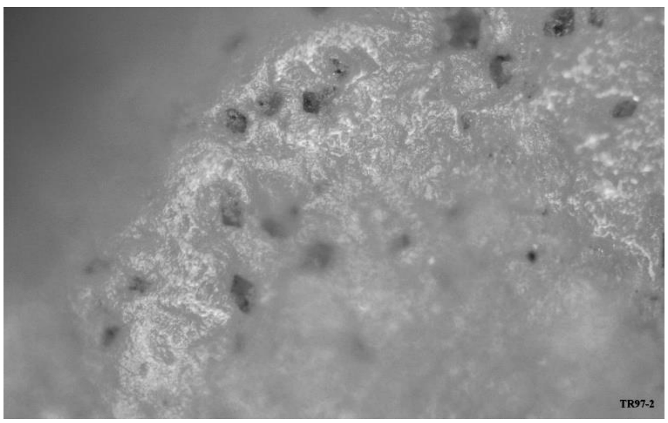
Photo #	Magnification	Feature	Location
TR96-1	200x	Dry hide polish	Ventral, Distal

Summary: Used in indeterminate motion on dry hide.

Microwear #: 97
Artifact #: 097
Site #: 47LC0095
Site Name: Tremaine



Dorsal View



Ventral View

Photo #	Magnification	Feature	Location
TR97-1	200x	Dry hide polish	Ventral, Lateral
TR97-2	200x	Dry hide polish	Ventral, Lateral

Summary: Used in indeterminate motion on dry hide.

Microwear #: 98
Artifact #: 098
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 99
Artifact #: 099
Site #: 47LC0095
Site Name: Tremaine

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 100
Artifact #: 100
Site #: 47LC0095
Site Name: Tremaine

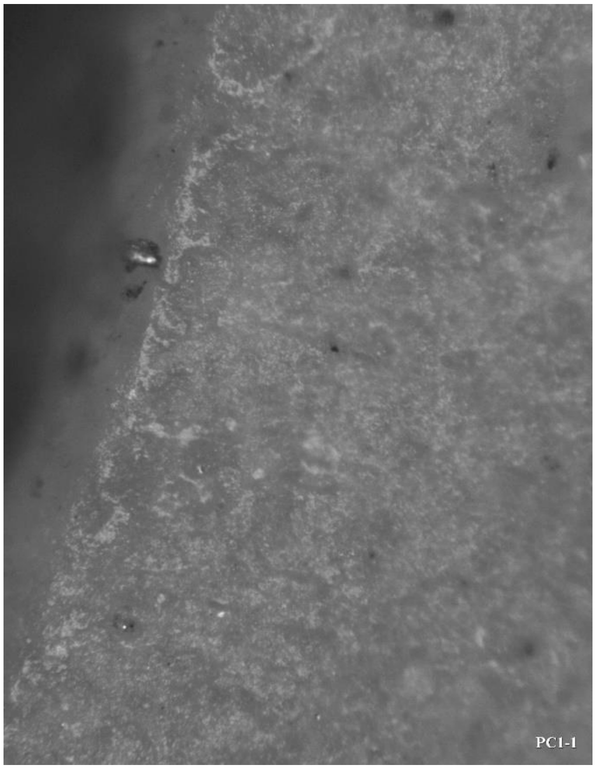
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 1
Artifact #: 001
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC1-1	100x	Bone polish	Ventral, Distal

Summary: Used in longitudinal motion on bone.

Microwear #: 2
Artifact #: 002
Site #: 47LC0061
Site Name: Pammel Creek

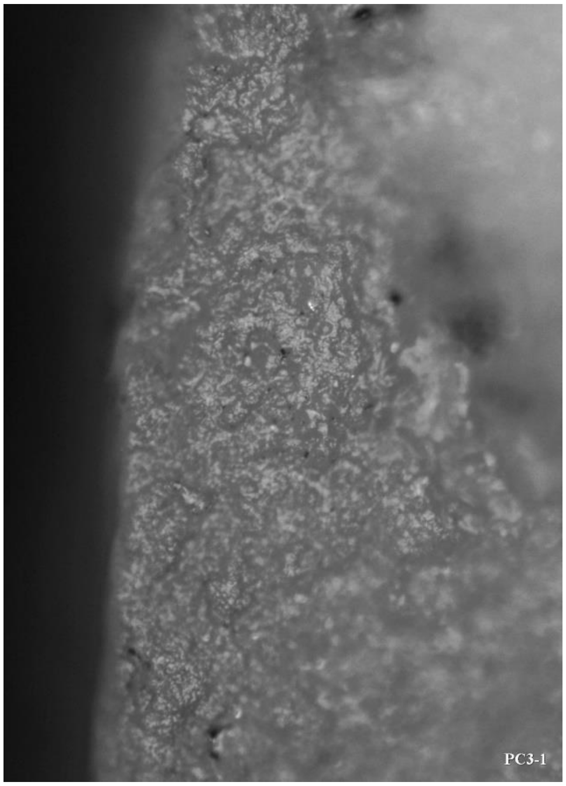
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 3
Artifact #: 003
Site #: 47LC0061
Site Name: Pammel Creek



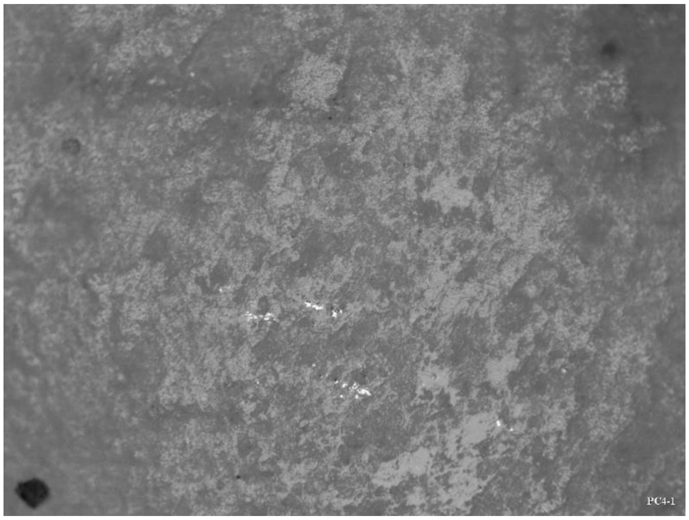
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC3-1	200x	Dry hide polish	Ventral, Proximal

Summary: Used in indeterminate motion on dry hide.

Microwear #: 4
Artifact #: 004
Site #: 47LC0061
Site Name: Pammel Creek



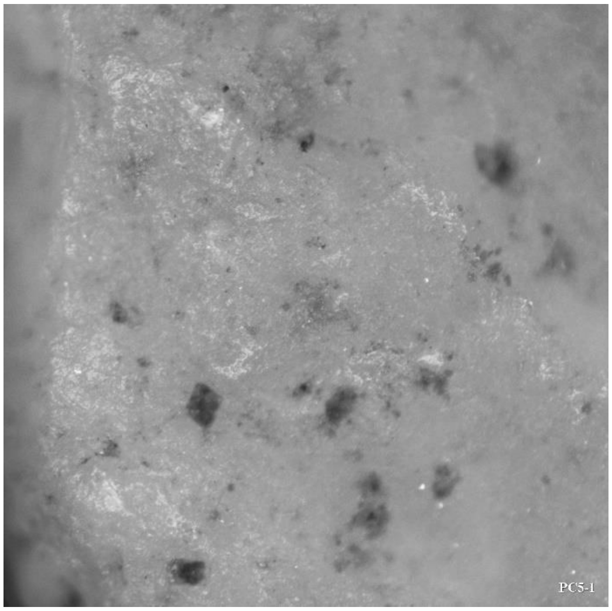
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC4-1	100x	Grit polish	Ventral, Proximal

Summary: Indeterminate use.

Microwear #: 5
Artifact #: 005
Site #: 47LC0061
Site Name: Pammel Creek



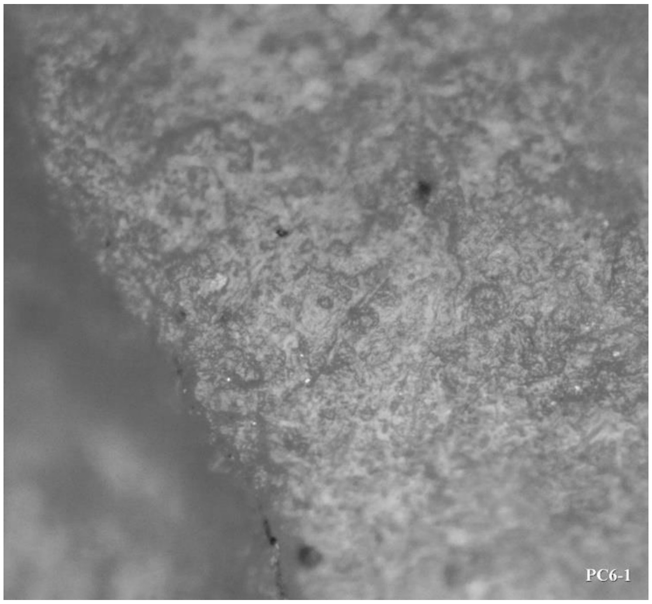
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC5-1	100x	Smooth pitted polish	Ventral, Lateral

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 6
Artifact #: 006
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC6-1	200x	Meat polish	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 7
Artifact #: 007
Site #: 47LC0061
Site Name: Pammel Creek

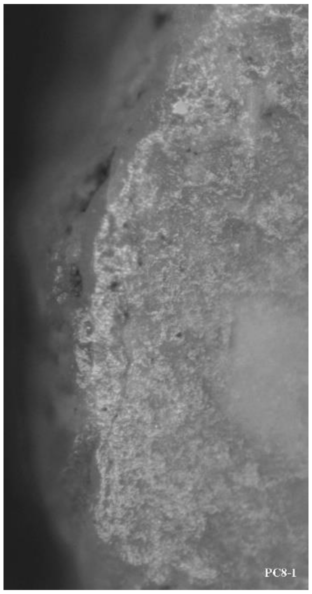
Dorsal View

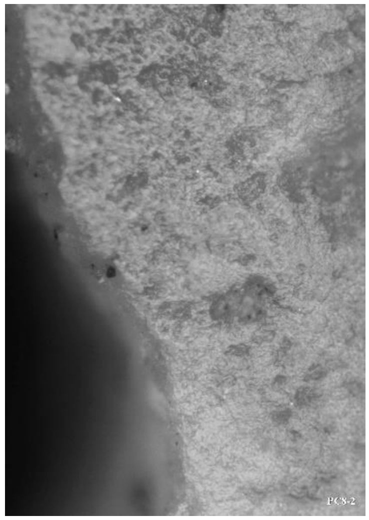
Ventral View

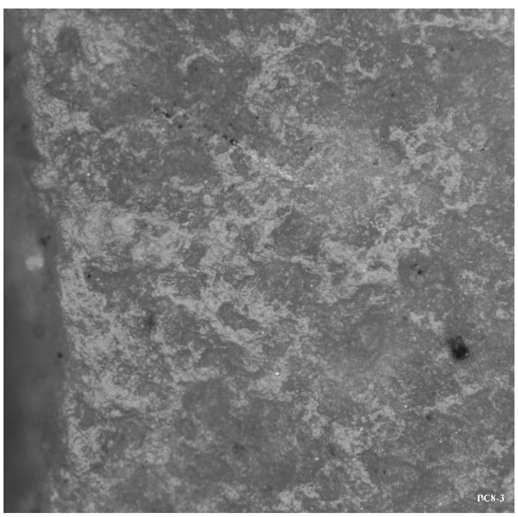
Photo #	**Magnification**	**Feature**	**Location**
PC7-1	200x	Polish and striations	Ventral, Distal

Summary: Used in transverse motion on indeterminate hard material.

Microwear #: 8
Artifact #: 008
Site #: 47LC0061
Site Name: Pammel Creek







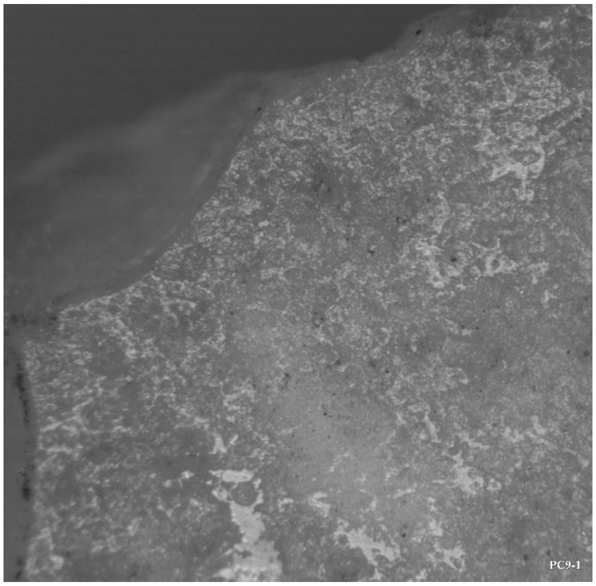
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC8-1	100x	Wet hide polish	Dorsal, Lateral
PC8-2	200x	Wet hide polish	Dorsal, Lateral
PC8-3	200x	Wet hide polish	Dorsal, Lateral

Summary: Used in transverse motion on wet hide.

Microwear #: 9
Artifact #: 009
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC9-1	100x	Grit polish	Ventral, Distal

Summary: Unused.

Microwear #: 10
Artifact #: 010
Site #: 47LC0061
Site Name: Pammel Creek

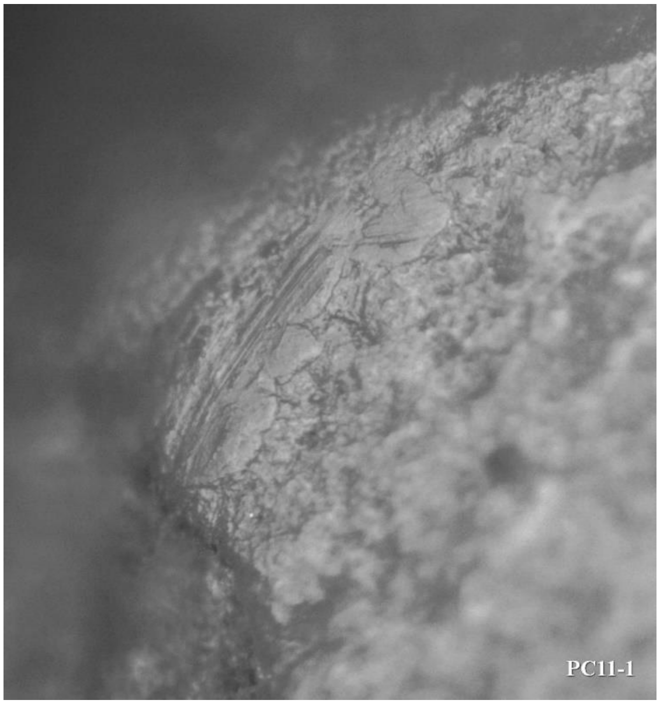
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 11
Artifact #: 011
Site #: 47LC0061
Site Name: Pammel Creek



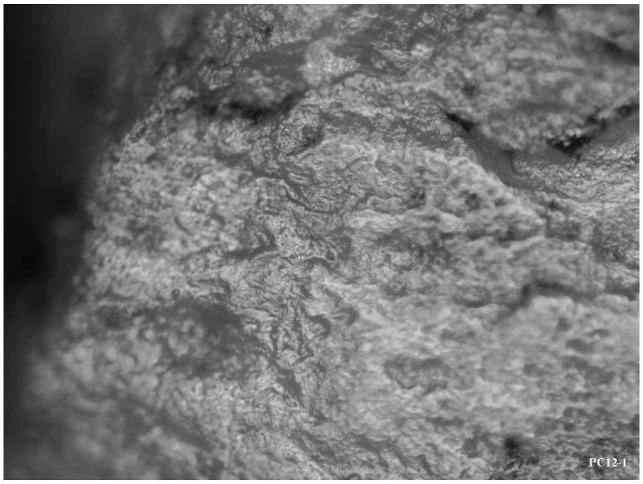
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC11-1	200x	Grit polish	Ventral, Distal

Summary: Unused.

Microwear #: 12
Artifact #: 012
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC12-1	200x	Heat treated surface	Ventral, Distal

Summary: Unused.

Microwear #: 13
Artifact #: 013
Site #: 47LC0061
Site Name: Pammel Creek

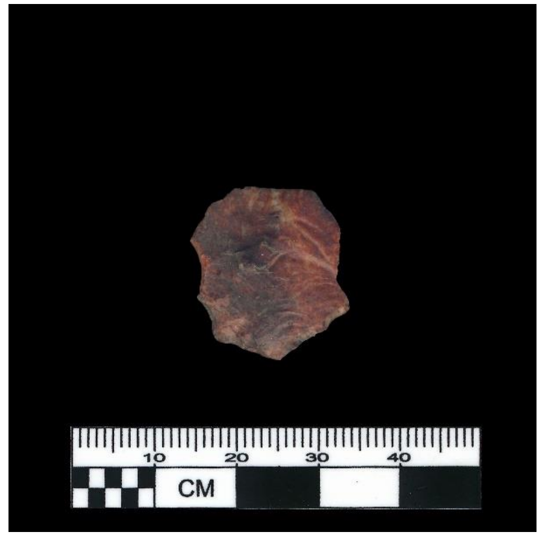
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 14
Artifact #: 014
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 15
Artifact #: 015
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 16
Artifact #: 016
Site #: 47LC0061
Site Name: Pammel Creek

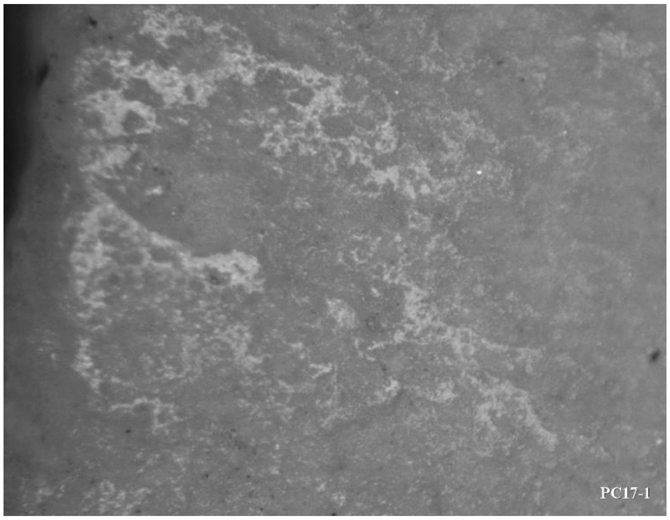
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 17
Artifact #: 017
Site #: 47LC0061
Site Name: Pammel Creek



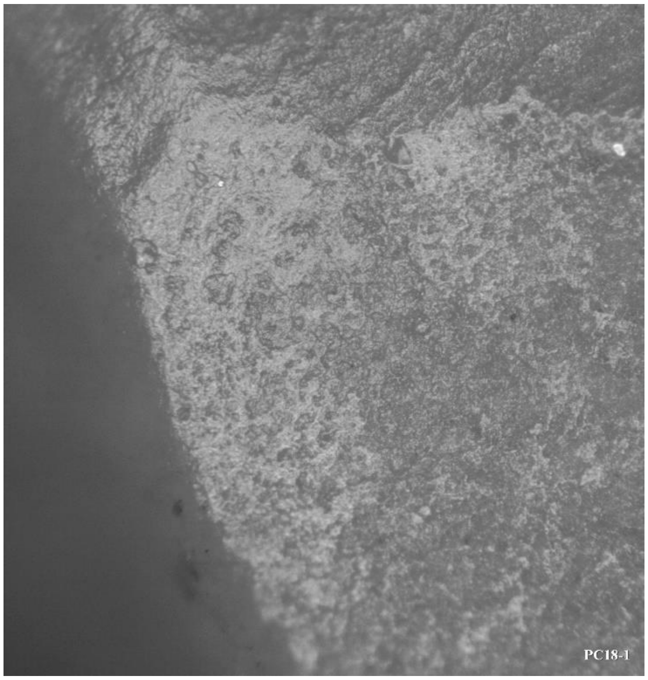
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC17-1	100x	Grit polish	Ventral, Lateral

Summary: Unused.

Microwear #: 18
Artifact #: 018
Site #: 47LC0061
Site Name: Pammel Creek



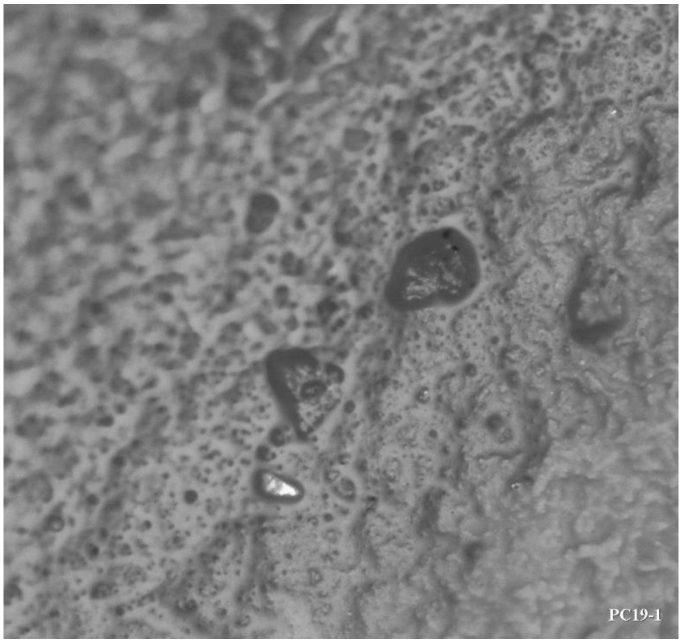
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC18-1	100x	Wood polish	Ventral, Proximal

Summary: Used in indeterminate motion on wood.

Microwear #: 19
Artifact #: 019
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC19-1	200x	Plant polish	Ventral, Distal

Summary: Used in indeterminate motion on plant matter.

Microwear #: 20
Artifact #: 020
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 21
Artifact #: 021
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 22
Artifact #: 022
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 23
Artifact #: 023
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 24
Artifact #: 024
Site #: 47LC0061
Site Name: Pammel Creek

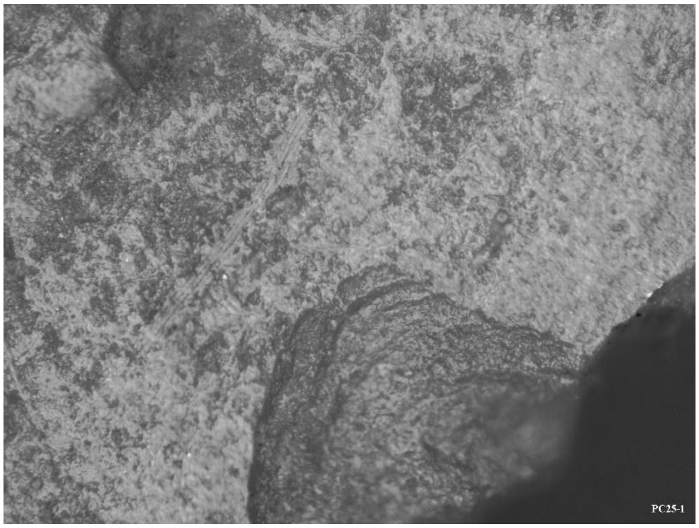
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on indeterminate hard material.

Microwear #: 25
Artifact #: 025
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC25-1	200x	Wood polish	Ventral, Lateral

Summary: Used in a longitudinal motion on wood.

Microwear #: 26
Artifact #: 026
Site #: 47LC0061
Site Name: Pammel Creek

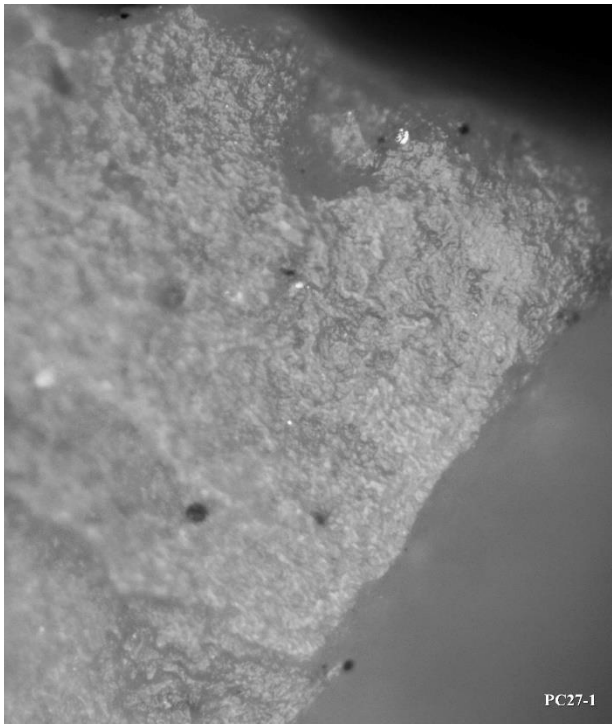
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 27
Artifact #: 027
Site #: 47LC0061
Site Name: Pammel Creek



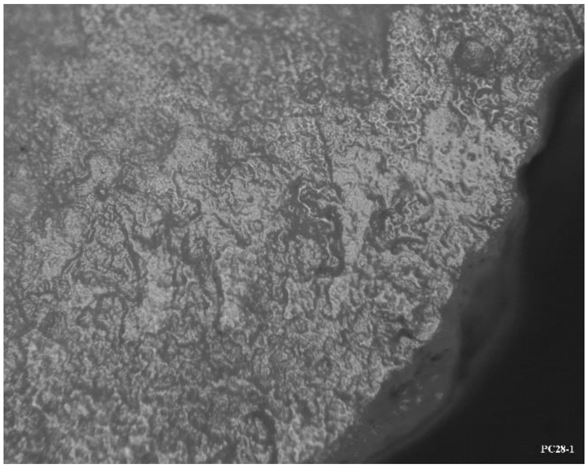
Dorsal View

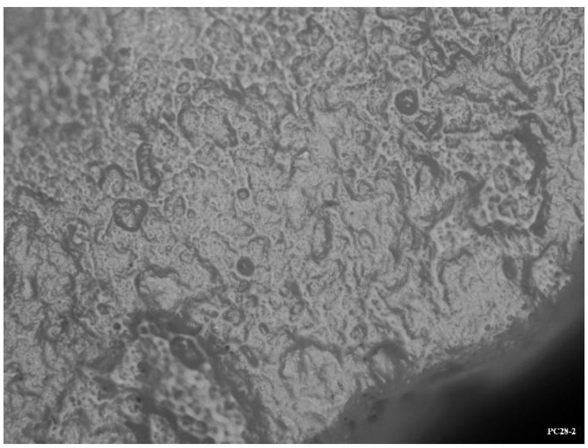
Ventral View

Photo #	Magnification	Feature	Location
PC27-1	200x	Meat polish	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 28
Artifact #: 028
Site #: 47LC0061
Site Name: Pammel Creek





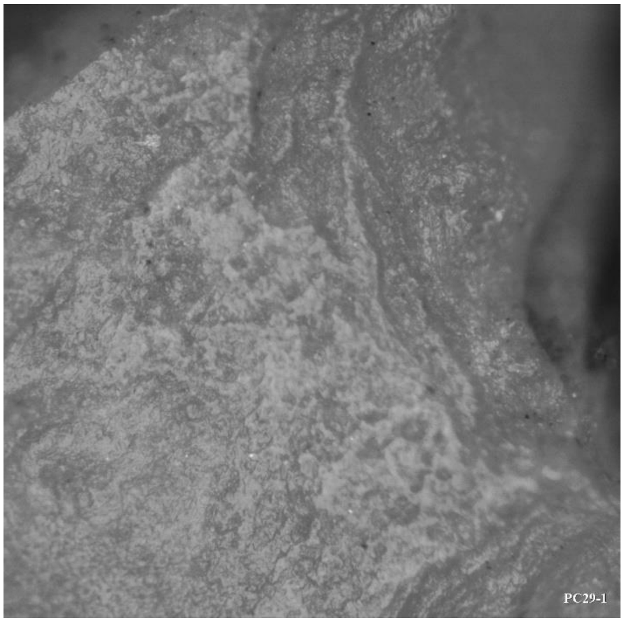
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC28-1	100x	Plant polish	Ventral, Distal
PC28-2	200x	Plant polish	Ventral, Distal

Summary: Used in indeterminate motion on plant matter.

