An Early Lithic Site In The San Juan Islands: Its Description And Research Implications

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909 First Avenue
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By

Stephen M. Kenady, Robert R. Mierendorf, and Randall F. Schalk

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Acknowledgment

The senior author is most grateful to the DeStaffany family for originally reporting the discovery of 45SJ414, allowing excavation on their property, and the study of the collection described in the present report. The important information from that work could not have been reported without their support and great patience.

Financial help from local residents supported part of the original work in 1972 as part of a research project separate from the University of Washington's archaeological field school. The contributions of Linda Henry, Gretchen Kaiser, and Barbara Brown enabled the independent regional field work which ultimately included this project. The National Park Service supported the site work through the loan of labor and resources of the Field School at English Camp during excavation, and later in the financial support of the final analysis. Jim Thomson of the Seattle office of the National Park Service helped find funding for radiocarbon dating, petrographic analyses, report preparation, and the excellent artifact drawings by Sarah Moore.

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Introduction

In the summer of 1972, a property owner on San Juan Island, Washington discovered an archaeological site while excavating sediment in a bowl-shaped depression in the bedrock behind his house. The owner, Mr. Richard DeStaffany, planned to create a small pond by removing all of the earth from the depression that held water during the winter months. In the process of this landscaping activity, DeStaffany had removed about half of the soil in the depression when he noticed the archaeological deposits it contained. He reported the discovery to archaeologists Roderick Sprague and Stephen Kenady who were directing a joint archaeological field school at English Camp (45SJ24) on behalf of the University of Idaho and the University of Washington. Kenady, who was responsible for the prehistoric period aspect of the field school, immediately recognized the significance of the find and the importance of excavating the remaining sediments in a systematic manner. Consequently, the effort to recover the deposits in the bedrock depression became an element of Kenady's ongoing research on San Juan Island.

When the recovery was completed, a total of 2730 artifacts was excavated, labeled, and cataloged. In addition, another large collection was recovered from the landowner's backdirt pile and additional excavation units excavated by Kenady's paid technicians after the field school closed. Both of these collections remained unanalyzed until 1995 when the National Park Service (NPS) provided funding to complete an analysis of the materials that were recovered during Kenady's excavation at the site. This report presents the descriptive analysis of an estimated 25 percent of this collection but does not include the artifacts that were recovered from the backdirt of DeStaffany's excavation or the uncataloged specimens which remain unanalyzed at the Burke Museum at the University of Washington.

In 1995, Kenady revisited the site with the co-authors. During this one day visit, the authors focused on describing stratigraphy, recovering organic remains for radiocarbon dating, and defining site boundaries with shovel test pits.

The DeStaffany site (45SJ414) stands apart when compared to all other archaeological sites reported in the San Juan Islands, particularly with regard to topographic setting, the morphology of its flaked stone tool assemblage, the stratigraphic context of its artifacts, and its apparent early age. The site may be important for understanding some of the earliest inhabitants of the region. This report first describes the site and its artifact assemblage and concludes with a consideration of the significance of these data for understanding San Juan Island prehistory.

Natural Setting

The DeStaffany site is located on top of a rocky knoll overlooking Griffin Bay on the southwest shore of San Juan Island (Figure 1). The San Juan Island archipelago consists of 473 islands and reefs and occupies an area about 27 miles long by 24 miles wide. Only 175 of these have been named. The sixteen largest islands comprise a total land area of 172 square miles (Schlots 1962). San Juan Island, where the site is located, is the western-most and second largest of the group.

The topography of the Islands is uneven, as they consist of glacially-smoothed bedrock domes and low mountains, with the highest elevations ranging from 2409 ft on Orcas Island to 1039 ft on San Juan Island. Lopez Island is the lowest large landform in the group. Vistas from Orcas and San Juan Island can encompass as many as three separate major mountain ranges and vast expanses of navigable waterways of northern Puget Sound.

Figure 1 - Study Area

Although there are a few freshwater lakes, there are no perennial rivers or streams in the islands. Today a seasonal stream empties into saltwater just south of the site. This drainage may have been an important fresh water source for the site's early inhabitants.

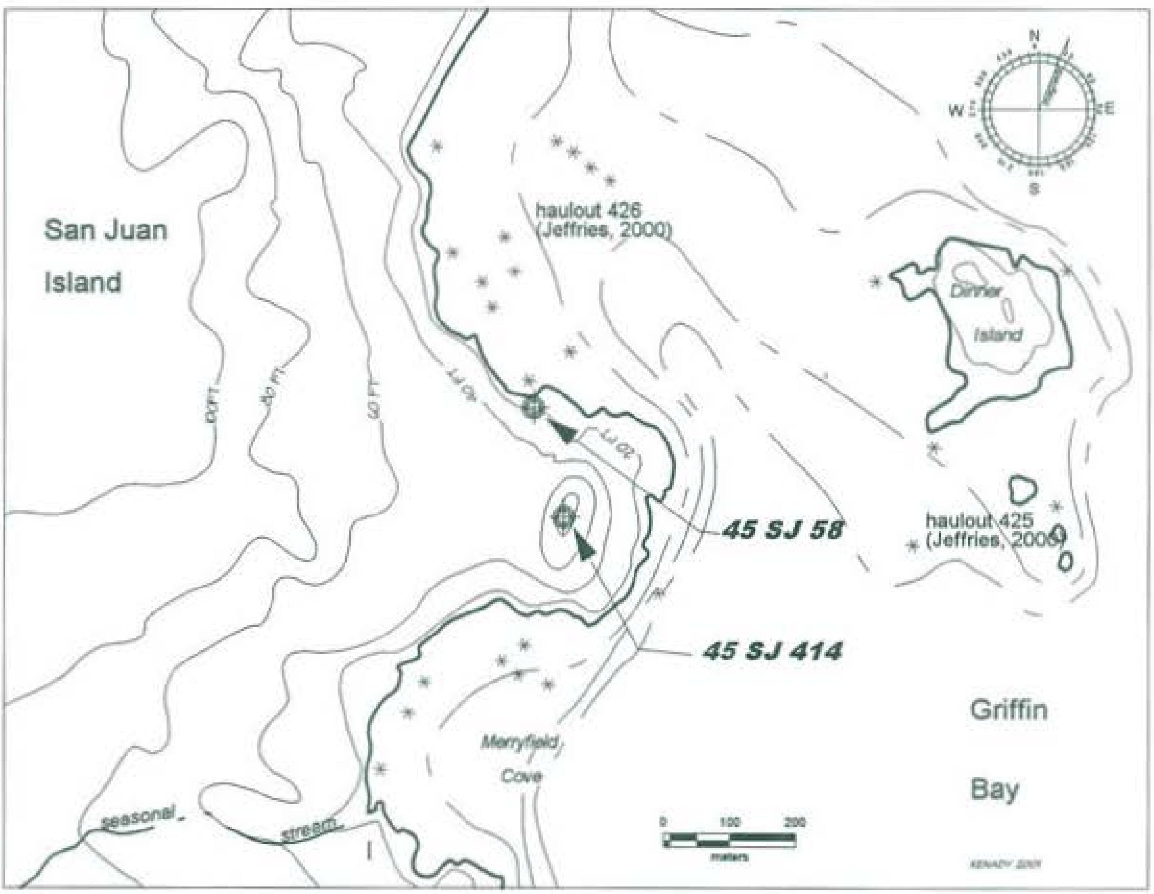
The marine waters surrounding the islands offered a rich and diverse suite of resources including a wide range of anadromous and other marine fish, sea mammals, and shellfish. The highly productive salmon runs bound for the Fraser River pass through the San Juans in their annual migration and supported an intensive reef-net fishery historically. Reef-net fishing has been ethnographically reported in the San Juan Islands by Suttles (1951) and underwater archaeological remains associated with this fishery have been described by Easton (1985).

Environmental conditions within the immediate vicinity of the site are linked in several important ways to our final inferences regarding the overall significance of the site. The vegetation covering the bedrock knoll, which defines the apparent locus of cultural activity, is dominated by Douglas fir (*Pseudotsuga menziesii*), and Western hemlock (*Tsuga heterophylla*) forest in the deeper soils on the protected leeward side. On the windward southerly slopes and the exposed summit of the knoll, trees with shallower root systems, such as Pacific madrona (*Arbutus menziesii*), Rocky Mountain juniper (*Juniperus scopulorum*), and Garry oak (*Quercus garryana*) can be found in isolated pockets of loess that have accreted in bedrock depressions.

Floroturbation (mixing of soil materials caused naturally by plants) is extensive on the rocky windward exposures. Today, several examples exist of wind-thrown trees that have outgrown the capacity of the soil pockets to provide sufficient nourishment and root support. The root masses of such trees are known to redeposit large volumes of soil material, as evidenced dramatically by an example observed in 1995, that exhibited a root mass 15 feet in height, with granite boulders embedded within the root mass. Eventually, through decay and weathering, the displaced sediments and heavier objects in the matrix are dropped back to ground where the cycle may be repeated. This process may have considerable importance for understanding the archaeological deposits described in this report.

Another environmental characteristic of the site may be linked to its function, which can be seen in both broad economic terms and in terms of marine resource usage. Several small islands and over 22 rocky islets are located within 750 meters of the site. Some are as close as 200 meters or less. These islets are used throughout the year by sea mammals as safe resting places and seasonal birthing sites. Today, harbor seals (*Phoca vitulina*) are readily observed from the site in several haulout locations, one of which (Figures 2 and 3:#425) supports a present day population of between 100 and 500 harbor seals (Jeffries et al, 2000: 123). This islet is one of the four largest among 145 other, though mostly smaller, instances of these haulout sites in the greater San Juan Islands region.

Figure 2 - 45SJ414 Vicinity Detail



Complex geological processes during the Holocene certainly altered the relative sea level and consequently the distribution and size of these haulout sites. Tectonic events are documented in the area and isostatic rebound is evident in the glacial deposits south of the site where today, a long sequence of wave cut terraces is an important feature of the landscape. More stable bedrock formations underlie the site itself and the associated haulouts. The relatively flat but rocky underwater seabed in front of the site probably provided variations of the present day shoreline/ islet complex throughout the Holocene.

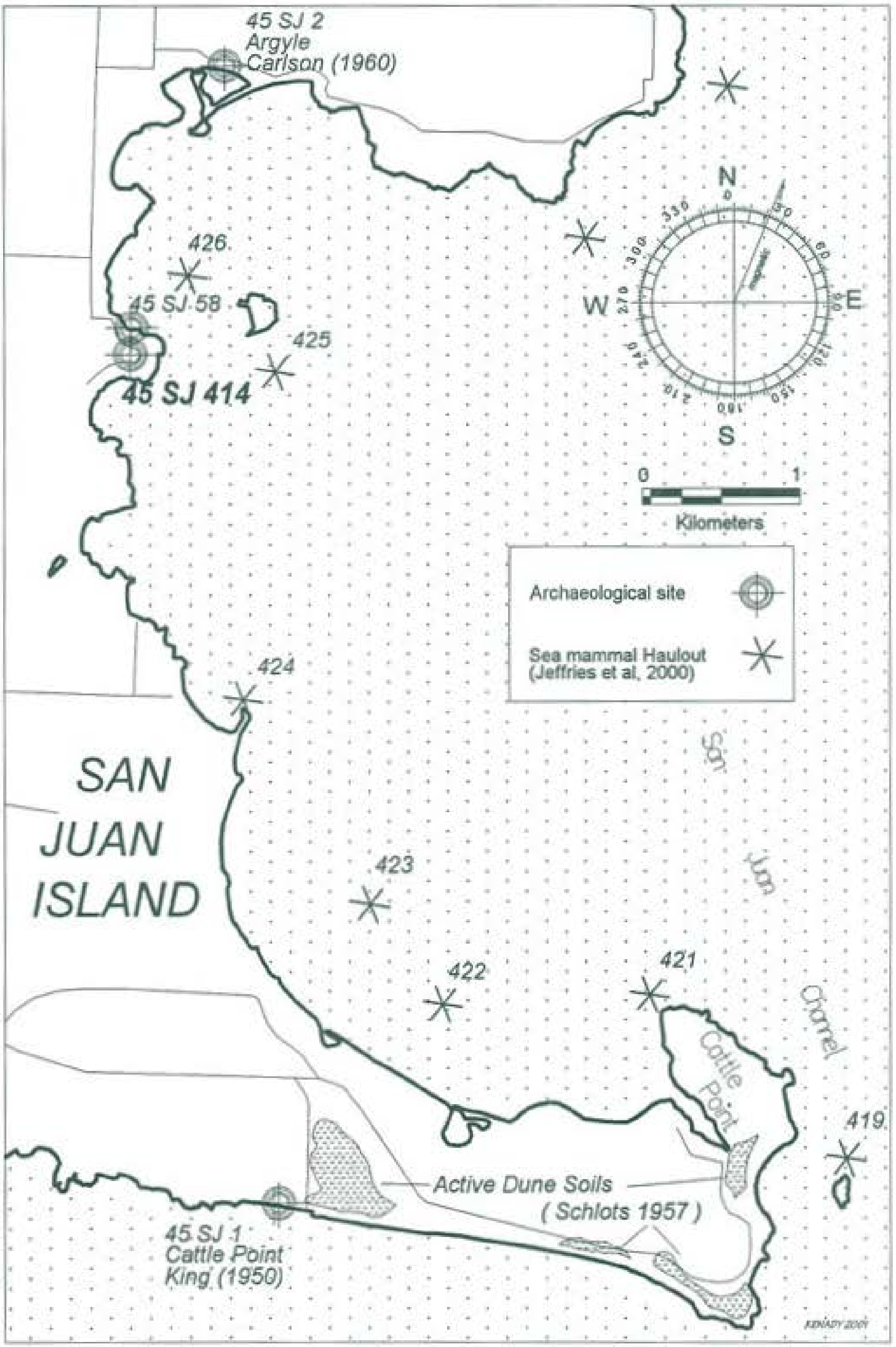
Although detailed geological study is beyond the scope of the present study, it is important to understand the sequential relationship between the relative sea level of the bedrock landform of the site and the glacial dunes to the south. It is possible that the bedrock site location was above sea level and available to human use before the emergence of the dune area south of the site. The dune area is apparently the primary source of the aeolian sediments in which the artifacts were found (see sediments and soils section below).

Archaeological Context of 45SJ414

Archaeological research in the San Juan Islands began at the turn of the century with the reports of William Thacker (1898a, 1898b and 1901), and later by Arthur Colley in 1926 (Sprague1975). Since then archaeology has been conducted by investigators associated with several universities. At least eight field schools have been conducted in the San Juan's, each with its own research goals, methods, and results. The data from these studies are available as published technical reports, unpublished theses and dissertations, and research papers. Most recently, cultural resource management programs, conducted by private, university, and government archaeologists, have added new information to the cumulative body of data about San Juan Islands archaeology.

The overwhelming majority of sites recorded in the islands is confined to the marine shoreline and its immediate vicinity. Riverine site locations do not exist here. In a 1985 study by Wessen (1986), previously recorded sites in the county were revisited and their forms updated. He reported that, of 241 confirmed sites, only six were classified as lithic, with the remainder classified as shell middens. None of the six contained buried archaeological remains and most represented very small collections or "lithic scatters". Figure 3 shows the DeStaffany site location and other nearby recorded sites. Two of these other sites are well documented shell middens (45SJ1 and 45SJ2); one (45SJ58) is a shell midden that has not been investigated.

Figure 3 - Site and Active Dune Locations



Although there is great variability in content and size within the class "shoreline shell midden", members of this class are similar in complexity. Most such sites are well stratified and contain a broad range of artifact categories. Fire-cracked rock; flaked and ground-stone artifacts, bone tools, ornamental objects, features, domestic refuse, structural remains, and occasionally human burials are found in shell middens. Shell midden sites can be quite large, often covering up to several acres in extent.

Faunal assemblages comprised of the remains of marine fish, invertebrates, birds, and mammals dominate the shell midden matrix. The taxonomic diversity exhibited by the islands' total archaeofaunal assemblage spans a broad range. Land mammals are represented by 18 taxa dominated by deer, elk, and dog; there are five sea mammal species represented, but harbor seals (*Phoca vitulina*) are typically the most common; sixteen species of birds and 18 of fish are reported as well (Bailey 1978, Bovy 1998, Carlson 1954, 1960, Kenady 2000, King 1950, and Wessen 1988). It appears likely that this assemblage of taxa accurately reflects the animal food resource exploited by the islands' inhabitants over the past 3000 years.

The early Holocene faunal assemblage of this region has not been documented, although two bison horn cores have been recovered from peat bogs on Orcas Island (Kenady 1991, Rensberger and Barnosky 1978), suggesting extinct populations of land mammals formerly inhabited the Islands. Investigators have described other extinct species found in shell middens formed in more recent periods throughout the archipelago. King (1950) reported recovering moose, mountain sheep, and mountain goat remains from the Cattle Point site on the south end of San Juan Island, although these identifications have not been confirmed. Black bear (*Ursus)* bone has been found in a site on San Juan Island (Kenady 1999) and in another midden on Orcas Island (Kenady 1993). And finally, elk (*Cervus*) are present in varying proportions in almost every shell midden reported in the area. Elk herds persisted in the islands until the arrival of firearms and settlement in the nineteenth century. It is clear, in any case, that the earliest occupants of the San Juan Islands may have co-existed with rather different mammalian fauna.

While most of the recorded sites have abundant faunal remains, artifact density is generally very low. At the English Camp site (45SJ24), flake tool density is reported to be typically less than 30 flakes /m^3 (Kenady 1995; Kornbacher 1992:177). In sharp contrast, the average density of flaked stone at the DeStaffany site measured 795 artifacts/m^3. Based just on the flaked stone artifact density the DeStaffany assemblage appears to represent activities quite different from those documented from the San Juan shell midden assemblages.

All lithic assemblages recovered from the San Juan Islands are dominated by a dense rock type, ranging from black to gray in color. This material is identified as "dacite" by Bakewell (Appendix 1), but has been described as "basalt" by earlier investigators. This rock type is ubiquitous in the region and the raw material is found in cobble form on beaches and in glacial deposits of every major island in the archipelago. Sources of other lithic raw materials are very limited. Obsidian artifacts in the islands are extremely rare and cryptocrystalline and microcrystalline materials are found in low frequencies as well. Slightly more common is a fine-grained green stone described as a metasediment

in this report. Other lithic materials, used primarily in ground-stone technologies, include slate, nephrite, argillite, sandstone, and schist.

A total of 41 radiocarbon dates has been reported from San Juan Island archaeological sites (OAHP n.d.), excluding two dates reported in the present study. All dates are between 160 B.P. (Stein 1992) and 2860 B.P (Benson 1981). Half of the samples (22) are from English Camp, and range in age from 160 B.P. to 1690 B.P. There are no investigated shoreline shell middens, or any other site types for that matter, older than 2860 B.P. in the San Juan Islands.

The chronological schemes referenced by various researchers are applicable, mostly to shell midden comparisons, and are not particularly useful analytical tools in the context of the present study. With the possible exception of the lanceolate point forms present in the early Cattle Point component, 45SJ1-1 (King 1950), the DeStaffany site bifaces show little similarity to those from other known San Juan County sites.

Older, early Holocene, sites are reported in similar, relatively sheltered, maritime environments north of the San Juan Islands in British Columbia. In its setting and archaeological content, the DeStaffany site possibly has its closest parallel at the Bear Cove site on the northeast coast of Vancouver Island (C. Carlson 1979). The lithics recovered at Bear Cove include leaf-shaped points, cobble-spall tools, and a number of large percussion flaked tools and cores. These materials were recovered from a non-shell deposit dated at 8020 ± 110 ^{14}C years B.P. underlying a shell midden. This early component of the site is located on a bench about 10 meters above mean high tide. The associated faunal assemblage distinguishes Bear Cover from sites with similar lithic assemblages in western Washington. Marine mammals comprise 78 percent of the Bear Cove mammalian assemblage. The vast majority of the marine mammal elements consist of porpoise and dolphin but fur seal, sea lion, and harbor seal are also represented. Land mammals include deer, canid, and river otter. Fish remains are dominantly rockfish but salmon, Pacific cod, pollock, sculpin, greenling, dogfish, and ratfish are also present. Bird remains were found too but not analyzed.

Carlson notes that there are numerous sea mammal rookeries in this area and interprets the site as an occupation of people whose subsistence system was focused on sea mammal hunting. She suggests that this hunting would have been done in boats or by clubbing seals on rookeries. Carlson notes that, while the lithic assemblage at Bear Cove is similar to those from other "Pebble Tool Tradition" sites, the faunal assemblage is not. This observation leads her to challenge the assumption by Borden and others that there is any simple relationship between lithic assemblages and subsistence (Carlson 1979:191). Although Bear Cove is frequently mentioned as evidence for heavy marine dependence in the early Holocene, Matson (1996:118) suggests that the faunal assemblage from Bear Cove derives from deposits overlying the earliest occupations that yielded the early radiocarbon date.

The Namu site, located on the central coast of British Columbia, yielded a lithic assemblage similar to those from DeStaffany and Bear Cove. Radiocarbon dates on an early non-shell component at this site indicate an age of 9700 B.P. ^{14}C years B.P. Although no faunal remains were recovered with this early occupation, some fauna were recovered from deposits dated between 7620 and 6310 B.P.; most

of the Namu faunal assemblage post-dates 6000 B.P. Despite this substantial disjunction between early dates and preserved fauna, it is nonetheless interesting that the faunal assemblage included delphinids, seals, sea lions, diverse marine fish species, and waterfowl.

Sediments, Soils, and Geomorphology

Site 45SJ414 is located on top of a local topographic prominence consisting of a glacially-smoothed, bedrock dome. Fine-scale topography on the dome surface is expressed as planar, nearly horizontal bedrock surfaces, interspersed with depressions and vertical escarpments not exceeding 3 m in vertical relief. Fine-grained, predominately silty, wind-blown (loess) deposits have accreted on some planar surfaces and in depressions. The largest and most prominent depression, on the summit of the dome, is the locus of the dense concentration of flaked stone excavated in 1972.

The fine-grained silt appears to form the distal end of a broad mantle of loess that covers a portion of San Juan Island. Upwind of the site, on the Cattle Point peninsula, is located a series of thick, active and stabilized dune fields (Schlots 1957 and Figure 3 this report). The primary source for most of these sediments is the coastal beach and immediately adjacent, eroding bluffs of glacial deposits at the southeastern end of the island. This source is located between 4.5 and 6.3 km southeast of 45SJ414. Other possible sources of eolian sediments include tephra ejected from Cascade volcanoes and silts from late-glacial outwash plains of the surrounding Puget Sound basin. Both of these source types are located at distances measured in 10s and 100s of km from the site.

The loess deposits observed in excavation and shovel test pits at 45SJ414 are texturally homogeneous and unstratified. Within this matrix are dispersed angular, pebble and cobble-size clasts of local bedrock fragments along with occasional, well-rounded and faceted cobbles and boulders of glacial origin. No obvious layers or lenses of primary tephra were observed; however, a discrete stratum buried approximately 1.6 m below ground surface in one portion of the site could be tephra-enriched. Examination of an uncleaned sample from this stratum under an optical stereomicroscope at a magnification of 45X indicated the presence of scattered glass shards. This observation is consistent with a secondary tephra deposit, wherein particles of volcanic glass are redeposited from their original site of deposition after the primary eruptive event.

The only clear stratigraphic variability observed in the site sediments is the expression of soil horizon formation. For the site generally, the uppermost horizon consists of a moderately developed, organic-rich A-horizon. It overlies a well-developed, reddish soil B-horizon. The degree of reddening is a function of the type of weathering processes occurring on-site and their duration, but in the absence of regional studies of chronosequences for other, similarly formed soil B-horizons, there is no basis for quantitatively estimating the age of this horizon. However, the degree of reddening of the B-horizon observed in some test pits is generally consistent with a long period of development, extending perhaps from the middle Holocene, possibly 6,000 or more years ago. In thinner loess deposits, the B-horizon overlaid bedrock, and in deeper deposits, unweathered loess (C-horizon) underlay the B-horizon down to bedrock.

Radiocarbon Age Estimates

Two radiocarbon dates were acquired from the site. However, no datable macroscopic organic remains were observed in the site sediment matrix. To overcome this problem, the first author extracted and concentrated datable carbon by washing and collecting the fine sediment adhering to the surface of flaked stone artifacts. For dating purposes, the samples thus collected were treated by Beta Analytic, Inc. as soil samples rather than as charcoal samples. Organic remains in the two samples yielded ages of 3750 ± 50 and 4750 ± 60 B.P. (Beta 84878 and Beta 84877, respectively; see Appendix 2).

