UNIVERSITY OF LEICESTER

THROUGH A GLASS DARKLY:

Finding Values in Obsidian Stemmed Tools from New Britain, Papua New Guinea

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By

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For Helen

Without whose love, unstinting support, help and encouragement I would never have achieved anything

Abstract

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Paul Tyrrell Dickinson

The ways of life of the inhabitants of prehistoric New Britain were almost unknown to archaeologists until the last quarter of the twentieth century. Until recently, the people who lived there during the early to mid-Holocene period, and who left scant traces in the archaeological record, were assumed to have been residentially mobile foragers living in simple societies. More recent research has shown that people were making and exchanging large, highly worked, obsidian tools. The inference was that these tools carried a component of social value and were used to signal status, and that the societies of mid-Holocene New Britain were more complex than previously thought.

My aim is to demonstrate that a detailed study of a distinctive class of obsidian stemmed tools supports the proposition that networks, in which concepts of social value existed and symbolic capital was exchanged, flourished in West New Britain in the period 5900-3600 BP.

This is achieved primarily by using a high-magnification use-wear analysis which, together with supplementary typological and raw material provenancing evidence, enables use-lives of individual artefacts to be constructed. An exploration of both the nature of value and of archaeological evidence for the ways in which people behave in response to the social value of such as status, prestige and identity provides a basis for linking the object biographies of these objects with ways in which people acted in response to symbolic and social value.

The results demonstrate that one group of stemmed tools were standardised products made by specialist craft workers acting within some form of social network and exchange system. The people who owned them treated them as 'special' objects, recognizing that some of the value attached to these tools was distinct from and separate to any value they may have had as practical utensils.

Use-wear is customarily seen as a functional analysis approach which provides data about matters such as diet and subsistence. Employing use-wear to address more abstract concepts such as status, prestige and identity is innovative and marks a step forward in the way in which a high-magnification microwear study can contribute to archaeology.

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I could not have done this alone. I will always be grateful to all of you

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Note: 'Through a Glass Darkly' is a biblical quotation (Corinthians 13.12). It has been used many times, including by Jim Rhoads for his ANU PhD in 1980. I have also borrowed for one of my sub-headings: 'Style is Knowing' is a quote from Gore Vidal (BBC, 2012). '

List of Abbreviations

BP	Before the present
Cal.	Calibrated
EFI	Electronically Focussed Image (a computer aided means of improving the depth of field of an image by combining several photomicrographs each of which is taken using a very slightly different focus)
ISEA	Island southeast Asia
LCC	Lapita Cultural Complex
TAQ	*Terminus Ante Quem*, date before which
TPQ	*Terminus Post Quem,* date after which
Trap	Trapezoid cross-section
Tri	Triangular cross-section

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1. Discovering Value Through Stemmed Tools

1.1 The Research Objective

The overall ambition of this work is twofold. It sets out to apply the use-wear seen under high-magnification microscopy to address a research question that is focussed on the more abstract issues of symbolic and social value, status, semiotics and identity rather than on the functional aspects of diet, food preparation and subsistence. In addition, it aims to make some useful contribution to our understanding of the lives of the people who inhabited the islands of the Bismarck Archipelago from the Late-Pleistocene to the early mid-Holocene.

The intention was to test the proposition that some unusual obsidian prismatic blades from mid-Holocene contexts in New Britain, Papua New Guinea, were valued by the people that made and used them, for reasons that were socially or symbolically determined. This has been achieved primarily by using data obtained from a high-magnification use-wear study. The use-wear results, supplemented by analysis of the morphology of the artefacts and by provenancing data, have been used to construct object biographies of individual artefacts from which the behaviours of the tool users, and in particular those behaviours which are modified in response to ideas of symbolic and social value, can then be inferred. Use-wear frequently focuses on using the micro-wear on the edges of tools as a conduit to an understanding of the user's subsistence and functional activities (Zhang *et al.*, 2010; Dubreuil, 2004; Lewenstein, 1981; Högberg *et al.*, 2009). The intention of this approach was to move functional analysis beyond the edges of tools and to look at the whole object. By collating an interpretation of tool use with an investigation of the hafting of the blades as well as the circulation of the artefacts, it has been possible to build an appreciation of how they were valued for reasons that were distinct from their utility as cutting edges. This focus on the whole of the tool, as well as on the changes in the ways it was used and treated over time, is the foundation for a recognition of the social importance of the artefacts.

Using object biographies in this way demonstrates that use-wear analysis can be successfully used to answer archaeological research questions arising from the more intangible and conceptual aspects of the lives of past peoples. There have been a handful of other studies which have incorporated use-wear into an evaluation of the social and symbolic roles of artefacts. In particular, a study of bone awls from Châtelperronian contexts at Grotte du Renne which are asserted to be decorated, an analysis of wear on copper-alloy axes, daggers and halberds from the Italian Chalcolithic, more recent work on perforated shell beads from the Middle Stone Age at Blombos Cave and an investigation of obsidian tattooing tools from Nanggu in the Solomon Islands from contexts dated to c. 2800 BP. (Vanhaeren *et al.*, 2013: 7, 10-14; d'Errico *et al.*, 2003; Dolfini, 2011: 267; Kononenko *et al.*, 2016: Table 3). However, the shell beads, the bone awls and the tattooing tools were all associated with ideas of ornamentation and the aesthetic. The copper-alloy blades were principally from mortuary deposits. In each case the symbolic or social role of the artefacts was presumed prior to the use-wear study. The aim of my research was to determine the social dimension of cutting tools which carried no presumption of any symbolic worth, but might otherwise be assumed to have been valued solely because of their usefulness as implements.

1.2 Obsidian Stemmed Tools

Obsidian is a plentiful and accessible raw material on some of the Bismarck islands, particularly on New Britain. Worked pieces of obsidian (including cores, debitage, flakes and blades) abound both in archaeological contexts and as surface scatters of artefacts. Amongst these is a relatively small number of tools which have distinct tangs or stems knapped into one end. The research assemblage that I have analysed for my study of the mid-Holocene inhabitants of New Britain has been drawn from this group of what are now referred to as 'stemmed tools'.

Araho *et al.* (2002) studied an assemblage of 59 of these obsidian stemmed tools from mid-Holocene sites in New Britain. These were classified into two distinct typological groups:

- Type 1 stemmed tools are formed on large prismatic blades with up to four arises. The platform end of the tool is heavily retouched into an ovate stem or tang (e.g. FEK 015; Figure 1-1) (Araho *et al.*, 2002: 63-65).
- Type 2 stemmed tools are an elaborate and distinctive form manufactured from Kombewa flakes. Kombewa flakes have double opposing bulbs of percussion at their platform end and are naturally tapered, forming a curved edge where the two ventral surfaces meet. The bulbar end is then heavily and dramatically flaked away to produce a stem (e.g. FABN 002; Figure 1-2) (Araho *et al.*, 2002: 63-65).

Araho *et al.* (2002) proposed that these very unusual artefacts may have had a component of value which was social and symbolic in nature (symbolic value) and distinct from any utility value they may have had as implements (Araho *et al.*, 2002: 75-76). They contended that some stemmed tools may have been intended for exchange and had a role in marking status (Araho *et al.*, 2002: 74-77). More recently, Torrence *et al.* (2013) have also described a small number (five) of phallic shaped obsidian tools which have not been dated but which share technological characteristics with Type 2 stemmed tools. This project is focussed exclusively on Type 1 stemmed tools, leaving the other types for future research by others.

1.3 The Study Sample

The study sample consists of 147 Type 1 obsidian stemmed prismatic blades recovered from mid-Holocene sites on the Willaumez Peninsula of New Britain and Garua Island (Figure 1-3 and Figure 1-4). It is drawn from 19 different sites spread over c. 700 km^2. Each artefact in the sample is identified by the three-letter or four-letter archaeological site-code allocated to its find-site by the Papua New Guinea National Museum, together with its sequential find number (e.g. FAP 123).

The stemmed tools have a number of physical characteristics that make them highly unusual. The Type 1 tools are large prismatic blades characterised by the distinct tang or stem formed at the proximal end by a hard-hammer percussion and bifacial retouch reduction process on what is an exceptionally brittle raw material. This fragility is, in many examples, exacerbated by the particularly weak design of the junction between the stem and the rest of the tool (Araho *et al.*, 2002: 76). They vary in size with most being 10 to 20 cm long and four to five cm in width. The largest, which can be 30 cm long and up to 10 cm wide would appear to be larger than required for practical utility (Araho *et al.*, 2002: 76; Torrence, 2003: 293-296). The design of both types is particularly complex and production would have required a high degree of manufacturing skill (Araho *et al.*, 2002: 76). Obsidian itself is highly reflective when freshly knapped, particularly where large flat surfaces are present as in the Kombewa flakes or the prismatic blade form. The size, form and brightness of these blades would have made them visually distinctive.

New Britain has an abundance of easily accessible obsidian. Substantial deposits of debitage, cores and simple flake tools at many locations testify to its extensive use as a raw material for the production of tools (Specht *et al.*, 1988: 5, 6). Within the broad range and great quantity of obsidian artefacts found in New Britain archaeological sites, stemmed tools are conspicuously rare (Torrence *et al.*, 2013: 288). Large accumulations of debitage at locations which were separate from residential sites indicate that they were primarily made at quarries (Torrence, 2003: 297).

Although some individual Type 1 tools have been analysed and described, no extensive use-wear study of an assemblage of these stemmed tools has yet been undertaken. Richard Fullagar (1993; 22-25) examined one Type 1 blade from Bitokara and reported that it appeared to have been hafted and used for cutting soft starchy roots. Kealhofer *et al.* (1999: 534) examined three stemmed tools (FAO 359, FAO 367 and FRL 352) for both use-wear and residues of which only FAO 367 and FRL 352 showed any traces of wear. Nina Kononenko's (2008: 267-275, Table 7-7) PhD study included five Type 1 stemmed tools in its extensive use-wear study. Kononenko *et al*. (2010: 18, 25) inspected five very small (with one exception each was less than 3.5 cm long) stemmed blades. A further six very small (each less than 4 cm long) stemmed points were included in Kononenko's (2012: 15-17, Table 1) study of tattooing and skin working tools.

1.4 The Structure of the Thesis

This project set out to try out a new, difficult and, because at the outset there was no certainty of success, risky approach to using a high-magnification use-wear study. The challenge was to use a functional study of micro-wear traces in an attempt to work through ideas of value and symbolism.

Chapter 2 provides the theoretical background to my approach. The argument is that people behaved in certain ways because of their ideas of what was valuable to them and that use-wear analysis can provide archaeological evidence for some of those behaviours. The overarching approach to this argument is the application of use-wear evidence to the construction of use-biographies as a means of illuminating those parts of their use-lives when they held a component of social or symbolic value. By exploring the object biographies of tools from the theoretical perspective of how people acted with respect to value and what they considered to be valuable, we can explore the functional and social worlds in which those tools were made and curated.

Chapter 3 identifies the geographical, geological and stratigraphic context for the artefacts that form the study sample. One of the particular challenges was the need to develop a robust recording system that was both sufficiently comprehensive in the range of variables recorded and capable of logging data from all areas of large prismatic blades as well as from small experimental reference collection flakes. In chapter 4 the coding system that was developed specifically for this analysis is both explained and justified. Key factors that impinge on the interpretation of the micro-wear, such as taphonomy and the effects of hafting on blade use are also reviewed.

Chapter 5 analyses the morphology of the stemmed tools, focussing on blade conformation and stem design. A typology of stem forms is established and then evaluated using statistical methods. The sources of the raw materials used to make the stemmed tools are identified by geochemistry. The results of the high-magnification use-wear are analysed in Chapter 6. The use-wear on the blade sections is interpreted in terms of the ways in which the blades were used and the types of materials they were applied to. Whether or not a tool was hafted is a significant factor in any interpretation of how it was used and how it was treated. Those tools which exhibit definite micro-wear traces of hafting are identified.

Chapter 7 is an investigation of tool life histories. The use-biographies support an interpretation in which hafting, standardisation of manufacture, style and identity come together to provide compelling evidence that some Type 1 obsidian stemmed tools were valued for reasons that were socially or symbolically determined.

This study, focussed as it is on socially mediated concepts of value and social networks, makes a positive contribution to the growing body of work that is enhancing our understanding of the mid-Holocene inhabitants of the islands of the Bismarck Archipelago. The worth of the study will be enhanced if it can be integrated into the existing corpus of scholarship and also provide something of a platform for new and wider studies of the period and the geographic region. Chapter 8 considers my results in the wider context and explores some areas of research that might complement this study.

2. Understanding Value

2.1 The Concept of Value

Value is a concept that categorises and orders human needs, wants and desires (Maslow, 1954: 35-36, 41-46; Hertzberg, 1968; Edwards, 1999: 24; Murray, 1938). As such, it has long been a widespread and continuing component of social and cultural life that influences and determines some of the ways in which people behave (Renfrew, 1986: 148; Campion *et al.*, 2006: 87). What exactly is valuable, the relative amount of value attributed to anything and the extent to which value drives behaviour are all variables which are culturally determined and which are subject to change over time (Renfrew, 1986: 150-152; Kopytoff, 1986: 67). Value can be attributed to both tangible and intangible things including those aspects of social position, eminence and social leverage for which Bourdieu (1977: 40-41) uses the term 'symbolic capital' (Bourdieu, 1977: 40-41; Bourdieu, 1989: 59-61, 120). There is a clear link between value, social capital and social power (Malinowski, 1922: 162, 501; Boone, 2000: 89, 104, 107; Boone, 2002: 14; Henrich and Gil-White, 2001: 172; Malinowski, 1920: 51).

There are innumerable strategies by which people set out to achieve their needs, wants and desires, but there are some recurrent behavioural patterns that are particularly associated with the acquisition, accumulation and employment of value. People living in societies in which recognised social ranking, conspicuous signalling of status or prestige as well as a marked differentiation in power and control of resources are significant aspects of life, act differently to those in societies where the social structure is centred on more egalitarian, reciprocal, social and economic relationships (Mauss, 1923: 35). Some of these behavioural patterns, such as conspicuous consumption or monumental architecture, do not feature in the archaeology of mid-Holocene New Britain and consequently will not be discussed here. There is some archaeological evidence for hoarding and for the sort of risky behaviour that may be associated with reputation and personal prestige (Torrence *et al.*, 2009; Torrence *et al.*, 2013). While this evidence tends to support what is argued here, it is meagre, tangential to the focus of the chapter and is not discussed any further.

This project has entirely focussed on material objects. Accordingly, this analysis specifically examines the links between material objects, behaviour and symbolic capital including the signalling of status, the use of 'special' artefacts to effect that signalling and the specialised production of things. It is important to consider the evidence of behaviours that can be obtained from the artefacts that make up the research sample. In particular, evidence for those behaviours that are determined or influenced by ideas of value in general and more specifically by concepts of social and symbolic value.

In order to make a compelling case that the makers and users of these artefacts were recognising, signalling or manipulating social value it was important to assemble and integrate discrete but corroborating and reinforcing strands of evidence. This was achieved by analysing and collating the results provided by geochemistry, artefact morphology and especially from the use-wear. Before going on to discuss the analysis of these three data sets it is appropriate to say in advance what sort of results could be expected to provide convincing evidence that the people who made, owned, used and discarded these pieces of obsidian did so with an awareness that, for them at least, these stemmed tools were objects of social and symbolic value. This chapter will provide the framework within which the data produced by this analysis can be evaluated.

2.2 Reading the Signs

Members of a social group must be able to read the relative status of each other for that society to function with a minimum of conflict (Henrich and Gil-White, 2001: 172). In order to achieve this, mechanisms have to be established for conveying important and necessary information about status between people within a community or social network, some of whom may be in competition with each other (Connelly *et al.*, 2011: 42-43). A simple example might involve signals that say “don’t compete with me for this marriage partner or that structural role because I have more wealth (economic capital), experience, knowledge, status or kinship resources (symbolic capital) than you”. This works for two main reasons:

1. Both the signaller and the receiver of the signal clearly understand the message (Connelly *et al.*, 2011: 44, 53).
2. There is a perceived mutual benefit to both the signaller and the receiver in the acceptance of the message and the consequent behaviours (Bleige-Bird and Smith, 2005: 223).

Social differentiation, and thus the potential access to social power, is marked within a culture by the transmission of social signs that reinforce and communicate identities (Chandler, 2002: 154). The form of these signs can vary widely. Nuances of accent, dress, personal style, socially significant possessions and behaviours all convey important social messages (Chandler, 2002: 154). The provision of feasts at funerary or matrimonial events are often collaborative signalling displays of material resources, kinship, altruism, prestige and social standing (Bleige-Bird and Smith, 2005: 225-228). The commissioning of monumental architecture or public works signals the ability to deploy both economic capital and the social capital necessary to harness and direct community engagement (Bleige-Bird and Smith, 2005: 231-232).

There may be some feedback between parties, counter signals, false signals and jockeying of position; but generally the purpose of making signals is to be understood and false signals are quickly recognised and discounted (Bleige-Bird and Smith, 2005: 224; Connelly *et al.*, 2011: 61). If the message is not understood and an active contest ensues, one of the parties is likely to lose heavily in terms of economic or symbolic capital or both. However, the cost of victory may also be heavy for the other party, hence the mutual benefit of understanding and accepting the signal (Bleige-Bird and Smith, 2005: 224, 237).

2.2.1 The Meaning of Things

Whatever other roles material objects play, many possessions and items of tangible wealth are used as signs to convey intangible social messages. The prime function of objects intended for social signalling is to be conspicuous. Items which function as transmitters of social signals are frequently seen to be enhanced or embellished versions of functional utensils, (what Binford (1962: 222) calls 'technomic' artefacts) (Renfrew, 1986: 167; Spielmann, 2002: 200; Renfrew, 2001: 16). That is not to say that they are incapable of practical use or they are never used as such. Some semiotically significant items such as swords or cauldrons may have both ritual and utilitarian functions (Whiteley, 2002: 221-222; Green, 1998: 63). Prestige varieties of branded goods, antiques or jewellery convey messages of social importance in contemporary society. The flint daggers of the Jutland Early-Bronze-Age are argued to have been objects for denoting status and gender rather than weapons (Sarauw, 2007: 74). A comparison of osteology and grave-goods in British Anglo-Saxon burials showed that many of the largest and most elaborate weapons were associated with adolescent boys too small to have wielded them effectively (Härke, 1990). In the Baringo district of Kenya iron spears are an essential sign of male social status and virility. They are habitually carried by adult men although they are rarely used and never for warfare (Hodder, 1982: 66-68). These artefacts clearly look like spears. Indeed, they could be used as such; but the term 'spears' is loaded and relates form to function in a way that Binford (1962: 219) refers to as being entirely technomic (i.e. practical and utilitarian). It not only makes assumptions about the maker's intentions, but ignores the socio-functions and ideo-functions afforded by the artefact.

The range of things used to fulfil semiotic roles is vast. What often distinguishes material objects used for social signalling is their decoration, exceptional production qualities and the levels of craft skill used to make them. Junker (1993: 13) includes finely decorated earthenware and textiles in a list of prestige goods presented to tribal leaders in the fifteenth and sixteenth century Philippines. Many of the archers' wrist guards found in Bell-Beaker graves in France and Germany were ornamented beyond any practical necessity. In some cases their position on the excavated skeleton relative to the arm bones indicates that they had been worn on the outside of the wrist where they would have been useless as protection but significantly more visible (Fokkens *et al.*, 2008: 10). Spielmann (2002: 200) asserts that in New Guinea stone axes intended for work have only their edge ground while those reserved for status marking often have heads which are highly polished all over.

In each of these cases artefacts are being used to semiotically signify a social differentiation and to demarcate status within the societies that produced them. The essential role of many objects defined as valuable by the community is to validate or elevate the social status of their owners. Objects that carry values can attach those values to the people that possess them (Gosden, 2008: 2005). However, the reverse is also true. Some objects derive value from their association with people. The symbolic value of the *soulava* necklaces of the *Kula* ring is derived from their history of ownership and circulation (Malinowski, 1920: 99-100). There is a dynamic relationship between people and objects in which symbolic value is transferred in both directions, as a sort of feedback loop in which it would be wrong to divorce the material sign from the concept which is signified (Gosden, 2008: 2005). The artefact is not merely a passive label, sitting outside of, but denoting the social context. Rather, it is an active and intrinsic constituent of it (Preucel, 2006: 5).

This is borne out at Varna I by what Renfrew interprets as a deliberate deception (Renfrew, 1986: 149). A stone shaft-hole axe was covered in thin gold leaf in a way that made the artefact appear to be something that it was not; part of a gold “sceptre” (Renfrew, 1986: 149). The stone axe was disguised to look more valuable, visibly distinctive and ritually significant than it was by covering it with gold leaf, a clear indication that both the form and the material it was covered with had social value and that appearances mattered. There is a similar deception in a Middle Bronze-Age grave at Borum Eshøj in Denmark. A sword scabbard contains only a dagger. When placed it would have looked as though the man was buried with a sword (Parker Pearson, 2009: 85). What mattered were the visual appearance and the symbolism of possessions.

2.2.2 Making Things Special

Not only were material items generally used to signal status and symbolic capital, indeed they still are in contemporary society, but there is strong ethnographic and archaeological evidence to show that some things (wedding rings, torcs, war bonnets or *Soulava* necklaces) have been produced specifically to be used as status markers. These objects were made with the intention that they be used in wholly symbolic ways (Riedler *et al.*, 2012: 245; Arnold, 1995: 159; Malinowski, 1920: 51). Renfrew (1986:167) argues that most societies have objects recognised intra-group as being “special” because they carry a potent socially mediated value. Binford (1962: 222) argues that the presence of “special” objects in assemblages is only comprehensible in terms of their social context. It seems clear that if an object can be identified as being “special” then the inferences are that the society within which it was employed had distinctions of rank, status, prestige or other socially valuable properties that were important to its members and that the object itself had a value that lay in its capacity to signal those aspects of symbolic capital.

The crucial role of these socially significant pieces is to facilitate the establishment of networks of personal interaction among individuals with authority and influence. They would be recognised by all parties as carrying a social potency which trumpeted the personal standing of their owner (Gosden, 2001: 164). “Special” objects would have been created with the intention that they had agency in the dynamics and relationships that formed the network. They would also have been used to denote obligations and counter-obligations in a way that is useful not only in enabling social groups to coexist, but also to provide an element of hedge against future hardship (Renfrew, 1986: 167). The existence of a “special” object testifies to the actuality of the network.

A problem for archaeologists lies in recognising what constitutes a “special” object. Binford (1962: 222) observed that within egalitarian societies in which status ranking exists but is open to attainment (rather than closed off by dynastic or kinship rules), status symbols are frequently derived versions of technomic artefacts which are made of exotic materials or are elaborately decorated. Renfrew similarly asserts that the particular objects chosen to fulfil those roles in various societies share many of the same characteristics (Renfrew, 1986: 167). In many cases they:

- are made from particularly durable materials,
- appear visually distinctive,
- possess a rarity that distinguishes them from commodity objects but are not so rare as to be inaccessible,

  and

- change in form such that one year’s model is slightly more desirable than a previous year’s model.

There is a need for caution here. Firstly, durability determines what survives to be recovered archaeologically. Secondly, in the past the composition of recovered assemblages has sometimes been skewed in favour of objects that are visually distinctive, eye-catching and easier to see than other less noticeable artefacts that might be overlooked (Huster, 2013: 83-86). There is a risk of circularity in arguing that certain artefacts denote status while status is marked by association with particular possessions and grave-goods. Nevertheless artefacts of gold, silver, jade, glass, exceptional ceramics and bronzes consistently turn up in assemblages which are associated with high social status by the collateral evidence of such as dietary patterns determined by stable isotopes, housing forms and materials and interpretations of the utility component of associated artefacts (Clark, 1979: 11; Costin and Earle, 1989: 701-706).

In cases where “special” objects lacked some of these attributes, these were sometimes added after acquisition. Many of the religious relics of medieval Europe were rare but fragile and unpleasantly decaying human remains. However, they were commonly stored in elaborately decorated, jewel encrusted, protective reliquaries which, in effect, became incorporated into the “specialness” of the relics themselves.

Echoing to some extent the ideas expressed by Binford (1962:222) and Renfrew (1986: 167), Spielmann (2002: 200) focuses on the production processes of “special” objects. She asserts that socially valuable objects which are used to signal symbolic capital are frequently more impressive examples of ordinary objects though often elaborate in form. For example, they may be polished, decorated, burnished or otherwise over-produced (Spielmann, 2002: 199).

They also tend to share two unique production aspects which distinguish them from other material objects;

- The provenance of the item or its raw materials has social significance (Spielmann, 2002: 198; Binford, 1962: 222; Renfrew, 1986: 167).
- An exceptional level of craft skills has been employed to transformed these artefacts from the mundane to the "special" (Spielmann, 2002: 200).

The two key constituents here are the symbolism attached to the origin of the artefact or its raw material source, and the level of craft skill used to transform it into something which is recognisable, within the society in which it plays a role, as something which is special and has a value which is not derived from any practical utility or service function (Spielmann, 2002: 198-200). The contention is that artefacts identified in the archaeological record as being distinguished from other items of the same broad typology and context, because they have some or all of these characteristics, are most likely to be objects which carried socially significant value. Consequently, it is worth looking at each of these criteria in turn:

2.2.3 The Importance of Origin

A number of archaeological examples support the assertion that some objects acquired social value because of the symbolic attributes of the places from which their raw material was obtained and the social networks through which they passed (Spielmann, 2002: 198; Binford, 1962: 222; Renfrew, 1986: 167). Early Neolithic flint axes from Cumbria are found some distance away over the Pennines in Yorkshire, a region with ample sources of raw material close by (Bradley and Edmonds, 1993: 162-163). Chert from distant sources was knapped at Puntutjarpa Rockshelter in the Western Desert of Australia, close to abundant local sources of better quality raw material (Gould and Saggars, 1985: 118). Green

(1987:246) argues that obsidian from New Britain found some 2000 km away in the Santa Cruz Islands had been imported for status signalling.

The exoticism of distance, difficulty and association with place is not limited to raw materials. The same conceptions seem to apply to finished artefacts. We see this in graves that not only contain assemblages that are untypically large and include prestige goods, but also contain the few foreign, long-distance sourced, imported artefacts found in that cemetery context, and thus clearly associate the exotic with the wealth and status of the deceased. Objects of imported and exotic materials are found in a wide range of high-status contexts, including a Greek cauldron in the Late Hallstatt 'Chieftain' grave at Hochdorf and imported worked shell in Moche burials in Peru (Bintley, 2011: 34; Biel, 1981: 17; Trubitt, 2003: 260-261). At Sutton Hoo in Eastern England the exceptional Anglo-Saxon ship burial contained ten Byzantine style silver bowls and two silver spoons all made in the Eastern Mediterranean. The presence of marine *Spondylus* shells in some of the richer graves in the Varna I cemetery confirms that those individuals participated in long distance exchange networks (Renfrew, 1986: 151). Hajdúsámson-Apa type bronze swords found at Stensgård and Torupgårde in Denmark are held to be exotic imports from the Carpathian plains (Sørensen, 2012: 45; Parker Pearson, 2009: 79).

The evidence shows that in many societies something obtained from a source which was known to be difficult to access because of distance, physical inaccessibility, political control or supernatural peril is likely to have had a rarity arising from the barriers to acquisition and a degree of exoticism arising from the distance an object has travelled, as well as the nature of the social relationships and negotiations through which it was obtained (Renfrew, 1986: 167). Ownership of these distantly obtained items both signals and simultaneously endows status and prestige (Earle, 1994: 445; Goldstein, 2000: 335). The ability of material objects to do so lies in their origin, the distance they have travelled, the difficulties of acquisition and the network of personal relationships that delivered them.

2.2.4 A Concentration of Effort

The most impressive and highly crafted artefacts, including those designed to signal symbolic capital, are most likely have been produced by craft specialists. This is simply because those who specialise are apt to become more proficient in their craft than non-specialists. Becoming an exceptionally skilled artisan or craftsman takes time, practice and often some form of apprenticeship or mentoring (Minar, 2001: 374-376; Ferguson, 2008: 52-53; Torrence *et al.*, 2010: 3; Bordes *et al.*, 1969: 5). Marked differences in craft skill and expertise in potting are clearly apparent in different examples of the abundant Koszider jugs made to exactly the same design template at the Bronze Age tell site of Százhalombatta in Hungary (Budden and Sofaer, 2009: 7). Axe makers in the Papua New Guinea Highlands, for example, outsource the complex work of hafting the axes to exceptionally skilled craftsmen in cases where the completed axe was intended to be used as a valuable, rather than as an implement. Making and fixing the haft was considered the most difficult task and could be undertaken by a small number of men (Burton, 1984: 94, 112, 124). Rare, valuable or socially symbolic raw materials are more likely to be entrusted to a craft specialist than to a novice or to an incompetent that might waste them (Bamforth and Finlay, 2008: 19-20). Specialisation, which can be defined simply as “the consistent production of things by some people for others” occurs in most societies (Edmonds, 2001: pers comms).

Material culture and settlement organisation provide the most obvious evidence for specialisation, but anthropological studies provide ample evidence that craft specialism is not limited to potting, smithing, knapping and storage but may include the less archaeologically visible cultural elements such as music, ritual and shamanistic roles or medicine (Dark, 1995: 135). Specialism clearly does not have to be an exclusively full-time or organised activity. Allen *et al.* (1997:19) describe what they refer to as 'village level craft specialisation' in terms of the part-time production of surpluses of specific goods intended for exchange, mainly for economic reasons, on the basis of cooperative or joint enterprise (Allen *et al.*, 1997: 19).

2.2.5 A Use Full Life

Speilmann's (2002) identification of factors that make objects 'special' intentionally focuses on the creation of such objects (Spielmann, 2002: 198-200). It takes no account of what happens to an object after it has been produced. The attributes which raise material objects to the level of being "special" are not limited to production factors. Things may attain the status of special objects because of what happens to them during their use-lives. Material evidence for participation in long-distance networks is a consistent characteristic of high status contexts (Earle, 1994: 445; Goldstein, 2000: 335). Mauss (1923: 21-22) and Malinowski (1920: 97, 99) both highlight the individual and special nature of some objects that circulate within gift exchange spheres. In *Kula* the circulating shell *mwali* armbands and red shell *souvlava* necklets are reserved exclusively for Gift Exchange. It is not merely the act of gifting, nor the relative eminence of the participants, that transfers kudos. It is the accumulated memory of ownership and transference that attaches to the object itself and becomes a part of its biography (Mauss, 1923: 22; Malinowski, 1920: 99) The value of an individual item is a reflection of its history and its personal association with those who have previously received it and passed it on.

Geary (1986: 179-182, 186) similarly points out specific factors that influenced the way in which value was attached to religious relics in early medieval Europe through the association with a particular individual of status, the manner of acquisition and the place of origin. A direct connection with Christ outweighed that with an obscure or ineffective minor saint. A gift from the Pope carried more value than an unauthenticated purchase and an object from Rome or Jerusalem is likely to have been seen as more exotic and powerful than something from close by. There is no doubt that the “specialness” of these relics did, and in many cases continues to, endow prestige and status on the communities within which they were venerated and the individuals responsible for their care. Some forms of Potlatch among the Kwakiutl and Haida peoples of the Canadian North-West coast entail the circulation of a class of objects, such as carved abalone shells or embroidered fabrics, that are regarded as having individual ‘personalities’. There is also a group of carved ceremonial wooden spoons and dishes, each of which has symbolism attached and carries a message, which are circulated among a strictly restricted group of clan members (Mauss, 1923: 42).

In each example the gift itself has its own complement of symbolic capital that passes to its holder. While it is material goods that are moving between one person and another, the transfer of economic capital in the form of the gift transforms the stock of symbolic capital held by giver and receiver. This symbolic value, which is referred to by Appadurai as its ‘prime value’, is not an intrinsic property of the object but entirely derived from its social context (Appadurai, 1986: 34). Such objects become desirable solely through the people that have interacted with them and the places they have been during their use-lives. For example, a wooden bat, intrinsically worth little, becomes both economically valuable and endowed with significant symbolic capital if it was once owned by, say, Bradman or Ruth.

Other things attain 'special' status not because of their ownership record but through the uses they were put to and when they were used. A battered army bugle has acquired inestimable symbolic value simply because it was blown to order the Light Brigade to charge at Balaklava. Any object associated with RMS Titanic or ordinary pennies stamped with suffragette slogans have all become “special” objects entirely through what they were used for and the circumstances of that use. Artefacts may accumulate a history of use as much as they may accrue a history of ownership. Each object that becomes endowed with symbolic value carries with it a biography of time, person and place which validates its social worth. The history of an object is arguably as important to its distinction as its provenance and the quality of the crafts skills that went into its production. Understanding the history and use-biography of an object will be an important constituent of recognising its symbolic value.

2.3 Assemblages of Differentiation

Allen *et al.* (1997: 14, 36) argue that the degree of specialisation evident in an artefact assemblage is often used by archaeologists as an ‘uneasy’ proxy for the extent of social differentiation that existed in the society that made them. Though they go on to say that village level part-time specialisation does not inevitably infer entrenched social stratification. Nevertheless some level of craft specialisation appears to be common to stratified societies and is frequently linked to both standardisation of output and a degree of organisation of manufacturing (Renfrew, 1974: 74; Clark, 1979: 10, 11; Costin, 1998: 12; Arthur, 2014: 112)). Peebles and Kus (1977: 423), for example, assert that there is a clear archaeological correlation between evidence for organised part-time craft specialism and with ranked societies. Costin (1991: 17-18) takes this approach further in arguing that the extent of the organisation of specialisation within a community can be characterised by four interconnected but independently variable parameters; the degree of elite patronage, spatial concentration, the scale of production and the intensity of production. This approach provides archaeologists with two broad categories of evidence for identifying production specialisation (Costin, 1991: 18):

Direct evidence lies in the production features, manufacturing debris, tools and raw material waste that are common at archaeological sites. Excavators are familiar with such examples as kilns, lithic debitage, pottery wasters and slag. These features can be analysed in terms of the quantities of debris and of finished goods recovered, and in terms of the relative position of such features to other site features, such as high status or ceremonial structures. However, while these mark production sites, there can be debate as to the extent to which any particular site provides evidence of specialisation or simply of domestic manufacture for the purposes of home consumption over an extended period of occupation.

Indirect evidence involves spatially discrete regional variations in design and falloff curves in the analysis of distribution. It also includes the recognition of relative large numbers of virtually identical and standardised artefacts as well as evidence for high artisan skill levels and an element of production efficiency (Costin, 1991: 32).

A number of studies have used indirect evidence to address this question. Torrence (1986: 157) challenged the arguments that the magnitude of the deposit of obsidian waste and debitage at Mallia, Knossos and Phylakopi demonstrated that these were sites where full time and specialist production of obsidian blades took place at the sites. She showed that, in each case the weights and numbers of obsidian pieces comprising the production outputs were insufficient to substantiate a specialist production site or any extensive system of exchange. Instead she argued that specialisation could be assumed to be concomitant with standardisation (Torrence, 1986: 159).

Standardisation describes a tendency for the output of craft specialists to become more homogenous over time. Both style and dimension become increasingly less variable so that what is produced shows markedly less artisan individuality and considerably more consistency of form (Blackman *et al.*, 1993: 61). How and why standardisation develops is open to debate. There may be many coincident factors involved including the effects of repetition and routines of working, an increased cost-effectiveness through simplification of process, the retention of craft skills within a close-knit group of specialists and the apprenticeship or mentoring process for developing novices (Blackman *et al.*, 1993: 61; Allen *et al.*, 1997: 17; Torrence, 1986: 42-46; Minar, 2001: 374). There is a distinct connection between specialisation and standardisation in that the latter arises from the former. The actuality of specialisation does not automatically infer the existence of standardisation. However, I assert that the reverse is true: standardisation infers specialisation.

What can be identified in the archaeological record is the degree of standardisation of a particular artefact type relative to that of other similar types from the same society and time period (Blackman *et al.*, 1993: 61). The established method for measuring standardization is to statistically determine the extent of dimensional and proportional variation within an assemblage in terms of their coefficients of variation (mean/standard deviation) (Junker, 1993: 17; Allen *et al.*, 1997: 30-31; Rath and Torrence, 2003: 125; Torrence, 1986; Bamforth and Finlay, 2008: 5; Schlanger, 1996: 242). Torrence (1986: 159-161) analysed the degree of standardisation evident in obsidian blades produced both by Aztecs at Teotihuacan and Greeks at Phylakopi and Knossos by using the coefficients of variation of key dimensions (in this case width and thickness). She concluded that lower values for the coefficients of variation, which signified a greater degree of manufacturing standardisation, pointed to a greater degree of specialism at Teotihuacan than at either Phylakopi or Knossos (Torrence, 1986: 159-161).

The precedent of using design and dimensional uniformity, statistical standard deviation and coefficients of variation as gauges of relative consistency and hence degree of specialisation has been adopted by other researchers. For example,

- Junker (1993: 23-25) used rim diameter coefficients of variation to identify a shift from domestic to specialist production of Philippine pottery in the context of a growing participation in exchange networks.
- Kennedy (1997: 88-89) argued that the coefficients of variation in length, breadth and thickness of obsidian Emsin points at site GEB on Southwest Manus was indicative of workshop production.
- Doelman and Cochrane (2014: 260-26) use this approach to argue that the production of Australian Tula adzes was standardised within individual sites.

2.4 Standardisation, Specialisation and Social Stratification

A competent artisan needs an understanding of the relevant materials and tools as well as the acquired motor skills to exploit them (Bamforth and Finlay, 2008: 9; Stout, 2002: 694). While it may be possible to acquire these attributes by being self-taught through experimentation or trial and error, craft expertise is likely to require the transmission of knowledge from a mentor, a long apprenticeship, repeated practice, and access to what may be valuable or rare raw materials to practice on (Bamforth and Finlay, 2008: 10, 11, 17). In Langda, in the Irian Jaya region of West Papua becoming a competent adze maker takes an apprenticeship of up to five years and is usually only open to close relatives of existing craft specialists (Stout, 2002: 695, 702). Proficiency only develops from continuous practice and real expertise takes up to ten years to attain (Stout, 2002: 702, 703). Ottaway (2001) points out that the complex processes involved in smelting bronze require great knowledge and skill to carry out successfully. She argues that acquisition of smelting skills in the Italian Bronze Age would have been a meticulous process with the sharing of knowledge carefully controlled (Ottaway, 2001: 95).

Many specialist activities are not carried out in isolation, but as part of a discrete group of people from within a wider community who are pursuing the same craft, sometimes in relatively close proximity to each other. The skill levels and outputs of each of these will reflect on the other members of the group (Ingold, 2000: 325). Status and prestige are thus moderated both by membership of an occupation group and by relative position within it (Frink, 2009: 284). Groups based on specific sets of craft skills will acquire respect for what they produce, for whatever practical utility, aesthetic qualities, economic importance or other attributes of their output make their products desirable and therefore valuable to both the group and the community as a whole. Occupational groups may be ranked within a society, even to the extent of an entrenched heredity caste system such as the weaving, smithing and musician castes of eighteenth and nineteenth century West Africa or the potter and hide-working castes of Ethiopia (Tamari, 1991: 224-225; Arthur, 2014: 107; Arthur, 2005: 194). Cohesive craft groups construct group identities for themselves which augment those of their individual members.

2.5 Social Identity

The work that people do and the specific tasks that they carry out within a community are major components of their social identity. People, even those who operate on a part-time basis, are known and recognised as potters, smiths, weavers or shamans, for example, just as they are simultaneously categorised by gender, age, or marital status (Ingold, 2000: 325). What you do is, to a large extent, who you are; and who you are is determined not only by what you do, but also by how well you are judged by the community to do it (Brumfiel, 1998: 150; Bamforth and Finlay, 2008: 2). Status, reputation and prestige are moderated through the perception of skill, aptitude and expertise.

Weissner (1984: 193) argues convincingly that social identity is a part of the self-identity that is derived from the knowledge that you are an accepted member of a social group and from the emotional benefit that membership brings. Mac Sweeney (2011: 36-38) argues that identity is a consequence of shared experiences during which social practices and activities create and recreate a perception of togetherness. These conditions are internal to the group and it is easy to see how a craft group of stone knappers, for example, working together in the same quarry, perhaps for days at a time, using exceptional skills to produce near identical products, while at the same time sharing banter and meals, would meet those conditions. The external identity of any craft group arguably results from the accumulation within the group of individual funds of proficiency, experience and competence that distinguishes one group from another and arbitrates its standing in the community. Any group that holds, exploits and controls access to specialist craft knowledge and expertise is thus socially differentiated from the rest of the community (Allen *et al.*, 1997: 14). Group ownership of specialised skills engenders group exclusiveness (Allen *et al.*, 1997: 14).

Material culture can be an important means of conveying group identity and demarking the social perimeters of membership. The 'old school tie', the Sikh Kara or the headed-bow of the Cheyenne Bow-String society are all material objects retained by group members in order to badge themselves as well as to signal faction affiliation and differentiation (Petersen, 1964: 146). Other actants, such as Mycenaean stirrup-jar perfume vessels or Apa-Hajdúsámson swords, signalled their origins and the artisan groups who made them through being exchanged and circulated beyond the group, and, ultimately, by being copied (Bergerbran, 2012: 146; Leonard *et al.*, 1993: 105-106).

2.5.1 Style is Knowing

Style among valued objects does not inevitably mean standardisation. Individual craft workers may produce material objects which are both unique and which at the same time share stylistic elements with things produced by other members of the same social group (Costin, 1991: 34). By way of contrast, the manufacture of standardised artefacts is predicated on the series production of things which are so uniform that the variation between individual examples is very low. This inevitably creates objects of shared style (Costin, 1991: 33; Kirch, 1991: 144-145; Blackman *et al.*, 1993: 61). Standardisation of production and style are inseparable.

Style acts by differentiating and comparing things of one style from other things and is a social rather than utilitarian function (Hegmon, 1992: 517-518; Weissner, 1989: 58; Hodder, 1982: 204). While style may be affected by the properties of materials and individual capacity, to some extent it is a deliberate outcome of choice. Ethnographic and archaeological evidence consistently shows that valued objects are often decorated and elaborated to distinguish them and to demonstrate personal ownership. The creative and ornamental outcomes of personalisation are not an exclusively individual aesthetic. The agency of personalisation takes place within a structure of social constraints and norms that differentiates one ethnic group from another (Lemonnier, 1989: 160). Even relatively plain Polynesian adzes exhibit a range of hafting methods and binding techniques that are specific to particular island groups, as well as individual arrangements of motifs from a relatively limited suite (Mead, 1971: 486-489). In essence, the individual expressions of form and decoration are underpinned by a collective style. They are the outcomes of deliberate choices about doing things in a certain way and at the same time a means of transmitting non-verbal expressions of affiliation and identity (Weissner, 1982: 256; Hegmon, 1992: 517-518).

Style is argued to be a semiotic means of communication that signals social and group identity (Kreiter, 2000: 2; Costin, 1998: 3). It functions as a projection of social identity that acts both within a social unit to foster a sense of group identity and externally to signal this identity to outsiders (Hodder, 1982: 205; Fredericksen, 1995: 156). By expressing position and, by comparison, style comments on the identities, values, ideas, practices and social groups of others (Weissner, 1984: 193). Renfrew (1994: 155-159), for example, argues from the pottery of San Pedro de Atacama that the combination of a homogeneity of style and of a standardisation of dimension (as analysed by a comparison of the coefficients of variation) is an expression of identity construction and community unification in the face of political and economic competition from a neighbouring polity. Torrence and Swadling (2008) use the stylistic differences of stone mortars and pestles from the Sepik-Ramu area of Papua New Guinea as leitmotifs to different social interaction spheres and hence to distinct though networked local communities (Torrence and Swadling, 2008: 605-608).

Style is a conceptual and societal property rather than an aspect of practical utility and acts as a semiotic means of articulating group and individual identity (Wobst, 1977: 321; Weissner, 1989: 57; Hodder, 1982: 204). Style is, in effect, a form of branding for a community, its values and standards. Things that are made to express style, such as objects with shared forms, motifs or distinct manufacturing techniques, are deliberately intended to have a social role and a value which is derived from their semiotic capacity rather than any functional value as utensils.

2.5.2 Specialisation, Standardisation and Networks

There is a clear link between specialisation and the existence of networks within which the output of specialists could be moved, exchanged and gifted. Specialisation involves some people producing things for other people and at the very least this implies the existence of some form of network of producers and consumers (Edmonds, 2001). Standardisation, which can be regarded as a systemisation of specialisation, shares the same implicit connection with exchange and the networks of people that engage in it (Costin, 2000: 397). It is realistic to hypothesise that there is a rough correlation between the extent of product standardisation evident in a community and the geographical spread and social complexity of the networks that it engages with. This hypothesis is supported by a number of archaeological case studies that show changes in societies occurring relatively contemporaneously with increases in specialisation, the degree of artefact standardisation and the complexity of their social networks. For example:

- The development and growth of production of standardised bronze artefact forms in Scandinavia from the late fifth millennium cal. BC onwards is argued to be an outcome of the rapid growth and maintenance of long-distance networks of exchange and communication (Freiman, 2012: 458).
- The sustained 1500 year growth cycle of the Minoan-Mycenaean civilisation and the associated growth in complexity and extent of Aegean networks was synchronous with increases in production of metal artefacts together with the development of new technologies and designs and with full time craft specialisation (Renfrew, 1974: 85).
- Around 1000 AD at Cahokia a rapid growth of social networks and trade routes extended throughout and beyond the central Mississippi Valley through which exotic materials (e.g., marine shells, galena, mica and copper) moved throughout the Midwest and Southeast. At the same time Cahokia developed specialisation production of Ramey pottery, beads and elaborate carved shell as part of a process of economic and social intensification (Kardulias, 2014: 116).

While there is a link between standardisation of some manufacture within a community and the participation of that community in a network of social and exchange relationships, that does not imply that what moves through the network is solely limited to the outputs of that standardised production. There is ample testimony that social networks are polysemic conduits through which people, intangibles, information, components of “special” objects as well as indices of prestige and status move and are exchanged, sometimes simultaneously (Gell, 1992: 150-151, 164-165; Hodder, 1982: 204-205; Aswani and Sheppard, 2003: S53; Thomas, 1991: 12, 45-46).

2.5.3 An Archaeology of Value

Some degree of social stratification is a feature of virtually all past and present societies. By definition some members of stratified communities have more status, rank, respect, prestige or other manifestation of symbolic capital than others. In order that societal relationships function effectively and the potential for intra-community conflict is minimised, individuals need to both semiotically communicate their social standing and stock of symbolic capital as well as to understand the signals of others. The archaeological and ethnographical data overwhelmingly demonstrate that behaviour and material objects have frequently been used to perform as social signals. As semiotic behaviour is often mediated through possessions, it is difficult to disentangle the two. Artefacts used to establish, emphasise or endorse the socially important attributes of those that possess and parade them consequently become endowed with a component of value which is entirely culturally derived. Such artefacts carry a symbolic value which is separate from any value they may also have as practical utensils.

The evidence indicates that many of the artefacts which are specifically made to be used as semiotic signals share certain characteristics. Their physical properties, raw materials and particularity of manufacture distinguish them from the more mundane technomic objects of the same community and period. Making these “special” objects requires expertise, developed skills and technical knowledge. These are attributes that are normally acquired by learning a craft through some form of social collaboration (through training, mentoring or some form of apprenticeship) and over a period of time by practice and repetition. Specialist skills are passed on through social interaction such as from master to novice or parent to child. Workers may operate in relatively close proximity to each other. The transmission of craft knowledge is often controlled and restricted. Craft specialists within any society are likely to form a recognisable group which occupies a specific social stratum and is identified by what it produces.

Specialism infers that some form of network existed within which at least some specialist production would have moved by means of some permutation of exchange or gift. On its own specialism says nothing about the size and extent of that network. For that information archaeologists require more information about where objects moved to and under what circumstances. The output of a specialist may be tiny but still play a part in a large and extended network. A substantial volume of specialist production argues against a limited and restricted set of connections.

The incidence of specialists within a community can lead to some degree of standardisation of manufacturing output as well as to the adoption and relative persistence of a specific suite of forms, design profiles or decorative motifs that together may be referred to as a style. Style is itself a semiotic means of identifying both the artisans who produced it, the group that they are members of and the wider society within which that group subsists. Style places that group within the social structure of its community both internally, to other community members, and externally through exchange networks and trade. Standardisation of output is predicated on the existence of specialised craft workers. The adoption of a recognisable and consistent style is a matter of choice which communicates the distinctiveness of both the community and the craft group within it that produced it. Stylistically consistent artefacts of standardised form and dimensions carry social messages that invest them with a component of symbolic capital that is distinct from any value they may have as practical tools or utility items.

What is clear is that an element of symbiosis exists between specialisation of occupation, standardisation of output and the networks that enable the movement, trade, exchange or gifting of what is produced to take place. Linked into this nexus are the people that make it happen and the aspects of identity, group membership, status, prestige and symbolic capital that run in tandem with any economic or utilitarian components of the system.

2.6 Prospects of Symbolic Value in Mid-Holocene New Britain

Having reviewed concepts of value, I now return to the issue of whether obsidian tools in Mid-Holocene New Britain were associated with forms of value that were socially and symbolically determined. This requires that I identify aspects of behaviour associated with social and symbolic value in the ways in which obsidian tools were made and used. This entails looking for evidence of standardization, production specialism and exceptional craft skills, tools that have the characteristics associated with 'special' objects and artefacts which share a distinct and recognizable style. In considering what data the stemmed tool sample can be expected to supply that would support the hypothesis that concepts of social and symbolic value were existent in Mid-Holocene New Britain, the intention is to raise expectations about the outcome of this study. Examination of the shaping of the stems opens the possibilities that the process of making these tools involved some form of craft specialisation and even standardisation of production. If it can be confirmed that some form of standardisation of stone tool production was in operation, if only for a limited period of time, other behavioural expressions of symbolic capital can be inferred. The standardised tools were actants in social networks that identified the artisan, the craft group and the place that produced them.

2.6.1 Standardisation and Specialisation

The use of the coefficient of variation in key artefact dimensions is a recognised method for identifying standardised production, but defining the value of the coefficient of variation that is an acceptable indicator of standardisation can be problematic. The extent to which artisans are capable of producing a standardised, homogenised output will depend to a great extent on the properties of their raw materials and the available production methods. Potters can reform wet clay to correct errors and the use of a wheel aids consistency. Knappers have a less forgiving medium and can only create through reduction (Eerkens, 2000: 667). Eerkens (2000), on the basis of a series of carefully designed practical experiments involving cutting card with scissors, after practice, estimates that the very best that can be achieved is a coefficient of variation of 3 ± 1%. He suggests that for knapping coefficients of variation of between 15 and 30% would demonstrate a high level of standardisation. My view is that, what is important is the degree of standardisation of a particular artefact form relative to other similar artefacts made from the same raw materials in like circumstances. Scrupulous attention to the background and context of the artefacts can mitigate the unavoidable element of subjectivity inherent in the terms 'similar' and 'like circumstances'.

Rath and Torrence's (2003) chaîne opératoire study of the production process of Type 1 obsidian stemmed tools from six sites on Garua Island was an important precursor to my project. Their lithic analysis was integrated with PIXE-PIGME geochemistry data which identified the raw material sources of each of the artefacts (Rath and Torrence, 2003: 120). A sequence of manufacturing stages was identified, each of which involved a discrete knapping process. This sequence culminated in pre-prepared cores being transformed into finished blades. Rath and Torrence (2003: 123, 125) measured the blade-width of a number of blades with stems (n=48) and of a number of stems without blades (n=42), comparing the coefficients of variation in blade-width (circa 24%), stem-width (circa 14%) and stem-width/thickness ratio (circa 24%) between artefacts made from the local Baki obsidian and those made from imported Kutau/Bao material. The consistency in the design and dimensions of the finished product was noted and the study concluded that there was no dimensional or proportional differentiation between Type 1 tools made from differently sourced raw materials. They argue that the final knapping process must have involved only a limited number of highly skilled specialists, located on Garua Island, to whom the blades were taken for finishing (Rath and Torrence, 2003: 126).

Focussing solely on artefacts recovered from sites on Garua Island, Rath and Torrence (2003: 123, 125) categorised and then analysed the Type 1 tools by the extent of retouch on the stem irrespective of the overall stem design. It might be argued that a study with a narrow geographic focus might be expected to reveal a degree of knapping consistency. By contrast, my study looked at a much larger and more morphologically diverse sample drawn from sites across the Willaumez Peninsula as well as Garua Island. It also took a different approach to typological categorisation within the assemblage of Type 1 artefacts. If the result of this examination of a much larger sample, drawn from a wider geographic spread of sites, indicates a high degree of manufacturing uniformity then this will significantly strengthen the argument that specialist or standardised production was used to produce at least some of these artefacts and that other behavioural patterns normally connected with standardisation and determined by concepts of value must also have been present in Mid-Holocene New Britain. The challenge will be to show that this value includes an element which was socially and symbolically mediated.

2.6.2 Long Distance Transport and Networks

If standardised manufacture can be shown to have been a feature of a community, then it is reasonable to assert that some form of network must also have existed which would have distributed the outputs. Only by analysing the archaeology can the geographical spread of that network and the extent to which elements of social capital, as well as what was simply useful and practical, were being transferred through it.

Spatial distribution studies of obsidian stemmed tools in museums and private collections have shown conclusively that stemmed tools were distributed over a vast area across Papua New Guinea (Torrence *et al.*, 2009; Torrence and Swadling, 2008: 609-612). Examples have been found as far West as Biak Island, in the Admiralty Islands over 2000 km to the South East of Biak and as far East as Bougainville (Figure 2-1) (Torrence and Swadling, 2008: 610). Geochemical provenancing shows that the obsidian outcrops from which the raw material for these artefacts could have been obtained are both limited in number and concentrated in the Admiralty Islands, New Britain and the Fergusson Islands (Torrence and Swadling, 2008: 610). The geochemical sourcing data unquestionably points to a movement of objects rather than the transfer of a design concept or idea (Torrence and Swadling, 2008: 610). Put simply, the evidence shows that a scarce number of visually distinctive objects from a very restricted range of source locations were widely, but not densely, distributed between Pacific islands by some combination of trade, down the line transfer or gift exchange. There is no real doubt that the networks through which these artefacts moved must have existed and that they were geographically extensive.

The investment of time and effort required to transfer artefacts through those networks as well as the distances involved implies that what was moved must have some form of value. The geochemical data clearly shows that during the Mid-Holocene, obsidian artefacts and cores, which had been pre-formed from raw material sourced from locations on the Willaumez Peninsula, were being transported some distance to Garua, a location with its own sources of ostensibly identical raw material, for the finishing process to take place (Rath and Torrence, 2003: 126). Analysis of the manufacturing stages indicates that this movement was effected by transferring the tools from one person to another rather than their being simply carried and discarded by their original owner (Rath and Torrence, 2003: 126). This pattern of transferred possession and logistical movement is strong evidence that the value attributed to some stemmed tools was derived, at least in part, from where their raw materials had come from and the social processes and negotiations that had accomplished their passage. The clear analogy with Hochdorf, Sutton Hoo, Neolithic Cumbria, Stensgård and Torupgårde is that these obsidian stemmed tools must have been valued and valuable for social and symbolic reasons. This pattern is entirely consistent with the recognition expressed by Renfrew (1986: 240) and Green (1987: 240) that value can be endowed to an object by rarity, exoticism, the distance an object has travelled and the network that moved it.

Geochemical sourcing data for the artefacts in the assemblage will be used to identify whether any were made from obsidian that had travelled some distance from its source to the locations where the stemmed tools were ultimately discarded. Rath and Torrence (2003) clearly showed that raw materials and pre-formed blade blanks from Kutau/Bao sources were being taken to Garua Island. Was this imported and valuable raw material only used to make objects that were exclusively practical utensils, or was at least some used to make “special” objects that carried social and symbolic value? What happened to the finished stemmed tools once they had been made? Were they exchanged back along the routes used to transport the raw material as part of a two-way flow, or were they distributed as finished goods evenly across the region? This study will address those questions.

2.6.3 The Making of “Special” Objects

In one of the earliest studies of these unusual and relatively scarce stemmed tools, Araho *et al.* (2002: 76) argued that the marked visual distinctiveness of these artefacts and the conspicuous technical prowess evident in their design are characteristics which in themselves are likely to have endowed them with value and with the potential to be objects for gift exchange. Inherent in this argument is the notion that all stemmed tools, and in particular all Type 1 stemmed tools, share the qualities that distinguish them as “special” objects. This premise calls for further analysis.

Visual distinctiveness is arguably a subjective judgement. The relative abundance of obsidian in Mid-Holocene New Britain means that it is unlikely to have been an unusual material and its natural reflectivity and lustre would have been fairly commonplace. It is also reasonable to suggest that in a stone tool using society many individuals would have possessed at least some stone knapping skills, and that most of the flakes and blades used were simple but effective expedient tools with a short use-life. In order to stand out against this background any visual distinction that marked objects as being “special” must have been derived from the way in which the obsidian was shaped. An object designed for signalling social value, intended for social exchange, gift, endowment or any other non-utilitarian manifestation of ownership must exhibit some permutation of both exceptional design and superior technical skill.

For groups of artefacts to be regarded as displaying exceptional design they first have to be relatively rare examples within an overall assemblage of material from the same archaeological contexts; otherwise they are typical rather than exceptional. Secondly, the parameters of their form should distinguish them from all of the other variants and sub-types within the assemblages. They must be more consistent and compliant with an identifiable template when compared to other forms and types in the assemblage. That is, they ought to be distinguished by their degree of conformity to a design which is contextually uncommon. A realistic assessment of the calibre of the technical skill used to make objects of exceptional design can be made by studying the intensity and consistency of retouch used to make the tool as well as by estimating the amount of work and time put into the production task. It is entirely reasonable to use these criteria to identify artefacts within a contextually coherent assemblage which have all the hallmarks of being “special” objects.

Araho *et al.* (2002), working from a small sample, argue that stemmed tools generally meet these tests. However, even a cursory examination of the much larger sample of Type 1 stemmed tools used here will make it plain that there is a wide range of variation and manufacturing treatment within the overall assemblage. Nevertheless, it is possible that some Type 1 stems within the sample may be inferred to have been made to be “special”. The question is whether some of the most proficiently crafted stems illustrate both an elevated level of craft skill and a degree of conformity to a design template that can be shown to be unusual when compared to the other Type 1 stemmed tools in the sample. If so, given that the evidence for the existence of networks has already been established, there would then be a convincing case that these exceptional items were made to be “special” objects which carried social and symbolic value through these networks (Spielmann, 2002: 200; Rath and Torrence, 2003: 126). This argument would be enhanced if a strong connection could be made between the manufacture of such “special” tools and a standardised production process.

2.6.4 Style

Style adds an extra dimension to the notion of “special” objects. An object may carry social value through qualities such as its visual distinction, the exceptional quality of the craft skill used to make it or an association with previous owners without necessarily carrying any indication of the individuals, groups and communities that made it. Endowing something with a recognisable and distinctive style is a deliberate act that signals its origins. The use of style in production conveys an identifying hallmark that is the opposite of obscurity or anonymity and asserts the importance of by whom and from whence something originated. A choice to acquire something which is in any way influenced by its style is choosing to attribute an element of value to what is being obtained, which is distinct not only from its practicality or utility, but also from any other components of symbolic value that it may have.

Style is essentially a repetition of elements of pattern, shape, motif or aesthetic characteristics across a number of manufactured objects such that they are relatively easily identified as sharing a common design precept. Of course there is an element of conflation here between the repetition of attributes that distinguishes style and the consistency of dimension, proportion and process that is diagnostic of standardisation, but these are not mutually exclusive properties. Standardisation describes organisation, process, method and consistency of dimension. Style defines the way in which finished products were intended to appear and identifies both the artisans and the communities that produced them. Consequently, it should be possible to recognise the presence of style in my assemblage of stemmed tools through the recurrence of these aspects of form. Recognition that style was an important aspect of at least some artefacts in this sample would strongly support the contention that they carried and expressed components of symbolic value.

2.6.5 Group Identity

As style is a semiotic means of communicating and advertising individual and group identity, it is no wonder that separating the archaeological evidence that distinguishes group identity from that which defines style is problematic. This is particularly the case where an original style begins as a local theme which is subsequently copied and manufactured at a number of disparate geographic locations, as is the case with *terra sigillata* or Mycenaean stirrup jars (Lewit, 2011: 313; Blake, 2008: 19, 21). In contrast however, where evidence for the use of a distinctive style as part of a manufacturing process or production sequence is seen to be constrained to a single location or a small group of neighbouring sites, then the inference is that the style does represent the artisans, the workshops and the community that chose to incorporate it into their output. Recognising distinct style within my study sample will demonstrate symbolic value. Attributing that style to a workshop or small and relatively close-knit group of workshops will substantiate the view that the style is the medium which the group has selected as a marker of its identity.

The intention is to investigate whether at least some of these obsidian blades had stems that were unquestionably crafted to a greater degree than other stems in the sample and to an extent that appears unnecessary for practical efficiency. The high-magnification microscopy study of the use-wear and hafting wear traces will be used to establish whether or not individual tools were hafted and were used as utensils. Indications that some tools were over-manufactured and elaborated beyond any purely economic advantage will be seen as indicating that they were made as much for social and symbolic reasons as for any practical utility. Evidence that such tools were hafted and used will confirm that they were not errors or friggers, but were intentionally highly crafted in order to form components of sophisticated composite tools that cannot be rationalised on any behavioural ecology basis, but must have borne some element of symbolic value.

2.6.6 Maintenance and Repair

Repairing a tool is likely to take less effort and raw materials than making a new one, and so the task for which the tool is required can be resumed with less delay. Aside from Bleed's (1986: 738, 740-742) arguments around reliability, maintainability and the risks of hunting failure, maintaining and repairing a tool by re-heading or re-hafting can be justified in the same type of cost versus benefit analysis as for the making of a new tool (Bleed, 1986: 738, 740-742). The recognition that people maintained and repaired their tools is evidence that they valued them. There is ample archaeological evidence, in the form of accumulations of worn artefacts, that valued tools or weapons were routinely fixed and restored, that the work of repair and maintenance was often undertaken at rest sites, and that raw material was brought in from some distance (Keeley, 1982: 798-799, 802; Binford, 1979: 269-270; Hayden, 1998: 44).

Repairing and maintaining a tool which has an element of semiotic or social importance may also be worthwhile if restoring it preserves some of the qualities that endowed the artefact with symbolic capital in the first place. Identifying evidence for this in the archaeological record is likely to be challenging. Nevertheless, examples of exceptional craft work, elaboration, extravagant decoration, the use of imported materials (particularly when perfectly serviceable alternatives were to hand) and, perhaps, the preservation of components beyond their economic life (as might be the case where history and provenance was important), might reasonably be interpreted as markers of a category of value that transcended any practical usefulness and functionality. Evidence that tool owners had consistently and repeatedly put more effort and resources into repairing a composite tool than might be reasonably justified in terms of any economic return on investment will strengthen the idea that the value of the repaired objects carried complements of symbolic capital. If evidence for repair and maintenance activity can be identified within the study sample and it appears that some of the remedial actions were centred on non-utilitarian aspects of the artefact, then it will be realistic to argue that the tool was repaired, at least in part, to preserve or restore its symbolic value.

2.7 Value, Behaviour and Archaeology

Value embodies the attribution of importance and significance to anything that people want, need or desire. Anything can have value and many of the things that are most sought after and highly valued are the benefits of incorporeal assets such as status, reputation, prestige, honour or notoriety that exist only within a social and cultural context; resources that may be collectively termed “symbolic capital”. The worth of anything is not only culturally determined but is a fluid, shifting and negotiable quantity which is only applicable at a particular point of time. Symbolic capital engenders social power and those that have symbolic capital are often powerful people who have influence and authority within the very societies whose concepts and constructions of value determine their social and economic wealth.

This chapter has highlighted some of the ways in which individuals and groups of people have behaved in response to their social and cultural recognitions of value as well as what they determined to be valuable. The argument put forward is that there are a number of social structures and community activities within which the concept of value and, particularly of symbolic capital, is an integral part of the shared norm. That is not to say that these concepts do not exist outside of these conditions but rather to assert that they most certainly exist within them. These patterns of conduct, which can be readily distinguished in contemporary societies, can also be recognised in past communities by means of the physical traces found by archaeology. Where the weight of archaeological evidence is sufficient to convincingly demonstrate that a past society exhibited those behavioural patterns, then it is reasonable to assert that an understanding of social and symbolic value was present in that community. To be conclusive, the archaeology needs to demonstrate clear and unequivocal confirmation that activities such as craft specialisation and even standardisation of production took place in Mid-Holocene New Britain. If this can be extended further to incorporate evidence for the deliberate employment of a shared style with its inferred need to signal and differentiate a group identity, then my argument that some stemmed tools carried components of value that were not derived from their use as practical implements will be upheld.

The task of this project was to use the evidence from the Type 1 obsidian stemmed tools to identify some expressions of the social structures, community activities or even individual actions of people which demonstrate the recognition of social value and symbolic capital were a feature of life in Mid-Holocene New Britain. Rath and Torrence's (2003) raw material provenancing study has already shown that obsidian was being moved from one site to another via a staged manufacturing process and has provided persuasive, but not compelling, evidence of the types of behaviour characteristic of a response to symbolic value (Rath and Torrence, 2003). One outcome is a much more cohesive perception of the ways in which people behaved with respect to symbolic value by integrating a high-magnification use-wear study of a specific class of stone tools with both an evaluation of their general form and design as well as with an analysis of the geographical sources of their raw materials. The resulting collation of different but complimentary data is then used to compose use-biographies of tools which, by linking together the processes of making them, of using them and ultimately of discarding them illuminate some of the behaviours and social interactions of the people who valued them.

3. Sites and Samples

This chapter provides the location and stratigraphic details of each of the archaeological sites that provided samples for this analysis, together with evidence for both the relative dating of the artefacts and, where available, details of the absolute scientific dating of specific strata within excavations and sections. The artefacts used in this investigation form part of the extensive collection of Early-Mid Holocene obsidian tools, debitage and cores from New Britain which are currently on temporary loan to the Australian Museum from the National Museum of Papua New Guinea. As only a relatively small part of this large assemblage was selected to be used in this project, the chapter ends by discussing the rationale and criteria for the sampling strategy employed.

3.1 Islands and Eruptions

The Bismarck Sea is a roughly circular patch of the Pacific Ocean bounded on its western side by the north-east coast of Papua New Guinea and on its southern edge by the island of New Britain. New Ireland, Manus and the other islands of the Bismarck Archipelago provide its eastern and northern perimeters (Figure 1-3). The primary geographical focus of my research is centred on both the Willaumez Peninsula of West New Britain and on Garua Island, which with its two prominent hills Hamilton and Baki, sits just off the east of the peninsula (Figure 1-4).

The geology of the Willaumez Peninsula (Figure 1-4) is predominantly the product of the active volcanism of the Bismarck Volcanic Arc which underlies the islands of the north coast of Papua New Guinea and the north of New Britain (Ryan, 1975; Specht, 1981: 338-340; Davies, 2012: 96). The peninsula incorporates 11 volcanoes, some of which have recently been active, and is terminated at its northern tip by the Dakataua Caldera Lake which is around 13 km in diameter (Lowder and Carmichael, 1970: 17). The Witori caldera lies some 60 km to the south east of Dakataua, across Kimbe bay, on the Hoskins Peninsula. Of the numerous volcanoes on or close to West New Britain, Dakataua and Witori have had the greatest effect on the mid-Holocene occupation of the area from which the samples were collected. Garua Island lies roughly halfway between these (Neall *et al.*, 2008: 331).

in the southern part of the Willaumez Peninsula, known as the isthmus area there is evidence of 12 Late Pleistocene and 13 Holocene eruptions and for at least 16 eruptions on Garua Island (Torrence, 2012: 152; Torrence *et al.*, 2009: 510 & Table 1; Neall *et al.*, 2008: 331-332). Material ejected from the West New Britain volcanoes during eruptions included varying quantities and proportions of plinian tephras (sustained vertical columns of ash which will be wind distributed and eventually descend to form air-fall tephra deposits) and pyroclastic flows (laterally moving high-velocity clouds consisting of a basal stratum of boulders and rock fragments carrying a layer of ash) (U.S. Geological Survey, 2014). The Peninsula rock formations, which include a number of cinder cones and rhyolitic intrusions, are principally pyroclastic flows of andesites with some basalt, basaltic andesite and lesser amounts of rhyolite (Lowder and Carmichael, 1970: 17). The rhyolite is mainly light coloured, pumice like, material but occasionally occurs as obsidian (Specht, 1981: 342). There are also some uplifted coral limestones and thick layers of air-fall plinian tephra as well as alluvial deposits of eroded igneous rock (Specht, 1981: 340). Garua Island is similarly formed of stratified pyroclastic material, air-fall plinian tephras and buried soils (Torrence, 1998).

3.2 Seams of Time

The succession of volcanic eruptions interspersed with intervening periods of vegetation re-colonisation and soil formation provide a clear pattern of stratigraphy within sections and test pits. Airfall or redeposited tephras from the eruptions are often sharply delineated and, being pale in colour, provide a graphic contrast to the darker brown palaeosols. Each individual tephra band within this clear stratigraphic sequence is labelled by reference to the volcanic combination that produced it and each combination numbered sequentially from oldest to youngest (Table 3-1) (Machida *et al.*, 1996: 66-69 and Table 1). For example:

- Witori-Kimbe events are labelled from W-K1 (6160-5750 cal. BP) through to the most recent event, W-K4 (1310-1170 cal. BP).
- The Dakataua only event (1350-1270 cal. BP) is labelled Dk.

This classification system has now been generally adopted and is used henceforth in this study.

This stratigraphy provides a clear local contextual indication as to when the use of the Type 1 obsidian stemmed tools began and ended. It is evident from this that manufacture of these artefacts in the isthmus region of the Willaumez Peninsula and on Garua Island started before the W-K1 eruption, recommenced sometime after that eruption, but ceased after the W-K2 eruption (Araho *et al.*, 2002: 62). There is a rather limited exception to this. A small number (<15) of rather small (< 10 cm longest axis) stemmed tools have been found in post W-K2 contexts on Boduna Island, off the east coast of Garua Island and on the eastern side of Garua Island itself (Kononenko *et al.*, 2010: 18). Nevertheless, the large Type 1 stemmed tools made on prismatic blades are not found in stratigraphy formed after the W-K2 eruption. Kononenko *et al*. (2010) suggest that the few much smaller tools may have resulted from some limited skills and knowledge being preserved in refuge locations and reintroduced to Garua during the post W-K2 reoccupation (Kononenko *et al.*, 2010: 26). These minor exceptions do not impact on this study. The W-K1 and W-K2 events remain specifically relevant to the period during which the Type 1 stemmed tools were being made.

The clear delineation of tephras and palaeosols also provided a clear opportunity for a much wider regional stratigraphic and relative dating sequence to be compiled. Machida *et al.* (1996) undertook a tephrastratigraphic survey of around 85 separate locations distributed over the Willaumez Peninsula and Garua Island as well as over an area of the north coast of West New Britain to the east of the peninsula including the Hoskins Peninsula as far as about 60 km east of the Kapiura River. This investigation included archaeological sites with site codes previously allocated: FRI, FRL, FDQ (Bitokara Mission), FRK, FEA and FAO (on Garua Island). Using the differences in geochemistry and glass reflective indices within the tephras, the research team was able to identify and discriminate each individual volcanic event (Machida *et al.*, 1996: 71). Subsequently chemical analysis of individual glass grains obtained from a site on the Willaumez Peninsula (site code FRL), a site on Garua Island (site code FAO) and a site at Yombon (site code FGT – which is outside of the area of this study) which were referenced against samples from known tephras obtained from Machida *et al's* (1996) location 37 and other samples provided by Machida (Torrence *et al.*, 2000: 230). This enabled the stratigraphy at site FRL to be correlated with that at FAO and FGT, and a clear chronostratigraphy to be established across the Willaumez Peninsula, Garua Island and some wider areas of New Britain (Torrence *et al.*, 2000: 230).The outcome was a composite stratigraphic sequence for the Holocene series of eruptions, a geochemical and refractive index 'fingerprint' for each event, uncalibrated absolute TAQ dates for the succession of tephra layers, together with the palaeosols and occupation layers interposed between them as well as an isopach map of the extent of tephra spreads (Figure 3-3 and Figure 3-4) (Machida *et al.*, 1996: 68-75; Torrence *et al.*, 2009: 509).

This reference framework has since been enhanced by an extensive series of ^{14}C dates obtained from different stratigraphic levels beneath the tephras previously identified at a number of other archaeological sites in the same general area covered by the isopach (Petrie and Torrence, 2008: 733-737, Tables 1-4). These absolute dates were then analysed using a Bayesian statistical model to give the summary shown in Table 3-1 from Petrie and Torrence (2008), to which I have added data for the estimated volume of air-fall tephra produced by these eruptions from Machida *et al.* (1996).

3.3 Time and Place

Archaeological fieldwork on the Willaumez Peninsula and Garua Island was undertaken by scientists from the Australian Museum from at least 1972 (Specht, 1981: 337) through to 2010 (Torrence *et al.*, 2010). Each of the archaeological sites from which one or more of the artefacts included in the research sample was obtained is described below. Its location is illustrated either as a site code on the map of Garua Island sites (Figure 3-5) or as a village location on the larger scale map of the Willaumez Peninsula (Figure 1-4). Each is listed in Table 3-3, which also states the number of artefacts that came from each site. Only some 44 artefacts (30%) of the 146 artefacts that make up the research sample came from stratified contexts as discussed below. The remaining 102 were recovered by surface collection. As well as the three and four-letter codes denoting sites, some sub-sites, particularly those on Garua Island along the Malaiol stream (Site FAP), are referred to as localities (Torrence, 1998: unnumbered; Torrence and Webb, 1992: 11).

3.4 Archaeological Sites on Garua Island (Figure 3-5)

3.4.1 General Stratigraphy

The majority of the artefacts I have used came from sites on Garua Island (Table 3-3). A general stratigraphic sequence compiled by Dr J. Webb in 1992 provides a geological history for the island (Figure 3-6) (Torrence and Webb, 1992: 9). Webb's composite stratigraphy, in which the stratigraphic units are numbered from the bottom upwards, was compiled from a number of separate sections both in the area of the Malaiol stream and elsewhere on Garua (Torrence and Webb, 1992: 10).

Garua Island initially arose from a build-up of lava from its two volcanoes (Torrence and Webb, 1992: 9). Coral reefs then became established over these rhyolitic flows before a complex progression of geological events saw these reefs buried by pumice upon which coral re-established itself only to be buried by more pyroclastic flows (Torrence and Webb, 1992: 9). Ash sediments washed in from the sea formed thin beds of turbidite before the deposition of what were possibly more pyroclastic flows (strata 1a-1f) (Torrence and Webb, 1992: 9). Following this sequence, isostatic uplift both exposed the geology to the atmosphere, thus stopping the formation of further coral growth, and deforming the turbidites which have become folded, faulted, intruded by dykes and infilled with sedimentary breccias (Torrence and Webb, 1992: 10).

This uplift also facilitated access to strata 1e which is a major source of obsidian at locality FAP G002 (Torrence and Webb, 1992: 10). Above these pre-occupation horizons, at units 2a (distinct stone lines with a concentration of artefacts) and 2b (a red-brown soil containing only scattered obsidian blocks and artefacts) are overlaid by a stream deposited bedded tephra (unit 3), which has been identified as redeposited W-K1 tephra. Over these strata are a series of distinct airfall tephras layers and one possible pyroclastic flow (unit 6) which consists of lapilli, blocks of obsidian and rhyolite in a white matrix (Torrence and Webb, 1992: 11). Above unit 6 sits a tephra deposit identified as airfall from the W-K2 eruption (Torrence, 1998).

In practice, while the stratigraphy of this small island is broadly consistent overall, the specific stratigraphic sequence does vary between individual sites because of local topography, the effects of erosion and redeposition, and the uneven distribution of tephras (for example Webb's stratigraphic units 5 to 8, including the WK-2 tephra unit, are not present at FAP). In particular the W-K1 tephra is only present on Garua Island in redeposited contexts (Petrie and Torrence, 2008: 731). It is shown in photographs of the 1989 FAP excavation on the lower part of the Malaiol stream as a distinct, thin, lighter coloured stratum and it is denoted as a partial stratum in the diagram of the upper reaches of that stream (Figure 3-8) (Torrence 1998). Although its presence on the island is clearly patchy, it was recorded at a 13m section (section HVI) exposed by erosion on the upper reaches of a contributory branch of Malaiol Stream (Torrence and Boyd, 1997: 22).

3.4.2 Site FAP

Site FAP, which comprises the banks and streambed of Malaiol Stream, provided the largest number of artefacts in the sample (71/146, 49%). This one kilometre watercourse passes between and drains water from the two hills, Baki and Hamilton, as it flows almost due north into the Bismarck Sea (Figure 3-5) (Torrence, 1998: unnumbered). This extensive area, which slopes uphill from the northern shoreline, was subdivided in 1992 into 17 localities for practical working purposes (Figure 3-7) (Torrence and Webb, 1992: 11). There are outcrops of Baki obsidian along the course of the stream; in particular, the G002 source located between localities 7 and 8 as well as others close to an eastern tributary further upstream. In 1989 a section (G14) produced a specific stratigraphy for the immediate location (Figure 3-8 and Figure 3-9). This sequence is numbered units 1-17 from the surface down with the WK-1 tephra layer identifiable as unit 6. Thus the 1989 unit 6 equates to Webb's 1992 composite stratigraphy unit 3, and the 1989 stratigraphy units 7 to 17 equate to Webb's 1992 units 2a & 2b. Worked obsidian was present in abundance in units 12-14 (approximately 0.8 -1.0 metres thick) with unit 12 being described as a 'flaking floor'. Worked obsidian is also present but to a lesser extent in units 15-17.

Hereinafter FAP stratigraphic units will be discussed with reference to Webb's (1992) composite stratigraphy.

The evidence of human occupation at FAP occurs first in units 2a and 2b and includes debitage from the manufacture of stemmed obsidian blades. This evidence is reinforced by a test pit at Locality 7 which produced a stemmed tool and a hammerstone from unit 2a (Torrence and Webb, 1992: 11). A calibrated AMS ^{14}C date (NZA1570) of 6280-5930 BP. was obtained from charcoal found in section G14, the beneath the WK-1 tephra, in the same unit 2a (Torrence *et al.*, 2000: 229; Petrie and Torrence, 2008: 735). Human occupation, and with it the use of stemmed tools, is then interrupted by the W-K1 event but both occupation and stemmed tool use resumes. Evidence from elsewhere on the island shows that this continues until both are again interrupted by the W-K2 eruption. While the location is eventually resettled, the distinctive stemmed tools do not reappear in the archaeology (Petrie and Torrence, 2008: 740-741).

Artefacts were collected on a number of different fieldwork expeditions from the stream wash-out locality of the beach, the ground surface around the stream and as they were seen eroding out of the sides of the stream bed. While most of the artefacts from FAP do not come from stratified contexts, FAP 232, which is included in the research sample, was recovered at locality 14 from strata identified by reference to section G14 as unit 2b, about 15cm below the WK-1 tephra.

3.4.3 Site FAO

This hill-top site sits above a beach and a small cape on the North-eastern side of Garua Island. This location was first discovered in 1989 at which time a 1m^2 test pit was dug which confirmed the stratigraphy and noted the clear delineation of the Dk (Layer 3) and W-K2 (Layer 6) tephras (Torrence and Webb, 1992: 5). In 1992 a further 1m^2 test-pit was opened

(100E/100N) (Torrence and Webb, 1992: 6). The stratigraphy at FAO was then found to consist of nine layers which could be correlated to the stratigraphic sequence previously recorded at site FRL (see below). The 1992 test pit was excavated down to below the W-K2 tephra (Torrence and Webb, 1992: 6; Therin *et al.*, 1999: 444). The 1989 and 1992 excavations recovered obsidian tools stratified beneath the W-K2 tephra (Torrence, 1993: 6; Therin *et al.*, 1999: 444; Boyd *et al.*, 2005: 387).

In 1993, as part of an extensive survey which included the excavation of some 20 1x1m test pits in the area of this site, the 1992 test-pit was both extended in area to $2m^2$, re-labelled as 1000/1010 (Figure 3-10 and Figure 3-11) and stepped down so that a sounding could be taken down to 3.3m (Layer 12) (Torrence, 1993: 6). However, the results were inconclusive as the deeper strata were heavily weathered clays which did not permit accurate cross-referencing to stratigraphies elsewhere on the island. The scanning electron microscope and microprobe work described above clearly distinguished the W-K2 tephra but the W-K1 tephra layer was absent (Lentfer and Torrence, 2007: 92-93). The assumption is that the deposition of this tephra was followed by a period of erosion as the tephra is found in redeposited contexts elsewhere (Torrence, 1993: 6; Lentfer and Torrence, 2007: 92-93). A ^{14}C date of 3885 cal. BP was obtained from carbonised nutshell taken from level 6, spit 1, just beneath the WK-2 horizon (NZA 2901) .The single stemmed tool from FAO included in my sample (FAO 1901) was excavated from test-pit 1000/1010 from Level 8 spit 1 about 10 cm below the WK-2 tephra layer (Torrence *et al.*, 2000: 228).

3.4.4 Site FEK

Facing the Willaumez Peninsula on the west coast of Garua Island, site FEK is a beach location beneath Mount America consisting of layers of mud sealed by slope-wash deposits (Torrence, 1993: 6; Specht and Torrence, 2007: 160). Torrence (1993: 6-7) reports that obsidian artefacts including one stemmed tool were found in a stratified context, lying above a mud flat deposited at a time of much higher sea level and sealed with subsequent slope-wash deposits. However, I cannot trace this stemmed tool and the remainder of my samples are all surface finds recovered during the 1992 and 1997 fieldwork seasons from mudflats which are exposed at low tide and as such are most likely to be redeposited material (Australian Museum, AFBL).

3.4.5 Site FAQ

This site sits almost in the centre of Garua Island, on the lower eastern slopes of Mount Hamilton, above the head of the Malaiol stream on an inland ridge that falls away southwards to the coastal plain. FAQ was first identified in 1989 as a widespread surface scatter of archaeological artefacts. Auguring then showed that, not only were the Dk and W-K2 tephras clearly identifiable, but that obsidian artefacts were present down to a depth of at least 2m. An excavation was undertaken in 1991 and the 1992 fieldwork team dug more test pits and carried out extensive surface sampling (Torrence and Webb, 1992: 7). A $1m^2$ test pit (ref. 95/210) opened in the 1993 season provided what was later thought to be an anomalous ^{14}C date and a further $1m^2$ sondage (test pit 1/95) was opened in 1995, slightly overlapping the earlier excavation, with the aim of investigating strata below those reached in 1993 (Torrence, 1993: 5). The 1997 fieldwork undertook a further 39 test pits at various locations on the island (Torrence and Boyd, 1997: 7, 8). Fieldwork at FAQ has produced two stemmed tools from stratified contexts, both of which are included in the sample: FAQ 010 from the 1992 test pit 45E49N (Figure 3-13) and FAQ 446 from the 1997 test pit B4, level 6, spit 1 (Figure 3-13). A ^{14}C date (NZA 2850) from a carbonised nutshell from test pit 45E49N produced a calibrated date for level 6 (spit 2) of 3690- 4080 BP (Petrie and Torrence, 2008: 735).

3.4.6 Site FSZ

This hilltop site is within Area A and is also referred to as Locality 1 in some documents reporting on field work at and around this site. FSZ sits on a small volcanic scoria cone, above a minor peninsula that forms the northern-most point of Garua Island (Torrence, 1998: unnumbered). As a settlement location it benefits from access to a good fresh water source as well as an extensive viewshed over Garua harbour and the Willaumez Peninsula to the north and east (Torrence and Webb, 1992: 3). Below the hill quarrying of scoria for road building materials has created a face where a stratigraphic sequence has been exposed (Figure 3-12) (Specht and Torrence, 2007: 162, 191, Plate 8). The site has been a focus of a series of fieldwork programmes, which undertook various elements of archaeological survey, landscape analysis, geomorphological soil and environmental recording, together with some excavation from about 1991 onwards (Torrence and Webb, 1992: 2). The 1992 fieldwork expedition initially opened one $16m^2$ trench and one 1x1m test pit at the top of the hill, both of which were excavated systematically to a depth of 1.85m in spits and quadrants) (Torrence and Webb, 1992: 4). The initial strata exposed by these excavations were recognised as the Dk tephra immediately above red-brown clay containing Lapita cultural material (Torrence and Webb, 1992: 4). The strata below this occupation layer were noted as being three tephra layers separated by developed soils, but the W-K2 tephra was not clearly identifiable and there was no correlation with the stratigraphy seen on other sites on Garua Island during this expedition (Torrence and Webb, 1992: 4). However, soil samples were taken at various depths and organic material was obtained for later ^{14}C dating. Four further 1 x 0.5m test pits were excavated on a nearby saddle of land but these resulted in little of note (Torrence and Webb, 1992: 5). A further test-pit in 1993 (17/100) was excavated down to 2.4m and soil samples taken for chemical analysis (Torrence, 1993: 6).

In 1996, as part of an island-wide sequence of some 29 test pits, a further 10 pits were dug in the general area of FSZ and by 1998 a stratigraphic sequence for FSZ had been established and correlated with the stratigraphy identified in a section at site FAAJ thus enabling delineation of the WK-2 tephra stratum (Figure 3-14) (Torrence, 1998; Torrence and Boyd, 1996: 13-14). Obsidian artefacts were recovered from surface collection and test pitting, although these ceased some 20cm below the W-K2 tephra. A stemmed tool (FSZ 141) was recovered from pit 27/83, unit 4, spit 1 which is the WK-2 tephra layer. A further weathered and degraded fragment of a stemmed tool (FSZ 205) was found in pit 17/98 unit 1, spit 5, above the DK tephra, in the soil some 50 centimetres below the surface. Its condition implies that it was exposed on the surface for some time before being re-deposited (Torrence, 1998; Australian Museum, AFBL).

3.4.7 Site FAR

FAR is positioned about 500m to the east of the Malaiol Stream, below Mount Baki. The site comprises an erosional gulley formed by an intermittent stream and also includes the redeposited material on the beach (Torrence and Boyd, 1996: 10). Over several fieldwork seasons from 1989 onwards obsidian stemmed tools have been recovered from the walls of the gulley and the stream wash-out on the beach (Torrence and Boyd, 1997: 10; Australian Museum, AFBL). While the records indicate that the stratigraphy is not clearly delineated (there is no stratigraphy diagram for site FAR), some of the finds were derived from a stone line (stone line 2) just above a level of highly weathered red clay (Unit 2) approximately 2m below the surrounding ground surface (Torrence and Boyd, 1997: 10; Australian Museum, AFBL). This site provided eight artefacts from stratfied contexts: FAR 003, FAR 020, FAR 022, FAR 023 were all taken from stone line 2 while FAR 028, FAR/II/002, FAR/II/007 and FAR/II/008 are recorded as being recovered from two metres below the ground surface in the walls of the gulley.

3.4.8 Site FAAJ

This gulley lies on the slopes of Mount America, above the west coast of Garua. This location was initially denoted as 96/2 pending allocation of the site code and is referred to as such in Torrence and Boyd (1996: 19) (Torrence and Boyd, 1997: 17). The cut of the gulley had exposed stratigraphy on the gulley walls including several stone lines (Figure 3-15 and Figure 3-16). However, the W-K1 tephra was not visible (Torrence and Boyd, 1997: 17). Test-pitting in 1996 produced large numbers of obsidian artefacts but only from post WK-2 contexts (Torrence and Boyd, 1997: 19). Some absolute earlier dates were obtained from ^{14}C dating of samples from Layer 5: 1900-1710 cal. BP, from a nutshell within spit 1 (Beta-102970), and 2490–2000 cal. BP from charcoal within spit 2 (Beta-102971) (Specht and Torrence, 2007: 163). By 1997 the area had been subject to erosion and although the stone lines in gulley walls were re-examined and some in-situ obsidian artefacts recovered, this site was not explored further (Torrence and Boyd, 1997: 17). While obsidian hydration dating is considered by some to be unreliable and dependent on sample size, work by Ambrose did give an indicative date range for the obsidian bearing strata of 4000–8000 years (Torrence and Boyd, 1997: 17; Rogers, 2010: 3244-3245; Anovitz *et al.*, 1999: 736-737). My sample includes two Type 1 stemmed tools: FAAJ 054 and 055 which were found in the section exposed by the gulley in layers below W-K2 as preserved in the test pit.

3.4.9 Site FAAL

This site was temporarily labelled 96/4 during the 1996 fieldwork expedition pending allocation of a formal site code and is referred to as this in Torrence and Boyd (1996: 10, 12). The outwash fan of a small stream had accumulated quantities of obsidian including Type 1 and 2 stemmed tools as well as a number of other distinctive tool forms and some pottery, all of which had been spread out over tidal mud flats on the east coast of Garua, close to a break in the reef (Specht and Torrence, 2007: 137, 140; Torrence and Boyd, 1997: 15).

However, no obsidian was seen to be eroding from exposed areas of the stream gulley and, as access was difficult, recovery of artefacts, including my sole sample FAAL 120, was by surface collection only (Torrence and Boyd, 1996: 12).

3.4.10 Site FAAT

Surface collection at this small cape on the south-eastern corner of Garua, adjacent to the eastern end of Malakuka Beach produced one unusual stemmed tool; FAAT 001 which was covered in marine accretion and not suitable for analysis (Torrence and Boyd, 1997: 3).

3.4.11 Site FAW

FAW is the site reference given to Taula Island, a tiny islet off the southern tip of Garua Island close to the east coast of the Willaumez Peninsula. The sole stemmed tool, FAW 001 was a surface find collected in 1989.

3.5 Archaeological Sites on the Willaumez Peninsula

3.5.1 Site FRL and Surface Scatter Locations FDW and FDY

The second largest contingent of samples for this study was obtained from site FRL at Bitokara Mission on the eastern side of the Peninsula. The mission consists of a church, school and associated residential buildings sitting on a terrace close to the leading edge of an outflow of the Kutau volcano, which forms the cliffs above Nariri beach (Figure 3-18 and Figure 3-17) The road from Nariri passes westwards through the mission site, heading uphill towards Waru and Dire.

In 1981 a latrine pit (later designated as Area 4) being dug close to the school revealed distinct stratigraphic layers of tephras and old soils down to more than 2.5 metres. At the bottom of this excavation was a dense assemblage of worked and unworked obsidian including one stemmed tool (Specht *et al.*, 1981: 7). Elsewhere on this Mission Station, obsidian was recovered from four discrete surface scatters which were allocated site codes

FDV, FDW, FDX and FDY. One type 1 stemmed tool from each of FDW and FDY was included in this study (Specht, 1981: 344).

Archaeological fieldwork in 1988 included the systematic excavation of a trench (TI/C/I) (Site FRL) about 60 metres north-east of the 1981 pit (Specht *et al.*, 1988: 8-9). This trench began as a 2 x 2 metre excavation which was then stepped down to 3.2 metres in depth. The lowest layer reached consisted of compacted clay containing no cultural material. The generally well defined strata within TI/C/I (Figure 3-19 and Figure 3-20) consisted of alternating layers of tephra, loams and clays and were numbered 1 through to 12 with sub-divisions at Layers 1A and 1B and again at Layers 12A and 12B. Of these, Layer 1A sits below Layer 1B which contains the earliest occupation evidence. Layers 10 through to 12B lead through from circa 100 BP to modern garden and school use (Specht *et al.*, 1988: 9).

Layer 2, a red-brown clay soil contains significant quantities of worked obsidian including stemmed tools. Layer 2 is overlaid with layer 3; a distinctive yellowy-brown, silty volcanic ash, which was identified as the W-K1 tephra. Immediately above this, Layer 4, another red-brown clay soil also contains quantities of worked obsidian, again including stemmed tools, with there being a noted increase in the density of cultural materials towards the top of the stratum. Overlying Layer 4, Layer 5 is a cream coloured tephra identified as coming from the W-K2 event. Above Layer 5 cultural materials are again present but this is interpreted as Lapita and has an absence of obsidian stemmed tools (Specht *et al.*, 1988: 8-10). The clear stratigraphy from this excavation shows that obsidian stemmed tools are present immediately below the W-K1 horizon (Layer 3), are present immediately above the W-K1 horizon (Layer 4), but, although obsidian continues to be worked, stemmed tools are not found above the W-K2 tephra (Layer 5) (Specht *et al.*, 1988: 8-9). Charcoal samples were taken from spit 12, a palaeosol sealed beneath the WK-2 tephra (identified as Layer 4 in

Figure 3-19). The resulting ^{14}C dates of 3850-3370 BP (SUA 2814) and 4140-3640 BP (Beta 57773) provided absolute TAQs for stemmed tool use at this location (Specht and Gosden, 1997: 185, Appendix 1).

Trench T1/C/I provided 24 artefacts; the following 20 of which were found stratified in spit 12:

FRL 101	FRL 116	FRL 118	FRL 124	FRL 134	FRL 155
FRL 183	FRL 185	FRL 221	FRL 221	FRL 352	FRL 428
FRL 513	FRL 582	FRL 1048	FRL 1049	FRL 1052	FRL 1053
FRL 1054	FRL 1056	FRL 1058			

A further four stemmed tools; FRL 230, FRL 335, FRL 595 and FRL 1050 were recovered from the deeper, and therefore earlier, spit 13 (Layer 2), beneath the redeposited WK-1 tephra of Layer 3. Close by trench T1/C/I, Area 4 at Bitokara was also re-investigated and four more artefacts; FRL 911, FRL 1004, FRL 1012 and FRL 1017 were obtained from Layer 1b (Figure 3-19 and Figure 3-20), at the top of the basal occupation layer (Specht *et al.*, 1988: 8; Specht *et al.*, 1981: 7).

The research sample for this project thus contains a total of 28 stemmed tools excavated at site FRL and found within stratified horizons. Each of these strata is sealed beneath the clearly visible and geochemically identified WK-2 tephra layer, the base of which sits on organic material from which charcoal samples have provided ^{14}C absolute dating (Torrence *et al.*, 2000: 230; Specht and Gosden, 1997: 185, Appendix 1). The artefact-bearing strata sit above and below the re-deposited WK-1 tephra (Specht *et al.*, 1988: 8-9).

3.5.2 Sites FQT and FDQ

Additional worked obsidian from Bitokara Mission, including one stemmed tool included in the sample (FQT 039), was found on the surface in the area of the Lambe Gulley (FQT), a short distance to the south of the Bitokara School. Obsidian artefacts were also recovered from a number of locations eastwards and uphill from trench TI/C/I where the cutting for the road exposed large quantities of obsidian debris resulting from quarrying and preliminary working. This cutting enabled accurate recordings of stratigraphy to be made (Torrence, 1992: 114-115). These locations: TI/D/I, TI/D/II, TI/D/III and TI/D/IV were collectively allocated Site code FDQ. Although no stemmed tools from Site FDQ were included in the sample, FDQ did provide a salient comparison between the content of the obsidian assemblages recovered from the uphill FDQ locations and those recovered lower down the slope at FRL. FDQ is in the vicinity of outcrops of obsidian and there is evidence that raw material was being quarried or collected here. Assemblages contained more and larger cores than observed lower down the hill in the FRL assemblages. Flakes were fewer but larger at FDQ than at FRL. The inference is that, while some artefacts were being fully fashioned at FDQ, there was a tendency for people to obtain raw material, trim and roughly work cores and then carry these away for final finishing. At FRL the cores worked tended to have been pre-trimmed and the knapping activity involved more finishing processes (Torrence, 1992: 116, 117).

3.5.3 Site FAAH

Located on a small hill rising from the coastal plain on the south-east side of the peninsula, FAAH lies within the Numundo Palm Oil Plantation (Neall *et al.*, 2008: 232; Figure 2; Torrence and Boyd, 1996: 9). First identified in 1996, a north-facing section enabled a tentative identification of stratigraphy to be recorded and some obsidian artefacts were recovered from between strata provisionally classified as W-K1 and W-K2 (Torrence and Boyd, 1996: 9). Following a reconnaissance in 1997 four test pits were excavated at the site. One (XVII) (Figure 3-21 and Figure 3-22) provided a stratigraphic sequence down to a layer below the W-K1 tephra with obsidian artefacts observed in virtually all of the palaeosols (Torrence and

Boyd, 1997: 9; Torrence, 2002: 11; Neall *et al.*, 2008: 334). This stratigraphy was later supplemented by the 2004 expedition which carried out a programme of auguring and coring to establish the former sea levels around the base of the hill (Torrence and Neall, 2004: 7). Although an abundance of in-situ obsidian artefacts were recorded in 2002, the sole Type 1 stemmed tool (FAAH 035) was collected from the surface of the gully washout (Australian Museum, AFBL).

3.5.4 Site FDM

FDM is the site code for part of a road that runs steeply downhill into Voganakai village (Figure 1-4). Finds are therefore all from surface collection including FDM 002 which was included in the sample (Specht and Torrence, 2007: 160).

3.5.5 Site FAY

Site FAY is an obsidian quarry from which Gulu raw material was obtained and is marked by an abundance of obsidian working debris. This hillside site lies close to Voganakai village on the west coast of the central part of the peninsula (Figure 1-4). The sample includes three stemmed tools (FAY 001, 007 and 010) obtained by surface collection in 1989 (Australian Museum, AFBL; Araho *et al.*, 2002: 62).

3.5.6 Site FDC

Located north of Volupai village where a small gully cuts across a beach on Bele bay, FDC is a surface scatter of artefacts across part of the intertidal zone and around the gully cut (Figure 1-4) (Specht and Torrence, 2007: 160). This site has produced one stemmed tool (FDC 005) for analysis.

3.6 Selection Criteria for the Research Assemblage

The process of selecting artefacts for the research sample focussed firstly on the raw material (only obsidian artefacts were included) and, secondly on criteria which distinguished the Type 1 stemmed blades from the Type 2 artefacts. The selection criteria focussed on three defining physical attributes:

(1) the artefacts were formed from prismatic blades (as distinct, for example, from artefacts formed from Kombewa flakes e.g. Torrence (2004) and Kononenko (2011)),

(2) some form of shaping of the proximal end into a stem or tang was evident (Torrence, 2004; Kononenko, 2011).

(3) The stem was formed on the proximal end of the artefact as evidenced by traces of the platform and, particularly, of a single bulb of percussion.

The Type 2 stemmed tools are specifically characterised by the use of two opposing bulbs of percussion to form the blade such that the stems are formed elsewhere on the tool blank. Consequently, even in cases where no other trace of the artefact remained apart from the tool stem, the presence of a single bulb of percussion on that tool stem together with the clear absence of a second bulb of percussion meant that these stems could be categorically identified as having been formed on prismatic blades and were therefore segments of Type 1 stemmed tools.

Two additional obsidian stemmed tools from New Britain were also studied but not included in the final study sample. These were used for training purposes in the museum and included with the group of ethnographic artefacts for reference purposes:

- FRL 150 (Figure 3-1) which had been found in a stratified context and had already been the subject of a use-wear analyis undertaken by Richard Fullagar (1993: 24). It had also provided clear phytolith evdence that it had once been hafted (Bowdery, 2001: 232-235).
- An obsidian stemmed tool labelled ‘Kandrian’ (Figure 3-2) which had been acquired by the museum in 1974 from a New Britain islander who had found it and then

hafted it as a knife. Whilst all archaeological context for this artefact had been lost, it was a useful reference example for micro-wear evidence of hafting.

The prime selection criterion was the physical condition of the surface of artefact and its suitability for use-wear analysis. The selection of the study sample was not intended to represent any statistically proportionate or discriminate sample of either the entire collection or of any particular site or excavation that had contributed to it. My strategy was firstly to draw my examples from sites where the artefacts had been relatively undisturbed such that post-deposition surface degradation was likely to be limited (e.g. Site FAP), and secondly, to choose material from excavation locations that had clear stratigraphic and datable contexts (e.g. Sites FAP and FRL). Finally, it was also judged important to include artefacts from other sites in the same broad location which appeared to be in a condition that would facilitate high-magnification microscopic examination. Given the promising initial work that I had undertaken with Nina Kononenko in observing and recording a sequence of use-wear, post-depositional damage and chemical contamination on what originally appeared to be unusably degraded tool surfaces, I initially rejected very few individual Type 1 stemmed tools as being completely unsuitable. In practice some of the more degraded artefacts revealed very little use-wear under examination, but, nevertheless, this data was recorded and forms part of the overall data set.

My sample, being restricted to one distinct artefact type, represents a small fraction of the whole collection of obsidian knapped stone recovered by teams led by experienced archaeologists and scientists from the Australian Museum, who conducted a series of fieldwork expeditions over a period of more than 20 years and recovered obsidian artefacts from 19 site locations distributed over three major and several minor site clusters across a region of around 60 km^2. The data obtained from this sample forms the best available analysis of Type 1 tool use and distribution patterns. It is also a robust resource from which to interpret the use-biographies of the tools and something of the lifeways of the people who made them.

Many of the 147 Type 1 stemmed tools that made up the research sample are broken and have sections missing (Table 3-2). Some consist only of broken blades. Arguably the absence of tool sections limits the validity of the use-wear analysis, as it is impossible to know what data the missing sections might have added to the analysis, were they present. However, working from incomplete artefacts does not invalidate my results. Archaeology frequently has to work with broken artefacts and with incomplete data sets. These observations and the arguments derived from them are derived from the data that is present and the implications of any missing artefact sections are discussed where relevant. Any sections of a tool that are missing may have had no use-wear or more of the same use-wear as on the rest of the tool, in which case the missing tool sections would have added little to the overall analysis. However, it is recognised that missing blade sections might have use-wear characteristics that are not present on the sections of the artefact that we do have. In that case the use-biography will inevitably be incomplete, but will nevertheless add value to the overall research programme.

3.7 Type 1 Stemmed Tools

The 147 artefacts which form the research sample for this study are all Type 1 obsidian stemmed tools. Stemmed tool manufacture began some time before the W-K1 eruption. An AMS ^{14}C date (NZA1570) from charcoal taken from below the W-K1 strata at Site FAP provided a date of 6280-5930 cal. BP and thus a *terminus ante quem* for the beginning of manufacture and use of these artefacts. They continue to be present in the archaeological record until the devastating W-K2 eruption after which they are no longer found.

TABLE 3.2: All artefacts forming the research sample, tabulated by site code, showing the numbers of complete and broken tools selected for use-wear analysis

Site Code	Archaeological Site	Complete Tools	Stems with blades missing only the tip section	Complete Blades with stems missing	Complete stems with all or part of the proximal section of the blade attached	Complete stems with no blade	Blade Tips	Incomplete artefact sections	Re-classified as unlikely to be Type 1 following laboratory examination	Totals
FAP	Garua Island, northeast, Malaiol Stream		14		18	27	3	9	1	**72**
FAO	Garua Island, northeast coast	0							1	**1**
FEK	Garua Island, west coast	2	2	1				3		**8**
FAQ	Garua Island, central				1			1		**2**
FSZ	Garua Island, northeast coast				1			1		**2**
FAR	Garua Island, northeast, east of Malaiol Stream		2		6	4	1	2		**15**
FAAJ	Garua Island, west coast	0					1		1	**2**
FAAL	Garua Island, east coast						1			**1**
FAAL	Garua Island, northeast coast						1			**1**
FAW	Taula Island							1		**1**
Totals	**All Garua Island sites**	2	18	1	26	31	7	17	3	105

Site Code	Archaeological Site	Complete Tools	Stems with blades missing only the tip section	Complete Blades with stems missing	Complete stems with all or part of the proximal section of the blade attached	Complete stems with no blade	Blade Tips	Incomplete artefact sections	Re-classified as unlikely to be Type 1 following laboratory examination	Totals
FRL	Bitokara Mission, Willaumez Peninsula		2		4	7	1	14		**28**
FDW	Bitokara, Willaumez Peninsula				1					**1**
FDY	Bitokara, Willaumez Peninsula		1							**1**
FQT	Lambe Gully, south of Bitokara Mission	1								**1**
FAAH	Numundo Oil Plantation, Willaumez Peninsula					1				**1**
FDM	Near Voganakai village, Willaumez Peninsula				1					**1**
FAY	Near Voganakai Village, Willaumez Peninsula	1						1		**2**
FDC	Near Volupai village, Willaumez Peninsula		1		2	2			2	**7**
Totals	**All Willaumez Peninsula sites**	2	4	0	8	10	1	15	2	42
Totals	**All Research Assemblage**	**6**	**40**	**2**	**60**	**72**	**15**	**49**	**8**	**147**

Calibrated ^{14}C dating of organic material taken from immediately beneath the WK-2 strata at Site FRL and Site FAQ provide robust dates for the W-K2 eruption of 3885 cal. BP (NZA 2901) and a *terminus post quem* for the cessation of production (Torrence and Doelman, 2007: 45, 46, 48; Neall *et al.*, 2008: 332; Petrie and Torrence, 2008: 738; Kononenko *et al.*, 2010: 26). The stratigraphy shows that these distinctive, elaborate and highly crafted blades were in use on Garua Island and the isthmus area of the Willaumez Peninsula for a period of around 2300 years and, although obsidian flake tool manufacture did restart after the W-K2 reoccupation of the devastated area, except for very rare small tools, production of stemmed tools was not resumed.

Stemmed tools undoubtedly formed a notable component of the material culture for the communities that occupied Garua Island and the isthmus of the Willaumez Peninsula before and after the W-K1 eruption and in the period immediately preceding the W-K2 eruption. One of the puzzles of the archaeology is why production was not resumed by the people who re-occupied the area after the W-K2 catastrophe. Arguably the practical tasks of daily subsistence would not be significantly different after recolonisation of the post-W-K2 landscape then they were before the eruption. It might be expected that similar sorts of tools would be made from the same type of raw materials and used in similar ways. However, these distinctive, and in many cases highly crafted, stemmed tools appear to have had no social or practical significance for the people who re-colonised the area after the W-K2 devastation. One inference of this is that the motives behind the making and using of obsidian stemmed tools were not restricted to the practical aspects of day to day living but included a component that valued this particular design of tool for cultural and symbolic reasons, independently of any practical value they may have had as utensils (Torrence, 2003: 297; Specht, 2005: 15, 19, 20; Araho *et al.*, 2002: 74,75). Demonstrating that at least some of the Type 1 obsidian stemmed tools had been regarded as having a social or symbolic value, that was separate to and distinct from any utility value they may have had, is ultimately dependent on providing convincing evidence of the ways in which these tools were used and treated.

4. Microwear and Method

To provide a reliable context for understanding tool function, I undertook a detailed microwear analysis of the whole surface of each artefact. The primary methodology of this study is the meticulous compilation of use-wear data observed under high-magnification microscopy using a systematic examination and recording system which was then carefully evaluated against appropriate and valid reference sources. The use-wear on an object accumulates during its use-life and may include evidence of different phases of use, hafting and curation. Consequently, analysis of the whole of the tool surface, rather than just the cutting edges of the blade was essential for understanding the use-lives of each artefact. A clear understanding of how specific tools were used, when collated with a study of the morphology of the artefacts as well as geochemistry provenancing data, makes it possible to construct rational and convincing use-biographies of those artefacts. Those parts of these use-biographies which are markedly not purely functional and practical can be differentiated. This, in turn, provides this study with a logical and reasonable means of identifying those elements of symbolic value which are integral to the ways in which a tool may have been used. This approach is clearly contingent upon the quality and evaluation of the evidence as to how each tool was used. Recording the microscopic traces of use-wear is the most accurate and effective way of providing the essential material evidence of the modes of tool use and the materials upon which they employed. The data collected by means of the high-magnification microscopy examination of the study sample artefacts thus informs and shapes the most important line of reasoning in this argument.

This chapter details the high-magnification micro-wear observation and recording systems that have been used. First, it establishes the precedents for and the validity of use-wear on obsidian as a technique before going on to explain the practical application of the methodology to the research sample. Details are provided of the preparation and training required and the technical equipment used. The factors which produce use-wear on a tool surface are explained and the characteristics of the use-wear key variables are described. An Interpretation of the use-wear for each artefact is produced by comparing the collated key variable data with valid and realistic reference sources. Both the nature of the reference material and the methods used to establish a common benchmark for both the reference collection and the data collected from the research sample are specified and discussed.

A crucial component of my methodology was the design and implementation of a coding system for recording the use-wear key variables. The idea of setting up this system was stimulated by several practical issues that arose from the size and nature of the study artefacts, the need to record all parts of the tool surface rather than just the working edges, as well as from the nature and locations of the reference collections used.

Acknowledging that there can be subjective and conjectural components of any archaeological interpretation of data, some of the principal risks to construction of use-biographies from use-wear data are then stated and explored. The aim of this chapter is to provide confidence that the use-wear collected in the laboratory by high-magnification microscopy is dependable, robustly and rationally interpreted, and forms a sound basis for this argument.

4.1 In the Footsteps

Analysis of use-wear using both low-magnification, high-magnification and, latterly, electronic microscopy has now become an established archaeological technique. The pioneering work of S.A. Semenov in the 1950's was founded upon a systematic experimental programme during which newly manufactured stone, bone or antler tools were applied to specific tasks for timed intervals. Microscopy was then used to identify individual wear characteristics (the use-wear key variables) and the resultant wear patterns were photomicrographed to provide a reference collection against which artefacts could be compared. While some of the details of the practice and of the technology has developed since Semenov (1964) the approach taken by many of the subsequent researchers in this field; for example, by Tringham *et al.* (1974), Keeley (1980), Kamminga (1982), Hurcombe (1992) and Kononenko (2008), has broadly followed this pattern. My high-magnification microscopy analysis of the Type 1 stemmed tools uses this established methodology.

4.2 The Glass Darkly

The majority of the early studies of stone tool micro-wear concentrated either on flint which is widely available in archaeological contexts or on grinding tools such as mortars and querns. This study focusses on obsidian, which has somewhat different properties from flint and tends to be much less widespread. The inherent characteristics and chemical composition of obsidian mean that it behaves differently to flint when used as a tool and when subject to the effects of taphonomy. All obsidians are rhyolites and chemically very similar to granites or basalts, being composed of around 50% Oxygen, 40% Silica, 7% Aluminium, small amounts of Sodium and Potassium plus a range of trace elements (Dorfman *et al.*, 2008: 1876). As a glass, obsidian is an amorphous solid without a primary crystalline structure although spherulites, clusters of fine, needle-like crystalline inclusions, form when obsidian has cooled slowly (Zallen, 1983: vii; Lockwood and Hazlett, 2010: 169). Obsidian is distinguished from most other stone types used for tool making by its exceptional brittleness. While it will fracture conchoidally and can be flaked to generate working edges of extremely acute angle and surgical sharpness, its fragility means that these edges break readily under load (Lockwood and Hazlett, 2010: 169; Hurcombe, 1992: 24-25). Hardness and abrasion resistance data shows that obsidian is softer than most other lithic tool raw materials (a hardness of circa 6.5 Mohs compared to fossiliferous flint at around 8.5 Mohs) and is much less resistant to abrasion (Kamminga and Zlotkowski, 1982: 27-8).

