EXCAVATIONS AT CHARLIE LAKE CAVE (HbRf 39)

JULY AND AUGUST 1990

JONATHAN C. DRIVER

and

MARTIN J. HANDLY

DEPARTMENT OF ARCHAEOLOGY,

SIMON FRASER UNIVERSITY,

Interim Report

Permit 1990-50

April 1991

CHARLIE LAKE CAVE PROJECT 1990

Table of Contents

CHARLIE LAKE CAVE PROJECT 1990

List of Tables

CHARLIE LAKE CAVE PROJECT 1990

List of Tables (continued)

List of Figures

CHARLIE LAKE CAVE PROJECT 1990

REPORT ON ACTIVITIES, CHARLIE LAKE CAVE PROJECT, 1990/1991

Jonathan C. Driver

INTRODUCTION

Excavations were undertaken at the Charlie Lake Cave site (HbRf 39) during July and August, 1990 by a crew from Simon Fraser University, directed by Jonathan C. Driver. This was the first year of a two year project, funded by a three year SSHRC research grant to J.C. Driver and K. Fladmark. A full report will be submitted upon the completion of excavations and analysis, and will be followed by publications on the site. This interim report discusses excavation strategy for 1990 and 1991, excavation and recording methods employed during fieldwork, and analyses which are currently under way at Simon Fraser University. A more detailed report on lithic analysis of materials recovered in the 1990 excavations follows the general report on activities.

THE SITE

Charlie Lake Cave (HbRf 39) is located about six kilometres up the Alaska Highway from Fort St. John, B.C. The site is situated on a sandstone escarpment to the north of Stoddart Creek (locally known as Fish Creek), just downstream from Charlie Lake. Although the site is notable for a fairly large cave, most excavation has taken place in front of the cave where a large detached sandstone block (the "parapet") has allowed sediments to be trapped between the block and the bedrock escarpment in which the cave is located. These sediments are at least four metres deep, and contain evidence for repeated human occupations in front of the cave, as well as a rich record of Late Pleistocene and Holocene fauna.

Detailed descriptions of the site have been presented elsewhere (Fladmark, Alexander, and Driver 1984; Fladmark, Driver and Alexander 1988; Driver 1988). Consequently, further refinement of the chronology, stratigraphy, culture history and other analyses will be reserved for future publications after excavations have been completed in 1991. The site is notable for a number of characteristics, which make it one of the most important excavated sites in western Canada. These include:

1. a well stratified deep deposit spanning Late Pleistocene (c. 10,500 B.P.) to late Holocene times.
2. the presence of numerous cultural components throughout the stratigraphic sequence, including a Palaeoindian component with diagnostic artifacts in the lowest excavated stratigraphic zone.
3. the presence of a varied, well-preserved faunal assemblage throughout the deposits.

EXCAVATION STRATEGY

Although Fladmark's 1983 excavations have been well

reported, and the significance of the site has been established, it was decided to undertake two further seasons work at the site in 1990 and 1991. This work is under the direction of J. Driver, and K. Fladmark is co-investigator of the project. The reasons for undertaking further excavations were as follows:

a. Although the 1983 excavations reached what is probably the lowest stratigraphic zone at the site (Zone 1, dating prior to 10,500 B.P.), very small amounts of that deposit were investigated. It appears to lack artifacts and faunal remains. However, the possibility that earlier deposits are present at the site requires that further excavations be undertaken into this Zone, as does the possibility that Zone 1 may contain sparse faunal or cultural remains.

b. Relatively small numbers of artifacts and animal bones were recovered from Zone IIa (10,500 to 10,000 B.P.) and Zone IIb (10,000 to 9,000 B.P.). Zone IIa contains the Palaeoindian component with an unusual lithic assemblage (Fladmark, Driver and Alexander 1988) and a faunal assemblage which is unique in western Canada in terms of its content, its position spanning the Pleistocene/Holocene boundary, its excellent dating, and its evidence for significant environmental change (Driver 1988). Further samples of artifacts and fauna from Zones IIa and IIb will provide a better understanding of culture and environment at a time which is critical for understanding human settlement in North America and the nature of the environments in which this took place.

c. Because the site contains a well-dated record of human cultures and palaeoenvironments in the Peace River, further samples of artifacts and fauna from post 9,000 B.P. sediments are equally important in providing better understanding of Holocene cultures and environments in northeastern B.C.

The excavation strategy adopted for the site was to open up a block area which ran from the bedrock escarpment to the face of the detached sandstone block, providing a section across the gully containing the deep sediments and associated artifacts and fauna. There were a number of reasons for choosing a block rather than the more widely spaced 1 by 1 metre units employed in 1983:

a. It was felt that a better understanding of site formation processes would result from a block excavation, as it would allow stratigraphic layers to be followed over a wider area. As will be discussed below, many stratigraphic layers at the site are very limited in areal extent, which makes detailed stratigraphic correlations between isolated excavation units difficult.

b. A block excavation provides better control over disturbance factors such as rodent burrows and roots.

c. Block excavations reveal features more easily than 1 by 1 metre units.

d. It was known that the Zone I deposits could not be

excavated in 1 by 1 metre units because they contain large boulders.

e. A block excavation is much safer when deep deposits are to be penetrated.

The block selected for study was laid out on the same grid as the 1983 excavations, and lay at the western margin of the site. The main reason for choosing this block was that it encompassed the area which had produced most of the Palaeoindian artifacts in 1983. It would also allow one unfinished unit from 1983 to be excavated. Furthermore, by locating the excavation area at one side of the site, the other side could be used for backdirt storage, a major problem on a site located on a steep slope. The 1983 and 1990/91 excavations areas are shown in Figure 1.

EXCAVATION METHODS

The 1983 excavation units included within the block were partially re-excavated to avoid mixing old backdirt with unexcavated deposits. (As the excavation proceeded, these units were always excavated deeper than the unexcavated deposits). A 1 by 1 metre grid was laid out over the excavation area, following the 1983 grid with reasonable precision. Elevation datums were set up around the excavation area, and tied in to the 1983 datum. Excavations were undertaken by identifying a stratigraphic layer, and removing the layer from all of 1 by 1 metre units in which it occurred. Deposits from each 1 by 1 metre unit were excavated and screened separately to provide some control over horizontal variation. Each layer was mapped horizontally, and elevations and thicknesses of sediments were recorded at 50 cm intervals. The term layer was used to refer to any stratigraphic "unit", regardless of its possible or probable genesis. Thus, the term layer was used for rodent hole fill, hearths, rockfalls, etc. If a layer was thicker than 10 cm, it was removed in arbitrary horizontal "levels" to the base of the stratigraphic layer. Once one layer was removed, the underlying layer was mapped and removed.

All sediments were screened through nested 6mm and 3mm screens, with provenience of screened material being related to layer, level (when appropriate) and by 1 by 1 metre unit. Sediment samples were taken on a judgmental basis, and these will be complemented by column samples taken at the end of the 1991 season. Generally, any lithic or faunal items greater than 3 cm in length were recorded three dimensionally *in situ*. Rocks larger than 15 cm were also mapped.

The excavation methods were generally successful, in that stratigraphic layers were isolated, defined, mapped and excavated. However, some problems were evident. Of these, the most critical concerns the ability of archaeologists to successfully define horizontal boundaries of layers. There was a continuing problem during excavation which results from the nature of deposition at the site. It appears that

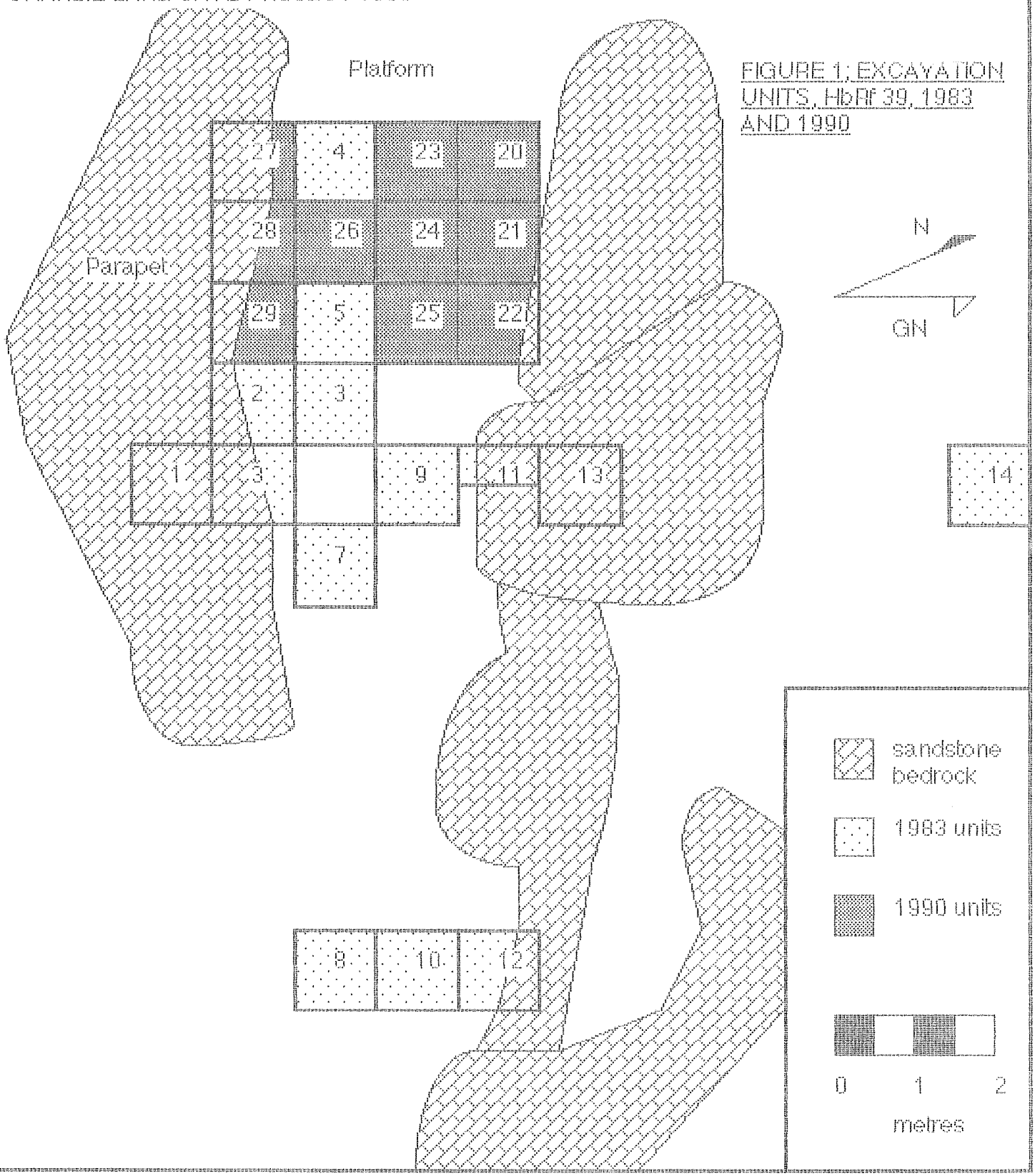


FIGURE 1; EXCAVATION UNITS, HbRf 39, 1983 AND 1990

most deposits were originally formed by colluvial deposition from the northern side (ie. the upslope side) of the site. This has resulted in the fairly continual deposition of similar sediments along the bedrock face on the northern edge of the site. Thus, for much of the Holocene a largely undifferentiated deposit built up against the bedrock. However, it appears that secondary redeposition of sediments occurred south of this primary deposition. Finer sediments were washed down from the primary depositional "cones" and formed a series of easily separable deposits against the south sandstone wall of the site. Because these deposits grade imperceptibly into the primary undifferentiated sediments, it is difficult to isolate the boundary between the northern and southern sediments. Consequently the northern sediments consist of very thick undifferentiated sediments excavated in arbitrary levels, while the southern deposits consist of easily separated, fairly finely divided deposits. The correlation between the easily differentiated sediments to the south and the massive sediments to the north is therefore somewhat arbitrary.

During the course of the 1990 field season over 63 separate layers were defined and excavated to a maximum depth of about 2 metres below modern surface. Faunal remains and lithics were recovered from many layers. Faunal analysis has not yet begun (see discussion below) and lithics are reported in detail by M. Handly in the following section of this report.

Other activities at the site in 1990 included the following:

1. further contour mapping of the site above the bedrock escarpment, to complement mapping undertaken in 1983.

2. inspection of possible raised beach sediments on the slope below the cave, including sampling what appear to be beach sands and gravels exposed in a trail up to the site.

3. test excavations in deposits above the bedrock escarpment, primarily to see whether artifacts found in the excavated sediments could have been redeposited from further up slope.

ONGOING ANALYSIS AND PRELIMINARY RESULTS

The project is funded for three years, and full analysis and reporting of results from the 1990 and 1991 excavations will not begin until the fall of 1991, and may continue to the spring of 1993. This section of the report discusses preliminary results from the 1990 excavations, and should be regarded as a progress report rather than a definitive presentation of results.

CHARLIE LAKE CAVE PROJECT 1990

SITE FORMATION PROCESSES AND GEOMORPHOLOGY

The site was visited by Dr. Peter Bobrowsky and Dr. Art Roberts during excavation in 1990. Dr. Bobrowsky suggested the possibility that the marked sculpting of the sandstone bedrock (including possibly the formation of the cave) was the result of subglacial hydraulic activity. Observations made on the structure of the bedrock escarpment and the detached bedrock boulder (the "parapet") during excavation suggest strongly that the "parapet" was once attached to the bedrock, and that it has moved about 3 metres away from the bedrock and about 1 metre vertically downslope after its detachment. A possible scenario for the formation of the site is as follows:

1. subglacial hydraulic scouring exploits a crack in the bedrock close to the edge of the escarpment, partially forming the cave seen at the site today;
2. some time before 10,500 B.P. the "parapet" is detached from the bedrock, and moves a short distance downslope. The cave entrance is enlarged as a result of this detachment, and a deep gully forms between the escarpment and the parapet;
3. the gully fills with sediment, a process which continues at the site today.

Drs. Bobrowsky and Roberts also examined the possible raised beach sections below the site. One deposit seems to be an in situ raised beach, and traces of a bench associated with the beach were traced a short distance along the hillside. A second deposit is probably redeposited material. If time permits, the in situ beach will be tested in 1991.

Analysis of sediments in the excavation area is being undertaken by Gregg Sullivan, a graduate student at SFU. Most samples recovered during excavation will be processed before the 1991 field season. This research is directed towards understanding horizontal variation in sediments within the same layer, to see how much downslope sorting may have occurred during the process of deposition. It will also investigate spatial variation in organics. Column samples will be taken in the 1991 field season when complete stratigraphic sections are exposed.

FAUNAL ANALYSIS

Fauna is being studied by Randall Preston as part of his M.A. research. All faunal remains from the 1990 field season have been washed and boxed separately. A comprehensive system for describing the fauna has been developed, with emphasis on detailed taphonomic analysis of the faunal remains, a subject neglected in previous analyses by Driver. Preston's research will consider a number of topics, including:

1. what processes (natural and cultural) introduced faunal remains into the site;
2. whether fauna associated with cultural components differs from fauna not associated with artifacts;
3. the extent to which a more detailed reconstruction

of palaeoenvironments can be achieved through more detailed consideration of taphonomic processes.

Examination of fauna by Driver during the 1990 excavations suggests that the species recovered in 1990 and 1991 will be similar to the assemblages recovered in 1983. There were no unexpected identifications made during cursory examination in the field. Some observations were made during excavation, and these need to be tested with further study. First, the quantity of bone recovered from excavation units in the north (against the bedrock) is very small. This is probably not due to poor preservation, but may be because bone fragments are preferentially transported downslope towards the parapet. It is also possible that more bone was initially deposited close to the parapet by human and other animal activities. Second, there appears to be a greater frequency of burnt bone associated with layers which also contain quantities of debitage.

CHRONOLOGY

Randall Preston is currently reviewing all radiocarbon dates from the site, and will assist in developing a series of priorities for further radiocarbon dating. In terms of cultural chronology, Martin Handly discusses projectile points and other "diagnostics" in the analysis of lithics.

THE LITHIC ASSEMBLAGE FROM CHARLIE LAKE CAVE (HbRf 39), 1990

Martin Handly

INTRODUCTION

This section of the report describes the lithic artifact assemblage recovered from Charlie Lake Cave, B.C. (HbRf 39) in 1990. Previous excavations were conducted at Charlie Lake Cave in 1974 and 1983. Detailed summaries of these excavations can be found in Fladmark, Alexander, and Driver (1984).

During this field season, excavations were conducted with trowel and nested 6mm and 3 mm screens. Ten 1 x 1 metre adjacent units were opened on the platform, and two 1 x 1 m test units were opened above the cave. An areal excavation technique, utilizing natural stratigraphic layers, was used and layer boundaries were defined on the basis of colour, granularity, and compactness. Areal excavation allowed for vertical and horizontal lithic artifact patterns to be defined across the site. Excavations terminated at approximately 350 cm below datum, above the Palaeoindian component excavated in 1983 (Fladmark, Driver and Alexander 1988).

The lithic artifact description is preliminary, pending conclusion of the excavations in 1991. This report focuses on the later artifact assemblages at Charlie Lake Cave; ie. those post-dating the Palaeoindian component. Basic artifact descriptions and limited interpretations are presented concerning temporal trends in lithic raw material, lithic

reduction activities and prehistoric site use at Charlie Lake Cave.

METHODS

Debitage comprised 92.6% of the lithic assemblage recovered in 1990. Debitage is often viewed as a more accurate indicator of lithic reduction activities at a site since it is less likely to be affected by post-depositional, cultural processes; ie. curation, reuse or recycling; and tends to be a waste product produced at the end of the lithic reduction process (Henry, Haynes and Bradley 1976; Hofman 1981; Magne 1989). Retouched artifacts, tools, and flakes of suitable morphology may be removed from the area of use or manufacture and would not be represented at the site, however the waste products of their manufacture should be represented at the site (Fish 1981). Debitage analysis should allow for inferences to be drawn concerning changes in site function and lithic reduction at Charlie Lake Cave.

The majority of debitage analyses have focused on biface manufacture. Various criteria have been employed to classify experimentally produced debitage: mass; ie. weight, length, thickness (Burton 1980; Stahle and Dunn 1982); flake attributes; ie. dorsal scar counts, cortex presence or absence, facetted platforms (Magne 1989); or some combination of the two (Patterson and Sollberger 1978; Fish 1981; Magne and Pokotylo 1981; Raab, Cande and Stahle 1979). In the majority of instances, mass appears to be the most reliable indicator of stage of lithic reduction. Flake size has been shown to be positively correlated with mass in the above experiments, and was used as the main classificatory criterion in this report.

The size categories employed in this study are shown in Table 1. The categories are arbitrary, except in the case of the Extra Small category. In the 1984 Charlie Lake Cave

Table 1;

Debitage Size Categories, 1990

Category	Size	Maximum Dimension
1. Extra Small	10 x 10 mm	14.1 mm
2. Small	20 x 20 mm	28.3 mm
3. Medium	40 x 40 mm	56.6 mm
4. Large	80 x 80 mm	113.2 mm
5. Extra Large	>80 x 80 mm	>113.2 mm

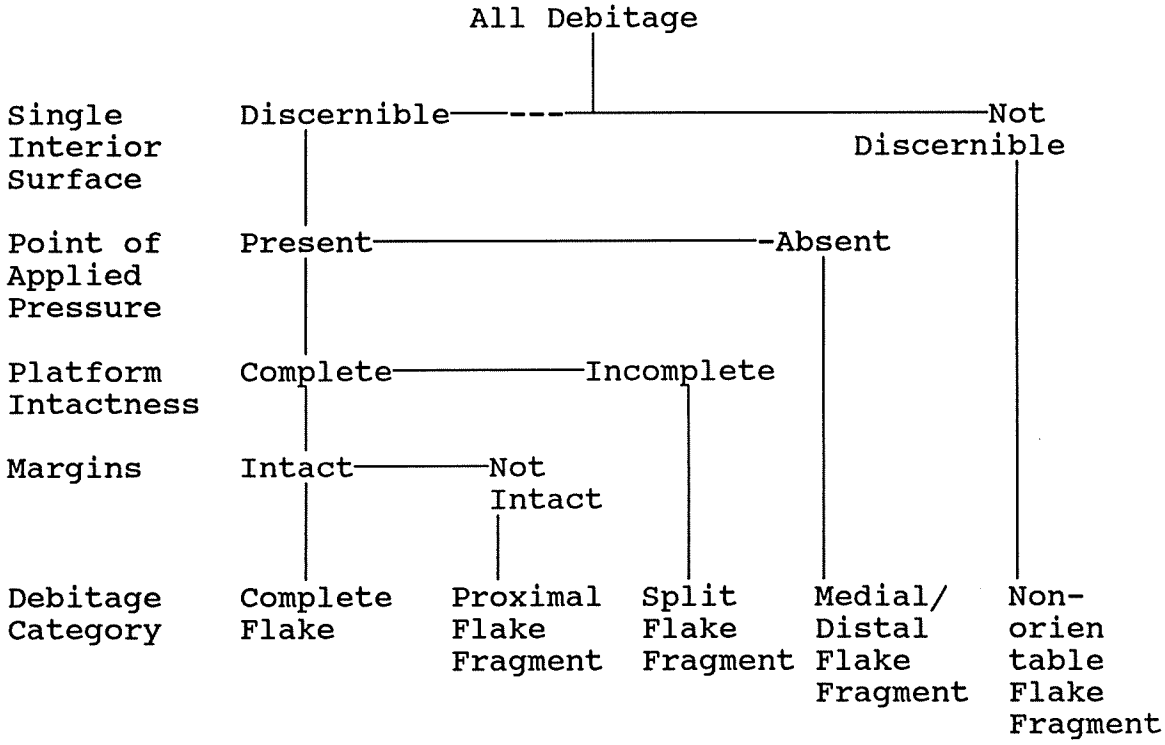
report, it was stated that "...biface tool resharpening formed a significant part of the archaeologically visible activities at the site (Fladmark *et al* 1984:100)." Experimental assemblages produced through biface manufacturing show that the majority of flakes produced are

pressure flakes in the 6-12 mm size range (Patterson and Sollberger 1978:109; Stahle and Dunn 1982:86). The size 1 category used in this report is designed to capture most of the debitage produced through biface pressure flaking. However, small sized debitage is the most numerically abundant type of artifact produced during all stages of lithic reduction (Stahle and Dunn 1982:86,94) and other variables, specifically lithic raw material, cortex presence and the presence of facetted platforms, will be used to more accurately determine if biface retouching or retooling was the predominant lithic activity occurring at the site.