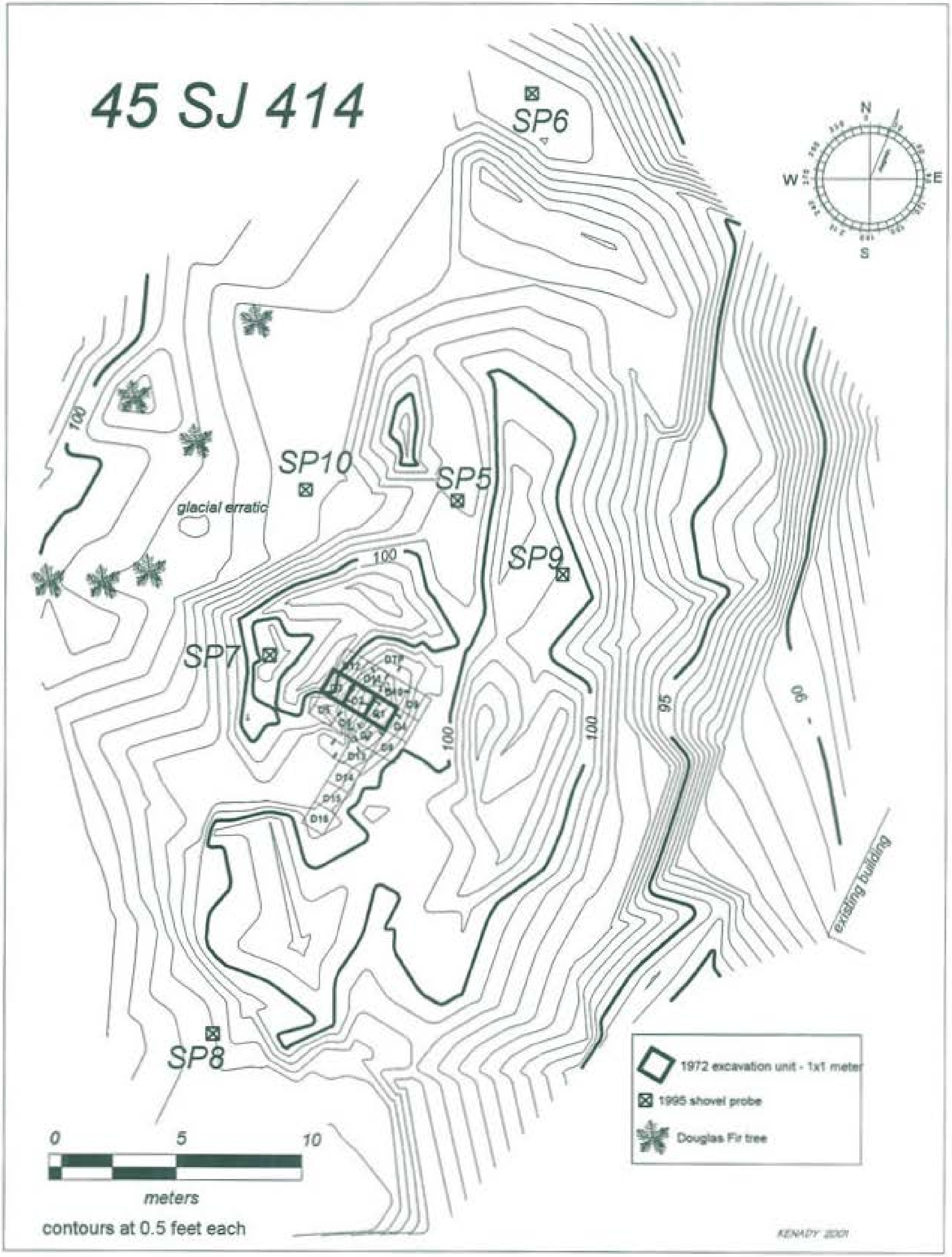
Although the dated organic remains are directly associated with the artifacts, there is no way to clearly demonstrate that they coincide temporally with cultural activity at the site. Furthermore, the organic residues in the samples were not separated and identified, so it is unknown which residues were dated. Such "soil dates" are notoriously difficult to interpret because each of the many different soil organic constituents are cycled through the soil matrix at different rates. For example, some residues may reside in the soil for thousands of years while others may break down or be biochemically recycled relatively quickly. As consequence, the "soil dates" only measure the average age of all of the organic remains in the sample. Such a date is said to measure the "mean residence time" of the soil organic remains. Given the above considerations, we interpret the two radiocarbon age estimates as upper limiting dates, meaning that the actual age of the site is most likely to be older than these two dates.

There are compelling reasons to believe that the artifacts were deposited very deep in the profile and must therefore predate the soils tested. Distribution analysis in this report supports that view. However, it can also be argued that the dates reflect the age of soils in another location since the dated sediments have on aeolian origin. In any case the radiocarbon dates are problematic and the result of an admittedly flawed sampling strategy.

Site Stratigraphy

Ten shovel probe test pits were dug in August, 1995, in order to expose and describe the site's stratigraphy, and to assist in determining site boundaries. These are shown in Figures 4 and 5 together with the 1972 excavation units and the site topography.

Figure 4 - Site Topography and Sampling Units



The overall results confirmed earlier observations that the site deposits lack virtually any depositional layering. However, the soil profiles revealed three different soil types at the site, based on the criteria of soil horizon sequence and degree of horizon development. The three different soil types are described below, one represented by SP5, another by SP6, and the third type by SPs 7-10.

Test Pit SP5 Description

Soil Horizon	Unit Description
A	Black (5YR2.5/1m), silt loam, granular soil structure.
B	Dark reddish brown (5YR3/3m), moderately sorted silt, developed in loess. Note: a stone flake was recovered *in situ* in the top of this horizon.

Test Pit SP6 Description

A	Very dark brown (7.5YR2.5/2m), granular soil structure, developed under open-canopy, Douglas-fir and Madrona forest, with predominately Oregon grape ground-cover.
B	Brown (7.5YR4/4m), moderately sorted, silt matrix encasing angular pebbles of local bedrock lithology, developed in loess, possibly tephra-enriched.
C	Brown (10YR4/3m), moderately sorted, silt, developed in loess parent material, possibly tephra-enriched.

Test Pits SP7-SP10 Description

A	Very dark brown (10YR2/2m), moderately sorted, fine sandy silt, horizon developed in loess under grass.
R	Bedrock

Lithic Raw Material Types

The DeStaffany site lithic assemblage was created from relatively few distinct rock types. These are described here and in Appendix 1. Although a total of six different lithic material types is recognized in the DeStaffany assemblage in this report, nearly the entire assemblage consists of vitrophyric dacite. The remainder consists of several unique pieces made of volcaniclastic chert, altered vitric tuff, marbeloid, chalcedony, and metasediment. The dacite, chert, tuff, and marbeloid have been identified by Bakewell through petrographic and trace element analysis (Appendix 1). The chalcedony and metasediment artifacts were identified by hand specimen identification only (both specimens are bifaces, which were not subjected to the thin-sectioning required for petrographic analysis). Elsewhere, Bakewell (1990) has assigned the name "San Juan Dacite" in referring to this lithic type, which is so prevalent in archeological assemblages in the San Juan Islands. In fact, in the senior author's 30 years of professional archaeological experience in San Juan County, tool stone types other than dacite are very uncommon in other archeological assemblages. Bakewell (Appendix 1) agrees with the uniqueness of the non-dacite lithic types, stating in his analysis that they "match no materials that I have analyzed in this region".

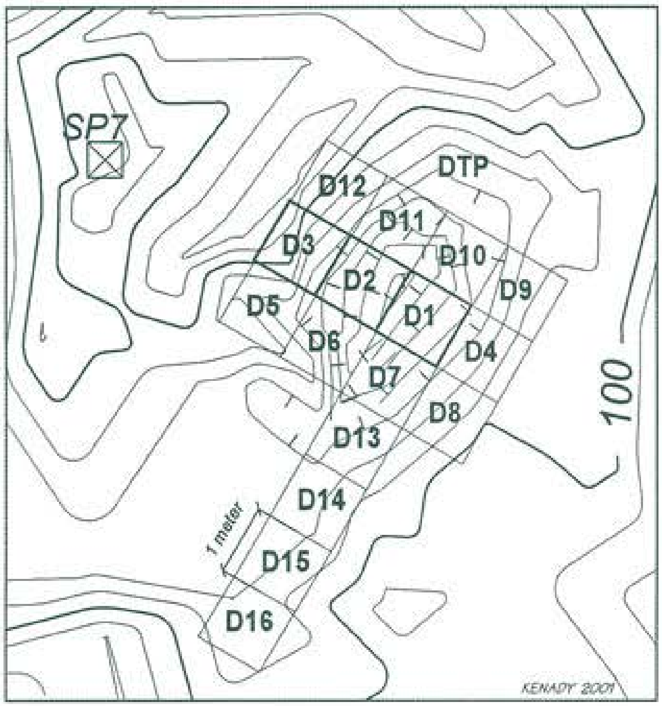
A prominent characteristic of the dacite in the DeStaffany lithic assemblage is the weathered outer surface that characterizes some artifacts (of a sample of 1058 pieces of dacite flakes, 8.7% exhibited this weathered appearance). In other sections of this report (the descriptive analysis of the bifaces and Appendix 1and 3) this "weathering rind" or "patenation" is described and its origin is considered. Whereas Bakewell (Appendix 1) suggests that this patenation is caused by intentional thermal alteration, we offer evidence to support a natural origin for its occurrence.

Methods and Results

The methods used to salvage the site were limited by the resources at hand and the availability of workers. The excavation, directed by Kenady, was done in two separate phases using comparable techniques. This report is limited to data collected from the first phase. This initial site work employed student labor from a joint University of Washington and University of Idaho field school over a three-week period beginning in mid June 1972. The second phase of the excavations was conducted during a one week period in mid August after the Field School closed. Two paid field technicians, Janet Boyd and Charlotte Benson, continued the work. They were employed by an independent, privately funded study, the San Juan Islands Archaeological Research Project (SJIARP), which was being directed by Kenady in the islands at the time.

The strategy during the first phase was to remove the partially disturbed sediments, in the area where the landowner had begun excavation, in order to create a straight edge and vertical profile of the remaining intact portion of the site. All of the sediments from these activities were dry screened through ¼-inch mesh, and collected as a single unit. Screening recovered 1552 artifacts from this operation designated in site records as provenience unit "DTP". Although the volume of this excavation was not accurately recorded, 1.2 cubic meters of sediments is a reasonable estimate.

Figure 5 - Sampling Unit Detail



This resulting profile provided a baseline for a 1x1 meter grid that was established over the remaining, apparently undisturbed, area of the site to the southwest (Figure 5). The first controlled one meter excavation units, pits D1, D2, and D3, were dug one meter south and parallel to the first wall creating a one meter trench sided by a one meter wide balk on the north east side. This balk could be viewed from both sides, making it potentially useful for recognizing stratigraphic units during the final excavation.

These three excavation units produced 1058 flake tools that were collected in 20 level bags, and later labeled and catalogued in the Field School Lab. Artifacts from the DTP units were cataloged and labeled at the same time. In addition the lab processed 17 vials of flaking detritus, and the bifaces described in detail in a later section of this report.

Later, in August during the second phase of the work, SJIARP excavated eight additional one meter excavation units. Units D4, D5, D6, D7, D8, D9, D10, and D13 (Figure 5) were dug to bedrock. Artifacts, soil, and feature samples were placed in 58 labeled bags for future cataloguing and labeling. These specimens were stored at the University of Washington and an unknown number were later returned to the DeStaffany family by the Burke Museum. These artifacts, that represent an estimated 75% of the collection, remain unrecorded and unanalyzed. The Burke Museum houses a portion of the collection that has been unavailable for study and returned another portion to the landowners where it is reportedly stored in a garden shed.

Artifacts from units D1, D2, D3, and DTP were cataloged and labeled according to their origin. For example the first artifact from the third level in D1 was labeled "D1-3/1" and the next "D1-3/2" and so on. Artifacts assigned alphabetical codes in this report were recovered from the property owner's backdirt pile. Thus information related to excavation history was recorded directly on each artifact without reference to a catalogue. This redundancy in recording proved to be very helpful in later analysis. During excavation, each level was recorded on a form that included a drawing of the floor of the finished level, and required tallies of fire-modified rock, feature description, and bag numbers. These primary records together with the artifact number codes provide important structure for the present analysis.

Each artifact was measured by placing the object on a millimeter grid and recording the maximum length and width at the perpendicular axis. Weight was then measured in tenths of ounces on an

electronic postage scale. Six additional general attributes were recorded. Material, presence or absence of cortex and presence or absence of "rind" describe the physical character. Three very general groups of manufactured qualities were noted as well. If an object was bifacially flaked, or appeared to be a retouched flake it was recorded as such. Some of these were worn and some were re-sharpening flakes. Finally, if an object had intersecting flake scars on only one side it was noted as a "Primary Flake" to distinguish it from shatter. These characteristics were recorded with the expectation that patterns would emerge to direct more detailed analysis. Appendix 3 tabulates these observations which are summarized in Table 1. While useful, the database generated for this report is no substitute for a thorough analysis of the flake tool category which may contain utilized, worn or unifacially retouched artifacts. More detailed study of these artifacts is warranted. Figure 6 illustrates examples of typical flake tools described in the text.

Figure 6 - Modified and Worn Flake Tools

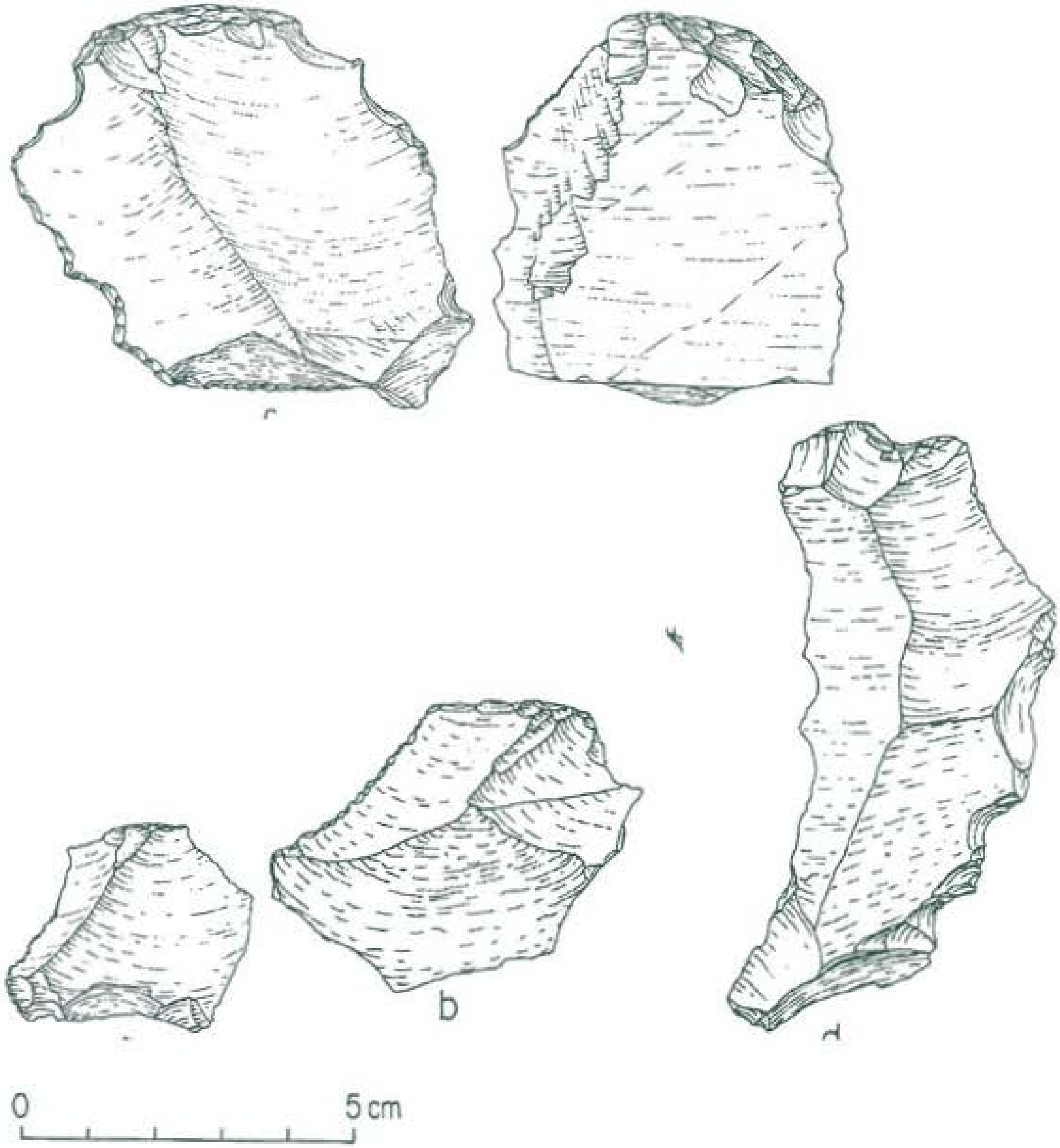


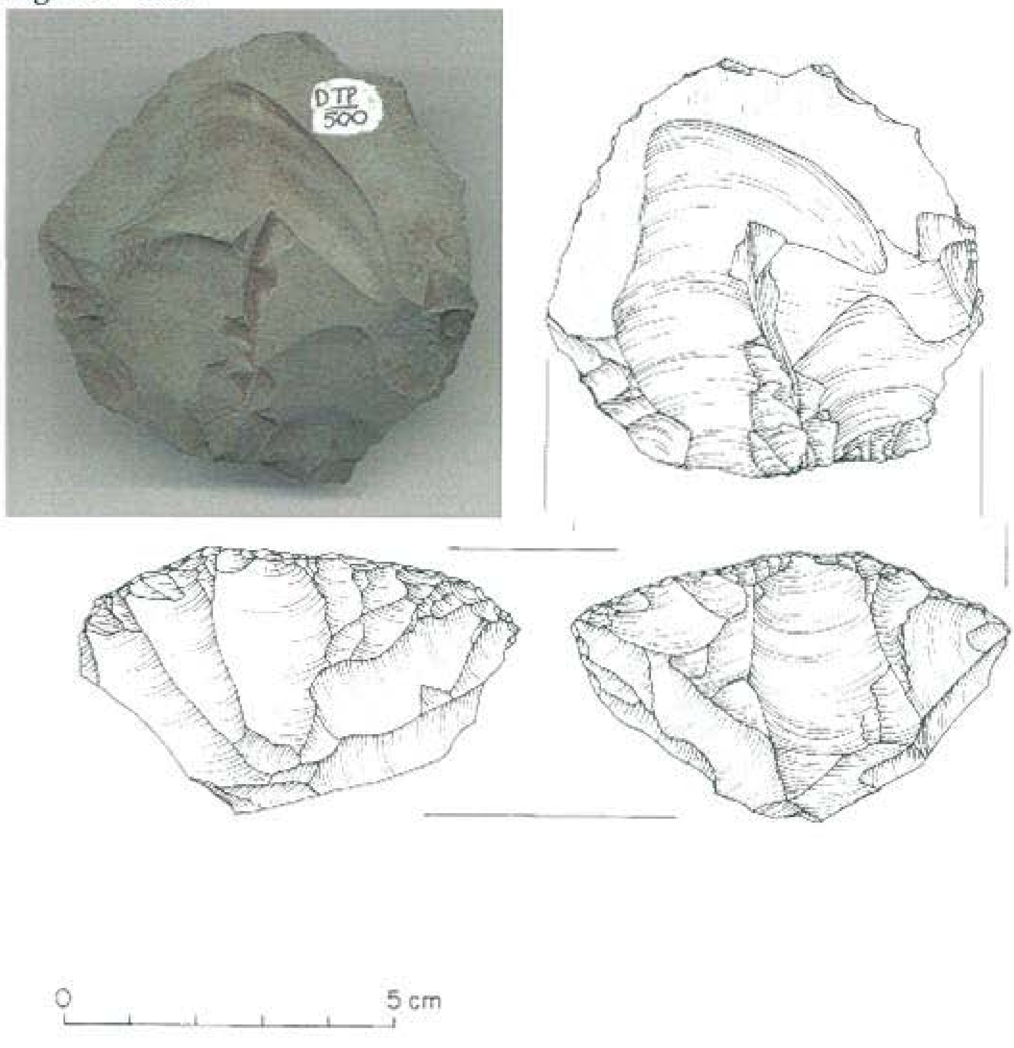
Table 1 - Flake Tool Summary

Lot - Level	Total	Average Weight	Rind	Cortex	Primary Flake	Resharpening	Biface
D1-2	14	.13	1	4	5	1	0
D1-3	30	.10	4	0	12	2	1
D1-4	215	.29	19	25	108	18	2
D1-5	106	.31	11	9	22	16	1
D1-6	25	.42	3	3	11	3	0
D2-2	74	.16	5	5	33	6	1
D2-3	89	.11	5	4	30	14	1
D2-4	80	.13	9	11	35	8	1
D2-5	178	.38	17	33	93	16	3
D2-6	76	.21	7	11	35	5	2
D3-1	18	.12	1	2	6	2	0
D3-2	34	.09	1	13	0	0	0
D3-3	46	.16	4	1	19	4	0
D3-4	59	.16	7	6	30	4	2
D3-5	14	.29	2	6	3	0	1
TOTAL	1058		96	133	442	99	15

Five main categories of material were recognized for descriptive purposes. The most common material, dacite, was noted in the database as a blank entry. Type one is bedrock (99 Pieces). Type 2 is a fine-grained green metasediment (12 pieces). Type 3 is a gray stone with red specks and some and red banding (28). It has been identified as a "marbleoid" by Bakewell. Type 4 is a green to grey material with a gritty texture, probably Bakewell's "altered vitric tuff."

In addition, other noteworthy artifacts in the collection besides the flakes and bifaces were two cores one of which is illustrated in Figure 7. This core is the same Type 2 green metasediment material as artifact DTP / 481 in the B - 4 Broad Stem Series described in the section on bifaces. The other core not illustrated, D1-4/162, is made from Material type 3.

Figure 7 - Core



No specimens of the following were found in the site choppers: pebble tools, microblades, fire-cracked rock, tools made by abrasion or pecking, art objects, features, bone or shellfish remains.

Descriptive Analysis of Bifaces

Introduction

This section describes the physical attributes of a sample of bifaces (n=45) recovered from 45SJ414, including all those of cultural and diagnostic significance. All bifaces were recovered from below the ground surface, initially following the site's discovery by the landowner in 1972, then during archeological excavations in 1972, and most recently, during shovel pit testing in 1995 to determine site boundaries. Ten attributes were systematically recorded from each biface. These include planview outline shape, cross-section shape, biface manufacturing stage, flake-scar pattern, flake-scar sequence, type of edge modification, location of breakage, lithic raw material type, type of weathering, and coatings. These attribute data form the basis for inferences made in this report regarding site age, function, and other aspects of site use.

General Biface Morphology

Outline shape of bifaces is categorized as lanceolate, ovate, or triangular. Lanceolate is defined by excurvate lateral margins (sides) converging at either end in a point; this shape is often referred to as "bi-pointed" or "leaf-shaped". Ovate is defined by more strongly excurvate sides that converge in rounded ends. Triangular is defined by straight sides that converge in a point at the distal end. Nearly 90% of the bifaces are lanceolate, with a few ovate, and one triangular (Table 2).

Table 2 - Planview Outline Shape

CATEGORY	NUMBER	PERCENT
Lanceolate	40	89
Ovate	4	9
Triangular	1	2
TOTALS	45	100

The cross-section shape is categorized as bi-convex, diamond, plano-convex, and triangular. This attribute is determined by visual inspection at the midpoint along the longitudinal axis of the object. Most bifaces are bi-convex in cross-section, with less than 10% each of diamond, plano-convex, and triangular (Table 3).

Table 3. Cross-section Shape

CATEGORY	NUMBER	PERCENT
Bi-convex	36	80
Diamond	2	4
Plano-convex	4	9
Triangular	3	7
TOTALS	45	100

Stage of Manufacture

Bifaces are categorized according to the degree of completeness of manufacture. The categories are meant to identify points along the continuum of transformation in object shapes, beginning with the unmodified raw material, to the final and completed tool form. Manufacturing categories are defined as I through V, and are slightly modified from earlier definitions used by Callahan (1979) and Ahler (1986). The attributes used to categorize bifaces include the presence of unflaked cortex, type of flake scars, sinuosity of margins, symmetry, and thickness relative to width, among others.

Biface I is the category representing the initial shape of an object prior to bifacial flaking. This category may be described by any number of shapes, depending on the form in which the raw material occurs naturally and the kinds of cleaning and preparation it has been subjected to prior to biface manufacture. Biface II reflects initial, rough shaping, exhibiting some cortex, an asymmetrical outline, sinuous margins, deep and irregular percussion flake-scars, and a thick, irregular cross-section. Biface III reflects an intermediate stage of manufacture, showing more symmetry due to greater regularity and control of the flakes removed; margin sinuosity is reduced, as is thickness relative to width; all cortex is removed. Biface IV reflects a complete or nearly complete form having bilateral symmetry; straight, acute-angled, and sharp margins; a small cross-sectional thickness to width ratio; secondary pressure flake-scars partially or completely obscure primary percussion flake-scars of earlier stages. Biface V is a category that exhibits additional flaked refinements, such as precise edge-sharpening or edge serration, or manufacture of shoulders, stems, barbs, and notches. None of the assemblage is classified as B-1, although 4 (9%) of the bifaces were manufactured from large flakes (Table 4). This is evidenced by the fact that one face of each of these consists of the ventral surface of a large flake. Other B-1 forms are possible, but this indicates that at least some of the bifaces were manufactured from large flakes that had been removed from a larger mass of raw material, or nodule, rather than being made directly from the nodule. Most of the bifaces, nearly 60%, are categorized as intermediate B-3 forms, with approximately 30% categorized as complete forms (B-4 and B-5). Only about 11% reflect primary, early stage forms. This relative abundance of intermediate and complete forms could indicate that the initial procurement, cleaning, and shaping of the stone raw materials used to manufacture biface tools was conducted at a location outside of the site boundaries.

Of the 14 B-4 and B-5 bifaces, 10 (71%) are categorized as either Olcott or Western-stemmed series, with the remainder indeterminate. "Olcott" is used to describe a series of mostly western Washington flaked-stone points having a leaf-shaped, often bi-pointed outline (Kidd 196?). "Western-stemmed" describes a series reflecting a wide range of points found across western North America dating to the early Holocene, and characterized by lanceolate blades having a prominent stem, defined shoulders, and meticulous use of pressure-flake removal in the final stages of manufacture (Willig et al.).

Table 4 - Biface Manufacturing Stage

BIFACE CATEGORY	NUMBER	PERCENT
B-2	5	11
B-3	26	58
B-4	6	13
B-5	8	18
TOTALS	45	100

In large biface assemblages, the ratio of width:thickness shows a regular increase as a function of degree of completeness (Ahler 1986). Thus, late-stage bifaces exhibit a larger ratio than do primary stage bifaces. This reflects an overall intent to manufacture thin bifaces, for whatever purpose. Thinness is correlated with more acute margins and both morphological attributes are desirable for bifaces that functioned as knives or projectile points. The ratio values shown in Table 5 do not exhibit a regular increase with degree of completeness, as might be expected. This could be due to any number of factors, including the small sample size of some of the biface categories, or it could reflect a systematic behavior pattern, such as the preferential use of some biface categories to perform certain functions.

