

AN ANALYSIS OF END SCRAPERS FROM SILVER MOUND, JACKSON CO.,
WISCONSIN: EXAMINING MORPHOLOGY TO ASSESS TEMPORAL CONTEXT

Paul Swader

May 8, 2009

A SENIOR THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF BACHELOR OF SCIENCE IN THE ARCHAEOLOGICAL STUDIES
UNIVERSITY OF WISCONSIN-LA CROSSE

Abstract

End scrapers are specialized tools with distinguishing stylistic features. In the northeastern Great Plains, end scrapers are commonly found at Paleoindian and late prehistoric Oneota sites. This paper examines end scraper morphology as a possible indicator of temporal context. Attribute measurements were taken from an assemblage of end scrapers recovered from thirteen fields in the Silver Mound Archaeological District in Jackson County, Wisconsin. The Silver Mound scraper data is compared with collections from sites having clear temporal associations. This research indicates that end scrapers exhibit typological characteristics within cultural traditions. With the identification of metric trends, end scraper assemblages may be examined to assess temporal context.

Introduction

Context is the foundation on which all archaeology is built. Without context archaeology is meaningless, if not obsolete. Archaeologists also depend on the analysis and interpretation of material culture, through which we get a glimpse of human behavior. Continually placing artifacts in time and space has allowed archaeologists to compile datasets of stylistic patterns that are indicative of cultural groups. These sources of empirical data are often used for relative dating. This has primarily involved the use of pottery or projectile points, but this study investigates the potential of an additional artifact for use in relative dating, the end scraper.

Aside from the periodic studies on spurred end scrapers, little focus has been directed toward typological or morphological attributes that may denote assignment to a cultural tradition. Studies on scrapers are normally limited to small sections in site reports under the subheading, “Unifaces”, where a general discussion follows on the raw material, their general shape, and whether they should be called “end scrapers” or “side scrapers.” However, just as pottery and projectile points are utilized for their definitive styles that correlate with cultural trends and adaptations to environmental conditions, end scrapers may exhibit statistically detectable changes over time.

This paper examines the morphology of end scrapers relative to their temporal context to investigate whether they are structurally diagnostic to specific time periods. The regional focus of this study is on the northeastern Great Plains. A quantified tabulation of end scraper attributes was recorded from two assemblages associated with different cultural traditions: Paleoindian and late prehistoric Oneota. The statistical data is compared to an assemblage of end scrapers with unknown temporal affiliation from Silver Mound, a site complex that was inhabited during every cultural period. Theoretically, this collection may contain all forms end scrapers have taken in

prehistory. Analysis of the culturally identifiable end scrapers should produce an aggregate of measurable attributes unique for each period. These typological statistics may then be graphically represented in the Silver Mound collection.

Background

Scrapers have been acknowledged as prehistoric tools since the latter half of the 19th century (Harrison 1892; Shrubsole 1885; Spurrell 1884). However, interpretations of how they were used have varied throughout the years. Although early records suggested they could be skinning tools (Spurrell 1884), few studies were conducted in the United States. Julian Steward (1928) presented them as possible “throwing stones” used for hunting or defensive weapons. Once experimental analysis was conducted, it was shown that they were likely used for working bone and wood, skinning animals, and cleaning hides (Ray 1937). The analysis of scrapers has evolved greatly over the years. More studies have turned to learning what cultural information can be extracted. Most of the focus is concentrated on spurred end scrapers and whether they are diagnostic artifacts from the Paleoindian tradition (Morris and Blakeslee 1987; Rogers 1986), or on patterns of reduction and edge wear (Blades 2003; Boszhardt and McCarthy 1999; McCarthy 1995).

End scrapers are a form of modified flake that differs from informal retouched or utilized flakes. Unlike these two artifact categories, end scrapers are a formal tool; part of a lithic toolkit that receives continuous attention (resharpening) and is kept or transported for an extended time. In contrast, creating retouched and utilized flakes is an extemporaneous production.

End scrapers have been recovered from archaeological sites throughout the world. In North America, their prehistoric utilization has spanned from the earliest inhabitants up until

European contact. Morris and Blakeslee (1987) stated in their report on spurred end scrapers that the temporal presence of a typological artifact may vary from region to region. Given the variation in regional environments and cultures throughout prehistory within the United States, this paper will focus on a specific area, the eastern border of the Great Plains.

End scrapers are primarily associated with hide processing. In this region, they are most commonly recovered from sites dating to the Paleoindian (ca. 13,500-8,000 B.P.) and late prehistoric Oneota (ca. A.D. 1300-1625) cultural traditions (Mason 1997; Overstreet 1997). In addition to end scrapers, bison remains are also primarily found at Paleoindian and Oneota sites. After the Paleoindian period, end scrapers are rarely found in Archaic (ca. 8,000-500 B.C.) and Woodland (ca. 500 B.C. – A.D. 1250) tradition tool assemblages (Stevenson et al. 1997; Stoltman 1997). For the Archaic and Woodland traditions, elk and deer provided an important subsistence base. Bison hides are thicker than elk and deer hides and, as a result, it has been suggested that intensive hide dressing is related to the increased production of end scrapers (Boszhardt and McCarthy 1999). To study end scrapers in this area, the Morrow-Hensel and Olson sites (Figure 1) were selected because they represent single component Early Paleoindian and Oneota assemblages, respectively.



Figure 1. Map showing site locations: 1, Silver Mound; 2, Olson; 3, Morrow-Hensel.

Paleoindian Tradition. Formally excavated Paleoindian sites in Wisconsin are rare. Because of the paucity of data available, Wisconsin data is often compared with Paleoindian sites from other regions of America. It has long been assumed that Paleoindians formed small band-level groups that were highly mobile. Their sites reflect short term settlements, normally discernable only by faunal or lithic remains. The Early Paleoindian stage is characterized by fluted projectile points, whereas the Late Paleoindian stage is distinguished by unfluted lanceolate points. Fluted points, such as Clovis, Folsom, and Gainey have been discovered in correlation with the remains of Pleistocene megafauna (e.g., mammoth and *Bison antiquus*), as seen at Blackwater Draw (Hester 1972) and Lindenmeier (Wilmsen and Roberts 1978) sites in New Mexico and Colorado (Judge 1973). This pattern has led to a persistent label of Paleoindians as “big game” hunters. Unlike the Oneota, during the Early Paleoindian period environmental settings varied considerably from modern conditions. Megafauna included mammoth, mastodon, long-horned bison, and caribou (Storck and Spiess 1994). The Boaz site in Wisconsin produced a mastodon skeleton with a fluted projectile point made of Hixton silicified sandstone (Palmer and Stoltman 1976), which Stoltman (1991) classified as a Gainey type.

In Wisconsin there is evidence of Paleoindian exploitation and transportation of non-local lithic material sources. This likely reflects Paleoindian people’s unfamiliarity with the region and its natural resources. However, there was a strong preference for Hixton Silicified Sandstone from Silver Mound, Wisconsin. Other raw materials commonly found in Paleoindian lithic assemblages are Cochrane chert, jasper taconite, Knife Lake siltstone, Gunflint Silica, Marquette rhyolite, Burlington chert, and Moline chert. Prairie du Chien (PDC) chert is also found, but rarely (Boszhardt 1991; Dudzik 1991).

Morrow-Hensel Site. Located in Pierce County, Wisconsin, the Morrow-Hensel site is situated on an upland lobe overlooking a tributary of the Mississippi River. The site is located at the northern edge of the Driftless Area, an un-glaciated part of the Midwest (Zakrzewska 1971). It was discovered by avocational archaeologists Danny Morrow and Kenneth Hensel, who conducted surface surveys and compiled an assemblage of artifacts between 1991 and 1994. They classified their finds as a fluted point assemblage. In 1998, the collection was formally analyzed by the Mississippi Valley Archaeology Center. A large assemblage of lithic artifacts were recovered (n = 12,681), of which all diagnostic specimens support an interpretation of a single component Early Paleoindian site. The lithic assemblage is almost entirely Hixton Silicified Sandstone and 25 fluted point fragments were found along with 34 fluted preforms. These fluted points resemble Gainey points. The Morrow-Hensel site is the largest Early Paleoindian assemblage in Wisconsin (Amick et al. 1999).

Oneota Tradition. The Oneota are considered a transformation of Woodland peoples with Mississippian influences. The Mississippian culture spread north from the American Bottom near St. Louis around A.D. 1050-1150, and interacted with local Woodland peoples. Evidence of this can be seen in the sites around Red Wing (e.g. Silvernale, Bryan, and Diamond Bluff) and at Trempealeau. Indicators of this transformation include the adoption of shell-tempered pottery (Emerson and Lewis 1991; Gibbon 1979) and agriculture. A large proportion of Oneota floral assemblages is domesticated plant remains. Hoes, constructed from bison scapulas, as well as many storage pits have been discovered at Oneota sites (O’Gorman 1993; O’Gorman 1994; Theler 1989; Theler and Boszhardt 2003). Prehistoric ridged fields uncovered at the Sand Lake

site, part of a late Oneota complex, along with preserved corn, beans, and squash further support the adoption of Mississippian introduced agriculture (Gallagher et al. 1985).

The Oneota culture did not entirely conform to a Mississippian lifestyle. They settled in villages that do not depict stratified societies, a common Mississippian trait often marked by platform mounds. Along with practicing agriculture, Oneota subsistence included hunting and gathering natural resources. The Oneota, particularly in the La Crosse locality, occupied terraces adjacent to the Mississippi River floodplain. Aquatic resources, from the lakes, ponds, rivers, and marshes, included freshwater fish, shellfish, and wild rice. The floodplains also provided fertile soil for cultivation. Nearby upland prairies offered deer, nuts, elk, and possibly bison. Concentration on these environmental zones shifted as the Oneota experienced cultural changes through time (Boszhardt 1994; O’Gorman 1993; O’Gorman 1994).

Oneota occupation of the La Crosse locality is divided into three phases: Brice Prairie, Pammel Creek, and Valley View. These three phases, spanning from A.D. 1300 to 1625, are defined by distinguishing ceramic types, settlement patterns, and utilization of certain lithic raw material (Boszhardt 1994). It is suggested that initial occupation, by the peoples of the Brice Prairie phase (A.D. 1300-1400), migrated from the Red Wing locality near Lake Pepin. Like the Oneota settlements at Red Wing, chipped stone assemblages from Brice Prairie sites contain a relatively large proportion of Grand Meadow chert. Grand Meadow chert was quarried in surface pits located in Mower County, Minnesota; but could also be obtained as small cobbles in streams (Bakken 1997). Another characteristic of the Brice Prairie phase is concentration of settlements on the floodplain and terraces of the Mississippi River.

The next Oneota phase at La Crosse was named after the Pammel Creek site (A.D. 1380-1520) (Arzigian et al. 1989). During this period there was a shift in lithic raw material use. The

percentage of PDC increased significantly during the Pammel Creek phase with a corresponding decline in the use of Grand Meadow chert and Hixton Silicified Sandstone. In addition, Pammel Creek sites shifted away from the Mississippi River, closer to the bluffs.

The Valley View phase is the final period of Oneota occupation in the La Crosse locality. Locally available PDC chert dominates Valley View phase lithic assemblages. Continuing a trend from the preceding Pammel Creek phase, settlements were established even farther from the Mississippi River, sometimes on defensible terraces. After its abundant use during Brice Prairie, there was a continued decline of Hixton Silicified Sandstone. Burlington chert remained consistently present throughout all phases. The decline in Grand Meadow use may reflect an end of contact with the peoples of the Blue Earth phase, who occupied south central Minnesota from ca. A.D. 1250-1400. It has been suggested that communal bison hunts once occurred between La Crosse and Blue Earth Oneota groups during this period (Boszhardt 1994).

Olson Site. The Olson site is located near the city of Onalaska, La Crosse County, Wisconsin. The site occupies an outlier Pleistocene outwash terrace within the Mississippi River floodplain. The area was first surveyed in 1980 and more intensely investigated in 1981 by the University of Wisconsin-La Crosse. Disturbances were minimal and restricted to the plow zone, or top 10 inches of the site. The site was determined eligible for the National Register of Historic Places because of its potential for producing detailed information about the subsistence strategies, migration patterns, and settlement composition of the peoples that inhabited this area. The Olson site was identified as a village site and is significant because it exhibited well preserved features and an extensive and diverse artifact assemblage (Gallagher et al. 1982).

Interpretation of the site was primarily based on pottery analysis, with subsidiary data obtained through lithic analysis and radiocarbon dating. Over 99% of the pottery is shell-tempered, while the remaining specimens are grit-tempered. Nearly 90% of the lithic assemblage is silicified sandstone. The rest is chert, primarily PDC and Galena. At La Crosse, shell-tempered pottery is generally diagnostic of the Oneota culture. The ceramic styles represented at Olson were a key component in defining the Brice Prairie phase (Boszhardt 1994). The majority of projectile points (94%) are Madison Triangular. The large proportion of silicified sandstone among the lithic artifacts is a characteristic of the Brice Prairie phase (Boszhardt 1994). A sample of charcoal and nutshell submitted for radiocarbon dating produced an estimated age of 350 – 700 years B.P. Since early 1980's investigations at Olson, more data has been collected on the La Crosse Oneota and the Brice Prairie phase is well dated to ca. A.D. 1300-1400.

Silver Mound Archaeological Site and Assemblage. This sample of end scrapers was chosen for analysis because it is part of a donated collection for which the temporal context is unknown. In addition, they were all recovered from the Silver Mound Archaeological District and could potentially represent any cultural period in this region.

In 1998, Betty J. Steele donated a collection of artifacts to the Mississippi Valley Archaeology Center (MVAC) at the University of Wisconsin-La Crosse. Along with her late husband, Gary Steele, Betty is an avocational archaeologist and volunteer at MVAC. The collection consists of several thousand lithic artifacts that are primarily from the Silver Mound Archaeological District. Gary conducted surface surveys of the fields that are located along the perimeter of the mound and documented the find locations of most artifacts.

Silver Mound is located in Jackson County, Wisconsin. Prehistorically, Silver Mound was a quarry site for extracting Hixton Silicified Sandstone. This material is distinct because of its high quality, due to a high degree of silica cementation and absence of other minerals. Such a valuable raw material made Silver Mound the target for exploitation since the beginning of human occupancy in the region, ca. 13,500 years ago (Carr and Boszhardt 2005). The fields at the base of Silver Mound, where Gary Steele collected artifacts, have experienced disturbances from plowing to plant row crops, precluding definitive dating of end scrapers and other non-diagnostic tools. Given the high integrity and importance of Silver Mound proper, peripheral sites likely contain important information.

Silver Mound is located in an ecotonal environment setting that offered various subsistence resources. The base of the mound would, therefore, be an attractive location for campsites, while hundreds of quarry pits have been found on Silver Mound along with a series of rockshelters. The deposition of lithics around Silver Mound suggests mining, workshop, and domestic activities. In addition, archaeological excavations have confirmed that this landmark was inhabited throughout prehistory (Carr and Boszhardt 2005).

In 1973, a field school from UW-Milwaukee and UW-Waukesha conducted surface surveys on Silver Mound and surrounding fields, and from 1973-1976 the University of Wisconsin-Oshkosh excavated the Dweyer Rockshelter, Cody locality, and quarry pits. The work by the Oshkosh field crew resulted in Silver Mound being listed on the National Register of Historic Places as an Archaeological District (Boszhardt 1989).

Investigations have revealed a wealth of diagnostic artifacts as well as a few radiocarbon dates. Many projectile points are indicative of the Paleoindian tradition. Point types such as Clovis, Gainey, Plainview, and Agate Basin have been documented in collections, including

Gary Steele's (Hill 1994). Artifacts found at the Cody locality on Silver Mound represent the Cody Complex, a cultural tradition that dates between 8,000 and 9,000 years B.P. Oneota and Woodland ceramics were found in the Dweyer Rockshelter. Finally, radiocarbon dates from Dweyer have ranged from 9405 ± 90 years ago to between 2630 ± 855 and 2310 ± 125 years B.P. The chronology compiled at Silver Mound suggests the exploitation of the mound spanned from the earliest arrival of native people to the Americas until the late prehistoric period (Boszhardt 1989).