A modified Sullivan and Rozen debitage typology (1985; Prentiss and Romanski 1989, Prentiss nd.) was used in conjunction with size grading to classify the debitage (Figure 2 and APPENDIX 2). The typology is composed of dichotomous, mutually exclusive categories, which can be used to characterize lithic assemblages predominantly formed through biface reduction (Sullivan and Rozen 1985; Rozen and Sullivan 1989:a,b).

Figure 2;

Debitage Typology; Charlie Lake Cave (HbRf 39), 1990



(Sullivan and Rozen 1985:759; Prentiss and Romanski 1989:89; Prentiss nd.)

The typology does not infer stages of lithic reduction, rather, it classifies debitage through the presence/absence of certain morphological characteristics. After

categorization, various assumptions concerning stages of reduction can be tested on the debitage categories. The typology is seen as being more objective than previous, attribute or trait based typologies.

The typology has been questioned by a number of researchers (Amick and Mauldin 1989; Prentiss and Romanski 1989; Ensor and Roemer 1989; Magne 1989) as to the usefulness, implied objectivity and validity of the conclusions drawn from the typology with respect to lithic reduction and site function. Although a few problems concerning the assumptions used by Sullivan and Rozen (1985) to interpret site functions are apparent, the utility of this scheme to classify debitage in a consistent and comparable manner, especially on intra- or intersite bases (*ibid*:759; Fish 1981:377), appears to be the main advantage of this typology. This typology allows for assumptions concerning site function and lithic reduction to be tested, while allowing other researchers access to comparable data.

Retouched artifacts are treated in a descriptive manner focussing on type and location of retouch (APPENDIX 2). The main artifact categories employed are: use retouch, unifacial retouch, bifacial retouch, projectile point, microblade, multidirectional core, bipolar core, groundstone; and other.

COMPONENT DESCRIPTIONS;

INTRODUCTION

Sixty four (64) natural stratigraphic layers were recorded in 1990 and these were divided into five stratigraphic zones. Six cultural components, within these five zones, were defined for Charlie Lake Cave in 1990. Artifact components were defined on the basis of stratigraphic context and horizontal and vertical artifact patterning. Components have been lettered in sequence from top to bottom (Table 2).

Table 2;

Stratigraphic Zone	Artifact Component
1	A
	B
2	C
3	D
4	E
5	F

Component assignments should be seen as preliminary since excavations did not terminate at the bottom of the deposits, and the 1990 components have not been fully correlated with the components defined in 1984 (Fladmark *et al*:1984). Excavations are to be continued at Charlie Lake Cave in 1991 and a synthesis of all three years excavations will be put together at that time.

COMPONENT A

Component A occurs within stratigraphic zone 1. It appears to correspond to components 10 and 11, defined in 1983 (Fladmark *et al* 1984). It is primarily defined by the presence of large amounts of historic material. Stratigraphic layers 1, 2, 3, 4, 5, 6, 8, and 9 were characterized as highly organic (10 YR 2/1, 2/2 or 3/2) black matrices. Historic debris was encountered in all excavated units (# 20-29). This debris consisted of glass and plastic bottles, glass shards, bottle caps, plastic spoons and forks, straws, aluminum foil, .22 caliber shells, pellets, nails, staples, thread and broken sections of a fishing rod and reel. No quantification was attempted with regard to the historic materials.

Disturbance, both human and rodent, appears to be fairly extensive in component A. In units 22 and 25, layer 4 represents a historic fire pit. A broken Coke bottle and plastic cutlery were found at the bottom of this feature. Rodent disturbance, possibly woodchuck, occurred along the parapet in units 27, 28 and 29 producing poorly defined stratigraphy and possible layer mixing.

Component A contained 13.9% of the lithic artifacts recovered from the total assemblage. These artifacts appear to cluster in units 22, 23 and 25 (Table 3 and Figure 3). This may be more a reflection of the influence of soil transport agencies introducing artifacts from the cave mouth, bedrock overhang or around the edges of the sandstone scarp, rather than through primary deposition. The lack of debitage occurring against the parapet, and the rapid decrease in artifact frequency as we move towards the parapet, may indicate that the majority of artifacts encountered in component A were originally deposited above the cave and subsequently washed downslope.

The lithic assemblage consisted of 77 artifacts, with two artifacts (2.6%) displaying signs of use or retouch. Layer 2 contained a small triangular biface fragment made of vitreous banded black and grey chert (#1019; 13.7 x 10.5 x 3.7 mm) from unit 26, and layer 5 contained a small biface tang made of vitreous black chert (#1047; 6.7 x 4.7 x 1.7 mm) from unit 22.

The majority of the assemblage (94.8%) is composed of the four main vitreous cherts (1-vitreous black chert; 2-vitreous banded black and grey chert; 3-banded translucent and black chert; and 4-grey chert) encountered in the 1990 field season, with black vitreous chert comprising 58.4% (Table 4) (see Appendix 2). The size 1 debitage comprises

78.7% of the assemblage, and there are no artifacts in the size 4 or 5 categories (Table 5). Two artifacts (2.6%) display cortex.

Table 3;

Number of Artifacts by Stratigraphic Layer and by Unit, Component A										
Sqs	20	21	22	23	24	25	26	27	28	29	Tot
Layers											
1	3		1	1		2		1			8
2				2	3		1				6
3						5	1				6
5	3		16	2	1	6					28
6				3	1	1	4				9
8									1		1
9				12	1	5	1				19
Tot	6	0	17	20	6	19	7	1	1	0	77

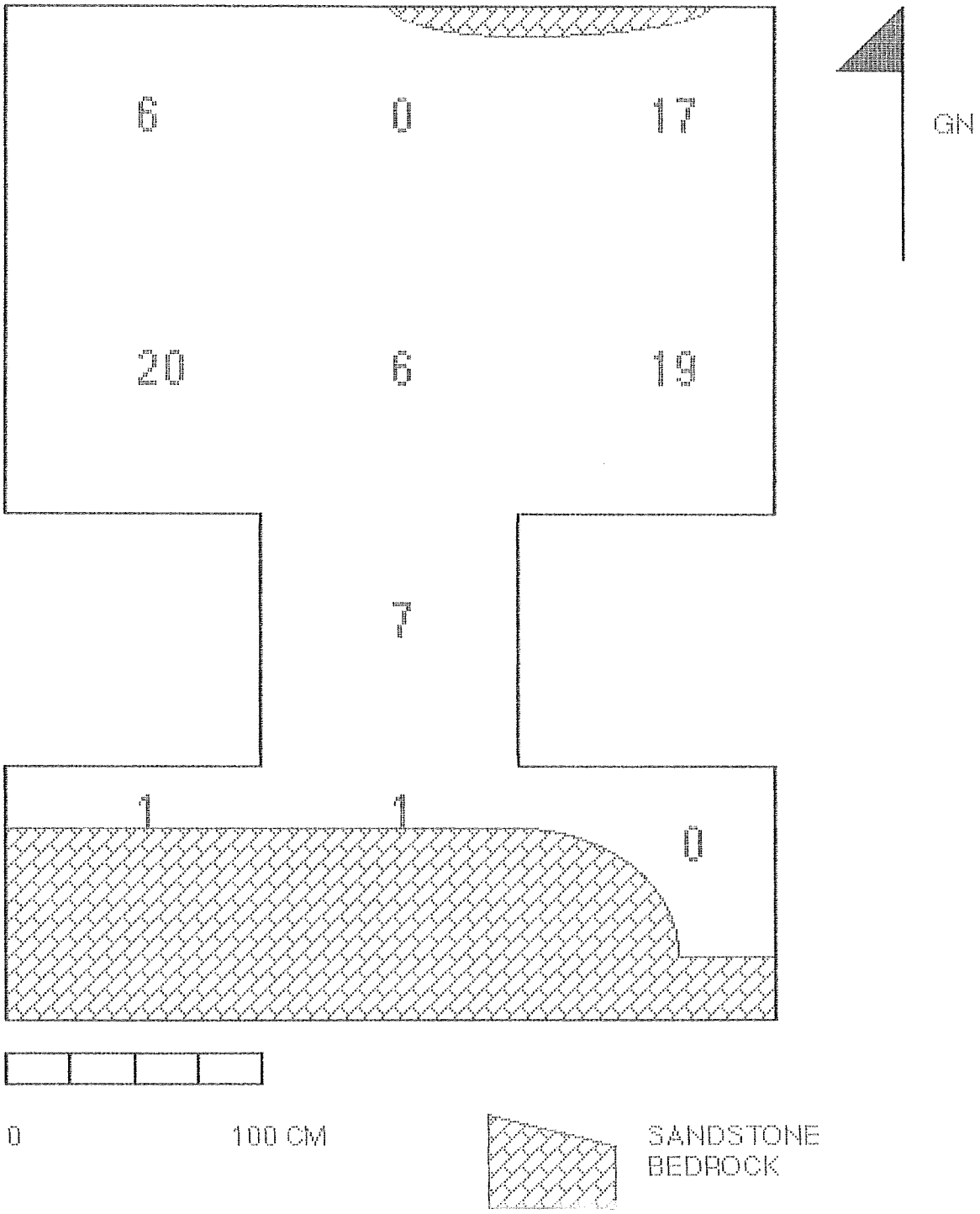
Table 4;

Number of Artifacts by Raw Material Type, Component A								
Material Type	1	2	3	4	5	6	7	8	Tot
Number of Artifacts	45	17	6	5	1	1	1	1	77
%age	58.4	22.1	7.8	6.5	1.3	1.3	1.3	1.3	100

Table 5;

Number of Debitage Artifacts by Size Grade, Component A						
Size Grade	1	2	3	4	5	Total
Number of Artifacts	59	13	3	0	0	75
%age	78.7	17.3	4.0	0	0	100

FIGURE 3; COMPONENT A LITHIC DISTRIBUTION



COMPONENT B

Component B occurs within stratigraphic Zone 1, inferior to component A. It appears to roughly correspond to Component 9, defined in 1983. It is defined by the disappearance of historic debris from the matrix and the occurrence of a spatially localized lithic distribution. Stratigraphic layers 12 and 13 were characterized as highly organic (10YR 2/1, 2/2, 3/2) black matrices, while 7a displayed a mottled, organic staining.

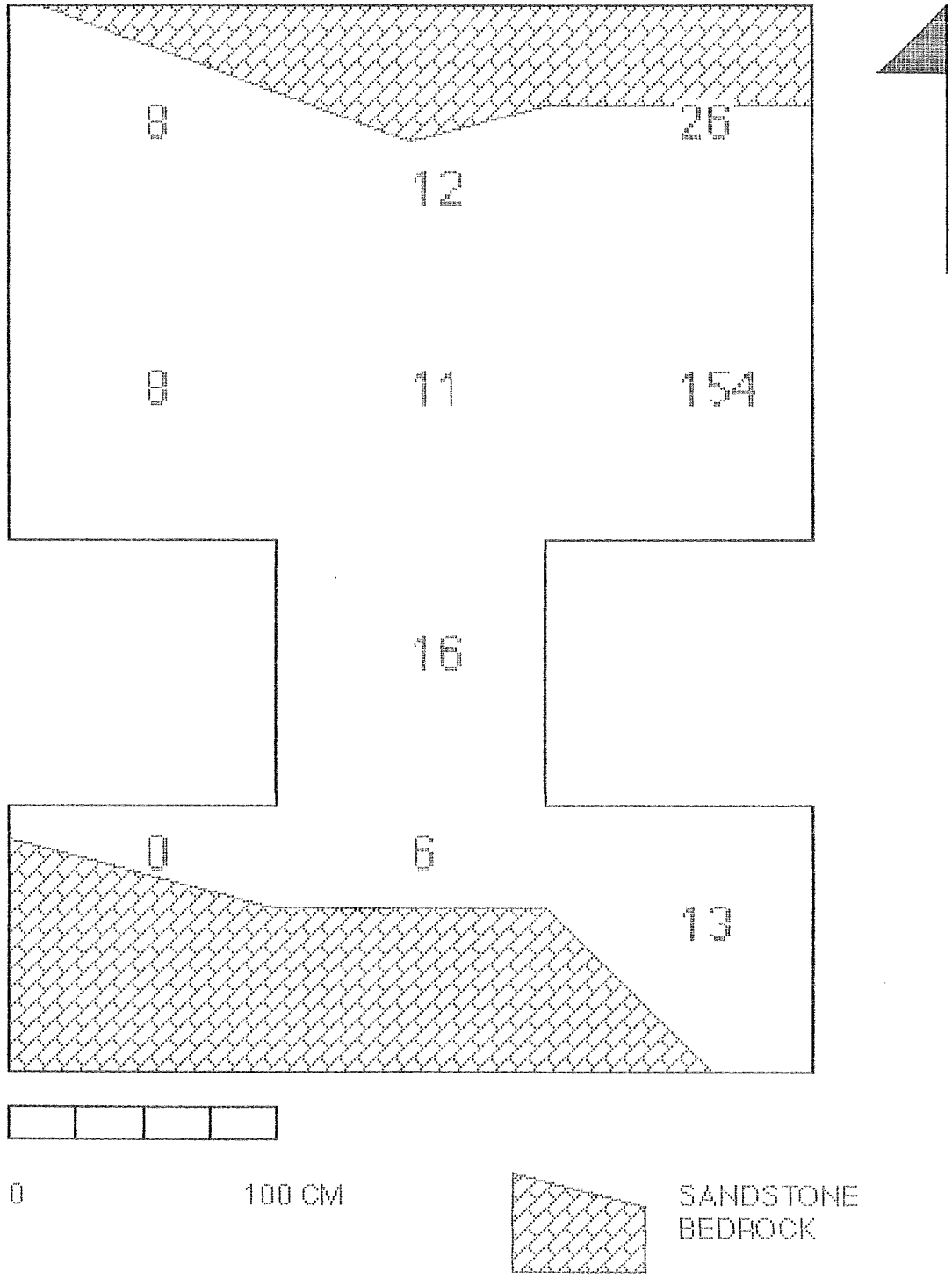
No layer disturbance was noted during excavation, and the artifact patterning appears to indicate that the assemblage has experienced little post-depositional alteration. A total of 254 artifacts were recovered, representing 46% of the total assemblage recovered in 1990. The artifacts appear to cluster in the eastern half of the site, specifically in units 22 and 25, (Table 6 and Figure 4).

Table 6;

Number of Artifacts by Stratigraphic Layer and by Unit, Component B											
Sqs	20	21	22	23	24	25	26	27	28	29	Tot
Layers											
12							4		6	13	23
13				6	4	115	12				137
7a	8	12	26	2	7	39					94
Tot	8	12	26	8	11	154	16	0	6	13	254

Six (6) retouched artifacts were recovered (3.5%), although one was composed of three conjoinable fragments. The four artifacts occurring in layer 12 were recovered from unit 29. A large, vitreous, banded black and grey chert uniface (#1261; 41.6 x 27.0 x 10.6 mm) with inverse, left lateral, abrupt retouch was recovered at a depth of 205 cmbd (centimetres below datum). The uniface displays hinge flake terminations. A vitreous, banded black and grey chert bifacially retouched flake (#1262; 21.0 x 29.2 x 8.3 mm), with a sinuous cutting edge was recovered. Three conjoinable biface fragments, made of vitreous, banded black and grey chert were also recovered (#1264; 19.0 x 24.6 x 10.9 mm, #1265; 19.8 x 23.7 x 11.4 mm, #1266; 13.6 x 13.0 x 8.6 mm). Flake scars are parallel and average 10 mm in length. Of particular interest is a red siltstone lineal flake (#1263; 12.3 x 5.7 x 1.1 mm) with three dorsal arrisses. It appears to be a complete microblade, with no apparent use wear or retouch. This is the only microblade-like flake found during the 1990 season, although a medial microblade fragment was reported in a lower stratigraphic context in 1984 (Fladmark *et al* 1984:88).

FIGURE 4; COMPONENT B LITHIC DISTRIBUTION



A small, vitreous black chert, side notched projectile point (#1284; 21.5 x 12.2 x 4.5 mm), was recovered from layer 13, unit 23. The basal outline is asymmetrically convex and no basal grinding was noted. Flake scars meet at the midline of the point. It is reminiscent of Besant phase projectile points from Alberta, dated between 2000 to 1150 bp (Vickers 1986:81; McCullough 1982:30-31). This is comparable to the date returned for component 9 in 1984; 1400 +/- 400 (Fladmark *et al* 1984:73).

Layer 7a contained a medium sized, granular, pink brown quartzite multidirectional core (#1144; 46.0 x 24.0 x 35.0 mm).

The majority of the assemblage (98.0%) is composed of the four main vitreous cherts, with vitreous black chert totalling 66.4% (Table 7). Size 1 debitage contributes 91.5% and no artifacts were recovered in the size 4 or 5 category (Table 8). Only one artifact (.4%) exhibited cortex. Two artifacts in 7a, unit 26 (# 1058 and 1059) were able to be refitted.

Table 7;

Number of Artifacts by Raw Material Type; Component B									
Material Type	1	2	3	4	8	11	12	14	Tot
Number of Artifacts	169	32	38	10	1	2	1	1	254
%age	66.4	12.6	15.0	3.9	.4	.8	.4	.4	100

Table 8;

Number of Debitage Artifacts by Size Grade; Component B						
Size Grade Category	1	2	3	4	5	Total
Number of Artifacts	225	17	4	0	0	246
%age	91.5	6.9	1.6	0	0	100

COMPONENT C

Component C occurs within stratigraphic Zone 2 and appears to roughly correspond to components 7 and 8 defined in 1983. It occurs within layers 15, 16, 17, 18, 19 and 7b. The main constituent is layer 16; a thick, dark brown to reddish brown (7.5YR 4/6) silty matrix occurring in units 26, 27, 28 and 29. Layers 15, 17 and 18 were dark brown to black (10YR 2/2) matrices. Layer 19 occurs in unit 26, and it appears to be a hearth feature containing a high concentration of charcoal. This appears to be the most recent prehistoric feature excavated at Charlie Lake Cave in 1990.

A noticeable reduction in the number of lithics is evident between components B and C. Component C produced 11.6% of the total lithic assemblage. Artifacts appear to cluster in units 21 and 29 (Table 9 and Figure 5). Layer 7b in unit 21 is interesting, in that, 16 of the 24 artifacts recovered appear to be derived from the same lithic reduction episode and are composed of a coarse grained, banded brown and black chert (Table 10, #15). Ten of the 16 artifacts are in the debitage size 3 or 4 category. All were found placed against the edge of the sandstone bedrock, within 15-20 centimetres of each other. They appear to have been placed there purposefully, possibly for later use; ie. cached. Initial refitting has only allowed two of the 16 pieces to be conjoined. No use wear or retouch was evident on any of these artifacts in this cluster.