Table 5 - Biface Metric Attributes by Category *

BIFACE CATEGORY	LENGTH	WIDTH	THICKNESS	W:T RATIO
B-2 (n=5)	**6.75** 1.70	**3.64** 1.32	**1.29** 0.38	**2.79** 0.65
B-3 (n=26)	**6.00** 1.39	**3.62** 0.54	**1.01** 0.16	**3.68** 0.80
B-4 (n=6)	**6.44** 2.07	**2.84** 0.65	**0.87** 0.26	**3.33** 0.60
B-5 (n=8)	**5.55** 3.35	**2.23** 0.66	**0.63** 0.22	**3.69** 0.79

*The upper bolded value = mean, the lower value = standard deviation.

Pattern of Flake Removal

The orientation of flake scars is defined by: irregular, irregular/collateral, and collateral. Irregular exhibits the absence of a systematic flake-scar pattern on both surfaces of the biface. Collateral exhibits parallel flake-scars, either horizontal or oblique, on both surfaces of the biface. The irregular/collateral category exhibits both flake-scar patterns. Irregular flake-scars characterize most (76%) of the assemblage. Irregular/collateral are common (22%), and consisted of 5 Olcott, 2 Western-stemmed, and 3 of indeterminate series. Only one biface, an Olcott series, was uniformly collaterally flaked (Table 6).

Table 6 - Flake-scar pattern

CATEGORY	NUMBER	PERCENT
Irregular	34	76
Irregular w/Collateral	10	22
Collateral	1	2
TOTALS	45	100

The order in which different kinds of flakes are removed can be discerned where a later flake-scar pattern cross-cuts an earlier flake-scar pattern. Percussion flake-scars have deep negative bulbs, are irregular in outline shape, and are larger than 5 mm across (many are considerably larger than this); pressure flake scars exhibit parallel to near-parallel margins, have shallow negative bulbs, and are less than 5 mm wide. A flake-scar pattern is considered primary if it overlies an unflaked surface; it is considered secondary if it overlies an earlier pattern; and it is considered tertiary if it overlies a secondary pattern.

Bifaces were categorized according to the latest (or overlying) flake-scar pattern visible. The four categories are primary percussion, secondary percussion, secondary pressure, and tertiary pressure (Table 7). The majority of bifaces (56%) exhibit only a primary percussion flake-scar pattern, but 24% exhibit tertiary flake-scars across some portion of the biface surface. One exceptional biface exhibits a percussion flake-scar pattern cutting into a finely-controlled, tertiary pressure flake-scar pattern, and this case was categorized as tertiary pressure. The subsequent percussion flaking appears to represent reworking of a broken biface that was shouldered and stemmed.

Although not shown in the tables, nearly all percussion-flaked bifaces fall into the biface 2 and 3 categories, and most of the pressure-flaked bifaces are category 4 and 5.

Table 7 - Flake-scar sequence

CATEGORY	NUMBER	PERCENT
Primary percussion	25	56
Secondary Percussion	2	4
Secondary Pressure	7	16
Tertiary Pressure	11	24
TOTALS	45	100

Lateral Margin Modification

Biface edges are classified according to the margin morphology seen under a stereomicroscope at magnifications between 7X and 40X. Edge categories are defined as: none, wherein the edge exhibits a sharp, acutely-angled margin that is unblunted; a ground/crushed edge exhibits margin segments having multiple, stacked-step fractures and/or an uneven, sometimes jagged topography; an edge showing a noticeable, high-gloss luster on the magnified margin is categorized as polish; and an edge exhibiting smoothly rounded, as distinct from sharply-acute margins, is categorized as rounded/smoothed. Seventy-six percent of the assemblage shows either no edge alteration or a ground/crushed edge; 20% are polished and 4% are rounded/smoothed (Table 8).

Of the 38% categorized as ground/crushed, it was not possible to determine a functional cause for the alteration, and it is assumed here that the cause is intentional edge grinding in preparation for another series of flake removals. It is possible, however, that tool use of the edge accounts for some margin alterations.

Nearly all biface edges and flake-scar margins show a slight, but noticeable degree of polishing. Such polish is probably due to abrasion from wind-transported fine sand and silt-size particles of the aeolian parent materials of the site's soil. However, the 20% categorized as "polish" show a degree of edge luster noticeably exceeding the background level that appears to have occurred on all other specimens in the collection. Of these 20% (9 bifaces), 5 are B-3, and 4 are B-4 and B-5. Of the nine bifaces, three are Olcott series and one is Western-stemmed series. The fact that polish does not occur evenly across all biface types, but seems to occur in both middle and late-stage bifaces, may be evidence for functional tool use. Tool use probably accounts for most of this polishing, such as from cutting or scraping a soft material like hide or meat, or a finely abrasive material, such as soft fiber or other soft plant parts. Overall however, the presence of polish remains somewhat problematic for interpreting tool function with any certainty.

Only two (4%) bifaces exhibit rounded/smoothed margin segments, that are considered here to result from tool use. This use, as with polish, is likely to reflect cutting or scraping a soft material like hide or meat, or a finely abrasive material, such as soft fiber or other soft plant parts. One of these bifaces is an Olcott series B-5 and the other is a B-4 of indeterminate series. Although the evidence from biface morphology is not compelling, it does appear to support the idea that some of the bifaces were used, possibly to cut or scrape, a soft material.

Table 8 - Type of Edge Modification

CATEGORY	NUMBER	PERCENT
None	17	38
Ground/crushed	17	38
Polished	9	20
Rounded/smoothed	2	4
TOTALS	45	100

Biface Breakage Pattern

For the biface assemblage as a whole, 82% (37) are broken and 18% (8) are complete. Of all breaks recorded, most occurred somewhere along the mid-length of the biface (Table 9). Although the frequency of proximal breaks exceeds distal breaks, the distinction between these break locations is problematic in early to middle stages of tool manufacture. There are nearly equal proportions of oblique and horizontal breaks (48% to 52%).

Finished bifaces (B-5) might be expected to exhibit a breakage pattern, reflecting the type of use and the type of hafting. Bifaces of the Olcott and Western-stemmed series are believed to have been hafted in sockets hollowed out in the end of a shaft (Bryan 1980). When a point or knife in such a haft is broken transversely during use, the stem or proximal end remains in the hafting element, and in a large assemblage of such tools, it is expected that most breaks would occur near the proximal (hafted) end of the tool. Of the 10 bifaces assignable to a series, seven exhibited a total of 10 breaks. Of these breaks, 50% were mid-length, 40% proximal, and 10% distal. Clearly, more proximal than distal breaks occur in the finished bifaces, but the sample size is too small to discount sampling error.

Table 9 Location of Break

CATEGORY	NUMBER	PERCENT
Mid-length	27	61
Proximal	11	25
Distal	6	14
TOTALS	44	100

Raw Materials

Three categories of raw material type are defined for the sample of bifaces, with one of these subdivided into three color varieties. These are dacite, metasediment, and chalcedony. The vitrophyric dacite is described in Bakewell's analysis (this report). Except for one metasediment type and one chalcedony type, the assemblage is dominated by dacite (96%).

Table 10 - Lithic Raw Material Type

CATEGORY	NUMBER	PERCENT
Dacite, black	38	84
Dacite, gray	4	10
Dacite, white	1	2
Metasediment, green	1	2
Chalcedony, white	1	2
TOTALS	45	101

Characteristics of Surface Coatings

One of the most prominent characteristics of the biface sample is the physical appearance of flake-scarred surfaces, which are for the most part, coated with a tenacious film of soil particles. These silt size particles adhere to the outer surfaces of the glassy-appearing dacite, and if such a surface exhibits chemical alteration compared with the unaltered, glossy matrix, the object is considered to have a weathered surface. Two categories of weathered surface are recognized: dull and chalky. If the flaked surface is mostly silt-coated and with slight color alteration and lower gloss of the glassy matrix, it is categorized as dull; if the weathered surface has a measurable thickness and appeared porous, it is categorized as chalky (this latter category corresponds with "patenated" samples, DS6-8, of Bakewell's report). Any object exhibiting a weathered surface that formed prior to flaking (ie., on unflaked surfaces) is designated as geologic cortex (gc). Only two of the bifaces (4%) exhibited geologic cortex over part of the exterior surface.

Table 11 shows that about three-quarters of the sample is characterized as having a dull weathered surface. Nearly one-quarter of the sample is patenated. Bakewell describes this altered rind as 1-2 mm thick, darker, and "burned". Under the stereomicroscope, the rind exhibits numerous vacuoles and pits, most of which were created by selective loss or weathering of crystalline material (on fresh interior dacite surfaces, numerous dark phenocrysts are embedded in a finer, glassy groundmass). Bakewell believes this rind was created by thermal alteration. Although this may be true, it has not been demonstrated, and in fact, several factors may contribute to the formation of patenation.

Only two bifaces exhibited geologic cortex. In one case, a water-smoothed cortex covered a portion of the dorsal surface of a B-2. This type of cortex is characteristic of cobbles along marine beaches, adjacent to or in river channels, and in glacial deposits. In the second case of geologic cortex, a small portion of the biface exhibited a dull, weathered surface similar in appearance to weathered surfaces on rock fragments in talus, on bedrock faces, on alluvial fans, and other natural exposures of weathered bedrock. With few exceptions then, nearly all weathered biface surfaces are a post-manufacturing phenomenon.

Table 11 - Type of Weathering on Flaked Surfaces

CATEGORY	NUMBER	PERCENT
Dull	34	76
Chalky	10	22
Trace	1	2
TOTAL	45	100

While conducting the analysis, several bifaces were observed with distinctive but uncommon, red coatings, the most prominent of which were barely visible without magnification. Microscopic examination at 70X revealed two different types of red coats. The first consists of a dense concentration of strongly red-hued crystals (probably ferric oxide), usually lining pits on the weathered surface, indicating phenocryst or other mineral alteration. This alteration, where it appears, is visible on all biface surfaces. The other category of stain is also strongly red-hued, but appears as an amorphous coating, in but a few scattered locations on any one biface. These coatings sometimes appear on or near margins, and sometimes removed from any margin. It is possible, but, in the absence of diagnostic tests, uncertain if these stains resulted from the intentional application of red ocher, an important Native American pigment. One-fifth of the bifaces exhibited red coatings, with three (6%) categorized as pitted and six (13%) as red-stained (of uncertain origin).

Table 12 Type of Coating

CATEGORY	NUMBER	PERCENT
None	36	80
Red stains	6	13
Pitted	3	7
TOTALS	45	100

Metric Attributes of Bifaces

Metric attributes of the sample of 45 bifaces were measured in cm and are recorded in Table 13. Maximum length, width, and thickness were measured with a hand-operated, stainless steel calipers, having a vernier scale accurate to 0.1 mm. A measurement error of 0.02 cm was calculated by remeasuring 10% of the sample, and dividing the sum of the differences by the number of measurements. Illustration locations for individual artifacts are noted in the table as figure numbers found in this report.

Table 13 - Metric Attributes Of Bifaces

BIFACE TYPE	ILLUSTRATION	CATALOG NO.	LENGTH	WIDTH	THICK	W:T RATIO	SERIES
B-2 (n = 5)	Figure 8	B	4.29	3.23	1.18	2.74	ind
	Figure 8	DTP/18	6.13	4.91	1.27	3.87	ind
	Figure 8	DTP/432	8.84	3.06	1.15	2.66	ind
	Figure 8	DTP/524	7.58	1.94	0.93	2.09	ind
	Figure 8	DTP/786	6.90	5.04	1.94	2.60	ind
		MEANS	**6.75**	**3.64**	**1.29**	**2.79**	
		STD DEVIATION	**1.70**	**1.32**	**0.38**	**0.65**	
B-3 (n = 26)	Figure 9	C	7.65	3.08	1.04	2.96	ind
	Figure 9	D	5.20	2.99	0.94	3.18	ind
	Figure 9	D1-4/38	4.11	2.90	0.81	3.58	ind
	Figure 9	D1-4/94	3.79	3.00	0.74	4.05	ind
	Figure 9	D1-5/80	6.60	4.50	1.13	3.98	ind
		D2-5/163	6.09	3.76	0.92	4.09	ind
		D2-6/48	4.53	3.70	0.80	4.63	ind
	Figure 9	DTP/193	7.25	3.92	1.17	3.35	ind
	Figure 9	DTP/490	10.07	3.62	0.94	3.85	ind
		DTP/508	5.43	3.18	1.27	2.50	ind
	Figure 10	DTP/51	5.64	4.51	0.77	5.86	ind
	Figure 10	DTP/522	7.10	3.45	1.21	2.85	ind
	Figure 10	DTP/530	7.28	3.37	1.03	3.27	ind
	Figure 10	DTP/532	6.93	3.04	0.94	3.23	ind
	Figure 10	DTP/533	3.99	3.83	0.76	5.04	ind
		DTP/547	5.16	3.92	1.01	3.88	ind
	Figure 10	DTP/557	6.10	3.94	1.01	3.90	ind
		DTP/585	5.98	3.82	1.17	3.26	ind
	Figure 11	DTP/602	6.53	4.89	0.99	4.94	ind
	Figure 11	DTP/607	7.60	3.89	1.13	3.44	ind
	Figure 11	DTP/694	5.58	4.27	1.09	3.92	ind
	Figure 11	E	4.81	3.81	0.96	3.97	ind
	Figure 11	F	5.15	3.02	1.03	2.93	ind
	Figure 12	G	6.74	3.41	1.35	2.53	ind
	Figure 12	H	4.79	3.38	0.87	3.89	ind
	Figure 12	J	5.86	2.85	1.06	2.69	ind

BIFACE TYPE	ILLUSTRATION	CATALOG NO.	LENGTH	WIDTH	THICK	W:T RATIO	SERIES
		MEANS	**6.00**	**3.62**	**1.01**	**3.68**	
		STD DEVIATION	**1.39**	**0.54**	**0.16**	**0.80**	
B-4 (n = 6)	Figure 14	DTP/481	7.83	3.43	0.81	4.23	Western Stemmed
	Figure 15	DTP/525	9.96	3.41	1.16	2.94	Olcott
	Figure 15	DTP/566	5.26	2.62	0.68	3.85	Olcott
	Figure 13	DTP/660	4.39	1.72	0.56	3.07	ind
	Figure 15	I	5.45	2.68	0.83	3.23	Olcott
	Figure 14	K	5.74	3.18	1.20	2.65	Western Stemmed
		MEANS	**6.44**	**2.84**	**0.87**	**3.33**	
		STD DEVIATION	**2.07**	**0.65**	**0.26**	**0.60**	
	Figure 16	A	4.86	1.79	0.75	2.39	Olcott
B-5 (n = 8)	Figure 14	D1-5/109	4.43	1.77	0.36	4.92	Western Stemmed
	Figure 16	D2-6/9	13.20	3.52	1.01	3.49	Olcott
	Figure 13	DTP/1258	3.24	1.64	0.48	3.42	Ind
	Figure 16	DTP/539	5.67	1.89	0.45	4.20	Olcott
	Figure 13	DTP/568	2.58	2.32	0.52	4.46	ind
	Figure 16	DTP/591	3.81	2.03	0.61	3.33	Olcott
	Figure 13	DTP/656	6.58	2.89	0.86	3.36	ind
		MEANS	**5.55**	**2.23**	**0.63**	**3.69**	
		STD DEVIATION	**3.35**	**0.66**	**0.22**	**0.79**	
TOTAL = 45							

These data reveal a pattern having widespread geographic distribution, which is shown in the mean values, wherein bifaces become thinnest in the finished tool shape. Because all but two of the sample of 45 bifaces are made of the same dacite rock type, the trend towards increasing mean width:thickness ratio seems to reflect a local biface-manufacturing focus at the site. This conclusion is supported by comparable results from another study of an even larger sample of bifaces reflecting a local biface-manufacturing focus, this in the upper Skagit River Valley of Washington (Mierendorf et al. 1998).

Figure 8 - Biface Type B - 2
Indeterminate Series

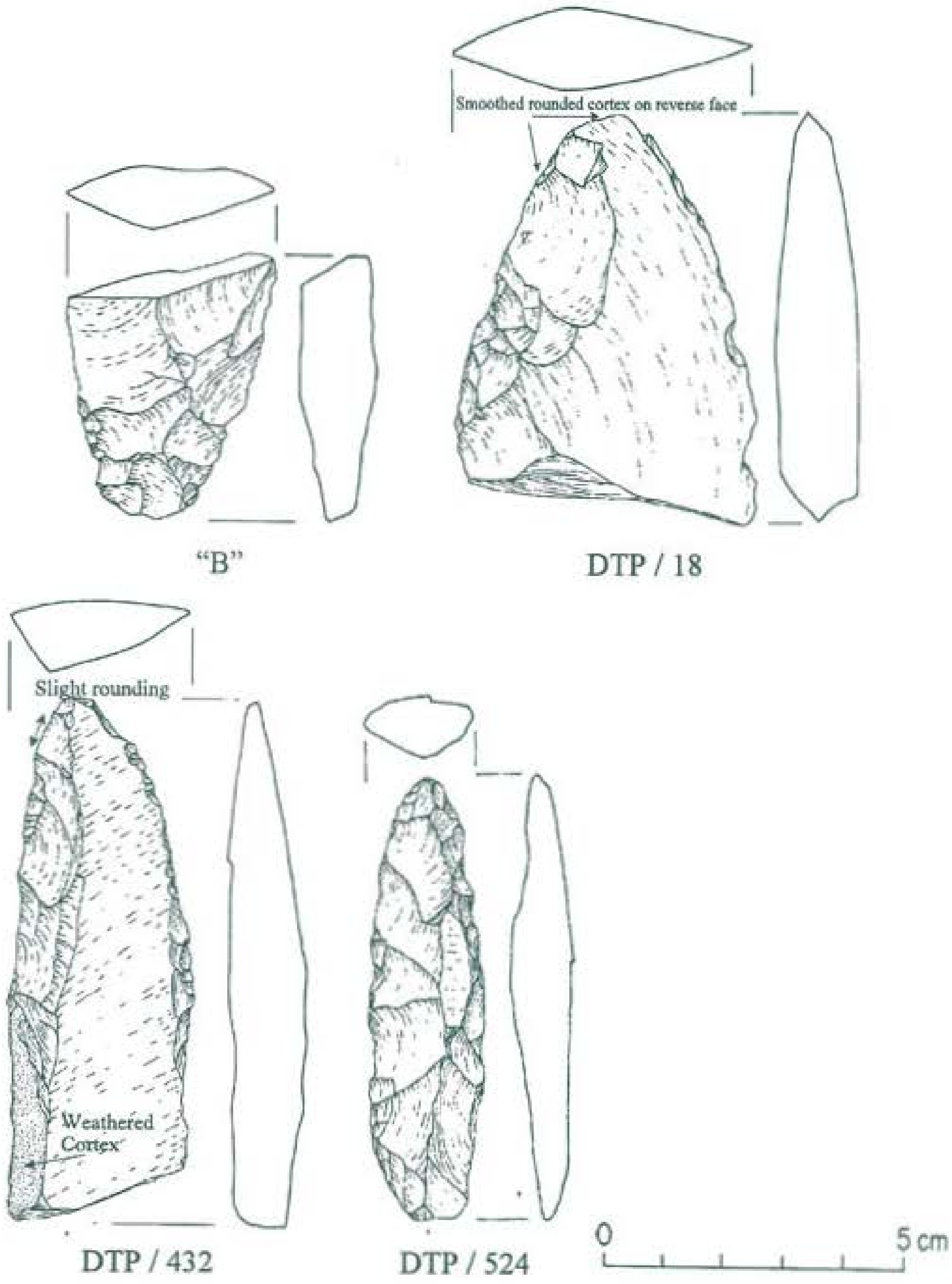


Figure 9 - Biface Type B - 3
Indeterminate Series

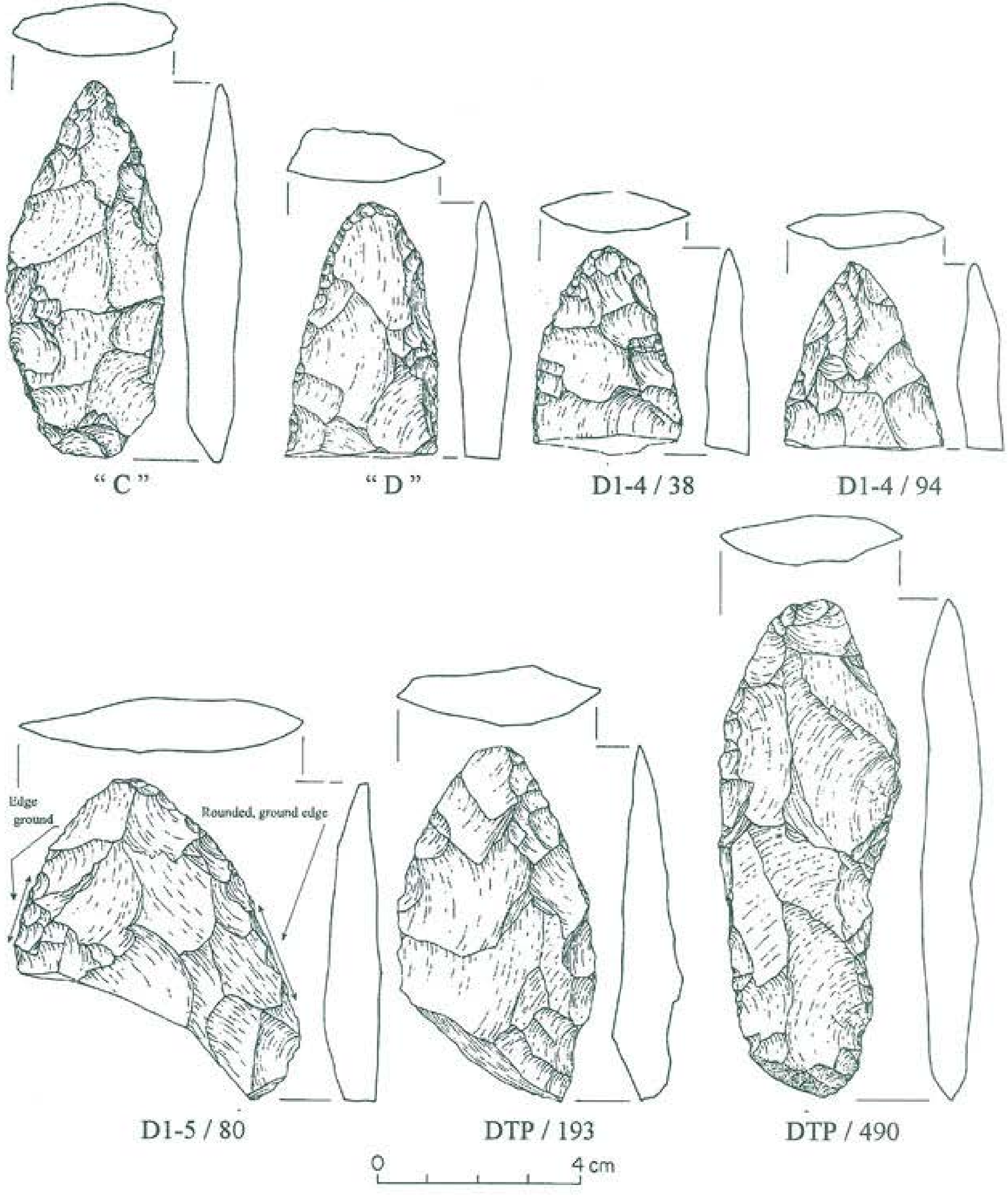
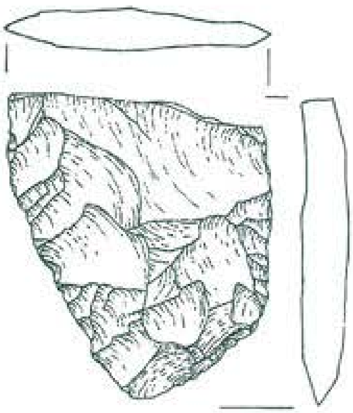
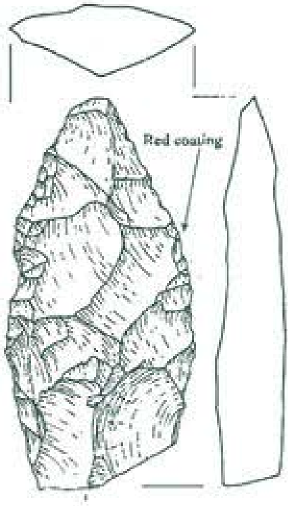


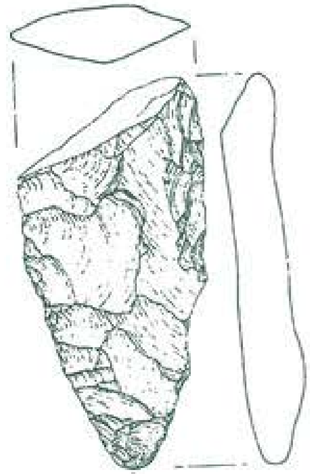
Figure 10 - Biface Type B - 3
Indeterminate Series