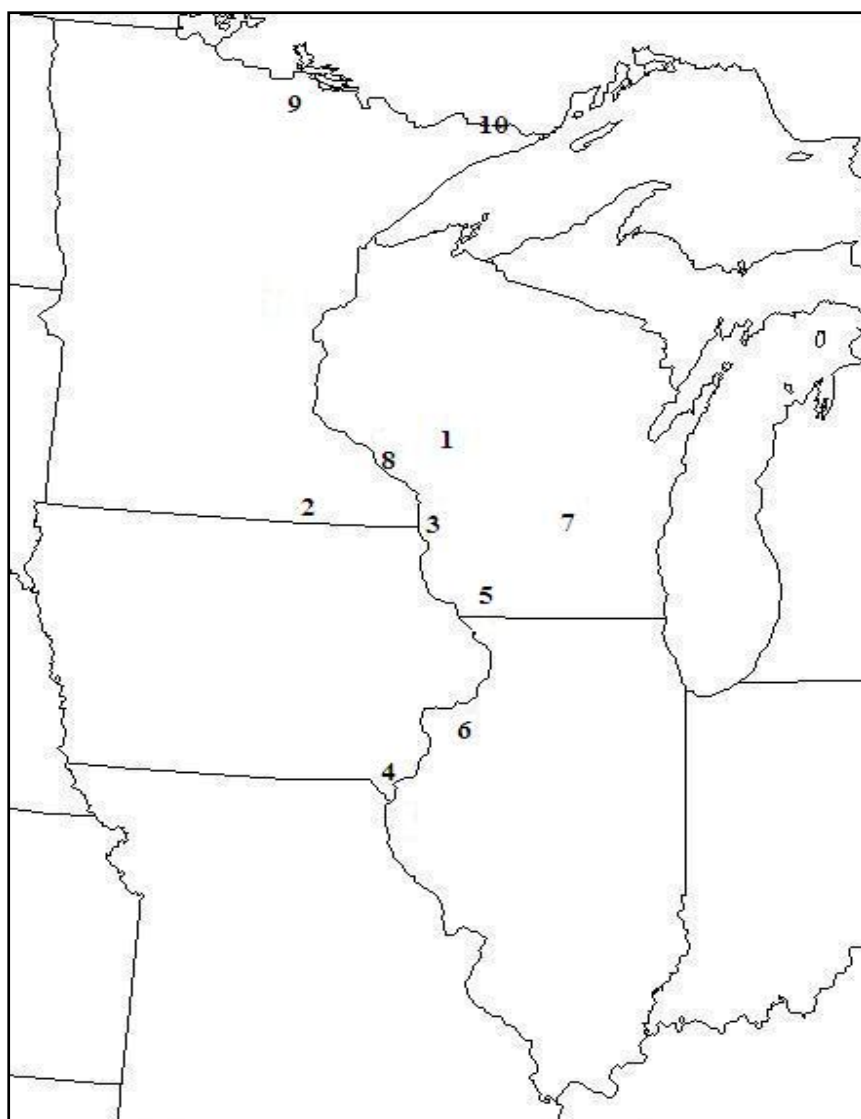


Figure 2. Map showing raw material locations: 1, Hixton silicified sandstone; 2, Grand Meadow chert; 3, Prairie du Chien chert; 4, Burlington chert; 5, Galena chert; 6, Moline chert; 7, Marquette rhyolite; 8, Cochrane chert; 9, Gunflint silica; 10, Jasper taconite.

The majority of lithic artifacts used and discarded at Silver Mound are undoubtedly made from Hixton Silicified Sandstone. Because a focus of traveling to the site was for retooling, exotic and many local artifacts represent the end of the tool's use-life. Given the degree to which Silver Mound was quarried, the numerous and diverse exotic materials discovered in its vicinity, and the extended distribution of Hixton Silicified Sandstone, it appears that prehistoric peoples established trading networks or traveled great distances to acquire this valuable lithic resource. The Gary Steele collection displays this diverse presence of raw materials. Figure 2 shows the relative locations of important raw materials that are found in the Gary Steele collection. Furthermore, it includes materials manufactured by Paleoindian and Oneota groups in this region, and found in the Morrow-Hensel and Olson assemblages.

Methodology

As the focus of this study, the Steele collection at MVAC required pre-analysis documentation. Because it lacked formal analysis, the preliminary objective was to catalogue, analyze, and curate this assemblage. After realizing that some artifacts are not from Silver Mound and others have no provenience record, the collection was divided into three groups: Silver Mound, individual counties (e.g., Monroe and La Crosse), and an unknown origin. The unknown portion is the largest group. These artifacts are either labeled with a number and the letters B.J.S. (for Betty J. Steele) preceding it, or are unmarked. Aside from classifying the majority of the lithics by artifact type, subsequent analysis focused on the assemblage from Silver Mound.

The Steele collection was relatively well organized. The artifacts were in good condition and exhibited an assortment of lithic types. Most importantly, Gary Steele kept a log of many of

the tools he collected. He recorded information about individual artifacts such as type, date of collection, provenience, and an assigned number; and, at times, included a description or identified raw material (see Appendix B). He labeled the majority of these artifacts with the date, provenience, and the assigned number (Figure 3). The assigned numbers were written

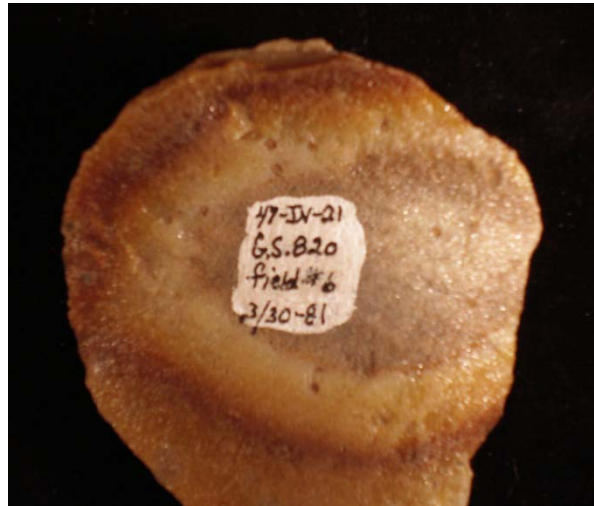


Figure 3. Gary Steele's artifact label.

with the initials G.S. preceding them. His proveniences, for which MVAC has artifacts, consist of thirteen fields he identified by the numbers 1 through 10 and the letters A, P, and X. In addition, his records include a sketch map of the fields in proximity to Silver Mound. Reference to the Steele collection, G.S. artifacts, or the Silver Mound assemblage, includes artifacts labeled with a G.S. number that have a known provenience.

Silver Mound artifacts were sorted according to Gary Steele's fields. Classification of field was mainly achieved from the labels on the artifacts. Occasionally, an artifact would only have the date it was collected or G.S. number written on it. In this situation, the log was used to establish field provenience by correlating descriptions with dates or, most often, from G.S. numbers. Rarely, and only in cases where writing was poorly preserved, artifact labels had to be examined under a microscope to verify what was printed.

In order to properly curate this collection, a specific site or locality had to be established. MVAC has extensive documented information on past investigations in this area. Those records were examined along with the Wisconsin Archaeological Site Inventory (ASI). Both sources contain recorded sites that overlapped Gary Steele's fields. Instances occurred when artifacts

could not be connected to a specific field. Instead, Mr. Steele sometimes gave locations relative to landmarks, such as the Geske farmhouse. If such a marker could not be identified on a map or in his records, plat books were used. All analyzed artifacts are now associated with their designated field and a recorded archaeological site.

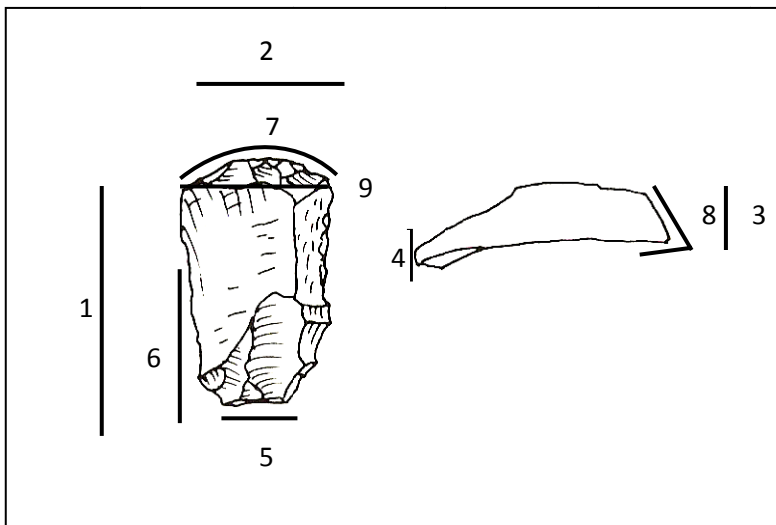
Analysis was initiated after determining where artifacts were found and when they could be grouped by field and site. Each site was studied independently to classify artifact types. Identifications were made with reference to a regional point guide (Boszhardt 2003) and MVAC's laboratory manual, *Cataloguing Process and Procedures* (2008). In addition, Robert Boszhardt was consulted throughout the project.

The curation process followed the methods outlined in *Cataloguing Process and Procedures* (2008). An "MVAC Artifact Catalogue Form" was filled out for each field, establishing a record for typology, provenience information, and counts of all the artifacts. Information from the catalogue sheets were transferred to tags and bags. Once acquisition numbers were obtained, the lithics were relabeled. Gary Steele used correction fluid, such as *White-Out* or *Liquid Paper*, as a base for writing with black or blue ink. Whenever possible, these labels were left on the artifacts. However, MVAC utilizes a different site and accession number system. The new labels consisted of an acrylic based seal for foundation followed by black ink applied with a quill pen. After the ink dried, an additional acrylic seal was placed on top.

Once all the artifacts were labeled and boxed they could be entered into a database. This ensured proper storage where the materials can be accessed and re-examined in the future. Having an inventoried record of the artifact types listed under provenience greatly facilitates subsequent analyses.

Artifacts from the Steele collection were bagged according to site and, in each group, subdivided by artifact type. End scrapers were separated from the other artifacts for further analysis. This was also done for the comparative Morrow-Hensel and Olson collections.

To conduct an experimental analysis aimed at identifying differential cultural patterns, a set of attributes was selected. These attributes were quantitative, and illustrate distinct functional and/or stylistic behaviors. Numerous site reports and journals on methodology were reviewed. The attributes chosen to study are part of an analytical method employed by Wilmsen (1970) and Shott (1993) (Figure 4).



1. Maximum Length
2. Maximum Width
3. Maximum Thickness
4. Platform Thickness
5. Platform Width
6. Haft Length (if determinable)
7. Working Edge Length
8. Working Edge Angle
9. Bit Length

Figure 4: End scraper attributes.

A data collection form was created for each end scraper to compile and record metric information (see Appendix C). Formation varied among the end scrapers so a fixed technique for identifying and measuring the attributes was established. The length is measured from the primary working edge to the opposite end. The platform is the marginal surface where pressure was exerted to remove the flake from a core or blank. Haft length is the length of the wear on the lateral edges, from attaching a tool to a wood or bone shaft; both the left and right sides are

measured. The working edge is the marginal surface that exhibits evidence of primary utilization. In specimens that had multiple sharpened sides it was identified by the greater edge angle, a sign of repeated sharpening. Most measurements were taken with a caliper and recorded in millimeters, except the working edge angles that were measured with a goniometer. The working edge was outlined with a string to account for the curvature, which was then measured with a caliper. All measurements were taken to the tenth of a millimeter. Note the Morrow-Hensel end scrapers were unavailable for the author to personally study and measure. However, copies of the original end scraper data forms were received from Thomas J. Loebel from the University of Illinois at Chicago (see Appendix D). The analysis and documentation of end scrapers presented in these records was conducted by Ken Hensel, Matthew Hill, Dan Amick, and Thomas J. Loebel. Included in these documents as a quantifiable attribute, is the bit length. To maintain congruency between the three assemblages, this attribute was later measured. It is not included on the original data collection forms but in the electronic database at MVAC.

After all of the end scrapers from the Steele collection were measured and recorded, the data collection forms were reviewed to establish which artifacts could be included in the comparative study. Some artifacts were reclassified as side scrapers and spokeshaves. Bifaces that were modified into scrapers were also excluded because the morphological attributes do not correlate with an intentionally manufactured end scraper. The purpose of this study is to examine cultural patterns and distinctions associated with the intentional manufacturing of end scrapers. Reworked bifaces demonstrate a spontaneous act of production similar to retouched flakes. Most of the artifacts discarded from the study were scrapers that exhibited severe damage that inhibited or precluded the extraction of relative data. In the end, the Silver Mound sample included 136 end scrapers that could be analyzed.

The comparative sample used to delineate structural patterns is comprised of 154 end scrapers; 54 from the Morrow-Hensel assemblage and 100 from the Olsen site. Because the archaeological end scrapers were likely discarded after use, many are normally broken or exhausted. In selecting the end scrapers, the complete specimens were chosen first followed by those that are only broken at the base, allowing the measurement of width-related attributes (e.g. edge length and bit length).

A database was created after recording all the quantitative data from each collection. Microsoft Access and Excel were used to transform ambiguous visual distinctions into statistical patterns to facilitate analysis and interpretation.

Results

Before conducting a detailed analysis of end scrapers, the attributes were assessed to determine which ones provided a sufficient sample size. Most end scrapers recovered by archaeologists or avocationalists were discarded by those who created them; therefore, they reflect the condition at the end of its use-life. As a result of extreme wear, such as plow damage or snapping from over usage, the platform and evidence of hafting is often absent from specimens. Contrarily, the maximum width, length, and thickness, bit length, edge length, and edge angle can be more inclusively analyzed. Although the maximum length often exhibits damage, if it was snapped during use then this attribute still offers useful data; it can potentially illustrate a behavioral trend relative to usage.

Table 1. Average end scraper measurements (mm).

	Olson	Morrow-Hensel	Silver Mound
Max. Length	24.05	32.42	33.52
Max. Width	19.60	26.78	27.62
Bit Length	19.46	23.95	25.79
Edge Length	21.91	30.43	31
Max. Thickness	6.09	9.67	8.87

Metric evidence shows that Silver Mound had the largest average end scrapers followed by Morrow-Hensel, then Olson (Table 1). This is reflected in length, width, bit length, and edge length. The Morrow-Hensel assemblage has the greatest average maximum thickness, followed by Silver Mound and Olson. While Silver Mound, on average, has the largest end scrapers it also is the most variable (Table 2). In this paper further analysis of end scrapers may concentrate on a specific attribute, mainly maximum width. Although some of the data presented is for a single attribute, as discussed, all attributes depicting size (excluding thickness) are metrically congruent.

Table 2. Variability of site, focusing on width and length (mm).

	Olson	Morrow-Hensel	Silver Mound
Width Range	31.1 - 10.8	53.6 - 13.7	72.1 - 13.4
Width Standard Deviation	4.4	6.2	7.1
Length Range	52.3 - 13.4	63.4 - 16.9	95.1 - 15.6
Length Standard Deviation	7.1	8.4	12.2

A comparison between edge length and bit length reflects the convexity of the end scraper working end. Morrow-Hensel and Olson have a greater degree of diversity between the edge lengths than the bit lengths. The Olson assemblage also has a larger proportion of end scrapers where the bit length was equivalent to the maximum width. To examine convexity an edge-bit ratio was quantified (Figure 5). This shows the edges of Paleoindian end scrapers from Morrow-Hensel had a larger convexity than Oneota from Olson, while Silver Mound exhibits an intermediate position between the two cultural characteristics.