Four artifacts (6.3%) display retouch. All were recovered from Layer 16. A large quartzite chopper tool (#1409; 120 x 85 x 69 mm) was recovered from unit 27, at 207 cmbd. It has been bifacially worked with a hard hammer to produce a sinuous chopping edge, and crushing is apparent on the utilized edge. The distal tip of a very thin,

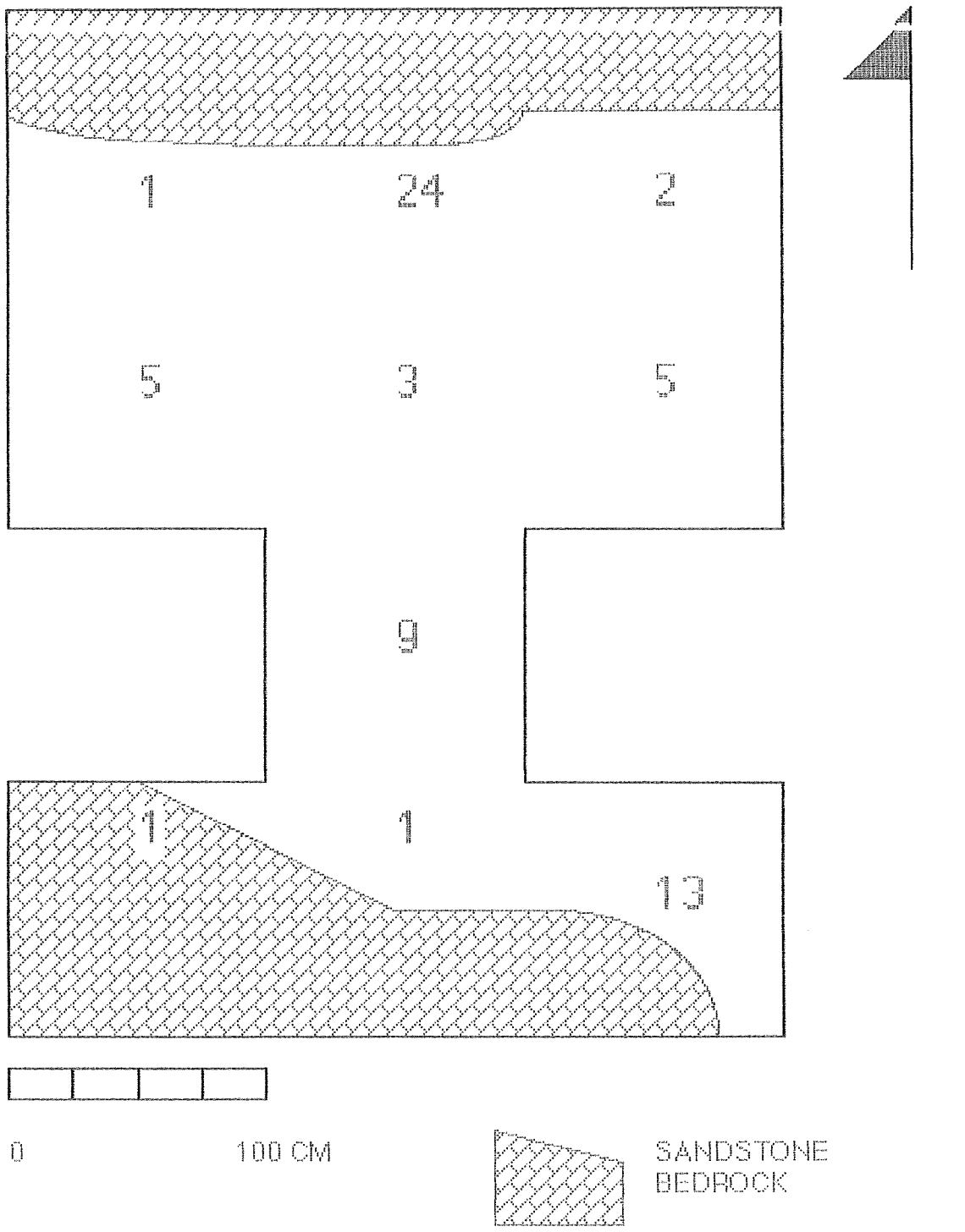
Table 9;

Number of Artifacts by Stratigraphic Layer and by Unit, Component C

Sqs	20	21	22	23	24	25	26	27	28	29	Tot
Layers											
15				4			1				5
16							5	1	1	10	17
17						3					3
18										3	3
7b	1	24	2	1	3	2	3				36
Tot	1	24	2	5	3	5	9	1	1	13	64

vitreous, banded black and grey chert biface (#1418; 38.6 x 24.3 x 5.1 mm) was recovered in unit 29, at 223 cmbd. It

FIGURE 5: COMPONENT C LITHIC DISTRIBUTION



is broken at an oblique angle, and does not appear to have been resharpened. An unfinished vitreous, black chert projectile point (#1421; 25.0 x 13.9 x 3.4 mm) was recovered in unit 26. It appears to have been produced from a biface thinning flake as it is curvate in cross-section with a small platform present distally. The basal section of the point appears to have broken during manufacture.

A rectangular, ground, sandstone artifact (#1419; 95.7 x 69.6 x 40.6 mm) was recovered in layer 16, unit 29, at 219 cmbd. All edges and faces on the artifact have been rounded and smoothed. Although no granule rounding was apparent under 16x magnification, the regular shape and smoothness of the object leave little doubt that it was intentionally shaped. Black organic staining is present on the surface of the artifact. The distal ends appear less finished than the rest of the tool. One flat surface displays 2 or 3 pockmarks or indentations into the ground surface, possibly indicating the object was being used as a hammer to fragment resistant materials (eg. bone?). This is the first groundstone artifact encountered at Charlie Lake Cave.

Table 10;

Number of Artifacts by Raw Material Type, Component C

Material Type	1	2	3	4	5	6	8	12	14	15	17	18	19	T
Number of Artifacts	24	5	7	1	1	1	1	1	1	16	2	1	1	64
%age	37.5	7.8	10.9	1.6	1.6	1.6	1.6	1.6	1.6	26.6	3.2	1.6	1.6	100

Table 11;

Number of Debitage Artifacts by Size Grade, Component C

Size Grade Category	1	2	3	4	5	Tot
Number of Artifacts	21	21	10	7	1	60
%age	35.0	35.0	16.7	11.7	1.6	100

The four main vitreous cherts composed 57.8% of the assemblage, with vitreous black chert representing 37.5% (Table 10). Size 1 debitage contributes 35.6% of the

assemblage (Table 11). Component C possesses debitage in all 5 size categories. Ten artifacts (15.6%) displayed cortex.

COMPONENT D

Component D occurs within stratigraphic Zone 3, and may roughly correspond to component 6, defined in 1983. It is found within layers 20, 21, 22, 23, 24, 27, 28, 30 and 7c. Layers 22 and 23, which occurred in all units except 20, 21 and 23, define component D. Layer 22 is a dark brown (2.5Y 5/2) matrix with a high percentage of sandstone fragments. Layer 23 is a black (10YR 2/1) silty sand. Layers 21 (units 20, 21, 23 and 24) and layer 24 (unit 29) appear to be features. They contain black (10YR 2/2) matrices and may represent some form of excavated hearth feature. No lithics were recovered in either layer.

Artifact numbers in component D are the lowest of all six components, at 31 (5.6%). Artifacts appear evenly distributed across the excavation area (Table 12 and Figure 6).

Seven artifacts (22.6%) display retouch or use, and one is composed of three conjoinable fragments. Layer 22 produced four retouched artifacts. A heat spall from a grey chert biface (#1437; 32.8 x 24.1 x 2.0 mm) was recovered from unit 27. The remnant surface displays oblique pressure flake removals that apparently carried from edge to edge. A small, vitreous black chert, basal fragment of a side notched projectile point was recovered in unit 29 (#1438; 9.4 x 11.3 x 3.4 mm). The basal outline is convex, and it has shallow side notches. Basal grinding and/or thinning is absent.

A large multidirectional core of coarse, granular, grey black chert (#1439; 114.0 x 96.0 x 40.7 mm) and two conjoinable flake fragments (# 1440;79.7 x 72.8 x 17.4 mm and #1441; 19.0 x 12.0 x 3.0 mm) were recovered from unit 26. The core displays battering and flake removals at several points along its circumference. After the one large flake was removed (#1440), both core and flake appear to have been discarded, possibly due to the poor quality of the raw material. A bipolar core of vitreous, banded black and grey chert (#1442; 33.4 x 39.0 x 10.3 mm) was recoveredfrom unit 24, at 202 cmbd. Step fractures are present on two opposing edges, and the interior face displays a flat, flake removal scar.

Two artifacts were recovered from layer 28, unit 28. One, a medium grained, grey black chert, multidirectional core (#1448; 32.4 x 43.0 x 23.9 mm) occurred at 243 cmbd. Battering is apparent along one edge, and two flake removals are present. A vitreous, black chert projectile point

FIGURE 6; COMPONENT D LITHIC DISTRIBUTION

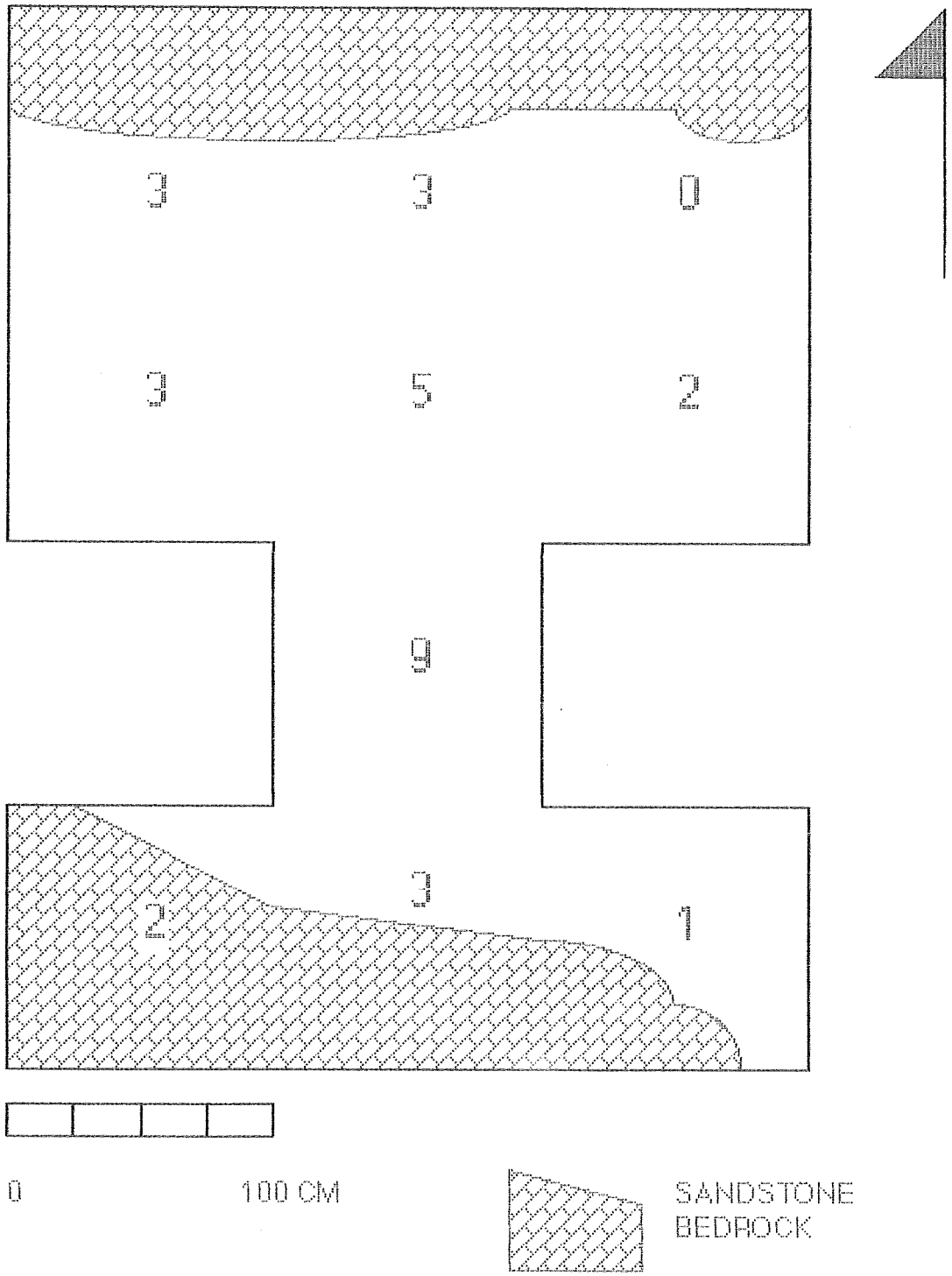


Table 12;

Number of Artifacts by Stratigraphic Layer and by Unit, Component D										
Sqs	20	21	22	23	24	25	26	27	28	29	Tot
Layer											
20							3				3
22					1	1	3	1		1	7
23							1	1			2
27					1						1
28					1		2				3
30									3		3
7c	3	3		3	2	1					12
Tot	3	3	0	3	5	2	9	2	3	1	31

(#1449; 53.4 x 24.4 x 6.4 mm) was recovered at 235 cmbd. It has shallow side notches and a convex basal outline. One of the tangs has been broken off. It appears to have been resharpened, with one lateral flake removal leaving a large hinge termination. This same edge displays an "unfinished", sinuous look, as if, after the flake hinged out, the point was discarded. It appears similar to Oxbow phase projectile points from northern Alberta, dated between 5000 to 3500 bp (Vickers 1986:33-34; McCullough 1982:25-26,153). However, an Oxbow phase component excavated at Farrell Creek (HaRk 1), southwest of Charlie Lake Cave, produced a date of 2485 +/- 130 bp (Spurling and Ball 1981:89). A date of 4200 +/- 160 bp was returned from a comparable level in 1983 from the interface between component 6/7 (Fladmark *et al* 1984:38).

In layer 7c, unit 21, a vitreous, black chert biface tang (#1192; 8.1 x 4.8 x 2.0 mm) was recovered.

Table 13;

Number of Artifacts by Raw Material Type, Component D										
Material Type	1	2	3	4	6	9	10	11	17	Tot
Number of Artifacts	13	3	3	3	1	1	3	1	3	31
%age	41.9	9.7	9.7	9.7	3.2	3.2	9.7	3.2	9.7	100

The majority of the assemblage is composed of the four main vitreous cherts (71.0%) with vitreous, black chert

comprising 41.9% of the assemblage (Table 13). Size 1 debitage contributes 70.8% and no size 5 artifacts were recovered (Table 14). Three artifacts (9.7%) displayed cortex.

Table 14;

Number of Debitage Artifacts by Size Grade, Component D						
Size Grade	1	2	3	4	5	Tot
Number of Artifacts	17	5	1	1	0	24
%age	70.8	20.8	4.2	4.2	0	100

COMPONENT E

Component E occurs within stratigraphic Zone 4, and may roughly correspond to component 5, defined in 1983. This component is found within layers 31, 32, 33, 35, 36, 38, 39a, 40, 41, and 7d (Appendix 1). Layer 31 is the main stratigraphic unit in the southern half of the site. It is a reddish, brown (2.5Y 4/3 or 4/4) gritty silt and occurred in all excavated units, except for unit 22.

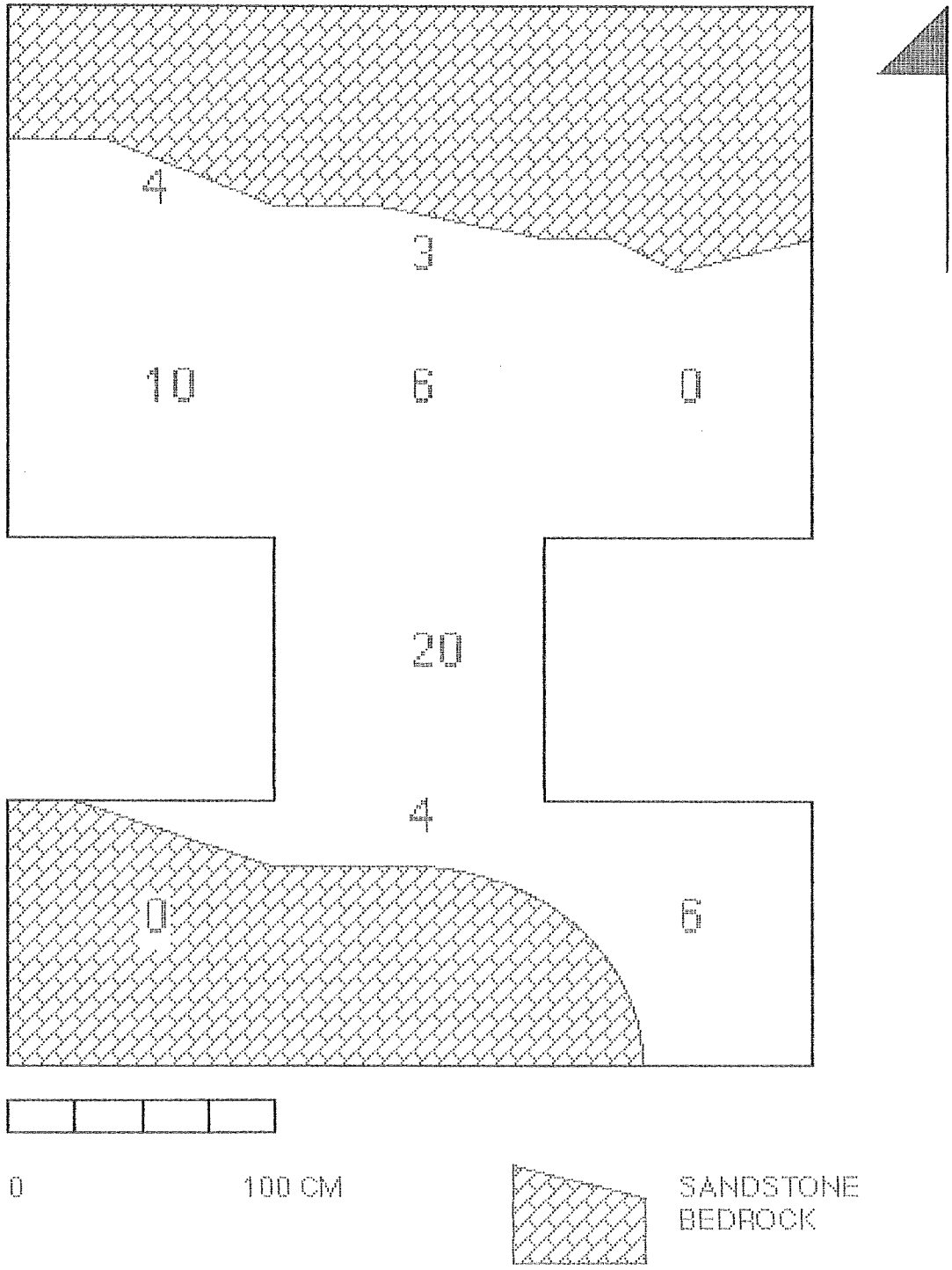
Component E contained 53 artifacts, or 9.6%, of the total lithic assemblage from 1990. The highest concentration occurred in unit 26 (Table 15 and Figure 7).

Eight artifacts displayed retouch or use wear (15.1%), with one composed of two conjoinable fragments. Three artifacts occurred in layer 31. In unit 28, a vitreous, black chert uniface (#1455; 33.5 x 22.3 x 10.2 mm) with semi-abrupt, lateral retouch was recovered. A vitreous,

Table 15;

Number of Artifacts by Stratigraphic Layer and by Unit, Component E										
Sqs	20	21	22	23	24	25	26	27	28	29	Tot
Layers											
31				2	1		4		3	3	13
32									1	1	2
33							1				1
38							1				1
39a							9				9
40										2	2
41							5				5
7d	4	3		8	5						20
Tot	4	3	0	10	6	0	20	0	4	6	53

FIGURE 7; COMPONENT E LITHIC DISTRIBUTION



banded, black and grey chert projectile point (#1459; 45.3 x 21.0 x 5.6 mm) occurred in unit 26, at 239 cmbd. It is roughly leaf-shaped, with shallow, intermediate side to corner notches. One tang appears to be broken off. The basal outline is concave. Basal grinding is evident and appears to have facilitated the removal of basal thinning flakes. A projectile point with very similar morphology was recovered from a higher stratigraphic context (component 7) in 1983 (Fladmark *et al* 1984:89,91 Figure 34a). No correlate for these points has been determined as yet.

In unit 29, two conjoinable flake fragments of a reddish brown, fine grained quartzite uniface (#1457; 55.6 x 53.7 x 10.9 mm and # 1467; 88.2 x 32.7 x 14.8 mm) were recovered from layers 31 and 32 at 250 and 236 cmbd respectively. Both display semi-abrupt, distal retouch.

Layer 38 had a vitreous, banded, black and grey chert uniface (#1469; 41.5 x 35.7 x 3.8 mm) with abrupt, left lateral retouch.

Layer 41, unit 26, had three retouched artifacts. One grey chert flake with use retouch was found (#1511; 20.0 x 13.5 x 2.4 mm). A grey black, granular chert core (#1513; 41.0 x 22.1 x 13.5 mm) was found at 278 cmbd. A green brown, chert uniface with two distal notches (#1514; 58.5 x 34.8 x 10.8 mm) was also recovered.