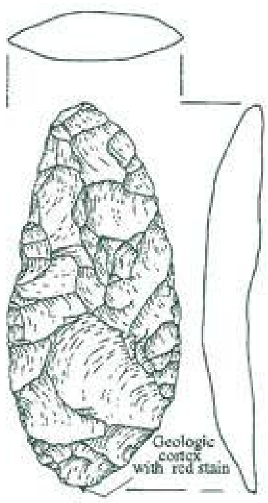
DTP / 51



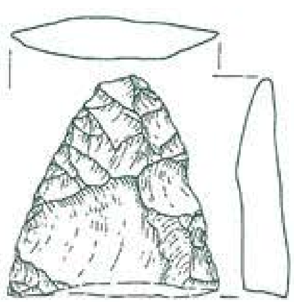
DTP / 522



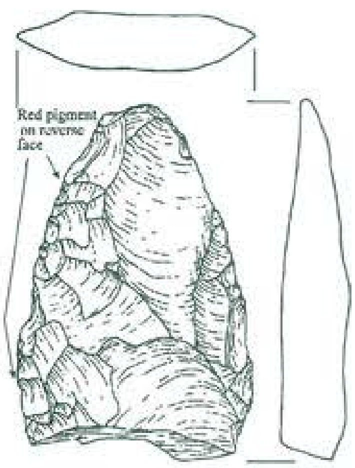
DTP / 530



DTP / 532



DTP / 533



DTP / 557

Figure 11 - Biface Type B - 3
Indeterminate Series

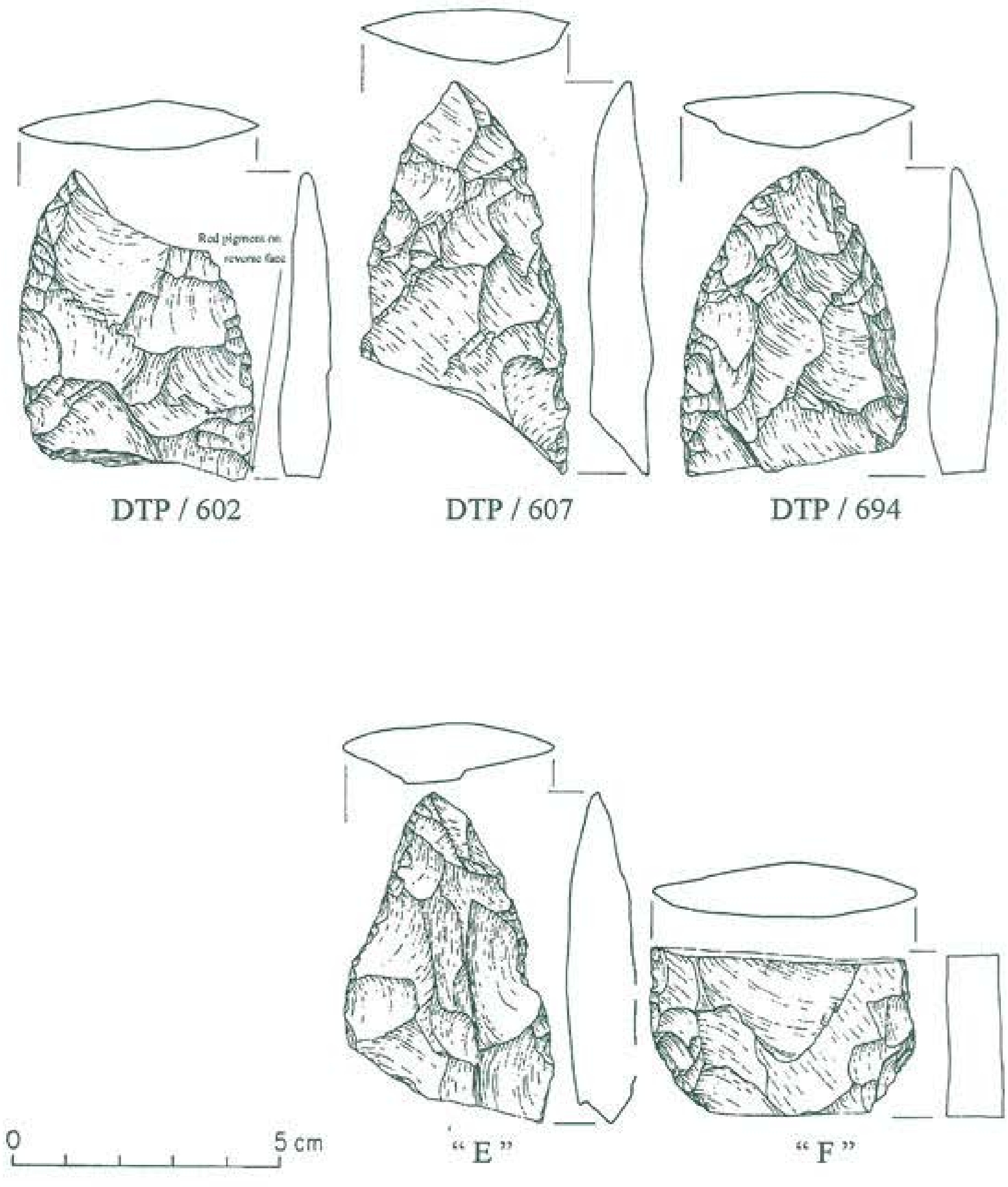


Figure 12 - Biface Type B - 3
Indeterminate Series

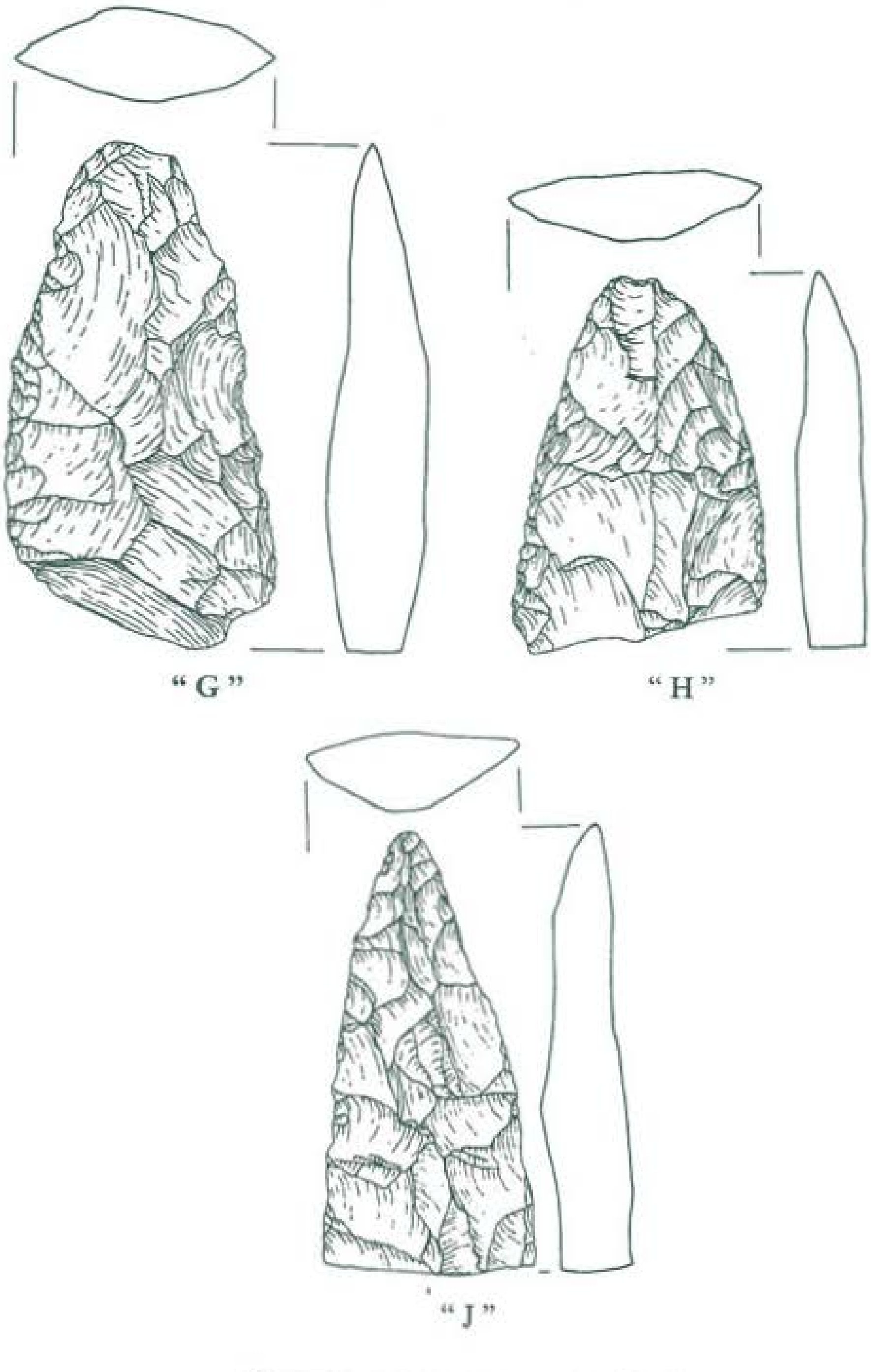
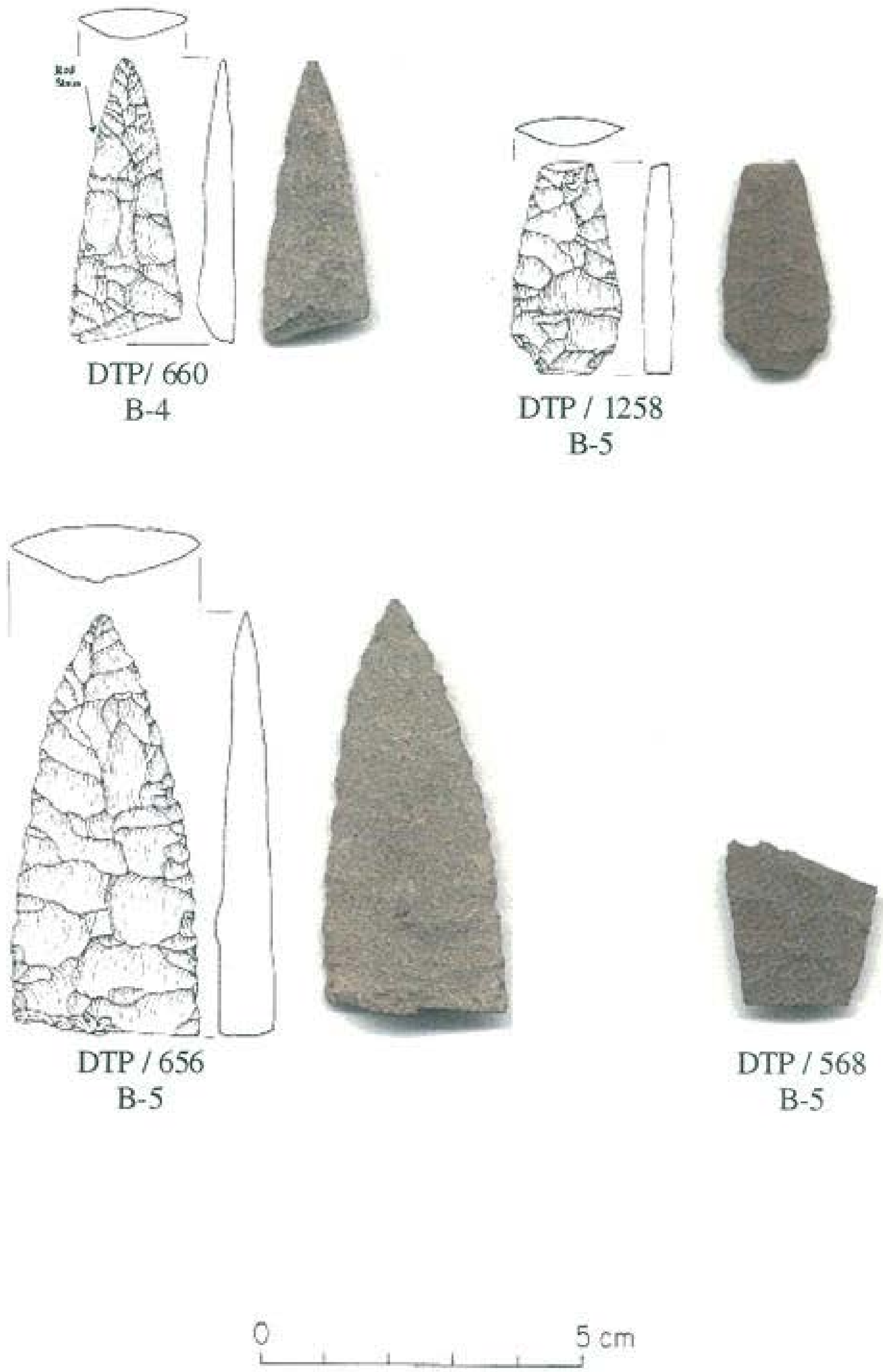


Figure 13 - DeStaffany Site
Indeterminate Series
Biface Type B - 4 and B -5



Chronological Implications of Projectile Point Forms

The combined sample of finished bifaces from the site shows a narrow range of stylistic variation. Outline shapes are generally described as lanceolate with a prominent blade, terminating in a point at the distal end, and a proximal end that is either rounded or terminates in a stem with a flattened base. For comparison with regional projectile point typologies, the finished points were compared with radiocarbon-correlated point sequences described at several localities within Washington and adjacent regions. No one typology serves as the standard for comparison given that each analyst selects and emphasizes different morphological, technological, and geological criteria in the construction of tool typologies. As a result, the series names assigned to the finished bifaces represent a blending of descriptions abstracted from a variety of typological analyses from published monographs and reports.

The two series to which ten bifaces were assignable are labeled "Western-stemmed" or "Olcott". The term "Western-stemmed" refers to one variety within the broader category of early, stemmed lanceolates found throughout the western cordilleras and intermountain basins. The series displays more or less well-defined shoulders above straight-sided to tapering stems, typically a straight to concave base, and occasional lateral margin grinding on the stem. There appear to be many regional subtypes and in Washington, these are not particularly well-dated. Within the Snake River drainage the subtype has been associated with radiocarbon dates spanning from 10,800 to 7000 BP (Irwin and Moody 1978, Sheppard et al. 1984), but other varieties seem to have persisted into more recent times. Along the upper Columbia River of central Washington the Makin Shouldered subtype has been assigned a time range between 8000 and 3500 (Lohse 1985). In the southern Cascades of Washington, they were found in components estimated between 6600 and 5200 radiocarbon years old (Lewarch and Benson 1989), and like at other similarly-dated components in Washington, were found in association with later dated bi-pointed lanceolates.

The term "Olcott" refers to a variety within the broader category of early, bi-pointed or willow-leaf shaped lanceolates found throughout the western cordilleras, intermountain basins, and beyond. The series displays generally medium to large lanceolate blades that taper both proximally and distally from the point of greatest width near midsection. Generally, the distal tip is pointed and the proximal end (base) is rounded; one subtype is weakly stemmed and shouldered. Cross-sections are usually bi-convex, and occasionally diamond-shaped; basal margins are sometimes ground; blade margins are occasionally serrated (one complete Olcott point in the assemblage exhibited a serrated distal half). Although Olcott components are poorly dated west of the Cascades in Washington, their interior counterpart, called "Cascade", is securely dated between about 8,000 and 4,500 radiocarbon years ago. The relatively few instances of radiocarbon-dated associations with Olcott series bifaces suggests a similar temporal depth and range to that expressed in the interior (Lewarch and Benson 1989, Matson 1976, Samuels 1993).

Figure 14 - DeStaffany Site
Western Stemmed Series

" K "
Type B-4

DTP / 481
Type B-4

D-1-5/109
Type B-5

0 4 cm

Figure 15 - DeStaffany Site
Olcott Series

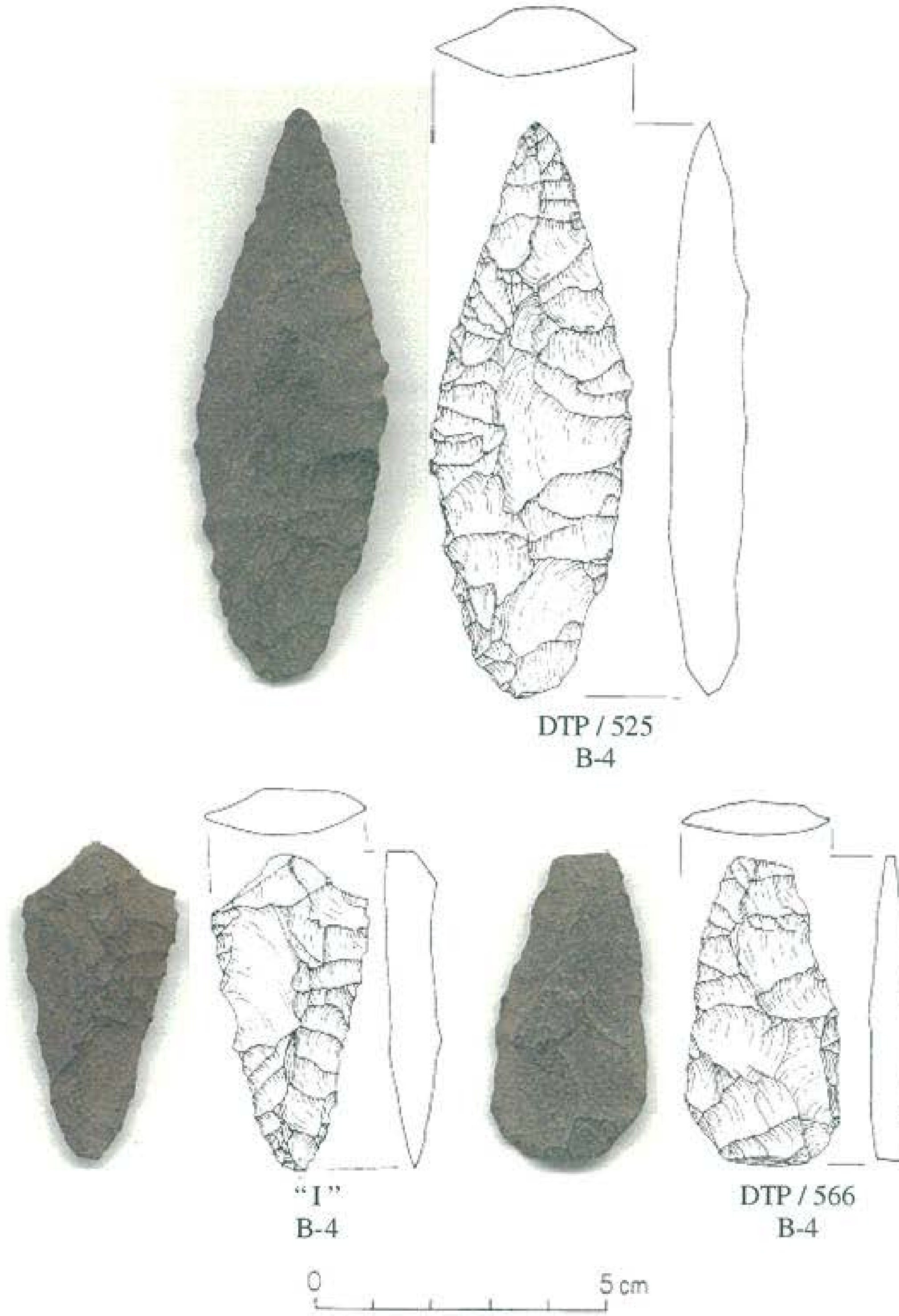
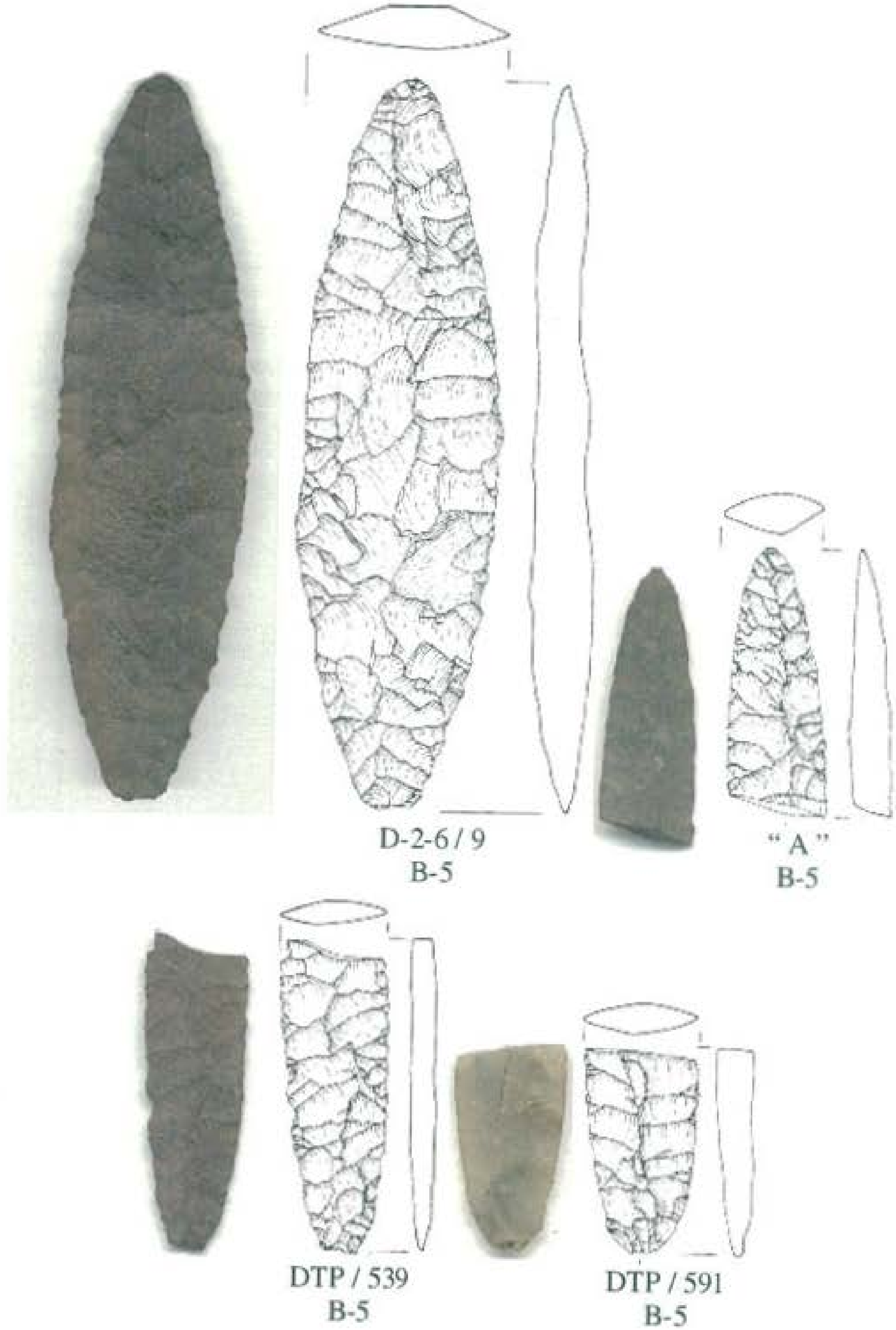


Figure 16 - DeStaffany Site
Olcott Series



Distribution

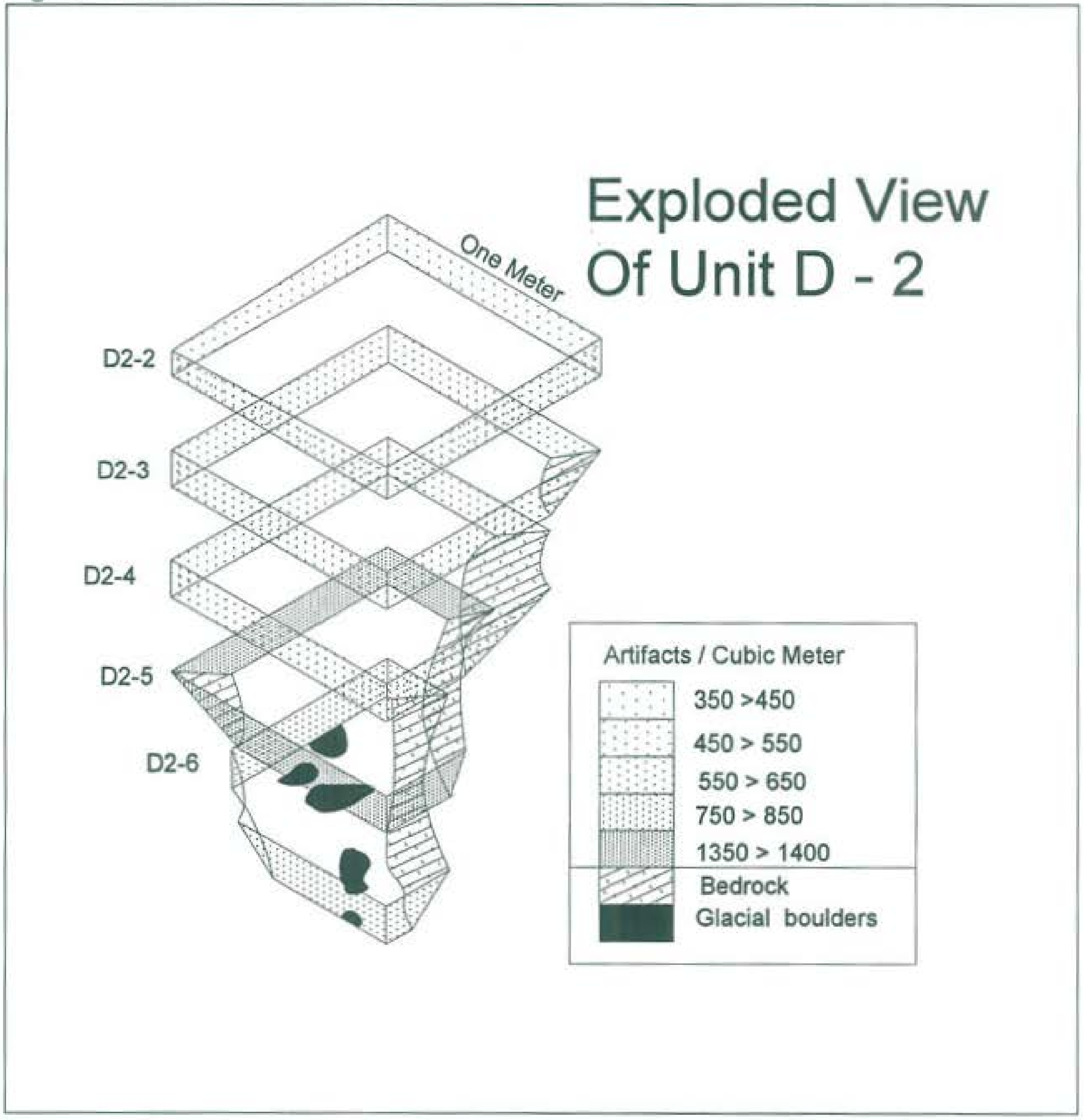
Since the deposit did not have clear stratigraphic elements it is necessary to examine any internal structure statistically. This has been done through the use of density calculations and relative frequencies of artifacts, expressed in terms of the collection units in which they were found. These arbitrary units are horizontal "levels", distinct within specific one meter squares. Each level represents different volumes of excavated material because of the intersecting bedrock and glacial boulders left in place in the lowest level. Volumes for each unit in Pits D1 and D2 have been calculated from data in the original excavation records and is presented in Table 14. The calculated volumes together with the number of artifacts / unit were used to determine a corrected value or density of artifacts expressed as n/cubic meter. Figure 18 graphically shows these relative densities in Unit D - 2.