Microwear #: 29
Artifact #: 029
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

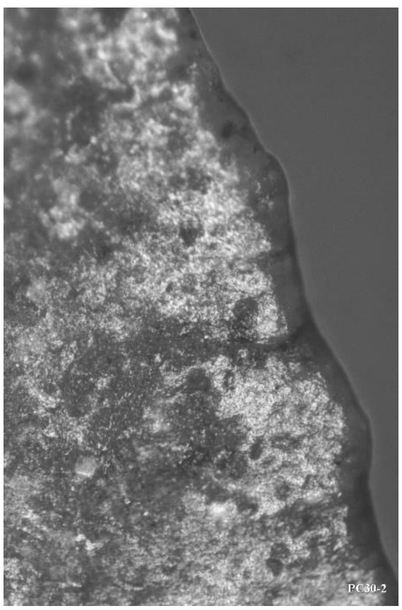
Ventral View

Photo #	Magnification	Feature	Location
PC29-1	200x	Grit polish	Ventral, Proximal

Summary: Unused.

Microwear #: 30
Artifact #: 030
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View



Ventral View

Photo #	Magnification	Feature	Location
PC30-1	200x	Dry hide polish	Ventral, Distal
PC30-2	100x	Dry hide polish	Ventral, Distal

Summary: Used in transverse motion on dry hide.

Microwear #: 31
Artifact #: 031
Site #: 47LC0061
Site Name: Pammel Creek

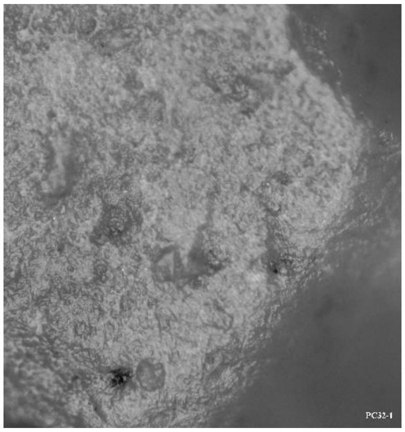
Dorsal View

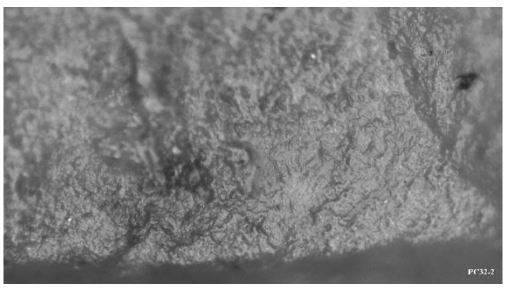
Ventral View

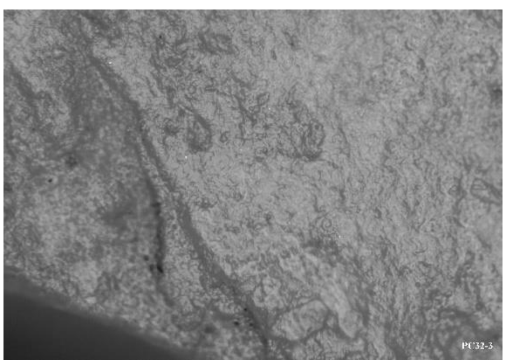
Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 32
Artifact #: 032
Site #: 47LC0061
Site Name: Pammel Creek







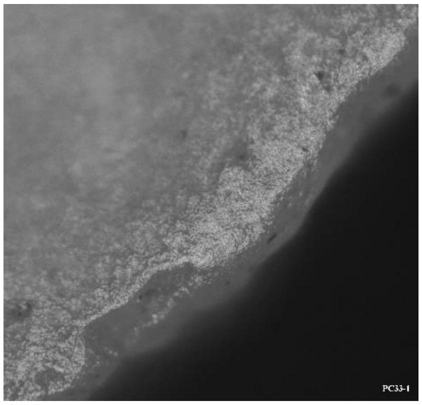
Dorsal View

Ventral View

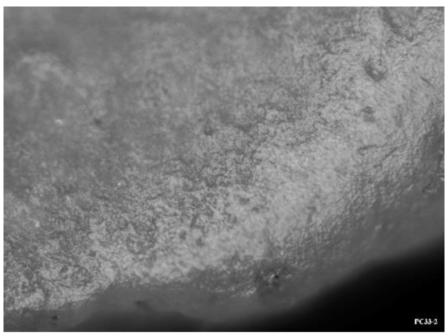
Photo #	Magnification	Feature	Location
PC32-1	200x	Meat polish	Ventral, Proximal
PC32-2	200x	Meat polish	Ventral, Proximal
PC32-3	200x	Meat polish	Ventral, Proximal

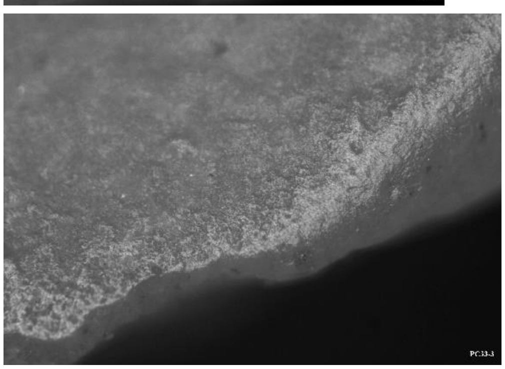
Summary: Used in indeterminate motion on meat.

Microwear #: 33
Artifact #: 033
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View



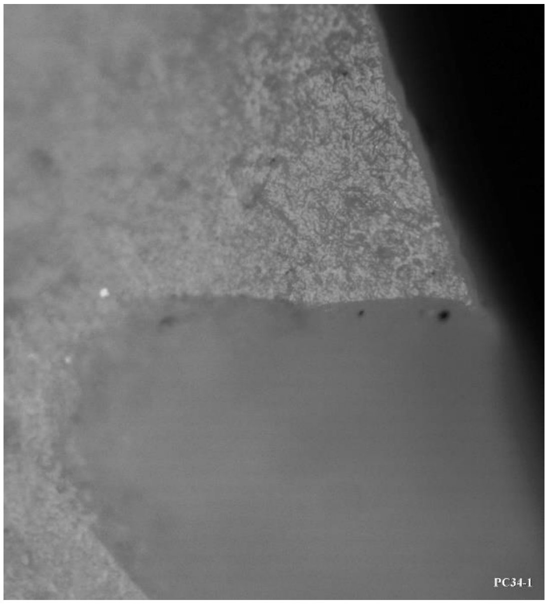


Ventral View

Photo #	Magnification	Feature	Location
PC33-1	100x	Wood polish	Ventral, Distal
PC33-2	200x	Wood polish	Ventral, Distal
PC33-3	100x	Wood polish	Ventral, Distal

Summary: Used in transverse motion on wood.

Microwear #: 34
Artifact #: 034
Site #: 47LC0061
Site Name: Pammel Creek



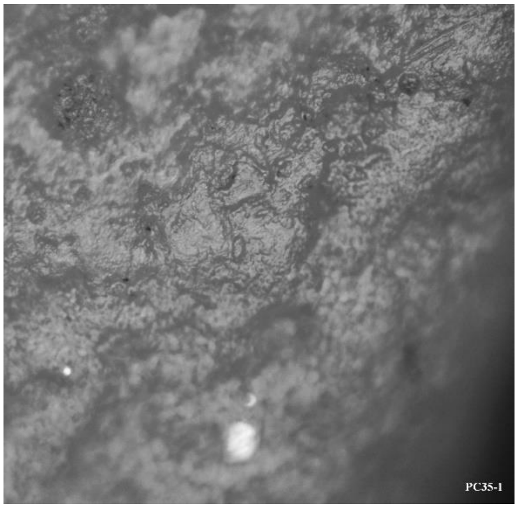
Dorsal View

Ventral View

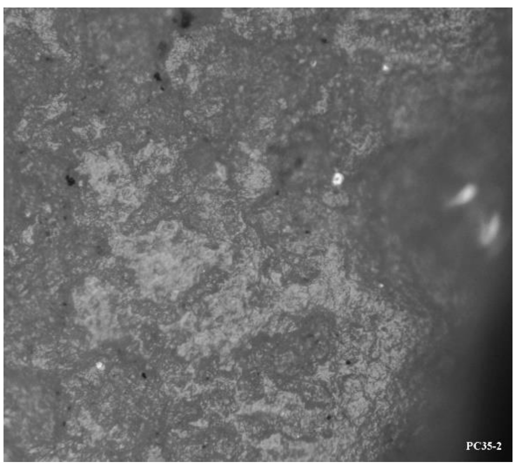
Photo #	Magnification	Feature	Location
PC34-1	200x	Smooth pitted polish	Ventral, Lateral

Summary: Used in transverse motion on indeterminate hard material.

Microwear #: 35
Artifact #: 035
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View



Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC35-1	200x	Meat polish	Ventral, Proximal
PC35-2	200x	Meat polish	Ventral, Proximal

Summary: Used in transverse motion on meat.

Microwear #: 36
Artifact #: 036
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

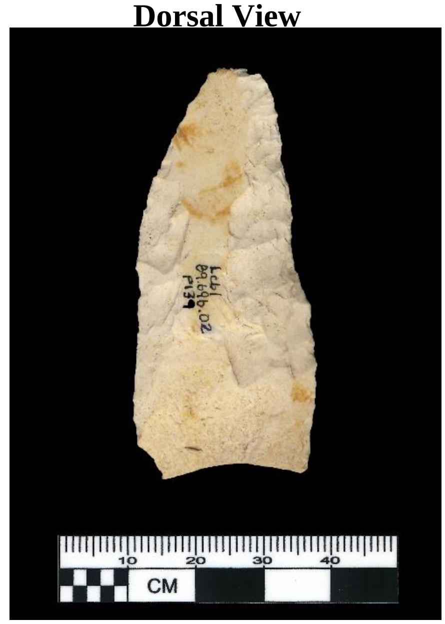
Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 37
Artifact #: 037
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

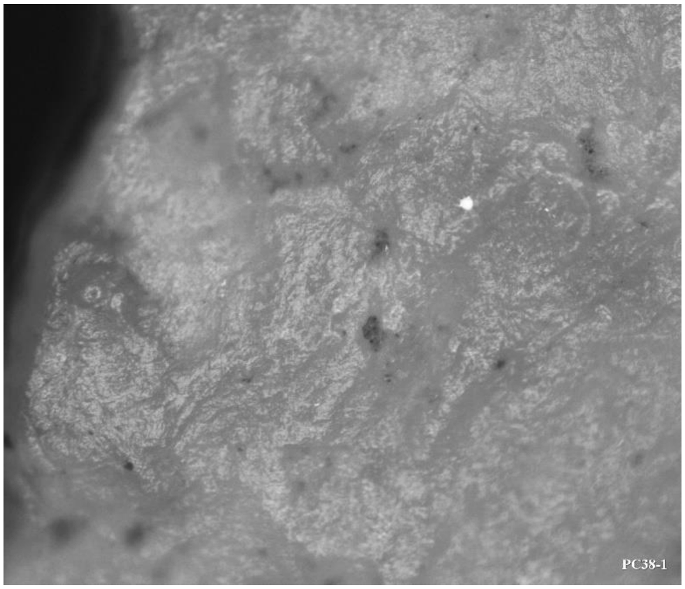


Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 38
Artifact #: 038
Site #: 47LC0061
Site Name: Pammel Creek



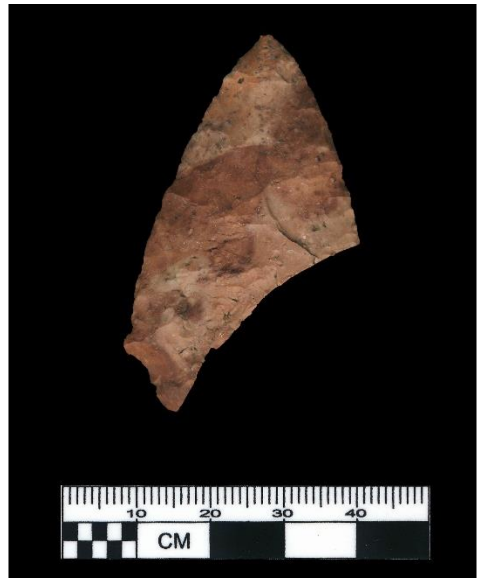
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC38-1	100x	Meat polish	Ventral, Distal

Summary: Used in indeterminate motion on meat.

Microwear #: 39
Artifact #: 039
Site #: 47LC0061
Site Name: Pammel Creek



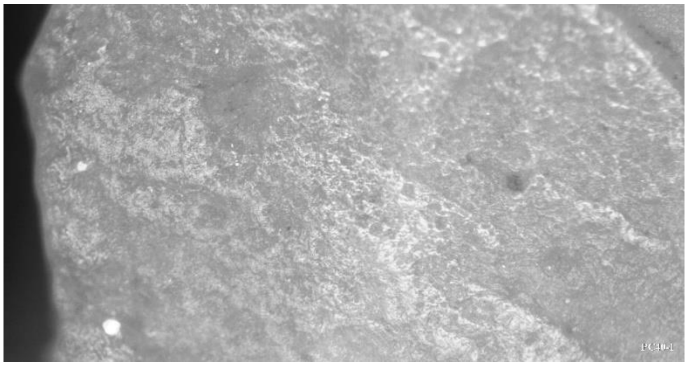
Dorsal View

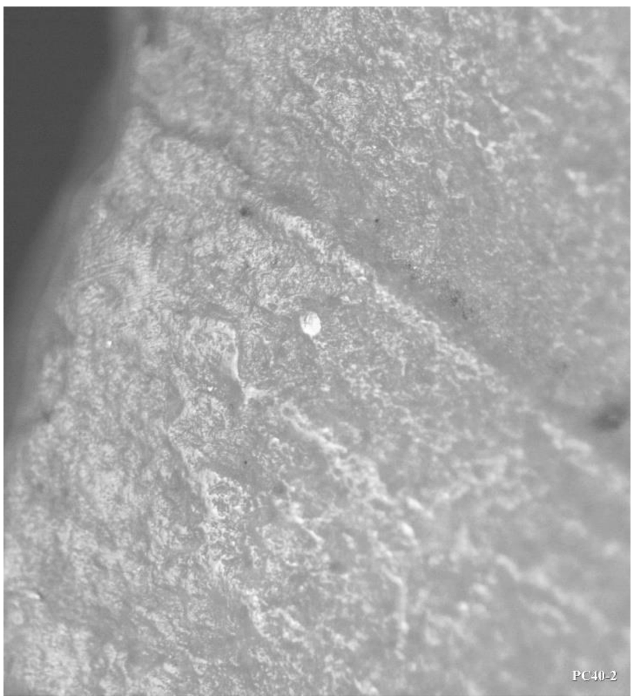
Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on meat.

Microwear #: 40
Artifact #: 040
Site #: 47LC0061
Site Name: Pammel Creek





Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC40-1	100x	Meat polish	Ventral, Lateral
PC40-2	100x	Meat polish	Ventral, Lateral

Summary: Used in longitudinal motion on meat.

Microwear #: 41
Artifact #: 041
Site #: 47LC0061
Site Name: Pammel Creek

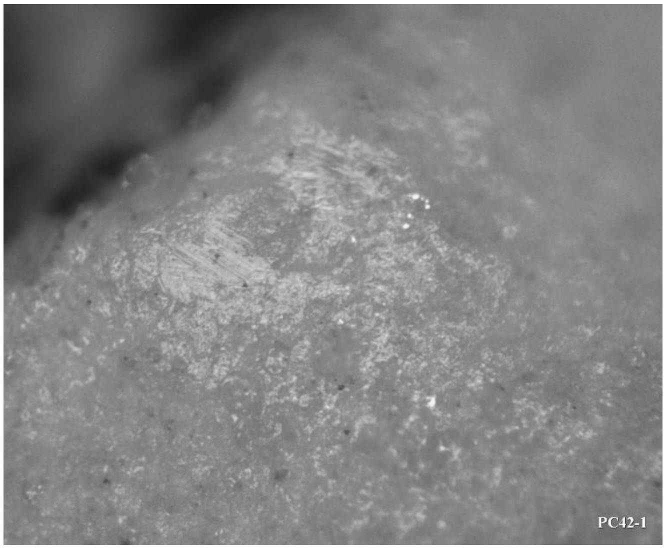
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 42
Artifact #: 042
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC42-1	100x	Hafting polish and striations	Dorsal, Medial

Summary: Used in longitudinal motion on indeterminate material.

Microwear #: 43
Artifact #: 043
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 44
Artifact #: 044
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 45
Artifact #: 045
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 46
Artifact #: 046
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC46-1	100x	Wood polish	Dorsal, Medial

Summary: Indeterminate use.

Microwear #: 47
Artifact #: 047
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 48
Artifact #: 048
Site #: 47LC0061
Site Name: Pammel Creek

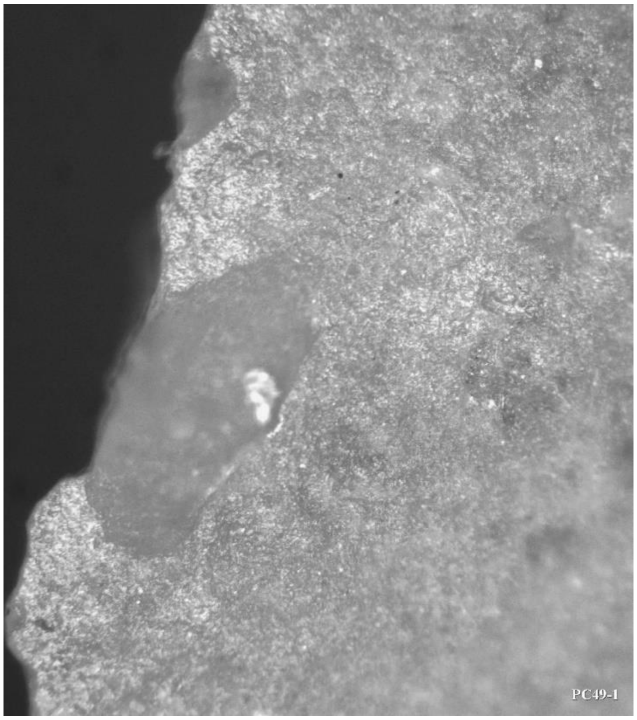
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 49
Artifact #: 049
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC49-1	100x	Generic weak polish	Ventral, Proximal

Summary: Indeterminate use.

Microwear #: 50
Artifact #: 050
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 51
Artifact #: 051
Site #: 47LC0061
Site Name: Pammel Creek

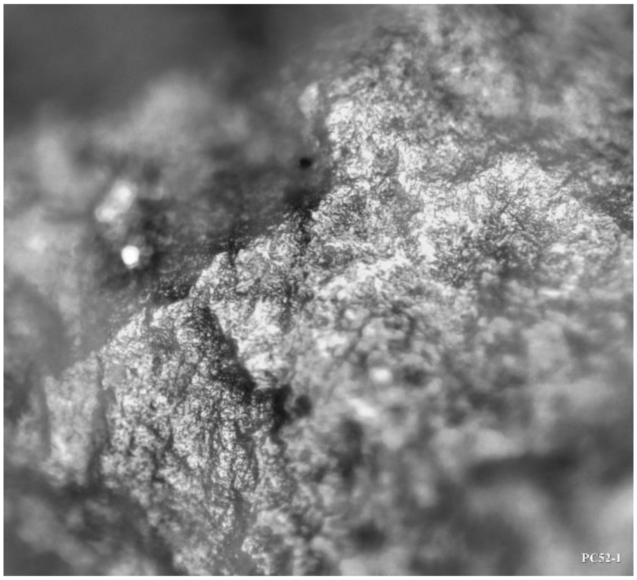
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 52
Artifact #: 052
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC52-1	200x	Smooth pitted polish	Dorsal, Distal

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 53
Artifact #: 053
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 54
Artifact #: 054
Site #: 47LC0061
Site Name: Pammel Creek

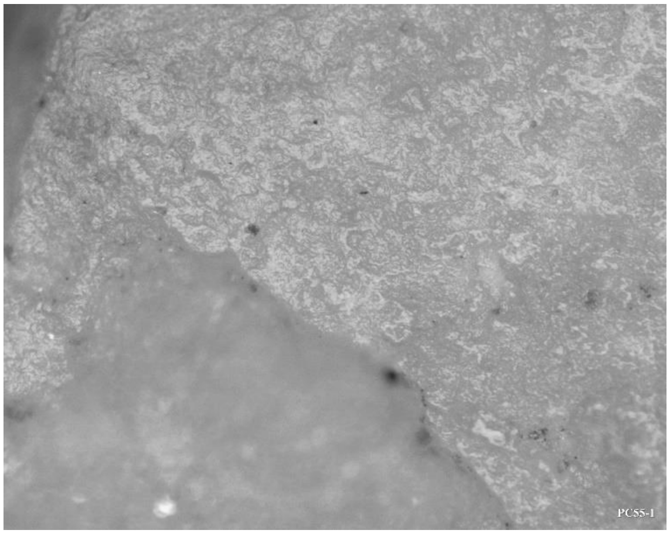
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 55
Artifact #: 055
Site #: 47LC0061
Site Name: Pammel Creek



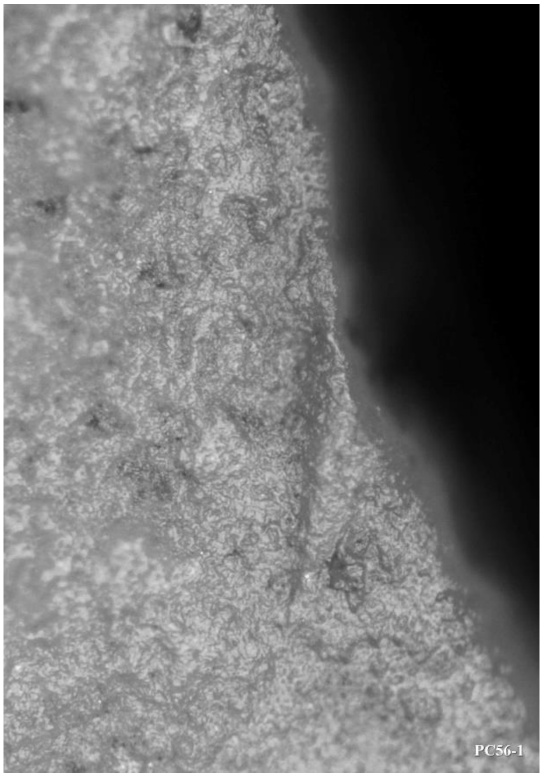
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC55-1	200x	Wood polish	Dorsal, Medial

Summary: Used in indeterminate motion on wood.

Microwear #: 56
Artifact #: 056
Site #: 47LC0061
Site Name: Pammel Creek



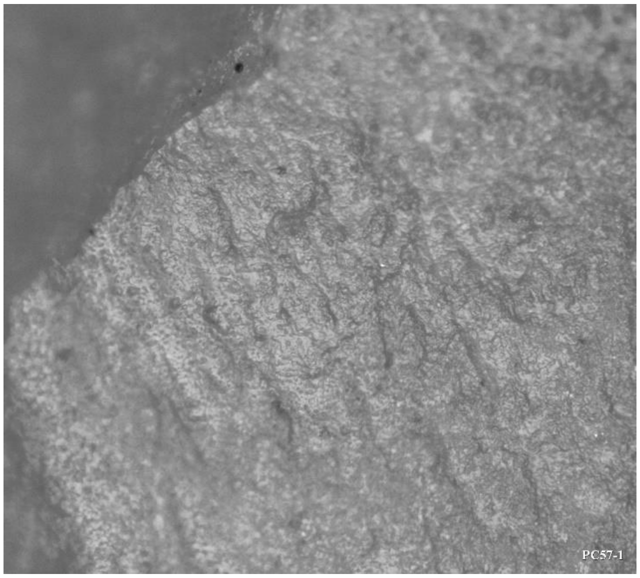
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC56-1	200x	Wet hide polish	Ventral, Proximal

Summary: Used in longitudinal motion on wet hide.

Microwear #: 57
Artifact #: 057
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC57-1	200x	Wood polish	Dorsal, Distal

Summary: Used in longitudinal motion on wood.

