

CHAPTER 12

The Projectile Point/Knife Sample from the Sentinel Gap Site

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Introduction

Recent archaeological investigations at the Sentinel Gap site (45-KT-1362) revealed an occupation surface containing a diverse and rich Paleoindian cultural assemblage (Galm and Gough 2001). Located in a small drainage basin immediately west of the Columbia River in central Washington (Figure 1), site materials were distributed over a ca. 82 m² area within an 8-cm-thick occupation surface. Exposed on this surface was a patterned distribution of artifacts and cultural features, most notably 13 discrete lithic waste flake “dumps” and two burned surface deposits possibly representing the remains of temporary brush structures. The approximately 283,000 artifacts recovered during investigations include a diversity of implement types ranging from projectile points/knives and bifaces to bone tools and ornaments (Galm and Gough 2001; Gough and Galm 2003). A large and diverse archaeofauna, incorporating bison (*Bison* sp.), elk (*Cervus canadensis*), mountain sheep (*Ovis canadensis*), badger (*Taxidea taxus*), and salmon (*Oncorhynchus* spp.), represents another important component of this assemblage. Five radiocarbon dates on charcoal derived from the occupation surface, including the two burned surface features, range between 10,680 and 10,010 radiocarbon years BP and provide an average age of ca. 10,200 BP (Galm and Gough 2001:31). Evidence compiled to date argues for use of the site by a small band of mobile foragers during a single occupation episode.

An examination of the projectile point/knife (hereafter “point”) sample from the Sentinel Gap

site is the subject of the present study. Presented herein are descriptions of the recovered specimens preliminary comparisons to other coeval regional point samples, and a discussion of the nature of relationships to foraging strategies and technological organization. Although the products and by-products of biface manufacture overwhelmingly dominate the sample of lithic artifacts from the site, the artifact assemblage does contain a small sample of point forms. However, the assemblage also provides examples of late stage bifaces and these items offer additional insights on stylistic attributes and production technology manifested in the point sample. Despite the low numbers of points recovered during the investigation, this sample represents an important new addition to the existing body of data on human use of the Columbia Plateau at the Pleistocene-Holocene boundary.

The Point Sample

Eleven points comprise the site sample. Of this number, only three are complete or nearly complete forms while the remaining specimens are, to varying degrees, fragmentary. As described below, most points are manufactured from exotic (or minimally, non-local) tool stone materials distinct from the local raw materials (cryptocrystalline silica or ccs) that characterize the bulk of the lithic sample. Differences in color, texture, and diaphaneity are the principal characteristics distinguishing exotic raw materials from local varieties of ccs.

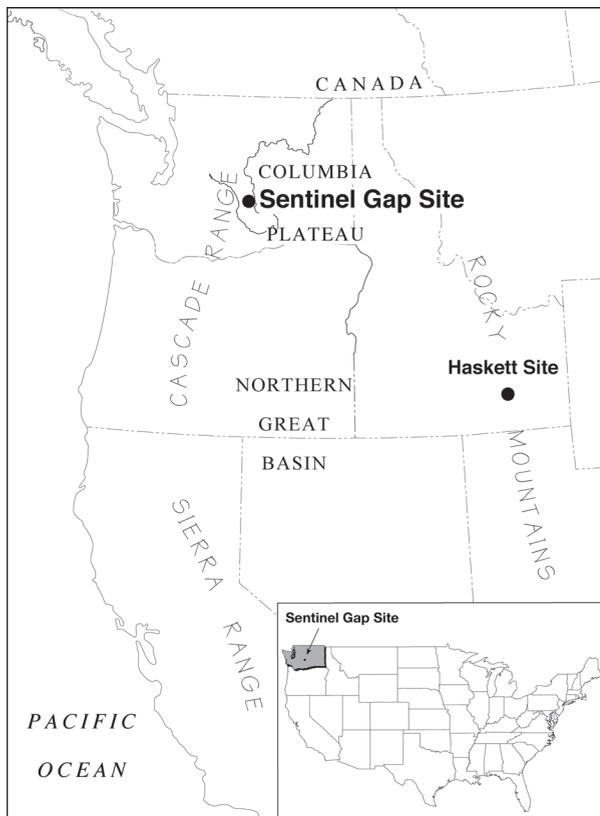


Figure 1. Sentinel Gap site in Eastern Washington and Haskett site type locality on the Snake River Plain, southeastern Idaho.

Following are descriptions of the eleven specimens in this sample. Metric data for the complete points are provided in Table 1; all points are illustrated in Figure 2.

Catalog Number 282: Defined as a small lanceolate form, this specimen has an extensively reworked blade element. The stem may also have been reworked (resized) in concert with the diminishing size of the blade. It is distinguished by a long tapering stem and a maximum width dimension that occurs above midline (distal segment). Stem margins are heavily ground except where reworking flakes have removed segments of lateral edges. Smoothing and polish are visible on some arrises of both faces and are probable

indicators of “bag wear” (Huckell et al. 2002). Outline morphology is asymmetrical due to the reshaping of one entire margin with corresponding flake removals extending only down the blade margin of the opposing side. The tip is broken and has been reinforced but not reshaped during reworking. The base is irregular and roughly pointed in outline shape. The point is manufactured from a translucent tan-colored opaline or opalized wood not recognized in raw material samples from the immediate vicinity of the site. The cross section is plano convex and this specimen appears to be manufactured from a flake blank with a proximal flake blank orientation. The shape and edge grinding characteristics indicate the point was deeply seated in the haft with only the approximate distal 1/3 available for piercing and/or cutting uses.