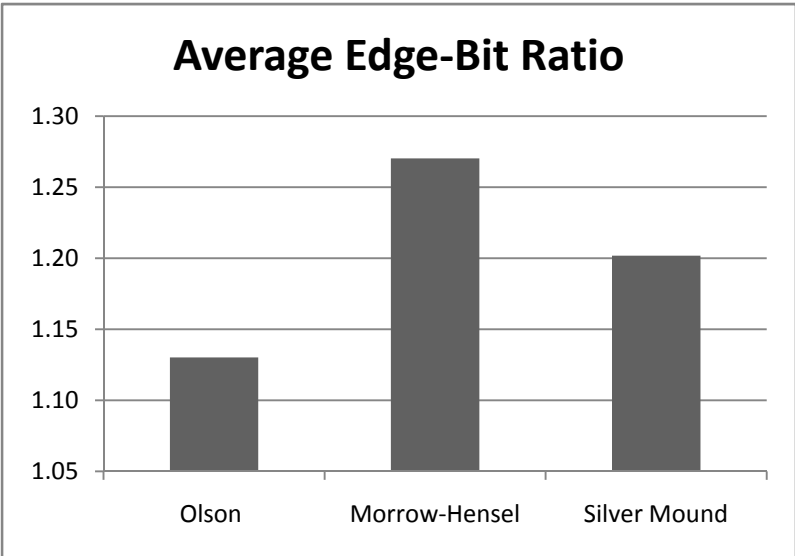


Figure 5. Average edge-bit ratio.

While considering the working edge, the edge angles on Olson end scrapers are significantly steeper than Morrow-Hensel (Table 3). A study conducted by Wilmsen (1968) on Paleoindian chipped stone tools showed that most of the edge angles fell within the 46°-55° range. Similarly, McCarthy (1995) proposed, in her experimental work with end scrapers, that an edge angle of 44° was most effective, while an angle of 60° was inefficient. Indeed, most of the La Crosse Oneota scrapers in McCarthy’s analysis had a greater edge angle than 60°, suggesting that most McCarthy’s scrapers had been retouched too steep to be efficient.

Table 3. Edge angle statistics (by site).

	Morrow-Hensel	Olson
Mean	61°	82°
Minimum	38°	67°
Maximum	84°	100°

An analysis of material culture relative to end scraper morphology was conducted to consider factors specific to each cultural tradition. It was discussed earlier that culturally specific patterns of raw material procurement are found in the archaeological record. Lithic materials vary in their quality and the size and shape they take before and during acquisition. Hixton Silicified Sandstone was mined from outcrops and talus slopes that contained large slabs. In contrast Grand Meadow chert was available as small cobbles. Prairie du Chien chert is available in larger outcrops but was likely collected as eroded nodules (Boszhardt 1998). End scrapers manufactured from different raw materials were compared within the sites, revealing a morphological difference (Figures 6 and 7). End scrapers made from Hixton silicified sandstone are larger than those formed from Prairie du Chien and Grand Meadow chert. This study indicates that these source material factors directly influence the morphology of end scrapers.

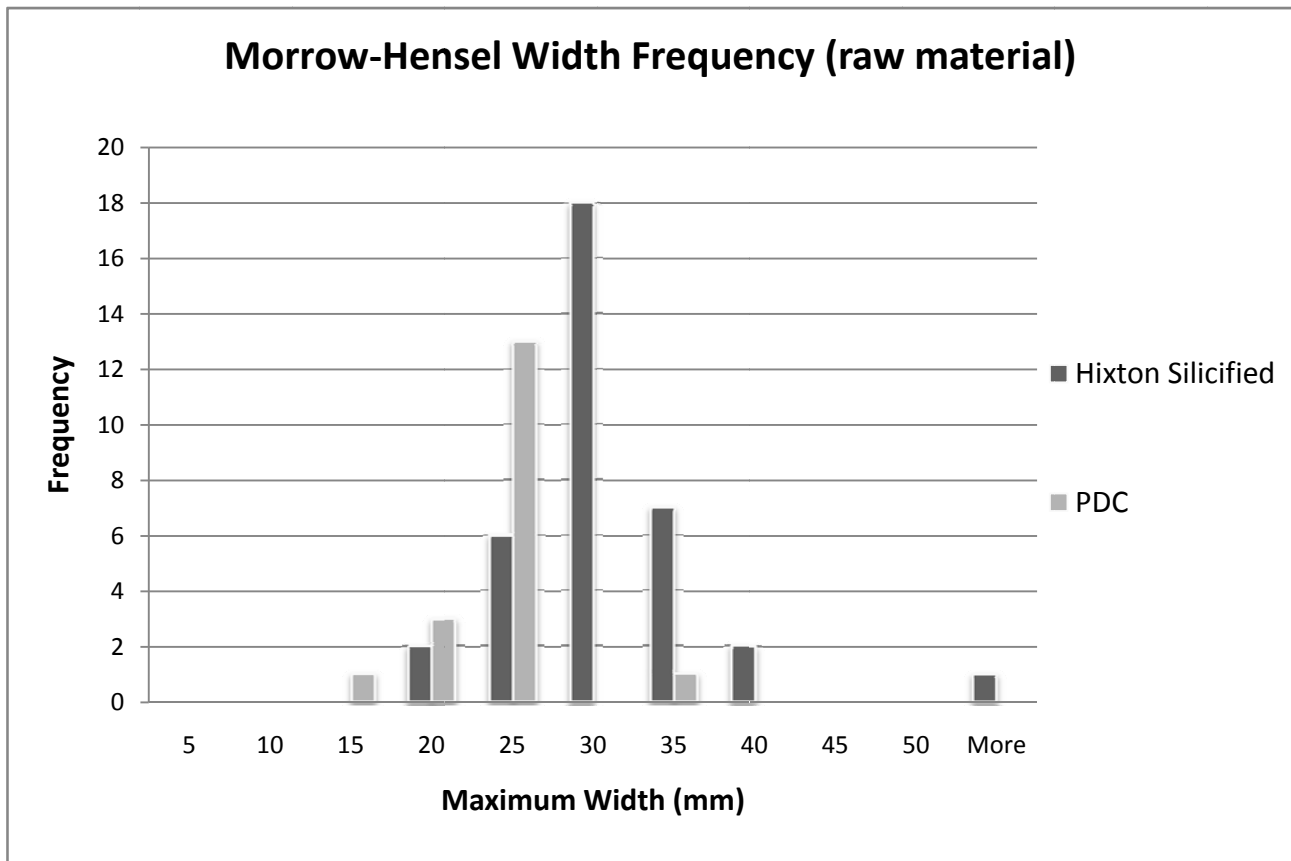


Figure 6. End scraper width frequency (by raw material) at the Morrow-Hensel site.

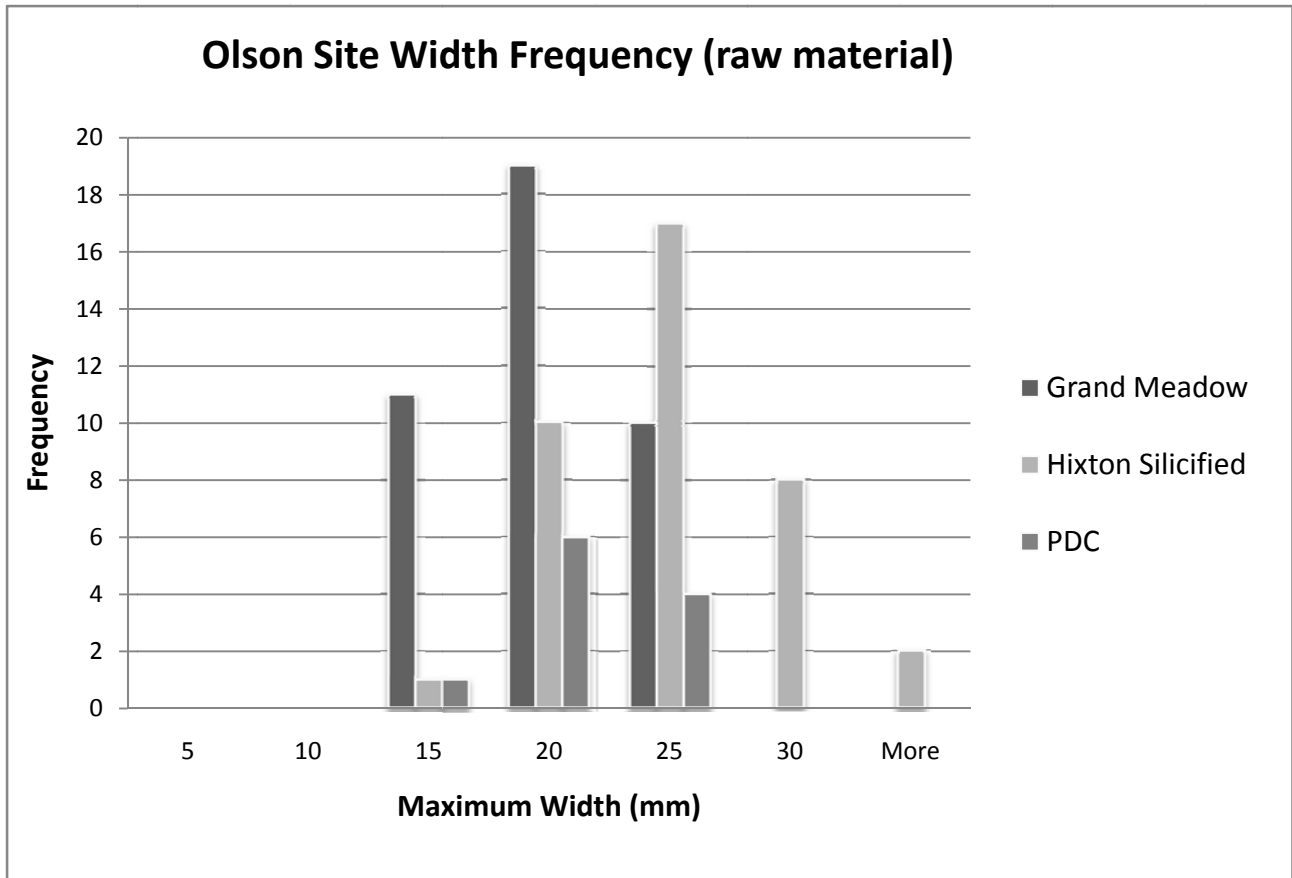


Figure 7. End scraper width frequency (by raw material) at the Olson site.

Hixton Silicified Sandstone was the primary material in use and exploited at Silver Mound through time, including by Paleoindian and Oneota groups. The Morrow-Hensel and Olson assemblages have substantial numbers of end scrapers made from Hixton Silicified Sandstone. If this raw material allows the manufacturing of larger end scrapers, size differences may reflect cultural influences. Metric attributes of Hixton Silicified Sandstone scrapers were compared between the three sites (Figure 8). The Paleoindian Morrow-Hensel end scrapers were larger than the Oneota Olson site. Silver Mound has specimens similar to both comparative sites, but is skewed more toward Morrow-Hensel.

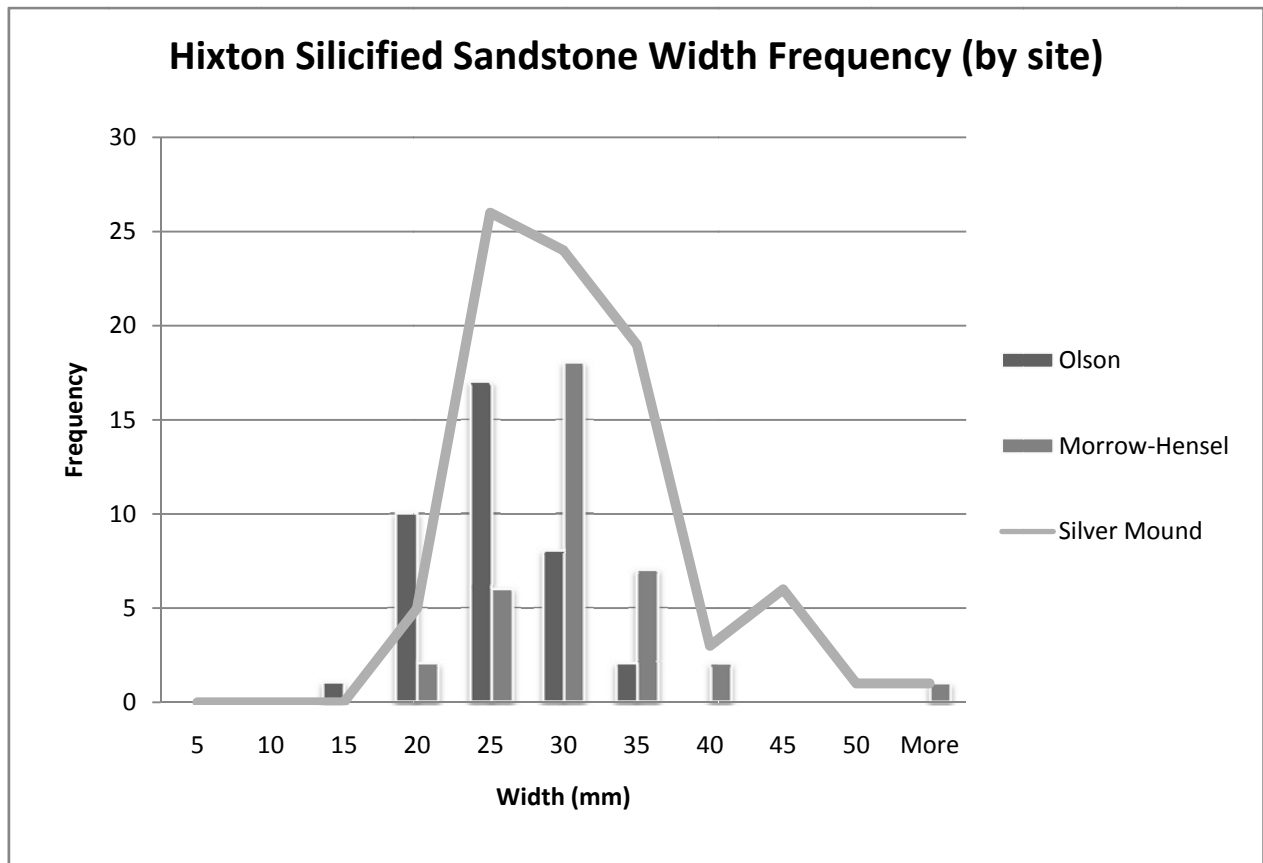


Figure 8. Hixton silicified sandstone width frequency: site comparison.

Raw material may influence morphology, but there is a clear morphological difference between the Morrow-Hensel and Olson specimens made of Hixton Silicified Sandstone. Metrical distinctions between Morrow-Hensel and Olson end scrapers were made concerning other raw materials, but the difference is not as notable. The diversity is supported by the typical size of the end scrapers and the convexity of the working edges. This division in structural characteristics was evaluated with the Silver Mound collection in order to gauge potential temporal and cultural affiliations (all end scrapers, not limited to Hixton Silicified Sandstone) (Figure 9). Silver Mound shows a strong correlation with the Morrow-Hensel assemblage. In contrast, the Olson end scrapers only show a weak connection with Silver Mound.