Microwear #: 58
Artifact #: 058
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 59
Artifact #: 059
Site #: 47LC0061
Site Name: Pammel Creek

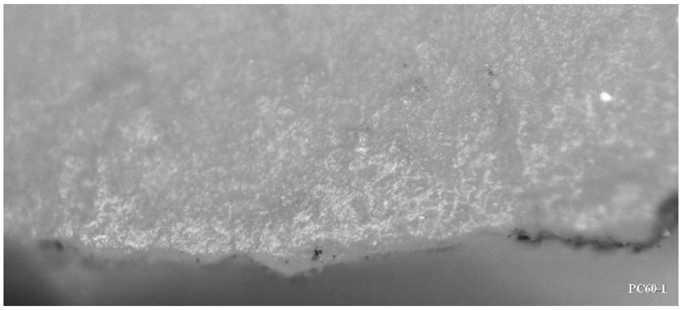
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 60
Artifact #: 060
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC60-1	100x	Bone polish	Ventral, Distal

Summary: Used in longitudinal motion on bone.

Microwear #: 61
Artifact #: 061
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Unused.

Microwear #: 62
Artifact #: 062
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Unused.

Microwear #: 63
Artifact #: 063
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Unused.

Microwear #: 64
Artifact #: 064
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 65
Artifact #: 065
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 66
Artifact #: 066
Site #: 47LC0061
Site Name: Pammel Creek

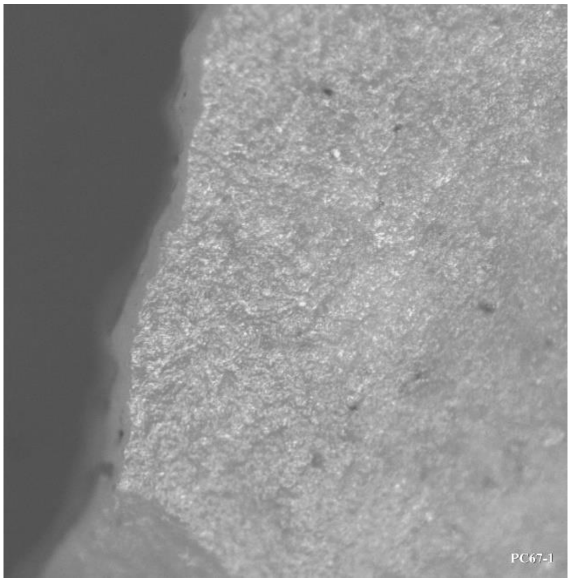
Dorsal View

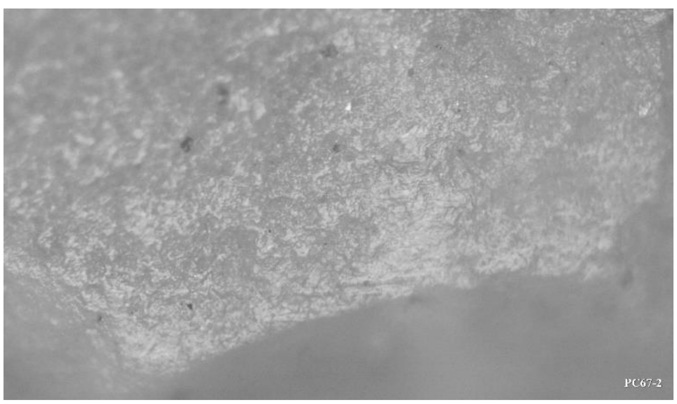
Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 67
Artifact #: 067
Site #: 47LC0061
Site Name: Pammel Creek





Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC67-1	100x	Wet hide polish	Ventral, Distal
PC67-2	200x	Wet hide polish and striations	Dorsal, Distal

Summary: Used in longitudinal motion on wet hide.

Microwear #: 68
Artifact #: 068
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 69
Artifact #: 069
Site #: 47LC0061
Site Name: Pammel Creek

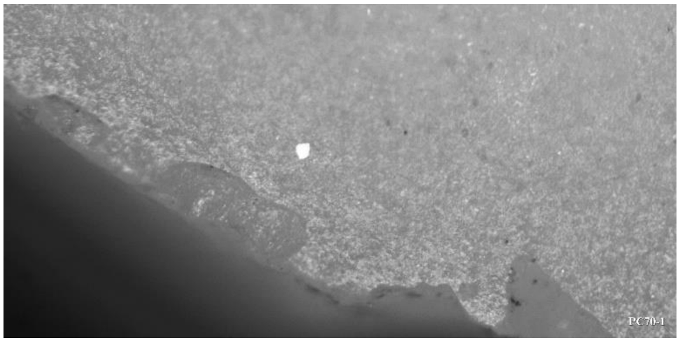
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on bone.

Microwear #: 70
Artifact #: 070
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC70-1	100x	Generic weak polish	Ventral, Distal

Summary: Used in transverse motion on indeterminate material.

Microwear #: 71
Artifact #: 071
Site #: 47LC0061
Site Name: Pammel Creek

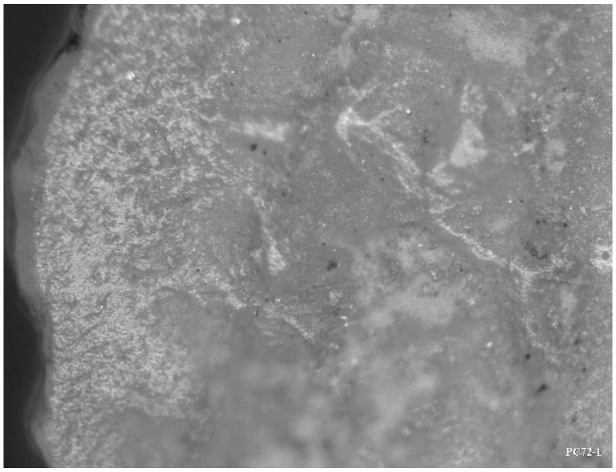
Dorsal View

Ventral View

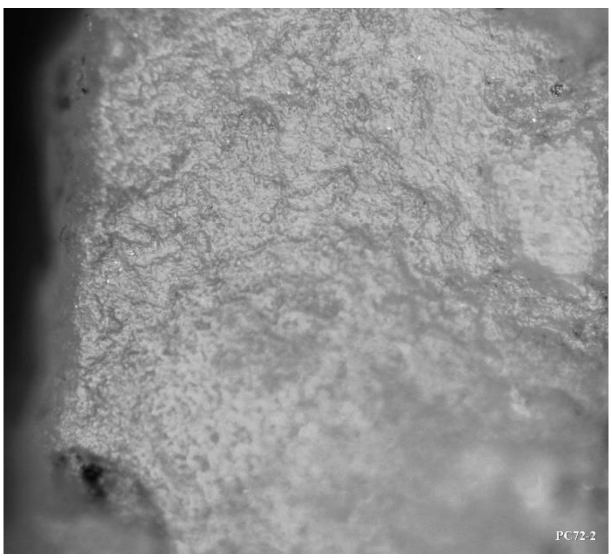
Photo #	**Magnification**	**Feature**	**Location**

Summary: Used in transverse motion on indeterminate material.

Microwear #: 72
Artifact #: 072
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

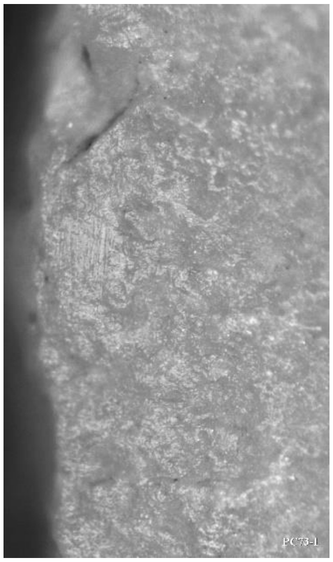


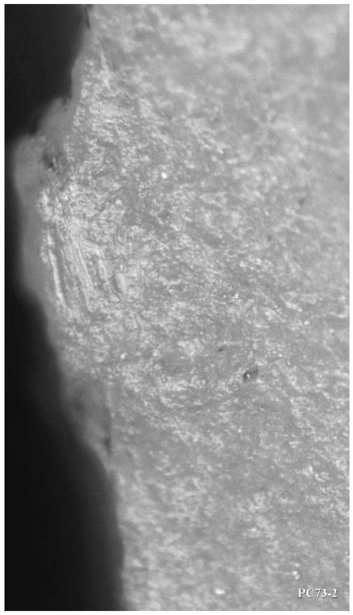
Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC72-1	100x	Wood polish	Ventral, Distal
PC72-2	200x	Wood polish	Ventral, Distal

Summary: Used in transverse motion on wood.

Microwear #: 73
Artifact #: 073
Site #: 47LC0061
Site Name: Pammel Creek





Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC73-1	100x	Polish and striations	Ventral, Distal
PC73-2	100x	Striations	Ventral, Distal
PC73-3	200x	Smooth pitted polish	Ventral, Distal

Summary: Used in longitudinal motion on indeterminate hard material.

Microwear #: 74
Artifact #: 074
Site #: 47LC0061
Site Name: Pammel Creek

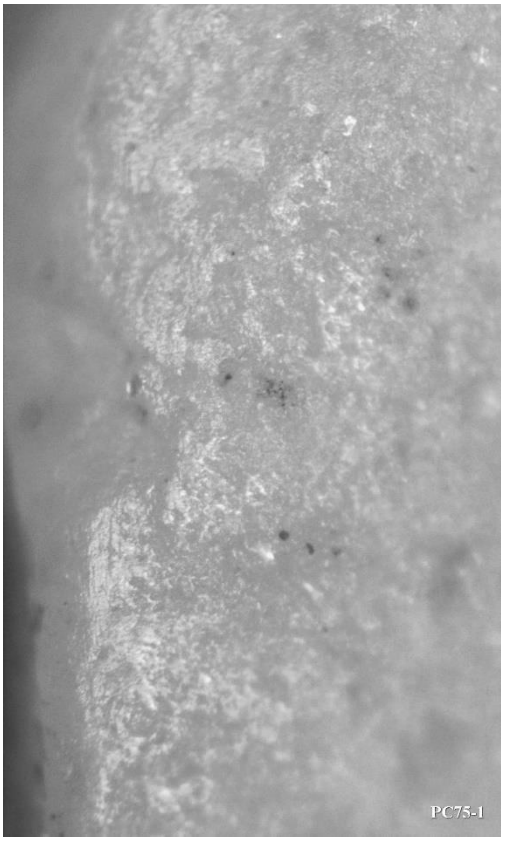
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on wet hide.

Microwear #: 75
Artifact #: 075
Site #: 47LC0061
Site Name: Pammel Creek



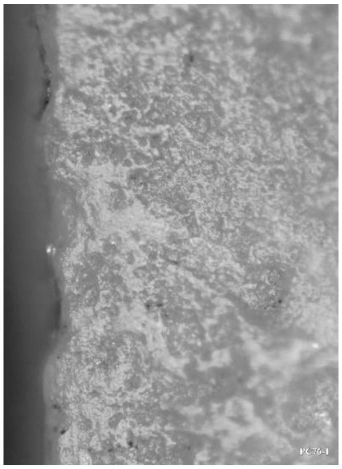
Dorsal View

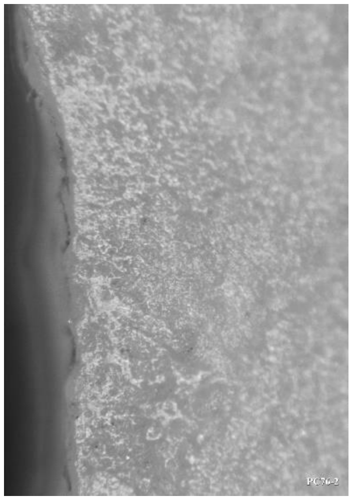
Ventral View

Photo #	Magnification	Feature	Location
PC75-1	100x	Polish and striations	Ventral, Distal

Summary: Used in multiple motions on bone.

Microwear #: 76
Artifact #: 076
Site #: 47LC0061
Site Name: Pammel Creek





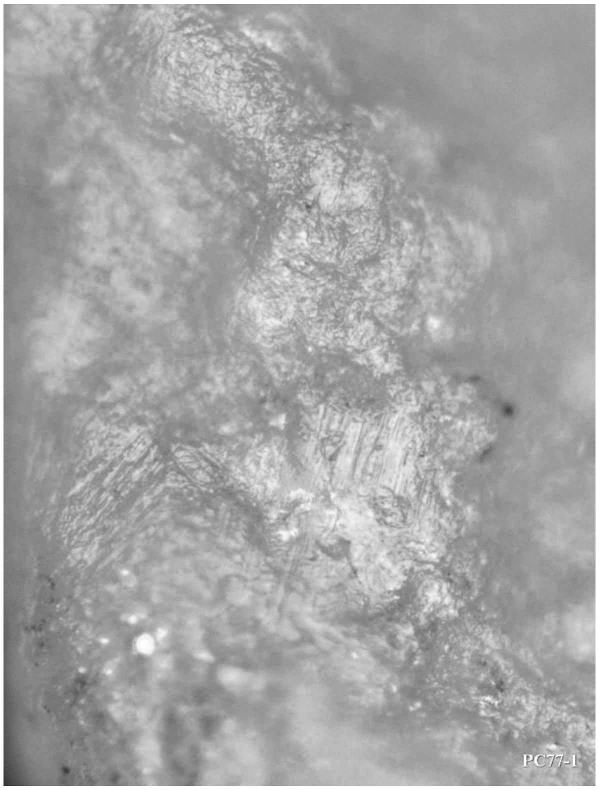
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC76-1	200x	Smooth pitted polish	Ventral, Distal
PC76-2	100x	Smooth pitted polish	Ventral, Distal

Summary: Used in transverse motion on indeterminate hard material.

Microwear #: 77
Artifact #: 077
Site #: 47LC0061
Site Name: Pammel Creek



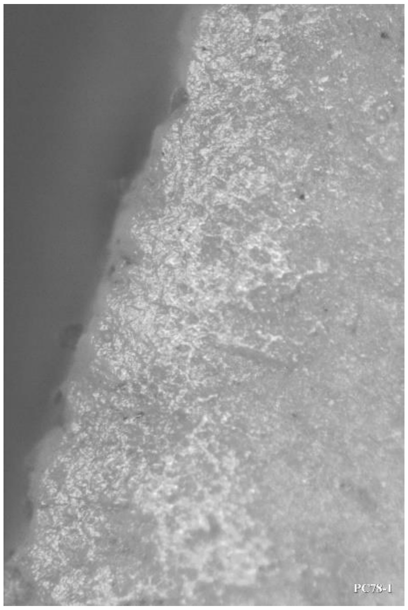
Dorsal View

Ventral View

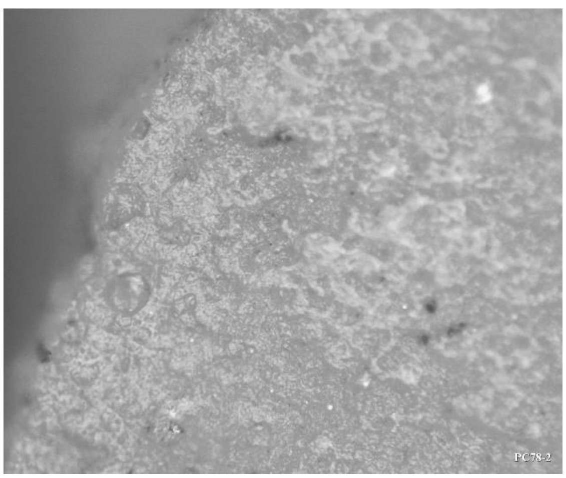
Photo #	Magnification	Feature	Location
PC77-1	200x	Striations	Ventral, Distal

Summary: Indeterminate use.

Microwear #: 78
Artifact #: 078
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View



Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC78-1	100x	Wet hide polish	Ventral, Distal
PC78-2	200x	Wet hide polish	Ventral, Distal

Summary: Used in indeterminate motion on wet hide.

Microwear #: 79
Artifact #: 079
Site #: 47LC0061
Site Name: Pammel Creek

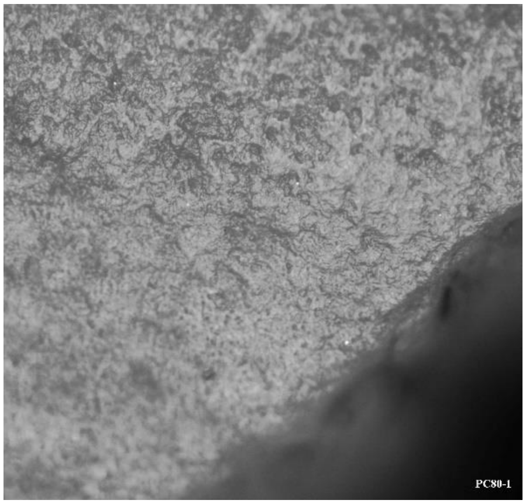
Dorsal View

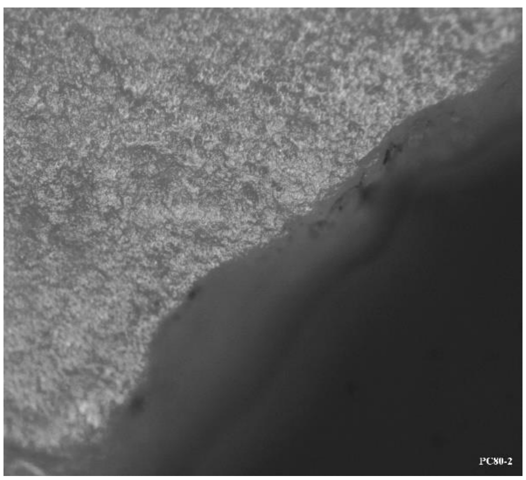
Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 80
Artifact #: 080
Site #: 47LC0061
Site Name: Pammel Creek





Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC80-1	200x	Wet hide polish	Ventral, Distal
PC80-2	100x	Wet hide polish	Ventral, Distal

Summary: Used in transverse motion on wet hide.

Microwear #: 81
Artifact #: 081
Site #: 47LC0061
Site Name: Pammel Creek

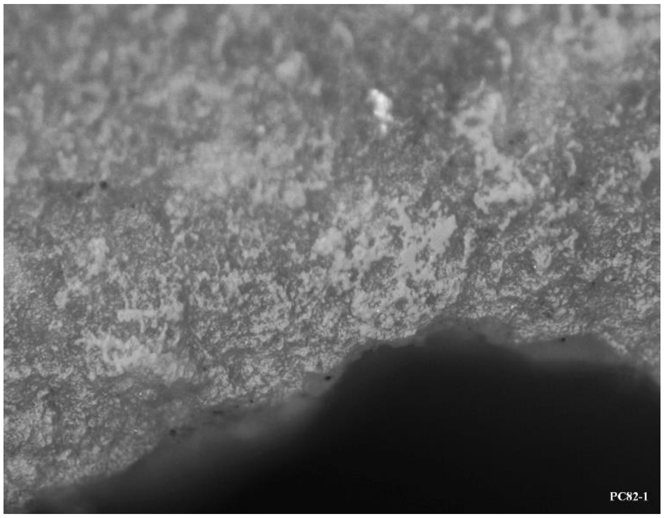
Dorsal View

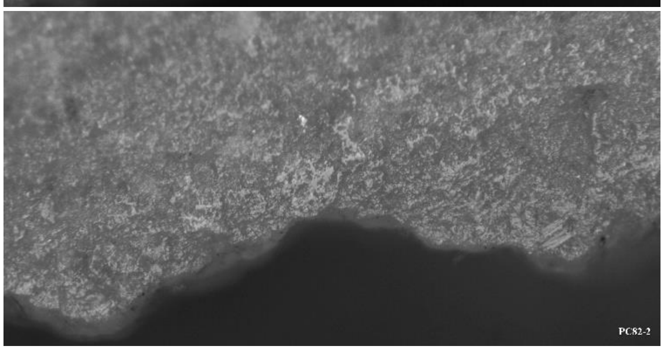
Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Unused.

Microwear #: 82
Artifact #: 082
Site #: 47LC0061
Site Name: Pammel Creek





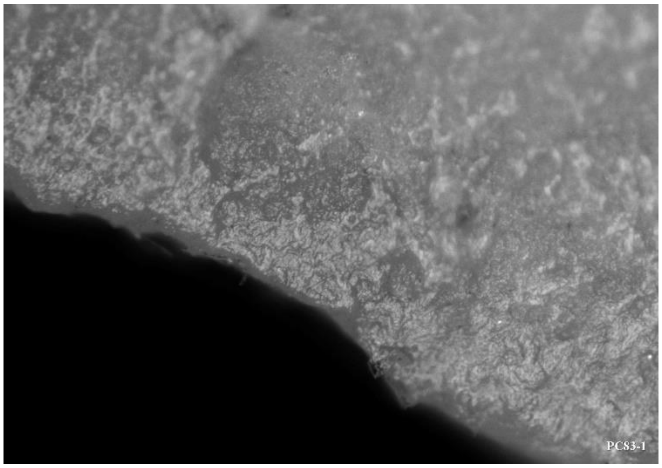
Dorsal View

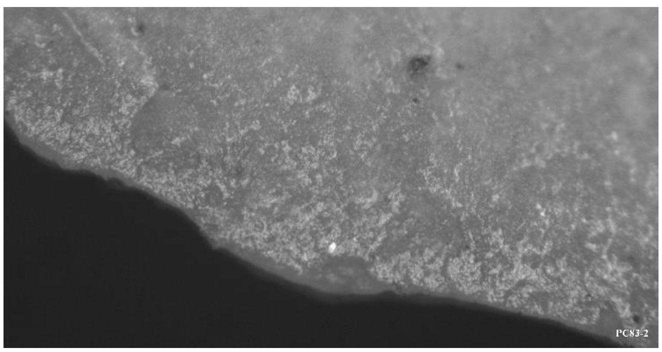
Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC82-1	200x	Bone polish	Ventral, Distal
PC82-2	100x	Bone polish	Ventral, Distal

Summary: Used in transverse motion on bone.

Microwear #: 83
Artifact #: 083
Site #: 47LC0061
Site Name: Pammel Creek





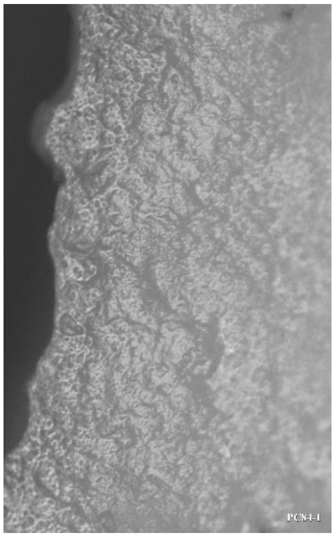
Dorsal View

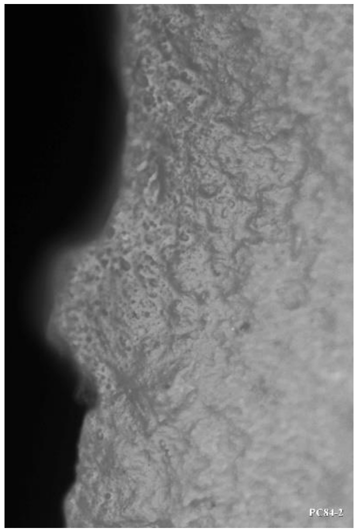
Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC83-1	200x	Bone polish	Ventral, Distal
PC83-2	100x	Bone polish	Ventral, Distal

Summary:

Microwear #: 84
Artifact #: 084
Site #: 47LC0061
Site Name: Pammel Creek





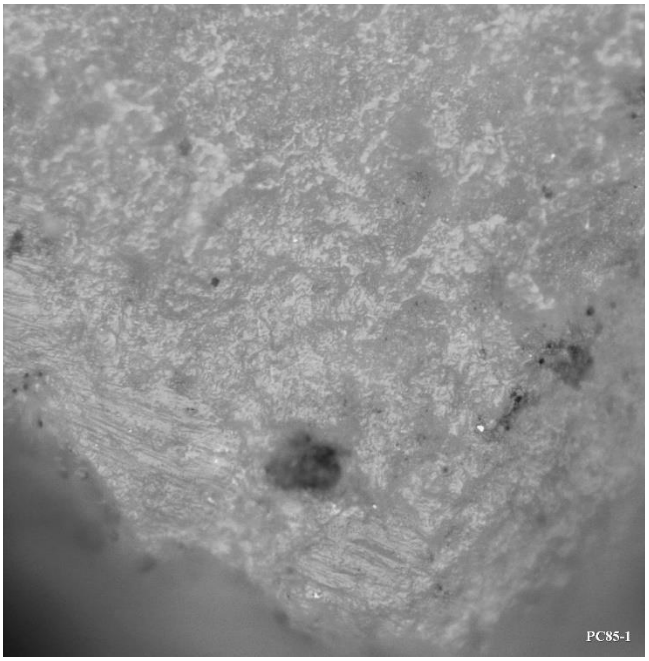
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC84-1	100x	Plant polish	Ventral, Distal
PC84-2	200x	Plant polish	Ventral, Distal

Summary: Used in indeterminate motion on plant matter.

Microwear #: 85
Artifact #: 085
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC85-1	200x	Striations	Ventral, Distal

Summary: Indeterminate use.

Microwear #: 86
Artifact #: 086
Site #: 47LC0061
Site Name: Pammel Creek

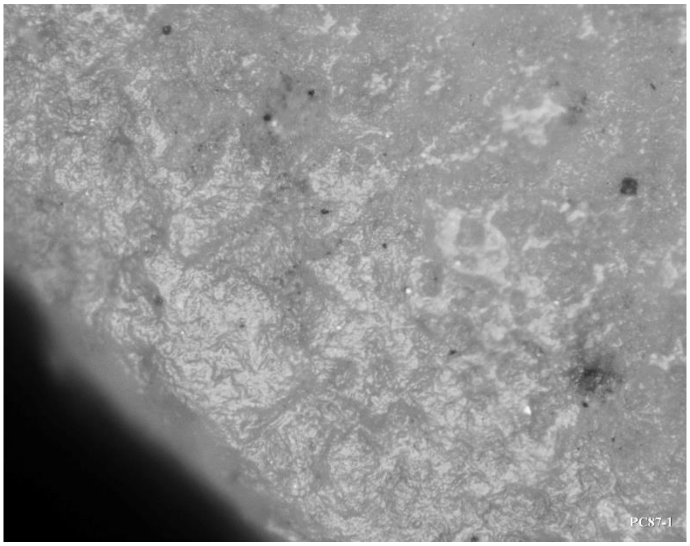
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**

Summary: Indeterminate use.