Catalog Number 295: Number 295 is a small base section similar in form to other basal styles in this sample. Manufactured from what appears to be a locally derived translucent brown ccs material, the fragment retains a weathered (white) patch on the base that ends in a flat facet. This may be a remnant of the striking platform employed during flake removal or simply a broken section of stem margin. Both edges are ground. The cross section is biconvex. The distal break is relatively flat and has the appearance of lateral snap fracture. Breakage may have occurred as a result of uneven loading during reworking or manufacture. Flake ridges on both faces exhibit smoothing and polish suggestive of bag wear.

Catalog Number 328: This specimen is the broken proximal section of a contracting stemmed point. Approximately one half of the base consists of a flat facet while the remaining section is a friable and actively degrading brownish-white weathering rind. The rind extends distally into the center of this fragment. The raw material is a translucent off white gray ccs, possibly of local origin. A brown-colored vein is present along the weathering front and extends the full length of the fragment. Stem edges are ground and the basal facet is also very smooth, although it is

Table 1. Sentinel Gap Site projectile point/knife metric data.

Catalog No.	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)
282	53.2	20.5	5.1	6.39
637	94.8	25.2	8.9	20.64
1254	89.2	23.3	7.0	15.26

not clear under low level magnification if this is the result of grinding. The base is straight and the juncture of base and stem is generally squared. Collateral flake removals do not typically meet at midline and thus form a symmetrical biconvex to slightly plano-convex cross section. The break surface is rolled possibly resulting from uneven loading of the piece during manufacture or reworking.

Catalog Number 556: This fragmentary section of a stem and base consists of two refitted pieces of a whitish ccs (opaline) raw material, presumably of non-local origin. The most recent breakage of this point is due to exposure to extreme heat as evidenced by crazing, numerous pot lid fractures, the presence of internal clouds and incipient fractures, and discoloration (reddish coloring on the base). In outline morphology, this is a medium-sized stemmed point with a slightly convex base and ground stem margin remnants in areas proximal to the base. Further evidence of edge grinding is obscured by the intense damage to this specimen caused by heat-induced fracture. The flake removal pattern, although largely obscured by heat damage, is a collateral style that crosses midline. This flaking pattern produced a biconvex cross section. The proximal break surface is gently “U” shaped across the width of the specimen and rolled in the opposing dimension.

Catalog Number 637: The single example in the Sentinel Gap point sample manufactured from basalt (or black fine-grained igneous stone) is a contracting stemmed style. Similar raw materials are common in the Lower Snake River Region, although other source locations cannot be ruled out. Stem and base margins are heavily ground with the exception of a ca. 2 cm long segment of one margin. This area was flaked in an apparent attempt to reshape this specimen. The convex base exhibits minor flake removals or breakage along one margin. The blade comprises approximately 60 percent of total specimen length and is extensively reworked. Reworking produced a narrowing of the blade beginning at the stem-blade juncture. Blade resharpening was apparently completed while the point remained in the haft. This resulted in the formation of an alternate bevel and the reshaping of the blade into a classic diamond-shaped configuration in cross section. By contrast, the stem has a biconvex cross section. Blade margins exhibit a moderate degree of sinuosity as a result of this late-stage reworking. A strongly asymmetrical tip is a by-product of

this resharpening technique and the extreme distal end of the tip is broken, possibly in the course of reworking. Typically broad collateral flake removals produce the shaping and thinning of this specimen. The joining of these collateral removals produced a slight midline ridge, although arrises along this ridge and across most of both faces exhibit extreme rounding and polish. The extent of rounding and polish implies bag wear presumably associated with long distance transport of the specimen. The overall shape of this specimen in long-section and cross section suggests a proximal flake blank orientation and a flake to biface reduction trajectory. Although somewhat similar in outline morphology to defined Cascade point forms from this region (cf. Ames et al. 1998:104–105, Fig. 2; Leonhardy and Rice 1970), extensive reworking of the blade margins has altered this point from a style possessing a wider blade and more pronounced blade-stem configuration.

Catalog Number 728: This item is the fragmentary midsection and stem portion of a large contracting stemmed point. Manufactured from a non-local off-white to light brown ccs, this specimen is missing only the distal section of the blade and tip. Stem and basal margins are ground and arrises on both faces are rounded, especially near midline, in a pattern consistent with bag wear. Approximately half of the base was removed by breakage but the remaining segment reveals a rounded configuration. With stem grinding occurring over approximately half the total length of this fragment, this is another example of a point form that was deeply seated in the haft during use. Collateral flake removal series generally thinned this specimen across midline, although the blade section was more recently reworked, possibly after the loss of the tip section. Typically broad collateral flake removals on the blade section contrast with smaller collateral flake scars on the stem. This difference also produces a slight midline ridge on the stem that is completely removed on the reworked blade segment. The short blade segment is therefore thinner than the adjoining stem. This suggests blade section reshaping may have been underway immediately prior to curation. The cross section is biconvex when viewed from the base but is more noticeably plano-convex when examined from the perspective of the reworked distal end. Stem margins are straight and generally regular as compared to the sinuous configuration of blade edges. The break surface has a slight incline