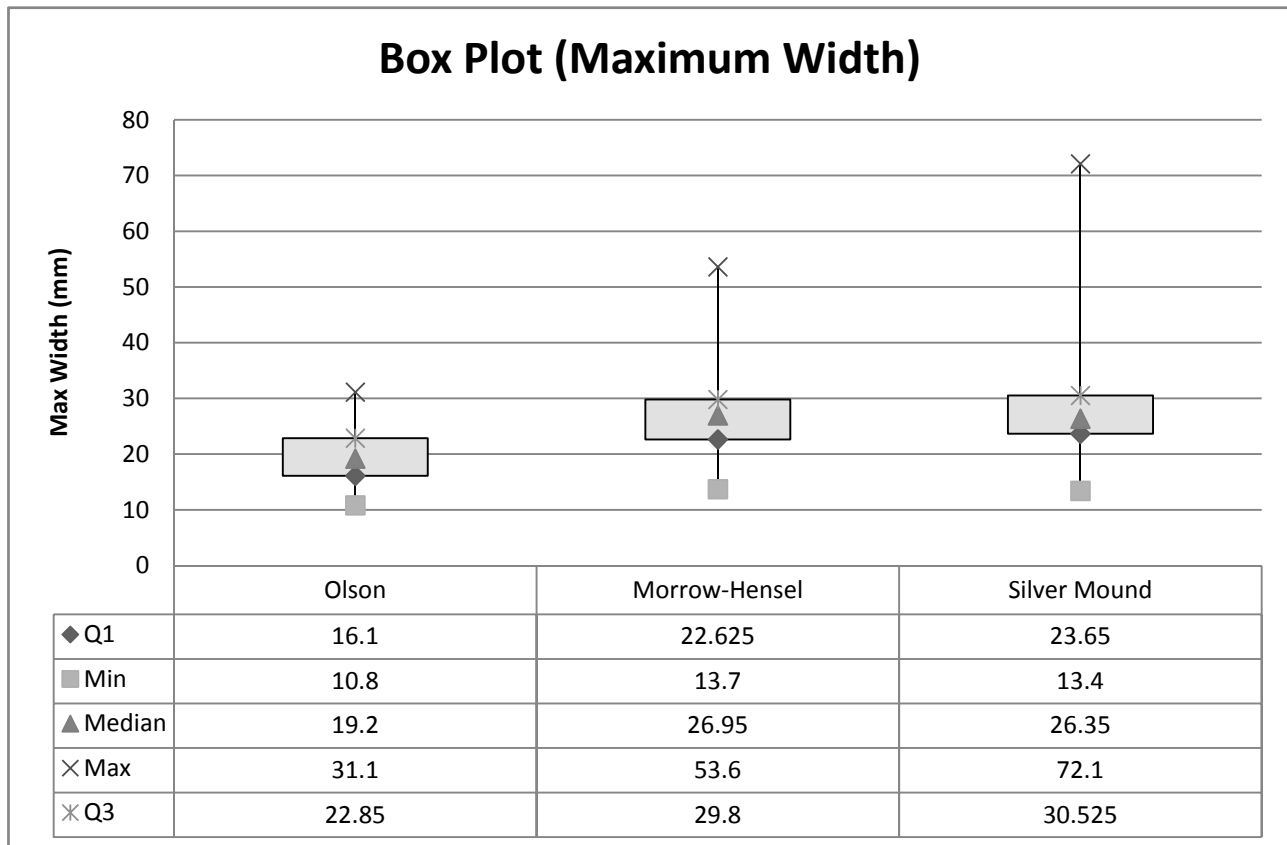


Figure 9. Box Plot of maximum width: site comparison.

T-tests further support this pattern. This analytical tool tests the probability that the samples from the sites could have come from the same population. The results show that the population means between the Silver Mound and Morrow-Hensel end scrapers are comparable (edge length P-value = 0.697). In contrast, the T-test (edge length P-value = 0.000) shows the population means between the Olson and Silver Mound collections are significantly different. This indicates that the end scrapers from Morrow-Hensel could have come from the same population as those from Silver Mound. An evaluation of Morrow-Hensel and Olson reveals that the samples probably derived from different populations (edge length P-value = 0.000). The T-tests were conducted considering all end scrapers, not limited by raw material.

Discussion and Conclusion

The objective of this paper was to study the metrical structure of end scrapers relative to temporal context in order to examine potential distinctions between cultural traditions.

Comparing end scrapers of unknown cultural affiliation from Silver Mound was based on establishing morphological distinctions between a single component Paleoindian assemblage from Morrow-Hensel and a single component Oneota assemblage from Olson.

The data obtained from this study shows that morphological distinctions exist between end scrapers from Paleoindian and Oneota contexts in this region. Olson end scrapers depict a

greater degree of wear than Morrow-Hensel; they have steeper edge angles, straighter working edges (less convexity), and are generally smaller. A morphological study of end scrapers by Morrow (1997) concluded that this difference follows a model of change in an end scraper use-life (see Figure 10). Likewise, Morrow states that the maximum thickness is the only attribute that is relatively unaltered.

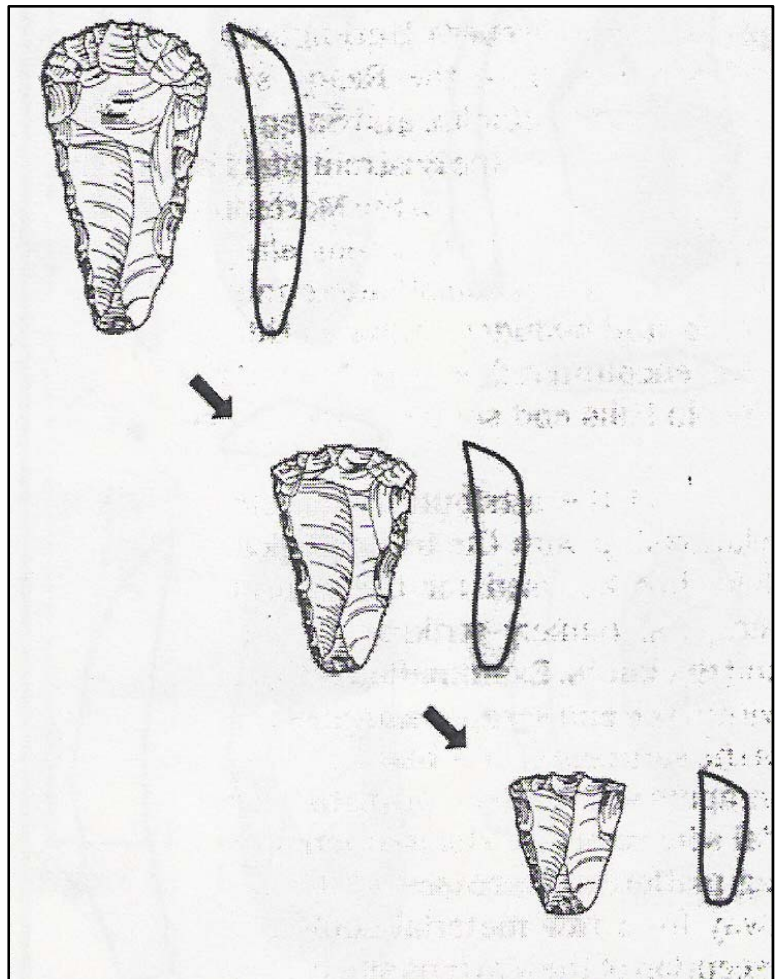


Figure 10. Model of changes in end scraper morphology with progressive resharpening; from (Morrow 1997: 77).

The principal goal of this study was to evaluate the temporally unknown Silver Mound collection based on the metrical characteristics of end scrapers from the Olson and Morrow-Hensel sites. The data consistently shows that the Silver Mound collection has a stronger correlation with the Morrow-Hensel, Paleoindian assemblage. Silver Mound end scrapers are, on average, slightly larger than Morrow-Hensel end scrapers. It has been suggested that the size of end scrapers made from the same material correlates with the distance they are found from that material's source; resulting in smaller end scrapers farther from a quarry than those closer (Morrow 1997). The majority of raw material in the Morrow-Hensel and Silver Mound assemblages is Hixton Silicified Sandstone but Morrow-Hensel is located about 170 kilometers from Silver Mound. This would therefore explain the slight difference in size. Likewise, Olson is located about 80 kilometers from Silver Mound and has the smallest scrapers in this comparative analysis. The Olson scrapers tend to show the greatest degree of use-were.

Investigations at Silver Mound acknowledge a greater amount of Paleoindian activity than Oneota. The primary focus of the *National Historic Landmark Nomination* for the Silver Mound Archaeological District was on its use by Early and Late Paleoindians (Carr and Boszhardt 2005). The Oneota appear to have utilized relatively small quantities of Hixton Silicified Sandstone. This concentration is supported by the fact that a bulk of the artifacts from Silver Mound are from the Paleoindian cultural tradition, while only a limited amount of archaeological data (a few sherds from the Dweyer Rockshelter) supports an Oneota occupation of the quarry site.

Paleoindians, on a spatially extensive level, have shown a preference for Hixton Silicified Sandstone. They were mobile and traveled great distances as is indicated by raw materials found

at their archaeological sites. Contrarily, the Oneota use of Hixton Silicified Sandstone is nearly restricted to the Brice Prairie phase at La Crosse and the preceding occupants at Red Wing. Social conflicts indicated by a shift in settlements to defensive positions at La Crosse may have restricted acquisition of non-local lithic materials. Evidence of this change also consists of an end in the presence of Grand Meadow chert and an increase in Prairie du Chien chert, and other local cherts.

This study has shown that there is a morphological difference relative to cultural context. Paleoindian and Oneota end scrapers exhibit distinct metrical attributes. Their intrinsic statistical characteristics are graphically represented in the Silver Mound collection. The correlation between the Paleoindian and Oneota comparative assemblages and the Steele collection is representative of Silver Mound's cultural association. According to the data, although cultural tradition may not be derived from individual analysis of end scrapers, examining entire assemblages allows better assessment of temporal context.

Much can be learned from the study of end scrapers. Further research should be conducted considering whether spurred end scrapers are diagnostic of the Paleoindian tradition or possibly related to bison, and other big game hide processing. The amount and type of wear on Oneota end scrapers indicates intensive dry hide processing. There are indications that the La Crosse Oneota traveled west for communal bison hunts. The lack of bison remains (except scapulae hoes) at La Crosse sites suggests they consumed meat while on the Plains and transporting the scapulas and dry hides back east. A similar rise in bison communal hunting and hide trading networks is seen in the Southern Plains (Creel 1991) and Northern Plains (Frink and Weedman 2006). Both scenarios began around A.D. 1300 and were marked by an increase in end scrapers, knives, and bison remains at archaeological sites. This pattern is seen in the Upper

Mississippi Valley beginning around A.D. 1150 with the onset of the Oneota culture at Red Wing, and continues through the La Crosse phase sequence.

Acknowledgments. I wish to acknowledge the many people who made this study possible. A special thanks to Betty and Gary Steele whose personal work and interest in archaeology has contributed valuable information and material to the discipline. I am especially grateful for the advisement and patience of Robert Boszhardt over this past year. I want to express my gratitude to professors Constance Arzigian and James Theler for their guidance, not only in writing this thesis but throughout my time at the University of Wisconsin-La Crosse. I also wish to thank Kenneth Hensel, Thomas Loebel, Daniel Amick, Danny Morrow, and Matthew Hill for their previous work on the Morrow-Hensel site. Finally, I greatly appreciate the time Mike Bednarchuk put in providing me with the resources I needed in the archaeology lab. Without the collective contribution of these individuals I would have lost out on the greatest project of my academic career.

REFERENCES CITED

- Amick, Daniel S., Thomas J. Loebel, Matthew G. Hill, Robert F. Boszhardt, and Kenneth Hensel.
1999 New Evidence for the Early Paleoindian Occupation of Western Wisconsin. In *Pure Paleo in Western Wisconsin* (compiled by R. F. Boszhardt). Reports of Investigations No. 350, Mississippi Valley Archaeology Center, University of Wisconsin-La Crosse.
- Arzigian, Constance M., Robert F. Boszhardt, James L. Theler, Roland L. Rodell, and Michael J. Scott.
1989 Human Adaptation in the Upper Mississippi Valley: A Study of the Pammel Creek Oneota Site (47Lc61), La Crosse, Wisconsin. *The Wisconsin Archeologist* 70:1-281.
- Bakken, Kent
1997 Lithic Raw Material Resources in Minnesota. *The Minnesota Archaeologist* 56:51-83.
- Blades, Brooke S.
2003 End Scraper Reduction and Hunter-Gatherer Mobility. *American Antiquity* 68:141-156.
- Boszhardt, Robert F.
1989 *A Phase I Archaeological Survey of Two Parcels at and adjacent to the Silver Mound Archaeological District*. Reports of Investigations No. 102 The Mississippi Valley Archaeology Center at the University of Wisconsin-La Crosse.
1991 The Paleoindian Study Unit in Region 6. *The Wisconsin Archeologist* 72:155-200.
1994 Oneota Group Continuity at La Crosse: The Brice Prairie, Pammel Creek, and Valley View Phases. *The Wisconsin Archeologist* 75:173-236.
1998 Newly Discovered Lithic Resources in Western Wisconsin. *The Minnesota Archaeologist* 57:85-98.
2003 *A Projectile Point Guide for the Upper Mississippi River Valley*. University of Iowa Press, Iowa City.
- Boszhardt, Robert F., and Joelle McCarthy
1999 Oneota End Scrapers and Experiments in Hide Dressing: An Analysis from the La Crosse Locality. *Midcontinental Journal of Archaeology* 24:177-199.
- Carr, Dillon, and Robert Boszhardt
2005 *Silver Mound Archaeological District*. National Historic Landmarks Survey, Washington, D.C.

Creel, Darrell

- 1991 Bison Hides in Late Prehistoric Exchange in the Southern Plains. *American Antiquity* 56:40-49.

Dudzik, Mark J.

- 1991 First People: The Paleoindian Tradition in Northwestern Wisconsin. *The Wisconsin Archeologist* 72:137-154.

Emerson, Thomas E., and R. Barry Lewis

- 1991 *Cahokia and the Hinterlands: Middle Mississippian Cultures of the Midwest*. University of Illinois Press, Chicago.

Frink, Lisa, and Kathryn Weedman (editors)

- 2006 *Gender and Hide Production*. Altamira Press, Walnut Creek, California.

Gallagher, James P., Roland Rodell, and Katherine Stevenson

- 1982 *The 1980-1982 La Crosse Area Archaeological Survey*. Mississippi Valley Archaeology Center, Reports of Investigations No. 2.

Gallagher, James P., Robert F. Boszhardt, Robert F. Sasso and Katherine Stevenson

- 1985 Oneota Ridged Field Agriculture in Southwestern Wisconsin. *American Antiquity* 50:605-612.

Gibbon, Guy E.

- 1979 *The Mississippian Occupation of the Red Wing Area*. Minnesota Historical Society, St. Paul.

Harrison B.

- 1892 On Certain Rude Implements from the North Downs. *The Journal of the Anthropological Institute of Great Britain and Ireland* 21:263-267.

Hester, James J.

- 1972 *Blackwater Locality No. 1: A Stratified Early Man Site in Eastern New Mexico*. Fort Burgwin Research Center Publication, 8.

Hill, Matthew G.

- 1994 Paleoindian Projectile Points from the Vicinity of Silver Mound (47JA21), Jackson County, Wisconsin. In *Midcontinental Journal of Archaeology* Vol. 19:223-259.

Judge, W. James

- 1973 *Paleoindian Occupation of the Central Rio Grande Valley in New Mexico*. University of New Mexico Press, Albuquerque.

Mason, Ronald J.

- 1997 The Paleoindian Tradition. *The Wisconsin Archeologist* 78:78-110.