Microwear #: 87
Artifact #: 087
Site #: 47LC0061
Site Name: Pammel Creek



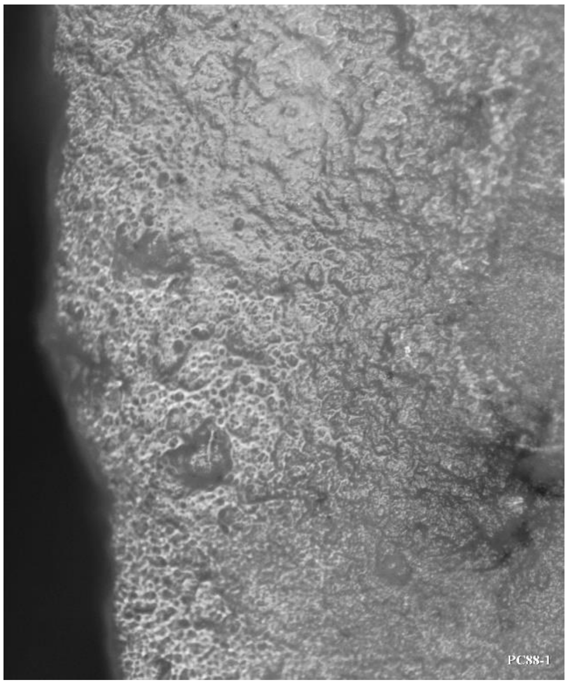
Dorsal View

Ventral View

Photo #	**Magnification**	**Feature**	**Location**
PC87-1	200x	Wet hide polish	Ventral, Distal

Summary: Used in indeterminate motion on wet hide.

Microwear #: 88
Artifact #: 088
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC88-1	100x	Plant polish	Ventral, Distal

Summary: Used in transverse motion on plant matter.

Microwear #: 89
Artifact #: 089
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Indeterminate use.

Microwear #: 90
Artifact #: 090
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on wood.

Microwear #: 91
Artifact #: 091
Site #: 47LC0061
Site Name: Pammel Creek

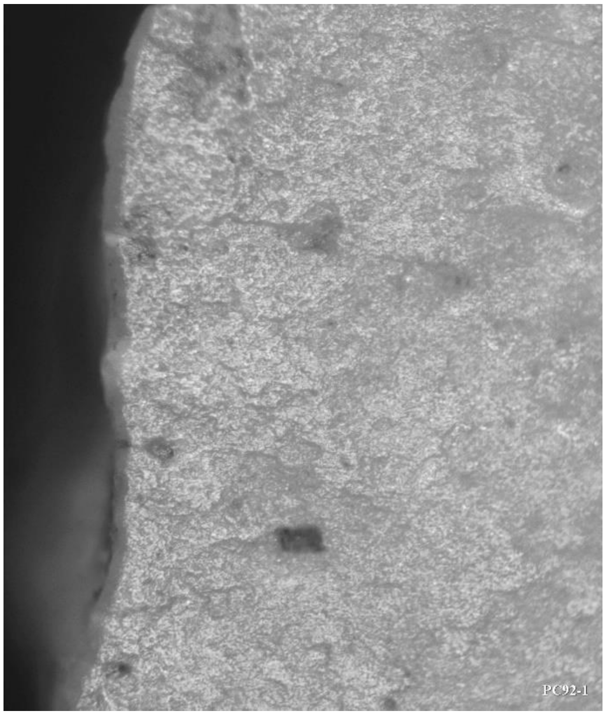
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on wood.

Microwear #: 92
Artifact #: 092
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC92-1	100x	Smooth pitted polish	Ventral, Distal

Summary: Used in indeterminate motion on indeterminate hard material.

Microwear #: 93
Artifact #: 093
Site #: 47LC0061
Site Name: Pammel Creek

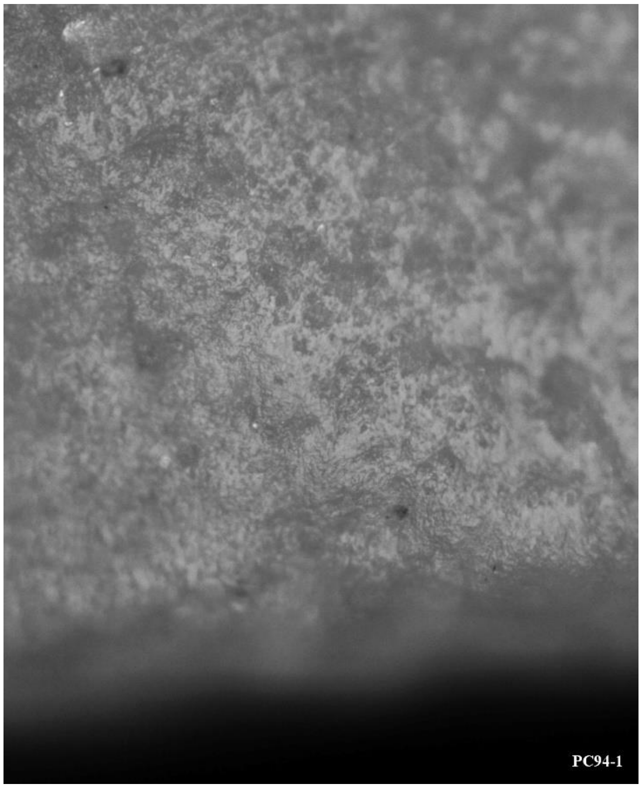
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Used in transverse motion on indeterminate material.

Microwear #: 94
Artifact #: 094
Site #: 47LC0061
Site Name: Pammel Creek



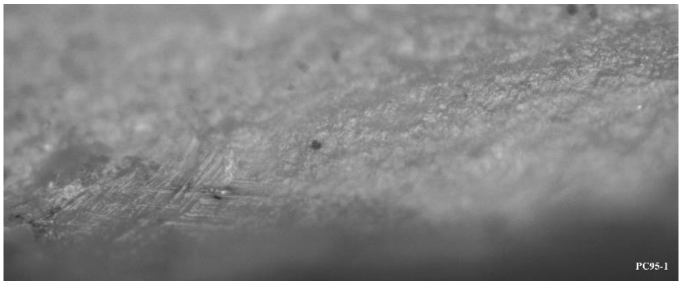
Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC94-1	200x	Wood polish	Ventral, Distal

Summary: Used in transverse motion on wood.

Microwear #: 95
Artifact #: 095
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC95-1	200x	Striations	Ventral, Distal

Summary: Unused.

Microwear #: 96
Artifact #: 096
Site #: 47LC0061
Site Name: Pammel Creek

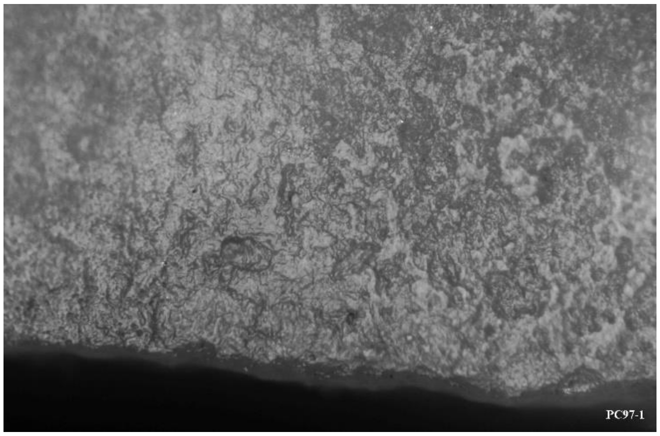
Dorsal View

Ventral View

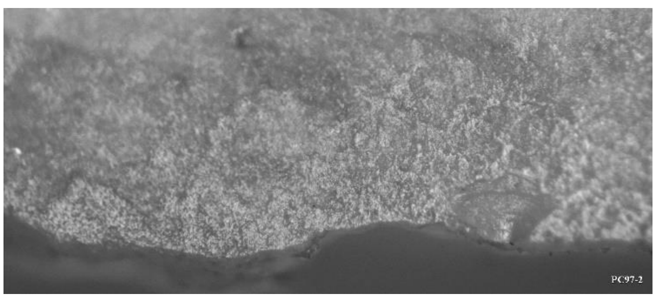
Photo #	Magnification	Feature	Location

Summary: Unused.

Microwear #: 97
Artifact #: 097
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

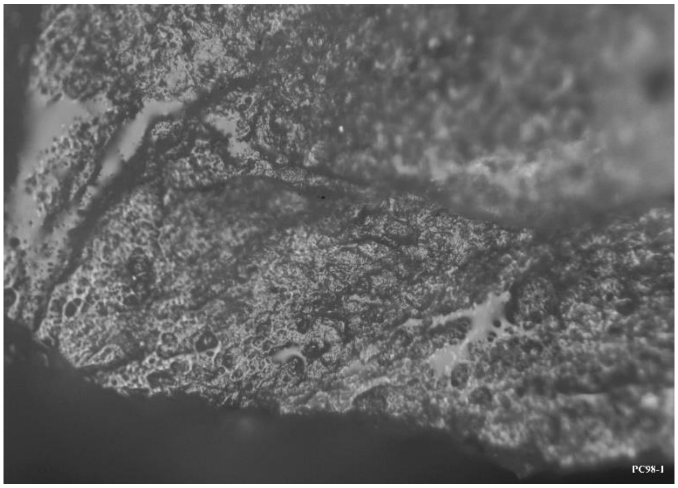


Ventral View

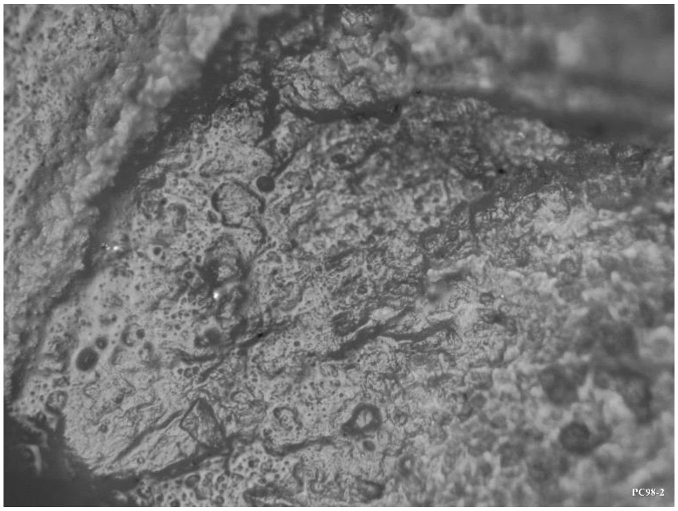
Photo #	**Magnification**	**Feature**	**Location**
PC97-1	200x	Bone polish	Ventral, Distal
PC97-2	100x	Bone polish	Ventral, Distal

Summary: Used in indeterminate motion on bone.

Microwear #: 98
Artifact #: 098
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

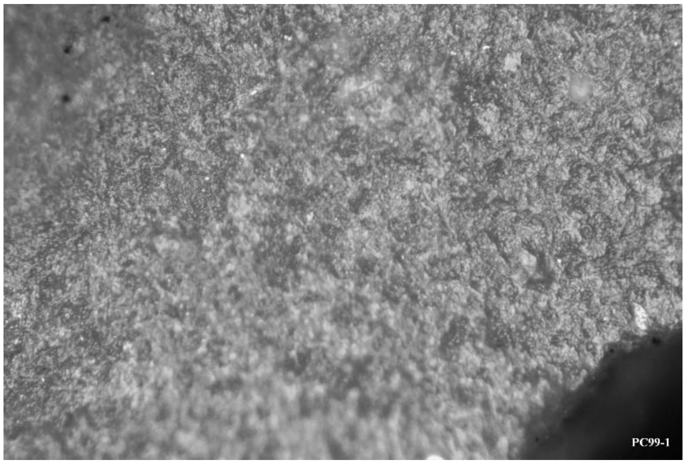


Ventral View

Photo #	Magnification	Feature	Location
PC98-1	100x	Plant polish	Ventral, Distal
PC98-2	200x	Plant polish	Ventral, Distal

Summary: Used in indeterminate motion on plant matter.

Microwear #: 99
Artifact #: 099
Site #: 47LC0061
Site Name: Pammel Creek



Dorsal View

Ventral View

Photo #	Magnification	Feature	Location
PC99-1	200x	Striations and generic weak polish	Ventral, Distal

Summary: Used in transverse motion on indeterminate material.

Microwear #: 100
Artifact #: 100
Site #: 47LC0061
Site Name: Pammel Creek

Dorsal View

Ventral View

Photo #	Magnification	Feature	Location

Summary: Unused.

APPENDIX C: CRESCENT BAY ASSEMBLAGE DATA

Tool #	Micro #	Raw Mat	Mat Qual	Amt Cortex	Heat Treated	Basic Form	Edge Mod	Method Mod	Refinement	Complete	Element Present	Reuse
1	191	Galena	Fair	0	Absent	Edge Only	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
2	108	Galena	Fair	0	Absent	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
3		Oneota PDC	Fair	<50	Present	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
4		Galena	Fair	0	Absent	Bifacial	Unifacial and Bifacial	Flaked	Medium	Broken	Proximal End	Absent
5	200	Galena	Fair	0	Burned	Bifacial	Unifacial	Flaked	Medium	Broken	Proximal End	Absent
6	204	Galena	Fair	>50,<100	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	Can't Determine	Absent
7		Platteville	Fair	<50	Absent	Multifacial	N/A	Flaked and Battered	N/A	Can't Determine	All Elements	Absent
8	199	Galena	Good	>50,<100	Absent	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
9	192	Galena	Fair	>50,<100	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
10	193	Shakopee PDC	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
11	190	Silurian	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Broken	All Elements	Absent
12		Shakopee PDC	Fair	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Can't Determine	Can't Determine	Absent
13	99	Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
14		Silurian	Fair	<50	Absent	Bifacial	Unifacial and Bifacial	Flaked	Crude	Broken	Mid-Section	Absent
16		Hixton	Poor	0	Absent	Bifacial	Bifacial	Flaked	Can't Determine	Broken	Distal End	Absent
17		Galena	Fair	<50	Absent	Bifacial	Unifacial and Bifacial	Flaked and Battered	Crude	Whole	All Elements	Absent
18		Unknown	Fair	0	Absent	Multifacial	Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
19	219	Galena	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
20	220	Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Broken	Proximal End	Absent
21	233	Galena	Fair	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
22		Oneota PDC	Fair	<50	Absent	Multifacial	Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
23	257	Galena	Fair	0	Absent	Edge Only	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
24		Orthoquartzite	Poor	0	Absent	Edge Only	Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
25	242	Orthoquartzite	Poor	<50	Absent	Edge Only	Unifacial	Battered	N/A	Whole	All Elements	Absent
26	259	Galena	Fair	0	Possible	Bifacial	Bifacial	Flaked and Battered	Crude	Whole	All Elements	Absent
27	247	Unknown	Fair	0	Absent	Bifacial	Bifacial	Flaked and Battered	Crude	Whole	All Elements	Absent
28		Galena	Fair	<50	Absent	Unifacial	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
29	235	Galena	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
30	239	Unknown	Poor	>50,<100	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
31		Galena	Fair	0	Present	Bifacial	Bifacial	Flaked and Battered	Medium	Whole	All Elements	Absent
32	243	Quartzite	Poor	<50	Absent	Bifacial	Bifacial	Flaked and Battered	Crude	Broken	Proximal End	Absent
33		Oneota PDC	Good	<50	Absent	Bifacial	Bifacial	Flaked	Medium	Broken	Distal End	Absent
34		Galena	Fair	0	Absent	Multifacial	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
35	122	Oneota PDC	Fair	0	Possible	Bifacial	Bifacial	Flaked	Refined	Whole	All Elements	Absent
36		Galena	Fair	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
37		Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Broken	Proximal End	Absent
38	229	Galena	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
40		Oneota PDC	Fair	0	Absent	Bifacial	Unifacial and Bifacial	Flaked	Medium	Whole	All Elements	Absent
41		Silurian	Fair	0	Absent	Edge Only	Unifacial	Battered	N/A	Whole	All Elements	Absent
42		Galena	Fair	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
43		Galena	Fair	0	Absent	Edge Only	Unifacial	Battered	N/A	Whole	All Elements	Absent
44		Galena	Fair	0	Possible	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
45		Galena	Fair	<50	Present	Edge Only	Unifacial	Battered	N/A	Whole	All Elements	Absent

Tool #	Micro #	Raw Mat	Mat Qual	Amt Cortex	Heat Treated	Basic Form	Edge Mod	Method Mod	Refinement	Complete	Element Present	Reuse
46		Oneota PDC	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
47		Oneota PDC	Fair	<50	Absent	Bifacial	Unifacial and Bifacial	Flaked	Crude	Whole	All Elements	Absent
48		Wyandotte	Good	0	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
49		Galena	Fair	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
50		Unknown	Fair	0	Possible	Edge Only	Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
51		Shakopee PDC	Fair	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
52		Galena	Fair	0	Possible	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
53		Oneota PDC	Fair	<50	Absent	Multifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
54		Galena	Fair	0	Present	Bifacial	Bifacial	Flaked	Refined	Whole	All Elements	Absent
55		Oneota PDC	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
56		Oneota PDC	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
57		Galena	Fair	<50	Possible	Edge Only	Unifacial	Flaked	N/A	Can't Determine	Can't Determine	Absent
58		Oneota PDC	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Broken	Distal End	Absent
59		Galena	Fair	0	Absent	Bifacial	Unifacial and Bifacial	Flaked	Crude	Broken	Distal End	Absent
60	104	Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
61	241	Galena	Fair	0	Possible	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
62		Galena	Fair	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
63		Unknown	Fair	0	Present	Edge Only	Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
64		Silurian	Fair	0	Present	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Absent
65		Unknown	Good	0	Present	Bifacial	Bifacial	Flaked	Refined	Broken	Distal End	Absent
66		Burlington	Fair	0	Possible	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
67		Galena	Fair	0	Present	Bifacial	Bifacial	Flaked and Battered	Crude	Broken	Proximal End	Absent
68		Oneota PDC	Fair	0	Absent	Edge Only	Bifacial	Battered	N/A	Whole	All Elements	Absent
69		Burlington	Fair	0	Present	Bifacial	Unifacial and Bifacial	Flaked	Crude	Whole	All Elements	Absent
70		Galena	Fair	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
71		Galena	Fair	0	Present	Edge Only	Unifacial	Battered	N/A	Whole	All Elements	Absent
72		Silurian	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
73		Galena	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
74		Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
75		Burlington	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Broken	Proximal End	Absent
76		Galena	Fair	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
77		Unknown	Poor	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
78		Burlington	Good	0	Possible	Bifacial	Unifacial and Bifacial	Flaked	Medium	Whole	All Elements	Absent
79		Galena	Fair	0	Absent	Unifacial	Bifacial	Flaked and Battered	N/A	Broken	Can't Determine	Absent
80		Galena	Fair	0	Absent	Bifacial	Unifacial and Bifacial	Flaked	Medium	Broken	Distal End	Absent
81	222	Galena	Fair	<50	Burned	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
82	221	Galena	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
83	101	Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
84	228	Galena	Fair	0	Absent	Edge Only	Bifacial	Flaked	N/A	Broken	Proximal End	Absent
85	225	Galena	Fair	<50	Absent	Multifacial	N/A	Flaked	N/A	Whole	All Elements	Absent
86	116	Galena	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
87	212	Hixton	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Broken	Proximal End	Absent
88	188	Galena	Fair	>50,<100	Absent	Edge Only	Unifacial	Flaked and Battered	Medium	Whole	All Elements	Absent

Tool #	Micro #	Raw Mat	Mat Qual	Amt Cortex	Heat Treated	Basic Form	Edge Mod	Method Mod	Refinement	Complete	Element Present	Reuse
89	187	Galena	Fair	>50,<100	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
90	184	Galena	Fair	<50	Burned	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
91	205	Galena	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
92	185	Galena	Fair	0	Present	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
93	128	Galena	Fair	0	Absent	Bifacial	Unifacial and Bifacial	Flaked	Medium	Whole	All Elements	Absent
94	186	Silurian	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
95	198	Galena	Poor	>50,<100	Present	Edge Only	Unifacial	Battered	N/A	Whole	All Elements	Absent
96	189	Galena	Fair	0	Possible	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
97		Oneota PDC	Fair	<50	Absent	Multifacial	N/A	Flaked	N/A	Whole	All Elements	Absent
98		Galena	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
99		Silurian	Fair	0	Absent	Bifacial	Unifacial and Bifacial	Flaked	Medium	Broken	Proximal End	Absent
100		Galena	Fair	0	Absent	Bifacial	Unifacial and Bifacial	Flaked	Medium	Whole	All Elements	Absent
101		Burlington	Fair	0	Absent	Bifacial	Unifacial and Bifacial	Flaked	Refined	Broken	Mid-Section	Absent
102		Galena	Fair	0	Absent	Bifacial	Unifacial	Flaked	Crude	Whole	All Elements	Absent
103		Burlington	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Broken	Distal End	Absent
104		Galena	Fair	0	Absent	Bifacial	Unifacial and Bifacial	Flaked and Battered	Medium	Broken	Distal End	Possible
105		Burlington	Fair	<50	Possible	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
106	94	Silurian	Fair	0	Absent	Unifacial	Unifacial and Bifacial	Flaked	N/A	Whole	All Elements	Absent
107	93	Oneota PDC	Poor	0	Absent	Unifacial	Unifacial and Bifacial	Flaked	Medium	Whole	All Elements	Absent
108	253	Galena	Fair	<50	Possible	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
109	254	Unknown	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
110	232	Galena	Fair	<50	Absent	Edge Only	Unifacial and Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
111	226	Silurian	Fair	0	Present	Unifacial	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
112	231	Burlington	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
113		Galena	Fair	<50	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
114	95	Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
115	252	Galena	Fair	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
116	261	Unknown	Poor	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
118		Silurian	Fair	>50,<100	Absent	Multifacial	N/A	Flaked	N/A	Whole	All Elements	Absent
119		Unknown	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
120		Galena	Fair	0	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
121		Galena	Fair	<50	Absent	Multifacial	N/A	Flaked	N/A	Whole	All Elements	Absent
122		Silurian	Fair	0	Absent	Multifacial	N/A	Flaked	N/A	Whole	All Elements	Absent
123		Silurian	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
124		Unknown	Fair	0	Absent	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
125		Silurian	Fair	0	Possible	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
126		Unknown	Fair	<50	Possible	Edge Only	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
127	234	Platteville	Poor	0	Absent	Edge Only	Bifacial	Battered	N/A	Whole	All Elements	Absent
128	223	Shakopee PDC	Fair	0	Absent	Edge Only	Unifacial	Battered	N/A	Whole	All Elements	Absent
129		Galena	Fair	0	Present	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
130		Galena	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
131		Oneota PDC	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
132		Unknown	Fair	0	Absent	Edge Only	Unifacial	Battered	N/A	Whole	All Elements	Absent

Tool #	Micro #	Raw Mat	Mat Qual	Amt Cortex	Heat Treated	Basic Form	Edge Mod	Method Mod	Refinement	Complete	Element Present	Reuse
133	203	Hixton	Poor	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
134		Oneota PDC	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
135		Shakopee PDC	Fair	0	Absent	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Absent
136	202	Galena	Fair	0	Absent	Bifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
137		Unknown	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
138		Burlington	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
139		Barron Co Quartzite	Poor	0	Absent	Bifacial	Unifacial	Flaked and Battered	Medium	Broken	Distal End	Possible
140	195	Galena	Fair	<50	Absent	Edge Only	Unifacial	Battered	N/A	Whole	All Elements	Absent
141	194	Galena	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
142	183	Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked and Battered	Medium	Whole	All Elements	Absent
143	196	Galena	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
144	258	Unknown	Fair	0	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
146	211	Galena	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
147		Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
148	103	Galena	Fair	0	Absent	Bifacial	Unifacial and Bifacial	Flaked	Medium	Whole	All Elements	Absent
149	210	Galena	Fair	<50	Absent	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Absent
150	217	Barron Co Quartzite	Poor	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
151		Barron Co Quartzite	Poor	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
153		Shakopee PDC	Fair	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
154	213	Galena	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
155		Unknown	Fair	0	Absent	Unifacial	Unifacial	Flaked	N/A	Broken	Distal End	Absent
156		Galena	Fair	0	Absent	Unifacial	Unifacial	Flaked	N/A	Broken	Distal End	Absent
157		Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked and Battered	Crude	Broken	Proximal End	Absent
158	209	Galena	Fair	0	Present	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
159	201	Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Broken	Proximal End	Absent
160	260	Silurian	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
161	197	Oneota PDC	Poor	<50	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
162		Galena	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
164		Galena	Fair	0	Absent	Bifacial	Unifacial	Flaked	Crude	Broken	Mid-Section	Absent
165	249	Silurian	Fair	0	Absent	Edge Only	Unifacial and Bifacial	Flaked	N/A	Whole	All Elements	Absent
166		Burlington	Fair	0	Absent	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
167		Baraboo Quartzite	Poor	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
168		Galena	Fair	0	Absent	Unifacial	Unifacial and Bifacial	Flaked	N/A	Whole	All Elements	Absent
169		Shakopee PDC	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
170		Oneota PDC	Fair	<50	Absent	Multifacial	N/A	Flaked	N/A	Whole	All Elements	Absent
171		Unknown	Fair	<50	Absent	Multifacial	N/A	Flaked	N/A	Whole	All Elements	Absent
172		Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked and Battered	Crude	Whole	All Elements	Absent
173		Galena	Fair	0	Absent	Bifacial	Bifacial	Battered	Crude	Whole	All Elements	Absent
174		Unknown	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
175		Unknown	Fair	0	Absent	Edge Only	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
176		Silurian	Fair	0	Absent	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Absent
177		Unknown	Good	<50	Present	Edge Only	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
178		Oneota PDC	Poor	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent

Tool #	Micro #	Raw Mat	Mat Qual	Amt Cortex	Heat Treated	Basic Form	Edge Mod	Method Mod	Refinement	Complete	Element Present	Reuse
179		Unknown	Fair	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
180		Galena	Fair	0	Absent	Bifacial	Bifacial	Battered	Crude	Broken	Mid-Section	Absent
181		Unknown	Fair	0	Absent	Edge Only	Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
182		Galena	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
183	110	Galena	Fair	0	Present	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
184		Galena	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
185		Oneota PDC	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
187		Galena	Fair	0	Absent	Edge Only	Bifacial	Flaked	N/A	Broken	All Elements	Absent
188		Oneota PDC	Poor	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
189		Galena	Fair	0	Absent	Bifacial	Bifacial	Battered	Crude	Whole	All Elements	Absent
190		Unknown	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
191		Unknown	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
192		Galena	Fair	0	Absent	Edge Only	Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
193		Unknown	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Broken	Proximal End	Absent
194		Unknown	Poor	0	Absent	Bifacial	Unifacial	Flaked	Crude	Whole	All Elements	Absent
195	206	Silurian	Fair	0	Absent	Bifacial	Unifacial and Bifacial	Flaked and Battered	Crude	Broken	Distal End	Absent
196	207	Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Broken	Distal End	Absent
197	230	Silurian	Poor	0	Absent	Bifacial	Unifacial and Bifacial	Flaked	Medium	Broken	Proximal End	Absent
198	208	Galena	Fair	0	Absent	Unifacial	Unifacial	Flaked	N/A	Broken	Distal End	Absent
199	214	Silurian	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
200		Oneota PDC	Fair	<50	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
201		Unknown	Fair	<50	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
202		Oneota PDC	Fair	<50	Absent	Edge Only	Bifacial	Battered	N/A	Whole	All Elements	Absent
203		Galena	Poor	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
204		Unknown	Fair	<50	Absent	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
205	251	Galena	Fair	<50	Present	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
206	224	Galena	Fair	<50	Possible	Edge Only	Bifacial	Flaked	N/A	Can't Determine	All Elements	Absent
207		Unknown	Fair	0	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
208	127	Unknown	Fair	0	Present	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
209	250	Galena	Fair	<50	Present	Unifacial	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
210		Oneota PDC	Poor	0	Absent	Multifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
211		Unknown	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
212		Galena	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
213	246	Unknown	Fair	<50	Absent	Bifacial	Bifacial	Battered	Crude	Broken	Mid-Section	Absent
214		Galena	Fair	0	Absent	Bifacial	Unifacial	Flaked	Medium	Broken	Distal End	Absent
215	215	Galena	Fair	<50	Present	Edge Only	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
216		Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Broken	Mid-Section	Absent
217	255	Unknown	Fair	0	Possible	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Absent
218	240	Unknown	Poor	>50,<100	Absent	Bifacial	Bifacial	Flaked	Medium	Broken	All Elements	Absent
219	113	Unknown	Fair	0	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
221		Shakopee PDC	Fair	0	Absent	Bifacial	Unifacial	Flaked and Battered	Crude	Whole	All Elements	Absent
222		Galena	Fair	0	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
223		Unknown	Fair	0	Present	Bifacial	Bifacial	Flaked and Battered	Crude	Whole	All Elements	Absent

Tool #	Micro #	Raw Mat	Mat Qual	Amt Cortex	Heat Treated	Basic Form	Edge Mod	Method Mod	Refinement	Complete	Element Present	Reuse
224		Unknown	Fair	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
225	256	Galena	Fair	<50	Absent	Edge Only	Unifacial and Bifacial	Flaked	N/A	Whole	All Elements	Absent
226		Unknown	Fair	<50	Absent	Edge Only	Unifacial and Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
227	248	Galena	Fair	<50	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
228		Burlington	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
229		Unknown	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
230		Oneota PDC	Poor	>50,<100	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
231	227	Galena	Fair	0	Absent	Edge Only	Unifacial and Bifacial	Flaked	N/A	Whole	All Elements	Absent
232	237	Galena	Fair	0	Absent	Edge Only	Unifacial and Bifacial	Flaked	N/A	Whole	All Elements	Absent
233	238	Unknown	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
234		Galena	Fair	0	Absent	Multifacial	N/A	Flaked	N/A	Whole	All Elements	Absent
235	245	Oneota PDC	Poor	<50	Absent	Bifacial	Unifacial	Flaked	Crude	Broken	Distal End	Possible
236		Burlington	Good	0	Absent	Edge Only	Unifacial and Bifacial	Battered	N/A	Whole	All Elements	Absent
237		Galena	Fair	0	Present	Unifacial	Unifacial	Flaked	N/A	Broken	All Elements	Absent
238	236	Unknown	Fair	0	Absent	Multifacial	N/A	Flaked	N/A	Whole	All Elements	Absent
239	216	Galena	Fair	0	Absent	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
240	218	Galena	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
241	92	Unknown	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
242	244	Shakopee PDC	Fair	0	Possible	Edge Only	Unifacial	Flaked	N/A	Broken	Proximal End	Absent
243		Quartz	Poor	0	Absent	Bifacial	Bifacial	Flaked	Medium	Broken	Distal End	Absent
244		Unknown	Poor	<50	Absent	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
245		Galena	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
246		Galena	Fair	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
247		Galena	Fair	0	Present	Bifacial	Unifacial	Flaked	Medium	Broken	All Elements	Absent
248		Unknown	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
249		Galena	Fair	0	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
250		Galena	Fair	0	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
251		Platteville	Poor	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
252		Unknown	Fair	>50,<100	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
253		Burlington	Good	0	Absent	Unifacial	Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
254	16	Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked	Refined	Broken	Distal End	Absent
255	21	Galena	Fair	0	Absent	Edge Only	Unifacial	Battered	N/A	Whole	All Elements	Absent
256	19	Galena	Good	<50	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
257	17	Galena	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
258	3	Unknown	Fair	0	Present	Edge Only	Unifacial	Battered	N/A	Whole	All Elements	Absent
259	29	Galena	Fair	<50	Possible	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
260	27	Burlington	Good	0	Possible	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
261	8	Galena	Fair	0	Absent	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Absent
262	15	Galena	Fair	0	Present	Edge Only	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
263	12	Galena	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
264	18	Galena	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
265	5	Silurian	Fair	<50	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
266	7	Unknown	Fair	0	Present	Edge Only	Unifacial	Battered	N/A	Whole	All Elements	Absent

Tool #	Micro #	Raw Mat	Mat Qual	Amt Cortex	Heat Treated	Basic Form	Edge Mod	Method Mod	Refinement	Complete	Element Present	Reuse
267	10	Galena	Fair	<50	Present	Edge Only	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
268	4	Galena	Fair	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
269	11	Oneota PDC	Poor	0	Absent	Bifacial	Unifacial and Bifacial	Flaked and Battered	Crude	Broken	Proximal End	Absent
270	23	Unknown	Poor	<50	Burned	Edge Only	Unifacial and Bifacial	Flaked	N/A	Whole	All Elements	Absent
271	2	Galena	Fair	0	Possible	Bifacial	Unifacial and Bifacial	Flaked	Medium	Broken	Distal End	Absent
272	20	Unknown	Poor	0	Present	Edge Only	Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
273	22	Burlington	Good	0	Present	Bifacial	Bifacial	Flaked and Battered	Crude	Broken	Proximal End	Absent
274	25	Galena	Fair	0	Absent	Edge Only	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
275	13	Platteville	Fair	<50	Possible	Edge Only	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
276	24	Galena	Fair	<50	Absent	Multifacial	N/A	Flaked and Battered	N/A	Whole	All Elements	Absent
277	6	Oneota PDC	Poor	0	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
278		Unknown	Good	0	Burned	Bifacial	Unifacial	Flaked and Battered	Crude	Broken	Distal End	Absent
279	14	Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
280	1	Unknown	Fair	0	Possible	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
281	112	Galena	Fair	0	Present	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
282	26	Silurian	Fair	0	Absent	Edge Only	Unifacial	Flaked	Crude	Whole	All Elements	Possible
283	9	Galena	Fair	<50	Possible	Edge Only	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
284	28	Unknown	Fair	<50	Absent	Bifacial	Unifacial and Bifacial	Flaked	Medium	Whole	All Elements	Possible
285		Burlington	Good	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Can't Determine	All Elements	Absent
286	67	Hixton	Fair	0	Absent	Unifacial	Bifacial	Flaked	N/A	Whole	All Elements	Absent
287	60	Silurian	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
288	61	Unknown	Fair	<50	Absent	Unifacial	Unifacial and Bifacial	Flaked	N/A	Whole	All Elements	Absent
289	59	Silurian	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
290	62	Galena	Fair	<50	Absent	Edge Only	Unifacial and Bifacial	Flaked	N/A	Broken	Proximal End	Absent
291	63	Silurian	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
292	64	Oneota PDC	Fair	<50	Absent	Bifacial	Bifacial	Flaked and Battered	Crude	Broken	Mid-Section	Absent
293	66	Galena	Fair	<50	Possible	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
294	65	Galena	Fair	<50	Absent	Edge Only	Unifacial and Bifacial	Flaked	N/A	Broken	Mid-Section	Absent
295	68	Platteville	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
296	71	Unknown	Fair	<50	Present	Edge Only	Unifacial	Flaked	N/A	Broken	Distal End	Absent
297	70	Platteville	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
298	69	Galena	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
299	73	Galena	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
300	72	Silurian	Good	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
301	74	Galena	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Can't Determine	Can't Determine	Absent
302	84	Unknown	Fair	<50	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
303	83	Galena	Fair	0	Possible	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
304	80	Burlington	Good	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Broken	Mid-Section	Absent
305	82	Unknown	Fair	0	Absent	Edge Only	Bifacial	Flaked	N/A	Broken	Mid-Section	Absent
306	81	Galena	Fair	>50,<100	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
307		Platteville	Fair	<50	Absent	Bifacial	Bifacial	Flaked and Battered	Medium	Whole	All Elements	Absent
308	79	Burlington	Fair	<50	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
309	78	Galena	Fair	<50	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent

Tool #	Micro #	Raw Mat	Mat Qual	Amt Cortex	Heat Treated	Basic Form	Edge Mod	Method Mod	Refinement	Complete	Element Present	Reuse
310	75	Unknown	Poor	>50,<100	Absent	Edge Only	Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
311	77	Oneota PDC	Fair	0	Absent	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Absent
312	76	Oneota PDC	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
313	85	Oneota PDC	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
314	86	Galena	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
315	87	Silurian	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
316	135	Unknown	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
317	133	Unknown	Fair	>50,<100	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
318	131	Galena	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
319	134	Oneota PDC	Fair	<50	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Possible
320	129	Unknown	Fair	<50	Absent	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Absent
321	90	Galena	Fair	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
322	132	Unknown	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
323	130	Galena	Fair	<50	Present	Edge Only	Unifacial and Bifacial	Flaked	N/A	Whole	All Elements	Absent
324	89	Unknown	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
325	88	Unknown	Poor	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
326	109	Burlington	Good	>50,<100	Present	Unifacial	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Possible
327		Oneota PDC	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
328		Unknown	Fair	>50,<100	Possible	Edge Only	Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
329		Galena	Fair	<50	Present	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Can't Determine	Can't Determine	Absent
330		Silurian	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
331		Unknown	Fair	>50,<100	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
332		Oneota PDC	Poor	0	Absent	Edge Only	Unifacial	Flaked	N/A	Can't Determine	Can't Determine	Absent
333		Burlington	Good	<50	Absent	Edge Only	Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
334		Galena	Fair	>50,<100	Present	Unifacial	Unifacial and Bifacial	Flaked and Battered	N/A	Whole	All Elements	Possible
335		Burlington	Good	<50	Absent	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
336		Galena	Good	<50	Present	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Absent
337		Galena	Fair	<50	Present	Edge Only	Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
338		Unknown	Fair	<50	Possible	Unifacial	Unifacial and Bifacial	Flaked	N/A	Whole	All Elements	Possible
339		Unknown	Fair	>50,<100	Present	Edge Only	Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
340		Shakopee PDC	Fair	<50	Absent	Edge Only	Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
341		Galena	Fair	<50	Absent	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
342		Platteville	Fair	<50	Absent	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
343		Silurian	Fair	<50	Present	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
344		Unknown	Fair	<50	Present	Bifacial	Bifacial	Flaked	Can't Determine	Broken	Mid-Section	Possible
345		Platteville	Fair	<50	Present	Bifacial	Bifacial	Flaked	Crude	Whole	All Elements	Absent
346		Silurian	Fair	<50	Present	Edge Only	Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
347		Galena	Fair	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
348		Silurian	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
349		Oneota PDC	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
350		Wyandotte	Good	<50	Present	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
351		Galena	Fair	<50	Present	Bifacial	Bifacial	Flaked	Crude	Broken	Proximal End	Absent
352		Silurian	Fair	>50,<100	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent

Tool #	Micro #	Raw Mat	Mat Qual	Amt Cortex	Heat Treated	Basic Form	Edge Mod	Method Mod	Refinement	Complete	Element Present	Reuse
353		Unknown	Fair	<50	Possible	Edge Only	Bifacial	Retouched&Used	N/A	Whole	All Elements	Absent
354		Oneota PDC	Good	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
355		Galena	Good	>50,<100	Present	Unifacial	Bifacial	Flaked	N/A	Whole	All Elements	Absent
356		Silurian	Fair	<50	Absent	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
357		Galena	Fair	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
358		Galena	Good	<50	Present	Unifacial	Unifacial and Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
359		Galena	Fair	>50,<100	Absent	Edge Only	Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
360		Silurian	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
361		Galena	Fair	<50	Absent	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
362		Galena	Fair	<50	Present	Unifacial	Unifacial and Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
363		Galena	Good	<50	Present	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
364		Galena	Good	<50	Present	Edge Only	Unifacial	Flaked	N/A	Broken	Can't Determine	Absent
365		Galena	Good	<50	Present	Edge Only	Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
366		Burlington	Good	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
367		Burlington	Fair	<50	Present	Multifacial	N/A	Flaked and Battered	N/A	Whole	All Elements	Absent
368		Galena	Fair	<50	Absent	Edge Only	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
369		Galena	Fair	<50	Absent	Bifacial	Bifacial	Flaked and Battered	Crude	Whole	All Elements	Absent
370		Galena	Good	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
371		Unknown	Fair	<50	Absent	Bifacial	Bifacial	Flaked	Can't Determine	Broken	Distal End	Absent
372		Galena	Good	0	Present	Bifacial	Bifacial	Flaked and Battered	Crude	Can't Determine	Can't Determine	Absent
373		Galena	Fair	<50	Present	Edge Only	Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
374		Platteville	Poor	<50	Absent	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Present
375		Galena	Fair	>50,<100	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
376		Burlington	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
377		Galena	Fair	<50	Present	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
378		Unknown	Fair	<50	Absent	Edge Only	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
379		Unknown	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Can't Determine	Can't Determine	Absent
380		Platteville	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
381		Silurian	Fair	<50	Absent	Unifacial	Bifacial	Flaked and Battered	N/A	Broken	Distal End	Absent
382		Galena	Fair	<50	Absent	Edge Only	Bifacial	Battered	N/A	Whole	All Elements	Absent
383		Galena	Good	<50	Present	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Can't Determine	Can't Determine	Absent
384		Shakopee PDC	Fair	>50,<100	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
385	123	Galena	Fair	0	Present	Bifacial	Bifacial	Flaked	Crude	Broken	Proximal End	Absent
386	126	Quartz	N/A	0	Absent	Bifacial	Bifacial	Flaked	Can't Determine	Broken	Distal End	Possible
387	117	Silurian	Fair	<50	Possible	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
388	118	Unknown	Good	<50	Present	Bifacial	Bifacial	Flaked	Crude	Whole	All Elements	Absent
389		Silurian	Fair	<50	Absent	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
390		Galena	Fair	>50,<100	Absent	Unifacial	Bifacial	Flaked	N/A	Can't Determine	Can't Determine	Possible
391	139	Galena	Good	<50	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
392	111	Galena	Fair	<50	Present	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
393	140	Shakopee PDC	Good	<50	Present	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
394	141	Burlington	Good	<50	Present	Unifacial	Bifacial	Flaked	N/A	Whole	All Elements	Absent
395	142	Silurian	Fair	0	Possible	Bifacial	Bifacial	Flaked	Crude	Broken	Distal End	Absent

Tool #	Micro #	Raw Mat	Mat Qual	Amt Cortex	Heat Treated	Basic Form	Edge Mod	Method Mod	Refinement	Complete	Element Present	Reuse
396	143	Galena	Fair	>50,<100	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
397	105	Unknown	Good	0	Present	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
398	144	Galena	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
399	145	Galena	Fair	<50	Present	Unifacial	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
400	146	Galena	Fair	<50	Absent	Bifacial	Bifacial	Flaked	Crude	Whole	All Elements	Absent
401	147	Silurian	Fair	<50	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
402		Unknown	Fair	0	Absent	Edge Only	Unifacial	Flaked	N/A	Broken	End Section	Possible
403	148	Burlington	Fair	0	Absent	Unifacial	Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
404	149	Galena	Fair	>50,<100	Absent	Edge Only	Bifacial	Use-wear only	N/A	Whole	End Section	Absent
405	150	Galena	Fair	<50	Present	Multifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
406		Galena	Fair	<50	Present	Edge Only	Unifacial	Battered	N/A	Whole	All Elements	Absent
407	114	Platteville	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
408	97	Galena	Fair	<50	Present	Bifacial	Bifacial	Flaked and Battered	Crude	Whole	All Elements	Absent
409	106	Galena	Good	<50	Present	Unifacial	Unifacial and Bifacial	Flaked	N/A	Whole	All Elements	Absent
410	171	Oneota PDC	Fair	0	Present	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
411	172	Platteville	Poor	>50,<100	Absent	Bifacial	Bifacial	Flaked	Crude	Whole	All Elements	Possible
412	173	Galena	Fair	<50	Present	Unifacial	Bifacial	Flaked	N/A	Broken	Distal End	Absent
413	138	Galena	Fair	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
414	174	Galena	Fair	<50	Possible	Edge Only	Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
415	170	Galena	Fair	0	Present	Bifacial	Bifacial	Flaked	Crude	Broken	Proximal End	Absent
416	107	Galena	Fair	>50,<100	Absent	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Possible
417	169	Galena	Fair	<50	Present	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Can't Determine	Can't Determine	Absent
418	168	Galena	Fair	<50	Present	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Can't Determine	Proximal End	Possible
419	151	Unknown	Fair	<50	Present	Unifacial	Unifacial and Bifacial	Flaked and Battered	N/A	Can't Determine	Can't Determine	Possible
420	167	Galena	Fair	<50	Absent	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Absent
421	152	Galena	Fair	<50	Present	Edge Only	Bifacial	Flaked	N/A	Broken	Distal End	Absent
422	154	Galena	Good	<50	Present	Bifacial	Bifacial	Flaked and Battered	Crude	Whole	All Elements	Possible
423	166	Platteville	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
424	165	Unknown	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
425	164	Galena	Fair	<50	Present	Edge Only	Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
426		Unknown	Good	<50	Possible	Unifacial	Bifacial	Flaked	N/A	Whole	All Elements	Absent
427	119	Galena	Fair	<50	Present	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
428	125	Silurian	Good	0	Present	Edge Only	Bifacial	Flaked	N/A	Broken	Proximal End	Absent
429	98	Unknown	Fair	<50	Present	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
430	115	Platteville	Fair	<50	Absent	Unifacial	Unifacial and Bifacial	Flaked	N/A	Whole	All Elements	Absent
431	136	Unknown	Good	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
432	163	Galena	Fair	>50,<100	Present	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Absent
433	162	Unknown	Fair	<50	Absent	Edge Only	Bifacial	Flaked and Battered	N/A	Can't Determine	Can't Determine	Absent
434	153	Galena	Fair	>50,<100	Present	Edge Only	Unifacial and Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
435	155	Galena	Fair	0	Possible	Edge Only	Unifacial	Use-wear only	N/A	Can't Determine	Can't Determine	Absent
436	156	Galena	Fair	<50	Present	Edge Only	Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
437	157	Galena	Fair	>50,<100	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
438	175	Galena	Good	<50	Present	Bifacial	Bifacial	Flaked	Can't Determine	Broken	Proximal End	Absent

Tool #	Micro #	Raw Mat	Mat Qual	Amt Cortex	Heat Treated	Basic Form	Edge Mod	Method Mod	Refinement	Complete	Element Present	Reuse
439	176	Unknown	Poor	0	Absent	Edge Only	Unifacial	Battered	N/A	Can't Determine	Proximal End	Absent
440	158	Galena	Fair	>50,<100	Absent	Edge Only	Unifacial	Use-wear only	N/A	Broken	End Section	Absent
441	177	Unknown	Fair	<50	Possible	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
442	178	Galena	Good	>50,<100	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
443	179	Galena	Fair	<50	Absent	Edge Only	Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
444	161	Unknown	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
445	180	Unknown	Fair	<50	Absent	Bifacial	Bifacial	Flaked	Crude	Whole	All Elements	Absent
446	159	Unknown	Fair	>50,<100	Present	Edge Only	Unifacial	Flaked	N/A	Broken	Proximal End	Absent
447	120	Unknown	Fair	<50	Absent	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Possible
448	160	Galena	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
449		Galena	Fair	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
450		Galena	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
451	181	Silurian	Fair	<50	Absent	Unifacial	Bifacial	Flaked	N/A	Broken	Mid-Section	Possible
452	182	Galena	Good	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
453	137	Platteville	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
454	58	Galena	Fair	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Can't Determine	Can't Determine	Absent
455	30	Unknown	Fair	>50,<100	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
456	40	Galena	Fair	0	Present	Bifacial	Unifacial and Bifacial	Flaked	Can't Determine	Broken	Distal End	Absent
457	39	Galena	Good	<50	Present	Edge Only	Unifacial	Retouched&Used	N/A	Broken	End Section	Absent
458	38	Oneota PDC	Poor	>50,<100	Absent	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
459	37	Maquoketa	Fair	<50	Possible	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
460	36	Unknown	Fair	<50	Present	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Absent
461	35	Galena	Good	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Broken	All Elements	Absent
462	34	Galena	Fair	<50	Present	Edge Only	Unifacial	Flaked and Battered	N/A	Whole	All Elements	Possible
463		Unknown	Fair	>50,<100	Present	Bifacial	Bifacial	Flaked	Crude	Can't Determine	Distal End	Absent
464	33	Unknown	Fair	<50	Absent	Edge Only	Unifacial	Flaked	N/A	Can't Determine	End Section	Absent
465	32	Galena	Fair	>50,<100	Present	Edge Only	Bifacial	Flaked and Battered	N/A	Whole	All Elements	Absent
466	31	Galena	Fair	0	Absent	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
467	41	Hixton	N/A	0	Absent	Bifacial	Bifacial	Flaked	Can't Determine	Broken	End Section	Absent
468	42	Wyandotte	Fair	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Broken	Can't Determine	Absent
469	43	Platteville	Fair	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
470	44	Galena	Fair	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
471	45	Galena	Good	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Broken	Distal End	Absent
472	46	Galena	Fair	0	Present	Unifacial	Unifacial	Flaked	N/A	Broken	Can't Determine	Absent
473	47	Galena	Fair	<50	Present	Edge Only	Bifacial	Use-wear only	N/A	Can't Determine	Distal End	Absent
474	48	Maquoketa	Fair	>50,<100	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
475	49	Galena	Fair	<50	Possible	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
476	50	Galena	Fair	0	Present	Edge Only	Unifacial and Bifacial	Flaked	N/A	Whole	All Elements	Present
477	51	Galena	Fair	<50	Present	Bifacial	Bifacial	Flaked	Crude	Broken	Proximal End	Absent
478	52	Burlington	Fair	<50	Present	Bifacial	Bifacial	Flaked	Can't Determine	Broken	Distal End	Absent
479	53	Orthoquartzite	N/A	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
480	54	Galena	Fair	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
481	55	Burlington	Good	0	Present	Multifacial	Unifacial and Bifacial	Flaked	N/A	Broken	Distal End	Absent

Tool #	Micro #	Raw Mat	Mat Qual	Amt Cortex	Heat Treated	Basic Form	Edge Mod	Method Mod	Refinement	Complete	Element Present	Reuse
482	56	Galena	Fair	<50	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
483	57	Galena	Fair	<50	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
484		Burlington	Fair	>50,<100	Possible	Unifacial	Bifacial	Use-wear only	N/A	Can't Determine	All Elements	Absent
485		Oneota PDC	Fair	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
486		Galena	Fair	0	Present	Bifacial	Bifacial	Flaked	Crude	Broken	Proximal End	Absent
487		Burlington	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
488		Unknown	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
489		Shakopee PDC	Fair	0	Present	Bifacial	Bifacial	Flaked	Crude	Can't Determine	Can't Determine	Possible
490		Silurian	Fair	>50,<100	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
491		Galena	Good	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
492		Unknown	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
493		Galena	Good	>50,<100	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
494		Galena	Good	<50	Present	Multifacial	Bifacial	Flaked	N/A	Can't Determine	Can't Determine	Absent
495		Burlington	Fair	<50	Absent	Edge Only	Bifacial	Flaked	N/A	Can't Determine	Can't Determine	Absent
496		Silurian	Fair	<50	Present	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Absent
497		Unknown	Fair	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
498		Galena	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
499		Unknown	Fair	0	Present	Edge Only	Unifacial	Flaked	N/A	Broken	Proximal End	Absent
500		Galena	Fair	<50	Present	Edge Only	Unifacial	Flaked	N/A	Broken	Distal End	Absent
501		Silurian	Fair	<50	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
502		Platteville	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
503		Galena	Fair	<50	Present	Edge Only	Bifacial	Flaked	N/A	Broken	Distal End	Absent
504		Unknown	Fair	<50	Possible	Edge Only	Bifacial	Flaked	N/A	Can't Determine	Can't Determine	Present
505		Galena	Fair	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Can't Determine	Distal End	Absent
506		Platteville	Fair	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Broken	All Elements	Absent
507		Unknown	Fair	>50,<100	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
508		Unknown	Fair	<50	Possible	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
509		Unknown	Fair	>50,<100	Present	Edge Only	Unifacial	Flaked	N/A	Whole	Distal End	Absent
510		Unknown	Good	<50	Present	Edge Only	Unifacial	Use-wear only	N/A	Broken	Mid-Section	Absent
511		Unknown	Fair	0	Possible	Edge Only	Unifacial	Use-wear only	N/A	Broken	Distal End	Absent
512		Unknown	Fair	>50,<100	Absent	Edge Only	Bifacial	Flaked	N/A	Whole	All Elements	Absent
513		Galena	Fair	<50	Absent	Edge Only	Unifacial and Bifacial	Battered	N/A	Whole	All Elements	Absent
514		Unknown	Fair	<50	Possible	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
515		Unknown	Good	0	Possible	Edge Only	Unifacial	Use-wear only	N/A	Whole	Proximal End	Absent
516		Oneota PDC	Fair	0	Absent	Edge Only	Unifacial	Use-wear only	N/A	Can't Determine	Distal End	Absent
517		Galena	Fair	0	Present	Bifacial	Bifacial	Flaked	Can't Determine	Broken	Mid-Section	Absent
518		Unknown	Fair	0	Possible	Bifacial	Bifacial	Flaked	Can't Determine	Broken	Proximal End	Absent
519		Galena	Good	0	Present	Edge Only	Unifacial and Bifacial	Use-wear only	N/A	Can't Determine	Mid-Section	Absent
520		Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked	Can't Determine	Broken	Distal End	Absent
521		Unknown	Fair	<50	Present	Edge Only	Unifacial and Bifacial	Flaked	N/A	Whole	All Elements	Absent
522		Galena	Fair	<50	Absent	Unifacial	Unifacial	Flaked	N/A	Whole	All Elements	Absent
523		Platteville	Poor	<50	Absent	Bifacial	Bifacial	Flaked	Crude	Broken	Proximal End	Absent
524		Galena	Fair	<50	Absent	Edge Only	Unifacial	Battered	N/A	Whole	All Elements	Absent