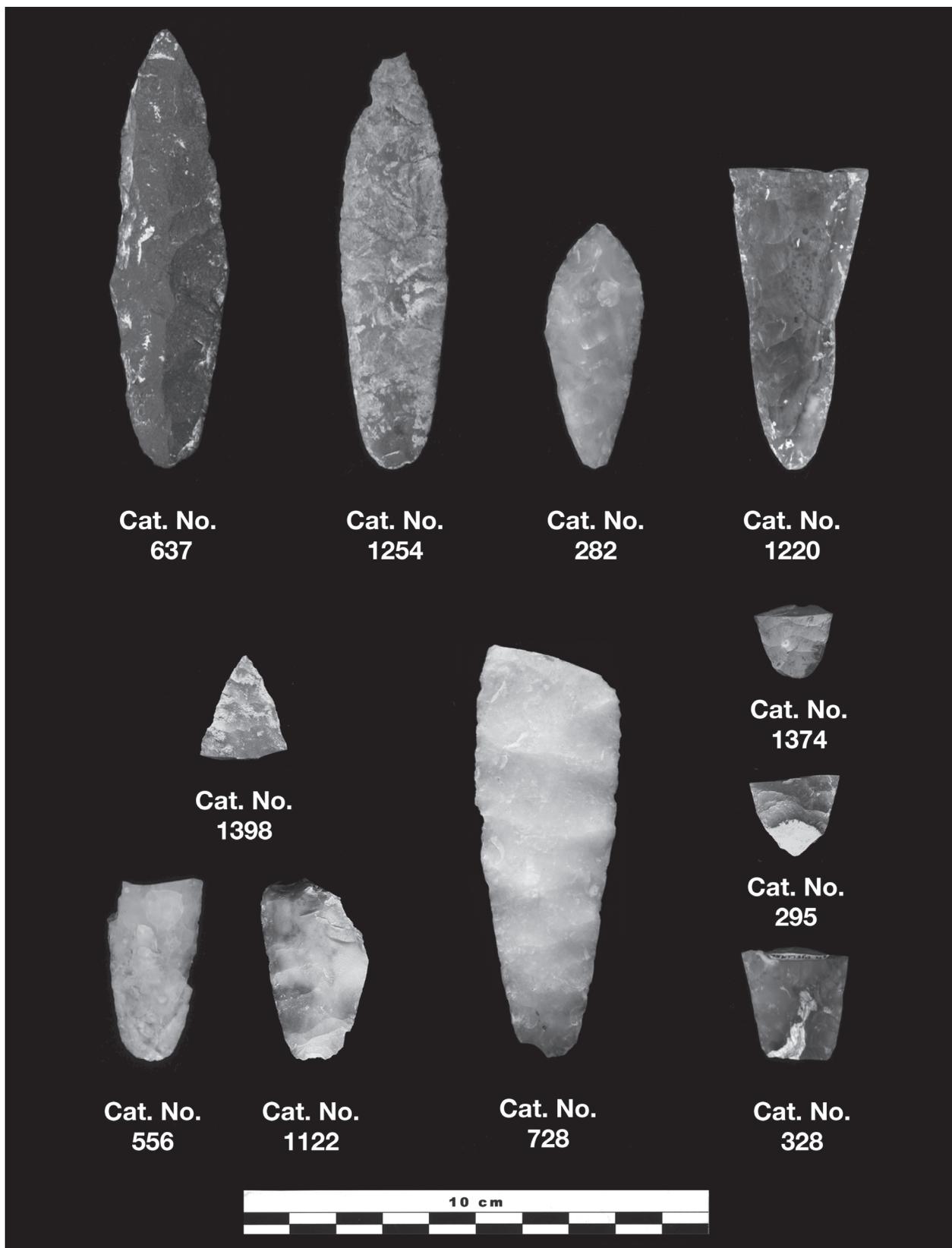


Figure 2. Sentinel Gap Site projectile points/knives and fragments. Note the morphological and technological similarities to Haskett Type 1 points (Butler 1965, 1967).

and roll on the high side of this configuration. A post-breakage attempt to reshape the tip section also is evident on one margin. It is noteworthy that the maximum width dimension of this form, taking into account the broken tip section, clearly occurred above (distal of) midline.

Catalog Number 1122: This appears to be the proximal segment (stem and base) of a contracting stemmed point. Reworking and breakage, especially on the base and distal end, obscure much of the original shape. The raw material is an exotic grayish-brown ccs with reddish colored clouds present along midline on both faces. The base is broken but was most likely rounded in outline. The distal end is reworked, possibly in an attempt to fashion a new functional edge. Unbroken segments of both margins are ground. If the shape of the remaining stem margins is an accurate reflection of the original configuration, this form was strongly contracting. Collateral flake removals generally pass across midline although a slight midline ridge is still present. The cross section is biconvex.

Catalog Number 1220: Catalog number 1220 is a fragmentary point consisting of contracting midsection and base sections. This specimen is manufactured from an exotic variegated brown ccs. This material is translucent only along the thin lateral margins. Stem margins converge to form a nearly pointed base. Apparent reworking of the base has removed the extreme end of this piece. A series of small flakes, possibly the result of unintentional fracture or scrubbing, produce a short, straight configuration at the proximal end. Stem margins are ground from the base to the midsection break. Collateral flake series extending beyond midline thinned this specimen and removed any evidence of a midline ridge. One stem margin is reworked, possibly representing an initial attempt to reshape this form. The edge on the reworked margin exhibits a series of micro-flake removals extending the full length of the fragment that are nearly continuous on both faces. The opposing stem margin is incurvate but regular. The asymmetry of the latter margin may have resulted from the reshaping of a broken section of the edge and/or the attempted reshaping of the entire piece prior to breakage at midsection. The break surface is only slightly rolled and a flaw in the material is visible near one edge of the break. It is highly likely that the structural weakness associated with this internal flaw is responsible for the

resulting breakage in this position. The cross section is biconvex.