Once formed, cooled and exposed to the atmosphere obsidian will absorb ambient water. This water forms a surface hydration layer which penetrates a few microns below the surface to a depth which varies according to time and conditions (Liritzis and Laskaris, 2011: 2013). The issues around the measurement of the depth of surface hydration and its application as a method of dating obsidian are beyond the scope of this study. However, the presence of a hydration layer may be a factor in the formation of use-wear and, possibly, the degree of surface degradation over time

Obsidian has not received as much attention from archaeological use-wear specialists as other materials. Semenov does discuss obsidian in terms of its hardness, and is reputed to have used obsidian in his experiments, but does not appear to have specifically reported on them (Semenov, 1964: 15). Johan Kamminga (1982 from a PhD Thesis submitted 1978) had also produced his own experimental reference collection and applied it to a study of Australian Aboriginal lithics (Kamminga, 1982). However, he did conduct some 10% of his 444 experiments with obsidian from Talasea, New Britain (Kamminga and Zlotkowski, 1982: 106-7). These limited examples apart, the only two comprehensive academic studies of use-wear on obsidian published so far are those conducted by Hurcombe and by Kononenko.

The application of high magnification microscopy and high-resolution photomicrography specifically to obsidian was advanced markedly by Linda Hurcombe’s (1986) Doctoral thesis and consequent (1992) monograph. Not only did she document some 169 experiments with

Sardinian obsidian, but she also quantified the experimental results (Hurcombe, 1992: xix, xxi, 36-7, 129-32). Kononenko (2008, 2011), working exclusively with obsidian, adopted and adapted key elements of Hurcombe's categorisation and recording system. She conducted 292 experiments of which 154 were analysed using high- magnification microscopy. The data and polychrome photographic reference collection were then applied to a comparative study of mid-Late Holocene artefacts from New Britain. Kononenko eschewed Hurcombe's grading scheme but adopted the descriptive terms that underlay the numerical values (Kononenko, 2008: 227-242; Kononenko, 2011: 7-8).

4.3 Tools of the Trade

An element of planning, preparation and training was required before the laboratory work necessary to address the research question could be undertaken. At the outset it was essential to learn how to use the microscopes effectively and how to inspect systematically the surfaces of the objects under examination such that any visible micro-wear could be competently identified and recorded. Considerable practice was required in order to build up expertise. This training and development was undertaken under the direction of Nina Kononenko at the Australian Museum, Sydney. This opportunity to train in the Australian Museum ensured that valid and consistent correlations could be made between the results obtained in Leicester and the work of Nina Kononenko as well as that of other use-wear specialists.

Each obsidian artefact was first examined at low power with a stereoscopic microscope using an oblique external light source and then at high power using a binocular metallurgical microscope equipped with an incident light source. The laboratories used were equipped as follows:

- Sydney; one Orient SM1 stereoscopic microscope and one Olympus BX60M binocular microscope with both incident and transmitted light options, fitted with an Olympus DP72 colour digital camera attached directly to the microscope.
- Leicester; one Zeiss Stemi 2000-C stereoscopic microscope plus two Zeiss Axioscop2 MAT binocular microscopes, one set up for incident light and one optimised for transmitted light. The laboratory also had one Zeiss Axiocam ERc 5s camera and one Zeiss Axiocam MRc 5 colour digital camera, each of which could be attached to any microscope via a standardised camera attachment fitting.

In each case the digital cameras were complemented by a software package supplied by their respective manufacturers which facilitated the process of taking and managing the photomicrographs. Each high-magnification microscope was equipped with bright and darkfield light sources as well as polarising and cross-polarising filters. The standard and suitability of equipment and software in each laboratory was approximately equal although Leicester had an additional high-magnification microscope available.

The procedure for examining artefacts and experimental samples was the same in both laboratories. Each object was given a preliminary examination using the stereoscopic microscope at magnifications of between 5x and 50x. The objects were generally hand-held or placed on a simple platform such that they could be moved and rotated under the microscope. This allowed me to view the object under different angles of illumination and obtain a general view of the degree and extent of any surface degradation, contamination or damage and of any areas of retouch. Each object was then meticulously inspected using one or other of the high-magnification microscopes at various magnifications from 50x to 1000x, employing selected combinations of the available range of light sources and filters. In practice I found that the use of a single polarising filter reduced the reflected glare from some of the very shiny surfaces typical of obsidian, while darkfield light created shadows that enhanced the appearance of some surface relief. Cross-polarising filters were useful for distinguishing traces of residue and, sometimes, for spotting starch grains.

4.4 Cleaning and Residues

While use-wear is significantly more visible and easier to identify if grease and dirt is cleaned from the artefacts before examination there is a cumulative body of scholarship that testifies to the growing importance and increasing sophistication of residue research as a contributor to the Functional Analysis of stone tools (Anderson, 1980; Loy, 1983; Fullagar, 1993; Fullagar *et al.*, 1998; Barton *et al.*, 1998; Kealhofer *et al.*, 1999; Perry, 2004; Ebeling and Rowan, 2004; Barton, 2005; Fullagar *et al.*, 2006). Although it may be expected that organic residues would rarely survive millennia of burial or surface exposure, Lombard (2008) reports plant and animal residues including starch grains, blood, animal fat and bone collagen from a Howiesons Poort type assemblage from the African Middle Stone Age in strata dated by OSL to between 75 and 60 Kya, while Fullagar et al. (2006) reports starch grains on a variety of Early-Mid Holocene stone tools from the Highlands of Papua New Guinea where the preservation period and conditions would have been similar to those for my study specimens (Fullagar *et al.*, 2006: 596, 601; Lombard, 2008: 27, 30). A number of studies of Early-Mid-Holocene obsidian artefacts from the Bismarck Archipelago have already observed and identified plant microfossils at distinctly greater quantities than those of the soil matrices from which those lithics were recovered (Fullagar, 1993; Barton *et al.*, 1998; Fullagar *et al.*, 1998; Kealhofer *et al.*, 1999; Bowdery, 2001; Kononenko, 2008; Kononenko, 2011). The inference is that at least some of those residues must have been present on the tools prior to discard, had been deposited during the tool's working life and had survived the taphonomic effects of prolonged burial.

Each of the tools in the research sample remained in the original plastic finds bag they had been placed in on excavation and several of these bags also held the dried remains of the soil matrices from the excavation contexts. This offered the strong possibility that microscopic residues might be present on the surface of all of these tools and that the overall use-biographies of these stemmed tools could be enhanced if, at some later date, useful data could be extracted from any residues on their surfaces. A balance had to be struck between cleaning each artefact thoroughly and not ruining the potential for future residue analysis. Consequently, a decision was made to restrict the amount of cleaning to the minimum necessary to obtain a clear view of the artefact surface. Where soil matrices or substantial surface residues were apparent these were washed from the tool or finds bag using purified water with hand agitation or use of the sonic bath. The resulting liquid was then stored and labelled for later examination. Depending on how much contamination needed to be removed, once any preliminary washing had been completed or discounted, the artefact was then cleaned using one or a combination of:

- immersion in a weak solution (approximately 0.1%) of Potassium Hydroxide (KOH) within a plastic finds bag which was then agitated for 10 minutes in a sonic bath
- spot cleaning using a weak solution (approximately 10%) of ethanol (CH_3CH_2OH) applied with a microscope cleaning tissue.

4.5 A Consistency of Variables

Evidence from previous experiments (Rots, 2010; Semenov, 1964; Keeley, 1980; Kamminga, 1982; Hurcombe, 1992; Kononenko, 2008; Kononenko, 2011) indicates that there are four principal factors in the production of use-wear:

1. the way in which the tool was used,
2. the composition of the tool (i.e. flint, obsidian or other raw material),

3. the composition of the material worked,

   and

4. the length of time the tool was in use.

The vocabulary employed in my analysis to describe the way in which the tool was used must be clarified. I have used ‘cutting’ as a completely generic term to refer to the action of a blade in incising something without making any reference to a specific mode of action. Specific methods of cutting include ‘sawing’ (a reciprocating action such that the motion is parallel to the blade edge), ‘slicing’ (where an action similar to sawing takes place but on softer material such that some movement of the blade perpendicular to the edge inevitably takes place), scraping (a pulling motion perpendicular to both the working edge) or a whittling action. Whittling involves placing the tool edge across a relatively hard use-material perpendicular to the long axis of the blade and then pushing the tool away from the user, while at the same time drawing the working edge through the material. It follows that whittling and slicing both combine movements which are simultaneously both parallel and perpendicular to the cutting edge of the blade. Differentiating between the use-wear evidence for whittling and slicing relies on using a combination of all of the key variables to determine the relative hardness or softness of the use materials. It is also possible to identify a chopping action (forcing the edge of a blade through the material such that the motion is perpendicular to that edge) but this is normally a feature of axes or adzes which have a markedly different design to the Type 1 stemmed tools in having the working edge perpendicular to the long axis of the tool. Chopping is not a significant variable here.

Each time an implement is used to saw, slice, scrape or whittle the combined effect of these four factors causes distinct and diagnostic patterns of micro-wear to be left on the surface of the tool. These configurations of use-wear are formed from the interaction of the four distinctive use-wear key variables:

1. edge scarring (scar damage to the tool edge),
2. edge rounding (attritional rounding of the edge in plan, profile or both),
3. striae,

   and
4. polish.

Each of these variables is a category of use-wear within which there are a number of different configurations and gradations of abrasion and attrition visible under high-magnification microscopy. It is relevant to examine each category in more detail.

4.5.1 Edge Scarring

The working edges of stone tools may be brittle and can fracture on contact with the worked material. The likelihood and degree to which such fracturing will occur depends on a number of factors: the type of stone used; the angle of the working edge; the hardness or density of the worked material, and the direction of use and the amount of pressure applied. The working action is likely to produce both pressure on the edge and a degree of flexion such that a variety of compression and flexing fractures will eject minute flakes leaving distinctive conchoidal and bending scars along the working edge. In keeping with Kononenko (2008) I have generally followed Kamminga (1982: 6-7) in classifying the scars as bending, feather, hinged or step scars, but have also included flaked scars as an additional category (Kononenko, 2008: 29). Flaked scars are sometimes referred to and classified as flaked striations and describe an incomplete fracture which is seen as a surface crack (Kononenko, 2011: Plate 36B & 71E). In effect they are an edge scar which is in process of development but which has not yet resulted in the complete detachment of the scar debitage (Hurcombe, 1992: 24). However, while Kamminga (1982: 7) sub-divides hinge scars by describing a retroflexed hinge, which he states as being very rare, I concur with Kononenko (2008) and Hurcombe (1992) in omitting this fine demarcation which has no practical relevance for this study. Edge scars are characterised as follows:

- Bending scars are distinctive as having no floor and are asserted to be particularly associated with acute edge angles (Figure 4-1, Figure 4-2 and Figure 4-3) (Kamminga, 1982: 6).
- Feather Scars terminate with a gentle sloping floor and a feather-like appearance (Figure 4-4, Figure 4-5 and Figure 4-6) (Kamminga, 1982: 6).
- Hinge scars terminate in a sloping floor which curves, but at a much steeper angle than a feather scar (Figure 4-7, Figure 4-8 and Figure 4-9) (Kamminga, 1982: 7).
- Step scars exhibit a distinct junction where the floor of the fracture intersects, often at something close to a right angle, with a second flat fracture surface resulting from an abrupt termination of the original fracture (Figure 4-10, Figure 4-11 and Figure 4-12) (Kamminga, 1982: 7).
- Flaked Scars (Figure 4-13) are incomplete fractures where part of what might become scar debitage is seen to be cracked but still attached to the tool edge. On flint or other fairly opaque materials flaked scars are likely to be virtually invisible but the translucency of obsidian sometimes exposes these (Hurcombe, 1992: 24).

4.5.2 Edge Rounding

Recording the erosion or attrition by abrasive processes of the edge in both profile (the bevelling or blunting of the edge between the two opposed working faces) and in plan (the rounding of corners or spurs and smoothing of edges left by edge scars when a working face is seen in plan) is important for reconstructing both the mode of tool use and the use-materials. The shape or symmetry of any bevelling of the edge profile can be affected by the angle that the working edge presents to the use material as an outcome of the way in which the tool is held or hafted. A sawing motion, for example, is normally carried out with the tool held perpendicular to the cut so that both faces are evenly in contact with the worked material. In contrast, holding the tool at an angle, with one face in more contact than the other, is more usual in a whittling or drawing (spokeshave) type action.

In the case of obsidian the erosive process of wear attrition is very similar to that of polishing (Fullagar, 1991: 2). Indeed Hurcombe includes edge rounding and bevelling within her classifications of ’Polish’ while also employing a separate category of ‘Attrition’ within which she again employs the description ‘bevelled’ (Hurcombe, 1992: 128). I found this ambiguous and while I broadly followed Hurcombe’s classification scheme, I made some amendments to suit the particular tasks that I was applying it to. Kononenko (2008: 30) followed Fullagar’s (1986: 80) approach and employed a specific category of ‘Edge Rounding’, using a practical four level classification system of ‘very light’ through to ‘bevelled’. However, neither scheme seems to distinguish between rounding in plan and rounding in profile and it was my view that my recording system, of which more below, would have to log each of these as separate use-wear key variables.

4.5.3 Striae

Striae (sometimes referred to as ‘striations’) are linear abrasions or scratches generated by hard particles that are pressed into and moved along the fresh surface of the tool. This may result from the working action of tool use, friction from hafting materials or from sand or grit particles on the hands of the users or trapped within wrapping or sheathing materials. The nature of the striae will be affected by the quantities and qualities of abrasive particles, the amount of pressure applied and the duration of use. It can be generally assumed that the more abrasive particles present, the greater the pressure and the duration of use, then the greater the effects on the obsidian surface. Particles are likely to vary in size and in their inherent smoothness or angularity and these factors all add to the variability of the use-wear outcomes. Some of these particles may derive from the detritus of edge scarring or abrasion of the tool itself or from the worked material and may be trapped on the tool surface by blood, sap, fat or other fluids (Kamminga, 1982: 11). The orientation of striae in relation to either the working edge or, for some particular tool morphologies, where a tool has more than one working edge, to the main alignments of the tool itself, can provide evidence for the direction of tool use (Semenov, 1964: 88). That is, they indicate whether a tool has been used in a sawing, slicing, scraping or a whittling action. The orientation of striae is usually recorded in terms of its relationship (perpendicular to or parallel to) the working edge of a blade. My use of an Access database to consolidate handwritten observational recordings prompted me to use the terms 'axial' and 'transverse' in place of parallel and perpendicular respectively, simply because I found it reduced transposition errors to do so. Striae present on stemmed tools are described as being axial, transverse or oblique with respect to the long axis of the tool.

Kamminga (1982: 12) divided the potential range of striae types into sleeks and furrows. He defined sleeks as having smooth regular margins and argued that they form through plastic deformation or displacement of the hydrolysed surface of the stone. He described them as extremely fine in most cases and only visible at very high magnifications. In contrast, furrows were formed by the excavation of material as a result of a process of micro-cracking and chip removal. These were seen to have irregular margins broken by the ploughing effect of abrasive grains being dragged through the surface of the obsidian by friction (Kamminga, 1982: 13).

Kononenko (2008: 29) followed Hurcombe (1992: 37) in utilising six categories of striae:

1. sleeks, which are straight-sided smooth-floored (Figure 4-14);
2. rough-bottomed, which have distinctly irregular bottoms (Figure 4-15);
3. fern-like, that have a central line of damage with a series of short lines or cracks running perpendicular to the principal striae direction;
4. flaked, with a line of fracture damage;
5. crescent row, (Figure 4-16) have a row of roughly crescentic cracks, frequently large and visible to the naked eye and associated with post-depositional damage or trampling;

   and

6. intermittent, which are defined as a small linear series of distinct points of damage (Figure 4-17).

Care, experience and some subjective judgement is needed to identify striae. For example, a sleek seen under low-magnification can appear rough-bottomed under high-magnification, while a rough-bottomed striation can taper to intermittent for part of its length. In my view extent, density and orientation of striae are more useful than a precise identification or classification of type.

4.5.4 Polish

Semenov (1964: 34) pointed out that not only is obsidian softer than flint, but also that it has a naturally glossy surface and exhibits significantly different wear characteristics to flint. In particular, the characteristics of polish on obsidian differ to those on other stone because the naturally reflective surface actually becomes roughened and dull (Semenov, 1964: 15). Keeley (1980: 60-78), in discussing his experimental results with respect to sickle polish, argued that use-wear polish on flint could be gauged comparatively in terms of a range of different worked materials. Keeley (1980: 60-78) measured the distinctive reflective values of polish produced by “wood” polish and “bone” polish and other use-materials with a photographic light meter and referred to these results as being diagnostic markers for specific use-materials. He argued that sickle polish was an addition to the stone surface of plant opal from phytoliths which became plastic through frictional pull and frictional heating.

Following Keeley’s initial proposals scholarly arguments ensued about how polish was formed on stone tools in general and obsidian in particular. Over time these coalesced into three broad hypotheses: that polish was an outcome of surface abrasion involving a grinding down and smoothing process abetted by abrasive detritus; that polish arose from a fusion of the silica content of the stone surface as a result of frictional heat; or that polish was an accretion process in which silica dissolved out of the stone surface to form a gel which subsequently precipitated the silica back onto the stone surface (Vaughan, 1985: 12-13). To test these ideas, Fullagar (1991: 2-3) drew on the work of Cornish *et al.* (1966: 2) which had investigated glass polishing for scientific instruments, and conducted a series of polish generation experiments. His experiments used ice made from purified distilled water as the use material or plant materials with documented silica contents. Fullagar reached several conclusions:

- Polish is a reductive process in which material is removed by a polishing agent (Cornish *et al.*, 1966: 2).
- The silica content of the polishing agent and of the polished material is critical. The higher the silica content of the stone, the lower the rate of removal in the polishing process (Cornish *et al.*, 1966: 3).
- Polishing agents operate most effectively when the surface of the stone is hydrolysed (Cornish *et al.*, 1966: 3).

- Amorphous silica from the stone itself (particularly in the case of obsidian) makes a significant contribution to polish development (Fullagar, 1991: 21).
- Because of the presence of amorphous silica detritus, particularly in conjunction with moisture such as the sap from fresh green plant material, obsidian will eventually develop very polished edges irrespective of the silica content of the materials worked (Fullagar, 1991: 21).

Fullagar's (1991) investigation into polish formation concluded that polish may be described in terms of four stages of production:

- Stage 1, in which an abrasive smoothing removes surface features from the working surface and, with obsidian, the abrasion is seen as a darker area on the stone surface. With obsidian this is described as appearing 'sugary' and rough compared to a fresh fractured surface (Fullagar, 1991: 6).
- Stage 2, in which the removal of material leaves patches of smooth and rounded surface within areas of abrasion. Peaks are levelled and depressions in-filled with impacted debris (Fullagar, 1991: 6).
- Stage 3 sees polish on peaks extended to an extensive polished surface on which surface defects have been removed by sub-surface cracking and flaking (Fullagar, 1991: 6).
- Stage 4 exhibits an extensive polished surface (Fullagar, 1991: 6).

Fullagar (1991; 6) asserted that all tools with an unstable edge would pass through Stage 1 although tools with stable edges and obtuse edge angles may not. Stage 2 was predicted to be the furthest stage reached by tools that were limited in use to soft and non-siliceous materials such as meat. Stage 3 would probably require water and a polishing agent was likely to be produced by working wood, plants, bone and by some skin working. Stage 4 was typical of phytolith polish on sickles and was the likely outcome of working moist, highly siliceous materials.

Kononenko (2008: 32) followed Fullagar's (1991: 6) four stages of polish production but substituted the labels 'very light', 'light', 'developed' and 'well-developed' for the individual stage numbers. I have followed her example, but have also specifically recorded absence of polish.

As well as classifying polish, it is important in this study to record its extent, its relationship to a working edge and its position on the tool as a whole. This is particularly relevant where the presence of polish on elevated areas or arrises, well away from any working edge, may indicate that the artefact had been hafted (Rots, 2010: 61, 95).

4.6 Hardness and Silica Content of Flora.

The degree and extent of use-wear is determined by a combination of the mode of tool use, the amount of pressure applied, the length of time that the tool is in use and by the hardness and silica content of the material upon which the tool is used. The hardness of the use-material affects the way in which the fragile edge of the blade fractures under the pressure of use thereby causing edge attrition, edge scarring and rounding. Silica is the primary polishing agent and is present in the cell structure of many of the plants the tools are likely to have been used on. The fine obsidian detritus that results from tool use is also composed of silica and not only contributes to the formation of polish but also becomes a factor in the development of striae.

As the relative hardness and silica content of each material used to produce the experimental reference collection are broadly known, comparison of the micro-wear identified on each artefact to the experimental reference collection photomicrographs enables an interpretation to be made of the hardness and silica content of the materials that the artefact had been used on. This can then be related to the known hardness and silica content of materials that were likely to have been available on mid-Holocene New Britain thus providing some indication of the types of materials the artefacts were employed to saw, slice, scrape or whittle. A coherent system for classifying the hardness and silica content of the plant materials used to make the reference collection is pivotal to the process of using the identified use-wear to formulate sensible and rational interpretations of the ways in which the artefacts were used.

The experimental reference collection was produced by using freshly knapped edges to cut single samples of materials. In the main these samples consisted of plant material, usually timber, but also vines, bark or leaves. A few experiments were also carried using fish, meat and other materials. The materials used for this reference collection included many species that were likely to have been used on New Britain during the mid-Holocene. However, some experiments had actually been carried out by other researchers who had placed their own entirely narrative interpretations on what was considered 'hard' or 'soft' wood or what level of silica a species typically contained. In order to apply a consistent approach to this this I needed to research independently both the hardness and the silica content of all of the experimental materials referred to and to devise a simple but effective ordering system for each of these variables that could be applied across all of the reference collection materials.

4.6.1 Hardness

Some materials are simply accepted as being very hard (e.g. bone or shell), very soft (flesh) or elastic (skin). Plant materials are much more diverse and required classifying in terms of their hardness. The standard method of determining the hardness of timber is by means of a Janka indentation test with the results expressed in kilonewtons (kN) or pounds-force (lbf).

As hardness can actually vary according to the freshness or dryness of a plant these measures are averages and measurements are usually conducted at 12% moisture content. Occasionally hardness is conflated with density and expressed as kg/m^3 though conversion tables are readily available online from commercial timber specialists (Indeco, 2016). The Australian Timber Development Association (ATDA) does produce a practical and convenient classification system for timber hardness based on the Janka test which utilises the following groupings (Table 4-1):

Table 4.1: Australian Timber Development Association timber hardness classification system. After (Janka, 1906) modified by ATDA (ATDA, 2016)

Classification	Hardness (kN)
Soft	<5.5
Moderate	5.5 to 7.0
Hard	7.1 to 10.0
Very Hard	> 10.0

This calibration formed the basis of my ordering system. In practice it was more useful to extend the range of the ATDA scale by sub-dividing it and by adding the category of ‘Elastic’ for those cases where the observed micro-wear best matched the experimental results obtained from working skin. The scale used for my analysis is shown in Table 4-2:

Table 4.2: Hardness scale adapted from the ATDA scale

Classification	Hardness (kN)
Very soft	< 3.0
Soft	3.1 to 4.0
Moderate/Soft	4.1 to 5.0
Moderate	5.1 to 6.4
Moderate/Hard	6.5 to 8.0
Hard	8.1 to 9.0
Very Hard	>9.1
Elastic	Not Specified

Where Janka hardness data is available I have classified the wood used for the reference experiments in line with this scale. Where Janka hardness data is unavailable, but a hardness classification known to be based on this scale is accessible, then I have adopted those descriptions. Where density, hardness or specific gravity values are not available, for example for *Bambusa spp*., which are Angiosperm monocotyledon grasses rather than timber, or where leaves rather than timber have been used, I have used a pragmatic subjective assessment of hardness.

For example:

- *Octomeles sumatrana* (Erima) has a dry Janka hardness of 1.5 kN, a density of 330 and is classified as very soft.
- *Pommetia pinnata* (Ton) has a dry Janka hardness of 6.52 kN, a specific gravity of 0.57 and is classified as moderate/hard.
- *Toona ciliata* (Red Cedar) is defined as soft by the Australian Timber Development Association based on a Janka hardness test but test results are not available. I have adopted the ATDA classification.

The overall outcome is a broad but practical means of grouping reference experiment use-materials and the materials that the artefacts could potentially have been used upon into a common system for categorising relative hardness.

4.6.2 Silica Content

Silica is drawn up by plant roots from the soil in the form of Monosilicic acid ($Si(OH)_4$) and deposited within cells in either a crystalline form as phytoliths or as a vitreous deposit lining cell walls (Amos, 1952: 7-9; Seiver and Scott, 1963). The silica content of wood is normally measured by analysing the ash content of a burned sample and expressing the silica content as a percentage of the dry weight of the sample (Fullagar, 1991: 4-5; Amos, 1952: 7). Angiosperms (generally broad leaved deciduous trees) and Gymnosperms (generally coniferous, evergreen trees) differ in their internal cell structure and Amos (1952: 10) asserts that silica is not accumulated within the cells of Gymnosperms to any level greater than 0.01%.

One difficulty with classifying plants in terms of silica content is that there can be significant variations in silica content between different parts of the same plant, within the same plant at different stages of growth and between examples of the same plant species growing in different environments (Fullagar, 1991: 7; McNaughton and Tarrants, 1983: 791). In Bamboos, for example, silica accumulates in leaves over time and young leaves will have markedly different silica content to older leaves (Motomura *et al.*, 2008: 463). Within Angiosperms the range of silica content varies from nil to a maximum of around 5% of dry weight although the silica content of bark is frequently much higher than that of the internal wood fibres of the same plant and has been found at concentrations of up to 34% of dry weight (Wahlgrean and Laundrie, 1977: 6, Table 1; Amos, 1952). Consequently, any system for ordering the silica content of plants can, at best, only provide rather broad and general groupings.

I have primarily drawn upon Richard Fullagar’s (1991: 4-5, Table 1) table of plant silica contents derived from his own laboratory measurements and, for species not included in this experimental series, on Amos (1952) which contains the results of a wider series of laboratory measurements. In order to have a practical scale relevant to the reference collection materials I have subjectively classified the silica content of the reference collection timbers into the following broad bands based on sub-dividing the range from the lowest to the highest figures recorded (Table 4-3):

Table 4.3: Classification of silica content of reference collection timbers used

Classification	% Silica Content
Nil	<0.1%
Very Low	0.1-1.0%
Low	1.1- 2.0%
Moderate	2.1-4.0%.
High	>4.0%

A summary of the hardness and silica content classifications for the reference collection results used are shown in Table 4-4, in the appendix.

4.7 Using the Reference Collection

The reference collection used for the interpretation of use-wear on the stemmed tools consisted of two sets of exemplars; those against which the use-wear on the blade sections of the artefacts was evaluated, and those used to identify micro-wear effects of hafting. The blade use-wear reference collection was formed using a small number (n=14) of reference experiments undertaken at Leicester University mainly using obsidian acquired from the USA as well as with some New Britain obsidian together with a larger number (n=35) of reference experiments conducted by Nina Kononenko at the Australian Museum in Sydney using obsidian from New Britain. These 49 obsidian flakes had been used for a range of practical sawing, scraping and whittling experiments. Each experiment involved a single episode of use on one particular material, in a specific way, for a set time period. While I carried out some of these experiments myself, other flakes in the reference collection were the carefully preserved outcomes of experiments carried out by Nina Kononenko and Richard Fullagar. The reference collection for hafting wear consisted of two elements. The first was a series (n=22) of experimental obsidian edges and blades made and used by Nina Kononenko. Each had been formally or informally hafted and was then used for a variety of timed tasks, including chopping and adzing. The second element was a small (n=9) set of hafts, hafted blades and formerly hafted artefacts from the Ethnographic Collection of the Australian Museum.

It is reasonable to question how pertinent a reference collection derived from obsidian from one particular source or made using faunal and floral material from one geographical region can be assumed to be for a study which uses materials from another region. Hurcombe (1992: 97) addressed the issue of obsidian source and concluded that, in terms of use-wear, the source of the obsidian had no significant effect on the outcomes. In practice however, Hurcombe appears to have conducted all of her 169 experiments with Sardinian obsidian and applied the resulting data and reference collection resource to a case study of 12 Sardinian lithics (Hurcombe, 1992: 79). While Kononenko conducted her 292 experiments using obsidian from the Baki outflows on Garua Island and from the Kutau/Bao source on the Willaumez Peninsula, New Britain, she also used obsidian artefacts from Korea, Vanuatu and Russia as comparisons. Her case study of 190 prehistoric artefacts was drawn from Garua Island and, while not stated, the implication is that the source of the obsidian was not a material issue. The experiments that informed my study were conducted mainly with obsidian from New Britain although some early formative work was undertaken using North American obsidian. The microscopic appearance and use-wear characteristics appear to be indistinguishable.

Hurcombe and Kononenko both used plants, animals, birds and fishes obtained from the same regions as the stone tools they were studying in order to make their experiments as representative as possible of the resources available to the people who had made those artefacts (Hurcombe, 1992: 30; Kononenko, 2011: 47). However, as the patterns of use-wear are the products of the hardness, silica content and moisture content of the worked material it is not necessary to use exactly the same species as may have been available to the tool makers, but rather to use species that replicate those same combinations of hardness, silica content and moisture content (Fullagar, 1991: 21; Kononenko, 2008: 43). The quality and range of the use-wear experiments is more important than the specific species used.

4.8 A System of Record

The collection and recording of data from the high-magnification microscopic examination of each of the reference examples and each Type 1 stemmed tool was centred on the consistent identification and logging of the presence and properties of the four use-wear key variables: edge scarring, edge rounding, striae and polish. It was also important to record where on each tool use-wear characteristics were located. This meant that the whole of each tool surface had to be examined and that the recording system included a locational component.

The recording system consisted of:

- A plan drawing of the ventral and dorsal faces of each artefact on which the precise locations of each of the photomicrographs was identified (Figure 4-18).
- A grid system for logging the locations of use-wear on the surfaces of all of the tools (Figure 4-19).
- A coding scheme for classifying the properties of the key variables, such as extent, density or type (Figure 4-19).
- A photographic reference card to promote consistency in the allocation of classification codes (Figure 4-20)
- A disciplined and systematic procedure based on a comprehensive set of worksheets (Figure 4-21, Figure 4-22 and Figure 4-23).

4.8.1 The Grid System for Locating Use-wear (Figure 4-19)

A locational grid system was devised to record the spatial distribution of the wear patterns on each artefact. This grid was based on an idealised "standard" complete Type 1 stemmed tool with 18 locations on each of the dorsal and ventral faces, labelled D1 to D18 and V1 to V18 appropriately (Figure 4-19). As some stemmed tools were broken and incomplete, section numbers were allocated on the basis of what would have been appropriate had the tool been complete. Where, for example, only a stem was present I would record for sections D10 to D18 and V10 to V18, noting the remaining sections as being missing, observation constrained by damage. This was found to be the most pragmatic approach given that the general form of these stemmed prismatic blades is understood and that the alternative, that of applying 36 grid sections to a fragment, was unworkable.

Henceforth reference to 'sections' of an artefact in this text are made relative to this grid system such that, for example; 'V2' would refer to the ventral face, centre, distal end of the blade area of the tool, while 'blade sections' describes any parts of an artefact that could be included in the range of grid locations D1 to D6 and correspondingly V1 to V6.

4.8.2 The Coding System for Key Variable Properties (Figure 4-19)

Each of the key variables was recorded in terms of a range of specific properties, such as density, extent, scar form or striae type such that, for example, I was able to log whether polish was present in isolated patches or extended areas, or any striae were scattered in distribution or densely clustered. In order to record these characteristics in a consistent and systematic way each property was allocated a grading system or type identification code.

These codes are as follows:

Edge Scarring

Type: B=Bending, F=Feather, L=Flaked, S=Step, M=Multiple microscars, V=Various

Distribution: C=Continuous distribution, D=Discontinuous/intermittent distribution

Edge rounding in profile: 1=Just Noticeable, 2=Quite Noticeable, 3=Distinct, 4=Severe

Edge Rounding in Plan: 1=Just Noticeable, 2=Quite Noticeable, 3=Distinct, 4=Severe

Abrasion of edge: 1=Just Noticeable, 2=Quite Noticeable, 3=Distinct, 4=Severe

Polish associated with edge-wear

Development: 0=None discernible, 1=Very light, 2=Light, 3=Developed, 4=Well developed

Extent: 1=Small isolated patches, 2= Larger patches of >200 x 200µm, 3=Extensive and merging areas of polish

How far from edge does polish extend?

1=<50µm, 2=51-100µm, 3=101-200µm, 4=201-500µm, 5=>500µm

Striae Variables

Primary Orientation: A=Axial, T=Transverse, B=Oblique

Primary Density: 1=Scattered, 2=Moderate density 3=Very dense

Primary Description: S=Sleeks, I=Intermittent, R=Rough Bottomed and deep, F=Flaked, C=Crescent row

Secondary Orientation: A=Axial, T=Transverse, B=Oblique

Secondary Density: 1=Scattered, 2=Moderate density 3=Very dense

Secondary Description: S=Sleeks, I=Intermittent, R=Rough Bottomed and deep, F=Flaked, C=Crescent row

Polish associated with elevated prominences /arrises/ scars away from edge

Development: 0=None discernible, 1=Very light, 2=Light, 3=Developed, 4=Well developed

Extent: 1= Small isolated patches, 2=Larger patches of >200 x 200 µm, 3=Continuous along line of elevation

The coding system for recording the presence and properties of the use-wear key variables was devised as a way of achieving consistency in the evaluation and recording of observations. The system I developed had its origins in both Hurcombe's (2008) concept of a grading system and Kononenko's (2008) narrative recordings which used a much more extensive range of key variable properties than Hurcombe (1992: xix, xxi, 36-7, 129-32). Hurcombe's (1992) system recorded gradations of wear within three broad categories: polish, striae and attrition as well as noting the presence and details of any residues observed. Each of these categories was further subdivided into specific variables such as location, orientation and extent. A value was then attributed to a specific gradation within each of these variables (For example; this system assigned a value of 1 to light attrition, 2 to definite attrition and 3 to pronounced attrition). The allocation of grades for a range of key variable characteristics means that results can be expressed in terms of permutations of value grades. Hurcombe (1992: 1992: 36, 52, 144-6) recorded 19 variables in her experiments but she only discusses the permutations of those four variables that she regards as being most determined by the use material: polish intensity, polish texture, polish edge relief and extent of attrition. Variables relating to use-action or a combination of use-action and use-materials were used later in her analysis process as supplementary data (Hurcombe, 1992: 52). Nina Kononenko (2008: 227-242, Table 4.1) did not use a coding system but did provide succinct narrative descriptions of the use-wear she recorded for each of her 290 reference experiments. Kononenko (2008) used a far wider set of use-wear variables than those selected by Hurcombe (1992) and therefore the range of code values ultimately used was extended to include these additional criteria. The recording system used here also draws on Fullagar's (1991) descriptions of the formation and development of polish over time which used similar but slightly differently labelled criteria to those of Hurcombe (1992) for these variables.

One important consideration was the need to benchmark the coding system used for this study with the work of other researchers. This was done by making comparisons between the codes applied to a high-magnification examination of the experimental reference collection and to the descriptions and gradings recorded in both Hurcombe (1992) and Kononenko (2008) for the same use-modes for similar durations on equivalent materials. Hurcombe's (1992) work used floral species that were relevant to her later work on artefacts from the Mediterranean area while the floral species used in my research are generally from the Pacific region. If allowance is made for these and for some differences in the use-durations, then these evaluations are broadly comparable (Table 4-5, Table 4-6 and Table 4-7). The differences between Hurcombe (1992) and the system adopted here are mainly semantic and a valid equivalence can be seen between two systems which are essentially recording the same thing. More importantly, the distinction within each system between the patterns of use-wear associated with different materials is clear. In the examples selected above the use-wear produced by working soft wood can be clearly distinguished from that generated by working hard wood and from working cane.

Many of Nina Kononenko's experiments differed only slightly from each other and produced descriptive results that were quite similar. The results of groups of very similar experiments were summarised to produce a set of composite reference descriptions (Table 4-8) (Kononenko, 2008: 380, 383, 464). The code system was applied not only to Kononenko's

(2008) descriptions of polish but also to her descriptions of edge scarring and striae, and this data was used to benchmark a very similar range of recordings taken from the reference collection.

The coding system I developed was applied to each of two sets of descriptive results and to a collection of used reference edges, each group of which related to a very similar series of experiments. While acknowledging the inevitably subjective nature of use-wear evaluation, the cross-checking of my reference collection codings to the work of the leading scholars in this field provided me with a robust set of reference code permutations against which my microscopy observation results from the artefacts could be realistically compared.

4.8.3 The Photographic Reference Card (Figure 4-20)

To mitigate any tendency for the assessment criteria to drift over the approximately 12 months required to conduct high-magnification microscope examinations on around 150 artefacts I prepared photomicrograph prints of reference examples of the various codes or grades advanced for each key variable property. These prints were organised onto a set of laminated reference cards which I used for each examination.

Hurcombe acknowledges the problem with coding systems generally in that no matter how carefully a grading structure is constructed in order to differentiate particular categories of wear, the allocation of a specific grade remains the subjective opinion of the observer (Hurcombe, 1992: 35) Even with a single observer throughout, consistency is probably difficult to achieve throughout a lengthy programme of experiments. The skills required to identify outcomes are learned over time and the observer's skill set may well change over the course of the programme. Nevertheless, the intent to systematize and quantify use-wear characteristics has been a significant influence on my methodology. The use of the photographic reference card (

Figure 4-20) enabled me minimise subjectivity and apply the codings devised for my analysis across both the reference collection and over the weeks of artefact examination with consistency.

4.9 Biographies of Use

In my view there is a risk of over-interpretation of use-wear data. Use-wear provides one useful set of findings that require careful integration into a much more extensive body of data before rounded interpretations of occupations, diet, life-ways and culture can be constructed. In order to do this, it is important that some additional factors which may affect the way in which use-wear is produced and appears under high-magnification microscopy are taken into account. There can be no doubt that use-wear analysis can indicate whether a tool was used predominantly in a certain fashion. It can provide evidence of the broad classes of materials the tool was used to work and it can signal the intensity and sometimes the duration of that work. Satisfactory as this may be, on its own it is some way from any understanding of the whole use-biography of the tool or any comprehension of the daily lives and customs of the people who made, used and discarded the artefact.

4.9.1 Hafting

Hafting has the potential to affect the way in which the tool is used. Hafting can assist a user to apply greater pressure or leverage to a tool and can enable it to be used in a specific way. As such hafting may affect the rate, degree and extent of use-wear as well as its location on the artefact. The hafting of a tool may be formal (the creation or fixing of a handle or shaft) or informal (a temporary wrapping in leaves or hide to protect the hand). Evidence for the use of hafting during the life-history of an artefact has the potential to provide important information about the production, curation and utility of an artefact as well as some of the social mediations within which that object participated. The wide variety of ways in which the attachment of a haft can be achieved are described and labelled by both Keeley (1982) and Rots (2010) although it is sufficient for the purpose of this study to note that hafts can be attached by any combinations of friction, binding and some form of mastic fixative (Figure 6-57 and Figure 6-58).

A number of research studies using high-magnification microscopy (e.g. Keeley (1982), Rots (2010), Rots (2003), Kononenko (2011)) have shown that the contact between the tool and the haft leaves distinctive patterns of abrasion and wear marks on the tool surface. The nature of these hafting-marks varies according to the method of hafting and the type of stone used (Rots, 2010: 42). Hafting may also leave microscopic residual traces of any fixative used to bind the haft to the tool (Keeley, 1982: 804; Rots, 2010: 17). As the use of a haft allows greater force to be applied to the tool in use, the tools are either more likely to be broken in use and have very brief use-lives, or they are used more heavily and thus carry more evidence of use-wear. The presence of the haft also protects that part of the stone tool that it covers so that the use-wear only occurs on the unhafted area. The combination of this masking effect and the increased pressure or leverage provided by the haft can result in a marked difference in the visible use-wear between the hafted and unhafted portions of the blade (Rots, 2010: 183).

4.9.2 Taphonomy and Surface Degradation

The fragility and chemical instability of obsidian makes it particularly liable to two forms of taphonomic damage: organic degradation of the surface though the effects of hydration and fungal attack as well as mechanical damage through abrasion, fracturing and trampling (Weber *et al.*, 2002: 351).

The hydration process to which obsidian is susceptible allows alkali and metal ions to be leeched out of the surface and replaced by water molecules from the deposition context or the ambient air (Patel *et al.*, 1998: 1047; Kudriavtsev *et al.*, 2010: 207). This creates a microscopically thin layer of opaque hydrated glass (perlite) on the obsidian surface which gradually increases in depth over time (Patel *et al.*, 1998: 1047). The hydration process facilitates the degradation of the obsidian surface in several ways. The ingress of water molecules causes tensile and compressive stresses within the glass such that structural failures occur within the hydrated surface layers (Anovitz *et al.*, 2008: 1169). In effect thin 'onion skin' layers are successively split away from the surface of the obsidian (Anovitz *et al.*, 2008: 1169). The water also dissolves trace elements from within the chemical structure of the obsidian such that, over time, it both forms masses of opaque bubbles (globulites) of between 0.5 and 5 µm in diameter and also facilitates the growth of opaque crystals out of solution (Lofgren, 1971: 115-117). The combined effect of these processes causes the obsidian to become pitted and progressively less translucent. The absence of translucency is not in itself a deterrent to use-wear identification as striae and surface polish can be identified as they can on opaque minerals such as flint or chert, but the pitting and flaking of the surface does physically remove micro-wear traces from the artefact.

Fungi will attach themselves to the stone surface and cause further deterioration by growing filamentous hyphae which invade and expand small fissures and pits in the surface (Adeyemi and Gadd, 2005: 279). These organisms naturally secrete malic, oxalic and fumaric acids which will etch the surface of the stone (Adeyemi and Gadd, 2005: 273, 277). This chemical erosion can create a dense series of small hemispherical pits scattered unevenly over the surface which obscures evidence of use-wear. (Kononenko, 2008: 36). The complex chemical reactions engendered by the fungi also cause opaque crystals to grow on the surface of the stone (Adeyemi and Gadd, 2005: 273). The small pits etched by the organic acids appear to become filled with dirt and, possibly, plant material which spreads over the surface of the artefact obscuring the obsidian. In some cases, this contamination has a linear distribution such that it appears to be filling patterns of underlying striae.

Within the research sample the patterns of organic surface degradation are quite varied and some have considerably more surface contamination than others. Many of the artefacts had parts of their surface contaminated by a greenish 'bloom', assumed to be fungal, which infilled striae, pits and depressions on their surfaces completely obscuring whatever lay underneath. Each artefact was given a preliminary examination using the low-power binocular microscope to determine the extent of surface contamination, the areas where any contamination was concentrated and whether an attempt at cleaning should be made prior to the detailed examination with the high-magnification microscope. Soil deposits were removed using purified water and a sonic bath. An attempt was made to clean areas of fungal growth by using a 1% solution of Potassium Hydroxide (K OH) in a sonic bath for periods of 10, 20 and 30 minutes. One artefact was left in the cleaning solution for a period of 48 hours to see if an extended period of soaking would remove the surface contamination. However, all of these attempts were unsuccessful. In practice few artefacts were completely obscured by surface degradation and most had some sections that were relatively free of contamination.

The smooth and relatively soft exterior of freshly flaked obsidian is particularly vulnerable to taphonomic degradation (Semenov, 1964: 34). The thin sharp edges of some obsidian blades are especially fragile and prone to fracture. This presents a particular problem as edge scarring and edge rounding are key variables in use-wear identification and analysis. Once discarded obsidian artefacts are exposed to abrasion by trampling or to surface scoring as a result of movement within a deposition context when small stone particles can scratch striae into the surface. While in some cases the taphonomic damage will be so extensive that the pre-deposition surface of the artefact is completely obscured, in practice this is seldom the case and, where mechanical damage does occur it rarely extends to the whole surface of both faces of the object.

There are clear differences in the appearances of systematic use-wear and random taphonomic surface attrition and it is possible to differentiate between these. The striae produced by taphonomy are usually completely random in direction, length, density and type providing a clear contrast with the more regular and consistent appearance of systematic use-wear striae. Tringham *et al.'s* (1974: 192) experiments with trampling were conducted with flint and showed that trampling damage was randomly distributed around the perimeter of the flakes used. A similar pattern can be expected for obsidian. The rolling action of small particles or pebbles across the obsidian surface during trampling or the movement of a deposition context generates characteristic 'crescent row' striations (Figure 4-16) which are not produced by use action (Hurcombe, 1992: 29; Kononenko, 2008: 29). Taphonomic edge damage tends to produce scars which are larger, less regular and which lack the rounding and graded abrasion that derives from sawing, scraping or whittling. Use-wear polishes are often seen as distinct lines parallel to or perpendicular to a working edge rather than randomly scattered. Use-wear usually produces assemblages of attendant evidence with patterns of striae, edge wear and polish that noticeably relate to each other rather than disassociated random patches of attrition. The freshness and irregularity of recent post-depositional or excavation scarring is markedly different from the regular distribution and dulled appearance of patinated use-wear scars. In general, the patterns of use-wear contrast with the more haphazard occurrences of taphonomic damage and can be discriminated. In practice post-depositional damage and surface contamination do result in less than ideal data sets and interpretive work will then have to carry clear caveats. Whereas it is a relatively straightforward matter to differentiate between use-wear and surface damage left by taphonomy, at times the post-deposition damage is so intensive that any use-wear is completely obliterated.

4.9.3 Multiple Usage and Complex Use-Biographies

The application of use-wear evidence should ideally be a systematic polythetic process, drawing on a synthesis of polish, edge damage and striae data to produce an interpretation of how and on what a tool was used (Holley and Del Bene, 1981: 343; Banks, 1996: 26; Hurcombe, 1992: 52). In practice, the micro-wear evidence obtained from stone tools is often complicated by the actualities of their use-lives. The edges employed to create the experimental reference collection are normally applied to a single episode of use consisting of one particular use-mode for a defined period of time on a specific use-material. The stemmed tools undoubtedly had much more complex use-lives. People tend to use useful things more than once and in more than one way. This is especially likely where a substantial amount of time and resources have been invested in producing or hafting a tool (e.g. Burton 1984: 132).

Tools may undergo multiple episodes of use involving different areas of the blade and several use modes. A tool's use-biography may, for example, include time as a prized and maintained treasure, a period as a continuously used edge and later use as a convenient scraper or smoother. Even when a tool is intended for one purpose it may be used in several different actions in carrying out that purpose. A blade intended for making a wooden implement may be used to saw a branch from a tree, lop off leaves and twigs, scrape off the bark and then whittle a point in the end. Each action has the potential to generate a separate set of use-wear key variables which may be located on different parts of the blade or may be superimposed. Tringham *et al.* (1974: 193) point out that edge abrasion is progressive. An edge is more likely to be used on soft materials while it is relatively new, as damage and abrasion arising from heavy use on hard materials would blunt it and retouch would not restore its original sharpness (Tringham *et al.*, 1974: 193). A blade used on hard materials for even a short period would accumulate use-wear and attrition that completely obliterated traces of any earlier use on much softer substances. Each phase of the use-biography is adding to and obscuring previous use-wear evidence. The risk is that data may become biased such that the roles and significance of expedient tools or tools used for short episodes on soft materials is under-represented in the analysis (Hurcombe, 1992: 67). What we see may be the outcome of a short, intense and concluding incident of hard use on tough material. What we may have lost is the prospect of finding evidence for any earlier, less attritional though perhaps culturally important episodes of use.

There are obvious problems for use-wear analysis here in untangling the sequences of use-wear, working out which sections of the tool were used for which purposes and recognising where later episodes have obscured earlier wear traces. Many of the Type 1 stemmed tools are such large blades that different sections of the edges could be used for different episodes of use. Several of the artefacts examined carried evidence of more than one episode of use, often in different modes on a variety of materials. The surfaces of many of the artefacts in the research sample were palimpsests of different use-wear and taphonomic outcomes, such that sorting out any sequences or patterns was difficult. In some cases, it was possible to see that one episode of use-wear clearly overlaid an earlier and dissimilar episode of use–wear. This was apparent, for example, where a pattern of striae could be seen to be running at an angle to and clearly over-cutting another pattern of striae (Figure 4-24). In order to record both episodes I categorised the underlying and thus the earliest use-wear as primary use-wear and the overlying use-wear as secondary use-wear. Other stemmed tools exhibited different patterns of use-wear at disparate locations on the blade with no clear overlap of wear and consequently no indication of which use episode was earliest. In these cases, I have exercised my judgement as to which use-wear evidence is predominant and can be classified as primary and which use-wear traces are present, but represent a minor use event and can be classified as secondary. This data was backed up by photomicrographs which enabled me to discriminate between these two slightly different sets of data at a later stage of interpretation.

Almost all of the artefacts within my research sample have been broken and have sections missing. It may be that some were fractured during use and that this prompted their discard, but the likelihood is that many were broken by taphonomy. The absence of sections of these artefacts is a limiting factor in the interpretation of any use-wear and the construction of any use-biographies of the whole tool. However, working with incomplete artefacts is not exceptional in archaeology and the fact that some artefact sections were missing is regarded as being part of the data set.

4.10 A Means to an End

This use-wear study deliberately builds on the precedents set by previous researchers, who have evolved a methodology which provides a rigour of approach and promotes a consistency of interpretation. In particular, I have drawn on Hurcombe (1992) and Kononenko (2008 & 2011) whose work has predominantly focussed on obsidian and its specific responses to use. However, I have tailored their methodical examination processes and recording systems to suit the specific data that I sought in order to address my own research question and the nature of the Type 1 stemmed tools.

The adoption of a codified data recording system provides a standardised and practical means of evaluating the use-wear seen on the stemmed tools against valid reference sources. This data set made it possible to form reasonable and rational interpretations of the use-biographies of these objects. Those interpretations were developed in the light of both the factors that affect the formation of use-wear, the effects of taphonomy as well as the other risks to the interpretation of the micro-wear observed under high magnification. The development of the use-wear coding and recording system, validated by the photographic reference card that underpins this analysis, is one of the pivotal methodological components of this study and has ensured that the data collected is reliable and fit for purpose.

5. Artefact Morphology and Provenance

Each of the artefacts used in this study is a practical utensil. All are made to the same basic design template. The material that each artefact is made of looks identical to, feels exactly the same as and functions in exactly the same way as that of every other example. A superficial assessment might reasonably conclude that there is nothing about any of these tools that marks them out as being the sort of 'special' objects that carried social signals, denoted status or carried a component of symbolic capital.

Although each of the Type 1 stemmed tools is, or is a portion of, an obsidian prismatic blade with a stem knapped into its proximal end, it is apparent that the Type 1 stemmed tools are not a uniform group and that there are meaningful distinctions between some artefacts within the research sample. The premeditated shaping of the blade of any cutting tool is resolved by the use for which the maker intended it. The design of the stem is likely to be influenced by the nature of any haft planned for it. The people who knapped the Type 1 stemmed tools made clear choices about the final form of each tool and they almost certainly did so with some idea of the ways in which the finished object was to be used. In any investigation of the ways in which these artefacts were employed, variations in the morphology of the objects inevitably form an essential part of the overall interpretation of results.

Binford (1962: 222) and Renfrew (1986: 167) have both made the case that 'special' objects are frequently distinctive and exceptional versions of technomic objects which are differentiated by the extraordinary craft skills required to have made them. That is, 'special' objects can be distinguished by their shape, design and the perceptible traces left by outstanding artisanship. The exceptional craft skills required to produce 'special' things infer an element of craft specialism, almost certainly developed over time, through a learning process and long practice. While specialisation does not inevitably infer standardisation, a process within which items are produced to very consistent standards and tolerances of manufacture, evidence for standardisation is undoubtedly confirmation of specialisation. The stems of the Type 1 tools are the areas of the artefact that have been most intensively and extensively retouched and have received the greatest investment in craft skills. It was clear from the outset that any evidence for specialisation and for the standardisation of the manufacturing process was most likely to be found in the form of the stem.

This chapter opens by first examining the design of the stems before then analysing the blades in terms of both their cross-section and the angle of their working edges. Each of these variables is examined in turn before the relationship between each of the blade attributes and then between blade characteristics and stem types is investigated. The discussion of tool morphology will use the grid system outlined in Chapter 4 to denote specific sections and areas of an artefact.

Another quality characteristic of 'special' objects is that they are often made from raw materials that are exceptional because they have been sourced from some distance away or have been obtained through interpersonal relationships which are themselves highly prized and which endow symbolic capital onto the finished object (Spielmann, 2002: 198). The second section of this chapter analyses the spatial differences between where the artefacts used in this study were found and the locations from which their raw material was obtained. The discussion considers the journeys that some objects had made between being quarried and being finally discarded as worn or broken tools. It sets out to establish whether the artefacts in this sample were only being made and used in the vicinity of the outcrops of the raw material from which they were made or whether some element of movement, transport and perhaps exchange of raw material, pre-formed blade blanks or finished objects took place during the period covered by this study.

The chapter closes by collating these two sets of data; the shape and form of the tools and the spatial patterns of raw materials provenancing and artefact find sites. The aim is to assess whether the ways in which some specific forms of these artefacts were sourced, made, used and discarded provides robust evidence that at least some Type 1 stemmed tools were regarded as 'special' and something other than merely practical utensils.

5.1 Sorting Stems

The shape of the stem of the Type 1 tools was important for two reasons. Firstly, it was conceivable that different stem shapes were intended for attachment to specific types of haft or shaft, or to facilitate different modes of haft attachment. If so, variances in hafting had the potential to demonstrate some relationship with the ways in which the tool had been used. Secondly, as the stem generally represented the area of most extensive and intensive retouch on the tool there was the possibility that the levels of variation in stem types, and within types of similar stems, when correlated with other data would provide evidence of some geographical, stratigraphic or other patterning in stem morphologies. Rath and Torrence (2003: 120, 122) have previously looked at the morphology of stems on a sample of Type 1 stemmed tools and classified these in terms of their shape (ovate, leaf, pear and rectangular) as well as by the extent and invasiveness of the retouch that had been applied to them. However, the assemblage used for this study contains a wider range of stem shapes than the sample reviewed by Rath and Torrence (2003) and some of their separate classifications, such as 'pear' and 'leaf' while visually distinctive, would seem to have presented almost identical hafting potential. Overall the study sample contains 111 stems or identifiable stem sections (36 blades have no identifiable stem sections present) and, after considering marked differences in ways in which the stems had been shaped, these were organised into a typology of five distinct forms (A-E) (Table 5-1) composed of:

5.1.1 Type A Stems

Type A stems are intensively bifacially retouched pear-shaped stems (Figure 5-1). At the junction of stem and blade the obsidian has been removed on either side of the blade in a distinctly curved design, leaving a very narrow and fragile-looking ‘neck’ connecting blade and stem. Of 43 examples within the assemblage, 32 either have the blade missing entirely, or have no more than a small section of blade attached adjacent to the neck. The majority of the Type A stems have been broken across or adjacent to the delicate ‘neck’ formed where the stem narrows at the junction between stem and blade. The three examples which have relatively large sections of blade attached all appear to have stems that are particularly crude examples which are only partially completed.

5.1.2 Type B Stems

Type B stems have no ‘neck’ between blade and the stems and have a broad triangular plan created by tapering the proximal end of the blade using retouch along the blade edges (Figure 5-2). The design is less delicate and requires much less retouch than Type A and the lack of a narrow neck at the junction of blade and stem makes the stem-blade intersection significantly more robust. The 10 robust and less intensively retouched Type B stems all have some blade sections attached.

5.1.3 Type C Stems

These stems are bifacially retouched over most of the surface and are carefully shaped to have a distinct hook or curve at the proximal end (Figure 5-3).

5.1.4 Type D Stems

These stems are characterised by a distinctly rectangular profile. The line of the stem shoulder at the stem-blade junction is much less curved than in Type A stems and runs more perpendicular to the long axis of the blade (Figure 5-4). The stem itself is retouched on the margins of both faces leaving an axial panel of original obsidian surface along the centre. The proximal corners of the stem are also generally right-angled.

5.1.5 Type E Stems

These are tapered stems with a minimum of marginal bifacial retouch and a generally curved proximal end (Figure 5-5). There are no shoulders at the stem-blade junction. They are relatively expediently stemmed.

5.2 Variance and Consistency

While it is possible that at least some of the blades of the artefacts in the sample were struck by specialists and that some standardisation of core preparation and blade-blank manufacture occurred, the stems of these artefacts had the greatest prospect of providing evidence for some degree of standardisation. A statistical analysis was therefore undertaken to establish whether or not any groups of stems within the research sample showed a dimensional or proportional uniformity consistent with standardised manufacture.

5.2.1 Measurement of Stem Dimensions

An accurate evaluation of stem dimensions and proportions was obtained by measuring the length, maximum width and maximum thickness of each artefact in the research sample that had sufficient identifiable stem to be measured. All stems which appeared to be complete were measured for length, some incomplete stems were measured for width and thickness. Measurements were made using a digital micrometre calliper gauge wherever possible and a transparent ruler otherwise. The measurements of width and thickness were taken perpendicular to the long axis of the stem and all measurements are recorded to the nearest millimetre.

Although the measurement of width and thickness can be considered reasonably objective in that the gauge spanned the physical perimeters of the artefact, the measurement of length was more challenging. In some cases, there was a judgement to be made as to where the stem ended and the blade commenced. To be considered complete, and therefore to be measured, a stem was required to have both:

- a proximal end which included either the original platform or, where the platform had been retouched away, had that retouch in place;

  and
- a distal end which had either some portion of blade attached or the inflection point of neck/stem junction was identifiable (please see line A-B on Figure 5-6 to Figure 5-10 inclusive).

While I accept that there is an inevitably subjective component of the stem length measurements, establishing the point on the proximal-distal axis where the stem ended and the blade began was sufficiently accurate for the stem to be clearly distinguished from the blade such that the subsequent measurements of stem maximum width and thickness could be done accurately with a micrometre calliper gauge. As some stems were typologically classifiable but were damaged such that some measurements were not able to be made accurately, there are some minor differences between the overall numbers of stems in Table 5-1 and Table 5-9 and the numbers of stem measurements taken in Table 5-7 to Table 5-10.

5.2.2 Standardisation and the Type A stems

The relative proportions of any artefact are a constituent of its design. The statistical data shows that, in contrast to all of the other stem types, the distinctive Type A stems have design parameters that are consistently maintained within narrow tolerances (Table 5-2 to Table 5-7 inclusive). A comparison between the data for the Type A stems alone (Table 5-2) and the overall data for all stems in the sample set (Table 5-7) shows that the coefficient of variation for each of the three measured dimensions is markedly smaller than for the sample as a whole. That is, the Type A stems are less variable in length, width and thickness than all of the other stem types together. This consistency is even more marked if we compare the Type A stems (Table 5-2) to the whole sample not including the Type A stems (Table 5-8). Comparison with each of the other stem shapes (Table 5-3 to Table 5-6 inclusive) demonstrates that, not only is the dimensional range of the Type A stems markedly more consistent than all of the other stem types as a group, but they are less variable than each of the other individual types (Table 5-9).

It is not only in absolute dimensions that Type A stems are distinctive. While the size of individual examples varies intra-type, their relative dimensions remain very consistent. An analysis of the ratio of width and thickness (the two least subjective and most accurate measurements), shows that with a coefficient of variation of 17.06% the proportions of the Type A stems are markedly less variable than for all of the stems together (35.44%) and for all of the other stems not including the Type A stems (35.89%) (Table 5-10). The degree of consistency in the dimensions of the Type A stems when compared to all of the other stem types, either as separate groups or as a whole, is remarkable. The application of Levene's statistical test of variation (Table 5-11) shows that this homogeneity of variance is unlikely to have occurred randomly. Table 5-11 illustrates that, for all stems taken together, the variation in each of the measured dimensions, length, width and thickness, as well as in all dimensions has a p value which is less than 0.05 (with values of <0.05 being generally accepted as statistically significant). However, when all of the values for the Type A stems are excluded from the test, the variances all have p values of more than 0.05. The consistency in the dimensions of the stems of the Type 1 tools only becomes statistically significant when the Type A stems are included in the sample. The most parsimonious explanation is that it is the Type A stems, and only the Type A stems, that have a statistically significant homogeneity of variation in their lengths, widths and thicknesses. Creating a series of almost identical stone tools with such tightly defined dimensions and proportions must have required considerable skill and production discipline. The making of the Type 1 stemmed tools with Type A stems is the epitome of standardised production.

5.3 A Sharpness of Blades

The cross-section of a prismatic blade has a geometrical effect on the angular acuteness of the blade edges. Whether a blade has a cross-section which is triangular (with a single dorsal arris) or a trapezoid (with two or more roughly parallel dorsal arrises) determines the range of angles that can be produced at the blade edges and hence the sharpness of the resultant 'cutting edges'. The cross-section is governed by the way in which the blade core is trimmed and shaped before the blade blank is struck from it. Rath and Torrence (2003: 120) show that not all of the prismatic blades produced from prepared cores had the required cross-section or width required for stemmed tools and that consequently some blades were discarded. The inference is that blade cross-section mattered to the user and was a deliberate choice made by the manufacturers. In order to factor this variable into the overall analysis of tool use, the cross-section of each blade was recorded whenever blade sections were present or where the blade cross section could be identified from the stem morphology. Of the 147 artefacts in the research assemblage some 101 examples (68.7%)

had identifiable blade cross-sections. Of these, 69 blades are trapezoidal (46.9% of overall research sample) and 34 are triangular (21.7% of overall research sample) in cross section (Table 5-12).

As blade cross-section affects the sharpness of the 'cutting edge' of the blade, it follows that it also has an influence on what a blade could or could not have been used for. Before discussing the 'cutting edge' it is necessary to define exactly what is meant and therefore what was measured and recorded for analysis. The angle at the edge of an unused and un-retouched stone tool, referred to by Hurcombe (1992: 7) as the production angle, is likely to differ significantly from that of the same edge after it has been eroded by wear. While some earlier publications (e.g. Wilmsen 1968) refer to the pre-wear angle as the 'edge-angle' more recent publications refer to this angle as the spine-plane angle. The spine-plane angle measures the angle between the dorsal arris and the ventral surface of the artefact and records the pre-wear angle of the blade's cutting edge rather than the post-wear edge-angle of the artefact (Tringham *et al.*, 1974: 179). Measuring the spine-plane angle provided an evaluation of how sharp each edge was before it was used or retouched.

Wilmsen's (1968: 156) study of Paleo-Indian flint artefacts argued that, while it was not possible to associate a specific function or use of a blade with a range of spine-plane angles, it was possible to infer broad categories of function for certain ranges of spine-plane angle values. Wilmsen (1968: 157) differentiated between acute angles (26^0-35^0) which he argued were used for cutting, angles of 46^0-55^0 which he classifies as optimal for skinning, hide scraping or heavy cutting and larger angles (66^0-75^0) which were often scrapers or tools he associated with woodworking, bone-working, skin softening and heavy shredding. Put simply, he made the practical assertion that the capacity of a tool to perform certain tasks is both constrained and enabled by its spine-plane angle.

Hiscock (1982: 82) advocated caution here, arguing that spine-plane angle was fundamentally an outcome of the properties of the raw material and the mechanics of knapping. He argued that any notion that this angle inevitably equated to function was speculation and that function could only really be determined by use-wear analysis (Hiscock, 1982: 82). Spine-plane angles determine potential uses. Cultural factors and individual preferences influence the actual selection of angles for use (White and Thomas, 1972: 290, 304; White *et al.*, 1977: 385). Nevertheless use-wear analysis on archaeological material from Ertebølle, Ringidoster, Vænget Nord and Ageröd V and on ethnographic material from the Wongkonguru people of eastern South Australia supports the perception that there is a relationship between spine-plane angles and function (Gould *et al.*, 1971: 151, 166-7; Jensen, 1986: 29). Accordingly, as part of the detailed enquiry into the uses and functions of this class of stone tools, it was important to incorporate spine-plane and edge angle data into the overall analysis.

The spine-plane and edge-angles were measured using a hand-held medical goniometer. Used carefully and consistently this instrument was accurate to the nearest 5^0, which was sufficient for my purposes. In practice many of the artefacts in this study had rounded and damaged edges such that, within the measurement accuracy of 5^0, it was practically difficult to distinguish between the edge-angles and the spine-plane angles. In these cases, the edge-angle and the spine-plane angle of an edge are, of necessity, recorded as the same value. A small number of artefacts have very wide angles. Where this characteristic is a production angle, i.e. it is the unretouched angle as struck from the blade blank, I have treated it as the spine-plane angle it is. I will comment separately on those artefacts which have wide edge angles which were produced by retouch or modification.

The distribution charts of both edge angles and spine-plane angles for all artefacts in the sample, for all blades with a trapezoid cross-section and for all blades with a triangular cross-section are shown below as histograms (Figure 5-11 to Figure 5-16 inclusive). As the blades usually had two edges, these are labelled left or right as viewed dorsal side upwards, proximal end towards the observer. In each histogram the blue columns represent the left edge and the red columns represent the right edge.

The results histograms for all artefacts in the sample show that there is no significant difference between the angles on the left edge and those on the right edge of the tools. For both edges the mean spine-plane angle is approximately 36^0 (Figure 5-11) while the mean edge angle is approximately 40^0 (Figure 5-12). The fundamental design of these tools was double-edged with little differentiation between the opposing edges. The data also shows that the majority of tools were made from blades with spine-plane (i.e. production edge) angles of between 20^0 and 40^0. However, while there are no blades with spine-plane angles of less than 20^0 there are a small number of outliers at broad or occasionally obtuse angles with seven left side and one right side spine-plane angles each of over 60^0.

If we consider spine-plane angles by blade cross-section, it is apparent that angles associated with trapezoid blades have a distribution curve that has a primary peak at around 30^0 with a secondary peak at around 60^0 (Figure 5-13 and Figure 5-14). For both edges the mean spine-plane angle is 35^0. Both left and right edges have a wide range of angles, from 20^0 to over 70^0. However, the distribution histograms for triangular blade spine-plane angles are noticeably narrower for both the left and right edges (Figure 5-14). The mean Triangular blade edge angles are both around 32^0 (Figure 5-16) and while both edges have a small number of acute angles at circa 20^0, there is an absence of very wide angles. The maximum angle for both left and right edges is 55^0. There are nine blades with spine-plane angles of at least 60^0 (Table 5-14). In addition, FAP 705, a trapezoid blade, while generally having acute spine-plane angles, has a facet on one edge at 100^0 which would probably have 'run out' well before reaching the tip and is unlikely to have affected the use of the blade as a slicing or sawing implement. Comparison of Figure 5-13 and Figure 5-14 shows that trapezoid blades were produced in a wider range of spine-plane angles than blades of triangular cross section. Both designs can provide acute-angled sharp edges but, for a triangular blade design that is double-edged with broadly similar spine-plane angles on opposing edges, the limitations of geometry mean that naturally wide angles are difficult to attain.

The differences in the range of spine-plane angles between the trapezoid and triangular cross-section blades suggests that there may have been a different range of functions influencing blade manufacturing decisions or some cultural factors affecting selection or both. The differences are not so marked at the more acute end of the angle range (both blade shapes can produce sharp edges) but is more noticeable at the broad end of the range where triangular blades do not afford the very wide spine-plane angles sometimes seen on blades with a trapezoid cross-section. In practice this limitation can be overcome by re-modelling the edge using retouch. Of the ten tools modified by retouch, seven blades or part blades have been heavily re-touched along one or both edges to the extent that edge angles of more than 45^0 have been produced (Table 5-15).

The effect of retouch in generating more obtuse edge angles is evident from the histograms. For trapezoid blades the range of edge angles (Figure 5-15) is both more extensive and more evenly distributed than the range of spine-plane angles (Figure 5-13). For triangular blades the range of spine-plane angles (Figure 5-14) is even more distinct from the range of edge angles (Figure 5-16) with the latter having a secondary peak at circa 80^0.

5.3.1 The Relationships between Stem Types and Blade Cross–section

The form of a stemmed tool imposes practical limitations on the ways in which it can be used. Arguably one characteristic that can enable or limit the range of uses is the cross-section of the blade. Another is the shape of the stem and its potential as an attachment point for different modes of hafting. It is therefore pertinent to consider the relationships between stem types and blade cross-sections in order to identify any patterns between blade cross-sections and stem types in order to establish whether or not there were any conspicuous correlations of these that could enhance the overall interpretation of the ways in which these tools were used and the materials they may have been used upon (Table 5-16).

The Type A stems (n=43) are conspicuous for the absence of blades although where blade sections are present it is notable that all are trapezoid. Although the proportion (26%, n=11) that is available is too small to represent a reasonable sample, it is not inconsistent with the idea of a standardised design. In contrast the most robust of the expediently made stems, Type B, have a roughly even ratio of triangular to trapezoid cross section blades (Table 5-16). I think this implies an absence of selectivity and the practical adaption of any useful blade into a simple hafted tool by the relatively quick process of tapering the platform end.

The ratio of trapezoid to triangular blade cross sections for both Type D and E stems are roughly 2:1 (Table 5-16). This may reflect some degree of preference for trapezoid over triangular blades which may infer some element of specialisation in the range of uses that these tools were intended for. However, this possibility is not supported by the use-wear evidence. Although many of the tools with Types D and E stems had degraded surfaces, the limited amount of use-wear that is available shows that both were mainly used for whittling or sawing moderate hard to very hard materials of varying silica contents.

I am convinced that the distinctive hooked shape of the 21 Type C stems is a deliberate design feature and conjecture that the Type C stem was knapped, perhaps taking advantage of a natural curve in the shape of the blade blank, with a specific function in mind and hence a particular form of haft. Having a curved stem possibly has certain functional advantages. It would, for example, enable a short knife-handle to be attached at an angle to the axis of the blade. Fixing the handle at an angle to the blade axis enables the palm of the hand, and in particular the ‘heel’ of the hand at the base of the thumb, to be used more effectively in a sawing or slicing motion. This same practical design principle informs the shape of modern saw handles. It is notable that 76% of the hooked Type C stems with blades have blades with a trapezoid cross section (Table 5-16). This reinforces the idea that this stem design was intended to produce a composite tool for a specific range of tasks. This interpretation is supported to an extent by the use-wear analysis, discussed in more detail below, which indicates that, although a number of blades (8/19) with Type C stems were too degraded for use-wear analysis, the majority of the type C stemmed tools (8/11) had been used for sawing or slicing moderate hard to very hard materials. That is, they were employed on tasks which required a push–pull action and the application of a certain amount of force.

5.3.2 Exceptions and Outliers

There are a small number of artefacts that exhibit characteristics that are anomalous to the general pattern of Type 1 stemmed tools. Three tools, FAP 442 (Figure 5-17), FAP 759 (Figure 5-18) and FAP 542 (Figure 5-19) have areas of cortex on the blade, which is unusual in terms of the overall research sample, but is consistent with Rath and Torrence’s (2003) description of the manufacturing stages of the prismatic blades from which these tools are fashioned and their observation that a small number of blades were made during the early stages of core preparation (Rath and Torrence, 2003: 121, 123). FAP 442 is a tip, but one which has a strongly concave left edge and an equally convex right edge and the other two examples both have fairly rudimentary expedient stems. In each case these are roughly fashioned blades that may simply represent opportunist re-use of debitage. FAP 783 (Figure 5-20) is similar to these three but is so badly damaged that no assessment is possible. FAP 562 (Figure 5-21) is a section of a large blade, some 79mm wide, which has a small stem retouched asymmetrically onto one edge such that the centre-line of the stem is offset 20^0 to what had been the longitudinal axis of the original blade. This artefact may represent the re-use of a broken blade section as a practice piece (Torrence *et al.*, 2010: 3).

5.4 Space, Place and Movement

'Special' objects are often made from raw materials that, in themselves, have a component of symbolic value because of where they were sourced, the distances they travelled as well as the people and networks through which they were obtained. (Spielmann, 2002: 198; Binford, 1962: 222; Renfrew, 1986: 167). The provenancing of the raw materials used to make the Type 1 stemmed tools has a direct influence on our understanding of their social importance. Rath and Torrence (2003: 126) have already shown that obsidian was not only being used at locations in the vicinity of each raw material source, but that some relatively large and heavy pieces of raw material were being transported as part of a sequenced process of manufacturing. In particular, that obsidian from one source (Kutau/Bao) on the Willaumez Peninsula was being moved to the vicinity of another raw material source on Garua Island (Baki).

There are significantly different cultural inferences to be drawn between obsidian stemmed tools which were made and used only within relatively restricted localities around their specific sources of raw material and tools which were used some distance from their sources in places where alternative supplies of suitable obsidian were already close to hand. The latter would have required complex movements of materials and people, networks for exchange as well as an element of organisation of a manufacturing process that may have drawn in resources from a wider locality (Rath and Torrence, 2003: 126).

New Britain has a number of accessible outcrops of obsidian. In addition nodules of obsidian can be recovered from some secondary sources located away from the outcrops themselves (Specht *et al.*, 1988: 5; Torrence, 2004: 170; Torrence *et al.*, 1992: 89). A comparison of the trace element geochemical composition of the individual artefacts in the research sample, to the known geochemistry of the various obsidian raw material sources on the Willaumez peninsula and Garua Island enabled the movements of obsidian from raw material to discard to be investigated. This analysis looked at the journeys made by each individual artefact and at the broader patterns in the movement of material which might illuminate the networks in which the raw material, part formed blade blanks or finished tools were actants.

The geochemical provenancing of obsidian artefacts is accomplished by identifying the quantities and proportions of a range of chemical elements within artefacts and matching that chemical 'fingerprint' to that of samples taken from obsidian outcrops. For Melanesia the identification process has used one of, and sometimes a combination of techniques including, proton induced X-rays and gamma ray emissions (PIXE-PIGME), portable X-ray fluorescence (PXRF), scanning electron microscope energy-dispersive X-ray spectrometry (SEM-EDX), Laser ablation inductively-coupled plasma mass spectrometry (LA ICP-MS) and instrumental neutron activation analysis (INAA). Of these methods two, PIXE-PIGME and PXRF were used in this study.

5.4.1 PIXE-PIGME Geochemical Analysis

PIXE-PIGME has a high degree of accuracy and compares well with the other available techniques (Bird *et al.*, 1997: 64). The apparatus can be calibrated against element reference values from 23 International Geological Standards, including obsidian standard NBS 278

(Clayton *et al.*, 1987). Geochemical analysis of New Britain obsidian was undertaken using an ANSTO 3 MV Van de Graaff accelerator generating a 2.5 MeV proton beam. A beam current of 300 nA was used with a twelve minute measuring time (Summerhayes and Allen, 1993: 146; Bird *et al.*, 1997: 64). This apparatus was used to measure the concentration levels of a range of elements including:

Fluorine (F), Sodium (Na), Aluminium (Al), Silicon (Si), Potassium (K), Calcium (Ca), Titanium (Ti), Manganese (Mn), Iron (Fe), Rubidium (Rb), Strontium (Sr), Yttrium (Y), Zirconium (Zr) and Niobium (Nb) (Bird *et al.*, 1997: 64).

5.4.2 PXRF Geochemical Analysis

Geochemical analysis of the artefacts in the study sample was undertaken by Robin Torrence, J. Peter White and Sarah Kellaway specifically for this project. They used a Bruker-Tracer III-V instrument (Figure 5-22) with a rhodium tube and a peltier-cooled silicon PIN diode detector, equipped with a filter consisting of 1 mil titanium (Ti),6 mil copper (Cu), and 12 mil Aluminium (Al). The equipment was operated for 180 seconds at 40 kV and 20 μA using the manufacturer recommended settings (Torrence *et al.*, 2013: 293). The instrument was calibrated against known samples from the relevant sources and discrimated the following elements:

Manganese (Mn), Iron (Fe), Galium (Ga), Thorium (Th), Rubidium (Rb), Strontium (Sr), Yttrium (Y), Zirconium (Zr) and Niobium (Nb) (Torrence *et al.*, 2013: 293).

5.4.3 Geochemical Characterisation of the Obsidian Sources

After cleaning to remove surface contamination, PIXE-PIGME was applied to some 194 samples of New Britain obsidian from seven obsidian sources (Figure 5-23) (Bird *et al.*, 1997: 64). In addition two obsidian samples taken from a known reference source (AD 2000 from

Lou Island) were analysed within each batch of 60 New Britain obsidian pieces in order to confirm the continued accuracy of the apparatus (Bird *et al.*, 1997: 62). Concentrations of some 14 elements were measured (Bird *et al.*, 1997: 64). The results of this analysis enabled the obsidian outcrops to be classified into five main chemical groups plus two sub-groups (Bird *et al.*, 1997: 64). These groups of geochemically consistent sources were named for the volcano or volcanoes to which they were most closely located (Figure 5-23)

- Kutau/Bao, a number of outcrops located on the central part of the Willaumez Peninsula;
- Gulu, towards the northern tip of the Willaumez Peninsula;
- Baki, on Garua and Garala Islands;
- Hamilton, on Garua Island;

  and
- Mopir, inland on the Hoskins Peninsula.

The Hamilton source, while physically closest to Baki, is chemically distinct from its near neighbour and is closer to Gulu in its trace element composition (Bird *et al.*, 1997: 64). However, obsidian from Hamilton tends to be of poor quality with a high number of pyrocrysts and, for all practical purposes can be ignored (Torrence *et al.*, 1992: 88, 93-94). There are therefore four obsidian source groups from the Willaumez Peninsula and Garua Island that are relevant to this study: Mopir, Kutau/Bao, Gulu and Baki. All of the flows pre-date the period during which the Type 1 stemmed tools were being made and consequently any changes in the patterns of raw material procurement could not be related to changes in availability of obsidian sources (Torrence *et al.*, 2004: 114).

5.4.4 Geochemical Characterisation of the Research Sample artefacts

As the artefacts in the study assemblage were accumulated from a number of fieldwork expeditions which took place from at least 1972 through to 2010, some artefacts were provenanced using PIXE-PIGME, some by the more recently available PXRF and a few by both methods (Specht, 1981: 337; Torrence *et al.*, 2010). PIXE-PIGME was conducted at ANSTO, Lucas Heights (Summerhayes *et al.*, 1998) while the PXRF analysis was also undertaken at the Australian Museum using methods described in Torrence *et al*. (2013).

Of 147 artfacts, some 31 were sourced using PIXE-PIGME of which 12 were also sourced using PXRF. A very small number of conflicting results occurred in the clutch of artefacts that were analysed by both methods. This issue was resolved by retesting those artefacts and ultimately there are no ambiguous source attributions within the sample. The remaining 101 artefacts were sourced using PXRF alone although a small number of artefacts (15/147, 10%) were overlooked and were not analysed.

5.4.5 Geochemistry Results by Find Site Location

The PIXE-PIGME and PXRF results (Table 5-17) show that of the 132 geochemically sourced artefacts 86 specimens were sourced to the Kutau/Bao obsidian source, nine were made from Gulu obsidian and 37 were provenanced to the Baki source. There are no examples in my sample made from raw material identified as coming from Mopir.

The correlation of find locations and raw material source locations for the research sample shows a distinct pattern of obsidian movement:

- Artefacts made from the most northerly raw material source, Gulu (Figure 5-24) appear both at Voganakai, which is located on the Willaumez Peninsula at an accessible outcrop of Gulu raw material, and also on Garua Island. There is a clear movement of Gulu sourced obsidian southwards and eastwards out to Garua Island.

- Stemmed tools sourced to Kutau/Bao (Figure 5-24) were found at Volupai, just to the east of the Kutau/Bao source, further eastwards at Bitokara (adjacent to an accessible outcrop of Kutau/Bao obsidian), at Numundo on the southeast coast of the Willaumez Peninsula and on Garua Island. There is a distinct movement of Kutau/Bao sourced obsidian southwards and eastwards out to Garua Island.
- Tools sourced to Baki (Figure 5-24) were only recovered from sites on the northeast of Garua Island (FAP, FAR and FSZ). There is no evidence that tools sourced to Baki moved onto the Peninsula.

These tools appear to have been used in the vicinity of a raw material source and in locations to the east and south of a source.

Rath and Torrence (2003: 126) argue that the movement of obsidian raw material from the Willaumez Peninsula to Garua Island took place because Garua Island was a repository of the specialist skills and knowledge required to fashion the more highly worked, most difficult to produce tools. However, the artefacts used in this study show that some blades were being made on the Willaumez Peninsula, including at Bitokara which was undoubtedly a major manufacturing site (Torrence, 1992: 122). Nevertheless, there is no immediate evidence in my sample, of finished Type 1 blades being moved from Garua Island back to the Willaumez Peninsula after the finishing process has taken place, as might be expected if Garua Island was simply acting as a regional manufacturing hub.

A number of hypotheses can be put forward:

- Tools made on Garua Island were being used on Garua Island.

- Finished Tools were being exchanged or transported back to the Willaumez Peninsula, close to their raw material sources but cannot be identified as such.
- Finished Tools were being exchanged off Garua Island, away from the Willaumez Peninsula.
- Some combination of all of these as they are not mutually exclusive.

The Type A stems are the most intensively and extensively retouched artefacts in the research sample. Their style, dimension and proportion make the Type A stems both unmistakeable in appearance and very easy to identify in any archaeological assemblage. All the indications are that localized production of these artefacts took place on Garua Island. It would be rational to expect that the output of such craft-skill would be dispersed through network connections to the individuals that would ultimately use these tools. If the distribution of complete tools with Type A stems included movement from Garua Island back onto the Willaumez Peninsula then we should expect to recognize them, without difficulty, on archaeological sites on the Willaumez Peninsula. What is striking is that I can find no evidence in my sample that tools with Type A stems made on Garua Island from obsidian sourced from Kutau/Bao or Baki were then transported back to areas around the sources of their original raw materials.

5.5 The Geochemistry Data Analysed by Stem Types

The evidence for manufacturing expertise and standardisation generally lies in the stem of the Type 1 artefacts. Although I acknowledge that sample numbers are small, nevertheless it is pertinent to analyse these in terms of their raw material sources and find locations (Table 5-18):

5.5.1 Type A stems

With the exception of three examples from a sample of 43, all of the Type A stemmed artefacts were recovered from Garua Island. They are made from all three of the identified sources although the majority (23/43) are made from Kutau/Bao obsidian. Obsidian from Gulu and Kutau/Bao was clearly flowing eastwards onto Garua to fulfil production requirements. The three exceptions to this pattern are:

- FDC/C/5, not sourced and found at Volupai (Figure 5-25);
- FDC/F/43, sourced to Kutau/Bao and found at Volupai (Figure 5-26); and
- FAAH 035, sourced to Kutau/Bao and found at Numundo (Figure 5-27).

While each shows more affinity to the Type A pattern than to any other stem type, all three examples are on the margins of being included in this typological group. FAAH 035 lacks lateral symmetry, a characteristic which is a feature of the Type A stems. FDC/F/43 has a relatively thick 'neck' and is also notably asymmetric. FDC/C/5 is also asymmetric and appears unfinished. None exhibits the high level of manufacturing skill normally evident in the Type A stems and each is only a marginal inclusion in the Type A stem classification. With these exceptions the overwhelming evidence is that the Type A stems were made on Garua Island from local and imported obsidian, but were not being discarded on the Willaumez Peninsula. They were either being used on Garua Island, exchanged away from Garua and the Peninsula or being returned to Garua as broken stems or some combination of these possibilities.

5.5.2 Type B stems

Of the 12 Type B stems, nine have been sourced to Kutau/Bao, one to Baki and two are unsourced. However, seven of these were recovered from Garua sites. The majority of the

Type B stems are therefore from blades made of Kutau/Bao obsidian that has been moved to and used on Garua Island. The one artefact made from Baki obsidian was recovered from Garua Island. The even proportions of Type B stemmed artefacts made from Kutau/Bao obsidian recovered from Willaumez (5/9) and Garua (4/9) find sites strongly suggest that the tools recovered from Bitokara and Volupai were made locally with local materials and that those recovered from Garua Island, while made of imported obsidian, were made for use on Garua. There is no evidence to support the re-export of finished Type 1 stemmed tools with Type B stems from Garua back to the Willaumez Peninsula

5.5.3 Type C stems

The Type C stem group includes one of the few artefacts used here which has been provenanced to the Gulu source. This artefact (FDM 002) was found at Voganakai, close to where the Gulu source outcrops. The other examples found on the Willaumez Peninsula, at Bitokara and Volupai, have all been sourced to Kutau/Bao. All of the artefacts which have been sourced to Baki were found on Garua Island. With the exception of seven tools sourced to Kutau/Bao and found on Garua Island, all of this group of artefacts were recovered from sites in the vicinity of their raw material source. The seven exceptions do not support the idea that finished goods made from raw materials transported from the Willaumez Peninsula were re-exported back onto the Peninsula.

5.5.4 Type D stems

Type D stems are quite robust with a broad ‘neck’ to the stem. Given the fairly symmetrical square ‘shoulders’ at the stem/blade junction they would have taken some skill to knap evenly. All but two of the 25 Type D stems were found on Garua and all but three came from the north-east part of Garua. They are made from an almost even mix of Kutau/Bao and Baki obsidian. These artefacts were being made on Garua from both local and imported obsidian.

Compared to the other stem types a high proportion (10/22, 46%) of the artefacts with Type D stems in the research sample were made from Baki obsidian, all of which were found at site FAP. This suggests that these were a relatively important form in use on Garua Island itself. The distinct and rugged nature of the stem shape may have related to a specific form of hafting and hence a particular range of uses. These artefacts were mainly being made on Garua Island from both imported Kutau/Bao and local obsidian. However, the evidence also shows that a small number (2/22) had either been made close to the Kutau/Bao source, which outcrops at Bitokara. There is a notional possibly that this design was being made on Garua from Kutau/Bao obsidian and had been re-exported back to the Willaumez Peninsula, but there is insufficient evidence to either prove or refute this. I think it more likely that the two locations simply shared a common design concept for a robust tool with a specific usage.

5.5.5 Type E stems

All of the Type E stems, the most minimally retouched and simply made artefacts, were found relatively close to the sources of their raw materials. Ten of the 14 Type E stem artefacts are Bitokara finds. The four Garua artefacts have been sourced to Baki, while the Bitokara examples, apart from two unsourced tools, are all made from Kutau/Bao obsidian. A reasonable conclusion is that these artefacts are essentially practical hand tools which were being expediently and independently made of materials to hand for local use. They were not transported but were used and discarded in the vicinity of their raw material sources.

5.6 The Geochemistry Data Analysed by Blade Cross-Section

Of the overall research sample of 147 artefacts some 46.8% (n=69) of blades are identifiable as having trapezoid cross-sections and 21.8%) (n=32) blades are identifiable as having triangular cross-sections (Table 5-17). While the sample sizes are acknowledged as being small and therefore need to be treated with care, Table 5-19 indicates that of the 29 blades made from Baki obsidian only 13.7% (n=4) of Baki sourced blades had a triangular cross section while 86.2% (n=25) were made in trapezoid form. This contrasts with the pattern for blades made with Kutau/Bao obsidian in which 59% (n=33 blades) of Kutau/Bao blades had trapezoid cross-sections and 41% (n=22) had triangular cross–sections. This suggests that the pattern of blade manufacture on Garua Island, using local materials, was predominantly aimed at producing blades with trapezoid cross-sections, which, although it is only tenuous evidence, is not inconsistent with the notion that an element of production consistency was prevalent on Garua Island.

While there are no triangular cross-section blades made from Gulu obsidian in the research sample, the overall proportion of identifiable blades made from this raw material source is so small (n=6) that no useful interpretation of this can be made.

5.7 Form, Shape and Place

Type 1 obsidian stemmed tools were in production for a period of circa. 3000 years and the group of 147 artefacts I used was recovered from 19 separate sites. It is perhaps not surprising that this collection does not form a homogenous assemblage of objects made to one inflexible template. The stem design variations together with the blade spine-plane and edge angle evidence all point to the Type 1 stemmed tools as a broad range of different sub-types with a diversity of hafting methods and functional roles. The Type 1 category represents a group of tools which are made using the same general manufacturing stages but ultimately have a variability of finished form, which may reflect a diversity of intended function.

The analysis of edge and spine-plane angles shows that while most Type 1 tools were produced as relatively symmetrical blades with acute spine-plane angles of less than 45^0, a small proportion were clearly designed to have very wide edge-angles. These broad and even obtuse angles at the edge were either deliberately created when striking the blade from the core or, particularly in cases where the blade blank was of triangular cross-section, retouched onto a previously acute edge. This evidence strongly suggests that this group of tools were made specifically to fulfil a particular range of functions that were distinct from those of the other Type 1 tools. In some cases, the use of retouch has not only deliberately produced a wide and sometimes obtuse edge angle but also shaped the point of the tool to the extent it would appear that the narrowness of the point has been deliberately preferred to the sharpness of the edge. This view is supported to some extent by the use-wear evidence, discussed in more detail below, which shows that the majority of these blades were used with an axial motion. However, in many cases the blade tip is missing and therefore the data is incomplete.

While Type 1 stemmed tools were made to the same general template, versions of the general Type 1 design were produced with different forms of stem. These distinctive stem designs can be regarded as two groups. The simpler, less retouched and more expedient types B, D and E contrast with the carefully made Types A and C which would have required a distinctly greater input of both skill and manufacturing time and carried a greater risk of manufacturing failure. It is reasonable to assume that the stems of these tools were intended to provide an anchorage for some form of haft. Consequently, the differences in stem designs may have been determined by intended function and designed to attach to specific haft types in order to produce a range of different tool types such as hand knives, spears or adzes. It is likely that the blade was consciously knapped with the specific purpose of the tool in mind and that the knapper had some idea of not only the general type of haft that would be attached, but also of the type of stem needed to provide the optimal attachment point for it. The rational argument is that different haft types represent different intended use-modes for the blades.

Within this overall assemblage the Type A stems stand out as a sub-type that is statistically differentiated from all of the other groups. The exceptional degree of dimensional and proportional uniformity within the Type A stems and the contrast between this consistency and the more varied data for the other stem types implies that this distinction reflects a difference in the production processes for the different forms of the Type 1 tools, and of the roles that these particular artefacts played in the social and cultural composition of the Mid-Holocene Bismarck Archipelago. The data shows that not only were Type A stems made to a markedly different and more highly-worked design than all of the other stems, but also that this design was executed to a significantly greater degree of manufacturing standardisation. The inference is that two different manufacturing methodologies were taking place. During the whole period covered by this study, individuals were making some bespoke obsidian stemmed tools for their own use or for limited exchanges. These varied in design according to individual agency, raw material constraints and the uses that they were intended for. In addition, for a period within this timespan, some degree of systematic workshop production was established, almost certainly on Garua Island, which produced a standardised version of a Type 1 stemmed tool with a Type A stem and trapezoid cross-section blade.

Specialisation and working to strict dimensional tolerances requires a high level of craft skill. The capability required to form the elaborate Type A stem design makes it likely that a knapper must have undertaken some degree of training in order to become proficient. Specialists acquire expertise and competence through doing the same thing over and over again and that proficiency can be detected in the recovered artefacts. Clear evidence that some element of practising was undertaken was provided by the collection of pieces of waste obsidian with multiple practice notches illustrated by Torrence *et al.,* (2010: 9). The likelihood must be that only a very limited number of craftsmen were involved in making these and that some sort of craft apprenticeship was customary.

A notable aspect of the Type A stemmed artefacts is the absence of blades. Even where some portion of the blade is present it generally consists of small part sections of blade contiguous with the stem. In the few (11/43) cases where a blade section is present it has a trapezoid cross section. Given the likelihood that the proportions of blade to stem for any given stemmed tool falls within fairly narrow parameters (for example that stems generally make up between 20 and 25% of the axial length of a complete stemmed tool) then the markedly similar dimensions of all the Type A stems suggest that all of the missing blades that were once attached to them must also have been of almost identical dimensions and appearance. Furthermore, the majority of the Type A stems appear to have lost their blades after the knapping of the stem was completed. As this stem type is extensively and intricately retouched it might reasonably be expected that these stems had lost their blades during the manufacturing process through end-shock or knapping error. This would indicate that the research sample must be composed almost entirely of manufacturing failures. Since craft specialisation and a high artisan skill level are likely to be reflected in a low rate of manufacturing errors and material wastage, then such a high error rate would militate against the notion that these stems are the product of specialist production. If this were the case, given that virtually all of the final manufacturing process went into the bifacial retouch of the stem, I would have expected that some bladeless, Type A stems would have been found in a clearly unfinished condition. There is only one example (FAP 705 Figure 6-103) which appears to have an incompletely finished stem. It is also improbable that virtually every manufacturing failure would have occurred at the same place on the tool, the junction of the neck and stem.

The existence of such a workshop would provide a plausible explanation for a further anomaly in the research sample. Blades that can be identified as having been broken from Type A stems are conspicuously absent. The presence of the ostensibly completed stems raises questions about the whereabouts of the corresponding blades. Possibilities that I considered are that:

- Having been broken from the stem, the blade still consisted of a useable obsidian cutting tool and could have had a fresh stem knapped out of the proximal end.
- The Blades shattered when the stem was broken off.
- The blades have not been recognised as artefacts and have not been recovered by the archaeological fieldwork teams.
- The blades were broken from the stems at another location and the broken stems then moved to the find sites.

In the case of 1 and 2 above the blades would be very difficult, if not impossible, to identify as having previously been attached to a Type A stem. One clue to a re-working of the stem would be an absence of traces of the original bulb of percussion. I cannot see an example of such re-working in the research sample. I also find it unlikely that these possibilities would encompass every single example and would expect some evidence of the detached blades to be included within my sample. I also doubt that archaeologists have simply not recognised and recovered some of these or that, as distinctive prismatic blades they have been wrongly identified in the finds recording process.

It would make no sense for a tool broken in manufacture at the stem-blade junction to be hafted as a bladeless stem. Any micro-wear evidence, which is discussed in more detail below, that the majority of these artefacts were hafted, must mean that they had been hafted as finished stemmed tools. This, together with the observation that almost all of them are broken at the stem/blade junction, close to the margin of the hafted area, would infer that they were broken while still fixed in their hafts. However, that still leaves questions as to why the broken stems appear to have accumulated in the vicinity of the Malaiol Stream gully.

Rath and Torrence (2003: 121) have already established that obsidian, either as raw material, prepared cores or blade blanks, was being transported from Kutau/Bao, Gulu, Baki and Mopir to Garua Island during the mid-Holocene. Araho *et al.'s* (2002: 74, Table 2) study of stemmed tools and debitage from New Britain reports that, amongst the examples studied, obsidian from Baki sources was only recovered from site locations on Garua Island. Obsidian from all of the Talasea sources, apart from Gulu were found on Garua, including two Type 1 stemmed tools ostensibly sourced to Mopir. Obsidian from Gulu was only found in the vicinity of that source (Araho *et al.*, 2002: 74, Table 2). The small quantity of stemmed tools recovered from Garua Island archaeological sites which were included in Torrence *et al.'s* (2009: 128) report on hammer-dressing decoration were all provenanced to either the Baki or the Kutau/Bao obsidian outcrop clusters. It is clear that some element of networking, within which obsidian raw material was moving, circulating and changing hands, was active in Mid-Holocene New Britain.

The geochemistry characterisation data indicates that this transfer of obsidian was a one-way only movement, whether as raw material, part-formed blanks or finished goods. There is no apparent circulation of obsidian northwards or westwards from each of the sources. In particular, tools manufactured to have Type A stems were made from a range of different raw materials but, with three possible exceptions, have only been recovered from Garua Island sites. There is no evidence in this sample to indicate that the most intensively, skilfully and consistently made tools were exchanged as finished goods back onto the Willaumez Peninsula. The Type A stems were either retained on Garua, returned to Garua for the stems to be discarded or moved outside the Willaumez Peninsula. It is feasible that this movement of obsidian took place because Garua Island was the location of a pool of skill and expertise with the capability of producing the most intensively knapped and adroitly made stemmed tools (Rath and Torrence, 2003: 126).

The most parsimonious interpretation is that Garua Island was the site of a craft manufactory or cluster of workshops within which a small number of specialist workers utilised, and even created a demand for, an in-flow of raw material from all available raw material sources to produce a highly skilled and relatively consistent output. The analysis substantiates the proposition that the standardised production of some stemmed tools, and in particular those with Type A stems, was the outcome of some degree of craft specialisation. The varied and distant sourcing of some raw materials together with the evidence for standardisation of manufacture by craft specialists leaves little doubt that at least some of the Type 1 stemmed tools were being made specifically to be ‘special’ objects. Understanding their role in the societies that made them and the values that may have been attached to them requires some understanding of what happened to them once they had left the workshop.

6. Results of the Microwear Study

Constructing rational use-biographies of the Type 1 stemmed tools relies on developing an understanding of the functions and the social roles played by these objects within the cultural structures of Mid-Holocene New Britain. This entails not only ascertaining how the blades were employed, the materials they were applied to and the intensity of the work done, but also recognising when a blade has been hafted into a composite tool. The functional analysis provided by this use-wear study places those tools into the daily lives of the people who made, hafted, used and discarded them by evaluating three criteria: the direction of the use-action, the hardness of the use materials and the relative silica content of the use-materials. It then uses these to develop a reasoned interpretation of how, on what and by how much each tool was actually used. The objectives of this analysis did not require every individual use-material to be explicitly identified for each artefact in the sample. It was sufficient to identify evidence for categories and modes of use on broad classes of materials. While the way a blade has been used is evident from the direction and location of striae, what it has been used on can be comparatively identified by edge attrition and polish.

This chapter opens by considering the ways in which the blade sections of the tools were used. It sets out the basis for the analysis of use-wear that follows by first establishing the validity of the use-wear reference collection. Details of the micro-wear observed on the edges produced by the controlled use experiments are specified and the method of comparing the use-wear on the stemmed tools to these exemplars is set out. The use-wear on the blades of the Type 1 tools is then analysed by reference to this data. The recognised synergy between form and function requires that any idea of how each stemmed tool was used and what it was used for has to take into account the shape of the object. One consideration for this investigation was whether it was possible to identify specific sub-types of the Type 1 stemmed tools that appeared to have been used only for restricted or specialised purposes. Accordingly, the analysis of the micro-wear observed on the artefact blade sections is organised firstly in terms of blade cross-section and then by Spine-plane angle.

Evidence for hafting was identified by reference to both a set of experimental tools which were used while hafted and to an assemblage of obsidian prismatic blades from the Australian Museum Ethnographic Collection. The hafting wear traces on each of these reference sets is described in turn. Using these exemplars, the micro-wear traces of hafting on the New Britain artefacts are then analysed, firstly with reference to the typology of the stems and secondly, in terms of the morphology of the blades.

Using the system detailed in Chapter 4, the code values for each artefact, experimental tool and Ethnographic Collection blade were recorded on handwritten worksheets. In practice most of the Type 1 stemmed tools were broken and a total of 2875 artefact sections (i.e. sections of tool labelled from the range D1-D18, V1-V18 in accordance with the grid system) were actually available for examination by high-magnification microscopy. The majority of these artefacts had taphonomic degradation to at least part of their surface. The data recorded on the worksheets was then loaded into an Access database which, as it is simply too large to be provided as a printed table, is made available on the computer data storage medium that accompanies this text.

The chapter closes by collating the evidence from both the blade use-wear and the hafting micro-wear as a basis for an overall interpretation of the data produced by the high-magnification examination of each artefact. It will conclude by asserting from the micro-wear evidence that, while many of the stemmed tools were chiefly employed as practical utensils, one distinctive sub-set of artefacts had a role that was not exclusively utilitarian.

6.1 A Wearing of Blades

The working edge of each of the 49 blade reference collection flakes was examined under high-magnification and the use-wear observed was codified, recorded and assembled into a reference table (Table 6-1) which lists the variety of plant and animal materials used in the use-wear experiments. Each extant section of the 147 Type 1 stemmed tools was inspected and the use-wear key variables identified using the high-magnification microscopes were also codified and recorded. The coded results were then assessed against the recordings of the same key variables obtained from the reference experiments. In some cases, recourse was also made to photomicrographs taken from both the stemmed tools and the reference collection in order to strengthen the assessment. The type and nature of the materials that the New Britain artefacts had been used on was then projected by reference to the hardness and silica content of the reference experiment materials. However, there is no attempt to explicitly attribute the wear seen on any tool to any specific species. All that can be said is that an instance of wear on an artefact closely resembles the wear seen on one or more reference examples and that the artefact was most likely used on material with similar hardness and silica content characteristics to the material used in the reference experiments. Table 6-2 contains a detailed narrative interpretation of the use-wear recorded on each of these blades.

6.1.1 Evidence for Use-materials: Hardness

The hardness of the materials on which the stemmed tools were used can be assessed by the extent and patterns of scarring, rounding and abrasion seen on the tool edges. As use-wear is cumulative there is a natural tendency for the effects of use on hard and abrasive materials to obscure the wear traces arising from use on less resilient substances. Many of the Type 1 stemmed tools have evidently had multiple episodes of use or have had edges damaged by taphonomy. FRL 1049, the tip and medial section of a large blade, has axial striae overlying oblique striae along the dorsal left edge (section D3) indicating its use in a sawing action. The microscaring and light rounding suggest that it was used on a moderately hard siliceous material. (Figure 6-1 and Figure 6-2). Similarly, the ventral face of FRL 1054 shows some signs of use on a harder material, having some abrasion and rounding to the edge (Figure 6-3 and Figure 6-4), while FAP 783 has an edge which is distinctly marked by small bending scars which have almost been abraded away by extended use on a hard substance (Figure 6-5 and Figure 6-6). Examples of edges which have been used but which have not been intensively abraded or scarred are scant.

6.1.2 Evidence for Use-materials: Silica content

Areas of micro-polish which are evident on the blade sections of the Type 1 tools in the study sample are taken to be the products of friction between the tool surface and the differing levels of silica present in the cutting action. In many cases silica is contained within the various plant materials the tool has been used on but it can also be generated as debris from the working edge of an obsidian blade as it is abraded during use (Chapter 4) (Fullagar, 1991: 21). The progressive intensification of use-wear is also determined by the length of time the tool is in use and the hardness of the use-materials. Harder materials and longer periods of work are more likely to generate silica detritus from the edges of an obsidian blade. Consequently, the extent and degree of development of polish cannot on its own indicate the level of silica content in use-materials. Any estimation of the silica content of use-materials also has to take into account the amount of edge abrasion and striae evident on the blade. Polish is particularly susceptible to the taphonomic effects of surface degradation and chemical pitting. Nevertheless, as the effects of taphonomy are inconsistent, some areas of even light polish, such as seen on FAR II 002 (Figure 6-7 and Figure 6-8), can be identified. FEK 052, a heavily retouched blade tip has areas of slightly more developed polish on its dorsal face (Figure 6-9 and Figure 6-10). This key variable can be seen even more distinctly on FAP 743 which has an area of developed polish on its dorsal face (Figure 6-11 and Figure 6-12).

6.1.3 Evidence for Use-mode

The use-mode visible on the blades of the artefacts is both recorded for each individual artefact in Table 6-2 and summarized in Table 6-3. The manner in which a tool was used can be identified by the alignment of striae (Semenov, 1964: 88). In many cases several patches of striae could be identified, either overlying earlier traces of use or as separate incidents on different sections of a tool. These are interpreted as indicating multiple episodes of use, in different ways, at various times. The difficulty for the observer lies in deciding what the tool was mainly or primarily used for. In those cases, where there are several incidents of striae, I have sought to identify the earliest (i.e. the lowest layer) or the most extensive striae (i.e. those resulting from the work for which the tool was used to the greatest extent). I have regarded these wear traces as indicating the 'Primary use-mode' of the tool.

Of the 96 artefacts with blade sections present, 25 were too degraded for any micro-wear to be identified and an additional 10 blades had no use-wear visible. The majority of blades (33/61, 54%) had striae which indicated that they had been predominantly used for sawing or slicing (Table 6-3). These are typified by artefacts FAP 229 (Figure 6-13 and Figure 6-14), FAQ 010 (Figure 6-15 and Figure 6-16) and FRL 1053 (Figure 6-17 and Figure 6-18), each of which shows areas of axial striae running parallel with the cutting edges of the respective blades. The moderately dense sleek axial striae in section V7 (Figure 6-13 and Figure 6-14) of FAP 229 are clearly identifiable traces of a sawing action. FAQ 010 has rough-bottomed striae on the dorsal face at V9, (Figure 6-15 and Figure 6-16) which, while also only moderately dense, are deeper and far more distinct. In the case of FRL 1053 (Figure 6-17 and Figure 6-18) the dense, rough-bottomed striae at V12 can be seen to lie beneath patches of surface degradation, a feature that not only indicates that the tool was used in an axial, sawing motion, but also shows that use-wear can sometimes be identified in spite of taphonomy.

Twelve blades carried clear evidence that they had been used as scrapers. Scraping produces striae that run back from the edge, perpendicular to the long axis of the blade. In the cases of FAP 212 (Figure 6-19 and Figure 6-20) and FEK 016 (Figure 6-21 and Figure 6-22), these are seen on the photomicrographs as very short deep striae which are located on and very close to the tool edge. These short deep striae are typical of those produced when applying some pressure to the edge of a blade in order to scrape hard material. FRL 1058 (Figure 6-23 and Figure 6-24) has longer rough-bottomed and sleek striae on the surface of the ventral face of the blade which are more difficult to interpret as only a fragment of the tool remains.

A further 16 blades exhibited the oblique striae characteristic of a whittling action. Artefact FAAL 120, the heavily retouched point of a large blade, provides a clear example of sleek and rough-bottomed oblique striae visible beneath an over layer of deep and probably post depositional scratches (Figure 6-25 and Figure 6-26). FAP 759, a crudely fashioned tool with an area of cortex on the dorsal face has evidence of whittling on the ventral face (Figure 6-27 and Figure 6-28) as does FAP 834 (Figure 6-29 and Figure 6-30), where the dense oblique rough-bottomed and intermittent striae can be seen in spite of taphonomic chemical pitting to the surface.

6.2 Collating the Key Variable Evidence

The interpretations made about the materials on which individual artefacts were used raises a question about the range of use-materials evident in the overall assemblage. It is relevant to ask whether the artefacts had been consistently used for cutting a restricted range of material or whether they were general purpose utensils used for a wide variety of tasks. Analysis was undertaken of those artefacts which had sections of blade extant and which also carried use-wear which indicated both the hardness of the use-materials and its silica content (n=50). This required the ordering of three data streams (hardness, silica content and the number of tools) and is best addressed using ‘bubble’ graphs which, in addition to the usual x and y axes (hardness and silica respectively), indicate the number of artefacts which have the same values for both x and y by the relative area of each ‘bubble’ (e.g. Figure 6-31).

It may be expected that the overall pattern of use-wear on these artefacts would be skewed towards use on harder and more siliceous materials because of the cumulative nature of use-wear. The overall picture of the ranges of materials that these artefacts were used on is entirely consistent with this notion. While one blade (FEK 001) shows evidence that it was used on elastic materials with a nil silica content and a few (13/50) were used on softer matter (with highly varying silica contents), the data shows that, while the tools that comprise this study sample were predominantly used on harder and more siliceous substances, there is no substantive evidence that they were reserved for use on a narrow range of materials.

6.2.1 Analysis of Use-wear on Artefact Blades by Blade Type

The use-wear evidence was analysed by blade cross-section to investigate whether there was any evidence that blade makers had deliberately chosen to make blades of a particular cross-section with the intent of using each type of blade for a different purpose. Four of these blades were damaged such that the blade cross-section was indeterminate.

Use-wear evidence was recorded on 33 blades of trapezoid cross section (Figure 6-33). Only seven of these blades appeared to have been used on soft or moderately soft materials although three blades also showed that the soft material contained moderate to high silica levels. One blade had use-wear consistent with elastic non-siliceous materials, such as skin, while the remaining 30 blades, the clear majority, appeared to have been used on moderate/hard to very hard substances of varying silica contents.

Use-wear is identifiable on 17 blades with triangular cross-section (Figure 6-32). Of these, six blades were employed on soft or moderately soft materials and two of these were used on materials with high silica content. Of the remaining 11 blades which were used on moderate hard through to very hard substances, of a fairly evenly spread range of silica contents. The range of use-materials indicated by the use-wear evidence is much more evenly distributed than for the trapezoid cross-section blades.

There is a slight variance in the range of use-materials that the different types of blade were used on. A greater proportion of the trapezoid blades have evidence of use on hard substances than is the case for triangular blades. The triangular blades appear to have been used on a slightly wider range of materials, with some slight bias towards softer and lower silica substances. However, this difference is not marked or strongly significant. Examples of both types of blade were used on very soft to very hard substances as well as on nil to high silica content matter. There is no indication from the use-wear that a particular blade cross-section was deliberately selected for a specific and specialised range of tasks.

6.2.2 Blades with Spine-plane Angles or Retouched Edge Angles of Greater than 60^0

One aspect of the enquiry into whether some blade shapes were manufactured to be consistently used in a particular manner or upon specific materials concerns artefacts identified as having either large Spine-plane angles or edges which had been retouched to have large edge angles. One possibility was that the large angle was optimised for scraping. The evidence (Table 6-4) shows that only FAR 003 and FEK 016 (Figure 6-21 and Figure 6-22) have micro-wear clearly identified with a scraping action. Four blades, FAP 439, FAP 759 (Figure 6-34 and Figure 6-35), FRL 1056 (Figure 6-36 and Figure 6-37) and FDW 001 (Figure 6-38 and Figure 6-39) had marked edge rounding but do not exhibit the short, deep transverse striae on the edge which are associated with using the edge as a scraper. FDW 001 shows evidence of use for whittling (Figure 6-40), FRL 1056 and FAP 783 were primarily used for slicing and FDC/F/43 for sawing. The use-wear evidence shows that, irrespective of the obtuseness of the angle of the working edge, these tools were used for a range of tasks including sawing or slicing, whittling and scraping. Nor does scraping appear as a dominant task within the range of use-modes. This data, albeit a very small sample, does not support the assertion of Wilmsen (1968: 157) that tools were constrained in their potential for different types of use by their spine-plane or edge angles.