- McCarthy, Joelle
1995 *Oneota End Scrapers: Form and Function in the La Crosse Area*. Unpublished B.A. Thesis, Department of Sociology and Archaeology, University of Wisconsin, La Crosse.
- Mississippi Valley Archaeology Center
2008 *Cataloguing Process and Procedures*. Manual on file, University of Wisconsin, La Crosse.
- Morris, Elizabeth Ann, and Richard C. Blakeslee
1987 Comment on the Paleoindian Occurrence of Spurred End Scrapers as Reported by Rogers. *American Antiquity* 52:830-831.
- Morrow, Juliet E.
1997 End Scraper Morphology and Use-Life: An Approach for Studying Paleoindian Technology and Mobility. *Lithic Technology* 22:70-85.
- Palmer, H. A., and J. B. Stoltman
1976 The Boaz mastodon: A possible association of man and mastodon in Wisconsin. *Midcontinental Journal of Archaeology* 1:163-177.
- Ray, Cyrus N.
1937 Probable Uses of Flint End-Scrapers. *American Antiquity* 2:303-306.
- Rogers, Richard A.
1986 Spurred End Scrapers as Diagnostic Paleoindian Artifacts: A Distributional Analysis on Stream Terraces. *American Antiquity* 51:338-341.
- O’Gorman, Jodie
1993 *The Tremaine Site Complex: Oneota Occupation in the La Crosse Locality, Wisconsin. Vol. I: The OT Site (47Lc-262)*. Museum Archaeology Program Archaeology Research Series No. 1. State Historical Society of Wisconsin, Madison.
1994 *The Tremaine Site Complex: Oneota Occupation in the La Crosse Locality, Wisconsin. Vol. II: The Filler Site (47Lc-149)*. Museum Archaeology Program Archaeology Research Series No. 2. State Historical Society of Wisconsin, Madison.
- Overstreet, David F.
1997 Oneota Prehistory and History. *The Wisconsin Archeologist* 78:250-296.
- Shott, Michael J.
1993 *The Leavitt Site: A Parkhill Phase Paleo-Indian Occupation in Central Michigan*. Memoir No. 25. Museum of Anthropology, University of Michigan, Ann Arbor.
- Shrubsole, O. A.

- 1885 On Certain Less Familiar Forms of Palaeolithic Flint Implements from the Gravel at Reading. *The Journal of the Anthropological Institute of Great Britain and Ireland* 14:192-200.
- Spurrell, F. C. J.
 1884 On Some Palaeolithic Knapping Tools and Modes of Using Them. *The Journal of the Anthropological Institute of Great Britain and Ireland* 13:109-118.
- Stevenson, Katherine P., Robert F. Boszhardt, Charles R. Moffat, Philip H. Salkin, Thomas C. Pleger, James L. Theler, and Constance M. Arzigian.
 1997 The Woodland Tradition. *The Wisconsin Archeologist* 78:140-201.
- Steward, Julian H.
 1928 A Peculiar Type of Stone Implement. *American Anthropologist* 30:314-316.
- Stoltman, James B.
 1991 A Reconsideration of Fluted Point Diversity in Wisconsin. *The Wisconsin Archeologist* 72:245-264.
 1997 The Archaic Tradition. *The Wisconsin Archeologist* 78:112-139.
- Storck, Peter L., and Arthur E. Spiess
 1994 The Significance of New Faunal Identifications Attributed to an Early Paleoindian (Gainey Complex) Occupation at the Udora Site, Ontario, Canada. *American Antiquity* 59:121-142.
- Theler, James L.
 1989 The Pammel Creek Site Faunal Remains. *The Wisconsin Archeologist* 70:157-241.
- Theler, James L., and Robert F. Boszhardt
 2003 *Twelve Millennia: Archaeology of the Upper Mississippi River Valley*. University of Iowa Press, Iowa City.
- Wilmsen, Edwin N.
 1968 Functional Analysis of Flaked Stone Artifacts. *American Antiquity* 33:156-161.
 1970 Lithic Analysis and Cultural Inference: A Paleo-Indian Case. *University of Arizona Anthropological Papers*, No. 16. Tucson.
- Wilmsen, Edwin N., and Frank H. H. Roberts, Jr.
 1978 *Lindenmeier, 1934-1974. Concluding Reports on Investigations*. Smithsonian Contributions to Anthropology, Number 24. Smithsonian Institution Press, Washington, D.C.
- Zakrzewska, Barbara

1971 Valleys of Driftless Areas. *Annals of the Association of American Geographers*
61:441-459.

APPENDIX

Appendix A – end scraper data

Table A1 – Olson End Scrapers

Table A2 – Morrow-Hensel End Scrapers

Table A3 – Silver Mound End Scrapers

Appendix B – Gary Steele sample log page

Appendix C – end scraper data collection form

Appendix D – Morrow-Hensel data form

Figure D1 – front

Figure D2 – back

Table A1 - Olson end scrapers (all measurements in millimeters, degrees, or grams, as appropriate)

ID	site name	acquisition number	third digit	raw material	weight	retouched side	edge form	length	broken length?	width	thickness	plat thickness	plat width	edge length	angle	bit length	comments
52	Olson	1980.810	.02	Burlington	1.1	rl	straight	14.8	FALSE	12.7	4.3	3.0	7.5	13.8	85.0	12.7	
53	Olson	1980.709	.04	Burlington	3.9	rl	straight	20.9	FALSE	17.8	7.1	2.2	4.8	18.7	88.0	17.8	
54	Olson	1980.999	.02	Burlington	3.45	rl	convex	24.0	FALSE	15.4	8.5			16.8	85.0	15.4	
73	Olson	1980.722	.03	Burlington	3.1	r	convex	24.6	FALSE	17.0	6.0			23.5	86.0	17.0	
81	Olson	1980.879	.07	Burlington	2.43		convex	17.1	TRUE	20.1	5.4			22.8	87.0	20.1	
102	Olson	1980.772	.01	Burlington	3.94	rl	convex	32.9	FALSE	17.9	5.5	3.6	9.1	17.0	82.0	14.3	cortex
114	Olson	1980.782	.06	Burlington	2.33	rl	convex	20.5	FALSE	20.0	4.7	2.1	5.6	21.7	80.0	20.0	ht. treated
115	Olson	1980.705	.11	Burlington	2.88	rl	convex	21.8	FALSE	16.3	6.7	3.0	9.0	19.0	82.0	16.3	
116	Olson	1980.887	.01	Burlington	5.69	rl	convex	30.3	FALSE	25.0	4.5	2.4	4.7	29.3	81.0	25.0	
140	Olson	1980.734	.04	Burlington		r	straight	17.8	TRUE	18.7	7.7			19.5	100.0	18.7	
41	Olson	1980.782	.05	Grand Meadow	1.38	r	convex	21.5	FALSE	14.7	2.9	1.3	4.5	16.1	75.0	14.7	cortex
42	Olson	1980.708	.10	Grand Meadow	3.91	rl	convex	28.6	FALSE	16.3	7.0			19.6	82.0	16.3	
43	Olson	1980.711	.22	Grand Meadow	3.96	l	straight	21.1	FALSE	19.5	7.2			18.6	77.0	18.1	cortex
44	Olson	1980.712	.13	Grand Meadow	5.11	rl	convex	27.7	FALSE	23.6	5.8			30.1	84.0	23.6	cortex
45	Olson	1980.707	.12	Grand Meadow	3.94	r	convex	33.3	FALSE	15.6	7.1			17.8	81.0	15.6	cortex
46	Olson	1980.708	.14	Grand Meadow	1.85	rl	convex	22.8	FALSE	10.8	6.3	2.0	5.9	12.3	77.0	10.8	
47	Olson	1980.800	.01	Grand Meadow	3.16	r	convex	26.5	FALSE	13.5	5.9			16.6	87.0	13.5	cortex
48	Olson	1980.837	.01	Grand Meadow	3.73	rl	straight	23.5	FALSE	16.5	5.6	2.0	3.3	17.8	81.0	16.5	cortex
49	Olson	1980.707	.17	Grand Meadow	1.72	l	convex	18.3	FALSE	14.6	5.0	2.2	4.9	16.8	78.0	14.6	cortex
50	Olson	1980.869	.01	Grand Meadow	1.97	rl	convex	17.2	FALSE	15.4	4.2	2.4	6.1	16.3	83.0	15.4	
51	Olson	1980.775	.05	Grand Meadow	3.14	rl	convex	18.4	FALSE	20.0	6.1	2.4	7.0	22.2	82.0	20.0	
55	Olson	1980.822	.02	Grand Meadow	3.56	rl	convex	28.6	FALSE	14.5	5.6	1.6	5.4	16.1	82.0	14.5	
56	Olson	1980.811	.01	Grand Meadow	2.93	l	straight	18.4	FALSE	20.0	7.4	1.2	5.3	21.5	80.0	20.0	
64	Olson	1980.722	.06	Grand Meadow	1.78	r	convex	14.2	FALSE	17.9	4.1			20.2	72.0	17.9	
65	Olson	1980.875	.01	Grand Meadow	2.08	r	convex	21.2	FALSE	18.9	4.2	2.2	6.2	20.0	80.0	18.9	
66	Olson	1980.878	.01	Grand Meadow		r	convex	16.6	TRUE	21.8	6.9			25.8	80.0	21.8	cortex
67	Olson	1980.704	.14	Grand Meadow	2.77	l	convex	18.6	FALSE	18.8	5.3	1.7	5.5	20.1	70.0	18.8	cortex
68	Olson	1980.828	.01	Grand Meadow	3.01	r	straight	27.0	FALSE	11.5	5.9			12.7	90.0	11.5	cortex
69	Olson	1980.782	.04	Grand Meadow	1.38	r	convex	18.7	FALSE	12.6	3.2			13.8	76.0	12.6	cortex
70	Olson	1980.766	.02	Grand Meadow	3.63	r	convex	18.0	FALSE	21.9	6.3			21.9	85.0	20.9	cortex
71	Olson	1980.924	.01	Grand Meadow	4.83	r	convex	27.4	FALSE	20.2	7.1	4.5	10.0	22.6	67.0	20.2	cortex
72	Olson	1980.825	.02	Grand Meadow	1.56	r	convex	16.0	FALSE	14.9	4.2	1.4	4.6	16.6	81.0	14.9	cortex
77	Olson	1980.707	.14	Grand Meadow	2.4		convex	21.7	FALSE	20.6	3.7	2.3	9.1	23.6	83.0	20.6	
78	Olson	1980.711	.25	Grand Meadow	1.66		straight	17.8	FALSE	19.4	3.4	1.8	4.9	20.6	78.0	19.4	cortex
79	Olson	1980.808	.04	Grand Meadow	1.82	rl	convex	20.5	FALSE	10.8	5.1			13.1	79.0	10.8	
80	Olson	1980.824	.01	Grand Meadow	1.65		straight	17.9	FALSE	15.5	5.2	1.3	3.4	18.0	88.0	15.5	
109	Olson	1980.711	.14	Grand Meadow	3.15	l	straight	22.5	FALSE	15.5	7.5			16.2	87.0	15.5	cortex
110	Olson	1980.762	.02	Grand Meadow	2.6	rl	convex	23.7	FALSE	17.4	5.0			18.5	84.0	17.4	
118	Olson	1980.789	.07	Grand Meadow		l	convex	20.0	FALSE	15.6	5.5	2.4	7.5	19.0	80.0	15.6	burnt, cortex
119	Olson	1980.845	.03	Grand Meadow	2.14	r	convex	17.1	TRUE	14.8	6.1			16.3	83.0	14.8	cortex
120	Olson	1980.782	.07	Grand Meadow	2.21	rl	convex	22.4	FALSE	13.0	5.2	1.7	4.9	14.5	78.0	13.0	cortex
121	Olson	1980.767	.01	Grand Meadow	7.75	rl	convex	32.5	FALSE	23.1	7.6	5.2	12.1	20.2	84.0	20.3	
122	Olson	1980.704	.13	Grand Meadow		rl	convex	15.5	TRUE	20.8	5.4			21.4	78.0	20.8	
123	Olson	1980.840	.01	Grand Meadow	2.54	rl	convex	28.2	FALSE	18.7	3.4	2.0	4.2	20.3	80.0	18.7	
124	Olson	1980.711	.13	Grand Meadow	4.42	rl	convex	23.1	FALSE	20.1	6.4	3.6	8.0	22.5	84.0	20.1	
125	Olson	1980.708	.06	Grand Meadow		rl	convex	22.8	TRUE	18.4	6.3			21.4	83.0	18.4	
126	Olson	1980.711	.23	Grand Meadow	2.52		convex	19.0	FALSE	21.2	3.9	2.4	7.5	22.1	81.0	21.2	
127	Olson	1980.705	.10	Grand Meadow	2.5	r	convex	24.5	FALSE	16.0	5.3	2.5	7.1	17.8	84.0	16.0	
136	Olson	1980.933	.03	Grand Meadow		rl	convex	38.1	TRUE	21.8	6.9			24.1	88.0	21.8	
138	Olson	1980.708	.07	Grand Meadow	4.08	rl	convex	22.8	FALSE	18.0	7.0	2.8	6.8	19.0	84.0	18.0	
57	Olson	1980.760	.01	Hixton Silicified Sandstone		rl	convex	24.0	TRUE	29.4	9.0			31.4	88.0	29.4	
58	Olson	1980.711	.21	Hixton Silicified Sandstone		rl	convex	29.4	TRUE	27.2	8.7			31.6	82.0	27.2	

Table A1 - Olson end scrapers (all measurements in millimeters, degrees, or grams, as appropriate)