Catalog Number 1254: One of the few essentially complete forms in the Sentinel Gap assemblage, catalog number 1254 is manufactured from an exotic grayish-brown, opaque chert. The absence of the distal-most portion of the tip, probably as a result of impact fracture, is the only exception to an otherwise intact form. Typically broad collateral flake removals thinned the point across midline and produce a smoothed, symmetrical biconvex cross section. As noted on other specimens in this collection, flake removal patterns on the blade are at variance with those on the stem. Greater variability in removal patterns on the blade implies reworking/reshaping of this section of the point, presumably while the stem remained fixed in the haft. Blade reworking does not appear to have occurred more than once or, possibly, twice based on the resulting pattern and type of flake removals. There is no clear evidence of post-breakage attempts to re-establish the tip element. A prominent scar on one face near the tip appears to be a pot lid fracture suggesting exposure to extreme heat either late in its use history or coincidentally in the post-depositional environment. Stem margins are contracting and the base is rounded. Stem margins are ground, as are a few unretouched segments of the basal edge. Stem grinding extends distally to the approximate midsection of this specimen.

Catalog Number 1374: This small fragment appears to be the contracting proximal end of a larger lanceolate form, similar in size and outline to number 295. This is one of only two points recovered from a feature context (Feature 00.14B). The raw material is possibly a non-local opaque, brown ccs, although a yellowish patina masks most of one entire face of this fragment. The base is rounded and generally consistent in size with the basal dimensions of the lanceolate forms in this collection. Remaining stem margins and the basal edge are heavily ground. The surface of the broken end is rolled and sharply inclined to one face. The cross section is biconvex.

Catalog Number 1398: This tip segment is the second of two specimens (see catalog number 1374) found in the Feature 14 complex (Feature 00.14C). The specimen is manufactured from a translucent brown ccs material, probably of local origin. This tip fragment is reworked and very thin. Reworking flake series on both margins originate primarily from one

surface (as opposed to alternating) but terminate before reaching the break. This results in an asymmetrical, inset edge configuration and may be an indication of edge modification following breakage. While the tip angle is acute, the extreme distal end is broken either from use or reworking. The break surface is uneven and intermittently “cupped” in a manner compatible with fracture due to exposure to high heat.

Discussion

Despite variation within this sample, enough consistency exists to offer several generalizations relating to the parameters of style and technology. Lanceolate forms, generally of large size, with acute tips, short blade elements, long tapering stems, and excurvate bases characterize points in this collection. The maximum width dimension typically occurs distal to point midline, thereby producing distinctive stem-blade configuration and outline morphology. Combined attributes suggest a strong stylistic affinity to Haskett point styles first reported from the eastern Snake River plain in Idaho (Butler 1965, 1967; Marler 2004:54–58; see also Galm and Gough 2001, 2002). Sentinel Gap points and late-stage bifaces most closely resemble the Type 1 form defined by Butler (1965) from points in the Haskett site assemblage. Following are other summary observations on the Sentinel Gap point sample.

Use-Wear

Sentinel Gap points were examined under a binocular microscope at low to moderate (10X–70X) magnification to define evidence and categories of use-wear. The few blade elements represented in the present collection are extensively reworked. In the case of catalog number 637, reworking occurred while the point remained in the haft, resulting in the removal of flakes from only one face of each lateral blade edge. This pattern of reworking produces a distinctive bevel and a diamond-shaped blade cross section (cf. Galm and Hofman 1984:51–53, Figure 6). Blade element reworking is also evident from a pattern of edge “blunting” indicative of light scrubbing of the margins in conjunction with platform preparation. Stem margins are moderately to heavily scrubbed along edge segments that can approximate up to $\frac{2}{3}$ of total point lengths. The pattern

of reworking and light scrubbing of blade margins, combined with the grinding of stem elements, therefore effectively removed the most obvious indicators of use-wear. Nevertheless, the apparent emphasis on the reworking/rejuvenation of blade margins, particularly when combined with the evidence for deep seating of these forms in the hafting element, strongly implies a companion use as knives. Deep seating in the haft can reduce lateral movement thus providing added protection of the point from uneven loading and resulting fracture-in-bending commonly associated with knife use. When seated in a foreshaft, resharpening of the tip/blade can be accomplished without removing the point when breakage does occur (Beck and Jones 1997:202; Galm and Hofman 1984; Marler 2004:55; Musil 1988:374). The point sample from Sentinel Gap is consistent with damage patterns observed on other Haskett points from southeastern Idaho (including the type site sample). The style of reworking Haskett points while still secured in the haft also serves to define a composite weapons system consisting of the point, a foreshaft, and spear socketed to accommodate the foreshaft.

Bag wear indicated by rounding and polish of flake ridges on both faces of Sentinel Gap specimens, was noted earlier. This form of wear is typically associated with friction occurring as a result of long distance transport in a bag (Huckell et al. 2002). Raw materials represented in this sample provide further support for the manufacture of at least some of these forms elsewhere with final curation at Sentinel Gap. As noted below, the site contains a wealth of information on the manufacture of objects from locally derived tool stones, an industry dominated by the production of bifaces.