Tool #	Micro #	Raw Mat	Mat Qual	Amt Cortex	Heat Treated	Basic Form	Edge Mod	Method Mod	Refinement	Complete	Element Present	Reuse
525		Galena	Fair	<50	Present	Edge Only	Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
526		Unknown	Fair	<50	Absent	Edge Only	Bifacial	Use-wear only	N/A	Whole	All Elements	Absent
527		Burlington	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Can't Determine	Distal End	Absent
528		Unknown	Fair	>50,<100	Absent	Edge Only	Unifacial	Flaked	N/A	Whole	Proximal End	Absent
529		Unknown	Fair	<50	Absent	Unifacial	Bifacial	Flaked	N/A	Broken	Distal End	Possible
530		Galena	Fair	<50	Possible	Bifacial	Unifacial and Bifacial	Flaked	Can't Determine	Broken	Mid-Section	Absent
531		Maquoketa	Fair	<50	Absent	Bifacial	Unifacial and Bifacial	Flaked	Can't Determine	Broken	Distal End	Absent
532		Maquoketa	Fair	<50	Possible	Bifacial	Unifacial and Bifacial	Flaked	Can't Determine	Broken	Distal End	Absent
533		Galena	Fair	0	Possible	Edge Only	Unifacial	Flaked	N/A	Whole	Distal End	Absent
534		Galena	Fair	0	Absent	Bifacial	Bifacial	Flaked	Crude	Whole	All Elements	Possible
535		Unknown	Fair	<50	Absent	Bifacial	Unifacial and Bifacial	Flaked	Can't Determine	Broken	Distal End	Absent
536		Silurian	Fair	0	Absent	Bifacial	Bifacial	Flaked	Crude	Whole	All Elements	Absent
537		Galena	Fair	<50	Present	Edge Only	Unifacial	Flaked	N/A	Whole	All Elements	Absent
538		Unknown	Fair	>50,<100	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
539		Galena	Fair	0	Absent	Unifacial	Unifacial and Bifacial	Flaked	N/A	Can't Determine	Can't Determine	Absent
540		Galena	Fair	<50	Burned	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent
541		Galena	Fair	>50,<100	Absent	Multifacial	N/A	Flaked	N/A	N/A	Can't Determine	Absent
542		Galena	Fair	<50	Possible	Edge Only	Unifacial	Use-wear only	N/A	Can't Determine	Can't Determine	Absent
543		Unknown	Good	0	Present	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Present
544	124	Silurian	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
545	102	Silurian	Fair	0	Absent	Bifacial	Bifacial	Flaked	Medium	Whole	All Elements	Absent
546	121	Silurian	Fair	<50	Absent	Bifacial	Bifacial	Flaked	Refined	Whole	All Elements	Absent
325A		Unknown	Fair	<50	Absent	Edge Only	Unifacial	Use-wear only	N/A	Whole	All Elements	Absent

Tool #	Distal End	Retouch	# Edges	Edge < A	Edge < B	Edge < C	Edge Config	Hafting	Projections	Projection Mod	Length	Width	Thickness	Weight	Tool Type
1	Blunt	End and Side	2	>75°	46-75°	N/A	Smooth	Absent	N/A	N/A	28.15	26.00	6.14	5	End Scraper
2	Blunt	End and Side	3	46-75°	>75°	46-75°	Smooth	Possible	Absent	Absent	28.65	17.89	5.59	4	End&Side Scraper
3	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Present	Absent	Absent	22.41	15.37	3.06	1	Madison Pt
4	N/A	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	Absent	17.80	15.00	3.37		Madison Pt
5	N/A	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	Absent	18.20	15.25	3.91		Madison Pt
6	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	25.00	21.97	5.54	2	Mod Edge Only
7	Blunt	N/A	4	46-75°	46-75°	0-45°	Smooth	Absent	Absent	Absent	26.73	20.38	6.37	3	Bipolar Core
8	Pointed	End and Side	3	46-75°	46-75°	46-75°	Smooth	Present	Absent	Absent	32.43	21.48	5.78	4	Madison Pt
9	Blunt	End and Side	3	46-75°	46-75°	46-75°	Smooth	Absent	Absent	Absent	19.90	21.56	4.55	2	Mod Edge Only
10	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	37.19	24.81	6.38	5	Mod Edge Only
11	N/A	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	15.52	13.15	3.03		Mod Edge Only
12	N/A	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	31.63	16.44	7.47	4	Mod Edge Only
13	Pointed	End and Side	3	46-75°	46-75°	0-45°	Smooth	Present	Absent	Absent	17.75	13.51	3.63	1	Madison Pt
14	N/A	Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	Absent	15.36	19.39	4.79		Mod Edge Only
16	Pointed	Can't Determine	0	N/A	N/A	N/A	N/A	Absent	Present	Present	8.25	6.39	4.60		Mod Edge Only
17	Blunt	End and Side	3	46-75°	0-45°	46-75°	Smooth	Absent	Absent	Absent	29.78	23.93	6.64	5	Bipolar Proj Pt
18	Can't Determine	End and Side	4	46-75°	46-75°	>75°	Smooth	Absent	Absent	Absent	33.85	42.52	15.14	23	Bipolar Core
19	Can't Determine	End and Side	2	0-45°	46-75°	N/A	Smooth	Absent	Absent	Absent	30.52	24.96	11.11	4	Mod Edge Only
20	N/A	End and Side	2	0-45°	0-45°	N/A	Smooth	Present	Absent	Absent	13.76	10.32	3.21		Madison Pt
21	Pointed	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	30.76	25.89	5.95	5	Mod Edge Only
22	Blunt	N/A	5	46-75°	46-75°	>75°	Smooth	Absent	Absent	Absent	52.86	45.99	23.92	53	Bipolar Core
23	Pointed	Side	2	0-45°	46-75°	N/A	Smooth	Absent	Absent	Absent	32.16	20.34	6.89	3	Mod Edge Only
24	Pointed	Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	Absent	71.15	26.23	7.24	15	Mod Edge Only
25	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	80.16	46.20	15.29	48	Mod Edge Only
26	Pointed	Side	2	46-75°	>75°	N/A	Smooth	Absent	Absent	Absent	22.70	19.73	4.08	2	Bipolar Proj Pt
27	Pointed	Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	Absent	16.23	11.92	3.90	1	Bipolar Proj Pt
28	Blunt	End and Side	3	0-45°	0-45°	46-75°	Smooth	Absent	Absent	Absent	25.90	20.29	7.27	3	End&Side Scraper
29	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	20.80	19.53	4.44	2	Mod Edge Only
30	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	67.11	45.41	9.49	21	Mod Edge Only
31	Pointed	Side	2	46-75°	46-75°	N/A	Smooth	Present	Absent	Absent	29.69	17.63	8.04	4	Madison Pt
32	N/A	End and Side	2	0-45°	46-75°	N/A	Smooth	Absent	Absent	Absent	16.68	22.26	4.14		Mod Edge Only
33	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Present	Absent	Absent	21.63	17.46	3.21		Madison Pt
34	Blunt	End and Side	4	>75°	>75°	46-75°	Smooth	N/A	Absent	Absent	19.01	16.64	9.78	3	Bipolar Core
35	Pointed	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	Absent	23.41	14.59	3.63	1	Madison Pt
36	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	17.84	19.14	3.88	2	Mod Edge Only
37	N/A	End and Side	3	46-75°	46-75°	0-45°	Smooth	Present	Absent	Absent	14.39	15.85	3.49		Madison Pt
38	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	39.33	28.99	9.63	8	Mod Edge Only
40	Pointed	End and Side	3	46-75°	46-75°	46-75°	Smooth	Present	Absent	Absent	27.57	18.55	5.8	3	Madison Pt
41	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	19.51	14.78	6.62	2	Mod Edge Only
42	Pointed	Side	3	46-75°	0-45°	0-45°	Smooth	Absent	Absent	Absent	29.84	19.86	6.41	3	Mod Edge Only
43	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	27.76	24.61	7.83	5	Mod Edge Only
44	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	15.46	23.14	6.20	3	End Scraper
45	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	22.65	18.71	4.80	2	Mod Edge Only

Tool #	Distal End	Retouch	# Edges	Edge < A	Edge < B	Edge < C	Edge Config	Hafting	Projections	Projection Mod	Length	Width	Thickness	Weight	Tool Type
46	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	12.11	18.04	3.72	1	End Scraper
47	Blunt	End and Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	Absent	20.25	14.72	6.06	2	End Scraper
48	Blunt	End and Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	Absent	34.71	17.64	6.19	4	Mod Edge Only
49	Pointed	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	50.06	27.13	11.66	10	Mod Edge Only
50	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	23.16	22.17	5.84	2	Mod Edge Only
51	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	30.11	21.93	8.24	3	Mod Edge Only
52	Blunt	End and Side	3	46-75°	46-75°	46-75°	Smooth	Absent	Absent	Absent	18.63	14.86	7.37	2	End&Side Scraper
53	Blunt	Side	3	>75°	46-75°	46-75°	Smooth	N/A	Absent	Absent	38.79	18.70	14.01	8	Bipolar Core
54	Pointed	End and Side	3	46-75°	46-75°	0-45°	Smooth	Present	Absent	Absent	20.54	11.43	3.97	1	Madison Pt
55	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	18.84	11.21	3.11	1	Mod Edge Only
56	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	9.43	13.83	2.45	1	Mod Edge Only
57	Can't Determine	Side	2	0-45°	46-75°	N/A	Smooth	Absent	Absent	Absent	19.49	15.65	5.32	1	Mod Edge Only
58	Pointed	Side	2	46-75°	46-75°	N/A	Smooth	Present	Absent	Absent	9.88	10.52	4.77		Madison Pt
59	Pointed	Side	2	0-45°	46-75°	N/A	Smooth	Present	Absent	Absent	17.41	12.85	3.96		Madison Pt
60	Pointed	End and Side	3	46-75°	46-75°	0-45°	Smooth	Present	Absent	Absent	17.97	15.41	4.04	1	Madison Pt
61	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	15.71	14.83	2.41	1	Mod Edge Only
62	Blunt	End and Side	2	0-45°	46-75°	N/A	Smooth	Absent	Absent	Absent	28.99	23.89	7.31	4	Mod Edge Only
63	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	32.93	13.92	5.87	2	Mod Edge Only
64	Pointed	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	20.91	18.21	6.31	2	Mod Edge Only
65	Pointed	Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	Absent	45.86	22.24	8.47		Knife
66	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	10.65	16.75	5.16	1	Mod Edge Only
67	N/A	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	7.76	16.84	5.76		Mod Edge Only
68	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	18.99	18.51	7.75	3	Mod Edge Only
69	Pointed	End and Side	3	>75°	>75°	46-75°	Smooth	Present	Absent	Absent	19.19	11.06	3.33	1	Madison Pt
70	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	31.89	19.78	5.65	3	Mod Edge Only
71	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	29.31	35.96	6.91	8	Mod Edge Only
72	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	25.19	23.98	4.45	2	Mod Edge Only
73	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	11.31	12.25	3.85	1	Mod Edge Only
74	Pointed	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	Absent	21.16	15.97	4.38	1	Madison Pt
75	N/A	End and Side	3	46-75°	46-75°	46-75°	Smooth	Present	Absent	Absent	17.23	12.53	4.24		Madison Pt
76	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	29.81	17.07	6.99	3	Mod Edge Only
77	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	14.06	17.05	4.09	1	Mod Edge Only
78	Pointed	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	Absent	15.79	13.66	2.23	1	Madison Pt
79	Can't Determine	Can't Determine	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	13.28	18.05	4.29		Mod Edge Only
80	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	8.99	7.68	2.93		Mod Edge Only
81	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	26.87	21.11	7.21	4	Mod Edge Only
82	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	21.29	11.85	7.08	2	Mod Edge Only
83	Pointed	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	Absent	22.96	14.69	3.45	1	Madison Pt
84	N/A	End and Side	3	46-75°	46-75°	46-75°	Smooth	Present	Absent	Absent	24.72	15.34	4.79		Madison Pt
85	Blunt	N/A	0	N/A	N/A	N/A	N/A	Absent	Absent	Absent	18.24	14.12	13.96	4	Core
86	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	14.13	11.24	5.51	1	Mod Edge Only
87	N/A	End and Side	3	46-75°	46-75°	46-75°	Smooth	Absent	Absent	Absent	19.93	26.23	10.65		Mod Edge Only
88	N/A	Side	2	46-75°	0-45°	N/A	Smooth	Present	Absent	Absent	24.11	20.84	5.31	2	Madison Pt

Tool #	Distal End	Retouch	# Edges	Edge < A	Edge < B	Edge < C	Edge Config	Hafting	Projections	Projection Mod	Length	Width	Thickness	Weight	Tool Type
89	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	19.77	21.15	4.47	2	Mod Edge Only
90	Pointed	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	27.33	15.53	6.43	2	Mod Edge Only
91	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	19.08	13.02	3.56	1	Mod Edge Only
92	Blunt	End and Side	3	>75°	46-75°	46-75°	Smooth	Absent	Absent	Absent	21.58	15.63	3.57	1	Mod Edge Only
93	Pointed	End and Side	3	46-75°	0-45°	46-75°	Smooth	Present	Absent	Absent	20.81	14.64	3.71	1	Madison Pt
94	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	25.63	19.57	4.06	2	Mod Edge Only
95	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	24.54	18.03	5.58	2	Mod Edge Only
96	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	23.55	26.24	5.51	4	Mod Edge Only
97	N/A	N/A	0	N/A	N/A	N/A	N/A	Absent	Absent	Absent	59.04	45.21	32.96	78	Core
98	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	36.36	21.44	4.68	3	Mod Edge Only
99	N/A	End and Side	3	46-75°	0-45°	46-75°	Smooth	Present	Absent	Absent	21.87	16.86	5.06		Madison Pt
100	Pointed	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	Absent	20.77	12.64	3.87	1	Madison Pt
101	N/A	Side	2	46-75°	46-75°	N/A	Smooth	Present	Absent	Absent		18.31	7.44		Madison Pt
102	Blunt	End and Side	2	46-75°	0-45°	N/A	Smooth	Absent	Absent	Absent	18.68	20.23	6.67	3	Mod Edge Only
103	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Present	Absent	Absent			2.44		Madison Pt
104	Pointed	End and Side	3	46-75°	46-75°	46-75°	Smooth	Present	Absent	Absent	29.56	24.11	6.03		Unclass Proj Pt
105	N/A	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	23.91	20.91	9.46	5	Mod Edge Only
106	Pointed	End and Side	3	0-45°	46-75°	46-75°	Smooth	Present	Absent	Absent	18.19	15.99	4.12	1	Madison Pt
107	Pointed	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	Absent	24.38	12.45	2.87	1	Madison Pt
108	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	32.09	21.79	9.63	8	Mod Edge Only
109	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	21.49	28.91	4.99	3	Mod Edge Only
110	Pointed	End and Side	3	46-75°	0-45°	46-75°	Smooth	Absent	Absent	Absent	31.41	16.65	8.74	3	Mod Edge Only
111	Pointed	End and Side	3	46-75°	46-75°	0-45°	Smooth	Present	Absent	Absent	28.32	18.44	5.74	3	Unclass Proj Pt
112	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	21.97	14.66	2.46	1	Mod Edge Only
113	Pointed	Side	2	0-45°	46-75°	N/A	Smooth	Absent	Absent	Absent	30.54	14.37	8.46	3	Mod Edge Only
114	Pointed	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	Absent	17.92	15.32	4.13	1	Madison Pt
115	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	25.23	14.44	6.91	3	Mod Edge Only
116	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	18.13	20.26	8.41	2	Mod Edge Only
118	N/A	N/A	0	N/A	N/A	N/A	N/A	Absent	Absent	Absent	42.55	18.06	20.23	13	Bipolar Core
119	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	17.02	16.87	3.26	1	Mod Edge Only
120	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	33.22	20.11	10.81	6	Mod Edge Only
121	N/A	N/A	0	N/A	N/A	N/A	N/A	Absent	Absent	Absent	16.76	16.15	8.23	3	Core
122	N/A	N/A	0	N/A	N/A	N/A	N/A	Absent	Absent	Absent	27.34	19.89	14.22	6	Bipolar Core
123	Pointed	End and Side	3	46-75°	0-45°	46-75°	Smooth	Present	Absent	Absent	16.56	13.57	4.64	1	Madison Pt
124	Pointed	Side	2	46-75°	0-45°	N/A	Smooth	Absent	Absent	Absent	35.86	20.34	9.96	5	Mod Edge Only
125	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	33.93	23.19	8.21	6	Mod Edge Only
126	Pointed	End and Side	3	0-45°	46-75°	0-45°	Smooth	Absent	Absent	Absent	83.48	53.82	18.65	64	Mod Edge Only
127	Pointed	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	30.02	22.93	6.28	4	Mod Edge Only
128	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	28.52	18.21	5.42	2	Mod Edge Only
129	Pointed	Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	Absent	23.98	11.16	4.66	1	Mod Edge Only
130	Blunt	End and Side	2	46-75°	0-45°	N/A	Smooth	Absent	Absent	Absent	26.33	21.94	4.14	1	Mod Edge Only
131	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	15.06	8.03	4.33	1	Mod Edge Only
132	Pointed	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	23.53	10.05	6.06	1	Mod Edge Only

Tool #	Distal End	Retouch	# Edges	Edge < A	Edge < B	Edge < C	Edge Config	Hafting	Projections	Projection Mod	Length	Width	Thickness	Weight	Tool Type
133	Blunt	End	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	16.93	16.62	2.48	1	Mod Edge Only
134	Pointed	Side	2	46-75°	46-75°	N/A	Smooth	Present	Absent	Absent	22.87	18.18	6.47	2	Unclass Proj Pt
135	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	31.76	16.99	5.19	2	Mod Edge Only
136	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	20.22	16.53	5.83	2	Mod Edge Only
137	Blunt	End and Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	22.35	23.89	5.42	2	Mod Edge Only
138	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	29.41	14.64	5.89	2	Mod Edge Only
139	Pointed	End and Side	3	46-75°	46-75°	46-75°	Smooth	Present	Absent	Absent	18.41	16.51	5.66		Madison Pt
140	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	33.88	21.63	5.44	4	Mod Edge Only
141	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	23.85	15.35	7.02	2	Mod Edge Only
142	Pointed	End and Side	3	46-75°	0-45°	46-75°	Smooth	Present	Absent	Absent	14.48	13.59	3.96	1	Madison Pt
143	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	13.57	16.73	6.25	1	Mod Edge Only
144	Blunt	End and Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	17.66	21.91	4.44	2	Mod Edge Only
146	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	19.62	15.32	4.24	1	Mod Edge Only
147	Pointed	End and Side	1	0-45°	0-45°	0-45°	Smooth	Present	Absent	Absent	21.09	13.12	3.57	1	Madison Pt
148	Pointed	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	Absent	20.07	11.57	3.23	1	Madison Pt
149	Pointed	Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	Absent	21.13	20.68	5.24	2	Mod Edge Only
150	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	54.93	33.14	10.51	15	Mod Edge Only
151	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	26.07	20.44	4.87	2	Mod Edge Only
153	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	25.53	17.94	4.57	2	Mod Edge Only
154	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	22.33	17.17	4.31	2	Mod Edge Only
155	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Present	Absent	Absent		17.81	5.39		Unclass Proj Pt
156	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	21.03	8.98	3.32		Mod Edge Only
157	Can't Determine	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent			3.53		Mod Edge Only
158	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	16.69	12.17	5.18	1	Mod Edge Only
159	Can't Determine	End	1	0-45°	N/A	N/A	Smooth	Present	Absent	Absent		13.68	2.64		Unclass Proj Pt
160	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	20.41	23.91	5.99	3	Mod Edge Only
161	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	20.87	19.02	7.24	3	End Scraper
162	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	17.11	13.06	4.39	1	Mod Edge Only
164	Can't Determine	Side	2	0-45°	0-45°	N/A	Smooth	Present	Absent	Absent		14.16	3.89		Unclass Proj Pt
165	Blunt	End and Side	3	46-75°	46-75°	46-75°	Smooth	Possible	Absent	Absent	27.58	22.66	4.53	3	End&Side Scraper
166	Blunt	End and Side	3	46-75°	46-75°	46-75°	Smooth	Absent	Absent	Absent	20.33	14.26	7.57	2	Mod Edge Only
167	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	92.14	29.45	12.44	32	Mod Edge Only
168	Pointed	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	Absent	25.69	12.63	3.78	1	Madison Pt
169	Pointed	End	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	25.71	15.34	7.29	3	Mod Edge Only
170	N/A	N/A	0	N/A	N/A	N/A	N/A	Absent	Absent	Absent	29.66	21.71	14.42	9	Core
171	N/A	N/A	0	N/A	N/A	N/A	N/A	Absent	Absent	Absent	43.13	31.15	18.95	30	Core
172	Blunt	End	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	16.42	18.31	5.88	2	Mod Edge Only
173	Pointed	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	30.85	15.34	11.99	4	Bipolar Proj Pt
174	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	23.52	18.57	4.22	1	Mod Edge Only
175	Blunt	End and Side	3	46-75°	46-75°	46-75°	Smooth	Present	Absent	Absent	29.96	21.29	7.39	3	Unclass Proj Pt
176	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	16.69	11.62	2.61	1	Mod Edge Only
177	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	18.58	14.77	7.05	3	Mod Edge Only
178	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	45.94	30.87	11.01	11	Mod Edge Only

Tool #	Distal End	Retouch	# Edges	Edge < A	Edge < B	Edge < C	Edge Config	Hafting	Projections	Projection Mod	Length	Width	Thickness	Weight	Tool Type
179	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	23.29	18.92	6.41	3	Mod Edge Only
180	Can't Determine	Side	1	46-75°	46-75°	N/A	Smooth	Absent	Absent	Absent		14.61	6.11		Mod Edge Only
181	Blunt	End and Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	Absent	22.12	14.99	4.19	1	Mod Edge Only
182	Pointed	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	21.28	11.69	7.01	1	Mod Edge Only
183	Blunt	End and Side	3	46-75°	46-75°	46-75°	Smooth	Possible	Absent	Absent	20.69	14.97	3.92	1	End&Side Scraper
184	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	16.65	11.92	4.86	1	Mod Edge Only
185	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	20.01	23.09	6.29	3	Mod Edge Only
187	Pointed	End and Side	2	46-75°	0-45°	N/A	Smooth	Present	Absent	Absent	33.62		5.07		Unclass Proj Pt
188	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	23.06	18.13	5.91	2	Mod Edge Only
189	Pointed	Side	2	46-75°	46-75°	N/A	Smooth	Possible	Absent	Absent	27.32	17.84	10.22	4	Bipolar Proj Pt
190	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	30.87	15.72	9.33	3	Mod Edge Only
191	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Present	Absent	Absent	21.52	20.87	5.89	2	Unclass Proj Pt
192	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	11.35	10.11	1.97	1	Mod Edge Only
193	Can't Determine	End	1	0-45°	N/A	N/A	Smooth	Present	Absent	Absent		14.83	2.02		Madison Pt
194	Pointed	Side	1	46-75°	N/A	N/A	Smooth	Present	Absent	Absent	29.51	17.62	8.44	4	Unclass Proj Pt
195	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Present	Absent	Absent			3.96		Madison Pt
196	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Present	Absent	Absent	23.89	19.78	4.02		Madison Pt
197	Can't Determine	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	Absent		19.57	5.02		Madison Pt
198	Pointed	Side	2	46-75°	46-75°	N/A	Smooth	Present	Absent	Absent		12.77	2.79		Madison Pt
199	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	27.58	18.93	2.95	1	Mod Edge Only
200	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	15.15	15.61	5.26	1	Mod Edge Only
201	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	18.64	12.93	4.96	1	Mod Edge Only
202	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	24.56	17.92	7.22	3	Mod Edge Only
203	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	28.11	21.91	5.95	3	Mod Edge Only
204	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	14.73	14.33	1.97	1	Mod Edge Only
205	Blunt	End and Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	Absent	21.01	12.75	8.59	2	Mod Edge Only
206	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	13.26	10.26	4.05	1	Mod Edge Only
207	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	22.32	10.61	7.24	2	Mod Edge Only
208	Blunt	End and Side	3	46-75°	46-75°	46-75°	Smooth	Possible	Absent	Absent	20.82	16.85	4.78	2	End Scraper
209	Blunt	End and Side	2	0-45°	46-75°	N/A	Smooth	Absent	Absent	Absent	22.31	17.66	6.62	2	Mod Edge Only
210	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	34.09	24.63	9.76	7	Core
211	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	30.34	22.29	6.89	5	Mod Edge Only
212	Blunt	End and Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	Absent	25.98	22.41	4.86	2	Mod Edge Only
213	Can't Determine	Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	Absent		31.81	12.59		Bipolar Proj Pt
214	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Possible	Absent	Absent		29.29	7.04		Knife
215	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	25.91	25.17	6.64	2	Mod Edge Only
216	Can't Determine	Side	2	46-75°	46-75°	N/A	Smooth	Present	Absent	Absent		12.81	5.11		Madison Pt
217	Pointed	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	20.75	13.41	5.01	1	Mod Edge Only
218	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Present	Absent	Absent	16.59		2.57		Unclass Proj Pt
219	Blunt	End and Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	Absent	20.65	13.72	4.39	2	Mod Edge Only
221	Pointed	Side	2	0-45°	46-75°	N/A	Smooth	Present	Absent	Absent	21.77	12.73	4.21	1	Madison Pt
222	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	36.92	19.31	8.62	5	Mod Edge Only
223	Pointed	Side	1	46-75°	N/A	N/A	Smooth	Present	Absent	Absent	20.76	17.27	6.26	2	Madison Pt