ID	site name	acquisition number	third digit	raw material	weight	retouched side	edge form	length	broken length?	width	thickness	plat thickness	plat width	edge length	angle	bit length	comments
59	Olson	1980.722	.05	Hixton Silicified Sandstone		l	convex	20.7	TRUE	14.5	3.9			16.8	77.0	14.5	
60	Olson	1980.735	.01	Hixton Silicified Sandstone	2.86	rl	convex	22.2	FALSE	17.6	5.2			21.2	83.0	17.6	
61	Olson	1980.749	.01	Hixton Silicified Sandstone	4.24	rl	straight	21.5	FALSE	23.0	5.9	3.2	9.1	24.8	79.0	23.0	
62	Olson	1980.708	.11	Hixton Silicified Sandstone	12.65	l	convex	34.5	FALSE	28.7	10.2	19.6	15.4	33.2	85.0	28.7	
63	Olson	1980.854	.01	Hixton Silicified Sandstone	3.7	l	convex	22.0	FALSE	21.0	6.1	3.0	11.2	26.0	82.0	21.0	
74	Olson	1980.711	.20	Hixton Silicified Sandstone	1.81	rl	convex	16.3	FALSE	17.6	4.7	2.0	4.0	20.3	83.0	17.6	
75	Olson	1980.840	.03	Hixton Silicified Sandstone	6.06	r	straight	33.0	FALSE	21.2	7.1			24.1	84.0	21.2	
82	Olson	1980.707	.17	Hixton Silicified Sandstone	3.54	l	straight	26.4	FALSE	21.0	4.6	1.6	6.9	20.0	83.0	19.7	
83	Olson	1980.804	.06	Hixton Silicified Sandstone	2.87	convex	convex	27.8	FALSE	16.2	6.8	4.2	7.2	16.7	85.0	16.2	
84	Olson	1980.711	.16	Hixton Silicified Sandstone	2.98	convex	convex	22.3	FALSE	18.4	6.4	2.4	3.9	22.7	84.0	18.4	
85	Olson	1980.766	.01	Hixton Silicified Sandstone	7.12	l	convex	39.0	FALSE	21.8	7.5	1.7	4.0	28.9	81.0	21.8	
86	Olson	1980.705	.14	Hixton Silicified Sandstone	4.94	convex	convex	33.7	FALSE	23.4	5.6	1.8	2.0	28.0	84.0	23.4	
87	Olson	1980.1032	.02	Hixton Silicified Sandstone	20.1	rl	straight	52.3	FALSE	29.2	10.0	5.2	11.1	31.5	90.0	29.2	resembles paleo
88	Olson	1980.710	.06	Hixton Silicified Sandstone	17.25	rl	convex	41.7	FALSE	30.3	13.1			38.3	86.0	30.3	
89	Olson	1980.704	.11	Hixton Silicified Sandstone		rl	convex	30.2	TRUE	26.9	5.1			32.0	83.0	26.9	
90	Olson	1980.763	.03	Hixton Silicified Sandstone		rl	convex	18.1	TRUE	25.0	6.2			27.4	84.0	25.0	
91	Olson	1980.1032	.01	Hixton Silicified Sandstone		l	convex	24.0	TRUE	24.1	7.7			28.9	85.0	24.1	
92	Olson	1980.712	.12	Hixton Silicified Sandstone			straight	17.0	TRUE	15.9	4.0			18.8	77.0	15.9	
93	Olson	1980.950	.01	Hixton Silicified Sandstone			convex	13.4	TRUE	17.5	5.4			21.8	83.0	17.5	
94	Olson	1980.707	.15	Hixton Silicified Sandstone	1.98		convex	18.8	FALSE	20.9	3.5	1.3	7.4	23.1	78.0	20.9	
95	Olson	1980.747	.02	Hixton Silicified Sandstone	9.05	rl	convex	31.0	FALSE	23.2	7.3	3.6	14.8	26.2	82.0	23.2	
96	Olson	1980.804	.02	Hixton Silicified Sandstone	1.71	rl	convex	25.4	FALSE	16.5	2.8			18.5	81.0	16.5	
97	Olson	1980.711	.12	Hixton Silicified Sandstone	4.48	rl	convex	19.9	FALSE	24.2	6.4	5.6	11.0	25.4	85.0	24.2	
104	Olson	1980.804	.04	Hixton Silicified Sandstone		rl	convex	25.5	TRUE	19.8	8.5			17.5	90.0	16.1	
106	Olson	1980.999	.01	Hixton Silicified Sandstone	2.99	rl	convex	15.7	FALSE	24.3	5.1	4.3	8.8	27.4	76.0	24.3	
107	Olson	1980.706	.04	Hixton Silicified Sandstone	4.9	rl	convex	26.6	FALSE	23.4	7.2			24.8	82.0	23.4	
108	Olson	1980.825	.01	Hixton Silicified Sandstone	2.86	r	convex	22.8	FALSE	15.7	9.0			17.3	81.0	15.7	cortex
128	Olson	1980.780	.01	Hixton Silicified Sandstone		rl	convex	28.9	TRUE	21.0	5.0			23.6	90.0	21.0	
129	Olson	1980.750	.03	Hixton Silicified Sandstone		rl	convex	23.6	TRUE	31.1	5.5			44.0	90.0	31.1	
130	Olson	1980.746	.01	Hixton Silicified Sandstone		rl	convex	18.0	TRUE	23.9	7.0			25.2	81.0	23.9	
131	Olson	1980.848	.01	Hixton Silicified Sandstone	7.52	rl	straight	29.0	FALSE	25.4	10.0	2.0	4.2	26.8	83.0	25.4	
132	Olson	1980.711	.15	Hixton Silicified Sandstone		rl	convex	22.6	TRUE	19.0	5.3			23.0	85.0	19.0	
133	Olson	1980.853	.01	Hixton Silicified Sandstone	9.9	rl	straight	30.7	FALSE	25.7	9.0			27.8	95.0	25.7	
134	Olson	1980.751	.01	Hixton Silicified Sandstone	6.42	rl	convex	35.0	FALSE	21.5	7.3	2.6	7.6	25.8	80.0	21.5	
135	Olson	1980.804	.03	Hixton Silicified Sandstone	11.42	rl	convex	49.8	FALSE	28.1	5.4	4.0	8.2	29.9	70.0	28.1	
137	Olson	1980.783	.04	Hixton Silicified Sandstone	6.29	rl	convex	32.5	FALSE	23.7	6.2	3.0	6.0	24.4	80.0	23.7	
76	Olson	1980.726	.02	PDC	1.24		convex	16.7	FALSE	16.1	3.5	3.5	6.9	19.4	83.0	16.1	
98	Olson	1980.845	.02	PDC	2.27		convex	17.3	FALSE	16.6	5.8	1.8	5.9	18.4	80.0	16.6	
99	Olson	1980.727	.03	PDC	2.81	rl	convex	17.5	FALSE	21.0	6.2	2.4	8.2	22.9	80.0	21.0	
100	Olson	1980.708	.12	PDC	2.69	l	convex	20.7	FALSE	14.6	6.3	3.6	5.8	17.3	82.0	14.6	cortex
101	Olson	1980.1032	.04	PDC	1.16	rl	convex	21.5	FALSE	16.1	2.8			19.0	83.0	16.1	
103	Olson	1980.709	.06	PDC	7.15	rl	convex	27.2	FALSE	19.0	8.8	5.1	10.7	21.3	86.0	19.0	cortex
105	Olson	1980.951	.01	PDC	8.55	l	convex	28.1	FALSE	24.5	8.0			27.0	84.0	24.5	
111	Olson	1980.783	.03	PDC	5.27	l	convex	19.9	FALSE	23.9	8.3	5.1	11.1	25.6	85.0	23.9	ht. treated
113	Olson	1980.705	.12	PDC	1.53	rl	convex	17.2	FALSE	15.4	5.2	1.0	4.3	18.4	78.0	15.4	
117	Olson	1980.870	.02	PDC	3.55	rl	convex	28.5	FALSE	20.0	5.1			24.9	83.0	20.0	cortex
139	Olson	1980.708	.13	PDC		l	convex	27.8	TRUE	22.8	6.2			26.0	83.0	22.8	
112	Olson	1980.785	.01	unid	2.14	rl	convex	18.9	FALSE	17.6	6.1	2.6	6.5	19.3	84.0	17.6	

Table A2 - Morrow-Hensel end scrapers (all measurements in millimeters, degrees, or grams, as appropriate)

ID	site name	acquisition number	third digit	raw material	weight	retouched side	edge form	length	broken length?	width	thickness	plat thickness	plat width	edge length	angle	bit length	comments
277	Morrow-Hensel	MH	130	Hixton Silicified Sandstone	8.3		convex	26.1	TRUE	37.8	8.3			46.3	58.0	37.8	
278	Morrow-Hensel	MH	131	Hixton Silicified Sandstone	13.5		convex	35.8	TRUE	29.8	9.1			33.7	76.0	24.1	
279	Morrow-Hensel	MH	133	Hixton Silicified Sandstone	9.7		convex	39.3	FALSE	25.1	11.7			29.5	67.0	24.8	
280	Morrow-Hensel	MH	134	Hixton Silicified Sandstone	10.5		convex	35.2	FALSE	29.4	10.5			30.0	50.0	27.5	
281	Morrow-Hensel	MH	1019	Hixton Silicified Sandstone	3.1		convex	28.1	FALSE	19.8	6.9			22.3	70.0	19.8	
282	Morrow-Hensel	MH	136	Hixton Silicified Sandstone	21.4		convex	37.8	TRUE	37.4	8.6			44.0	50.0	37.5	snapped
283	Morrow-Hensel	MH	123/341	Hixton Silicified Sandstone	15.8		convex	63.4	TRUE	32.4	6.1	3.3	9.1	64.6	62.0	30.0	snapped into distal and proximal halves;
284	Morrow-Hensel	MH	126	Hixton Silicified Sandstone	5.5		convex	31.9	TRUE	28.9	6.0			31.4	47.0	24.5	snapped
285	Morrow-Hensel	MH	127	Hixton Silicified Sandstone	9.6		convex	33.4	TRUE	30.9	70.0			23.1	70.0	20.0	plow damage, snapped
286	Morrow-Hensel	MH	109	Hixton Silicified Sandstone	8.4		convex	37.0	FALSE	28.4	7.3	3.5	5.8	35.4	63.0	27.8	
287	Morrow-Hensel	MH	110	Hixton Silicified Sandstone	14.2		convex	36.4	FALSE	29.5	11.9			35.0	71.0	29.2	
288	Morrow-Hensel	MH	111	Hixton Silicified Sandstone	10.4		convex	41.9	FALSE	29.4	6.9			41.4	54.0	29.5	
289	Morrow-Hensel	MH	112	Hixton Silicified Sandstone	13		convex	45.8	FALSE	29.8	9.1			37.4	62.0	29.3	plow damage
290	Morrow-Hensel	MH	113	Hixton Silicified Sandstone	9.8		convex	37.5	FALSE	28.0	8.9			35.5	78.0	28.1	
291	Morrow-Hensel	MH	114	Hixton Silicified Sandstone	10.7		convex	32.6	FALSE	28.5	9.4	5.2	9.3	37.8	73.0	29.7	
292	Morrow-Hensel	MH	115	Hixton Silicified Sandstone	14		convex	43.2	FALSE	33.6	11.4			43.1	38.0	32.6	
293	Morrow-Hensel	MH	116	Hixton Silicified Sandstone	14.7		convex	41.4	FALSE	31.1	13.0	4.0	7.4	34.7	66.0	26.4	
294	Morrow-Hensel	MH	117	Hixton Silicified Sandstone	15.6		convex	37.3	TRUE	28.6	12.6			34.5	74.0	25.8	plow damage; hafted
295	Morrow-Hensel	MH	118	Hixton Silicified Sandstone	9		convex	30.4	FALSE	29.9	10.4			33.3		25.6	
296	Morrow-Hensel	MH	119	Hixton Silicified Sandstone	15.4		convex	34.0	TRUE	29.2	18.7			36.3	58.0	29.1	plow damage
297	Morrow-Hensel	MH	120	Hixton Silicified Sandstone	8.7		convex	22.1	TRUE	23.1	12.5			30.3	67.0	24.7	haft element gone
298	Morrow-Hensel	MH	104	Hixton Silicified Sandstone	4.2		convex	27.8	TRUE	19.5	7.5			15.5	51.0	11.3	plow damage
299	Morrow-Hensel	MH	377	Hixton Silicified Sandstone	6.7		convex	30.8	TRUE	32.4	6.2	3.5	8.0	31.7	40.0	29.0	plow damage, snapped
300	Morrow-Hensel	MH	188/343	Hixton Silicified Sandstone	8.7		convex	53.2	TRUE	24.7	6.5	3.8	9.2	31.3	78.0	21.4	spurred
301	Morrow-Hensel	MH	139	Hixton Silicified Sandstone	8.5		convex	32.6	TRUE	24.4	8.6			30.2	66.0	21.7	snapped; spurred
302	Morrow-Hensel	MH	194	Hixton Silicified Sandstone	5		convex	28.5	FALSE	25.9	7.0	1.9	6.0	36.4	56.0	31.0	spurred
303	Morrow-Hensel	MH	147	Hixton Silicified Sandstone	25		convex	33.5	TRUE	53.6	12.3			35.0		33.0	plow damage, snapped
304	Morrow-Hensel	MH	87	Hixton Silicified Sandstone	2.9		convex	21.0	TRUE	20.9	6.4			12.4	60.0	10.1	snapped
305	Morrow-Hensel	MH	90	Hixton Silicified Sandstone	8.2		convex	33.7	FALSE	28.4	8.2	2.4	7.8	34.3		24.6	spurred; hafted
306	Morrow-Hensel	MH	91	Hixton Silicified Sandstone	10.5		convex	37.7	FALSE	29.5	7.5	6.0	11.8	38.9	64.0	29.2	hafted
307	Morrow-Hensel	MH	92	Hixton Silicified Sandstone	14.5		convex	37.6	TRUE	29.1	11.5			33.1	60.0	26.7	plow damage; hafted
308	Morrow-Hensel	MH	93	Hixton Silicified Sandstone	7.9		convex	30.9	FALSE	30.4	7.4			37.5	60.0	30.3	
309	Morrow-Hensel	MH	94	Hixton Silicified Sandstone	8.6		convex	33.7	FALSE	30.6	6.2			34.8	63.0	30.7	hafted
310	Morrow-Hensel	MH	95	Hixton Silicified Sandstone	7.1		convex	30.4	FALSE	29.9	7.7	2.6	6.6	42.4	54.0	29.9	plow damage, snapped
311	Morrow-Hensel	MH	96	Hixton Silicified Sandstone	5.4		convex	30.8	FALSE	25.0	5.5			32.9	66.0	27.0	spurred; plow damage, snapped
312	Morrow-Hensel	MH	97	Hixton Silicified Sandstone	10.4		convex	31.6	FALSE	24.4	9.5			29.1	51.0	20.7	snapped; plow damage, snapped
313	Morrow-Hensel	MH	137	PDC	6.2		convex	26.0	FALSE	23.5	8.6	6.3	13.5	26.6	61.0	23.0	right side cortex
314	Morrow-Hensel	MH	128	PDC	3.7		convex	25.2	TRUE	20.5	5.4			21.7	70.0	19.6	plow damage
315	Morrow-Hensel	MH	124	PDC	4.1		convex	23.2	FALSE	20.6	6.7	2.5	8.5	20.2	84.0	17.2	
316	Morrow-Hensel	MH	105	PDC	7.8		convex	32.7	FALSE	22.2	11.4			27.3	80.0	22.3	left side cortex
317	Morrow-Hensel	MH	106	PDC	3.4		convex	21.0	FALSE	21.3	7.5	2.3	4.6	21.4	62.0	20.4	
318	Morrow-Hensel	MH	107	PDC	3		convex	17.9	FALSE	22.6	8.0			19.0	60.0	16.4	
319	Morrow-Hensel	MH	108	PDC	4.1		convex	31.6	FALSE	18.7	6.1			18.2	55.0	13.0	
320	Morrow-Hensel	MH	99	PDC	17.4		convex	37.1	FALSE	34.8	10.5			39.9	67.0	34.5	cortex
321	Morrow-Hensel	MH	100	PDC	10.9		convex	32.6	FALSE	24.5	12.9			23.7	62.0	17.5	cortex
322	Morrow-Hensel	MH	102	PDC	4.6		convex	28.8	FALSE	22.7	5.7	3.9	7.9	34.6	56.0	23.1	
323	Morrow-Hensel	MH	103	PDC	8.7		convex	39.3	FALSE	21.4	9.8	3.4	8.9	26.5	69.0	20.8	spur
324	Morrow-Hensel	MH	293	PDC	2.6		convex	16.9	TRUE	20.8	6.1			23.0	64.0	20.7	cortex; snapped
325	Morrow-Hensel	MH	279	PDC	3.2		convex	22.5	TRUE	23.0	8.5			12.9	59.0	10.8	cortex; snapped
327	Morrow-Hensel	MH	337	PDC	5.7		convex	32.2	TRUE	24.9	6.4			20.5	45.0	16.0	spur; plow damage
328	Morrow-Hensel	MH	656	PDC	3.6		convex	22.9	TRUE	13.7	7.0			14.7	44.0	12.5	plow damage, snapped; some cortex
329	Morrow-Hensel	MH	657	PDC	2		convex	17.9	TRUE	19.3	4.5			19.6	66.0	18.0	snapped
330	Morrow-Hensel	MH	496	PDC	4.2		convex	32.2	FALSE	23.3	4.7	2.7	8.7	21.7	52.0	13.6	plow damage
331	Morrow-Hensel	MH	653	PDC	3.2		convex	26.2	TRUE	19.2	5.2			16.4	52.0	13.6	plow damage, snapped

Table A3 - Silver Mound end scrapers (all measurements in millimeters, degrees, or grams, as appropriate)