Table 14 - Flake Tool Density

UNIT	VOLUME (V) CUBIC METERS	NUMBER OF ARTIFACTS "N"	ARTIFACT DENSITY N/V
D1 - 2	.032	14	437.5 / cu m
D1 - 3	.077	30	389.6
D1 - 4	.155	215	1387.1
D1 - 5	.131	106	809.1
D1 - 6	.055	25	454.5
D2 - 2	.150	74	493.3
D2 - 3	.146	89	609.6
D2 - 4	.141	80	567.4
D2 - 5	.130	178	1369.2
D2 - 6	.099	76	767.7
	1.116	887	

Incomplete records in Pit D3 do not allow reliable calculations and those volumes are omitted. Note that both Pit D1 and D2 begin excavation at Level 2. This is the beginning elevation at that location and does not mean that level 1 was not excavated. Only Pit D3 had an excavated level 1.

Figure 17 - Relative Artifact Densities



The distribution analysis indicates that, although artifacts are found in every unit, the highest density is found in the lower levels 4 and 5. Importantly, the excavated volume calculations did not account for subtraction of the volumes of underlying boulders which intruded into these levels from below but were left in place. Therefore the real artifact density for the lowest units is higher than shown in Table 14. The original location of the artifacts was in the lower elevations of the site and possibly deposited there before the buildup of the overlying eolian sediments. Further supporting this interpretation is the fact that the artifacts were sorted by weight within the site sediments. Table 15 shows that the heavier objects were found lower in the deposit than the lighter specimens.

Table 15 - Average Weight of Artifacts from Pits D-1, D-2, and D-3

Arbitrary Level	Total Artifacts	Average Weight (Ounces)
Level1	18	.12
Level 2	122	.14
Level 3	165	.12
Level 4	354	.23
Level 5	298	.35
Level 6	101	.26
Total	1058	

Floroturbation would be expected to sort objects vertically according to relative weights as the artifact distribution in this site shows. All of this combined information leads to the conclusion that the artifacts were originally deposited very deep in the profile probably just above the thin underlying glacial deposit or on the bedrock. The loess deposit which accumulated later provided a soil to support the vegetation that caused the migration of lighter objects to the surface through the process of floroturbation.

Summary

The lithic assemblage from the DeStaffany site is one of the largest that has been described from an early Holocene archaeological site in the Puget Sound Region. The present study was limited to 2730 artifacts, roughly a quarter of the total number recovered in the early 1970s. Although no dateable organic materials were found in clear association with these artifacts, the lanceolate projectile point forms, lithic technology, predominance of basaltic toolstone, soil formation processes, and minimum limiting age estimates based on two radiocarbon dates on soil carbon, considered in combination, point to an early Holocene age for this site. In addition to lacking tight chronological control, this site has much in common with other sites believed to be of Early Holocene age. It lacks associated faunal remains, visible depositional layering, fire-modified rock, and combustion features. Old Cordilleran Culture (Butler 1961), Old Cordilleran (Matson 1976); Early Period (Kidd 1964), Pebble Tool Tradition (R. Carlson 1990), Early Lithic (Mitchell 1971), Olcott (Kidd 1964), and Archaic (Ames and Maschner 1999) are some of the names that have been applied to similar assemblages.

Although the DeStaffany site has numerous similarities to other early Holocene sites, it also has some unusual characteristics that distinguish it from previously described sites in the region. These characteristics include its environmental setting, its exceptionally high density of lithic artifacts, the absence of cobble cores or "pebble tools", and the relatively low diversity of tool forms in the assemblage. Each of these characteristics warrants further discussion.

The setting of this site, a bedrock knob overlooking a saltwater bay with numerous rocky islets, has not been previously described for an archaeological site in Western Washington. Most recorded Olcott sites in this area are located on old river terraces at some distance from saltwater (Kidd 1964:26). Indeed, archaeological surveys in hydroelectric reservoirs in the upper river valleys of western Washington have documented surprisingly high frequencies of such sites as well as some of the largest known examples (Herbal and Schalk 2002:4.16; Mierendorf et al.; Schalk 1988:85-106). These high terraces provide commanding vistas of the valley floors where game such as deer and elk are concentrated on their winter ranges. The DeStaffany site offers no apparent strategic advantage relative to spotting large land mammals. It does, however, offer a good overview of numerous rocky islets and reefs that have probably been sea mammal haulouts throughout the Holocene. Ecologically, sea mammals are the most salient food resources that would have been available in the vicinity of the site.

A second rather remarkable characteristic of the DeStaffany site is its exceptionally high lithic density—the average density of flaked stone was estimated at 795 artifacts/m^3. This density stands in sharp contrast to that observed at most Olcott sites which typically have rather low densities. It exceeds by more than an order of magnitude the lithic densities documented at shell middens such as 45SJ24. This very high density of lithics concentrated on the top of a bedrock knob suggests that this location attracted repeated and intensive usage. Something about this bedrock knob appears to have attracted people to reuse the same discrete location. This brings us to a third unusual characteristic of this site.

The lithic assemblage lacks what are virtually the hallmark lithic artifacts of the early Holocene sites in this region—cobble cores. In addition, although bifacial reduction was clearly the dominant lithic technique, Stage 1 bifaces are also missing from the collection which is numerically dominated by late stage bifaces. The occupants of this site brought biface roughouts with them from some other location where initial stages of reduction were carried out. In other words, lithic production itself does not appear to be what *attracted* site occupants to the same location.

Still another distinctive characteristic of the site is the low morphological diversity of the stone tool assemblage. Early Holocene archaeological assemblages are not known for their diversity of tool forms but the DeStaffany assemblage is particularly notable for what it lacks. It is significant that all of the diagnostic tools manufactured here were projectile point or knife forms probably related to hunting. Compared to other lithic assemblages of early to mid-Holocene age, artifact diversity of this assemblage is low.

Although stone tool production and maintenance were secondary activities conducted at this site, it appears that people came to this site for other reasons. The hilltop location with its sweeping vista may have been chosen for tool-making activities because it overlooks sea mammal haul-out sites and broad expanses of open water. The specialized nature of the lithic assemblage and the environmental setting of the site point to monitoring of sea mammal haulouts as the primary activity conducted at the site. Tool-making in this context would have been simply a productive use of time while waiting for prey to appear. Hunters engaged in tool-making activities inside the bedrock depression could monitor sea mammals on the haulout sites from a naturally concealed location.

Some of the lithic raw materials that were used to manufacture tools were brought to the island by watercraft. These exotic rock types are not known to exist locally and have not appeared in other archaeological sites in the area. It would seem that either the hunters had trade opportunities to procure these materials, or that they had an effective range over a much larger area for collecting high quality toolstone. Either explanation suggests that the lithic raw materials were highly valued resources and that watercraft were efficient enough to transport lithic raw materials over substantial distances. These people were very mobile and accomplished at navigating on saltwater. The lack of heavy duty wood working tools in this or other Early Holocene assemblages suggests the likelihood that skin-covered boats were used.

Nomadic sea mammal hunting is a subsistence system well suited to rapid colonization along coastlines and some authors (e.g., Dixon, 1999) have argued that these people populated the New World perhaps long before other interior groups. The DeStaffany site and at least two others in British Columbia have characteristics suggesting that they could be closely related to these maritime colonists.

Artifacts closely resembling those from the DeStaffany site have been found in British Columbia sites that have associated faunal remains. The projectile points and other bifaces from the Early Namu component are strikingly similar to those from the DeStaffany site (R. Carlson 1996:96). The Namu faunal collection is overwhelmingly marine oriented (Cannon 1996:107). And surprisingly, it

contained a higher frequency of dolphin and porpoise remains than later components at the same site. The same emphasis on these species is reported at another early Holocene site, Bear Cove, on the northeast end of Vancouver Island (C. Carlson 1979). Significantly, sophisticated watercraft and harpoon technology are required to hunt these animals under most conditions.

Discussions of Early Holocene subsistence systems for the Northwest Coast tend to be polarized into two views—one that depicts these systems as based largely on large land mammals and the other that depicts systems that were heavily maritime. To some extent these contrastive views are geographically based—most of archaeological proponents of the first view have worked in Washington (e.g., Butler 1961; Kidd 1964) while proponents of the second view have worked in coastal British Columbia (e.g., Borden 1975; C. Carlson 1979, R. Carlson 1979). The archaeological data from the DeStaffany site leads us to question whether these contrastive views may be overdrawn and, in important respects, oversimplifications.

First, given the variations in terrestrial and marine resources along this latitudinal gradient, there are important environmental differences along the coast. In particular, the productivity of the marine ecosystem relative to the terrestrial ecosystem tends to be higher as one moves northward along this coastline (Schalk 1977; 1981). Even in the early Holocene, we would expect this environmental difference would have had significant implications for hunter-gatherer subsistence.

Second, for hunter-gatherers surviving on immediate consumption rather than food storage, large mammals would be of considerable importance, particularly in the winter months. Relative to land mammals, sea mammals have a higher percentage of useable meat (e.g., Imamoto 1976), have substantially higher body fat, and can provide hides that can be used for manufacture of skin boats. For example, while a deer and a harbor seal may have roughly similar live body weights, the percentage of useable meat is about 50 percent for the deer but about 70 percent for the seal (Imamoto 1976:29). Also, considering the critical dietary importance of fats in the diets of hunter gatherers in environments where carbohydrates are scarce either seasonally or throughout the year (Speth and Spielmann 1983), we would expect that fat-rich sea mammals would always been highly ranked resources wherever they were available. In sum, there are several reasons to expect that exploitation of sea mammals would have been a component of subsistence from the earliest human occupations of this region. If this reasoning is correct and occupation of the DeStaffany site indeed was related to sea mammal hunting, it seems likely that similar sites will be found in analogous environmental settings in the San Juan Islands and elsewhere in Puget Sound.

We recognize that the analysis described herein is incomplete and preliminary and that the interpretations that have been proposed are highly tentative. Nonetheless, we hope that this effort has identified some promising directions for future investigations. In that context, we propose a series of recommendations for further research. These include:

1) Complete a thorough analysis of the DeStaffany site collection. It is important that the entire collection from the DeStaffany site, including that part of the collection unavailable for the present

study, be analyzed and that the results of this analysis be described in detail. The current study should provide a framework for approaching that analysis but should be extended to include the substantial collection of artifacts recovered by the landowner. All lithic artifacts including debitage should be considered in this analysis.

2) *Conduct archaeological surveys focused on landforms adjacent to other known sea mammal haulouts in the San Juan Islands.* These surveys should employ field methods appropriate to finding not just shell middens but less obtrusive sites such as lithic scatters as well. There are 145 other recorded sea mammal haulout sites in the greater San Juan Islands area. Each of these additional locations should be considered a potential area that may be associated with nearby archaeological deposits containing assemblages that have not been previously identified or recognized. Future researchers should investigate these locations if possible and begin to study similar areas not necessarily associated with shell midden deposits.

3) *Carry out additional excavations at 45SJ58 and archaeological testing of nearby locations .* Although the assemblage obtained from the bedrock knoll at the DeStaffany site appears to be a special purpose location, occupations of a residential nature may be located nearby. (An additional ,presently unrecorded site may exist south of the DeStaffany site. In 1996 construction workers un earthed human remains in the stream bed south of the site in a most unusual context. These remains were identified as Native American by the King County Coroner's Office and presumably returned to the Lummi Tribe. The San Juan County Sheriff may have more details)

4) *Conduct experimental research aimed at understanding the patenation process on dacite lithics.* Bakewell maintains that this patenation is the product of heat treatment by prehistoric flint-knappers. More recently, Morgenstein (2002) has interpreted differential rind thickness on these types of stone to be a simple result of natural weathering processes and, therefore, that rind thicknesses provide a useful measure of artifact ages. Yet another perspective proposed here is that this patenation is a product of the very active floroturbation at the site and the buried nature of the artifacts. Heat, which speeds up most chemical and physical processes when combined with other kinds of exposures, may account for this apparent patenation through naturally occurring events. It is reasonable to assume that because of many episodes of upheaval resulting from floroturbation, some artifacts have been exposed to the elements more often or longer than other artifacts manufactured at the same time. Wild fires, which can be considered another form of natural weathering, could have altered some artifacts during their exposure at the surface while having no effect on others buried more deeply in the insulating sediments. These alternate explanations for differential patenation in the DeStaffany lithic assemblage may provide a basis for generating testable hypotheses that can be evaluated experimentally.

Lastly, these studies should refine the hypothesis generated by the data in this report. That is: *Sea mammal hunting was an important element of the earliest subsistence systems in the San Juan Islands region.* This hypothesis has testable implications for patterns of site distribution, technology, and faunal remains.

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Appendix 1

Petrograhics Analysis
by Ed Bakewell

Summary Report

This analysis of nine DeStaffany Site lithics and two Olcott Site lithics has shown that the patenated material at the DeStaffany Site (DS6-8) is the same as the unpatenated volcanic lithics (DS3-5), but that this material is very different from patenated samples from the Olcott Site. The six samples of volcanic lithic debitage from DeStaffany are vitrophyric dacite (Figure 1). This material matches the petrographic and geochemical profiles for the "San Juan Dacite" found throughout the Gulf of Georgia and at sites on the Olympic Penninsula. The geological source of this material is a dacite dome at Watt's Point south of the Squamish River on the British Columbia coast. Cobbles of this material are obtainable in great quantities from beaches south of the dome (e. g. Brunswick Beach and Porteau Cove). The Olcott Site lithics are a metamorphic material, a Cordierite Hornfels of unknown origin.

Aside from the classifications given, little can be said of the three cherty lithics from the site (DS1, DS2, DS9). They are all very different, as the petrographic descriptions attached indicate. They match no materials that I have analyzed in this region. I suspect that the volcaniclastic chert (DS9) may be local, Orcas Chert, partially because of the fragmental texture.

The volcaniclastic chert (DS9) and the patenated dacite (DS6-8) have been thermally altered at some point. The rim area (patination) on the dacite flakes appears carbonized in thin section. The volcaniclastic chert is clearly and deeply oxidized.

Petrographic Description
Olcott Site Lithics

Cordierite Hornfels
B1/B3

Very fine-grained, evenly distributed hornfels texture marks these samples as a distinctly metamorphic species. Both samples have a rim in cross section (from patenated surfaces) about .5-.75 mm thick. This area appears slightly darker (carbonized or oxidized). One of the two samples has a cortical remnant of fine-grained sandstone still attached to the exterior surface. The chief metamorphic mineral appears to exhibit sector twinning common in cordierite.

Petrographic Descriptions
DeStaffany Lithics

Altered Vitric Tuff
DS1

The flake from which this thin section was made is a fine-grained greenish material. In thin section, it is pale green. It does not appear to be thermally altered, having no detectable rind or patination. Arcuate glass shards have been replaced by authigenic zeolite minerals, probably heulandite and clinoptilolite. There is also a fair amount of chlorite in the rock, which is probably responsible for the greenish hue.

Marbeloid
DS2

A whitish, speckled, cherty material in the flake specimen, Thin section analysis reveals oval-shaped ghosts of foraminifera in a fine-grained lightly veined texture. The specks are caused by masses of fine-grained opaques. The texture indicates a siliceous replacement of a carbonate (biopelmicrite) rock.

Dacite
DS3-5

Clearly an igneous material, predominately composed of brown glass, cryptocrystalline minerals, microlytic plagioclase in a trachytic texture, and opaques, (See modal analyses)

Dacite
DS6-8

Petrographically identical to the dacites in DS3-5 (see modal analyses), but with a 1-2 mm rind, giving the material a patinated appearance. This rind appears to be the result of some thermal process, as it appears slightly carbonized in thin section.

Volcaniclastic Chert
DS9

The grayish-brown color of this flake gives way to a greenish-gray in the interior. No distinctive evidence of fossil forms are present. The material is highly tectonized and has a fragmental texture in thin section. The exterior color results from severe oxidation or burning, which penetrates to the interior along some of the cracks. A granular texture may be seen in places, suggesting siliceous replacement of a clastic sediment.

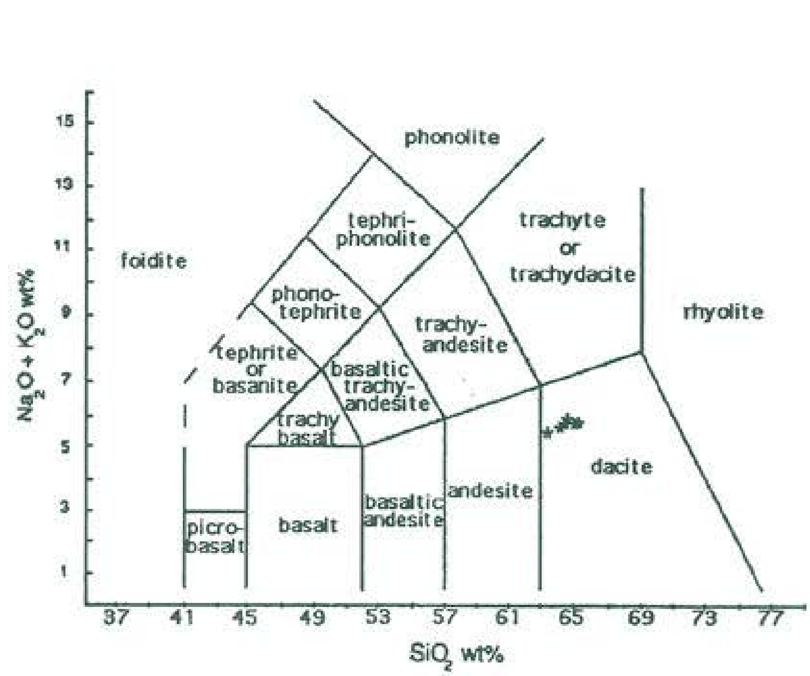

Figure 1 : Classification Scheme

International Union of Geophysical Sciences

(After LeMaitre 1989)

Modal Analysis
Dacite DS-3

Phenocryst Phases

Range	Phase	Description
0-1%	Plagioclase	Euhedral to Subhedral crystals .3 to .8 mm. in length, albite twins, complex growth twins, normal oscillatory zoning, hiatal .
2-3%	Orthopyroxene (Hypersthene)	Euhedral to subhedral crystals, accicular to cumulophryic (xenocrysts), faintly pleochroic, skeletal crystals.
0-1%	Clinopyroxene (Augite)	Euhedral to subhedral crystals

Groundmass Phases

Range	Phase	Description
40-50%	Plagioclase	Euhedral, .1 mm. and less, lath-shaped microlites, trachytic texture.
10-15%	Opaques (Magnetite)	Euhedral to anhedral microlites.
40-50%	Glass	Includes brown glass and cryptocrystaline minerals.

Modal Analysis
Dacite DS-5

Phenocryst Phases

Range	Phase	Description
0-1%	Plagioclase	Euhedral to Subhedral crystals .3 to .8 mm. in length, albite twins, complex growth twins, normal oscillatory zoning, hiatal .
2-3%	Orthopyroxene (Hypersthene)	Euhedral to subhedral crystals, accicular to cumulophryic (xenocrysts), faintly pleochroic, skeletal crystals.
0-1%	Clinopyroxene (Augite)	Euhedral to subhedral crystals

Groundmass Phases

Range	Phase	Description
40-50%	Plagioclase	Euhedral, .1 mm. and less, lath-shaped microlites, trachytic texture.
10-15%	Opaques (Magnetite)	Euhedral to anhedral microlites.
40-50%	Glass	Includes brown glass and cryptocrystaline minerals.

Modal Analysis
Dacite DS-6

Phenocryst Phases

Range	Phase	Description
0-1%	Plagioclase	Euhedral to Subhedral crystals .3 to .8 mm. in length, albite twins, complex growth twins, normal oscillatory zoning, hiatal .
2-3%	Orthopyroxene (Hypersthene)	Euhedral to subhedral crystals, accicular to cumulophryic (xenocrysts), faintly pleochroic.
0-1%	Clinopyroxene (Augite)	Euhedral to subhedral crystals

Groundmass Phases

Range	Phase	Description
40-50%	Plagioclase	Euhedral, .1 mm. and less, lath-shaped microlites, trachytic texture.
10-15%	Opaques (Magnetite)	Euhedral to anhedral microlites.
40-50%	Glass	Includes brown glass and cryptocrystaline minerals.

An altered rim of about 1-2 mm thick occurs along the perimeter of this section. Groundmass is darker, burned in the area of this rim.

Modal Analysis
Dacite DS-7

Phenocryst Phases

Range	Phase	Description
0-1%	Plagioclase	Euhedral to Subhedral crystals .3 to .8 mm. in length, albite twins, complex growth twins, normal oscillatory zoning, hiatal .
2-3%	Orthopyroxene (Hypersthene)	Euhedral to subhedral crystals, accicular to cumulophryic (xenocrysts), faintly pleochroic.
1-2%	Clinopyroxene (Augite)	Euhedral to subhedral crystals

Groundmass Phases

Range	Phase	Description
40-50%	Plagioclase	Euhedral, .1 mm. and less, lath-shaped microlites, trachytic texture.
10-15%	Opaques (Magnetite)	Euhedral to anhedral microlites.
40-50%	Glass	Includes brown glass and cryptocrystaline minerals.

An altered rim of about 1-2 mm thick occurs along the perimeter of this section. Groundmass is darker, burned in the area of this rim.

Modal Analysis
Dacite DS-8

Phenocryst Phases

Range	Phase	Description
0-1%	Plagioclase	Euhedral to Subhedral crystals .3 to .8 mm. in length, albite twins, complex growth twins, normal oscillatory zoning, hiatal .
2-3%	Orthopyroxene (Hypersthene)	Euhedral to subhedral crystals, accicular to cumulophryic (xenocrysts), faintly pleochroic.
2-3%	Clinopyroxene (Augite)	Euhedral to subhedral crystals

Groundmass Phases

Range	Phase	Description
40-50%	Plagioclase	Euhedral, .1 mm. and less, lath-shaped microlites, trachytic texture.
10-15%	Opaques (Magnetite)	Euhedral to anhedral microlites.
40-50%	Glass	Includes brown glass and cryptocrystaline minerals.

Spots of alteration occur along the perimeter of this section. Groundmass is darker, burned in the area of alteration.

Olcott Site Lithics
Major/Minor Element Analyses (Wt. %)

Sample Number / Element	B-1	B-3
SiO_2	59.5	59.1
TiO_2	1.05	1.03
Al_2O_3	18.7	20.3
Fe_2O_3	8.20	8.36
MnO	0.10	0.09
MgO	3.13	3.30
CaO	1.97	1.12
Na_2O	2.30	1.92
K_2O	1.71	2.11
P_2O_5	0.24	0.17
LOI	1.35	1.25
Total	98.2	98.8
Material	Hornfels	Hornfels
Method	XRF	XRF

Trace Element Analyses (ppm)

Sample Number / Element	DS3	DS4	DS5	DS6	DS7	DS8	DS1	DS9
Zr	111	120	116	110	111	114	117	80
Zn	61	62	65	62	68	62	85	40
Y	11	12	12	11	11	11	35	11
Cr	20	28	25	22	36	20	9	46
V	77	80	80	80	86	83	51	78
Be	1.1	1.1	1.1	1.2	1.1	1.1	1.1	1.3
Ba	607	622	640	612	625	631	375	18
Ni	37	38	42	38	47	38	5	36
Sr	651	685	678	623	621	639	249	51
Cu	28	28	29	26	24	27	4	14
Sc	8.1	8.9	8.5	8.6	9.5	8.9	23.5	13.7
As	<3	<3	<3	<3	<3	<3	<3	<3
Mo	2	<1	<1	<1	<1	<1	<1	<1
Ag	.4	.3	<.2	.3	.5	.4	.2	.2
Cd	<1	<1	<1	<1	<1	<1	<1	<1
Sn	<10	<10	<10	<10	<10	<10	<10	<10
Sb	<5	<5	<5	<5	<5	<5	<5	<5
Pb	<2	<2	<2	<2	<2	<2	<2	<2
Bi	<5	<5	<5	<5	<5	<5	<5	<5
La	13.9	14.7	14.6	13.5	14.1	14.4	15.6	14.2
Method	ICP(MA)	ICP(MA)	ICP(MA)	ICP(MA)	ICP(MA)	ICP(MA)	ICP(MA)	ICP(MA)

Olcott Site Lithics
Trace Element Analyses (ppm)

Sample Number / Element	B-1	B-3
Zr	71	73
Zn	129	141
Y	16	16
Cr	59	73
V	189	182
Be	1.5	1.7
Ba	607	847
Ni	69	79
Sr	308	260
Cu	58	60
Sc	20.1	18.8
As	<3	<3
Mo	<1	<1
Ag	<.2	.3
Cd	<1	<1
Sn	<10	<10
Sb	<5	<5
Pb	<2	<2
Bi	<5	<5
La	19.0	22.5
Method	ICP(MA)	ICP(MA)

Appendix 2

Beta Analytic
Radiocarbon Dates

BETA ANALYTIC INC.

DR. J.J. STIPP and DR. M.A. TAMERS

UNIVERSITY BRANCH
4985 S.W. 74 COURT
MIAMI, FLORIDA, USA 33155
PH: 305/667-5167 FAX: 305/663-0964
E-mail: beta@analytic.win.net

REPORT OF RADIOCARBON DATING ANALYSES

FOR: Mr. Steve Kenady
Cultural Resource Management

DATE RECEIVED: August 23, 1995
DATE REPORTED: September 28, 1995

Sample Data	Measured C14 Age	C13/C12 Ratio	Conventional C14 Age (*)
Beta-84877	4750 +/- 60 BP	-25.0 o/oo	4750 +/- 60 BP

SAMPLE #: #1
ANALYSIS: AMS (Lawrence Livermore)
MATERIAL/PRETREATMENT:(organic sediment): acid washes.