Tool #	Distal End	Retouch	# Edges	Edge < A	Edge < B	Edge < C	Edge Config	Hafting	Projections	Projection Mod	Length	Width	Thickness	Weight	Tool Type
224	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	24.01	21.11	4.64	2	Mod Edge Only
225	Blunt	Side	2	0-45°	46-75°	N/A	Smooth	Absent	Absent	Absent	33.73	27.54	8.97	9	Mod Edge Only
226	Pointed	End and Side	3	46-75°	46-75°	46-75°	Smooth	Possible	Absent	Absent	28.25	18.27	5.94	3	Mod Edge Only
227	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	31.78	25.87	10.22	6	Mod Edge Only
228	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	27.76	21.91	7.81	4	Mod Edge Only
229	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	30.66	21.75	6.56	4	Mod Edge Only
230	Blunt	End and Side	3	0-45°	0-45°	0-45°	Smooth	Absent	Absent	Absent	27.65	20.46	5.34	2	Mod Edge Only
231	Blunt	End and Side	3	0-45°	0-45°	0-45°	Smooth	Absent	Absent	Absent	26.45	32.47	7.49	8	Mod Edge Only
232	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	27.16	20.61	7.86	3	Mod Edge Only
233	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	15.44	15.97	2.96	1	Mod Edge Only
234	N/A	N/A	0	N/A	N/A	N/A	N/A	Absent	Absent	Absent	21.11	12.16	6.79	2	Bipolar Core
235	Pointed	End	1	0-45°	N/A	N/A	Smooth	Present	Absent	Absent		9.89	4.49		Madison Pt
236	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	18.22	20.11	4.08	2	Mod Edge Only
237	Blunt	End	1	46-75°	N/A	N/A	Smooth	Present	Absent	Absent	16.16	12.81	2.67		Madison Pt
238	N/A	N/A	0	N/A	N/A	N/A	N/A	Absent	Absent	Absent	20.37	11.69	6.52	1	Bipolar Core
239	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	25.34	14.21	9.11	3	Mod Edge Only
240	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	27.27	17.24	4.13	2	Mod Edge Only
241	Pointed	Side	2	46-75°	46-75°	N/A	Smooth	Present	Absent	Absent	20.02	14.95	3.68	1	Madison Pt
242	Can't Determine	End and Side	3	0-45°	0-45°	0-45°	Smooth	Possible	Absent	Absent		16.31	2.57		Mod Edge Only
243	Pointed	Side	2	46-75°	46-75°	N/A	Smooth	Present	Absent	Absent	17.51		3.47		Madison Pt
244	Pointed	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	71.71	46.09	19.01	46	Mod Edge Only
245	Pointed	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	38.98	28.82	9.84	10	Mod Edge Only
246	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	18.01	17.26	2.88	1	Mod Edge Only
247	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	19.65		4.29		Mod Edge Only
248	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	19.05	12.77	3.88	1	Mod Edge Only
249	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	13.18	16.92	3.38	1	Mod Edge Only
250	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	Absent	Absent	21.45	19.34	7.23	2	Mod Edge Only
251	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	Absent	20.89	16.04	3.69	1	Mod Edge Only
252	Pointed	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	Absent	30.34	29.15	8.22	6	Mod Edge Only
253	Pointed	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	N/A	N/A	17.61	16.61	3.42	0.8	Madison Pt
254	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Present	N/A	N/A			2.76		Madison Pt
255	Blunt	End and Side	1	0-45°	N/A	N/A	Smooth	Absent	N/A	N/A	25.49	14.61	4.04	1.61	Mod Edge Only
256	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	N/A	N/A	21.58	10.51	3.47	0.72	Mod Edge Only
257	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	N/A	N/A	19.44	17.37	3.43	0.97	Mod Edge Only
258	Blunt	End	1	46-75°	N/A	N/A	Smooth	Possible	N/A	N/A	30.81	25.22	6.28	4.39	Mod Edge Only
259	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	N/A	N/A	22.82	19.69	7.67	2.3	Mod Edge Only
260	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	N/A	N/A	25.72	21.35	5.61	2.22	Mod Edge Only
261	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	N/A	N/A	12.48	9.71	3.01	0.37	Mod Edge Only
262	Blunt	End and Side	2	46-75°	46-75°	N/A	Smooth	Absent	N/A	N/A	21.38	19.95	5.03	2.39	Mod Edge Only
263	Blunt	End and Side	1	0-45°	N/A	N/A	Smooth	Absent	N/A	N/A	30.43	28.12	6.99	5.66	Mod Edge Only
264	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	N/A	N/A	28.59	25.34	6.92	4.94	Mod Edge Only
265	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	N/A	N/A	29.79	21.3	6.28	2.45	Mod Edge Only
266	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	N/A	N/A	35.74	17.2	6.94	4.47	Mod Edge Only

Tool #	Distal End	Retouch	# Edges	Edge < A	Edge < B	Edge < C	Edge Config	Hafting	Projections	Projection Mod	Length	Width	Thickness	Weight	Tool Type
267	Blunt	End and Side	3	0-45°	46-75°	46-75°	Smooth	Absent	N/A	N/A	22.31	19.9	5.83	2.91	End&Side Scraper
268	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	N/A	N/A	30.69	18.04	5.24	4.1	Mod Edge Only
269	N/A	End and Side	3	46-75°	46-75°	46-75°	Smooth	Present	N/A	N/A		14.81	4.07		Madison Pt
270	Pointed	Side	2	46-75°	46-75°	N/A	Smooth	Possible	N/A	N/A	42.14	27.51	6.24	5.78	Knife
271	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Present	N/A	N/A			3.91		Madison Pt
272	N/A	Side	1	46-75°	N/A	N/A	Smooth	Absent	N/A	N/A	30.48	13.46	7.82	2.45	Mod Edge Only
273	N/A	End and Side	2	46-75°	46-75°	N/A	Smooth	Present	N/A	N/A		29.72	8.75		Unclass Proj Pt
274	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	N/A	N/A	27.39	19.72	9.06	5.37	End Scraper
275	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	N/A	N/A	29.29	14.57	4.34	2.07	Mod Edge Only
276	N/A	N/A	4	46-75°	46-75°	46-75°	Smooth	Absent	N/A	N/A	45.38	28.53	22.58	22.42	Core
277	N/A	Side	1	46-75°	N/A	N/A	Smooth	Absent	N/A	N/A	17.94	14.13	1.97	0.53	Mod Edge Only
278	Pointed	End and Side	2	46-75°	46-75°	N/A	Smooth	Present	N/A	N/A	24.4		4.95		Madison Pt
279	Pointed	Side	2	46-75°	46-75°	N/A	Smooth	Possible	N/A	N/A	20.18	6.73	4.9	0.54	Drill
280	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	N/A	N/A	24.77	18.54	3.51	1.34	Mod Edge Only
281	Pointed	End and Side	3	46-75°	46-75°	46-75°	Smooth	Present	Absent	N/A	18.6	13.87	3.75	0.85	Madison Pt
282	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	N/A	N/A	28.41	21.41	5.88	2.8	Mod Edge Only
283	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	N/A	N/A	22.09	20.64	4.64	2.37	Mod Edge Only
284	Pointed	End and Side	3	0-45°	46-75°	46-75°	Smooth	Present	N/A	N/A	13.77	12.16	3.16	0.42	Madison Pt
285	Blunt	Side	1	0-45°	N/A	N/A	Smooth	N/A	N/A	N/A	36.06	13.89	12.18	5.46	Mod Edge Only
286	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	28.51	19.95	10.52	6.47	End&Side Scraper
287	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	N/A	Absent	N/A	31.88	28.33	7.21	6.22	Mod Edge Only
288	Blunt	End and Side	3	0-45°	0-45°	0-45°	Smooth	Possible	Absent	N/A	28.91	19.01	6.06	2.95	End Scraper
289	Blunt	End and Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	N/A	31.86	28.95	9.3	7.21	End Scraper
290	N/A	End and Side	1	46-75°	N/A	N/A	Smooth	N/A	Absent	N/A	22.39	19.46	6.11		Mod Edge Only
291	Blunt	End and Side	3	46-75°	46-75°	46-75°	Smooth	Absent	Absent	N/A	30.36	22.97	7.66	6.42	Mod Edge Only
292	N/A	Side	2	46-75°	46-75°	N/A	Smooth	N/A	Absent	N/A	17.7	15.82	5.51		Mod Edge Only
293	Blunt	Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	N/A	17.98	17.39	5.43	1.92	Mod Edge Only
294	N/A	Side	2	0-45°	0-45°	N/A	Smooth	N/A	Absent	N/A	18.18	12.21	3.9		Mod Edge Only
295	Blunt	End and Side	4	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	25.84	23.42	6.89	4.27	End&Side Scraper
296	Pointed	Side	1	0-45°	N/A	N/A	Smooth	N/A	Absent	N/A	15.5	12.65	1.53		Mod Edge Only
297	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	22.61	13.65	4.01	0.79	Mod Edge Only
298	Blunt	End and Side	5	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	26.87	20.50	5.7	3.17	End&Side Scraper
299	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	21.38	19.25	4.93	1.65	End&Side Scraper
300	Blunt	End and Side	3	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	20.86	16.64	5.03	1.65	End&Side Scraper
301	N/A	Side	2	0-45°	46-75°	N/A	Smooth	Absent	Absent	N/A	16.54	6.42	4.71	0.41	Mod Edge Only
302	Blunt	End and Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	25.58	20.06	5.27	3.22	End Scraper
303	Blunt	End and Side	3	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	20.71	17.21	3.1	1.09	End&Side Scraper
304	N/A	Side	2	0-45°	0-45°	N/A	Smooth	N/A	Absent	N/A	14.01	13.97	3.35		Mod Edge Only
305	Blunt	Side	1	0-45°	N/A	N/A	Smooth	N/A	Absent	N/A	11.23	8.68	3.82		Mod Edge Only
306	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	26.01	25.39	6.82	3.68	End&Side Scraper
307	Pointed	Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	20.53	13.59	3.49	0.77	Madison Pt
308	Blunt	Side	3	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	18.72	11.90	2.93	0.57	End&Side Scraper
309	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	23.97	21.19	4.79	2.03	End Scraper

Tool #	Distal End	Retouch	# Edges	Edge < A	Edge < B	Edge < C	Edge Config	Hafting	Projections	Projection Mod	Length	Width	Thickness	Weight	Tool Type
310	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	33.34	20.66	6.34	4.31	End Scraper
311	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	30.9	26.73	7.62	5.81	End Scraper
312	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	41.35	24.94	10.65	8.28	End Scraper
313	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	22.22	14.60	4.74	1.33	End Scraper
314	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	35.15	24.93	14.15	7.2	End&Side Scraper
315	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	37.9	30.10	12.91	10.73	End Scraper
316	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	32.67	20.60	7.19	4.56	End Scraper
317	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	33.74	29.54	6.51	6.97	End Scraper
318	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	28.58	26.82	4.05	3.6	End Scraper
319	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	14.06	11.79	2.73	0.48	Mod Edge Only
320	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	32.88	26.72	10.87	11.2	End Scraper
321	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Present	Absent	N/A	25.13	18.79	4.93	1.63	Unclass Proj Pt
322	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	50.7	34.49	9.54	12.22	End Scraper
323	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	27.53	13.49	4.17	1.38	Mod Edge Only
324	Blunt	End	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	N/A	32.69	19.01	3.06	2.09	Mod Edge Only
325	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	20.31	13.77	3.48	0.9	End Scraper
326	Blunt	End and Side	3	0-45°	N/A	N/A	Smooth	Possible	N/A	Absent	26.57	15.53	5.78	2.13	End Scraper
327	Blunt	End and Side	3	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	23.69	23.86	3.94	1.81	End Scraper
328	Pointed	Side	2	46-75°	0-45°	N/A	Smooth	Absent	Absent	N/A	38.27	17.95	7.46	4.25	Mod Edge Only
329	N/A	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	18.95	12.35	2.2	0.53	End&Side Scraper
330	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	25.65	12.28	4.02	1.09	End Scraper
331	Blunt	End and Side	3	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	33.56	22.58	5.63	3.24	Mod Edge Only
332	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	17.24	12.83	5.57	0.83	End Scraper
333	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	19.45	15.8	4.61	1.52	End&Side Scraper
334	Blunt	End and Side	3	46-75°	0-45°	0-45°	Smooth	Absent	Absent	N/A	19.12	14.5	4.77	1.51	End&Side Scraper
335	Blunt	End and Side	3	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	18.98	14.7	7.66	1.72	End&Side Scraper
336	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	19.59	16.01	4.29	0.97	End&Side Scraper
337	Blunt	End	1	0-45°	N/A	N/A	Smooth	Possible	N/A	N/A	20.14	15.95	4.47	1.25	Mod Edge Only
338	Blunt	Side	2	46-75°	0-45°	N/A	Smooth	Absent	Absent	N/A	27.11	20.55	4.43	3.4	Mod Edge Only
339	Blunt	End and Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	N/A	23.89	15.17	10.38	3.3	Mod Edge Only
340	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	29.41	23.72	6.15	3.99	End&Side Scraper
341	Blunt	End and Side	2	0-45°	46-75°	N/A	Smooth	Absent	Absent	N/A	46.93	28.43	13.13	13.68	Mod Edge Only
342	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	22.9	16.11	4.7	1.55	End&Side Scraper
343	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	31.33	16.7	5.31	2.58	End&Side Scraper
344	N/A	N/A	2	46-75°	46-75°	N/A	Smooth	N/A	N/A	N/A	6.67	6.57	3.03		Unclass Proj Pt
345	Pointed	N/A	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	19.94	17.55	4.14	1.08	Madison Pt
346	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	35.47	26.04	6.58	5.96	End Scraper
347	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	21.3	13.16	5.52	0.91	Mod Edge Only
348	Blunt	End and Side	2	0-45°	46-75°	N/A	Smooth	Absent	Absent	N/A	44.29	36.28	11.07	14.13	End&Side Scraper
349	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	38.05	25.52	5.81	5.35	End&Side Scraper
350	Blunt	End and Side	3	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	26.94	17.69	2.95	1.16	Mod Edge Only
351	N/A	N/A	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	17.59	14.09	2.64		Madison Pt
352	Blunt	Side	2	0-45°	46-75°	N/A	Smooth	Absent	Absent	N/A	43.23	17.46	6.62	5.15	Mod Edge Only

Tool #	Distal End	Retouch	# Edges	Edge < A	Edge < B	Edge < C	Edge Config	Hafting	Projections	Projection Mod	Length	Width	Thickness	Weight	Tool Type
353	Pointed	Side	2	0-45°	0-45°	N/A	Serrated	Absent	Absent	N/A	48.36	28.19	10.07	10.61	Mod Edge Only
354	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	37.05	26.19	8.34	6.87	Mod Edge Only
355	Blunt	End and Side	2	46-75°	0-45°	N/A	Smooth	Absent	Absent	N/A	29.38	15.38	3.48	1.42	Mod Edge Only
356	Blunt	End and Side	3	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	26.17	23.43	5.87	3.15	End&Side Scraper
357	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	36.38	26.17	13.87	8.26	Mod Edge Only
358	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	21.47	17.65	3.12	0.77	End&Side Scraper
359	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	28.71	26.61	7.51	4.08	End Scraper
360	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	25.49	11.48	6.25	1.54	Mod Edge Only
361	Blunt	End and Side	3	0-45°	46-75°	0-45°	Smooth	Absent	Absent	N/A	27.26	21.27	8.18	3.09	End&Side Scraper
362	Blunt	End and Side	4	0-45°	46-75°	46-75°	Smooth	Absent	Absent	N/A	34.08	29.36	5.82	4.88	Mod Edge Only
363	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	26.54	20.57	6.28	2.63	End Scraper
364	Can't Determine	Can't Determine	1	0-45°	N/A	N/A	Smooth	N/A	N/A	N/A	16.69	7	2.72		Mod Edge Only
365	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	19.72	16.06	3.81	0.89	Mod Edge Only
366	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Possible	Absent	N/A	27.49	12.2	5.9	1.18	Mod Edge Only
367	N/A	N/A	0	N/A	N/A	N/A	N/A	Absent	Absent	N/A	21.82	18.05	7.81	2.66	Core
368	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	42.83	22.87	13.18	8.9	End&Side Scraper
369	Pointed	N/A	2	0-45°	46-75°	N/A	Smooth	Present	Absent	N/A	16.45	10.79	3.81	0.56	Bipolar Proj Pt
370	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	26.71	11.59	4.21	1.2	Mod Edge Only
371	Pointed	N/A	2	0-45°	0-45°	N/A	Smooth	Present	Absent	N/A	10.11	9.34	2.72		Bipolar Proj Pt
372	Pointed	N/A	2	0-45°	0-45°	N/A	Smooth	Present	Absent	N/A	15.98	14.56	2.75	0.5	Bipolar Proj Pt
373	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	19.76	15.91	7.91	1.85	Mod Edge Only
374	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	41.76	31.04	9.05	8.59	End Scraper
375	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	31.43	30.03	9.02	6.72	End Scraper
376	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	28.91	27.71	7.61	3.54	Mod Edge Only
377	Blunt	End and Side	4	0-45°	0-45°	46-75°	Smooth	Absent	Absent	N/A	30.88	14.1	8.58	2.61	Mod Edge Only
378	Blunt	Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	N/A	31.56	24.78	9.96	8.36	Mod Edge Only
379	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	29.29	25.34	3.83	2.85	Mod Edge Only
380	Blunt	End and Side	2	0-45°	46-75°	N/A	Smooth	Absent	Absent	N/A	31.03	24.64	10.93	4.48	Mod Edge Only
381	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	15.08	12.88	4.2		Mod Edge Only
382	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	16.46	12.06	5.02	0.64	Mod Edge Only
383	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	23.53	12.86	4.42	1.26	Mod Edge Only
384	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	17.48	14.25	5.08	0.89	Mod Edge Only
385	N/A	N/A	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	15.7	15.05	3.04		Madison Pt
386	Blunt	N/A	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	17.23	9.18	3.77		Mod Edge Only
387	Pointed	N/A	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	25.88	16.64	3.25	1.07	Unclass Proj Pt
388	Pointed	N/A	2	0-45°	46-75°	N/A	Smooth	Present	Absent	N/A	17.71	13.72	4.09	0.91	Madison Pt
389	Pointed	N/A	3	46-75°	0-45°	46-75°	Smooth	Present	Absent	N/A	16.96	15.65	3.81	0.7	Madison Pt
390	Blunt	Side	2	0-45°	46-75°	N/A	Smooth	Present	Absent	N/A	28.63	20.62	6.01	2.92	Unclass Proj Pt
391	Blunt	Side	2	46-75°	0-45°	N/A	Smooth	Absent	Absent	N/A	20.35	17.02	3.89	1.06	Mod Edge Only
392	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	25.17	23.17	5.79	2.11	Mod Edge Only
393	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	39.25	26.67	7.72	6.99	Mod Edge Only
394	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	29.86	17	9.57	2.55	Mod Edge Only
395	Blunt	N/A	2	0-45°	46-75°	N/A	Smooth	Present	Absent	N/A	16.82	9.7	3.68		Unclass Proj Pt

Tool #	Distal End	Retouch	# Edges	Edge < A	Edge < B	Edge < C	Edge Config	Hafting	Projections	Projection Mod	Length	Width	Thickness	Weight	Tool Type
396	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	24.41	16.64	4.18	1.34	Mod Edge Only
397	Blunt	N/A	1	0-45°	N/A	N/A	Smooth	Possible	Absent	N/A	30.83	13..67	8.98	2.9	End Scraper
398	Blunt	End	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	28.8	22.7	8.24	4.09	Mod Edge Only
399	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	33.06	19.41	8.82	4.74	Mod Edge Only
400	Pointed	N/A	3	0-45°	0-45°	46-75°	Smooth	Present	Absent	N/A	17.42	16.43	4.25	0.85	Mod Edge Only
401	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	28.91	20.33	3.72	1.7	Mod Edge Only
402	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	28.75	7.76	5.8		Mod Edge Only
403	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	27.13	24.19	7.41	5	End Scraper
404	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	28.07	13.04	7.2	1.88	Mod Edge Only
405	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	26.68	14.31	11.06	3.61	Core
406	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	18.08	15.47	6.18	1.49	Mod Edge Only
407	Pointed	N/A	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	19.45	11.18	3.48	0.48	Madison Pt
408	Pointed	N/A	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	27.9	18.36	8.17	4.03	Mod Edge Only
409	Blunt	End and Side	3	0-45°	46-75°	0-45°	Smooth	Absent	Absent	N/A	31.7	13.79	4.43	1.53	End&Side Scraper
410	Pointed	Side	3	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	24.88	18.99	4.76	1.43	Mod Edge Only
411	Pointed	N/A	3	0-45°	0-45°	46-75°	Smooth	Present	Absent	N/A	27.78	20.22	5.46	2.18	Unclass Proj Pt
412	Blunt	Side	2	0-45°	0-45°	N/A	Serrated	Present	Absent	N/A	15.89	13.61	4.36		Unclass Proj Pt
413	Pointed	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	33.83	17.55	8.6	4.23	Mod Edge Only
414	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	31.47	19.63	5.6	3.27	Mod Edge Only
415	N/A	N/A	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	19.29	15.98	3.82		Madison Pt
416	Blunt	End and Side	3	46-75°	46-75°	46-75°	Smooth	Absent	Absent	N/A	26.2	24.11	6.27	3.76	Mod Edge Only
417	Blunt	End and Side	3	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	26.79	18.67	3.42	1.17	Mod Edge Only
418	Blunt	End and Side	3	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	24.42	18	3.06	1.01	Mod Edge Only
419	Blunt	End and Side	3	46-75°	>75°	46-75°	Smooth	Absent	Absent	N/A	21.14	20.72	6.15	2.44	End Scraper
420	Pointed	Side	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	N/A	41.67	27.95	12.4	13.22	Mod Edge Only
421	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	25.66	8.66	6.55		Mod Edge Only
422	Blunt	End and Side	3	46-75°	0-45°	46-75°	Smooth	Absent	Absent	N/A	25.32	19.09	6.27	2.54	End&Side Scraper
423	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	25.6	11.33	7.59	2.13	Mod Edge Only
424	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	24.76	13.63	7.47	1.54	Mod Edge Only
425	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	19.08	18.04	4.86	1.3	Mod Edge Only
426	Pointed	Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	18.39	15.29	2.98	0.91	Madison Pt
427	Pointed	N/A	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	19.22	13.77	3.91	0.77	Madison Pt
428	N/A	N/A	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	20.1	16.52	4.01		Madison Pt
429	Pointed	N/A	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	22.26	13.36	3.61	0.9	Madison Pt
430	Blunt	End and Side	3	46-75°	46-75°	46-75°	Smooth	Absent	Absent	N/A	35.23	26.17	7.99	5.59	End Scraper
431	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	24.12	20.03	2.98	1.23	Mod Edge Only
432	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	47.19	24.65	6.49	8.04	End Scraper
433	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	18.72	16.73	6.78	1.25	Mod Edge Only
434	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	29.57	21.36	5.95	4.51	Mod Edge Only
435	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	26.56	19.08	8.99	3.11	Mod Edge Only
436	Blunt	End	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	25.77	21.26	5.37	2.82	Mod Edge Only
437	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	34.04	32.28	6.27	4.89	Mod Edge Only
438	Can't Determine	End and Side	2	0-45°	0-45°	N/A	Smooth	Present	Present	Present	28.65	9.79	6.31		Unclass Proj Pt

Tool #	Distal End	Retouch	# Edges	Edge < A	Edge < B	Edge < C	Edge Config	Hafting	Projections	Projection Mod	Length	Width	Thickness	Weight	Tool Type
439	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	22.94	13.82	3.92	1.07	Mod Edge Only
440	Blunt	End and Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	13.08	11.47	2.73		Mod Edge Only
441	Pointed	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	25.21	16.68	5.52	1.89	Mod Edge Only
442	Blunt	End and Side	2	0-45°	46-75°	N/A	Smooth	Absent	Absent	N/A	23.01	17.99	4.28	1.52	Mod Edge Only
443	Blunt	Side	3	0-45°	46-75°	0-45°	Smooth	Absent	Absent	N/A	32.71	28.83	6.12	5.37	Mod Edge Only
444	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	18.27	12.01	4.62	0.86	Mod Edge Only
445	Pointed	N/A	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	19.75	17.02	3.37	0.85	Madison Pt
446	N/A	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	18.96	11.02	2.81		End&Side Scraper
447	Pointed	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	20.92	14.23	3.83	0.76	Madison Pt
448	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	36.81	34.18	20.65	10.89	Mod Edge Only
449	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	25.75	19.02	5.98	2.51	End Scraper
450	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	19.81	16.08	5.38	1.32	Mod Edge Only
451	Can't Determine	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	17.31	11.65	2.76		Mod Edge Only
452	Blunt	End and Side	3	0-45°	46-75°	0-45°	Smooth	Absent	Absent	N/A	18.91	15.85	3.3	0.87	Mod Edge Only
453	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	34.77	18.61	3.88	1.93	Mod Edge Only
454	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	22.33	11.75	4.65	1.03	Mod Edge Only
455	Blunt	End and Side	3	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	22.93	18	4.08	1.41	Mod Edge Only
456	Pointed	N/A	2	0-45°	0-45°	N/A	Smooth	Present	Absent	N/A	10.63	6.86	3.18		Unclass Proj Pt
457	Blunt	Side	1	0-45°	N/A	N/A	Serrated	Absent	Absent	N/A	14.26	10.09	1.3		Mod Edge Only
458	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	32.45	21.05	6.19	2.45	Mod Edge Only
459	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	19.46	16.37	3.71	0.97	Mod Edge Only
460	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	16.93	11.06	3.14	0.44	Mod Edge Only
461	N/A	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	20.68	18.49	4.02		Mod Edge Only
462	Blunt	Side	2	46-75°	0-45°	N/A	Smooth	Absent	Absent	N/A	25.35	18.24	6.14	2.53	End&Side Scraper
463	Blunt	N/A	2	0-45°	0-45°	N/A	Smooth	Present	Absent	N/A	22.76	11.64	4.29	0.9	Madison Pt
464	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	26.37	17.81	6.47	2.38	Mod Edge Only
465	Blunt	End	2	46-75°	0-45°	N/A	Smooth	Absent	Absent	N/A	24.33	17.05	7.04	2.05	Mod Edge Only
466	Blunt	End and Side	3	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	21.44	15.83	5.07	1.66	Mod Edge Only
467	N/A	N/A	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	21.53	13.3	4.13		Mod Edge Only
468	Can't Determine	Can't Determine	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	5.47	4.14	1.15		Mod Edge Only
469	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	29.7	24.76	5	2.45	Mod Edge Only
470	Blunt	End	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	34.46	27.59	4.42	3.67	Mod Edge Only
471	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	21.48	17.85	4		Mod Edge Only
472	Can't Determine	Can't Determine	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	12.38	8.3	2.89		Mod Edge Only
473	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	18.54	13.71	3.84	0.68	Mod Edge Only
474	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	26.59	20.59	6.97	2.75	Mod Edge Only
475	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	36.71	31.76	9.89	7.56	Mod Edge Only
476	Pointed	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	19.37	13.84	3.06	0.78	Unclass Proj Pt
477	N/A	N/A	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	16.64	13.7	3.48		Madison Pt
478	Pointed	N/A	2	0-45°	0-45°	N/A	Smooth	Present	Absent	N/A	11.81	10.3	2.85		Madison Pt
479	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	24.99	17.47	6.15	2.63	Mod Edge Only
480	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	25.1	17.35	6.21	2.1	Mod Edge Only
481	Pointed	N/A	3	46-75°	46-75°	0-45°	Smooth	Absent	Absent	N/A	20.47	8.04	4.8		Drill