Technology

Figure 3 illustrates the hypothesized production stages represented in point manufacture. Evidence for the manufacture of final point forms is limited but, equally important, is dwarfed by the number of bifaces in this assemblage. The mostly broken bifaces in this sample (n=63) indicate off-site completion of final forms and by extension, a design to manufacture late stage bifaces for later use or trade. Virtually all of the products and by-products in the biface production trajectory are manufactured from locally derived cryptocrystalline quartz tool stone.

The partial refitting of two cores documents the full sequence of biface production and the virtual absence of any significant concern for economy in technological approach. In this scheme, one core produced a single biface and at best, perhaps a few additional tools from ample numbers of large waste flakes. Most waste flakes were not employed in secondary lithic production as indicated by the multiple waste flake features that circumscribe the outer boundary of the occupation surface.

Large lanceolate points are the apparent end product of this production sequence. Late stage bifaces, final point forms, and debitage confirm an emphasis on the manufacture of point styles of considerable size that most closely resemble the Type 1 variant of Haskett points (Butler 1965). Broad collateral flake series were employed to thin and shape late stage forms. These series often terminate at midline, thus creating a smoothed to slight midline ridge and corresponding biconvex cross section. While some examples exhibit thinning flake scars that cross midline on blade elements, it is not clear if these flake removals are consistently associated with manufacture or instead reflect the reshaping of specimens following use and breakage.

Cross sections become more extreme if reworking is completed while the point remains in the haft as described earlier. Pronounced midline ridges present on a few Sentinel Gap specimens, as well as on the classic specimen (number H1) from the Haskett type-site, may simply represent a technological accommodation of brittle raw materials. Greater thickness along the longitudinal midline would have reinforced, and therefore compensated for, the brittleness inherent in certain tool stone materials. Some glassy volcanic raw materials for example, tend to exhibit this characteristic and a resulting susceptibility to stress fracture during use. The added thickness along the longitudinal midline would enhance use of forms manufactured from such materials as knives. Sentinel Gap points manufactured from ccs and basalt raw materials do not have pronounced midline ridges like those found on Haskett site obsidian specimens H1 and H3 (Butler 1965). However, Sentinel Gap points are consistent with other chert point examples from the type-site.

The recovery of a single clothespin-style bone/antler foreshaft fragment from the Sentinel Gap occupation surface offers important clues to the style of composite weapons system employed here

and perhaps throughout the Haskett complex (Figure 4). The bone foreshaft blank was ground to produce the desired shape. This form of manufacture is evident from the exposure of interior bone cancellous structure on one side of the piece (see Figure 4a) and dense bone wall on the other (see Figure 4b). A notch cut into the distal foreshaft segment accommodates the point and produces the classic “clothespin” form. The total length of this object is unknown as the proximal segment of the foreshaft is broken. The depth of the foreshaft notch at 41.54 mm corresponds well with the stem length of 39.98 to 42.97 mm for point number 637. Although the maximum stem thickness of 8.72 mm for this point is too great for the maximum 7.73 mm foreshaft notch width, the size and shape of this foreshaft could accommodate most of the points in the Sentinel Gap sample. Also, a green bone foreshaft most likely was flexible enough to accept point 637 or styles of similar thickness. The foreshaft notch width is narrowest (3.48 mm) at the proximal end and widest at the distal end.

In cross section the foreshaft is a flattened oval. The stem is narrowest at the proximal end (14.03 mm) and widest at the distal stem-notch junction (15.64 mm). Stem dimensions also provide an indication of the corresponding spear socket diameter required to accommodate this foreshaft. In all likelihood, the depth of the socket exceeded the remaining truncated length of the foreshaft (61.32 mm). This combination of points and bone foreshaft in the Sentinel Gap assemblage provide a rare insight into the composite weapons system employed in this late Paleoindian timeframe. Foreshaft metric data also provide important new evidence for spear shaft dimensional relationships.

The composite weapon system outlined above not only readily accommodates use of the points as hafted knives, but also obviates the need for a separate, stylized knife form. In this regard, it is interesting to note the presence of a similar pattern of blade element reworking, and corresponding interpretation of knife use, on Haskett points from the type-site and other locations in eastern Idaho (Marler 2004:54–58).

Point Distributions

Figure 5 illustrates the distribution of points within the well-defined occupation surface at Sentinel Gap.