Beta-84878	3750 +/- 50 BP	-24.1 o/oo	3770 +/- 50 BP

SAMPLE #: #2
ANALYSIS: AMS (Lawrence Livermore)
MATERIAL/PRETREATMENT:(organic sediment): acid washes

NOTE: It is important to read the calendar calibration information and to use the calendar calibrated results (reported separately) when interpreting these results in AD/BC terms.

NOTE: Sample #3 was not necessary to complete the analyses and is being returned under separate cover.

Dates are reported as RCYBP (radiocarbon years before present, "present" = 1950A.D.). By International convention, the modern reference standard was 95% of the C14 content of the National Bureau of Standards' Oxalic Acid & calculated using the Libby C14 half life (5568 years). Quoted errors represent 1 standard deviation statistics (68% probability) & are based on combined measurements of the sample, background, and modern reference standards.

Measured C13/C12 ratios were calculated relative to the PDB-1 international standard and the RCYBP ages were normalized to -25 per mil. If the ratio and age are accompanied by an (*), then the C13/C12 value was estimated, based on values typical of the material type. The quoted results are NOT calibrated to calendar years. Calibration to calendar years should be calculated using the Conventional C14 age.

Appendix 3

Flake Tool Catalogue

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D 1-2/1	1	2	1	2.4	1.5	0.10						
D 1-2/2	1	2	2	1.7	1.1	0.00						
D 1-2/3	1	2	3	3.7	2.2	0.30						
D 1-2/4	1	2	4	3	2.2	0.10				1	1	
D 1-2/5	1	2	5	2.7	1.3	0.10			1			
D 1-2/6	1	2	6	3.2	1.6	0.20						
D 1-2/7	1	2	7	3	1.6	0.10				1		
D 1-2/8	1	2	8	1.8	1.8	0.10	1					
D 1-2/9	1	2	9	3.4	2.2	0.20			1	1		
D 1-2/10	1	2	10	1.9	1.9	0.00		1		1		
D 1-2/11	1	2	11	4.4	3.8	0.40			1			
D 1-2/12	1	2	12	2.9	2.3	0.20			1			
D 1-2/13	1	2	13	2	1.6	0.00				1		
D 1-2/14	1	2	14	3	1.8	0.10						
14						0.14	1	1	4	5	1	
D 1-3/1	1	3	1	2.6	2	0.10				1		
D 1-3/2	1	3	2	1.9	1.9	0.00				1		
D 1-3/3	1	3	3	4	3.6	0.30		1		1	1	
D 1-3/4	1	3	4	4.7	2.8	0.40		1				
D 1-3/5	1	3	5	1.9	1.3	0.00				1		
D 1-3/6	1	3	6	2.3	1.5	0.00				1		
D 1-3/7	1	3	7	2.2	1.7	0.00						
D 1-3/8	1	3	8	2.5	2.3	0.10						
D 1-3/9	1	3	9	1.6	1.7	0.00						
D 1-3/10	1	3	10	1.9	1.2	0.00						
D 1-3/11	1	3	11	1.9	1.2	0.00				1		
D 1-3/13	1	3	13	2.7	1.3	0.00						
D 1-3/14	1	3	14	2.2	2.3	0.00				1	1	
D 1-3/15	1	3	15	2	1.6	0.00						
D 1-3/16	1	3	16	2	1.1	0.00		1				
D 1-3/17	1	3	17	2.2	2	0.10				1		
D 1-3/18	1	3	18	2.2	1.6	0.00				1		
D 1-3/20	1	3	20	2.5	2.2	0.10		1				
D 1-3/21	1	3	21	2.7	2	0.20						
D 1-3/22	1	3	22	6.6	3	0.50				1		
D 1-3/23	1	3	23	1.9	1.9	0.00						
D 1-3/24	1	3	24	3.2	3	0.30						
D 1-3/25	1	3	25	4.3	2.7	0.50						
D 1-3/26	1	3	26	2.6	1.9	0.20	1					
D 1-3/27	1	3	27	1.7	1.4	0.00				1		
D 1-3/28	1	3	28	2.5	2.5	0.20						1
D 1-3/29	1	3	29	1.7	1	0.00						
D 1-3/30	1	3	30	2	1.4	0.00				1		
D 1-3/31	1	3	31	1.9	1.3	0.00						
D 1-3/32	1	3	32	2.2	2	0.10	1					
30						0.10		4	0	12	2	1
D 1-4/0	1	4	0	6.2	3.7	1.50			1			
D 1-4/1	1	4	1	4.4	3.5	0.40				1		
D 1-4/2	1	4	2	1.7	1	0.00				1		
D 1-4/2	1	4	2	2.4	1.4	0.40						
D 1-4/3	1	4	3	1.5	1.4	0.00		1		1		
D 1-4/4	1	4	4	4.2	2.7	0.30				1		
D 1-4/4	1	4	4	4.3	3.4	0.50						
D 1-4/5	1	4	5	4.4	3.5	0.60						
D 1-4/6	1	4	6	8.2	4.6	2.20		1				1

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D 1-4/7	1	4	7	4.8	3.5	0.40				1		
D 1-4/8	1	4	8	1.8	1.8	0.00						
D 1-4/9	1	4	9	2.5	2.3	0.00				1		
D 1-4/10	1	4	10	3	2.4	0.20				1	1	
D 1-4/11	1	4	11	2.7	1.5	0.10			1			
D 1-4/12	1	4	12	2.2	1.2	0.10	1					
D 1-4/13	1	4	13	3	2.3	0.20				1	1	
D 1-4/14	1	4	14	3	1.7	0.10				1		
D 1-4/15	1	4	15	2.6	1.5	0.00				1		
D 1-4/16	1	4	16	4.1	3.7	0.40				1		
D 1-4/16	1	4	16	6	1.3	0.00				1		
D 1-4/17	1	4	17	3.3	2.1	0.20						
D 1-4/18	1	4	18	2.4	1.7	0.00	3			1	1	
D 1-4/20	1	4	20	3.2	2.9	0.10					1	
D 1-4/21	1	4	21	2.7	2.1	0.10		1		1		
D 1-4/22	1	4	22	3	2.6	0.20						
D 1-4/23	1	4	23	3.2	1.6	0.10						
D 1-4/24	1	4	24	0.1	1.1	0.00						
D 1-4/25	1	4	25	3.3	2.1	0.20				1		
D 1-4/26	1	4	26	4.8	2.2	0.50			1			
D 1-4/27	1	4	27	3.1	2.3	0.20			1	1		
D 1-4/28	1	4	28	3.1	3.2	0.30			1			
D 1-4/28	1	4	28	2.4	2.1	0.00				1	1	
D 1-4/29	1	4	29	2.5	1	2.70			1			
D 1-4/30	1	4	30	2	1.5	0.00						
D 1-4/31	1	4	31	2.8	1.8	0.10				1		
D 1-4/32	1	4	32	3.8	2.5	0.20				1		
D 1-4/33	1	4	33	3.5	2.6	0.20				1		
D 1-4/34	1	4	34	2	1.7	0.00				1		
D 1-4/35	1	4	35	2.5	1.5	0.00						
D 1-4/36	1	4	36	2	1.7	0.00						
D 1-4/37	1	4	37	2.2	2	0.00						
D 1-4/38	1	4	38	2	1.9	0.00				1		
D 1-4/39	1	4	39	6	3.6	0.60						
D 1-4/40	1	4	40	2.6	1.3	0.00						
D 1-4/41	1	4	41	3	2	0.20			1			
D 1-4/42	1	4	42	2.9	5	0.10						
D 1-4/43	1	4	43	1.6	1.1	0.00		1		1		
D 1-4/44	1	4	44	1.5	1.5	0.00						
D 1-4/45	1	4	45	2.2	1.9	0.10				1		
D 1-4/46	1	4	46	5.8	4.4	0.10			1			
D 1-4/47	1	4	47	3.3	2.9	0.20	3			1		
D 1-4/48	1	4	48	4.3	2.3	0.30						
D 1-4/49	1	4	49	1.7	3	0.00				1	1	
D 1-4/50	1	4	50	1.6	1.2	0.00						
D 1-4/51	1	4	51	1.9	1.1	0.00						
D 1-4/53	1	4	53	4.8	2.1	0.20	SLATE					
D 1-4/55	1	4	55	1.7	1.9	0.00						
D 1-4/56	1	4	56	3.8	2.4	0.20		1		1		
D 1-4/58	1	4	58	1.8	1.6	0.00				1		
D 1-4/59	1	4	59	2.3	1.5	0.10				1		
D 1-4/60	1	4	60	2	1.4	0.00				1	1	
D 1-4/60	1	4	60	3.8	1.8	0.20			1			
D 1-4/61	1	4	61	2	2	0.00				1		

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D 1-4/61	1	4	61	2.3	1.2	0.00				1		
D 1-4/62	1	4	62	3	2	0.20			1	1		
D 1-4/63	1	4	63	2.8	1.7	0.00						
D 1-4/63	1	4	63	8	5.3	1.20			1	1		
D 1-4/64	1	4	64	2.8	2.5	0.10		1		1		
D 1-4/65	1	4	65	2.9	2.3	0.10						
D 1-4/66	1	4	66	2	1	0.00				1	1	
D 1-4/66	1	4	66	2	1.1	0.00				1		
D 1-4/67	1	4	67	2.5	1.6	0.00				1		
D 1-4/68	1	4	68	2.6	2	0.00						
D 1-4/69	1	4	69	7	1.1	0.00				1		
D 1-4/70	1	4	70	1.3	1.3	0.00		1				
D 1-4/71	1	4	71	1.8	1.4	0.00						
D 1-4/72	1	4	72	1.7	1.3	0.00						
D 1-4/73	1	4	73	2	1.6	0.00						
D 1-4/74	1	4	74	1.9	1.1	0.00	3					
D 1-4/75	1	4	75	2	6	0.00				1		
D 1-4/75	1	4	75	2.9	2	0.10				1		
D 1-4/76	1	4	76	1.5	1.6	0.00				1	1	
D 1-4/77	1	4	77	2.3	8	0.00						
D 1-4/78	1	4	78	3.3	3	0.20				1		
D 1-4/78	1	4	78	3.1	3	0.30				1		
D 1-4/79	1	4	79	4.6	4	0.40			1	1		
D 1-4/80	1	4	80	1.8	1.2	0.00				1		
D 1-4/81	1	4	81	2.5	1.4	0.00				1		
D 1-4/82	1	4	82	2.1	1.3	0.00						
D 1-4/83	1	4	83	3.8	3.2	0.30			1	1		
D 1-4/83	1	4	83	2.2	1.7	0.00						
D 1-4/84	1	4	84	2.6	1.9	0.00				1		
D 1-4/85	1	4	85	2.2	1.3	0.00				1		
D 1-4/87	1	4	87	2.7	2.1	0.20						
D 1-4/88	1	4	88	2.3	1.5	0.00						
D 1-4/89	1	4	89	2	1.1	0.00				1	1	
D 1-4/90	1	4	90	1.5	1.3	0.00						
D 1-4/91	1	4	91	1.8	1.6	0.00	3			1		
D 1-4/92	1	4	92	1.8	2	0.00						
D 1-4/93	1	4	93	2.6	1.6	0.00						
D 1-4/95	1	4	95	2.3	2	0.00				1		
D 1-4/96	1	4	96	2.9	1.8	0.10						
D 1-4/97	1	4	97	1.8	2	0.00		1				
D 1-4/98	1	4	98	1.6	1.9	0.00						
D 1-4/99	1	4	99	2	1.5	0.00				1		
D 1-4/100	1	4	100	1.2	1.1	0.00				1	1	
D 1-4/102	1	4	102	3.4	2.5	0.20	1					
D 1-4/105	1	4	105	2.8	1.6	0.00						
D 1-4/105	1	4	105	2.6	2.1	0.20						
D 1-4/106	1	4	106	3.2	1.5	0.10				1		
D 1-4/107	1	4	107	2.8	2	0.20	1					
D 1-4/108	1	4	108	1.9	1.1	0.00						
D 1-4/109	1	4	109	3.5	2	0.10				1		
D 1-4/110	1	4	110	2.7	2.4	0.10				1		
D 1-4/111	1	4	111	2.5	2.6	0.20	1					
D 1-4/112	1	4	112	2.7	2.2	0.20						
D 1-4/112	1	4	112	1.7	1.1	0.00				1		
D 1-4/113	1	4	113	2.4	1.9	0.10						

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D 1-4/114	1	4	114	2.6	1.2	0.00						
D 1-4/115	1	4	115	2	2	0.00				1		
D 1-4/116	1	4	116	1.3	1	0.00						
D 1-4/117	1	4	117	2.2	0.8	0.00						
D 1-4/117	1	4	117	1.5	2	0.00						
D 1-4/118	1	4	118	1.9	1.3	0.00	1					
D 1-4/119	1	4	119	1.7	1.3	0.00				1		
D 1-4/120	1	4	120	1.9	1.5	0.00						
D 1-4/121	1	4	121	2.3	1.5	0.10				1		
D 1-4/122	1	4	122	2.1	2	0.00						
D 1-4/123	1	4	123	4.4	4	0.70			1	1		
D 1-4/124	1	4	124	3.2	2	0.20	1					
D 1-4/125	1	4	125	2	1.9	0.10	1					
D 1-4/126	1	4	126	3.8	2	0.20	1					
D 1-4/127	1	4	127	2	2	0.00				1		
D 1-4/128	1	4	128	1.5	1.4	0.00					1	
D 1-4/129	1	4	129	1.6	1.3	0.00						
D 1-4/130	1	4	130	1.2	2	0.00						
D 1-4/131	1	4	131	6	1	0.00				1		
D 1-4/132	1	4	132	2.5	1.3	0.00				1		
D 1-4/133	1	4	133	2.8	1.9	0.00						
D 1-4/134	1	4	134	4	3.3	0.30				1		
D 1-4/135	1	4	135	3.1	2.7	0.20				1		
D 1-4/136	1	4	136	2.7	1.8	0.00				1	1	
D 1-4/137	1	4	137	2.8	1.2	0.00						
D 1-4/138	1	4	138	2.2	2.1	0.30						
D 1-4/139	1	4	139	1.9	1.8	0.00				1		
D 1-4/140	1	4	140	2.1	1.3	0.00						
D 1-4/141	1	4	141	1.9	1.3	0.00				1		
D 1-4/142	1	4	142	2.1	1.5	0.00				1		
D 1-4/142	1	4	142	4.8	3.3	0.40				1	1	
D 1-4/143	1	4	143	2.5	1.6	0.10						
D 1-4/144	1	4	144	4.8	4.8	0.90			1			
D 1-4/145	1	4	145	4	2.8	0.40	1					
D 1-4/146	1	4	146	3.4	2.9	0.20			1	1		
D 1-4/147	1	4	147	4.5	3.3	0.40		1		1		
D 1-4/149	1	4	149	2.6	2.4	0.20						
D 1-4/150	1	4	150	7	5.1	0.60				1		
D 1-4/151	1	4	151	4.3	2.9	0.30						
D 1-4/152	1	4	152	3.4	3	0.30		1				
D 1-4/153	1	4	153	3.4	2	0.10				1		
D 1-4/154	1	4	154	5.5	4.3	0.50			1	1		
D 1-4/155	1	4	155	5.7	4.4	1.00			1			
D 1-4/156	1	4	156	4.2	2.2	0.40		1				1
D 1-4/158	1	4	158	3.4	2.4	0.10		1		1		
D 1-4/159	1	4	159	1	2.1	0.10				1		
D 1-4/161	1	4	161	2	1.5	0.00						
D 1-4/162	1	4	162	10.1	8.6	12.50	3		1	1		
D 1-4/163	1	4	163	6.6	6.8	12.10			1			
D 1-4/167	1	4	167	1.7	1.7	0.00						
D 1-4/168	1	4	168	2.2	1.8	0.00				1		
D 1-4/170	1	4	170	1.8	1.4	0.00				1		
D 1-4/171	1	4	171	1.8	1.4	0.00						
D 1-4/172	1	4	172	4.6	3.3	0.30	3			1		
D 1-4/173	1	4	173	2	0.9	0.00	1					

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D 1-4/174	1	4	174	10.4	5.6	5.80			1	1		
D 1-4/176	1	4	176	3.2	2.8	0.10						
D 1-4/177	1	4	177	1.9	1.6	0.00				1	1	
D 1-4/178	1	4	178	1.6	1.4	0.00		1				
D 1-4/179	1	4	179	1	1.3	0.00	1					
D 1-4/180	1	4	180	1.9	1.4	0.00				1		
D 1-4/181	1	4	181	3.8	2.9	0.30				1		
D 1-4/182	1	4	182	0.9	0.9	0.00		1			1	
D 1-4/184	1	4	184	1.9	1.4	0.00		1		1		
D 1-4/186	1	4	186	2.1	1.3	0.00		1		1		
D 1-4/186	1	4	186	3.6	2.2	0.10				1		
D 1-4/187	1	4	187	1.8	1.2	0.00						
D 1-4/188	1	4	188	2.5	1.1	0.00					1	
D 1-4/189	1	4	189	4	3	0.30		1				
D 1-4/190	1	4	190	3.1	2.9	0.10		1		1		
D 1-4/190	1	4	190	3.4	1.5	0.10				1		
D 1-4/191	1	4	191	1.8	1.2	0.00						
D 1-4/192	1	4	192	3.9	3	0.20				1		
D 1-4/193	1	4	193	2.9	2.5	0.10				1		
D 1-4/194	1	4	194	2.9	2.3	0.00				1		
D 1-4/195	1	4	195	1.9	1.3	0.00						
D 1-4/196	1	4	196	2.6	4.9	0.10				1		
D 1-4/197	1	4	197	3.4	4.8	0.30				1		
D 1-4/199	1	4	199	1.8	3	0.00				1		
D 1-4/200	1	4	200	1.4	1.4	0.00			1			
D 1-4/202	1	4	202	6.4	4.5	1.00				1		
D 1-4/203	1	4	203	2.7	1.4	0.10		1				
D 1-4/204	1	4	204	2.9	1.5	0.00						
D 1-4/205	1	4	205	5.6	4.3	0.80			1	1		
D 1-4/206	1	4	206	1.9	1.9	0.00	3		1			
D 1-4/207	1	4	207	4.5	4	0.50			1	1		
D 1-4/208	1	4	208	2	1.9	0.00				1		
D 1-4/209	1	4	209	4.4	2.8	0.20	3			1		
D 1-4/210	1	4	210	3.1	2.5	0.20				1	1	
D 1-4/212	1	4	212	2	1.5	0.00						
D 1-4/213	1	4	213	3.2	1.8	0.20				1		
D 1-4/214	1	4	214	2	1.4	0.10	1					
D 1-4/215	1	4	215	1.6	1.3	0.00						
D 1-4/216	1	4	216	1.6	1.6	0.00						
D 1-4/217	1	4	217	2.5	2.4	0.20	3			1		
D 1-4/218	1	4	218	1.8	1.2	0.00				1		
D 1-4/219	1	4	219	1.8	1.1	0.00						
215						0.29		19	25	108	18	2
D1-5/1	1	5	1	2.6	1.9	0.10						
D1-5/2	1	5	2	2.6	2.2	0.20	1	1				
D1-5/3	1	5	3	2.7	1.9	0.20	1					
D1-5/4	1	5	4	3.3	2.3	0.20						
D1-5/5	1	5	5	2.4	1.6	0.00						
D1-5/6	1	5	6	2.1	1.9	0.00						
D1-5/7	1	5	7	2.3	1.6	0.00		1				
D1-5/8	1	5	8	2.3	1.9	0.00				1		
D1-5/9	1	5	9	2.1	1.8	0.00						
D1-5/10	1	5	10	2.1	1.3	0.00						
D1-5/11	1	5	11	2.8	2	0.10				1		
D1-5/12	1	5	12	3	0.7					1		

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D1-5/13	1	5	13	3.2	1.8	1.00						
D1-5/14	1	5	14	2.5	2.5	1.00						
D1-5/15	1	5	15	1.9	1.4	0.00						
D1-5/16	1	5	16	2.6	1.8	0.10					1	
D1-5/17	1	5	17	1.9	1.5	0.00				1	1	
D1-5/18	1	5	18	2.3	1.1	0.00		1				
D1-5/19	1	5	19	2	1.6	0.00						
D1-5/20	1	5	20	2.7	1.7	0.00				1		
D1-5/21	1	5	21	1.9	1.2	0.00						
D1-5/22	1	5	22	3.1	2.4	0.10				1		
D1-5/23	1	5	23	1.6	1.4	0.00						
D1-5/24	1	5	24	2	1.6	0.00						
D1-5/25	1	5	25	2.4	1.7	0.10						
D1-5/26	1	5	26	2.2	1	0.00					1	
D1-5/27	1	5	27	2.6	1.4	0.00						
D1-5/28	1	5	28	1.8	2	0.00						
D1-5/29	1	5	29	1.8	1.5	0.00				1	1	
D1-5/30	1	5	30	2.4	1.5	0.00						
D1-5/31	1	5	31	2.3	1.9	0.00				1	1	
D1-5/32	1	5	32	2.5	2.1	0.10		1				
D1-5/33	1	5	33	2.1	1.9	0.00				1	1	
D1-5/34	1	5	34	2.4	1.6	0.00				1		
D1-5/35	1	5	35	2.3	1.3	0.00						
D1-5/36	1	5	36	2.1	1.3	0.00						
D1-5/37	1	5	37	2.5	1.6	0.00				1	1	
D1-5/38	1	5	38	3.8	1.4	0.10						
D1-5/39	1	5	39	2	1.3	0.00		1				
D1-5/40	1	5	40	2.08	1	0.00						
D1-5/41	1	5	41				1					
D1-5/42	1	5	42	3.1	1.4	0.00		1				
D1-5/42	1	5	42	3.2	1.6	0.10						
D1-5/43	1	5	43	2.1	2.1	0.10						
D1-5/44	1	5	44	2.1	1.8	0.00						
D1-5/45	1	5	45	2.4	0.155	0.00				1	1	
D1-5/46	1	5	46	1.9	1.7	0.00						
D1-5/49	1	5	49	2.6	1.9	0.10				1	1	
D1-5/50	1	5	50	2.2	2	0.10						
D1-5/51	1	5	51	2	1.4	0.00				1	1	
D1-5/52	1	5	52	1.9	1.2	0.00						
D1-5/53	1	5	53	2.7	1.1	0.00						
D1-5/54	1	5	54				1					
D1-5/55	1	5	55	1.9	1.7	0.00				1		
D1-5/56	1	5	56	1.7	1.5	0.00						
D1-5/57	1	5	57	1.2	1.2	0.00						
D1-5/58	1	5	58	1.85	1.3	0.00						
D1-5/59	1	5	59	1.9	1.9	0.00				1		
D1-5/59	1	5	59	1.4	4	0.00						
D1-5/60	1	5	60	2	1.8	0.00						
D1-5/61	1	5	61	2.3	1.9	0.10	3					
D1-5/62	1	5	62	3.6	2	0.20	1					
D1-5/63	1	5	63	5.1	3.4	0.40						
D1-5/64	1	5	64	8.4	4.2	3.90	2	1				
D1-5/66	1	5	66	5.5	3	0.80	1					1
D1-5/67	1	5	67	6.1	4.6	0.80				1		
D1-5/71	1	5	71	7.3	5.6	2.50	1		1			

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D1-5/72	1	5	72	4.8	4.2	1.00	1		1			
D1-5/73	1	5	73	4.8	4.1	0.30	1			1		
D1-5/74	1	5	74	4.2	4	0.40	1					
D1-5/75	1	5	75	7.7	5.8	3.20	1		1			
D1-5/76	1	5	76	4.1	4.6	0.90	1					
D1-5/77	1	5	77	3.4	2	0.20			1			
D1-5/78	1	5	78	4.8	3.4	0.40	1					
D1-5/79	1	5	79	9	6.4	3.60			1			
D1-5/80	1	5	80	2.8	2	0.10						
D1-5/81	1	5	81	4.3	3.3	0.30	1					
D1-5/83	1	5	83	6.4	3.2	0.90						
D1-5/85	1	5	85	3.4	3.1	0.20					1	
D1-5/86	1	5	86	3.3	2.2	0.20						
D1-5/87	1	5	87	2	1.9	0.10						
D1-5/88	1	5	88	6.4		0.30	1		1	1	1	
D1-5/89	1	5	89	2.9	1	0.10		1				
D1-5/90	1	5	90	3.2	1.9	0.30			1			
D1-5/91	1	5	91				1					
D1-5/92	1	5	92	5.3	2.8	0.70			1			
D1-5/93	1	5	93	4.8	2.5	0.70			1			
D1-5/94	1	5	94	6	2.8	1.40	1					
D1-5/95	1	5	95	1.8	1.8	0.00						
D1-5/96	1	5	96	3.8	1.6	0.10						
D1-5/97	1	5	97	3.4	3.2	0.20	1					
D1-5/98	1	5	98	3.9	2.6	0.40						
D1-5/99	1	5	99	5.6	5.5	0.20	1			1	1	
D1-5/100	1	5	100	2.7	1.5	0.00						
D1-5/102	1	5	102	3.2	2.8	0.20						
D1-5/103	1	5	103	4.6	3.3	1.30						
D1-5/104	1	5	104	2.5	2.5	0.00		1				
D1-5/105	1	5	105	5.9	2.4	0.40						
D1-5/106	1	5	106	3.3	2	0.20						
D1-5/107	1	5	107	3.7	2.2	0.20	2	1				
D1-5/108	1	5	108	2.5	2.5	0.20						
D1-5/110	1	5	110	3.3	2.4	0.10		1		1		
D1-5/111	1	5	111	2.8	2.2	0.10				1	1	
D1-5/112	1	5	112	2.8	2	0.10					1	
D1-5/113	1	5	113	3	2.4	0.20						
D1-5/115	1	5	115	3.1	2.3		1				1	
106						0.31		11	9	22	16	1
D1-6/1	1	6	1	6.1	5.7	4.20			1			
D1-6/2	1	6	2	1.9	1.4	0.00		1		1		
D1-6/3	1	6	3	5.4	4.3	0.70		1		1		
D1-6/4	1	6	4	2.7	2.7	0.20				1		
D1-6/5	1	6	5	4	3.3	0.30			1			
D1-6/6	1	6	6	2.6	1.4	0.60						
D1-6/7	1	6	7	4.9	3.3	0.60				1		
D1-6/8	1	6	8	1.6	1.3	0.00		1		1		
D1-6/9	1	6	9	2.4	1.2	0.00						
D1-6/10	1	6	10	4	1.6	0.10						
D1-6/11	1	6	11	2.5	1.5	0.00						
D1-6/12	1	6	12	1.6	1.7	0.00						
D1-6/13	1	6	13	3.9	2	0.20				1		
D1-6/14	1	6	14	2	1.6	0.00						
D1-6/15	1	6	15	2	1.5	0.00					1	