Layer 7d produced a grey, waxy chert flake with use retouch along one margin (#1150; 25.0 x 18.5 x 10.5 mm).

The majority of the assemblage (60.4%) is composed of the four main vitreous cherts, with vitreous black chert contributing 43.4% (Table 16). Size 1 debitage contributes 42.8% of the total assemblage, with one size 5 debitage artifact present (Table 17). Fourteen artifacts (26.4%) displayed cortex.

Table 16;

Number of Artifacts by Raw Material Type, Component E

Material Type	1	2	3	4	6	8	9	10	13	16	17	20	22	Tot
Number of Art.	23	3	2	4	1	3	5	1	1	2	2	3	3	53
%age	43.4	5.7	3.8	7.5	1.9	5.7	9.4	1.9	1.9	3.8	3.8	5.7	5.7	100

Table 17;

Number of Debitage Artifacts by Size Grade Component E						
Size Grade	1	2	3	4	5	Tot
Number of Artifacts	19	16	9	0	1	45
%age	42.2	33.6	20.0	0	2.2	100

COMPONENT F

Component F occurs within stratigraphic Zone 5. Its relationship to the 1983 component sequence is uncertain since excavations have not been completed and its exact depth is unknown. This last component is found within layers 43, 46, 48, 49, 50, 56, 60, 7e and 39b. The southern portion of the site is composed of alternating thin bands of organic black and brown silts.

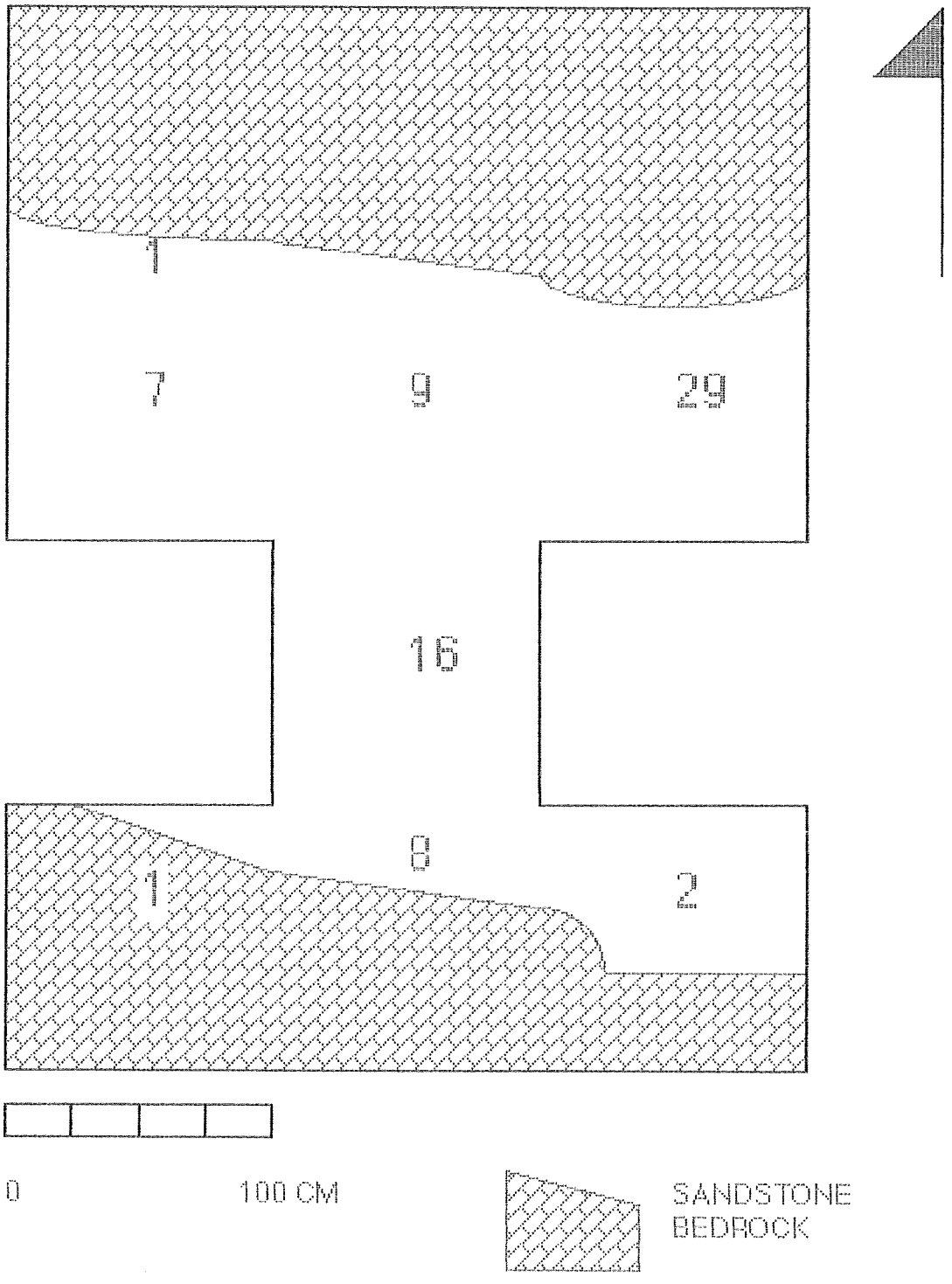
Component F possessed 73 artifacts, or 13.2% of the total assemblage. The highest concentrations of artifacts are in units 25 and 26 (Table 18 and Figure 8). Layer 39b contributed more artifacts to this component than any other layer.

Table 18;

Number of Artifacts by Stratigraphic Layer and by Unit, Component F										
Sqs	20	21	22	23	24	25	26	27	28	29	Tot
Layers											
43									1		1
46					1		8	1			10
48					4	1					5
49				1		3	6		7	1	18
50					1						1
56										1	1
60							1				1
7e	1			3	3						7
39b				3		25	1				29
Tot	1	0	0	7	9	29	16	1	8	2	73

Seven artifacts display use or retouch, with one of these being composed of three conjoinable fragments (13.9%). Two unifaces were recovered in layer 46. The first was made of vitreous, banded black and grey chert (#1516; 31.6 x 28.9 x 3.9 mm) and displayed right, laterodistal semi-abrupt retouch, and two distal notches. It was found in unit 27 and at 320 cmbd. The second is a coarse grained, black chert

FIGURE 8; COMPONENT F LITHIC DISTRIBUTION



that occurred in unit 26, at 317 cmbd (#1526; 41.0 x 22.3 x 4.5 mm). It has right lateral, semi-abrupt retouch.

Four artifacts were recovered from layer 49, including the tool composed of three conjoinable fragments. A vitreous, black chert multidirectional core (#1538; 49.0 x 48.0 x 30.9 mm) occurred in unit 28, at 326 cmbd. Flake removal scars are evident on all surfaces and from at least three directions. Three conjoinable fragments from a vitreous, banded black and grey chert, flake tool displaying use retouch were recovered in unit 28 (#1539; 41.5 x 30.0 x 4.9 mm; #1540; 17.1 x 29.5 x 2.0 mm; and #1541; 15.0 x 20.0 x 1.7 mm) at 329 cmbd. Use retouch is apparent on the right lateral, and left laterodistal margins. All three display potlids on their surface from exposure to fire or heat. A vitreous, black chert bipolar core (#1546; 28.3 x 32.2 x 9.8 mm) was recovered in unit 26. A small, circular cobble of granitic material shows a pecked surface around its circumference (#1548; 40.0 x 35.4 x 25.0 mm). It may be a small hammerstone. The artifact was found at 323 cmbd. A medium grained, quartzite multidirectional core was the only artifact recovered from layer 56, unit 29 (#1554; 69.2 x 32.0 x 26.9 mm).

A fire-reddened (oxidized) granitic rock was recovered from layer 60, unit 26 (#1555; 82.3 x 62.2 x 43.0 mm) at 358 cmbd.

The majority of the assemblage (82.1%) is composed of the four main vitreous cherts, with vitreous black chert contributing 61.6% (Table 19). Size 1 debitage represents 50.0% of the component and artifacts occurred in all five size categories (Table 20). Thirty eight artifacts (56.7%) displayed cortex.

Table 19;

Number of Artifacts by Raw Material Type, Component F

Mat Type	1	2	3	4	6	8	9	10	12	13	14	17	18	21	T
Number of Artifacts	45	7	2	6	1	1	1	1	2	1	3	1	1	1	73
%age	61.6	9.6	2.7	8.2	1.4	1.4	1.4	1.4	2.7	1.4	4.1	1.4	1.4	1.4	100

Table 20;

Number of Debitage Artifacts by Size Grade. Component F						
Size Grade	1	2	3	4	5	Total
Number of Artifacts	31	19	9	2	1	62
%age	50.0	30.6	14.5	3.2	1.6	100

1990 LITHIC ASSEMBLAGE FROM CHARLIE LAKE CAVE (HbRf 39)

DISCUSSION

A total of 552 artifacts were recovered during 1990 (Table 21). Sixty percent of the assemblage occurred in stratigraphic zone 1, components A and B. Although the 1984 report noted that the majority of lithics tended to occur against the parapet (Fladmark *et al* 1984:110), in 1990 the lithics were clustered in the centre of the platform, in units 21 through 26, with unit 25 containing 37.9% (Figure 9). Future analyses may indicate that the spatial loci of lithic reduction activities changed through time.

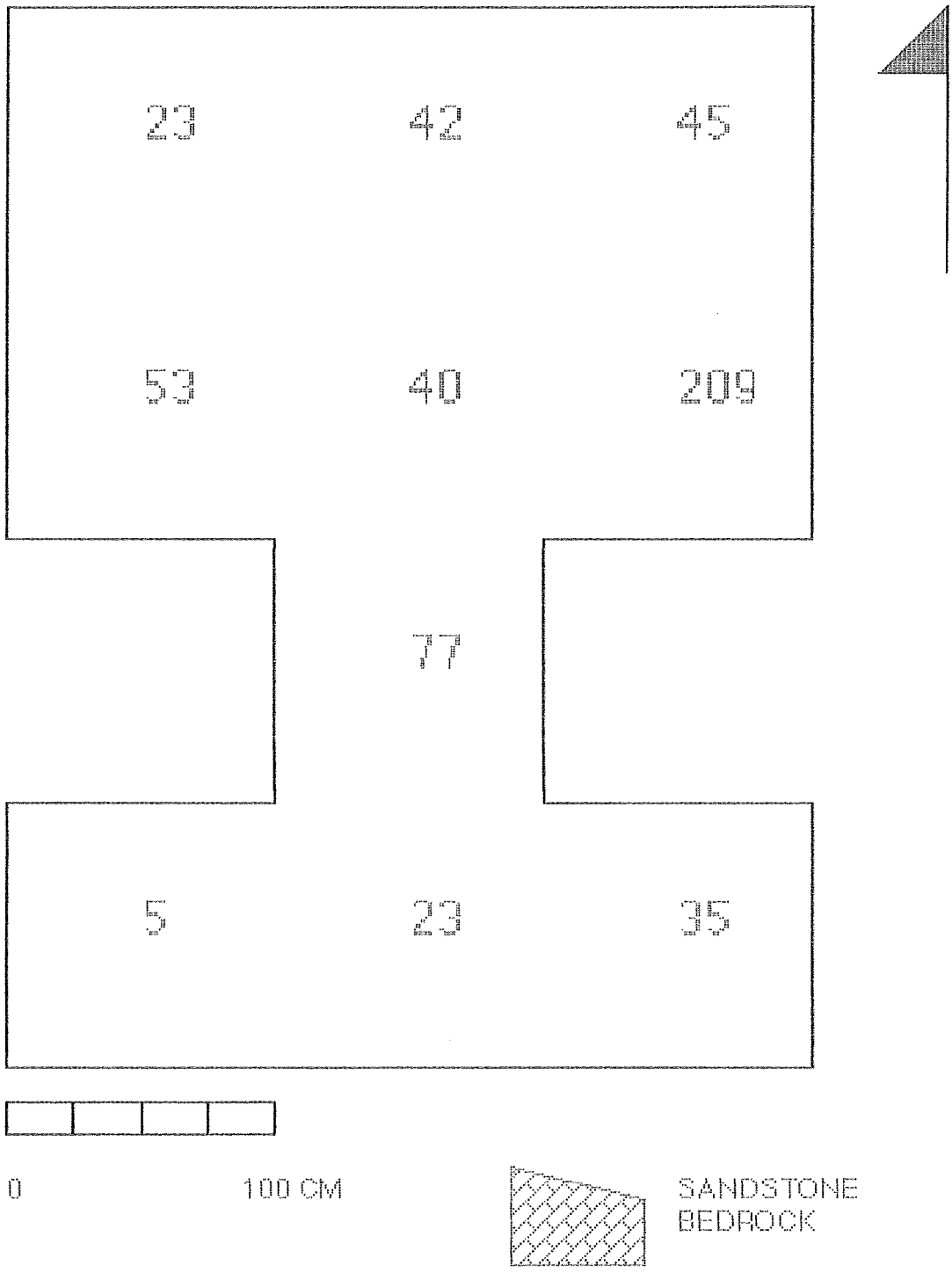
Table 21;

Number of Artifacts by Component

Component	Number of Artifacts	Percent of Total Assemblage
A	77	13.9
B	254	46.0
C	64	11.6
D	31	5.6
E	53	9.6
F	73	13.2
Total	552	100.0

Only component B appears to reflect an intensive, but possibly short duration, use of the site for lithic reduction activities. It averages 10-15 cm in depth, yet contains 46% of the total lithic assemblage and displays the most discretely, clustered artifact distribution of any component. The other components occur in thicker deposits, yet their artifact counts are much lower and more randomly distributed. The depositional pattern of the lithics in these components argues for intermittent or sporadic lithic

FIGURE 9; LITHIC DISTRIBUTION FROM ALL COMPONENTS



reduction activities occurring during the time these deposits were formed.

TEMPORAL CHANGES IN LITHIC RAW MATERIALS

Twenty two (22) lithic raw materials were recorded in 1990 (Appendix 2). The most common raw material is a vitreous black chert, that constitutes 57.8% of the total assemblage (Figure 10). Table 22 displays the percentage of vitreous black chert occurring in each component. Components C, D and E have markedly lower percentages of vitreous black chert artifacts than other components. In total, four types of vitreous chert; black, banded black and grey (12.1%), banded translucent and black (10.5%) and grey chert (5.3%); accounted for 85.7% of the total assemblage at Charlie Lake Cave. Coarser lithic raw materials appear more prevalent in components C, E and F.

Table 22;

Number of Vitreous Black Chert Artifacts by Component

Component	Number of Artifacts	Percent of Component
A	45	58.4
B	169	66.4
C	24	37.5
D	13	41.9
E	23	43.4
F	45	61.6
Total	319	57.8

More types of lithic raw material are present in components C, D, E and F, than in A and B. The majority of these earlier raw material types are medium to coarse grained cherts, and fine to medium grained quartzites (Table 23). The increase in numbers of raw material types may reflect increased mobility of the social groups utilizing the cave site, since this would allow the group to come into contact with more lithic raw materials during their movements.

Table 23;

Number of Raw Material Types by Component	
A	******** 8
B	******** 8
C	************ 13
D	********* 9
E	************ 13
F	************** 14

TEMPORAL CHANGE IN DEBITAGE SIZES

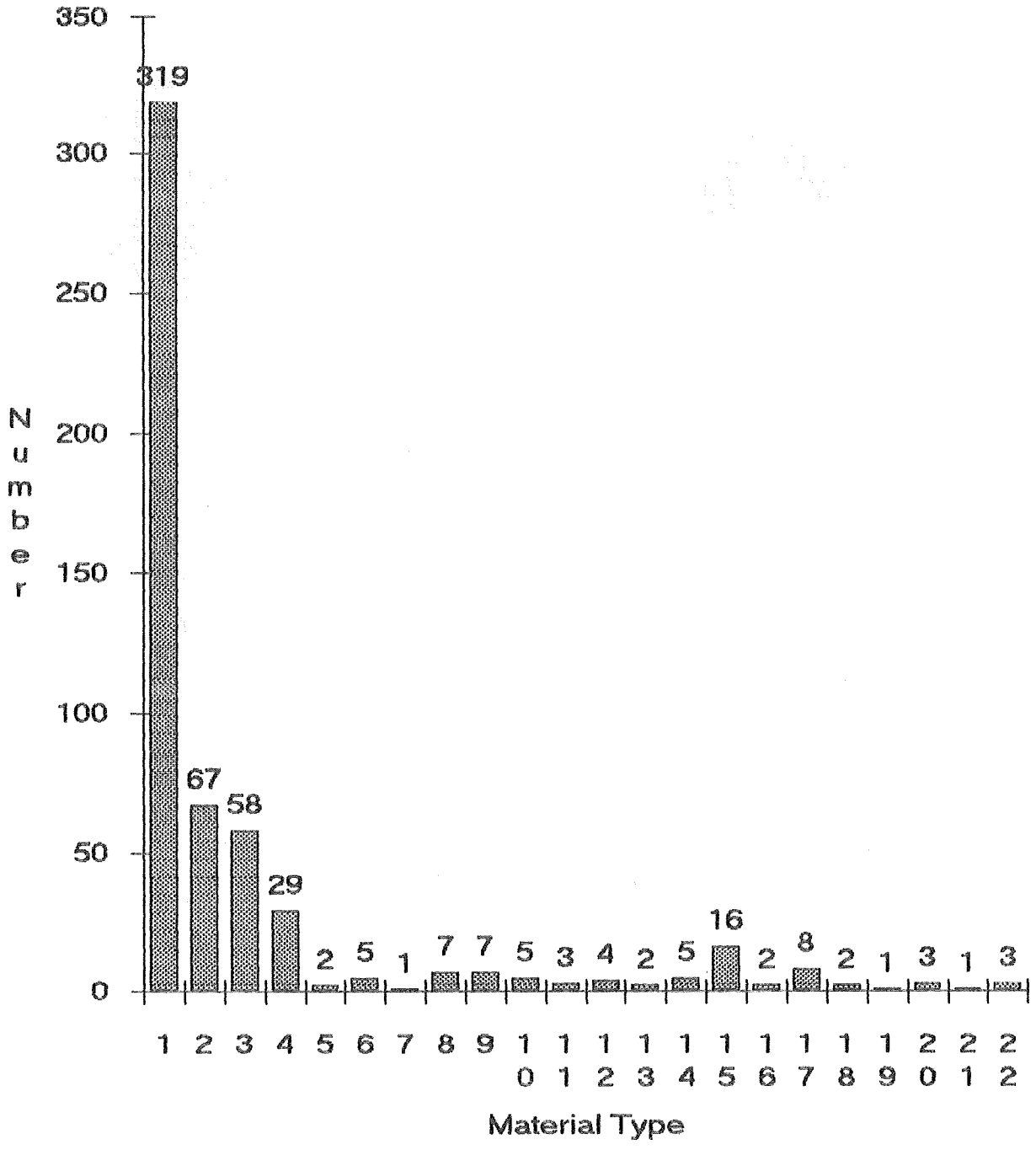
The distribution of debitage within the five size categories shows that components A and B do not possess debitage in the size 4 (Large) and 5 (Extra Large) (Table 24). However, only 2.4% (n=13) of the total assemblage at Charlie Lake Cave falls into these two size categories.

Flake length, width, and thickness for all debitage artifacts were employed to determine the variability within and between debitage assemblages. It was felt that flake length measurements would have been more susceptible to manufacture breakage and post-depositional disturbance (trampling) than flake width or thickness. This analysis provided a medium to determine whether there were any differences in the utility of the three debitage measurements for determining variation within each component. Sample means, standard deviations, maximum and minimum values and coefficients of variation (CV) were calculated and are presented in Table 25. A relative ranking of the coefficient of variation across components appears at the bottom of the table.

The CV's for the three measurements indicate that all three were equally useful in determining the variation within the samples. This probably reflects the dependent nature of these measurements. They show that component A is the least variable, or most tightly clustered component, with component D being the most variable, or least clustered. However, component A and D also represent opposite ends of the sampling spectrum at Charlie Lake Cave: 254 vs 31. There appears to be some overlap with respect to the CV ranking of components C, E, and F. This overlap in CV's may indicate that similar sizes of debitage (possibly from similar lithic reduction activities) were produced in these three components. Further analysis is necessary before this could be demonstrated more adequately.