ID	site name	acquisition number	third digit	raw material	weight	retouched side	edge form	length	broken length?	width	thickness	plat thickness	plat width	edge length	angle	bit length	comments
183	Silver Mound	2008.0042	.158	Burlington	17.8	rl	convex	53.0	FALSE	27.5	11.0	7.6	12.2	37.6	86.0	28.2	
184	Silver Mound	2008.0042	.159	Burlington		rl	convex	68.2	TRUE	27.5	18.1			28.2	89.0	24.6	
185	Silver Mound	2008.0042	.161	Burlington	2.34	rl	convex	23.8	FALSE	13.4	5.2			11.4	90.0	10.7	retouched all around
186	Silver Mound	2008.0042	.162	Burlington	4.98	rl	convex	23.4	FALSE	22.2	19.4	3.6	5.0	33.6	87.0	22.2	
228	Silver Mound	2008.0040	.57	Burlington		r	convex	22.2	TRUE	23.8	2.2			27.9	70.0	23.8	
232	Silver Mound	2008.0045	.60	Burlington	4.96	rl	straight	26.0	FALSE	24.3	6.3	4.3	7.0	29.0	85.0	24.3	
239	Silver Mound	2008.0045	.68	Burlington		rl	convex	27.9	TRUE	23.5	10.8			28.8	85.0	23.5	snapped
245	Silver Mound	2008.0045	.76	Burlington	5.4	rl	convex	25.2	FALSE	20.7	8.0	5.0	10.4	20.8	93.0	18.7	cortex
189	Silver Mound	2008.0042	.167	cochrane	27.99	rl	straight	43.9	FALSE	33.1	15.3			30.6	96.0	29.0	cortex
174	Silver Mound	2008.0042	.142	galena		r	convex	28.2	TRUE	20.3	6.3			22.8	80.0	19.4	snapped
175	Silver Mound	2008.0042	.144	galena		rl	convex	21.1	TRUE	26.6	9.1			29.5	84.0	26.6	snapped
176	Silver Mound	2008.0042	.145	galena	15.02	rl	convex	42.8	FALSE	30.8	10.2			39.8	84.0	25.4	cortex on left side
177	Silver Mound	2008.0042	.146	galena		rl	convex	26.3	TRUE	26.4	7.6			27.5	87.0	24.8	snapped
182	Silver Mound	2008.0042	.153	galena	6.24	rl	convex	22.6	FALSE	26.3	8.4			28.5	86.0	26.3	spurred
216	Silver Mound	2008.0044	.19	galena	60.25	l	convex	58.8	FALSE	48.5	22.5	8.6	15.6	51.7	65.0	43.4	cortex
267	Silver Mound	2008.0045	.104	galena	2.59	r	convex	23.4	FALSE	19.4	5.0	2.9	6.9	17.5	88.0	16.3	
173	Silver Mound	2008.0042	.141	Grand Meadow		rl	convex	27.6	TRUE	33.6	11.1			36.8	96.0	33.6	cortex
203	Silver Mound	2008.0047	.12	Gun Flint Silica	6.8	rl	convex	21.3	FALSE	21.4	10.8			17.8	75.0	16.0	worked all around
141	Silver Mound	2008.0042	.95	Hixton Silicified Sandstone		rl	convex	64.7	TRUE	41.1	18.3			35.9	80.0	29.7	
142	Silver Mound	2008.0042	.96	Hixton Silicified Sandstone	26.2	rl	convex	53.1	FALSE	40.5	10.1	6.9	13.1	51.2	85.0	38.0	
143	Silver Mound	2008.0042	.97	Hixton Silicified Sandstone	27.8	rl	convex	45.7	FALSE	41.3	14.3			38.7	85.0	36.5	
144	Silver Mound	2008.0042	.98	Hixton Silicified Sandstone	13.05	rl	convex	48.5	FALSE	36.7	7.5	5.3	15.5	31.8	86.0	25.2	
145	Silver Mound	2008.0042	.99	Hixton Silicified Sandstone	22	rl	convex	52.3	FALSE	30.3	11.0	7.1	11.4	34.9	88.0	26.3	
146	Silver Mound	2008.0042	.101	Hixton Silicified Sandstone	17.48	rl	convex	46.5	FALSE	26.0	13.1	3.5	9.5	29.3	88.0	26.0	spurred; Haft length - lft=20; right=15
147	Silver Mound	2008.0042	.105	Hixton Silicified Sandstone	12.43	rl	convex	40.0	FALSE	28.8	8.7	5.1	12.0	35.8	87.0	28.8	
148	Silver Mound	2008.0042	.107	Hixton Silicified Sandstone	50.5	rl	convex	54.1	FALSE	34.3	20.2			33.9	87.0	31.3	some cortex
149	Silver Mound	2008.0042	.109	Hixton Silicified Sandstone	9.12	rl	straight	37.3	FALSE	25.9	9.1	3.3		28.5	80.0	25.9	spurred
150	Silver Mound	2008.0042	.111	Hixton Silicified Sandstone		rl	convex	28.6	TRUE	25.5	7.7			26.9	87.0	23.5	bottom snapped
151	Silver Mound	2008.0042	.112	Hixton Silicified Sandstone		rl	convex	36.4	FALSE	26.0	7.9			30.7	80.0	26.0	spurred; bottom snapped slightly
152	Silver Mound	2008.0042	.113	Hixton Silicified Sandstone	10.39	rl	straight	27.5	FALSE	33.7	9.5	5.5	10.0	29.3	77.0	26.0	
153	Silver Mound	2008.0042	.114	Hixton Silicified Sandstone	11.33	rl	convex	30.8	FALSE	31.0	8.6			34.1	90.0	31.0	
154	Silver Mound	2008.0042	.115	Hixton Silicified Sandstone		rl	convex	28.9	TRUE	34.5	11.1			39.2	85.0	34.5	snapped
155	Silver Mound	2008.0042	.116	Hixton Silicified Sandstone		rl	convex	29.9	TRUE	23.8	6.3			30.7	72.0	23.8	
156	Silver Mound	2008.0042	.118	Hixton Silicified Sandstone	11.03	r	concave	38.5	FALSE	28.0	9.3			25.8	85.0	25.4	
157	Silver Mound	2008.0042	.122	Hixton Silicified Sandstone	5.1	rl	convex	29.4	FALSE	22.7	5.6	4.7	8.9	26.4	84.0	22.7	
158	Silver Mound	2008.0042	.124	Hixton Silicified Sandstone	5.52	rl	convex	29.3	FALSE	24.8	5.4			27.1	80.0	24.8	spurred; cortex
159	Silver Mound	2008.0042	.126	Hixton Silicified Sandstone	5.64	rl	convex	23.4	FALSE	25.3	6.2			28.4	80.0	25.3	
160	Silver Mound	2008.0042	.127	Hixton Silicified Sandstone	8.29	r	convex	34.7	FALSE	24.0	9.5	3.1	10.0	27.2	89.0	24.0	
161	Silver Mound	2008.0042	.128	Hixton Silicified Sandstone		rl	convex	21.2	TRUE	25.5	5.5			30.0	84.0	25.5	cortex; bottom snapped
162	Silver Mound	2008.0042	.129	Hixton Silicified Sandstone	4.85	rl	convex	29.6	FALSE	22.0	6.2	4.0	8.7	27.1	81.0	22.0	
163	Silver Mound	2008.0042	.130	Hixton Silicified Sandstone	5.54	rl	convex	32.5	FALSE	21.4	6.6	3.9	7.9	24.0	90.0	21.4	spurred
164	Silver Mound	2008.0042	.131	Hixton Silicified Sandstone	5.56	rl	convex	23.0	FALSE	23.7	8.1	4.1	8.3	22.5	81.0	21.1	
165	Silver Mound	2008.0042	.132	Hixton Silicified Sandstone	3.82	r	convex	23.9	FALSE	23.7	5.2	3.6	7.5	32.6	81.0	23.7	cortex
166	Silver Mound	2008.0042	.133	Hixton Silicified Sandstone	9.16	rl	convex	25.2	FALSE	23.8	14.4			34.0	93.0	23.8	cortex
167	Silver Mound	2008.0042	.135	Hixton Silicified Sandstone	2.08	rl	convex	21.2	FALSE	18.7	4.0	1.5	4.8	19.5	75.0	18.7	
192	Silver Mound	2008.0048	.01	Hixton Silicified Sandstone	39.39	rl	convex	58.2	FALSE	41.1	12.7	7.8	20.5	37.2	98.0	31.3	cortex
193	Silver Mound	2008.0050	.04	Hixton Silicified Sandstone	3.03	rl	convex	24.7	FALSE	16.8	4.3	2.5	10.3	21.5	76.0	15.5	
194	Silver Mound	2008.0052	.11	Hixton Silicified Sandstone		rl	convex	22.6	TRUE	21.6	4.6			19.7	54.0	19.4	cortex top right
195	Silver Mound	2008.0052	.12	Hixton Silicified Sandstone	3.9	r	convex	22.6	FALSE	21.3	5.0	2.4	7.3	22.0	64.0	19.7	
196	Silver Mound	2008.0046	.07	Hixton Silicified Sandstone	7.84	rl	convex	29.2	FALSE	22.8	9.0	2.1	4.8	35.5	90.0	22.8	cortex
197	Silver Mound	2008.0046	.08	Hixton Silicified Sandstone	9.35	l	convex	36.5	FALSE	30.6	6.5	4.0	12.6	32.2	72.0	25.7	
198	Silver Mound	2008.0046	.09	Hixton Silicified Sandstone	5.7	rl	convex	32.4	FALSE	25.5	4.5	1.8	5.0	33.5	75.0	25.5	cortex
200	Silver Mound	2008.0043	.19	Hixton Silicified Sandstone		rl	convex	36.0	TRUE	24.9	7.2			30.0	85.0	24.9	
204	Silver Mound	2008.0047	.13	Hixton Silicified Sandstone	18.7	rl	convex	50.0	FALSE	27.9	10.4	2.2	8.7	30.0	85.0	23.1	cortex
205	Silver Mound	2008.0047	.14	Hixton Silicified Sandstone	21	rl	convex	47.6	FALSE	41.5	9.4	3.3	14.0	53.5	87.0	41.5	
207	Silver Mound	2008.0051	.09	Hixton Silicified Sandstone	18.1	rl	convex	47.1	FALSE	33.9	9.2	5.0	17.2	30.7	77.0	25.7	

Table A3 - Silver Mound end scrapers (all measurements in millimeters, degrees, or grams, as appropriate)

ID	site name	acquisition number	third digit	raw material	weight	retouched side	edge form	length	broken length?	width	thickness	plat thickness	plat width	edge length	angle	bit length	comments
210	Silver Mound	2008.0051	.13	Hixton Silicified Sandstone		rl	convex	21.1	TRUE	19.4	4.8			17.2	75.0	15.9	
211	Silver Mound	2008.0044	.14	Hixton Silicified Sandstone	17.37	r	convex	46.1	FALSE	27.5	12.8	1.9	10.0	32.2	58.0	24.2	
213	Silver Mound	2008.0044	.16	Hixton Silicified Sandstone		rl	convex	42.5	TRUE	31.6	6.5			43.1	70.0	31.6	
214	Silver Mound	2008.0044	.17	Hixton Silicified Sandstone	9.42	rl	convex	28.0	FALSE	27.6	10.8			33.4	60.0	25.5	
215	Silver Mound	2008.0044	.18	Hixton Silicified Sandstone	15.16	l	convex	49.5	FALSE	24.2	13.5	3.0	8.0	35.8	100.0	24.0	cortex
217	Silver Mound	2008.0040	.45	Hixton Silicified Sandstone	42.7	l	convex	65.1	FALSE	47.4	10.4	7.4	18.4	38.4	84.0	33.4	cortex
218	Silver Mound	2008.0040	.46	Hixton Silicified Sandstone		l	convex	30.5	TRUE	27.9	7.9			31.8	82.0	27.9	
219	Silver Mound	2008.0040	.48	Hixton Silicified Sandstone	8.8	l	convex	28.7	FALSE	29.0	9.6	3.9	7.7	33.5	82.0	29.0	cortex; possible scraper
220	Silver Mound	2008.0040	.49	Hixton Silicified Sandstone		l	convex	37.8	TRUE	22.4	7.4	3.1	6.7	24.3	76.0	21.9	
221	Silver Mound	2008.0040	.50	Hixton Silicified Sandstone		r	convex	28.9	TRUE	31.5	5.4			37.6	81.0	31.5	
222	Silver Mound	2008.0040	.51	Hixton Silicified Sandstone		r	convex	20.6	TRUE	28.1	4.5			18.3	82.0	15.3	
223	Silver Mound	2008.0040	.52	Hixton Silicified Sandstone		r	convex	33.1	TRUE	35.0	8.8			54.3	80.0	35.0	
224	Silver Mound	2008.0040	.53	Hixton Silicified Sandstone		r	convex	23.5	TRUE	23.1	7.2	2.1	6.6	23.7	88.0	23.1	
225	Silver Mound	2008.0040	.54	Hixton Silicified Sandstone	8.6	rl	convex	29.4	FALSE	33.4	7.7	3.3	7.2	34.9	85.0	33.4	spurred; some cortex
226	Silver Mound	2008.0040	.55	Hixton Silicified Sandstone		r	convex	26.0	TRUE	33.7	8.4			39.4	82.0	33.7	spurred
229	Silver Mound	2008.0040	.58	Hixton Silicified Sandstone	26.2	rl	convex	56.0	FALSE	31.5	12.4	3.9	12.2	49.3	87.0	33.2	spurred
230	Silver Mound	2008.0040	.59	Hixton Silicified Sandstone		3rl	straight	17.3	FALSE	19.1	6.8	5.5	7.7	20.0	80.0	18.3	
231	Silver Mound	2008.0040	.61	Hixton Silicified Sandstone	4.2	r	convex	24.5	FALSE	22.1	6.6	3.1	6.2	22.3	80.0	19.9	spurred
233	Silver Mound	2008.0045	.61	Hixton Silicified Sandstone		rl	convex	25.0	FALSE	24.9	4.5			26.0	75.0	23.9	snapped
234	Silver Mound	2008.0045	.62	Hixton Silicified Sandstone	5.7	l	convex	34.0	FALSE	22.8	6.7	4.0	11.0	28.3	82.0	22.8	spurred
235	Silver Mound	2008.0045	.63	Hixton Silicified Sandstone	115.3	rl	convex	95.1	FALSE	72.1	16.8	8.1	16.5	79.8	90.0	62.6	possible spur; some cortex
236	Silver Mound	2008.0045	.64	Hixton Silicified Sandstone		rl	convex	42.9	TRUE	33.0	13.1			41.8	88.0	33.0	spurred
238	Silver Mound	2008.0045	.67	Hixton Silicified Sandstone	9.37	r	convex	34.0	FALSE	31.6	8.3	3.6	8.2	36.2	83.0	31.6	
241	Silver Mound	2008.0045	.70	Hixton Silicified Sandstone	5.4	r	convex	30.1	FALSE	28.3	5.2	3.4	12.6	36.7	76.0	28.3	
242	Silver Mound	2008.0045	.71	Hixton Silicified Sandstone	9.6	rl	convex	44.8	FALSE	24.6	6.9	2.8	6.3	31.7	80.0	24.6	spurred
243	Silver Mound	2008.0045	.72	Hixton Silicified Sandstone		r	convex	30.4	TRUE	30.9	13.9			39.2	80.0	30.1	plow damage
244	Silver Mound	2008.0045	.74	Hixton Silicified Sandstone		r	convex	41.3	TRUE	35.8	14.9			40.4	87.0	35.8	spurred
246	Silver Mound	2008.0045	.77	Hixton Silicified Sandstone	21.2	r	convex	49.1	FALSE	37.4	12.7	4.5	9.2	50.5	79.0	37.4	Hafted - lft=28.9, right=31.2
247	Silver Mound	2008.0045	.78	Hixton Silicified Sandstone	16.3	rl	convex	51.2	FALSE	31.5	9.7	3.6	9.5	27.9	84.0	25.9	
248	Silver Mound	2008.0045	.80	Hixton Silicified Sandstone		5rl	convex	27.0	FALSE	24.5	6.5	2.7	6.1	29.0	79.0	24.5	spurred
249	Silver Mound	2008.0045	.82	Hixton Silicified Sandstone		rl	straight	44.9	TRUE	41.3	11.1			42.8	88.0	41.3	spurred
252	Silver Mound	2008.0045	.85	Hixton Silicified Sandstone	12.1	r	convex	37.0	FALSE	26.4	11.2	6.0	12.2	32.0	80.0	26.4	spurred
254	Silver Mound	2008.0045	.89	Hixton Silicified Sandstone	6.8	r	straight	37.2	FALSE	24.5	5.8	4.2	5.2	28.6	86.0	22.8	
255	Silver Mound	2008.0045	.90	Hixton Silicified Sandstone	9.3	r	convex	33.9	FALSE	30.5	10.0	3.8	7.0	37.5	80.0	30.5	cortex
256	Silver Mound	2008.0045	.91	Hixton Silicified Sandstone	6.1	rl	straight	33.9	FALSE	20.4	7.5	4.8	6.3	25.8	75.0	20.4	spurred
257	Silver Mound	2008.0045	.93	Hixton Silicified Sandstone		r	convex	23.0	TRUE	24.5	6.0			26.2	76.0	24.5	
258	Silver Mound	2008.0045	.94	Hixton Silicified Sandstone		l	convex	32.0	TRUE	27.7	7.0	3.7	8.6	30.4	77.0	27.1	
259	Silver Mound	2008.0045	.95	Hixton Silicified Sandstone	8.8	r	convex	24.3	FALSE	26.0	4.9	2.6	6.9	32.9	69.0	26.0	
260	Silver Mound	2008.0045	.96	Hixton Silicified Sandstone	3.3	rl	convex	27.5	FALSE	19.8	4.5	3.0	5.2	26.9	72.0	19.8	
262	Silver Mound	2008.0045	.98	Hixton Silicified Sandstone	9.08	r	convex	29.7	FALSE	27.6	8.9			24.7	84.0	23.7	cortex
266	Silver Mound	2008.0045	.103	Hixton Silicified Sandstone		l	convex	23.3	TRUE	26.3	6.7			30.5	78.0	26.9	
268	Silver Mound	2008.0045	.105	Hixton Silicified Sandstone	9.8	r	convex	26.0	FALSE	27.3	11.5	5.5	9.8	28.5	75.0	26.6	
269	Silver Mound	2008.0045	.106	Hixton Silicified Sandstone	19.2	r	convex	49.5	FALSE	33.1	9.0			35.8	85.0	30.0	spurred; hafted- right=24.4, lft=unkwn
270	Silver Mound	2008.0045	.107	Hixton Silicified Sandstone		rl	convex	35.2	TRUE	26.8	9.7			32.3	78.0	25.4	
272	Silver Mound	2008.0045	.109	Hixton Silicified Sandstone		r	convex	27.0	TRUE	30.0	9.6			36.5	83.0	30.0	snapped
273	Silver Mound	2008.0045	.110	Hixton Silicified Sandstone	7.9	l	convex	25.5	FALSE	22.0	11.5	3.0	11.5	21.6	88.0	19.1	
274	Silver Mound	2008.0045	.111	Hixton Silicified Sandstone	5.54	rl	straight	23.1	FALSE	23.5	6.6	3.8	8.0	23.9	90.0	23.5	
237	Silver Mound	2008.0045	.66	Hudson Bay Lowland Chert	4.5	rl	convex	28.3	FALSE	25.2	5.8	4.1	8.5	26.2	85.0	25.2	spurred
276	Silver Mound	2008.0045	.113	Jasper Taconite	11.04	rl	convex	31.1	FALSE	27.8	11.4	4.5	14.7	23.9	82.0	18.2	
187	Silver Mound	2008.0042	.165	Marquette ryolite	13.6	rl	convex	40.6	FALSE	30.0	10.6	3.0	8.5	36.8	87.0	30.0	
171	Silver Mound	2008.0042	.139	PDC	6.76	r	straight	26.0	FALSE	30.2	6.9	4.1	8.8	27.2	83.0	25.5	cortex; possibly spurred
178	Silver Mound	2008.0042	.149	PDC	10.75	r	convex	36.6	FALSE	29.2	10.2	3.2	8.5	35.2	88.0	29.2	spurred
179	Silver Mound	2008.0042	.150	PDC		rl	straight	23.5	TRUE	23.3	7.8			16.8	88.0	15.8	snapped
180	Silver Mound	2008.0042	.151	PDC		rl	convex	46.9	TRUE	28.1	13.4			32.7	84.0	26.4	cortex on left; snapped
199	Silver Mound	2008.0043	.18	PDC		r	convex	18.3	TRUE	17.6	5.6			22.0	89.0	16.8	ht. treated
201	Silver Mound	2008.0047	.10	PDC	5.7	rl	convex	27.8	FALSE	18.0	7.2	2.3	6.8	19.5	66.0	18.0	burned; spurred