6.2.3 Secondary Use-wear on Blade Sections

The definition given above of 'primary use-wear' infers that some micro-wear evidence has been categorised as 'secondary use-wear' and has not formed part of the analysis thus far. It was clear from observation that some tools carried evidence of more than one episode of use. Different areas of a tool had been used in different ways on different materials or earlier traces clearly lay beneath subsequent wear traces. Secondary use-wear includes wear which is later than and thus overlies primary use-wear or which is a minor feature of the artefact and is distinct from the wear traces of what the tool was for to the greatest extent.

In each case secondary use-wear is identified as striae running at a different alignment to the primary use-wear evidence and in most cases overlying it. This analysis has focussed on the striae in order to interpret the secondary use-mode.

Of the 147 artefacts examined 52 had no blade sections, eight were too degraded to provide data and 72 had no identifiable secondary use-wear. The remaining 15 blades showed signs of more than one use-mode (Table 6-5). For example; FAR II 002 (Figure 6-41 and Figure 6-42) is dominated by axial striae that indicate use in a sawing or slicing mode. Figure 6-42 also shows that this blade has a small but dense patch of deep striae that run almost perpendicular to and overlie those axial striae indicating that at some point, subsequent to the sawing action, the blade was used for a brief period in a completely different way.

The majority (11/15) of these blades have trapezoid cross-section blades. All except two had some stem sections present and where stems were present the majority were Type D stems (7/15). With such a large proportion of the sample unavailable for analysis because blade sections were missing or through surface degradation, no meaningful interpretation of these figures is possible. However, I speculate that the angular design of the Type D stem lends itself to a more robust hafting technique than for other stem designs and may have helped to extend the practical use-life of the tool.

As this wear is secondary I am less confident about using the data from edge scarring, edge rounding and polish as a means of evaluating the hardness and silica content of the materials the tools were used on. Table 6-5 makes no attempt to infer use-materials. It is not possible to determine the time lapse between different episodes of use-wear and indeed there is a strong possibility that the different use episodes are components of the same task.

However, its presence on an artefact does indicate that the tool was used in a flexible and multi-purpose way.

6.2.4 Absence of Use-wear

One significant issue for this analysis was whether any substantive evidence would be found which would demonstrate that at least some of these stemmed tools were made not to be used but rather to be displayed or used entirely as objects to be prized, appreciated and looked after. There are two problems with addressing this question. Firstly, while 14 artefacts, consisting of 149 blade and stem sections, had areas which were both free from surface degradation and had no visible use-wear, only ten of these 14 artefacts exhibit no (or very little) micro-wear over the whole artefact surface (Table 6-6). All of these are incomplete tools. Secondly, use-wear is cumulative and will reflect the aggregate life-history of a tool rather than discrete periods within it (Tringham *et al.*, 1974: 193). It is possible that an artefact initially made for display was later relegated to more mundane and utilitarian tasks, then became damaged, was re- worked and finally discarded underfoot. The use-wear acquired during its final employment is likely to have obscured any evidence of a period in which its role was largely semiotic or symbolic and its function as a practical cutting tool was restricted. My analysis does not provide any reasonable evidence that some stemmed tools were completed but never used as cutting tools.

6.2.5 Analysis of Use-wear on artefact blades by stem type

The manner and purpose for which a blade was used might have been governed by the type of haft that it was fastened to. The design of the stem may, in turn, have been determined by the type of haft it was intended to be secured to. As the possibility exists of a relationship between the shape of the stem and the blade’s intended function, an analysis was undertaken of the relationship of the use-wear evidence on artefact blades to the type of stem.

6.2.6 Type A stems

The 43 Type A stems are characterised by the very high proportion (30/43) which are broken across the stem 'neck' and consequently have no or very little blade present to testify to any use-wear. Of the remaining 13 artefacts in the sample which have Type A stems, three have surfaces which are too degraded for use-wear to be observed. Ten artefacts have blades attached which are sufficiently free of surface degradation for use-wear to be identified; although two of these carry no evidence of any use. Use-wear is identifiable on eight blades (e.g. FAP 433, Figure 6-43 and Figure 6-44) but, as these represent only 19% of the assemblage of Type A stems, caution has to be exercised in drawing any general interpretation from these. The use-wear evidence that is available shows that these blades were consistently used on hard to very hard material with moderate silica content. It also indicates that the use-modes are fairly evenly distributed between slicing, sawing, scraping and whittling. The only suggestion that some blades with Type A stems may have been reserved rather than used lies in the two apparently unused examples, FAP 446 and FAP 756, though each has such a small section of surviving proximal blade remaining attached to the stem that no conclusions can be drawn.

6.2.7 Type B stems

Of the 12 artefacts with Type B stems, seven have surfaces which are too degraded for use-wear to be identified. One blade, FRL 183 has an undegraded surface and appears unused. FDW 001 (Figure 6-38 and Figure 6-39) has use-wear characteristic of sawing and whittling hard materials but no polish is visible on the blade. FAP 562 has wear associated with scraping soft low silica substances and the other two artefacts have wear compatible with hard materials, FAP 255 (Figure 6-107) having been used in a sawing action on low silica substances and FAO 1901 which has evidence of scraping high silica, hard material. The overall assessment is that the use-patterns are generally random.

6.2.8 Type C stems

A total of 19 artefacts were classified as having Type C stems. Eight of these had too much surface degradation for any use-wear to be observed. Three blades, FAP 229, FAP 429 and FDM 002 (Figure 6-45 and Figure 6-46), are all trapezoid blades which show evidence of use in slicing or sawing softer materials. In the case of FAP 229 (Figure 6-47 and Figure 6-48) a band of developed polish on the dorsal arris, located away from the part of the tool which is normally joined to a haft, indicates that these materials contained moderate to high amounts of silica. The remaining eight blades all carry evidence of use on moderate/hard to very hard substances and in the cases of FAP 401 and FQT 039, substances with low or very low silica.

6.2.9 Type D stems

Of 24 Type D stems, 10 had surfaces that were too degraded for any use-wear to be identified. Two artefacts with undegraded surfaces, FAP 283 and FAP 831, both of which have trapezoid blades, exhibit no use-wear and appear to be unused. Two blades, FAP 783 (Figure 6-5), FAP 420 and FEK 109 were evidently mainly used on soft materials (although FAP 783 does have one small area of edge damage at Point 2 (Figure 6-6), but the rest all carry evidence of use on moderate hard to very hard substances, mostly substances with moderate to low silica.

6.2.10 Type E stems

Less than half of the 13 type E stems had blades which were sufficiently free of surface degradation for use-wear to be recorded. Four of the six blades with use-wear, such as FEK

011 (Figure 6-49 and Figure 6-50) for example, were used on moderate/hard to hard materials mainly with very low to moderate silica content. Two examples, FAP 221 and FRL 743 carry evidence that they were used on soft high silica substances.

6.2.11 Use-wear by Stem Type

Reviewing the overall patterns of use in relation to stem types is significantly disrupted by the very high proportion of tools with Type A stems which have no blade. Nevertheless, where blade sections are present the majority of the more formally knapped Type C and Type A stems have blade use-wear evidence consistent with use on harder materials, often containing low silica levels. There is, however, a minority of blades within each of these stem types, that exhibit wear from use on softer and much higher silica content substances. That is, they were not exclusively used for tasks which involved cutting hard and low silica materials. Whereas the use-wear patterns of the Type B stemmed blades was fairly random, the Types D and E blades mainly, but not exclusively, carry use-wear evidence of application to hard and low-silica substances.

6.2.12 The Type 1 Stemmed Tools in Use

Most of the tools with use-wear evidence were used in an axial mode for either sawing or slicing. However, this does not mean that the range of tools was used exclusively in this way. The sample includes blades which have scraping and whittling traces. The Type 1 tools were used to cut and work a variety of materials with characteristics ranging from elastic through soft to very hard and with a full spectrum of silica contents. There is some weighting of the data relating to use-materials towards the harder materials with lower silica content. This observation that the blades were frequently used on hard substances is entirely consistent with Tringham *et al's*. (1974: 193) assertion that use-wear is progressive and that any use on hard materials would be likely to obscure episodes of use on softer materials. There are however, a number of examples which appear to have been used only on soft or moderately soft materials, often materials with a moderate to high silica content, as well as a number of unused artefacts. There is no indication of these tools being reserved for a limited range of specific tasks or used within a special context. However, the absence of blades from the Type A stems is a significant factor in the overall interpretation of blade use. The Type A stemmed blades are the most likely sub-type of stemmed tool to have been reserved for a special or limited range of tasks but the fact that almost all of those blades are missing precludes any further investigation.

Overall, whatever other function these artefacts may have had, the evidence shows that most, though not all by any means, were used for cutting, usually by sawing or whittling, hard, tough but only moderately siliceous plant materials. Plants that have those characteristics and are likely to have been growing in New Britain would include 'Ton' (*Pommetia sp*.) and some varieties of Eucalyptus. That is, their final wear episodes encompassed the normal utilitarian functions of a versatile cutting tool that might be expected in a rural subsistence way of life.

6.3 A Grasp of Hafting

Whether or not a tool was hafted makes a significant difference to its use-biography. Not only does the investment of time and materials involved in hafting add value to the implement but it also both changes the ways in which it can be used and amplifies its effectiveness. An important factor in the interpretation of use-wear and the development of object-biographies is identifying which of the artefacts were hafted when they were in use. The nature of the interface between artefact and haft is profoundly different to that between a working edge and the materials it is used to cut. As a result, the patterns of micro-wear seen using high-magnification microscopy are also fundamentally different.

Rots (2010: 37, 38) asserts that the fragile edges of a stone blade will tend to fracture under the pressure of contact at the locations where a stone tool is hafted. Where the tool is hand-held or held by means of a wrapping the resultant edge scarring will be slight but visible to the naked eye. Where a formal haft is attached the scars are normally larger in size and noticeably more extensive. This is particularly the case where the haft is fixed by some form of binding wrapped tightly around the edge, but the effect can also be seen when the haft is fixed using an adhesive matrix. There is a tendency for even the most tightly fitted hafts to move very slightly under use and this movement causes distinct wear traces on the tool. While Veerle Rots' (2002, 2003 and 2010) work was undertaken with flint, the observations, photomicrographs and interpretations that emanated from this study are argued to be sufficiently applicable to obsidian for this to be a valid reference source for my purposes. Kononenko (2011: 37), working exclusively with New Britain obsidian, reported similar patterns of hafting micro-wear on some of the experimental tools that she had used either informally hafted with leaf wrappings or formally hafted into wooden handles during her extensive series of use-wear experiments. She particularly refers to patches of scarring where the edges of the tools are in contact with the haft binding and to transverse striae running back from the blade edges.

6.3.1 Hafting Wear Evidence on Experimental Tools

There is a marked differentiation between the extent and intensity of hafting micro-wear seen on those tools which had been firmly attached to relative hard and inflexible wooden handles and the much less developed micro-wear observed on those tools which had been hand-held with the aid of some form of soft wrapping. A detailed analysis of the hafting wear summarized in Table 6-7 shows that hafting, and in particular formal hafting in a wooden shaft or helve, generates varying combinations of the following types of wear on the hafted area of the tool:

- contiguous flake and feather scars along the tool edge (Figure 6-51),
- contiguous microscaring on the edges of earlier retouch scars or ridges on the tool surface (Figure 6-52),
- transverse striae, particularly at the hafting margin (Figure 6-53),
- patches of very short, dense rough-bottomed striae running parallel to the direction of working action (Figure 6-54),

  and
- polish on arrises and ridges well away from the working edge of the tool (Figure 6-55).

The experimental reference tools thus provide one set of typical hafting-wear characteristics against which the micro-wear on the research artefacts can be referred.

6.3.2 Hafting Wear Evidence on Ethnographic Collection Artefacts

Obsidian prismatic blades were in use in the islands of the Bismarck Archipelago for a variety of purposes, including spear heads and hand knives, in the post-contact period. There are accounts of blades being exchanged with visitors and tourists from the late eighteenth century up until the 1980s' and museums around the world now hold many hundreds of these items, many of which are or have been hafted (Torrence, 2002: 74, 76; Ohnemus, 1998: 369, 370). It is important to emphasise that there is no evidence for any direct cultural continuity between the people inhabiting the Bismarck Archipelago in the 18th, 19th and 20th centuries and the manufacturers of the Type 1 stemmed tools in the mid-Holocene period. Nevertheless, the same raw material was available to both populations and there are likely to have been similarities in the ways in which it was used, handled and treated. Nine artefacts from the Ethnographic Collection of the Australian Museum (Table 6-8) were used to provide a second series of hafting-wear references. This group consisted of hafted blades, hafts with missing blades and seven examples of blades which were recorded as having been hafted but where the haft had either been lost or had become so loosened that the blades were no longer retained in the haft (Figure 6-56).

There is a significant difference between the ethnographic specimens and the artefacts used in the research. The ethnographic blades do not have a retouched stem (Figure 6-56). As the evidence from both the use-wear and the museum records show that blades of this form were routinely hafted and as the absence of a fully developed stem did not in any way obscure the contact areas between the blade and the haft, this did not seriously detract from the use of these tools as reference examples. Torrence (1993: 472) describes the two principle methods of hafting which were in use in the post-contact period and the Ethnographic Collection provided one example of each (Torrence, 1993: 472):

E 917 (Figure 6-57) is a spear shaft of simple tapered form with a wrapping of fibrous material which has been covered over with similar putty to that on PUN 929.

PUN 929 has a fork or yoke-shaped frame into which the proximal end of the blade sat (Figure 6-58). The blade was held in place by a string binding which was then covered in a form of putty made from the Parinarium nut (*Atuna racemosa*). This putty is naturally red and has been decorated with white paint

The seven Ethnographic Collection obsidian blades, which are recorded as having been acquired from sources in the Admiralty Islands, together with the two New Britain obsidian stemmed tools from archaeological contexts which were known to have been hafted (the blade labelled 'Kandrian' and artefact FRL 150), were examined using the high-magnification microscopes available in the museum. The entire surface of each artefact was examined and the micro-wear observed as recorded as for the research artefacts using the coding and recording system as used on the New Britain stemmed tools. The recorded data is provided in the access database that accompanies this text. The micro-wear on the hafted sections of the artefacts (normally D4-D6 and V4-V6 on the ethnographic examples and D7-D18 and V7-V18 on the two stemmed tools) provides reference examples for evaluating hafting wear traces on the research assemblage (Table 6-9). As these artefacts were part of an important museum cultural collection, surface cleaning was restricted to light brushing and limited spot cleaning with ethanol. However, this was not a significant handicap.

The micro-wear characteristics observed on the hafted sections of the nine ethnographic and archaeological specimens (Table 6-9) are consistent with those recorded on the hafted area of the experimental tools. These consist of:

- contiguous flake and feather scars along the tool edge {A 14158 (Figure 6-59), E 64465, E 200042, 'Kandrian')},
- contiguous microscaring on the edges of earlier retouch scars or ridges on the tool surface,
- transverse striae, particularly at the hafting margin {E 200042 (Figure 6-60) E 64465 (Figure 6-61) E 20043 (Figure 6-62)},
- patches of very short, dense rough-bottomed striae running parallel to the direction of working action {A 14158 (Figure 6-63) E64472 (Figure 6-64){,
- polish on arrises and ridges well away from the working edge of the tool {E 20042 (Figure 6-65}),
- a marked difference in surface texture between the unhafted and formerly hafted areas of the artefact {PUN 930 (Figure 6-66)},

  and
- an abundance of residues {E 64465 (Figure 6-67)}.

These observations are broadly similar to those of Rots (2002, 2003 and 2010) and Kononenko (2011) and the presence of a combination of some or all of these characteristics may be considered *prima facie* evidence that an obsidian blade has been formally hafted at some point in its use-biography.

6.4 An Enlightenment of Brightspots

In addition to the hafting-wear indicators identified above, there is a further surface micro-wear characteristic, the Brightspot, that is particularly associated with hafting. Brightspots (or bright spots) are exceptionally smooth, highly reflective micro-wear surface features which have been seen on flint and chert tools and described by researchers since the mid 1980s' (Keeley, 1982: 804). Obsidian, being naturally glossy and softer than flint, was not expected to develop Brightspots and these had never been reported on obsidian (Semenov, 1964: 15). At the outset of this project it was not anticipated that Brightspots would be a key variable and no provision was made for recording this data. However, during the course of my laboratory work Brightspots were identified on several of the New Britain stemmed tools. This prompted a re-examination of certain artefacts and the collection of additional data. One significant additional finding of this study is that Brightspots do form on obsidian and that they are present on several of the Type 1 stemmed tools.

6.4.1 Brightspots and Hafting

Early research on Brightspots centred on two questions:

1. Are all Brightspots the same, and if not, does this indicate that different types of Brightspots evidenced different formation processes?
2. What were those formation processes and therefore what could Brightspots tell us about the biography of the tool?

The debate centred on whether these features were the result of taphonomy, such as friction between artefacts in the soil or chemical effects, or of human action during manufacture, ownership and use. Levi-Sala (1986: 234) conducted a number of experiments using chemicals and friction on flint which did produce a few Brightspots but generally these were seen as dubious features of uncertain origin (Rots, 2002: 62). Certainly Pawlik (2001: 13) described Brightspots as an outcome of stone on stone contact either during post deposition, or during the tool manufacturing process.

Jensen (1994: 123-129) raised the question as to whether some Brightspots on flint were the result of hafting wear. Rots (2002) conducted a series of experiments on flint specifically to investigate the link between some types of Brightspot and hafting. These experiments established that hafting Brightspots can be distinguished from taphonomically produced Brightspots by their location, distribution and their association with other micro-wear and residues. Three types of hafting Brightspots were classified:

- smooth, flat areas produced by abrasion,
- undulated and, sometimes grooved surfaces produced by friction with antler, and
- rough, dull, areas which may be flat or rippled resulting from friction with resin.

Rots (2002: 63-64) concluded that hafting Brightspots occur on surfaces in direct contact with the haft such as on edges, the tool butt and around the haft limit. These were particularly prevalent on elevated areas such as ridges and the bulb of percussion. Brightspots were chiefly present when the tools were hafted with a hard material in direct contact with the stone surface (Rots, 2002: 66). In addition Brightspots were produced during the process of de-hafting tools that had been hafted using a resin matrix; particularly where the resin had been fractured whilst cold and hard (Rots, 2002: 69). Rots (2002) experimental work established Brightspots as a clear indicator of hafting on flint tools.

In almost every case the Brightspots I have identified are located on the stem area of the tool, on ridges and elevated points such as on the edges of the scars around the former bulb of percussion; see for example:

- FAP 407, Point 7 (Figure 6-68 and Figure 6-69); a large Brightspot located on the dorsal face, at the stem/blade junction;
- FAP 433, Point 6 (Figure 6-70 and Figure 6-71); a large rounded surfaced Brightspot on the ventral face of a Type A stem;

  and
- FAP 400, Point 11 (Figure 6-72 and Figure 6-73); a small but distinct Brightspot on the edge of a large retouch scar on the dorsal face of a Type A stem.

The location and distribution of this wear characteristic strongly indicates that it is a result of friction with a hard haft and/or an association with a hafting resin. In order to test this idea, the hafted areas of the blades from the Ethnographic Collection were carefully re-examined using high-magnification microscopy. No Brightspots were found on the formerly hafted blades from the Admiralty Islands. However, the examination of FRL 150 and 'Kandrian' revealed Brightspots on the hafted area of each artefact which are directly comparable in appearance to those noted on the artefacts in the research sample. This raises the question as why Brightspots are present on these two blades although they have not been found on the Admiralty Islands tools. The seven Admiralty Islands blades are notable for the almost complete lack of use-wear visible on those sections of each blade that were outside of the hafted area (i.e. sections D1-D6/V1-V6). There is no evidence that any force had ever been applied to those blades through the haft or that they had been subjected to a sustained workload. Whilst hafting micro-wear is identifiable it is probable that the blades of these artefacts have not seen significant use and had either been newly manufactured or carefully preserved before they came into the museum collection, or else had been specifically made for tourism.

Brightspots on the stem and proximal areas of the blade of an obsidian tool are asserted to be a diagnostic indication not only that the tool was formally hafted but that the contact area between the haft, any hafting matrix and the surface of the obsidian had been subjected to an element of pressure.

6.4.2 Hafting and the Type 1 Stemmed Tools

Given the skill, effort and time that must have been invested into the process of knapping stems onto these blades it would be reasonable to expect the micro-wear to show that the majority of them had been hafted. Finding sufficient evidence to confirm that blades were hafted is dependent on at least part of the stem and/or some of the proximal sections of the blade being present. These elements were completely missing from 25 artefacts in the sample. Of the remaining 122 tools, 30 had surface degradation in the key locations which prevented any hafting traces being observed. This left 92 examples which had the potential for hafting wear to be identified. Of these, 18 artefacts had sections of the tool present where hafting wear would be expected to be located and were free of surface contamination but showed no signs of hafting. The remaining 74 examples all exhibited hafting traces.

The evidence for hafting differed according to the degree and density of use-wear seen and the extent to which different combinations of key variables were co-present for each individual artefact. There is an inevitable subjectivity in deciding whether or not the evidence is sufficient to support an assertion that any particular artefact was hafted. In order to limit this subjectivity a consistent approach was adopted to evaluate the evidence for each artefact. The prospect that each of the 74 artefacts was formally hafted was graded as either: Certain, Probable or Possible (Table 6-10).

It is important to state that an artefact graded as 'Possible' was judged to have positive traces of hafting wear although this wear may be limited in extent, partially obscured, or the artefact be so damaged and incomplete that correlation between several wear locations was not possible. On FAP 446 (Figure 6-78 and Figure 6-79), for example, there is a distinct if scattered band of transverse intermittent striae across the artefact at the edge of the area which would have been embedded in a haft. FAP 212 (Figure 6-81 and Figure 6-82) has a very rounded area of edge on the dorsal face of the distal stem which also has short transverse striae running across the smoothed surface. FAP 481 (Figure 6-80 and Figure 6-83) is a bladeless Type A stem with a distinct line of well-developed polish running axially along the elevated edge of a retouch scar. This is so distinct and developed that it is most likely the outcome of hafting. Overall 17 Type 1 tools were interpreted as having possibly been hafted.

The 13 artefacts graded as 'Probable' would exhibit more extensive evidence, typically of more than one type of key variable and on more than one location. FAP 429 (Figure 6-84, Figure 6-85 and Figure 6-86) has hafting wear traces at two locations. There are deep transverse striae at the junction of the blade and stem as well as a well-rounded polish area on an edge on the ventral distal area of the stem. Similarly FRL 183 (Figure 6-87, Figure 6-88 and Figure 6-89) has two areas of transverse striae close to the stem/blade junction. The transverse rough-bottomed striae on FAP 214 (Figure 6-90, Figure 6-91 and Figure 6-92), seen at locations V7 and V9, correspond to each other in a way that suggests the line of the haft edge across the ventral face of the tool. FEK 109 (Figure 6-93, Figure 6-94 and Figure

6-95) also has two areas of transverse hafting striae at D7 and on the top of the arris at D8, at points where a haft edge would pass over the dorsal face at the stem/blade junction. FRL 428 (Figure 6-96, Figure 6-97 and Figure 6-98) has hafting evidence on both the dorsal and ventral faces of the same edge (locations D10 and V9) with dense transverse striae and distinct edge rounding at V9.

In several cases the traces of hafting-wear included Brightspots on elevated areas of the stem. For example FAP 261 (Figure 6-99, Figure 6-100, Figure 6-101 and Figure 6-102), a bladeless Type A stem with dense transverse striae visible on the edge of the broken neck of the stem and a Brightspot close to the proximal tip of the stem at V17. FAP 705 (Figure 6-103, Figure 6-104, Figure 6-105 and Figure 6-106) has dense transverse striae at the hafting line, developed polish on the ventral stem edge at V10 and a Brightspot at V12. FAP 255 (Figure 6-107, Figure 6-108, Figure 6-109 and Figure 6-110) exhibits the distinctive contiguous feather scars which are typical of hafting wear on the edge at V7, a band of transverse striae across the ventral stem at V14 and a well-developed polish patch on the top of the dorsal arris in the centre of the stem at D14. FDY 001 (Figure 6-111, Figure 6-112, Figure 6-113 and Figure 6-114), an almost complete tool with noticeable burin type spalls running back from the missing tip, has three separate Brightspots on the dorsal face around the area of the hafting margin. Although FAP 420 (Figure 6-115 and Figure 6-116) has a degraded surface, one Brightspot visible at D18 is convincing evidence of hafting.

The summary of the results of the evaluation of hafting wear evidence provided in Table 6-10 confirms this. Of the 92 artefacts that had the potential to exhibit hafting traces, 74/92, (80%) appear to have been incorporated into some form of composite tool using a formal, fixed hafting method for at least some part of their use-lives. There is no doubt that these tools were provided with a stem with the explicit intention of hafting them.

6.4.3 Hafting and Stem Typology

The hafting evidence was cross-referred to the stem typology (Table 6-11) to investigate whether there was any evidence to indicate that some stem types were formally hafted more often than others and that, as a result, particular functions or specific hafting arrangements informed the maker's choice of stem design.

The data shows that a notably high proportion (31/43, 72%) of Type A stems were hafted. Only four Type A stems appeared to have no traces of hafting wear while eight stems were too degraded for hafting traces to be identified. There seems little doubt that the relatively large prismatic blades onto which Type A stems were knapped were specifically designed to be hafted. Furthermore, the consistency in the design and dimensions of these stems points to a mode of hafting that was sufficiently standardised that the replacement of any broken blades would have been a very straightforward matter. Given both the absence of large mammals (humans apart) and an abundance of obsidian on New Britain in the period in which these tools were being made the reasons why such a maintainable system should be adopted are not clear.

I am wary of drawing comparisons between the Type A stems and the other stem types in view of the data issues arising from small sample sizes and the number of incomplete or degraded artefacts in the sample. However, the evidence indicates that the Type B stems were hafted in at least 50% (6/12) cases and that where hafting evidence is present, it is distinct. This suggests that the hafting was mainly formal with a direct contact rather than prehension or the tool being wrapped before being inserted into the haft. Similarly, the Type C stems were frequently hafted (12/19, 63%) with only two undegraded examples appearing to be free of hafting wear. All of the Type D stems that were hafted (12/24, 50%) provided clear and in most cases (11/12) certain evidence of formal hafting. This includes artefacts

FAP 407 (Figure 6-68 and Figure 6-69) and FAP 424 (Figure 6-117 and Figure 6-118) which carry notable Brightspots on the stem elevations. The small number of Type E stems include nine (10/14, 71%) with hafting wear although six of these were graded as 'possible' which may suggest that some element of wrapping was used or that the use duration was relatively short.

6.4.4 Hafting and Blade Morphology

Care is necessary when considering whether there is any link between blade cross-sections and hafting potential because of the high number of stems with no, or virtually no, blades attached (46/147, 36%) (Table 6-12). Most of the Type A stems are broken across the stem 'neck' and have no blades and, in any case, the majority of the blades (68%) present in the overall sample are trapezoid in cross-section. The data does not indicate any significant relationships between blade morphology and hafting practices with 46% (34/69) of trapezoid cross-section blades and (44% (14/32) of triangular cross-section blades having evidence of hafting wear.

6.4.5 Tools Exhibiting No Hafting Evidence

The 17 tools with surfaces which were not degraded but which showed no hafting wear are tabulated both in terms of their use-mode (Table 6-13) and the hardness of materials they were used upon (Table 6-14). Overall seven blades (41%) were used in a sawing action and five blades (29%) had evidence of use for whittling. The range of stem and blade shapes shows no significant patterns. The lack of hafting wear may testify to those artefacts having been used either as hand tools cushioned in a protective plant or hide wrap, as formally, but indirectly hafted tools (with a wrapping between stone and haft), or as simply having been hafted for a very short episode of use before discard. In the absence of evidence, it is not possible to discriminate between these possibilities.

6.4.6 Hafting and Use-wear: Hafted tools

Of the 74 tools that exhibited hafting traces, six have no apparent use-wear. A further 36 do carry evidence of hafting but no examination of the surface of the blade sections of those artefacts was possible. This was either because the remainder of the tool was either missing (usually because the blade had broken at a point just distally of the stem/blade junction) or they had surfaces that were degraded. The remaining 32 artefacts had evidence of a primary use-mode as shown in Table 6-15. Fifteen of the artefacts with indications of hafting also carried evidence of more than one episode or mode of use. Three of these, FEK 016 (Figure 6-21), FAP 759 (Figure 6-27) and FAP 864 were well worn artefacts that had palimpsests of use-wear over their surfaces and edges.

The range of materials that hafted blades were used to saw, slice, scrape or whittle is expressed graphically (Figure 6-119) and shows that the distribution pattern is skewed towards the higher hardness levels but is fairly evenly distributed with regard to silica content, although there is a noticeable grouping around the soft/high silica area of the chart. There is one hafted tool (FEK 001) which was used to slice elastic material with nil silica and this is shown as a single 'bubble' at the extreme left of the X axis.

6.5 A Condensation on Glass

The use-wear identified using high-magnification microscopy shows that the majority of the Type 1 stemmed tools were used mainly, but not exclusively, in a slicing action or a sawing action on a variety of mainly plant materials. The micro-wear also confirms that, of the artefacts which had stem sections present which were sufficiently free of surface degradation for micro-wear to be identified, most (74/92, 80%) had been formally hafted. The tools were deliberately shaped to be hafted and, in the main, each became a component of a composite tool.

As part of their daily lives people made Type 1 blades to individual style with accessible materials as versatile cutting tools. The use-wear evidence indicates that they were useful, practical implements that were employed in ways which were consistent with general subsistence activities such as clearing vegetation, harvesting or working with timber. With the very limited exception of a few blades with exceptionally large edge angles, whether a blade had a triangular or a trapezoid cross-section does not appear to have a significant difference to the ways in which it was used. Similarly, the shape of its stem seems to have had little bearing on the uses to which a blade was put. There was a tendency for stemmed tools to be used on harder materials, but given that the presence of a haft would have protected the user's hands and enabled them to apply more pressure onto the blade edge, this may simply imply that if the user needed to cut some tough, hard material, their hafted blade would have been the tool of choice. Hafting was applied to all types of Type 1 tool, irrespective of blade cross-section and stem shape, a practice that was extended as far as a rudimentary Type E stem (FAP 220 a Type E stem has a distinct hafting Brightspot on the stem at location D12 (Figure 6-120 and Figure 6-121)).

While hafting a blade makes the resultant composite tool more powerful and more useful, the striking evidence of the artefacts from the Ethnographic Collection is that a knapped tang or stem is not an essential prerequisite for making an effective haft for a spear or dagger (Figure 6-56). The examples from the Ethnographic Collection which have retained their hafts are robust and effective weapons. The methods used to haft a stemmed blade in the mid-Holocene must have been somewhat different from the methods used to haft the blades in the Ethnographic Collection and this may reflect a functional distinction. However, the use-wear provides no evidence that stemmed tool blades were only used to cut a limited or specialised range of materials that might require exceptional force or an augmented haft anchorage. The materials and skills available to the mid-Holocene island populations will have been virtually identical to those available in the post-contact period and it is difficult to envisage any marked differences in the availability of hafting materials that might be resolved by knapping a stem onto a blade. The unmistakeable inference is that the time, skill and risk of breakage involved in the crafting of a tang or stem was functionally unnecessary and that blades could be effectively hafted without undergoing that stage of manufacture.

Although 75% of the 43 Type A stems are broken at roughly the same place, across the 'neck' of the stem, it is clear that these must have been broken after they were hafted. These are not manufacturing failures or discards. They must be used components of composite tools that were broken either during use or by mishap. The most parsimonious explanation is that the blades that were crafted to have Type A stems were replaceable elements of a maintainable tool system. The consistency in the design and dimensions of these stems points to a mode of hafting that was sufficiently standardised that the replacement of any broken blades would have been a very straightforward matter. Given both the absence of large mammals and an abundance of obsidian on New Britain in the period in which these tools were being made, the reasons why such a maintainable system should be adopted are not clear. Moreover, this does not explain why the design of the stems was so carefully and elaborately crafted. It must have been perfectly possible for such highly skilled artisans to design a standardised stemmed blade for a maintainable tool system which was robust, effective and easily replaceable without the necessity to shape the complex internally curved 'shoulders'. It would also have been straightforward to revise the stem design to eliminate the obvious weak point at the 'neck' of the stem. Is it also possible that craft specialists derived social or economic benefit from producing these tools for others to acquire and use? Redesigning the standard stem to be more robust would have led to a reduction in the demand for replacements and a diminution in the role and importance of the craftsmen that supplied them. The regularity and symmetry of the appearance of the Type A stems advertises the high levels of skill and investment of time that went into making them. What is puzzling is that all of these stems would have been buried in the hafts of the composite tools and not normally seen. The possibility remains that the process of knapping the stem was important and that possessing as well as demonstrating the skill needed to knap an effective stem onto an obsidian blade was culturally significant. In which case, the more skilfully knapped stems would have brought the most respect and thus generated an element of symbolic capital.

7. A Biography of Value

Gosden (2008: 2005) argues that value attributed to objects helps to confer value on the people who own and use them, and *vice versa*. The values conferred on people or the values that people assign to things generally do not exist outside of a social context (Binford, 1969: 162-3; Renfrew, 1986: 143; Simmel, 1957; Firth, 1953: 151). Kopytoff (1986: 66) highlighted the way in which the values of objects change and become socially redefined over the course of their use-lives. The aim of identifying evidence for a type of value which is distinct from the worth of something simply as a useful tool is to try and illuminate not only some of the behaviours of the people who made and used these blades, but also some aspects of the social frameworks that underpinned those behaviours.

The case for some Type 1 stemmed tools having social value and symbolic capital is built on the links between ways in which people act in response to cultural and social ideas of value and of what is valuable, and the physical traces of those actions identified in the archaeology. I have argued in Chapter 2 that in many societies social and symbolic value resides in material objects which simultaneously carry a component of social value and operate to signal the symbolic capital of their owners. Many of the artefacts used in this way are 'special' objects distinguished by some aspects of their manufacture; by exotic raw materials, or by exceptional craft work. People are argued to behave differently with respect to these objects than they do to things which may have value derived entirely from practical utility or functionality.

Unequivocal evidence that some Type 1 stemmed tools were treated in ways that showed that their makers and users not only regarded them as having value, but, that a component of that value that was socially determined, must provide a compelling argument for the importance and materialisation of social and symbolic value in a community. The challenge was to find convincing evidence that some of these artefacts were made to be 'special' or had use-lives that showed that they had been regarded as being socially or symbolically important.

The data presented in Chapters 5 and 6 will be used to construct object biographies for a small number of the artefacts within the research sample in order to illustrate how people and objects interact in the creation, transfer and destruction of value. The collation of the results from the high magnification microscopy use-wear analysis together with the morphology and provenancing data shows that some of the Type 1 stemmed tools had aspects of social value and symbolic capital attributed to them at some point in their use-lives. The collation of these different data streams verifies that social and symbolic value was marked by a differentiation in the treatment of each artefact. It is not argued that all of the artefacts in the sample had a value that was other than utilitarian. Nor is it claimed that others only had a social or symbolic significance. I have argued that things can have more than one type of value, either at the same time or at different stages in their use-life. The value of things is conceived of as flexible and changes in both nature and extent. Nevertheless, the evidence for standardised manufacture with its inferences of craft specialisation, the hafting of some blades and the patterns of movement of raw materials all combine to attest that the behaviours of some people in Mid-Holocene New Britain were moderated by ideas that some of the Type 1 stemmed tools carried components of value that were socially and symbolically derived.

The chapter will then go on to discuss the possible links between the individual object biographies and the resulting broader picture about standardisation of design and manufacture, craft specialisation, the role of style in maintaining individual and group identity, and finally, the possible role of both raw materials and of the tools with the distinctive Type A stems in interconnected networks. It will conclude by asserting that the case for some tools in this study sample having social value and symbolic capital is substantiated by a combination of use-wear, artefact morphology and geochemistry.

7.1 Biographies of Objects

The movement of obsidian raw material is an important component of the biographies of stemmed tools. In order to emphasise this and to impose some system on the selection of which artefacts to use as use-life exemplars, I have opted to structure the discussion of the artefacts around the journeys that some artefacts must have made. The geochemical data shows that obsidian was transported generally in an easterly and southerly direction. Accordingly, this exploration of use-biographies will begin with examples from the most westerly and northerly raw material sources and follow the trail of artefacts southwards and eastwards towards Garua Island. The artefacts are grouped together below not because of where they were found or their morphological similarity, but according to the sources of their raw material. The purpose of this grouping is to emphasise some of the differences between those tools made from obsidian that was local to where they were discarded and those which had use-biographies that incorporated movement from distant sources. Within this structure the specific artefacts chosen to have detailed object biographies are not a random or an even selection from the overall research sample. They were selected because they preserved relatively clear use-wear evidence.

7.1.1 Northern Group: Gulu

Sometime during the mid-Holocene, the raw material for artefacts FDM 002, FAP 400 and FAP 705 (Figure 7-1, Figure 7-6 and Figure 7-5) would have been quarried from an outcrop or recovered as water-rolled boulders from a stream bed. Each of these stemmed tools was made from obsidian which has been geochemically identified as coming from the Gulu sources which are located on the north of the central Isthmus region of the Willaumez Peninsula, mainly towards the west and east coasts. From the outset these raw lumps of obsidian would have a value derived both from their potential as a source of tools and from the investment of effort made to procure them. The value inherent in these would be owned by whoever had control of them or of sources from where they were obtained.

These rough nodules would have to be prepared for use by being shaped into cores. This would have required another investment of time, labour and skill into reducing, transforming and adding value to the raw material. First, a relatively flat platform end would be created by the removal of a hemispherical block from one end (Rath and Torrence, 2003: 120-121). Then the core would have been shaped, and, at the same time the cortex removed, by striking off a series of flaked crests and long flakes perpendicular to the platform. This process would have created long ridges running parallel with the long axis of the core (Rath and Torrence, 2003: 120-121). Prismatic blades could now be produced by continuously working around the core striking off blades from the platform until the core was exhausted (Rath and Torrence, 2003: 120-121). Blades from the first circuit of the core are likely to be shorter than blades struck later in the process, but could still have value as useful blades (Rath and Torrence, 2003: 120-121).

FDM 002, a prismatic blade of trapezoid cross-section was found on the surface quite close to the western coast sources of Gulu raw material. As the proportions of what remains suggest that it would have been only about 15 cm in length when complete, FDM 002 may well have been a blade struck from an early circuit of such a core. A further investment of time, labour and skill then added further value. A Type C stem was then knapped at the proximal end. Transverse striae on the proximal area of the blade (Figure 7-2), developed polish on the stem (Figure 7-3) and axial striae in the middle of the ventral face at V8 (Figure 7-4) all testify that the tool was formally hafted, possibly, given the carefully shaped ‘hook’ of the stem, as a hand-knife. FDM 002 became part of a composite tool.

The hafting wear shows that during this phase in its ‘life’ this blade had a value, though there is no evidence that it arose from anything other than its practical utility and the investment put into producing it. At some point the blade broke near the stem, rendering the tool useless. The value of the blade having disappeared, it was discarded close to where the modern village of Voganakai is now located, not far from the obsidian sources. Its haft may have been capable of being re-bladed and as such retained some residual value. The remains of FDM 002 probably lay for many years in the general vicinity of the raw material source from which it was made. Eventually, it was picked up by an archaeologist from the surface, probably in 1974 (the artefact label is not dated) and immediately acquired entirely new sets of value as an artefact, as a piece of evidence and as a museum specimen.

The proportions of FAP 705 (Figure 7-5) and FAP 400 (Figure 7-6) suggest that they would have been made from larger blades than FDM 002, perhaps because they were struck from further into the core. In a further contrast with FDM 002, both were found some 10-20 km distant, as the crow flies, from any sources of the Gulu raw material from which they were made. The close design and dimensional match with other Type A stems infers that FAP 400 was knapped at a workshop on Garua Island. The broadly similar stem of FAP 705 suggests that this also may well have been shaped on Garua Island. Rath and Torrence’s (2003) analysis of debitage from Garua Island shows that obsidian was imported onto the island as prepared cores and blade blanks from Gulu, Kutau/Bao and Mopir sources (Rath and Torrence, 2003: 121). Given the scarcity of cortical debitage flakes of Gulu obsidian on Garua Island and the strong stylistic knapping evidence, it seems virtually certain that the cores that were to produce FAP 705 and FAP 400 were trimmed close to their source locations (Rath and Torrence, 2003: 122). One plausible scenario is that the process of working a core with the aim of producing large blade blanks for Type 1 tools also resulted in some initial blades being struck from these cores that were used locally (as blades similar to FDM 002) but that the larger Type 1 blade blanks struck from further into the core were intended to be taken to Garua Island for finishing.

There are at least four separate skills involved in the production sequence for making these stemmed prismatic blades: (1) the acquisition of the raw material; (2) the preparation of the core; (3) the creation of the blade blanks and then; (4) the knapping of the stem. While it is possible that one person was capable of the whole process, and in the case of FDM 002 this may well be so, the likelihood is that the production of large blades with more highly crafted stems involved separate individuals at each production phase. As Gulu obsidian is accessible on both the west and east coast of the Willaumez Peninsula, transport to Garua Island would have required at least a short sea crossing and the use of watercraft. Moving obsidian from the east coast may well have been undertaken largely by water. Transporting obsidian from the west coast will have involved the portage of heavy stone across the peninsula for some distance to the coast and a waiting canoe. The biographies of FAP 400 and FAP 705 will contain a series of separate steps in the transformation from nodule to finished stemmed tool and the transfer from the raw material source to Garua Island, with the likelihood that each step was undertaken by different individuals. This implies, as Rath and Torrence (2003) have already suggested, that as well as stages of manufacture, use and discard, the biographies of these objects are likely to record a series of human interactions as ownership is transferred, territorial boundaries are crossed and relationships are made or reinforced

(Rath and Torrence, 2003: 126). The making of FAP 400 and FAP 705 is as much a *chaîne opératoire* as it is a production sequence.

We can date at least one of these events with reasonable accuracy. FAP 400, a Type A stem broken at the blade-stem junction, is almost identical in design and dimensions to the stem section of artefact FAP 232 (Figure 7-7). The quality and consistency of the workmanship evident on both artefacts strongly implies that the knapping of these stems was undertaken reasonably contemporaneously and probably within the same workshop. FAP 232, of which more later, was excavated from a stratified context in unit 2b of section G14 about 15cm below the W-K1 tephra layer along the Malaiol Stream on Garua Island. Unit 2a of section G14, above unit 2b, has provided a calibrated AMS ^{14}C date (NZA1570) of 6280-5930 BP. FAP 705 was also found on the surface not far from FAP 400. It shares some stylistic elements with FAP 400 and FAP 232, but is nowhere near as consistently made. However, it is almost certainly made to the same design tradition as these artefacts. Both FAP 400 and FAP 705 were made from obsidian that had been purposely carried onto Garua Island from some distance away. FDM 002 is morphologically different from all of these.

7.1.2 Central Group: Kutau/Bao

Most of the stemmed tools for which we have geochemical data (86/132, 65%) were made from obsidian from the Kutau/Bao sources which are spread across the central part of the Willaumez Peninsula, some way south of the Gulu sources. FDC/F/43 (Figure 7-10) began life as a large blade struck from a nodule of Kutau/Bao obsidian that later had its proximal end fashioned into a version of a Type A stem. The transverse striations on the neck of the stem (Figure 7-10) and a Brightspot (Figure 7-11) on the dorsal arris in the central stem area show that this blade was then formally hafted and probably remained as a component of a composite tool for some time. As such, it experienced a similar biography to FDM 002 and accumulated value through investment and utility in the same way. Only the proximal section of the blade remains attached and it is unusual in being asymmetric, having an exceptionally large left spine-plane angle of 70^0 and a right spine-plane angle of 35^0. The knapping of the stem slightly overlies the left edge of the blade which indicates that the stem was formed on a blade that already had an unusual shape, the left edge of which had limited use potential. Axial striae and an abraded, rounded edge (Figure 7-12) on the ventral face of the blade, well outside the hafted area, indicate that it was used for sawing hard material. Eventually the blade must have shattered as the fractured edge is jagged and the tool was then discarded close to the modern village of Volupai, on the west coast of the Willaumez Peninsula.

FDC/F/43 is one of only three Type A stemmed tools in the sample that were found away from Garua Island. The possibility is that, although a Type A stem, this was not made on Garua Island by a craft specialist from imported obsidian and then transported back to Volupai. It may be that this is a crudely and locally made copy of a specialist–made blade and thus may indicate that a composite tool that incorporated blades with a Type A stem, like the imitation shaft hole axe at Varna, was a desirable object to own and to be seen with (Renfrew, 1986: 149). If so, this hints at a value which is inherent in non-utilitarian aspects of the object such as the design, the provenance of the craftsmanship and the status of the owner.

FDW 001 (Figure 7-13), is the stem and proximal blade remnant of what must have been a relatively large and broad trapezoid blade. Blades of this size and regularity are likely to have come from very large cores that had been trimmed and also had at least one set of smaller blades struck from them. The proximal end of FDW 001 was heavily retouched to form a Type B stem which a large well-developed polish spot on the stem indicates was then formally hafted (Figure 7-14). The investment of time, materials and labour that went into the pre-use preparation of FDW 001 would have added significant value to it. This tool was used extensively in an axial motion on relatively soft and possibly elastic material and later in a whittling, oblique manner (Figure 7-15). It may well have been a practical implement used as a hand knife or spear on fish or meat. Eventually discarded close to what is now Bitokara Mission, it was a surface find made by archaeologists on the 1981 fieldwork expedition.

Close by site FDW the same archaeologists also picked up FDY 001 (Figure 7-16) from the ground surface. FDY 001 is a long, thin triangular blade with an intensively retouched Type B stem. A Brightspot at D8 (Figure 7-17) indicates that it spent some time as a formally hafted tool. The blade surface is badly degraded and little use-wear can be seen. Although the tip has been lost, some eight to ten centimetres of blade remain above the hafted area which would have provided lengths of useful cutting edge. Like FDW 001 a certain amount of effort had been invested in FDY 001 in order to manufacture a useful and thus valuable tool.

There is no immediate evidence that either FDW 001 or FDY 001 carried any value apart from that as well made and practical tools. FDY 001 has lost its tip in a manner that has not only left a very distinct transverse step scar across the blade, but has also resulted in three smaller scars that run distally to proximally back towards the stem, in the manner of a burin. These may be impact fractures and FDY 001 may have been a projectile point that was broken in use. If so, as a spearhead FDY 001 would have carried components of value distinct from those of practical utility. As the tips of long, conspicuous, composite tools spears semiotically signal power, capability and status as hunter or warrior. They required skill to exploit, a good eye and a strong arm together with the courage and determination to use them. The person who carries them is seen to have power in their hands. As Gosden (2008; 2009) points out, there is a two-way interaction between people and things. The social role of such weapons is complex in that the weapon both places the owner into a particular social role but also defines her/him in terms of status, power and symbolic capital. The weapon itself is simply a pointed tool with potential until it is carried, displayed, is identified with owner's marks, and used. Of course weapons have a practical utility value but they also carry a socially mediated value which extends beyond utility.

FRL 1053 (Figure 7-18) is a blade with a triangular cross-section and a minimally retouched Type E stem. The dorsal arris is slightly misaligned which suggests that this blade may represent the expedient use of a piece of core-trimming debitage. The presence of a Brightspot at D14 (Figure 7-19) demonstrates that this blade was probably formally hafted. The edges are very worn and rounded which, together with an abundance of axial striae (Figure 7-20) indicate that it was extensively used for sawing hard materials with a moderate to high silica content: plant fibres such as Black Palm, (Caryota sp.), vines (Calamus sp.) and Bush Callophylum. This was a useful and well used utensil that was discarded when it became worn down and broken.

Similarly, FRL 1050 (Figure 7-21) may represent the intensive practical use of a large, irregular piece of core trimming debitage. It is a broken and irregularly shaped blade with a minimally retouched Type E stem. It is well-worn and has a palimpsest of striae and edge abrasion. An element of utility value had clearly been given to what might otherwise have been the waste product of a manufacturing process. The value of FRL 1053 and FRL 1050 having been exhausted, they were discarded somewhere close to the source of the raw material from which they were made. Both artefacts were excavated from trench T1/C/I; FRL 1053 was recovered from Spit 12, FRL 1050 from Spit 13.

Two further examples, both made from Kutau/Bao raw material were transported over the short sea crossing to Garua Island. FAP 864 (Figure 7-23), which is missing the tip of its blade section, is badly damaged. A huge flake has been lost from the dorsal side at D6 and D9 and the resultant scar has become contiguous with the retouch that shaped the Type D stem. It might be possible to see this as a manufacturing failure were it not for evidence that it was hafted (Figure 7-24) and that its trapezoid blade was used for slicing or sawing moderately hard but not particularly siliceous material such as Mango or Hibiscus wood (Figure 7-22). FAP 864 contrasts in form with FAP 481 (Figure 7-25), an archetypical Type A stem which was found on the surface of the Malaiol stream gully. FAP 481 has been skilfully bifacially retouched into a stem which has been broken, with a hinge fracture, close to the stem/blade junction. This artefact is unmistakably the work of a highly skilled knapper who has not only shaped it so that it is symmetrical about both its length and width axes but, in my view, has added a tiny embellishment as a demonstration of skill. The proximal end of the stem has not only had the platform removed but has been carefully tapered into a point. Not all Type A stems have this point and no other stem shape has it. There does not seem to be any functional imperative for this detail. Furthermore, a line of developed polish along the elevated edge of a retouch scar at D14 (Figure 7-26) and a few very small spots of polish along the line of the break at D10, D11 and D12 all indicate that this stem was hafted. The skilfully made stem with its maker’s flourish would have been entirely concealed within the hafting union of a composite tool.

Arguably FAP 864 was a useful object which would have been valued during its stages of manufacturing and as a practical tool. Certainly there was an investment put into it in terms of its journey from outcrop or stream bed, through the hands of the core makers and blade blank shapers as well as from its source to its disposal some distance away on Garua Island. It may have had a value other than one that was derived from the effort put into it and the work that was done with it, but I have no evidence for this. FAP 481 is different. The morphological and statistical evidence strongly indicates that FAP 481, like FAP 400 and FAP 232 is both a standardised product and the work of a highly skilled, specialist artisan.

7.1.3 Eastern Group: Baki

Utility blades were made and used on Garua Island just as they were on the Willaumez Peninsula. FAP 407 (Figure 7-27), which was collected in 1996 along the Malaiol Stream gully, consists of a large trapezoid blade, missing its tip section, with a rudimentary Type D stem retouched into one end. It was hafted. It has a Brightspot at D10 (Figure 7-30), a line of developed polish on a scar edge at V16 (Figure 7-29) and has dense, axial, rough-bottomed striae on both edges of the blade (Figure 7-28). The presence of well-developed polish on the blade suggests that this well-used tool, made from local material, was used to saw hard, but high silica material such as Caryota sp. or Bamboo. Like most of the other examples in this selection, its value must have mainly lay in its practicality, its utility and the work put into making and hafting it.

FAP 232 which was mentioned in terms of its stratigraphy above (Figure 7-7), and the surface find FAP 270 (Figure 7-31) were, like FAP 407, discarded close to the source of their raw materials. However, both FAP 232 and FAP 270 have much more in common with the Kutau/Bao sourced FAP 481 and the Gulu sourced FAP 400 than they do with FAP 407. All of these artefacts are bifacially retouched Type A stems of very similar dimensions. Each has the tapered point carefully crafted into the proximal end. FAP 270 has a hafting Brightspot on the ‘neck’ of the stem at D10 and D12 (Figure 7-32). FAP 232 has several areas of hafting wear striae and polish, particularly on the dorsal face at D14, D17, V18 (Figure 7-28) and on the fragment of blade still attached at D7. Both FAP 270 and FAP 232 have been hafted and incorporated into a composite tool or weapon. The four Type A stems have broken close to the haft/blade junction, presumably while still fastened into the shaft that held them.

All of the examples I have discussed held value at different stages of their object-biographies. All had time and effort invested into making them and each had a utility which made them worth owning. What is also clear is that the examples from each of the raw material sources, Gulu, Kutau/Bao and Baki, can be divided into those that were found close to their raw material source and those that have been found on Garua Island. While many of the artefacts in the study sample were used and discarded in the near vicinity of the obsidian outcrops from which they were made, others had been transported, probably as trimmed cores or blade preforms, overland and across the narrow strait to Garua Island. In some cases, the distances involved, the social negotiations over territorial boundaries as well as over manufacturing stages or the involvement of an acknowledged artisan would have added to the investment put into them and signified their worth. However, all of this evidence of value can be argued to testify only to their desirability and worth as sharp and practical cutting tools. However, the Type A stemmed blades are an exception to this. These distinct artefacts appear to have possessed more than a singular worth as utilitarian tools and therefore merit further examination.

7.2 Type A Stemmed Blades and Symbolic Value

Artefacts with Type A stems are morphologically differentiated from all of the other artefacts in the research sample by their general shape, the extent, symmetry and regularity of their bifacial retouch and by the consistency in their proportions. The fact that almost all of them are broken in the same place, at the stem/blade junction also distinguishes them from the rest of the sample. While the find site evidence shows that a small number of Type 1 blades with Type A stems were manufactured at disparate locations on the Willaumez Peninsula and Garua Island, the clear majority (40/43) of the Type A stems were found on

Garua Island, with one example having been recovered from Numundo Plantation and two from Volupai.

7.2.1 Standardised Design and Craft Specialism

The statistical evidence corroborates the proposition that the blades with Type A stems were made to a standardised design. From this one can infer that they were the output of one specialist or a group of specialists who worked in sufficiently close physical and temporal proximity to one another that they could work empirically to very close design parameters. It is likely that some form of training or practice was needed before a knapper could consistently produce such accurate and detailed work using only hard-hammer percussion on such brittle material (Araho *et al.*, 2002: 67-68; Torrence *et al.*, 2009: 139). The overall interpretation of the morphological and geochemical data is one of occupational specialisation operating from a workshop production centre on Garua Island which was drawing in raw material from surrounding sources and producing a relatively standard end product.

Costin (1991) asserts that evidence for specialisation provides a very strong signal that a social mechanism which distributed production surpluses in exchange for goods or services was in place to sustain the specialist process (Costin, 1991: 3). In the case of mid-Holocene New Britain, it is unlikely that the presence of occupational specialisation was definite evidence that the society which supported it was socially stratified to the extent of having elites or that an element of patronage supported the craft workers. Production by independent, possibly part-time or seasonal village-level craft specialists is not dependent on or exclusively a consequence of social differentiation, high production outputs or controlled organisation (Allen *et al.*, 1997: 19). Specialisation and standardisation can be linked to efficiency of production. Standardisation of output arguably affords a systemisation of process which in turn proffers the opportunity to separate out the stages of production. People can work more quickly and make fewer errors when working on tasks that they frequently repeat. Lesser skilled workers can concentrate on the less intricate stages of process, leaving the more experienced and more expert artisans to do the finer and riskier work (Torrence, 1986: 44-45). Blumfiel and Earle (1987) assert that specialisation is an expected outcome of factors such as an unequal access to resources, production which is based on craft skills that take some time to learn and perfect, or the potential for significant economies of scale (Blumfiel and Earle, 1987: 5).

The Type A stemmed tools suggest that, for a period of time, a group of accomplished workers became specialist producers of a class of standardised stemmed blades into each of which they invested considerable time, expertise, learned skill and personal dexterity. The overall level of that investment strongly implies that these objects had a social role and a value that was both additional to and distinctive from any value that they may have had as practical tools or utility implements.

7.3 Value and Composite Tools

The investment of effort and skill as well as the acceptance of the risk of failure required to knap a stem into the platform end of the Type 1 stemmed tools strongly suggests that there was intention to incorporate these blades into composite tools by attaching each one to some form of handle, helve or shaft. The use-wear confirms that the majority of these stemmed tools were formally hafted. In reality referring to these artefacts as 'tools' is something of a misnomer; most were constituents of composite tools that would only have functioned effectively once all of the components were correctly assembled (Rots, 2003). The 'tool' was the synergy of the constructed whole rather than just the working head, blade or edge (Zeanah and Elston, 2001: 99).

7.3.1 Cost, Benefit and the Value of Effectiveness

Composite tools work most effectively when all of the components are complete and combined together. The value of any composite tool is thus greater than the sum of its parts. For a blade, edge, point or tip (the head) to be really effective it has to be attached to a haft that is specifically designed to exploit the properties of that head (Bleed, 1986: 738-9). An arrow shaft will not function effectively as an axe handle. A spear shaft would not work as a cooking knife handle. A drill might require a shaft that aids precision. In essence a haft and a head are integrated into a new composite implement that can be re-headed or re-hafted during a long use-life. The tool is neither the haft nor the working head; it is the synthesis of both (Rots, 2010: 9). Weedman's (2006) study of obsidian scrapers from Ethiopia epitomizes this. The tools used to scrape cowhides are unadorned but valued wooden handles into which the owners fit new obsidian blades as and when needed, in a similar way to replacing the worn blade in a modern craft knife (Weedman, 2006: 212).

Keeley's (1982: 800) assertion, that the manufacture and fitting of a haft often requires significantly more time and effort than is used in producing the tool to be hafted, is generally supported by practical replication experiments (Fischer, 1985: 29; Spencer, 1974: 57). Burton's (1984: 122, 126-136) study of axe production in the Highlands of Papua New Guinea showed that around 32 hours of labour were needed to produce the helve for an axe. However, this figure on its own takes no account of the time and energy spent collecting hafting materials or the time spent learning the various skills needed to undertake the work. The ethnographic evidence indicates that in some cultures it was not unusual for haft-making and composite tool assembly to be undertaken by specialist craftsmen, in which case some form of social negotiation is likely to have been a part of the tool-making process (Burton, 1984: 94, 112, 124; Keeley, 1982: 800). Such social investment in production adds value to the tool and its blade.

There is a behavioural ecology view of this outlay in labour and materials. Ugan *et al.* (2003), for example, argue that there is a mathematical relationship between the effort put into producing an artefact and its performance in terms of maximising the energy return from using it. They give as an example a digging stick which costs 10 hours to make but which reduces the time spent digging by 18 hours and thus represents a net return on invested time of 8 hours (Ugan *et al.*, 2003: 1321). Ugan *et al.* (2003: 1321) are correct in their basic premise that adding any sort of haft to a blade, point or flake immediately changes several key performance aspects of the tool. Hafts act to multiply the amount of effectiveness that the implement can generate when used (Bleed, 1986). For the same amount of muscular energy expended, a 30cm haft will enable a stone axe to deliver four times the energy to the point of impact that a similar hand-held axe would supply (Dickson, 1976: 43). Multiplying the effectiveness of an implement is not simply about increasing the delivery of muscular energy. It can also be a function of the degree of control that the user has over the presentation of the active edge or point to the task. An axe or adze is mechanically more effective when used with a helve which presents the cutting edge to the cut surface at a consistent and optimal angle, extends the leverage of the user's arm and acts as an absorber of the shock of impact (Dickson, 1976: 42). A thrusting spear has greater extension than an unhafted blade and a shaft adds a significant aerodynamic effect to a projectile (Rots, 2003: 805; Keeley, 1982: 799). Hafting affects the size of blade that can be manipulated. It determines reach and aids control of the use process (Rousseau, 2004: 9). The composite hafted device is therefore considerably more useful and effective than a simple hand-held tool (Rousseau, 2004: 9). The expenditure of effort and materials required to make the haft, together with the increase in working efficiency arising from using the composite tool, are significant factors in making the hafted tool more useful, more desirable to own and more valuable to its owners. In general, hafted tools will have a component of value that is derived from utility, productivity and cost-effectiveness.

The use-wear analysis shows that, irrespective of either blade cross-section or stem type, the majority (74/92, 80%) of tools in this study sample which had the potential for hafting wear to be identified, had been hafted at some point in their use-lives. The probability is that most of the Type 1 stemmed tools were formally hafted and derived an element of value from their practical effectiveness and utility.

7.3.2 The Social Value of Increased Effectiveness

Evaluating the benefits of hafting solely in terms of productive output is akin to buying a car exclusively on the basis of its fuel consumption. Of course efficiency and effectiveness are factors, but there is considerable evidence that the real benefits of many hafted tools are much more extensive than simply their effectiveness as utensils. Any increase in a tool's performance capabilities is likely to enhance the productive capacity of the owner. In many cultures there is a link between the level of economic contribution that an individual makes and personal status. This affinity is seen in a wide range of subsistence economies and is described in terms of hunting prowess, for example, amid the Alaskan Yup'ik (Frink 2009: 283), the !Kung by Weissner (2002: 416, 418), Ache communities in Paraguay by Hawkes (1991: 32, 39) and cultivators in Melanesia by Bleige-Bird and Smith (2005: 226, 228). A reputation for being a competent and reliable provider of food with the added ability to bring in occasional gluts of meat or grow surpluses for feasting, or to establish reciprocal obligations by sharing can be important factors in gaining social power and preferential access to marriage partners (Hawkes, 1991: 49).

Improving the effectiveness of a tool may have other social effects. It may also create time that can be used for non-subsistence activities including those social, cultural or ritual components of a society that endorse the symbolic capital of its members. The hafted tool may thus immediately acquire more social power than an unhafted blade. I do not suggest that hunting prowess or gardening skill is solely dependent on tools or indeed on whether they are hafted, but I do argue that, in any competition for status and symbolic capital, having the most efficient and productive equipment is a contributing factor and that having the optimum handle, haft, shaft or helve is critical to the effectiveness of any composite tool.

In some circumstances it is not enough to be more efficient, more productive or wealthier. It is also important to signal these standings to the rest of society (Bleige-Bird and Smith, 2005: 224). Items of material culture convey signals about themselves and their competency as well as about the social place of their makers and users. As soon as a haft is added to any head, tip or blade, the resultant composite tool is necessarily larger and heavier than the unhafted tool (Kamminga, 1982: 21). In many cases it is significantly so. A complete spear or arrow is many times longer than its tip. An axe head might be 15-20 cm long, while even a short hatchet is likely to have a shaft length of around 30 cm and a *Dom gaima* axe such as those described by Burton (1984: Figures 6.6 & 6.7, Plate 9.8), might be around 50 cm long (Dickson, 1976: 43). The Admiralty Islands obsidian knives seen in museum collections have effectively been doubled in length by the addition of the knife-handle (Ohnemus, 1998: 350-351). The semiotic statement made by the hafted, composite tool is markedly different to that of the unhafted implement and, as a consequence, so is its value within the society that produces it. The statement that it makes is not only about its practical effectiveness as a tool, but also about the social status of the person who owns and displays it.

Where the hafted implement happens to be a weapon, then additional social and inter-personal considerations also come into play. A weapon is a direct projection of power which may convey ideas of protection, risk management and even the culturally constructed notion of hero status. Weapons also express threat and the risks of conflict or domination. Having a more effective weapon than someone else may have significant social consequences. Having a larger, more powerful looking, dramatically decorated weapon broadcasts signals of power and capability. Given that a single obsidian spear point makes a formidably efficient killing tool, the extravagant multiple-pointed Admiralty Islands spears seen in museum collections appear over-engineered for use as functional weapons (Ohnemus, 1998: 365 (Figure 436), 369 (Figure 438), 370 (Figure 440)). The maker's objective was surely aimed at enhancing the visual declaration made by the artefact and its semiotic capacity to broadcast the symbolic capital and identity of its owner.

The act of carrying a tool, wearing a knife or holding a spear is a component of the visual appearance of a person (Sørensen, 2006: 117). The act makes a statement about the social characteristics of that person; about their traditions, their gender, competence, resources and occupation. The tool, knife or spear becomes an accessory to the construction of identity (Sørensen, 2006: 117). Binford's (1986: 457, 550) account of the making of men's wooden handled quartzite knives among the Alyawara of central Australia reveals elements of identity by artefact. Only men make the morphologically distinctive men's knives and do so as part of a communal and social experience undertaken exclusively at men's camps. The paradox is that these hafted stone tools are made using modern steel axes (Binford, 1986: 550, 553). These stone knives are not obsolete and redundant utensils whose practical function has been usurped by modern technology; they are important symbols of manhood and prowess which semiotically marked the identity, gender and stature of their owners (Binford, 1986: 554).

7.3.3 Ownership and Identity

Hafts can be treasured objects that are cared for and handed on from one generation to another (Rots, 2003: 19; Brandt *et al.*, 1996: 40). The stone head of any hafted tool is likely to have a relatively brief use-life because hafting enables a user to apply additional pressures to a tool which tends to mean that the head frequently requires replacing (Keeley, 1982: 799). Consequently the value of the haft is often greater than that of the stone tool fitted to it and it is the haft that is retained and requires re-tipping, rather than the blade that needs re-hafting (Keeley, 1982: 808; Rots, 2010: 19). The discarded debris of once-hafted tools is regularly found accumulated at archaeological sites, showing not only that these maintenance activities took place away from kill sites, at a rest site or camp, but that the worn lithics had often been transported some distances from their raw material sources (Keeley, 1982: 798,799,802; Binford, 1979: 269-270). There is evidence that replacement heads, blades and points were routinely transported some distance from stone quarries to re-tip valued hafts (Hayden, 1998: 44).

Those who invest their time and labour in constructing and then maintaining composite tools tend to prize and assert personal ownership of their equipment (Binford, 1979: 268-269; Keeley, 1982: 802, 804). Where there are many similar valued objects in use within a community, there is a natural inclination to add owner's marks or distinguishing features to them so that ownership is declared and recognised (Keeley, 1982: 800). Grinnell (1962) notes the importance of ownership marks among Cheyenne warriors who tried to retrieve their arrowheads after hunting or conflict because of the time and effort that went into making them (Grinnell, 1962: 178). Lee (1979: 218) describes a similar practice among the !Kung. People clearly valued their own equipment and sought to differentiate their gear from that of their fellows.

The cost of time and resources in adding a simple identification mark to a composite tool may be justified in behavioural ecology terms by a saving of time or tension in establishing ownership. However, there is a difference between identification marking and adding the sort of elaborate decoration seen on many ethnographic and archaeological examples. The visual impact that hafting a blade makes and the dramatic increase in size afforded by the haft is often deliberately amplified by colour, elaborate shaping or applied decoration (Ohnemus, 1998; Torrence, 2002: 74). There are numerous hafted tools in which time, craftsmanship and a variety of materials has been invested in order to make the object look distinctive to an extent which seems completely disproportionate to any practical need to identify ownership and reduce the chance of loss (for example: Figure 7-33, Figure 7-35, Figure 7-34 and Figure 7-36). None of the elaborate decoration applied to these hafts would seem to have added anything to the working efficiency of the tool. The cost of decorating the object cannot plausibly be justified by any increase in the practical utility value of the tool. The extravagant personalisation of these artefacts can only be explained in terms of some social value. Such hafted tools have a semiotic component that significantly exceeds any functional aspect of simple ownership marking.

7.4 Special Objects

Although hafts have not been preserved it is reasonable to suggest that the amount and quality of work that went into making the blade and its stem would have been matched by the degree of refinement and craft skill applied to this critical part of the finished tool. Given the recognition that hafts are frequently the most important and valued part of any composite tool, stems which are exceptionally well crafted are likely to have been attached to hafts that were also both particularly well-constructed and distinguished by ownership personalisation (Keeley, 1982: 808; Rots, 2010: 19). As complete composite tools, they would have received an overall investment of skill and expertise which would have been consistent with them having a social worth in addition to any utility value.

The intensity of retouch, symmetry and consistency of dimension of the Type A stems, together with the risk of manufacturing failure inherent in the design, differentiates them from the other stems in the research sample. The use-wear evidence, including the Brightspots, on the stems, shows that a large majority (31/43, 72%) of the Type A stemmed tools had been hafted. By comparison with other stem types in the assemblage that also have hafting micro-wear, the amount of work and the increased skill levels which were applied to knapping these stems was considerably more than was necessary to achieve a competent, practical and robust hafting joint. The inference is that these exceptionally crafted stems would have been married to outstandingly well-shaped and probably individually personalised hafts. The complete tools would seem to fit the descriptions and criteria advanced by Binford (1962: 222), Renfrew (1986: 167) and Spielmann (2002: 199-200) for “special” objects as durable, visually distinctive versions of technomic artefacts showing evidence of exceptional skill levels.

7.5 Style and Identity

The process of sorting the Type 1 tools in the research sample into typological divisions by stem shape is essentially one of selection by style. The highly crafted and, sometimes, elaborately finished Type A stems exhibit a consistency of style as well as of dimension and proportion that differentiates them from the each of the other stem types. The design and style of these objects is so distinct that it almost certainly would have identified their place of origin, the group that made them and possibly even the individual artisan. This typological group exhibits the levels of marked internal similarity and external differentiation that Fredericksen (1995: 156) describes as being akin to those of a ‘Trademark’. Artefacts that perform semiotic roles as differentiators of place, group or person and which, in effect, advertise the merits of the society that made them, must carry a component of value distinct from any value derived from their use as practical utensils or from any investment of labour, skill and time in their manufacture. One outcome of the idea of distinct and recognisable material objects acting as identifiers of both the place and the people who made them is that they may become sought after, in the way that Mycenaean stirrup jars or Hajdúsámson–Apa swords became desired possessions, and copied or counterfeited (as is perhaps the case with FDC/F/43) (Vandkilde, 2014: 604; Spataro *et al.*, 2014: 2).

7.6 Maintaining the Value

Type A stemmed blades appear to have been specifically designed to be incorporated into a composite tool such as a spear or knife using a method of hafting which is likely to have bound the stem tightly to the shaft or handle. If during later use the blades broke from the stems those blades would probably have been discarded wherever they fell. The owner then had a possession which was useless as a tool. In addition, as its power and effectiveness had been destroyed, it was impotent as a social signal. To fully restore the tool and the symbolic capital inherent in its ownership, the owner would have to replace the broken blade. There was an abundance of obsidian raw material available and so this work could have been done almost anywhere. If so, the broken stems extracted from the hafts would have been randomly scattered. The archaeological evidence shows that the broken Type A stems were not discarded in a widely dispersed manner. Some 70% (30/43) were recovered from site FAP, on the north east coast of Garua Island. A further 23% (10/43) were picked up a few hundred metres from FAP at nearby site FAR. Rath and Torrence (2003: 122) show that the finishing stages of a production sequence which used both local obsidian and raw material imported from Kutau/Bao, Gulu and Mopir sources took place on Garua Island. One interpretation is that the value of the spear or knife could only have been satisfactorily restored if the broken blade was replaced with a blade made to the same design and skill as the original. This would have required the composite tool, with the broken stem still embedded in the haft union, to be taken back to the knappers who made the original blade. At the work site, the broken stub would have been pulled out of the haft and tossed away. Consequently, the working area would have become surrounded by the discarded stems of tools which had lost their blades somewhere else. Similar patterns of discard of worn or damaged stone tools at raw material resource or replenishment sites are reported and discussed elsewhere (Keeley, 1982: 804; Gramly, 1980: 826, 829; Buchanan, 2002: 141-2; Stevenson, 1985: 67). This process would mean that the composite tool was valued to the extent that the effort involved in returning it to the workshop was more worthwhile than simply throwing the whole thing away and acquiring a new one. It also indicates that, given the relative abundance of obsidian raw material, having a new blade with a Type A stem made at the Garua Island workshop, possibly by a particular artisan, was important.

The Garua Island produced Type A stem must have been valued over and above its utility value for what it was, where it came from and who made it. This is entirely consistent with the relative accumulations of the most standardised stem type, Type A, at sites FAP and FAR. It is also consistent with the observation that almost all of these are broken at the neck of the stem, at a point where the hafted artefact projects from the supporting hafting matrix. This pattern of broken stem disposal reinforces the hypothesis that these stems are the product of a standardised manufacturing process. The recognition that replacement stemmed blades of identical style and dimensions must have been essential to the maintenance of valued composite tools indicates that where these tools were made and by whom added a component of value to them. This value is entirely derived from cultural attributes of the tools and was both additional to and distinct from any utility value that they had as implements.

7.7 Connections and Spheres

The geochemical evidence shows that almost identical stems were being made on Garua Island from local Baki obsidian as well as from obsidian imported from both the Kutau/Bao sources and the more distant Gulu source. People were not only obtaining obsidian nodules to be used for these distinctive artefacts from local sources, but were also receiving a supply line of raw material from at least two different locations on the Willaumez peninsula. Rath and Torrence (2003) have already provided detailed evidence that Kutau/Bao obsidian cores were being trimmed and blade preforms prepared before they were then imported onto Garua island for the final stages of production of some blades to be carried out (Rath and Torrence, 2003: 125). This implies that the ownership of those trimmed cores and blade blanks was also being transferred. That is, the prepared cores and blade blanks were not simply transported to the workshop for work to be done before being returned to distant owners.

This study, taken in isolation, provides no evidence that finished stemmed tools from the Garua Island craft workshop were being redistributed back westwards. There is no suggestion as to what the people of Garua Island may have exchanged for the Gulu and Kutau/Bao material that was was being moved from the Willaumez Peninsula, apart from the clear indication that it was not the distinctive Type A stemmed tools. There is a key question here about the motives for undertaking this labour and the social as well as physical risks involved in the transporting, shipping and hard-hammer knapping of this material. Costin (1991: 4) argues that there is a symbiotic relationship between specialist production and exchange. If so, the movement of obsidian and the transfer of ownership must have formed some part of an exchange. Whether settlement of that exchange was an immediate barter of goods, was deferred or was an exchange for an intangible such as some aspect of symbolic capital. Exchange implies the existence of some form of social network within which relationships between people were established, negotiated and maintained while things of utility, symbolic capital, semiotic importance and value were transacted.

Anthropologists and Behavioural Ecologists have long argued that social networks which involve exchange and reciprocity are ordinarily established as a risk management strategy. For example, Cashdan (1985: 455) argues that while reciprocity may have more than one purpose one of its most important functions is the minimisation of risk and variance in income. Winterhalter (1977: 132), writing of hunter-gatherers, asserts that risk minimisation provides a logical and ecological explanation for the 'ethnographic commonplace' which is manifested as food sharing and social network maintenance. Weissner (1982: 61) points out that establishing social relationships not only means that a dependable insurance against risk is available in the present but, by careful management, those relationships can be passed on to future generations. She lists other potential risk reduction strategies such as storage, prevention of loss and the transfer of risk to another individual, but argues that these options are generally not available to forager societies and that the social method of hedging risk through what is a 'storage of social obligations' distributes that risk over a much wider and more varied entity than the immediate social band (Weissner, 1982: 65). Within the Bismarck Archipelago it was arguably the networks themselves that were important and the stemmed tools operated as actants in the process of maintaining them.

Mid-Holocene New Britain must have been an exceptionally demanding environment in which to live. The population would have not only had weather and climatic risks such as cyclones to withstand (e.g. Torrence *et al.,* 2009: 528) but the effects of volcanism to endure. Torrence and Doelman (2007: 52-53) have described the artefactual evidence that social networks existed on New Britain before the W-K1 eruption and argued that these networks may have provided a refuge and later facilitated the process of recolonisation of the devastated landscape. In order to provide an effective refuge, at least some element of such a network would have needed to be located far enough from the Willaumez Peninsula and Garua Island to escape the effects of a major eruption of the proximate volcanoes. Establishing network relationships with the inhabitants of other islands would seem to be a rational way of achieving this for people living in an archipelago. The geochemical evidence from New Ireland which shows that obsidian was being moved some 400 km by sea from the Willaumez Peninsula to other parts of the southern and eastern Bismarck Archipelago by at least 20000 BP verifies that the people of mid-Holocene New Britain clearly had the maritime competence to have established and maintained such remote connections (Summerhayes and Allen, 1993: 113). Ethnographic evidence indicates that in many such social networks, the exchanges of the symbolic capital that underlie the network are concurrent with the movement of specific material objects, such as *Gimwali,* the Fijian whale's teeth *Tabua* or stone axe heads (Malinowski, 1920: 105; Gosden and Marshall, 1999: 170; Bradley and Edmonds, 1993: 162-3). The highly wrought, distinctive and standardised 'special' objects produced by a high quality workshop would have been ideally suited for such a social role.

Within the wider networks of mid-Holocene New Britain, there appear to have been separate spheres of circulation. One sphere incorporates the movement of and exchange for obsidian in the form of trimmed cores and blade blanks from the Willaumez Peninsula and has a node on Garua Island. Another sphere which shares the same Garua Island network node, transferred and, presumably, exchanged the products of the specialist knappers away from the production site. The present absence of any further evidence opens the intriguing question as to where the Type 1 stemmed tools with the distinctive Type A stems, or the composite tools into which they had been incorporated, were being moved to.

7.8 An Image of Value

There is no one separate strand of evidence that unequivocally demonstrates that at least some of the Type 1 obsidian stemmed tools from West New Britain were valued in a way that was not simply a reflection of their usefulness as tools or of the effort required to make them or replace them. Instead, this argument has required the combination of the key findings of each of three separate data streams; the artefact morphology, the geochemistry and the use-wear, to show that some Mid-Holocene New Britains behaved in ways that signified that some of the Type 1 stemmed tools must have had a social or symbolic value. The geochemical confirmation of the movement of raw material, when integrated with evidence for the standardised production of a conspicuously styled sub-group of artefacts (the Type A stemmed tools), by a group of expert and specialist craftspeople shows that people were expending labour, time and imported obsidian in an effort to produce some of these stemmed tools to a level of consistency and precision that was disproportionate to any utility value they may have had.

The use-wear evidence recorded from the blades of the Type 1 stemmed tools shows that the majority of them were used for sawing the sorts of hard, tough but moderately siliceous plant materials that would have been used as part of daily subsistence activities in mid-Holocene New Britain. This evidence might be held to weigh against any idea that some of the stemmed tools were 'special' objects that might have been reserved for particular purposes. There are two problems with this notion. Firstly, 'special' objects may have been used in a practical way within ceremonial contexts. Kononenko *et al.* (2015: 267) for example, point out that some ceremonies or rites may have needed ritual equipment such as masks or vessels that could only be made using tools reserved for that purpose. Spielmann (1998: 155) argues that the links between power and ritual among the northwest coast Native Americans were manipulated by chiefs who controlled access to those stone tools which were solely dedicated to carving. The second problem is that the Type 1 stemmed tools most likely to have been 'special' objects (i.e. those with Type A stems), are conspicuous for the absence of blades. There is insufficient evidence in the artefact assemblage used for this issue to be properly investigated.

The evidence of the hafting use-wear strongly infers that the Type A stemmed blades were sought after to the extent that replacing broken examples with almost identical products of the same workshop as the original was important. These distinctive tools both identified their origins by style and performed as connecting actants in components of social and exchange network establishment and maintenance. The evidence of this study and of other researchers is that in the 3000 years or so prior to onset of the Lapita Cultural Complex a web of social networks thrived in the Bismarck Archipelago (Torrence and Swadling, 2008: 612-614; Rath and Torrence, 2003: 216)

These distinctive Type A stems not only conveyed value through the investment of effort put into producing them and the practical utility derived from them, but, simultaneously, they provided overwhelming evidence for the existence of concepts of value that were social and symbolic; that were predicated in ideas of group and personal identity, social relationships, status and symbolic capital. This high-magnification microscopy use-wear study has provided compelling evidence that some Type 1 obsidian stemmed tools were valued for reasons that were socially or symbolically determined.

8. A Wider Context

The semiotic function of a wide range of material objects in signalling social roles, status and the ownership of symbolic capital is well established (Preucel, 2006: 66). What is important in archaeology is not so much what objects did but rather what objects meant (Bauer, 2002: 38). I have been able to demonstrate that some of the Type 1 stemmed tools made on New Britain in the mid-Holocene were 'special' objects, made by craft specialists in workshops that created standardised products. I have also argued that some obsidian stemmed tools were distinguished by recognizable design and stylistic elements which enabled them to function as markers of group identity and of their place of origin. In doing so, I have shown that people in mid-Holocene New Britain had elements of their lives that differed greatly from any ideas of egalitarian hunter-gatherers (Sheppard, 2011: 802). I have also tried to find a new intellectual way forward by using the data obtained from a high-magnification use-wear analysis as the primary element in the construction of use-biographies of artefacts as a means of illuminating social and symbolic aspects of the lives of the people who made and used these tools. The outcome is an innovative approach which uses a functional analysis to address questions about social and symbolic behaviour.

The results of this study will become significantly more useful if they can contribute to or encourage further research. This chapter discusses some other areas of archaeological research that might follow from this work. It argues that there are aspects of the archaeology of the islands of the Bismarck Archipelago that still pose relevant and interesting questions and that more research is needed into the chemical and mechanical processes by which some types of use-wear develop in obsidian.

8.1 Networks and Nodes

There is clear evidence that networks within which obsidian was being transported were active both within islands and between islands by 20000 BP (Allen *et al.*, 1989: 554; Specht *et al.*, 1986: 92; Summerhayes *et al.*, 1998: Table 6-4, 151). Archaeology also shows that networks continued to function after the devastating W-K2 volcanic eruption that effectively marks the end of the stemmed tools (Summerhayes, 2004: 146-148). Making and substantiating the argument that Garua Island was one node in a network within which Type 1 stemmed tools with Type A stems were transferred and exchanged raises further questions. The archaeological evidence shows that, around the mid-Holocene, Garua Island, just off the north coast of New Britain, was a key intersection in a lattice of connections and relationships within which some Type 1 stemmed tools were moved and exchanged. My study has no means of determining where other nodes in this network were located. Nor can it say whether any other networks may have interconnected with it in the way that the Willaumez Peninsula obsidian raw material supply chain must have intermeshed with the standardized production unit on Garua Island. Identifying the extent of any social and exchange network and the locations of its nodes may be a difficult task. Networks are composed of personal interactions and therefore it is inevitable that they are fluid, mutable entities that are subject to constant change (Gosden *et al.*, 1989: 574; Summerhayes, 2004: 152; Mills *et al.*, 2013: 5789; Eerkens and Spurling, 2008: 199-200; Collar *et al.*, 2015: 5). Nevertheless, shedding light on the extents and interconnectedness of networks, would considerably enhance our understanding of the social complexity of this island world.

For much of the last 50 years the Lapita colonization of the islands of Oceania has been a major concern for Pacific archaeologists (Blust 1976, Specht 1981, Spriggs 1984, Specht *et al.* 1988, Allen *et al.* 1989, Kirch 1996, Bird *et al.* 1997, Torrence and Swadling 2008, Denham *et* *al.* 2012, Specht *et al.* 2014). Sometime shortly after 3500 BP the Bismarck Archipelago became the springboard for a dynamic and rapid dispersal of people, carrying both the Lapita Cultural Complex and some island southeast Asia (ISEA) linguistic and genetic elements, southwards and eastwards to colonise the islands of the Pacific (Specht *et al.*, 2014: 91). Lapita spread exceptionally quickly and its settlements endured. The archaeological evidence from a plethora of sites is that it did so within the beneficial context of a strong social network (Spriggs, 1984: 214, 217; Specht *et al.*, 2014: 217). One key question that underpins any understanding of the processes of the Lapita 'phenomenon' concerns the extent to which cultural elements, including established and vibrant social networks, which already existed in the Bismarck Archipelago prior to the influx from ISEA, contributed to both the content of this 'package' and to the overall dynamism of this migration. Using archaeology to map these networks in both time and space would considerably expand our understanding of the Pre-Lapita societies of the Bismarck Sea.

Any enquiry into these networks might start with what has already been uncovered. Firstly, it is evident it was not only obsidian that was moving within networks. Stone pestles and mortars appear in archaeological contexts over much of West Papua, New Britain, New Ireland. Relative dating and some ^{14}C dating of material in associated excavated contexts shows that they were in use from c. 8000 to c. 3000 BP. Regional groupings of similar motifs and forms across large areas of land and between islands testify that concepts of style and ideas of design must have been shared through networks within which information was exchanged. While some pestles and mortars are local copies of imported designs, the likelihood is that they were copied from examples which had been moved through an exchange network (Torrence and Swadling, 2008: 602-604). There are also other forms of unusual elaborately and skilfully made obsidian stemmed tools found in mid-Holocene contexts on New Britain. The Type 2 stemmed tool, a fundamentally different design to the Type 1, has not been extensively studied. Torrence (2004: 166-169) argues that at least one of these, FABN 002 (Figure 1-2) was never intended to have been a utilitarian tool but was made to have a social or symbolic role in a society. Comparative studies of use-wear, raw material provenancing, find sites and distribution patterns have still to be carried out. Finding links and differences between the distribution patterns of disparate things that may have moved at similar times within the same network or between interlinked networks would be a major step towards advancing our understanding of this significant period in the pre-history of the Bismarck Archipelago.

Secondly, the geographical span of networks appears to have changed over time. The geochemical provenancing data shows that the earliest movements of obsidian for which we have absolute dating took place within relatively limited geographical areas. The distribution of obsidian in the late Pleistocene and early to mid-Holocene around the Bismarck Sea seems to have involved connections between New Britain and Papua New Guinea, networks within New Britain and linkages between new Britain and New Ireland. Similarly, the movement of Admiralty Islands obsidian appears to have been restricted to that island group until the early Lapita period (3300-3000 BP) (Summerhayes, 2009: 114-116; Allen *et al.*, 1989: 554-555). From the late Pleistocene through to the mid-Holocene the networks within which obsidian is being moved are clearly in place but they are limited in both geographical extent and reach. Notably, there is no direct evidence of interaction between the networks centred on New Britain and those centred on Manus Island, {although Torrence *et al.* (2010: 3)} proffer stylistic convergence as possible indirect evidence). By around 3000 BP this pattern of interaction appears to have changed. Obsidian from both the Admiralty Islands sources and from New Britain was reaching early Lapita sites on Mussau Island (Site ECA, ANU 5075) (Kirch, 1987: 168, 173; Torrence and Swadling, 2008). Summerhayes (2009: 113) describes the progressive expansion of these networks, citing the identification of obsidian from both Kutau/Bao, Admiralty Island sources and from Banks Island on the Solomon Islands, Vanuatu and New Caledonia in contexts dating from 3.1 Kya, on Fiji by 3000 BP and on Tonga and Samoa by 2900 BP. Once the Lapita migration gets underway, the networks become both extended and increasingly overlapped.

The evidence of Type A stem FAP 232 (Figure 7-7), found in strata about 15 cm below a context ^{14}C dated to 6280-5930 cal BP (NZA 1570), is that Type A stems were being made before 5900 BP. The inference must be that the networks through which they moved would have been characteristic of the pre-Lapita period and hence restricted in extent and range. If Garua Island forms one node of the network within which the standardized Type A stems were exchanged, then other nodes in this system would probably have been located on New Britain itself and New Ireland. As the existing evidence indicates that finished artefacts manufactured on Garua Island were not transported westwards onto the Willaumez Peninsula, then New Ireland looks to be the more likely option. Archaeological research on New Ireland has tended to concentrate on the very earliest sites (e.g. Allen *et al.*,1989; Allen, 1996; Fredericksen, 1997) or on sites linked to Lapita settlements (e.g. White and Downie, 1980; Gosden *et al.,* 1989). There is a paucity of archaeological site reports from mid-Holocene sites in New Ireland. White *et al.*'s (1991) excavation of the Balof 2 rockshelter did recover obsidian artefacts from Mid-Holocene contexts, but none were formally retouched tools (White *et al.*, 1991: 54). Should opportunity and resources become available for the identification and archaeological excavation of mid-Holocene sites on New Ireland then the findings of my research could be significantly extended. This, in turn, has the potential to provide a clearer picture of the mid-Holocene networks that preceded and may have underlain the more extensive and dynamic networks associated with the Lapita Phenomenon.

8.2 Reflections on a Brightspot

This study has highlighted not only the importance of hafting to our understanding of the roles of stone tools but also of the value of Brightspots as a use-wear indicator of hafting. Questions remain about how Brightspots are generated on obsidian. It seems likely that this involves certain specific forms of hafting, the production of mastics and extended periods of use and physical pressure. The social implications of resourcing, craft specialism as well as the semiotic and symbolic value of these tools is likely to be better informed if the use-wear analyst has a clearer understanding of the process of Brightspot formation.

Previous work on Brightspots has all been undertaken using flint, a harder material with a different surface texture to obsidian. Rots' (2002) seminal series of experiments on flint established a clear connection between Brightspots and hafting as well as a causal link between some Brightspots and the use of a resin to attach the haft to the lithic (Rots, 2002: 63). In particular, Rots (2002) suggested that some Brightspots were formed during the process of removing a blade from a haft as a result of friction between particles in the resin and the stone surface. She also asserts that the frequency and extent of other Brightspot formation on a hafted area of a blade is dependent on the hardness of the material worked and the intensity and duration of that work (Rots, 2002: 63). Any impact between the edge of a hafted tool and a relatively hard surface such as a piece of timber causes very small but high-pressure movements between tool and haft which Rots cites as a main cause of Brightspot formation (Rots, 2002: 63).

I cannot locate any similar study of Brightspot formation that has used obsidian. Nor can I find any references to the amount of pressure, the length of time, the type of haft or the composition of the resin or mastic that can cause Brightspots to form. There is no detailed understanding of the formation of Brightspots and possibilities such as chemical etching of the stone surface or even a very localised surface melt through frictional heat have not been tested and eliminated (Hurcombe, 1992: 13). Gaining an understanding of the process involved would enable researchers to make more use of Brightspots in their interpretations, not only of the materials worked using hafted tools, but also the intensity and duration of the effort used. In order to achieve this two further pieces of work are required. Firstly, an experimental programme designed to generate Brightspots on obsidian through a series of tests in which incremental and quantified levels of pressure, friction and time are applied is important. Secondly, a high-magnification microscopy analysis of residues recovered from the surfaces of previously hafted tools that carry hafting Brightspots will be required. Analysis of residues, including the identification of starch grains and phytoliths, recovered from lithic artefacts has long been a recognised and accepted archaeological technique (e.g. Barton, 1991; Loy *et al.,* 1992; Fullagar, 1993; Kealhofer *et al*., 1999; Barton *et al.,* 1998). Identifying the make-up of the actual fixatives used on hafted artefacts will not only aid the proposed experimental programme, but will inform a wider understanding of the practical and social mechanisms involved in the production and the roles of composite tools.

8.3 A Common Standard

A meticulously consistent approach for recording the use-wear observed on both the experimental reference collection material and the artefact is an essential factor in use-wear analysis. One key to this procedure is access to a comprehensive and relevant reference collection. Creating such a reference collection is a protracted, tedious and expensive process. The tendency has been for each research team to design and execute a substantial experimental programme from which a reference collection of photomicrographs would be built up, principally for application to their own specific case studies but which ostensibly had the potential to provide a reference library resource for other archaeological researchers (Tringham *et al.*, 1974: 184-5; Keeley, 1980: 5,7,9,14; Kamminga, 1982; Hurcombe, 1992: 29-30, Plates 3-140; Kononenko, 2008: 35). Van Gijn has assembled a significant reference collection at Leiden University, Keeley and Loebel have established a similar photomicrograph reference library at the University of Illinois at Chicago, as has Flora Church at the University of Ohio and Kononenko in Sydney (Kononenko, 2011: 3; van Gijn, 1989; Church, 2007; University of Illinois at Chicago, 2013). Not all reference collections are the same as the content of each is likely to be partial towards the types of tool and use-materials which are relevant to their areas of research. Any new researcher entering the field of use-wear analysis has either to obtain access to an existing reference collection or to engage in the lengthy process of creating a new one.

Given that the key variables identified in use-wear analysis are generally accepted as being fundamental data categories, the coding system developed for this analysis has the potential to be developed into a standard recording protocol which could be adopted across all use-wear reference collections. Analysts could compare the coded values they have applied to their research examples to published codings for each reference edge. I acknowledge that the current system would require considerable development and significant cooperation between research teams but it offers the possibility of increased access for analysts and, perhaps, computer algorithms for some use-wear analysis (see for example van den Dries, 1998)

8.4 Use-wear and Ideas

Use-wear identified and classified using high-magnification microscopy can be successfully used to answer archaeological research questions arising from the more intangible and conceptual aspects of the lives of past peoples. Provided that a sound theoretical argument is used to link the ways in which people behave in response to social, cultural or symbolic motivations to the use and treatment of artefacts, then use-wear studies can address the more abstract and conceptual aspects of archaeology. The difficulty lies in attributing social or cultural significance to objects which are essentially variants of practical and ordinarily mundane utensils. Ethnographic evidence verifies that some societies distinguished between stone tools used for everyday work and 'special' tools which are reserved for sacred tasks. Hampton (1997: 476, 499 & 518) maintains that the Dani people of Irian Jaya select certain axes, adzes and knives from among the tools that they use for secular activities, invest them with spirit power through rituals and then preserve them solely for ritual use. These objects are covered in white clay, wrapped in leaves and stored in special places. A ritual knife is always used to make the initial cut when skinning a sacred pig. Special ground stone hafted axes are only used to split tree trunks longitudinally, never for chopping wood. The Nyatunyatjara people of the Australian Western Desert make special *pitjuru-pitjuru* stone tools which are hafted and covered in ochre exclusively for incising decorations on spearthrowers and sacred boards (Gould *et al.*, 1971: 155). These tools are sacred items which must never be shown to the uncircumcised or to women. In each case the use-wear evidence is likely to indicate the limited and controlled ways in which the tool was used. Linking use-wear to other data such as residue analysis or typology has the potential to enable coherent and plausible use-biographies to be constructed. Identifying artefacts in the archaeological record which have use-lives which include social or symbolic episodes can illuminate the more abstract and conceptual aspects of a past society. The application of use-wear to recognise symbolic value by building an understanding of how things were actually used need not be restricted to stone or metal tools. Using use-wear as a methodology, as Vanhaeren *et al.* (2013: 511-513) has shown, offers significant potential for the study of what may be valuable in other cultural contexts. Use-wear is an established method of recognising how people subsisted. It has the potential to tell us something about how they thought.

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THROUGH A GLASS DARKLY:

Finding Values in Obsidian Stemmed Tools from New Britain, Papua New Guinea

Thesis submitted for the degree of Doctor of Philosophy at the University of Leicester

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Volume 2

Appendix: Figures and Tables

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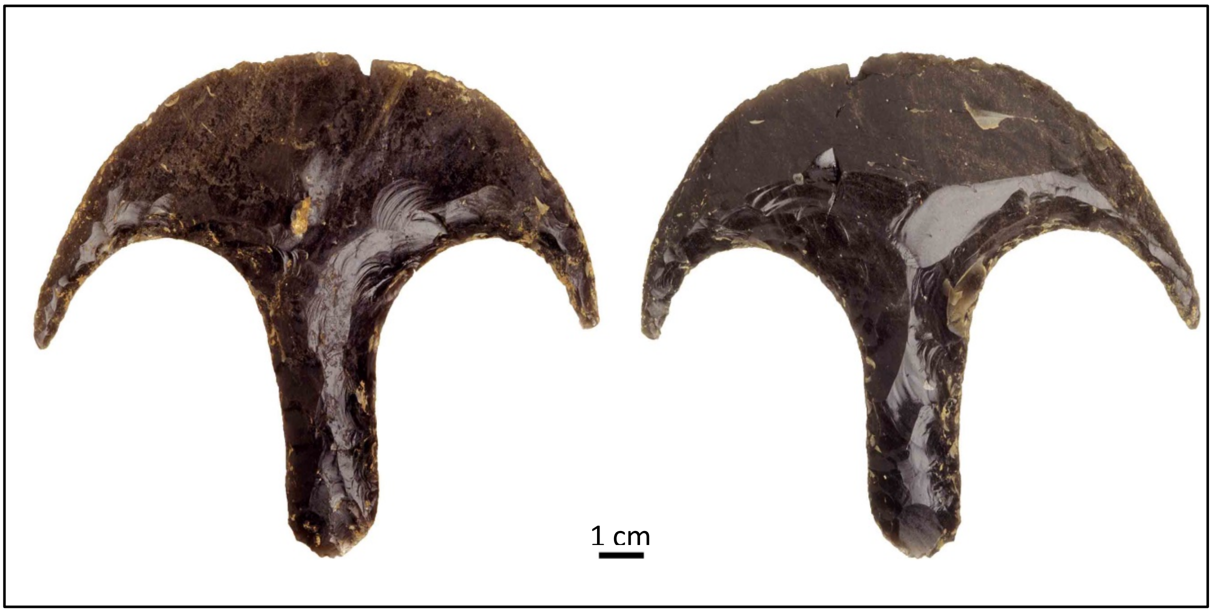
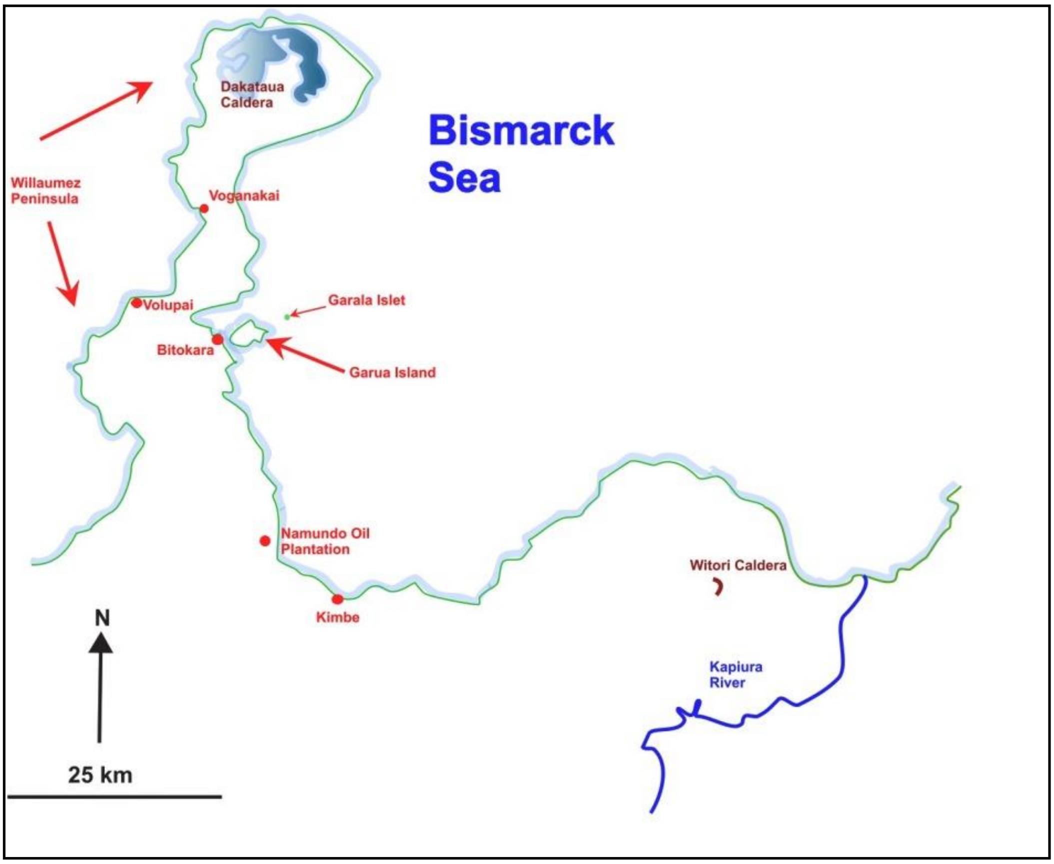


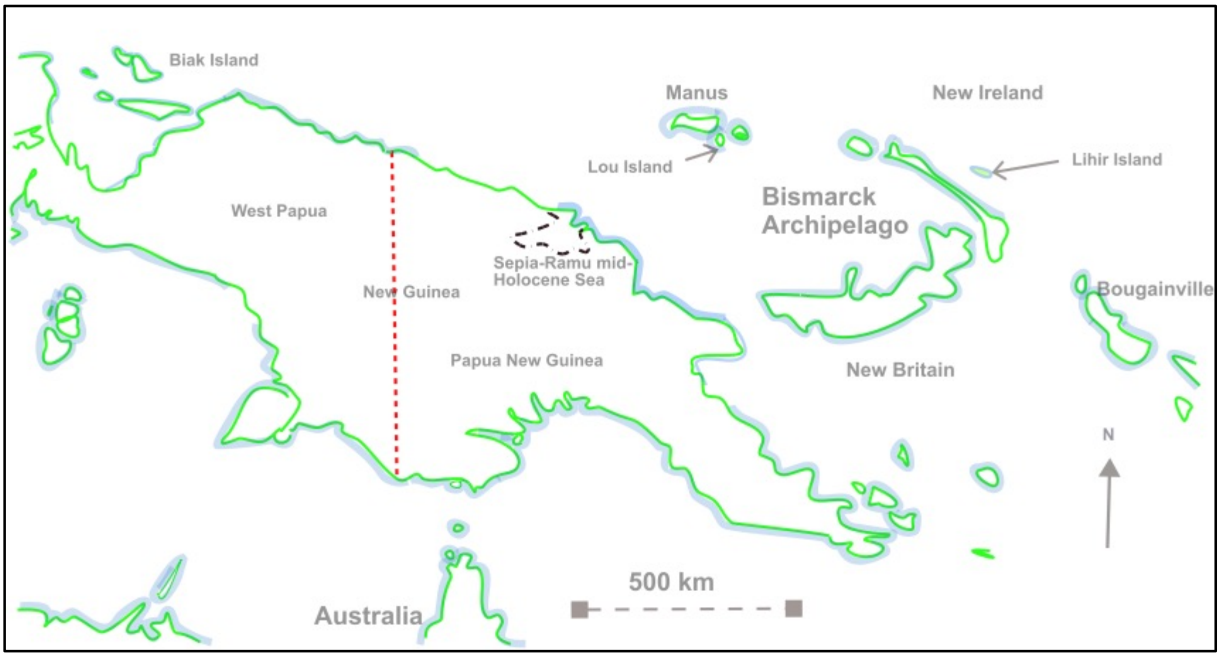
Figure 1-3: Bismarck Sea region showing the larger islands of the Bismarck Archipelago. Inset box showing Willaumez Peninsula and Garua Island (please see Figure 1-4) (Mapbox.com, 2013)

Figure 1-4: Willaumez Peninsula and Garua Island showing principal locations mentioned in the text (after (Summerhayes *et al.*, 2010))



Illustrations to Chapter 2.