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D1-6/16	1	6	16	1.8	1.8	0.00						
D1-6/17	1	6	17	2	1.5	0.00						
D1-6/18	1	6	18	3.6	2.9	0.10				1		
D1-6/19	1	6	19	2.6	1.6	0.10				1	1	
D1-6/20	1	6	20	2.8	2.2	0.10						
D1-6/21	1	6	21	1.7	1.5	0.00						
D1-6/22	1	6	22	2.9	1.6	0.10			1			
D1-6/23	1	6	23	2.7	1.6	0.00				1		
D1-6/24	1	6	24	3.6	2.4	0.20				1	1	
D1-6/65	1	6	65	8.2	6.6	3.10	4			1		
25						0.42		3	3	11	3	
D 2-2/1	2	2	1	3.4	1.9	0.10				1		
D 2-2/2	2	2	2	3.1	2.7	0.20				1	1	
D 2-2/3	2	2	3	2.8	2.3	0.10				1		
D 2-2/4	2	2	4	6	3.8	2.90	1					
D 2-2/5	2	2	5	3.2	1.7	0.20			1			
D 2-2/6	2	2	6	2.4	1.8	0.10						1
D 2-2/7	2	2	7	4.3	3.7	0.90	1					
D 2-2/8	2	2	8	2.5	2	0.10				1	1	
D 2-2/9	2	2	9	2.1	1.8	0.10						
D 2-2/10	2	2	10	3.9	2.4	0.60	SNDS TON					
D 2-2/11	2	2	11	4.6	3.8	0.50			1	1		
D 2-2/12	2	2	12	1.4	2.6	0.20						
D 2-2/13	2	2	13	2.7	1.6	0.10				1		
D 2-2/14	2	2	14	6.1	1.7	0.70	1					
D 2-2/15	2	2	15	4.6	2.4	0.30			1	1		
D 2-2/16	2	2	16	3.3	3	0.30				1		
D 2-2/17	2	2	17	1.7	1	0.00				1		
D 2-2/18	2	2	18	2.9	2.2	0.10				1		
D 2-2/19	2	2	19	4.1	3	0.30						
D 2-2/20	2	2	20	2.5	1.2	0.00						
D 2-2/21	2	2	21	2	4	0.00						
D 2-2/22	2	2	22	1.9	1.3	0.00						
D 2-2/22	2	2	22	3.6	2.6	0.20				1	1	
D 2-2/23	2	2	23	2.2	1.5	0.00				1		
D 2-2/24	2	2	24	3.3	2.1	0.30						
D 2-2/25	2	2	25	2.6	2.4	0.20				1		
D 2-2/26	2	2	26	5	2	0.50						
D 2-2/27	2	2	27	2.9	2.3	0.20				1	1	
D 2-2/27	2	2	27	2.7	1.5	0.20	1					
D 2-2/28	2	2	28	2.6	1.9	0.00				1		
D 2-2/29	2	2	29	2.1	1.8	0.00						
D 2-2/29	2	2	29	3.2	1.8	0.10						
D 2-2/30	2	2	30	2.6	1.5	0.10	1					
D 2-2/31	2	2	31	2.4	1.6	0.00						
D 2-2/32	2	2	32	2.7	1.9	0.10						
D 2-2/33	2	2	33	2.9	6	0.10						
D 2-2/34	2	2	34	3.2	1.5	0.20				1		
D 2-2/35	2	2	35	2	1.5	0.00						
D 2-2/36	2	2	36	2	1.5	0.00		1				
D 2-2/37	2	2	37	2.4	1.7	0.00				1		
D 2-2/38	2	2	38	1.8	1	0.00				1		
D 2-2/39	2	2	39	2.4	1.6	0.10			1			
D 2-2/40	2	2	40	2	1.5	0.00	3					

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D 2-2/41	2	2	41	2.1	1	0.00						
D 2-2/42	2	2	42	2.4	1.4	0.00				1		
D 2-2/43	2	2	43	2.6	1.7	0.00				1		
D 2-2/44	2	2	44	1.9	1.5	0.00				1		
D 2-2/45	2	2	45	4.2	2.3	0.40						
D 2-2/48	2	2	48	2.7	1.9	0.10		1		1		
D 2-2/49	2	2	49	2.4	2	0.10						
D 2-2/50	2	2	50	3.6	3	0.20				1		
D 2-2/51	2	2	51	1.8	1.4	0.00						
D 2-2/52	2	2	52	1.9	1.8	0.00				1		
D 2-2/53	2	2	53	2	1.6	0.00		1		1		
D 2-2/53	2	2	53	3.9	2.6	0.30				1	1	
D 2-2/54	2	2	54	2.2	2	0.20	1					
D 2-2/55	2	2	55	1.9	1.6	0.00						
D 2-2/55	2	2	55	2	1.6	0.00		1		1		
D 2-2/56	2	2	56	2	1.4	0.00						
D 2-2/57	2	2	57	3	1.5	0.10	3			1		
D 2-2/59	2	2	59	3.6	2.6	0.20		ONE SIDE				
D 2-2/60	2	2	60	2.3	1.9	0.00				1		
D 2-2/61	2	2	61	2.9	1.4	0.00				1	1	
D 2-2/62	2	2	62	1.7	1.6	0.00						
D 2-2/63	2	2	63	1.6	1	0.00	1					
D 2-2/64	2	2	64	2.5	1.8	0.10		1		1		
D 2-2/65	2	2	65	1.9	1	0.10	1					
D 2-2/67	2	2	67	1.5	1.6	0.00						
D 2-2/68	2	2	68	2	1	0.00						
D 2-2/69	2	2	69	6	1	0.00			1	1		
D 2-2/70	2	2	70	2.8	2.1	0.10				1		
D 2-2/71	2	2	71	2.3	2.2	0.10						
D 2-2/72	2	2	72	2.6	1	0.00						
D 2-2/73	2	2	73	2.4	0.9	0.00						
74						0.16		5	5	33	6	1
D2-31	2	3	1	2.4	1.6	0.00						
D2-32	2	3	2			0.10						
D2-34	2	3	4	2.9	2	0.10		1				
D2-35	2	3	5	2.9	1.5	0.10						
D2-36	2	3	6			0.10	1					
D2-37	2	3	7	3	2	0.10						
D2-38	2	3	8	3	1.7	0.20	1					
D2-39	2	3	9	3.5	2.2	0.20				1		
D2-310	2	3	10	2.8	2	0.10				1		
D2-311	2	3	11	3	2.4	0.10						
D2-312	2	3	12	3.2	2.7	0.20				1		
D2-313	2	3	13	2.5	2	0.00				1	1	
D2-314	2	3	14	2.1	1.2	0.00						
D2-315	2	3	15	3.8	2.7	0.20						
D2-316	2	3	16	1.9	1.6	0.00						
D2-317	2	3	17	2	1	0.00						
D2-318	2	3	18	1.5	2.2	0.10						
D2-319	2	3	19	2.5	2	0.10	1					
D2-319	2	3	19	4.4	3.9	0.80		1	1	1		
D2-320	2	3	20			0.10						
D2-321	2	3	21	3.4	1.8	0.10				1		
D2-322	2	3	22	3	1.9	0.10			1			

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D2-322	2	3	22	2	1.1	0.10	1					
D2-323	2	3	23	4.3	3.6	0.40				1		
D2-324	2	3	24	3.6	2	0.10	3					
D2-325	2	3	25	2.4	1.3	0.10						
D2-326	2	3	26	2.8	1.7	0.10						
D2-327	2	3	27	2.6	1.4	0.00						
D2-328	2	3	28	4.2	3	0.30				1	1	
D2-329	2	3	29	3.3	2.7	0.20		1		1		
D2-330	2	3	30	2	1.3	0.00		1				
D2-330	2	3	30	2.8	2.3	0.00	3			1		
D2-331	2	3	31	2.7	1.8	0.10						
D2-332	2	3	32	2.2	1.3	0.00						
D2-333	2	3	33	3	2.6	0.20				1	1	
D2-334	2	3	34	2.9	1.6	0.10						
D2-335	2	3	35	1.8	0.5	0.00	1					
D2-336	2	3	36	2.5	1.4	0.10						
D2-337	2	3	37	3.4	2.4	0.10				1	1	
D2-338	2	3	38	1.8	1.5	0.00				1		
D2-339	2	3	39	2.5	1.8	0.10						
D2-340	2	3	40	2.8	2	0.10						
D2-341	2	3	41	2	1.4	0.00						
D2-342	2	3	42			0.10						
D2-343	2	3	43	2	1.4					1	1	
D2-344	2	3	44	3.2	1.3	0.00	1					
D2-344	2	3	44	1.8	1.5	0.00				1		
D2-346	2	3	46	1.5	1.5	0.00						
D2-347	2	3	47	2	1.2	0.00		1				
D2-348	2	3	48	2.1	1.5	0.00				1		
D2-349	2	3	49	1.8	1.2	0.00						
D2-3/50	2	3	50	2.2	1.9	0.10	2			1		
D2-351	2	3	51	2.5	2	0.10				1	1	
D2-352	2	3	52	3.6	1.6	0.10				1		
D2-353	2	3	53	2	1.7	0.10						
D2-354	2	3	54	3.4	1.8	0.20						
D2-355	2	3	55	2.5	1.9	0.10						
D2-356	2	3	56	3.6	2.7	0.00						
D2-357	2	3	57	2.1	1.4	0.00						
D2-358	2	3	58	4	3.3	0.50			1	1		
D2-359	2	3	59	2.3	2.1	0.00						
D2-361	2	3	61	2	1.7	0.00				1		
D2-362	2	3	62	3.8	2.5	0.20				1	1	
D2-363	2	3	63	3.8	3.9	0.60					1	1
D2-364	2	3	64	3.8	3	0.10					1	
D2-3/65	2	3	65	6	3.8	0.80	1					
D2-366	2	3	66	4.3	3	0.20					1	
D2-367	2	3	67	2.2	2.6	0.20			1			
D2-368	2	3	68	2.5	0	0.10						
D2-369	2	3	69			0.20	1					
D2-370	2	3	70	2.4	2	0.00				1		
D2-371	2	3	71	2.2	1.6	0.10						
D2-373	2	3	73	2.8	2.4	0.10				1	1	
D2-374	2	3	74	3.4	1.8	0.10				1	1	
D2-375	2	3	75	3.3	2.3	0.10					1	
D2-376	2	3	76	3	2	0.10						
D2-377	2	3	77	2.2	2.3	0.10				1		

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D2-379	2	3	79	3.5	2.2	0.10				1		
D2-380	2	3	80	2.5	2.1	0.10						
D2-381	2	3	81	1.7	1.5	0.00						
D2-382	2	3	82	1.9	1.5	0.00				1		
D2-383	2	3	83	1.6	1.3	0.00						
D2-384	2	3	84	1.8	1.4	0.00						
D2-385	2	3	85			0.00	1					
D2-387	2	3	87	2	1.4	0.00	1					
D2-388	2	3	88	2.6	1.8	0.10				1	1	
D2-389	2	3	89	2.6	2.2	0.00				1		
D2-390	2	3	90	2.9	1.5	0.10	1					
D2-391	2	3	91	2.1	1.3	0.00						
89						0.11		5	4	30	14	1
D2-4/1	2	4	1	3	2.7	0.20				1		
D2-4/2	2	4	2	2	1.6	0.00			1			
D2-4/3	2	4	3	1.6	1.5	0.00	1					
D2-4/4	2	4	4	5.3	2.5	0.40						
D2-4/5	2	4	5	2.9	2	0.10				1		
D2-4/5	2	4	5	2.8	1.9	0.00				1		
D2-4/6	2	4	6	2.2	2	0.00				1		
D2-4/7	2	4	7	3.1	2	0.10				1		
D2-4/7	2	4	7	1.6	1.5	0.00				1	1	
D2-4/8	2	4	8	1.7	1.1	0.00	1					
D2-4/9	2	4	9	2	1.7	0.10						
D2-4/10	2	4	10	2.6	2	0.10				1		
D2-4/11	2	4	11	1.7	1.5	0.00				1		
D2-4/12	2	4	12	1.3	1.1	0.00					1	
D2-4/13	2	4	13	3.3	3.4	0.20			1			
D2-4/14	2	4	14	5	2	0.30		1		1		
D2-4/16	2	4	16	2.6	2.1	0.20	1					
D2-4/17	2	4	17	3.8	2	0.30	1					
D2-4/18	2	4	18	1.6	3.2	0.30				1		
D2-4/18	2	4	18	3	2.4	0.10				1		
D2-4/19	2	4	19	5.2	3.2	0.60			1	1		
D2-4/19	2	4	19	2.6	1.8	0.00						
D2-4/20	2	4	20	3.1	1.9	0.10				1		
D2-4/21	2	4	21	2.3	1.9	0.00			1	1		
D2-4/22	2	4	22	3.8	2.2	0.30						
D2-4/23	2	4	23	2.6	2.4	0.10						
D2-4/24	2	4	24	2.6	1.8	0.10						
D2-4/25	2	4	25	3.2	2.6	0.20				1	1	
D2-4/26	2	4	26	4.4	2.5	0.20	3					1
D2-4/27	2	4	27	2.2	1.4	0.00		1		1		
D2-4/29	2	4	29	1.6	1.2	0.00				1		
D2-4/30	2	4	30	8.6	2.6	1.00				1		
D2-4/31	2	4	31	2	1.1	0.00	1					
D2-4/32	2	4	32	2	1.4	0.00						
D2-4/33	2	4	33	1.8	1	0.00				1		
D2-4/34	2	4	34	1.9	1.5	0.00						
D2-4/35	2	4	35	1.3	1.2	0.00					1	
D2-4/36	2	4	36	3	2.7	0.20	1					
D2-4/37	2	4	37	3.6	2.2	0.10				1		
D2-4/38	2	4	38	2.6	1.8	0.10		1				
D2-4/39	2	4	39	3	2.5	0.10						
D2-4/40	2	4	40	3.4	2.2	0.10				1		

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D2-4/41	2	4	41	1.6	1	0.00						
D2-4/42	2	4	42	1.7	1	0.00						
D2-4/43	2	4	43	2.6	1.6	0.10				1		
D2-4/44	2	4	44	2.5	1.6	0.00		1				
D2-4/45	2	4	45	2	1.7	0.00				1	1	
D2-4/46	2	4	46	4.1	2.7	0.40	3					
D2-4/47	2	4	47	2.3	1.3	0.00						
D2-4/48	2	4	48	3.4	3.1	0.30				1	1	
D2-4/49	2	4	49	4	1.9	0.20			1			
D2-4/52	2	4	52	2.2	1.1	0.00						
D2-4/53	2	4	53	6	3	0.60				1		
D2-4/54	2	4	54	2.6	1	0.00						
D2-4/56	2	4	56	3.6	1.9	0.10						
D2-4/57	2	4	57	2.6	2	0.20	1					
D2-4/58	2	4	58	2	1.4	0.00				1		
D2-4/59	2	4	59	3.6	2.8	0.40		1		1		
D2-4/60	2	4	60	5.4	3.8	0.50		1		1		
D2-4/60	2	4	60	1.5	1.6	0.00				1		
D2-4/61	2	4	61	2.1	2	0.00				1		
D2-4/62	2	4	62	1.7	1.2	0.00	1					
D2-4/63	2	4	63	2.4	1.7	0.10				1		
D2-4/64	2	4	64	2.7	2.1	0.20			1			
D2-4/65	2	4	65	4.3	3	0.50				1		
D2-4/66	2	4	66	2.2	2	0.20						
D2-4/67	2	4	67	2.9	2.5	0.20	1					
D2-4/68	2	4	68	2.3	2	0.10	3					
D2-4/69	2	4	69	2.2	1.3	0.00					1	
D2-4/70	2	4	70	4.6	2.7	0.30			1	1		
D2-4/71	2	4	71	2.5	2.1	0.00						
D2-4/73	2	4	73	3.1	2.6	0.20		1		1		
D2-4/74	2	4	74	2.9	2	0.10		1		1		
D2-4/76	2	4	76	1.9	1.6	0.00			1			
D2-4/77	2	4	77	3	2.6	0.10			1			
D2-4/78	2	4	78	1.3	1.4	0.00						
D2-4/79	2	4	79	2.6	1.9	0.10			1			
D2-4/80	2	4	80	1.9	1.9	0.00			1			
D2-4/81	2	4	81	1.7	1.4	0.00		1				
D2-4/82	2	4	82	2.1	1.5	0.00					1	
80						0.13		9	11	35	8	1
D 2-5/	2	5	0	2.5	2	0.00				1		
D 2-5/	2	5	0									
D 2-5/1	2	5	1	3.6	2.7	0.20				1	1	
D 2-5/2	2	5	2	2.6	2	0.10				1		
D 2-5/3	2	5	3	3.7	1.8	0.10				1		
D 2-5/4	2	5	4	1.6	2	0.00				1	1	
D 2-5/5	2	5	5	2.3	2	0.00						
D 2-5/6	2	5	6	3	1.2	0.00						
D 2-5/7	2	5	7	4.8	3.8	0.50				1		
D 2-5/8	2	5	8	3.4	2.2	0.10			1	1		
D 2-5/9	2	5	9	4.1	2.2	0.20				1		
D 2-5/11	2	5	11	5.6	3.9	0.50				1	1	
D 2-5/12	2	5	12	3.3	2.3	0.20						
D 2-5/13	2	5	13	5.2	2.8	0.60			1			
D 2-5/14	2	5	14	2.9	1.9	0.10				1		
D 2-5/15	2	5	15	3	2.2	0.10				1		

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D 2-5/16	2	5	16	2.6	1	0.00						
D 2-5/17	2	5	17	1.3	1.4	0.00		1				
D 2-5/18	2	5	18	2.2	2.4	0.10				1		
D 2-5/19	2	5	19	3	1.8	0.10		1		1		
D 2-5/19	2	5	19	1.7	0.8	0.00						
D 2-5/20	2	5	20	3.2	2.2	0.20				1		
D 2-5/21	2	5	21	2.4	1.8	0.00				1		
D 2-5/22	2	5	22	1.8	2.5	0.00				1		
D 2-5/23	2	5	23	2.1	1.3	0.00						
D 2-5/24	2	5	24	4.1	3	0.40				1		
D 2-5/25	2	5	25	2.2	1.8	0.10		1		1		
D 2-5/26	2	5	26	2.3	1.5	0.10				1		
D 2-5/27	2	5	27	4.7	3.2	0.60			1	1		
D 2-5/28	2	5	28	2.6	1.8	0.10		1				
D 2-5/29	2	5	29	6.6	4.7	1.40			1			
D 2-5/30	2	5	30	4.8	4.5	0.10			1			
D 2-5/31	2	5	31	3.6	2.6	0.40						
D 2-5/33	2	5	33	3.5	3.2	0.30						
D 2-5/34	2	5	34	2.7	1.7	0.10						
D 2-5/35	2	5	35	2.3	1.4	0.00		1				
D 2-5/36	2	5	36	2.4	1.8	0.10						
D 2-5/37	2	5	37	2.3	1.9	0.00			1			
D 2-5/38	2	5	38	2.5	2.7	0.00				1		
D 2-5/39	2	5	39	2.5	1.6	0.00						
D 2-5/40	2	5	40	2.9	2.8	0.10				1	1	
D 2-5/40	2	5	40	2.1	2.2	0.10						
D 2-5/41	2	5	41	2.6	1.6	0.00						
D 2-5/42	2	5	42	2.9	2	0.10				1	1	
D 2-5/43	2	5	43	4.8	4.2	0.60				1		
D 2-5/43	2	5	43	3	1	0.00			1			
D 2-5/44	2	5	44	3	1.8	0.20						
D 2-5/45	2	5	45	2.4	1.9	0.10						
D 2-5/46	2	5	46	5	3.2	0.80		1		1		
D 2-5/47	2	5	47	2	1.4	0.00				1		
D 2-5/47	2	5	47	5	3.1	0.60						1
D 2-5/48	2	5	48	3	3.4	0.40	1					
D 2-5/49	2	5	49	2.2	1.7	0.00				1	1	
D 2-5/50	2	5	50	2.9	1.9	0.10						
D 2-5/51	2	5	51	2.2	2.1	0.10						
D 2-5/52	2	5	52	3.5	1.6	0.20		1	1			
D 2-5/53	2	5	53	2.7	1.6	0.10						
D 2-5/54	2	5	54	1.9	1.4	0.00						
D 2-5/55	2	5	55	4.8	4	0.80				1		
D 2-5/56	2	5	56	2.9	1.6	0.10				1		
D 2-5/57	2	5	57	3.5	1.6	0.20			1			
D 2-5/58	2	5	58	3.6	2.9	0.20						
D 2-5/59	2	5	59	3.5	2.4	0.20	4			1	1	
D 2-5/60	2	5	60	2.4	1.6	0.00			1			
D 2-5/61	2	5	61	3.4	2.2	0.20				1	1	
D 2-5/62	2	5	62	4.1	2.6	0.20				1		
D 2-5/63	2	5	63	3.1	1.8	0.10						
D 2-5/64	2	5	64	2.5	3.1	0.30				1		
D 2-5/65	2	5	65	4.1	3	0.20					1	1
D 2-5/66	2	5	66	4.1	2.6	0.20		1				
D 2-5/67	2	5	67	2.2	2.4	0.10			1			

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D 2-5/68	2	5	68	2.4	1.7	0.00				1		
D 2-5/69	2	5	69	2.5	2.2	0.20						
D 2-5/71	2	5	71	2.5	2	0.10						
D 2-5/72	2	5	72	2	1.7	0.00				1		
D 2-5/73	2	5	73	2.5	2	0.00				1		
D 2-5/74	2	5	74	2	1.6	0.00			1			
D 2-5/75	2	5	75	2.2	1.8	0.00				1		
D 2-5/76	2	5	76	2.8	1.8	0.10				1		
D 2-5/77	2	5	77	2.4	1.2	0.00	3					
D 2-5/78	2	5	78	3.1	2.5	0.10				1	1	
D 2-5/79	2	5	79	2.4	2	0.20			1			
D 2-5/80	2	5	80	1.8	1.5	0.00		1				
D 2-5/81	2	5	81	4.1	3	0.30				1	1	
D 2-5/82	2	5	82	3	1.8	0.10						
D 2-5/83	2	5	83	2	1.3	0.00				1		
D 2-5/84	2	5	84	4.4	2	0.20			1			
D 2-5/85	2	5	85	8.4	1	3.40			1			
D 2-5/86	2	5	86	3.3	1.8	0.30		1				
D 2-5/87	2	5	87	2.3	1.7	0.00	1					
D 2-5/88	2	5	88	3.7	2	0.20			1	1		
D 2-5/89	2	5	89	3	2.6	0.10				1		
D 2-5/90	2	5	90	2.2	2	0.10				1		
D 2-5/91	2	5	91	1.9	1.9	O						
D 2-5/92	2	5	92	2	1.4	0.00				1		
D 2-5/93	2	5	93	2.8	2.3	0.10						
D 2-5/94	2	5	94	2.2	2	0.00				1		
D 2-5/95	2	5	95	2.4	2.4	0.20						
D 2-5/96	2	5	96	1.9	1.5	0.00						
D 2-5/97	2	5	97	1.8	1.4	0.00	2			1		
D 2-5/98	2	5	98	2.6	1.8	0.00				1	1	
D 2-5/99	2	5	99	2.2	2.2							
D 2-5/100	2	5	100	2	1	0.00	3			1		
D 2-5/102	2	5	102	3	2.3	0.20			1	1		
D 2-5/103	2	5	103	3	2.5	0.10				1		
D 2-5/104	2	5	104	3.6	3.5	0.40				1		
D 2-5/105	2	5	105	7.2	2.5	0.60				1		
D 2-5/106	2	5	106	5.7	3.6	0.90			1			
D 2-5/107	2	5	107	3	1.6	0.10						
D 2-5/107	2	5	107	4.7	2	0.30				1		
D 2-5/108	2	5	108	2.2	1	0.20						
D 2-5/109	2	5	109	4.4	2.2	0.20				1		
D 2-5/110	2	5	110	2.4	1.4	0.00			1	1		
D 2-5/111	2	5	111	2.9	2.3	0.20						
D 2-5/113	2	5	113	1.3	1.2	0.00		1				
D 2-5/114	2	5	114	2.3	1.3	0.00						
D 2-5/115	2	5	115	2.1	0.8	0.00	3			1		
D 2-5/116	2	5	116	1.7	1.3	0.00				1		
D 2-5/117	2	5	117	4.5	3.5	0.30				1		
D 2-5/118	2	5	118	2.6	1.6	0.00				1		
D 2-5/119	2	5	119	7.2	4.2	4.30						
D 2-5/120	2	5	120	4.5	1.8	0.30		1				
D 2-5/121	2	5	121	3	1.2	0.00						
D 2-5/122	2	5	122	3.4	2.8	0.30	2			1		
D 2-5/123	2	5	123	5.1	4.7	0.60				1		
D 2-5/124	2	5	124	9	3	0.60			1	1		