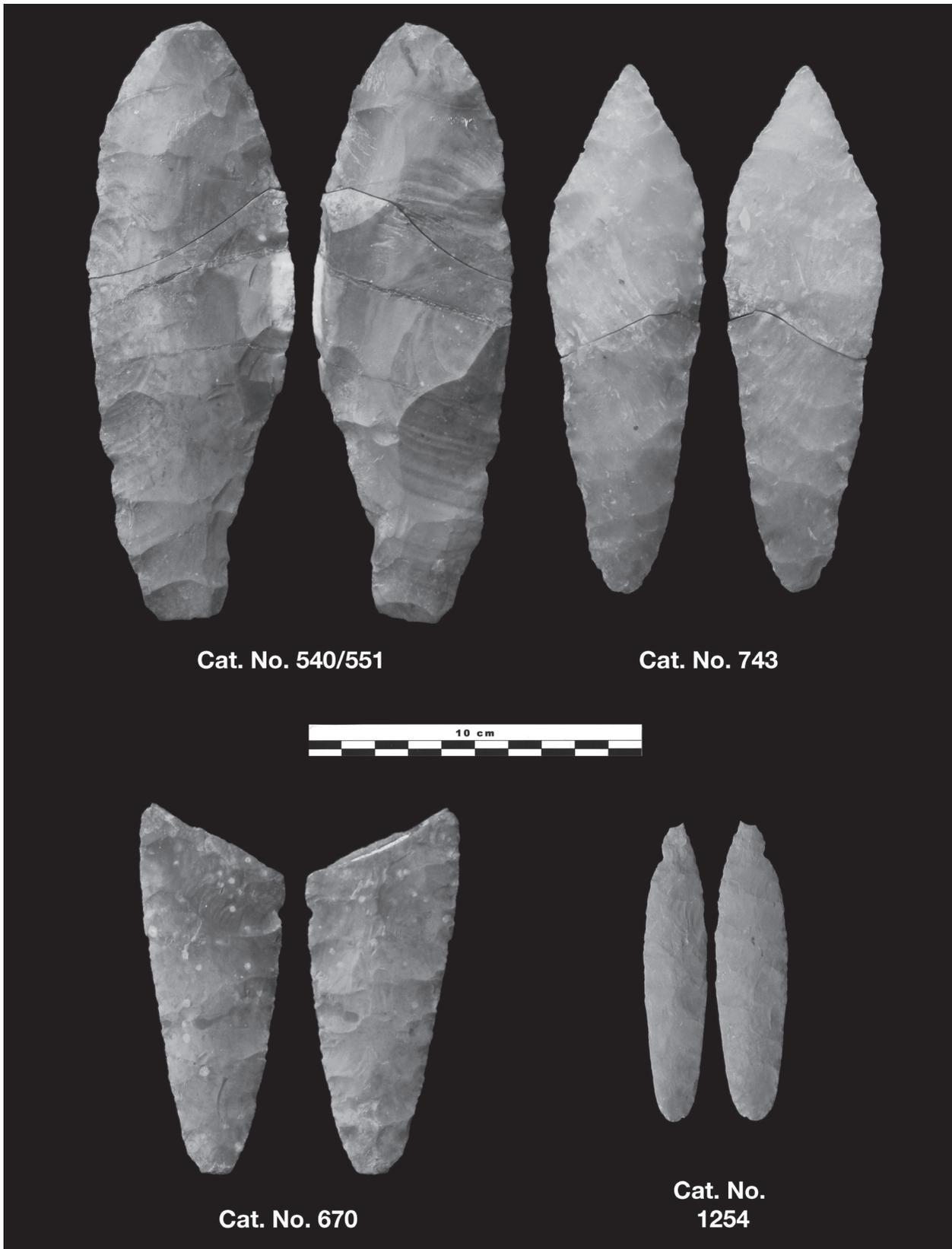


Figure 3. Major stages in the core to biface to projectile point/knife production system documented at the Sentinel Gap site.

The points on this surface are primarily distributed in an arc delimiting the outermost zone of the occupation surface and site. Within this zone are the 13 large lithic waste flake features (i.e., dumps) noted earlier, although many other smaller debris concentrations (i.e., flake, bone, fragmentary/complete implements) are present here as well. The concentration of debris in this outer ring, dominated by the products and by-products of biface production, defines a contrasting distribution of artifacts on the

interior of the occupation surface. Here two burn features (Features 99.1 and 99.3) are focal points in a distribution of functional artifact forms oriented toward a range of domestic activities. Whether or not these features represent the burned remnants of simple brush dwellings, there is little doubt of their importance as activity foci in a rich and highly diverse functional artifact distribution characteristic of a residential camp.

The physical condition of the specimens included in the point sample, combined with their broad distribution within the waste management zone, strongly suggest these forms had reached the end of productive use and were discarded. For the more complete specimens in this sample, their projected use as multipurpose tools and specifically, the recognition of their reduced utility as knives, are important considerations in future evaluations of point life histories and technological organization in general.

Conclusions

The proposed assignment of the Sentinel Gap points and site to the Haskett complex is one of the more significant findings of this study. The style and technology of the points and late stage bifaces are consistent with specimens reported from the type-site (Butler 1965:1–21; 1967:25) and other finds from the eastern Snake River plain (Holmer 1995:4; Marler 2004) and Northern Great Basin in general (cf. Beck and Jones 1997; Russell 1993:79–85; Schroedl 1991:1–15). Possible relationships to Agate Basin–Hell Gap points and Western Stemmed/Great Basin Stemmed Series complexes of the northern Great Plains and Northern Great Basin, respectively, also have been noted (Beck and Jones 1997:189, 202; Butler 1965:7–9; Marler 2004:54–55). At approximately 10,200 B.P., the temporal placement of this sample is consistent with reported age estimates for the Haskett complex (Holmer 1995:4). Figure 6 relates the Sentinel Gap point sample to point sequences defined to date for the Northern Great Basin, Columbia Plateau, and Great Plains.