Figure 2-1: New Guinea showing the location of the Sepik-Ramu inland sea and surrounding islands. After (Torrence and Swadling, 2008: 601)



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Eruption	95.4% HPD regions (cal. BP)	Modal date(s) (cal. BP)	Volume of Air-fall Tephra
W-K1 Eruption (NZA 1570)	6160–5750	5920	10 km^3
W-K2 Eruption (est.)	3480–3150	3315	30 km^3
W-K3 Eruption (est.)	1740–1540	1615	6 km^3
Dk Eruption (date)	1350–1270	1300	10 km^3
W-K4 Eruption (date)	1310–1170	1280	6 km^3

Figure 3-1: FRL 150

Figure 3-2: Artefact 'Kandrian'

Table 3-2: All artefacts forming the research sample, tabulated by site code, showing the numbers of complete and broken tools selected for use-wear analysis

Site Code	Archaeological Site	Complete Tools	Stems with blades missing only the tip section	Complete Blades with stems missing	Complete stems with all or part of the proximal section of the blade attached	Complete stems with no blade	Blade Tips	Incomplete artefact sections	Re-classified as unlikely to be Type 1 following laboratory examination	Totals
FAP	Garua Island, northeast, Malaiol Stream		14		18	27	3	9	1	**72**
FAO	Garua Island, northeast coast	0							1	**1**
FEK	Garua Island, west coast	2	2	1				3		**8**
FAQ	Garua Island, central				1			1		**2**
FSZ	Garua Island, northeast coast				1			1		**2**
FAR	Garua Island, northeast, east of Malaiol Stream		2		6	4	1	2		**15**
FAAJ	Garua Island, west coast	0					1		1	**2**
FAAL	Garua Island, east coast						1			**1**
FAAL	Garua Island, northeast coast						1			**1**
FAW	Taula Island							1		**1**
Totals	**All Garua Island sites**	2	18	1	26	31	7	17	3	105

Site Code	Archaeological Site	Complete Tools	Stems with blades missing only the tip section	Complete Blades with stems missing	Complete stems with all or part of the proximal section of the blade attached	Complete stems with no blade	Blade Tips	Incomplete artefact sections	Re-classified as unlikely to be Type 1 following laboratory examination	Totals
FRL	Bitokara Mission, Willaumez Peninsula		2		4	7	1	14		**28**
FDW	Bitokara, Willaumez Peninsula				1					**1**
FDY	Bitokara, Willaumez Peninsula		1							**1**
FQT	Lambe Gully, south of Bitokara Mission	1								**1**
FAAH	Numundo Oil Plantation, Willaumez Peninsula					1				**1**
FDM	Near Voganakai village, Willaumez Peninsula				1					**1**
FAY	Near Voganakai Village, Willaumez Peninsula	1						1		**2**
FDC	Near Volupai village, Willaumez Peninsula		1		2	2			2	**7**
Totals	**All Willaumez Peninsula sites**	2	4	0	8	10	1	15	2	42
Totals	**All Research Assemblage**	**6**	**40**	**2**	**60**	**72**	**15**	**49**	**8**	**147**

Figure 3-3: Isopach map of Willaumez Peninsula area showing the extent of tephra distribution from the W-K1 eruption. Tephras were distributed westwards of the dotted 0 cm contour line (Machida et al., 1996: 73)

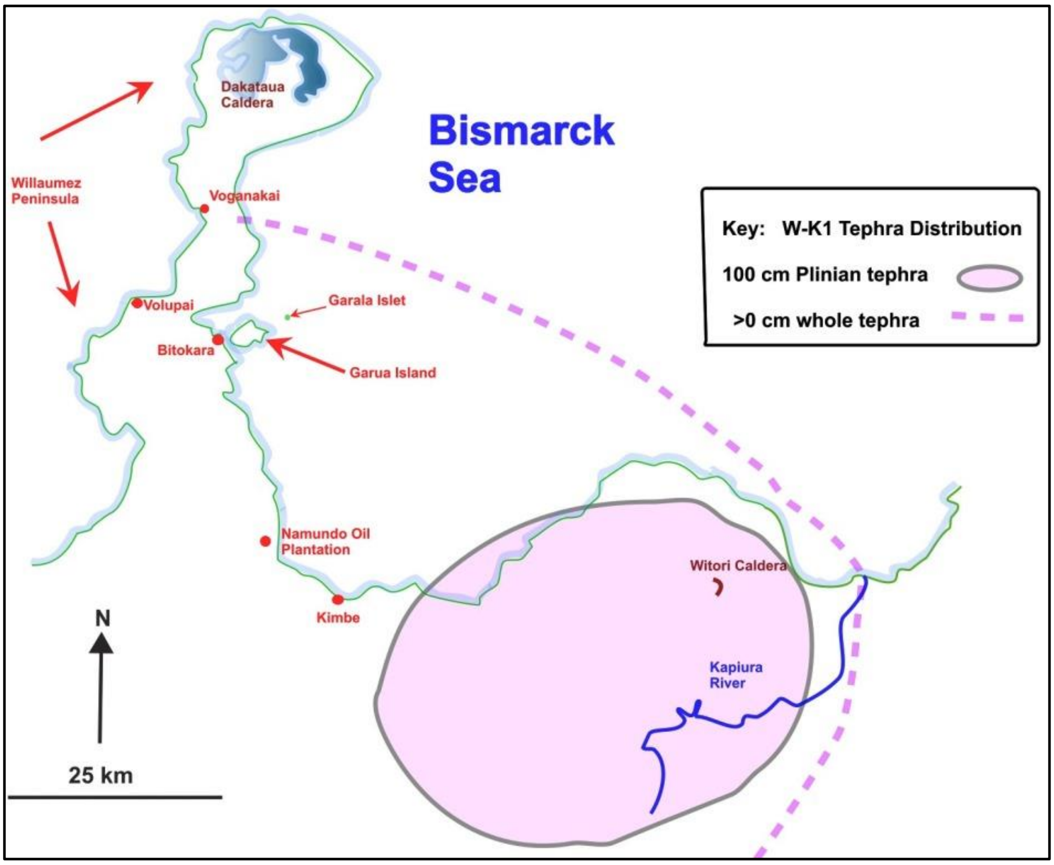


Figure 3-4: Isopach map of the Willaumez Peninsula area showing the extent of the whole tephra distribution from the W-K2 eruption

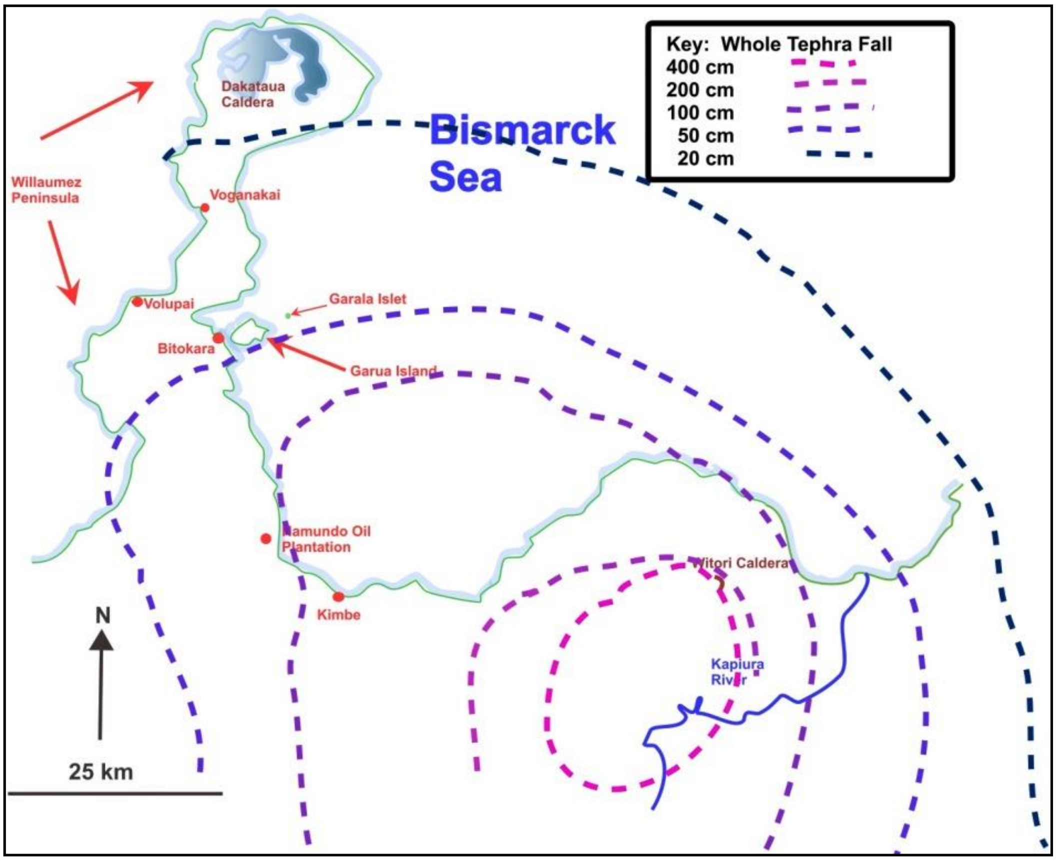
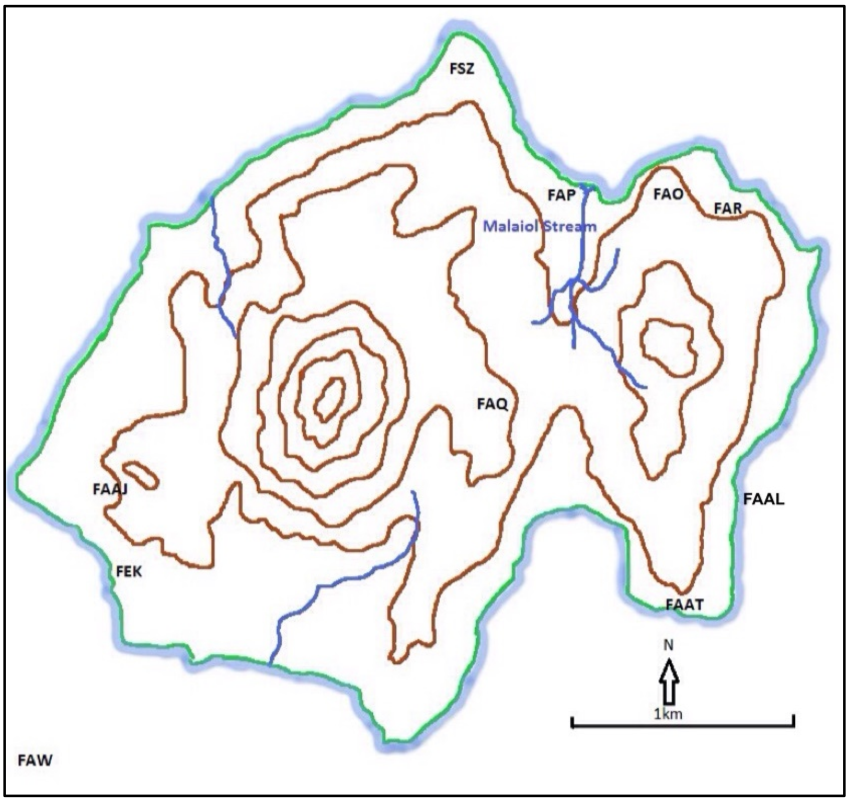


Table 3-3: Site codes on Willaumez Peninsula and Garua Island from which the artefacts in the study sample were obtained (Specht, 1981: 344; Specht and Torrence, 2007: 160; Torrence and Webb, 1992: 7,11,13,14; Torrence, 1993: 6,7; Torrence, 1995: 8-9; Torrence and Boyd, 1996: 13,16,17, Table 3; Torrence and Boyd, 1997: 16-17; Torrence et al., 1999; Torrence et al., 2000: 228; Torrence, 2004: 165; Araho et al., 2002: 62; Petrie and Torrence, 2008: 735-736 (Table 3))

Site Code	No of artefacts	Location	Fieldwork Years	Archaeological Context	Notes
FAP	72	Garua Island	1989, 1991, 1992, 1996, 1997	Eroding out of gulley cut 1x stratified context + 70 surface collection	Quarry site exposed by Malaiol stream. Clear stratigraphy with obsidian lithics only in strata 2a & b, both of which underlie W-K2 tephra. W-K1 tephra ^{14}C dated to 6164-5903 Cal. BP (NZA 1570)
FAO	1	Garua Island	1995	Stratified Context	W-K2 tephra ^{14}C dated to 3990-3640 BP (NZA 2901)
FEK	9	Garua Island	1993, 1997	Surface Collection	Mudflats sealed by slope-wash
FAQ	2	Garua Island	1989, 1992, 1993, 1995, 1996	Stratified Context	W-K2 tephra ^{14}C dated to 3223 cal. BP (NZA 2850)
FSZ	2	Garua Island	1993	Stratified context: beneath W-K2 tephra	W-K2 strata is ^{14}C dated to 3070-2750 BP (95.4% HPD) (NZA 6099)
FAR	15	Garua Island	1992	5 x stratified + 10 surface collection	Eroding out of Malaiol Stream gully cut
FAAJ	2	Garua Island	1997	Stratified context	Side walls of Gulley. W-K2 tephra ^{14}C dated to 2680-2000 BP (Beta-102971)
FAAL	1	Garua Island	1996, 1997	Surface Collection	Beach outwash fan
FAAT	1	Garua Island	1997	Surface Collection	Beach outwash fan
FAW	1	Garua Island	1996	Surface Collection	Bitokara Mission
FRL	28	Willaumez Peninsula	1988	Stratified context	Excavation Bitokara Mission
FDW	1	Willaumez Peninsula	1981	Surface collection	Bitokara Mission
FDY	1	Willaumez Peninsula	1973	Surface Collection	Bitokara Mission
FQT	1	Willaumez Peninsula	1988	Surface Collection	Lambe Gully, close to Bitokara Mission
FDQ	0	Willaumez Peninsula	1988	Surface collection	Uphill from Bitokara Mission. Formerly T1/D/I, II, III and IV
FAAH	1	Willaumez Peninsula	1996, 1997, 1999	Stratified context	Deposits below W-K1 strata
FDM	1	Willaumez Peninsula	1991	Surface Collection	Close to Voganakai Village
FAY	2	Willaumez Peninsula	1989	Surface Collection	Close to Voganakai Village
FDC	7	Willaumez Peninsula	1991	Surface Collection	Close to Volupai Village

Figure 3-5: Garua Island showing sites referred to (Torrence, 1998)



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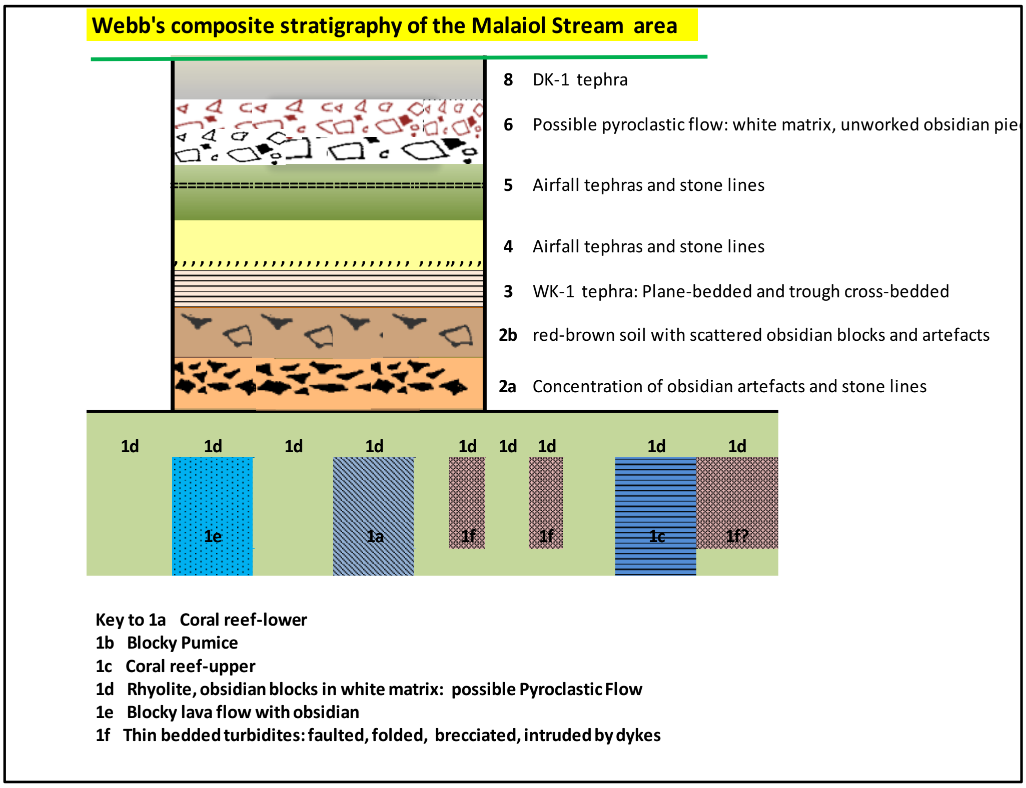

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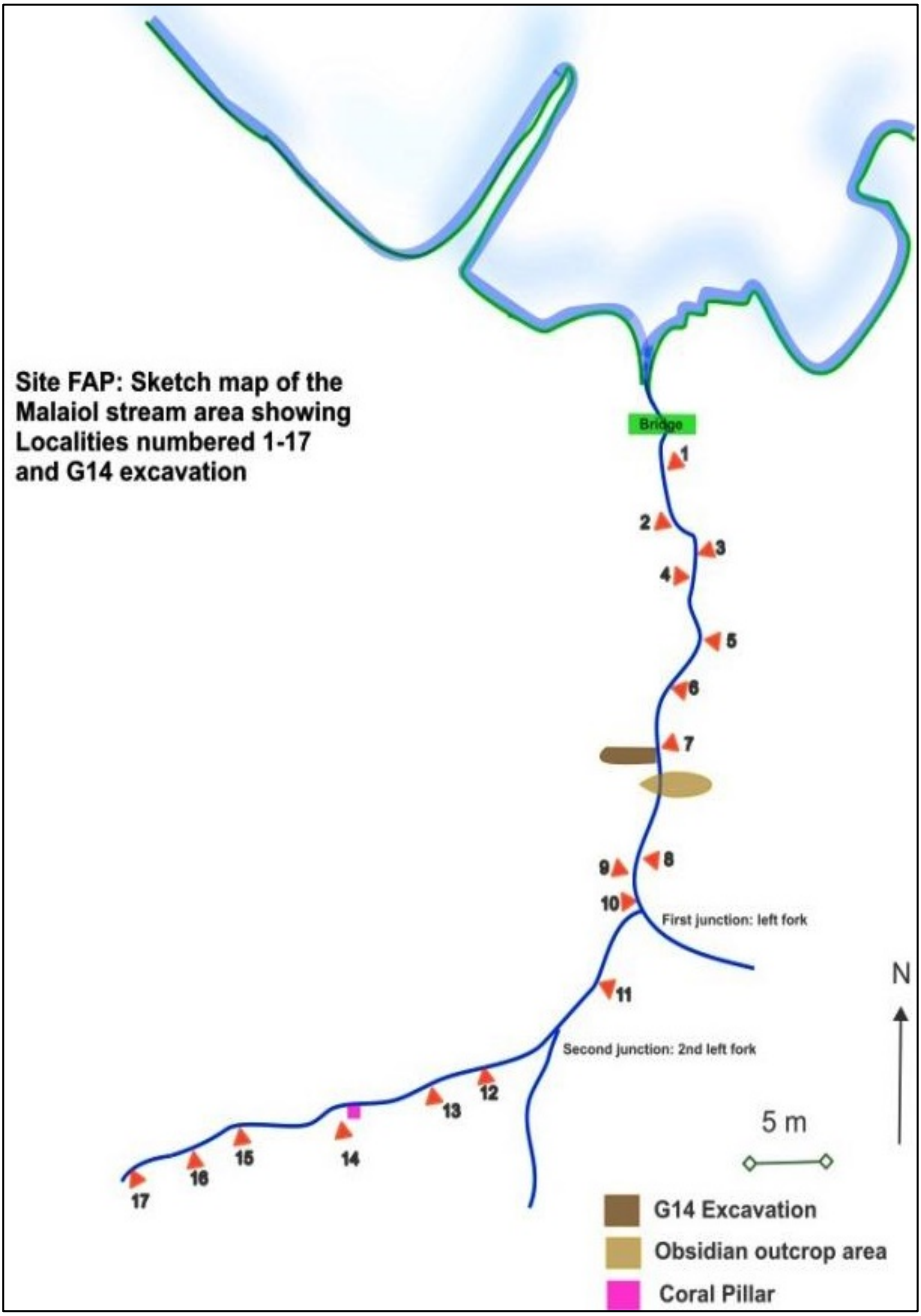

Figure 3-8: Site FAP excavation trench G14 (Photo supplied by Robin Torrence)

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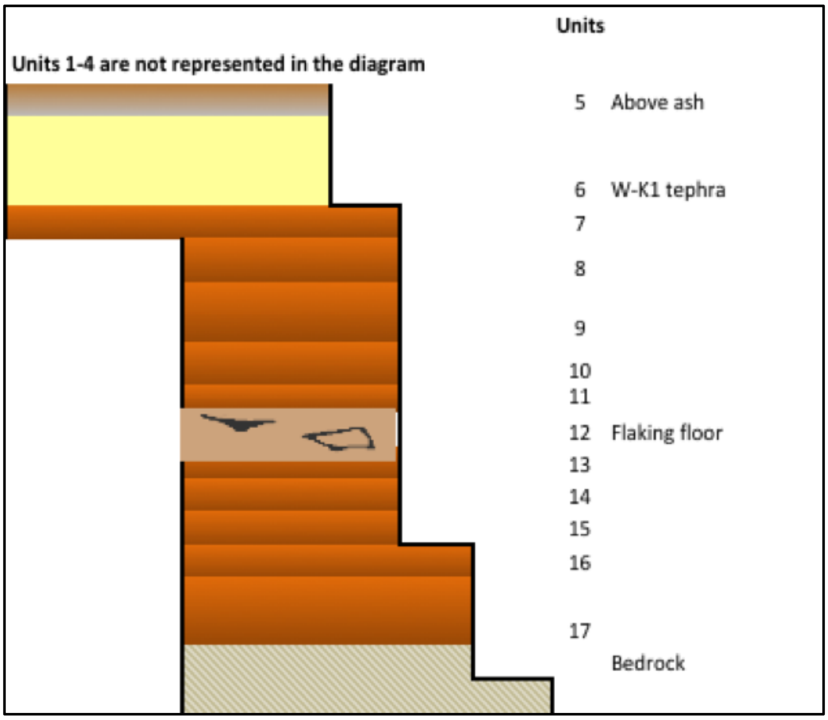
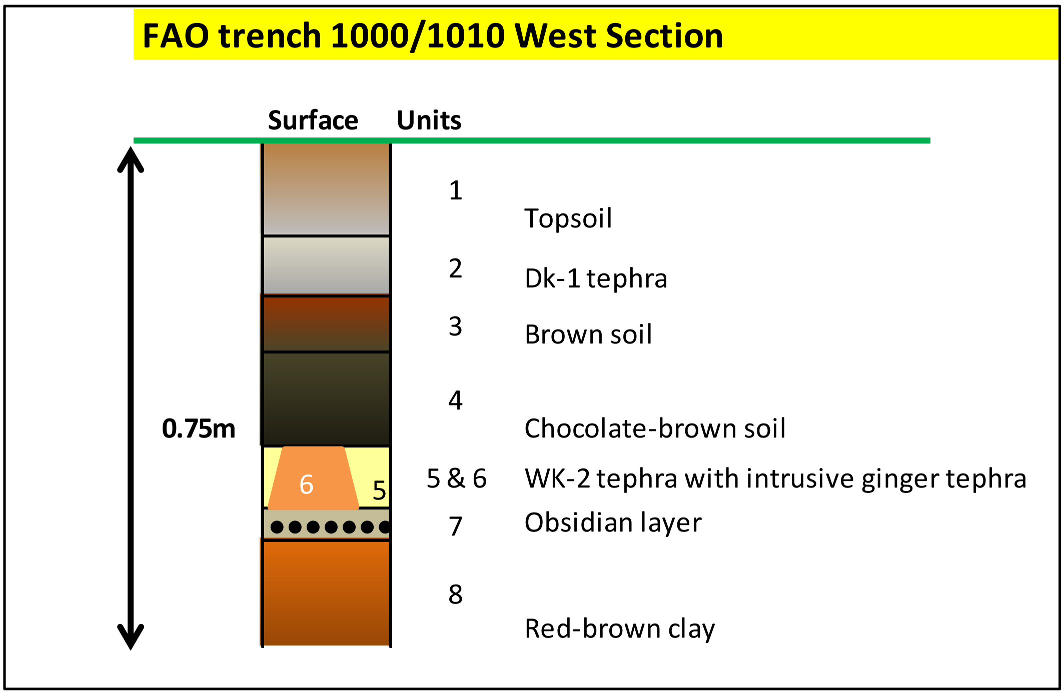


Figure 3-10: Site FAO: Diagrammatic representation of the stratigraphy of the west face of trench 1000/1010 (Torrence and Webb, 1992: 6; Lentfer and Torrence, 2007: 85-86)



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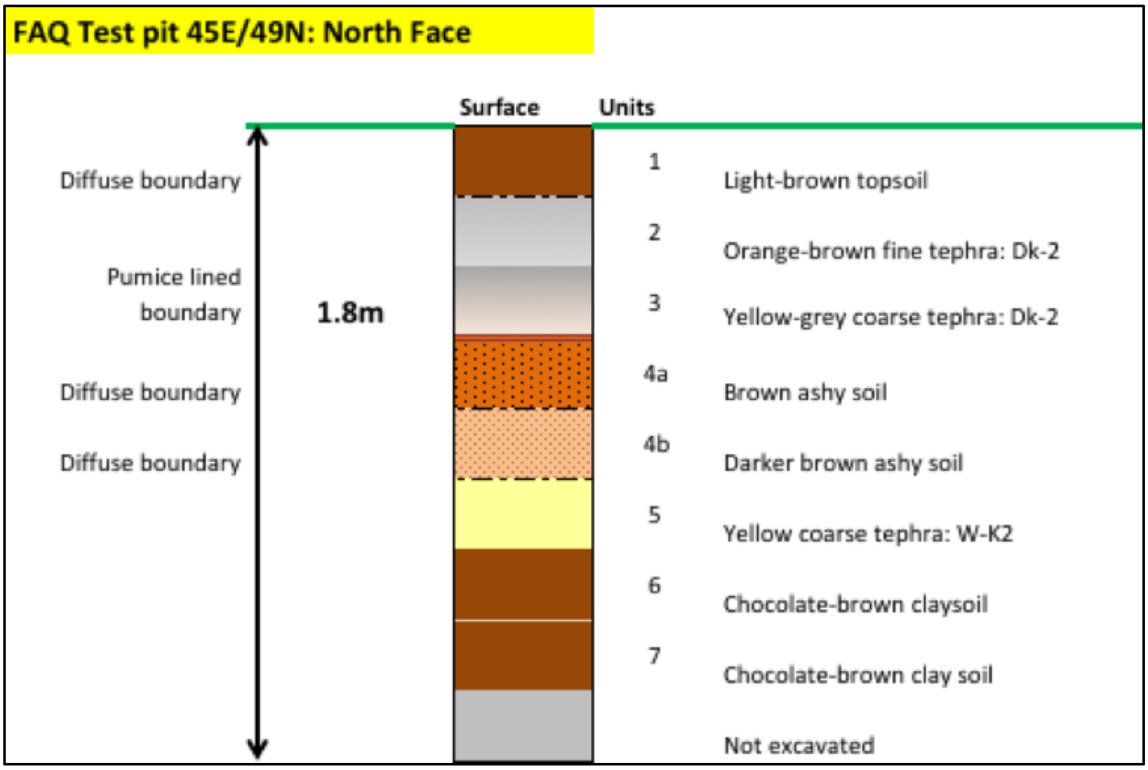
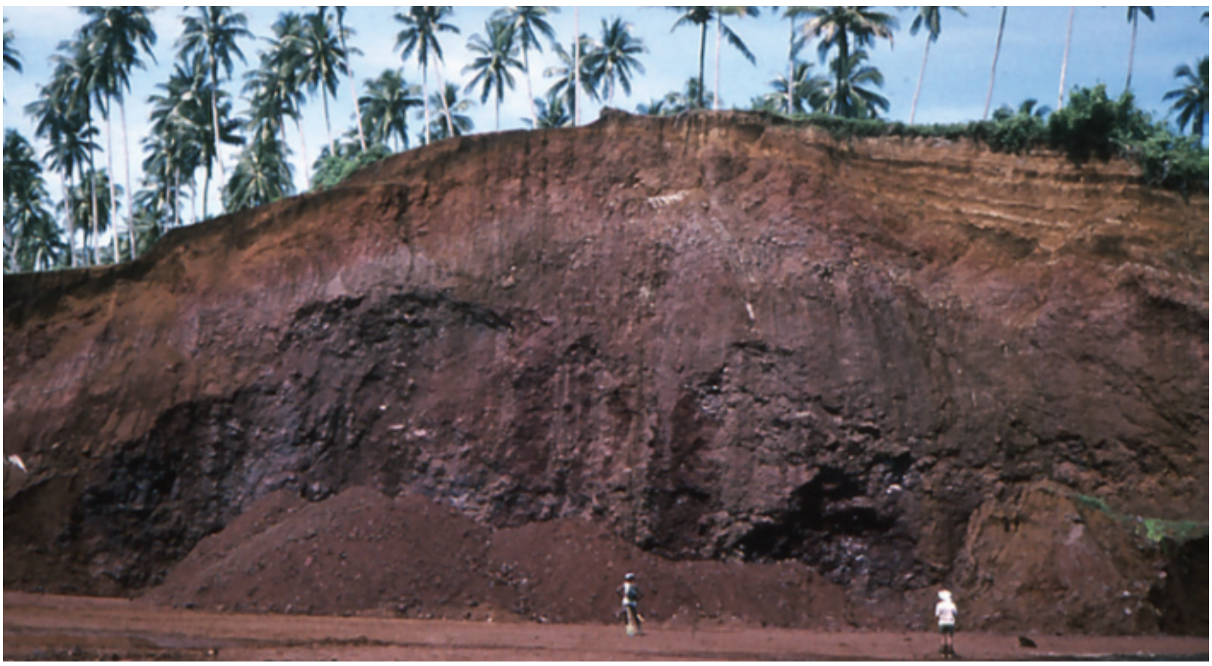


Figure 3-12: Stratigraphy exposed at Site FSZ by quarrying (Specht and Torrence, 2007: 162, 191, Plate 8)



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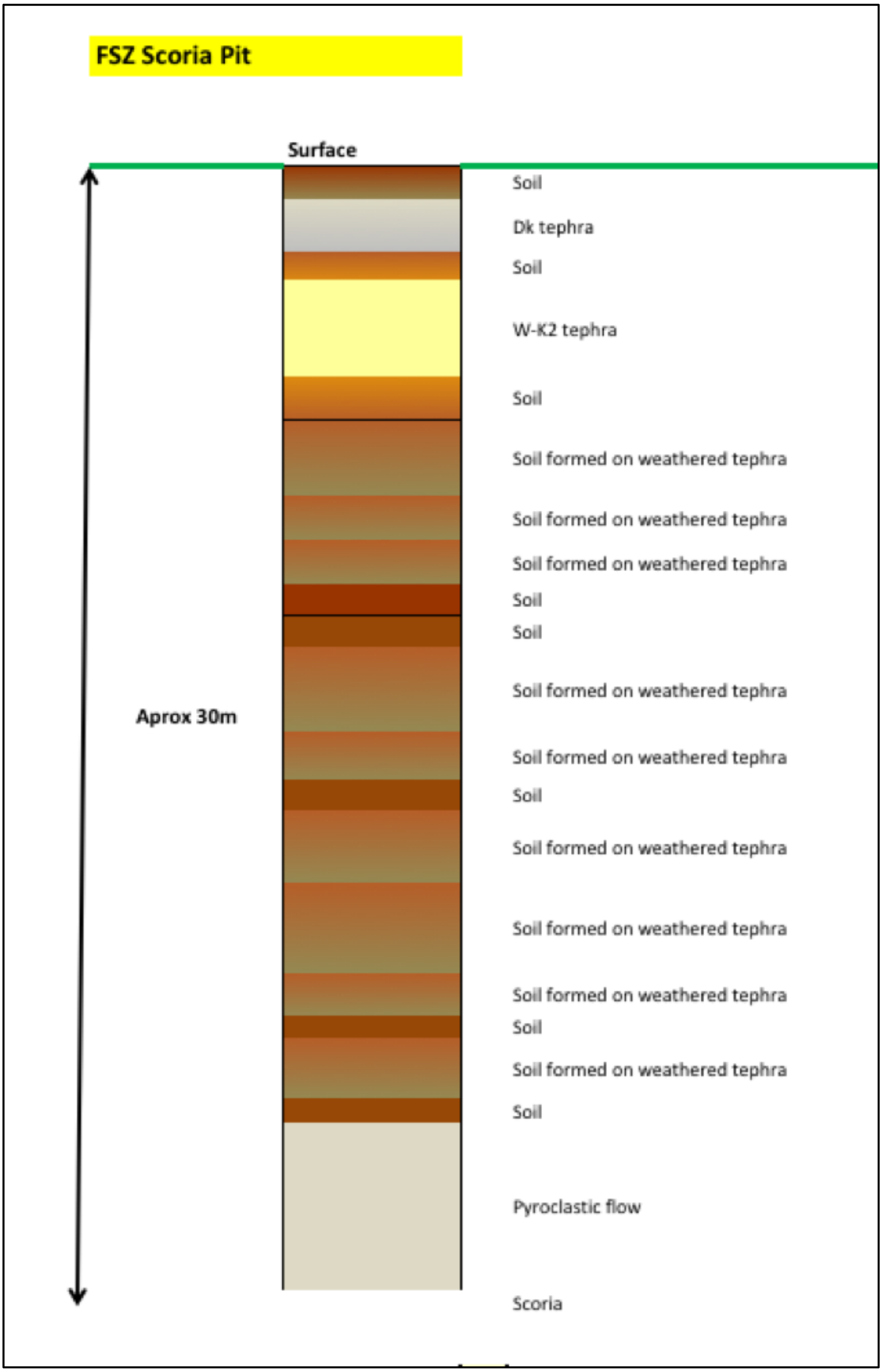

Figure 3-15: Site FAAJ: Profile 3. (Photo supplied by Robin Torrence)

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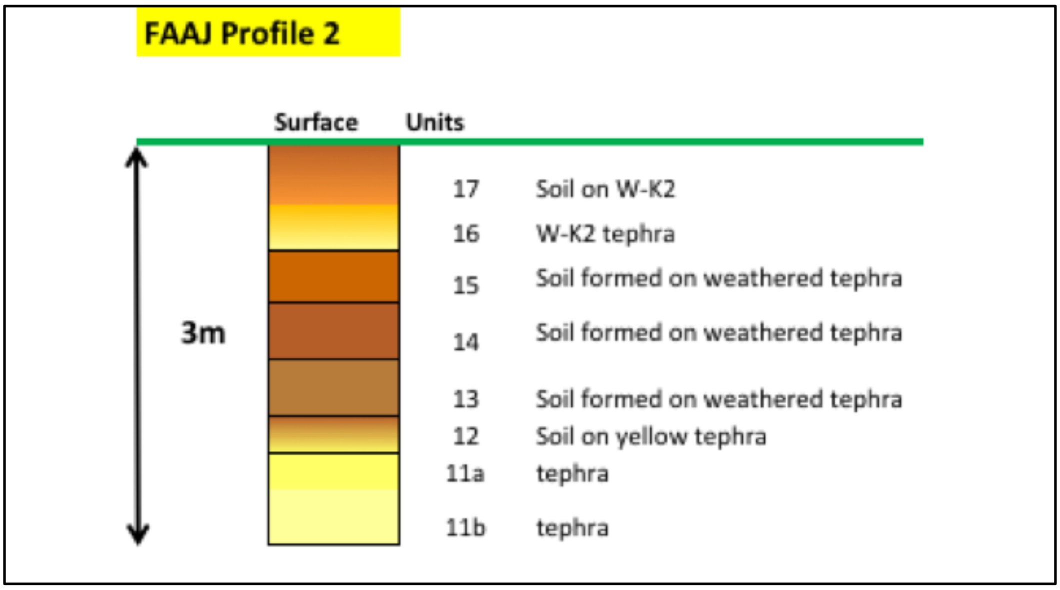

Figure 3-17: Sketch map of Bitokara Mission showing Sites FRL, FDQ and FQT (Torrence, 1998: unumbered)

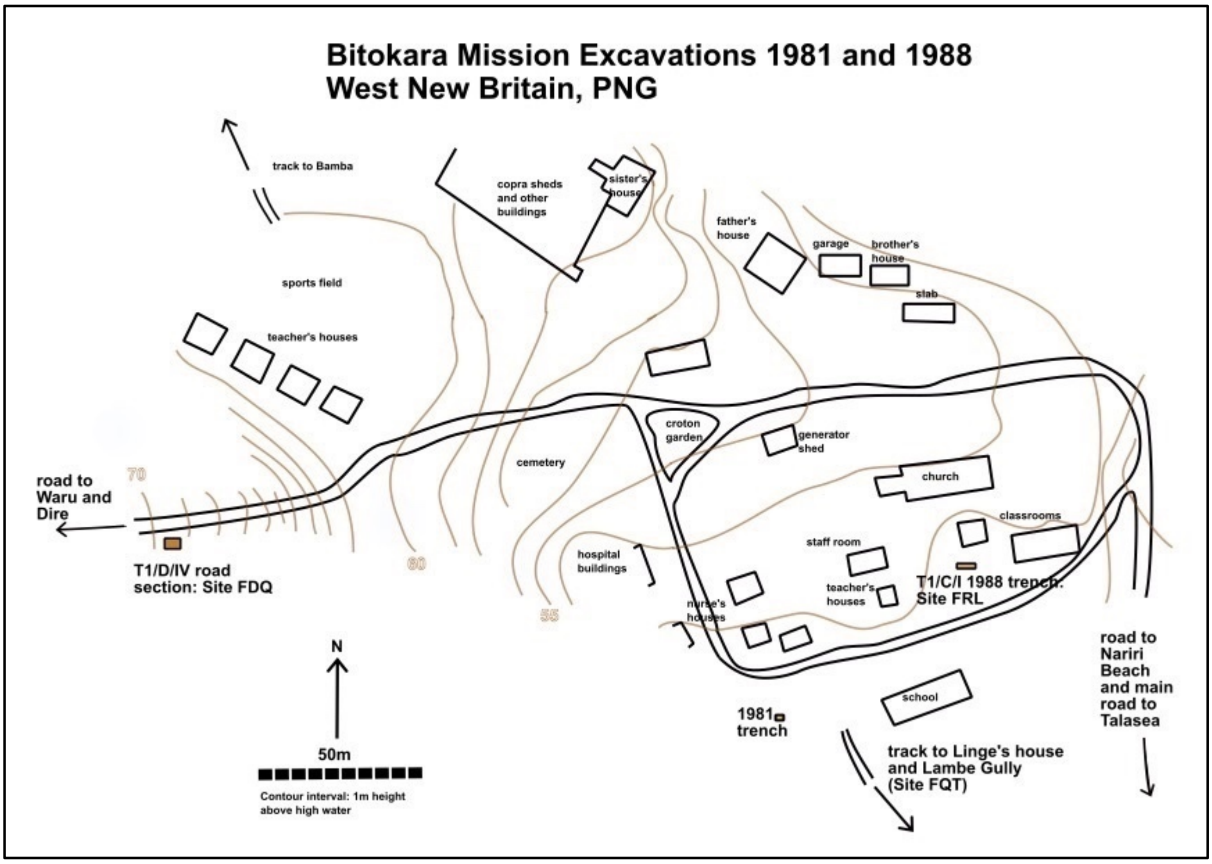

Figure 3-18: Bitokara Mission (Photo supplied by Robin Torrence)

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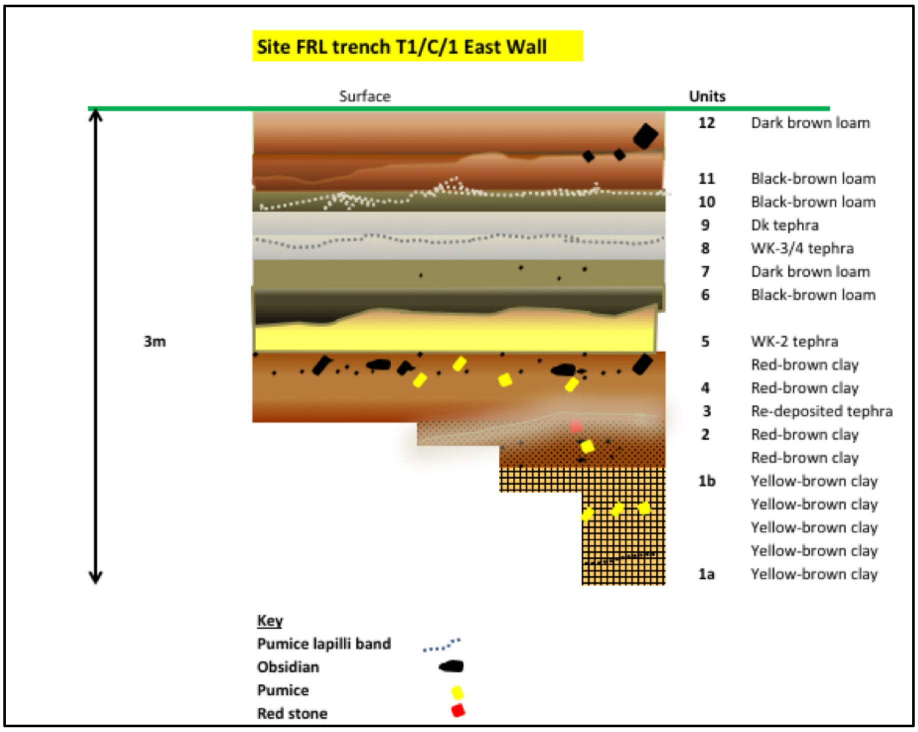
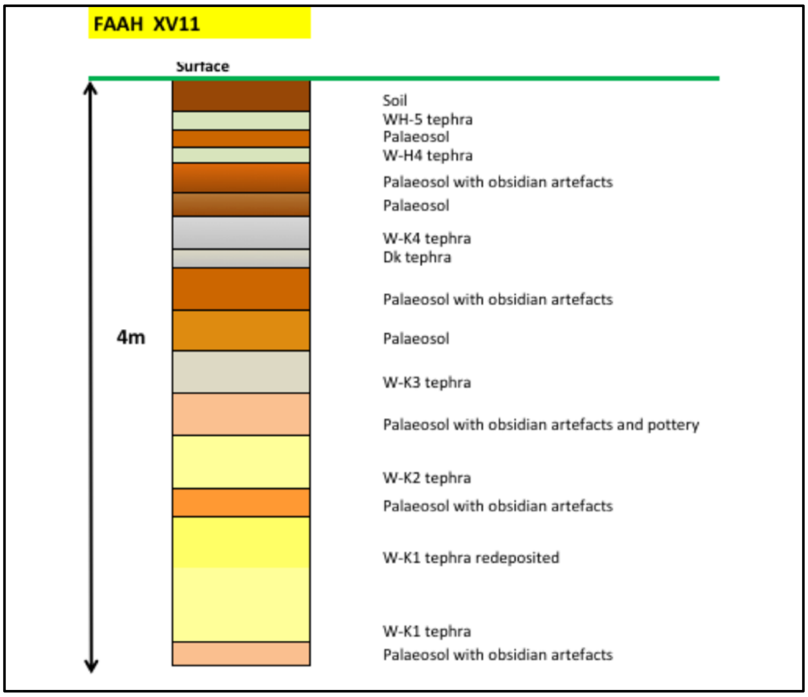


Figure 3-20: Site FRL: Trench T1/C/I. (Photo supplied by Robin Torrence)

Figure 3-21: Site FAAH section XVII (Photo supplied by Robin Torrence)

Figure 3-22: Site FAAH: Diagrammatic representation of stratigraphy of section XVII (Neall *et al.*, 2008: 334)



Illustrations to Chapter 4.

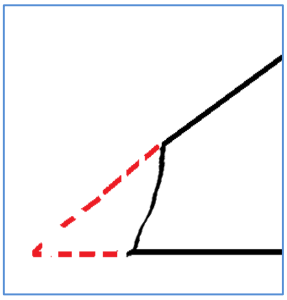


Figure 4-1: Bending Scar Diagram after (Kamminga, 1982: 6)

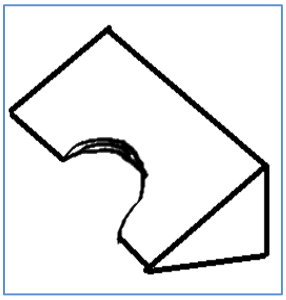


Figure 4-2: Bending Scar

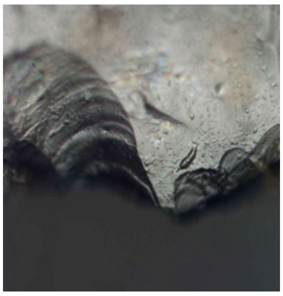


Figure 4-3: Bending Scar

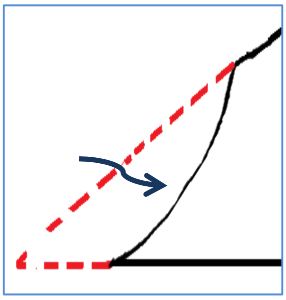


Figure 4-4: Feather Scar Diagram. Blue arrow indicates 'floor' of scar after (Kamminga, 1982: 6)

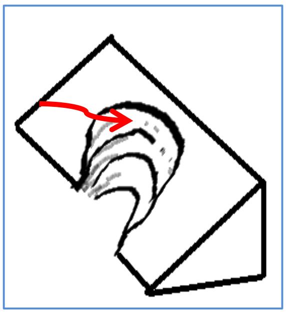


Figure 4-5: Feather Scar Diagram. Red arrow indicates 'floor' of scar

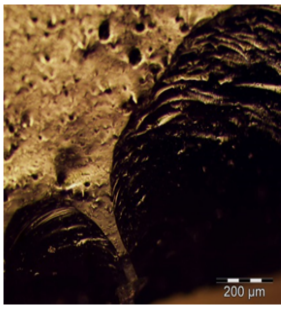


Figure 4-6: Feather Scar

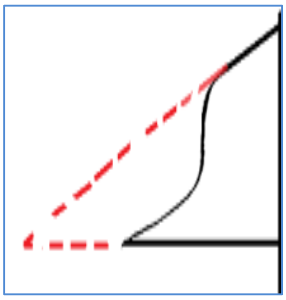


Figure 4-7: Hinge Scar Diagram after (Kamminga, 1982: 6)

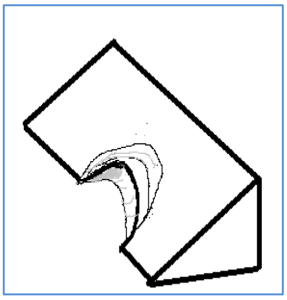


Figure 4-8: Hinge Scar

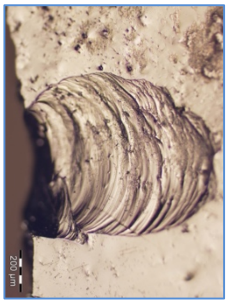


Figure 4-9: Hinge Scar

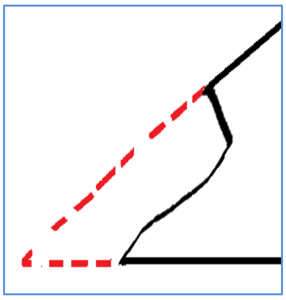


Figure 4-10: Step Scar Diagram after (Kamminga, 1982: 6)

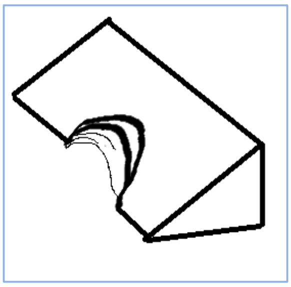


Figure 4-11: Step Scar

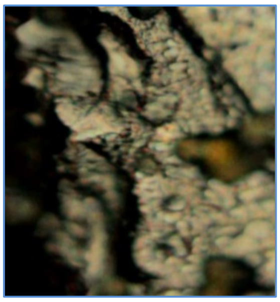


Figure 4-12: Two small step scars

Figure 4-13: Flaked scar

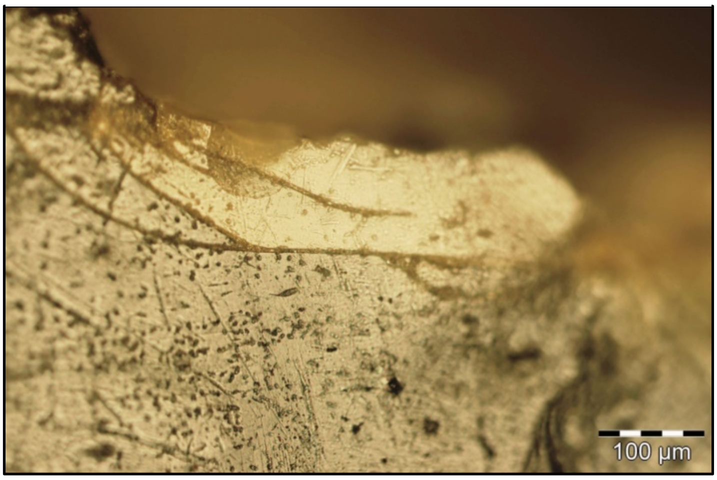


Figure 4-14: Sleek striae

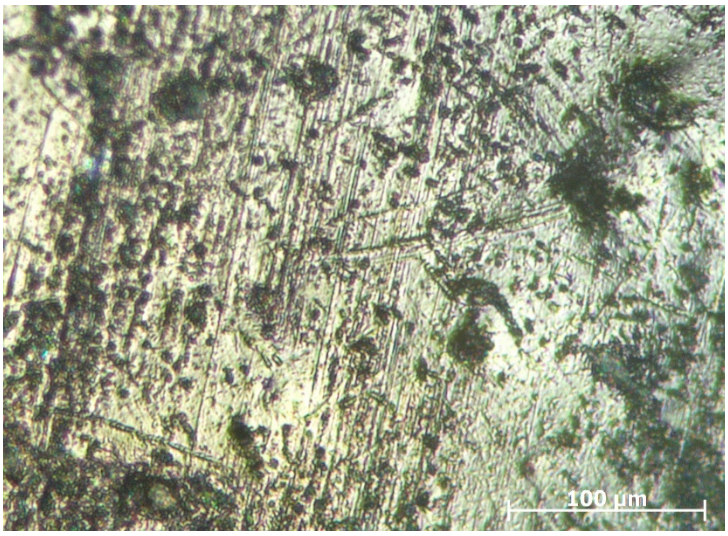


Figure 4-15: Rough-bottomed striae

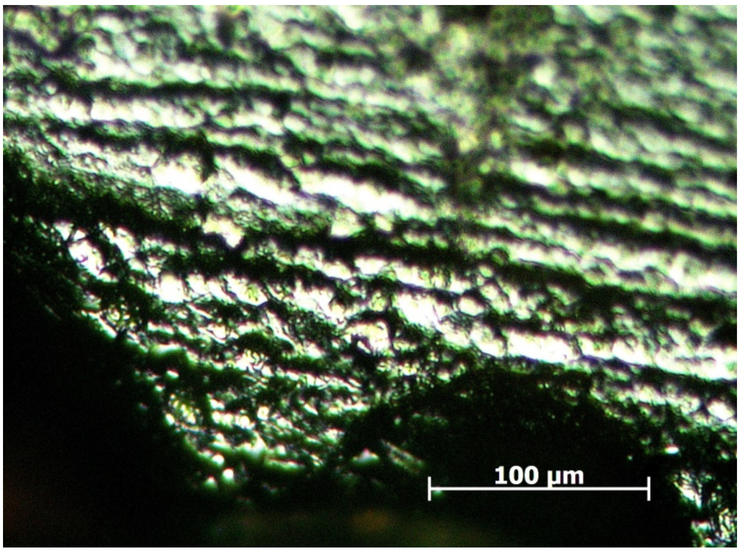


Figure 4-17: Intermittent striae

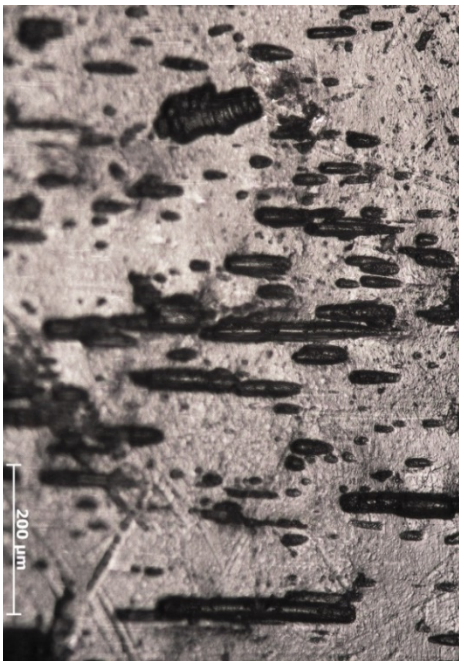


Figure 4-16: Crescent Row striae

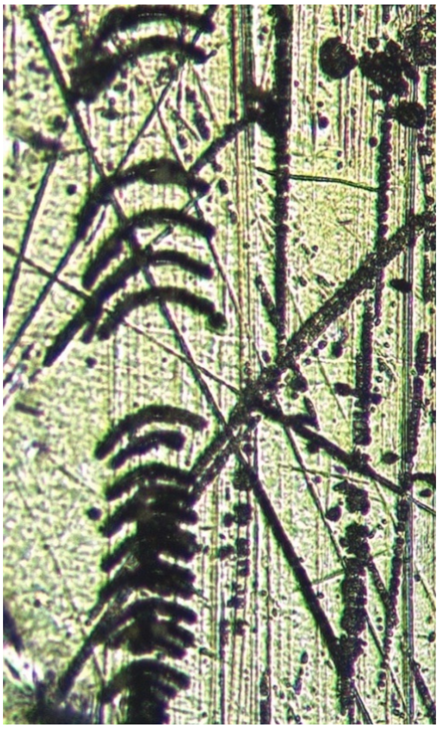


Table 4-1: Australian Timber Development Association timber hardness classification system. After (Janka, 1906) modified by ATDA (ATDA, 2016)

Classification	Hardness (kN)
Soft	<5.5
Moderate	5.5 to 7.0
Hard	7.1 to 10.0
Very Hard	> 10.0

Table 4-2: Hardness scale adapted from the ATDA scale and used for the reference collection

Classification	Hardness (kN)
Very soft	< 3.0
Soft	3.1 to 4.0
Moderate/Soft	4.1 to 5.0
Moderate	5.1 to 6.4
Moderate/Hard	6.5 to 8.0
Hard	8.1 to 9.0
Very Hard	>9.1
Elastic	Not Specified

Table 4-3: Classification of silica content of reference collection timbers

Classification	Silica Content %
Nil	<0.1
Very Low	0.1-1
Low	1.1- 2.0
Moderate	2.1-4.0
High	>4.0

Table 4-4: Relative hardness/softness and silica content of materials used to produce the experimental reference collection

Species	Common Name	Hardness	Silica Content	Hardness Reference	Silica Content Reference
Octomeles sumatrana	Erima	Very Soft	Low	(Usami, 1978: 110, Table 2)	(Wahlgrean and Laundrie, 1977: Table 1)
Colocasia esculenta	Taro	Soft	low	Personal observation	(Parr and Sullivan, 2005: 121)
Musa sp.	Banana	Soft	Low	Personal observation	(Parr and Sullivan, 2005: 121)
Cocos nucifera	Coconut mid-leaf	Soft	Moderate	Personal observation	(Parr and Sullivan, 2005: 121)
Toona sp.	Red Cedar	Soft	High	(Meier, 2014)	(Amos, 1952: Appendix II)
Conoidus sp.	Pandanus	Soft	High	Personal observation	(Parr and Sullivan, 2005: 121)
Mangifera sp.	Mango	Moderate	Very Low	(Bello and Mosteiro, 1997: 77)	(Amos, 1952: 12)
Hibiscus sp.	Hibiscus/ Cottonwood	Moderate	Very Low	(Bello and Mosteiro, 1997: 87)	(Amos, 1952: Appendix I)
Gnetum gnemon	Tulip Tree	Moderate	Nil	Personal Observation	(Amos, 1952: Appendix I)
Pommetia sp.	Ton/ Tulip Plum	Mod/Hard	Low	(Usami, 1978: 110, Table 2; Bello and Mosteiro, 1997: 73)	(Amos, 1952: Appendix I)
Calophyllum sp.	Bush Calophyllum	Mod/Hard	High	(Bello and Mosteiro, 1997: 43)	(Amos, 1952: Appendix II)
Caryota sp.	Black Palm	Hard	Moderate	Personal observation	(Amos, 1952: 9)
Nipholphila gunnii	Eucalyptus	Hard	Very low	Personal Observation	(Amos, 1952: Appendix I)
Cocos nucifera	Coconut shell	Hard	High	(Meier, 2014)	(Amos, 1952: 9)
Calamus muelleri	Rattan	Hard	High	Personal observation	(Amos, 1952: 9)
Calamus sp.	Lawyer Vine	Hard	High	Personal observation	(Amos, 1952: 9)
Bambusa sp.	Bamboo	Hard	High	(Meier, 2014)	(Amos, 1952: 9; Parr and Sullivan, 2005: 121)
Homalium foetidum	Malas	Hard	Nil	(Usami, 1978: 110, Table 2)	(Amos, 1952: Appendix I)
Eucalyptus sp.	Eucalyptus	Very Hard	High	(Wiemann and Green, 2007: 17, Appendix I)	(Parr and Sullivan, 2005: 121)
Casaurina sp.	Sheoak	Very Hard	Nil	(Meier, 2014)	(Amos, 1952: Appendix I)

Table 4-5: Comparison of grading values for soft wood

Hurcombe (1992)		**This Research**	
Sawing soft wood (Picea sp.) 15 mins	Value	Value	Sawing soft wood (Octomeles sumatrana) 240 mins
Polish intensity	3 = fairly bright	2 = light	Polish development
Polish texture	2 = smooth	2 = light	Polish development
Polish edge relief	4 = slightly rounded	3 = distinct rounding	Edge rounding in plan and edge rounding in profile
Extent of attrition	2 = up to 242 µm from the edge	2 = 250-500 µm from the edge	Extent and distance polish extends from edge

Table 4-6: Comparison of grading values for hard wood

Hurcombe (1992)		**This Research**	
Sawing hard wood (Quercus sp.) 10 mins	Value	Value	Sawing hard wood (Niphophila sp.) 15 mins
Polish intensity	2 = bright	2 = very light	Polish development
Polish texture	3 = slightly smooth	2 = very light	Polish development
Polish edge relief	4 = slightly rounded	1 = rounding just noticeable	Edge rounding in plan and edge rounding in profile
Extent of attrition	2.= 26-242 µm from the edge	2 = 51-100 µm from the edge	Extent and distance polish extends from edge

Table 4-7: Comparison of grading values for cane

Hurcombe (1992)		**This Research**	
Scraping cane (Arundo sp.) 30 mins	Value	Value	Scraping cane (Bambusa sp.) 30 mins
Polish intensity	4 = fairly dull	3 = developed	Polish development
Polish texture	4 = bumpy	3 = developed	Polish development
Polish edge relief	3 = rounded	3 = distinct rounding	Edge rounding in plan and edge rounding in profile
Extent of attrition	2 = 26-242 µm from the edge	2 = 51-100 µm from the edge	Extent and distance polish extends from edge

Table 4-8: Summary Table of use-wear analysis results from Kononenko (2008), sorted by hardness and then silica content of use-materials. The analysis codes as used in this research appended below each category.

Use-Material	Examples	Common Names	Hardness /Density	Silica Content	Use Mode	Striation Direction	Striation Description	Polish	Edge Scarring	Edge Rounding
Plant Material	*Colocasia esculenta*	Taro	Soft	Low	Slicing	Oblique	moderate shallow sleek striae	very light polish	Bending and feather microscars	very little evident
Use-wear Code						A	2 S	1 1	B, F D	1 1 1
Plant Material	leaves of Musa Sp., leaves of *Cocos nucifera*	Banana, Coconut	Soft	Low	Sawing	Axial	deep and shallow sleeks	isolated patches	continuous very small bending and feather scars	slight evidence
Use-wear Code						A	2 S	1 2	B, F C	1 1 1
Plant Material	Octomeles Sp.	Erima	Very Soft	Low	Whittling	Oblique	long shallow and deep sleeks, Some rough-bottomed striae	light polish on worked face only	Scars on worked face of edge only-mainly feather scars which are oriented slightly oblique to the edge	light to moderate
Use-wear Code						B	2 R, S	2 1	F, D	2

Use-Material	Examples	Common Names	Hardness /Density	Silica Content	Use Mode	Striation Direction	Striation Description	Polish	Edge Scarring	Edge Rounding
Plant Material	*Hibiscus tiliceus*, Mangifera sp.,	Hibiscus/ Cottonwood Mango,	Moderate	Very Low	Sawing	Axial	low density long deep sleek and rough-bottomed striae	smooth developed polish on elevated edges only	very intensive scarring. Small bending and feather scars on face with most contact with use-material, some scarring on opposing surface	moderate
Use-wear Code						A	2 S, R	2 3	B, F C	2
Plant Material	Calophyllum sp.	Bush Calophyllum	Moderate /hard	High	Sawing	Axial	dense short deep and shallow rough-bottomed striae	line of continuous polish which extends further back from working edge as use continues	continuous flake and feather scars	moderate
Use-wear Code						A	3 R	3 3	L, F C	2

Use-Material	**Examples**	**Common Names**	**Hardness /Density**	**Silica Content**	**Use Mode**	**Striation Direction**	**Striation Description**	**Polish**	**Edge Scarring**	**Edge Rounding**
Plant Material	Conoidus sp., Caryota sp.	Pandanus , Black Palm	Moderate /hard	Moderate	Scraping	Transverse	shallow and deep sleek striations	Appears after 5-15 minutes. Soon after formation scars become rounded. Polish prevents re-scarring	Small -medium continuous bending and feather scars	light rounding develops slowly
Use-wear Code						T	2 S	2 2	B, F C	2
Plant Material	*Pometia pinnata*	Ton	Moderate /hard	Low	Scraping	Transverse	patches of rough-bottomed and intermittent striations, some sleeks and some isolated striations within polish patches	Developed	continuous step, feather and bending scars on face not in contact	Distinct
Use-wear Code						T	2 R, I, S	3 2	B, S, F C	3

Use-Material	Examples	Common Names	Hardness /Density	Silica Content	Use Mode	Striation Direction	Striation Description	Polish	Edge Scarring	Edge Rounding
Plant Material	Bambusa sp., Calamus Sp., shell of *Cocos nucifera*	Bamboo, Rattan, Coconut Shell	Hard	High	Scraping	Transverse	short rough-bottomed, intermittent and sleek striae running back from edge	well-developed on face in contact	Face not in contact develops intensive edge scarring that obscures other use-wear close to edge. Scars are complex overlapping bending step and feather scars	intensive
Use-wear Code						T	2/3 R, I,S	4 2	B, S, F C	4
Soft Elastic Non-Plant Material	Pigskin, chicken skin		Elastic	NIL	Slicing	Axial	Individual shallow sleeks close to edge		Rare appearance of small scars.	thin line of edge rounding
Use-wear Code						A	1 S		M D	1
Soft Elastic Non-Plant Material	Fish-Scaridae sp.	Parrot Fish	Elastic	NIL	Slicing	Axial	scatter of isolated long deep Rough-bottomed striae axial to motion	spots of smooth light polish on elevations	small scars in groups where bone or scale is encountered.	slight rounding

Use-Material	Examples	Common Names	Hardness /Density	Silica Content	Use Mode	Striation Direction	Striation Description	Polish	Edge Scarring	Edge Rounding
Use-wear Code						A	2 R	1 1	B, F D	1
Exceptionally Hard Non-Plant Materials	Katylesia sp.	Clam Shell	Very Hard	NIL	Sawing	Axial	initial deep Rough-bottomed and intermittent striae are rapidly eroded away	thick line of well-developed polish	Distinct crushing of edge. Multiple bending and feather scars	intensive rounding
Use-wear Code						A	3 R, I	4 3	B, F C	4
Exceptionally Hard Non-Plant Materials	Katylesia sp.	Clam Shell	Very Hard	NIL	Scraping	Transverse	initial deep Rough-bottomed and intermittent striae are rapidly eroded away	thick line of well-developed polish on contact surface	dense step and bending scars	intensive rounding
Use-wear Code						T	2 R, I	4 3	S, B C	4

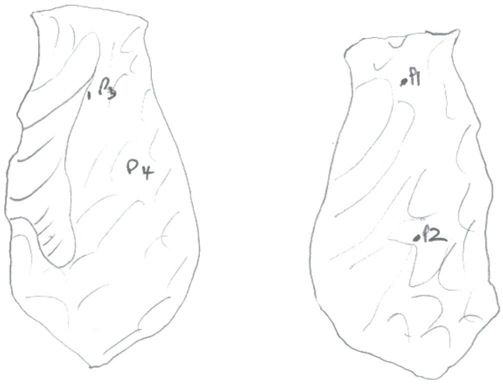
Figure 4-18: Drawing worksheet showing artefact drawing and photomicrograph locations

Lithic Microwear Worksheet

Lithic Reference N°	FAP 203	Master Record Sheet N°	0115
Date	8/12/13	Recorder	[signature]
Residue Sheet N°			

Context: FAP New stemmed tool locality 1992 LOCALITY 4

Drawing (large drawings on reverse of sheet)



Points	Mag	Description
P1.	100	scattered axial AB Striae
2	100	Axial abrasion & AB & I Striae
3	200	Small areas of polish on elevations
4	200	polish patches

Notes: Ventral side same axial abrasion — AB Striae with small patches of polish

Dorsal side — looks as if it had quite a bit of polish underneath the chemical pitting & on top of the original flaking/retouch. — Possible hafting polish?

Figure 4-19: Coding system scorecard (showing schematic diagram of 'standardised' tool), as used in laboratory assessment to systemise recordings.

Analysis scorecard	0	= Clean surface but no use wear detectable / neglible/random
Microwear Variables	**Values**	= Surface condition prevents observation)
Edge Scarring		
Type	B= bending, F= feather, L= Flaked, S= step, M= multiple microscars, V= mixt/various	
Distribution	c= continuous distribution, d= discontinuous/intermittent distrbution	
Edge Rounding		
Edge rounding in profile	1= Just Noticeable, 2= Quite Noticeable, 3= Distinct, 4= Severe	
Edge Rounding in Plan	1= Just Noticeable, 2= Quite Noticeable, 3= Distinct, 4= Severe	
Abrasion of edge	1= Just Noticeable, 2= Quite Noticeable, 3= Distinct, 4= Severe	
Polish associated with edge-wear		
Development		
None discernible	0	
very light	1	
light	2	
developed	3	
well developed	4	
Extent		
small isolated patches	1	
larger patches of > 200 x 200 µm	2	
extensive and merging areas of polish	3	
How far from edge does polish extend?		
< 50µm	1	
51- 100µm	2	
101-200µm	3	
201-500µm	4	
>500µm	5	
Striae Variables		
Primary Orientation	**A**xial/**T**ransverse/o**B**lique	**A/T/B**
Primary Density	1= scattered, 2= moderate density 3= very dense	
Primary Description	S= sleeks,I = Intermittent, R = Rough Bottomed and deep, F= Flaked, C= Crescent row	
Secondary Orientation	Axial/Transverse/Oblique	**A/T/B**
Secondary Density	1= scattered, 2= moderate density 3= very dense	
Secondary Description	S= sleeks,I = Intermittent, R = Rough Bottomed and deep, F= Flaked, C= Crescent row	
Polish associated with elevated prominences /arrises/ scars away from edge		
Development		
None discernible	0	
very light	1	
light	2	
developed	3	
well developed	4	
Extent		
small isolated patches	1	
larger patches of > 200 x 200 µm	2	
Continuous along line of elevation	3	
Residues		
Present/not present	0= not present 1= present	
Extract ref		
Source	0 = unidentified, 1= possible plant residue, 2= possible animal residue	
Starch present	0 = not found, 1= found but not identified, 3= found and identified (see Residue Record Sheet)	
Location	Point number	
B/A	Before Cleaning/After Cleaning	
Measurements		
50 x : 10 units = 50 µm		
100x : 10 units = 100 µm		
200x: 10 units = 200 µm		
500X: 10 units = 500 µm		

Prefix location number with 'Dorsal' or 'Ventral'
e.g. dorsal side mid-stem = D14

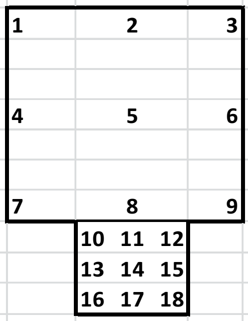
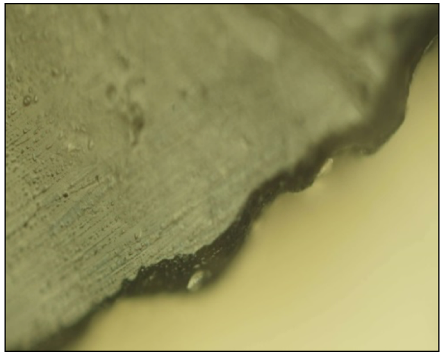


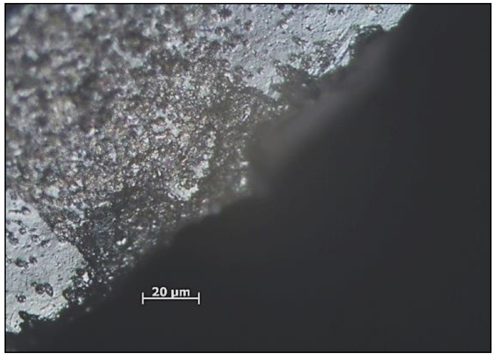
Figure 4-20: Photographic Reference Card used to promote consistency in the allocation of analysis codes

Definitions Photographic Guide

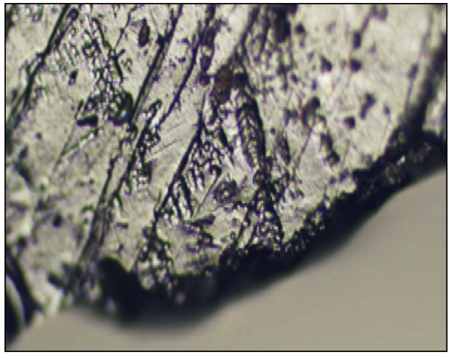
Edge Rounding



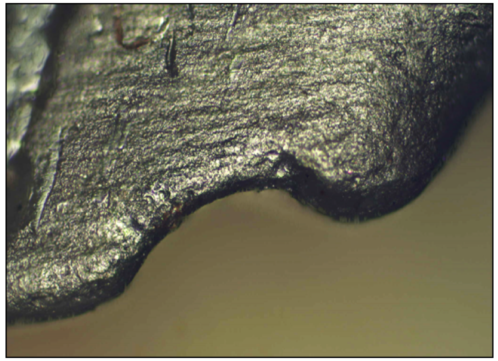
Just Noticeable



Quite Noticeable

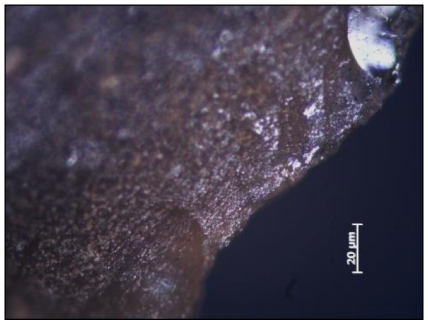


Distinct

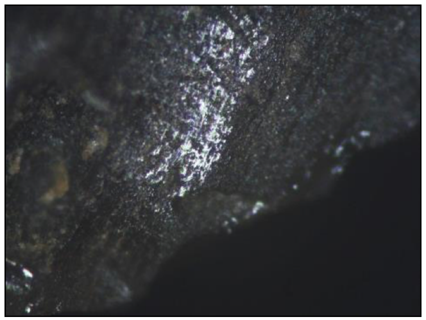


Severe

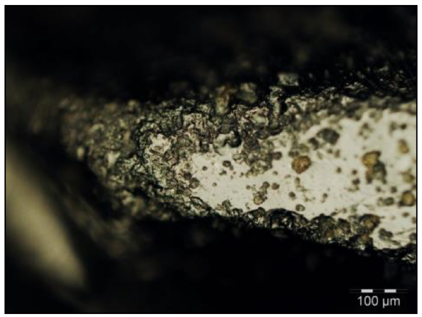
Polish



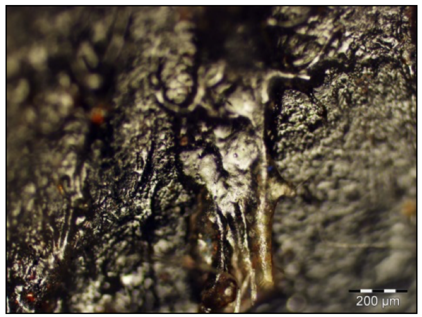
Very Light



Light

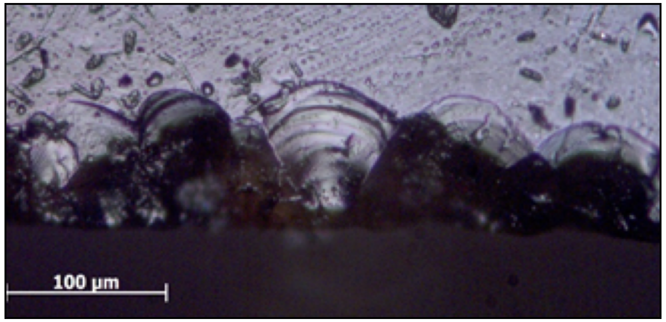


Developed

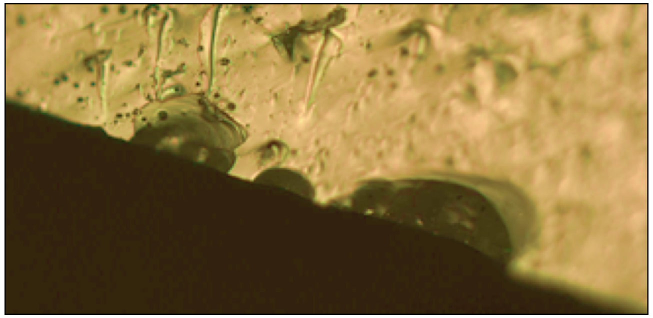


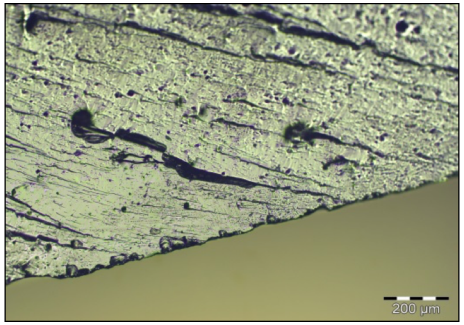
Well Developed

Edge Scarring

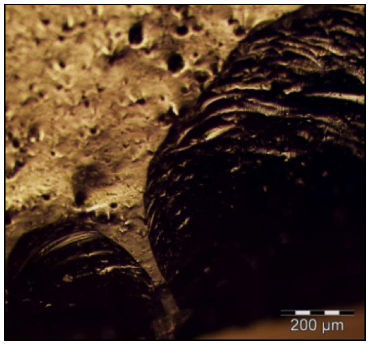


Continuous

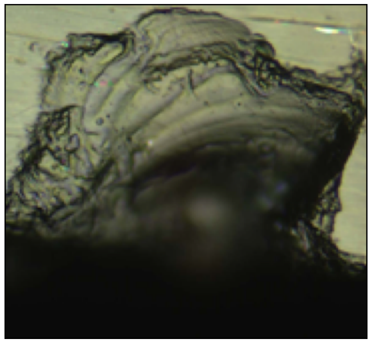

Intermittent

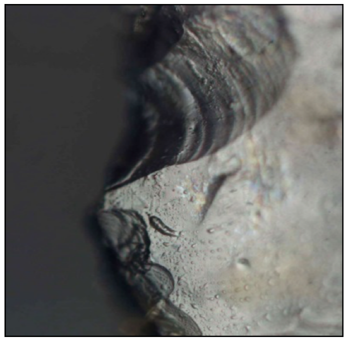


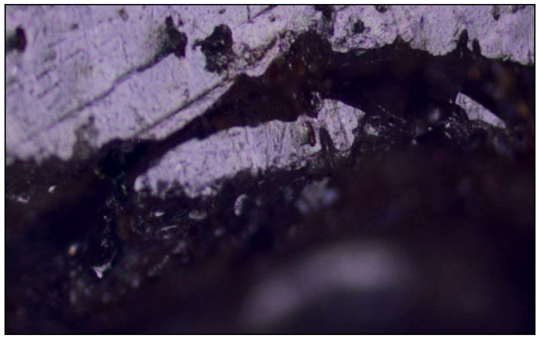
Multiple Microscars



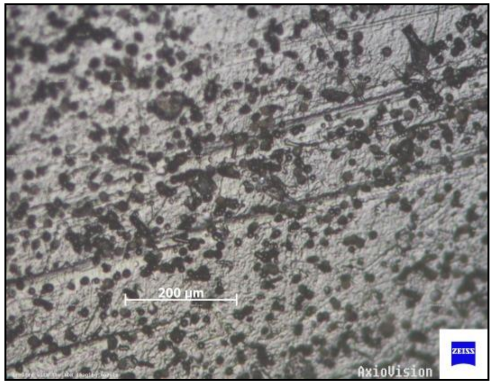
Feather Scar


Step Scar

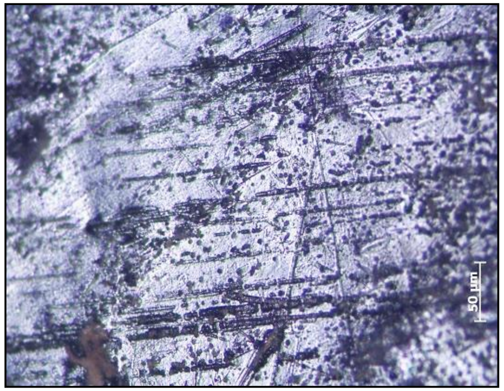

Bending Scar


Flaked Scar showing incomplete

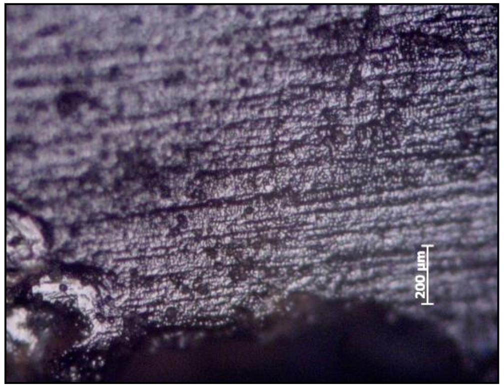
Striae



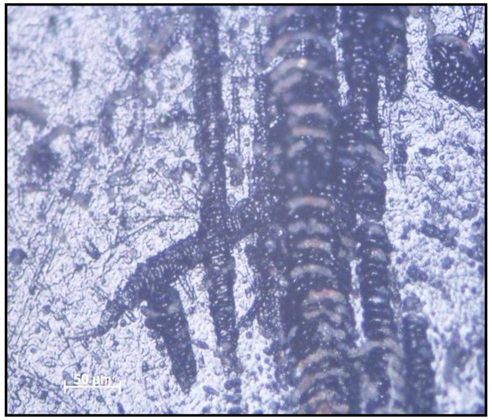
Scattered



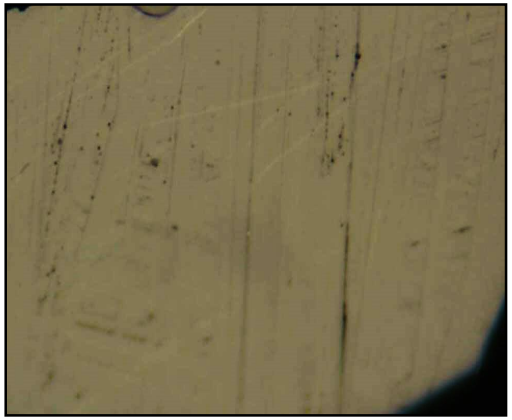
Moderately Dense



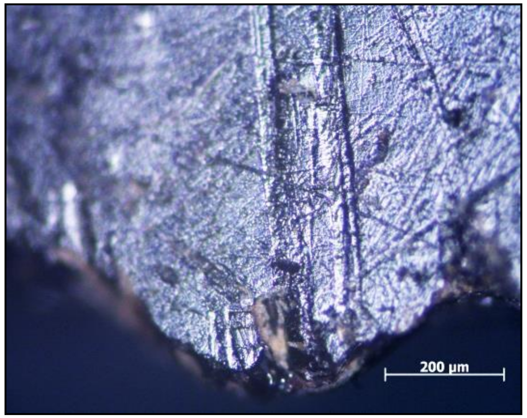
Very Dense



Crescent Row



Sleeks



Rough Bottomed

Figure 4-21: Recording worksheet 1/3

Artefact Lithic Microwear and Residue Master Record								Dorsal										
Lithic Ref:		Sheet N°		Residue Sheet N°			Database update											
Weight g.	Max length	Max Width mm	Max Thickness	Edge Plan	Dorsal Left	Edge Plan	Dorsal Right	Edge Angle	Dorsal Left	Edge Angle	Dorsal Right	Spine Plane	Dorsal Left	Spine Plane	Dorsal Right	Stem Type	Blade X Section	
Position on Lithic	**D1**	**D2**	**D3**	**D4**	**D5**	**D6**	**D7**	**D8**	**D9**	**D10**	**D11**	**D12**	**D13**	**D14**	**D15**	**D16**	**D17**	**D18**
Edge Deformation																		
Scar Type																		
Scar Distribution																		
Edge Rounding Prof																		
Edge Rounding Plan																		
Abrasion of edge																		
Polish ass with edge wear																		
Development																		
Extent																		
Closeness to Edge																		
Striae																		
Primary Orientation																		
Primary Density																		
Primary Description																		
Secondary Orientation																		
Secondary Density																		
Secondary Description																		
Polish ass with elevations and arrises																		
Development																		
Extent																		
Residues																		
Present/not present																		
Extract ref N°																		
Source																		
Starch present																		
Cleaning																		

Figure 4-22: Recording Worksheet 2/3

Artefact Lithic Microwear and Residue Master Record									**VENTRAL**										
Lithic Ref :		**Sheet N°**			**Residue Sheet N°**														
Position on Lithic		**V1**	**V2**	**V3**	**V4**	**V5**	**V6**	**V7**	**V8**	**V9**	**V10**	**V11**	**V12**	**V13**	**V14**	**V15**	**V16**	**V17**	**V18**
Edge Deformation																			
Scar Type																			
Scar Distribution																			
Edge Rounding Prof																			
Edge Rounding Plan																			
Abrasion of edge																			
Polish ass with edge wear																			
Development																			
Extent																			
Closeness to Edge																			
Striae																			
Primary Orientation																			
Primary Density																			
Primary Description																			
Secondary Orientation																			
Secondary Density																			
Secondary Description																			
Polish ass with elevations and arrises																			
Development																			
Extent																			
Residues																			
Present/not present																			
Extract ref N°																			
Source																			
Starch present																			
Cleaning																			

Figure 4-23: Recording Worksheet 3/3

Lithic Microwear Worksheet

Lithic Reference N° | Master Record Sheet N°

Date | Recorder | Residue Sheet N°

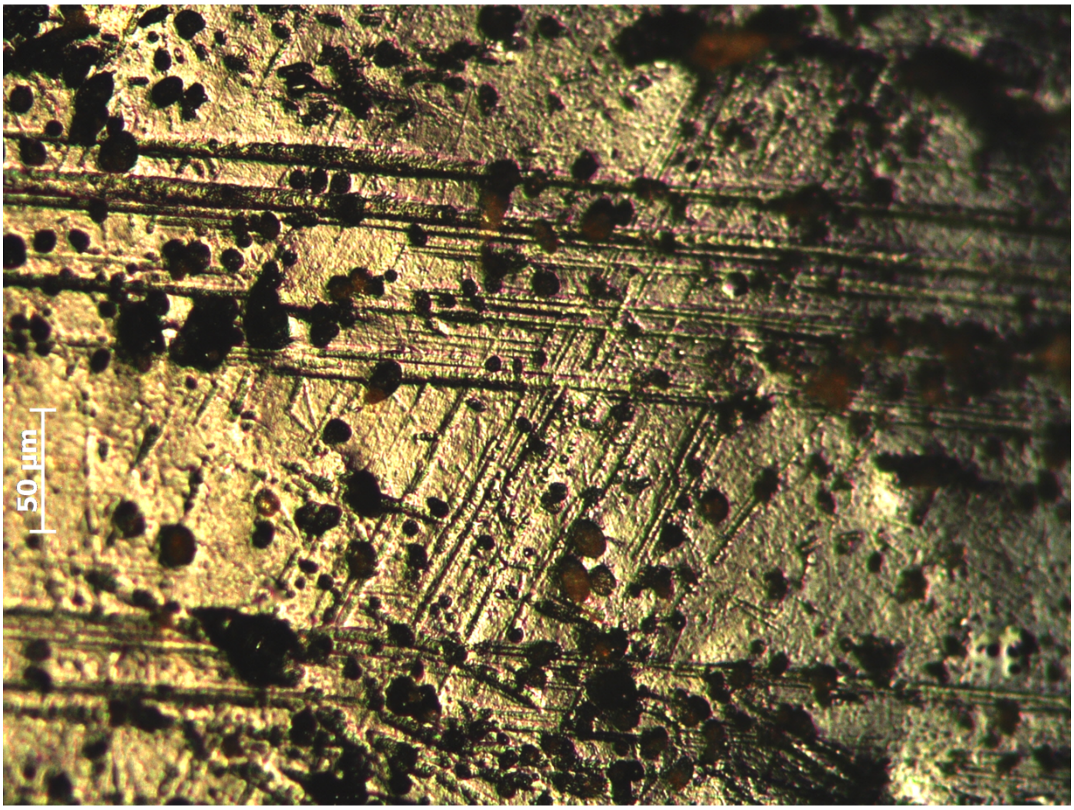
Context

Drawing (large drawings on reverse of sheet)

Points | Mag | Description

Notes

Figure 4-24: Transverse sleek and rough-bottomed striae overlaid with axial striae



Illustrations to Chapter 5.

Figure 5-1: Type A stem

Table 5-1: Summary of stem type numbers

Stem Type	n=
Type A	43
Type B	10
Type C	19
Type D	24
Type E	13
Total	**109**

Figure 5-2: Type B stem

Figure 5-3: Type C stem

Figure 5-4: Type D stem

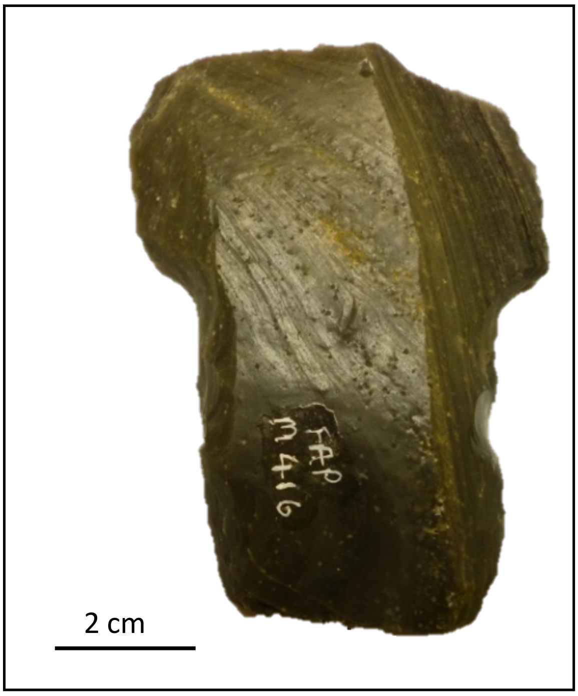


Figure 5-5: Type E stem

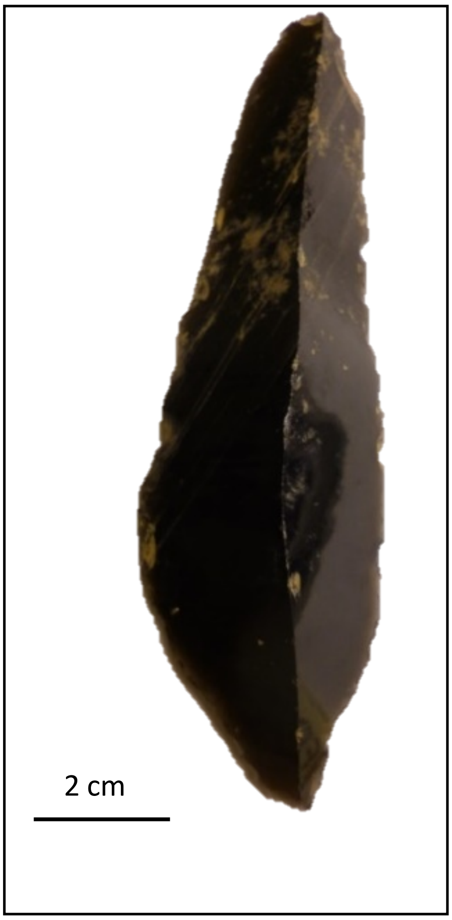


Figure 5-6: Type A stem showing measurement of stem length along line A-B

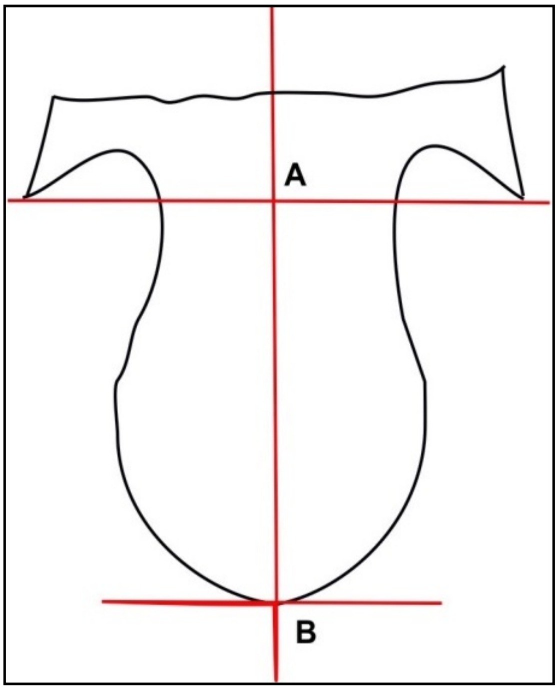


Figure 5-7: Type B stem showing measurement of stem length along line A-B

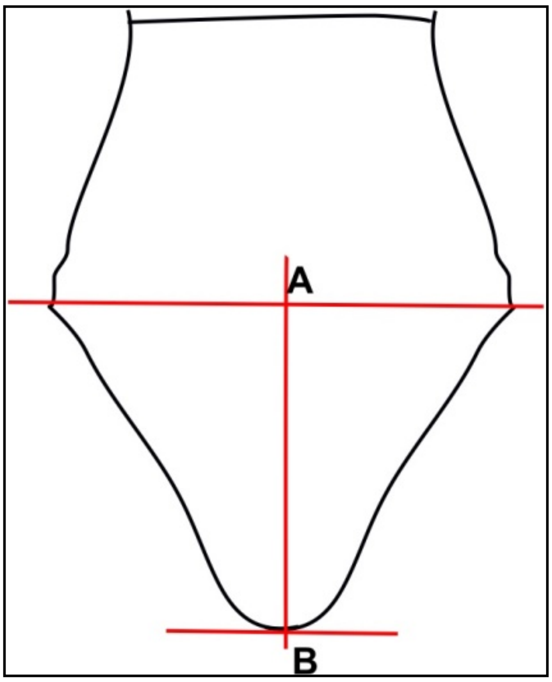
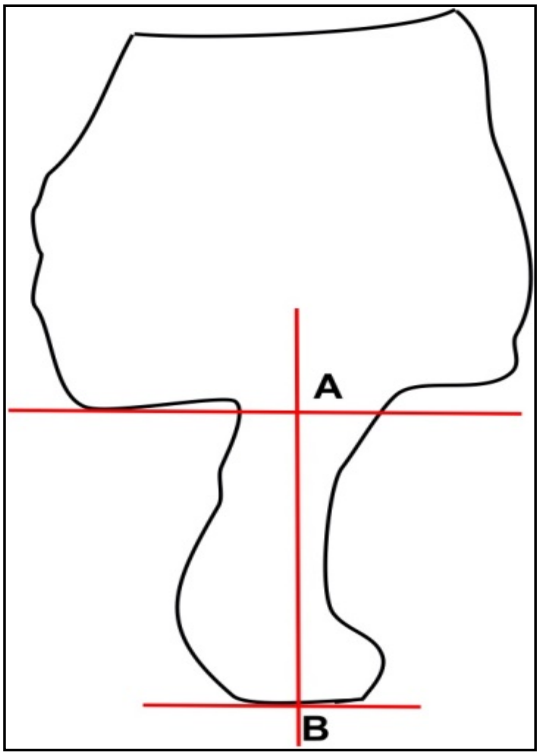


Figure 5-8: Type C stem showing measurement of stem length along line A-B



Table

Figure 5-9: Type D stem showing measurement of stem length along line A-B

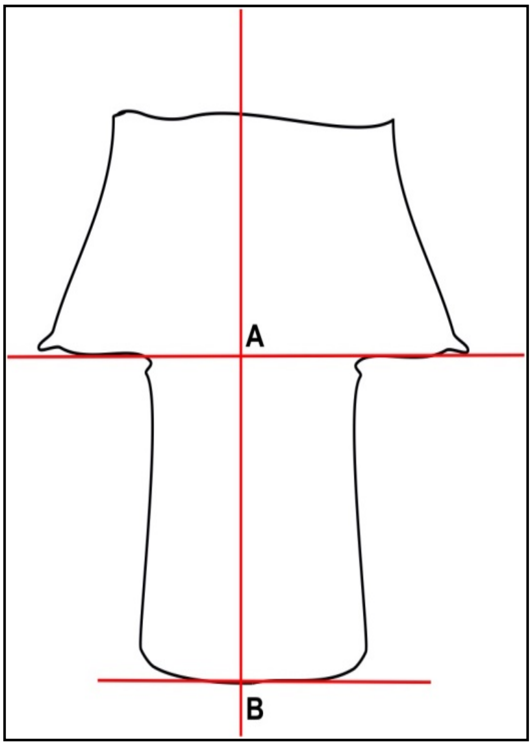


Figure 5-10:Type E stem showing measurement of stem length along line A-B

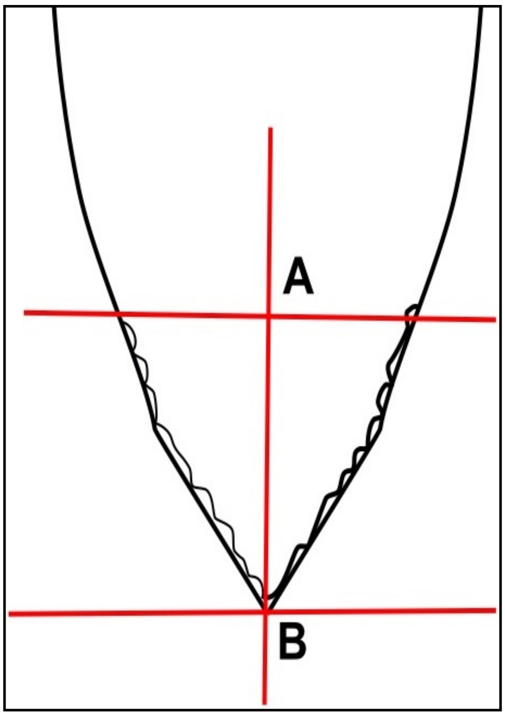


Table 5-2: Dimensions and statistical analysis: Type A stems

Dimension	n=	Min	Max	Mean: μ	Standard Deviation: σ	Coefficient of Variation: $C_{v\,\%}$
Length	40	42	75	58.28	7.62	13.08
Width	41	25	43	34.73	4.05	11.68
Thickness	41	8	15	11.90	1.83	15.24

Table 5-3: Dimensions and statistical analysis: Type B stems

Dimension	n=	Min	Max	Mean: μ	Standard Deviation: σ	Coefficient of Variation: $C_{v\,\%}$
Length	9	37	85	49.89	14.76	29.58
Width	9	15	70	36.11	16.95	44.47
Thickness	9	7	22	14.56	4.06	27.93

Table 5-4: Dimensions and statistical analysis: Type C stems

Dimension	n=	Min	Max	Mean: μ	Standard Deviation: σ	Coefficient of Variation: $C_{v\,\%}$
Length	14	22	54	37.64	12.30	32.66
Width	16	14	37	24.13	7.08	29.34
Thickness	16	9	18	13.70	3.20	23.37

Table 5-5: Dimensions and statistical analysis: Type D stems

Dimension	n=	Min	Max	Mean: μ	Standard Deviation: σ	Coefficient of Variation: $C_{v\,\%}$
Length	21	22	74	45.14	12.77	28.29
Width	21	24	51	33.91	7.50	22.11
Thickness	21	9	20	13.86	2.80	20.19

Table 5-6: Dimensions and statistical analysis: Type E stems

Dimension	n=	Min	Max	Mean: μ	Standard Deviation: σ	Coefficient of Variation: C_v
Length	7	20	92	57.00	26.80	47.00
Width	10	26	64	42.40	12.57	29.65
Thickness	10	9	26	15.7	4.95	31.50

Table 5-7: Dimensions and statistical analysis; All stems

Dimension	n=	Min	Max	Mean: μ	Standard Deviation: σ	Coefficient of Variation: $C_{v\,\%}$
Length	91	20	92	50.87	14.66	28.83
Width	97	14	70	33.72	9.37	27.79
Thickness	97	7	25	13.25	3.17	23.92

Table 5-8: Dimensions and statistical analysis: all stems not including Type A stems

Dimension	n=	Min	Max	Mean: μ	Standard Deviation: σ	Coefficient of Variation: $C_{v\,\%}$
Length	49	22	92	45.90	16.14	35.18
Width	56	14	70	33.28	11.88	35.69
Thickness	56	7	25	14.33	3.54	24.69

Table 5-9: Summary Table of coefficients of variation in stem width and thickness measurements

Stem	n=	Coefficient of Variation of width: C_V %	Coefficient of Variation of thickness: C_V %
Type A	41	11.68	15.24
Type B	9	44.47	27.93
Type C	16	29.34	23.37
Type D	21	22.11	20.19
Type E	10	29.65	31.50
All stems	97	27.79	23.92
All stems excluding Type A	56	35.69	24.69

Table 5-10: Ratio of width to thickness

Ratio of width: thickness	n=	Min	Max	Mean:	Standard Deviation:	Coefficient of Variation: C_v %
All stems	97	1.06	5.83	2.66	8.16	30.68
Type A only	41	2.13	4.11	3.00	5.1	17.01
All stems excluding Type A	56	1.06	5.83	2.41	9.07	37.60

Table 5-11: Levene's test for homogeneity of variation applied to stem dimensions

Dimension	Levene's test for homogeneity of variation; p=
Length: all stems	0.002311
Length: all stems except Type A	0.09836
Width: all stems	0.000111
Width: all stems except Type A	0.0791
Thickness: all stems	0.004401
Thickness: all stems except Type A	0.6662
All Dimensions	0.000004598
All Dimensions except Type A	0.2294

Table 5-12: All Artefacts in sample showing morphology characteristics. Key: TRI = Triangular, TRAP = Trapezoid, M= Missing, /= Not ascertainable

Artefact Reference	Edge Angle Dorsal Left	Edge Angle Dorsal Right	Spine Plane Dorsal Left	Spine Plane Dorsal Right	Stem Type	Blade Cross Section	Geochemical Sourcing Results
FAAH 035	/	/	/	/	A	/	Kutau/Bao
FAAJ 054	25	25	25	25	M	TRI	Kutau/Bao
FAAJ 055	50	35	50	35	/	/	
FAAL 120	50	50	/	/	M	TRAP	Kutau/Bao
FAO 1901	50	55	50	55	/	/	
FAP 202	30	10	30	35	D	TRAP	Baki
FAP 203	/	/	/	/	A	/	Kutau/Bao
FAP 212	20	20	20	20	E	TRI	Baki
FAP 214	25	45	/	/	C	TRAP	Kutau/Bao
FAP 215	/	/	/	/	A	/	Kutau/Bao
FAP 220	/	/	/	/	E	/	Baki
FAP 221	/	/	/	/	A	/	
FAP 229	60	45	60	45	C	TRAP	Baki
FAP 231	/	/	/	/	A	/	Kutau/Bao
FAP 232	/	/	/	/	A	/	Baki
FAP 248	/	/	/	/	A	/	Kutau/Bao
FAP 249	/	/	/	/	A	/	Kutau/Bao
FAP 255	30	60	30	60	B	TRAP	Kutau/Bao
FAP 258	25	25	25	25	D	TRI	Kutau/Bao
FAP 259	25	75	25	20	B	TRAP	Kutau/Bao
FAP 261	/	/	/	/	A	/	
FAP 270	/	/	/	/	A	/	Baki
FAP 272	40	30	40	30	C	TRAP	Baki
FAP 279	/	/	/	/	A	/	Kutau/Bao
FAP 283	30	35	30	35	D	TRAP	Baki
FAP 400	/	/	/	/	A	/	Gulu
FAP 401	30	40	30	40	C	TRAP	Kutau/Bao
FAP 407	30	40	30	40	D	TRAP	Baki
FAP 416	30	25	30	25	D	TRAP	Kutau/Bao
FAP 420	30	30	30	30	D	TRAP	Baki
FAP 421	30	40	30	40	D	TRAP	Kutau/Bao
FAP 424	30	20	30	20	D	TRI	Baki

Artefact Reference	Edge Angle Dorsal Left	Edge Angle Dorsal Right	Spine Plane Dorsal Left	Spine Plane Dorsal Right	Stem Type	Blade Cross Section	Geochemical Sourcing Results
FAP 427	40	30	40	30	A	TRAP	Baki
FAP 429	20	30	20	30	C	TRAP	Baki
FAP 433	20	30	/	/	A	TRAP	Kutau/Bao
FAP 439	75	30	75	30	E	TRAP	Baki
FAP 440	/	/	/	/	A	/	
FAP 442	35	35	35	35	M	TRAP	Baki
FAP 446	40	35	40	35	A	TRAP	Baki
FAP 452	20	20	20	20	D	TRI	Baki
FAP 464	45	/	/	/	C	TRAP	Kutau/Bao
FAP 481	/	/	/	/	A	/	Kutau/Bao
FAP 514	/	/	30	25	/	/	Baki
FAP 528	/	/	/	/	A	/	Kutau/Bao
FAP 537	/	/	/	/	A	/	Kutau/Bao
FAP 542	35	30	35	30	B	TRAP	Baki
FAP 543	/	/	/	/	A	/	Kutau/Bao
FAP 550	/	/	/	/	A	/	Baki
FAP 560	/	/	/	/	A	/	Kutau/Bao
FAP 562	30	30	30	30	B	TRAP	
FAP 563	/	/	/	/	A	/	Baki
FAP 564	/	/	/	/	A	/	Kutau/Bao
FAP 573	30	35	20	20	M	TRAP	Baki
FAP 610	25	30	25	30	M	TRI	Baki
FAP 705	/	100	40	/	A	TRAP	Gulu
FAP 732	30	35	/	25	M	TRAP	Kutau/Bao
FAP 743	40	30	40	30	E	TRAP	Baki
FAP 746	25	25	/	/	M	TRI	Kutau/Bao
FAP 756	35	/	35	/	A	TRAP	Baki
FAP 758	40	40	40	40	D	TRAP	Baki
FAP 759	60	35	65	35	D	TRAP	Baki
FAP 779	55	35	/	/	B	TRI	Kutau/Bao
FAP 782	/	35	/	35	M	TRAP	Gulu
FAP 783	/	/	90	20	D	/	Baki
FAP 788	/	/	/	/	A	/	Kutau/Bao
FAP 789	/	/	/	/	A	/	Kutau/Bao
FAP 829	30	/	30	30	/	TRAP	Kutau/Bao
FAP 831	30	30	30	30	D	TRAP	Kutau/Bao
FAP 834	/	/	60	35	D	TRAP	Kutau/Bao

Artefact Reference	Edge Angle Dorsal Left	Edge Angle Dorsal Right	Spine Plane Dorsal Left	Spine Plane Dorsal Right	Stem Type	Blade Cross Section	Geochemical Sourcing Results
FAP 835	/	/	/	/	A	/	Kutau/Bao
FAP 842	/	/	/	/	A	/	Gulu
FAP 843	40	25	40	25	M	TRAP	Baki
FAP 848	30	45	30	45	M	TRAP	Baki
FAP 863	/	/	/	/	A	/	Kutau/Bao
FAP 864	30	/	/	/	D	TRAP	Baki
FAP 865	40	39	40	40	A	TRAP	Gulu
FAP 866	40	45	40	30	D	TRAP	Kutau/Bao
FAQ 010	30	50	30	50	C	TRI	Kutau/Bao
FAQ 446	/	/	/	/	C	/	
FAR 003	80	75	80	30	A	TRAP	Kutau/Bao
FAR 020	/	/	/	/	A	/	Kutau/Bao
FAR 022	45	25	20	/	A	TRAP	Baki
FAR 023	35	/	35	/	D	TRAP	Kutau/Bao
FAR 027	/	/	/	/	A	/	Kutau/Bao
FAR 031	/	/	/	/	A	/	Baki
FAR 033	30	35	30	35	A	TRAP	Baki
FAR 038	/	/	/	/	A	/	Gulu
FAR 040	40	30	40	30	D	TRAP	Kutau/Bao
FAR 046	40	50	/	/	M	TRAP	Baki
FAR II 001	20	35	20	35	D	TRAP	
FAR II 002	55	20	20	/	A	TRAP	Baki
FAR II 007	20	30	20	30	D	TRI	
FAR II 008	25	50	25	20	M	TRAP	
FAR II 028	/	/	/	/	A	/	Kutau/Bao
FAW 001	90	85	20	25	M	TRAP	Kutau/Bao
FAY 007	40	/	40	/	/	TRAP	Gulu
FAY 010	25	30	25	30	C	TRI	
FDC/A/13	25	30	/	/	/	/	Kutau/Bao
FDC/A/22	/	/	/	30	C	TRI	Kutau/Bao
FDC/C/5	/	/	/	/	A	/	
FDC/F/22	/	/	/	/	C	/	Kutau/Bao
FDC/F/39	25	/	/	/	/	/	Kutau/Bao
FDC/F/43	70	35	70	35	A	TRAP	Kutau/Bao
FDC/F/46	20	30	20	30	C	TRAP	Kutau/Bao
FDM002	30	40	30	40	C	TRAP	Gulu
FDW 001	65	45	65	45	B	TRAP	Kutau/Bao

Artefact Reference	Edge Angle Dorsal Left	Edge Angle Dorsal Right	Spine Plane Dorsal Left	Spine Plane Dorsal Right	Stem Type	Blade Cross Section	Geochemical Sourcing Results
FDY 001	55	40	55	40	B	TRI	Kutau/Bao
FEK 001	15	15	35	30	M	TRAP	Gulu
FEK 011	30	30	30	30	D	TRI	Kutau/Bao
FEK 015	/	70	60	30	C	TRI	Kutau/Bao
FEK 016	105	75	35	30	C	TRAP	Kutau/Bao
FEK 025	75	80	30	20	M	TRAP	Kutau/Bao
FEK 029	40	20	40	20	B	TRI	Kutau/Bao
FEK 032	20	20	20	20	/	TRI	Kutau/Bao
FEK 052	70	80	45	55	M	TRI	Kutau/Bao
FEK 109	25	55	/	/	D	TRI	Kutau/Bao
FQT 039	35	40	35	40	C	TRAP	
FRL 1004	40	40	40	40	E	TRI	
FRL 101	45	40	45	40	M	TRAP	Kutau/Bao
FRL 1012	30	20	20	30	/	TRI	Kutau/Bao
FRL 1017	/	/	45	30	/	TRI	Kutau/Bao
FRL 1048	30	30	30	30	M	TRI	Kutau/Bao
FRL 1049	35	30	35	30	M	TRI	Kutau/Bao
FRL 1050	40	40	/	20	E	/	Kutau/Bao
FRL 1052	/	/	30	30	E	/	Kutau/Bao
FRL 1053	30	30	30	30	E	TRI	Kutau/Bao
FRL 1054	40	30	40	35	M	TRI	Kutau/Bao
FRL 1056	80	70	80	70	M	TRAP	Kutau/Bao
FRL 1058	45	55	35	55	M	TRAP	Kutau/Bao
FRL 116	/	/	/	/	E	TRAP	Kutau/Bao
FRL 118	65	80	20	20	E	TRAP	
FRL 124	25	30	25	30	M	TRAP	Kutau/Bao
FRL 134	30	50	30	50	M	TRI	Kutau/Bao
FRL 155	/	/	/	/	/	/	Kutau/Bao
FRL 183	40	20	40	20	B	TRI	Kutau/Bao
FRL 185	30	45	30	45	E	TRAP	Kutau/Bao
FRL 221	60	35	20	30	E	/	Kutau/Bao
FRL 230	50	25	35	25	B	TRAP	Kutau/Bao
FRL 335	/	/	/	/	C	/	Kutau/Bao
FRL 352	20	45	20	45	D	TRI	Kutau/Bao
FRL 428	50	45	20	45	E	TRAP	Kutau/Bao
FRL 513	20	/	/	/	D	/	Kutau/Bao
FRL 582	30	60	60	30	M	TRAP	Kutau/Bao

Artefact Reference	Edge Angle Dorsal Left	Edge Angle Dorsal Right	Spine Plane Dorsal Left	Spine Plane Dorsal Right	Stem Type	Blade Cross Section	Geochemical Sourcing Results
FRL 595	30	60	30	60	E	TRAP	Kutau/Bao
FRL 911	30	40	30	40	M	TRI	Kutau/Bao
FSZ 141	60	60	45	60	C	TRAP	Baki
FSZ 205	/	/	/	/	C	/	Kutau/Bao

Table 5-13: Summary analysis of Type 1 tools with blade sections present

Artefact Find Site	Use-wear present	Surface Too Degraded	Nil use-wear	Total
Garua Island Sites	40	21	8	69
Bitokara Sites	15	2	3	20
Other Willaumez Peninsula sites	5	2	0	7
Total	60	25	11	96

Table 5-14: Blades with spine-plane or edge angles ≥600

Artefact Reference	Blade Cross-section	Spine-plane Angle left (degrees)	Spine-plane Angle Right (degrees)
FRL 595	Trapezoid	30	60
FRL 1056	Trapezoid	80	70
FEK 015	Triangular	60	30
FRL 221	Indeterminate	60	35
FAP 229	Trapezoid	60	45
FAP 255	Trapezoid	30	60
FSZ 141	Trapezoid	60	60
FDW 001	Trapezoid	65	45
FAP 759	Trapezoid	60	35

Table 5-15: Artefacts with retouch to blade and with spine-plane or edge angles $>45^0$

Artefact Reference	Details
FAP 783	A partial blade with one edge at 90^0
FAP 439	A trapezoid blade with one edge at 75^0
FAP 759	A possible adze blade with one edge at 65^0
FAR 003	A trapezoid blade with one edge at 80^0
FDC/F/43	A trapezoid blade with one edge at 70^0
FDW 001	A trapezoid blade with one edge at 65^0
FRL 1056	A trapezoid blade with a left edge at 80^0 and a right edge at 70^0