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D 2-5/125	2	5	125	5	4.3	1.60			1			
D 2-5/126	2	5	126	7.2	4.6	1.00			1	1		
D 2-5/127	2	5	127	6	4.3	1.30						
D 2-5/127	2	5	127	6.9	4.1	2.00			1			
D 2-5/128	2	5	128	2.1	3.2	0.30		1				
D 2-5/128	2	5	128	6.1	3.9	1.30		1				
D 2-5/130	2	5	130	2.5	1.9	0.00						
D 2-5/131	2	5	131	5.5	3.8	1.00		1	1	1		
D 2-5/132	2	5	132	7.6	4.5	3.20	2					
D 2-5/134	2	5	134	4.8	3.2	0.70	1					
D 2-5/135	2	5	135	5.7	4.3	2.00			1	1		
D 2-5/135	2	5	135	5.2	2.6	0.30			1	1		
D 2-5/136	2	5	136	3.6	3.3	0.30				1		
D 2-5/137	2	5	137	3.2	2.5	0.30				1		
D 2-5/138	2	5	138	4.4	2.8	0.30				1		
D 2-5/139	2	5	139	3.8	2	0.10				1		
D 2-5/140	2	5	140	8.9	6.6	2.90	3		1	1		
D 2-5/141	2	5	141	2.5	2.6	0.00				1		
D 2-5/142	2	5	142	2.8	1.5	0.10						
D 2-5/144	2	5	144	3.5	3	0.30				1	1	
D 2-5/145	2	5	145	6.2	4.6	4.60		1	1			
D 2-5/146	2	5	146	4.7	2.6	0.20	3			1		
D 2-5/148	2	5	148	1.8	1.4	0.00				1		
D 2-5/149	2	5	149	5.6	4	1.00						
D 2-5/150	2	5	150	3.2	3	0.30			1			
D 2-5/151	2	5	151	3.8	3.3	0.50				1		
D 2-5/152	2	5	152	5.2	4.7	0.80			1	1		
D 2-5/153	2	5	153	4	3.4	0.30				1		
D 2-5/154	2	5	154	4.9	2.9	0.60			1	1		
D 2-5/155	2	5	155	5.6	3.3	0.70	2					
D 2-5/156	2	5	156	3.7	3.3	0.30				1		
D 2-5/156	2	5	156	3.8	3.4	0.30				1		
D 2-5/157	2	5	157	4.7	3.4	0.50						1
D 2-5/158	2	5	158	4.6	3.5	0.70				1		
D 2-5/159	2	5	159	2.8	2.2	0.10						
D 2-5/160	2	5	160	4.3	3.5	0.50						
D 2-5/161	2	5	161	2	1.4	0.00						
D 2-5/162	2	5	162	5.5	3.7	0.70				1		
D 2-5/163	2	5	163	2.9	1.7	0.10				1		
D 2-5/164	2	5	164	4.2	3.4	0.30						
D 2-5/165	2	5	165	5.8	3.5	0.40				1		
D 2-5/166	2	5	166	4.1	3.3	0.70						
D 2-5/167	2	5	167	4.3	3.3	0.40			1	1		
D 2-5/168	2	5	168	4.8	2.5	0.50						
D 2-5/169	2	5	169	5.1	3.6	0.30				1	1	
D 2-5/170	2	5	170	4.7	2.6	0.60			1			
D 2-5/171	2	5	171	5	3.4	0.30				1		
D 2-5/172	2	5	172	4	3.2	0.30				1		
D 2-5/173	2	5	173	4	2.6	0.30						
D 2-5/174	2	5	174	4.8	3.5	0.50				1	1	
D 2-5/175	2	5	175	6	4.3	0.70				1	1	
D 2-5/176	2	5	176	6.3	5.4	1.50		1		1		
178						0.38		17	33	93	16	3
D2-6/1	2	6	1	2.9	1.9	0.10			1	1		
D2-6/2	2	6	2	2.4	1.7	0.20			1			

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D2-6/3	2	6	3	3.1	2.7	0.20				1		
D2-6/4	2	6	4	2.3	1.4	0.00						
D2-6/5	2	6	5	2.5	1.8	0.10				1		
D2-6/6	2	6	6	5.7	1.7	0.20						
D2-6/7	2	6	7	1.8	1.4	0.00		1				
D2-6/8	2	6	8	3.1	2.4	0.20		1		1		
D2-6/10	2	6	10	2.6	1.9	0.10		1		1		
D2-6/11	2	6	11	2.1	1.4	0.00				1		
D2-6/12	2	6	12	3.7	1.4	0.10			1	1		
D2-6/13	2	6	13	3.6	2.7	0.50						
D2-6/14	2	6	14	2.6	2.6	0.10				1		
D2-6/14	2	6	14	2.3	1.5	0.00	2					
D2-6/15	2	6	15	8.4	5	2.10			1	1		
D2-6/16	2	6	16	2.5	2	0.00				1		
D2-6/17	2	6	17	1.8	1.5	0.00						
D2-6/18	2	6	18	2.9	1.6	0.00						
D2-6/19	2	6	19	2.5	2.3	0.10	2					
D2-6/20	2	6	20	2.3	1.5	0.00				1		
D2-6/21	2	6	21	2.5	1.6	0.10						
D2-6/22	2	6	22	3.6	1.5	0.00						
D2-6/23	2	6	23	2.3	1.5	0.00				1		
D2-6/24	2	6	24	3.4	2.6	0.20				1		
D2-6/25	2	6	25	2.9	2.1	0.10				1		
D2-6/26	2	6	26	2.5	1.2	0.00						
D2-6/27	2	6	27	2.2	1.5	0.00			1			
D2-6/28	2	6	28	1.4	0.8	0.00						
D2-6/29	2	6	29	2.8	1.9	0.10			1			
D2-6/30	2	6	30	2.9	2	0.10			1	1		
D2-6/31	2	6	31	2	1.6	0.00				1	1	
D2-6/32	2	6	32	2.9	1.2	0.00						
D2-6/33	2	6	33	3.2	1.4	0.10						
D2-6/34	2	6	34	1.9	1.5	0.00				1		
D2-6/35	2	6	35	5.3	22	0.20				1		
D2-6/36	2	6	36	2.7	1.9	0.00						
D2-6/36	2	6	36	7	6	2.80		1		1		
D2-6/37	2	6	37	3	1.9	0.10				1		
D2-6/38	2	6	38	2.9	1.9	0.10				1		
D2-6/39	2	6	39	1.9	1.3	0.10	3					
D2-6/40	2	6	40	3	2.7	0.20	3			1		
D2-6/41	2	6	41	2.4	1.2	0.00		1				
D2-6/42	2	6	42	3.8	3.1	0.40			1	1		
D2-6/43	2	6	43	3.3	1.8	0.10						
D2-6/44	2	6	44	2.4	1.5	0.10						
D2-6/45	2	6	45	2.9	1.3	0.00						
D2-6/46	2	6	46	4.6	2.4	0.60			1			
D2-6/47	2	6	47	3.7	2.1	0.30						
D2-6/49	2	6	49	3.5	2.7	0.10						
D2-6/50	2	6	50	5.2	4	0.60				1		
D2-6/51	2	6	51	3.8	1.7	0.10				1		
D2-6/52	2	6	52	4.6	3.5	0.50						1
D2-6/53	2	6	53	2.6	2.1	0.00					1	
D2-6/54	2	6	54	3.1	2.6	0.10				1	1	
D2-6/55	2	6	55	3.2	2.4	0.20		1		1		
D2-6/57	2	6	57	3	2	0.00	1					
D2-6/58	2	6	58	3.8	3.6	0.40		1				

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D2-6/59	2	6	59	2.1	1.2	0.00	3			1		
D2-6/60	2	6	60	3.5	2.6	0.40				1		
D2-6/61	2	6	61	4.3	4	0.50				1		
D2-6/62	2	6	62	4.4	3	0.50						
D2-6/63	2	6	63	4.6	2.8	0.30						
D2-6/63	2	6	63	3.1	2.1	0.20						
D2-6/64	2	6	64	3.5	2.5	0.20				1		
D2-6/65	2	6	65	4	1.7	0.20			1	1		
D2-6/66	2	6	66	3.6	3.5	0.30					1	
D2-6/67	2	6	67	2.8	2.3	0.20						
D2-6/68	2	6	68	2.5	1.8	0.00						
D2-6/70	2	6	70	2.7	1.5	0.00				1		
D2-6/71	2	6	71	2.1	1.7	0.00						
D2-6/72	2	6	72	3.4	2.6	0.30						1
D2-6/73	2	6	73	3.2	2	0.20						
D2-6/75	2	6	75	4.2	3.5	0.50			1	1		
D2-6/76	2	6	76	1.9	1.6	0.00				1	1	
D2-6/77	2	6	77	2.8	1.4	0.10	4					
D2-6/78	2	6	78	2.3	2.3	0.00						
76						0.21		7	11	35	5	2
D 3-1/1	3	1	1	2.4	1.8	0.10				1		
D 3-1/2	3	1	2	2.3	1.3	0.00						
D 3-1/3	3	1	3	2.8	1.6	0.10	1					
D 3-1/4	3	1	4	1.7	1.6	0.00						
D 3-1/5	3	1	5	2.4	1.6	0.00				1	1	
D 3-1/6	3	1	6	1.5	1.8	0.00		1			1	
D 3-1/7	3	1	7	3.2	2	0.10	1					
D 3-1/8	3	1	8	3.2	2.3	0.20				1		
D 3-1/9	3	1	9	1.8	1.4	0.00	1					
D 3-1/10	3	1	10	2.2	2.3	0.10				1		
D 3-1/11	3	1	11	2.7	1.6	0.20			1	1		
D 3-1/12	3	1	12	2.2	1.8	0.10	1					
D 3-1/14	3	1	14	2.4	1.4	0.00	1					
D 3-1/15	3	1	15	4.6	2.4	0.40						
D 3-1/16	3	1	16	2.4	1.6	0.20						
D 3-1/17	3	1	17	3	2	0.20	1					
D 3-1/18	3	1	18	1.8	1.9	0.00				1		
D 3-1/19	3	1	19	3.9	3	0.40			1			
18						0.12		1	2	6	2	
D 3-2/1	3	2	1	4	3.2	0.50	1					
D 3-2/2	3	2	2	2.4	1.7	0.00				1		
D 3-2/3	3	2	3	3	2	0.10				1		
D 3-2/5	3	2	5	2.3	1.4	0.00	1					
D 3-2/6	3	2	6	2.3	1.5	0.00						
D 3-2/7	3	2	7	2.8	1.9	0.10				1		
D 3-2/8	3	2	8	3.4	2.1	0.20	1					
D 3-2/9	3	2	9	2.4	1	0.10						
D 3-2/10	3	2	10	2.9	2.2	0.10				1		
D 3-2/11	3	2	11	4.9	3	0.70	1					
D 3-2/12	3	2	12	3.6	2.7	0.30			1			
D 3-2/12	3	2	12	2.2	1.8	0.10	1					
D 3-2/13	3	2	13	2.9	2	0.10				1		
D 3-2/14	3	2	14	2.5	1.3	0.00	1					
D 3-2/15	3	2	15	2.6	1.5	0.10	1					
D 3-2/16	3	2	16	3.4	2.6	0.30						

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D 3-2/16	3	2	16	2.6	1.8	0.00				1		
D 3-2/18	3	2	18	2.4	1.3	0.00	1					
D 3-2/19	3	2	19	2	1.8	0.00				1		
D 3-2/19	3	2	19	1.7	1	0.00						
D 3-2/20	3	2	20	1.9	1	0.00	1					
D 3-2/21	3	2	21	2.5	1.9	0.10				1		
D 3-2/22	3	2	22	3.1	2.6	0.20						
D 3-2/23	3	2	23	2.4	1.6	0.00						
D 3-2/24	3	2	24	1.8	1.6	0.00						
D 3-2/24	3	2	24	2.4	1.2	0.00				1		
D 3-2/25	3	2	25	1.7	1.8	0.00				1		
D 3-2/26	3	2	26	2.2	1.8	0.00						
D 3-2/27	3	2	27	2	1.1	0.00	1					
D 3-2/28	3	2	28	1.8	1.5	0.00	1					
D 3-2/29	3	2	29	1.7	1.1	0.00				1		
D 3-2/30	3	2	30	1.6	1.4	0.00				1		
D 3-2/31	3	2	31	1.6	1.6	0.00	1					
D 3-2/32	3	2	32	1.8	1.5	0.00				1		
34						0.09			1	13		
D3-3/1	3	3	1	5	3.3	0.40						1
D3-3/2	3	3	2	2.8	1.6	0.10	5					
D3-3/3	3	3	3	4.1	2.8	0.30						
D3-3/4	3	3	4	4.2	3	0.30		1				
D3-3/5	3	3	5	3.1	2	0.10				1		
D3-3/5	3	3	5	2.8	1.7	0.00				1		
D3-3/6	3	3	6	3	2.8	0.20				1		
D3-3/7	3	3	7	2.8	0.9	0.20	2			1		
D3-3/8	3	3	8	5.8	4.9	0.80	3		1	1		
D3-3/9	3	3	9	4.7	3.6	0.70				1		
D3-3/10	3	3	10	3.4	2.9	0.20				1		
D3-3/11	3	3	11	2.3	1.9	0.10						
D3-3/12	3	3	12	7	4.2	0.70		1		1		
D3-3/13	3	3	13	2	1.6	0.00				1	1	
D3-3/14	3	3	14	2.6	1.5	0.10						
D3-3/15	3	3	15	2.1	1.5	0.10						
D3-3/16	3	3	16	2.6	2.4	0.20	1					
D3-3/17	3	3	17	2.5	2	0.10				1		
D3-3/18	3	3	18	2.1	1	0.00						
D3-3/19	3	3	19	2.1	1.5	0.10				1	1	
D3-3/20	3	3	20	3.1	1.6	0.20	1					
D3-3/21	3	3	21	4.1	3	0.20	2					
D3-3/22	3	3	22	3	2.2	0.30						
D3-3/23	3	3	23	2.7	1.6	0.10	1					
D3-3/24	3	3	24	1.6	2	0.20	1					
D3-3/25	3	3	25	3.2	2.4	0.20				1		
D3-3/26	3	3	26	3.6	3.3	0.40	1					
D3-3/27	3	3	27	2.5	1.1	0.00						
D3-3/28	3	3	28	3.5	2.3	0.20						
D3-3/29	3	3	29	1.6	1.4	0.00						
D3-3/30	3	3	30	1.8	1.2	0.00	1					
D3-3/31	3	3	31	2	1.3	0.00		1		1		
D3-3/32	3	3	32	2.7	1.8	0.10				1	1	
D3-3/33	3	3	33	2.8	1.1	0.00						
D3-3/34	3	3	34	2	1.6	0.00						
D3-3/35	3	3	35	1.8	1.5	0.00					1	

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D3-3/36	3	3	36	1.6	1.2	0.00		1		1		
D3-3/37	3	3	37	2	1.6	0.00				1		
D3-3/38	3	3	38	2.2	1.4	0.20						
D3-3/39	3	3	39	2.3	1.3	0.00				1		
D3-3/40	3	3	40	2.1	1.5	0.00						
D3-3/41	3	3	41	3.6	1.9	0.20						
D3-3/42	3	3	42	2.2	0.8	0.00						
D3-3/43	3	3	43	3	1.6	0.10	1					
D3-3/44	3	3	44	2.2	1.3	0.00				1		
D3-3/45	3	3	45	2.5	2	0.10				1		
46						0.16		4	1	19	4	
D 3-4/1	3	4	1	1.8	1.5	0.00						
D 3-4/2	3	4	2	2.6	1.8	0.00				1		
D 3-4/3	3	4	3	1.7	1.7	0.00	2			1		
D 3-4/4	3	4	4	1.5	0.6	0.00				1		
D 3-4/5	3	4	5	1.8	1.6	0.00				1		
D 3-4/6	3	4	6	3.8	2.8	0.60	1					
D 3-4/6	3	4	6	2.9	2.5	0.20			1			
D 3-4/7	3	4	7	2.6	1.6	0.00				1		
D 3-4/8	3	4	8	1.7	1.4	0.00			1	1		
D 3-4/9	3	4	9	2.9	1.4	0.00	3					
D 3-4/10	3	4	10	1.9	1.7	0.00				1		
D 3-4/11	3	4	11	1.5	0.9	0.00				1		
D 3-4/12	3	4	12	2	1.2	0.00	1					
D 3-4/13	3	4	13	2	1.6	0.00						
D 3-4/14	3	4	14	2.4	2	0.00			1	1		
D 3-4/15	3	4	15	2.2	1	0.00						
D 3-4/16	3	4	16	3.9	1.7	0.00	1					
D 3-4/17	3	4	17	4.2	3.3	0.40		1		1		
D 3-4/18	3	4	18	2	1.8	0.10						
D 3-4/19	3	4	19	2.3	1.8	0.10				1		
D 3-4/20	3	4	20	3.6	2.7	0.20				1		
D 3-4/22	3	4	22	3.3	2	0.10				1	1	
D 3-4/23	3	4	23	3.3	3	0.30		1		1		
D 3-4/24	3	4	24	5.5	4.3	1.10				1		
D 3-4/25	3	4	25	5.6	4	1.50			1			1
D 3-4/26	3	4	26	2.3	1.9	0.00		1				
D 3-4/27	3	4	27	1.8	0.5	0.00						
D 3-4/28	3	4	28	2.4	2.5	0.10		1				
D 3-4/29	3	4	29	2.4	1.4	0.00				1		
D 3-4/30	3	4	30	2	1.6	0.00				1		
D 3-4/31	3	4	31	3	2.1	0.10				1	1	
D 3-4/31	3	4	31	3	1.9	0.10						
D 3-4/32	3	4	32	2.7	1.7	0.00				1		
D 3-4/33	3	4	33	2	1.9	0.00				1		
D 3-4/34	3	4	34	3.4	2.2	0.20				1	1	
D 3-4/35	3	4	35	2	1.5	0.00				1		
D 3-4/36	3	4	36	4.6	3	0.50						1
D 3-4/37	3	4	37	2.2	1.8	0.10						
D 3-4/38	3	4	38	2.5	2.4	0.10				1	1	
D 3-4/39	3	4	39	2.4	1.3	0.10	1					
D 3-4/40	3	4	40	2.5	2.3	0.10				1		
D 3-4/41	3	4	41	4.7	2.4	0.20				1		
D 3-4/42	3	4	42	3.9	2	0.30	1					
D 3-4/43	3	4	43	2.4	1.4	0.10		1				

NUMBER	LOT	LEVEL	SERIAL	LENGTH cm	WIDTH cm	WEIGHT ounces	MATERIAL	RIND	CORTEX	PRIMARY	RESHARP	BIFACE
D 3-4/44	3	4	44	1.8	1.8	0.00			1	1		
D 3-4/45	3	4	45	3.2	2	0.20						
D 3-4/46	3	4	46	1.4	1.7	0.10				1		
D 3-4/47	3	4	47	3	1.3	0.00				1		
D 3-4/48	3	4	48	1.9	1.9	0.50						
D 3-4/50	3	4	50	3.4	2.1	0.20						
D 3-4/51	3	4	51	1.7	1.6	0.00						
D 3-4/52	3	4	52	2.2	1.9	0.30				1		
D 3-4/53	3	4	53	2	1.5	0.00			1			
D 3-4/54	3	4	54	2	1.7	0.00		1				
D 3-4/55	3	4	55	2.3	1.5	0.10						
D 3-4/56	3	4	56	2	1.4	0.00		1		1		
D 3-4/57	3	4	57	1.8	0.6	0.00						
D 3-4/58	3	4	58	5.4	3	0.70	1					
D 3-4/59	3	4	59	6.2	3.5	0.90	1					
59						0.16		7	6	30	4	2
D 3-58	3	5	8	5.2	3.1	0.60			1	1		
D 3-59	3	5	9	7.3	3.8	1.20			1			
D 3-51	3	5	1	3.3	2.7	0.30						
D 3-52	3	5	2	5.3	3.1	0.70			1			1
D 3-53	3	5	3	4.3	2.9	0.40			1			
D 3-54	3	5	4	3.2	2	0.10						
D 3-55	3	5	5	2.4	1.6	0.00						
D 3-56	3	5	6	2.9	2.2	0.10						
D 3-57	3	5	7	2.2	1.2	0.00			1			
D 3-510	3	5	10	2.7	2.1	0.20		1				
D 3-511	3	5	11	3.8	2.1	0.20						
D 3-512	3	5	12	2.6	2.1	0.00		1	1			
D 3-513	3	5	13	2.8	2	0.10				1		
D 3-514	3	5	14	2.8	2	0.10				1		

Appendix 4

Biface Catalogue

CATALOG NO.	LENGTH	WIDTH	THICKNESS	MORPHOLOGY	TECHNOLOGY	FLAKE PATTERN	SERIES	EDGE ALT	FUNCTION	FRACTURE	MATERIAL	WEATHERING	NOTES/COMMENTS
A	4.86	1.79	0.75	lbd	B-5	IC2&3pr	Olcott	use smo	pt/kn	lotm	bl igneous	fed	
B	4.29	3.23	1.18	lbb	B-2	I1pe	ind	none	none	lotm	bl igneous	fed	
C	7.65	3.08	1.04	obb	B-3	I1pe	ind	none	none	comp	gr igneous	fec	thick weathering rind
D	5.20	2.99	0.94	lbb	B-3	I1pe	ind	grd/cru	none	lhtm	bl igneous	fed	
D1-4/38	4.11	2.90	0.81	lbb	B-3	I1pe	ind	pol	none	lhtm	gr igneous	fed	pits w/iron oxide grains
D1-4/94	3.79	3.00	0.74	lbb	B-3	I1pe	ind	grd	none	lhtd	bl igneous	obscured	
D1-5/109	4.43	1.77	0.36	lbssb	B-5	IC2&3pr	Western Stemmed	none	pt/kn	l3otmp	bl igneous	fed	
D1-5/80	6.60	4.50	1.13	obb	B-3	I1pe	ind	grd	none	lotm	bl igneous	fed	B-1 flake form
D2-6/48	4.53	3.70	0.80	lbb	B-3	I1pe	ind	cru	none	lhtm	bl igneous	fed	
D2-6/9	13.20	3.52	1.01	lbb	B-5	I1pe-IC2&3pr	Olcott	pol	pt/kn	comp	bl igneous	fed	
DTP/1258	3.24	1.64	0.48	lbssb	B-5	IC2&3pr	Ind	none	pt	l2htdp	bl igneous	fed	
DTP/18	6.13	4.91	1.27	lbb	B-2	I1pe	ind	none	none	lhtm	bl igneous	fed & gc	cobble cortex;B-1 flake form
DTP/193	7.25	3.92	1.17	lbb	B-3	I1pe	ind	grd/cru	none	ltop	bl igneous	fed	
DTP/432	8.84	3.06	1.15	lbt	B-2	I1pe	ind	none	none	lotp	bl igneous	fed-fec	B-1 flake form
DTP/481	7.83	3.43	0.81	lbssb	B-4	I1pe-IC2&3pr	Western Stemmed	pol	pt/kn	lhtp	gr metased	fed	iron oxide & organic? stains
DTP/490	10.07	3.62	0.94	lbb	B-3	I1pe	ind	grd	none	comp	bl igneous	fec	
DTP/51	5.64	4.51	0.77	lbb	B-3	I1pe	ind	grd	none	lotm	bl igneous	fed	
DTP/522	7.10	3.45	1.21	lbt	B-3	I1pe	ind	none	none	lotp	bl igneous	fed	red stain
DTP/524	7.58	1.94	0.93	lbt	B-2	I1pe	ind	grd	none	comp	bl igneous	fec	
DTP/525	9.96	3.41	1.16	lbb	B-4	I1pe-IC2pr	Olcott	none	pt/kn	comp	bl ingeous	fed	serrated distal half
DTP/530	7.28	3.37	1.03	lbb	B-3	I1pe	ind	none	none	lotp	bl igneous	fec	
DTP/532	6.93	3.04	0.94	lbb	B-3	I1pe	ind	use polish	kn/sc	comp	bl igneous	fed-gc	red stain
DTP/533	3.99	3.83	0.76	lbb	B-3	I1pe	ind	grd	none	lhtd	bl igneous	fed	
DTP/539	5.67	1.89	0.45	lbb	B-5	IC2&3pr	Olcott	pol	pt/kn	l2otmp	bl igneous	fed	
DTP/557	6.10	3.94	1.01	lbb	B-3	I1pe	ind	use grd/pol	none	lotm	bl igneous	fed	red stain
DTP/566	5.26	2.62	0.68	lbb	B-4	I1pe-IC2pr	Olcott	grd/cru	pt/kn	l2htdp	bl igneous	fed	
DTP/585	5.98	3.82	1.17	lbb	B-3	I1pe	ind	grd/cru	none	lotm	bl igneous	fed	B-1 flake form
DTP/591	3.81	2.03	0.61	lbd	B-5	C2&3pr	Olcott	pol	pt	lhtm	wt chalced	negligible	
DTP/602	6.53	4.89	0.99	lbb	B-3	I1pe-2pr	ind	none	none	lhtm&otd	bl igneous	fed	red stain

CATALOG NO.	LENGTH	WIDTH	THICKNESS	MORPHOLOGY	TECHNOLOGY	FLAKE PATTERN	SERIES	EDGE ALT	FUNCTION	FRACTURE	MATERIAL	WEATHERING	NOTES/COMMENTS
DTP/607	7.60	3.89	1.13	lbpc	B-3	I1pe	ind	cru	none	lotm	bl igneous	fed	B-1 flake form
DTP/656	6.58	2.89	0.86	lbb	B-5	IC2&3pr	ind	none	pt/kn	lhtm	bl igneous	fec	
DTP/660	4.39	1.72	0.56	tbb	B-4	I2&3pr	ind	use smo	pt/kn	lotm	gr igneous	fec	red stain
DTP/694	5.58	4.27	1.09	lbb	B-3	I1pe	ind	cru	none	lhtm	bl igneous	fed	
E	4.81	3.81	0.96	lbb	B-3	I1pe	ind	grd/cru	none	lhtm	bl igneous	fed	
F	5.15	3.02	1.03	lbb	B-3	I1pe	ind	pol	none	l2htmp	gr igneous	fec	
G	6.74	3.41	1.35	lbb	B-3	I1pe	ind	grd	none	lotp	bl igneous	fec	
H	4.79	3.38	0.87	lbpc	B-3	I1pe-2pr	ind	pol	none	lhtm	bl igneous	fed	
I	5.45	2.68	0.83	lbb	B-4	I1pe-C2pr	Olcott	none	pt/kn	l2otm	bl igneous	fed	
J	5.86	2.85	1.06	lbpc	B-3	I1pe2pr	ind	none	none	lhtm	bl igneous	fed	wt. circular coatings