Table A3 - Silver Mound end scrapers (all measurements in millimeters, degrees, or grams, as appropriate)

ID	site name	acquisition number	third digit	raw material	weight	retouched side	edge form	length	broken length?	width	thickness	plat thickness	plat width	edge length	angle	bit length	comments
202	Silver Mound	2008.0047	.11	PDC		rl	convex	19.0	TRUE	27.0	4.3			34.0	75.0	27.0	
206	Silver Mound	2008.0051	.08	PDC	4.2	l	convex	22.3	FALSE	21.0	6.5	4.4	9.5	18.0	80.0	15.7	
208	Silver Mound	2008.0051	.10	PDC	3.3	rl	straight	22.8	FALSE	19.4	3.3			21.0	67.0	19.4	
209	Silver Mound	2008.0051	.11	PDC		l	convex	17.5	TRUE	24.1	5.3	4.1	8.0	26.6	75.0	22.5	
212	Silver Mound	2008.0044	.15	PDC		rl	convex	37.0	TRUE	24.0	10.6			30.0	80.0	22.6	spurred
240	Silver Mound	2008.0045	.69	PDC	5.1		convex	24.8	FALSE	26.9	8.9	3.3	7.4	27.3	83.0	25.0	
250	Silver Mound	2008.0045	.83	PDC	11.1	rl	convex	30.8	FALSE	29.5	9.9	4.3	9.4	35.0	88.0	29.5	spurred
251	Silver Mound	2008.0045	.84	PDC		rl	convex	47.3	TRUE	25.4	10.6			39.4	87.0	25.4	snapped
253	Silver Mound	2008.0045	.86	PDC	11.26		convex	34.7	FALSE	28.2	19.8	3.4	7.0	39.8	82.0	28.2	
261	Silver Mound	2008.0045	.97	PDC		7.8 rl	convex	36.0	FALSE	30.4	6.4	4.0	10.0	38.2	92.0	30.4	
264	Silver Mound	2008.0045	.101	PDC	5.9	rl	convex	31.7	FALSE	20.5	6.4	4.3	7.4	28.3	80.0	20.5	spur
275	Silver Mound	2008.0045	.112	PDC		l	convex	41.1	TRUE	23.0	10.5			23.7	89.0	18.6	cortex
190	Silver Mound	2008.0042	.170	quartz	9.75	l	convex	29.0	FALSE	32.7	10.5	5.2	12.5	35.0	84.0	26.8	
191	Silver Mound	2008.0042	.171	quartz			convex	15.6	TRUE	22.5	7.4			27.6	87.0	22.0	snapped
188	Silver Mound	2008.0042	.166	root river		rl	convex	19.6	TRUE	26.4	3.9			28.5	88.0	24.9	
168	Silver Mound	2008.0042	.136	Silurian	6.4		convex	30.4	FALSE	30.0	7.0	3.5	6.5	34.0	85.0	28.8	
169	Silver Mound	2008.0042	.137	Silurian			convex	22.3	TRUE	24.4	5.5			23.6	75.0	21.9	snapped
170	Silver Mound	2008.0042	.138	Silurian		rl	straight	21.7	TRUE	25.0	5.0			26.4	88.0	25.0	snapped platform
227	Silver Mound	2008.0040	.56	Silurian	10.3	rl	convex	33.5	FALSE	28.1	9.1	3.2	9.8	34.4	92.0	22.3	
265	Silver Mound	2008.0045	.102	Silurian		r	convex	34.3	TRUE	33.4	10.3	6.0	10.5	33.1	88.0	29.0	
271	Silver Mound	2008.0045	.108	Silurian		r	convex	30.4	TRUE	25.4	6.1			27.8	80.0	25.4	spurred
181	Silver Mound	2008.0042	.152	Silurian Silicified Sandstone		rl	convex	31.5	TRUE	25.1	9.1			30.0	85.0	25.1	spurred
172	Silver Mound	2008.0042	.140	unid			convex	31.6	TRUE	25.7	9.0	3.5	7.1	27.6	80.0	25.7	snapped; cortex
263	Silver Mound	2008.0045	.99	unid		l	convex	18.8	TRUE	18.7	9.7			22.0	88.0	17.3	burnt

Appendix B – Gary Steele sample log page

47-30-21 G.S. 600	snubnose scraper (red)	field #3	7-6-78
47-30-21 G.S. 601	snubnose scraper	field #5	7-6-78
47-30-21 G.S. 602	snubnose scraper	field #3	7-6-78
47-30-21 G.S. 603	POINT	field #3	7-6-78
47-30-21 G.S. 604	POINT Blue Chert	field #3	7-6-78
47-30-21 G.S. 605	POINT (Folsom Type point)	field #3	7-6-78
47-30-21 G.S. 606	snubnose scraper (Red color)	field #1	7-6-78
47-30-21 G.S. 607	Knife (Green color)	field #7	7-6-78
47-30-21 G.S. 608	POINT (Red Chert)	field #3	7-9-78
47-30-21 G.S. 609	POINT	field #3	7-9-78
47-30-21 G.S. 610	snubnose scraper (Chert white + brown)	field #3	7-9-78
47-30-21 G.S. 611	snubnose scraper (Chert gray)	field #3	7-9-78
47-30-21 G.S. 612	snubnose scraper (Chert ^{gray})	field #3	7-9-78
47-30-21 G.S. 613	snubnose scraper (Chert white)	field #3	7-9-78
47-30-21 G.S. 614	snubnose scraper	field #3	7-9-78
47-30-21 G.S. 615	snubnose scraper	field #3	7-9-78
47-30-21 G.S. 616	snubnose scraper	field #3	7-9-78
47-30-21 G.S. 617	I think it's a Hoc	field #3	7-9-78
47-30-21 G.S. 618	snubnose scraper	field #7	3-20-79
47-30-21 G.S. 619	Knife	field #7	3-20-79
47-30-21 G.S. 620	looks like a large Point "But shows wear"	field #7	3-20-79
47-30-21 G.S. 621	snubnose scraper	field #4	3-30-79
47-30-21 G.S. 622	small (Chert) Knife	field #4	3-30-79
47-30-21 G.S. 623	Large Knife Gray Chert	field #3	3-31-79
47-30-21 G.S. 624	Large Knife (Red Brown) marked on map	field #3	7-9-78
47-30-21 G.S. 625	Large snubnose scraper (Gray color)	field #3	3-31-79

Appendix C – end scraper data collection form

End Scraper Form	
Site Name: G.S. 6	County: Jackson
Site Number: 47 JA 542	Collector/Collection: Gary Steele
Acquisition Number: 2008.0045.71	Cultural Tradition: N/a
Raw Material: HSS	Broken: Y <input checked="" type="radio"/> N <input type="radio"/>
Weight (g): 9.6	Bulb of Percussion Opposite Edge: <input checked="" type="radio"/> Y <input type="radio"/> N
Retouched Sides: <input checked="" type="radio"/> R <input checked="" type="radio"/> L	Working Edge Form: <input checked="" type="radio"/> convex <input type="radio"/> straight <input type="radio"/> concave

Attributes	(mm)		
1. Max Length	44.8	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Top</p> </div> <div style="text-align: center;"> <p>Side</p> </div> </div>	
2. Max Width	24.6		
3. Max Thickness	6.9		
4. Platform Thickness	2.8		
5. Platform Width	6.3		
6. Haft Length (if determinable)	N/A		
7. Working Edge Length	31.7		
8. Working Edge Angle	80°		

24.6

Comments:

Spurred

Figure D1 – Morrow-Hensel data form (front)

Date: 5-28-98 Recorder: MGH Spec. Number: MH-133 Type: endscraper (2 pr)

Collection of: Kou Hensel

Specimen found by: _____ Date Found: _____

Find-Spot-State: _____ County: _____ River system: _____

Site: Morrow-Hensel Legal: _____ 1/4S: _____ T: _____ R: _____

Context: (field, pasture, road, streambed, terrace, upland, slope, excav): _____

Type: 0. indeterminate (fragmentary) 6. combo narrow/wide endscraper
 1. trianguloid endscraper 7. proximal end-sidescraper combo
 2. offset bit endscraper 8. combo endscraper and concave-sidescraper
 3. fluted endscraper 9. combo endscraper and convex-sidescraper
 4. narrow endscraper 10. misc endscraper=
 5. thin endscraper 11. sidescraper

or describe: _____

Lithic material: (source but may include translucence, color, texture): HSS

Thermal alteration: 0 Weathering/patina: 0 Cortex: 0

Fragment type: 0. complete 1. proximal 2. medial 3. lateral 4. distal 5. lateral edge missing 6. indeterm

Breakage/damage: plow (right lateral)

Bit condition: 0. indeterminate 2. heavy polish/abrasion 4. heavy retouch (stepped)
 1. light polish/abrasion 3. light retouch (sharp but not stepped) 5. other=

Haft modification: 0. indeterminate 1. bulb thinning 2. lateral margins 3. platform dorsal

Haft wear: 0. indeterminate 1. not visible 2. dorsal ridge polish 3. other=

Cross-section: 0. indeterminate 2. plano-triangular 4. pentagonal
 1. plano-convex 3. trapezoidal 5. irregular

Blank type: 0. indeterminate 3. biface thinning flake 9. Other=
 1. end-struck core flake 4. bipolar core flake
 2. side-struck core flake 5. flake of unknown type

Platform Surface: 0. indeter 1. cortex 2. simple 3. faceted 4. abraded 5. crushed 6. isolated 7. trimmed

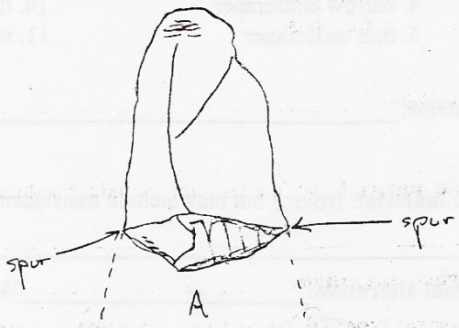
Distal Edge Form: 0. indeterm 1. none 2. straight 3. concave 4. convex 5. irregular 6. alternate
 Left Edge Form: 0. indeterm 1. none 2. straight 3. concave 4. convex 5. irregular 6. alternate
 Right Edge Form: 0. indeterm 1. none 2. straight 3. concave 4. convex 5. irregular 6. alternate
 Proximal Edge Form: 0. indeterm 1. none 2. straight 3. concave 4. convex 5. irregular 6. alternate

Retouch Type: 0. indeterminate 1. normal (dorsal) 2. inverse (ventral) 3. bifacial

Figure D2 - Morrow-Hensel data form (back)

Measurements: (mm)

Weight (grams)	9.7g
Maximum Flake Length	39.3
Maximum Flake Width	25.1
Maximum Flake Thickness	11.7
Maximum Width Position	5
Platform Width	—
Platform Thickness	—
Platform External Angle	—
Curvature	9+
Dorsal Flake Scars	2



	Func Edge A	Func Edge B	Func Edge C	Func Edge D
Bit Width (margin length)	24.8			
Bit Depth (retouch length)	1.0			
Bit Thickness (termination)	10.6			
Bit Angle (max-min range)	46 - 67°			
Edge Form (shape codes)	4			

Comments: (morphology, production history, breakage type, wear)