Figure 5-11: All blades: spine-plane angles

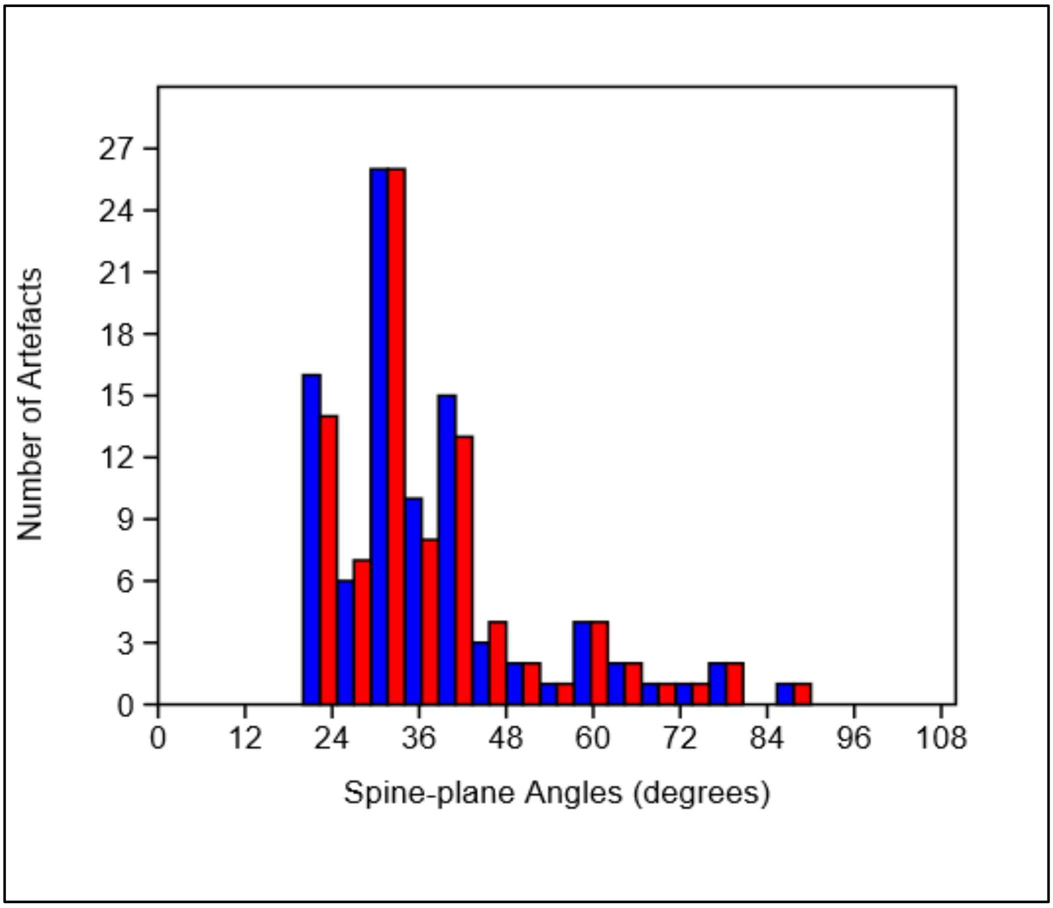


Figure 5-12: All blades: edge angles

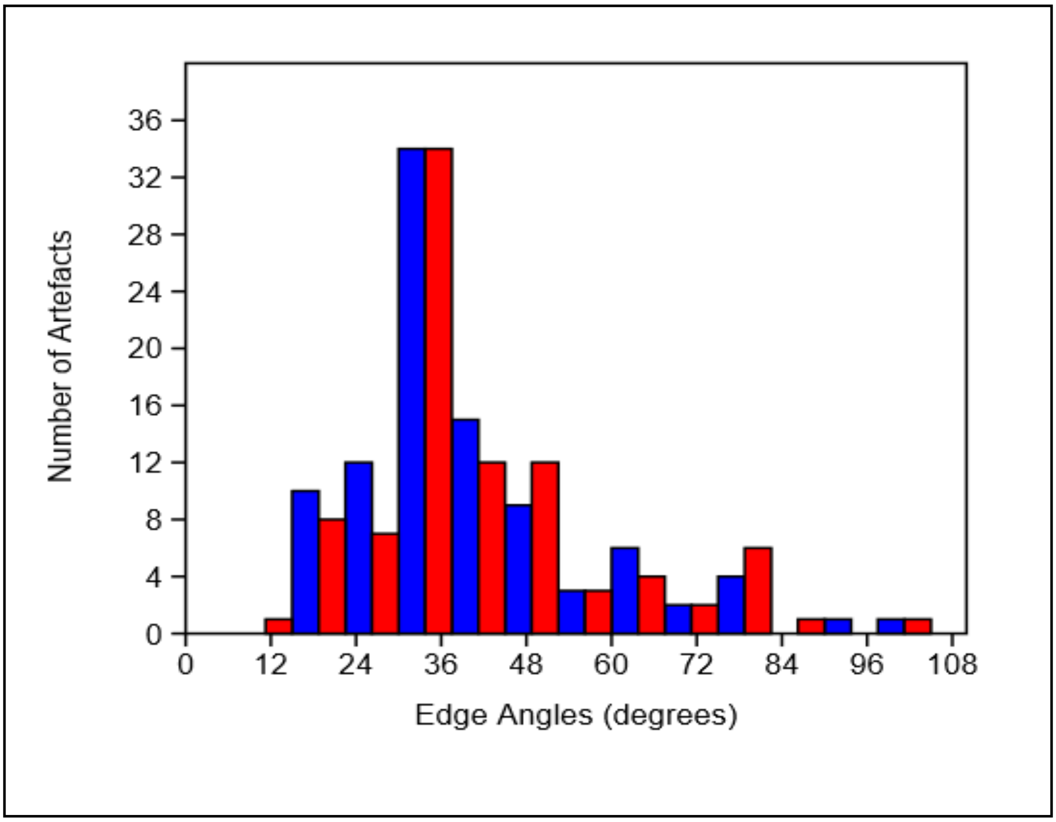


Figure 5-13: Trapezoid blades: spine-plane angles

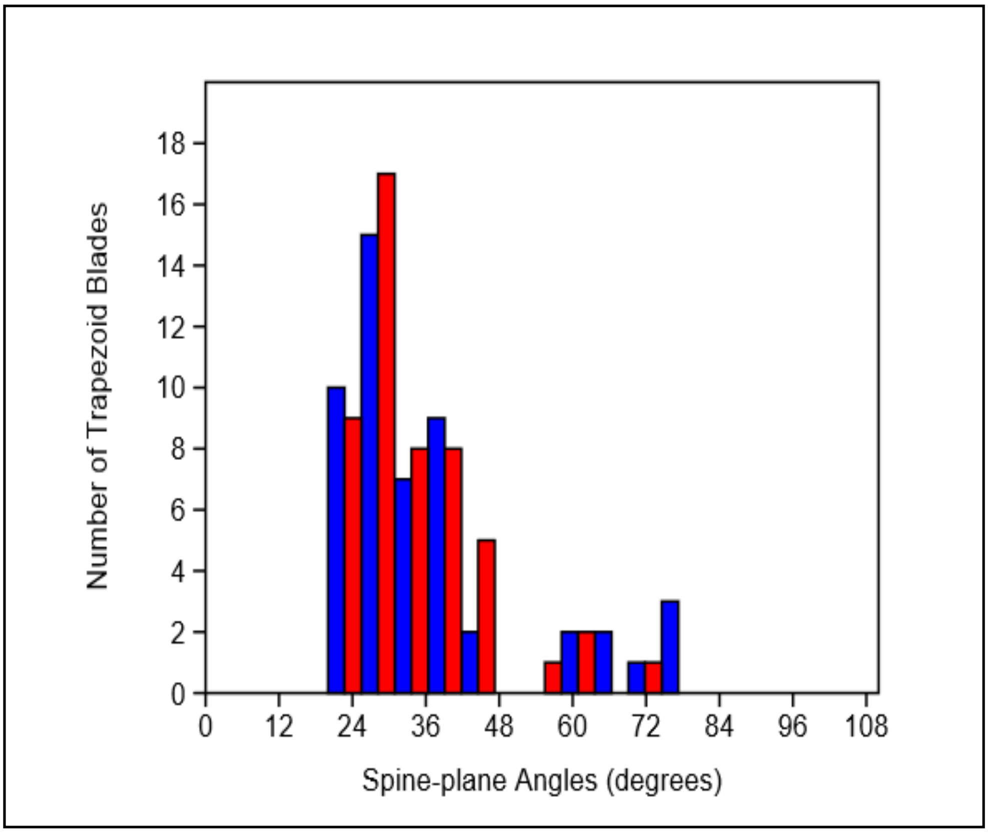


Figure 5-14: Triangular blades: spine-plane angles

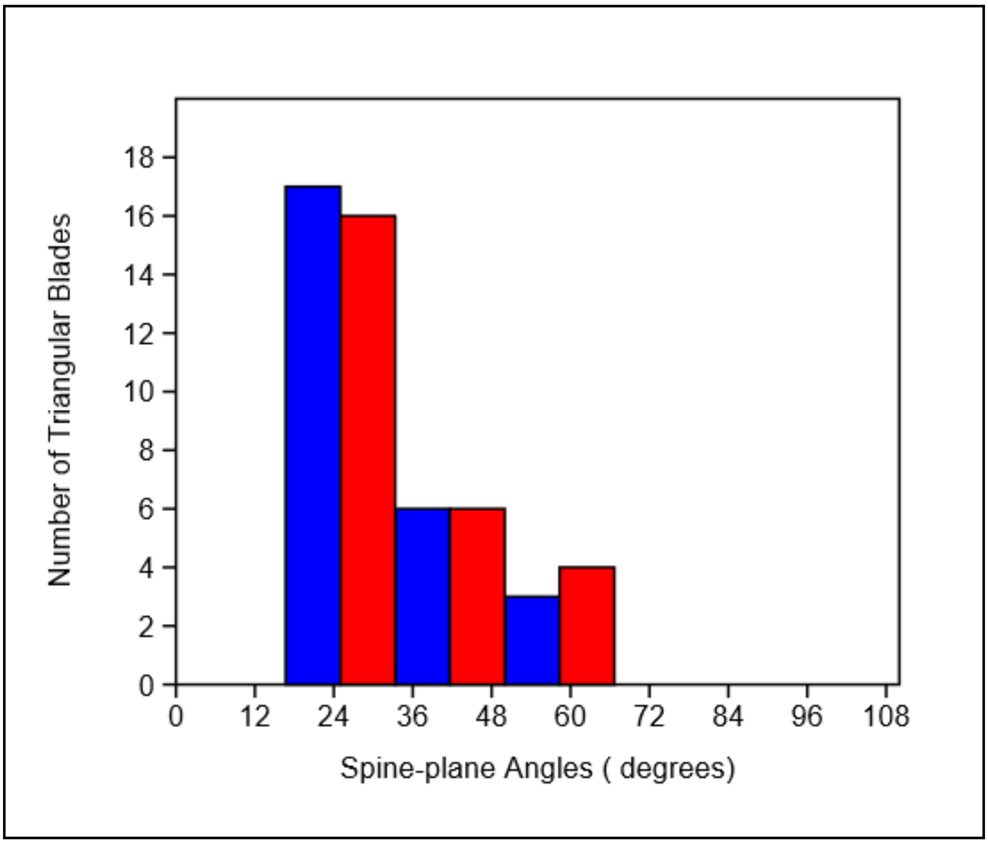


Figure 5-15: Trapezoid blades: edge angles

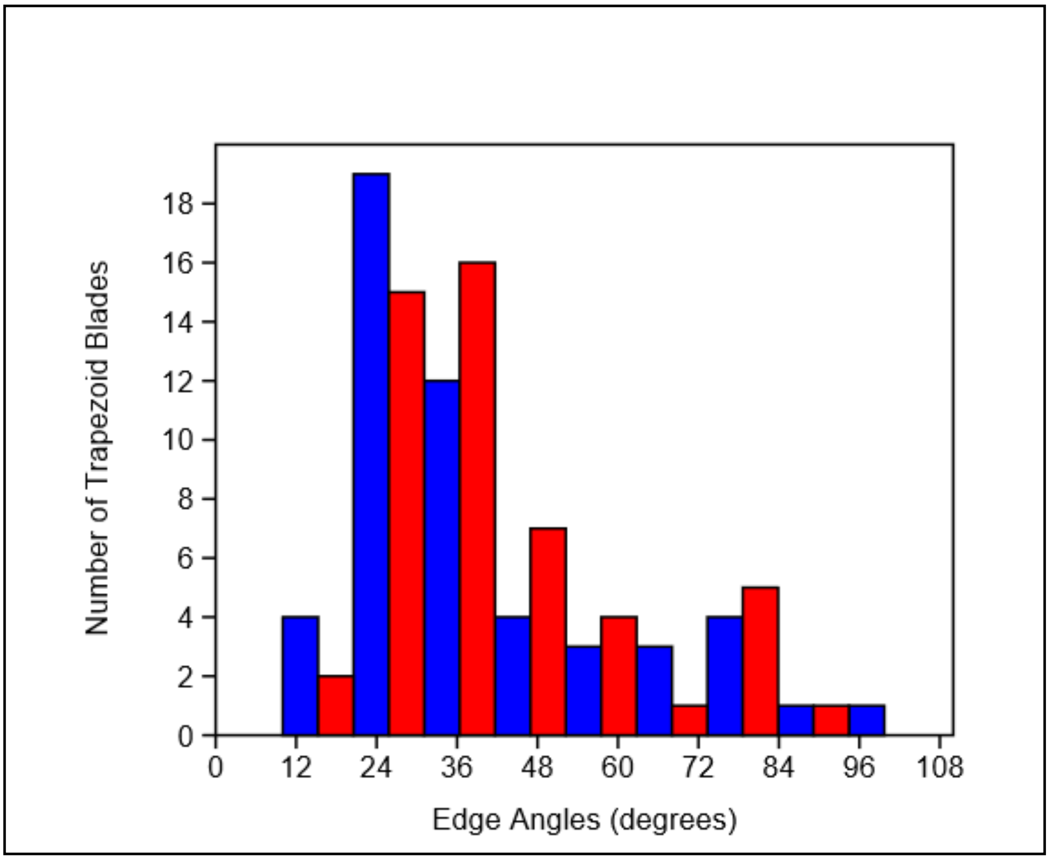


Figure 5-16: Triangular blades: edge angles

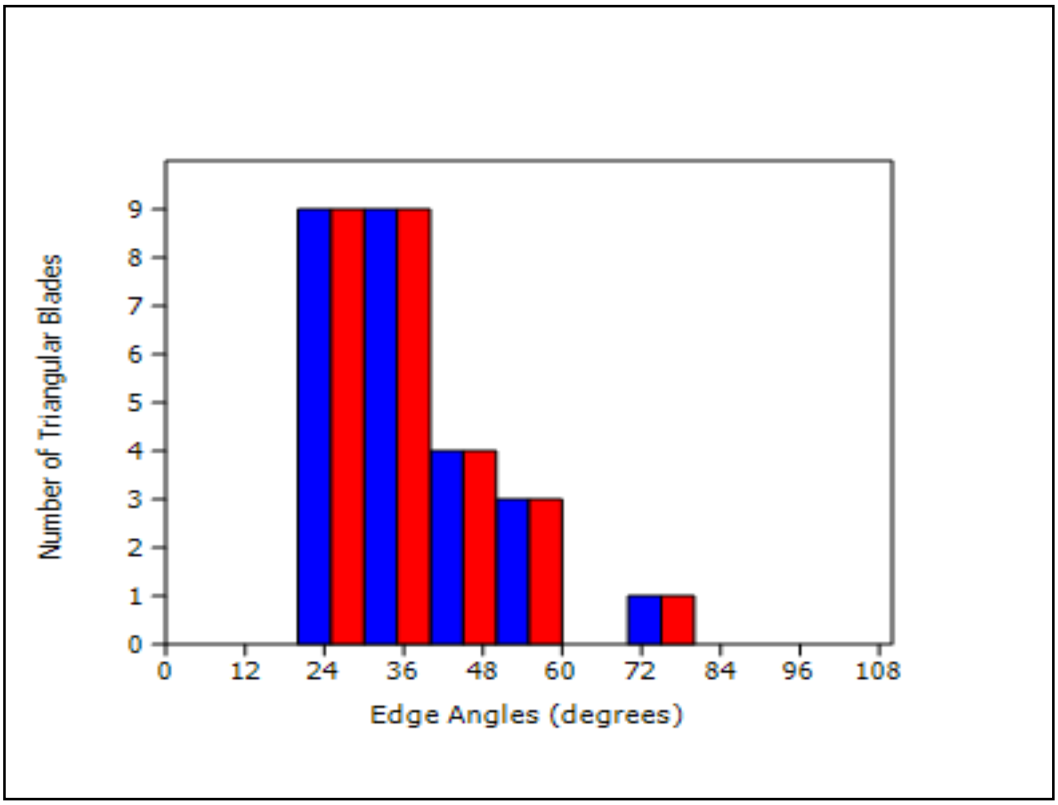


Table 5-16: Relationships between stem Types and blade cross-sections

Stem Type	Trapezoid blade cross-section	Triangular blade cross-section	Blade missing or unidentifiable	Total
A	11	0	32	43
B	6	4	0	10
C	11	4	4	19
D	15	7	2	24
E	7	3	4	14
No stem/ Unidentified	19	13	5	37
Total	69	32	46	147

Figure 5-17: FAP 442, Stemmed tool stem section with cortex

Figure 5-18: FAP 759, Stemmed tool with cortex on blade

Figure 5-19: FAP 542, Stemmed tool with cortex on blade

Figure 5-20: FAP 783, Stemmed Tool too damaged for assessment

Figure 5-21: FAP 562, Stemmed tool with offset stem

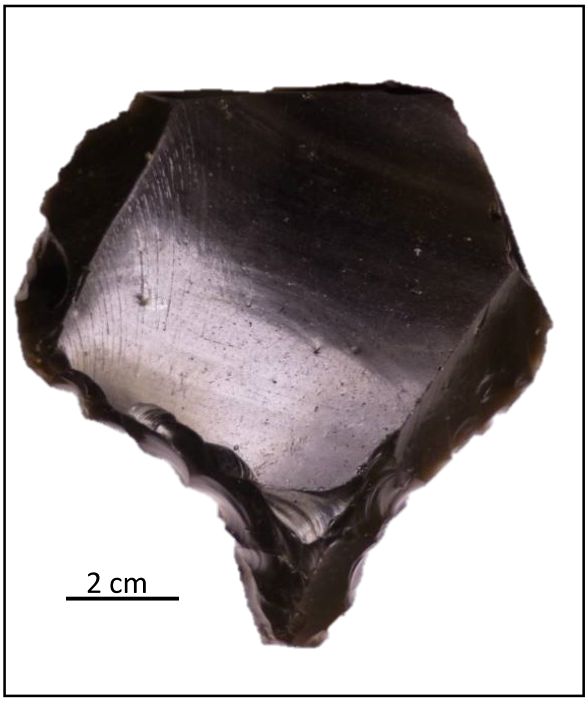


Figure 5-22: Bruker-Tracer III-V PXRF machine being used for non-destructive testing of a hafted obsidian blade (Torrence *et al.*, 2013: 295)

Figure 5-23: Obsidian sources on the Willaumez Peninsula and Garua Island discussed in the text after: (Bird *et al.*, 1997: 63)

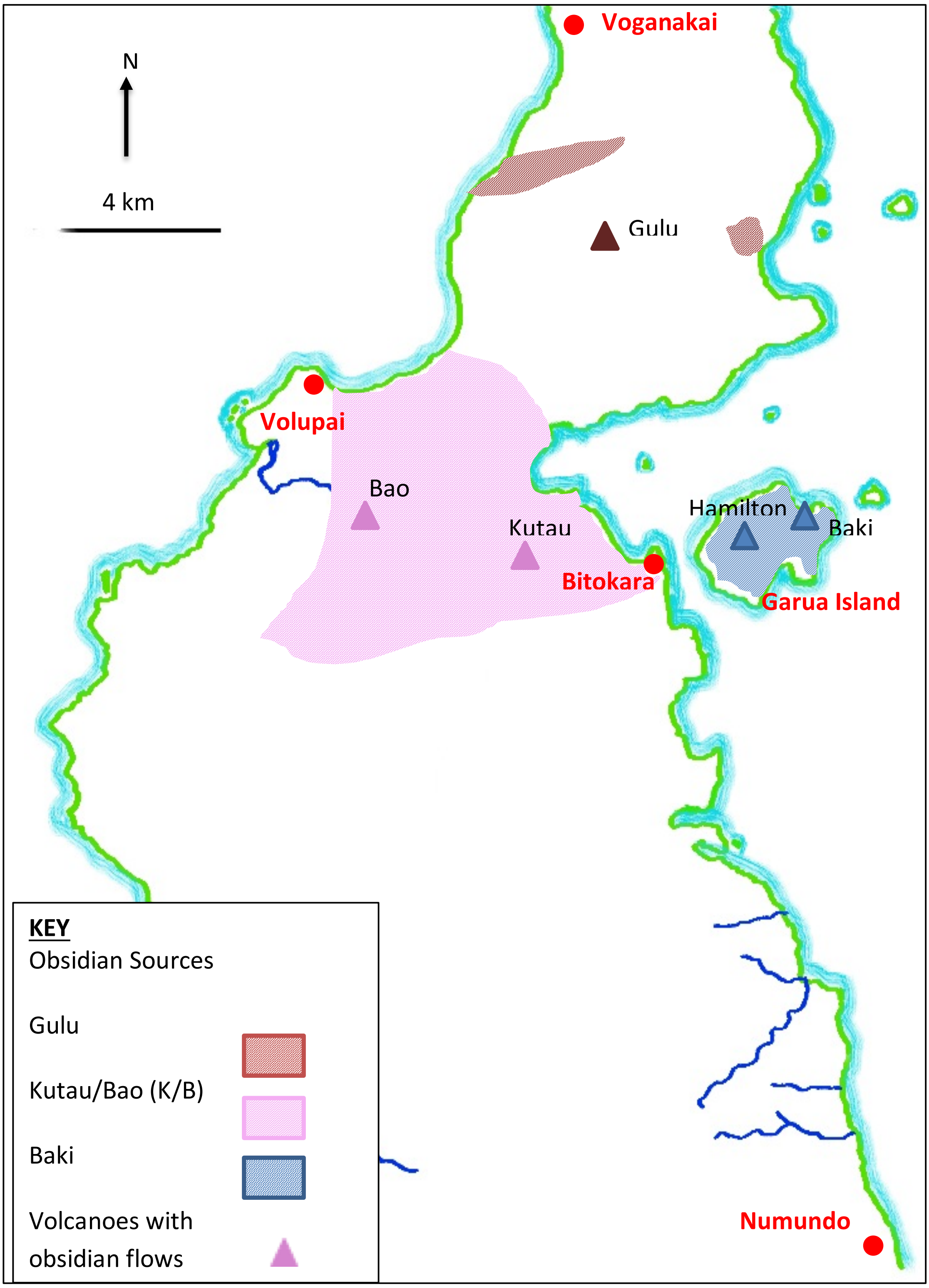


Figure 5-24: Distribution map showing the numbers of research assemblage artefacts recovered from each site by raw-material source

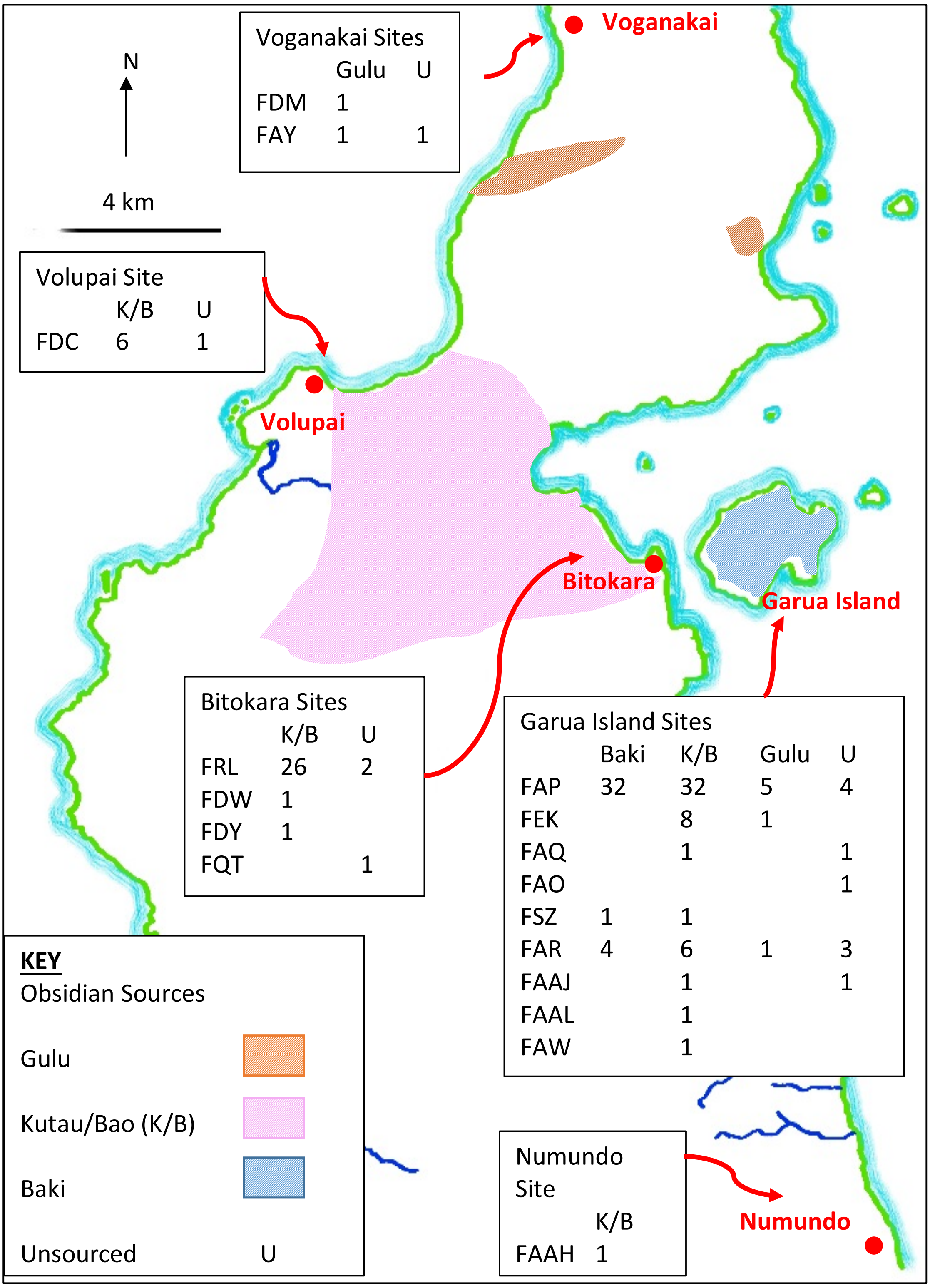


Table 5-17: Breakdown of the geochemical sourcing data by obsidian source, site code and find location

Raw Material Source	Find site code	Find location	Number of artefacts n=
Baki	FAP	Garua Island	32
Baki	FSZ	Garua Island	1
Baki	FAR	Garua Island	4
Total Baki			37
Gulu	FEK	Garua Island	1
Gulu	FAP	Garua Island	5
Gulu	FDM	Voganakai	1
Gulu	FAY	Voganakai	1
Gulu	FAR	Garua Island	1
Total Gulu			9
Kutau/Bao	FRL	Bitokara	26
Kutau/Bao	FAAH	Numundo	1
Kutau/Bao	FAAJ	Garua Island	1
Kutau/Bao	FAAL	Garua Island	1
Kutau/Bao	FAP	Garua Island	32
Kutau/Bao	FAQ	Garua Island	1
Kutau/Bao	FAR	Garua Island	6
Kutau/Bao	FAW	Garua offshore	1
Kutau/Bao	FDC	Volupai	6
Kutau/Bao	FDW	Bitokara	1
Kutau/Bao	FDY	Bitokara	1
Kutau/Bao	FEK	Garua Island	8
Kutau/Bao	FSZ	Garua Island	1
Total Kutau/Bao			86
Sub Total			132
Unsourced		Garua Island	10
Unsourced		Willaumez Peninsula	5
Total			147

Figure 5-26: Type A stem FDC/F/43

Figure 5-25: Type A stem FDC/C/5

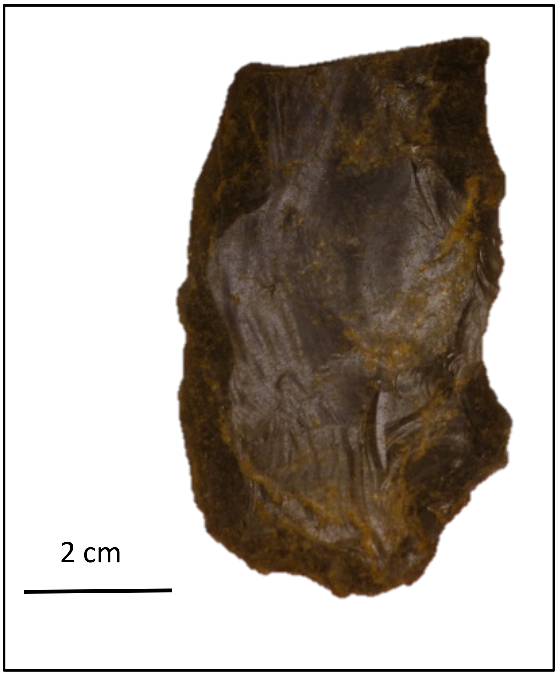


Figure 5-27: Type A stem FAAH 035

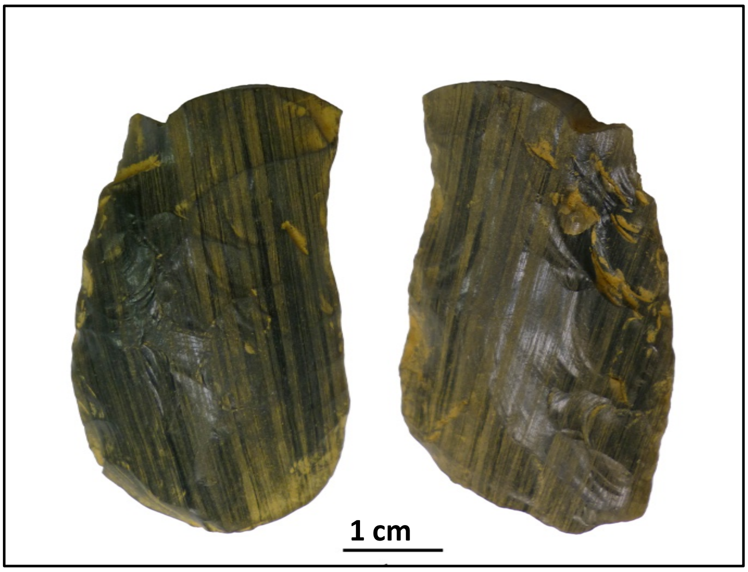


Table 5-18: Stem type analysed by obsidian source

Obsidian Source	Type A	Type B	Type C	Type D	Type E	Total
Kutau/Bao	23	8	11	12	8	62
Gulu	5	0	1	0	0	6
Baki	11	1	4	10	4	30
Unsourced	3	1	3	2	2	11
Total	42	10	19	24	14	109

Table 5-19: Blade cross-section analysed by obsidian source

Obsidian Source	Trapezoid Blades	Triangular Blades
Kutau/Bao	33	22
Baki	25	4
Gulu	6	0
Unknown	5	5
Total	69	31

Illustrations to Chapter 6.

Table 6-1: Summary table of use-wear reference experiments sorted by hardness and then silica content of use-materials showing the application of the coding system used to classify and record use-wear. 'Primary' and 'Secondary' orientation and density refer to striae. The codes used for data recording are those referred to in Chapter 4, Section 4.6.1

Lithic Reference No	Species	Hardness	Silica Content	Mode of Use	Time Elapsed (min)	Polish Development	Polish Extent	Relationship to edge	Polish away from edge	Primary Orientation	Primary Density	Primary Description	Secondary Orientation	Secondary Density	Secondary Description	Edge Scar Type	Distribution	Edge Rounding Profile
WNB 074	*Octomeles sumatrana*	Very Soft	Low	Sawing	240	2	2	2	1	0	0	0	0	0	0	B	D	3
WNB 069	*Octomeles sumatrana*	Very soft	Low	Carving	240	0	0	0	0	0	0	0	0	0	0	F, L	C	2
WNB 005	*Colocasia esculenta*	Soft	Low	Slicing	5	0	0	0	0	T	1	S	0	0	0	0	0	0
WNB 033	*Colocasia esculenta*	Soft	Low	Slicing	15	1	1	1	0	0	1	S	0	0	0	M	C	0
WNB 076	Fish	Soft	Nil	Slicing	15	1	1	1	0	A	1	R	0	0	0	M	C	3
WNB 163	*Cocos nucifera*	Soft	Moderate	Paring	23	0	0	0	0	A	1	I	0	0	0	F,S	D	2
WNB 013	Toona sp.	Soft	High	Whittling	15	2	1	4	1	0	0	0	0	0	0	B	D	3
WNB 028	Conoidus sp.	Soft	High	?	17	2	2	2	3	A	1	S	0	0	0	M, B, F	C	3
WNB 094	Toona sp.	Soft	High	Carving		1	1	1	0	A	2	R	0	0	0	0	0	0
WNB 241	Toona sp.	Soft	High	Carving		3	2	2	1	A	3	R	B	2	I	F	C	0

Lithic Reference No	Species	Hardness	Silica Content	Mode of Use	Time Elapsed (min)	Polish Development	Polish Extent	Relationship to edge	Polish away from edge	Primary Orientation	Primary Density	Primary Description	Secondary Orientation	Secondary Density	Secondary Description	Edge Scar Type	Distribution	Edge Rounding Profile
WNB 073	Mangifera sp.	Moderate	Nil	Sawing	30	3	2	2	0	A	2	I	A	2	S	0	0	0
WNB 217	Hibiscus sp..	Moderate	Nil	Whittling	15	1	1	1	0	B	1	S	0	0	0	M, F, B	D	3
WNB 237	Hibiscus sp.	Moderate	Nil	Whittling	30	2	2	0	2	B	1	R	T	1	S	M	C	3
Exp 021	*Gnetum gnemon*	Moderate	Low	Sawing	30	2	2	1	2	T	2	S	A	1	S	M	C	1
Exp 021	*Gnetum gnemon*	Moderate	Low	Scraping	30	1	1	3	3	T	2	I	A	1	I	M	C	2
Exp 022	*Gnetum gnemon*	Moderate	Low	Sawing	5	2	2	2	2	A	2	I	0	0	0	M	C	0
UWR 011	Pommetia sp.	Moderate/Hard	Low	Scraping	30	1	1	2	1	T	1	R,S	0	0	0	F	C	2
WNB 092	Calophyllum sp.	Moderate/Hard	High	Sawing	5	2	2	2	1	A	2	R	A	1	S	M	C	0
WNB 186	Caryota sp.	Hard	Moderate	Sawing	10	2	1	1	0	A	3	R	A	2	S	0	0	0
WNB 508	Caryota sp.	Hard	Moderate	Scraping	60	2	2	2	2	T	2	R	0	0	0	B, F	C	2
WNB 228	Caryota sp.	Hard	Moderate	Whittling	5	3	2	3	3	B	2	R	0	0	0	0	0	0

Lithic Reference No	Species	Hardness	Silica Content	Mode of Use	Time Elapsed (min)	Polish Development	Polish Extent	Relationship to edge	Polish away from edge	Primary Orientation	Primary Density	Primary Description	Secondary Orientation	Secondary Density	Secondary Description	Edge Scar Type	Distribution	Edge Rounding Profile
WNB 307	Cow bone	Hard	Nil	Scraping	45	0	0	0	0	T	3	R	0	0	0	F	C	4
Exp 018	*Nipholphila gunnii*	Hard	Very low	Sawing	5	2	2	2	2	0	0	0	0	0	0	0	0	0
Exp 019	*Nipholphila gunnii*	Hard	Very low	Sawing	15	2	1	2	1	A	1	I	0	0	0	M	C	1
Exp 020	*Nipholphila gunnii*	Hard	Very low	Sawing	30	2	2	3	2	A	2	I	B	1	I	0	0	0
WNB 150	*Cocos nucifera*	Hard	Moderate	Sawing	60	0	0	0	0	0	0	0	0	0	0	M, F	C	1
WNB 139	Calamus sp.	Hard	Moderate	Whittling	30	2	1	2	1	A	2	R	0	0	0	F, L	C	3
WNB 225	*Calamus muelleri*	Hard	Moderate	Sawing	5	1	1	1	2	A	2	R	0	0	0	B, F	C	2
WNB 225	Calamus sp.	Hard	High	Sawing	5	1	1	1	0	A	3	R	0	0	0	B, F	C	2
Exp 009	Bambusa sp.	Hard	High	Scraping	5	2	2	2	1	T	1	S	B	1	S	M, B	C	2
Exp 010	Bambusa sp.	Hard	High	Scraping	15	3	2	4	2	T	2	R	0	0	0	M, F	C	3
Exp 011	Bambusa sp.	Hard	High	Scraping	30	3	2	2	2	T	1	R,I	0	0	0	M, B	D	3
Exp 012	Bambusa sp.	Hard	High	Sawing	5	1	1	1	0	A	1	S	0	0	0	S	d	1

Lithic Reference No	Species	Hardness	Silica Content	Mode of Use	Time Elapsed (min)	Polish Development	Polish Extent	Relationship to edge	Polish away from edge	Primary Orientation	Primary Density	Primary Description	Secondary Orientation	Secondary Density	Secondary Description	Edge Scar Type	Distribution	Edge Rounding Profile
Exp 013	Bambusa sp.	Hard	High	Sawing	15	2	2	1	0	0	0	0	0	0	0	0	0	0
Exp 014	Bambusa sp.	Hard	High	Sawing	30	2	2	2	2	A	1	s	0	0	0	M	c	3
Exp 015	Bambusa sp.	Hard	High	Scraping	5	1	1	1	1	0	0	0	0	0	0	0	0	0
Exp 016	Bambusa sp.	Hard	High	Scraping	15	2	2	2	2	A	2	S	t	1	S	M	C	2
Exp 017	Bambusa sp.	Hard	High	Scraping	30	3	2	2	2	T	2	R	A	1	S	M	C	0
Exp 026	Bambusa sp.	Hard	High	Sawing	5	1	1	1	2	A	1	I	A	1	S	M	c	0
WNB 231	Bambusa sp.	Hard	High	Sawing	15	3	2	2	0	A	3	R	0	0	0	F	C	4
EXP new	Unknown hardwood	Hard	?	Scraping	5	1	1	2	1	T	1	I	0	0	0	F	C	2
UWR 005	Unknown hardwood	Hard	?	Scraping	30	1	0	0	1	0	0	0	0	0	0	F, M	D	3
WNB 133	Casaurina sp.	Very Hard	Very low	Whittling	30	2	2	2	0	A	2	I	0	0	0	M	C	0
WNB 262	Katylesia sp.	Very Hard	Nil	Scraping	25	4	2	2	0	B	2	R, S	0	0	0	L	D	4
WNB 304	Eucalyptus sp.	Very Hard	High	Sawing	20	2	1	2	1	A	2	R, I	A	1	S	L	D	4

Lithic Reference No	Species	Hardness	Silica Content	Mode of Use	Time Elapsed (min)	Polish Development	Polish Extent	Relationship to edge	Polish away from edge	Primary Orientation	Primary Density	Primary Description	Secondary Orientation	Secondary Density	Secondary Description	Edge Scar Type	Distribution	Edge Rounding Profile
WNB 324	Incising clay tablet	Very Hard	High	Carving		4	4	3	0	A	1	R	0	0	0	A	C	4
WNB 264	Chicken skin piercing tattoo replication	Elastic	Nil	Piercing	30	2	1	1	0	B	2	S	0	0	0	F	D	2
WNB 327	Pig Skin scarification	Elastic	Nil	Slicing	15	1	1	1	0	B	2	R	0	0	0	M	C	0
WNB	Cutting and gutting fish			Slicing	75					/		/	/		/	M	C	2

Table 6-2: Detailed analysis of the 96 Type 1 obsidian stemmed tools which have sections of blade present with a summary description of the wear traces seen under high-magnification microscopy. The 25 artefacts that are too degraded for use-wear to be identified are marked 'Not Applicable'. The ten artefacts that appear to have not been used are marked 'Nil Use-wear'. Key: M= stem is missing, U= unidentifiable.

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FAAJ 054	188	M	Triangular	Kutau/ Bao	Only the tip is present. Oblique scatter of short rough-bottomed striae plus a few sleeks at tip. The edge has continuous small scars, almost no polish and is slightly rounded. Some evidence of a short period of whittling action on moderate/soft, low silica material. E.g. Mangifera spp., Hibiscus spp.	Whittling	Moderate /Soft	Low	
FAAJ 055	199	U	Triangular	Not Tested	Whole tool present. The morphology suggests that this is a chisel or woodcarving tool rather than a knife blade or spear head. Used in a sawing motion on moderate/hard material with moderate silica content. Also some evidence of whittling the same sort of material. E.g. Caryota spp. or Calamus spp.	Sawing, Whittling	Moderate /Hard	Moderate	
FAAL 120	195	M	Trapezoid	Kutau/ Bao	Only the tip is present. Tip is retouched along edges. Dorsal side has oblique rough-bottomed and intermittent striae overlaid with dense axial striae. The tip was used to whittle a moderate/hard, very low silica material before it was then pushed with an axial motion into hard, low silica material. E.g. Eucalyptus spp., bone.	Whittling	Moderate /Hard	Very Low	6.26
FAO 1901	202	U	Triangular	Not Tested	Classification as Type 1 is uncertain although use-wear is present Most of the striae on the blade are transverse moderate density rough-bottomed striae with some sleeks. The edge is mainly badly damaged post-depositionally but there are areas of hinge and feather scars, particularly on ventral face. Polish on edge is developed - particularly on sections D1/V3. Evidence indicates the tool was used for scraping moderate hard material with high silica content. e.g. Calophyllum spp.,	Scraping	Moderate /Hard	High	

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure Nº
FAP 202	166	D	Trapezoid	Baki	Stem and proximal section of blade only present. Edge has distinct rounding and has developed polish, particularly at D7/V9. Scattered/ low density transverse and oblique rough-bottomed and intermittent striae only visible. Given that remainder of blade is missing, the well-developed polish at D7 suggests that this is hafting wear.	Not Applicable	Not Applicable	Not Applicable	
FAP 212	81	E	Triangular	Baki	Tip missing. There are dense transverse striae at V8 & V9, as well as polish at D9. These suggest hafting wear. Transverse rough-bottomed and intermittent striae at V4, 5, 6 together with extensive areas of light polish all point to scraping a moderate hard but fairly high silica material, e.g. Bambusa spp. A few axial striae at V6 and D6 indicate that tool was also used for sawing.	Scraping	Moderate /Hard	High	6.19 & 6.80
FAP 214	106	C	Trapezoid	Kutau/ Bao	Stem and proximal section of blade only present. Most of the striae are transverse and in the areas D7, 8, 9 and V9. There is some developed edge polish at D7 & D8. Those transverse striae close to the stem are probably hafting marks. A small patch at D7 further from the stem indicates a scraping action. There is a light scatter of axial rough-bottomed striae away from the edge at D8 overlaid with a moderate dense pattern of oblique rough-bottomed striae but these are likely to be taphonomic.	Scraping	Moderate /Hard	High	
FAP 229	154	C	Trapezoid	Baki	Stem and proximal section of blade only present. Edges are badly damaged and no scars can be identified. However, there is some distinct edge rounding in areas V7, D9 & D7 and developed polish just away from the edge in the same areas. Visible striae are mainly axial, moderate to dense rough-bottomed and sleeks. A dense area of axial sleeks at V7 is accompanied by patches of developed polish which indicates a sawing action into hard and highly siliceous material similar to, say e.g. bamboo or rattan.	Sawing	Hard	High	6.13 & 6.46

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FAP 232	114	A	U	Baki	Stem and small section (D7/V9) of proximal section of blade only present. While there is light polish visible at D7, there are no striae. Section V9 has a scatter of oblique rough-bottomed and intermittent striae but the small amount of visible wear on the blade at V9 is in an area that is otherwise so contaminated that no interpretation is possible.	Not Applicable	Not Applicable	Not Applicable	7.7
FAP 255	173	B	Trapezoid	Kutau/ Bao	Distal section of blade missing (V1, 2, 3, D3, 2, 1). Wear is characterised by scatters of axial and some oblique rough-bottomed striae at V6, V7, D4 & D6 accompanied by continuous bending, feather and hinge scars on the ventral face and distinct edge rounding on the dorsal face in the same areas. There are only isolated areas of light polish. Use-wear indicates a sawing motion on a very hard material with very low/nil silica - similar in density to a hardwood such as Eucalyptus spp., or bone? Moderate density oblique striae at V9 suggest secondary use for whittling.	Sawing	Very Hard	Very Low	6.106
FAP 258	165	D	Triangular	Kutau/ Bao	Stem and proximal section of blade only present. Very badly degraded. No interpretation offered.	Not Applicable	Not Applicable	Not Applicable	
FAP 272	78	C	Trapezoid	Baki	Distal section of blade missing (V1, 2, 3, D3, 2, 1). Wear on areas away from the stem mainly typified by striae at V4, V7, V9 and D6 & D7 which is oblique to the axis but roughly parallel to the edge. However, edge is very damaged and therefore very little edge polish or edge scarring is visible. Sawing movement on moderate hard material.	Sawing	Moderate /Hard	Not Applicable	
FAP 283	167	D	Trapezoid	Baki	Tip missing. Edges severely damaged. No use-wear visible on blade. Ventral face has scatter of transverse rough-bottomed striae at neck of stem (V10 & V11) Dorsal face has polish on stem at D10 and at D16.	Nil Use-wear	Nil Use-wear	Nil Use-wear	

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FAP 401	168	C	Trapezoid	Kutau/ Bao	Distal section of blade missing (V1, 2, 3, D3, 2, 1) Dense axial rough-bottomed and intermittent striae at D4 & 7, V6, 7 & 9 plus intensive edge rounding in plan and profile together with edge abrasion. No polish. Extensive sawing motion into hard and abrasive materials with low/nil silica; similar in density to a hardwood such as Eucalyptus spp., or bone?	Sawing	Very Hard	Nil	
FAP 407	129	D	Trapezoid	Baki	Distal section of blade missing (V1, 2, 3, D3, 2, 1). Edges are badly damaged and scarring cannot be identified. However, edge is noticeably rounded at D9. There are dense axial rough-bottomed and intermittent striae along both edges as well as some oblique striae across the dorsal side from D7 to D5 and secondary oblique striae at D7, D9 and V9 which I interpret as being mainly post depositional. Tool was mainly used in a sawing motion. Striations are dense and there is smooth well-developed polish evident at D4 and V9. Sawing hard but high silica material – such as Bambusa sp. or Caryota sp. Moderate density transverse striae at V7 interpreted as secondary use for scraping, maybe informal hafting?	Sawing	Very Hard	high	6.67 & 7.27
FAP 416	119	D	Trapezoid	Kutau/ Bao	Missing tip and most of stem. Very badly contaminated. Some oblique striae but these look like post depositional. However, distinct polish patch on arris at D7 is typical of hafting No use interpretation possible.	Not Applicable	Not Applicable	Not Applicable	
FAP 420	136	D	Trapezoid	Baki	Tip and proximal section of stem missing. Edge scarring, rounding and polish obliterated by considerable edge damage. In very poor condition but small polish spot and some axial sleeks on edge at D9 suggest slicing of soft material with a low silica content - such as Banana or *Cocos nucifera* leaf material.	Slicing	Soft	Low	6.114

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FAP 421	171	D	Trapezoid	Kutau/ Bao	Stem with proximal sections of blade (V7, 8, 9, D7, 8, 9) only present. Overall the artefact is badly degraded but pattern of scattered oblique rough-bottomed and sleek striae together with severe edge rounding suggests a whittling action. The surface contamination and edge damage prevents more specific interpretation. The intensity of edge rounding does not match the lack of density in the striation pattern and indicates that the edge rounding is likely to be post depositional or hafting damage (which would fit with the small polish patch at V12).	Whittling	Not Applicable	Not Applicable	
FAP 424	162	D	Triangular	Baki	Stem and proximal section of blade only present. Light scatter of oblique rough-bottomed striae on ventral blade is insufficient for interpretation.	Not Applicable	Not Applicable	Not Applicable	6.116
FAP 427	140	A	Trapezoid	Baki	Stem and proximal section of blade only present. A small scatter of oblique striae at V9 is matched to an extent by scatter of transverse striae on opposite face of blade at D7 but edge is too damaged to see any scarring or polish.	Whittling	Not Applicable	Not Applicable	
FAP 429	116	C	Trapezoid	Baki	Tip and proximal/medial sections of stem missing. Indications of hafting but the only use-wear evidence on the blade is on the dorsal face and consists mostly of an axial scatter of rough-bottomed and intermittent striae which are associated with light polish on edge, continuous mixed scarring and light edge rounding. Possibly some light use slicing soft materials low silica; e.g. banana leaves.	Sawing	Soft	Low	6.85

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FAP 433	104	A	Trapezoid	Kutau/ Bao	Stem and proximal section of blade only present. Edges are all retouched or damaged. Scatter of axial striae on edge at V7 associated with developed polish indicates use in slicing soft material with high silica content; e.g. Toona spp. or Pandanus spp.	Slicing	Soft	High	6.42 & 6.69
FAP 439	156	E	Trapezoid	Baki	Tip missing. Very obtuse edge angles which would militate against use as a saw or slicing tool. Oblique scatter of rough-bottomed striations at V6 together with distinct edge rounding and light polish on dorsal face opposite V6 suggest whittling action on hard, moderate silica material such as Caryota spp.	Whittling	Hard	Moderate	
FAP 442	139	M	Trapezoid	Baki	Tip only. Edges are polished (D1, D3, V1 & V3) but the only striae are a patch of quite dense axial striae close to and parallel to arris.	Not Applicable	Not Applicable	Not Applicable	5.17
FAP 446	148	A	Trapezoid	Baki	Stem and proximal section of blade only present. Edges are badly damaged. Scatters of axial rough-bottomed and sleek striae in several areas across blade. No polish. But otherwise little evidence of any use-wear.	Nil Use-wear	Nil Use-wear	Nil Use-wear	6.78
FAP 452	160	D	Triangular	Baki	Stem and proximal section of blade only present. Ventral face (V7) has intermittent bending scars, distinct edge rounding and light polish in patches close to the edge. The opposite face (D9) has discontinuous feather scars, severe edge rounding, light polish and a scatter of transverse rough-bottomed and intermittent striae. This suggests a scraping action on moderate/hard material with moderate/low silica content. E.g. Gnetum spp.	Scraping	Moderate /Hard	Low	
FAP 542	127	B	Trapezoid	Baki	Tip missing. Little evidence of use-wear.	Nil Use-wear	Nil Use-wear	Nil Use-wear	5.19

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FAP 562	117	B	Trapezoid		Stem and proximal section of blade only present. Stem in offset position. Scattered transverse rough-bottomed and intermittent striae on ventral face where edges have continuous varied scarring and some large patches of light polish. Opposing dorsal face has a complete absence of striae with discontinuous bending scars plus light polish in isolated spots close to edge. Possible use in scraping of soft, low silica material such as removing skin from Taro, or extracting *Cocos nucifera* meat.	Scraping	Soft	Low	5.21
FAP 573	123	M	Trapezoid	Baki	Fragment only identified as medial section of blade. A few random scratches only. However, edge viewed from dorsal face has distinct abrasion, rounding and light polish which suggests scraping a hard contact surface with moderate/high silica content such as a hardwood (Calophyllum/Caryota spp or even *Cocos nucifera* shell)	Scraping	Hard	Moderate	
FAP 610	105	M	Triangular	Baki	Fragment only, identified as a proximal section of a blade. Dorsal face has discontinued varied scarring on both edges and slight polish and edge rounding on D7. No striae at all on dorsal side. Ventral Face has moderate dense transverse rough-bottomed striae at V9 together with discontinuous varied scarring, slight edge rounding and light polish in small isolated patches. No photos taken as very little to see. Possibly scraping Taro or descaling fish?	Scraping	Soft	Low	

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FAP 705	150	A	Trapezoid	Gulu	Tip missing. The blade has one obtuse edge angle (Dorsal Left = 102°). Edges are rounded but no scars visible. Dense oblique but almost transverse rough-bottomed and intermittent striae at V7 (point 3) together with a rounded edge and a light polish streak along the edge is complemented by the opposing face (D9) which has a notable absence of use-wear. Interpreted as scraping action with one face (V7) in contact with a hard, moderate/low silica material - maybe Pometia spp. or Eucalyptus spp.? Evidence is also of moderate dense axial rough-bottomed striae at V9 with light edge rounding and light polish which is matched on the opposing face at D7 with a scatter of axial intermittent striae and some slight edge rounding. This occurs in the area where the edge angle is very obtuse. The blade apparently also used in an axial motion with ventral face in greatest contact, moderate/soft material low silica - possibly some sort of smoothing of a softish material such as banana leaves or bark?	Scraping	Hard	Low	6.102 & 7.5
FAP 732	128	M	Trapezoid	Kutau/ Bao	Tip only. Edges are all retouched into a point. Tip of what was a very large broad flat tool with edges that do not look as though they were ever sharp. All visible striae are a scatter of generally axial intermittent, sleek and a few rough-bottomed striae. Retouch prevents edge assessment. A little polish on arrises. No real evidence that this blade was used.	Nil Use-wear	Nil Use-wear	Nil Use-wear	
FAP 743	135	E	Trapezoid	Baki	Tip may be missing. Edge is damaged such that scarring cannot be viewed. Some edge rounding and light polish on the edge on the both dorsal and ventral faces. Ventral face at V6 has patches of transverse and oblique rough-bottomed, intermittent and sleek striae together with developed polish at V7. These indicate a whittling motion on soft but high silica material such as Toona spp. or Conoidus spp.	Whittling	Soft	High	6.11

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FAP 746	109	M	Triangular	Kutau/ Bao	Fragment only - identified as the medial section of a blade. Retouched on both edges. Transverse moderate dense but deep rough-bottomed striae at V5 and continued at V6. Some light polish at V6 and noted rounding/abrasion of edge. Edge abrasion and light polish at D4 but degradation prevents further examination. No interpretation offered.	Not Applicable	Not Applicable	Not Applicable	
FAP 756	112	A	Trapezoid	Baki	Stem and proximal sections of blade only present. Ventral face has axial sleeks at V9. Overall very little evidence of use wear.	Nil Use-wear	Nil Use-wear	Nil Use-wear	
FAP 758	145	D	Trapezoid	Baki	Stem and proximal section of blade only present. All edges retouched or damaged. Some transverse striae at D8 are possibly hafting wear. Axial rough-bottomed and intermittent striae at D9 suggests use-wear from sawing hard material but this is not supported by any edge scarring or polish and opposing face V7 is badly damaged. V8 has moderate dense transverse rough-bottomed striae overlying a scatter of oblique striae which suggests secondary use as a scraper No interpretation offered.	Not Applicable	Not Applicable	Not Applicable	
FAP 759	130	D	Trapezoid	Baki	Tip missing. Centre of dorsal side has cortex. Patches of moderate dense axial rough-bottomed striae seen on ventral face along edge at V6 and V9 with quite noticeable edge rounding plus some isolated patches of developed polish also at V9. Together with some polish on edge of broken tip at D5 these all indicate a short period of sawing of hard material with high silica content - e.g. bamboo or rattan. There are also some oblique striae at V4 accompanied by quite noticeable edge rounding and developed polish which indicates a possible whittling action on similar materials. Moderate dense oblique striae at V6 overlying earlier axial striae indicate secondary use for whittling.	Whittling, Sawing	Hard	High	5.18 & 6.27 & 6.34

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FAP 782	141	U	Trapezoid	Gulu	Distal section of stem and proximal section of blade only present: D8-13 & V8-13. Has pecked decoration which affects ability to see use-wear. Traces of hafting.	Not Applicable	Not Applicable	Not Applicable	
FAP 783	110	D	U	Baki	Stem and proximal section of blade only present. V7 has continuous microscaring but no edge abrasion/rounding. Isolated patches of light polish and a scatter of axial/ curved intermittent striae all indicate slicing soft, very low silica material - e.g. Taro, Banana leaf	Slicing	Soft	Very Low	5.20 & 6.5
FAP 829	137	D	Trapezoid	Kutau/ Bao	Stem and fragment (V7/D9) of proximal section of blade only present. Scatter of oblique intermittent striae, distinct edge rounding and light polish visible. I think there is little direct connection between the scatter of striae and the distinct edge rounding. Edge rounding is from use on very hard material with low silica - bone/shell/Casuarina spp. There is a later use for a short time to whittle a moderate hard material.	Whittling	Very Hard	Very Low	
FAP 831	172	D	Trapezoid	Kutau/ Bao	Tip missing. The relatively undegraded surface is notable for the clear absence of striae over most of the blade surface. Very little use-wear visible apart from a few scattered axial striae at V9 accompanied by severe edge rounding and abrasion. Not enough data on the blade area of the tool to make an interpretation.	Nil Use-wear	Nil Use-wear	Nil Use-wear	
FAP 834	133	D	Trapezoid	Kutau/ Bao	Stem and proximal section of blade only present. Dense patch of oblique rough-bottomed and intermittent striae at V9 with patches of well-developed polish running back from the edge on the opposing face at D7 all suggest whittling of moderate/hard material with moderate/high silica content. e.g. Calophyllum spp.,	Whittling	Moderate /Hard	Moderate	6.29

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FAP 843	111	M	Trapezoid	Baki	Tip only present (sections D1, 2, 3 & V1, 2, 3). No discernible use-wear.	Nil Use-wear	Nil Use-wear	Nil Use-wear	
FAP 848	138	M	Trapezoid	Baki	Tip and medial section of blade only present. Blade has a palimpsest of use-wear - mainly scatters of transverse striae. The edges at V1 and V6 in particular have moderate dense oblique striae running back from the edges. The edges are damaged and it is not possible to evaluate scaring or polish. However, edge rounding is notable at D3 (opposing face to V1) and D4 (opposing face to V6). Both dorsal locations have light polish in isolated patches. Wear suggests whittling action on moderate hard, moderate to low silica material such as Pometia spp. or Gnetum spp on both edges. D4 & D5 have moderate density axial rough-bottomed and intermittent striae but also moderately dense oblique rough-bottomed striae, which I interpret as secondary to those axial striae indicating some additional use for whittling.	Whittling, Sawing	Moderate /Hard	Low	
FAP 864	132	D	Trapezoid	Baki	Tip missing. Ventral face is badly damaged. Most striae on blade are a scatter of transverse rough-bottomed striae which appear random. There is a notable patch of axial striae close to the edge at V9 but the opposing face at D6 is badly damaged. Some edge rounding but no polish at V9. Used for sawing a moderate hard but very low silica material such as Niphophila spp.	Sawing	Hard	Very Low	7.23

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FAP 865	113	A	Trapezoid	Gulu	Tip missing. Blade is covered in a palimpsest of dense and mainly oblique rough-bottomed and sleek striae. Very little visible polish, some edge rounding and abrasion, notably at D7 and V4. There are discontinuous feather scars at V6 and V9 and discontinuous bending scars at V7. Wear indicates several usages as a whittling or scraping tool, usually with dorsal side in contact, on hard, very low silica material e.g. Casuarina spp., maybe bone?	Whittling, Scraping	Very Hard	Very Low	
FAP 866	169	D	Trapezoid	Kutau/ Bao	Stem and proximal section of blade only present. Surface is badly degraded. The only identifiable use-wear is dense transverse rough-bottomed striae at D7 accompanied by severe edge rounding. On the opposing face at V9 there are moderate dense oblique rough-bottomed and sleek striae. Also moderate dense transverse rough-bottomed striae at V8. Not enough data to interpret.	Not Applicable	Not Applicable	Not Applicable	
FAQ 010	191	C	Triangular	Kutau/ Bao	Stem and proximal section of blade only present. D7 has discontinuous bending scars on a noticeably rounded and abraded edge with light polish. There is a moderate density of axial rough-bottomed and intermittent striae. On the opposing face at V9 the edge is also rounded and there is an area of moderate density axial rough-bottomed and intermittent striae which extends out to the centre section of the blade at V8. Blade was used in a sawing motion with both faces making contact on moderate hard material with moderate to low silica; maybe Pometia spp., some varieties of Eucalyptus?	Sawing	Moderate /Hard	Low	6.15

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FAR 003	213	A	Trapezoid	Kutau/ Bao	Stem and proximal section of blade only present. Surface is severely degraded. V7 has scatter of axial rough-bottomed and intermittent striae while V9 has severely rounded and abraded edge. On opposing face at D7 edge is also distinctly rounded and abraded with scatter of short rough-bottomed striae running back from the edge and a band of developed polish. The artefact is quite degraded but use-wear looks like sawing but also some scraping of hard material with moderate to high silica content; e.g. Calamus spp.	Sawing, Scraping	Hard	Moderate	
FAR 022	211	A	Trapezoid	Baki	Stem and proximal section of blade only present. All edges are either retouched or severely abraded (D7, 9, V7, 9). Some light polish close to edge at V7, V9 and D7. Scatter of axial rough-bottomed and intermittent striae at D7 are probably post-depositional. Deep transverse rough-bottomed striae at V8 and V9 interpreted as hafting line.	Not Applicable	Not Applicable	Not Applicable	
FAR 023	216	D	Trapezoid	Kutau/ Bao	Stem and part proximal section of stem only present. Badly degraded. No discernible use-wear.	Not Applicable	Not Applicable	Not Applicable	
FAR 033	217	A	Trapezoid	Baki	Stem and proximal section of blade only present. Surface is badly degraded all over. D8 has moderate dense oblique rough-bottomed striae well away from the edge. Scatter of axial rough-bottomed at D9 but no interpretation is possible.	Not Applicable	Not Applicable	Not Applicable	

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FAR 038	197	A	U	Gulu	Stem and fragment (V7/D9) of proximal section of blade only present. V7 has a severely rounded and abraded edge with developed polish in isolated spots close to the edge. Also scatter of transverse rough-bottomed and intermittent striae. Opposing edge at D9 has discontinuous step scars and moderate edge rounding with light polish. This maybe hafting wear but is a little above the stem neck and may just be scraping hard high silica material e.g. bamboo, rattan.	Scraping	Hard	High	
FAR 040	215	D	Trapezoid	Kutau/ Bao	Stem and proximal section of stem only present. Badly degraded. No discernible use-wear.	Not Applicable	Not Applicable	Not Applicable	
FAR 046	207	M	Trapezoid	Baki	Tip only present. No discernible use-wear.	Not Applicable	Not Applicable	Not Applicable	
FAR II 001	204	D	Trapezoid		Tip missing. Blade is only crudely and superficially retouched into a stem at proximal end. Notable for an almost complete absence of use-wear which, as the surface is not degraded, suggests incomplete manufacture. There are a few axial rough-bottomed striae at D4 overlaid by a secondary dense layer of transverse rough-bottomed and intermittent striae. The edge at D4 is severely abraded and has developed polish patches close to edge. On the opposing face to D4 at V6 there are discontinuous bending and hinge scars but no rounding, abrasion or polish. This suggests an initial use for sawing and a subsequent intense scraping at D4 with the dorsal face in contact and the ventral face throwing off small scars as a result of pressure from the dorsal side. Very hard high silica material e.g. bamboo, rattan.	Sawing, Scraping	Very Hard	High	

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure Nº
FAR II 002	210	A	Trapezoid	Baki	Tip missing. Blade edges are all either retouched or abraded/rounded until no scars can be identified. Edges are dominated by axial rough-bottomed, intermittent and sometimes sleek striae which are dense at V6 and V9. Very little polish is visible. Dorsal face has moderate dense axial rough-bottomed and intermittent striae at D4 and D7 (which directly oppose V6 and V9 resp.) as well as light polish at D4 and D7. V6 also has moderate dense transverse striae overlying the earlier axial striae. Mainly used in an axial sawing motion on hard material with moderate to low silica content. e.g. Caryota spp., Calamus Spp., *Cocos nucifera* shell.	Sawing	Hard	Low	6.40
FAR II 007	206	D	Triangular		Proximal section of blade only present. Very badly damaged. Edge at V9 is distinctly rounded and abraded with dense oblique rough-bottomed striae in V9 and in adjacent V8 section. Although the surface is not degraded no polish can be seen. On the Dorsal side, D7 and D8 are too badly degraded to provide data. Possibly some whittling of moderate hard, nil silica material, bone? The likelihood is that striae are taphonomy.	Not Applicable	Not Applicable	Not Applicable	
FAR II 008	205	M	Trapezoid		Tip and medial section of blade only present. Badly degraded. No discernible use-wear.	Not Applicable	Not Applicable	Not Applicable	
FAW 001	193	M	Trapezoid	Kutau/ Bao	Tip and medial section of blade only present. Tip is retouched on both edges. Ventral face has severely rounded and abraded. Edges which although badly degraded do exhibit developed polish at several points. The blade tip has a distinct flake removal from the distal end which may be deliberate such that the tip is an adze/axe edge. A few rough-bottomed and intermittent axial striae at V4 are scattered and overlaid by oblique crescent-row striae. V5 has moderately dense transverse striae which appear to be post-depositional. There are no striae visible on the ventral side of tip/edge. While in a poor condition, the general scarcity of striae suggest that this blade has not been heavily used.	Nil Use-wear	Nil Use-wear	Nil Use-wear	

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FAY 007	196	U	Trapezoid	Gulu	Proximal section of blade and distal section of stem only present. Surface has palimpsest of striae but the underlying primary striae are moderate dense rough-bottomed striae which are axial or oblique/axial. Edges are damaged but severely rounded and abraded. Some of this damage is undoubtedly taphonomic. There is a little light polish visible in isolated spots close to the edge. Sawing/possibly whittling action on hard abrasive material with low silica content. E.g. Cocos nucifera shell, some Eucalyptus spp. Casuarina spp.	Sawing, Whittling	Very Hard	Very Low	
FAY 010	208	C	Triangular		Whole tool is present but is badly damaged at edges and has much surface degradation. Morphology suggests that this is not a well -made tool - it looks ill-shaped. However, there is clear evidence for hafting including transverse rough-bottomed striae at V8 and V9, visible under the surface contamination, and a clear developed polish spot at V17. Only use-wear on the blade is moderate dense axial striae near dorsal tip at D3 and rounding/polish to edges. Suggests axial movement into moderate hard material. Dorsal arris has continuous developed polish. Edge damage prevents more interpretation.	Sawing	Moderate /Hard	U	
FDC/A/22	187	C	Triangular	Kutau/ Bao	Very small tool with missing tip. Edges are heavily rounded with light and developed polish visible on both ventral and dorsal edges. V4 and V7 have continuous step scars together with distinct edge rounding and light polish. Striae in these areas are scattered transverse and oblique rough-bottomed. Possibly used for scraping or whittling hard material with moderate/high silica such as Calophyllum spp., Cocos nucifera shell, bamboo. Stem area has deep transverse striae at V11 and large developed polish patch at V17 which all indicate hafting.	Whittling, Scraping	hard	Moderate	

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FDC/F/39	185	U	U	Kutau/ Bao	Stem and proximal section of blade only present. These are so badly damaged that almost no use-wear can be identified. A few random, scattered oblique rough-bottomed striae on dorsal face of blade section (D8, 9, 10) are probably taphonomic. No interpretation possible.	Not Applicable	Not Applicable	Not Applicable	
FDC/F/43	183	A	Trapezoid	Kutau/ Bao	Stem and proximal section of blade only present. Edges are rounded and abraded at D7 & V7 with discontinuous bending scars visible at D9 and V9. There is light polish in isolated spots close to but not at the edges at these points. Ventral side has small area of axial striae at V7 and moderate dense oblique striae at V7 and V8 but the inclusion of crescent row striae suggests that the latter are taphonomic. Some evidence from a scatter of deep axial striae at D8 of a sawing movement in moderate/hard material which, together with the developed polish on the edge might indicate Calophyllum spp., Caryota spp., or Calamus spp.?	Sawing	Moderate /Hard	Moderate	5.25 & 7.9
FDC/F/46	182	C	Trapezoid	Kutau/ Bao	Little discernible use-wear apart from transverse possible hafting line at V11.	Not Applicable	Not Applicable	Not Applicable	
FDM 002	194	C	Trapezoid	Gulu	Stem and proximal section of blade only present. Overall in generally poor condition with taphonomic edge damage and surface degradation. Edges, where visible, are all severely abraded and rounded. Edge polish is visible on the ventral face at V7 (light) & V9 (developed). Dense axial rough-bottomed and sleek striae at V8 indicate slicing action into moderate/soft, moderate silica material such as Conoidus spp.	Slicing	Moderate /Soft	Moderate	6.45 & 7.1

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FDW 001	192	B	Trapezoid	Kutau/ Bao	Stem and proximal section of blade only present. Edges are quite noticeably rounded but no polish is evident on ventral or dorsal face edges because of surface degradation. Dense axial sleek and rough-bottomed striae are present at V7 and V9 as well as on the opposing face at D8. D9 is obscured by degradation but there are no complementary axial striae at D7 (the opposing face to V9). At D7 the striae are dense oblique rough-bottomed and sleeks. The use-wear shows a sawing action into hard material, possibly on multiple occasions. Absence of visible polish prevents comment on silica content. Possibly Bambusa spp.? At D8 the striae are overlaid with moderately dense oblique striae.	Sawing, Whittling	Hard	U	6.38 & 7.13
FDY 001	190	B	Triangular	Kutau/ Bao	Tip missing. Surface is very heavily degraded. On the ventral face the edges are all damaged, distinctly rounded and abraded. No scars are identifiable. A few scattered striae are visible on the ventral side but these all look to be post-depositional. The dorsal side has discontinued bending scars along both blade edges with some edge rounding and very light polish, apart from at D9 where an isolated patch of developed polish may be hafting wear. There are no striae visible on the heavily degraded dorsal face apart from a patch of moderate density axial rough-bottomed and intermittent striae at D7 - which look post-depositional. No interpretation offered.	Not Applicable	Not Applicable	Not Applicable	6.110 & 7.16

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FEK 001	31	M	Trapezoid	Gulu	Stem and the extreme tip are missing. Some retouch is present on edges close to the stem (V7/D9 and V9/D7). The ventral face has edges with microscars and areas of multi-type scarring and patches of developed polish. Striae at the distal end of the artefact are axial, scattered or moderately dense rough-bottomed and intermittent striae with an overlay of random sleeks. Striae at the ventral proximal area of the blade are moderately dense transverse rough-bottomed and are probably hafting marks. The dorsal face has a similar use-wear distribution pattern with axial striae noticeable at the distal end and transverse striae at proximal end of blade in the area where hafting marks are predicted. This blade was used in an axial motion, slicing into low silica, moderately soft or elastic material. E.g. skin, fish, meat, low silica soft plant material such as banana or *Cocos nucifera* leaf. Overlying striae at V6 are oblique and suggest some secondary use for whittling.	Slicing	Elastic	Nil	
FEK 011	176	D	Triangular	Kutau/ Bao	Proximal and medial sections of the stem missing. Blade appears 'upside down' as tapered/pointed end is at the platform end of artefact and there are indications that the stem was retouched out of the distal end. The surface is very degraded. Ventral face has no identifiable edge scars as the edge is very abraded and rounded. There is a little light polish at V3 & V4. Dense axial rough-bottomed, intermittent and sleek striae at V3 and a scatter of the same at V6 indicate a sawing action on fairly hard but low silica material. Dorsal face also has distinct edge rounding and abrasion, little evidence of polish but a pattern of scattered and moderately dense axial rough-bottomed and intermittent striae at D1, 2 & 3 - at tip end. Striae nearer the stem are all oblique and probably post-depositional. The edge at D1/V3 in particular was used to saw hard but low silica material such as Pometia spp., Casuarina Spp. or maybe bone.	Sawing	Very Hard	Very Low	6.49

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FEK 015	177	C	Triangular	Kutau/ Bao	Artefact is complete. The tip is retouched on both sides. No edge scars are identifiable. The ventral face edge around the tip at V1, 2, 3 is rounded and has developed polish at V1, slight polish at V2. There is a scattering of axial rough-bottomed striae at V1 and V2 but V3 has transverse rough-bottomed striae. Overall the ventral face shows very little use-wear. The dorsal face is heavily degraded but has a patch of dense oblique rough-bottomed and sleek striae at D3 and developed polish on the edge at D4 which points to use with a whittling action on hard material with a fairly high silica content such as Bamboo or Rattan. At V9 a scatter of axial striae are overlaid with moderately dense oblique rough-bottomed and sleek striae which points to multiple episodes of varying use.	Whittling	Hard	High	1.1
FEK 016	32	C	Trapezoid	Kutau/ Bao	Artefact is complete. The tip is retouched on both sides. The ventral face has distinct edge rounding and some light polish visible at locations which are not retouched together with discontinuous bending and some feather scars. Visible striae are mostly scatters and patches of medium density axial rough-bottomed and sleeks. The dorsal face has developed polish at the tip and on the edges of the medial section, some bending and flake scars at D4 together with moderate dense transverse rough-bottomed and sleek striae. Opposing face at V6 has discontinuous bending scars and some secondary transverse striae. Use-wear Indicates a scraping action on hard material with moderate silica content. E.g. Calophyllum spp. or Caryota spp. The tool may have been used in more than one fashion - to thrust into a softish elastic material with no silica such as meat or fish as well as to scrape a harder siliceous plant material using the thicker section of blade near to the haft.	Scraping	Hard	Moderate	6.21

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure Nº
FEK 025	181	M	Trapezoid	Kutau/ Bao	Tip only present D1, 2, 3 & V1, 2, 3 only. No discernible use-wear.	Not Applicable	Not Applicable	Not Applicable	
FEK 029	175	B	Triangular	Kutau/ Bao	Tip missing. Edges on ventral face are severely rounded and abraded. No scar pattern can be identified. Any edge polish is obscured by surface degradation. Areas of the ventral face where surface degradation is discontinuous have few striations, apart from a scatter of transverse post depositional rough-bottomed and crescent row striae at V5. Moderate dense axial striae at V9 indicate a sawing motion into hard material but the absence of scar and polish data inhibits interpretation. Transverse striae at V10 are clear haft marks. Dorsal face at D4 has moderate dense transverse rough-bottomed and intermittent striae close to the tip fracture line plus some light polish and noticeable edge rounding but this appears to be taphonomic damage. No further interpretation possible.	Sawing	U	U	
FEK 032	178	U	Triangular	Kutau/ Bao	Distal section of stem and proximal section of blade only present. The only use-wear visible is hafting traces at V9.	Not Applicable	Not Applicable	Not Applicable	

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure Nº
FEK 052	180	M	Triangular	Kutau/ Bao	Tip and medial section of blade only present. The blade tip is retouched on both edges. The dorsal face is almost entirely retouch scars and no use-wear is visible. The ventral face has moderate dense axial sleek and rough-bottomed striae at V1 and V2 with polish developing close to the edges. Very little used but what use there is was in an axial motion into a moderate/soft, moderate silica material e.g. *Cocos nucifera* leaf or soft timber such as Gnetum spp. or Toona spp.	Slicing	Moderate /Soft	Moderate	6.9
FEK 109	179	D	Triangular	Kutau/ Bao	Tip missing. Ventral face has edges which are either damaged or retouched such that edge scars are not identifiable. However, all blade edge scars (V3, 6, 7, 9) are noticeably rounded and the edges are severely abraded. There is light polish in patches all along both edges. A scatter of axial rough-bottomed and sleek striae is visible near the tip at V4 and a few random oblique/transverse striae at V5 and V6. Otherwise the micro-wear appears to be all post depositional. The dorsal face also has damaged/retouched edges with no identifiable scarring and significant abrasion. D4, 5 & 6 all show axial rough-bottomed, intermittent and some sleek striae which are particularly dense at D5. This wear is away from the edge and consistent with the tool tip being pushed into a moderate hard material. The developed polish at D6 and the scatter of axial sleek striations suggests suggest a slicing motion on a moderate/soft but relatively high silica material e.g. Toona spp.	Slicing	Soft	High	6.94

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure Nº
FQT 039	42	C	Trapezoid		Artefact is complete but surface condition is very poor. The ventral face has axial striae at V1, 3, 6 plus light polish, distinct edge rounding and abrasion. Dorsal face has axial striae at D1 (D2 and 3 are obscured), developed polish at D2 (tip) and continuous edge scarring. The majority of wear is sawing motion into moderate to hard material with low silica content e.g. Calophyllum spp. A secondary usage trace evidenced by transverse moderate dense rough-bottomed and sleek striae at V4 together distinct edge rounding and scarring which suggest it was also used to scrape hard, low silica material but opposing face at D6 is too badly damaged to provide supporting evidence.	Sawing, Scraping	Moderate /Hard	Low	
FRL 101	92	M	Trapezoid	Kutau/ Bao	Medial and proximal section of blade only present. The ventral face has damaged edges apart from at V4 and no scars can be identified. V4 is scar free. V6 has light polish extending some distance from the edge and dense rough-bottomed and sleek striae running obliquely back from the edge. This is consistent with whittling a moderate hard, moderate silica material; e.g. Calophyllum spp., Caryota spp. Dense transverse striae running back from the edge at V8 is likely to be hafting wear but I am uncertain as to exactly where this fragment was located on the original unbroken tool. The dorsal face also has an abundance of oblique striae, particularly at D6, which also has continuous feather scars and distinct edge rounding but no polish. This also indicates whittling of hard but non-siliceous material - maybe bone or shell? There are also moderate dense/dense axial striae at D4 and 5 together with developed polish and severe edge abrasion. This fragment is part of a tool that has had multiple use episodes with different portions of the blade used at different times for different slicing and whittling tasks.	Whittling, Sawing	Moderate /Hard	Moderate	

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FRL 1048	99	M	Triangular	Kutau/ Bao	Tip and medial section of stem only present. There is almost no evidence of use wear apart from scatters of oblique rough-bottomed and sleek striae which can be seen on the ventral face running back from the edge. The edge itself at V3 has discontinuous feather scars, very light rounding and no polish. The use-wear suggests whittling of soft, low silica or non-siliceous material such as Taro	Whittling	Soft	Nil	
FRL 1049	74	M	Triangular	Kutau/ Bao	Tip and medial section of blade only present. Moderate dense axial rough-bottomed and sleek striae at D6. The ventral face at V1 & V3 has discontinuous feather scars and slight edge rounding but almost no polish. Striae are scattered and fairly random transverse rough-bottomed, intermittent and sleek. At V4, V5 & V6 the edge is too damaged to interpret although there is a scatter of oblique rough-bottomed and sleek striae. On the dorsal face, D1 has noticeable edge abrasion/rounding and a scatter of axial rough-bottomed and intermittent striae. The most intensive use-wear, the axial striae at D6, indicates a sawing action on moderate hard/moderate silica material such as Caryota spp., Calamus spp., or Calophyllum spp. In addition, D3 has discontinuous microscaring, slight edge abrasion and some rounding but little polish together with axial striae overlying oblique striae along the dorsal left edge indicating its use in a sawing action on a moderately hard siliceous material. The underlying oblique striae provide evidence for a whittling action at D3/V1 with D3 in contact with the surface and feather scars being thrown off the edge at V1.	Sawing	Moderate /Hard	Moderate	6.1

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FRL 1050	98	E	U	Kutau/ Bao	Stem and fragment of proximal section of blade only present. Only the ventral blade section, V8, has a retouched edge. The ventral surface has moderate dense, axial rough-bottomed and sleek striae. The dorsal face at D9 has discontinuous step scarring, no polish and moderate dense axial rough-bottomed striae. The use-wear indicates a sawing action on moderate hard non-siliceous material such as Pometia or Hibiscus spp..	Sawing	Moderate /Hard	Nil	7.21
FRL 1053	89	E	Triangular	Kutau/ Bao	Stem and proximal section of blade only present. The blade has distinct edge rounding and abrasion at D7 and V7 with developed polish at D7 and light polish at V7. The edge abrasion has obliterated any scars. A scatter of axial rough-bottomed and intermittent striae at D7 appears disconnected from a dense patch of axial rough-bottomed and intermittent striae at D9. D9 also has some light polish. Overall this is a well-worn fragment with abraded and damaged edges, moderate dense patches of what I think are post-deposition striae but with one area where there is evidence of a sawing action on moderate/hard material with a moderate silica content such as Caryota, Calamus, or Calophyllum spp.	Sawing	Moderate /Hard	Moderate	6.17 & 7.18
FRL 1054	75	M	Triangular	Kutau/ Bao	Tip and medial section of blade only present. The tip is retouched. The surface is badly degraded and all edges are heavily abraded and rounded. There is a little very light polish distributed over the edges of the fragment. There is a band of transverse striae on the central area of the ventral face at V2 and V5 but these are assumed to be post-depositional. There is also a scatter of oblique intermittent and rough-bottomed striae at D3, D4 & D5. The blade appears to have been used lightly but mainly in a whittling motion plus some evidence of slicing at V6 There is little polish. Use-wear indicates a whittling action into moderate to soft/low silica material such as Hibiscus, Mango or Gnetum.	Whittling	Moderate /Soft	Low	

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FRL 1056	96	M	Trapezoid	Kutau/ Bao	Tip and medial section of blade only present. Tip is a 'square edge' so might be an axe/adze blade or, as this is a very small blade, a chisel. The dorsal face at D1, 2 and 3 has a scatter of axial rough-bottomed and sleek striae with some Crescent Row striae. The dorsal face edges around the tip have discontinuous feather and bending scars but little abrasion or polish. On the ventral face the evidence is all on the medial section at V4, 5 and 6 where the edges are scarred and V4 has noticeable edge rounding with light polish. The striae here are mainly scatters of oblique rough-bottomed striae but V6 has a patch of more moderately dense axial rough-bottomed striae. Use-wear indicates a slicing action into moderately soft material with very low silica content.	Slicing	Moderate /Soft	Very Low	6.7 & 6.36
FRL 1058	79	M	Trapezoid	Kutau/ Bao	Medial section of blade only present. The ventral face is marked by moderate dense transverse intermittent striae at V4 and V5. The edge at V4 has discontinuous feather scarring, distinct edge rounding but very little polish. The dorsal face at D6 has bending scars, distinct edge rounding and light polish. Scraping of moderate/hard material with low silica content - e.g. Pometia spp.	Scraping	Moderate /Hard	Low	6.23
FRL 116	83	E	Trapezoid	Kutau/ Bao	Stem and part of proximal section of blade only present. On the ventral face V8 section is missing. V7 has discontinuous feather scars on the edge with little rounding or polish visible. Moderate dense transverse rough-bottomed striae at V7 and V9 are interpreted as a hafting line. A similar patch of moderate density, transverse rough-bottomed striae at D7 & D9 supports this interpretation. It appears that this was a very large blade which broke close to the hafting line and there is insufficient of the blade area of the artefact to make any further interpretation.	Not Applicable	Not Applicable	Not Applicable	

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure Nº
FRL 124	73	M	Trapezoid	Kutau/ Bao	Part of the distal and all of the medial section of blade only present. Very little use-wear evident. The artefact is well worn with abraded edges and only a scatter of transverse rough-bottomed and intermittent striae are visible at D6 and V5. These are interpreted as post-depositional.	Nil Use-wear	Nil Use-wear	Nil Use-wear	
FRL 134	76	M	Triangular	Kutau/ Bao	Tip and part of medial section of blade only present. The ventral face shows almost no recordable use wear apart from some edge abrasion and a scatter of transverse rough-bottomed striae over V2, 3, 4, 5. There is a marked absence of polish on the ventral face even though surface is not heavily degraded. The dorsal face has a few feather scars at D1 but the remainder of the edge is damaged or retouched although it is also abraded and rounded. There is a marked absence of polish near the edges. There is a general scatter of axial intermittent striae but no substantive evidence of this ever being used as a tool.	Nil Use-wear	Nil Use-wear	Nil Use-wear	
FRL 183	77	B	Triangular	Kutau/ Bao	Tip missing. The ventral face has bending scars on the edge at V6 and feather scars at V9. The edges generally show noticeable and even distinct edge rounding with some patches of light polish. Most visible striae on the ventral side are oblique and post-depositional; though moderate density oblique rough-bottomed striae at V5 and dense transverse rough-bottomed striae at V4 maybe use-wear. The dorsal face has bending scars at D6 & 7, and very light polish but, apart from post-depositional scratches, the only striae are a moderate dense patch of axial intermittent striae at D8 and transverse rough-bottomed and intermittent striae at D9 in the area where hafting wear is normally found. No interpretation possible.	Not Applicable	Not Applicable	Not Applicable	6.88

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FRL 221	100	E	U	Kutau/ Bao	Stem and proximal section of blade only present. All edges are retouched or damaged. The ventral face has developed polish close to the edge at V9 and a scatter of transverse rough-bottomed striae at V8 & 9. The dorsal face at D7 & 9 also has transverse rough-bottomed and sleek striae although no polish is visible. There is also a scatter of sleek striae at V7 but no polish or other evidence. The use-wear indicates a scraping/drawing action on soft but high silica material with the ventral face in contact. E.g. Conoidus spp., Toona spp.?	Scraping	Soft	High	
FRL 352	97	D	Triangular	Kutau/ Bao	Tip is missing. Tool is very misshapen with badly damaged edges and considerable surface degradation. The ventral face has bending and feather scars at V4 together with moderate dense axial rough-bottomed and sleek striae, but no polish or edge rounding. Bending and feather scars are visible at V6 together with distinct edge rounding, some abrasion and developed polish. The striae here are a scatter of transverse rough-bottomed and intermittent. These striae extend across to V5 where they are overlying a moderate density of transverse rough-bottomed and sleek striae. Apart from some transverse rough-bottomed and intermittent striae at V8, which may be hafting wear, the rest of the ventral face is largely covered in post-depositional striae. On the opposing dorsal face at D6 the edge has discontinuous feather scars and axial striae are also visible but to a lesser extent than on the ventral face. Axial rough-bottomed and some intermittent striae are also present on much of the rest of the dorsal face of the blade. It seems that the ventral right/dorsal left edge, which had a noticeably more acute edge angle than the other edge, was used in a sawing action on moderate/hard low silica material; e.g. Pommetia spp. or some Eucalyptus spp.	Sawing	Moderate /Hard	Low	

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Raw Material Source	Summary Description	Primary Use Mode	Primary Use Material: Hardness	Primary Use Material: Silica	Illustration Figure N°
FRL 582	90	M	Trapezoid	Kutau/ Bao	Tip and part of medial section of blade only present. The edges are all damaged but all ventral face edges show distinct rounding and light polish. A few scattered rough-bottomed and sleek striae are visible at V3 and V4. The dorsal face has very few striae apart from a scatter of axial rough-bottomed and intermittent striae at D1. The edges are all distinctly rounded and have light polish apart from at D6 which has continuous feather scars, very little abrasion and no striae. There are traces of use in a sawing motion on the dorsal face at D1 but this is largely obliterated. Surface features appear to be mostly post-depositional.	Sawing	Very Hard	Low	
FRL 911	84	M	Triangular	Kutau/ Bao	Part of tip section only present. The edges on both faces have feather scars, light rounding and some light polish. The ventral face also has a scatter/moderate density of axial rough-bottomed striae. The dorsal face has transverse rough-bottomed and some intermittent striae located somewhat further away from the tip than the striae on the ventral face. The blade was used in a slicing motion on low silica, moderate to soft material with the ventral face mainly in contact. There is also evidence of very light use on the dorsal face as a scraper on a much harder and more siliceous substance like Caryota spp. or Calophyllum spp.	Slicing, Scraping	Moderate /Soft	Nil	
FSZ 141	189	C	Trapezoid	Baki	Stem and proximal section of blade only present. The ventral face is scarred with step and feather scars but edge rounding is light and there is very little polish. All striae are transverse and those across the centre section at V8 are dense, rough-bottomed, intermittent and sleek. The dorsal face has no visible striae but some polish which is quite developed at D9. Because the densest area of the transverse striae is in the centre of the ventral face and the edges are step scarred on either side, I interpret this as evidence of hafting.	Not Applicable	Not Applicable	Not Applicable	

Figure 6-1: FRL 1049, Dorsal face; Point 9

Figure 6-2: FRL 1049 x100, Point 9; edge is relatively unscarred and unabraded. Moderate dense axial rough-bottomed and intermittent striae are indicated by red arrows. These appear to be overlain by oblique striae (yellow arrows)

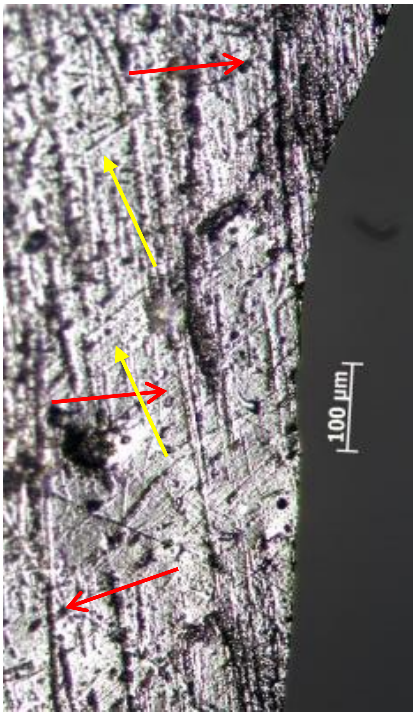


Figure 6-3: FRL 1054, Ventral face; Point 2

Figure 6-4: FRL 1054, Point 2 x100; moderate edge abrasion and rounding

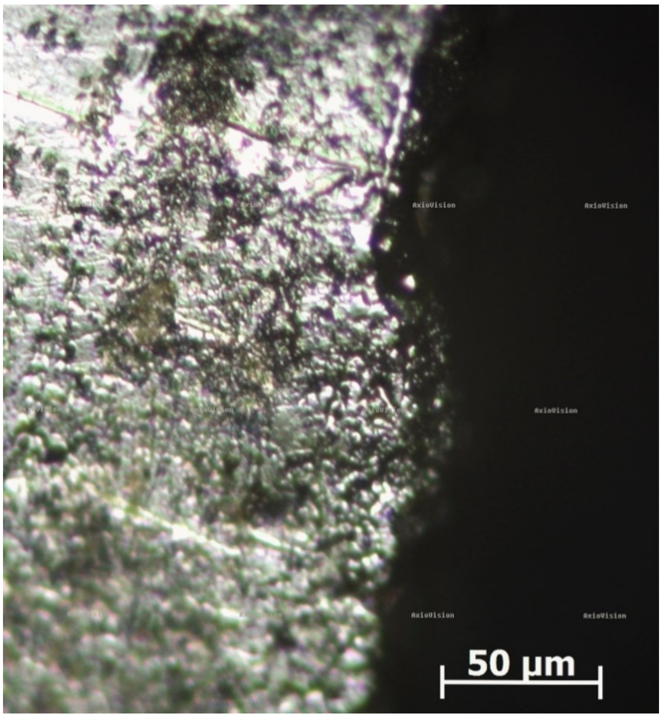


Figure 6-5: FAP 783, Dorsal face; Point 2

Figure 6-6: FAP 783, Point 2 x100; edge scarring at A and B is almost abraded away

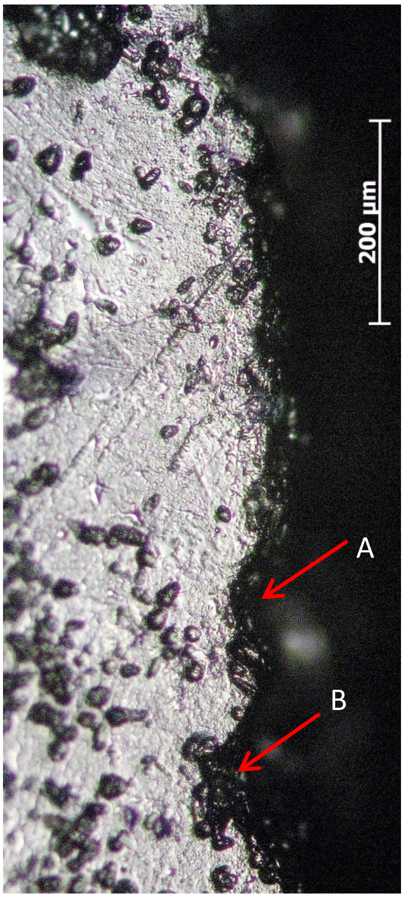


Figure 6-7: FAR II 002 Ventral face; Point 2

Figure 6-8: FAR II 002; Point 2 x 200, flat light polish patches in area indicated by red oval

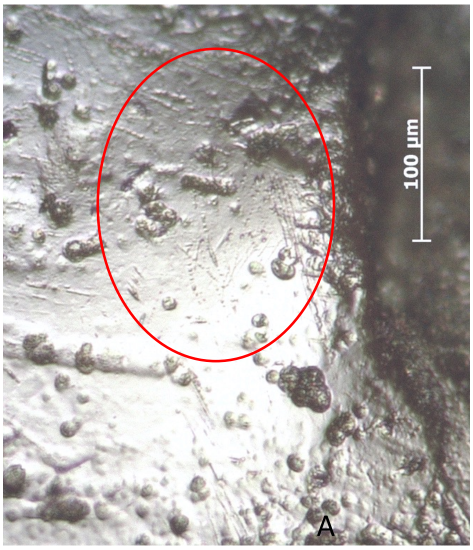


Figure 6-9: FEK 052, Dorsal face; Point 3

Figure 6-10: FEK 052, Point 3 x100; developing polish patches at A indicated by red arrows

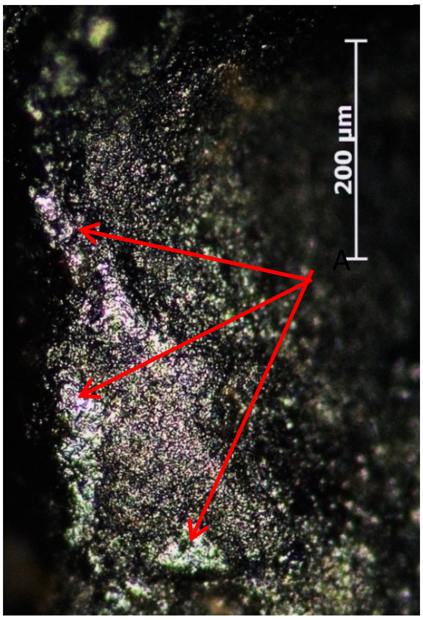


Figure 6-11: FAP 743, Ventral face; Point 1

Figure 6-12: FAP 743, Point 1 x200; area of developed polish indicated by red oval

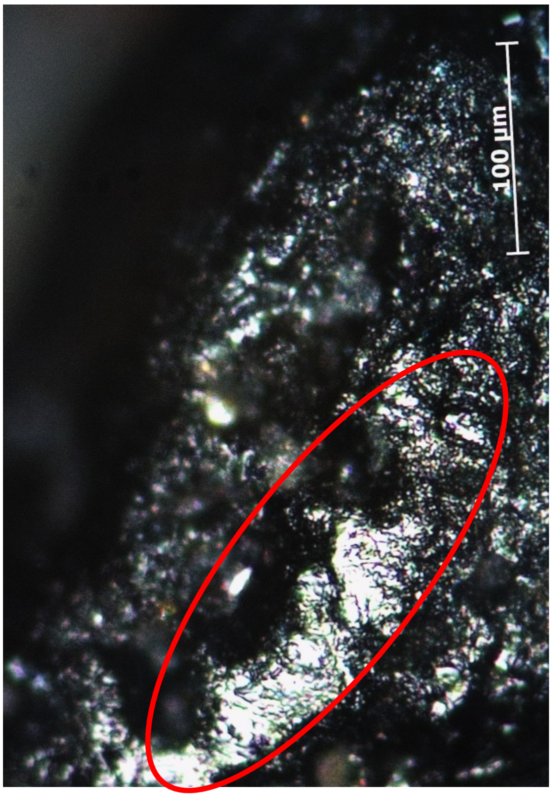


Table 6-3: Analysis of use-modes for those artefacts with blade sections present and identifiable use-wear

Use-mode	**n=**
Sawing	24
Slicing	9
Whittling	16
Scraping	12
Total	61

Figure 6-13: FAP 229, Ventral face; Point 1

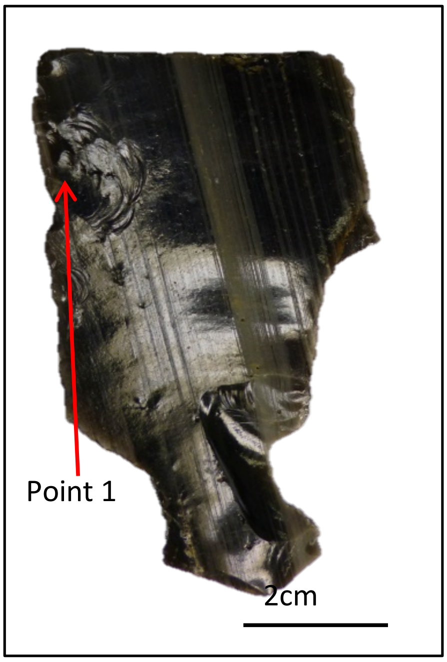


Figure 6-14: FAP 229, Point 1 x200; moderate dense axial sleek striae indicated by red arrows

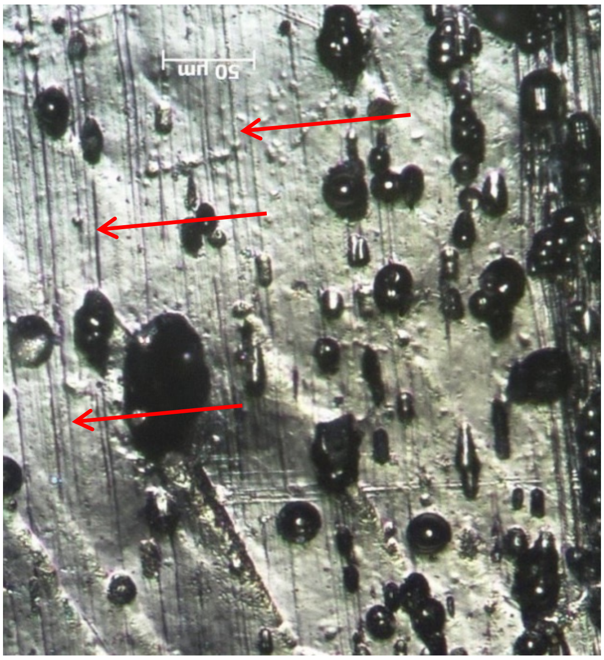


Figure 6-15: FAQ 010, Ventral face; Point 3

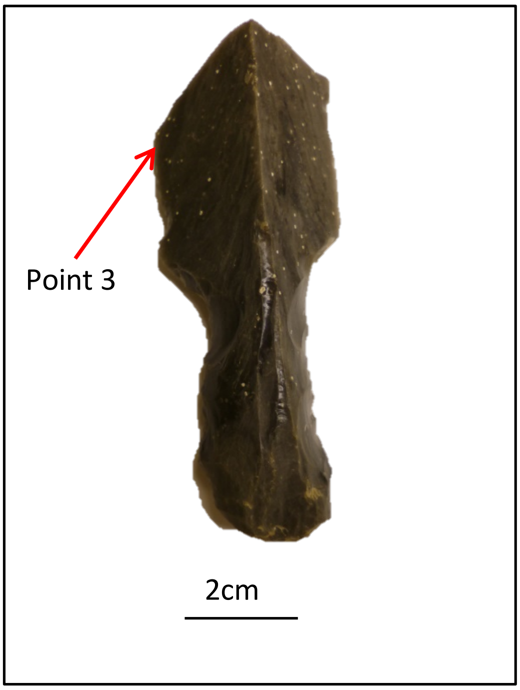


Figure 6-16: FAQ 010, Point 3 x200; moderate dense axial rough-bottomed striae indicated by red arrows

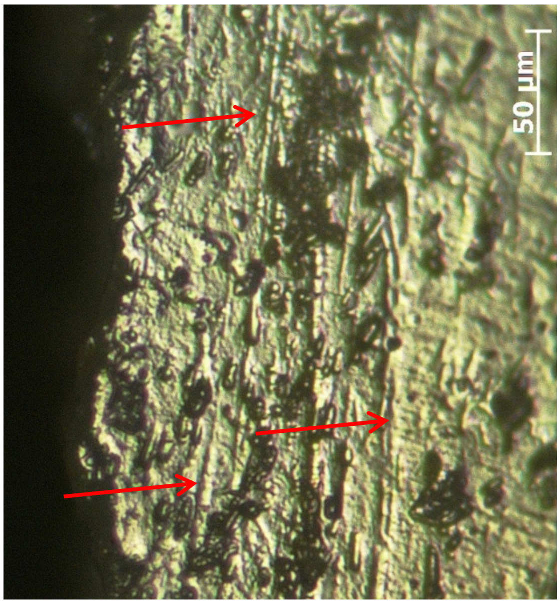


Figure 6-17: FRL 1053, Ventral face; Point 5

Figure 6-18: FRL 1053, Point 5 x200; dense axial rough-bottomed and intermittent striae indicated by red arrows

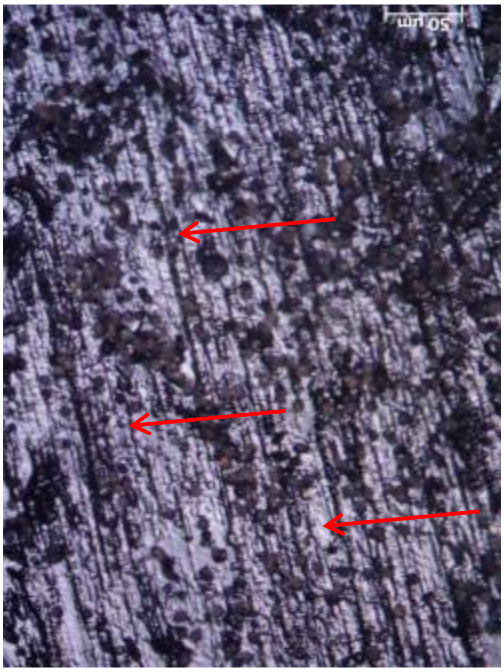


Figure 6-19: FAP 212, Ventral face; Point 4

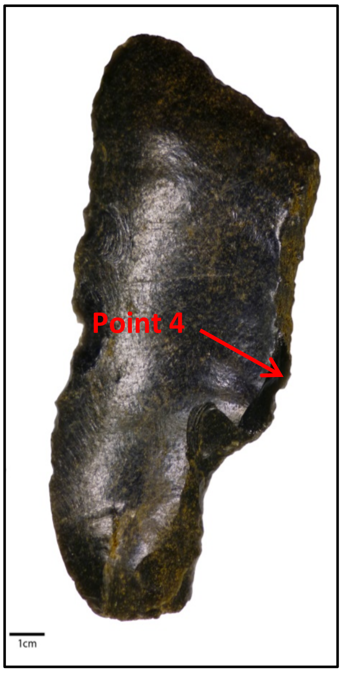


Figure 6-20: FAP 212, Point 4 x500; evidence of scraping; short transverse stria running back from edge indicated by red arrows

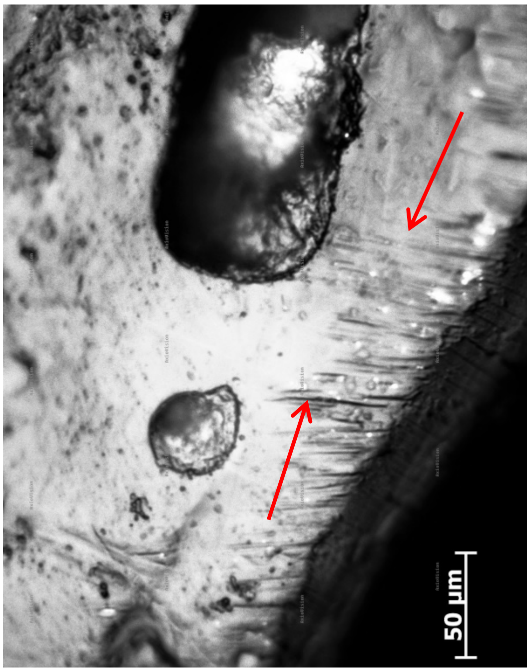


Figure 6-21: FEK 016; Point 12

Figure 6-22: FEK 016, Point 12 x200 EFI; short transverse striae running back from edge indicated by red arrows

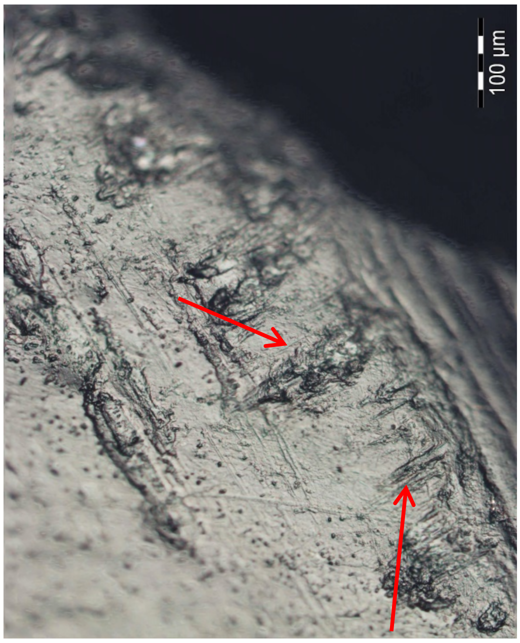


Figure 6-23: FRL 1058
Ventral face

Figure 6-24: FRL 1058 Point 1 x200: Evidence of scraping; transverse striae (indicated by yellow arrows) overlaid with later oblique striae, indicated by red arrows, which are probably taphonomic

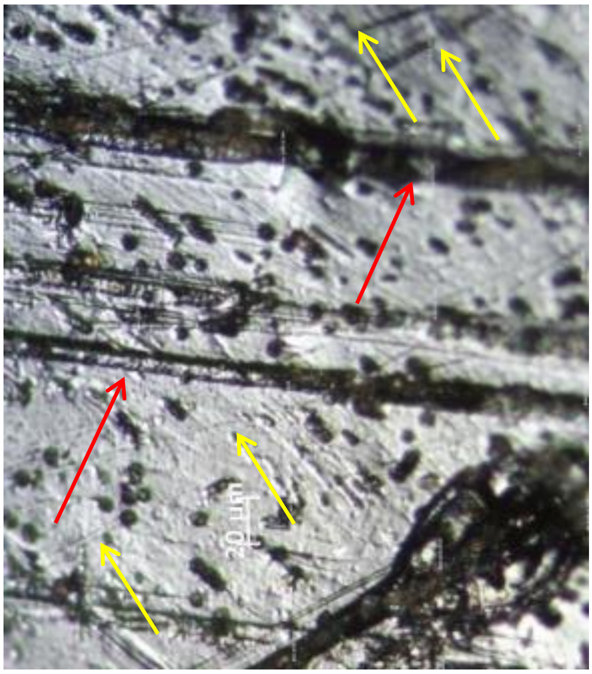


Figure 6-25: FAAL 120, Dorsal face; Point 2

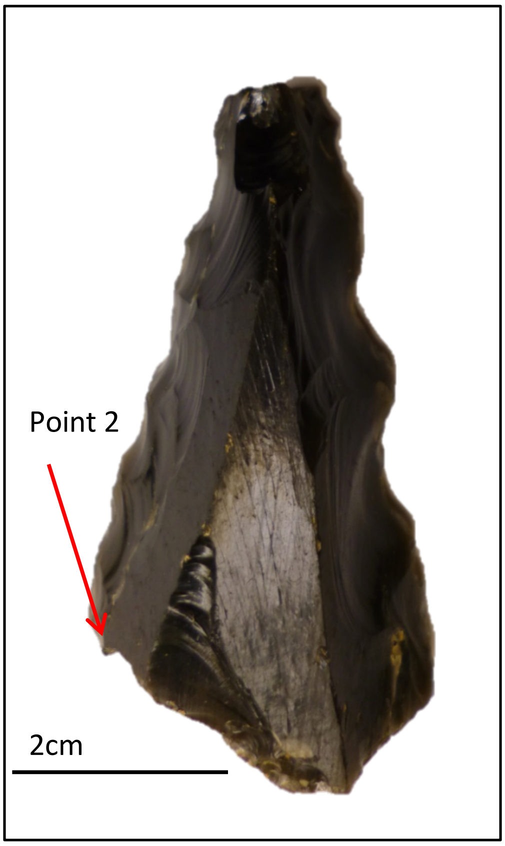


Figure 6-26: FAAL 120, Point 2 x100; moderate dense oblique rough-bottomed and sleek striae (indicated by red arrows) are overlaid by dense transverse rough-bottomed striae indicated by yellow arrows

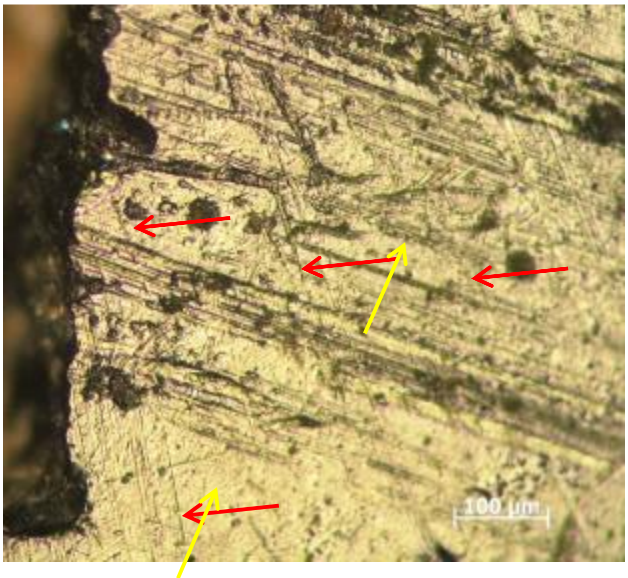


Figure 6-27: FAP 759, Ventral face; Point 3

Figure 6-28: FAP 759 x200, Point 3; moderate dense oblique striae indicated by red arrows

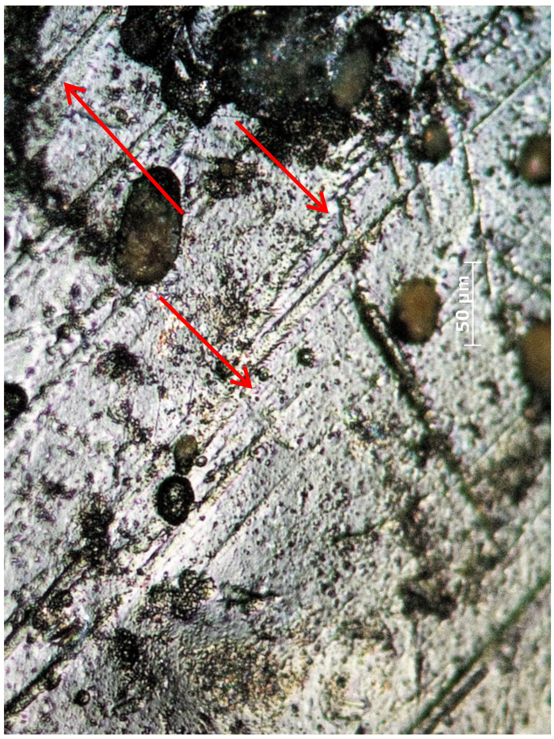


Figure 6-29: FAP 834, Ventral face; Point 2

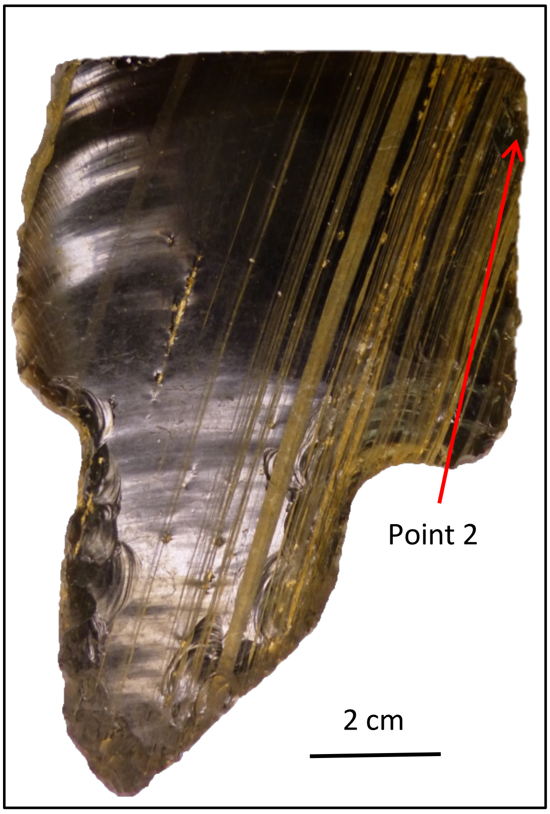


Figure 6-30: FAP 834, Point 2 x200; dense patch of oblique rough-bottomed and intermittent striae indicated by red arrows

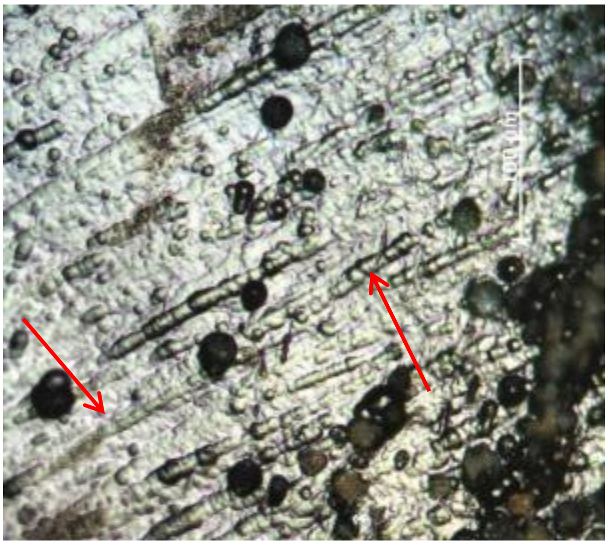


Figure 6-31: Bubble graph showing all Blades with use-wear by hardness and silica content of the materials they were used on. The green bubble indicates artefacts with evidence of use on elastic materials The number of artefacts is indicated both by the relative area of the bubble and by a label within each bubble.

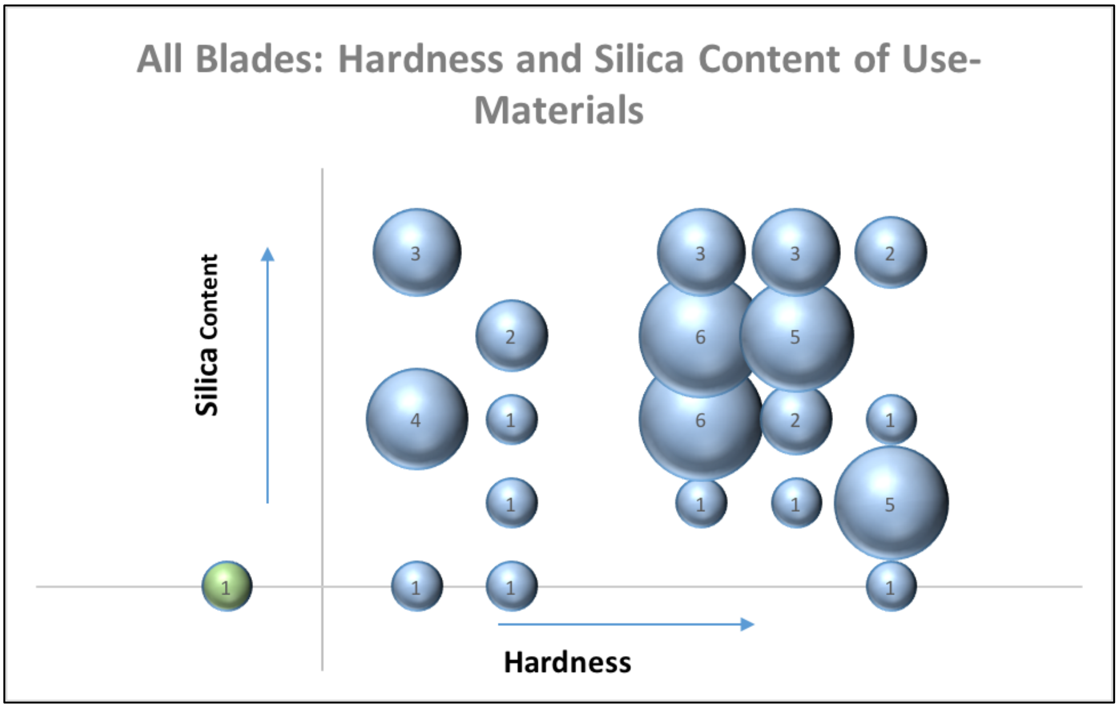


Figure 6-33: Bubble graph showing trapezoid cross-section blades by hardness and silica content of the materials they were used on. The green bubble indicates artefacts with evidence of use on elastic materials. The number of artefacts is indicated both by the relative area of the bubble and by a label within each bubble.