An analysis of variation (ANOVA) documenting between versus within variance was used to determine whether or not the components could have been drawn from the same debitage sample population. The results are presented in Table 26. The ANOVA demonstrates that the three debitage measurements produce an F Ratio greater than the critical value for

Figure 10; Number of Artifacts by Lithic Raw Material; Total Assemblage



CHARLIE LAKE CAVE PROJECT 1990

Table 24;

Summary of Debitage Categories for all Components

Debitage Category		COMPONENTS					
		A	B	C	D	E	F
S1	1	15	40	6	6	5	13
	2	16	48	2	1	4	1
	3	24	116	11	8	10	14
	4	2	4	2	1		1
	5	2	17		1		2
Total		59	225	21	17	19	31
S2	6	4	1	3	2	4	5
	7	4	10	3		1	2
	8	5	5	11	3	8	5
	9						6
	10		1	4		3	1
Total		13	17	21	5	16	19
S3	11	1	1	4		1	2
	12	2	2	2		2	1
	13		1	4	1	3	3
	14					2	2
	15					1	1
Total		3	4	10	1	9	9
S4	16			5	1		1
	17						1
	18			1			
	19			1			
	20						
Total		0	0	7	1	0	2
S5	21					1	
	22						1
	23			1			
	24						
	25						
Total		0	0	1	0	1	1
Grand Total		**75**	**246**	**60**	**24**	**45**	**62**

CHARLIE LAKE CAVE PROJECT 1990

Table 25;

Summary Statistics for Total Debitage Assemblage from Charlie Lake Cave (HbRf 39)

	COMPONENTS					
N	75	246	60	24	45	62
Length	**A**	**B**	**C**	**D**	**E**	**F**
Mean	8.608	7.372	20.64	12.69	16.84	16.15
SD	5.021	4.194	19.1	15.21	18.32	13.23
Max	30.5	39.4	111.0	79.7	119.3	65.3
Min	3.3	3.0	3.0	3.8	3.3	3.1
CV (%)	58.3	56.9	92.5	119.9	108.8	81.9
Width	**A**	**B**	**C**	**D**	**E**	**F**
Mean	8.489	6.733	19.36	11.59	15.84	14.58
SD	5.858	3.296	15.92	14.16	13.6	12.2
Max	34.9	30.5	66.0	72.8	76.7	52.3
Min	3.0	1.4	3.8	3.3	4.8	3.3
CV (%)	69.0	48.9	82.2	122.2	85.9	83.7
Thickness	**A**	**B**	**C**	**D**	**E**	**F**
Mean	1.583	1.125	3.687	2.396	4.476	3.809
SD	1.411	.739	3.8	3.478	5.106	4.478
Max	7.5	7.9	19.0	17.4	23.7	23.4
Min	.5	.2	.5	.4	.6	.5
CV (%)	89.1	65.7	103.1	145.2	114.1	117.6

Rank of Coefficient of Variation (CV)

	Least				**Most**
Length	B	A	F	C	E	D
Width	B	A	C	F	E	D
Thick	B	A	C	E	F	D

CHARLIE LAKE CAVE PROJECT 1990

Table 26;

ANOVA for Length, Width and Thickness Measurements of all Debitage

Between Variance DF; k - 1 = 5

Components

	Length	Width	Thickness
A	503.88	245.98	20.05
B	3604.78	3129.98	233.85
C	5346.82	4925.02	151.11
D	53.28	39.94	2.10
E	1431.43	1381.12	254.04
F	1488.62	630.92	121.52
T	12428.81	10352.96	782.67
T/5	2486.76	2070.59	156.53

Within Variance DF; N - k = 512 -6 = 506

Components

	Length	Width	Thickness
A	1865.875	2539.491	147.288
B	4310.001	2661.243	133.619
C	21525.080	14950.600	851.830
D	5323.700	4609.200	278.170
E	14766.700	8133.150	1147.340
F	11141.390	7172.058	1068.420
T	58932.746	40065.742	3626.667
T/506	116.468	79.181	7.167

F Ratio:

Length $\frac{2486.76}{116.47}$ = **21.35**

Width $\frac{2070.59}{79.18}$ = **26.18**

Thickness $\frac{156.53}{7.17}$ = **21.83**

A Df of 5 and 506 at the .05 level produces a critical value of **3.46.**
A Df of 5 and 506 at the .001 level produces a critical value of **9.02.**

rejection of the null hypothesis. It can therefore be stated statistically, that these components were not drawn from the same sample population, and may therefore represent different lithic reduction activities occurring in the components.

Component B appear less variable than those of other components. This component has the largest lithic assemblage, flake measurements are tightly clustered around the mean, and the CV is the lowest in all of the components. Replicative experiments involving biface reduction have shown that the resultant lithic assemblages display a mean flake weight lower than flakes produced during primary or secondary reduction, debitage size tends to vary less around the mean and the assemblage tends to be skewed towards higher percentages of small flakes (Henry, Haynes and Bradley 1976; Patterson and Sollberger 1978; Raab, Cande and Stahle 1979). Component B appears to reflect this type of reduction procedure.

Component A is slightly more variable than B and this, in association with the spatial distribution of the artifacts, and the rodent and human disturbance noted previously, suggests that the lithics were not primarily deposited. The small size of the debitage may indicate that erosional forces transported the flakes downslope to collect on the platform, producing the localized concentrations near the edges of the sandstone scarp.

Components C through F display debitage distributions more consistent with primary and secondary lithic reduction; debitage is spread across all five size categories, flake sizes vary greatly around the mean, and the coefficients of variation are much greater than components A or B.

Cumulative distribution frequency (CDF) graphs of flake sizes are often used to characterize and compare lithic assemblages. Figure 11 shows the CDF graphs for all components. Two distributional clusters are apparent, and have been divided into;

Group 1. Components A, B and D and;
Group 2. Components C, E and F.

Group 1 is characterized by 70 to 90% of their assemblages being composed of size 1 debitage. Group 2 assemblages contain 35 to 50% size 1 debitage. The CDF graphs seem to support the observations produced by the debitage measurement data and the CV's, except for the inclusion of component D in Group 1. It should be noted that component D suffers from a very small sample size (n=24) in comparison to other components, and it is felt that the inclusion of component D in Group 1 is a result of sample bias. The data suggests that Group 1 represents activities related to the tertiary stages of lithic reduction; ie. bifacial reduction or retooling; whereas Group 2 predominantly reflects primary and secondary lithic reduction activities.

The debitage from all components was evaluated for the presence of trampling effects. Prentiss and Romanski (1989:94-95) noted that trampling of core reduction and

biface thinning assemblages in a soft sand matrix produced a "drastic" decrease in complete flakes and an increase in proximal and mediodistal flakes, in both reduction assemblages. According to these expectations, components B and E have suffered the largest amount of trampling, while component C has suffered the least (Table 27).

Table 27;

Number of Proximal and Mediodistal Flakes by Component

Component	Number	Percent
A	43	57.3
B	184	75.4
C	18	30.5
D	13	52.0
E	38	86.4
F	31	53.5
Total	327	

Breakage properties of the various vitreous cherts in the area have not been experimentally determined, but it should be noted that fracture properties of lithic raw materials are conditioned by a number of noncultural variables; ie. homogeneity, lack of inclusions, etc. Further replicative work is suggested before technological processes of debitage production and cultural and non-cultural taphonomic processes can be identified in the assemblage.

THE SIGNIFICANCE OF CORTEX AND FACETTED PLATFORMS IN AN ASSEMBLAGE

The number of cortex bearing flakes in an assemblage is assumed to reflect the stage of lithic reduction when the assemblage was produced; the more artifacts possessing cortex in an assemblage, the earlier in the reduction sequence the assemblage was formed. Conversely, assemblages with few or no artifacts displaying cortex reflect lithic reduction activities occurring at the terminal stages of lithic reduction; ie. biface thinning or pressure flaking. The amount of cortex in an assemblage is also a reflection of the lithic material nodule size. Small nodules will tend to produce more flakes with cortex on them than will large nodules (Beck and Jones 1990).

Cortex was evaluated on a presence\absence basis and all debitage and retouched artifacts were included. Table 28 displays the number and percentage of artifacts with cortex by component.

Figure 11; Cumulative Distribution Frequencies for all Debitage by Component

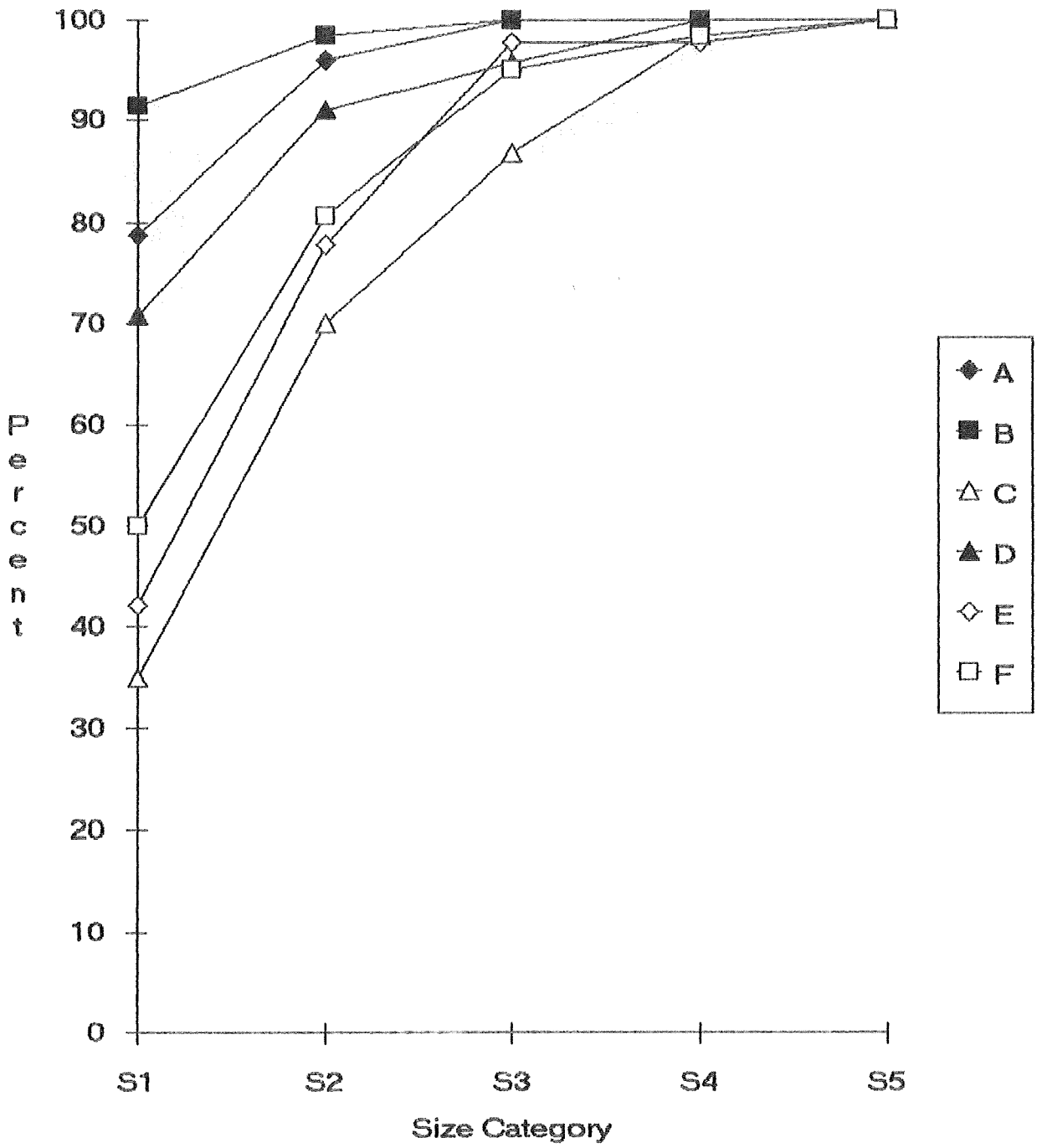


Table 28;

Cortex Artifacts by Component

Component	Number	Percent
A	2	2.6
B	1	0.4
C	9	14.1
D	3	9.7
E	14	26.4
F	38	52.1
Total	67	

A total of 67 artifacts with cortex (12.1%) were noted in the 1990 assemblage. Table 29 displays the percentage of cortex artifacts by component. This shows that component F contributed 56.7% of all cortex artifacts recovered, while components C, D, E and F contributed 95.5% of all cortex artifacts in the assemblage. This may indicate that the earlier four components, and specifically F, reflect assemblages where primary and secondary lithic reduction were occurring or that there were more small nodules of raw material being utilized. The lack of cortex artifacts in components A and B may be a reflection of biface thinning or pressure flaking activities.

Table 29;

Percentage of Cortex Artifacts
Total Assemblage

Component	Number	Percent
A	2	3.0
B	1	1.5
C	9	13.4
D	3	4.5
E	14	20.9
F	38	56.7
Total	67	100.0

The presence of bifacial facetted platforms in an assemblage is considered a good indicator of bifacial pressure flaking having occurred (Magne and Pokotylo 1981). A total of 44 artifacts with facetted platforms (8.0%) were recovered in the 1990 assemblage (Table 30). Component B contained 50% of the total facetted platform assemblage (Table 31). This data tends to support the assertion that only in component B is there sufficient evidence to suggest

that the primary lithic reduction activities were biface production or retooling. However, component B also possesses the largest assemblage, so the number of facetted platforms present may be more a reflection of sample size, rather than lithic reduction strategy.

Table 30;

Facetted Platform Artifacts by Component

Component	Number	Percent
A	6	7.8
B	22	8.7
C	6	9.4
D	2	6.5
E	6	11.3
F	2	2.7
Total	44	

Table 31;

Percentage of Facetted Platform Artifacts; Total Assemblage

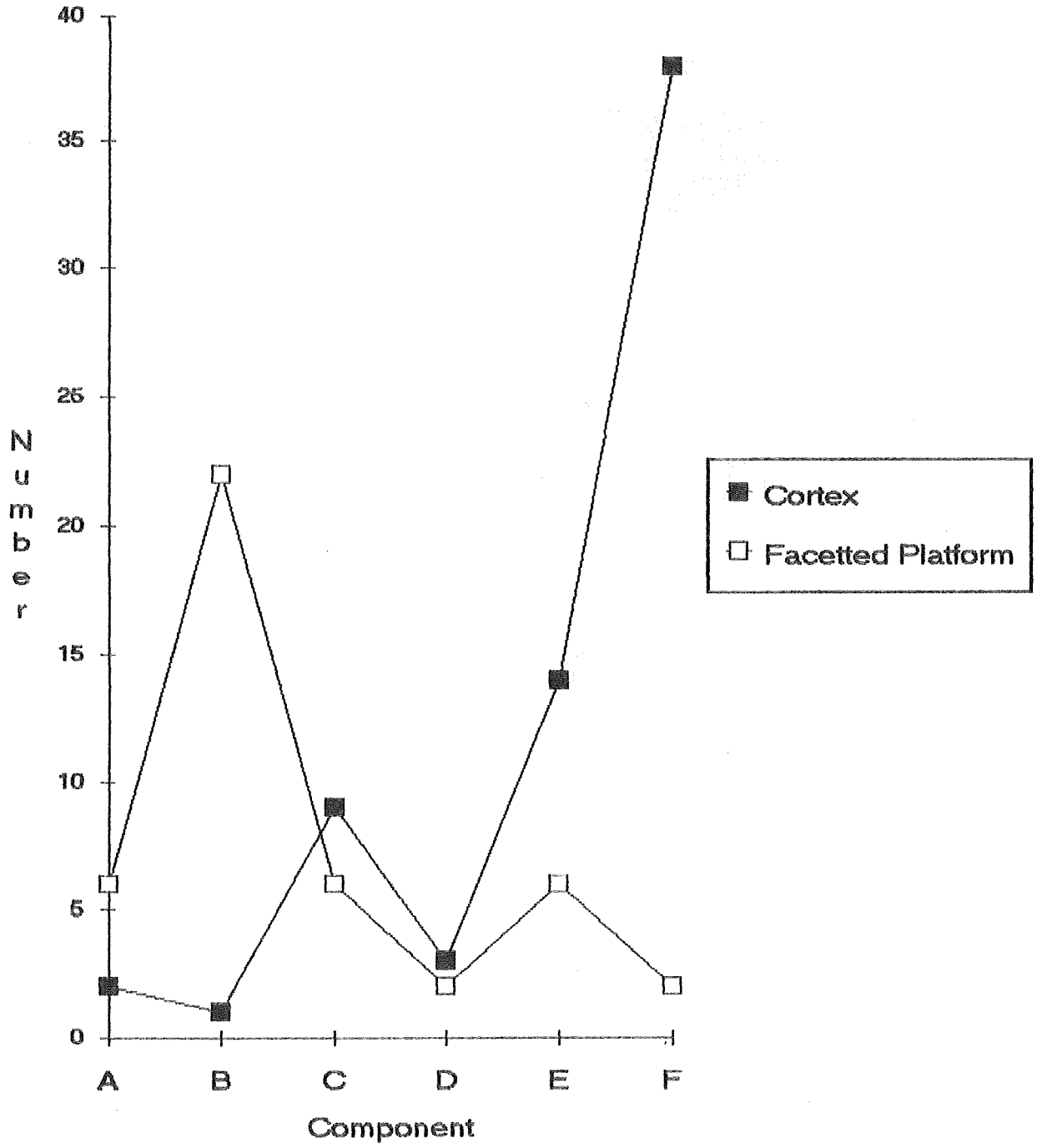
Component	Number	Percent
A	6	13.6
B	22	50.0
C	6	13.6
D	2	4.5
E	6	13.6
F	2	4.5
Total	44	100.0

A scattergram of numbers of cortex and facetted platform flakes by component is presented in Figure 12. The plot seems to indicate a weak inverse relationship between these two flake attributes in the Charlie Lake Cave assemblage.

RETOUCHED ARTIFACTS AND CORES

A total of 35 retouched artifacts, composed of 41 fragments, were recovered in 1990 (7.4%) (Table 31). Figure 13 displays the percentage of artifacts in relation to the total assemblage from each component. Component D has the highest ratio of artifacts to total assemblage, but this is a reflection of a small sample size (n=31). It is

Figure 12; Plot of Cortex and Facetted Platforms Flakes by Component



interesting to note that components C through F have higher retouched artifact to total assemblage ratios than A and B.

Table 32;

Retouched Artifacts by Component

Component	A	B	C	D	E	F	TOT
Artifact							
1. Use retouch					2	1	3
2. Unifacial retouch		1			4	2	7
3. Bifacial retouch	2	2	1	2			7
4. Projectile Point		1	1	2	1		5
5. Microblade		1					1
6. MD Core		1		2	1	2	6
7. Bipolar Core				1		1	2
8. Groundstone			1				1
9. Other			1*			2**	3
Total	2	6	4	7	8	8	35

* quartzite chopper

** granitic hammerstone and manuport

For interpretive purposes, the retouched artifacts and cores were then divided into four categories: 1. Unifacial and use retouch; 2. Bifacial retouch and projectile points; 3. Multidirectional and bipolar cores; and 4. Microblade, groundstone and other.