With the exception of a possible Haskett point from the Lind Coulee site (45GR97) in central Washington (Craven 2003:35–37), other Haskett points have not been reported from the Columbia Plateau. Craven (2003:35–37, figures 4.1–4.2) includes a point midsection and biface from Lind

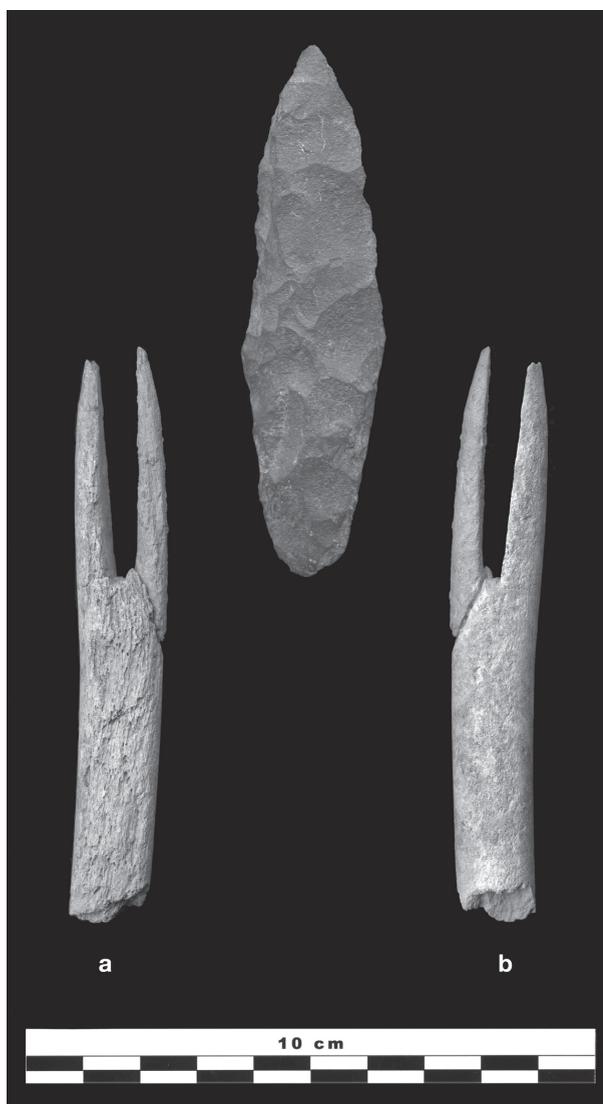


Figure 4. Sentinel Gap site bone/antler clothespin-style foreshaft and point components of a composite weapon system. Note the cancellous interior bone structure (4a) and the dense exterior wall surface (4b) visible on the foreshaft. These characteristics indicate bone blank shaping to achieve the desired foreshaft form and dimensions.

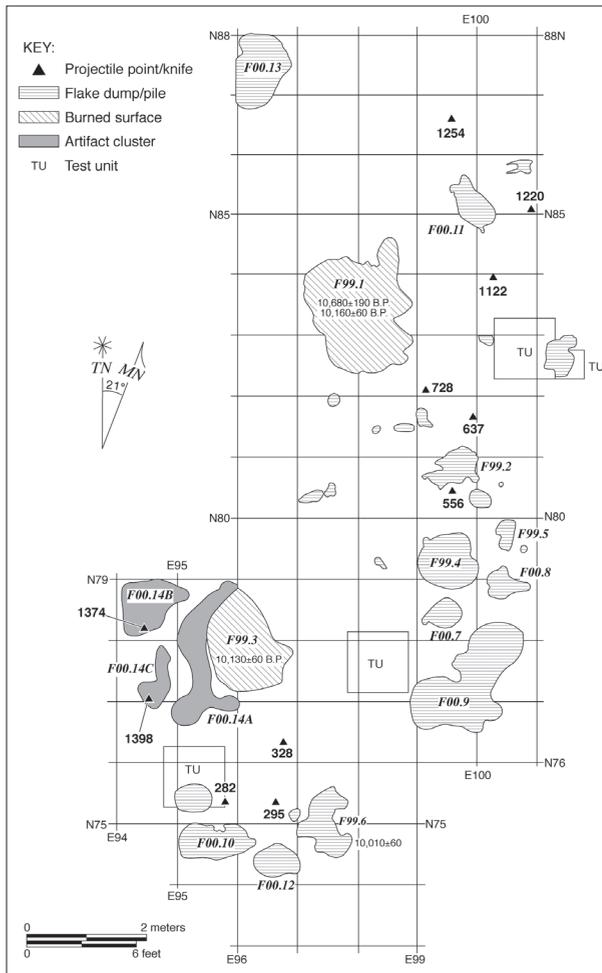


Figure 5. The majority of Sentinel Gap projectile points/knives were distributed in the Waste Management Zone Defined by Discrete Waste Flake Piles or Dumps. This zone bounds the site's central domestic activity areas surrounding burn Features 99.1 and 99.3.