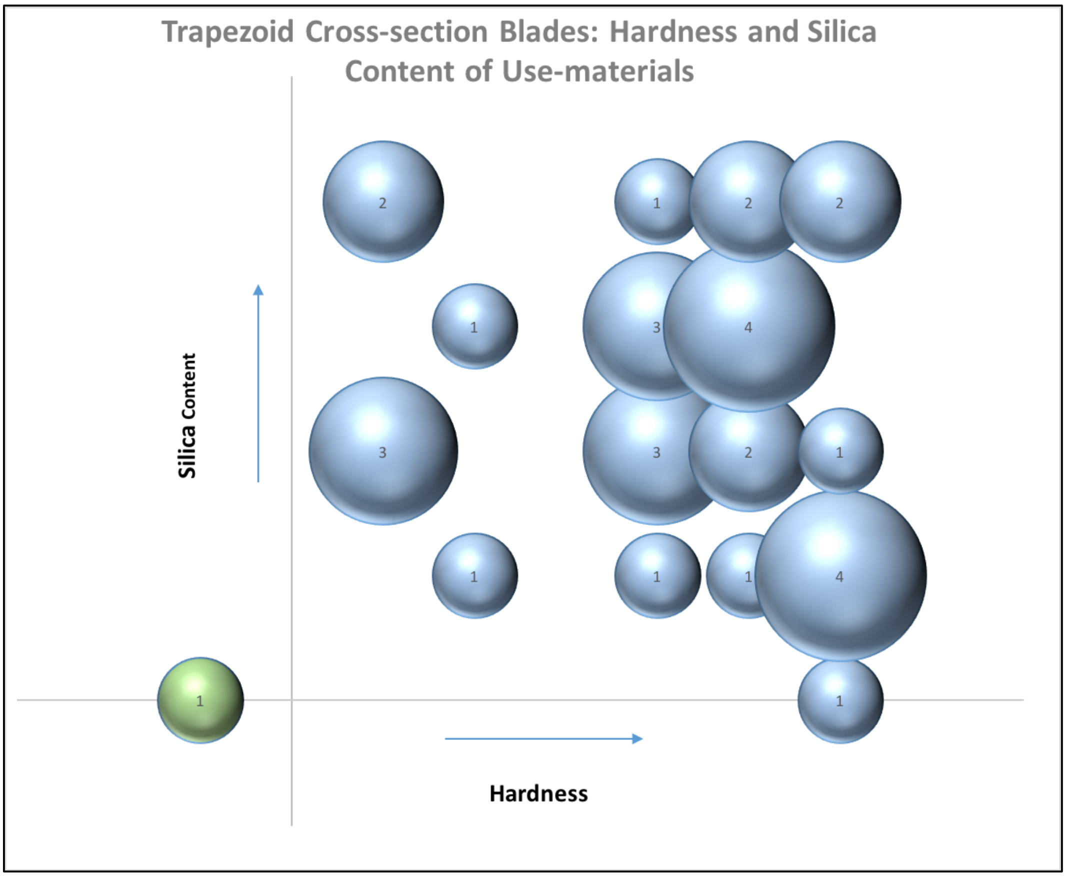


Figure 6-32: Bubble graph showing triangular cross-section blades by hardness and silica content of the materials they were used on. The number of artefacts is indicated both by the relative area of the bubble and by a label within each bubble.

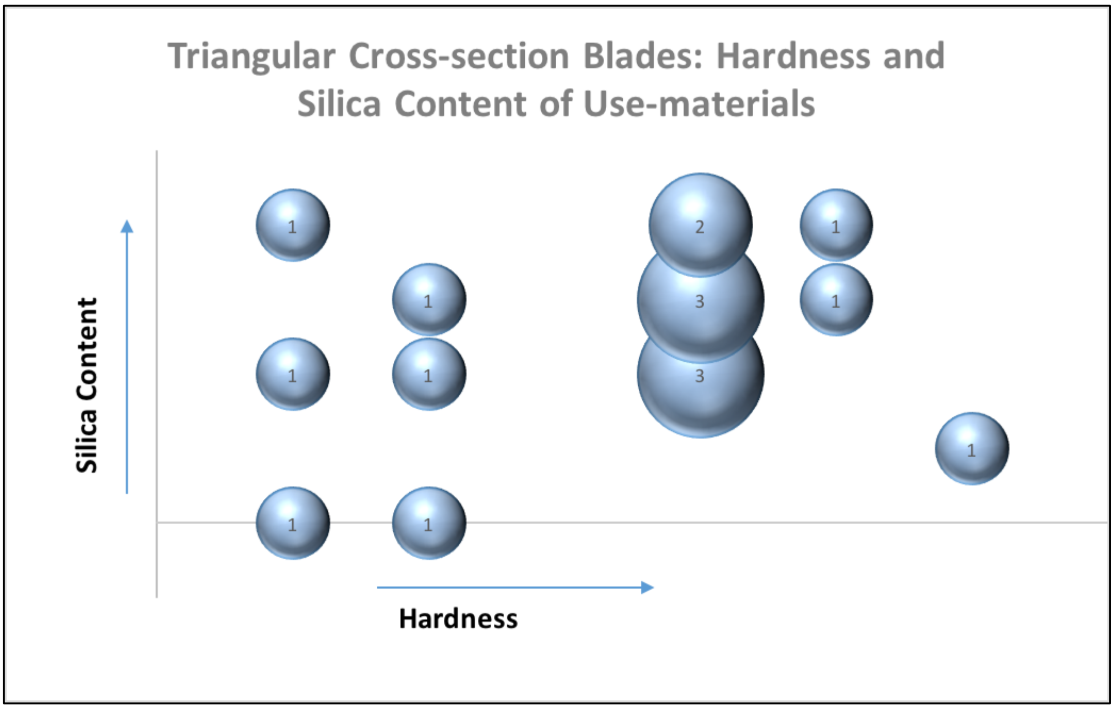


Table 6-4: Artefacts with large spine-plane angles or retouched edge angles

Artefact Reference	Maximum Angle ⁰	Primary Use-mode
FEK 016	105	Scraping, Sawing
FRL 1056	79	Slicing
FAP 439	74	Whittling
FEK 015	61	Whittling
FEK 052	80	Slicing
FEK 025	80	None visible
FSZ 141	61	None visible
FDW 001	90	Whittling
FAW 001	90	None visible
FAR 003	80	Scraping
FAAL 120	52	Whittling
FEK 109	54	Slicing
FAP 759	60	Sawing, Whittling

Figure 6-34: FAP 759, Ventral face; Point 5

Figure 6-35: FAP 759, Point 5 x200; edge rounded and abraded. Axial striae indicated by red arrows

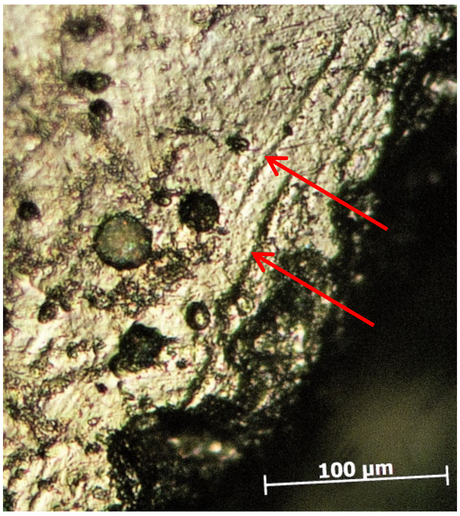


Figure 6-36: FRL 1056, Ventral face; Point 2

Figure 6-37: FRL 1056, Point 2 x100 EFI; rounded and abraded edge

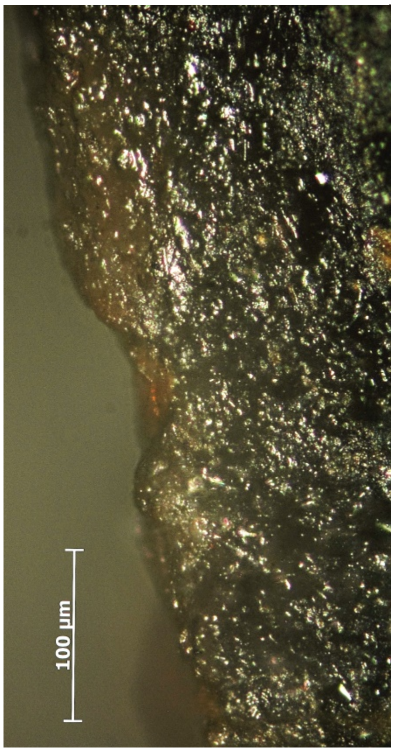


Table 6-5: Artefacts exhibiting secondary use-wear

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-section	Blade Sections: Secondary Use-wear	Secondary Use mode
FAAL 120	195	Missing	Trapezoid	D1 = Axial dense rough-bottomed and intermittent striae	Sawing
FAP 212	81	E	Triangular	V6 = Axial moderate dense rough-bottomed striae	Sawing
FAP 255	173	B	Trapezoid	V9 = Oblique moderate dense rough-bottomed and intermittent striae	Whittling
FAP 407	129	D	Trapezoid	V7 = transverse moderate dense rough-bottomed and intermittent striae. Possibly informal hafting?	Scraping
FAP 743	135	E	Trapezoid	D6 = Oblique moderate dense intermittent and sleek striae. V6= Axial moderate dense sleek striae	Whittling
FAP 758	145	D	Trapezoid	V8 = Transverse moderate dense rough-bottomed striae	Scraping
FAP 759	130	D	Trapezoid	V6 = Oblique moderate dense rough-bottomed and sleek striae. V8 = Axial moderate dense rough-bottomed striae	Whittling
FAP 848	138	Missing	Trapezoid	D4 = Oblique moderate dense rough-bottomed striae	Whittling
FAP 864	132	D	Trapezoid	V6 = Oblique moderate dense rough-bottomed striae	Whittling
FAR II 001	204	D	Trapezoid	D4 = Transverse dense rough-bottomed and intermittent striae. Red residue.	Scraping
FAR II 002	210	A	Trapezoid	V6 = Transverse moderate dense rough-bottomed striae overlying earlier axial striae	Scraping
FDW 001	192	B	Trapezoid	D8 = Oblique moderate dense rough-bottomed and sleek striae. V7 = Oblique dense rough-bottomed and sleek striae	Whittling
FEK 011	176	D	Triangular	V6 = Oblique moderate dense rough-bottomed and sleek striae. V1 = Transverse moderate dense rough-bottomed and intermittent striae	Whittling
FEK 015	177	C	Triangular	V9 = Oblique moderate dense rough-bottomed and sleek striae	Whittling
FRL 352	97	D	Triangular	V5 = Axial moderate dense rough-bottomed and sleek striae	Sawing

Figure 6-38: FDW 001, Ventral face; Point 1 and Point 2

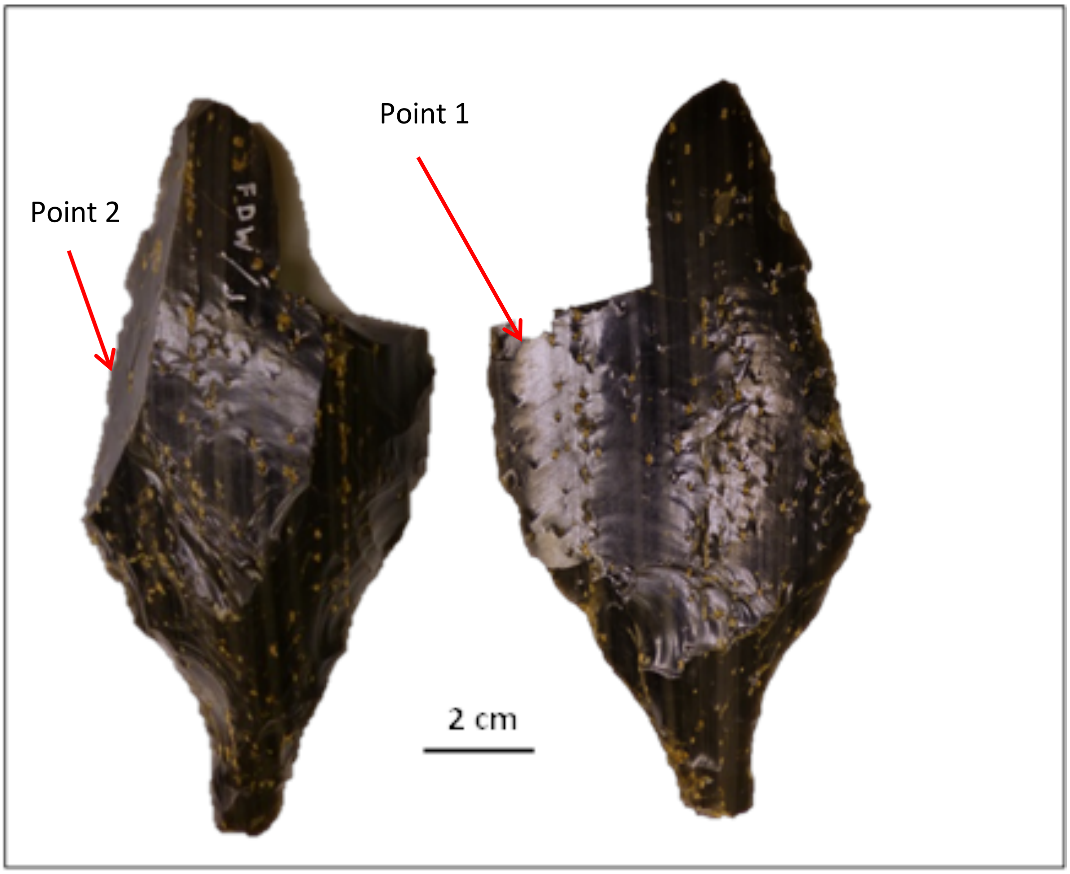


Figure 6-39: FDW 001, Point 1 x100; axial rough-bottomed striae (indicated by yellow arrows) overlaid by dense oblique striae (indicated by red arrows)

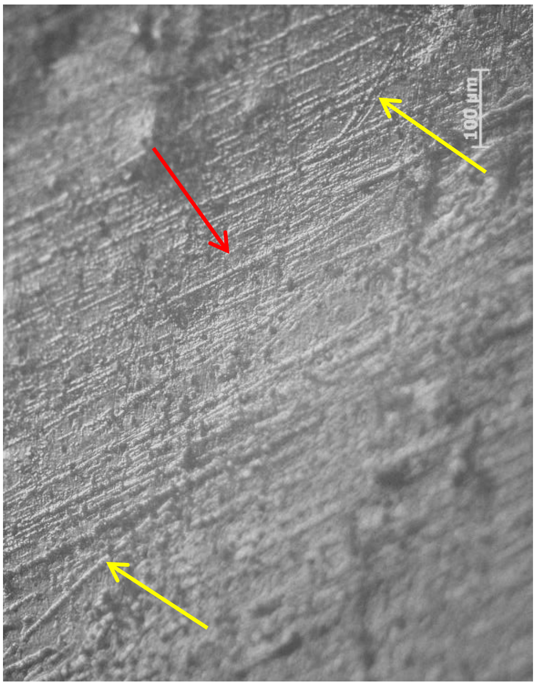


Figure 6-40: FDW 001; Point 2 x200, dense oblique striae consistent with a whittling action, indicated by red arrows

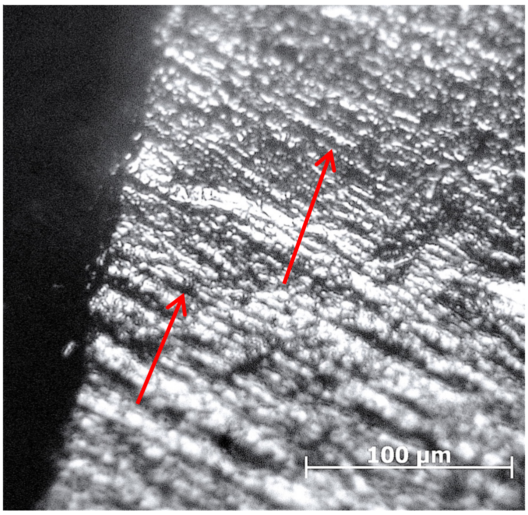


Figure 6-41; FAR II 002, ventral face; Point 6

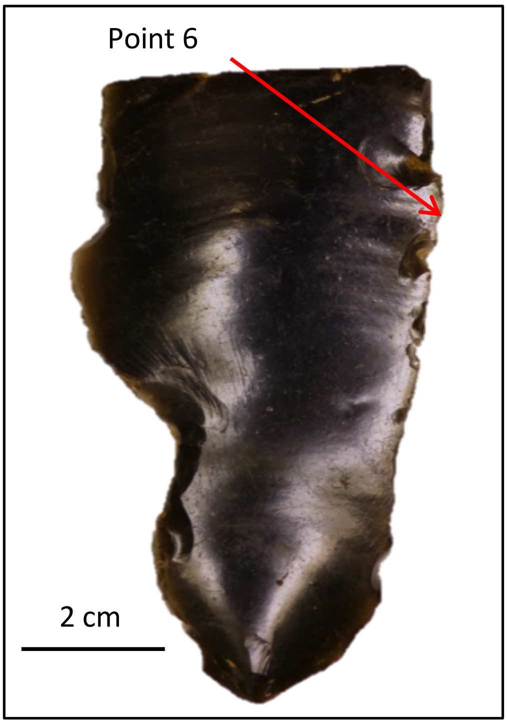


Figure 6-42: FAR II 002, Point 6 x200; despite surface accretion, moderate dense transverse striae (red arrows) can be seen to overlie earlier axial striae (yellow arrows)

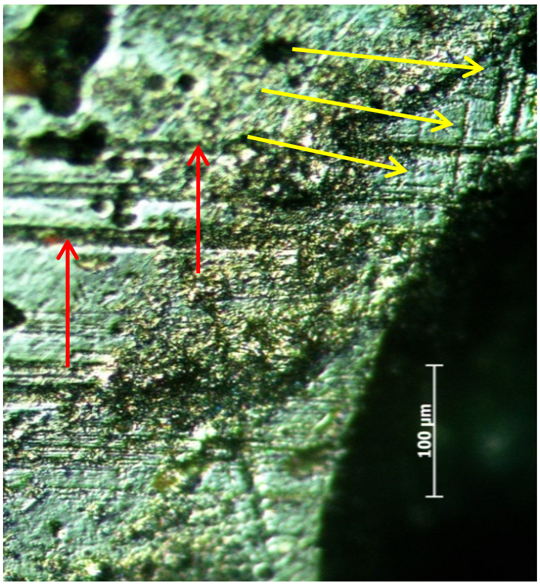


Figure 6-43: FAP 433, Ventral face; Point 2

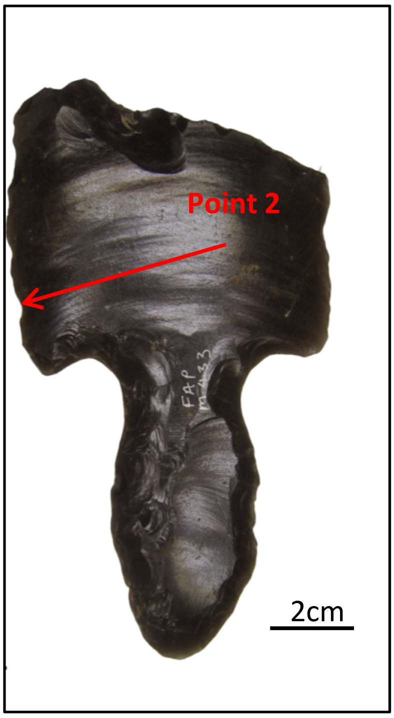


Figure 6-44: FAP 433, Point 2 x200; axial striae on edge indicated by red arrows

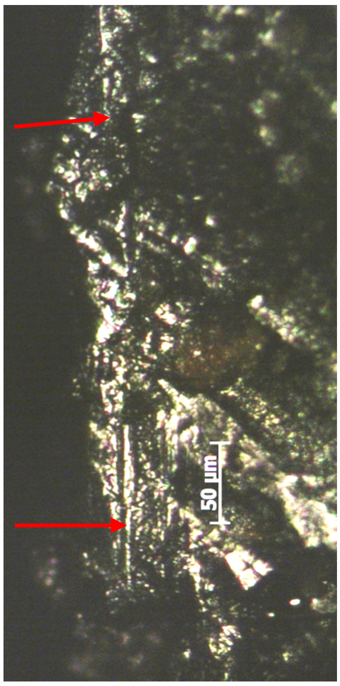


Table 6-6: Artefacts with no or almost no visible use-wear

Artefact Reference	Work sheet N°	Comments
FAP 283	167	No use-wear visible on blade. Ventral face has scatter of transverse rough-bottomed striae at neck of stem (V10 & V11) Dorsal face has polish on stem at D10 and at D16.
FAP 446	148	Scatters of axial rough-bottomed and sleek striae in several areas across blade. No polish. But otherwise little evidence of any use-wear.
FAP 542	127	Tip missing. Little evidence of use-wear.
FAP 732	128	All visible striae are a scatter of generally axial intermittent, sleek and a few rough-bottomed striae. Retouch prevents edge assessment. A little polish on arrises. No real evidence that this blade was used.
FAP 756	112	Ventral face has axial sleeks at V9. Overall very little evidence of use wear.
FAP 831	172	The relatively undegraded surface is notable for the clear absence of striae over most of the blade surface. Very little use-wear visible.
FAP 843	111	Tip only present (sections D1, 2, 3 & V1, 2, 3). No discernible use-wear.
FAW 001	193	Ventral face has edges which are severely rounded and abraded. Although the surface is badly degraded the edges do exhibit developed polish at several points. A few rough-bottomed and intermittent axial striae at V4 are scattered and overlaid by oblique crescent-row striae. V5 has moderately dense transverse striae which appear to be post-depositional. There are no striae visible on the ventral side of tip/edge. While in a poor condition, the general scarcity of striae suggest that this blade has not been heavily used.
FRL 124	73	Very little use-wear evident. The artefact is well worn with abraded edges and only a scatter of transverse rough-bottomed and intermittent striae are visible at D6 and V5. These are interpreted as post-depositional.
FRL 134	76	The ventral face shows almost no recordable use wear apart from some edge abrasion and a scatter of transverse rough-bottomed striae over V2, 3, 4, 5. There is a marked absence of polish on the ventral face even though surface is not heavily degraded. The dorsal face has a few feather scars at D1 but the remainder of the edge is damaged or retouched although it is also abraded and rounded. There is a marked absence of polish near the edges. There is a general scatter of axial intermittent striae but no substantive evidence of this ever being used as a tool.

Figure 6-45: FDM 002, Ventral face; Point 1

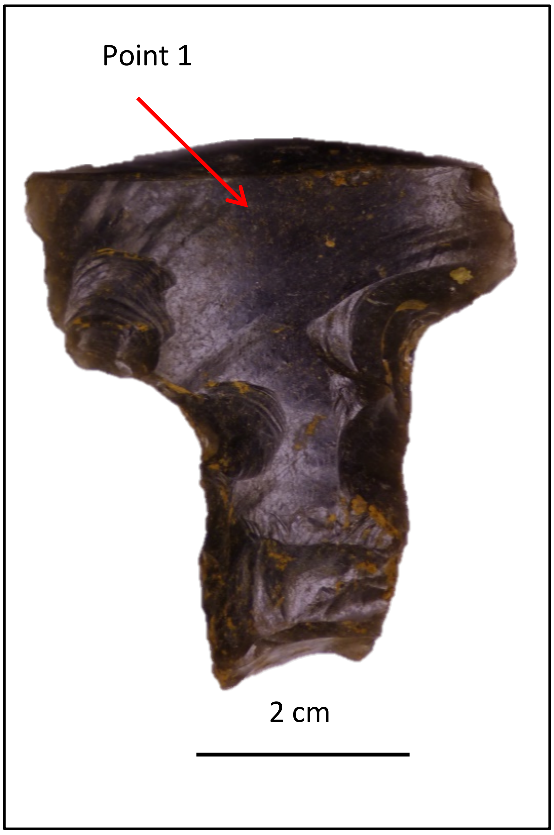


Figure 6-46: FDM 002, Point 1 x100; axial rough-bottomed and sleek striae

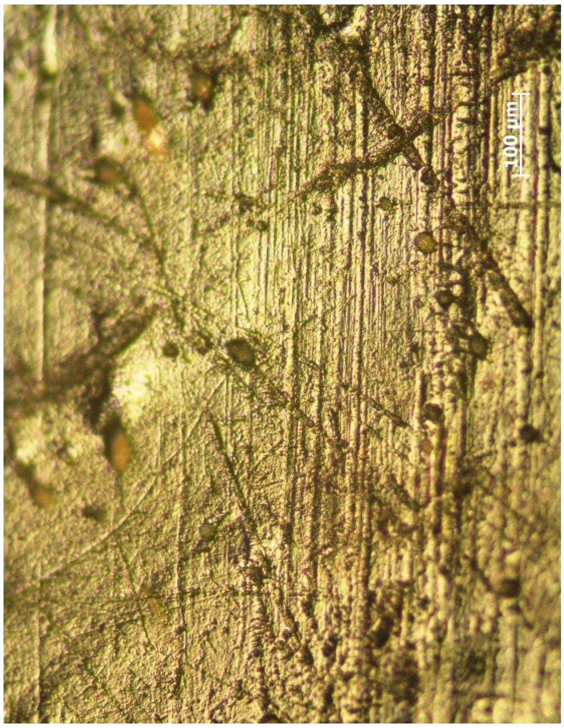


Figure 6-47: FAP 229, Dorsal face; Point 5

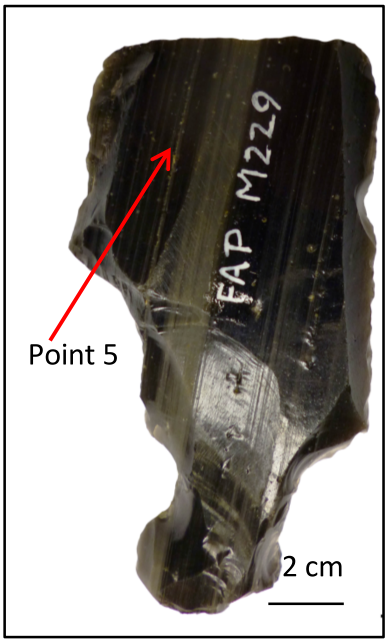


Figure 6-48: FAP 229, Point 5 x100; developed polish on arris

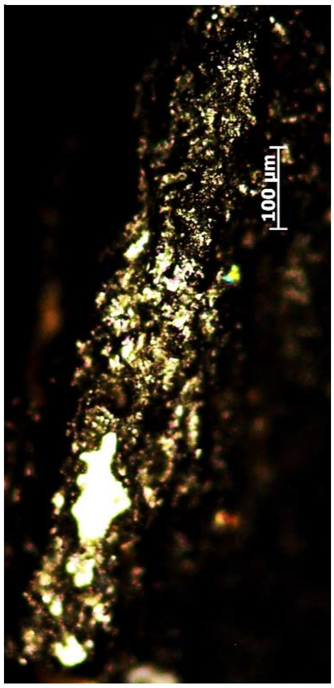


Figure 6-49: FEK 011, Ventral face; Point 2

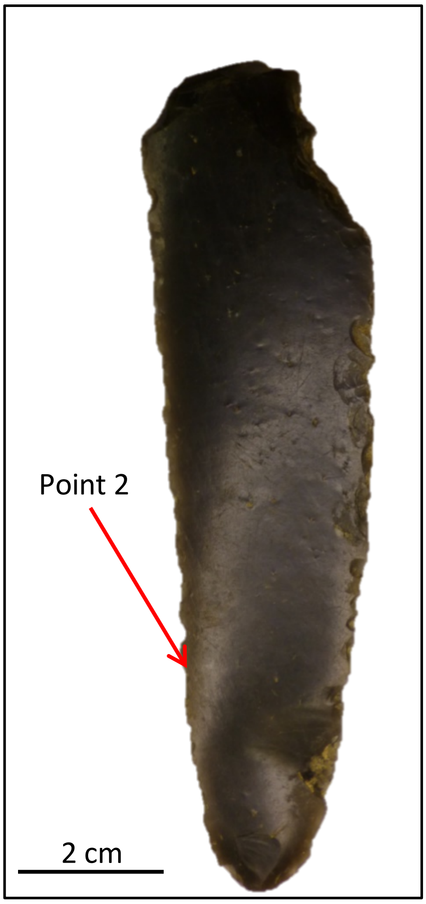


Figure 6-50 FEK 011, Point 2 x100 EFI; dense axial rough-bottomed striae indicated by red arrows

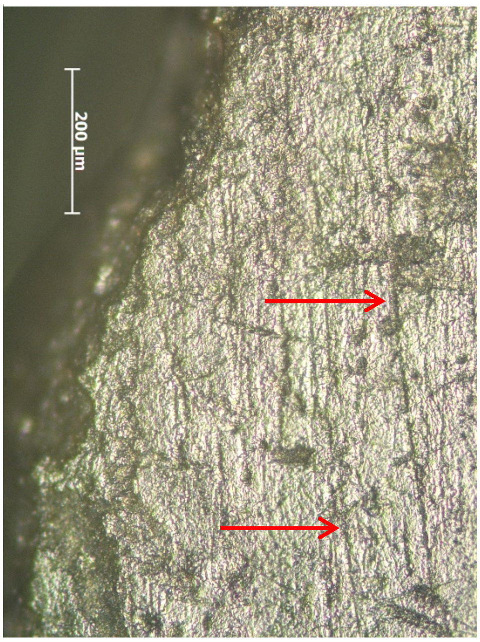


Table 6-7: Detailed analysis of the hafting micro-wear identified on the 22 experimental obsidian tools made and used by Nina Kononenko and used as reference exemplars for hafting wear, with a summary description of the wear traces seen under high-magnification microscopy.

Lithic Reference No	Description	Mode of Use	Species	Hardness	Silica Content	Haft	Time Elapsed (min)	Hafting Micro-wear
WNB 178	Small stemmed Kombewa flake	Slicing	Musa sp. Leaves and leaf midrib	Soft	Moderate	Formal: Hibiscus wood	45	One face has flaked scars on unretouched portion of edge of stem and edge damage with polish and striae. The other face has abrasion to edges of retouch scars, transverse striae and polish.
WNB 234	Irregular flake	Sawing and Whittling	Hibiscus sp.	Moderate	Low	Informal: Bambusa sp. Leaves	25	Evidence is slight. Contiguous small flake and feather scars to edge on ventral face.
WNB 247	Irregular flake	Sawing	Nypa sp. leaves and leaf midrib	Soft	Low	Formal: Hibiscus wood	15	Ventral face has Brightspot in hafted area and edge abrasion with transverse striae. Dorsal face has small contiguous feather scars cut into the edge of an earlier retouch scar.
WNB 91	Large Kombewa flake knapped into axehead	Chopping	Caryota sp. timber	Moderate/ Hard	Moderate/ High	Formal: indirect with cane wrapping, wooden helve. Hafted as an axe	15	Both sides of hafted area on ventral face have edge scarring and rounding overlying earlier retouch. Some transverse striae associated with edge scars.
WNB 06	Large flake knapped into axehead	Chopping	Soft wood (species not specified)	Soft	?	Formal: hafted as an axe	60	Short axial striae on dorsal face and transverse striae running over dorsal arris.

Lithic Reference No	Description	Mode of Use	Species	Hardness	Silica Content	Haft	Time Elapsed (min)	Hafting Micro-wear
WNB 180	Large flake knapped into axehead	Chopping	Cycas revoluta fronds and leaf midrib	Moderate	Nil	Formal: hafted as an axe	15	Abrasion and contiguous small microscars along edge of earlier retouch scar.
WNB 128	Large Kombewa flake knapped into axehead	Scraping	Octomeles sp. timber	Moderate/ Soft	Low	Formal: hafted as a scraper	10	Contiguous small feather scars and adjacent patch of abrasion on elevated retouch scar edge.
Nina EXP 90	Large flake knapped into axehead	Chopping	Homalium sp.	Hard	High	Formal: hafted as an axe	20	Dorsal face has developed polish spots, patches of very short dense rough-bottomed striae parallel to the direction of the working action and contiguous small feather scars to edge of hafted area.
Nina Exp 12	Large Kombewa flake knapped into adze-head	Adzing	Unspecified timber	?	?	Formal: hafted as an adze	10	Edge of inter-scar ridge is abraded with dense transverse striae. There are patches of developed polish and small areas of very short dense rough-bottomed striae parallel to the direction of the working action. Contiguous feather scars on edge in hafted area
Wood chopping 1	Small stemmed Kombewa flake	Chopping	Hibiscus sp.	Moderate	Low	informal: Bambusa sp. Leaves	30	Polish and transverse striae on elevated edge of retouch scars.

Lithic Reference No	Description	Mode of Use	Species	Hardness	Silica Content	Haft	Time Elapsed (min)	Hafting Micro-wear
WNB 176	Small stemmed Kombewa flake	Slicing	Musa sp. Leaves and leaf midrib	Soft	Moderate	Formal: unspecified timber (15 mins) then hand held (30 mins)	45	Small areas of developed polish on edges of ridges. Short transverse rough bottomed striae.
WNB 71	Irregular flake	Scraping	Mangifera sp. Timber	Moderate	Low	Informal: cane wrapping	15	Ventral face has areas of very small contiguous feather scars along edges and patches of very short dense rough-bottomed striae parallel to the direction of the working action.
WNB 62	Irregular flake	Whittling	Octomeles sp. Timber	Moderate/ Soft	Low	Informal: cane wrapping	30	Small contiguous feather scars along proximal ventral edge. Developed polish on dorsal arris well away from working edge.
WNB 237	Irregular blade	Whittling	Hibiscus sp.	Moderate	Low	Informal: Bambusa sp. Leaves	30	Some contiguous feather scars on edge of Dorsal face.
WNB 262	Irregular blade	Scraping	Katylesia sp.	Very Hard	Nil	Informal: Bambusa sp. Leaves	25	Multiple contiguous flake scars on ventral edge within wrapped area. Developed polish on dorsal arris well away from working edge.
WNB 74	Irregular flake	Sawing	Octomeles sp. Timber	Moderate/ Soft	Low	Informal: Musa sp. Leaves	30	Edge rounded in plan and profile. Otherwise very little hafting micro-wear
WNB 13	Small Kombewa flake	Whittling	Toona sp. Timber	Soft	High	Informal: Musa sp. Leaves	15	No clear hafting traces

Lithic Reference No	Description	Mode of Use	Species	Hardness	Silica Content	Haft	Time Elapsed (min)	Hafting Micro-wear
WNB 231	Irregular blade	Sawing	Green Bambusa sp. Stem	Soft	High	Informal: Bambusa sp. Leaves	15	Some small feather scarring to edge within wrapped area but otherwise very little hafting micro-wear
WNB 69	Irregular flake	Carving and Engraving	Octomeles sp.	Soft	Low	Informal: Musa sp. Leaves	360	Multiple contiguous flake scars on ventral edge within wrapped area. Dorsal face has patches of very short dense rough-bottomed striae running parallel to the working action.
WNB 28	Irregular blade	Sawing and Scraping	Pandanus sp.	Soft	High	Informal, cotton cloth	17	No clear hafting traces
WNB 139	Irregular blade	Sawing and Whittling	Green Cane (species not specified)	Soft	High	Informal: Musa sp. Leaves	30	Contiguous micro-scarring of edge on ventral face. Developed polish on dorsal arris within hafted area and well away from the working edge.
WNB 163	Irregular flake	Sawing and Whittling	Nucifera sp. Leaf shaft	Soft	High	Informal: Musa sp. Leaves	23	Contiguous feather and flake scars along edge of hafted area on dorsal face.

Figure 6-51: Experimental Tool Nina Exp12 x100; contiguous feather scars on edge in hafted area

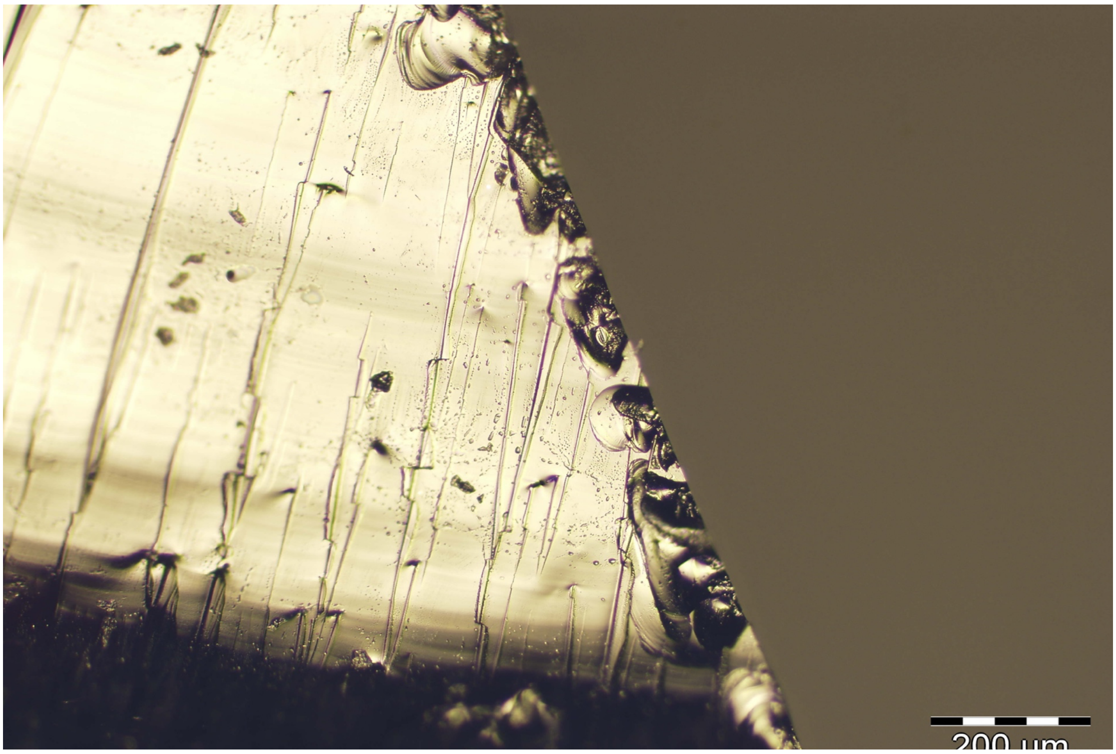


Figure 6-52: Experimental Tool WNB 247 x200; contiguous micro-scarring on elevated edge of retouch scar

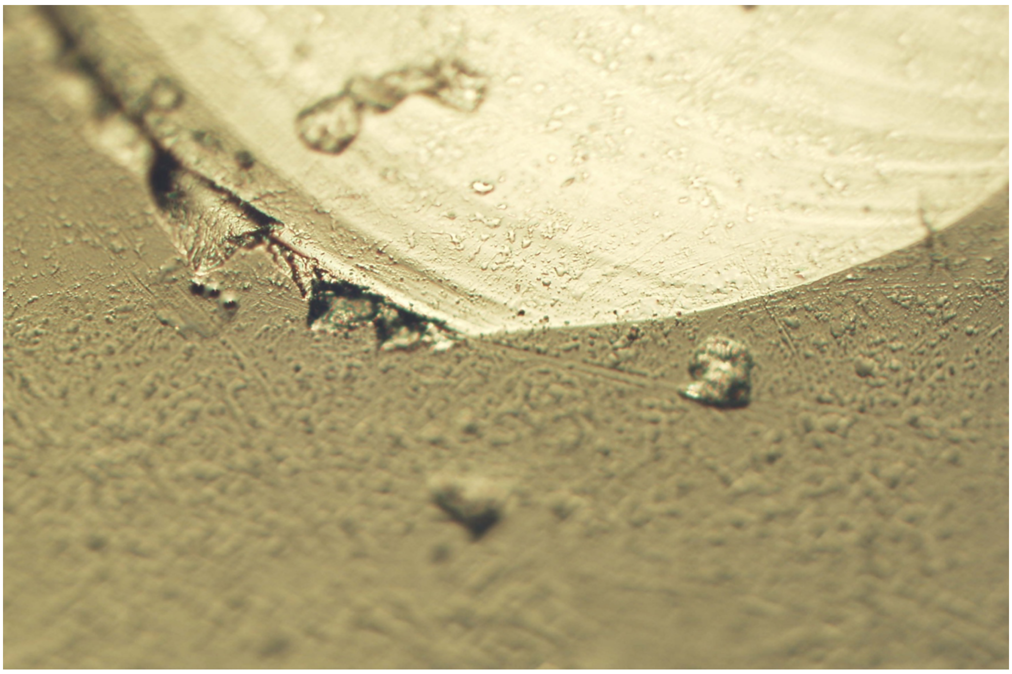


Figure 6-53: WNB 247 x500; transverse striae across hafted area

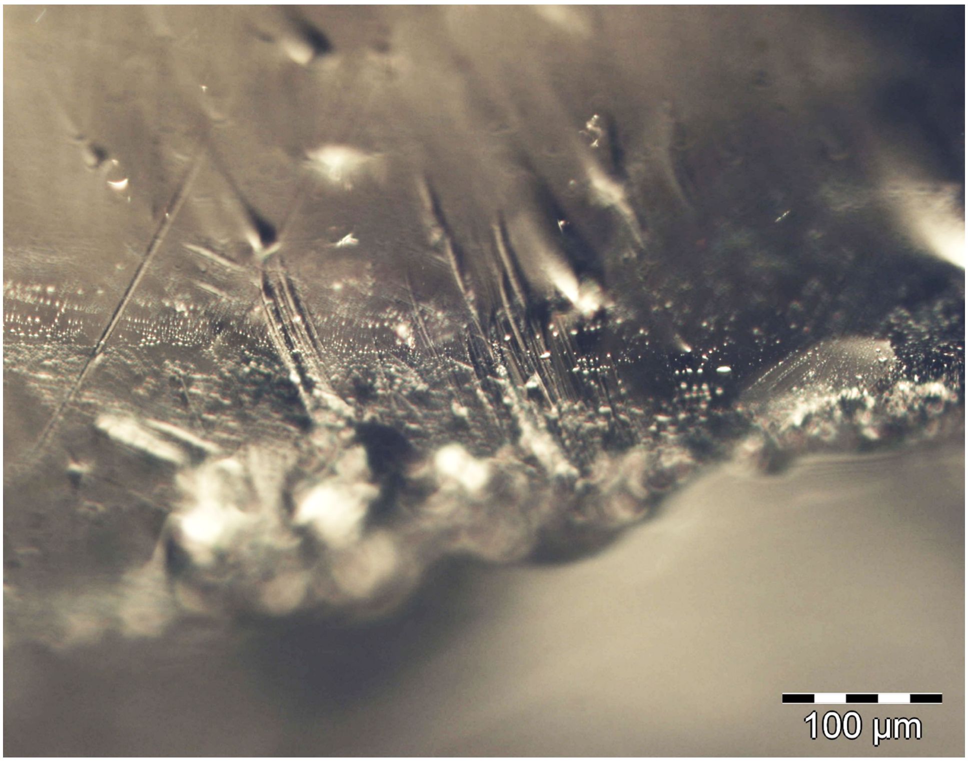


Figure 6-54: WNB 71 x200; patch of very short dense rough-bottomed striae running parallel to the direction of work action

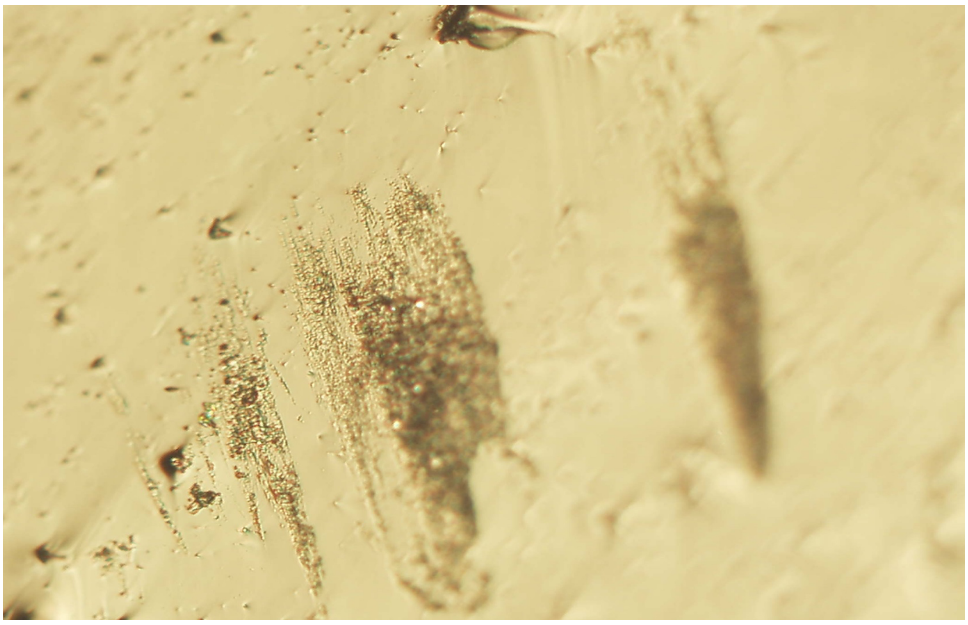


Figure 6-55: WNB 257 x500 EFI; developed polish on ridge within the hafted area

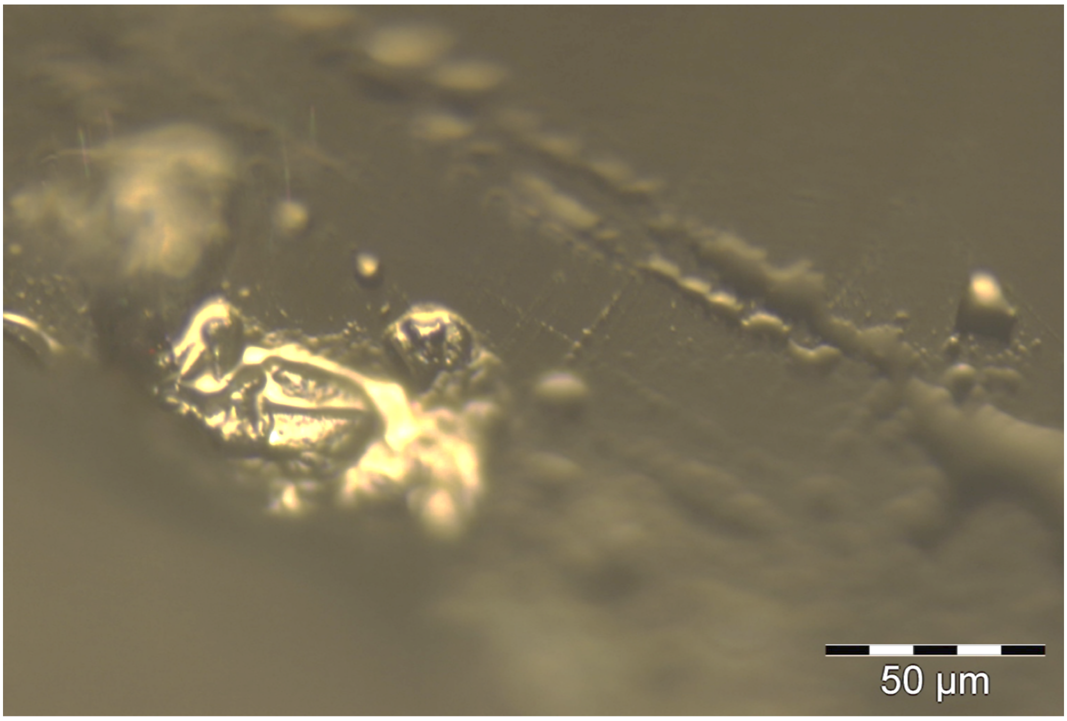


Table 6-8: Ethnographic artefacts from the Australian Museum Collection used as hafting wear exemplars

Museum Reference No.	Description	Acquisition Year
E 917	sectioned spear haft, no blade	1887
PUN 929	spear haft with blade missing	not known
PUN 930	formerly hafted blade	not known
A 14158	formerly hafted blade	1883
E 65465	formerly hafted blade	1969
E 20043	formerly hafted blade	1912
E 20042	formerly hafted blade	1912
E 64472	formerly hafted incomplete blade	1969
E 51028	formerly hafted blade	1944

Figure 6-56: E 20042, a formerly hafted spearhead from the Ethnographic Collection of the Australian Museum

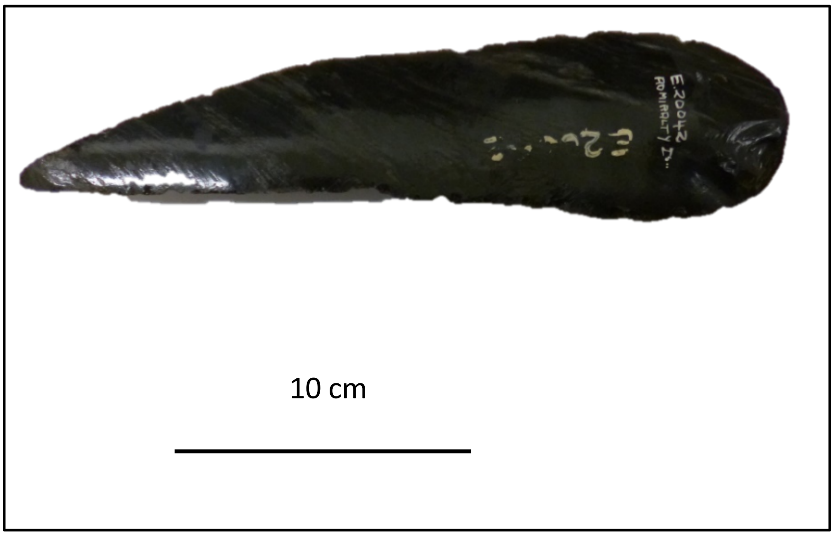


Figure 6-57: E 917, a spear haft in section, from the Ethnographic Collection of the Australian Museum

Figure 6-58: PUN 929, a yoke-type hafting attachment from the Ethnographic Collection of the Australian Museum

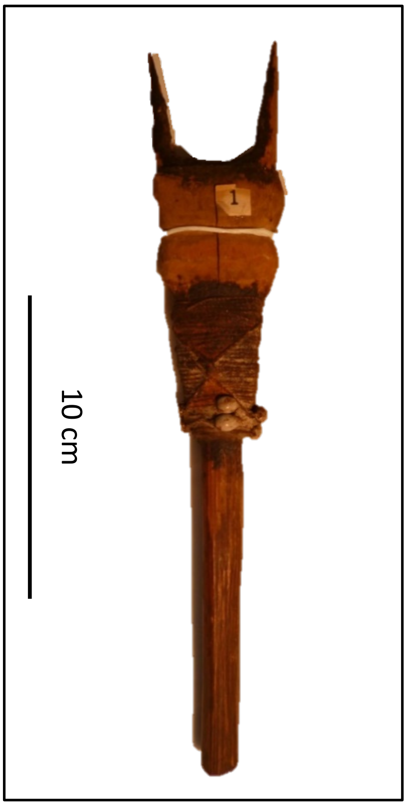


Figure 6-59: A14158 x200; contiguous feather and flake scars where haft binding has wrapped around edge of tool

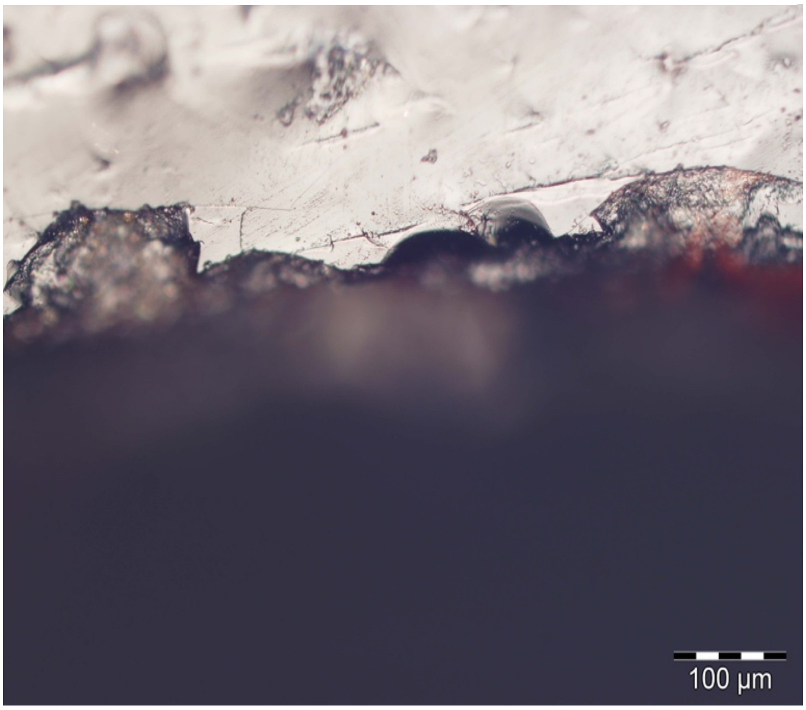


Figure 6-60: E 20042 x200; transverse striae running from edge scar at hafting margin

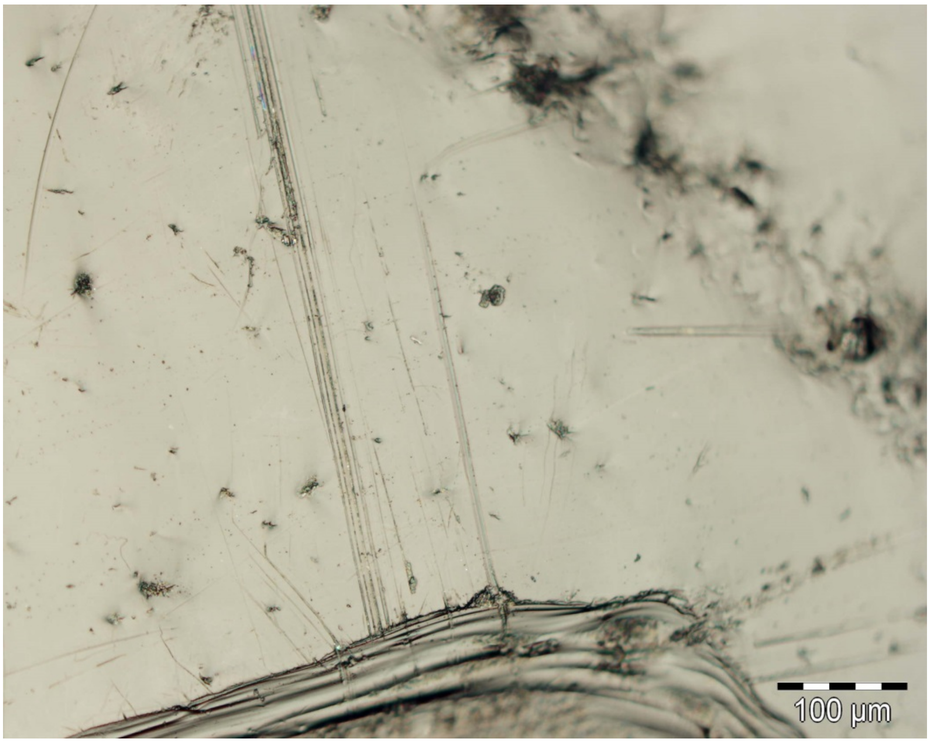


Figure 6-61: E 64465 x100; transverse rough-bottomed striae across ventral face of hafted area. Arrows indicate striae

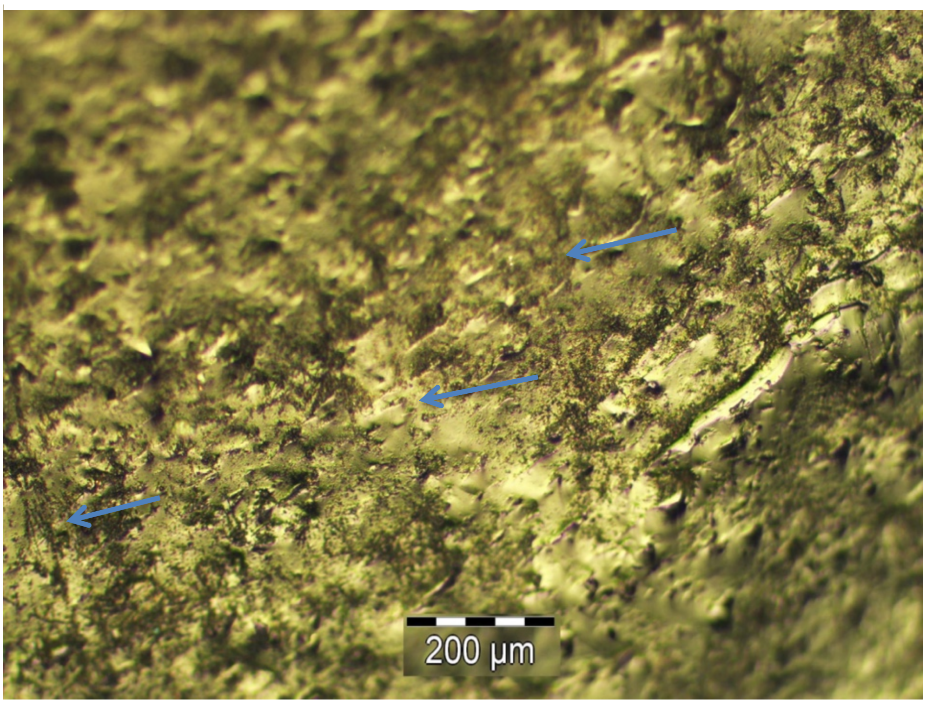


Figure 6-62: E20043 x200; transverse rough-bottomed striae across ventral surface within the hafted area.

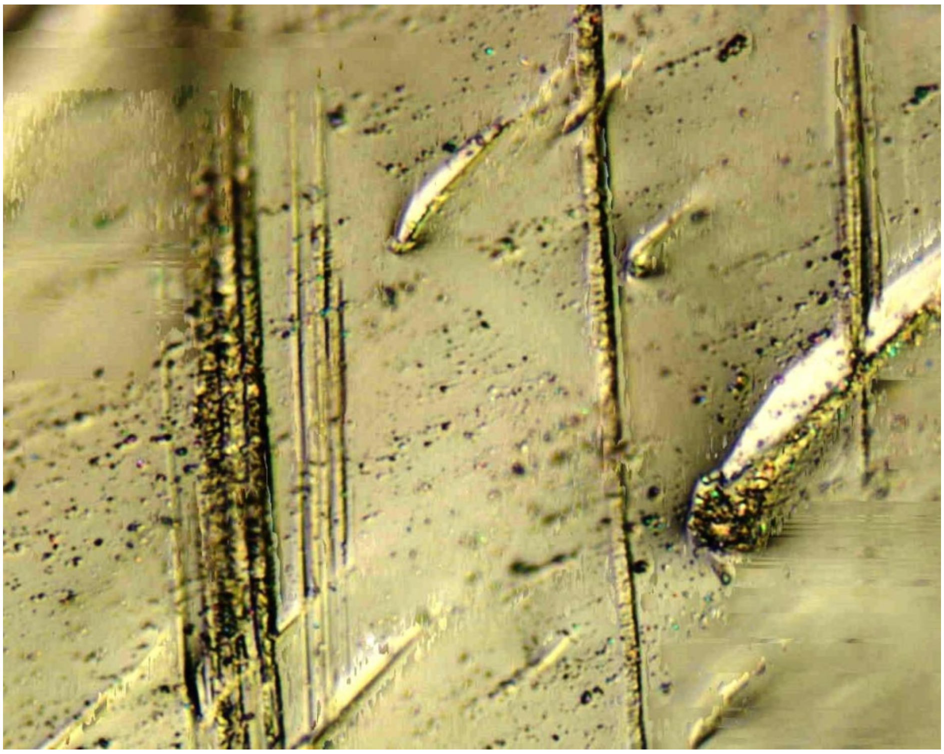


Figure 6-63: A 14158 x200; patches of very short dense rough-bottomed striae filled with residues

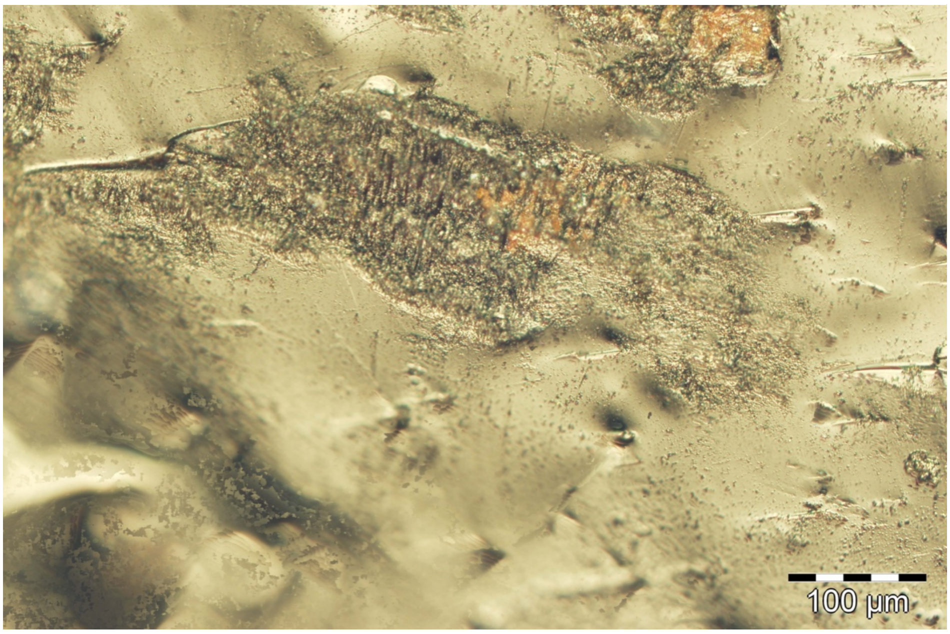


Figure 6-64: E 64472 x200 EFI; dense patch of short transverse rough-bottomed striae across ventral face of hafted area

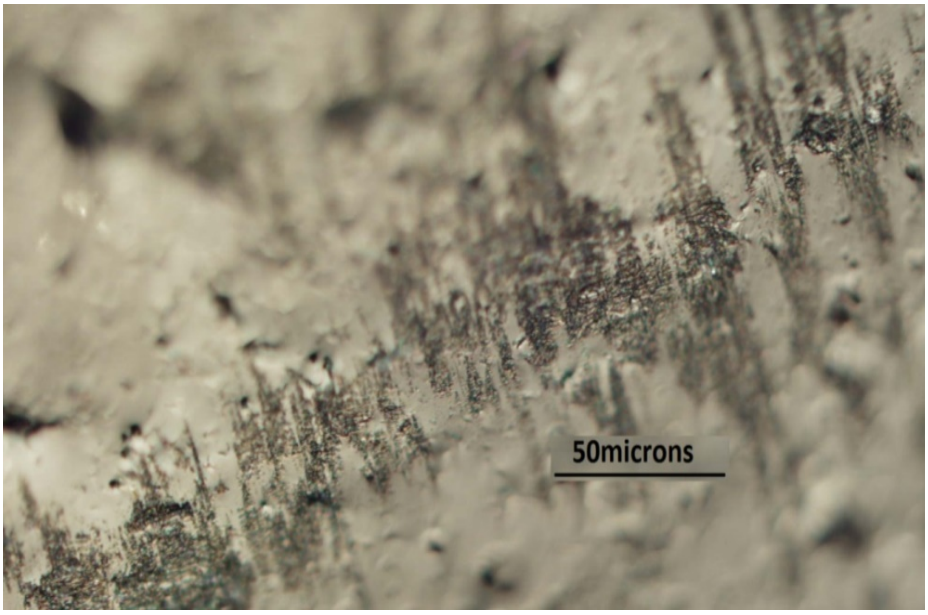


Figure 6-65: E 20042 x200; developed polish on arris within hafted area

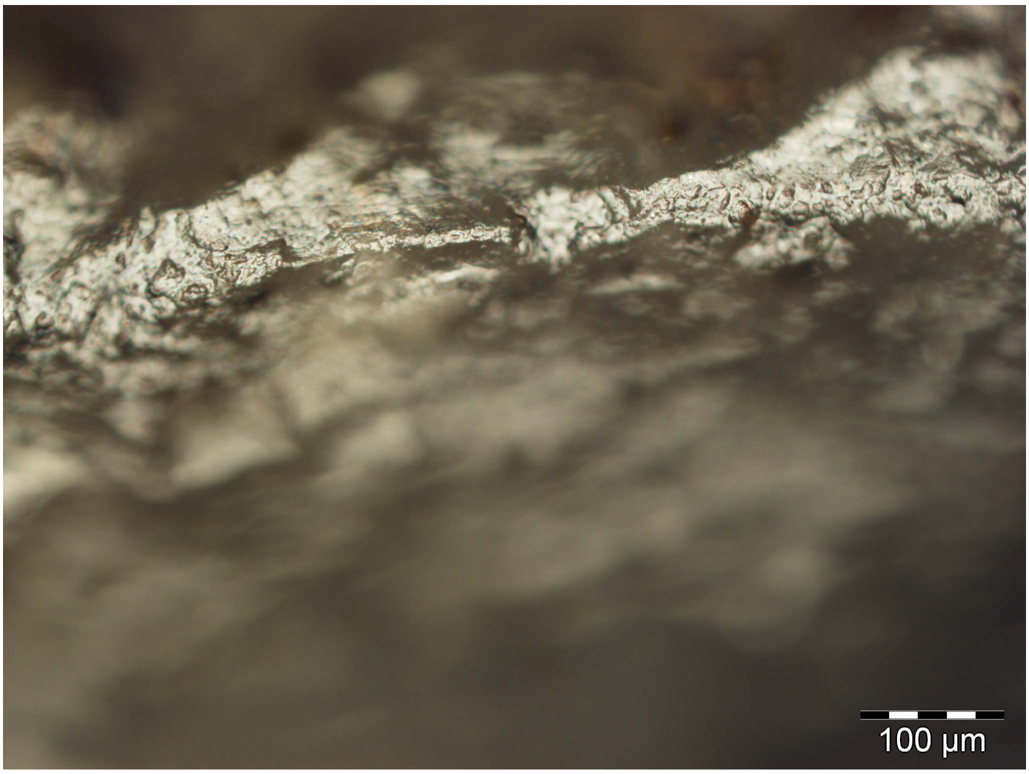


Figure 6-66: PUN 930 x100; showing the contrast in the surface texture of obsidian within the hafted area compared to that outside of the hafted area. Some secondary sleek striae (indicated by white arrow) can also be seen running axially, which may be the result of the blade being pulled out of the haft

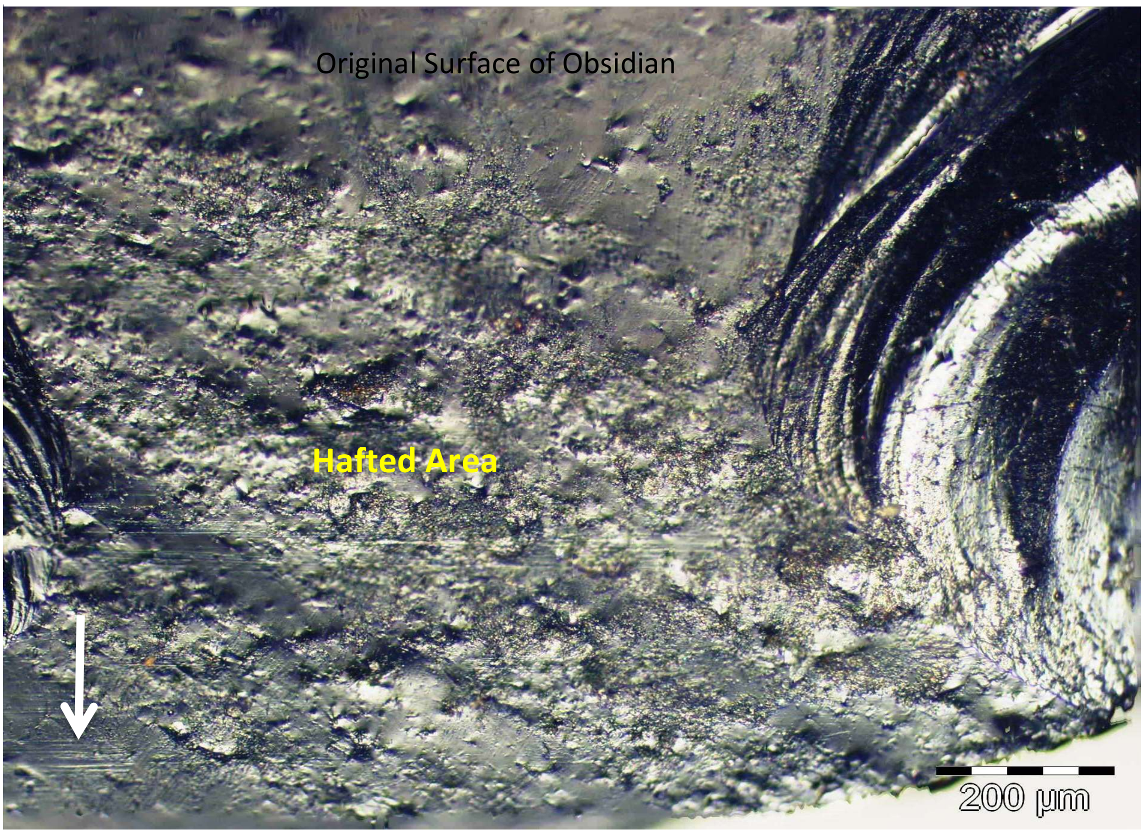


Figure 6-67: E 64465 Point 1 x1000; orange-yellow residues, which include some starch grains, photographed in polarised light

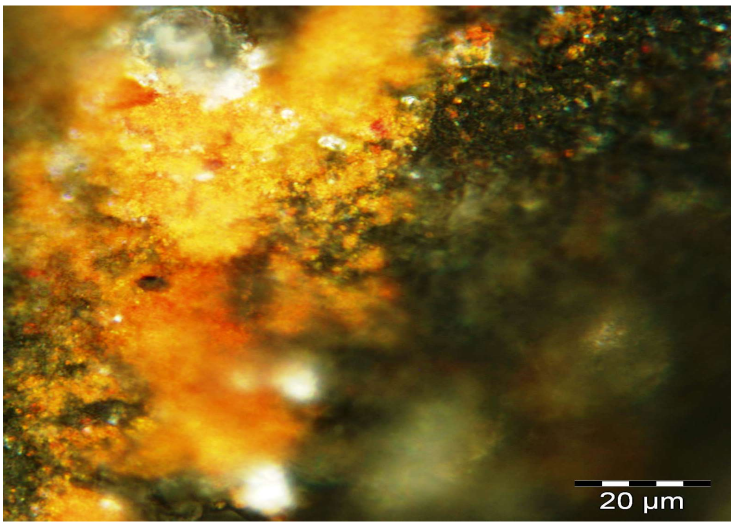


Figure 6-68: FAP 407, Dorsal face; Point 7

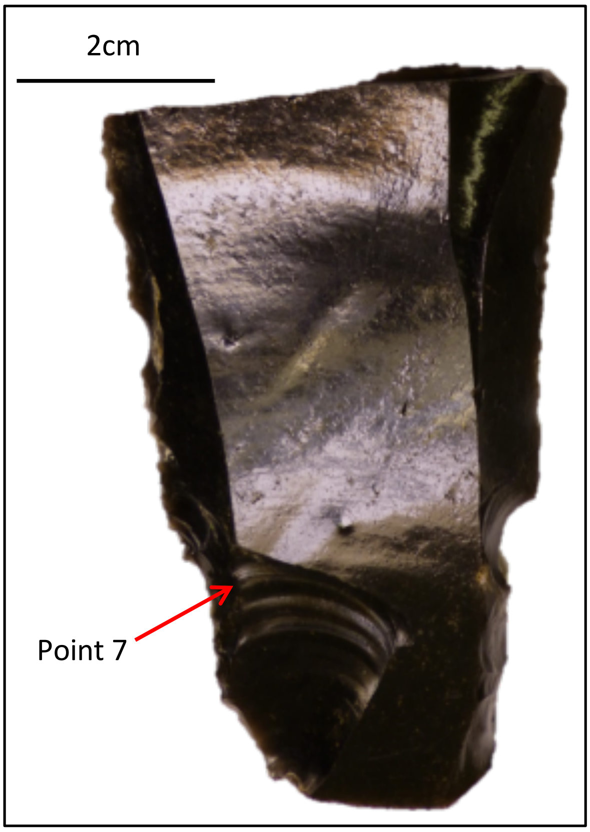


Figure 6-69: FAP 407, Point 7 x200; large Brightspot indicated by red oval

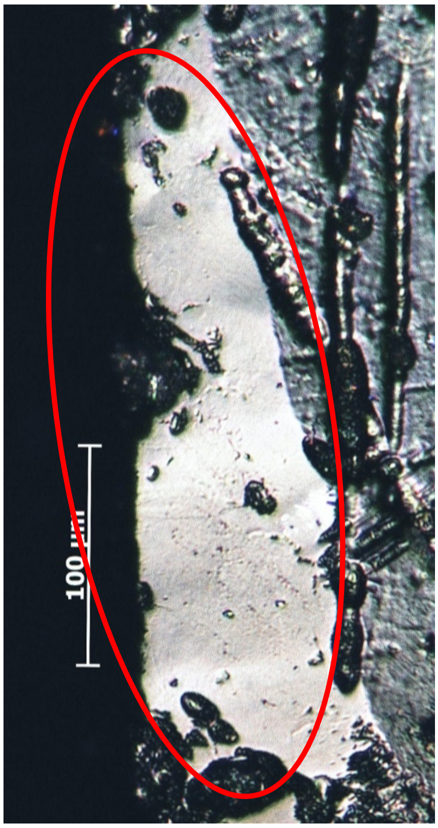


Figure 6-70: FAP 433, Ventral face; Point 6

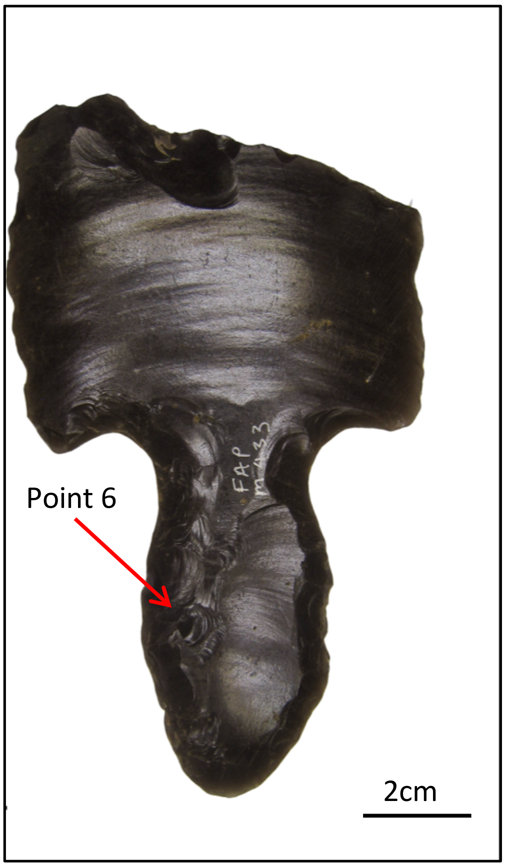


Figure 6-71: FAP 433, Point 6 x200 EFI; Brightspot indicated by red oval

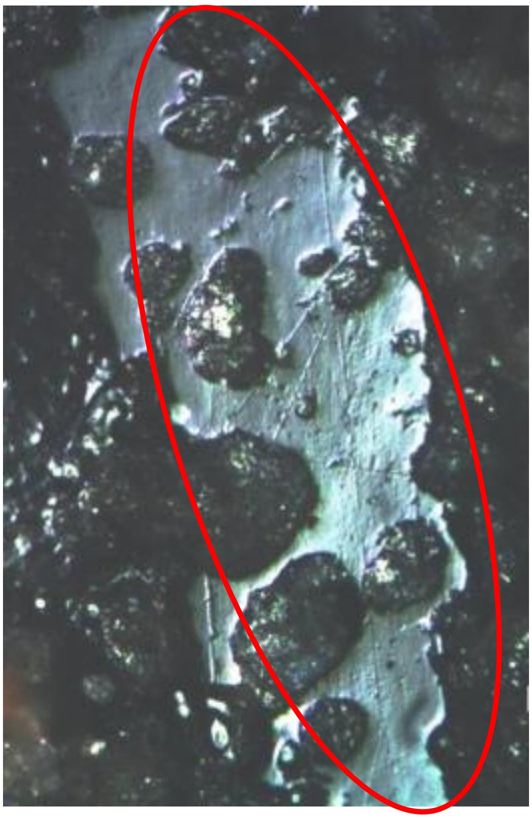


Figure 6-72: FAP 400, Dorsal face; Point 11

Figure 6-73: FAP 400, Point 11 x100; Brightspot indicated by red oval

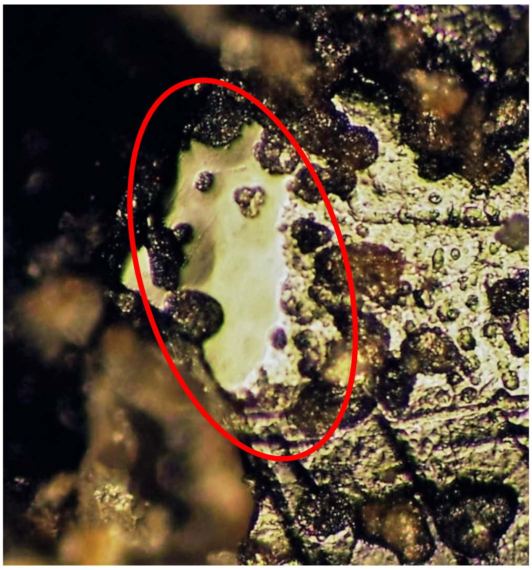


Figure 6-74: FRL 150, Ventral face; Point 8

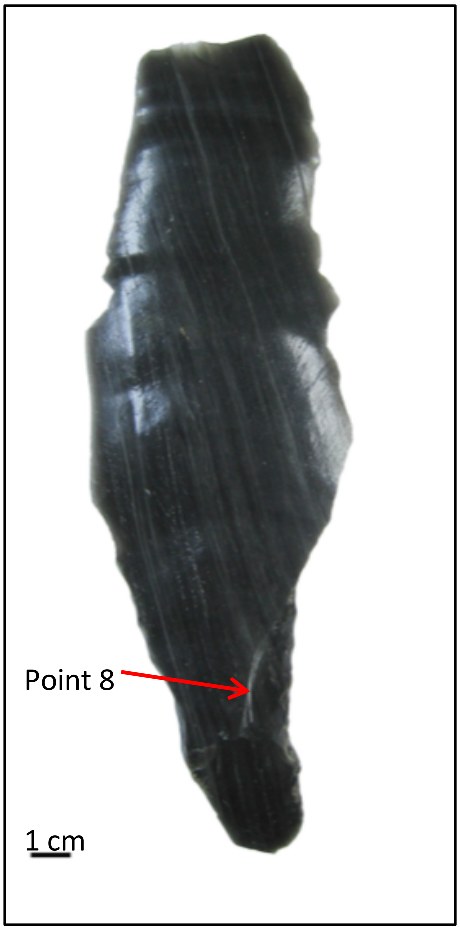


Figure 6-75: FRL 150, Point 8 x500; Brightspot indicated by red oval

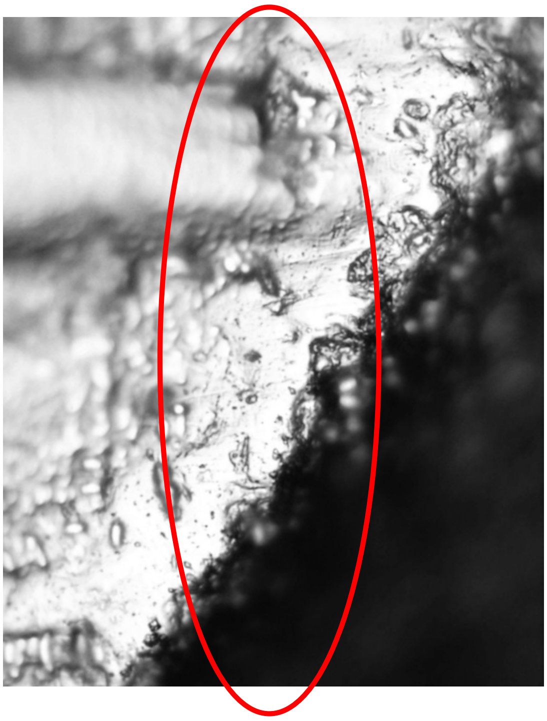


Table 6-9: Detailed analysis of the use-wear identified on seven obsidian artefacts from the Ethnographic Collection of the Australian Museum plus two Type 1 obsidian stemmed tools from New Britain, used as reference exemplars for hafting wear, with a summary description of the wear traces seen on the blade sections and hafted areas of the artefacts under high-magnification microscopy.

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Place of Origin	Description of Use-wear	Primary Use Mode
PUN 930	33	Stemless-known to have been hafted	Trapezoid	Admiralty Islands	Blade section shows very little use-wear apart from multiple feather and bending scars on edge at D4 which may be recent. Some moderately-dense transverse rough-bottomed striae plus a few axial sleek striae and developed polish on the arris at at D3. Proximal end has distinct transverse attrition line at D5 with developed polish and residues at V7 and V8.	Minimal evidence of use
A 14158	35	Stemless-known to have been hafted	Trapezoid	Admiralty Islands	Blade tip is heavily retouched from D4 to D1. The only indications of use area patch of developed polish on the tip at D2 and a scatter of transverse rough-bottomed striae at V4. Multiple flake scars at V7, (Points 2-1,2-2 and 2-3), developed polish on the arris at D6 together with a line of transverse rough-bottomed striae at V6 and a Brightspot close to V6 are all hafting traces.	Minimal evidence of use
E 20043	65	Stemless – no record of having been hafted	Trapezoid	Admiralty Islands	Blade has a broken tip and is heavily retouched along both edges at D1 and from D3 to D6. The only possible evidence of use is a moderately dense patch of axial rough-bottomed striae at D5 that are probably taphonomic. The proximal end has an abundance of black granular residue that it was not possible to completely clean off. This together with moderately dense rough-bottomed and intermittent transverse striae at V9 and a scatter of the same at D9 all indicate that the artefact	No evidence of use

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Place of Origin	Description of Use-wear	Primary Use Mode
					was hafted	
E 64465	34	Stemless - known to have been hafted	Trapezoid	Admiralty Islands	Blade is retouched from D4 to D7. The tip is rounded in plan with residues and polish patches at D2 and striae running back from the tip at V2. There is some light polish running parallel with the edges at D1 and D3 which may be the result of handling in the museum. Otherwise, there is no indication of use. The proximal end has multiple small step scars on the edge at V9 (Point 2-1), transverse sleek striae at D7 which together with a Brightspot at V8 all verify that the artefact was hafted.	No evidence of use
E 20042	66	Stemless - believed to have been hafted	Trapezoid	Admiralty Islands	Blade is retouched at D1. Tip is abraded and has moderate dense axial rough-bottomed and sleek striae running back from the point. The edge at V3, opposing the retouched edge at D1, is damaged and abraded but this may be the result of the retouching. Otherwise, very little use-wear on the blade. Hafting is evidenced by small flake scars at D4, developed polish and red residues at D5 and axial striae associated with edge damage at D4 which may have resulted from the withdrawal of the blade from the haft.	Minimal evidence of use
E 64472	67	Stemless -broken blade with sections D1-D3/V1-V3 missing	Triangular	Admiralty Islands	The missing blade sections limit the use-wear evidence that can be obtained. The ventral face has scatters of striae at V4 and V5 but these are almost certainly taphonomic. Ventral face has edge scarring at V7 and V9 with deep transverse striae at V7. The arris at D6 has a developed polish spot.	No evidence of use
E 51028	80	Stemless -known to have been	Trapezoid	Admiralty Islands	Almost no micro-wear apart from a small patch of axial rough-bottomed striae at D6.	No evidence of use

Artefact Reference	Work Sheet Number	Stem Type	Blade Cross-Section	Place of Origin	Description of Use-wear	Primary Use Mode
		hafted				
Kandrian	29	Stemmed Tool	Trapezoid	New Britain: Volupai	Tool was re-hafted with cane and used as a hand-knife in modern times. Ample evidence of use on the blade but this is not relevant to this study. Exemplar for hafting wear only. Hafting is indicated by developed polish on scar edges at V7, V8 and V9 and at D5 and D8.	Re-used in recent times
FRL 150	28	Stemmed Tool - Known to have been hafted	Trapezoid	New Britain: Bitokara	Tip is broken. Ventral face shows multiple axial striae plus scattered transverse and oblique striae all of which indicate that the tool was mainly used for slicing with some whittling/scraping. Multiple contiguous flake scars at V12, abrasion and polish at D17 together with abrasion and transverse striae at V17 are all evidence of hafting.	Mainly slicing with some whittling

Figure 6-76: Artefact 'Kandrian', Ventral face; Point 8

Figure 6-77: Artefact 'Kandrian', Point 8 x500; Brightspot indicated by red oval

Figure 6-78: FAP 446, Point 4 x100; Scatter of transverse intermittent striae at hafting line indicated by red arrows

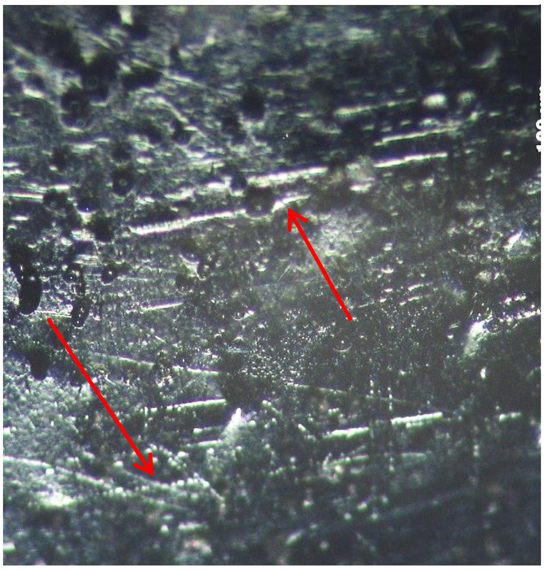


Figure 6-79: FAP 446, Ventral Face; Point 4

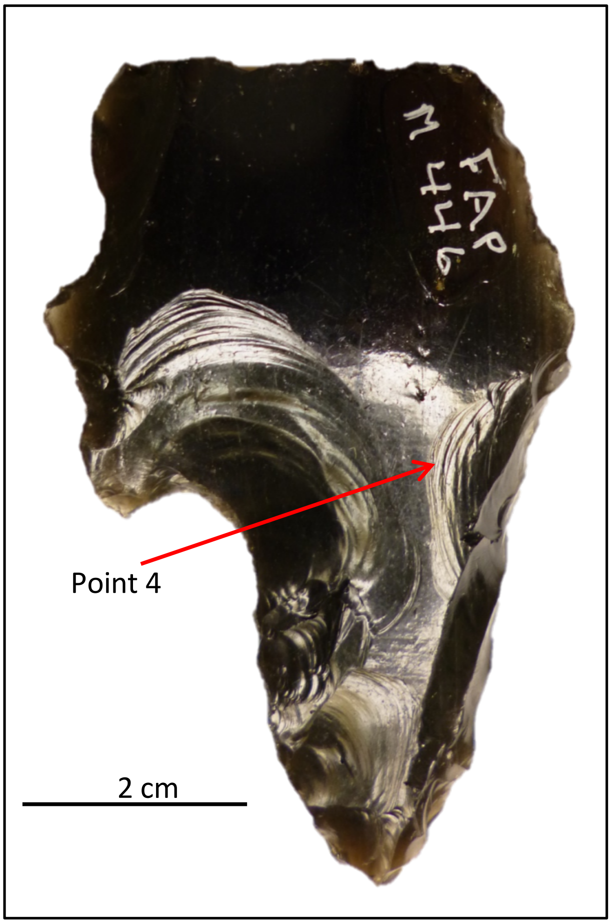


Figure 6-81: FAP 212, Dorsal face; Point 14

Figure 6-82: FAP 212, Point 14 x200; rounded edge with short striae from hafting indicated by red arrows

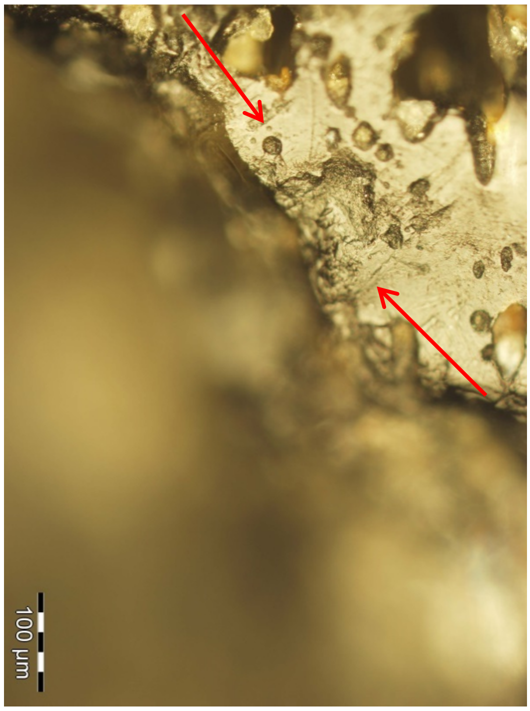


Figure 6-80: FAP 481, Dorsal face; Point 1

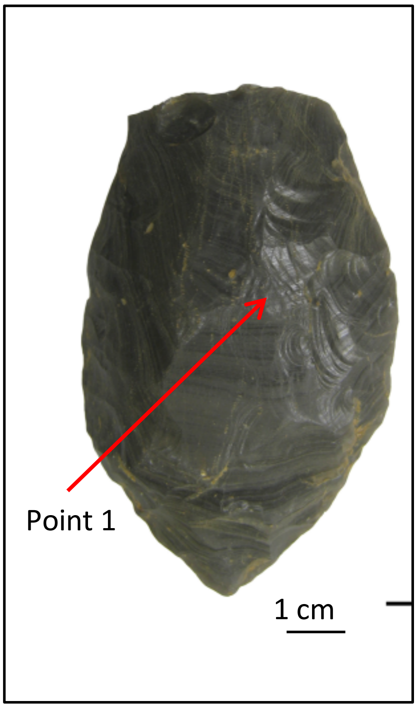


Figure 6-83: FAP 481, Point 1 x100; line of well-developed polish on elevated edge of scar

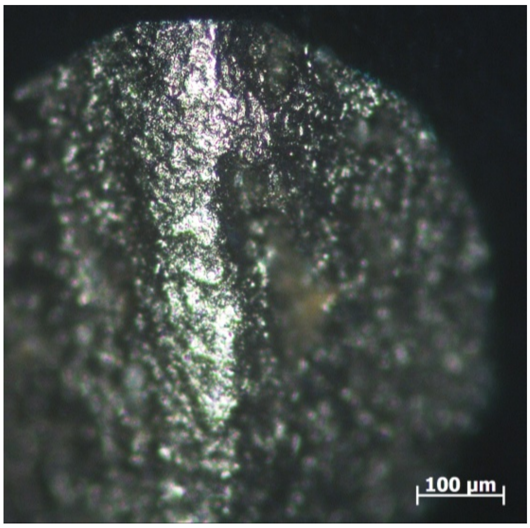


Figure 6-84: FAP 429, Ventral face; Points 3 and 4b

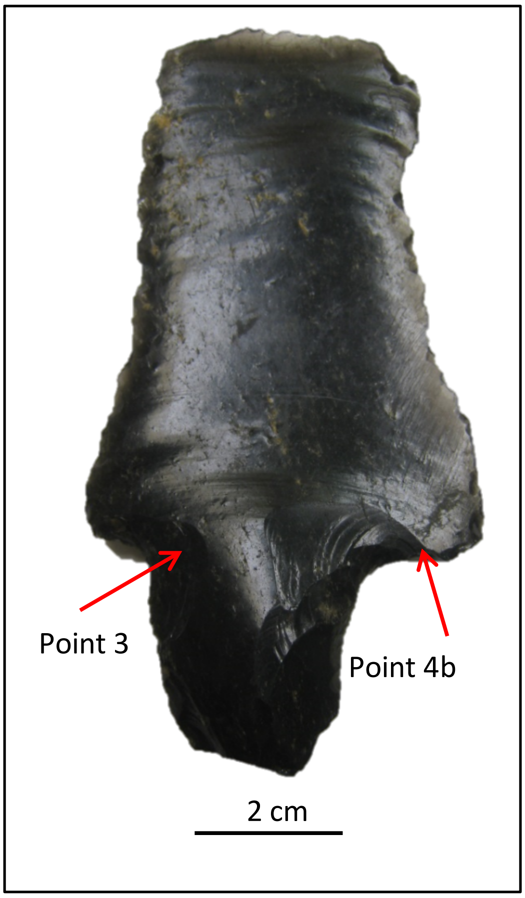


Figure 6-85: FAP 429, Point 3 x500; rounded polish spot on edge

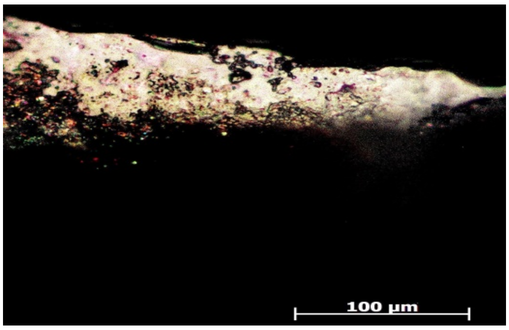


Figure 6-86: FAP 429, Point 4b x50; parallel lines of transverse striae at hafting line, indicated by red arrows

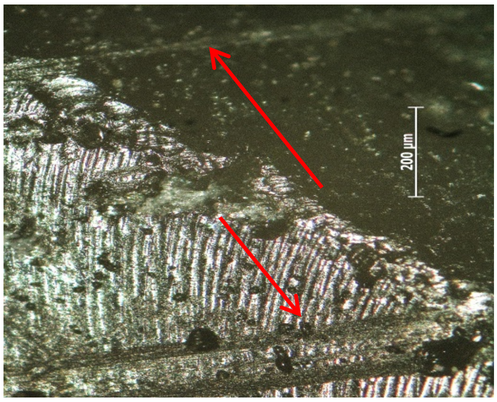


Figure 6-87: FRL 183, Points 3 and 4

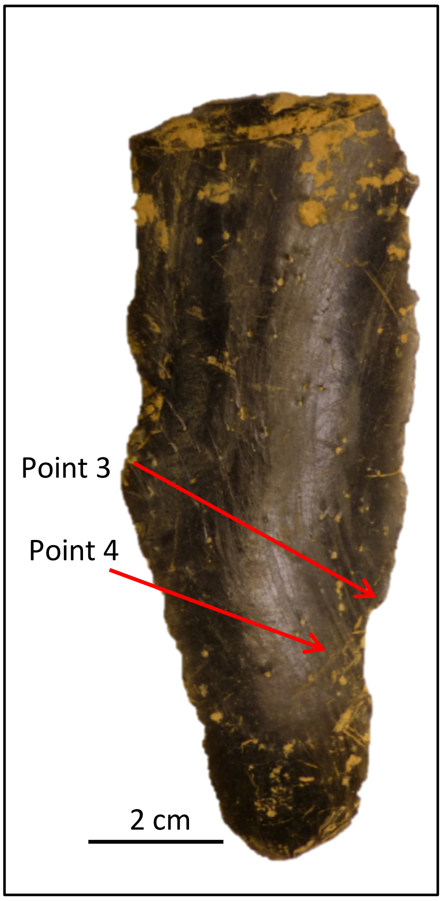


Figure 6-88: FRL 183, Point 3 x200; scatter of transverse rough-bottomed striae indicated by red arrows. These are on a slightly different alignment to the dense crescent row striae, indicated by a yellow arrow, that overlie them

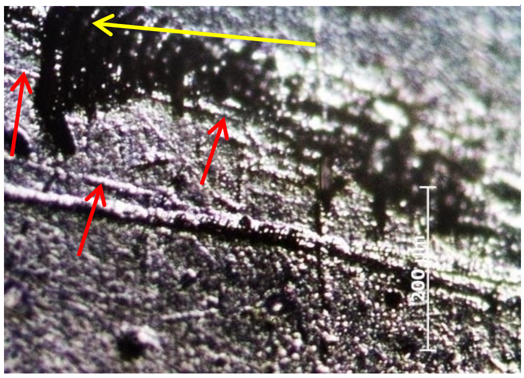


Figure 6-89: FRL 183, Point 4 x100; dense transverse rough-bottomed striae indicated by red arrows

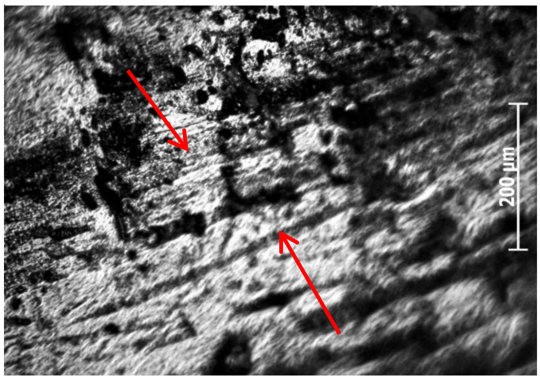


Figure 6-90: FAP 214, Ventral face; Points 1 and 2

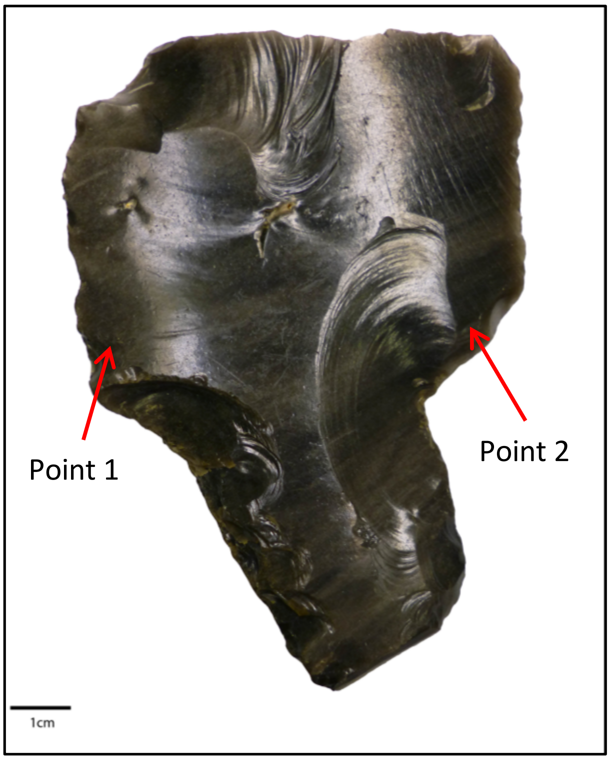


Figure 6-91: FAP 214, Point 1 x100; transverse rough-bottomed striae indicated by red arrows

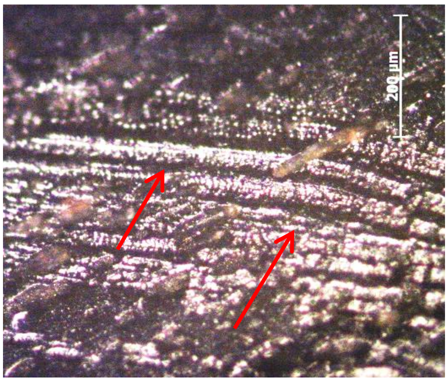


Figure 6-92: FAP 214, Point 2 x100; transverse rough-bottomed striae indicated by red arrows

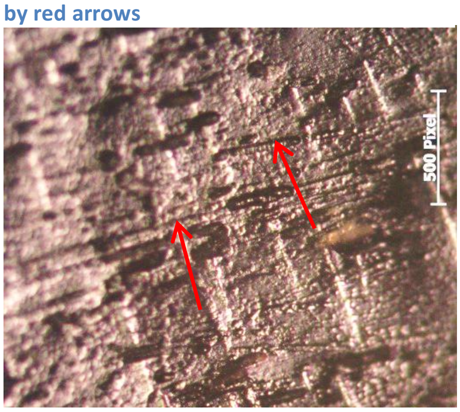


Figure 6-93: FEK 109, Dorsal face; Points 3 and 4

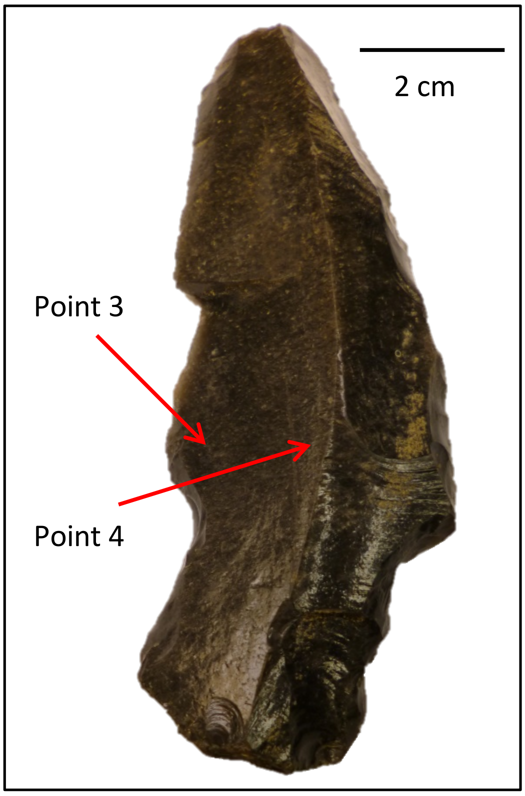


Figure 6-94: FEK 109, Point 3 x100 transverse rough-bottomed striae indicated by red arrows

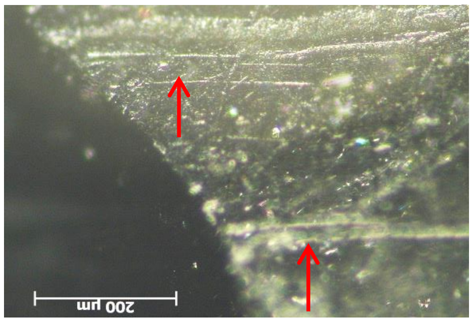


Figure 6-95: FEK 109, Point 4 x100; scatter of transverse striae indicated by red arrows

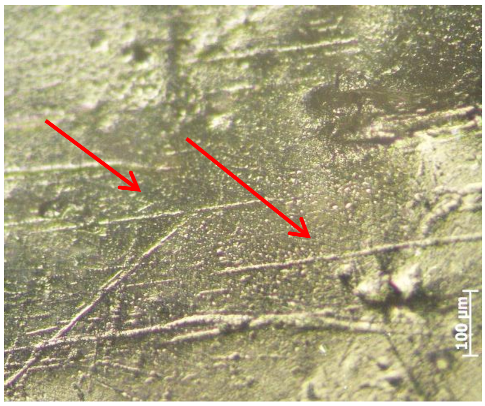


Figure 6-96: FRL 428; Points 3 and 5

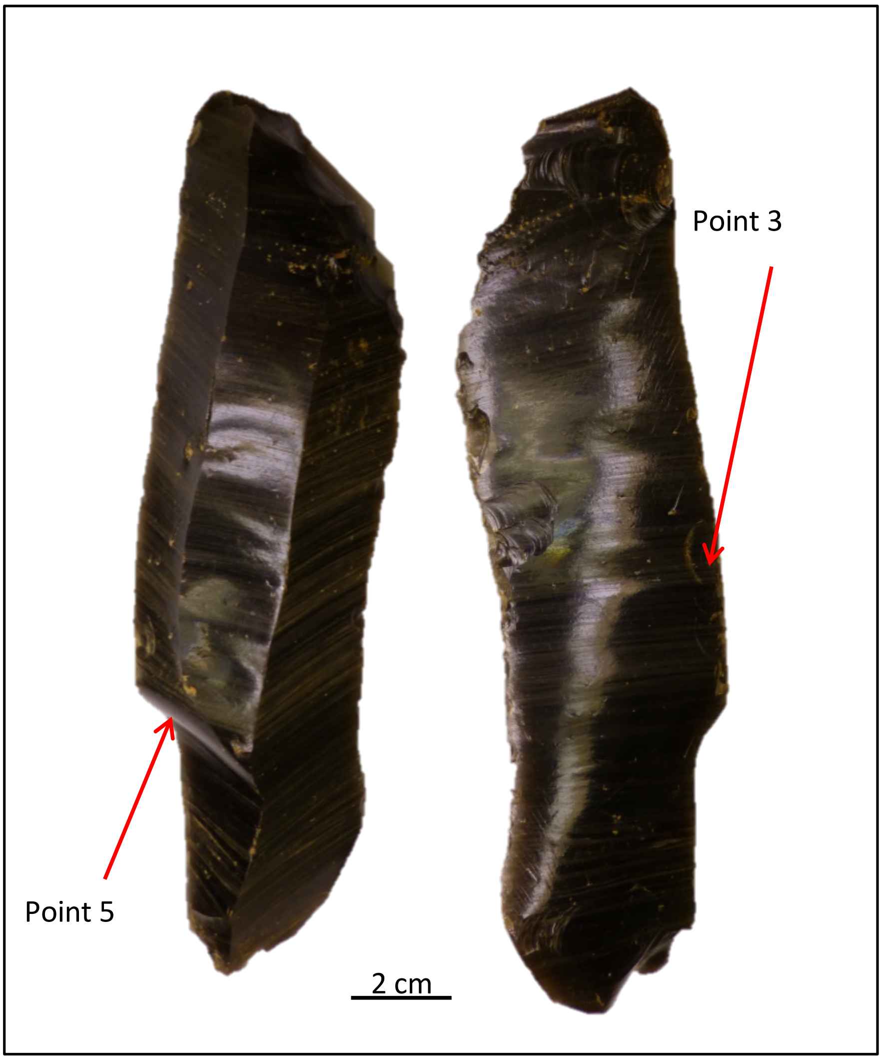


Figure 6-97: FRL 428, Point 5 x100; transverse striae indicated by red arrows

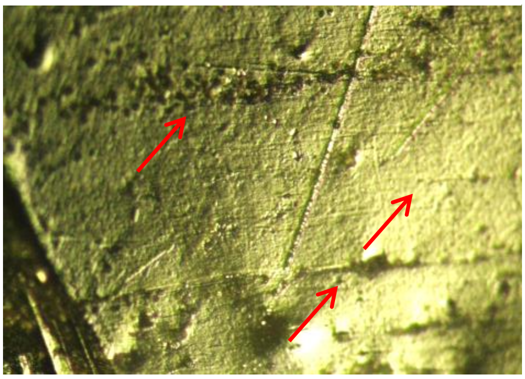
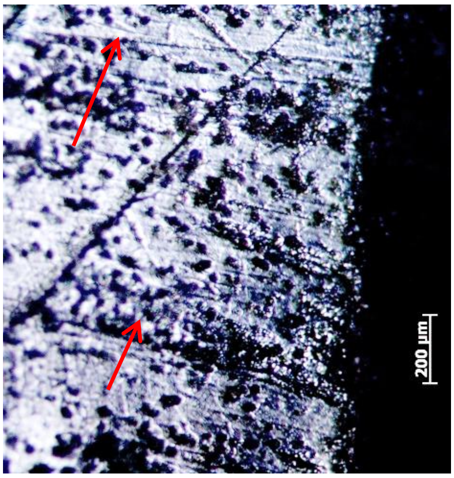


Figure 6-98: FRL 428, Point 3 x200; edge rounding and moderate dense transverse striae indicated by red arrows



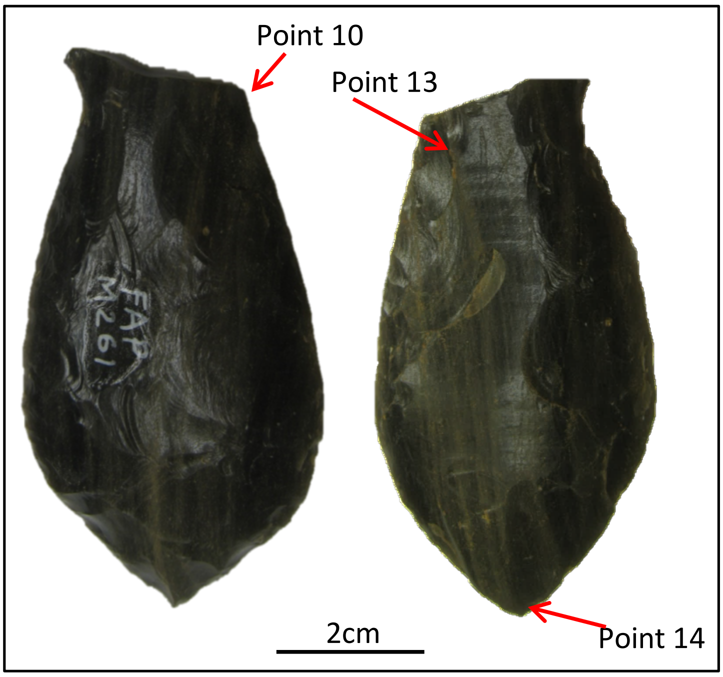


Figure 6-99: FAP 261, Type A stem; Points 10, 13 and 14

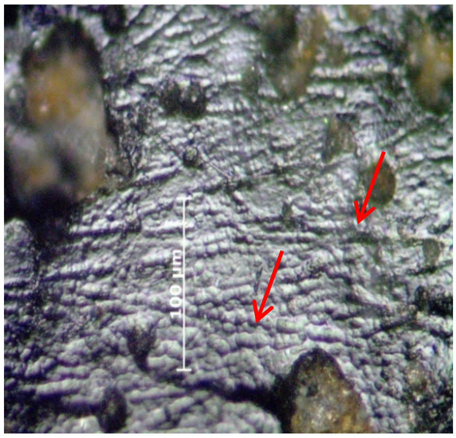


Figure 6-100: FAP 261, Point 10 x200; dense transverse striae across neck of stem indicated by red arrows

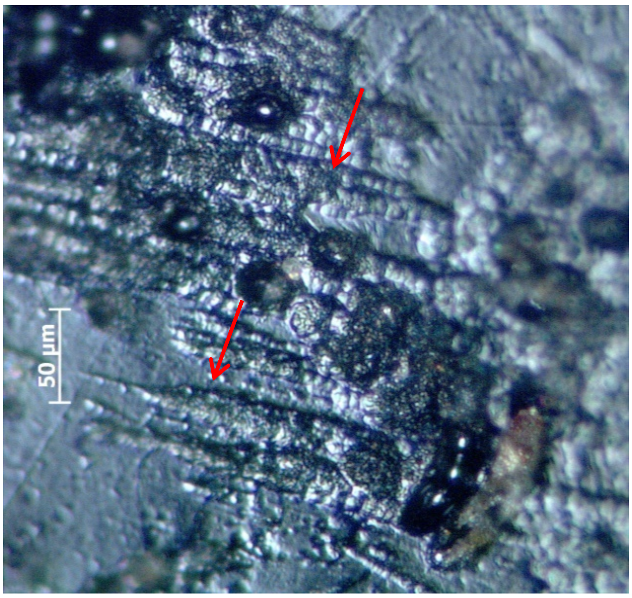


Figure 6-101: FAP 261, Point 13 x200: dense patch of very short striae indicated by red arrows