UNIFACIAL AND USE RETOUCH

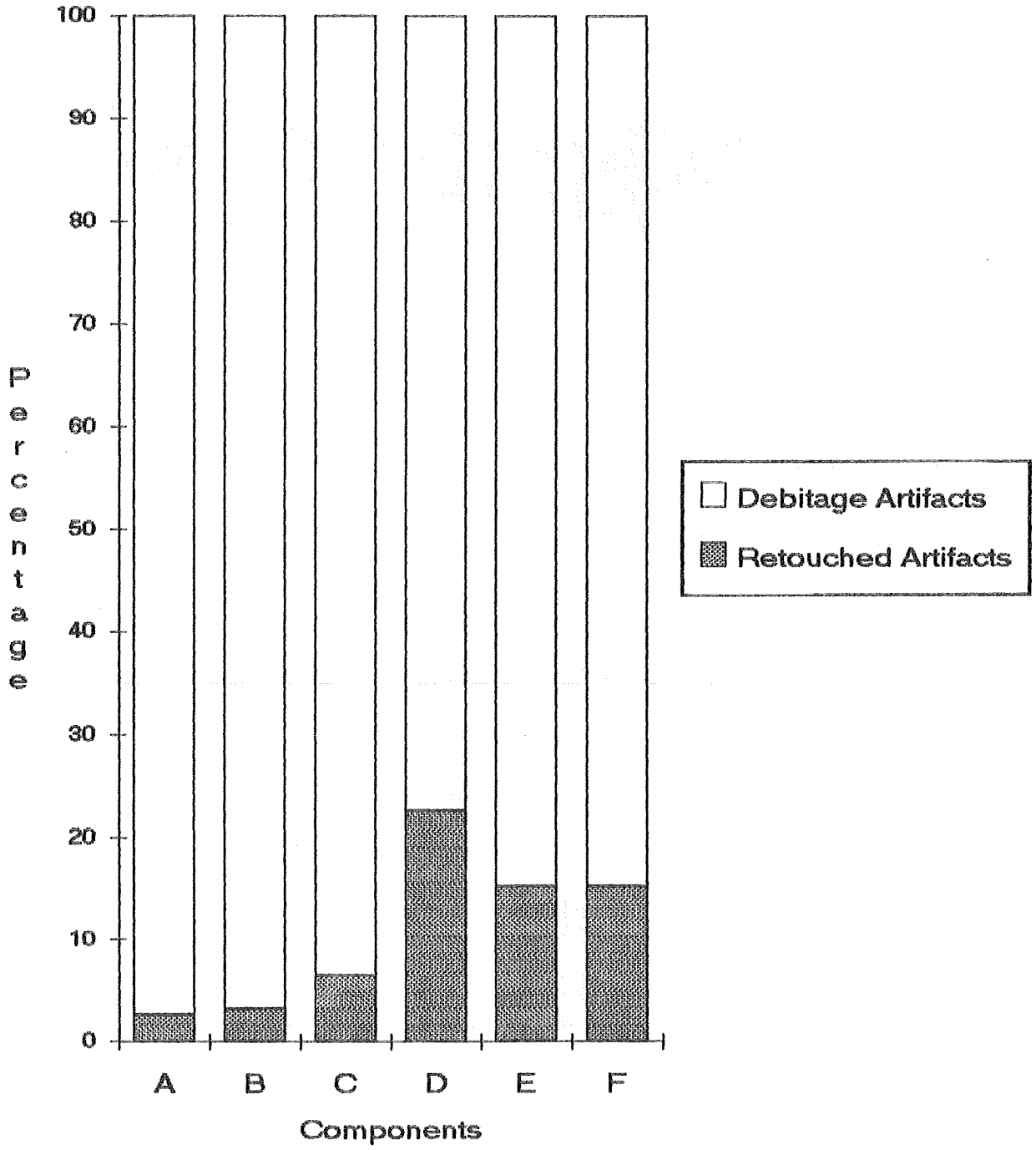
Ten artifacts (28.6%) display use (3) or unifacial retouch (7). Nine (9) of these artifacts occur in components E and F. The unifaces are produced from variable raw material types, ranging from vitreous to coarse grained lithic materials, with vitreous banded black and grey chert predominating (4). The presence of these artifacts may indicate that activities relating to the scraping of wood or bone may have been more prevalent in the two earliest components. None of the unifacially retouched artifacts display any formal morphology and may reflect expediently produced tools used for a short time period.

BIFACIAL RETOUCH AND PROJECTILE POINTS

Twelve artifacts (34.3%) are bifacially retouched (7) or projectile points (5). Component D has the highest concentration of these artifacts (4). Only component F contains neither artifact type. Six are produced from vitreous black chert, 5 from vitreous, banded black and grey chert and one from vitreous grey chert. All but one of the projectile points is produced from vitreous black chert.

In assemblages where projectile point rejuvenation or retooling was occurring, a higher frequency of small biface

Figure 13; Percentage of Retouched Artifacts and Debitage Artifacts by Component



fragments; ie. point bases, tips, tangs and ears; are expected to be present as a result of breakage (Tower and Warburton 1990). The majority of bifacially retouched artifacts (6/7) appear to be fragments of projectile points that were broken either during production, use, or rejuvenation. Three artifacts from component D; a projectile point base, a partially rejuvenated Oxbow phase projectile point and a biface tang; indicate that biface rejuvenation was one of the activities occurring at this time.

Only two projectile points appear to be easily identifiable as to culture historical context; # 1284, Besant phase from component B; and # 1449, Oxbow phase from component D. When further radiocarbon dates are processed for the 1990 field season, it may be easier to speculate on the meaning of the cultural sequence represented at Charlie Lake Cave.

CORES

A total of eight (22.8%) multidirectional (6) or bipolar (2) cores were recovered in 1990. The majority (7) occur in components D, E and F. Primary core reduction activities appear to have been more prevalent in these components.

MICROBLADES, GROUNDSTONE AND OTHER

Two "microblades"; a medial section in 1983 and a complete blade in 1990; have been recovered. This represents .15% of the total lithic assemblage collected in two field seasons. Lineal blade segments are produced fortuitously during bifacial reduction and should therefore represent a very small percentage of any lithic assemblage (Patterson and Sollberger 1978:110). Without the supporting evidence of microblade cores or core fragments, core preparation flakes or a greater number of microblades in the assemblage, I would be hesitant to state that a microblade technology was in use at Charlie Lake Cave (contra Fladmark *et al* 1984:88-89).

The groundstone artifact recovered from component C is a mystery at present. No similar types of artifacts have been reported in the Peace River country (pers. comm. Fladmark 1990). It appears to be a curated object, involving a certain amount of energy and time to produce. The large quartzite "chopper" recovered from component C may have functioned as an implement for crushing or fragmenting hard objects; ie. bone. The same functional interpretation could also be used for the groundstone artifact. Residue analyses have not yet been attempted on the surfaces of both artifacts, but should help to determine the function they performed in the assemblage.

CONCLUSIONS

From an intrasite perspective, the components at Charlie Lake Cave allow for changes in site use and function to be evaluated from a diachronic perspective. Two general

types of site activities are suggested for the components at Charlie Lake Cave in 1990.

The first, represented by components A and B (tentatively assigned to the Late Prehistoric phase), appears to reflect a more limited, but specialized use of the site. This is inferred on the basis of;

a. a greater proportion of good quality, vitreous cherts;
b. exclusion of coarser lithic raw materials;
c. fairly uniform debitage flake size;
d. low numbers of artifacts displaying cortex;
e. relatively high numbers of facetted platform flakes;
f. low numbers of other retouched artifacts and cores, and;
g. relatively high numbers of bifaces, projectile points, or fragments thereof, in the components.

Site use appears to focus on the tertiary stages of reduction; ie. biface and projectile point production or retooling; and little else. During this time, it appears that the cave site and escarpment may have been used as a vantage point, or station, for monitoring the movement of game on the plains below the cave. This site type is usually associated with a logistically organized, mobility strategy where specialized parties range out from their residential camp to acquire necessary resources (Binford 1980). During these observation periods, projectile points may have been produced from biface blanks and damaged or dulled projectile points may have been resharpened in preparation for the subsequent hunt. Intensive site use is inferred by the high number of proximal and mediodistal flakes probably produced through trampling, especially in component B.

The remaining four components; C, D, E and F; display a more generalized and much less intense use of the cave site. The generalized nature of the assemblages is inferred by;

a. increased numbers of coarser lithic raw materials in use;
b. exceedingly variable debitage flake sizes;
c. increased numbers of cortex bearing flakes;
d. relatively low numbers of facetted platform flakes;
e. high proportions of unifaces and use retouched flakes;
f. high proportions of multidirectional and bipolar cores;
g. lower numbers of bifaces and projectile points;
h. possible processing of longbone shafts for marrow extraction in Component C (?);
i. presence of hearth features in component D, and evidence of fire in component F and:
j. generally lower artifact counts.

Site functions in components C, D, E and F may reflect the use of Charlie Lake Cave as a field camp, used for more day to day activities (Binford 1980). Camps are expected to generate more variable assemblages reflecting processing, manufacturing and maintenance activities related to the day

to day functioning of the social group (*ibid*). Processing activities are indicated by the presence of the hearth features, unifaces and use retouched artifacts and the possibility of marrow extraction in component C. Lithic reduction strategies appear to focus upon primary and secondary core reduction, although tertiary biface reduction is still visible, especially in component D. Increased mobility may also be inferred on the basis of the greater number of lithic raw materials in use at Charlie Lake Cave during this time (Beck and Jones 1990). Frequent, but low intensity, reuse of the site is suggested by the accretional nature of the artifact depositional pattern. Only component E shows a high probability of trampling, and possibly heavier site use, having occurred.

Two broad types of site activities have been suggested for the assemblages at Charlie Lake Cave on the basis of trends in raw material usage, lithic reduction strategies and inferred site use. Future analysis will allow for more specific interpretations to be put forth as to the changing function of Charlie Lake Cave through time, at least as it is reflected by the changing lithic reduction strategies employed by the groups using the cave and surrounding area. As was noted by Fladmark (1984:72), "... Charlie Lake Cave represents one of the longest and most extensively radiocarbon dated single site sequences in Canada." This long time depth, and the presence of the fluted point assemblage, makes Charlie Lake Cave a very important site for understanding the prehistory of the Peace River and Northern Plains.

CHARLIE LAKE CAVE PROJECT 1990

ACKNOWLEDGEMENTS

The ongoing research at Charlie Lake Cave is funded by the Social Sciences and Humanities Research Council. Mr. John Cleeve, who owns the land on which the site is situated, kindly gave permission for the 1990 excavations. The Huhn family, who rented the house on the property in 1990, offered many kindnesses throughout the summer. The North Peace Historical Society helped fund a high school student who participated in the project. In addition, Donna Kyllo and Joan Patterson went out of their way to make us welcome in the community. Finola Finlay, Northern Lights Community College, assisted in funding a second high school student, organized an evening lecture at the College, and offered welcome hospitality. The Simon Fraser University crew consisted of John Breffitt, Martin Handly, Gyles Iannone and Gregg Sullivan, each of whom contributed a valuable expertise. They were joined by Becky Wheat and Dawn Andrews of Fort St. John. Finally, we were pleased that Dick Gilbert was able to join us from Prince George, as he has participated in more seasons at the site than any other archaeologist.

REFERENCES CITED

Amick, D. S. and R. P. Mauldin
1989 Comments on Sullivan and Rozen's "Debitage Analysis and Archaeological Interpretation". American Antiquity 54(1):166-168.

Beck, C. and G. T. Jones
1990 Toolstone Selection and Lithic Technology in Early Great Basin Prehistory. Journal of Field Archaeology 17:283-299.

Binford
1980 Willow Smoke and Dogs' Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation. American Antiquity 45:4-20.

Burton, J.
1980 Making Sense of Waste Flakes: New Methods for Investigating the Technology and Economics Behind Chipped Stone Assemblages. Journal of Archaeological Science 7:131-148.

Driver, J.C
1988 Late Pleistoceneand Holocene Vertebrates and Palaeoenvironments from Charlie Lake Cave, northeast British Columbia, Canadian Journal of Earth Sciences, 25:1545-1553.

Ensor, H. B. and E. Roemer, Jr.
1989 Comments on Sullivan and Rozen's Debitage Analysis and Archaeological Analysis. American Antiquity 54(1):175-178.

Fladmark, K. R., J. C. Driver and D. Alexander
1988 The PalaeoIndian Component at Charlie Lake Cave (HbRf 39), British Columbia. American Antiquity 53(2):371-384.

Fladmark, K. R., J. C. Driver and D. Alexander
1984 Excavations at Charlie Lake Cave (HbRf 39) 1983., Report submitted to the Heritage Conservation Branch, Victoria, B.C.

Fish, P.
1981 Beyond Tools: Middle Palaeolithic Debitage Analysis and Cultural Inference. Journal of Anthropological Research 37:374-386.

Henry, D. O., C. V. Haynes and B. Bradley
1976 Quantitative Variations in Flaked Stone Debitage. Plains Anthropologist 21(71):57-61.

Hofman, J.
1981 The Refitting of Chipped Stone Artifacts as an Analytical and Interpretive Tool. Current Anthropology 22:691-693.

Magne, M.
1989 Lithic Reduction Stages and Assemblage Formation Processes. in Experiments in Lithic Technology, BAR International Series 528, ed. D. S. Amick and R. P. Mauldin, pp. 15-32.

Magne, M. and D. Pokotylo
1981 A Pilot Study in Bifacial Lithic Reduction Sequences. Lithic Technology 10(2-3):34-47.

McCullough, E. J.
1982 Prehistoric Cultural Dynamics of the Lac La Biche Region. Occasional Papers; Archaeological Survey of Alberta, Occasional Paper No. 18.

Patterson,L.W. and J. B. Sollberger
1978 Replication and Classification of Small Sized Debitage. Plains Anthropologist 23:103-112.

Prentiss, W. C. and E. J. Romanski
1989 Experimental Evaluation of Sullivan And Rozen's Debitage Typology. in Experiments in Lithic Technology, BAR International Series 528, ed. D. S. Amick and R. P. Mauldin, pp. 89-99.

Prentiss, W.C.
ND Debitage and the Formation of a Housepit Floor Lithic Assemblage, unpublished PhD Dissertation, Simon Fraser University, Burnaby, B.C.

Raab, L. M., R. F. Cande and D. W. Stahle
1979 Debitage Graphs and Archaic Settlement Patterns in the Arkansas Ozarks. Mid-Continental Journal of Archaeology 4(2):167-182.

Rozen, K. C. and A. P. Sullivan
1989a Measurement, Method, and Meaning in Lithic Analysis: Problems with Amick and Mauldin's Middle-Range Approach. American Antiquity 54(1):169-175.

1989b The Nature of Lithic Reduction and Lithic Analysis: Stage Typologies Revisited. American Antiquity 54(1):179-184.

Spurling,, B. E. and B. F. Ball
1981 On Some Distributions of the Oxbow Complex. Canadian Journal of Archaeology. 5:89-101.

Stahle, D. W. and J. E. Dunn
1982 An Analysis and Application of the Size Distribution of Waste Flakes from the Manufacture of Bifacial Stone Tools. World Archaeology 14(1):84-97.

Sullivan, A. P. and K. C. Rozen
1985 Debitage Analysis and Archaeological Interpretation. American Antiquity 50(4):755-779.

Vickers, J. R.
1986 Alberta Plains Prehistory: A Review. Occasional Papers; Archaeological Survey of Alberta, Occasional Paper No. 27.

Tower, R. H. and M. Warburton
1990 Projectile Point Rejuvenation: A Technological Analysis. Journal of Field Archaeology 17:311-321.

CHARLIE LAKE CAVE PROJECT 1990

APPENDIX 1; COMPONENT SUBDIVISIONS WITHIN LAYERS 7 AND 39

Zone 1: COMPONENT B; Layer 7a

SQ 20	7-1,2,3	
SQ 21	7-2,3	
SQ 22	7-2,3	
SQ 23	7-1	
SQ 24	7-1	
SQ 25	7-1	

Zone 2: COMPONENT C; Layer 7b

SQ 20	7-4	
SQ 21	7-4	
SQ 22	7-4	
SQ 23	7-2	
SQ 24	7-2	
SQ 25	7-2	
SQ 26	7-1,2	

Zone 3: COMPONENT D; Layer 7c

SQ 20	7-5,6,7,8	
SQ 21	7-5,6,7,8,9,10,11	
SQ 22	7-6	
SQ 23	7-3,4,5,6	
SQ 24	7-5,6	
SQ 25	7-4,5	

Zone 4: COMPONENT E; Layer 7d and 39 a

SQ 20	7-10,11,12,13,14,15	
SQ 21	7-12,13,14,15	
SQ 23	7-7,8,9,10,11	
SQ 24	7-8,9,10,11	39-1,2
SQ 25	7-6	39-1,2,3,4,5
SQ 26		39-1,2

Zone 5: COMPONENT F; Layers 7e and 39 b

SQ 20	7-17	
SQ 23	7-12,13,14,15	
SQ 24	7-12	39-4,5,6
SQ 25		39-6,7,8,9,10

APPENDIX 2; LITHIC ARTIFACT CATALOGUE REFERENCE LIST
CHARLIE LAKE CAVE (HbRf 39) (1990)

Column N
Denotes the artifact catalogue number.
Column L1
Denotes the stratigraphic layer where the artifact occurred.
Column L2
Denotes the contoured or arbitrary level within the stratigraphic layer where the artifact occurred.
Column SQ
Denotes the excavation unit where the artifact occurred.
Column L
Denotes the length of the artifact, in millimetres, from proximal to distal margins. If undetectable, this measurement reflects the maximum dimension of the artifact. All length measurements were made with a Kanon caliper to the nearest .1mm.
Column W
Denotes the maximum width of the artifact, in millimetres, measured perpendicular to the midline of the long axis of the artifact.
Column T
Denotes the thickness of the artifact, in millimetres, measured at the midpoint of the long axis.
Column M
Denotes the lithic raw material from which the artifact was derived. The order of the colour designates the minor and major constituents of the raw material.

1. black chert (vitreous)
2. banded black and grey chert (vitreous)
3. banded translucent and black chert (vitreous)
4. grey chert or siltstone
5. banded brown black chert (fine grained)
6. banded grey brown chert
7. white quartz massive
8. reddish brown siltstone or chert
9. translucent brown chert
10. green brown (olive) chert
11. translucent chalcedony
12. medium grained quartzite (brown, reddish brown, yellow brown, green or green grey)
13. grey waxy chert
14. black chert (coarse grained)
15. banded brown black chert (coarse grained)
16. banded grey chert or siltstone (coarse grained)
17. grey black chert (very coarse and granular)
18. sandstone
19. #1425
20. concretion
21. oxidized sedimentary
22. olive green quartzite (fine grained)

Column ART
Denotes 1) the size and debitage category of the artifact or 2) that the artifact displayed one or more of the following characteristics; a. usewear; b. unifacial or bifacial retouch; c. projectile point; d. microblade; e. multidirectional or bipolar core; f. groundstone or other.

1. size 1, complete flake.
2. size 1, proximal flake fragment.
3. size 1, medial/distal fragment.
4. size 1, split flake fragment.
5. size 1, nonorientable fragment.
6. size 2, complete flake.
7. size 2, proximal flake fragment.
8. size 2, medial/distal fragment.
9. size 2, split flake fragment.
10. size 2, nonorientable fragment.
11. size 3, complete flake.
12. size 3, proximal flake fragment.
13. size 3, medial/distal fragment.
14. size 3, split flake fragment.
15. size 3, nonorientable fragment.
16. size 4, complete flake.
17. size 4, proximal flake fragment.
18. size 4, medial/distal fragment.
19. size 4, split flake fragment.
20. size 4, nonorientable fragment.
21. size 5, complete flake.
22. size 5, proximal flake fragment.
23. size 5, medial/distal fragment.
24. size 5, split flake fragment.
25. size 5, nonorientable fragment.
26. use wear or use retouch.
27. unifacially retouched.
28. bifacially retouched.
29. projectile point.
30. microblade.
31. unmodified core or nodule.
32. multidirectional core.
33. bipolar core or bipolar flake.
34. groundstone.
35. other.

Column FP
Denotes the presence (1) or absence (0) of a facetted striking platform. This was only recorded for complete and proximal flakes. This column refers specifically to the debitage size categories listed above.

Column CX
Denotes the presence (1) or absence (0) of cortex on the dorsal surface of the flake. This was recorded for all debitage and retouched artifacts.

CHARLIE LAKE CAVE PROJECT 1990

Comments
Contains any comments felt to be important to the artifact description.

*NA denotes that the information in the category was not available or applicable. Where an entire line has been blanked, the artifact in question has been removed from the artifact list.