Tool #	Distal End	Retouch	# Edges	Edge < A	Edge < B	Edge < C	Edge Config	Hafting	Projections	Projection Mod	Length	Width	Thickness	Weight	Tool Type
482	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	34.55	18.19	6.25	3.89	Mod Edge Only
483	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	24.85	14.2	4.72	1.9	Mod Edge Only
484	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	27.27	21.67	6.86	2.59	Mod Edge Only
485	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	20.31	19.76	5.34	1.77	Mod Edge Only
486	N/A	N/A	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	13.05	13.2	2.57		Madison Pt
487	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	18.92	12.33	4.75	0.88	Mod Edge Only
488	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	35.98	25.43	6.58	4.21	Mod Edge Only
489	Can't Determine	N/A	2	0-45°	0-45°	N/A	Smooth	Present	Absent	N/A	20.58	12.01	3.47	0.75	Unclass Proj Pt
490	Blunt	End	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	34.32	23.72	7.67	5.76	Mod Edge Only
491	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	23.43	13.1	3.53	0.89	Mod Edge Only
492	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	25.01	16.47	7.55	2.28	Mod Edge Only
493	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	36.41	24.71	5.98	3.7	Mod Edge Only
494	N/A	N/A	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	N/A	24.41	10.19	6.4	1.61	Mod Edge Only
495	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	25.04	21.76	5.09	2.01	Mod Edge Only
496	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	28.73	21.28	5.78	3.16	Mod Edge Only
497	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	25.03	15.95	4.17	1.24	Mod Edge Only
498	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	32.43	28.23	6.42	5.19	Mod Edge Only
499	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	13.07	8.64	2.34		Mod Edge Only
500	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	22.75	13.1	2.77		Mod Edge Only
501	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	21.77	20.1	6.26	2.48	Mod Edge Only
502	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	29.03	23.89	5.55	2.54	Mod Edge Only
503	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	26.42	11.44	6.27		Mod Edge Only
504	N/A	Can't Determine	2	46-75°	46-75°	N/A	Smooth	Absent	Absent	N/A	13.37	13.16	3.89	0.47	Mod Edge Only
505	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	22.94	19.38	7.12	2.42	Mod Edge Only
506	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	38.13	22.85	7.84		Mod Edge Only
507	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	27.08	17.07	5.27	1.43	Mod Edge Only
508	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	26.86	20.04	7.84	3.4	Mod Edge Only
509	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	25.72	13.36	3.87	1.53	End Scraper
510	N/A	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	16.6	13.97	2.8		Mod Edge Only
511	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	26.94	16.42	3.59		Mod Edge Only
512	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	30.19	28.1	7.36	4.55	Mod Edge Only
513	Blunt	End and Side	2	46-75°	>75°	N/A	Smooth	Absent	Absent	N/A	32.26	25.2	8.48	5.28	Mod Edge Only
514	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	21.64	17.78	5.05	1.43	Mod Edge Only
515	N/A	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	23.07	21.1	3.91	1.47	Mod Edge Only
516	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	20.93	17	2.13	0.74	Mod Edge Only
517	N/A	N/A	2	0-45°	0-45°	N/A	Smooth	N/A	Absent	N/A	15.9	8.04	3.26		Unclass Proj Pt
518	N/A	N/A	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	12.78	7.37	4.08		Madison Pt
519	N/A	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	22.2	16.29	3.55	0.94	Mod Edge Only
520	Pointed	N/A	2	0-45°	0-45°	N/A	Smooth	N/A	Absent	N/A	14.84	11.21	4.98		Unclass Proj Pt
521	Blunt	End and Side	3	>75°	>75°	46-75°	Smooth	Absent	Absent	N/A	29.95	18.07	7.9	5.24	End&Side Scraper
522	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	28.53	22	6.13	2.56	Mod Edge Only
523	N/A	N/A	3	0-45°	0-45°	46-75°	Smooth	Present	Absent	N/A	19.3	17.32	4.88		Madison Pt
524	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	34.52	32.34	8.67	7.95	Mod Edge Only

Tool #	Distal End	Retouch	# Edges	Edge < A	Edge < B	Edge < C	Edge Config	Hafting	Projections	Projection Mod	Length	Width	Thickness	Weight	Tool Type
525	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	30.67	20.52	6.06	3.92	Mod Edge Only
526	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	24.08	17.34	5.48	2.74	Mod Edge Only
527	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	20.9	15.85	3.66	0.9	Mod Edge Only
528	Blunt	End and Side	2	0-45°	46-75°	N/A	Smooth	Absent	Absent	N/A	24.33	16.87	4.36	1.95	Mod Edge Only
529	Blunt	Side	2	0-45°	0-45°	N/A	Smooth	Present	Absent	N/A	17.23	12.16	3.43		Unclass Proj Pt
530	N/A	N/A	2	0-45°	0-45°	N/A	Smooth	Present	Absent	N/A	11.76	8.2	3.44		Madison Pt
531	Blunt	N/A	2	0-45°	0-45°	N/A	Smooth	Possible	Absent	N/A	15.23	9.26	3.33		Mod Edge Only
532	Pointed	N/A	2	0-45°	0-45°	N/A	Smooth	Present	Absent	N/A	17.99	10.51	3.54		Unclass Proj Pt
533	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	22.51	7.84	6.67	0.91	Mod Edge Only
534	Pointed	N/A	3	46-75°	0-45°	0-45°	Smooth	Present	Absent	N/A	20.9	12.91	5.02	0.94	Madison Pt
535	Pointed	N/A	2	0-45°	0-45°	N/A	Smooth	Present	Absent	N/A	17.44	11.22	4.33		Madison Pt
536	Pointed	N/A	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	30.44	15.37	4.51	1.46	Madison Pt
537	Blunt	Side	1	46-75°	N/A	N/A	Smooth	Absent	Absent	N/A	25.95	16.34	4.94	1.92	Mod Edge Only
538	Blunt	Side	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	16.51	11.77	2.87	0.42	Mod Edge Only
539	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	16.84	15.97	3.55	1.06	Mod Edge Only
540	Blunt	End and Side	4	0-45°	0-45°	0-45°	Smooth	Absent	Absent	N/A	13.68	10.79	2.47	0.36	Mod Edge Only
541	N/A	N/A	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	62.08	49.69	27.84	72.5	Core
542	Blunt	End	1	0-45°	N/A	N/A	Smooth	Absent	Absent	N/A	17.78	9.04	3.82	0.64	Mod Edge Only
543	N/A	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	20.34	19.15	5.77	1.25	Mod Edge Only
544	Pointed	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	19.23	14.43	3.48	0.8	Madison Pt
545	Pointed	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	16.66	12.59	2.49	0.49	Madison Pt
546	Pointed	End and Side	3	0-45°	0-45°	0-45°	Smooth	Present	Absent	N/A	23.96	14.39	3.56	0.78	Madison Pt
325A	Blunt	End and Side	2	0-45°	0-45°	N/A	Smooth	Absent	Absent	N/A	30.84	21.17	7.64	4.09	End&Side Scraper

KATHERINE M. STERNER, Ph.D., R.P.A

Curriculum vitae (Revised 7 May 2018)

CONTACT INFORMATION:

Department of Anthropology
University of Wisconsin-Milwaukee
3413 N. Downer Ave.
390 Sabin Hall
Milwaukee, WI 53211
(216) 502-0550
ksterner@uwm.edu

PROFESSIONAL PREPARATION:

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

2012 M.S., Anthropology, University of Wisconsin-Milwaukee
Thesis title: *Oneota Lithics: A Use-Wear Analysis of the Crescent Bay Hunt Club Assemblage from the 2004 Excavations*

2009 B.A., Anthropology, History minor, The Pennsylvania State University

PEER-REVIEWED PUBLICATIONS:

McLeester, Madeleine, Mark Schurr, Katherine Sterner and Robert Ahlrichs
n.d. Marine Shell Working in Protohistoric Northern Illinois. Submitted to *American Antiquity.*

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.

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.

ACADEMIC AWARDS, GRANTS, AND FUNDING:

2017: College of Lake County Adjunct Faculty Travel Grant
2015-2016: UWM Graduate School Distinguished Dissertation Fellowship
2015: 1st Place, UWM Anthropology Department Student Paper Competition
2014: Wisconsin Archaeological Society Research Award
2013: 2nd Place, Midwest Archaeological Conference Student Paper Competition
2011, 2015: UWM Graduate School Travel Grants

RESEARCH REPORTS AND MANUSCRIPTS:

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

2017 Report on the Discovery of Human Remains at the Crescent Bay Hunt Club Site (47JE904), Jefferson County, Wisconsin. Report submitted to the Wisconsin Historical Society. Dr. Robert J. Jeske, Principal Investigator.

Epstein, Ethan A. and Katherine Sterner-Miller

2015 Phase I Archaeological Survey of the STH 32/STH 165 Intersection Improvements, (WisDOT Project 3240-11-00) Kenosha County, Wisconsin. Archaeological Research Laboratory Report of Investigations No. 396, UWM-CRM, Milwaukee, Wisconsin.

Haas, Jennifer R. and Katherine Sterner-Miller

2015 Phase I Archaeological Investigations for Peters Concrete Borrow Pit, Oconto County, Wisconsin. Archaeological Research Laboratory Report of Investigations No. 365, UWM-CRM, Milwaukee, Wisconsin.

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

2015 Archaeology Around Wisconsin in 2014: UWM Program in Midwestern Archaeology. *The Wisconsin Archaeologist*, 96(1): 123-125.

Jeske, Robert J. and Katherine M. Sterner-Miller

2014 Report on the Discovery of Human Remains at the Crescent Bay Hunt Club Site (47Je904), Jefferson County, Wisconsin. Report submitted to the Wisconsin Historical Society. Dr. Robert Jeske, Principal Investigator.

Sterner, Katherine M.

2010 A Preliminary Study of the Flaked Chert Industry at Margarita, Quintana Roo, Mexico. Report submitted to University of Wisconsin-Milwaukee, Dr. Laura Villamil, Principal Investigator.

Sterner, Katherine M.

2009 A Morphological Study of Whittlesey Projectile Points. Report submitted to the Cleveland Museum of Natural History. Dr. Brian Redmond, Principal Investigator

Snow, Dean R. and Katherine M. Sterner

2008 Whitehall Rock Shelter, Site 11716 Catalog Guide, Lake George Excavations. Report submitted to the New York State Museum. Dr. Dean Snow, Principal Investigator.

Snow, Dean R. and Katherine M. Sterner

2008 Bacon Pond, Site 11726 Catalog Guide, Lake George Excavations. Report submitted to the New York State Museum. Dr. Dean Snow, Principal Investigator.

PAPERS DELIVERED AT PROFESSIONAL CONFERENCES:

Sterner, Katherine M., Robert E. Ahlrichs, Dan Wendt and Larry Furo
2018 Testing Adaptive Efficiency: A Comparison of the Durability of Stone and Copper Project Points. Paper presented at the 83rd Annual Meeting of the Society for American Archaeology, Washington, D.C.

Jeske, Robert J. and Katherine M. Sterner
2018 Early Oneota Longhouses in Southeastern Wisconsin. Paper presented at the 83rd Annual Meeting of the Society for American Archaeology, Washington, D.C.

Sterner, Katherine M. and Paul J. Moriarity
2017 Communities in Stone: Examining Interaction in Late Prehistoric Wisconsin through Lithic Analysis. Paper presented at the 61st Annual Meeting of the Midwest Archaeological Conference, Indianapolis, Indiana.

Sterner, Katherine M. and John D. Richards
2017 Rediscovering the UWM-ARL Collections: The Things We Find During Rehabilitation. Paper presented at the 61st Annual Meeting of the Midwest Archaeological Conference, Indianapolis, Indiana.

Jeske, Robert, Katherine Sterner, Hannah Blija, Samantha Bomkamp and Tania Milosavljevic
2017 Ten Seasons Later: The Crescent Bay Hunt Club Site and Wisconsin Oneota Lifeways. Paper presented as part of an invited symposium at the 61st Annual Meeting of the Midwest Archaeological Conference, Indianpolis, Indiana.

Sterner, Katherine M. and Robert E. Ahlrichs
2017 Examining the Use Lives of Archaic Bipointed Bifaces: Cache Blades from the Riverside Site. Paper presented at the 82nd Annual Meeting of the Society for American Archaeology, Vancouver, British Columbia.

Jeske, Robert J., Seth A. Schneider, Richard W. Edwards, Katherine M. Sterner, and Rachel C. McTavish
2016 Strangers in a Strange Land: The Lake Koshkonong Oneota Locality in Context. Paper presented at the 60th Annual Meeting of the Midwest Archaeological Conference, Iowa City, Iowa.

Sterner, Katherine M.
2016 Integrating Use-Wear Analysis: A Case Study from the Holdorf I Site. Paper presented at the 60th Annual Meeting of the Midwest Archaeological Conference, Iowa City, Iowa.

Sterner-Miller, Katherine M. and Robert J. Jeske
2016 A Scraper is Sometimes Just a Scraper: A Multi-Method Approach to Inferring Tool Use at an Oneota Site in Southeastern Wisconsin. Paper presented at the 81st Annual Meeting of the Society for American Archaeology, Orlando, Florida.

Ahlrichs, Robert E. and Katherine M. Sterner-Miller
2015 The Susceptibility of Wyandotte Chert to High Power Use-Wear Analysis. Paper presented as part of an invited symposium at the 59th Annual Meeting of the Midwest Archaeological Conference, Milwaukee, Wisconsin.

Sterner-Miller, Katherine M.
2015 Intraregional Variation in the Oneota Lithic Economy: A Comparison of the La Crosse and Koshkonong Localities. Paper presented as part of an invited symposium at the 59th Annual Meeting of the Midwest Archaeological Conference, Milwaukee, Wisconsin.

Sterner-Miller, Katherine M., Robert J. Jeske and Robert E. Ahlrichs
2015 Understanding Oneota Stone Tool Functions: A Case Study of Precision and Accuracy in Use-Wear Analysis. Paper presented at the 80th Annual Meeting of the Society for American Archaeology, San Francisco, California.

Sterner-Miller, Katherine M.
2014 Another Piece of the Puzzle: Ongoing Excavations at the Crescent Bay Hunt Club Oneota Site (47Je904). Paper presented as part of an invited symposium at the 58th Annual Meeting of the Midwest Archaeological Conference, Champaign, Illinois.

Ahlrichs, Robert E. and Katherine M. Sterner-Miller
2014 A Preliminary Analysis of the Lithic Assemblage from the Koshkonong Creek Village Site (47Je379). Paper presented as part of an invited symposium at the 58th Annual Meeting of the Midwest Archaeological Conference, Champaign, Illinois.

Torgerson, Rebecca R., Richard W. Edwards IV and Katherine M. Sterner-Miller
2014 Retracing Old Footsteps: A Recent Pedestrian Survey at the Bent Elbow Farm. Paper presented as part of an invited symposium at the 58th Annual Meeting of the Midwest Archaeological Conference, Champaign, Illinois.

Jeske, Robert J. and Katherine M. Sterner-Miller
2014 Microwear Analysis of Bipolar Tools From the Crescent Bay Hunt Club Site (47Je904). Paper presented as part of an invited symposium at the 79th Annual Meeting of the Society for American Archaeology, Austin, Texas.

Sterner, Katherine M., Robert J. Jeske and Sara A. Shuler
2013 Results of Blood Residue Analysis and Microwear of Suspected Arrow Points and Scraping Tools from the Crescent Bay Hunt Club Site (47Je904). Paper presented at the 57th Annual Meeting of the Midwest Archaeological Conference, Columbus, Ohio.

Sterner, Katherine M.
2012 Oneota Lithics: A Functional Analysis of the Crescent Bay Hunt Club Assemblage. Paper presented at the 77th Annual Meeting of the Society for American Archaeology, Memphis, Tennessee.

Sterner, Katherine M.

2012 The Secret Lives of Oneota Flakes: Microwear Analysis at Crescent Bay Hunt Club. Paper presented as part of an invited symposium at the 56th Annual Meeting of the Midwest Archaeological Conference, East Lansing, Michigan.

Sterner, Katherine M.

2011 Oneota Lithics: A Functional Analysis of the Crescent Bay Hunt Club Assemblage. Paper presented at the 55th Annual Meeting of the Midwest Archaeological Conference, La Crosse, Wisconsin.

ORGANIZED SYMPOSIA:

Sterner, Katherine M. (organizer)

2017 Archaeological Collections Management in the Midwest During the Curation Crisis. Symposium presented at the 61st Annual Meeting of the Midwest Archaeological Conference, Indianapolis, Indiana.

Sterner, Katherine M. and Robert E. Ahlrichs (organizers)

2017 Integrating Functional Analysis: Contributions of Use-Wear within the Broader Context of Human Behavior in Prehistoric North America. Symposium presented at the 82nd Annual Meeting of the Society for American Archaeology, Vancouver, British Columbia.

Sterner-Miller, Katherine M. and Robert E. Ahlrichs (organizers)

2015 Approaches to Lithic Analysis in the Midwest: Old Questions and New Data. Symposium presented at the 59th Annual Meeting of the Midwest Archaeological Conference, Milwaukee, Wisconsin.

Edwards IV, Richard W., Katherine M. Sterner-Miller, and Robert J. Jeske (organizers)

2014 A Look Around the Lake: Recent Archaeological Investigations in the Lake Koshkonong Region of Southeastern Wisconsin. Symposium presented at the 58th Annual Meeting of the Midwest Archaeological Conference, Champaign, Illinois.

PRESENTATIONS TO PUBLIC AUDIENCES:

Public Lectures

Hoard Historical Museum

- September 2014

Three Rivers Archaeological Society

- June 2016

Wisconsin Archaeological Society – Charles E. Brown Chapter

- November 2016

Wisconsin Archaeological Society – Kenosha Chapter

- October 2017

Wisconsin Archaeological Society – Milwaukee

- April 2017
- September 2017

Wisconsin Archaeological Society – Robert Ritzenthaler Chapter

- November 2013
- November 2015
- December 2015
- May 2017

Outreach Events

Milwaukee Public Museum Archaeology Days

- 2014, 2015, 2016, 2017

Powers-Walker Archaeology Awareness Program

- 2016, 2017

Lake County Forest Preserve Pop-Up Museum (2017)
Galloway House and Village Archaeology Day (2017)
Boy Scout STEMpede Archaeology Merit Badge (2017)

ACADEMIC APPOINTMENTS:

2017 *Instructor*, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin
Anthropology 467: Archaeological Curation

2014-2018 *Adjunct Instructor*, College of Lake County, Grayslake, Illinois
Anthropology 221: Cultural Anthropology
Anthropology 224: Introduction to Archaeology

2014-2017 *Adjunct Instructor*, Alverno College, Milwaukee, Wisconsin
Biology 231L: Human Anatomy and Physiology Lab
Science 120L: Foundations of Biology Lab

2013-2015 *Graduate Teaching Assistant*, University of Wisconsin-Milwaukee
Anthropology 481: Criminalistics, Instructor – Eva Lewis, B.S., B.A.
Anthropology 566: Archaeological Analysis, Instructor - Robert Jeske, Ph.D.
Anthropology 567: Archaeological Field School, Instructor - Robert Jeske, Ph.D.
Anthropology 103: Approaches to Archaeology, Instructor - Robert Jeske, Ph.D.
Anthropology 103: Approaches to Archaeology, Instructor - Jean Hudson, Ph.D.

2012, 2017 *Undergraduate Research Mentor*, University of Wisconsin-Milwaukee, Office of Undergraduate Research, Milwaukee, Wisconsin

2011-2013 *Laboratory Instructor*, University of Wisconsin-Milwaukee, Milwaukee, Wisconsin
Biological Sciences 202: Human Anatomy and Physiology

SUPERVISORY FIELD EXPERIENCE:

2017 *Site Director*, University of Wisconsin-Milwaukee Field School, excavation of Crescent Bay Hunt Club site, Jefferson County, Wisconsin, Robert J. Jeske, Ph.D. principal investigator

2015-2018 *Crew Chief and Archaeologist*, UWM-CRM, Phase I, II, and III excavations and monitoring throughout Wisconsin, John D. Richards, Ph.D. director

2014 *Field Supervisor*, College of Lake County Volunteer Archaeology Project, excavation and survey of the Adlai E. Stevenson Home, Lake County, Illinois, Scott Palumbo, Ph.D. principal investigator

2014 *Field Supervisor*, University of Wisconsin-Milwaukee Field School, excavation of Lake Koshkonong Oneota Complex, Jefferson County, Wisconsin, Robert J. Jeske, Ph.D. principal investigator

SUPERVISORY LABORATORY EXPERIENCE:

2016-Present *Collections Manager*, University of Wisconsin-Milwaukee Archaeological Research Laboratory, curation and maintenance of artifacts, archives, and reports from the UWM-ARL, Milwaukee, Wisconsin, Robert J. Jeske, Ph.D., Director

2014-2016 *Flotation Lab Supervisor*, University of Wisconsin-Milwaukee Archaeological Research Laboratory, heavy and light fraction flotation of samples from the Lake Koshkonong Oneota Complex, Milwaukee, Wisconsin, Robert J. Jeske, Ph.D., Director

2014-2016 *Archaeology Lab Manager*, University of Wisconsin-Milwaukee Archaeological Research Laboratory Program in Midwestern Archaeology, processing and curation of cultural material from the Lake Koshkonong Oneota Complex, Milwaukee, Wisconsin, Robert J. Jeske, Ph.D., Director

ARCHAEOLOGICAL FIELD EXPERIENCE:

2013 *Archaeological Technician*, Historic Resource Management Services, excavation of the MCIG cemetery and laboratory processing of human remains, Milwaukee, Wisconsin, Patricia B. Richards, Ph.D. principal investigator

2011 *Archaeological Technician*, Historic Resource Management Services, phase III excavations, survey, monitoring, report writing, and GIS, Milwaukee, Wisconsin

2009 *Archaeological Technician*, Firelands Archaeological Research Center, excavation of the Heckleman Hopewell site, Milan, Ohio, Brian Redmond, Ph.D. principal investigator

2009 *Archaeological Technician*, Penn State University, excavation of Scare Pond Farm, State College, Pennsylvania, Claire Milner, Ph.D. principal investigator

2008 *Excavation and Reconstruction Intern*, Dayton Society of Natural History, excavation of 33My127 and reconstruction of stockade at 33My57 (Sunwatch Village), Dayton, Ohio, William Kennedy, M.S., R.P.A principal investigator

2008 *Field Student*, North Pennines Archaeology Ltd., excavation of Dilston Castle, Cumbria, England, Kevin Mounsey, M.A. principal investigator

ARCHAEOLOGICAL LABORATORY EXPERIENCE:

2011-Present *Lithic and Microwear Analyst*, Crescent Bay Hunt Club Oneota site, Robert J. Jeske, Ph.D., Director. Master's and Ph.D. research.

2010 *Laboratory Assistant*, Margarita Archaeological Project, Margarita, Quintana Roo, Mexico, Laura Villamil, Ph.D., Director.

2009 *Archaeology Intern*, Archaeology Lab, Cleveland Museum of Natural History, Ann DuFresne, M.S., Director

2008-2009 *Laboratory Assistant*, Northeastern and Mesoamerican Archaeology Lab, Pennsylvania State University, Dean Snow, Ph.D., Director.

PROFESSIONAL SERVICE:

2016-Present *Secretary*, Wisconsin Archaeological Society
2015-2017 *Student Workshop Committee Member*, Midwest Archaeological Conference

CURRENT MEMBERSHIPS:

Society for American Archaeology (2009)
Midwest Archaeological Conference (2008)
Register of Professional Archaeologists (2012)
Wisconsin Archaeological Society (2012)
Association of Archaeological Wear and Residue Analysts (2013)
Wisconsin Archaeological Survey (2014)
Lambda Alpha National Honor Society (2015)
Plains Anthropological Society (2015)
Society for Pennsylvania Archaeology (2018)

PROFESSIONAL LICENSES AND CERTIFICATIONS:

Qualified Burial Excavator, State of Wisconsin (2014)
Registered Professional Archaeologist, Register of Professional Archaeologists (2012)

TECHNOLOGY AND LANGUAGE PROFICIENCY:

Total Data Station; PastPerfect; ArcGIS; R; MS Office; SPSS; Adobe Acrobat, InDesign, Photoshop; D2L; Angel; Moodle; Blackboard
Read and Write German