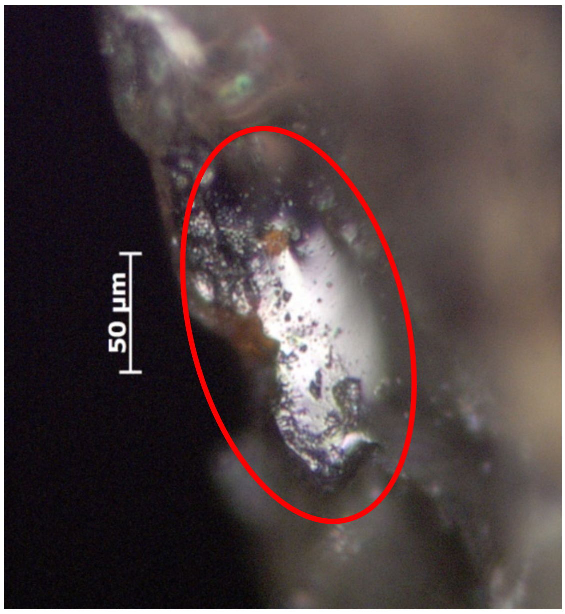


Figure 6-102: FAP 261, Point 14 x200: Brightspot indicated by red oval

Figure 6-103: FAP 705, Type A stem; Points 6, 10 and 11

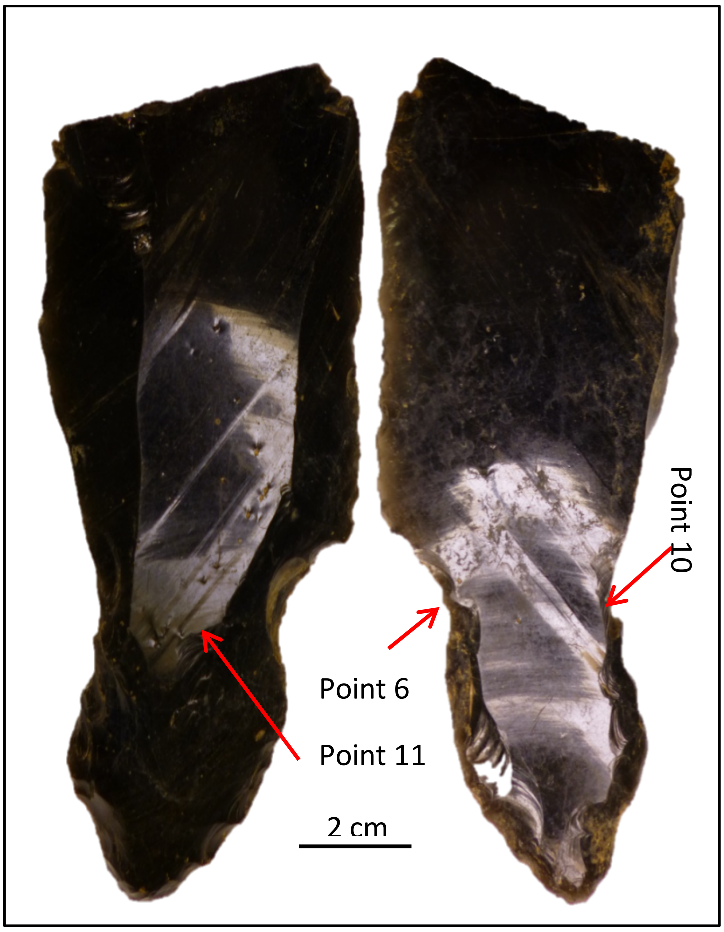


Figure 6-104: FAP 705, Point 6 x200; developed polish patch on edge indicted by red oval

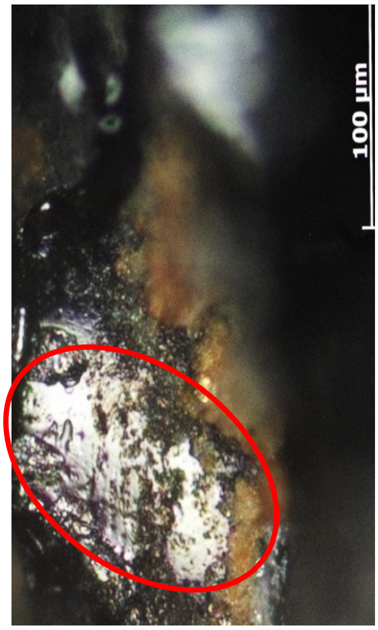


Figure 6-105: FAP 705 Point 11 x100; dense transverse rough-bottomed striae at hafting line

Figure 6-106: FAP 705, Point 10 x100; Brightspot on edge

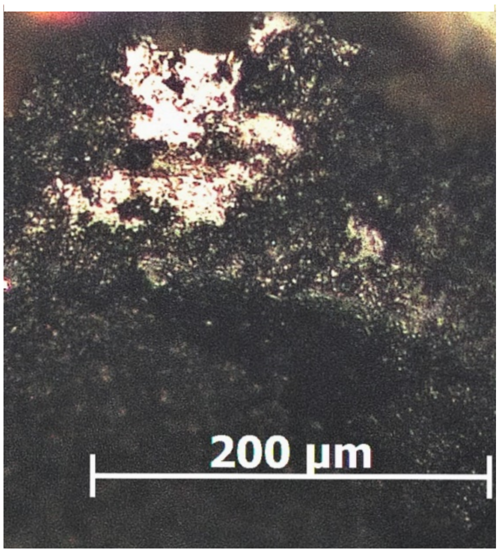


Figure 6-107: FAP 255, Points 3, 5 and 8

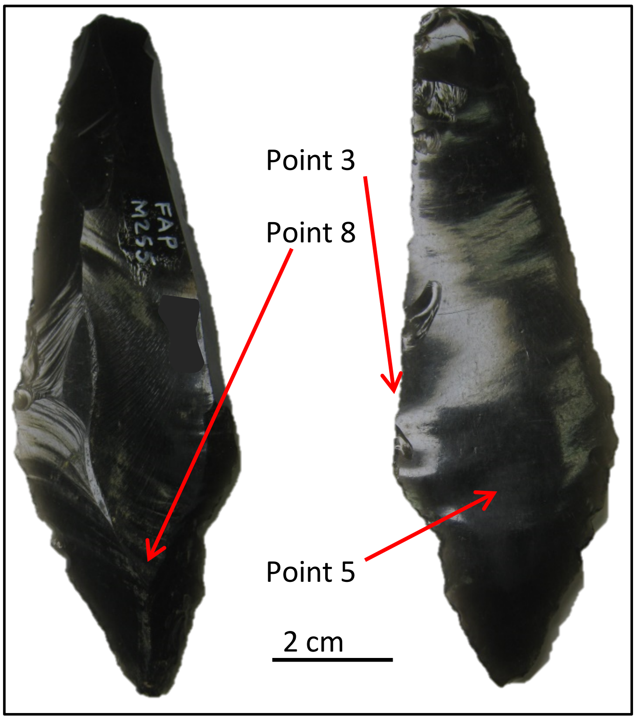


Figure 6-108: FAP 255, Point 3 x100; feather scars on edge

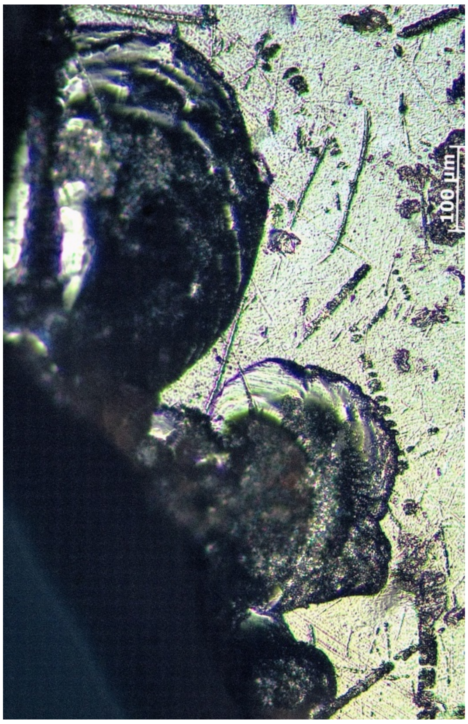


Figure 6-109: FAP 255 Point 8 x200; well-developed polish patch

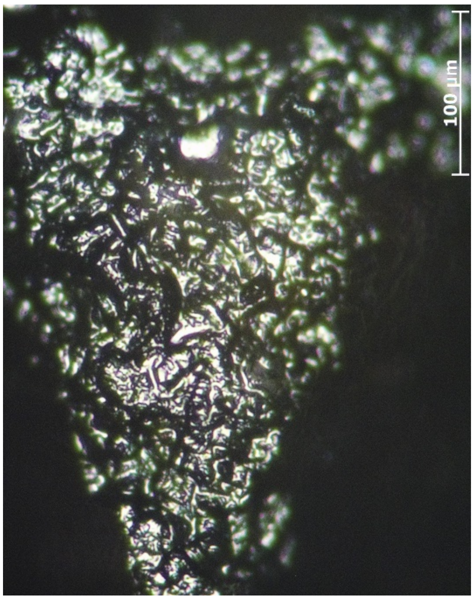


Figure 6-110: FAP 255, Point 5 x100; transverse rough-bottomed striae

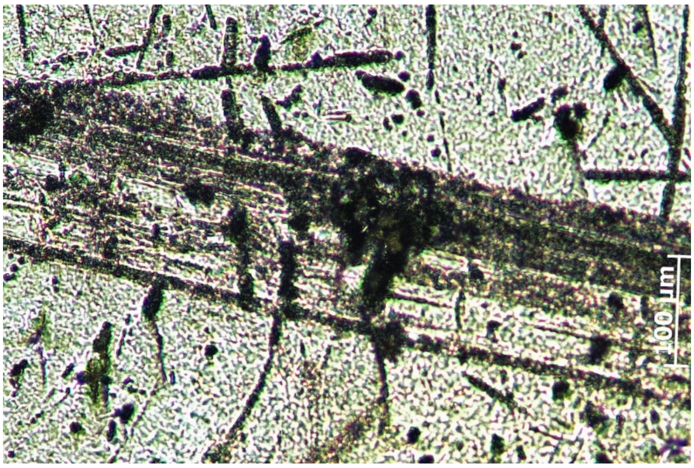


Figure 6-111: FDY 001, Dorsal face; Points 3, 4 and 5

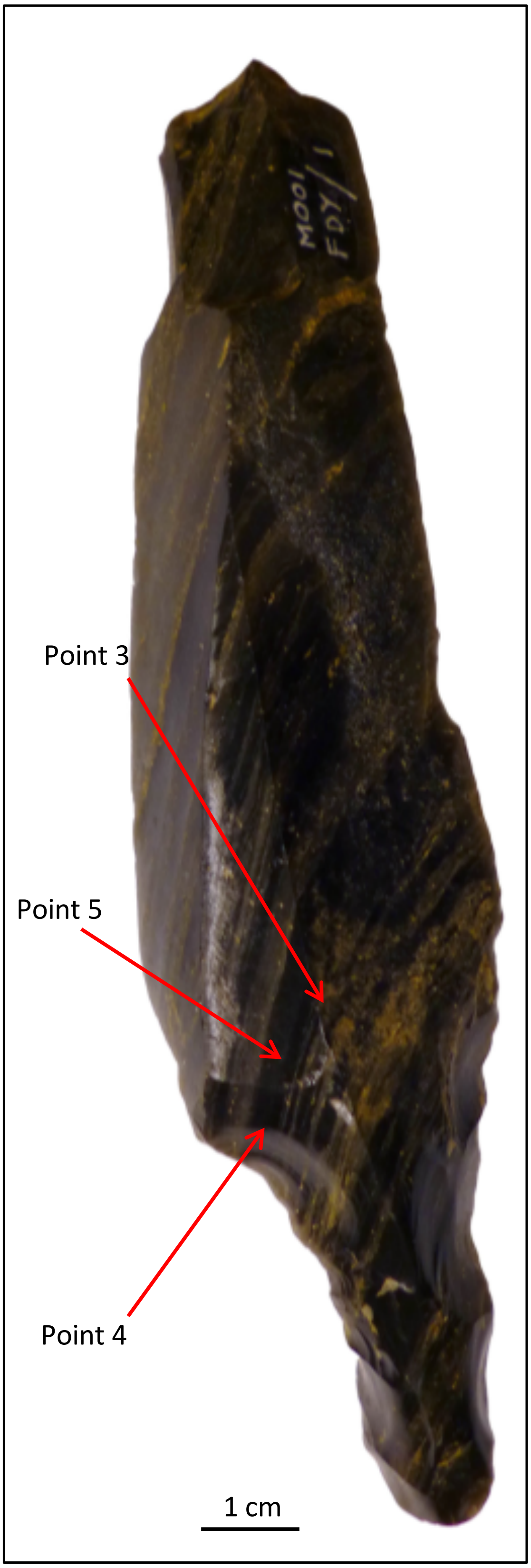


Figure 6-112: FDY 001, Point 3 x100 Brightspot

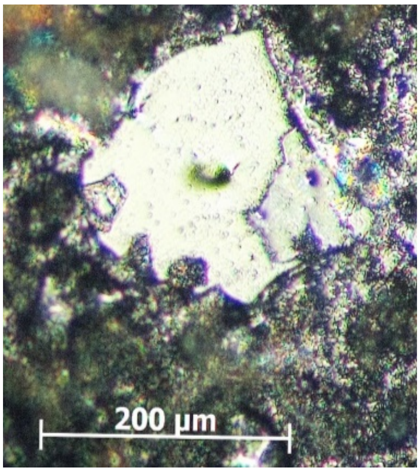


Figure 6-113: FDY 001, Point 4 x500 EFI; Brightspot indicated by red oval

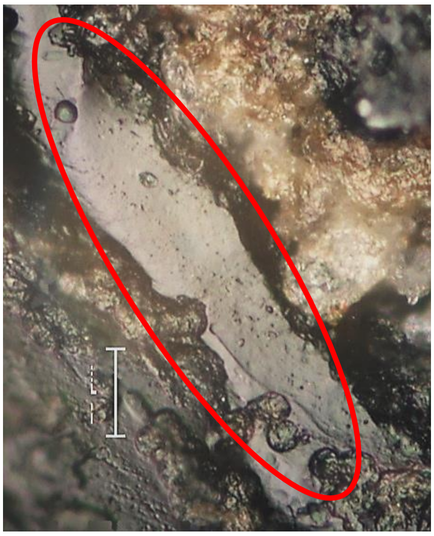


Figure 6-114: FDY 001, Point 5 x1000, Brightspot

Figure 6-115: FAP 420, dorsal face; Point 7

Figure 6-116: FAP 420, Point 7 x 500; Brightspot

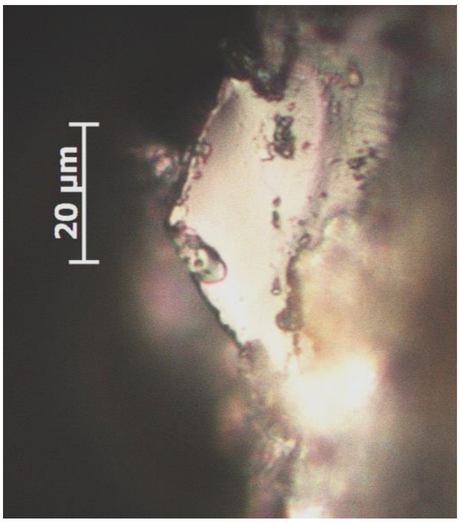


Table 6-10: Analysis of overall assemblage by hafting evidence

Hafting Potential	Number of Artefacts
Certain	44
Probable	13
Possible	17
Surface Degraded	30
No Evidence	18
Missing Relevant Sections	25
Total	147

Table 6-11: All artefacts by stem type showing potential to have been hafted

Stem Type	Hafting Potential	n=	Totals
A	Certain	20	
A	Probable	5	
A	Possible	6	
A	Total with Hafting Evidence	31	
A	Surface Degraded	8	
A	No Evidence	4	
A	Total	43	43
B	Certain	5	
B	Probable	1	
B	Possible	0	
B	Total with Hafting Evidence	6	
B	Surface Degraded	2	
B	No Evidence	4	
B	Total	12	12
C	Certain	3	
C	Probable	4	
C	Possible	5	
C	Total with Hafting Evidence	12	
C	Surface Degraded	6	
C	No Evidence	1	
C	Total	19	19
D	Certain	11	
D	Probable	1	
D	Possible	0	
D	Total with Hafting Evidence	12	
D	Surface Degraded	8	
D	No Evidence	4	
D	Total	24	24
E	Certain	3	
E	Probable	1	
E	Possible	6	
E	Total with Hafting Evidence	10	
E	Surface Degraded	0	
E	No Evidence	4	
E	Total	14	14
Unidentified	With Hafting Evidence	2	2
Unidentified	Surface Degraded	6	6
Unidentified	No Evidence	1	1
Stem Missing	Missing	25	25
Stem Missing	With Hafting Evidence on Blade	1	1
All stems	Total	74	147

Figure 6-117: FAP 424, ventral face; Point 2

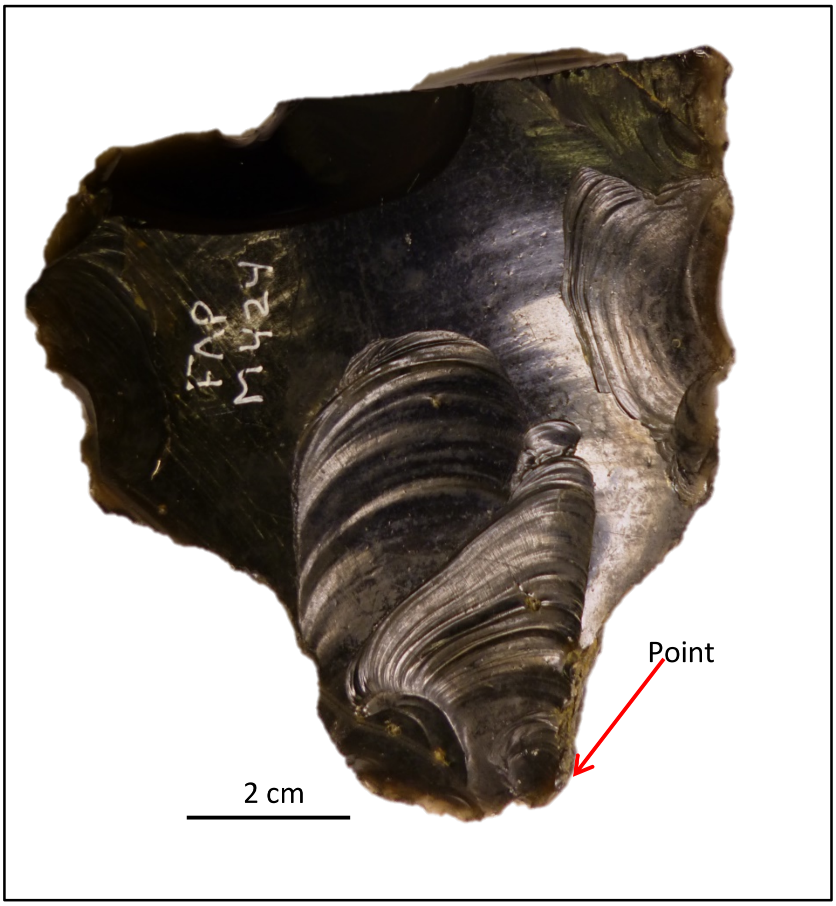


Figure 6-118: FAP 424, Point 2 x200; Brightspot

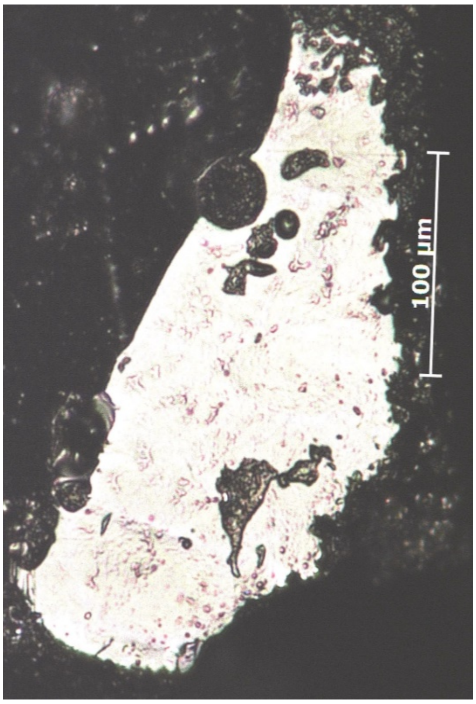


Table 6-12: Hafting Evidence: Analysis by blade cross-section. Unidentifiable blades are mainly Type A stemmed artefacts broken across the 'neck' of the stem and have no blade sections attached.

Blade Cross-section	Hafting Potential	n=	Totals
Trapezoid	Certain	18	
	Probable	6	
	Possible	10	
	No Evidence	8	
	Degraded	16	
	Stem Missing	11	
	Total	69	69
Triangular	Certain	5	
	Probable	3	
	Possible	6	
	No Evidence	5	
	Degraded	6	
	Stem Missing	7	
	Total	32	32
Unidentifiable		46	46
All Artefacts	Total		147

Table 6-13: Artefacts with no visible hafting evidence but which do have use-wear evident on blade sections: use-materials

Use-materials	Artefacts with no Hafting Evidence
Unidentified	1
Soft	2
Moderate/Soft	2
Moderate/Hard	3
Hard	6
Very Hard	3
Total	17

Table 6-14: Artefacts with no visible hafting evidence but which do have use-wear evident on blade sections: use-mode

Use-mode	Artefacts with no Hafting Evidence
Sawing	7
Whittling	5
Scraping	2
Slicing	3
Total	17

Table 6-15: Hafted artefacts by use-mode

Use-mode	Number of Artefacts
Sawing	14
Whittling	8
Scraping	5
Slicing	5
Total	32

Figure 6-119: Bubble graph showing hafted artefacts by use-materials: Hardness and Silica. The green bubble indicates artefacts with evidence of use on elastic and non-siliceous material. The number of artefacts is indicated both by the relative area of the bubble and by a label within each bubble.

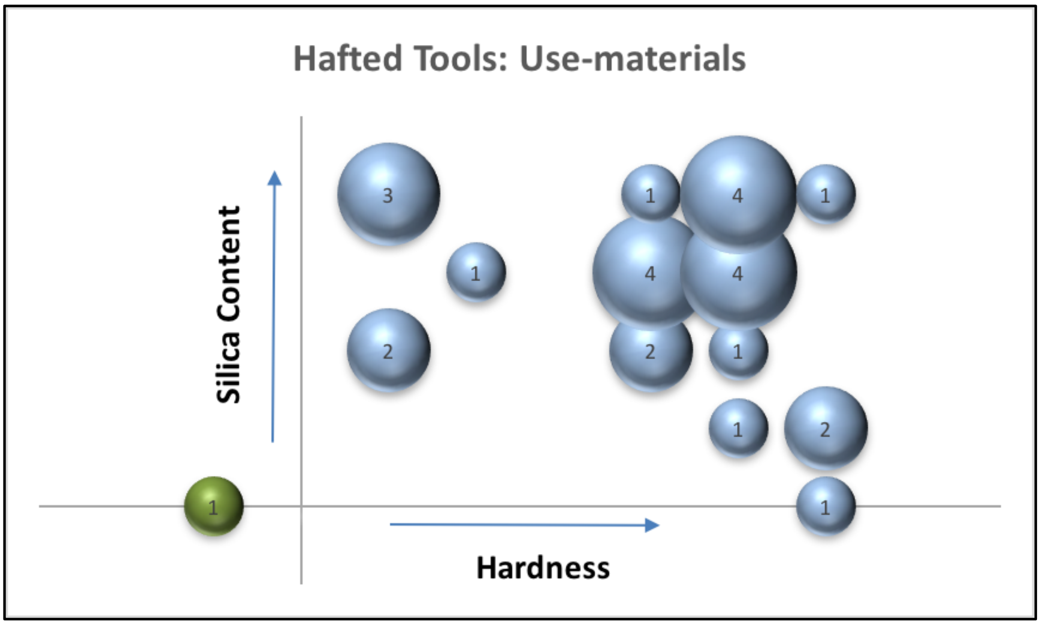


Figure 6-120: FAP 220, Dorsal face; Brightspot at D12

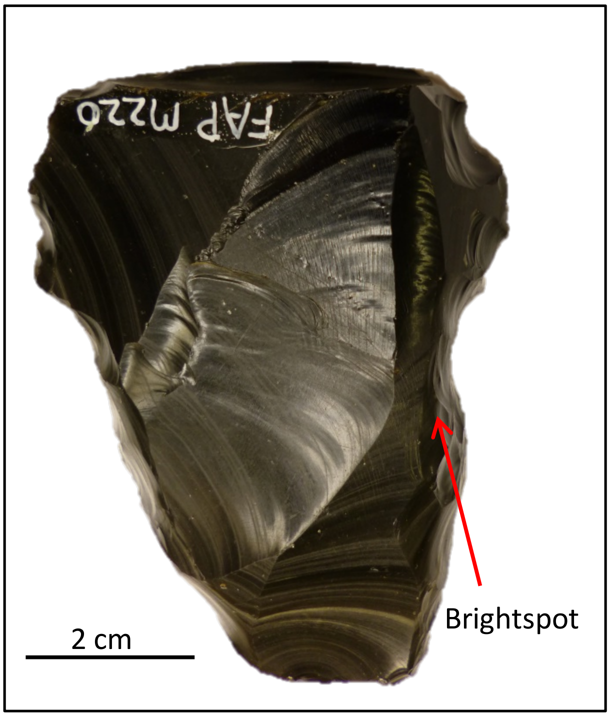
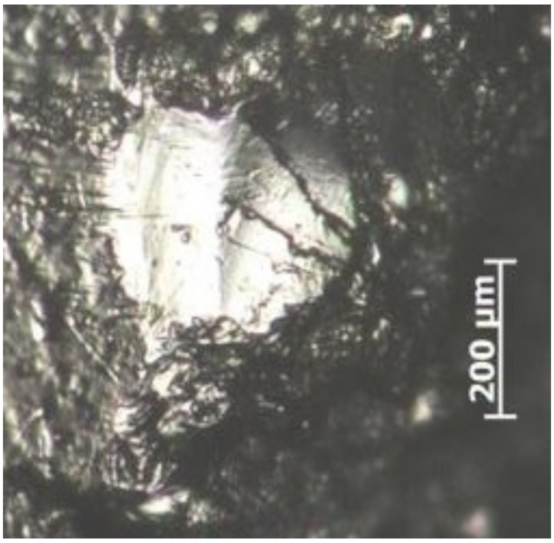


Figure 6-121: FAP 220 x200; Brightspot at D12



Illustrations to Chapter 7.

Figure 7-1: FDM 002, Dorsal Face; Points 3, 5 and 6

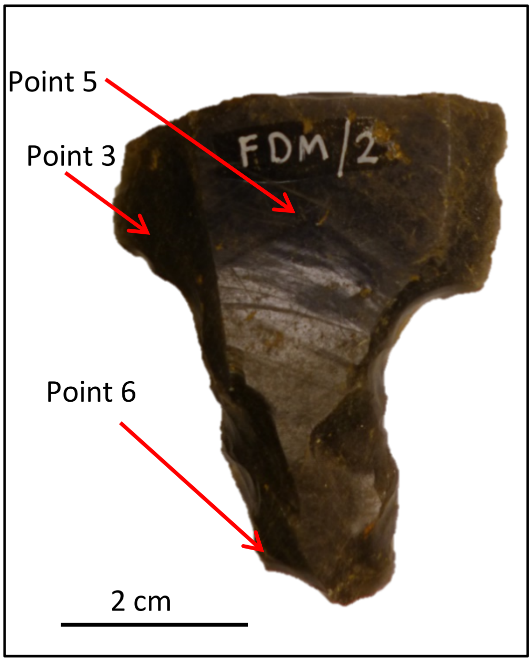


Figure 7-2: FDM 002, Point 3 x200; transverse striae at hafting line indicated by red arrows

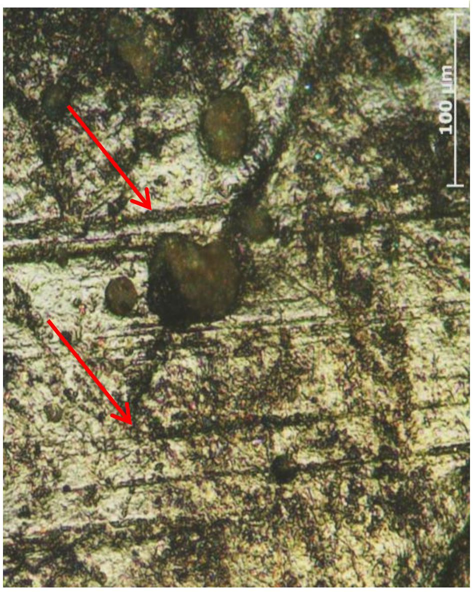


Figure 7-3: FDM 002, Point 6 x200; developed polish on stem arris

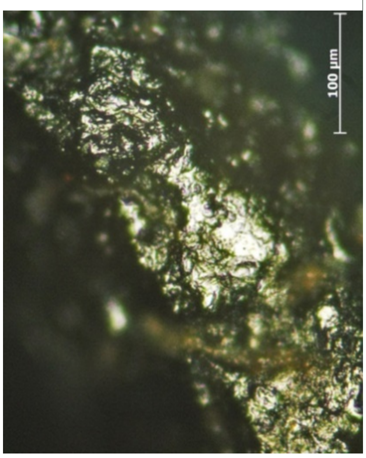


Figure 7-4: FDM 002, Point 5 x200; axial striae indicated by red arrows

Figure 7-5: FAP 705, Ventral Face

Figure 7-6: FAP 400

Figure 7-7: FAP 232; Point 6

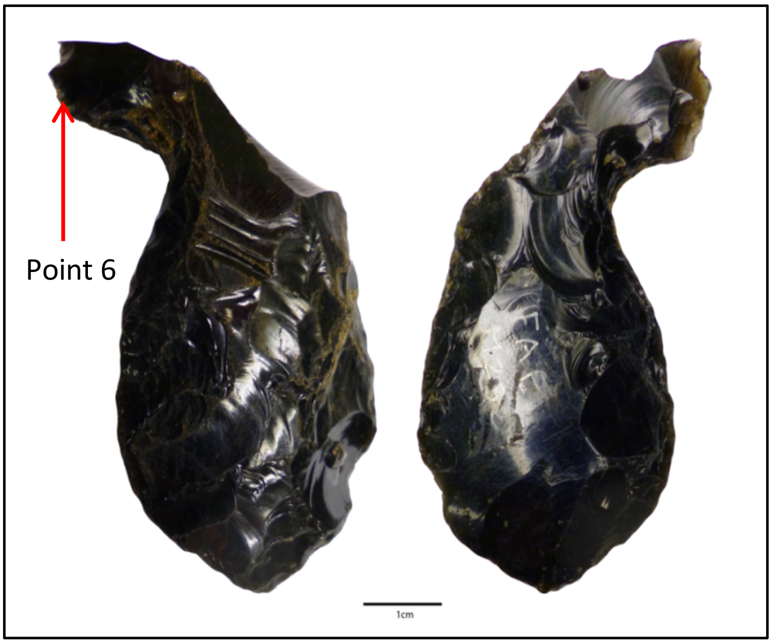


Figure 7-8: FAP 232, Point 6 x200; axial striae, contiguous feather scars and abrasion on dorsal face at junction between blade and stem

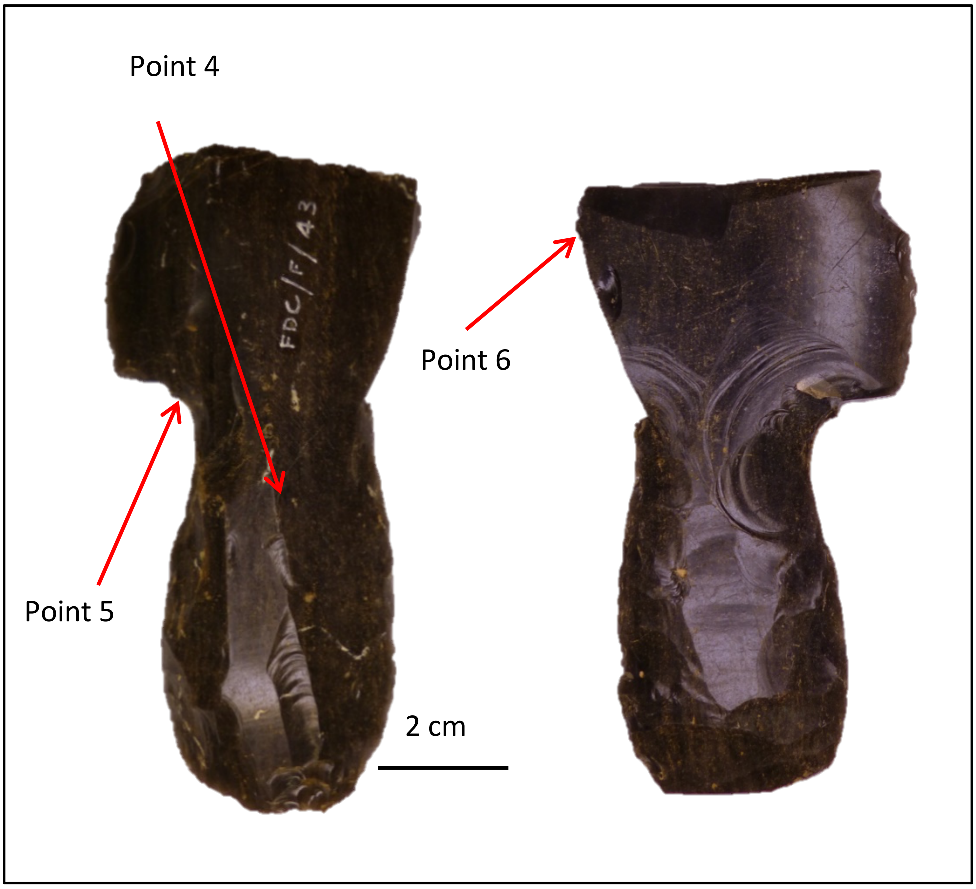


Figure 7-9: FDC/F/43; Points 4, 5 and 6

Figure 7-10: FDC/F/43, Point 5 x100; hafting striae indicated by red arrows

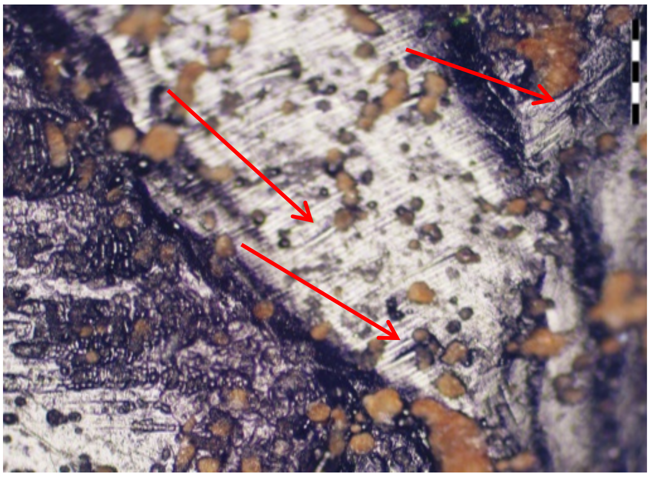


Figure 7-11: FDC/F/43, Point 4 x500; Brightspot on stem arris

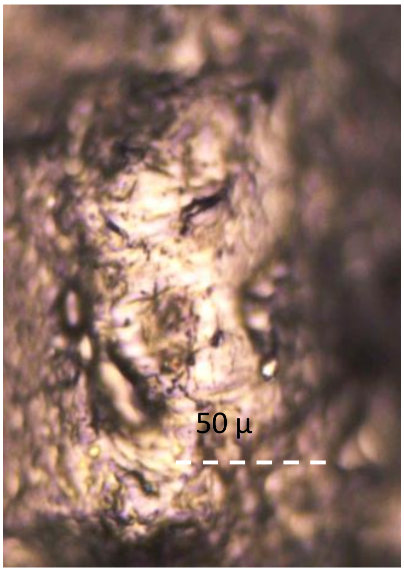


Figure 7-12: FDC/F/43, Point 6 x 100; axial striae running virtually parallel with edge. Edge is abraded and rounded

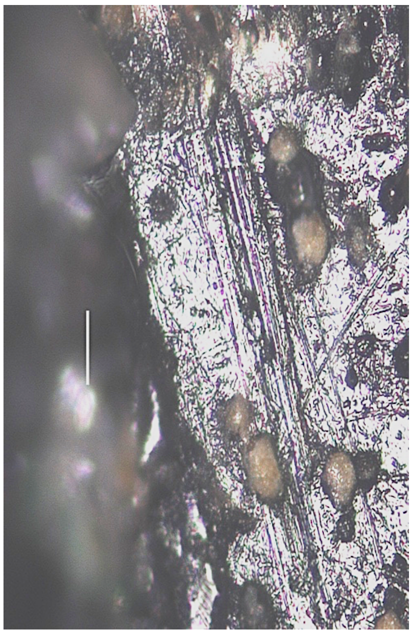


Figure 7-13: FDW 001; Points 1 and 5

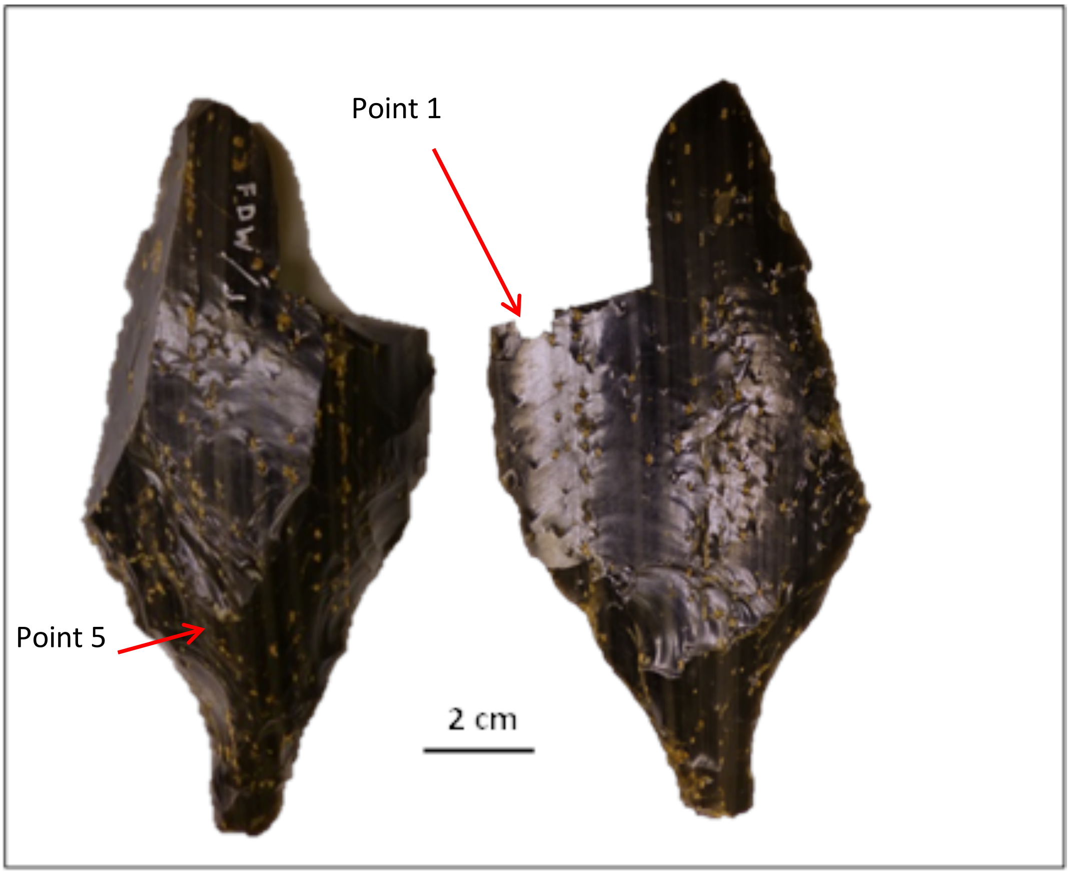


Figure 7-15: FDW 001, Point 1 x100; dense axial sleek and rough-bottomed striae (indicated by red arrows) overlaid by dense oblique rough-bottomed and sleek striae (yellow arrows)

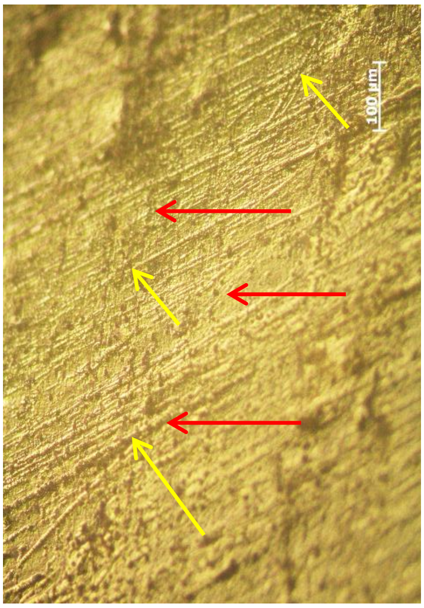


Figure 7-14: FDW 001, Point 5 x100; developed polish spot on stem arris

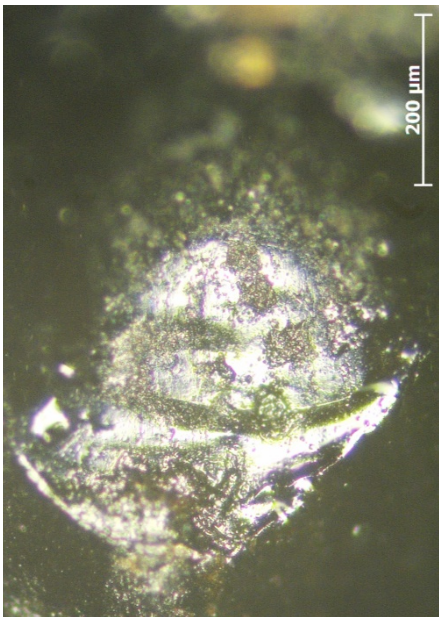


Figure 7-16: FDY 001

Figure 7-17: FDY 001, Point 3 x100; Brightspot

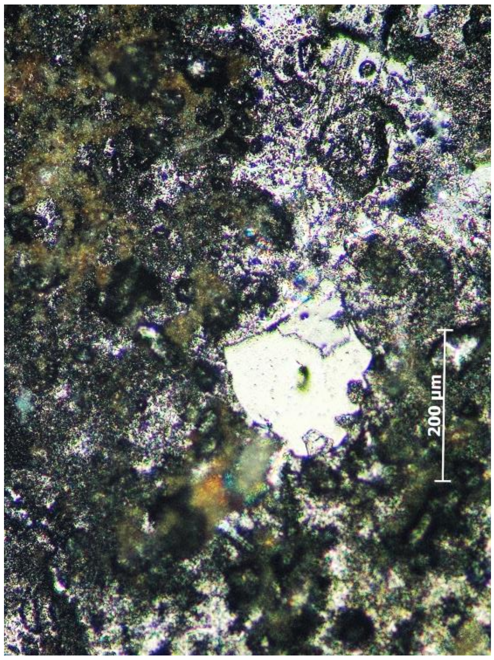


Figure 7-18: FRL 1053

Figure 7-19: FRL 1053, Brightspot at D14 x500

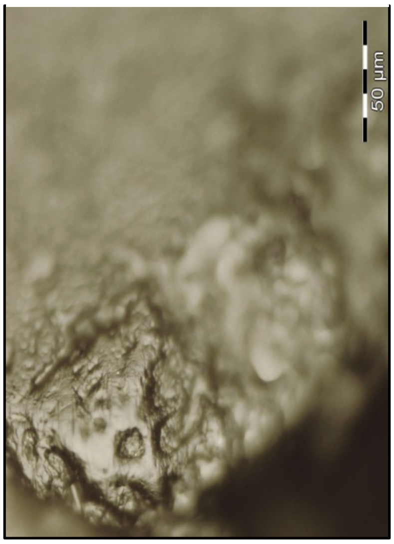


Figure 7-20: FRL 1053, Point 10 x200; dense axial striae

Figure 7-21: FRL 1050

Figure 7-22: FAP 864, Point 3 x200; axial rough-bottomed striae running close to edge (red arrows)

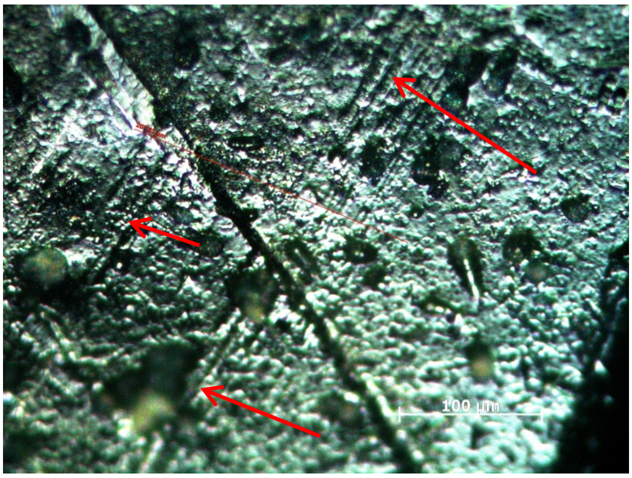


Figure 7-23: FAP 864; Points 3 and 6

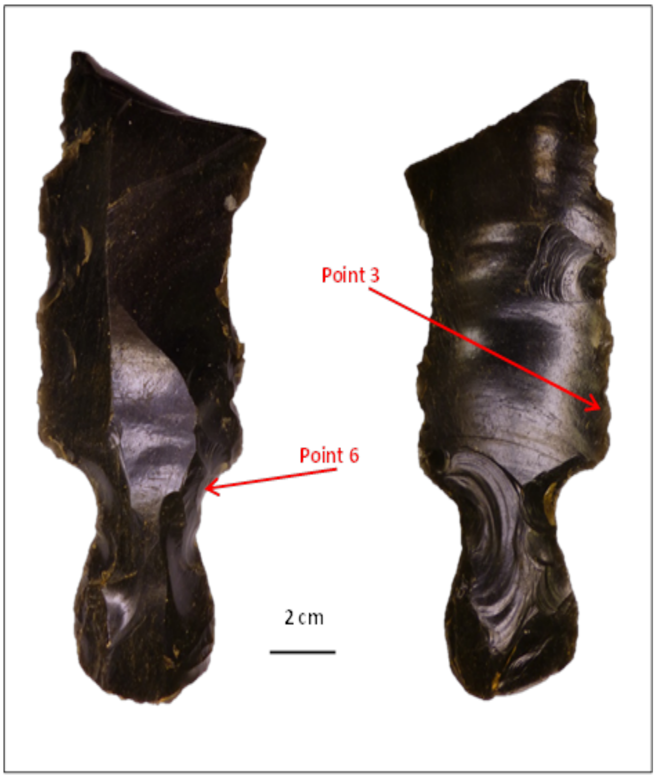


Figure 7-24: FAP 864, Point 6 x100; transverse rough-bottomed striae on stem from hafting wear (red arrows)

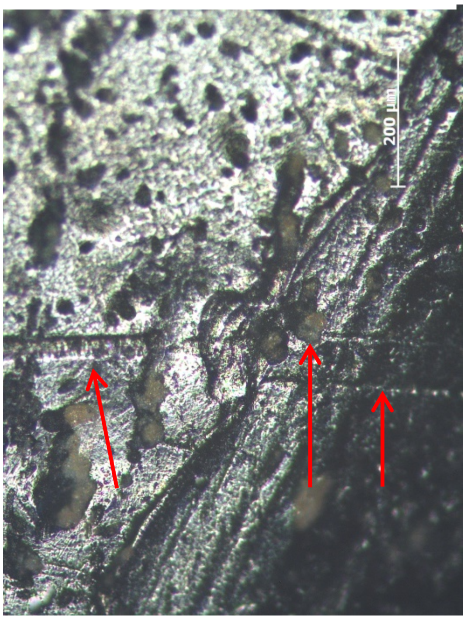


Figure 7-25: FAP 481, Point 1

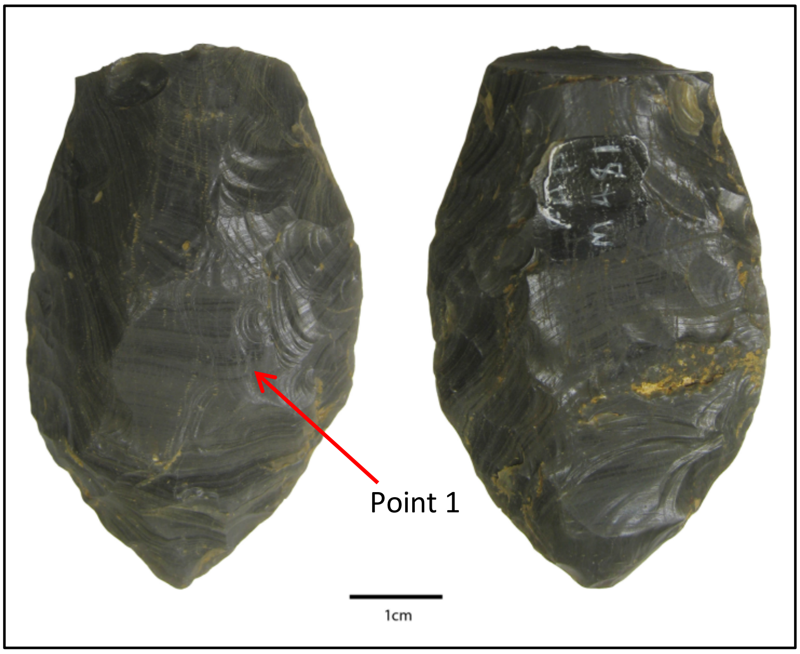


Figure 7-26: FAP 481, Point 1 x100; developed polish on stem arris

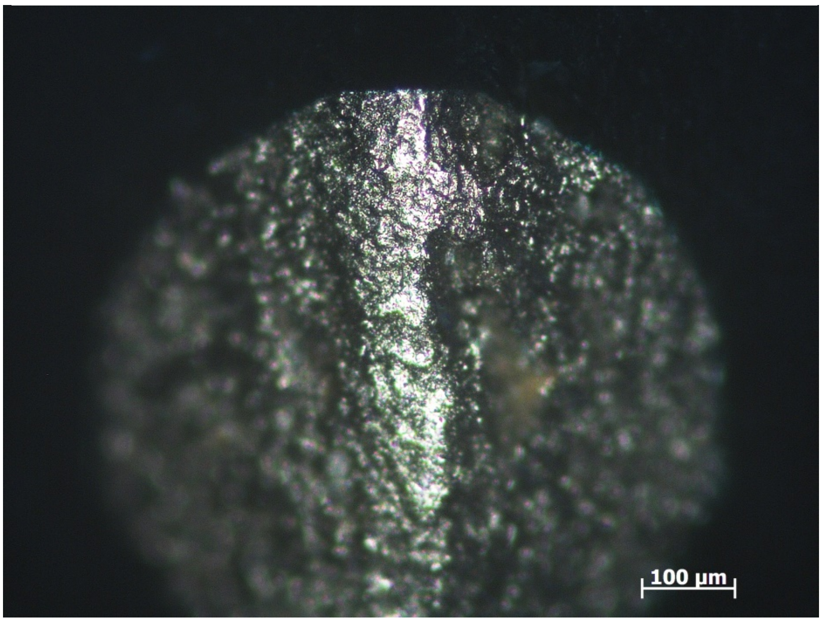


Figure 7-27: FAP 407; Points 2, 4 and 7

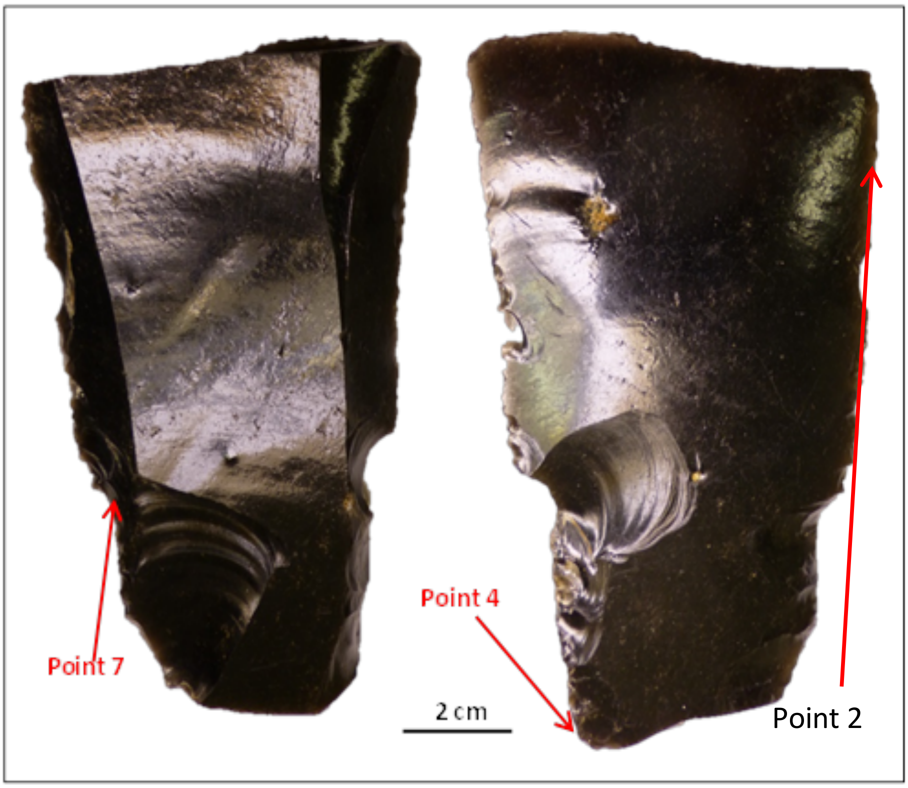


Figure 7-28: FAP 407, Point 2 x200 EFI; Dense axial rough bottomed striae close to edge on ventral face

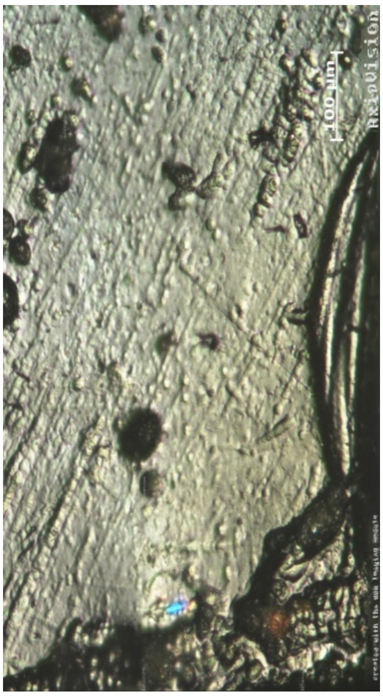


Figure 7-29: FAP407, Point 4 x200; line of developed polish on exposed edge of arris

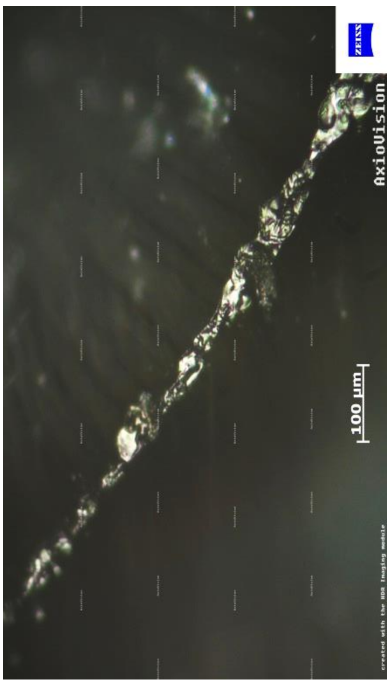


Figure 7-30: FAP 407, Point 7 x200; Brightspot

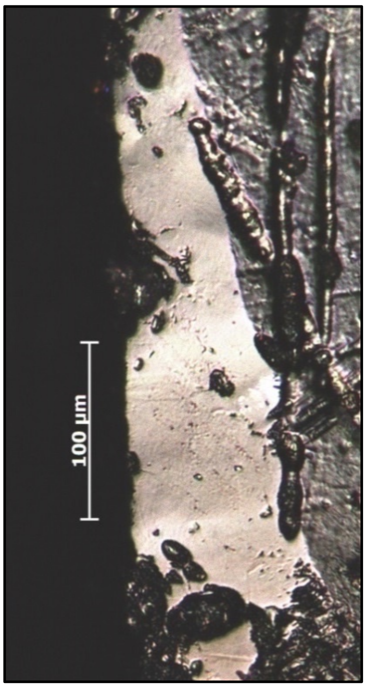


Figure 7-31: FAP 270

Figure 7-32: FAP 270 Brightspot at D10 and D12 x200

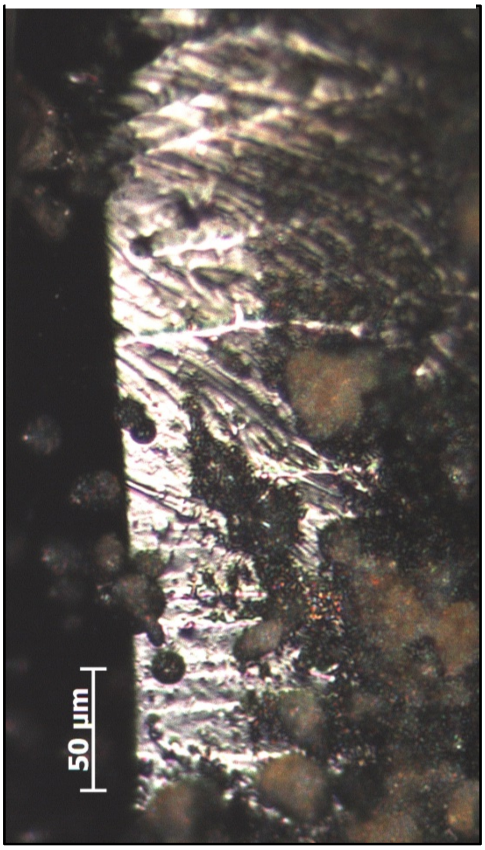
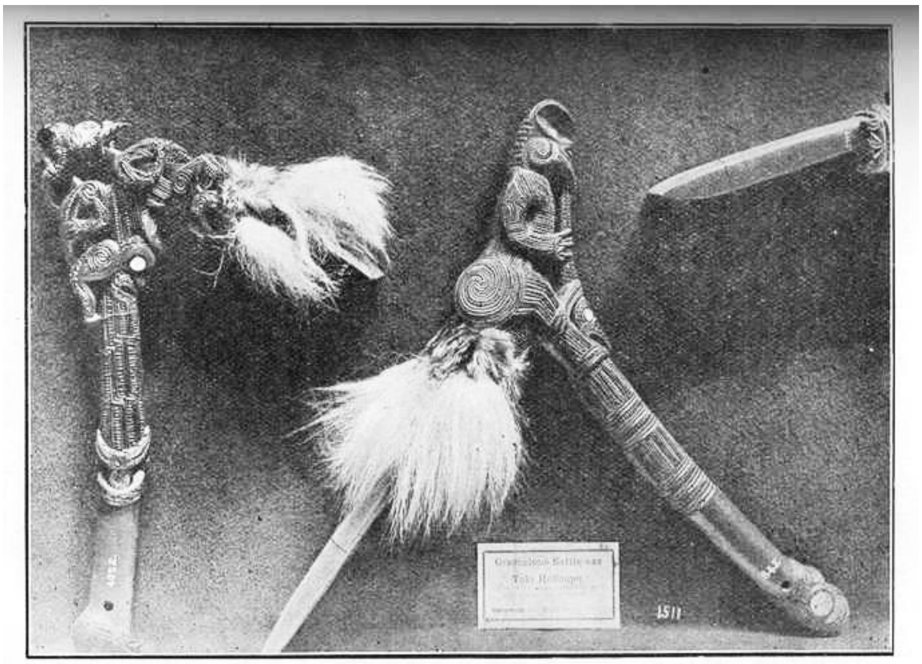


Figure 7-33: A Cook Islands adze decorated with braided cord (Peabody Museum, 2015: 77-35-70/11640)

Figure 7-34: A Salish 'D' adze from the American Northwest with a carving of a kneeling man (Peabody Museum, 2015: 05-07-10/65509)

Figure 7-35: Admiralty Islands adze decorated with a carved relief (Peabody Museum, 2015: 18-20-70/D1227).

Figure 7-36: Hafted Maori adze: (Best, 1924)



Toki hohoupu. Stone adze blade halfted on a handle adorned with carving, also with dog's hair, etc. This form of adze was used as a weapon also as a baton used by a man when delivering a speech.

Addenda: Access Database in CD-ROM format

ID	Lithic Referer	Sheet N	Description	Residue	Weight	Max Lengt	Max Wid	Max Thic
38	FEK 001	31	complete blade no stem		107	187	42	
43	FEK 016	32	complete		72	143	26	
44	FQT 039	42	complete		228	220	81	13
2	FRL 124	73	medial only		45.37	75.06	46.22	15.56
6	FRL 1049	74	tip + medial		69.35	85.01	56.56	15.84
7	FRL 1054	75	tip + medial		188.94	116.33	79.68	35.15
8	FRL 134	76	tip + medial		151.05	128.49	55.97	30.04
25	FRL 183	77	tip missing		68.79	111.92	41.06	14.42
10	FAP 272	78	tip missing		165.46	155.5	61.98	15.9
11	FRL 1058	79	medial only		19.38	48.45	26.93	12.92
13	FAP 212	81	tip missing		134.56	139.0	57.3	16.15
14	FRL 335	82	stem only		20.74	49.89	29.39	16.99
1	FRL 116	83	stem + proximal		173.80			
16	FRL 911	84	tip only		17.04	60.99	32.90	10.25
17	FRL 595	85	part stem		30.41	56.67	39.46	11.74
33	FRL 1017	86	part stem		44.91	45.05	19.45	/
34	FRL 155	87	stem only		19.12	45.69	26.32	16.77
20	FRL 118	88	stem only		63.92	63.68	63.84	14.04
35	FRL 1053	89	stem + proximal		55.07	111.57	38.35	15.85
15	FRL 582	90	tip + medial		70.35	92	58	12
36	FRL 428	91	stem only		98.33	140	40	15
46	FRL 101	92	medial + proximal		135.48	101	69	13
47	FRL 1052	93	stem only		46.10	108	36	13
48	FRL 1012	94	part stem		37.61	54	47	13
50	FRL 185	95	part stem		141.95	120	65	16
58	FRL 1056	96	tip + medial		18.63	65.5	19	9
57	FRL 352	97	tip missing		47.89	84	44	11.5
56	FRL 1050	98	stem + proximal		56.89	106	39	11
55	FRL 1048	99	tip + medial		47.07	77	41	12
54	FRL 221	100	stem + proximal		196.05	134	76	17
53	FRL 1004	101	stem only		47.55	106	34	16
52	FRL 230	102	stem only		17.29	51	34	12
51	FRL 513	103	part stem		31.23	74	29	19
70	FAP 433	104	stem + proximal		75.61	104	70	10
66	FAP 610	105	medial only		34.97	48	46	13
69	FAP 214	106	stem + proximal		132.7	103	71	18
176	FAP 261	107			29.22	64	37	10
79	FDC/A/13	108	Not Type 1		97,26	110	42	14
67	FAP 746	109	medial only		73.74	74	61	16
68	FAP 783	110	stem + proximal		44.38	79	41	13
65	FAP 843	111	tip only		28.97	68	39	8
64	FAP 756	112	stem + proximal		34.89	90	47	8
63	FAP 865	113	tip missing		85.62	124	42	14
62	FAP 232	114	stem + proximal		27.79	70	33	12
61	FAP 203	115	stem only		34.10	66	34	13

Edge Angle	Edge Angl	Spine Plane [	Spine Plane	Stem Type	Blade Cro	Hafted	PXRF
13	14	33	28	M	TRAP	CERTAIN	G
105	75	35	30	C	TRAP	CERTAIN	K
35	38	35	38	C	TRAP	PROBABLE	
26	28	26	28	M	TRAP	M	K
34	32	34	32	M	TRI	M	K
42	33	42	33	M	TRI	M	K
30	50	30	50	M	TRI	M	K
38	22	38	22	B	TRI	PROBABLE	K
38	32	38	32	C	TRAP	CERTAIN	B
45	56	35	56	M	TRAP	M	K
20	20	20	20	E	TRI	PROBABLE	B
/	/	/	/	C	/	/	K
/	/	/	/	E	TRAP	NO	K
32	42	32	42	M	TRI	M	K
30	58	30	58	E	TRAP	POSSIBLE	K
/	/	45	30	/	TRI	/	K
/	/	/	/	/	/	/	K
64	82	18	18	E	TRAP	NO	*
30	30	30	30	E	TRI	NO	K
28	58	58	28	M	TRAP	M	K
50	45	18	45	E	TRAP	POSSIBLE	K
38	45	45	38	M	TRAP	M	K
/	/	29	30	E	/	NO	K
30	22	22	30	/	TRI	/	K
32	44	32	44	E	TRAP	NO	K
79	72	79	72	M	TRAP	M	K
20	45	20	45	D	TRI	NO	K
40	40	/	20	E	/	NO	K
29	29	29	29	M	TRI	M	K
60	35	21	29	E	/	NO	K
42	38	42	38	E	TRI	NO	*
50	26	36	26	B	TRAP	/	K
20	/	/	/	D	/	NO	K
22	27	/	/	A	TRAP	CERTAIN	K
24	30	24	30	/	TRI	M	B
24	46	/	/	C	TRAP	PROBABLE	K
/	/	/	/	/	/		
26	32	/	/	/	/	/	K
24	24	/	/	/	TRI	M	K
/	/	90	18	D	/	NO	B
38	24	38	24	/	TRAP	M	B
36	/	36	/	A	TRAP	NO	B
40	38	40	38	A	TRAP	POSSIBLE	G
/	/	/	/	A	/	NO	B
/	/	/	/	A	/	NO	K

Artefact Morpholo	Spit
clear signs hafting	
Distinct traces ha	
Surface condition	
	/

ID	Lithic Referer	Sheet N	Description	Residue	Weight	Max Lengt	Max Widt	Max Thic
60	FAP 429	116	part stem + proximal + me		32.93	92	46	6
59	FAP 562	117	stem + proximal		95.06	91	79	9
71	FAP 220	118	stem only		133.42	88	65	24
72	FAP 416	119	part stem + proximal		93.32	120	63	54
73	FAP 279	120	stem only		34,52	55	36	14
74	FAP 259	121	stem only		49.6	75	41	15
75	FAP 270	122	stem only		17.45	55	29	9
76	FAP 573	123	proximal only		10.31	45	28	5.5
77	FAP 514	124	Not Type 1		2.97	33	23	5
78	FAP 863	125	stem only		30.77	73	34	11
80	FAP 560	126	stem only		40.47	60	32	15
81	FAP 542	127	tip missing		167.04	136	60	16
83	FAP 732	128	tip only		84.63	94	88	6.5
84	FAP 407	129	tip missing		130.34	119	67	11.5
85	FAP 759	130	tip missing		92.85	115	53	12
86	FAP 842	131	stem only		18.98	53	27	11
92	FAP 864	132	tip missing		84.56	110	43	12
91	FAP 834	133	stem + proximal		105.29	104	70	10
87	FAP 537	134	stem only		38.75	65	37	13
90	FAP 743	135	tip missing		94	116	44	16
89	FAP 420	136	part stem + proximal + me		84.54	88	54	14
88	FAP 829	137	stem + proximal		35.5	72	36	11
93	FAP 848	138	tip + medial		75.15	98	46	10
94	FAP 442	139	tip only		67.60	80	43	14
95	FAP 427	140	stem + proximal		36.14	70	45	10
96	FAP 782	141	part stem + proximal		31.21	42	57	12
97	FAP 231	142	stem only		28.81	58	31	12
98	FAP 221	143	stem only		29.22	65	38	10
99	FAP 215	144	stem only		43.78	70	42	11
100	FAP 758	145	stem + proximal		95.63	88	57	18
101	FAP 248	146	stem only		44.16	73	43	13
102	FAP 779	147	stem only		29.53	84	32	16
103	FAP 446	148	stem + proximal		31.56	63	40	12
152	FAP 563	149	part stem		25.39	46	34	14
153	FAP 705	150	tip missing		104.76	128	53	13
154	FAP 400	151	stem only		25.77	57	33	10
155	FAP 543	152	stem only		35.22	62	35	13
156	FAP 835	153	stem only		37.72	61	36	15
157	FAP 229	154	stem + proximal		42.11	77	40	12
158	FAP 550	155	stem only		12.96	47	30	7
159	FAP 439	156	tip missing		74.83	90	47	13
160	FAP 440	157	stem only		31.88	55	35	15
161	FAP 481	158	stem only		28.34	60	35	11
162	FAP 788	159	stem only		38.08	68	38	12
163	FAP 452	160	stem + proximal		43.68	62	55	14

Edge Angl	Edge Angl	Spine Plane [	Spine Plane	Stem Type	Blade Cr	Hafted	PXRF
22	30	22	30	C	TRAP	POSSIBLE	B
28	32	28	32	B	TRAP	NO	*
/	/	/	/	E	/	CERTAIN	B
30	24	30	24	D	TRAP	/	K
/	/	/	/	A	/	/	K
25	75	25	20	B	TRAP	/	K
/	/	/	/	/	/	NO	B
30	34	18	18	M	TRAP	M	B
/	/	28	26	/	/	/	B
/	/	/	/	A	/	NO	K
/	/	/	/	A	/	POSSIBLE	K
35	30	35	30	B	TRAP	NO	B
28	36	/	24	/	TRAP	M	K
30	42	30	42	D	TRAP	NO	B
60	36	64	36	D	TRAP	POSSIBLE	B
/	/	/	/	A	/	POSSIBLE	G
32	/	/	/	D	TRAP	PROBABLE	B
/	/	56	35	D	TRAP	POSSIBLE	K
/	/	/	/	A	/	/	K
40	30	40	30	E	TRAP	POSSIBLE	B
30	32	30	32	D	TRAP	POSSIBLE	B
3/	/	30	30	/	TRAP	NO	K
30	44	30	44	/	TRAP	M	B
36	34	36	34	/	TRAP	M	B
40	32	40	32	A	TRAP	NO	B
/	36	/	36	/	TRAP	M	G
/	/	/	/	A	/	NO	K
/	/	/	/	A	/	POSSIBLE	
/	/	/	/	A	/	POSSIBLE	K
39	40	39	40	D	TRAP	POSSIBLE	B
/	/	/	/	A	/	POSSIBLE	K
56	36	/	/	B	TRI	NO	K
38	35	38	35	A	TRAP	NO	B
/	/	/	/	A	/	NO	B
/	102	38	/	A	TRAP	NO	G
/	/	/	/	A	/	CERTAIN	G
/	/	/	/	A	/	POSSIBLE	K
/	/	/	/	A	/	PROBABLE	K
60	44	60	44	C	TRAP	PROBABLE	B
/	/	/	/	/	/	POSSIBLE	B
74	28	74	28	E	TRAP	PROBABLE	B
/	/	/	/	A	/	NO	*
/	/	/	/	A	/	NO	K
/	/	/	/	A	/	POSSIBLE	K
20	22	20	22	D	TRI	POSSIBLE	B

Artefact Morpholo	Spit

ID	Lithic Referer	Sheet N	Description	Residue	Weight	Max Lengt	Max Widt	Max Thic
164	FAP 464	161	stem only		18.61	41	40	18
165	FAP 424	162	stem + proximal		80.50	66	67	19
166	FAP 249	163	stem only		35.67	80	36	10
167	FAP 789	164	stem only		32.40	64	40	11
168	FAP 258	165	stem + proximal		58.76	80	43	14
169	FAP 202	166	stem + proximal		87.76	101	54	10
170	FAP 283	167	tip missing		62.93	102	45	10
171	FAP 401	168	tip missing		30.22	85	33	8
172	FAP 866	169	stem + proximal		98.25	102	57	12
173	FAP 528	170	stem only		36.71	70	39	10
104	FAP 421	171	stem + proximal		83.26	80	65	13
105	FAP 831	172	tip missing		117.79	114	56	16
106	FAP 255	173	tip missing		27.54	107	34	10
107	FAP 564	174	stem only		28.44	55	31	12
108	FEK 029	175	tip missing		76.73	136	38	13
109	FEK 011	176	complete blade + part ste		29.77	38	43	61
110	FEK 015	177	complete		107.88	162	37	21
112	FEK 032	178	part stem + proximal		27.65	54	45	11
113	FEK 109	179	tip missing		72.31	43	30	57
114	FEK 052	180	tip + medial		62.41	91	29	24
115	FEK 025	181	tip only		17.47	87	16	9
116	FDC/F/46	182	stem + proximal		56.66	96	47	11
117	FDC/F/43	183	stem + proximal		70.89	89	47	15
118	FDC/C/5	184	stem only		22.07	53	31	9
119	FDC/F/39	185	stem + proximal		77	75	60	17
120	FDC/F/22	186	stem only		18.18	50	28	17
121	FDC/A/22	187	tip missing		21	82	21	11
122	FAAJ 054	188	tip only		13.93	65	32	9
123	FSZ 141	189	stem + proximal		74.97	81	48	19
124	FDY 001	190	tip missing		82.97	146	37	17
125	FAQ 010	191	stem + proximal		48.44	91	35	14
126	FDW 001	192	stem + proximal		139.04	125	55	22
127	FAW 001	193	tip + medial		128.33	106	40	25
128	FDM002	194	stem + proximal		17.86	49	40	7
129	FAAL 120	195	tip only		20.12	50	30	13
130	FAY 007	196	part stem + proximal		91.16	93	70	12
131	FAR 038	197	stem + proximal		45.57	78	41	12
132	FAQ 446	198	part stem		6.72	32	19	15
133	FAAJ 055	199	complete		36.9	137	23	12
134	FSZ 205	200	part stem		3.87	18	10	16
135	FAAH 035	201	stem only		25.22	50	31	12
136	FAO 1901	202	complete		2.5	60	9	5
137	FAR 031	203	stem only		19.65	52	32	9
138	FAR II 001	204	tip missing		49.13	99	44	9
139	FAR II 008	205	tip + medial		52.66	113	52	8

Edge Angl	Edge Angl	Spine Plane [	Spine Plane	Stem Type	Blade Cr	Hafted	PXRF
45	/	/	/	C	TRAP	/	K
30	20	30	20	D	TRI	NO	B
/	/	/	/	A	/	NO	K
/	/	/	/	A	/	NO	K
26	24	26	24	D	TRI	/	K
30	12	30	34	D	TRAP	/	B
28	36	28	36	D	TRAP	CERTAIN	B
30	38	30	38	C	TRAP	POSSIBLE	K
38	46	38	28	D	TRAP	/	K
/	/	/	/	A	/	NO	K
28	40	28	40	D	TRAP	NO	K
30	30	30	30	D	TRAP	POSSIBLE	K
32	60	32	60	B	TRAP	POSSIBLE	K
/	/	/	/	A	/	/	K
42	22	42	22	B	TRI	CERTAIN	K
32	32	32	32	D	TRI	NO	K
/	70	60	28	C	TRI	CERTAIN	K
22	20	22	20	/	TRI	PROBABLE	K
24	54	/	/	D	TRI	POSSIBLE	K
70	80	44	54	M	TRI	/	K
74	80	28	20	M	TRAP	/	K
20	30	20	30	C	TRAP	/	K
70	36	70	36	A	TRAP	POSSIBLE	K
/	/	/	/	A	/	NO	*
24	/	/	/	B	TYPE 2?	NO	K
/	/	/	/	C	/	/	K
/	/	/	30	C	TRI	POSSIBLE	K
24	24	24	24	M	TRI	/	K
60	58	44	58	C	TRAP	NO	B
54	40	54	40	B	TRI	POSSIBLE	K
28	48	28	48	C	TRI	NO	K
64	44	64	44	B	TRAP	NO	K
90	85	22	24	M	TRAP	/	K
30	38	30	38	C	TRAP	PROBABLE	G
48	52	/	/	M	TRAP	/	K
38	/	38	/	/	TRAP	/	G
/	/	/	/	A	/	POSSIBLE	G
/	/	/	/	C	/	/	*
47	35	47	35	/	TRI	POSSIBLE	*
/	/	/	/	C	/	/	K
/	/	/	/	A	/	/	K
48	54	48	54	B	TRI	NO	*
/	/	/	/	A	/	POSSIBLE	B
22	34	22	34	D	TRAP	NO	*
24	50	24	18	M	TRAP	/	*

Artefact Morpholo	Spit

ID	Lithic Referer	Sheet N	Description	Residue	Weight	Max Lengt	Max Widt	Max Thic
140	FAR II 007	206	part stem + proximal		39.75	74	51	11
141	FAR 046	207	tip only		19.84	42	35	11
142	FAY 010	208	complete		56.69	98	41	15
143	FAR 027	209	stem only		53.21	60	39	14
144	FAR II 002	210	tip missing		59.81	99	55	8
145	FAR 022	211	stem + proximal		55.75	66	54	13
146	FAR II 028	212	stem only		36.57	65	41	13
147	FAR 003	213	stem + proximal		53.93	89	42	10
148	FAR 020	214	stem only		31.28	63	38	12
149	FAR 040	215	stem + proximal		89.60	88	69	11
150	FAR 023	216	stem + proximal		70.77	93	61	12
151	FAR 033	217	stem + proximal		48.80	91	41	12

Edge Angle	Edge Angl	Spine Plane [	Spine Plane	Stem Type	Blade Cro	Hafted	PXRF
18	28	18	28	D	TRI	/	*
42	50	/	/	M	TRAP	/	B
24	28	24	28	C	TRI	POSSIBLE	*
/	/	/	/	A	/	/	K
54	18	18	/	A	TRAP	NO	B
45	24	20	/	A	TRAP	PROBABLE	B
/	/	/	/	A	/	/	K
80	76	80	30	A	TRAP	NO	K
/	/	/	/	A	/	/	K
38	30	38	30	D	TRAP	/	K
36	/	36	/	D	TRAP	/	K
30	34	30	34	A	TRAP	/	B

Artefact Morpholo	Spit

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2153	FAAH 035	201		D10
2154	FAAH 035	201		D11
2155	FAAH 035	201		D12
2156	FAAH 035	201		D13
2157	FAAH 035	201		D14
2158	FAAH 035	201		D15
2159	FAAH 035	201		D16
2160	FAAH 035	201		D17
2161	FAAH 035	201		D18
2162	FAAH 035	201		V10
2163	FAAH 035	201		V11
2164	FAAH 035	201		V12
2165	FAAH 035	201		V13
2166	FAAH 035	201		V14
2167	FAAH 035	201		V15
2168	FAAH 035	201		V16
2169	FAAH 035	201		V17
2170	FAAH 035	201		V18
1923	FAAJ 054	188		D1
1924	FAAJ 054	188		D2
1925	FAAJ 054	188		D3
1926	FAAJ 054	188		V1
1927	FAAJ 054	188		V2
1928	FAAJ 054	188		V3
2111	FAAJ 055	199		D1
2112	FAAJ 055	199		D2
2113	FAAJ 055	199		D3
2114	FAAJ 055	199		D4
2115	FAAJ 055	199		D5
2116	FAAJ 055	199		D6
2117	FAAJ 055	199		D7
2118	FAAJ 055	199		D8
2119	FAAJ 055	199		D9
2120	FAAJ 055	199		D10
2121	FAAJ 055	199		D11
2122	FAAJ 055	199		D12
2123	FAAJ 055	199		D13
2124	FAAJ 055	199		D14
2125	FAAJ 055	199		D15
2126	FAAJ 055	199		D16
2127	FAAJ 055	199		D17
2128	FAAJ 055	199		D18
2129	FAAJ 055	199		V1
2130	FAAJ 055	199		V2
2131	FAAJ 055	199		V3

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
B,F	D	2	2
N	N	N	N
B	C	2	2
B,S	C	2	2
N	N	N	N
B,F	C	2	1
V	C	3	3
N	N	N	N
/	/	3	3
/	/	3	3
N	N	N	N
B	D	3	3
V	D	3	1
N	N	N	N
/	/	3	2
/	/	4	3
N	N	N	N
/	/	4	3
/	/	4	4
N	N	N	N
/	/	3	3
/	/	3	3
N	N	N	N
B,S	D	2	1
B	D	2	2
N	N	N	N
B	D	3	3

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
1	0	0	0
N	N	N	N
1	1	1	2
2	0	0	0
N	N	N	N
1	1	1	1
3	2	1	1
N	N	N	N
3	2	1	1
3	2	1	2
N	N	N	N
3	2	1	1
2	3	1	1
N	N	N	N
3	3	1	1
3	2	2	3
N	N	N	N
4	2	2	3
4	2	2	2
N	N	N	N
2	3	1	1
3	0	0	0
N	N	N	N
1	2	1	1
2	0	0	0
N	N	N	N
3	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R	0	0
B	1	R	0	0
B	1	R	0	0
B	1	R,S	0	0
0	0	0	0	0
B	1	C	0	0
A	1	R	0	0
0	0	0	0	0
B	1	R,C	0	0
A	1	R	B	R,C
0	0	0	0	0
B	2	R	A	R
0	0	0	0	0
0	0	0	0	0
B	1	R,C	0	0
0	0	0	0	0
T	1	R,I	0	0
0	0	0	0	0
A	1	R	0	0
T	1	R,I	0	0
0	0	0	0	0
T	1	R	0	0
A	2	R	0	0
/	/	/	/	/
0	0	0	0	0
T	1	R,I	B	R,C
A	1	R,I	B	R,C

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	1	3	1
0	N	N	1
0	N	N	1
0	2	1	1
0	N	N	1
1	N	N	1
0	2	1	1
1	N	N	1
0	N	N	1
0	3	1	1
0	N	N	1
0	3	1	1
0	3	1	1
0	N	N	1
0	N	N	1
0	2	1	1
0	N	N	1
0	N	N	1
0	N	N	1
/	2	1	1
0	N	N	1
2	N	N	1
2	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			S
			S

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2132	FAAJ 055	199		V4
2133	FAAJ 055	199		V5
2134	FAAJ 055	199		V6
2135	FAAJ 055	199		V7
2136	FAAJ 055	199		V8
2137	FAAJ 055	199		V9
2138	FAAJ 055	199		V10
2139	FAAJ 055	199		V11
2140	FAAJ 055	199		V12
2141	FAAJ 055	199		V13
2142	FAAJ 055	199		V14
2143	FAAJ 055	199		V15
2144	FAAJ 055	199		V16
2145	FAAJ 055	199		V17
2146	FAAJ 055	199		V18
2067	FAAL 120	195		D1
2068	FAAL 120	195		D2
2069	FAAL 120	195		D3
2070	FAAL 120	195		V1
2071	FAAL 120	195		V2
2072	FAAL 120	195		V3
2171	FAO 1901	202		D1
2172	FAO 1901	202		D2
2173	FAO 1901	202		D3
2174	FAO 1901	202		D4
2175	FAO 1901	202		D5
2176	FAO 1901	202		D6
2177	FAO 1901	202		D7
2178	FAO 1901	202		D8
2179	FAO 1901	202		D9
2180	FAO 1901	202		D10
2181	FAO 1901	202		D11
2182	FAO 1901	202		D12
2183	FAO 1901	202		D13
2184	FAO 1901	202		D14
2185	FAO 1901	202		D15
2186	FAO 1901	202		D16
2187	FAO 1901	202		D17
2188	FAO 1901	202		D18
2189	FAO 1901	202		V1
2190	FAO 1901	202		V2
2191	FAO 1901	202		V3
2192	FAO 1901	202		V4
2193	FAO 1901	202		V5
2194	FAO 1901	202		V6

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
B	D	3	3
N	N	N	N
/	/	3	3
/	/	3	3
N	N	N	N
/	/	3	3
/	/	3	3
N	N	N	N
/	/	2	2
/	/	3	2
N	N	N	N
/	/	3	3
V	C	2	2
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	R	/
N	N	N	N
R	R	/	/
/	/	4	3
N	N	N	N
/	/	4	3
H	D	2	2
N	N	N	N
F,H	D	1	1
/	/	4	3
N	N	N	N
B,S	D	0	0
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	4	2
N	N	N	N
F,H	D	1	1
H,S	D	1	1
N	N	N	N
F,H	C	2	1

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
3	1	1	1
N	N	N	N
3	2	3	3
3	2	3	3
N	N	N	N
3	0	0	0
3	2	1	2
N	N	N	N
2	1	1	1
2	/	/	/
N	N	N	N
3	1	1	1
1	2	1	1
N	N	N	N
3	3	2	1
/	/	/	/
N	N	N	N
/	2	1	1
/	/	/	/
N	N	N	N
/	2	1	1
4	2	3	3
N	N	N	N
4	0	0	0
2	0	0	0
N	N	N	N
1	0	0	0
3	3	2	2
N	N	N	N
0	0	0	0
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	2	2	3
N	N	N	N
1	0	0	0
1	0	0	0
N	N	N	N
2	0	0	0

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
0	0	0	0	0
B	1	R,I,S	B	R,C
A	2	R,I,S	B	R,C
B	3	R,I,C	0	0
B	1	R,C	0	0
A	2	R,I	B	R
A	1	S	B	R,I
B	1	C	0	0
0	0	0	0	0
0	0	0	0	0
A	1	R	B	R,C
/	/	/	/	/
A	1	C	/	/
B	1	C	0	0
/	/	/	/	/
B	2	R,I	A	R,I
A	3	C,I	/	/
/	/	/	/	/
B	1	R,I	B	C
T	1	R,I	B	C
A	3	R,S	T	R,C
T	1	R,I	0	0
T	2	R,I	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	2	R	0	0
/	/	/	/	/
0	0	0	0	0
T	2	R	0	0
0	0	0	0	0
T	2	R	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
1	N	N	1
2	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
2	N	N	1
/	N	N	1
/	N	N	1
0	N	N	1
/	/	/	1
3	1	2	1
/	3	2	1
/	/	/	1
1	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
0	3	3	1
0	N	N	1
0	N	N	1
0	3	3	1
0	N	N	1
0	N	N	1
0	3	3	1
0	N	N	1
0	N	N	1
0	3	3	1
0	N	N	1
0	N	N	1
0	3	3	1
0	N	N	1
0	N	N	1
0	3	3	1
0	N	N	1
0	N	N	1
/	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2195	FAO 1901	202		V7
2196	FAO 1901	202		V8
2197	FAO 1901	202		V9
2198	FAO 1901	202		V10
2199	FAO 1901	202		V11
2200	FAO 1901	202		V12
2201	FAO 1901	202		V13
2202	FAO 1901	202		V14
2203	FAO 1901	202		V15
2204	FAO 1901	202		V16
2205	FAO 1901	202		V17
2206	FAO 1901	202		V18
2105	FAO 446	198		D13
2106	FAO 446	198		D14
2107	FAO 446	198		D15
2108	FAO 446	198		V13
2109	FAO 446	198		V14
2110	FAO 446	198		V15
2865	FAP 202	166		D7
2866	FAP 202	166		D8
2867	FAP 202	166		D9
2868	FAP 202	166		D10
2869	FAP 202	166		D11
2870	FAP 202	166		D12
2871	FAP 202	166		D13
2872	FAP 202	166		D14
2873	FAP 202	166		D15
2874	FAP 202	166		D16
2875	FAP 202	166		D17
2876	FAP 202	166		D18
2877	FAP 202	166		V7
2878	FAP 202	166		V8
2879	FAP 202	166		V9
2880	FAP 202	166		V10
2881	FAP 202	166		V11
2882	FAP 202	166		V12
2883	FAP 202	166		V13
2884	FAP 202	166		V14
2885	FAP 202	166		V15
2886	FAP 202	166		V16
2887	FAP 202	166		V17
2888	FAP 202	166		V18
802	FAP 203	115		D10
803	FAP 203	115		D11
804	FAP 203	115		D12

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
F	D	3	2
N	N	N	N
B	D	3	3
/	/	3	3
N	N	N	N
B,F	D	4	3
R	R	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	/	/
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	2	2
N	N	N	N
/	/	2	2
R	R	0	0
N	N	N	N
R	R	0	0
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
R	R	R	R
N	N	N	N
R	R	R	R

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
2	0	0	0
N	N	N	N
3	2	1	1
3	0	0	0
N	N	N	N
4	0	0	0
/	0	0	0
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	0	0	0
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
2	4	1	1
N	N	N	N
2	2	1	1
0	0	0	0
N	N	N	N
0	0	0	0
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
R	R	R	R
N	N	N	N
R	R	R	R

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
T	1	R,I	A	R
A	1	C	0	0
0	0	0	0	0
A	2	R,I	0	0
B	2	R,I	0	0
T	1	R,I	0	0
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	R,S	B	R,C
B	2	R,I	B	C
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	C,I	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	2	R,I,C	B	C
T	2	R,I,C	B	C
T	2	R,I,C	B	C
T	2	R,C	0	0
T	2	R	B	C
T	2	R	B	C
T	1	R	B	C
T	1	R	B	R,C
T	1	R	B	R,C
T	1	R,S	B	C
T	1	R,S	B	C
T	1	R,S	B	C
/	/	/	/	/
A	1	R,I	0	0
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
1	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
/	/	/	1
/	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
1	3	3	1
3	N	N	1
/	/	/	1
/	N	N	1
/	3	3	1
/	/	/	1
/	/	/	1
/	N	N	1
/	3	3	1
/	3	3	1
/	N	N	1
/	3	3	1
1	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
1	1	3	1
1	N	N	1
/	2	2	1
0	2	2	1
/	/	/	/

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
805	FAP 203	115		D13
806	FAP 203	115		D14
807	FAP 203	115		D15
808	FAP 203	115		D16
809	FAP 203	115		D17
810	FAP 203	115		D18
811	FAP 203	115		V10
812	FAP 203	115		V11
813	FAP 203	115		V12
814	FAP 203	115		V13
815	FAP 203	115		V14
816	FAP 203	115		V15
817	FAP 203	115		V16
818	FAP 203	115		V17
819	FAP 203	115		V18
409	FAP 212	81		D4
410	FAP 212	81		D5
411	FAP 212	81		D6
412	FAP 212	81		D7
413	FAP 212	81		D8
414	FAP 212	81		D9
415	FAP 212	81		D10
416	FAP 212	81		D11
417	FAP 212	81		D12
418	FAP 212	81		D13
419	FAP 212	81		D14
420	FAP 212	81		D15
421	FAP 212	81		D16
422	FAP 212	81		D17
423	FAP 212	81		D18
424	FAP 212	81		V4
425	FAP 212	81		V5
426	FAP 212	81		V6
427	FAP 212	81		V7
428	FAP 212	81		V8
429	FAP 212	81		V9
430	FAP 212	81		V10
431	FAP 212	81		V11
432	FAP 212	81		V12
433	FAP 212	81		V13
434	FAP 212	81		V14
435	FAP 212	81		V15
436	FAP 212	81		V16
437	FAP 212	81		V17
438	FAP 212	81		V18

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
/	/	/	/
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
/	/	4	4
N	N	4	4
/	/	4	4
/	/	2	2
N	N	N	N
/	/	4	4
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
/	/	4	4
N	N	N	N
/	/	/	/
/	/	4	3
N	N	N	N
/	/	/	3
R	R	R	R
N	N	N	N
V	D	2	1
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	0
R	R	R	R
4	0	0	0
4	N	N	N
4	2	2	3
2	1	2	3
N	0	0	0
4	2	2	3
R	2	3	5
N	3	3	2
R	2	3	5
2	3	2	4
N	N	N	N
3	3	3	5
3	2	2	2
3	3	3	3
3	2	2	2
4	2	2	3
N	2	2	3
3	1	1	3
4	1	1	3
N	0	0	0
2	0	0	0
R	2	2	4
N	0	0	0
2	2	1	2
R	2	2	4
N	2	2	4
R	2	1	5
R	2	1	3
R	2	1	3
R	2	1	3

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	1	R,I	B	C
/	/	/	/	/
/	/	/	/	/
A	2	R,I	0	0
/	/	/	/	/
/	/	/	/	/
A	2	R,I	0	0
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
B	1	I	A	I
0	0	0	0	0
0	0	0	0	0
A	1	R,I	T	R
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
B	1	R,I	0	0
0	0	0	0	0
B	1	I	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	1	R,I	B	I
T	1	R,I	B	I
T	2	R,I	A	R
T	1	C	T	R
T	3	R	0	0
T	3	S	A	R
B	2	R	0	0
T	2	R	A	R
T	2	R	A	R
A	2	R	0	0
A	2	R	0	0
B	1	I	0	0
A	1	I	0	0
A	1	I	0	0
A	1	I	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	/	/
/	2	2	1
/	2	2	1
/	2	2	1
1	/	/	1
/	/	/	1
/	/	/	1
0	/	/	1
/	/	/	1
/	/	/	1
0	/	/	1
/	2	2	1
/	/	/	1
0	3	2	1
0	/	/	1
0	3	2	1
0	3	2	1
1	0	0	1
0	0	0	1
0	3	3	1
1	0	0	1
/	2	0	1
0	3	3	1
0	2	0	1
0	3	0	1
0	4	3	1
0	3	0	1
0	2	0	1
0	3	0	1
0	2	0	1
1	0	0	1
1	0	0	1
2	0	0	1
1	0	0	1
0	0	0	1
1	0	0	1
0	2	0	1
2	0	0	1
1	0	0	1
0	2	0	1
0	2	0	1
0	2	0	1
0	2	0	1
0	2	0	1
0	2	0	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
918	FAP 214	106		D7
919	FAP 214	106		D8
920	FAP 214	106		D9
921	FAP 214	106		D10
922	FAP 214	106		D11
923	FAP 214	106		D12
924	FAP 214	106		D13
925	FAP 214	106		D14
926	FAP 214	106		D15
927	FAP 214	106		D16
928	FAP 214	106		D17
929	FAP 214	106		D18
930	FAP 214	106		V7
931	FAP 214	106		V8
932	FAP 214	106		V9
933	FAP 214	106		V10
934	FAP 214	106		V11
935	FAP 214	106		V12
936	FAP 214	106		V13
937	FAP 214	106		V14
938	FAP 214	106		V15
939	FAP 214	106		V16
940	FAP 214	106		V17
941	FAP 214	106		V18
1436	FAP 215	144		D10
1437	FAP 215	144		D11
1438	FAP 215	144		D12
1439	FAP 215	144		D13
1440	FAP 215	144		D14
1441	FAP 215	144		D15
1442	FAP 215	144		D16
1443	FAP 215	144		D17
1444	FAP 215	144		D18
1445	FAP 215	144		V10
1446	FAP 215	144		V11
1447	FAP 215	144		V12
1448	FAP 215	144		V13
1449	FAP 215	144		V14
1450	FAP 215	144		V15
1451	FAP 215	144		V16
1452	FAP 215	144		V17
1453	FAP 215	144		V18
966	FAP 220	118		D10
967	FAP 220	118		D11
968	FAP 220	118		D12

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
B	D	2	3
N	N	N	N
/	/	3	3
R	R	R	R
N	N	N	N
R	R	2	3
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	/	/
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	0
R	R	R	R
R	R	R	R
R	R	/	/
M	M	M	M
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	R	R

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
3	2	3	4
N	N	N	N
3	2	3	4
R	2	3	4
N	N	N	N
2	2	3	3
R	1	2	3
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	/	/	/
R	2	1	1
N	N	N	N
R	2	2	2
/	2	1	2
N	N	N	N
R	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
0	0	0	0
R	0	0	0
R	1	1	1
/	/	/	/
M	M	M	M
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
R	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
T	1	R	B	R
A	1	R,I	B	R
A	1	R,I	B	R
T	2	R	A	R,C
T	2	R,I	A	R,C
/	/	/	/	/
B	1	R,S	B	R,C
B	1	R,S	B	R,C
/	/	/	/	/
/	/	/	/	/
B	1	R,I	0	0
0	0	0	0	0
T	2	R,C	B	R
B	2	R,C	B	R
T	3	R,I	0	0
A	1	R	B	R,C
T	3	R,I	A	R,S
T	2	R,S	0	0
A	1	S	B	C
A	1	S	B	C
T	2	S,I,C	A	R
T	2	I	0	0
T	2	I	B	C
T	1	I	0	0
/	/	/	/	/
M	M	M	M	M
/	/	/	/	/
/	/	/	/	/
T	1	R	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
B	1	C	0	0
B	1	R,S	B	C

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
1	N	N	0
2	4	3	1
2	4	3	1
2	N	N	1
1	3	3	1
/	/	/	1
2	3	3	1
2	N	N	1
/	3	3	1
/	3	3	1
0	0	0	1
0	/	/	1
1	N	N	1
2	N	N	1
0	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
2	N	N	1
2	N	N	1
1	N	N	1
0	N	N	1
1	N	N	1
0	N	N	1
/	1	2	1
M	M	M	M
/	/	/	1
/	/	/	1
/	2	3	1
/	/	/	1
/	/	/	1
/	3	2	1
/	/	/	1
0	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
0	N	N	1
0	N	N	1
1	2	3	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
	/		B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
969	FAP 220	118		D13
970	FAP 220	118		D14
971	FAP 220	118		D15
972	FAP 220	118		D16
973	FAP 220	118		D17
974	FAP 220	118		D18
975	FAP 220	118		V10
976	FAP 220	118		V11
977	FAP 220	118		V12
978	FAP 220	118		V13
979	FAP 220	118		V14
980	FAP 220	118		V15
981	FAP 220	118		V16
982	FAP 220	118		V17
983	FAP 220	118		V18
1418	FAP 221	143		D10
1419	FAP 221	143		D11
1420	FAP 221	143		D12
1421	FAP 221	143		D13
1422	FAP 221	143		D14
1423	FAP 221	143		D15
1424	FAP 221	143		D16
1425	FAP 221	143		D17
1426	FAP 221	143		D18
1427	FAP 221	143		V10
1428	FAP 221	143		V11
1429	FAP 221	143		V12
1430	FAP 221	143		V13
1431	FAP 221	143		V14
1432	FAP 221	143		V15
1433	FAP 221	143		V16
1434	FAP 221	143		V17
1435	FAP 221	143		V18
2614	FAP 229	154		D7
2615	FAP 229	154		D8
2616	FAP 229	154		D9
2617	FAP 229	154		D10
2618	FAP 229	154		D11
2619	FAP 229	154		D12
2620	FAP 229	154		D13
2621	FAP 229	154		D14
2622	FAP 229	154		D15
2623	FAP 229	154		D16
2624	FAP 229	154		D17
2625	FAP 229	154		D18

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	0	0
R	R	/	/
R	R	/	/
R	R	R	R
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
/	/	3	3
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	0	0	0
N	N	N	N
/	/	/	/
/	2	3	4
N	N	N	N
/	/	/	/
/	2	2	4
N	N	N	N
/	/	/	/
/	2	2	3
N	N	N	N
0	0	0	0
/	/	/	/
/	/	/	/
R	2	1	2
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
3	3	2	2
N	N	N	N
4	2	3	3
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
A	1	R	T	R,C
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
T	2	R	0	0
0	0	0	0	0
B	1	R,I	0	0
B	1	R	T	R,I
T	1	R,I	B	R,C
A	2	R	B	R,S
A	2	R	B	R,S
/	/	/	/	/
/	/	/	/	/
A	2	R	0	0
T	2	R,I	0	0
A	3	R,I	0	0
A	2	I	0	0
/	/	/	/	/
/	/	/	/	/
T	1	R	0	0
/	/	/	/	/
B	1	S	T	R,S
T	1	R,S	A	R,S
T	2	R,I	B	R
A	3	R,I	B	R,C
A	2	R,I	B	R,C
A	2	R,I	B	R,I
/	/	/	/	/
B	2	R,I	B	R
/	/	/	/	/
A	2	R	/	/
/	/	/	/	/
A	2	R,S	/	/
/	/	/	/	/
A	2	R,S	/	/
A	2	R,S	/	/
/	/	/	/	/
A	2	S	/	/
A	2	S	/	/
/	/	/	/	/
A	2	S	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
1	0	0	1
0	3	3	1
0	3	3	1
/	3	3	1
/	3	3	1
/	3	3	1
0	2	2	1
0	N	N	1
0	2	2	1
0	2	2	1
2	N	N	1
1	N	N	1
1	3	3	1
1	3	3	1
/	/	/	1
/	2	2	1
0	2	2	1
0	2	2	1
0	0	0	1
0	N	N	1
/	3	2	1
/	2	2	1
0	2	2	1
/	2	2	1
1	3	3	1
2	N	N	1
1	3	2	1
2	N	N	1
2	N	N	1
2	N	N	1
/	2	2	1
1	2	2	1
/	2	2	1
/	3	3	1
/	3	3	1
/	3	3	1
/	/	/	1
/	3	3	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	3	2	1
/	3	2	1
/	/	/	1

Extract Ref No	Source	Starch Present	Cleaning
			S
			B
			B
			B
			B
			B
			B
			S
			S
			B
			B
			S
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			S
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2626	FAP 229	154		V7
2627	FAP 229	154		V8
2628	FAP 229	154		V9
2629	FAP 229	154		V10
2630	FAP 229	154		V11
2631	FAP 229	154		V12
2632	FAP 229	154		V13
2633	FAP 229	154		V14
2634	FAP 229	154		V15
2635	FAP 229	154		V16
2636	FAP 229	154		V17
2637	FAP 229	154		V18
1400	FAP 231	142		D10
1401	FAP 231	142		D11
1402	FAP 231	142		D12
1403	FAP 231	142		D13
1404	FAP 231	142		D14
1405	FAP 231	142		D15
1406	FAP 231	142		D16
1407	FAP 231	142		D17
1408	FAP 231	142		D18
1409	FAP 231	142		V10
1410	FAP 231	142		V11
1411	FAP 231	142		V12
1412	FAP 231	142		V13
1413	FAP 231	142		V14
1414	FAP 231	142		V15
1415	FAP 231	142		V16
1416	FAP 231	142		V17
1417	FAP 231	142		V18
820	FAP 232	114		D7
821	FAP 232	114		D10
822	FAP 232	114		D11
823	FAP 232	114		D12
824	FAP 232	114		D13
825	FAP 232	114		D14
826	FAP 232	114		D15
827	FAP 232	114		D16
828	FAP 232	114		D17
829	FAP 232	114		D18
830	FAP 232	114		V9
831	FAP 232	114		V10
832	FAP 232	114		V11
833	FAP 232	114		V12
834	FAP 232	114		V13

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
/	/	3	3
N	N	N	N
/	/	4	3
R	R	/	/
N	N	N	N
M	M	M	M
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
M	M	M	M
N	N	N	N
R	R	/	/
M	M	M	M
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	R	R
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
/	/	/	/
R	R	/	/
N	N	N	N
R	R	R	R
R	R	R	R

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
3	3	2	3
N	N	N	N
4	3	2	3
/	/	/	/
N	N	N	N
M	M	M	M
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
M	M	M	M
N	N	N	N
/	/	/	/
M	M	M	M
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	2	1	3
R	2	2	2
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
/	/	/	/
/	/	/	/
N	N	N	N
R	R	R	R
R	R	R	R

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
A	3	S	T	S
A	2	R,S	T	R,C
/	/	/	/	/
/	/	/	/	/
A	3	S	T	I
M	M	M	M	M
/	/	/	/	/
B	1	R,S	0	0
/	/	/	/	/
A	2	S	T	I
T	1	R,I	B	R
A	2	R	/	/
A	2	R	/	/
/	/	/	/	/
/	/	/	/	/
M	M	M	M	M
A	1	R	B	R
T	1	C,S	/	/
M	M	M	M	M
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	2	R	/	/
	0	0	0	0
/	/	/	/	/
A	2	R,I	B	C
A	1	S	/	/
A	1	R	/	/
B	2	R,I	B	I,S
A	2	R,I	B	R
A	1	R	B	R
B	1	R	/	/
B	1	R	/	/
B	1	R,I	0	0
T	1	S,I,C	0	0
T	1	S,I,C	0	0
0	0	0	0	0
B	1	R,S	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
1	N	N	1
1	N	N	1
/	N	N	1
/	N	N	1
1	N	N	1
M	M	M	1
/	N	N	1
0	N	N	1
/	N	N	1
1	N	N	1
1	N	N	1
/	3	2	1
/	3	3	1
/	/	/	1
/	/	/	1
M	M	M	M
1	/	/	1
/	/	/	1
M	M	M	M
/	2	3	1
/	2	3	1
/	3	1	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
0	N	N	1
/	2	2	1
1	2	2	1
/	2	1	1
/	3	2	1
1	2	2	1
1	2	2	1
1	1	1	1
/	1	1	1
/	2	1	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
835	FAP 232	114		V14
836	FAP 232	114		V15
837	FAP 232	114		V16
838	FAP 232	114		V17
839	FAP 232	114		V18
1478	FAP 248	146		D10
1479	FAP 248	146		D11
1480	FAP 248	146		D12
1481	FAP 248	146		D13
1482	FAP 248	146		D14
1483	FAP 248	146		D15
1484	FAP 248	146		D16
1485	FAP 248	146		D17
1486	FAP 248	146		D18
1487	FAP 248	146		V10
1488	FAP 248	146		V11
1489	FAP 248	146		V13
1490	FAP 248	146		V13
1491	FAP 248	146		V14
1492	FAP 248	146		V15
1493	FAP 248	146		V16
1494	FAP 248	146		V17
1495	FAP 248	146		V18
2806	FAP 249	163		D10
2807	FAP 249	163		D11
2808	FAP 249	163		D12
2809	FAP 249	163		D13
2810	FAP 249	163		D14
2811	FAP 249	163		D15
2812	FAP 249	163		D16
2813	FAP 249	163		D17
2814	FAP 249	163		D18
2815	FAP 249	163		V10
2816	FAP 249	163		V12
2817	FAP 249	163		V13
2818	FAP 249	163		V14
2819	FAP 249	163		V15
2820	FAP 249	163		V16
2821	FAP 249	163		V17
2822	FAP 249	163		V18
1592	FAP 255	173		D4
1593	FAP 255	173		D5
1594	FAP 255	173		D6
1595	FAP 255	173		D7
1596	FAP 255	173		D8

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
F	C	2	2
N	N	N	N
/	/	3	3
/	/	3	3
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
R	R	R	R
N	N	N	N
R	R	R	R
R	2	3	2
R	2	1	2
/	/	/	/
N	N	N	N
/	2	2	2
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
2	0	0	0
N	N	N	N
2	2	2	3
2	3	3	2
N	N	N	0

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
B	1	S	T	C
B	1	R,C	0	0
B	1	C	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R,I	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	C	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	3	C	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	1	R,S	0	0
B	1	R,S	0	0
A	1	R,S	0	0
A	1	S	0	0
0	0	0	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	0	0	1
1	0	0	1
0	0	0	1
/	/	/	1
/	/	/	1
/	/	/	1
/	3	3	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	3	2	1
/	2	2	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	/	/	1
/	/	/	1
/	3	3	1
/	/	/	1
0	N	N	1
0	2	2	1
0	3	1	1
0	N	N	1
0	0	0	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1597	FAP 255	173		D9
1598	FAP 255	173		D10
1599	FAP 255	173		D11
1600	FAP 255	173		D12
1601	FAP 255	173		D13
1602	FAP 255	173		D14
1603	FAP 255	173		D15
1604	FAP 255	173		D16
1605	FAP 255	173		D18
1606	FAP 255	173		V4
1607	FAP 255	173		V5
1608	FAP 255	173		V6
1609	FAP 255	173		V7
1610	FAP 255	173		V8
1611	FAP 255	173		V9
1612	FAP 255	173		V10
1613	FAP 255	173		V11
1614	FAP 255	173		V12
1615	FAP 255	173		V13
1616	FAP 255	173		V14
1617	FAP 255	173		V15
1618	FAP 255	173		V16
1619	FAP 255	173		V17
1620	FAP 255	173		V18
1621	FAP 255	173		D17
2841	FAP 258	165		D7
2842	FAP 258	165		D8
2843	FAP 258	165		D9
2844	FAP 258	165		D10
2845	FAP 258	165		D11
2846	FAP 258	165		D12
2847	FAP 258	165		D13
2848	FAP 258	165		D14
2849	FAP 258	165		D15
2850	FAP 258	165		D16
2851	FAP 258	165		D17
2852	FAP 258	165		D18
2853	FAP 258	165		V7
2854	FAP 258	165		V8
2855	FAP 258	165		V9
2856	FAP 258	165		V10
2857	FAP 258	165		V11
2858	FAP 258	165		V12
2859	FAP 258	165		V13
2860	FAP 258	165		V14