N	L1	L2	Sq	l	W	T	M	Art	Fp	Cx	Comments
1000	1	1	27	12.8	22.9	5.9	1	8	0	0	20.9/20.51/1.55
1001	1	1	23	7.1	7.4	1.5	1	1	1	0	
1002	1	1	25	7.4	7.8	1.3	1	1	1	0	
1003	1	1	25	4.8	13.4	2.7	1	3	0	0	
1004	1	2	20	9.1	7.6	1.0	2	1	0	0	
1005	1	2	20	9.8	6.8	1.3	1	2	1	0	
1006	1	2	20	18.1	19.7	2.2	2	8	0	0	
1007	1	2	22	13.1	8.4	1.3	1	8	0	0	
1008	2	1	23	17.5	34.9	7.1	1	13	0	0	
1009	2	1	23	26.9	26.8	7.0	1	13	0	0	
1010	2	1	24	10.1	5.0	0.9	1	1	1	0	
1011	2	1	24	6.0	4.6	0.7	3	5	0	0	
1012	2	1	24	7.2	3.0	0.8	1	4	0	0	
1013	3	1	25	7.1	5.9	3.6	1	1	0	0	
1014	3	1	25	5.2	5.1	0.9	1	3	0	0	
1015	3	1	25	9.7	9.3	1.6	1	3	0	0	
1016	3	1	25	10.3	3.3	1.2	2	3	0	0	
1017	3	1	25	13.0	11.7	1.5	4	7	0	0	
1018	3	1	26	13.4	15.4	1.7	5	7	0	0	
1019	2	1	26	13.7	10.5	3.7	2	28	0	0	21.63/21.23/1.49 Biface fragment
1020	5	1	23	7.0	7.9	0.8	1	3	0	0	
1021	5	1	23	3.7	7.2	1.8	3	3	0	0	
1022	5	1	24	6.2	11.7	3.6	2	2	1	0	
1023	5	1	25	5.6	7.0	1.4	1	2	0	0	
1024	5	1	25	3.6	11.6	1.7	1	3	0	0	
1025	5	1	25	30.5	31.5	7.5	6	11	0	1	
1026	5	2	25	9.5	6.7	1.6	1	2	0	0	
1027	5	2	25	5.8	6.4	0.9	2	3	0	0	
1028	5	2	25	4.2	5.9	1.0	1	3	0	0	
1029	5	1	20	6.1	6.7	1.4	1	4	0	0	
1030	5	1	20	6.8	3.9	0.7	2	3	0	0	
1031	5	1	20	6.0	4.9	0.7	2	3	0	0	
1032	5	2	22	8.3	8.3	1.2	1	1	0	0	
1033	5	2	22	4.3	4.4	0.7	1	1	1	0	
1034	5	2	22	5.3	8.2	1.2	1	2	0	0	
1035	5	2	22	4.8	6.2	0.8	1	2	0	0	
1036	5	2	22	7.2	7.0	0.8	1	2	0	0	
1037	5	2	22	4.3	5.0	0.8	1	2	0	0	
1038	5	2	22	4.2	3.6	0.6	1	2	0	0	
1039	5	2	22	4.4	4.4	1.0	1	2	0	0	
1040	5	2	22	4.0	5.4	0.6	2	2	0	0	
1041	5	2	22	8.0	4.8	1.1	1	3	0	0	
1042	5	2	22	5.0	6.5	1.5	1	3	0	0	
1043	5	2	22	5.6	4.5	0.8	1	3	0	0	
1044	5	2	22	4.0	5.4	0.5	3	3	0	0	
1045	5	2	22	3.3	9.5	0.9	2	3	0	0	
1046	5	2	22	9.8	9.4	1.4	1	7	0	0	
1047	5	2	22	6.7	4.7	1.7	1	28	0	0	Triangular biface fragment
1048	6	1	26	5.9	6.5	1.0	1	2	0	0	
1049	6	1	26	5.0	6.0	0.6	3	3	0	0	
1050	6	1	26	10.7	16.2	1.8	1	7	0	0	
1051	6	1	26	7.6	6.3	1.8	7	5	0	0	
1052	6	1	23	3.8	3.2	1.1	8	3	0	0	
1053	6	2	23	8.0	4.2	0.8	2	3	0	0	
1054	6	2	23	4.8	3.9	0.8	1	3	0	0	
1055	6	1	24	9.6	5.6	1.2	2	3	0	0	
1056	6	1	25	5.9	3.6	0.9	2	3	0	0	
1057	7	1	26	24.9	22.0	5.2	2	10	0	0	
1058	7	1	26	30.8	36.3	6.7	1	12	0	1	Conjoins with 1059
1059	7	1	26	12.0	22.7	4.5	1	8	0	1	Conjoins with 1058

N	L1	L2	Sq	L	W	T	M	Art	Fp	Cx	Comments
1060	7	1	23	5.5	3.3	0.6	2	2	0	0	
1061	7	1	23	16.9	5.5	4.2	2	10	0	0	
1062	7	2	23	5.1	6.0	1.0	1	1	0	0	
1063	7	3	23	7.0	5.1	0.8	3	1	0	0	
1064	7	3	23	5.7	5.8	1.0	4	1	0	0	
1065	7	4	23	7.2	4.7	0.6	1	3	0	0	
1066	7	7	23	4.0	4.8	0.7	1	3	0	0	
1067	7	9	23	6.1	7.1	1.4	1	3	0	0	
1068	7	9	23	8.0	6.4	2.5	1	3	0	0	
1069	7	9	23	3.4	10.5	0.6	1	3	0	0	
1070	7	10	23	12.2	6.4	1.5	9	1	0	0	Potlids present
1071	7	10	23	11.0	8.5	1.2	9	8	0	0	Potlids present
1072	7	10	23	6.6	17.9	1.6	8	10	0	0	Potlids present
1073	7	10	23	33.2	15.0	2.9	8	10	0	0	Potlids present
1074	7	12	23	7.2	6.6	1.0	2	1	0	0	
1075	7	13	23	26.6	15.2	7.8	1	9	0	1	
1076	7	15	23	10.0	15.7	6.8	1	9	0	1	
1077	7	1	24	6.8	4.6	0.8	2	1	1	0	
1078	7	1	24	6.7	6.2	1.1	1	1	0	0	
1079	7	1	24	5.4	4.4	0.8	1	3	0	0	
1080	7	1	24	5.5	6.7	1.0	1	3	0	0	
1081	7	1	24	7.0	4.8	1.0	1	4	0	0	
1082	7	1	24	16.5	14.4	4.0	1	7	0	0	
1083	7	1	24	9.8	13.9	3.0	1	7	0	0	
1084	7	2	24	6.0	5.0	1.0	2	1	0	0	
1085	7	2	24	5.0	7.6	1.6	1	3	0	0	
1086	7	2	24	13.3	4.0	1.8	3	8	0	0	
1087	7	5	24	9.7	6.2	0.8	10	1	0	0	
1088	7	5	24	5.3	4.0	1.5	1	3	0	0	
1089	7	10	24	19.1	18.7	4.0	1	8	0	0	
1090	7	11	24	7.4	6.2	1.1	1	2	0	0	
1091	7	11	24	6.0	7.3	0.8	1	3	0	0	
1092	7	11	24	13.2	25.9	2.8	1	6	0	0	
1093	7	11	24	16.7	19.0	2.5	2	8	0	0	
1094	7	12	24	6.4	7.4	0.8	9	1	0	0	
1095	7	12	24	3.1	13.7	1.2	1	3	0	0	
1096	7	12	24	15.3	15.9	2.3	1	8	0	1	
1097	7	1	25	9.3	6.8	1.0	1	1	0	0	
1098	7	1	25	5.6	5.8	0.9	1	1	1	0	
1099	7	1	25	7.2	5.4	1.0	1	1	0	0	
1100	7	1	25	8.3	4.0	0.6	3	1	0	0	
1101	7	1	25	6.3	3.4	0.6	1	1	0	0	
1102	7	1	25	5.5	4.2	0.6	1	1	0	0	
1103	7	1	25	3.6	3.6	0.5	2	1	0	0	
1104	7	1	25	12.0	5.3	1.0	11	1	0	0	
1105	7	1	25	8.0	5.0	0.8	1	2	0	0	
1106	7	1	25	10.0	5.7	1.0	1	2	0	0	
1107	7	1	25	7.7	8.4	1.3	1	2	0	0	
1108	7	1	25	7.7	5.5	0.8	3	2	0	0	
1109	7	1	25	5.0	3.0	0.4	3	2	0	0	
1110	7	1	25	9.3	9.8	1.4	1	2	0	0	
1111	7	1	25	10.2	9.4	1.4	1	3	0	0	
1112	7	1	25	11.5	8.4	0.9	1	3	0	0	
1113	7	1	25	4.4	7.4	0.8	1	3	0	0	
1114	7	1	25	4.4	7.5	0.7	1	3	0	0	
1115	7	1	25	8.2	5.4	1.7	1	3	0	0	
1116	7	1	25	5.0	7.1	0.7	3	3	0	0	
1117	7	1	25	8.1	6.0	0.8	1	3	0	0	
1118	7	1	25	3.9	5.9	0.8	1	3	0	0	
1119	7	1	25	7.0	5.7	1.0	1	3	0	0	

N	L1	L2	Sq	L	W	T	M	Art	Fp	Cx	Comments
1120	7	1	25	5.9	6.7	0.9	1	3	0	0	
1121	7	1	25	5.8	7.8	1.0	1	3	0	0	
1122	7	1	25	4.0	4.7	0.7	1	3	0	0	
1123	7	1	25	7.5	5.0	0.6	3	3	0	0	
1124	7	1	25	3.9	5.1	1.0	1	3	0	0	
1125	7	1	25	7.5	3.6	0.6	1	3	0	0	
1126	7	1	25	4.0	4.0	0.7	1	3	0	0	
1127	7	1	25	5.2	8.0	2.7	1	3	0	0	
1128	7	1	25	7.5	4.1	0.6	1	3	0	0	
1129	7	1	25	4.6	4.5	1.0	1	3	0	0	
1130	7	1	25	3.6	5.4	0.6	1	3	0	0	Broke during measurement
1131	7	1	25	6.2	5.1	0.8	1	2	0	0	
1132	7	1	25	6.0	5.6	1.7	1	5	0	0	
1133	7	1	25	7.8	7.9	0.9	3	3	0	0	
1134	7	1	25	10.0	3.7	0.5	1	5	0	0	
1135	7	1	25	7.3	8.9	0.8	1	3	0	0	
1136	7	2	25	7.4	7.5	1.0	1	1	1	0	
1137	7	2	25	7.0	6.4	1.0	1	1	0	0	
1138	7	5	25	12.4	13.2	3.2	6	8	0	0	
1139	7	1	20	9.0	5.4	0.9	1	2	0	0	
1140	7	1	20	5.2	7.8	1.0	1	2	0	0	
1567	7	2	20	9.2	8.2	0.8	4	1	0	0	
1566	7	2	20	10.3	7.9	1.2	1	1	0	0	
1141	7	2	20	10.0	9.7	2.2	1	1	0	0	
1142	7	2	20	4.8	5.6	0.9	1	2	0	0	
1143	7	2	20	8.9	6.2	0.8	3	3	0	0	
1144	7	2	20	24.0	46.0	35.0	12	32	0	0	Core
1145	7	4	20	6.4	10.9	2.3	1	3	0	0	
1146	7	5	20	4.1	3.3	0.5	1	5	0	0	
1147	7	6	20	7.1	8.1	1.3	2	2	0	0	
1148	7	6	20	19.9	18.4	3.9	2	8	0	0	
1149	7	10	20	24.6	11.3	3.8	8	0	0	0	Potlids present
1150	7	10	20	25.0	18.5	10.5	13	27	0	0	Use retouch
1151	7	12	20	9.2	10.3	2.7	4	3	0	0	
1152	7	12	20	10.6	11.1	2.5	1	6	0	1	
1153	7	17	20	5.8	3.6	0.9	1	3	0	0	
1154	7	2	20	8.2	4.9	0.9	1	1	0	0	
1155	7	2	21	8.6	7.6	1.4	1	2	0	0	
1156	7	2	21	9.2	5.6	0.8	3	3	0	0	
1157	7	2	21	6.0	4.7	1.1	3	3	0	0	
1158	7	3	21	7.1	8.6	1.4	1	1	0	0	
1159	7	3	21	9.0	5.6	1.0	2	1	1	0	
1160	7	3	21	3.6	6.2	1.0	1	1	0	0	
1161	7	3	21	10.8	7.4	1.5	1	2	0	0	
1162	7	3	21	6.8	8.8	1.6	1	3	0	0	
1163	7	3	21	18.1	15.9	1.5	4	7	0	0	
1164	7	3	21	24.6	13.0	1.8	1	11	0	0	
1165	7	3	21	30.8	23.4	4.4	14	13	0	1	23.06/21.38/1.55
1166	7	4	21	3.6	4.5	0.8	1	2	1	0	
1167	7	4	21	6.2	5.0	1.2	2	2	0	0	
1168	7	4	21	3.0	12.7	0.7	1	3	0	0	
1169	7	4	21	4.0	9.7	0.8	1	3	0	0	
1170	7	4	21	6.4	7.9	0.8	1	3	0	0	
1171	7	4	21	13.2	6.7	1.3	15	3	0	0	
1172	7	4	21	21.5	21.0	2.8	15	6	0	1	
1173	7	4	21	12.7	23.0	3.6	15	8	0	1	
1174	7	4	21	10.5	17.6	3.6	15	8	0	0	
1175	7	4	21	7.4	16.0	4.0	15	8	0	0	
1176	7	4	21	6.7	14.5	1.4	1	8	0	0	
1177	7	4	21	15.0	6.2	2.8	1	8	0	0	

N	L1	L2	Sq	L	W	T	M	Art	Fp	Cx	Comments
1178	7	4	21	18.4	4.7	2.5	1	8	0	0	
1179	7	4	21	7.9	20.5	3.8	15	10	0	0	
1180	7	4	21	40.1	38.3	6.2	15	11	0	0	
1181	7	4	21	41.4	39.5	3.2	15	11	0	0	
1182	7	4	21	38.2	36.7	4.8	15	13	0	0	
1183	7	4	21	42.9	28.2	4.5	15	13	0	0	
1184	7	4	21	24.9	18.4	3.2	15	13	0	0	
1185	7	4	21	61.7	61.8	19.0	15	16	0	1	
1186	7	4	21	46.0	41.7	4.0	15	16	0	1	
1187	7	4	21	45.2	48.8	5.7	15	16	0	0	
1188	7	4	21	38.0	50.3	4.0	15	18	0	0	
1189	7	4	21	59.9	23.0	6.2	15	19	0	0	
1190	7	5	21	9.7	5.1	1.4	11	1	0	0	
1191	7	5	21	9.2	8.0	1.4	1	3	0	0	
1192	7	5	21	8.1	4.8	2.0	1	28	0	0	Biface tang
1193	7	14	21	8.3	6.2	0.9	4	2	0	0	
1194	7	15	21	14.2	43.8	14.0	16	12	0	0	23.15/21.25/2.69 Conjoins with 1195
1195	7	15	21	14.2	52.3	14.0	16	13	0	0	23.15/21.25/2.69 Conjoins with 1194
1196	7	2	22	9.2	10.1	1.0	1	1	0	0	
1197	7	2	22	10.1	4.9	0.8	1	1	0	0	
1198	7	2	22	5.2	4.9	0.7	1	2	0	0	
1199	7	2	22	5.0	8.0	1.0	4	2	1	0	
1200	7	2	22	7.6	7.8	1.3	3	3	0	0	
1201	7	2	22	8.6	6.0	1.2	1	3	0	0	
1202	7	2	22	7.8	8.5	0.8	1	3	0	0	
1203	7	2	22	3.4	6.3	0.8	2	3	0	0	
1204	7	2	22	7.3	7.2	1.0	1	3	0	0	
1205	7	2	22	4.8	6.3	1.0	3	3	0	0	
1206	7	2	22	3.8	6.1	0.9	1	3	0	0	
1207	7	2	22	4.2	4.6	1.0	1	3	0	0	
1208	7	2	22	3.8	4.5	0.4	3	3	0	0	
1209	7	2	22	8.4	7.9	2.5	1	5	0	0	
1210	7	2	22	13.3	7.9	1.4	1	6	0	0	
1211	7	2	22	8.0	4.6	1.1	4	4	0	0	
1212	7	3	22	8.5	4.9	0.8	3	1	0	0	
1213	7	3	22	4.1	7.7	1.6	1	1	0	0	
1214	7	3	22	7.0	6.6	0.7	2	1	0	0	
1215	7	3	22	4.6	5.7	0.7	2	1	1	0	
1216	7	3	22	8.1	5.2	1.3	1	4	1	0	
1217	7	3	22	9.0	6.8	1.7	1	3	0	0	
1218	7	3	22	5.9	6.9	1.0	1	3	0	0	
1219	7	3	22	6.4	3.4	1.3	2	3	0	0	
1220	7	3	22	3.8	6.3	0.7	1	3	0	0	
1221	7	3	22	14.6	5.8	1.2	3	3	0	0	
1222	7	4	22	5.2	7.3	0.6	1	3	0	0	
1223	7	4	22	6.3	9.1	1.7	5	3	0	0	
1224	8	1	28	16.9	10.5	2.2	1	6	0	1	
1225	9	1	26	13.1	7.5	1.9	1	3	0	0	
1226	9	1	23	7.8	8.9	1.3	4	1	0	0	
1227	9	1	23	9.4	7.1	1.4	1	1	0	0	
1228	9	1	23	7.0	6.2	0.7	3	1	0	0	
1229	9	1	23	7.5	6.8	1.4	1	1	0	0	
1230	9	1	23	6.6	7.0	0.9	1	1	0	0	
1231	9	1	23	7.6	7.8	1.5	1	2	0	0	
1232	9	1	23	5.3	7.7	1.8	4	2	0	0	
1233	9	1	23	4.5	6.0	0.8	1	2	0	0	
1234	9	1	23	5.0	4.0	0.8	2	2	0	0	
1235	9	1	23	4.0	4.6	0.5	3	3	1	0	
1236	9	1	23	14.0	8.3	1.2	4	6	0	0	
1237	9	1	23	11.2	8.9	2.7	2	6	1	0	

N	L1	L2	Sq	L	W	T	M	Art	Fp	Cx	Comments
1238	9	1	24	14.5	10.0	2.0	1	8	0	1	
1239	9	1	25	9.2	6.2	1.2	1	1	0	0	
1240	9	1	25	8.6	6.6	1.0	4	1	0	0	
1241	9	1	25	13.2	5.9	1.2	2	1	0	0	
1242	9	1	25	16.6	12.7	1.8	2	6	0	0	
1243	9	1	25	16.2	10.5	1.2	1	8	0	0	
1244	12	1	28	8.6	7.4	1.3	1	2	0	0	
1245	12	1	28	12.6	9.3	1.7	2	2	0	0	
1246	12	1	28	9.6	11.2	2.4	1	8	0	0	
1247	12	1	28	11.8	15.5	2.1	4	7	0	0	
1248	12	1	28	39.4	22.4	3.9	1	12	0	0	
1249	12	1	28	22.8	30.5	3.9	1	12	0	0	
1250	12	1	26	9.1	6.3	1.2	1	2	0	0	
1251	12	1	26	12.5	6.0	1.0	1	3	0	0	
1252	12	1	26	5.9	8.9	1.3	2	3	0	0	
1253	12	1	26	5.6	5.2	0.7	3	3	0	0	
1254	12	1	29	7.3	6.2	1.3	2	1	0	0	
1255	12	1	29	7.0	5.4	1.1	1	1	1	0	
1256	12	1	29	7.6	3.8	0.9	2	1	0	0	
1257	12	1	29	7.0	4.5	0.7	4	1	0	0	
1258	12	1	29	6.7	7.2	1.2	11	1	0	0	
1259	12	1	29	6.8	8.7	1.0	1	3	0	0	
1260	12	1	29	7.0	6.8	1.3	1	5	0	0	
1261	12	1	29	41.6	27.0	10.6	2	27	0	0	20.74/22.85/2.05 Inverse retouch uniface
1262	12	1	29	21.0	29.2	8.3	2	28	0	0	Biface
1263	12	1	29	12.3	5.7	1.1	8	30	0	0	Microblade, red siltstone
1264	12	1	29	19.0	24.6	10.9	2	28	0	0	Biface. Conjoins with 1265, 1266
1265	12	1	29	19.8	23.7	11.4	2	28	0	0	Biface. Conjoins with 1264, 1266
1266	12	1	29	13.6	13.0	8.6	2	28	0	0	Biface. Conjoins with 1264, 1265
1267	13	1	26	11.0	4.5	1.1	1	2	0	0	
1268	13	1	26	4.5	4.1	0.5	1	2	1	0	
1269	13	1	26	6.3	7.0	1.1	2	2	1	0	
1270	13	1	26	6.9	1.4	1.2	1	3	0	0	
1271	13	1	26	6.2	5.0	0.9	1	3	0	0	
1272	13	1	26	4.2	4.0	0.8	1	3	0	0	
1273	13	1	26	3.6	5.5	0.5	1	3	0	0	
1274	13	1	26	6.5	4.3	0.2	2	3	0	0	
1275	13	1	26	4.7	3.3	1.1	1	5	0	0	
1276	13	1	26	4.6	5.2	1.4	2	5	0	0	
1277	13	1	26	13.5	8.3	1.6	1	8	0	0	
1278	13	1	26	27.6	14.8	7.9	2	32	0	0	Core
1279	13	1	23	4.4	4.0	0.7	3	1	0	0	
1280	13	1	23	7.7	8.8	0.9	2	2	0	0	
1281	13	1	23	6.6	9.9	0.8	4	2	0	0	
1282	13	2	23	4.2	3.5	0.6	2	2	0	0	
1283	13	2	23	5.3	3.4	0.7	1	2	0	0	
1284	13	2	23	21.5	12.1	4.5	1	29	0	0	Side notched PP, Pelican Lake?
1285	13	1	24	9.6	6.3	1.3	1	1	0	0	
1286	13	1	24	4.5	5.5	0.6	1	2	0	0	
1287	13	1	24	4.5	5.7	0.7	1	3	0	0	
1288	13	2	24	10.1	18.2	1.8	2	8	0	0	
1289	13	1	25	6.8	6.0	0.8	1	1	0	0	
1290	13	1	25	9.0	7.6	1.7	1	1	0	0	
1291	13	1	25	5.8	5.0	0.8	1	1	0	0	
1292	13	1	25	3.7	4.0	0.6	1	1	1	0	
1293	13	1	25	6.2	3.8	0.7	1	3	0	0	
1294	13	1	25	5.6	4.4	0.6	3	3	0	0	
1295	13	1	25	6.1	5.9	0.8	1	3	0	0	
1296	13	1	25	6.7	5.1	0.7	3	3	0	0	
1297	13	1	25	4.3	5.4	1.1	1	3	0	0	