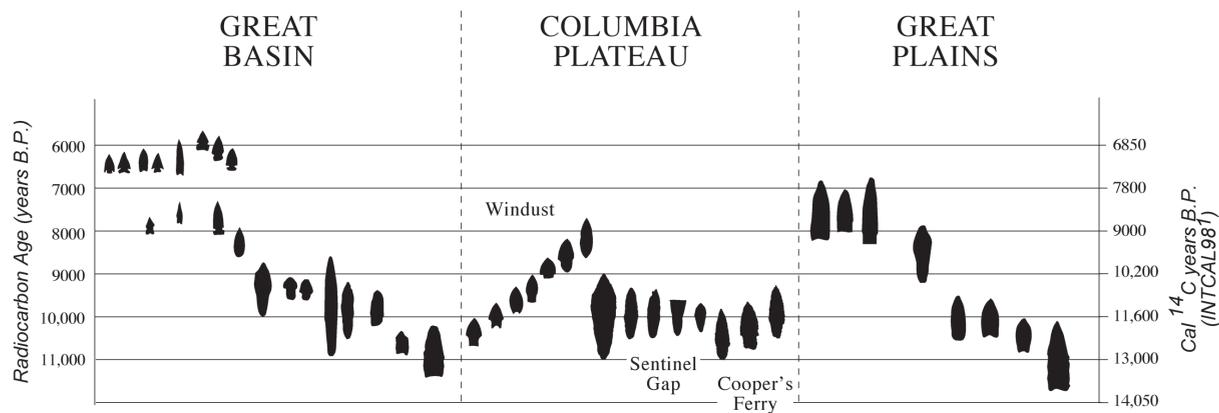
Coulee as possible Haskett styles. However, neither example is a particularly good fit with the Type 1 Haskett variety. The point midsection is simply too fragmentary to assess with any certainty and the biface illustrated by Craven is stylistically similar to the Type 2 Haskett variety. The Type 2 variety was defined by Butler (1965:6) on the basis of two surface finds from the type-site. More recent finds of Haskett points typically do not include the Type 2 variant thereby casting doubt on the viability of this form as a diagnostic point style. In any case, no Type 1 Haskett points are reported from Windust sites in the Plateau to date.

Sentinel Gap then is the first site in the Plateau with compelling evidence of an association with the

Haskett complex. This proposition raises intriguing new questions on the possible nature of relationships between the occupants of Sentinel Gap and coeval Windust Phase settlements in this region (Ames et al. 1998; Galm et al. 1981; Leonhardy and Rice 1970; Rice 1972). Preliminary comparison of these cultural complexes indicates a few significant differences, but also the need for further study of these cultural complexes.

One measure of the differences in lithic technological orientation represented by Sentinel Gap and Windust components is the respective emphasis on curated as opposed to expedient technological approaches. Following Amick, present use of the term “curation” is “simply descriptive and refers to complex tools which have relatively long use-lives and are frequently transported in anticipation of use at other locations” (1999:3). Expedient technology on the other hand is an expression of an unstandardized technology used to produce “convenience” flake tools. Expedient technologies are highly adaptable. The adaptability inherent in this approach provides ready accommodation of variations in resource access and availability, implement needs, and even sexual divisions of labor. But it also anticipates variability in tool stone availability, as well as size, geometry, and overall quality.

Sentinel Gap lithic technology is organized, first and foremost, around the abundance of lithic raw materials available in the immediate area. As refitting analysis has documented, this resulted in the repeated use of a large core to produce a single large biface followed by the discard of waste flakes, regardless of the numbers or sizes of these by-products (Galm and Gough 2002; Huckleberry et al. 2003). This approach is in agreement with MacDonald's (1971:34) assessment that Paleoindian groups were less concerned with economy in raw material use when sources were close. Technological approaches appear highly standardized resulting in the staged production of large bifaces and by extension, points. In fact, the paucity of evidence for an expedient technology, particularly in view of the abundance of large flakes available for use, is somewhat surprising. Finally, the manufacture of some points from exotic or non-local raw material indicates they were brought in from elsewhere and subsequently discarded. Replacement of points and bifaces thus comprises a major part of the retooling activity represented at Sentinel Gap.



¹Stuiver et al. 1998

Figure 6. Sentinel Gap site projectile point/knife assemblage in comparison to regional point sequences.

By contrast, Windust lithic technological approaches are characterized by an economy of tool stone use, the production of smaller biface-point (and other tool) forms, and the presence of large numbers of expedient tools (Rice 1972). Manufacturing sequences for bifaces and points appear less standardized perhaps reflecting an accommodation of parent raw materials of smaller size, variable geometry and overall quality. In short, Windust lithic assemblages reveal marked differences in lithic technological strategies including the system of manufacture and stylistic attributes of points and bifaces. The emphasis on core-flake technology can be documented in the large number of “convenience” flake tools found in Windust assemblages from this region (Rice 1972). The fact that most of these unstandardized convenience tools are of small to moderate size contrasts sharply with the formalized implement styles of relatively large sizes found at Sentinel Gap and in most Haskett assemblages.

The siting of the Sentinel Gap habitation near a major source of raw materials of large size therefore reveals more than just an important site selection factor. The quest for large raw materials and the associated identification and exclusion of waste materials for secondary tool manufacture are possible parts of an established “mental template” for lithic technology present in the Haskett complex. It is also a likely indicator of high mobility. A rigid standardization of lithic technology and an attendant structured classification of products and by-products in this Haskett system also are most likely central to distinctions between regional

manifestations of “Paleoindian” and “Archaic” adaptations. In this scenario, the appearance of a more generalized, less structured and standardized lithic technology in Windust phase components can be viewed as part of a wider constellation of cultural changes marking the transition into an Archaic cultural pose. The timing of these changes at the Pleistocene-Holocene boundary is not likely to be fortuitous but implies new coping strategies designed to accommodate a rapidly changing environment. The Sentinel Gap archaeological record provides the first compelling evidence of overlapping late Paleoindian and Archaic occupations of the Columbia Plateau at the Pleistocene-Holocene boundary. While beyond the scope of the present study, emerging data also intimate different patterns of land use and adaptive strategies in the archaeological records of Sentinel Gap and regional Windust Phase components. But regardless of the long-term implications of future research, Sentinel Gap introduces an extraordinary record of late Paleoindian settlement, including previously unreported point styles and lithic technology, into the record of Columbia Plateau archaeology.

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