N	L1	L2	Sq	L	W	T	M	Art	Fp	Cx	Comments
1298	13	1	25	8.5	8.1	1.0	1	3	0	0	
1299	13	1	25	4.7	5.3	1.6	1	1	0	0	
1300	13	1	25	4.8	4.0	1.3	1	2	0	0	
1301	13	1	25	4.4	4.1	0.4	1	2	1	0	
1302	13	1	25	9.6	7.9	1.5	2	2	0	0	
1303	13	1	25	9.5	7.0	1.3	2	3	0	0	
1304	13	1	25	9.3	8.9	2.0	1	2	1	0	
1305	13	1	25	7.0	7.9	1.1	1	2	1	0	
1306	13	1	25	7.0	6.9	1.2	2	2	0	0	
1307	13	1	25	6.3	7.0	1.4	1	2	0	0	
1308	13	1	25	5.3	7.0	0.8	4	2	0	0	
1309	13	1	25	6.3	5.8	0.8	1	2	1	0	
1310	13	1	25	6.3	6.4	1.0	1	4	0	0	
1311	13	1	25	8.1	6.6	0.8	1	2	0	0	
1312	13	1	25	6.5	5.7	0.9	1	2	1	0	
1313	13	1	25	8.0	6.2	0.9	1	2	1	0	
1314	13	1	25	4.7	7.6	1.4	1	1	0	0	
1315	13	1	25	6.7	7.3	1.1	1	2	1	0	
1316	13	1	25	5.7	4.5	0.7	2	1	0	0	
1317	13	1	25	4.2	6.9	1.4	1	3	0	0	
1318	13	1	25	5.0	3.8	0.7	3	2	0	0	
1319	13	1	25	5.4	4.2	0.6	1	2	0	0	
1320	13	1	25	4.5	6.6	1.2	1	2	1	0	
1321	13	1	25	4.0	5.0	1.2	1	2	0	0	
1322	13	1	25	7.8	6.4	1.3	2	2	0	0	
1323	13	1	25	9.0	8.7	1.3	3	2	1	0	
1324	13	1	25	9.2	8.5	1.3	3	2	0	0	
1325	13	1	25	9.9	10.5	1.4	1	3	0	0	
1326	13	1	25	8.1	8.5	1.2	1	3	0	0	
1327	13	1	25	7.4	8.1	1.2	1	3	0	0	
1328	13	1	25	6.5	8.9	1.0	1	3	0	0	
1329	13	1	25	8.1	11.2	1.1	1	3	0	0	
1330	13	1	25	4.3	8.9	1.3	1	3	0	0	
1331	13	1	25	11.0	8.3	1.0	1	3	0	0	
1332	13	1	25	7.9	6.5	1.2	3	3	0	0	
1333	13	1	25	5.6	8.6	1.2	1	3	0	0	
1334	13	1	25	4.2	8.9	0.8	3	3	0	0	
1335	13	1	25	8.3	5.8	0.9	1	3	0	0	
1336	13	1	25	4.6	10.2	0.7	3	3	0	0	
1337	13	1	25	5.0	11.8	0.6	1	3	0	0	
1338	13	1	25	7.0	4.8	0.8	1	3	0	0	
1339	13	1	25	4.7	7.5	0.8	1	3	0	0	
1340	13	1	25	4.4	5.0	1.0	2	3	0	0	
1341	13	1	25	6.2	7.1	0.9	1	3	0	0	
1342	13	1	25	7.6	6.0	1.1	3	3	0	0	
1343	13	1	25	5.0	5.9	0.9	1	3	0	0	
1344	13	1	25	5.9	5.0	0.8	3	3	0	0	
1345	13	1	25	7.0	6.7	1.0	3	3	0	0	
1346	13	1	25	5.0	5.6	0.9	1	3	0	0	
1347	13	1	25	4.9	6.7	1.1	1	3	0	0	
1348	13	1	25	8.1	5.8	1.2	1	3	0	0	
1349	13	1	25	8.8	6.6	1.0	1	3	0	0	
1350	13	1	25	4.7	6.0	0.8	3	3	0	0	
1351	13	1	25	6.4	6.2	0.7	3	3	0	0	
1352	13	1	25	6.0	4.6	1.1	1	3	0	0	
1353	13	1	25	5.0	5.5	0.8	3	3	0	0	
1354	13	1	25	6.6	3.9	0.6	1	3	0	0	
1355	13	1	25	3.8	7.0	0.9	1	3	0	0	
1356	13	1	25	7.6	4.8	0.8	1	3	0	0	
1357	13	1	25	6.5	4.4	1.0	1	3	0	0	

N	L1	L2	Sq	L	W	T	M	Art	Fp	Cx	Comments
1358	13	1	25	5.7	6.8	0.8	1	3	0	0	
1359	13	1	25	5.0	7.1	1.2	1	3	0	0	
1360	13	1	25	5.9	5.0	0.9	3	3	0	0	
1361	13	1	25	4.9	3.3	0.6	3	3	0	0	
1362	13	1	25	3.9	6.0	1.0	1	3	0	0	
1363	13	1	25	6.7	5.0	0.9	1	3	0	0	
1364	13	1	25	5.2	4.4	0.8	1	3	0	0	
1365	13	1	25	5.7	6.2	0.5	1	3	0	0	
1366	13	1	25	5.5	4.5	0.5	3	3	0	0	
1367	13	1	25	3.2	3.8	0.7	1	3	0	0	
1368	13	1	25	3.0	5.9	1.3	1	5	0	0	
1369	13	1	25	5.8	3.4	0.8	1	3	0	0	
1370	13	1	25	5.3	3.4	0.8	1	3	0	0	
1371	13	1	25	4.9	3.0	1.1	1	5	0	0	
1372	13	1	25	3.6	4.8	0.5	1	3	0	0	
1373	13	1	25	4.2	4.2	0.8	1	3	0	0	
1374	13	1	25	3.4	4.0	0.4	1	5	0	0	
1375	13	1	25	4.2	4.1	0.8	1	5	0	0	
1376	13	1	25	5.2	4.0	0.9	1	3	0	0	
1377	13	1	25	3.5	5.6	1.1	1	3	0	0	
1378	13	1	25	5.0	3.4	0.6	1	3	0	0	
1379	13	1	25	10.8	5.5	1.4	3	3	0	0	
1380	13	1	25	3.1	8.2	1.5	1	3	0	0	
1381	13	1	25	4.1	9.9	1.8	1	2	0	0	
1382	13	1	25	6.8	4.2	0.6	1	3	0	0	
1383	13	1	25	3.3	6.5	0.6	1	3	0	0	
1384	13	1	25	6.4	6.3	1.0	1	5	0	0	
1385	13	1	25	7.2	4.4	1.5	1	5	0	0	
1386	13	1	25	7.2	5.8	0.8	1	3	0	0	
1387	13	1	25	6.7	5.3	0.8	1	5	0	0	
1388	13	1	25	5.5	5.0	0.9	1	5	0	0	
1389	13	1	25	6.1	4.9	0.9	3	5	0	0	
1390	13	1	25	4.6	4.6	2.1	1	5	0	0	
1391	13	1	25	7.2	3.4	0.8	1	5	0	0	
1392	13	1	25	15.4	12.4	2.1	2	7	1	0	
1393	13	1	25	12.0	8.1	1.7	1	7	0	0	
1394	13	1	25	9.8	11.4	1.9	1	7	0	0	
1395	13	1	25	13.2	13.2	1.5	1	7	1	0	
1396	13	1	25	9.9	10.0	1.3	1	7	0	0	
1397	13	1	25	9.8	10.8	1.1	1	7	1	0	
1398	13	1	25	12.3	10.3	1.3	1	7	1	0	
1399	13	1	25	15.1	12.8	1.8	4	8	0	0	
1400	13	1	25	8.8	11.9	1.4	4	8	0	0	
1401	13	1	25	4.3	4.0	0.3	3	1	0	0	
1402	13	1	25	3.5	4.3	0.5	3	2	0	0	
1403	13	1	25	4.8	4.4	0.5	3	3	0	0	
1404	15	1	26	4.5	4.2	0.5	3	3	0	0	
1405	15	1	23	111.0	66.0	12.6	12	23	0	0	22.38/20.20/1.76
1406	15	1	23	41.0	41.6	12.6	12	16	0	0	22.08/20.27/1.97
1407	15	1	23	13.2	8.0	2.4	1	10	0	0	
1408	15	1	23	7.2	6.8	0.8	3	1	0	0	
1409	16	3	27	120.0	85.0	69.0	12	35	1	0	20.93/20.50/2.07 Chopper
1410	16	3	28	7.9	4.8	0.9	3	4	0	0	
1411	16	1	29	37.1	48.0	16.1	17	16	0	1	
1412	16	1	29	20.4	9.0	6.3	17	10	0	0	
1413	16	2	29	11.4	13.5	2.9	1	6	0	0	
1414	16	2	29	8.9	11.6	1.6	8	7	0	0	
1415	16	2	29	15.6	8.6	1.6	2	8	0	0	
1416	16	2	29	32.8	30.3	9.2	1	11	0	1	
1417	16	2	29	28.8	41.0	2.9	1	13	0	0	

N	L1	L2	Sq	L	W	T	M	Art	Fp	Cx	Comments
1418	16	2	29	38.6	24.3	5.1	2	28	0	0	20.05/22.97/2.23 Distal biface tip
1419	16	2	29	95.7	69.6	40.6	18	34	0	0	20.56/22.95/2.19 Groundstone
1420	16	2	29	12.0	3.8	1.0	6	3	0	0	
1421	16	1	26	25.0	13.9	3.4	1	29	0	0	21.36/21.25/NA Projectile point
1422	16	1	26	6.7	6.6	1.2	3	1	1	0	
1423	16	1	26	4.7	8.0	1.2	1	3	0	0	
1424	16	1	26	16.8	9.4	1.8	4	7	0	0	
1425	16	2	26	25.9	42.0	7.5	19	11	0	1	
1426	17	1	25	23.6	13.6	1.8	1	6	0	0	
1427	17	1	25	8.9	7.0	1.4	1	4	1	0	
1428	17	1	25	38.6	30.9	9.7	14	27	0	0	Uniface
1429	18	1	29	25.5	17.8	2.1	1	7	1	0	
1430	18	1	29	15.4	17.3	1.8	3	8	0	0	
1431	18	1	29	16.0	10.5	2.0	1	8	0	0	
1432	20	1	26	7.2	5.5	0.8	1	1	1	0	
1433	20	1	26	6.8	5.6	0.5	1	3	0	0	
1434	20	1	26	18.6	8.3	5.5	3	3	0	0	
1435	22	1	25	3.8	8.1	1.0	3	1	1	0	
1436											NA
1437	22	1	27	32.8	24.1	2.0	4	28	0	0	Biface heat spall
1438	22	1	29	9.4	11.3	3.4	1	28	0	0	Biface basal fragment
1439	22	1	26	114.0	96.0	40.7	19	32	0	0	Core. Conjoins with 1440, 1441
1440	22	1	26	79.7	72.8	17.4	19	16	0	1	Conjoins with 1439, 1441
1441	22	1	26	19.0	12.0	3.0	19	8	0	0	Conjoins with 1439, 1440
1442	22	1	24	33.4	39.0	10.3	2	33	0	0	22.66/21.88/2.02 Bipolar core
1443	23	1	27	11.6	17.9	3.9	1	6	0	0	
1444	23	1	26	5.0	7.0	0.4	9	3	0	0	
1445											NA
1446	27	1	24	13.4	16.1	2.1	10	6	0	0	
1447	28	1	24	8.8	4.4	1.4	1	1	0	0	
1448	28	1	26	32.4	43.0	23.9	1	32	0	0	21.32/21.05/2.43 Core
1449	28	1	26	53.4	24.4	6.4	1	28	0	0	21.70/21.30/2.35 Oxbow
1450	30	1	28	6.5	8.4	0.8	4	3	0	0	
1451	30	1	28	4.9	5.0	0.7	1	3	0	0	
1452	30	1	28	22.0	25.2	3.6	10	13	0	0	
1453	31	2	28	6.4	10.2	1.1	1	3	0	0	
1454	31	2	28	3.3	5.3	0.7	4	3	0	0	
1455	31	4	28	33.5	22.3	10.2	1	27	0	0	Uniface, proximal retouch
1456	31	1	29	119.3	76.7	23.7	17	21	1	1	
1457	31	1	29	55.6	53.7	10.9	22	27	0	1	20.83/22.17/2.50 Uniface. Conjoin with 1467
1458	31	2	29	6.9	6.9	0.7	9	2	1	0	
1459	31	1	26	45.3	21.0	5.6	2	29	0	0	21.95/21.75/2.39 Oxbow
1460	31	3	26	4.2	7.0	1.1	1	3	0	0	
1461	31	4	26	3.8	6.1	0.7	3	1	0	0	
1462	31	5	26	5.2	7.0	1.1	3	3	0	0	
1463	31	1	23	17.1	12.4	7.3	1	8	0	1	
1464	31	1	23	26.5	20.4	7.7	1	15	0	1	
1465	31	2	24	8.5	6.2	0.8	9	1	0	0	
1466	32	1	29	9.8	7.2	0.9	6	2	1	0	
1467	32	1	28	88.2	32.7	14.8	22	27	0	1	20.65/21.45/2.36 Uniface. Conjoin with 1457
1468	33	1	26	5.7	6.0	1.1	1	1	0	0	
1469	38	1	26	41.5	35.7	3.8	2	27	1	0	21.93/22.00/NA Uniface. See 1539-41
1470	39	2	26	23.0	15.2	2.6	4	8	0	0	
1471	39	4	24	17.6	14.3	1.5	1	8	0	0	
1472	39	6	24	5.4	6.4	0.7	2	1	0	0	
1473	39	6	24	8.4	5.6	1.8	1	3	0	0	
1474	39	1	25	20.1	28.0	5.3	1	12	1	0	
1475	39	3	25	38.8	19.3	10.4	1	14	0	1	Conjoins with 1512
1476	39	3	25	24.7	21.7	14.1	1	13	0	1	
1477	39	3	25	22.9	30.0	10.3	1	13	0	1	

N	L1	L2	Sq	L	W	T	M	Art	Fp	Cx	Comments
1478	39	4	25	7.0	9.0	1.2	9	1	0	0	
1479	39	4	25	25.6	24.0	8.1	1	0	0	1	
1480	39	4	25	33.0	23.7	5.6	20	11	1	1	Concretion with eraillure scar
1481	39	5	25	22.7	12.5	14.3	1	10	0	0	22.45/22.10/2.66
1482	39	5	25	20.8	17.0	4.4	1	7	0	1	
1483	39	6	25	12.4	8.3	2.0	1	1	0	1	
1484	39	6	25	8.0	9.8	2.0	1	1	0	0	
1485	39	7	25	6.4	4.5	0.5	4	2	1	0	
1486	39	7	25	11.3	8.8	1.6	1	9	0	1	
1487	39	8	25	13.7	3.3	1.5	1	1	0	1	
1488	39	8	25	4.1	12.0	1.4	1	3	0	0	
1489	39	8	25	8.3	4.9	2.2	1	4	0	1	
1490	39	8	25	6.5	6.9	1.4	1	1	0	1	
1491	39	8	25	6.0	3.5	0.8	1	3	0	0	
1492	39	8	25	22.1	11.5	1.9	1	9	0	1	
1493	39	9	25	8.9	5.6	1.5	1	1	0	1	
1494	39	9	25	6.0	6.6	0.9	1	1	0	1	
1495	39	9	25	5.9	4.9	0.8	1	3	0	0	
1496	39	9	25	5.4	5.4	1.9	1	1	0	1	
1497	39	9	25	8.3	3.4	2.1	1	1	0	1	
1498	39	9	25	5.2	5.8	0.8	3	3	0	0	
1499	39	9	25	9.0	4.9	2.3	1	5	0	0	
1500	39	9	25	16.0	17.0	4.0	1	6	0	1	
1501	39	9	25	14.5	13.3	3.6	1	6	0	1	
1502	39	9	25	13.2	10.3	4.8	1	6	0	1	
1503	39	9	25	13.5	14.2	2.1	1	7	0	1	
1504	39	9	25	15.6	21.0	4.6	1	10	0	1	
1505	39	9	25	12.2	9.6	2.4	1	8	0	1	
1506	39	10	25	6.2	8.0	0.6	4	3	0	0	
1507	39	10	25	14.4	10.0	2.6	1	9	0	1	
1508	40	1	29	10.9	10.5	1.9	20	6	0	1	
1509	40	1	29	14.4	11.6	2.6	20	8	0	0	
1510	41	1	26	11.2	14.4	1.9	22	6	0	0	
1511	41	1	26	20.0	13.5	2.4	4	26	0	0	Use retouch
1512	41	1	26	38.1	15.7	10.3	1	14	0	1	Conjoins with 1475
1513	41	1	26	41.0	22.1	13.5	17	32	0	0	21.94/21.28/2.78 Core
1514	41	1	26	58.5	34.8	10.8	10	27	0	0	Uniface. 2 distal notches
1515	43	1	28	33.8	21.6	3.1	1	11	0	1	
1516	46	2	27	31.6	28.9	3.9	2	27	0	0	20.49/20.48/3.20 Uniface
1517	46	1	26	43.4	36.0	23.4	17	15	0	0	21.20/21.50/3.07 Grey rind
1518	46	1	26	31.0	14.8	2.4	4	13	0	0	
1519	46	1	26	24.7	40.7	3.9	12	13	0	0	
1520	46	1	26	11.3	7.4	2.1	1	3	0	0	
1521											NA
1522											NA
1523	46	2	26	48.5	41.0	7.9	14	22	0	1	
1524	46	2	26	65.3	48.6	12.0	4	16	0	1	21.99/21.85/3.00 Olive rind
1525	46	2	26	7.8	7.0	1.3	4	3	0	0	
1526	46	2	26	41.0	22.3	4.5	14	27	0	0	21.00/21.77/3.17 Uniface
1527											NA
1528	46	2	24	50.3	36.6	7.9	10	17	0	1	22.16/21.62/2.93 Olive brown rind
1529	48	1	24	10.6	7.6	2.1	1	1	0	0	
1530	48	1	24	6.8	4.9	1.4	1	1	0	0	
1531	48	1	24	4.8	8.9	2.9	1	3	0	0	
1532	48	1	24	18.8	17.9	4.3	1	6	0	1	
1533	48	1	25	7.8	5.9	1.8	13	5	0	0	
1534											NA
1535	49	1	28	7.6	5.8	0.9	2	3	0	0	
1536	49	1	28	8.4	3.9	1.7	1	3	0	0	
1537	49	1	28	6.4	4.4	0.9	1	3	0	0	

N	L1	L2	Sq	L	W	T	M	Art	Fp	Cx	Comments
1538	49	1	28	49.0	48.0	30.9	1	32	0	0	20.87/21.75/2.26 Core
1539	49	1	28	41.5	30.0	4.9	2	26	0	0	20.89/21.60/2.29 Potlids. Conjoinable.
1540	49	1	28	17.1	29.5	2.0	2	26	0	0	Potlids. Conjoinable.
1541	49	1	28	15.0	20.0	1.7	2	26	0	0	Potlids. Conjoinable.
1542	49	1	29	37.8	37.2	4.2	8	13	0	0	
1543	49	1	26	7.2	18.2	1.5	3	8	0	0	
1544	49	1	26	14.7	10.3	2.1	14	8	0	0	
1545	49	1	26	32.5	28.2	10.8	1	11	1	1	
1546	49	1	26	28.3	32.2	9.8	1	33	0	1	Bipolar core
1547	49	1	26	42.0	23.9	19.2	1	14	0	1	21.97/21.63/3.11
1548	49	1	26	40.0	36.4	25.0	18	35	0	0	21.64/21.70/3.23 Hammerstone
1549	49	1	23	23.4	13.3	3.7	1	7	0	1	
1550	49	1	25	13.9	6.6	2.6	1	9	0	0	
1551	49	1	25	14.0	13.3	3.0	1	6	0	1	
1552	49	1	26	43.7	20.9	11.2	1	33	0	1	Bipolar core/split flake
1553	50	1	24	22.9	33.3	3.6	6	12	0	1	
1554	56	1	29	69.2	32.0	26.9	12	32	0	0	Core
1555	60	1	26	82.3	62.2	43.0	21	35	0	0	21.20/21.52/3.58 Red oxidized sedimentary
1556	1	1	30	25.0	15.0	12.4	1	10	0	1	
1557	2	1	30	15.0	16.0	3.7	1	8	0	0	
1558	1	1	31	23.6	20.7	2.8	10	8	0	0	
1559	2	1	31	24.8	16.0	6.8	1	11	0	1	
1560	2	1	31	12.2	19.0	1.8	2	8	0	0	
1561	2	1	31	8.9	11.3	1.8	1	8	0	0	
1562	2	1	31	12.2	16.2	2.4	20	8	0	0	
1563	2	2	31	30.6	41.5	1.8	15	13	0	0	
1564	2	2	31	6.9	11.5	1.7	10	1	0	0	
1565	3	1	31	7.0	4.8	2.1	1	1	0	1	