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	3	3
R	R	R	R
0	0	0	0
N	N	N	N
B,H	C	1	1
F,H	C	2	2
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
N	N	N	N
/	/	/	/
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
3	0	0	0
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	0	0	0
2	2	1	1
R	/	/	/
0	0	0	0
N	N	N	N
0	0	0	0
1	2	1	1
N	N	N	N
3	2	1	1
/	0	0	0
N	N	N	N
/	0	0	0
/	2	1	1
N	N	N	N
/	2	2	2
/	0	0	0
/	0	0	0
/	/	/	/
N	N	N	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
0	0	0	0	0
A	3	S	0	0
/	/	/	/	/
/	/	/	/	/
A	1	R	B	C
/	/	/	/	/
A	1	R,S	0	0
A	1	R,S	0	0
A	1	S	0	0
A	1	R,I	0	0
B	2	C,S	0	0
A	1	R,I	B	R,I
B	1	R,I	B	R,C
A	1	I,S	B	R,S
T	2	R,I	B	R,I
A	1	R,S	B	S
A	1	R,I	B	S
B	1	R	T	R,C
B	1	C	0	0
B	1	C	B	C
B	1	R,C	0	0
B	1	C	0	0
B	1	C	0	0
B	1	R,C	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,C	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	1	R,I	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	3	3	1
0	N	N	1
/	3	3	1
/	3	3	1
1	N	N	1
/	3	3	1
0	/	/	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
2	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1
/	3	3	1
/	N	N	1
/	3	3	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	3	3	1
/	N	N	1
/	N	N	1
/	2	3	1
/	N	N	1
/	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			S
			S
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			S
			S
			S
			S
			S
			S
			S
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2861	FAP 258	165		V15
2862	FAP 258	165		V16
2863	FAP 258	165		V17
2864	FAP 258	165		V18
1020	FAP 259	121		D10
1021	FAP 259	121		D11
1022	FAP 259	121		D12
1023	FAP 259	121		D13
1024	FAP 259	121		D14
1025	FAP 259	121		D15
1026	FAP 259	121		D16
1027	FAP 259	121		D17
1028	FAP 259	121		D18
1029	FAP 259	121		V10
1030	FAP 259	121		V11
1031	FAP 259	121		V12
1032	FAP 259	121		V13
1033	FAP 259	121		V14
1034	FAP 259	121		V15
1035	FAP 259	121		V16
1036	FAP 259	121		V17
1037	FAP 259	121		V18
3074	FAP 261	107		D10
3075	FAP 261	107		D11
3076	FAP 261	107		D12
3077	FAP 261	107		D13
3078	FAP 261	107		D14
3079	FAP 261	107		D15
3080	FAP 261	107		D16
3081	FAP 261	107		D17
3082	FAP 261	107		D18
3083	FAP 261	107		V10
3084	FAP 261	107		V12
3085	FAP 261	107		V12
3086	FAP 261	107		V13
3087	FAP 261	107		V14
3088	FAP 261	107		V15
3089	FAP 261	107		V16
3090	FAP 261	107		V17
3091	FAP 261	107		V18
1038	FAP 270	122		D10
1039	FAP 270	122		D11
1040	FAP 270	122		D12
1041	FAP 270	122		D13
1042	FAP 270	122		D14

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	/	/
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	/	/
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	2	1	2
N	1	1	2
R	/	/	/
R	1	1	2
N	N	N	N
R	3	1	2
R	1	1	2
N	N	N	N
R	1	1	2
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	1	C,S	/	/
A	1	C,S	/	/
A	1	C,S	/	/
A	1	S,I,C	/	/
B	1	R,S	/	/
A	1	I,S	/	/
B	1	R,S	/	/
A	1	C,S	/	/
A	1	C,S	/	/
B	2	R,C	/	/
B	2	R,C	/	/
B	1	R,C	/	/
B	1	R,S,C	/	/
B	1	R,S,C	/	/
B	1	R,S,C	/	/
B	1	R,S,C	/	/
B	1	R,S,C	/	/
B	1	R,S,C	/	/
A	1	R	/	/
A	1	R	/	/
T	3	R	/	/
A	3	R	T	R,I
A	1	R	/	/
A	1	R	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	3	R	/	/
A	3	R	/	/
A	2	R	T	C
T	2	C	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	3	R	/	/
A	3	R	/	/
A	3	R	/	/
A	2	R,I	B	C
A	2	R,I	B	C

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	0	0	0
/	0	0	0
/	0	0	0
/	0	0	0
/	2	1	0
/	0	0	0
/	0	0	0
/	0	0	0
/	0	0	0
/	N	N	0
/	N	N	0
/	N	N	0
/	N	N	0
/	N	N	0
/	N	N	0
/	N	N	0
/	N	N	0
/	N	N	0
/	/	/	1
/	1	1	1
/	1	1	1
1	/	/	1
/	/	/	1
/	3	2	1
/	1	2	1
/	1	2	1
/	1	2	1
/	/	/	1
/	2	2	1
/	/	/	1
2	/	/	1
/	/	/	1
/	2	2	1
/	/	/	1
/	4	2	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
1	/	/	1
1	/	/	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			S
			S
			B
			B
			B
			B
			B
			B
			B
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1043	FAP 270	122		D15
1044	FAP 270	122		D16
1045	FAP 270	122		D17
1046	FAP 270	122		D18
1047	FAP 270	122		V10
1048	FAP 270	122		V11
1049	FAP 270	122		V12
1050	FAP 270	122		V13
1051	FAP 270	122		V14
1052	FAP 270	122		V15
1053	FAP 270	122		V16
1054	FAP 270	122		V17
1055	FAP 270	122		V18
372	FAP 272	78		D4
373	FAP 272	78		D5
374	FAP 272	78		D6
375	FAP 272	78		D7
376	FAP 272	78		D8
377	FAP 272	78		D9
378	FAP 272	78		D10
379	FAP 272	78		D11
380	FAP 272	78		D12
381	FAP 272	78		D13
382	FAP 272	78		D14
383	FAP 272	78		D15
384	FAP 272	78		D16
385	FAP 272	78		D17
386	FAP 272	78		D18
387	FAP 272	78		V4
388	FAP 272	78		V5
389	FAP 272	78		V6
390	FAP 272	78		V7
391	FAP 272	78		V8
392	FAP 272	78		V9
393	FAP 272	78		V10
394	FAP 272	78		V11
395	FAP 272	78		V12
397	FAP 272	78		V14
398	FAP 272	78		V13
399	FAP 272	78		V15
400	FAP 272	78		V16
401	FAP 272	78		V17
402	FAP 272	78		V18
1002	FAP 279	120		D10
1003	FAP 279	120		D11

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	/	/
/	/	2	2
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
/	/	/	/
/	/	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
R	R	R	R
R	R	R	R
N	N	N	N
R	2	1	1
R	2	1	1
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	2	2	5
0	3	1	2
0	0	0	0
0	1	1	1
0	1	1	1
0	0	0	0
3	/	/	/
N	0	0	0
1	2	1	1
2	3	1	1
2	3	1	1
1	2	1	1
2	3	1	1
2	3	1	1
1	2	1	1
/	0	0	0
N	0	0	0
/	0	0	0
/	0	0	0
/	0	0	0
N	0	0	0
R	2	1	2
R	2	1	0
R	2	1	0
R	2	2	5
R	2	1	0
R	3	2	3
R	2	2	3
R	0	0	0
R	2	2	1
/	/	/	/
/	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
A	1	R	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R,C	B	C
B	3	R	A	R
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	1	R,I	/	/
A	2	R,I	/	/
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
B	2	R	A	R
B	2	R	A	R
0	0	0	0	0
T	1	R,C	B	I
0	0	0	0	0
T	2	R,I	0	0
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
B	3	R	0	0
A	2	R	T	I
0	0	0	0	0
B	1	R	0	0
0	0	0	0	0
B	1	R	A	I
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
B	1	I	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
A	2	R	T	I
A	1	R	0	0
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
1	/	/	1
2	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	2	1	1
/	/	/	1
0	2	2	1
0	0	0	1
1	0	0	1
1	0	0	1
0	3	0	1
1	4	0	1
0	0	0	1
0	0	0	
/	0	0	1
/	0	0	1
0	0	0	1
/	0	0	1
/	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
1	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
1	0	0	1
0	0	0	1
0	2	0	1
0	2	0	1
0	2	0	1
0	2	0	1
0	0	0	1
0	2	0	1
1	0	0	1
0	0	0	1
/	/	/	/
/	/	/	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B
			B
			B
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			B
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			B
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			B
			B
			B
			B
			A
			A
			A
			A
			A
			A
			A
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1004	FAP 279	120		D12
1005	FAP 279	120		D13
1006	FAP 279	120		D14
1007	FAP 279	120		D15
1008	FAP 279	120		D16
1009	FAP 279	120		D17
1010	FAP 279	120		D18
1011	FAP 279	120		V10
1012	FAP 279	120		V11
1013	FAP 279	120		V12
1014	FAP 279	120		V13
1015	FAP 279	120		V14
1016	FAP 279	120		V15
1017	FAP 279	120		V16
1018	FAP 279	120		V17
1019	FAP 279	120		V18
2889	FAP 283	167		D4
2890	FAP 283	167		D5
2891	FAP 283	167		D6
2892	FAP 283	167		D7
2893	FAP 283	167		D8
2894	FAP 283	167		D9
2895	FAP 283	167		D10
2896	FAP 283	167		D11
2897	FAP 283	167		D12
2898	FAP 283	167		D13
2899	FAP 283	167		D14
2900	FAP 283	167		D15
2901	FAP 283	167		D16
2902	FAP 283	167		D17
2903	FAP 283	167		D18
2904	FAP 283	167		V4
2905	FAP 283	167		V5
2906	FAP 283	167		V6
2907	FAP 283	167		V7
2908	FAP 283	167		V8
2909	FAP 283	167		V9
2910	FAP 283	167		V10
2911	FAP 283	167		V11
2912	FAP 283	167		V12
2913	FAP 283	167		V13
2914	FAP 283	167		V14
2915	FAP 283	167		V15
2916	FAP 283	167		V16
2917	FAP 283	167		V17

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
/	/	/	/
/	/	/	/
/	/	/	0
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	4	1	2
/	/	/	/
/	/	/	/
0	0	0	0
N	N	N	N
/	/	/	/
4	0	0	0
N	N	N	N
/	0	0	0
2	0	0	0
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
B	1	C	0	0
B	1	C,S	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	1	R	0	0
T	2	R	0	0
T	2	R	/	/
A	1	R	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	2	2	1
/	/	/	1
/	2	2	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	4	3	1
/	3	3	1
/	/	/	1
/	3	3	1
/	/	/	1
/	/	/	1
/	/	/	/
/	/	/	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
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			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2918	FAP 283	167		V18
2560	FAP 400	151		D10
2561	FAP 400	151		D11
2562	FAP 400	151		D12
2563	FAP 400	151		D13
2564	FAP 400	151		D14
2565	FAP 400	151		D15
2566	FAP 400	151		D16
2567	FAP 400	151		D17
2568	FAP 400	151		D18
2569	FAP 400	151		V10
2570	FAP 400	151		V11
2571	FAP 400	151		V12
2572	FAP 400	151		V13
2573	FAP 400	151		V14
2574	FAP 400	151		V15
2575	FAP 400	151		V16
2576	FAP 400	151		V17
2577	FAP 400	151		V18
2919	FAP 401	168		D4
2920	FAP 401	168		D5
2921	FAP 401	168		D6
2922	FAP 401	168		D7
2923	FAP 401	168		D8
2924	FAP 401	168		D9
2925	FAP 401	168		D10
2926	FAP 401	168		D11
2927	FAP 401	168		D12
2928	FAP 401	168		D13
2929	FAP 401	168		D14
2930	FAP 401	168		D15
2931	FAP 401	168		D16
2932	FAP 401	168		D17
2933	FAP 401	168		D18
2934	FAP 401	168		V4
2935	FAP 401	168		V5
2936	FAP 401	168		V6
2937	FAP 401	168		V7
2938	FAP 401	168		V8
2939	FAP 401	168		V9
2940	FAP 401	168		V10
2941	FAP 401	168		V11
2942	FAP 401	168		V12
2943	FAP 401	168		V13
2944	FAP 401	168		V14

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
H,S	D	2	3
N	N	N	N
/	/	/	/
/	/	3	3
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	/	/
0	N	N	N
/	/	3	3
/	/	2	2
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	3	1	1
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	2	1	3
2	0	0	0
N	N	N	N
/	/	/	/
3	/	/	/
N	N	N	N
3	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
2	0	0	0
2	0	0	0
N	N	N	N
3	0	0	0
/	0	0	0
N	N	N	N
/	0	0	0
/	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
T	1	I	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	R	0	0
T	1	R	B	R,C
A	1	R	B	C
T	1	R	0	0
T	1	R	0	0
T	2	R	0	0
/	/	/	/	/
B	1	R	B	R,C
/	/	/	/	/
A	3	R,I	B	R
B	1	R	0	0
0	0	0	0	0
A	3	R,I	0	0
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R,S	B	R
B	1	R	0	0
A	2	R,I	0	0
A	2	R	0	0
0	0	0	0	0
A	3	R,I	0	0
T	1	R	0	0
T	1	R,S	B	R,S
T	2	R,S	0	0
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	N	N	1
/	2	3	1
/	/	/	1
/	/	/	1
/	/	/	1
/	4	2	1
/	/	/	1
/	2	1	1
/	2	1	1
/	2	1	1
0	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
/	4	3	1
2	N	N	1
/	N	N	1
1	N	N	1
0	3	3	1
0	3	3	1
0	N	N	1
0	3	3	1
0	4	3	1
/	N	N	1
/	3	3	1
/	/	/	1
/	/	/	1
/	3	3	1
/	/	/	1
/	/	/	1
/	3	3	1
/	/	/	1
1	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
1	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			S
			S
			S
			S
			S
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2945	FAP 401	168		V15
2946	FAP 401	168		V16
2947	FAP 401	168		V17
2948	FAP 401	168		V18
1138	FAP 407	129		D4
1139	FAP 407	129		D5
1140	FAP 407	129		D6
1141	FAP 407	129		D7
1142	FAP 407	129		D8
1143	FAP 407	129		D9
1144	FAP 407	129		D10
1145	FAP 407	129		D11
1146	FAP 407	129		D12
1147	FAP 407	129		D13
1148	FAP 407	129		D14
1149	FAP 407	129		D15
1150	FAP 407	129		D16
1151	FAP 407	129		D17
1152	FAP 407	129		D18
1153	FAP 407	129		V4
1154	FAP 407	129		V5
1155	FAP 407	129		V6
1156	FAP 407	129		V7
1157	FAP 407	129		V8
1158	FAP 407	129		V9
1159	FAP 407	129		V10
1160	FAP 407	129		V11
1161	FAP 407	129		V12
1162	FAP 407	129		V13
1163	FAP 407	129		V14
1164	FAP 407	129		V15
1165	FAP 407	129		V16
1166	FAP 407	129		V17
1167	FAP 407	129		V181
984	FAP 416	119		D7
985	FAP 416	119		D8
986	FAP 416	119		D9
987	FAP 416	119		D10
988	FAP 416	119		D11
989	FAP 416	119		D12
990	FAP 416	119		D13
991	FAP 416	119		D14
992	FAP 416	119		D15
993	FAP 416	119		V7
994	FAP 416	119		V8

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	2	2
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
F,H	C	0	1
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
/	/	/	/
R	R	R	R
N	N	N	N
R	R	2	1
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	3	2
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	2	2
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	2	1	2
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
2	2	1	2
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
0	0	0	0
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	1	1	2
R	/	/	/
N	N	N	N
2	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
N	3	2	3
R	/	/	/
2	/	/	/
N	N	N	N
R	R	R	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
2	2	1	2
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	3	R,I	0	0
B	1	R,S	0	0
A	3	R,I	0	0
B	2	S	B	R,C
B	1	R,C	0	0
A	2	R	B	R,C
/	/	/	/	/
B	1	R,S	0	0
B	1	S	0	0
/	/	/	/	/
B	1	R,S	0	0
0	0	0	0	0
A	2	S	B	C
A	1	S	T	C
T	1	C	0	0
A	3	R,I	B	R
B	1	R,I,S	0	0
A	3	R,I	A	R,C
A	2	R,I	T	R,I
B	2	R,I,C	0	0
A	3	R,S	B	R
0	0	0	0	0
B	1	R,C,S	0	0
A	3	R,I	B	C
0	0	0	0	0
T	1	R,I,C	A	R
B	1	R,C	0	0
0	0	0	0	0
B	1	R,I	0	0
B	1	R,I	0	0
/	/	/	/	/
A	1	R,I	/	/
/	/	/	/	/
0	0	0	/	/
0	0	0	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
0	3	3	1
0	N	N	1
0	3	3	1
1	3	3	1
0	N	N	1
1	3	3	1
/	/	/	1
0	/	/	1
0	3	3	1
/	3	3	1
0	N	N	1
0	3	3	1
1	N	N	1
2	N	N	1
0	/	/	1
1	N	N	1
0	N	N	1
1	N	N	1
2	N	N	1
0	N	N	1
1	N	N	1
0	0	0	1
0	N	N	1
1	N	N	1
0	N	N	1
1	N	N	1
0	N	N	1
0	2	3	1
0	0	0	1
0	0	0	1
/	2	1	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	N	N	1
/	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
995	FAP 416	119		V9
996	FAP 416	119		V10
997	FAP 416	119		V11
998	FAP 416	119		V12
999	FAP 416	119		V13
1000	FAP 416	119		V14
1001	FAP 416	119		V15
1237	FAP 420	136		D4
1238	FAP 420	136		D5
1239	FAP 420	136		D6
1240	FAP 420	136		D7
1242	FAP 420	136		D8
1243	FAP 420	136		D9
1244	FAP 420	136		D10
1245	FAP 420	136		D11
1246	FAP 420	136		D12
1247	FAP 420	136		D13
1248	FAP 420	136		D14
1249	FAP 420	136		D15
1250	FAP 420	136		V4
1251	FAP 420	136		V5
1252	FAP 420	136		V6
1253	FAP 420	136		V7
1254	FAP 420	136		V8
1255	FAP 420	136		V9
1256	FAP 420	136		V10
1257	FAP 420	136		V11
1258	FAP 420	136		V12
1259	FAP 420	136		V13
1260	FAP 420	136		V14
1261	FAP 420	136		V15
1538	FAP 421	171		D7
1539	FAP 421	171		D8
1540	FAP 421	171		D9
1541	FAP 421	171		D10
1542	FAP 421	171		D11
1543	FAP 421	171		D12
1544	FAP 421	171		D13
1545	FAP 421	171		D14
1546	FAP 421	171		D15
1547	FAP 421	171		D15
1548	FAP 421	171		D16
1549	FAP 421	171		D17
1550	FAP 421	171		V7
1551	FAP 421	171		V8

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
/	/	1	1
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	3	3
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
N	N	N	N
/	/	3	3
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
1	0	0	0
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	3	1	2
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	2	1	1
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	/	/	/
N	N	N	N
3	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
3	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
0	0	0	/	/
0	0	0	/	/
B	1	R,C	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	2	S	/	/
/	/	/	/	/
/	/	/	/	/
A	1	S	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	2	R,B,I	B	R,S
B	2	R,I	T	C
A	1	R,S	B	R,S
/	/	/	/	/
B	1	S	0	0
B	1	S	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R	B	C
B	1	R,S	0	0
B	1	R,S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	R,S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,I	/	/
B	1	R,I	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	N	N	1
/	N	N	0
/	N	N	0
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	/
1	N	N	1
3	N	N	1
1	N	N	1
/	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
/	3	2	1
/	/	/	1
/	/	/	1
/	2	2	1
2	/	/	1
0	3	3	1
0	N	N	1
/	2	2	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
0	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	N	N	1
/	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			A
			A
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1552	FAP 421	171		V9
1553	FAP 421	171		V10
1554	FAP 421	171		V11
1555	FAP 421	171		V12
1556	FAP 421	171		V13
1557	FAP 421	171		V14
1558	FAP 421	171		V15
1559	FAP 421	171		V16
1560	FAP 421	171		V17
1561	FAP 421	171		V18
2782	FAP 424	162		D7
2783	FAP 424	162		D8
2784	FAP 424	162		D9
2785	FAP 424	162		D10
2786	FAP 424	162		D11
2787	FAP 424	162		D12
2788	FAP 424	162		D13
2789	FAP 424	162		D14
2790	FAP 424	162		D15
2791	FAP 424	162		D16
2792	FAP 424	162		D17
2793	FAP 424	162		D18
2794	FAP 424	162		V7
2795	FAP 424	162		V8
2796	FAP 424	162		V9
2797	FAP 424	162		V10
2798	FAP 424	162		V11
2799	FAP 424	162		V12
2800	FAP 424	162		V13
2801	FAP 424	162		V14
2802	FAP 424	162		V15
2803	FAP 424	162		V16
2804	FAP 424	162		V17
2805	FAP 424	162		V18
1364	FAP 427	140		D7
1365	FAP 427	140		D8
1366	FAP 427	140		D9
1367	FAP 427	140		D10
1368	FAP 427	140		D11
1369	FAP 427	140		D12
1370	FAP 427	140		D13
1371	FAP 427	140		D14
1372	FAP 427	140		D15
1373	FAP 427	140		D16
1374	FAP 427	140		D17

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
/	/	0	0
N	N	N	N
S,F	D	2	1
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
3	/	/	/
/	/	/	/
N	N	N	N
/	1	1	1
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
0	0	0	0
N	N	N	N
0	0	0	0
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
B	1	R,I	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	2	C,I	0	0
B	1	R	0	0
B	1	R	B	R,C
T	1	R	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
B	1	C	0	0
B	1	C,S	0	0
B	1	R	0	0
B	1	R,C	0	0
B	1	C	0	0
B	1	C,I	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	R,C	0	0
B	1	C	0	0
0	0	0	0	0
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
B	1	C,S	0	0
/	/	/	/	/
/	/	/	/	/
B	1	C	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
0	N	N	1
0	3	3	1
1	N	0	1
0	3	2	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
0	N	N	1
0	N	N	1
0	N	N	1
0	2	2	1
0	N	N	1
0	3	3	1
0	N	N	1
0	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
0	0	0	0
0	0	0	0
0	0	0	0
/	0	0	0
0	N	N	0
/	3	3	0
/	0	0	0
0	N	N	0
/	0	0	0
/	0	0	0
0	0	0	0

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			S
			S
			B
			S
			B
			B
			B
			B
			S
			S
			B
			B
			B
			B
			S
			B
			B
			B
			B
			S
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1375	FAP 427	140		D18
1376	FAP 427	140		V7
1377	FAP 427	140		V8
1378	FAP 427	140		V9
1379	FAP 427	140		V10
1380	FAP 427	140		V11
1381	FAP 427	140		V12
1382	FAP 427	140		V13
1383	FAP 427	140		V14
1384	FAP 427	140		V15
1385	FAP 427	140		V16
1386	FAP 427	140		V17
1387	FAP 427	140		V18
784	FAP 429	116		D4
785	FAP 429	116		D5
786	FAP 429	116		D6
787	FAP 429	116		D7
788	FAP 429	116		D8
789	FAP 429	116		D9
790	FAP 429	116		D10
791	FAP 429	116		D11
792	FAP 429	116		D12
793	FAP 429	116		V4
794	FAP 429	116		V5
795	FAP 429	116		V6
796	FAP 429	116		V7
797	FAP 429	116		V8
798	FAP 429	116		V9
799	FAP 429	116		V10
800	FAP 429	116		V11
801	FAP 429	116		V12
942	FAP 433	104		D7
943	FAP 433	104		D8
944	FAP 433	104		D9
945	FAP 433	104		D10
946	FAP 433	104		D11
947	FAP 433	104		D12
948	FAP 433	104		D13
949	FAP 433	104		D14
950	FAP 433	104		D15
951	FAP 433	104		D16
952	FAP 433	104		D17
953	FAP 433	104		D18
954	FAP 433	104		V7
955	FAP 433	104		V8

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
R	R	/	/
N	N	N	N
H,S	D	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
V	C	3	2
N	N	N	N
V	C	2	2
V	C	2	2
N	N	N	N
/	/	2	2
R	R	R	R
N	N	N	N
R	R	R	R
/	/	2	2
N	N	N	N
/	/	2	2
/	/	3	3
N	N	N	N
V	C	2	2
R	R	R	R
R	R	R	R
R	R	R	R
/	/	/	/
N	N	N	N
/	/	/	/
R	R	R	R
/	/	/	/
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
1	2	1	2
N	N	N	N
2	2	2	2
2	2	1	2
N	N	N	N
2	2	1	2
R	2	1	1
N	N	N	N
R	/	/	/
1	2	1	2
N	N	N	N
2	2	1	2
2	2	2	3
N	N	N	N
2	2	1	1
R	2	1	1
R	3	2	2
R	2	1	1
0	2	1	1
N	N	N	N
/	/	/	/
R	/	/	/
/	/	/	/
R	R	R	R
R	R	R	0
N	N	N	N
R	2	2	2
R	R	R	R
R	R	R	R
R	1	1	2
/	3	2	2
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
B	1	C	0	0
B	1	R	0	0
B	1	C	0	N
T	2	R,C	0	0
B	1	R,C	0	0
B	1	C	0	0
B	1	C	0	0
A	2	R	B	C
T	2	R,C	0	0
B	2	C	0	0
0	0	0	0	0
0	0	0	0	0
A	1	R,I	T	C
T	1	R,I	0	0
0	0	0	0	0
A	1	R,I	B	R,C
A	1	R	0	0
/	/	/	/	/
B	2	R	0	0
B	2	R	0	0
T	2	C	0	0
T	2	C	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	2	R	0	0
0	0	0	0	0
B	1	R,C,S	A	S
T	1	R,C	B	S
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
B	2	R,C	B	R,I
B	1	R,I	0	0
/	/	/	/	/
A	1	R,I	0	0
B	1	C,S	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	0	0	0
/	/	/	/
0	N	N	0
0	N	N	1
0	N	0	0
0	N	N	0
0	N	N	0
0	N	N	0
0	N	N	0
1	N	N	0
0	N	N	0
0	N	N	1
0	N	N	0
0	3	3	1
1	N	N	1
0	3	3	1
0	3	3	1
2	N	N	1
0	3	3	1
/	/	/	1
0	3	3	1
0	3	3	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	0	0	1
0	N	N	1
1	3	3	1
1	4	3	1
0	0	0	1
0	0	0	1
/	0	0	1
0	3	2	1
/	2	2	1
/	N	N	1
1	3	1	1
0	2	1	1
/	/	/	1
0	N	N	0
0	N	N	0

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			S
			S
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			A
			B
			B
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
956	FAP 433	104		V9
957	FAP 433	104		V10
958	FAP 433	104		V11
959	FAP 433	104		V12
960	FAP 433	104		V13
961	FAP 433	104		V14
962	FAP 433	104		V15
963	FAP 433	104		V16
964	FAP 433	104		V17
965	FAP 433	104		V18
2656	FAP 439	156		D4
2657	FAP 439	156		D5
2658	FAP 439	156		D6
2659	FAP 439	156		D7
2660	FAP 439	156		D8
2661	FAP 439	156		D9
2662	FAP 439	156		D10
2663	FAP 439	156		D11
2664	FAP 439	156		D12
2665	FAP 439	156		D13
2666	FAP 439	156		D14
2667	FAP 439	156		D15
2668	FAP 439	156		D16
2669	FAP 439	156		D17
2670	FAP 439	156		D18
2671	FAP 439	156		V4
2672	FAP 439	156		V5
2673	FAP 439	156		V6
2674	FAP 439	156		V7
2675	FAP 439	156		V8
2676	FAP 439	156		V9
2677	FAP 439	156		V10
2678	FAP 439	156		V11
2679	FAP 439	156		V12
2680	FAP 439	156		V13
2681	FAP 439	156		V14
2682	FAP 439	156		V15
2683	FAP 439	156		V16
2684	FAP 439	156		V17
2685	FAP 439	156		V18
2686	FAP 440	157		D10
2687	FAP 440	157		D11
2688	FAP 440	157		D12
2689	FAP 440	157		D13
2690	FAP 440	157		D14

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
/	/	/	/
R	R	/	/
N	N	N	N
R	R	R	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
/	/	4	3
N	N	N	N
/	/	4	3
/	/	4	2
N	N	N	N
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
/	/	3	3
N	N	N	N
/	/	3	3
/	/	3	3
N	N	N	N
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	0	0	0
/	0	0	0
N	N	N	N
/	3	2	2
R	3	2	2
N	N	N	N
0	0	0	0
R	/	/	/
R	2	3	4
R	2	3	4
4	2	2	2
N	N	N	N
4	3	2	2
4	3	2	2
N	N	N	N
4	3	1	2
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	2	1	2
/	/	/	/
3	3	1	3
N	N	N	N
3	0	0	0
4	0	0	0
N	N	N	N
4	2	2	3
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	2	2	2
/	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
0	0	0	0	0
0	0	0	0	0
T	3	R	0	0
0	0	0	0	0
/	/	/	/	/
B	1	R,C	0	0
B	1	R,C	0	0
/	/	/	/	/
T	1	R	A	R,I
0	0	0	0	0
A	1	R	0	0
T	1	R,I	B	C
B	1	R,I	0	0
A	1	R	0	0
T	2	R,I	B	C
T	3	R	B	R,C
B	1	R,C	0	0
A	2	R	B	C,I
/	/	/	/	/
/	/	/	/	/
A	2	R	T	R
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,S	0	0
T	1	R,C	A	R
B	1	R	A	R,C
B	1	R,C	0	0
B	2	R,C	A	R
B	1	R,C	0	0
T	2	R,C	B	R,S
B	2	R,C	B	R
B	1	R,C	0	0
/	/	/	/	/
A	1	R	/	/
B	1	R	/	/
0	0	0	0	0
/	/	/	/	/
A	1	R	B	R
/	/	/	/	/
A	2	R,I	B	C
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	0	N	0
0	3	2	1
0	N	N	1
0	N	N	1
/	3	2	1
0	/	/	1
0	N	N	1
/	4	2	1
1	N	N	1
0	N	N	1
0	3	3	1
1	N	N	1
0	3	3	1
0	3	3	1
1	N	N	1
1	4	3	1
0	4	3	1
1	4	3	1
/	3	3	1
/	3	3	1
1	3	3	1
/	3	3	1
/	3	3	1
/	4	3	1
/	3	3	1
0	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
1	N	N	1
0	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
/	/	/	1
/	0	0	1
/	N	N	1
0	N	N	1
/	N	N	1
1	3	3	1
/	/	/	1
1	/	/	1
/	/	/	1
/	2	3	1
/	3	3	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			S
			S
			S
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2691	FAP 440	157		D15
2692	FAP 440	157		D16
2693	FAP 440	157		D17
2694	FAP 440	157		D18
2695	FAP 440	157		V10
2696	FAP 440	157		V11
2697	FAP 440	157		V12
2698	FAP 440	157		V13
2699	FAP 440	157		V14
2700	FAP 440	157		V15
2701	FAP 440	157		V16
2702	FAP 440	157		V17
2703	FAP 440	157		V18
1358	FAP 442	139		D1
1359	FAP 442	139		D2
1360	FAP 442	139		D3
1361	FAP 442	139		V1
1362	FAP 442	139		V2
1363	FAP 442	139		V3
1514	FAP 446	148		D7
1515	FAP 446	148		D8
1516	FAP 446	148		D9
1517	FAP 446	148		D10
1518	FAP 446	148		D11
1519	FAP 446	148		D12
1520	FAP 446	148		D13
1521	FAP 446	148		D14
1522	FAP 446	148		D15
1523	FAP 446	148		D16
1524	FAP 446	148		D17
1525	FAP 446	148		D18
1526	FAP 446	148		V7
1527	FAP 446	148		V8
1528	FAP 446	148		V9
1529	FAP 446	148		V10
1530	FAP 446	148		V11
1531	FAP 446	148		V12
1532	FAP 446	148		V13
1533	FAP 446	148		V14
1534	FAP 446	148		V15
1535	FAP 446	148		V16
1536	FAP 446	148		V17
1537	FAP 446	148		V18
2740	FAP 452	160		D7
2741	FAP 452	160		D8

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
/	/	/	/
/	/	3	3
/	/	3	3
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
2	3	2	4
/	/	/	/
2	3	1	3
3	2	1	2
N	N	N	N
3	2	1	2
/	/	/	/
N	N	N	N
/	/	/	/
/	1	3	3
N	N	N	N
/	/	/	/
/	/	/	/
N	0	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	1	3	3
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	3	1	1
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
B	1	R,I	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	I	B	C
A	2	R,S	T	R,C
/	/	/	/	/
/	/	/	/	/
B	1	R	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
A	2	R	0	0
0	0	0	0	0
B	1	R,S	0	0
B	1	R,S	0	0
A	0	S	B	R
A	1	S	B	R,C
B	1	C,S	0	0
A	1	S	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	C,I	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	1	R,S	0	0
A	1	R,S	B	I,S,C
A	1	R,S	0	0
T	1	R,S	B	S
B	1	R,S	B	S
T	1	I,S	B	S
/	/	/	/	/
B	1	R,I	0	0
/	/	/	/	/
/	/	/	/	/
A	2	R,I	B	I
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	/	/	1
/	/	/	1
/	3	3	1
/	/	/	1
1	N	N	1
1	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	3	3	1
/	3	3	1
/	/	/	1
0	N	N	1
/	/	/	/
0	3	3	1
0	N	N	1
0	N	N	1
0	N	N	1
1	N	N	1
1	0	0	1
0	0	0	1
0	2	3	1
0	N	N	1
/	0	0	1
/	0	0	1
/	0	0	1
0	0	0	1
/	/	/	1
/	/	/	1
/	/	/	1
0	N	N	0
1	N	N	0
0	N	N	0
1	N	N	1
1	N	N	1
1	N	N	1
/	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
1	N	N	1
/	N	N	1
0	N	N	1
0	3	3	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			S
			/
			S
			S
			S
			S
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2742	FAP 452	160		D9
2743	FAP 452	160		D10
2744	FAP 452	160		D11
2745	FAP 452	160		D12
2746	FAP 452	160		D13
2747	FAP 452	160		D14
2748	FAP 452	160		D15
2749	FAP 452	160		D16
2750	FAP 452	160		D17
2751	FAP 452	160		D18
2752	FAP 452	160		V7
2753	FAP 452	160		V8
2754	FAP 452	160		V9
2755	FAP 452	160		V10
2756	FAP 452	160		V11
2757	FAP 452	160		V12
2758	FAP 452	160		V13
2759	FAP 452	160		V15
2760	FAP 452	160		V16
2761	FAP 452	160		V17
2762	FAP 452	160		V18
2763	FAP 464	161		D10
2764	FAP 464	161		D11
2765	FAP 464	161		D12
2766	FAP 464	161		D13
2767	FAP 464	161		D14
2768	FAP 464	161		D15
2769	FAP 464	161		D16
2770	FAP 464	161		D17
2771	FAP 464	161		D18
2772	FAP 464	161		V10
2773	FAP 464	161		V11
2774	FAP 464	161		V12
2775	FAP 464	161		V13
2776	FAP 464	161		V14
2777	FAP 464	161		V15
2778	FAP 464	161		V16
2779	FAP 464	161		V16
2780	FAP 464	161		V17
2781	FAP 464	161		V18
2704	FAP 481	158		D10
2705	FAP 481	158		D11
2706	FAP 481	158		D12
2707	FAP 481	158		D13
2708	FAP 481	158		D14

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
F	D	4	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
B	D	3	3
N	N	N	N
B	D	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	4	3
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
4	2	1	2
/	2	1	3
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
2	2	1	2
N	N	N	N
2	0	0	0
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	2	2	2
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
T	1	R,I	0	0
/	/	/	/	/
T	1	R	0	0
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
T	1	S	0	0
0	0	0	0	0
T	1	R,S	0	0
0	0	0	0	0
B	1	C	0	0
/	/	/	/	/
0	0	0	0	0
B	1	R,I	0	0
T	2	R,C	B	R,I
T	1	R	0	0
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	2	R	A	R
/	/	/	/	/
/	/	/	/	/
T	1	R	0	0
/	/	/	/	/
/	/	/	/	/
A	1	R	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	N	N	1
/	N	N	1
0	3	3	1
/	N	N	1
/	N	N	1
0	3	3	1
/	N	N	1
/	N	N	1
/	3	3	1
/	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1
0	N	N	1
0	3	3	1
1	N	N	1
0	3	2	1
0	2	3	1
0	2	3	1
/	/	/	1
/	2	3	1
/	/	/	1
/	/	/	1
/	/	/	1
/	3	3	1
/	/	/	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
2	N	N	1
/	N	N	1
/	N	N	1
0	N	N	1
/	N	N	1
/	2	2	1
/	2	2	1
/	0	0	1
/	/	/	1
/	3	3	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
	/		B
			B
			B
			B
			B
			S
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2709	FAP 481	158		D15
2710	FAP 481	158		D16
2711	FAP 481	158		D17
2712	FAP 481	158		D18
2713	FAP 481	158		V10
2714	FAP 481	158		V11
2715	FAP 481	158		V12
2716	FAP 481	158		V13
2717	FAP 481	158		V14
2718	FAP 481	158		V15
2719	FAP 481	158		V16
2720	FAP 481	158		V17
2721	FAP 481	158		V18
1061	FAP 514	124		NIL DOES NOT FIT
2973	FAP 528	170		D10
2974	FAP 528	170		D11
2975	FAP 528	170		D12
2976	FAP 528	170		D13
2977	FAP 528	170		D14
2978	FAP 528	170		D15
2979	FAP 528	170		D16
2980	FAP 528	170		D17
2981	FAP 528	170		D18
2982	FAP 528	170		V10
2983	FAP 528	170		V11
2984	FAP 528	170		V12
2985	FAP 528	170		V13
2986	FAP 528	170		V14
2987	FAP 528	170		V15
2988	FAP 528	170		V16
2989	FAP 528	170		V17
2990	FAP 528	170		V18
1216	FAP 537	134		D10
3042	FAP 537	134		D11
3043	FAP 537	134		D12
3044	FAP 537	134		D13
3045	FAP 537	134		D14
3046	FAP 537	134		D15
3047	FAP 537	134		D16
3048	FAP 537	134		D17
3049	FAP 537	134		D18
3050	FAP 537	134		V10
3051	FAP 537	134		V11
3052	FAP 537	134		V12
3053	FAP 537	134		V13

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
0	0	0	0
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
0	0	0	0
/	2	1	1
N	N	N	N
/	1	2	2
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	1	R	B	R
A	1	R	T	R
A	1	R	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R,I	/	/
A	2	R,I	/	/
A	2	R,I	/	/
A	3	R,I	B	R
T	1	R	B	C
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
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/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
0	0	0	
/	0	0	1
/	/	/	/
/	0	0	1
1	N	N	1
1	N	N	1
/	3	1	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
1	N	N	1
2	N	N	1
/	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	/
/	/	/	1
/	/	/	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			A
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			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
3054	FAP 537	134		V14
3055	FAP 537	134		V15
3056	FAP 537	134		V16
3057	FAP 537	134		V17
3058	FAP 537	134		V18
1099	FAP 542	127		D4
1100	FAP 542	127		D5
1101	FAP 542	127		D6
1103	FAP 542	127		D7
1104	FAP 542	127		D8
1105	FAP 542	127		D9
1106	FAP 542	127		D10
1107	FAP 542	127		D11
1108	FAP 542	127		D12
1110	FAP 542	127		D13
1111	FAP 542	127		D14
1112	FAP 542	127		D15
1113	FAP 542	127		D16
1114	FAP 542	127		D17
1115	FAP 542	127		D18
1116	FAP 542	127		V4
1117	FAP 542	127		V5
1118	FAP 542	127		V6
1119	FAP 542	127		V7
1120	FAP 542	127		V8
1121	FAP 542	127		V9
1122	FAP 542	127		V10
1123	FAP 542	127		V11
1124	FAP 542	127		V12
1125	FAP 542	127		V13
1126	FAP 542	127		V14
1127	FAP 542	127		V15
1128	FAP 542	127		V16
1129	FAP 542	127		V17
1130	FAP 542	127		V18
2578	FAP 543	152		D10
2579	FAP 543	152		D11
2580	FAP 543	152		D12
2581	FAP 543	152		D13
2582	FAP 543	152		D15
2583	FAP 543	152		D14
2584	FAP 543	152		D16
2585	FAP 543	152		D17
2586	FAP 543	152		D18
2587	FAP 543	152		V10

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	3	4
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	/	/
N	N	N	N
C	C	C	C
R	R	R	R
N	N	N	N
/	/	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
4	2	1	2
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	/	/
N	N	N	N
C	C	C	C
R	R	R	R
N	N	N	N
/	/	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	R,S	0	0
T	1	R,S	B	C
B	1	R,S	0	0
T	1	R,S	B	C
T	1	S	T	C
A	2	S	T	R,S
T	2	R,S	T	C
T	2	R,S	T	C
T	2	R,S	T	C
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	C	0	0
/	/	/	/	/
A	1	R,S,C	0	0
B	1	C,S	0	0
/	/	/	/	/
T	1	R,S	A	C
A	2	R,I	0	0
T	1	R,S	0	0
/	/	/	/	/
B	1	R	0	0
/	/	/	/	/
/	/	/	/	/
B	1	R,S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	C	/	/
T	1	R,C	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
0	N	N	1
1	N	N	1
0	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
0	N	N	1
/	N	N	1
0	N	N	1
0	3	3	1
/	3	3	1
1	3	3	0
0	N	N	0
0	2	3	1
/	N	N	1
0	/	/	0
/	0	0	0
/	/	/	0
0	/	/	0
/	0	/	0
/	/	/	0
/	/	/	0
/	/	/	0
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	2	1	1
/	/	/	1
/	/	/	1
/	2	1	1
/	/	/	1
/	/	/	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			A
			B
			B
			B
			S
			S
			S
			B
			B
			B
			B
			B
			B
			B
			B
			A
			S
			B
			S
			B
			B
			B
			B
			B
			B
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2588	FAP 543	152		V11
2589	FAP 543	152		V12
2590	FAP 543	152		V13
2591	FAP 543	152		V14
2592	FAP 543	152		V15
2593	FAP 543	152		V16
2594	FAP 543	152		V17
2595	FAP 543	152		V18
2638	FAP 550	155		D10
2639	FAP 550	155		D11
2640	FAP 550	155		D12
2641	FAP 550	155		D13
2642	FAP 550	155		D15
2643	FAP 550	155		D14
2644	FAP 550	155		D16
2645	FAP 550	155		D17
2646	FAP 550	155		D18
2647	FAP 550	155		V10
2648	FAP 550	155		V11
2649	FAP 550	155		V12
2650	FAP 550	155		V13
2651	FAP 550	155		V14
2652	FAP 550	155		V15
2653	FAP 550	155		V16
2654	FAP 550	155		V17
2655	FAP 550	155		V18
1081	FAP 560	126		D10
1082	FAP 560	126		D11
1083	FAP 560	126		D12
1084	FAP 560	126		D13
1085	FAP 560	126		D14
1086	FAP 560	126		D15
1087	FAP 560	126		D16
1088	FAP 560	126		D17
1089	FAP 560	126		D18
1090	FAP 560	126		V10
1091	FAP 560	126		V11
1092	FAP 560	126		V12
1093	FAP 560	126		V13
1094	FAP 560	126		V14
1095	FAP 560	126		V15
1096	FAP 560	126		V16
1097	FAP 560	126		V17
1098	FAP 560	126		V18
760	FAP 562	117		D7

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	2	3

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	2	1	2
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	2	2	3
N	N	N	N
/	/	/	/
R	/	/	/
N	N	N	/
R	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
R	2	1	1
N	N	N	N
R	2	1	1
R	/	/	/
N	N	N	N
R	2	1	1
R	/	/	/
N	N	N	N
R	R	R	/
2	2	1	1

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	2	R	/	/
/	/	/	/	/
T	2	R	/	/
/	/	/	/	/
T	2	R	/	/
B	1	R	T	R
A	1	R,I	/	/
/	/	/	/	/
0	0	0	0	0
T	1	I	0	0
T	1	I	T	C
T	1	R	B	C
A	2	R	T	C
T	2	R,I	B	R
B	1	R	0	0
/	/	/	/	/
T	2	R,I	/	/
T	1	R,I	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
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/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
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/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	3	2	1
/	/	/	1
/	3	3	1
/	/	/	1
/	/	/	1
/	3	3	1
/	3	3	1
/	3	3	1
/	3	3	1
/	3	3	1
3	0	0	1
/	3	3	1
/	/	/	1
0	N	N	1
0	N	N	1
1	N	N	1
2	N	N	1
2	N	N	1
1	N	N	1
0	N	N	1
/	3	3	1
/	3	1	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	3	2	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
0	3	3	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
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			B
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			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
761	FAP 562	117		D8
762	FAP 562	117		D9
763	FAP 562	117		D10
764	FAP 562	117		D11
765	FAP 562	117		D12
766	FAP 562	117		D13
767	FAP 562	117		D14
768	FAP 562	117		D15
769	FAP 562	117		D16
770	FAP 562	117		D17
771	FAP 562	117		D18
772	FAP 562	117		V7
773	FAP 562	117		V8
774	FAP 562	117		V9
775	FAP 562	117		V10
776	FAP 562	117		V11
777	FAP 562	117		V12
778	FAP 562	117		V13
779	FAP 562	117		V14
780	FAP 562	117		V15
781	FAP 562	117		V16
782	FAP 562	117		V17
783	FAP 562	117		V18
2519	FAP 563	149		D13
2520	FAP 563	149		D14
2521	FAP 563	149		D15
2522	FAP 563	149		D16
2523	FAP 563	149		D17
2524	FAP 563	149		D18
2525	FAP 563	149		V13
2526	FAP 563	149		V14
2527	FAP 563	149		V15
2528	FAP 563	149		V16
2529	FAP 563	149		V17
1622	FAP 564	174		D10
1623	FAP 564	174		D11
1624	FAP 564	174		D12
1625	FAP 564	174		D13
1626	FAP 564	174		D14
1627	FAP 564	174		D15
1628	FAP 564	174		D16
1629	FAP 564	174		D17
1630	FAP 564	174		D18
1631	FAP 564	174		V10
1632	FAP 564	174		V11

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
N	N	N	N
B	D	2	2
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
V	C	2	2
N	N	N	N
V	C	2	2
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	1	1
N	N	N	N
R	R	1	1
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
N	N	N	N
1	2	1	1
/	1	3	3
N	N	N	N
/	1	3	3
/	1	3	3
N	N	N	0
/	1	2	2
/	1	2	2
N	N	N	N
/	1	2	2
2	0	0	0
N	N	N	N
2	2	2	2
R	1	1	1
N	N	N	N
R	0	0	0
R	0	0	0
N	N	N	N
R	2	2	2
1	2	1	1
N	N	N	N
1	2	1	1
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
B	1	R,I	0	0
0	0	0	0	0
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
B	1	R,S	0	0
T	2	R,I	B	C
T	2	R,I	0	0
0	0	0	0	0
T	1	I	0	0
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	1	S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	N	N	1
0	3	3	1
/	3	2	1
0	0	0	1
/	3	2	1
/	3	2	1
0	0	0	1
/	2	2	1
/	2	2	1
0	2	2	1
/	2	2	1
0	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
/	0	0	1
/	3	3	1
/	0	0	1
/	/	/	1
/	/	/	1
/	/	/	1
/	0	0	1
0	0	0	1
/	0	0	1
/	0	0	1
/	/	/	1
/	N	N	1
/	/	/	1
/	N	N	1
/	N	N	1
/	3	3	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			A
			B
			B
			A
			B
			B
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1633	FAP 564	174		V12
1634	FAP 564	174		V13
1635	FAP 564	174		V14
1636	FAP 564	174		V15
1637	FAP 564	174		V16
1638	FAP 564	174		V17
1639	FAP 564	174		V18
1056	FAP 573	123		D7
1057	FAP 573	123		D8
1058	FAP 573	123		D9
1059	FAP 573	123		V7
1060	FAP 573	123		V9
1131	FAP 573	123		V8
883	FAP 610	105		D7
884	FAP 610	105		D8
885	FAP 610	105		V7
886	FAP 610	105		V8
887	FAP 610	105		V9
2530	FAP 705	150		D4
2531	FAP 705	150		D5
2532	FAP 705	150		D6
2533	FAP 705	150		D7
2534	FAP 705	150		D8
2535	FAP 705	150		D9
2536	FAP 705	150		D10
2537	FAP 705	150		D11
2538	FAP 705	150		D12
2539	FAP 705	150		D13
2540	FAP 705	150		D14
2541	FAP 705	150		D15
2542	FAP 705	150		D16
2543	FAP 705	150		D17
2544	FAP 705	150		D18
2545	FAP 705	150		V4
2546	FAP 705	150		V5
2547	FAP 705	150		V6
2548	FAP 705	150		V7
2549	FAP 705	150		V8
2550	FAP 705	150		V9
2551	FAP 705	150		V10
2552	FAP 705	150		V11
2553	FAP 705	150		V12
2554	FAP 705	150		V13
2555	FAP 705	150		V14
2556	FAP 705	150		V15

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
R	R	/	/
N	N	N	N
M	M	M	M
R	R	/	/
N	N	N	N
R	R	/	/
B	D	3	3
N	N	N	N
B	C	2	2
/	/	2	3
B,F	D	2	2
N	N	N	N
V	D	2	1
N	N	N	N
B	D	2	3
N	N	N	N
V	D	2	1
/	/	2	2
N	N	N	N
/	/	3	2
/	/	2	1
N	N	N	N
/	/	1	1
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	2	2
N	N	N	N
/	/	/	/
/	/	3	2
N	N	N	N
/	/	2	2
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
/	/	/	/
/	/	/	/
N	N	N	N
M	M	M	M
/	/	/	/
N	N	N	N
/	/	/	/
3	2	1	1
N	N	N	N
2	2	1	1
2	0	0	0
1	0	0	0
N	N	N	N
0	2	1	1
N	N	N	N
1	2	1	3
N	N	N	N
1	2	1	1
3	3	1	2
N	N	N	N
3	2	1	2
2	/	/	/
N	N	N	N
1	0	0	0
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	2	1	3
N	N	N	N
/	/	/	/
2	2	1	2
N	N	N	N
2	2	1	2
/	3	1	2
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
M	M	M	M	M
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	1	R,I	A	C
0	0	0	0	0
B	1	I,S	B	C
0	0	0	0	0
0	0	0	0	0
B	1	R,S	B	C
B	1	S	B	C
T	2	R	A	R
B	1	R	0	0
B	1	R,S	A	R
0	0	0	0	0
A	1	R,S	0	0
B	1	C	0	0
0	0	0	0	0
A	1	C	0	0
/	/	/	/	/
B	3	R,S	B	R,C
A	1	R	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R,S	B	R,C
T	2	R,C	B	R,C
A	1	R	T	C
B	3	R,I	0	0
B	1	R,I,C	B	C
A	2	R	T	C
B	1	R,I,S	0	0
B	1	S	B	C,I
T	1	C,S	B	R
T	1	C,S	B	C
T	1	C,S	B	C
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	N	N	1
/	N	N	1
/	N	N	1
M	M	M	0
/	N	N	1
/	/	/	1
/	/	/	1
0	N	N	1
0	1	3	1
0	1	3	1
1	N	N	1
0	N	N	1
1	N	N	1
0	N	N	1
0	2	3	1
1	N	N	1
1	N	N	1
1	N	N	1
0	3	3	1
1	2	2	1
0	2	2	1
0	3	3	1
0	N	N	1
0	3	3	1
0	N	N	1
/	2	3	1
1	3	2	1
/	2	2	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
1	N	N	1
1	N	N	1
2	N	N	1
0	N	N	1
1	N	N	1
2	N	N	1
0	3	2	1
1	N	N	1
1	N	N	1
2	N	N	1
2	N	N	1
/	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			S
			A
			A
			A
			A
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2557	FAP 705	150		V16
2558	FAP 705	150		V17
2559	FAP 705	150		V18
1132	FAP 732	128		D1
1133	FAP 732	128		D2
1134	FAP 732	128		D3
1135	FAP 732	128		V1
1136	FAP 732	128		V2
1137	FAP 732	128		V3
1262	FAP 743	135		D4
1263	FAP 743	135		D5
1264	FAP 743	135		D6
1265	FAP 743	135		D7
1266	FAP 743	135		D8
1267	FAP 743	135		D9
1268	FAP 743	135		D10
1269	FAP 743	135		D11
1270	FAP 743	135		D12
1271	FAP 743	135		D13
1272	FAP 743	135		D14
1273	FAP 743	135		D15
1274	FAP 743	135		D16
1275	FAP 743	135		D17
1276	FAP 743	135		D18
1277	FAP 743	135		V4
1278	FAP 743	135		V5
1279	FAP 743	135		V6
1280	FAP 743	135		V7
1281	FAP 743	135		V8
1282	FAP 743	135		V9
1283	FAP 743	135		V10
1284	FAP 743	135		V11
1285	FAP 743	135		V12
1286	FAP 743	135		V13
1287	FAP 743	135		V14
1288	FAP 743	135		V15
1289	FAP 743	135		V16
1290	FAP 743	135		V17
1291	FAP 743	135		V18
888	FAP 746	109		D4
889	FAP 746	109		D5
890	FAP 746	109		D6
891	FAP 746	109		D6
892	FAP 746	109		V4
893	FAP 746	109		V5

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
N	N	N	N
R	R	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
/	/	3	3
N	N	N	N
/	/	/	/
/	/	3	3
N	N	N	N
/	/	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	D	3	3
N	N	N	N
/	/	/	/
/	/	/	/
R	R	1	1
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
N	N	N	N
/	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
R	/	/	/
R	/	/	/
2	2	1	3
N	N	N	N
/	/	/	/
2	2	1	2
N	N	N	N
/	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
R	2	1	2
N	N	N	N
R	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
/	2	1	2
N	N	N	N
/	/	/	/
/	3	1	3
N	N	N	N
/	2	2	2
R	/	/	/
N	N	N	N
R	3	3	3
R	3	3	3
N	N	N	N
R	3	2	3
R	/	/	/
N	/	/	/
R	/	/	/
2	2	1	2
N	N	N	N
/	/	/	/
/	/	/	0
1	1	1	1
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
T	2	R,C	0	0
/	/	/	/	/
A	1	I,S	/	/
A	1	I,S	B	I,S
A	1	I,S	B	C,I
B	1	R,I,C	0	0
B	1	R,I	0	0
A	1	S	B	R,C
0	0	0	0	0
B	1	S	0	0
A	1	R,I	B	I,S
B	1	R,I	B	C
B	1	R,I	B	C
0	0	0	0	0
/	/	/	/	/
T	2	R	T	C
A	1	S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
B	1	R,S	B	R
B	1	R,I,S	0	0
T	2	R,S	A	S
B	2	R,I,S	B	S
B	1	R,S	B	R,C
B	2	R,C	B	C
B	1	S	0	0
T	2	R,I	B	R
B	1	R	T	R,I
B	1	R	T	R,I
A	1	S	B	C,S
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
T	2	R	B	R,C

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	N	N	1
0	N	N	1
/	N	N	1
/	2	3	1
1	N	N	1
1	2	3	1
0	N	N	1
0	N	N	
1	N	N	1
0	N	N	1
0	3	2	1
2	N	N	1
1	N	N	1
1	N	N	1
0	3	3	1
/	/	/	1
1	3	3	1
0	/	/	1
/	/	/	1
/	N	N	1
/	/	/	1
/	/	/	1
0	N	N	1
/	/	/	1
1	N	N	1
0	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
1	N	N	1
1	N	N	1
3	N	N	1
2	N	N	1
0	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	N	N	1
/	2	3	1
0	2	3	1
0	N	N	1
/	N	N	1
1	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			A
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
894	FAP 746	109		V6
855	FAP 756	112		D7
856	FAP 756	112		D8
857	FAP 756	112		D10
858	FAP 756	112		D11
859	FAP 756	112		D12
860	FAP 756	112		D13
861	FAP 756	112		D14
862	FAP 756	112		D15
863	FAP 756	112		D16
864	FAP 756	112		D17
865	FAP 756	112		D18
866	FAP 756	112		V8
867	FAP 756	112		V9
868	FAP 756	112		V10
869	FAP 756	112		V11
870	FAP 756	112		V12
871	FAP 756	112		V13
872	FAP 756	112		V14
873	FAP 756	112		V15
874	FAP 756	112		V16
875	FAP 756	112		V17
876	FAP 756	112		V18
1454	FAP 758	145		D7
1455	FAP 758	145		D8
1456	FAP 758	145		D9
1457	FAP 758	145		D10
1458	FAP 758	145		D11
1459	FAP 758	145		D12
1460	FAP 758	145		D13
1461	FAP 758	145		D14
1462	FAP 758	145		D15
1463	FAP 758	145		D16
1464	FAP 758	145		D17
1465	FAP 758	145		D18
1466	FAP 758	145		V7
1467	FAP 758	145		V8
1468	FAP 758	145		V9
1469	FAP 758	145		V10
1470	FAP 758	145		V11
1471	FAP 758	145		V12
1472	FAP 758	145		V13
1473	FAP 758	145		V14
1474	FAP 758	145		V15
1475	FAP 758	145		V16

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
R	R	2	2
B	D	2	3
N	N	N	N
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
N	N	N	N
B,F	D	0	1
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
3	2	1	1
2	2	1	2
N	N	N	N
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	1	1	1
R	1	1	1
N	N	N	N
1	0	0	0
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	3	2	2
R	2	1	1
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	0	0	0
/	/	/	/
N	N	N	/
/	/	/	/
/	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
T	1	R	B	R
0	0	0	0	0
B	1	R,C	A	I,S
A	2	R,S	B	C
A	1	S	B	I
T	1	R	0	0
B	1	S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	1	S	T	R
B	1	R	T	R
B	2	R	A	S
A	2	R	B	S
A	2	R,S	B	S
B	1	R,C	A	S
B	1	R,C	0	0
A	1	R,C	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	2	R,I	B	R
A	2	R,I	B	R,I
/	/	/	/	/
B	1	R	B	R,I,C
B	3	R,I	B	R
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R	A	C,I
/	/	/	/	/
B	1	R,C	T	R
A	1	R	T	R
B	2	R,I	0	0
B	1	R,S	A	R
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,I	B	R,C
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
1	N	N	1
0	3	3	1
1	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	0	0	1
1	N	N	1
1	0	0	1
/	2	2	1
2	2	3	1
1	0	0	1
/	3	3	1
/	3	3	1
/	3	3	1
/	3	3	1
/	3	3	1
2	/	/	1
/	/	/	1
2	N	N	1
1	/	/	1
0	/	/	1
1	N	N	1
/	/	/	1
/	/	/	1
/	0	0	1
1	/	/	1
/	2	2	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1476	FAP 758	145		V17
1477	FAP 758	145		V18
1168	FAP 759	130		D4
1169	FAP 759	130		D5
1170	FAP 759	130		D6
1171	FAP 759	130		D7
1172	FAP 759	130		D8
1173	FAP 759	130		D9
1174	FAP 759	130		D10
1175	FAP 759	130		D11
1176	FAP 759	130		D12
1177	FAP 759	130		D13
1178	FAP 759	130		D14
1179	FAP 759	130		D15
1180	FAP 759	130		D16
1181	FAP 759	130		D17
1182	FAP 759	130		D18
1183	FAP 759	130		V4
1184	FAP 759	130		V5
1185	FAP 759	130		V6
1186	FAP 759	130		V7
1187	FAP 759	130		V8
1188	FAP 759	130		V9
1189	FAP 759	130		V10
1190	FAP 759	130		V11
1191	FAP 759	130		V12
1192	FAP 759	130		V13
1193	FAP 759	130		V14
1194	FAP 759	130		V15
1195	FAP 759	130		V16
1196	FAP 759	130		V17
1197	FAP 759	130		V18
1496	FAP 779	147		D10
1497	FAP 779	147		D11
1498	FAP 779	147		D12
1499	FAP 779	147		D13
1500	FAP 779	147		D14
1501	FAP 779	147		D15
1502	FAP 779	147		D16
1503	FAP 779	147		D17
1504	FAP 779	147		D18
1505	FAP 779	147		V10
1506	FAP 779	147		V11
1507	FAP 779	147		V12
1508	FAP 779	147		V13

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
N	N	N	N
R	R	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	2	2
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	2	2
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	2	2
N	N	N	N
R	R	1	1
R	R	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
N	N	N	N
/	/	/	/
R	2	2	2
N	N	N	N
R	2	2	3
R	2	2	3
N	N	N	N
R	2	3	3
R	/	/	/
N	N	N	N
R	/	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
2	3	2	3
N	N	N	N
/	/	/	/
/	2	1	4
N	N	N	N
2	3	1	3
R	/	/	/
N	N	N	N
R	/	/	/
R	2	1	3
N	N	N	N
R	/	/	/
R	2	1	3
N	N	N	N
R	2	1	2
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
2	/	/	/
N	N	N	/
1	/	/	/
/	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
A	1	R,I	B	R,C
/	/	/	/	/
B	1	I	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
A	1	R,I	B	S
/	/	/	/	/
A	1	R	B	C
A	1	R,I	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R,S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,I	0	0
T	1	R,S	A	R,I
A	1	R	B	R,S
A	1	S	T	S
T	3	R	A	R
A	1	R	T	R
T	2	R,S	A	R
A	1	R	B	I,S
T	1	R,I	0	0
A	1	R	0	0
A	1	R	0	0
0	0	0	0	0
A	2	R,S	B	R
A	2	R	T	R,C
T	1	R	B	S
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
B	1	R	0	0
/	/	/	/	/
A	1	R,S	B	R
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
1	/	/	1
/	/	/	1
0	N	N	1
0	2	2	1
0	2	2	1
0	3	3	1
1	3	3	1
/	3	3	1
1	3	2	1
0	N	N	1
/	/	/	1
/	/	/	1
/	3	2	1
0	3	2	1
/	/	/	1
/	/	/	1
/	/	/	1
0	N	N	1
1	N	N	1
2	N	N	1
1	N	N	1
2	N	N	1
1	N	N	1
2	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
1	3	3	1
1	N	N	1
1	N	N	1
/	2	3	1
/	/	/	1
/	2	2	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
0	0	0	1
/	/	/	1
0	N	N	/
/	N	N	/
1	N	N	/
/	N	N	/

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			S
			S
			S
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1509	FAP 779	147		V14
1510	FAP 779	147		V15
1511	FAP 779	147		V16
1512	FAP 779	147		V17
1513	FAP 779	147		V18
1388	FAP 782	141		D8
1389	FAP 782	141		D9
1390	FAP 782	141		D10
1391	FAP 782	141		D11
1392	FAP 782	141		D12
1393	FAP 782	141		D13
1394	FAP 782	141		V8
1395	FAP 782	141		V9
1396	FAP 782	141		V10
1397	FAP 782	141		V11
1398	FAP 782	141		V12
1399	FAP 782	141		V13
895	FAP 783	110		D8
896	FAP 783	110		D9
897	FAP 783	110		D10
898	FAP 783	110		D11
899	FAP 783	110		D12
900	FAP 783	110		D13
901	FAP 783	110		D14
902	FAP 783	110		D15
903	FAP 783	110		D16
904	FAP 783	110		D17
905	FAP 783	110		D18
906	FAP 783	110		V7
907	FAP 783	110		V8
908	FAP 783	110		V9
909	FAP 783	110		V10
910	FAP 783	110		V11
911	FAP 783	110		V12
912	FAP 783	110		V13
913	FAP 783	110		V14
914	FAP 783	110		V15
915	FAP 783	110		V16
916	FAP 783	110		V17
917	FAP 783	110		V18
2722	FAP 788	159		D10
2723	FAP 788	159		D11
2724	FAP 788	159		D12
2725	FAP 788	159		D13
2726	FAP 788	159		D14

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	2	2
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	/	/
F	D	2	2
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
M	C	0	0
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	0	0
N	N	N	N
R	R	0	0
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
N	N	N	/
/	/	/	/
/	/	/	/
N	2	2	4
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
2	0	0	0
N	N	N	N
/	0	0	0
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	0
2	0	0	0
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	0
/	/	/	/
N	N	N	N
/	/	/	/
0	2	1	1
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
0	0	0	0
N	N	N	N
0	0	0	0
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	1	R,C	T	C
T	2	R,C	0	0
T	2	R,C	0	0
B	1	R,C	0	0
/	/	/	/	/
/	/	/	/	/
B	1	R,C	0	0
B	1	R,C	0	0
0	0	0	0	0
/	/	/	/	/
B	2	I	0	0
A	3	R	/	/
0	0	0	0	0
B	1	I,S	0	0
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
A	1	R,S	B	S
/	/	/	/	/
A	1	I	B	C,S
B	1	C,S	0	0
/	/	/	/	/
/	/	/	/	/
B	1	R,S	T	R
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
B	1	R,S	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	N	N	/
/	N	N	/
/	N	N	/
/	N	N	/
/	N	N	/
2	2	2	1
0	N	N	1
0	2	2	1
0	/	/	1
/	3	3	1
/	2	1	1
0	N	N	1
0	N	N	1
0	N	N	1
/	0	0	1
0	N	N	1
/	0	0	1
0	/	/	1
0	0	0	1
/	/	/	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
1	0	0	1
/	/	/	1
1	N	N	1
0	N	N	1
/	/	/	/
/	/	/	1
1	N	N	1
/	/	/	1
/	/	/	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			S
			B
			B
			B
			B
			B
			S
			B
			B
			B
			S
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
	/		/
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2727	FAP 788	159		D15
2728	FAP 788	159		D16
2729	FAP 788	159		D17
2730	FAP 788	159		D18
2731	FAP 788	159		V10
2732	FAP 788	159		V11
2733	FAP 788	159		V12
2734	FAP 788	159		V13
2735	FAP 788	159		V14
2736	FAP 788	159		V15
2737	FAP 788	159		V16
2738	FAP 788	159		V17
2739	FAP 788	159		V18
2823	FAP 789	164		D10
2824	FAP 789	164		D11
2825	FAP 789	164		D12
2826	FAP 789	164		D13
2827	FAP 789	164		D14
2828	FAP 789	164		D15
2829	FAP 789	164		D16
2830	FAP 789	164		D17
2831	FAP 789	164		D18
2832	FAP 789	164		V10
2833	FAP 789	164		V11
2834	FAP 789	164		V12
2835	FAP 789	164		V13
2836	FAP 789	164		V14
2837	FAP 789	164		V15
2838	FAP 789	164		V16
2839	FAP 789	164		V17
2840	FAP 789	164		V18
1217	FAP 829	137		D9
1218	FAP 829	137		D10
1219	FAP 829	137		D11
1220	FAP 829	137		D12
1221	FAP 829	137		D13
1222	FAP 829	137		D14
1223	FAP 829	137		D15
1224	FAP 829	137		D16
1225	FAP 829	137		D17
1226	FAP 829	137		D18
1227	FAP 829	137		V7
1228	FAP 829	137		V10
1229	FAP 829	137		V11
1230	FAP 829	137		V12

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	3	3
R	R	R	R
N	N	N	N
R	R	R	R

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	2	1	1
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	0	0	0
R	2	2	2
N	N	N	N
R	0	0	0
R	3	2	2
N	N	N	N
R	0	0	0
R	0	0	0
N	N	N	N
R	0	0	0
2	2	3	3
R	0	0	0
N	N	N	N
R	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	3	R,I	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R,I	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	3	R,I	/	/
/	/	/	/	/
A	2	R,I	B	C
A	2	R,I	A	C
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	/	/
A	2	R,I	B	C
/	/	/	/	/
T	1	C	/	/
A	2	R,I	T	C
B	2	I,S	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	2	R,C	B	R,S
B	1	R,I	0	0
0	0	0	0	0
0	0	0	0	0
T	1	R,S	A	R,I
0	0	0	0	0
B	1	R	T	C
A	1	R	0	0
T	1	R	0	0
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	N	N	1
/	3	2	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	2	1	1
/	0	0	1
/	/	/	1
1	/	/	1
1	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	N	N	1
1	N	N	1
/	N	N	1
/	N	N	1
3	N	N	1
/	N	N	1
/	N	N	1
/	3	1	1
/	N	N	1
0	2	3	1
0	0	0	1
0	0	0	1
0	2	3	1
1	0	0	1
0	0	0	1
0	2	3	1
0	0	0	1
1	0	0	1
0	2	3	1
1	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1231	FAP 829	137		V13
1232	FAP 829	137		V14
1233	FAP 829	137		V15
1234	FAP 829	137		V16
1235	FAP 829	137		V17
1236	FAP 829	137		V18
1562	FAP 831	172		D4
1563	FAP 831	172		D5
1564	FAP 831	172		D6
1565	FAP 831	172		D7
1566	FAP 831	172		D8
1567	FAP 831	172		D9
1568	FAP 831	172		D10
1569	FAP 831	172		D11
1570	FAP 831	172		D12
1571	FAP 831	172		D13
1572	FAP 831	172		D14
1573	FAP 831	172		D15
1574	FAP 831	172		D16
1575	FAP 831	172		D17
1576	FAP 831	172		D18
1577	FAP 831	172		V4
1578	FAP 831	172		V5
1579	FAP 831	172		V6
1580	FAP 831	172		V7
1581	FAP 831	172		V8
1582	FAP 831	172		V9
1583	FAP 831	172		V10
1584	FAP 831	172		V11
1585	FAP 831	172		V12
1586	FAP 831	172		V13
1587	FAP 831	172		V14
1588	FAP 831	172		V15
1589	FAP 831	172		V16
1590	FAP 831	172		V17
1591	FAP 831	172		V18
1292	FAP 834	133		D7
1293	FAP 834	133		D8
1294	FAP 834	133		D9
1295	FAP 834	133		D10
1296	FAP 834	133		D11
1297	FAP 834	133		D12
1298	FAP 834	133		D13
1299	FAP 834	133		D14
1300	FAP 834	133		D15

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	3	3
N	N	N	N
/	/	3	3
/	/	3	3
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	4	4
N	N	N	N
/	/	4	4
/	/	4	4
N	N	N	N
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
3	/	/	/
N	N	N	N
3	/	/	/
3	/	/	/
N	N	N	N
3	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
4	/	/	/
N	N	N	N
4	/	/	/
4	/	/	/
N	N	N	N
4	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	3	1	3
N	N	N	N
/	2	1	3
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
B	2	R,I	0	0
/	/	/	/	/
/	/	/	/	/
B	2	R,I	0	0
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
B	2	R,I,S	0	0
0	0	0	0	0
/	/	/	/	/
A	2	R,I	0	0
/	/	/	/	/
/	/	/	/	/
T	1	R,I	0	0
/	/	/	/	/
/	/	/	/	/
B	1	C	0	0
/	/	/	/	/
/	/	/	/	/
T	1	R,I,S	0	0
A	1	R,C	B	C
/	/	/	/	/
T	2	R,I,S	A	R
A	2	R,I	0	0
/	/	/	/	/
B	1	R,C	A	R,S
B	2	R,I,C	0	0
/	/	/	/	/
0	0	0	0	0
A	1	R,B	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,I,S	A	R
/	/	/	/	/
T	3	R,S	A	R
T	3	R,S	A	R
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
0	N	N	1
/	N	N	1
0	3	3	1
0	N	N	1
0	3	3	1
0	3	3	1
0	N	N	1
0	3	3	1
/	0	0	1
0	N	N	1
/	N	N	1
/	N	N	1
0	N	N	1
/	2	3	1
/	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
0	N	N	1
1	N	N	1
/	N	N	1
1	N	N	1
0	N	N	1
/	N	N	1
1	N	N	1
0	N	N	1
/	N	N	1
0	2	3	1
/	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
1	N	N	1
/	2	3	1
1	N	N	1
1	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			S
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1301	FAP 834	133		D16
1302	FAP 834	133		D17
1303	FAP 834	133		D18
1304	FAP 834	133		V7
1305	FAP 834	133		V8
1306	FAP 834	133		V9
1307	FAP 834	133		V10
1308	FAP 834	133		V11
1309	FAP 834	133		V12
1310	FAP 834	133		V13
1311	FAP 834	133		V14
1312	FAP 834	133		V15
1313	FAP 834	133		V16
1314	FAP 834	133		V17
1315	FAP 834	133		V18
2596	FAP 835	153		D10
2597	FAP 835	153		D11
2598	FAP 835	153		D12
2599	FAP 835	153		D13
2600	FAP 835	153		D14
2601	FAP 835	153		D15
2602	FAP 835	153		D16
2603	FAP 835	153		D17
2604	FAP 835	153		D18
2605	FAP 835	153		V10
2606	FAP 835	153		D11
2607	FAP 835	153		V12
2608	FAP 835	153		V13
2609	FAP 835	153		V14
2610	FAP 835	153		V16
2611	FAP 835	153		V17
2612	FAP 835	153		V18
2613	FAP 835	153		V15
1198	FAP 842	131		D10
1199	FAP 842	131		D11
1200	FAP 842	131		D12
1201	FAP 842	131		D13
1202	FAP 842	131		D14
1203	FAP 842	131		D15
1204	FAP 842	131		D16
1205	FAP 842	131		D17
1206	FAP 842	131		D18
1207	FAP 842	131		V10
1208	FAP 842	131		V11
1209	FAP 842	131		V12

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
M	M	M	M
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	R	R
N	N	N	N
R	2	2	1
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
R	/	/	/
M	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,C	B	I
B	2	R,I	B	I
B	3	R,I	A	R,I
B	1	R,I	B	C
B	1	R,C	B	C
/	/	/	/	/
A	1	R,I,S	B	R
A	1	R,S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R	B	C
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	3	R	B	C
A	2	R	B	C
/	/	/	/	/
A	2	R	B	C
A	3	R	B	C
/	/	/	/	/
A	2	R	/	/
/	/	/	/	/
A	2	R	B	C
A	2	R,I	B	S
A	2	R,I	0	0
T	1	R	B	C
A	1	R	0	0
A	2	S	A	C
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	R,I	A	I
T	1	R,I	A	I
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	/	/
/	/	/	/
/	/	/	/
1	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
/	N	N	1
1	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	/	/	1
/	3	2	1
/	2	2	1
/	/	/	1
/	4	2	1
1	2	2	1
/	/	/	1
/	/	/	1
/	/	/	1
2	/	/	1
2	/	/	1
/	/	/	1
3	/	/	1
2	/	/	1
/	N	N	1
/	N	N	1
/	/	/	1
2	N	N	1
1	2	2	1
0	/	/	1
1	2	2	1
0	1	2	1
1	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
1	2	3	1
1	2	2	1
/	/	/	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1210	FAP 842	131		V13
1211	FAP 842	131		V14
1212	FAP 842	131		V15
1213	FAP 842	131		V16
1214	FAP 842	131		V17
1215	FAP 842	131		V18
877	FAP 843	111		D1
878	FAP 843	112		D2
879	FAP 843	111		D3
880	FAP 843	111		V1
881	FAP 843	111		V2
882	FAP 843	111		V3
3059	FAP 843	111		D2
1346	FAP 848	138		D1
1347	FAP 848	138		D2
1348	FAP 848	138		D3
1349	FAP 848	138		D4
1350	FAP 848	138		D5
1351	FAP 848	138		D6
1352	FAP 848	138		V1
1353	FAP 848	138		V2
1354	FAP 848	138		V3
1355	FAP 848	138		V4
1356	FAP 848	138		V5
1357	FAP 848	138		V6
1062	FAP 863	125		D10
1063	FAP 863	125		D11
1064	FAP 863	125		D12
1065	FAP 863	125		D13
1066	FAP 863	125		D14
1067	FAP 863	125		D15
1068	FAP 863	125		D16
1069	FAP 863	125		D17
1070	FAP 863	125		D18
1071	FAP 863	125		V10
1072	FAP 863	125		V11
1073	FAP 863	125		V12
1074	FAP 863	125		V13
1075	FAP 863	125		V14
1076	FAP 863	125		V15
1077	FAP 863	125		V16
1078	FAP 863	125		V17
1079	FAP 863	125		V18
1316	FAP 864	132		D4
1317	FAP 864	132		D5

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	3	3
N	N	N	N
R	R	2	2
F	C	1	1
/	/	0	0
H	D	1	1
N	N	N	N
/	/	2	2
N	N	N	N
/	/	3	3
/	/	2	2
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	2	3
N	N	N	N
/	/	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
N	N	N	N
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
2	1	2	2
N	2	2	2
1	2	1	1
1	3	1	2
0	2	1	1
1	2	1	1
N	N	N	N
1	2	1	2
N	N	N	N
2	2	1	2
2	2	1	2
N	N	N	N
/	/	2	1
/	/	/	/
N	N	N	N
/	/	/	/
2	2	1	1
N	N	N	N
/	/	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	/	/	/
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
N	N	N	N
N	N	N	N
R	R	R	R
R	1	2	3
N	N	N	N
R	2	2	3
/	3	1	2
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
A	1	R	/	/
A	2	R,I,S	B	R,C
A	1	R,S	/	/
A	2	R,S	/	/
A	2	R,S	/	/
/	/	/	/	/
0	0	0	0	0
A	1	R,C	0	0
0	0	0	0	0
0	0	0	0	0
T	1	R,C	0	0
0	0	0	0	0
A	1	R,C	0	0
A	2	R,I	0	0
B	1	S	0	0
0	0	0	0	0
A	2	R,I	B	R
B	2	R,I	B	C
B	2	R,I	0	0
B	2	R,I,C	0	0
T	1	R,I,C	0	0
T	1	S	0	0
T	2	R	B	R,C
T	1	R,C	0	0
B	2	R	0	0
A	1	C	/	/
T	1	R,S	T	C
/	/	/	/	/
/	/	/	/	/
A	2	R	A	C
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R	B	C
A	1	R	B	C
/	/	/	/	/
T	2	R	/	/
A	2	R	B	C
T	1	C	/	/
/	/	/	/	/
T	1	R,I	T	C
/	/	/	/	/
0	0	0	0	0
B	1	R,S	T	R

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	0	0	1
2	2	1	1
/	2	1	1
/	/	/	1
/	/	/	1
/	/	/	1
0	N	N	1
0	2	2	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	2	2	1
0	N	N	1
0	3	3	1
0	0	0	1
2	N	N	1
1	2	3	1
0	2	3	1
0	N	N	1
0	N	N	1
0	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
/	/	/	0
1	/	/	1
/	2	3	1
/	2	2	1
1	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
2	/	/	0
1	/	/	0
/	/	/	0
/	/	/	0
1	/	/	0
/	/	/	0
/	/	/	1
1	/	/	1
/	/	/	1
0	3	3	1
1	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			S
			B
			S
			B
			B
			B
			A
			A
			A
			A
			A
			A
			A
			S
			B
			B
			B
			S
			S
			S
			B
			S
			S
			B
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1318	FAP 864	132		D6
1319	FAP 864	132		D7
1320	FAP 864	132		D8
1321	FAP 864	132		D9
1322	FAP 864	132		D10
1323	FAP 864	132		D11
1324	FAP 864	132		D12
1325	FAP 864	132		D13
1326	FAP 864	132		D14
1327	FAP 864	132		D15
1328	FAP 864	132		D16
1329	FAP 864	132		D17
1330	FAP 864	132		D18
1331	FAP 864	132		V4
1332	FAP 864	132		V5
1333	FAP 864	132		V6
1334	FAP 864	132		V7
1335	FAP 864	132		V8
1336	FAP 864	132		V9
1337	FAP 864	132		V10
1338	FAP 864	132		V11
1339	FAP 864	132		V12
1340	FAP 864	132		V13
1341	FAP 864	132		V14
1342	FAP 864	132		V15
1343	FAP 864	132		V16
1344	FAP 864	132		V17
1345	FAP 864	132		V18
840	FAP 865	113		D4
841	FAP 865	113		D5
842	FAP 865	113		D6
843	FAP 865	113		D7
844	FAP 865	113		D8
845	FAP 865	113		D9
846	FAP 865	113		D10
847	FAP 865	113		D11
848	FAP 865	113		D12
849	FAP 865	113		D13
850	FAP 865	113		D14
851	FAP 865	113		D15
852	FAP 865	113		D16
853	FAP 865	113		D17
854	FAP 865	113		D18
3027	FAP 865	113		V4
3028	FAP 865	113		V5

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
/	/	/	/
N	N	N	N
/	/	/	/
B	D	2	3
N	N	N	N
/	/	2	0
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
S,F	C	2	1
N	N	N	N
S	D	2	1
/	/	3	3
N	N	N	N
S	D	2	1
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
R	R	R	R
R	R	R	R
/	/	2	3
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
/	/	/	/
/	2	2	2
N	N	N	N
/	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
/	2	1	1
N	N	N	N
/	2	1	1
3	2	1	1
N	N	N	N
2	0	0	0
R	/	/	/
N	N	N	N
R	2	2	3
R	/	/	/
N	2	2	2
R	/	/	/
R	/	/	/
N	N	N	N
R	2	1	2
1	0	0	0
N	N	N	N
2	1	1	1
3	1	1	1
N	N	N	N
1	1	1	1
R	/	/	/
N	N	N	N
R	/	/	/
R	2	1	1
N	N	N	N
R	/	/	/
R	2	1	1
R	3	2	2
R	R	R	R
2	1	3	5
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
B	1	R	0	0
B	2	C	B	C
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	R	T	C
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	0	0	0	0
/	/	/	/	/
B	1	R,I	B	I
T	2	R,C	0	0
T	2	R,C	B	R
T	1	R,C	T	C
T	1	R	0	0
T	1	R	A	R
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
B	1	R,S	0	0
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
B	3	R,S	B	C
B	3	R,S	0	0
B	3	R,S	B	C
B	2	R,S	B	C
B	1	R,S	T	C
B	2	R,S	B	R,C
/	/	/	/	/
T	1	C,S	B	C
T	2	R,S	T	C
/	/	/	/	/
B	2	R,S	0	0
T	2	R,S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	3	R,S	B	R
B	3	R,S	T	R

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	/	1
0	3	3	1
2	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
2	3	2	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
0	0	0	1
/	/	/	1
1	N	N	1
0	N	N	1
2	N	N	1
1	N	N	1
0	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
/	/	/	1
/	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
0	N	N	1
/	/	/	1
1	N	N	1
0	2	3	1
1	3	3	1
1	N	N	1
1	2	3	1
1	2	3	1
/	3	3	1
1	3	3	1
1	N	N	1
/	2	2	1
0	3	3	1
0	/	/	1
/	/	/	1
/	3	3	1
/	2	2	1
2	N	N	1
2	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
3029	FAP 865	113		V6
3030	FAP 865	113		V7
3031	FAP 865	113		V8
3032	FAP 865	113		V9
3033	FAP 865	113		V10
3034	FAP 865	113		V11
3035	FAP 865	113		V12
3036	FAP 865	113		V13
3037	FAP 865	113		V14
3038	FAP 865	113		V15
3039	FAP 865	113		V16
3040	FAP 865	113		V17
3041	FAP 865	113		V18
2949	FAP 866	169		D7
2950	FAP 866	169		D8
2951	FAP 866	169		D9
2952	FAP 866	169		D10
2953	FAP 866	169		D11
2954	FAP 866	169		D12
2955	FAP 866	169		D13
2956	FAP 866	169		D14
2957	FAP 866	169		D15
2958	FAP 866	169		D16
2959	FAP 866	169		D17
2960	FAP 866	169		D18
2961	FAP 866	169		V7
2962	FAP 866	169		V8
2963	FAP 866	169		V9
2964	FAP 866	169		V10
2965	FAP 866	169		V11
2966	FAP 866	169		V12
2967	FAP 866	169		V13
2968	FAP 866	169		V14
2969	FAP 866	169		V15
2970	FAP 866	169		V16
2971	FAP 866	169		V17
2972	FAP 866	169		V18
1983	FAQ 010	191		D7
1984	FAQ 010	191		D8
1985	FAQ 010	191		D9
1986	FAQ 010	191		D10
1987	FAQ 010	191		D11
1988	FAQ 010	191		D12
1989	FAQ 010	191		D13
1990	FAQ 010	191		D14

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
F	D	1	1
B	D	2	2
N	N	N	N
F	D	2	2
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	4	4
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
B	D	3	4
N	N	N	N
/	/	2	1
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
1	1	1	1
2	1	2	4
N	N	N	N
1	2	2	4
/	/	/	/
N	N	N	N
/	/	/	/
/	2	3	4
N	N	N	N
/	/	/	/
/	2	2	2
N	N	N	N
/	2	1	1
4	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	/	/	/
N	N	N	N
3	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	2	2	3
N	N	N	N
1	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
T	3	R,S	B	R,S
T	3	I,S	B	C,I
B	3	R	B	C,I
B	3	R,I	B	C
B	2	R,S	/	/
/	/	/	/	/
T	2	R,C	/	/
B	3	R	/	/
B	3	R,S	/	/
B	3	R,S	/	/
/	/	/	/	/
B	2	R	/	/
/	/	/	/	/
T	3	R	B	C
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	2	R,C	B	C
T	2	R	B	C
B	2	R,S	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R,I	B	C
/	/	/	/	/
/	/	/	/	/
T	1	R,S	A	R,S
T	1	R,S	A	R,S
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
2	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
2	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
1	N	N	1
2	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
1	N	N	1
/	3	3	1
/	N	N	1
1	N	N	1
1	N	N	1
/	N	N	1
/	/	/	1
/	/	/	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			A
			A
			A
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1991	FAQ 010	191		D15
1992	FAQ 010	191		D16
1993	FAQ 010	191		D17
1994	FAQ 010	191		D18
1995	FAQ 010	191		V7
1996	FAQ 010	191		V8
1997	FAQ 010	191		V9
1998	FAQ 010	191		V10
1999	FAQ 010	191		V11
2000	FAQ 010	191		V12
2001	FAQ 010	191		V13
2002	FAQ 010	191		V14
2003	FAQ 010	191		V15
2004	FAQ 010	191		V16
2005	FAQ 010	191		V17
2006	FAQ 010	191		V18
2409	FAR 003	213		D7
2410	FAR 003	213		D8
2411	FAR 003	213		D9
2412	FAR 003	213		D10
2413	FAR 003	213		D11
2414	FAR 003	213		D12
2415	FAR 003	213		D13
2416	FAR 003	213		D14
2417	FAR 003	213		D15
2418	FAR 003	213		D16
2419	FAR 003	213		D17
2420	FAR 003	213		D18
2421	FAR 003	213		V7
2422	FAR 003	213		V8
2423	FAR 003	213		V9
2424	FAR 003	213		V10
2425	FAR 003	213		V11
2426	FAR 003	213		V12
2427	FAR 003	213		V13
2428	FAR 003	213		V14
2429	FAR 003	213		V15
2430	FAR 003	213		V16
2431	FAR 003	213		V17
2432	FAR 003	213		V18
2433	FAR 020	214		D10
2434	FAR 020	214		D11
2435	FAR 020	214		D12
2436	FAR 020	214		D13
2437	FAR 020	214		D14

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
B	D	4	4
N	N	N	N
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	/	/	/
N	N	N	N
3	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	3	1	1
N	N	N	N
3	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
4	2	2	3
N	N	N	N
4	2	2	3
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	1	S	/	/
A	2	R,S	B	C
A	2	R,I	/	/
0	0	0	0	0
B	1	R,C	0	0
B	1	R,C	0	0
/	/	/	/	/
/	/	/	/	/
T	2	C	/	/
T	2	C	/	/
T	2	C	/	/
/	/	/	/	/
T	1	R	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	1	R,I	0	0
/	/	/	/	/
T	1	C	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
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/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	N	N	1
2	N	N	1
/	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	2	2	1
/	2	1	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	N	N	1
/	N	N	1
/	/	/	1
/	/	/	1
0	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	/	/	1
/	/	/	1
/	N	N	1
/	N	N	1
/	N	N	1
/	/	/	1
/	/	/	1
/	N	0	1
/	1	1	1
/	N	N	1
/	3	2	1
/	/	/	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			S
			B
			B
			S
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
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			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2438	FAR 020	214		D15
2439	FAR 020	214		D16
2440	FAR 020	214		D17
2441	FAR 020	214		D18
2442	FAR 020	214		V10
2443	FAR 020	214		V11
2444	FAR 020	214		V12
2445	FAR 020	214		V13
2446	FAR 020	214		V14
2447	FAR 020	214		V15
2448	FAR 020	214		V16
2449	FAR 020	214		V17
2450	FAR 020	214		V18
2367	FAR 022	211		D7
2368	FAR 022	211		D8
2369	FAR 022	211		D9
2370	FAR 022	211		D10
2371	FAR 022	211		D11
2372	FAR 022	211		D12
2373	FAR 022	211		D13
2374	FAR 022	211		D14
2375	FAR 022	211		D15
2376	FAR 022	211		D16
2377	FAR 022	211		D17
2378	FAR 022	211		D18
2379	FAR 022	211		V7
2380	FAR 022	211		V8
2381	FAR 022	211		V9
2382	FAR 022	211		V10
2383	FAR 022	211		V11
2384	FAR 022	211		V12
2385	FAR 022	211		V13
2386	FAR 022	211		V14
2387	FAR 022	211		V15
2388	FAR 022	211		V16
2389	FAR 022	211		V17
2390	FAR 022	211		V18
2475	FAR 023	216		D7
2476	FAR 023	216		D10
2477	FAR 023	216		D11
2478	FAR 023	216		D12
2479	FAR 023	216		D13
2480	FAR 023	216		D14
2481	FAR 023	216		D15
2482	FAR 023	216		D16

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	4	4
N	N	N	N
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
4	2	2	2
N	N	N	N
4	/	/	/
/	1	2	2
N	N	N	N
/	1	2	2
/	1	2	2
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	2	1	1
N	N	N	N
3	2	2	2
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
4	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	R,C	0	0
/	/	/	/	/
T	1	C	0	0
T	1	C	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	1	R,I	0	0
B	1	R	A	R
T	1	R	A	R
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,S,C	0	0
T	2	R	A	R
T	2	R	B	R,C
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,C	0	0
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	N	N	1
0	N	N	1
/	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
0	1	3	1
1	N	N	1
1	/	/	1
/	N	N	1
/	2	2	1
/	N	N	1
/	N	N	1
/	2	2	1
/	N	N	1
/	N	N	1
/	2	1	1
/	N	N	1
0	N	N	1
2	N	N	1
1	N	N	1
/	1	1	1
/	1	1	1
/	1	1	1
/	1	1	1
0	N	N	1
/	1	1	1
0	N	N	1
0	2	2	1
0	N	N	1
/	/	/	1
/	N	N	1
/	N	N	1
/	/	/	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
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			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2483	FAR 023	216		D17
2484	FAR 023	216		D18
2485	FAR 023	216		V9
2486	FAR 023	216		V10
2487	FAR 023	216		V11
2488	FAR 023	216		V12
2489	FAR 023	216		V13
2490	FAR 023	216		V14
2491	FAR 023	216		V15
2492	FAR 023	216		V16
2493	FAR 023	216		V17
2494	FAR 023	216		V18
2319	FAR 027	209		D10
2320	FAR 027	209		D11
2321	FAR 027	209		D12
2322	FAR 027	209		D13
2323	FAR 027	209		D14
2324	FAR 027	209		D15
2325	FAR 027	209		D16
2326	FAR 027	209		D17
2327	FAR 027	209		D18
2328	FAR 027	209		V10
2329	FAR 027	209		V11
2330	FAR 027	209		V12
2331	FAR 027	209		V13
2332	FAR 027	209		V14
2333	FAR 027	209		V15
2334	FAR 027	209		V16
2335	FAR 027	209		V17
2336	FAR 027	209		V18
2207	FAR 031	203		D10
2208	FAR 031	203		D11
2209	FAR 031	201		D12
2210	FAR 031	201		D13
2211	FAR 031	201		D14
2212	FAR 031	201		D15
2213	FAR 031	203		D16
2214	FAR 031	203		D17
2215	FAR 031	203		D18
2216	FAR 031	203		V10
2217	FAR 031	203		V11
2218	FAR 031	203		V12
2219	FAR 031	203		V13
2220	FAR 031	203		V14
2221	FAR 031	203		V15

Scar Type	Scar Distributior	Edge Rounding Prof	Edge Rounding Plan
N	N	N	N
/	/	/	/
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
N	N	N	N
/	/	/	/
4	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	2	1	1
N	N	N	N
/	2	1	1
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	0	0	0
N	N	N	N
/	3	2	2
/	/	/	/
N	N	N	N
/	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
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/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
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/	/	/	/	/
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/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	2	R	0	0
/	/	/	/	/
B	2	R,S	0	0
T	1	R,C	B	C
B	2	R,S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	I	0	0
/	/	/	/	/
B	1	R,I,S	0	0
B	1	R,S	0	0
A	1	R	B	R,C

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
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/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	3	2	1
0	3	2	1
/	/	/	1
0	N	N	1
1	/	/	1
0	3	1	1
/	/	/	1
/	/	/	1
/	/	/	1
/	N	N	1
0	N	N	1
/	N	N	1
0	N	N	1
0	N	N	1
1	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
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			B
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			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
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			B
			S
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			S
			B
			B
			B
			B
			B
			B
			B
			B
			S
			S
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2222	FAR 031	203		V16
2223	FAR 031	203		V17
2224	FAR 031	203		V18
2495	FAR 033	217		D7
2496	FAR 033	217		D8
2497	FAR 033	217		D9
2498	FAR 033	217		D10
2499	FAR 033	217		D11
2500	FAR 033	217		D12
2501	FAR 033	217		D13
2502	FAR 033	217		D14
2503	FAR 033	217		D15
2504	FAR 033	217		D16
2505	FAR 033	217		D17
2506	FAR 033	217		D18
2507	FAR 033	217		V7
2508	FAR 033	217		V8
2509	FAR 033	217		V9
2510	FAR 033	217		V10
2511	FAR 033	217		V11
2512	FAR 033	217		V12
2513	FAR 033	217		V13
2514	FAR 033	217		V14
2515	FAR 033	217		V15
2516	FAR 033	217		V16
2517	FAR 033	217		V17
2518	FAR 033	217		V18
2085	FAR 038	197		D9
2086	FAR 038	197		D10
2087	FAR 038	197		D11
2088	FAR 038	197		D12
2089	FAR 038	197		D13
2090	FAR 038	197		D14
2091	FAR 038	197		D15
2092	FAR 038	197		D16
2093	FAR 038	197		D17
2094	FAR 038	197		D18
2095	FAR 038	197		V7
2096	FAR 038	197		V10
2097	FAR 038	197		V11
2098	FAR 038	197		V12
2099	FAR 038	197		V13
2100	FAR 038	197		V14
2101	FAR 038	197		V15
2102	FAR 038	197		V16

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
N	N	N	N
R	R	/	/
/	/	4	4
N	N	N	N
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	4	4
N	N	N	N
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
S	D	2	1
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
N	N	N	N
/	/	/	/
4	/	/	/
N	N	N	N
4	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
4	/	/	/
N	N	N	N
4	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
2	2	2	2
/	0	0	0
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
4	3	1	2
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
0	0	0	0	0
B	1	R,I	0	0
B	1	R,I	0	0
/	/	/	/	/
B	2	R	/	/
A	1	R	/	/
/	/	/	/	/
B	2	R	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	1	R	T	R
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R	0	0
/	/	/	/	/
/	/	/	/	/
B	1	S	B	C,I
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	R,I	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,S	B	C
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	N	N	1
0	3	2	1
0	N	N	1
/	N	N	1
/	/	/	1
/	/	/	1
/	N	N	1
/	/	/	1
/	N	N	1
/	N	N	1
/	2	3	1
/	N	N	1
/	N	N	1
1	2	3	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	2	3	1
/	N	N	1
0	0	0	1
/	3	3	1
/	2	2	1
1	N	N	1
/	2	2	1
/	/	/	1
/	/	/	1
/	/	/	1
0	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
2	N	N	1
/	N	N	1
/	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2103	FAR 038	197		V17
2104	FAR 038	197		V18
2451	FAR 040	215		D7
2452	FAR 040	215		D8
2453	FAR 040	215		D9
2454	FAR 040	215		D10
2455	FAR 040	215		D11
2456	FAR 040	215		D12
2457	FAR 040	215		D13
2458	FAR 040	215		D14
2459	FAR 040	215		D15
2460	FAR 040	215		D16
2461	FAR 040	215		D17
2462	FAR 040	215		D18
2463	FAR 040	215		V7
2464	FAR 040	215		V8
2465	FAR 040	215		V9
2466	FAR 040	215		V10
2467	FAR 040	215		V11
2468	FAR 040	215		V12
2469	FAR 040	215		V13
2470	FAR 040	215		V14
2471	FAR 040	215		V15
2472	FAR 040	215		V16
2473	FAR 040	215		V17
2474	FAR 040	215		V18
2275	FAR 046	207		D1
2276	FAR 046	207		D2
2277	FAR 046	207		D3
2278	FAR 046	207		V1
2279	FAR 046	207		V2
2280	FAR 046	207		V3
2225	FAR II 001	204		D4
2226	FAR II 001	204		D5
2227	FAR II 001	204		D6
2228	FAR II 001	204		D7
2229	FAR II 001	204		D8
2230	FAR II 001	204		D9
2231	FAR II 001	204		D10
2232	FAR II 001	204		D11
2233	FAR II 001	204		D12
2234	FAR II 001	204		D13
2235	FAR II 001	204		D14
2236	FAR II 001	204		D15
2237	FAR II 001	205		D16

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
N	N	N	N
R	R	/	/
/	/	4	4
N	N	N	N
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	4	4
N	N	N	N
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	3	2
N	N	N	N
B,S	D	0	0
/	/	3	2
N	N	N	N
B,S	D	0	0
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
N	N	N	N
/	/	/	/
4	/	/	/
N	N	N	N
4	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
4	/	/	/
N	N	N	N
4	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	0
N	N	N	N
/	/	/	/
3	3	1	2
N	N	N	N
0	0	0	0
3	0	0	0
N	N	N	N
0	0	0	0
/	0	0	0
N	N	N	N
/	0	0	0
/	0	0	0
N	N	N	N
/	0	0	0
/	0	0	0

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,S,C	B	R,S,C
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	1	C	A	R
A	1	R	T	R,I
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
A	1	R	T	R

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	N	N	1
/	N	N	1
/	/	/	1
/	N	N	1
/	/	/	1
/	/	/	1
/	N	N	1
/	/	/	1
/	/	/	1
/	N	N	1
/	/	/	1
/	/	/	1
/	N	N	1
/	/	/	1
/	/	/	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
1	0	0	1
/	/	/	1
0	2	3	1
0	N	N	1
0	N	N	1
1	N	N	1
3	N	N	1
0	2	1	1
0	2	1	1
0	N	N	1
0	3	3	1
0	2	3	1
0	N	N	1
0	2	3	1
0	0	0	1
0	2	3	1
0	2	3	1
0	0	0	1
3	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			A
			A
			A
			A
			A
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B
			B
			S
			S
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2238	FAR II 001	205		D17
2239	FAR II 001	204		D18
2240	FAR II 001	204		V4
2241	FAR II 001	204		V5
2242	FAR II 001	204		V6
2243	FAR II 001	204		V7
2244	FAR II 001	204		V8
2245	FAR II 001	204		V9
2246	FAR II 001	204		V10
2247	FAR II 001	204		V11
2248	FAR II 001	204		V13
2249	FAR II 001	204		V14
2250	FAR II 001	204		V15
2251	FAR II 001	204		V16
2252	FAR II 001	204		V17
2253	FAR II 001	204		V18
2337	FAR II 002	210		D4
2338	FAR II 002	210		D5
2339	FAR II 002	210		D6
2340	FAR II 002	210		D7
2341	FAR II 002	210		D8
2342	FAR II 002	210		D9
2343	FAR II 002	210		D10
2344	FAR II 002	210		D11
2345	FAR II 002	210		D12
2346	FAR II 002	210		D13
2347	FAR II 002	210		D14
2348	FAR II 002	210		D15
2349	FAR II 002	210		D16
2350	FAR II 002	210		D17
2351	FAR II 002	210		D18
2352	FAR II 002	210		V4
2353	FAR II 002	210		V5
2354	FAR II 002	210		V6
2355	FAR II 002	210		V7
2356	FAR II 002	210		V8
2357	FAR II 002	210		V9
2358	FAR II 002	210		V10
2359	FAR II 002	210		V11
2360	FAR II 002	210		V12
2361	FAR II 002	210		V13
2362	FAR II 002	210		V14
2363	FAR II 002	210		V15
2364	FAR II 002	210		V16
2365	FAR II 002	210		V17

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
N	N	N	N
R	R	/	/
/	/	2	2
N	N	N	N
B,H	D	0	0
/	/	3	3
N	N	N	N
0	0	0	0
R	R	/	/
N	N	N	N
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
/	/	3	3
/	/	3	3
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
/	/	4	4
/	/	3	3
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
N	N	N	N
/	0	0	0
2	2	1	1
N	N	N	N
0	0	0	0
2	2	1	2
N	N	N	N
0	0	0	0
/	0	0	0
N	N	N	N
/	0	0	0
N	N	N	N
/	0	0	0
/	3	2	2
N	N	N	N
/	0	0	0
3	2	1	1
N	N	N	N
2	2	1	1
3	2	1	1
N	N	N	N
3	0	0	0
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	0	0	0
N	N	N	N
4	0	0	0
3	2	1	1
N	N	N	N
3	0	0	0
/	0	0	0
N	N	N	N
/	0	0	0
/	2	1	1
N	N	N	N
/	0	0	0
/	0	0	0
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
0	0	0	0	0
0	0	0	0	0
A	1	S	0	0
A	1	S	B	C
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
B	1	R,C	0	0
T	1	R,C	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
A	2	R,I	B	C
0	0	0	0	0
0	0	0	0	0
A	2	R,I	/	/
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
A	1	R,S	T	C
B	1	R	T	C
A	3	R,I	T	R
B	1	C	0	0
A	1	C	0	0
A	3	R,I,S	B	C
B	1	R,I	B	C
A	1	R	B	R,C
A	2	R	B	C
A	1	R	B	R
B	2	R,C	A	R
B	1	R,C	0	0
B	1	R,C	0	0
B	1	R,C	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	3	3	1
0	0	0	1
0	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
1	2	2	1
0	N	N	1
0	2	3	1
/	3	3	1
0	N	N	1
0	N	N	1
/	/	/	1
0	N	N	1
/	/	/	1
/	/	/	1
0	N	N	1
/	/	/	1
/	/	/	1
0	N	N	1
/	/	/	1
1	N	N	1
1	N	N	1
2	N	N	1
0	N	N	1
0	N	N	1
1	N	N	1
1	N	N	1
2	N	N	1
1	N	N	1
3	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			S
			B
			B
			S
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			S
			B
			B
			S
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2366	FAR II 002	210		V18
2264	FAR II 007	206		D7
2265	FAR II 007	206		D8
2266	FAR II 007	206		D9
2267	FAR II 007	206		D11
2268	FAR II 007	206		D12
2269	FAR II 007	206		V8
2270	FAR II 007	206		V9
2271	FAR II 007	206		V10
2272	FAR II 007	206		V11
2273	FAR II 007	206		V13
2274	FAR II 007	206		V14
2254	FAR II 008	205		D1
2255	FAR II 008	205		D2
2256	FAR II 008	205		D3
2257	FAR II 008	205		D5
2258	FAR II 008	205		D6
2259	FAR II 008	205		V1
2260	FAR II 008	205		V2
2261	FAR II 008	205		V3
2262	FAR II 008	205		V5
2263	FAR II 008	205		V6
2391	FAR II 028	212		D10
2392	FAR II 028	212		D11
2393	FAR II 028	212		D12
2394	FAR II 028	212		D13
2395	FAR II 028	212		D14
2396	FAR II 028	212		D15
2397	FAR II 028	212		D16
2398	FAR II 028	212		D17
2399	FAR II 028	212		D18
2400	FAR II 028	212		V10
2401	FAR II 028	212		V11
2402	FAR II 028	212		V12
2403	FAR II 028	212		V13
2404	FAR II 028	212		V14
2405	FAR II 028	212		V15
2406	FAR II 028	212		V16
2407	FAR II 028	212		V17
2408	FAR II 028	212		V18
2031	FAW 001	193		D1
2032	FAW 001	193		D2
2033	FAW 001	193		D3
2034	FAW 001	193		D6
2035	FAW 001	193		D4

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
/	/	/	/
N	N	N	N
/	/	/	/
N	N	N	N
R	R	/	/
/	/	/	/
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
N	N	N	N
/	/	/	/
N	N	N	N
/	/	/	0
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	3	2
N	N	N	N
N	N	N	N
R	R	3	2
R	R	3	3

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
/	0	0	0
/	/	/	/
N	N	N	N
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
3	0	0	0
/	/	/	/
N	N	N	N
/	0	0	0
N	N	N	N
/	/	/	/
N	N	N	N
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	N	N	N
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
4	3	1	2
N	N	N	N
N	N	N	N
4	/	/	/
3	3	2	2

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
B	1	R,C	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	2	R	0	0
B	3	R	0	0
B	1	C	0	0
B	1	C	0	0
B	1	C	0	0
B	1	C	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	R,S	A	R,S
T	1	R,S	A	R,S
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	3	2	1
/	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	N	N	1
/	N	N	1
/	N	N	1
/	/	/	1
/	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	3	3	1
1	2	3	1
1	2	3	1
/	/	/	1
/	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2036	FAW 001	593		D5
2037	FAW 001	193		V1
2038	FAW 001	193		V2
2039	FAW 001	193		V3
2040	FAW 001	193		V4
2041	FAW 001	193		V5
2042	FAW 001	193		V6
3060	FAW 001	193		D5
2073	FAY 007	196		D7
2074	FAY 007	196		D8
2075	FAY 007	196		D9
2076	FAY 007	196		D10
2077	FAY 007	196		D11
2078	FAY 007	196		D12
2079	FAY 007	196		V7
2080	FAY 007	196		V8
2081	FAY 007	196		V9
2082	FAY 007	196		V10
2083	FAY 007	196		V11
2084	FAY 007	196		V12
2281	FAY 010	208		D1
2282	FAY 010	208		D2
2283	FAY 010	208		D3
2284	FAY 010	208		D4
2285	FAY 010	208		D5
2286	FAY 010	208		D6
2287	FAY 010	208		D7
2288	FAY 010	208		D8
2289	FAY 010	208		D9
2290	FAY 010	208		D10
2291	FAY 010	208		D11
2292	FAY 010	208		D12
2293	FAY 010	208		D12
2294	FAY 010	208		D13
2295	FAY 010	208		D14
2296	FAY 010	208		D15
2297	FAY 010	208		D16
2298	FAY 010	208		D17
2299	FAY 010	208		D18
2300	FAY 010	208		V1
2301	FAY 010	208		V2
2302	FAY 010	208		V3
2303	FAY 010	208		V4
2304	FAY 010	208		V5
2305	FAY 010	208		V6

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
N	N	N	N
S,F	D	4	4
N	N	N	N
B	D	4	4
B	D	4	4
N	N	N	N
/	/	4	4
N	N	N	N
S	D	3	3
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
/	/	4	4
N	N	N	N
/	/	4	4
/	/	4	4
N	N	N	N
/	/	/	/
/	/	4	4
N	N	N	N
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	4	4
N	N	N	N
/	/	4	4
/	/	4	4
N	N	N	N
/	/	4	4

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
N	N	N	N
4	3	1	2
N	N	N	N
4	3	1	2
4	3	1	2
N	N	N	N
4	3	2	2
N	N	N	N
3	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	2	1	1
N	N	N	N
3	2	1	1
/	/	/	/
N	N	N	N
/	/	/	/
4	2	2	1
N	N	N	N
4	2	2	1
4	2	2	2
N	N	N	N
/	/	/	/
4	2	2	2
N	N	N	N
4	2	2	2
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
4	2	2	1
N	N	N	N
4	2	2	1
4	2	2	1
N	N	N	N
4	2	2	1

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
A	1	R,I	B	R,C
0	0	0	0	0
B	1	R,C	0	0
A	1	R,I	B	R,I
T	2	R,C	B	C
B	1	R	T	R
/	/	/	/	/
B	1	R,S	0	0
B	2	R	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	R,I	B	R,C
0	0	0	T	C
A	2	R,I	B	C
B	3	R,I	T	R
B	2	R,I	B	C
A	1	R	T	R,S
B	1	C	/	/
/	/	/	/	/
A	2	R	/	/
B	1	R,I,C	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,C	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	3	3	1
1	N	N	1
0	N	N	1
0	N	N	1
1	N	N	1
1	N	N	1
2	N	N	1
/	3	3	1
0	3	3	1
/	/	/	1
/	/	/	1
/	3	3	1
/	/	/	1
/	3	3	1
1	N	N	1
1	N	N	1
1	N	N	1
2	N	N	1
1	N	N	1
1	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	3	3	1
/	/	/	1
/	N	N	1
/	3	3	1
/	N	N	1
/	N	N	1
/	3	3	1
/	N	N	1
/	N	N	1
/	N	N	1
/	3	3	1
/	N	N	1
/	N	N	1
/	3	3	1
/	N	N	1
/	N	N	1
/	2	2	1
/	N	N	1
/	N	N	1
/	2	2	1
/	2	2	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			A
			S
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2306	FAY 010	208		V
2307	FAY 010	208		V7
2308	FAY 010	208		V8
2309	FAY 010	208		V9
2310	FAY 010	208		V10
2311	FAY 010	208		V11
2312	FAY 010	208		V12
2313	FAY 010	208		V13
2314	FAY 010	208		V14
2315	FAY 010	208		V15
2316	FAY 010	208		V16
2317	FAY 010	208		V17
2318	FAY 010	208		V18
1080	FDC/A/13	108		NIL DOES NOT FIT
1893	FDC/A/22	187		D4
1894	FDC/A/22	187		D5
1895	FDC/A/22	187		D6
1896	FDC/A/22	187		D7
1897	FDC/A/22	187		D8
1898	FDC/A/22	187		D9
1899	FDC/A/22	187		D10
1900	FDC/A/22	187		D11
1901	FDC/A/22	187		D12
1902	FDC/A/22	187		D13
1903	FDC/A/22	187		D14
1904	FDC/A/22	187		D15
1905	FDC/A/22	187		D16
1906	FDC/A/22	187		D17
1907	FDC/A/22	187		D18
1908	FDC/A/22	187		V4
1909	FDC/A/22	187		V5
1910	FDC/A/22	187		V6
1911	FDC/A/22	187		V7
1912	FDC/A/22	187		V8
1913	FDC/A/22	187		V9
1914	FDC/A/22	187		V10
1915	FDC/A/22	187		V11
1916	FDC/A/22	187		V12
1917	FDC/A/22	187		V13
1918	FDC/A/22	187		V14
1919	FDC/A/22	187		V15
1920	FDC/A/22	187		V16
1921	FDC/A/22	187		V17
1922	FDC/A/22	187		V18
1837	FDC/C/5	184		D10

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
0	0	0	0
/	/	4	4
N	N	N	N
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
0	0	0	0
/	/	4	4
N	N	N	N
/	/	4	4
/	/	4	4
N	N	N	N
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
S	C	3	2
N	N	N	N
/	/	3	3
S	C	3	3
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
0	0	0	0
4	2	2	2
N	N	N	N
4	2	2	2
/	2	2	2
N	N	N	N
/	2	2	2
/	/	/	/
N	N	N	N
/	2	1	1
/	2	1	1
N	N	N	N
/	2	1	1
0	0	0	0
4	3	2	3
N	N	N	N
4	2	2	2
4	2	2	2
N	N	N	N
4	2	2	2
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	2	1	2
N	2	1	2
3	3	1	1
3	2	1	1
N	N	N	N
3	2	1	1
/	2	1	1
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
0	0	0	0	0
/	/	/	/	/
T	1	R	/	/
T	1	R	/	/
/	/	/	/	/
/	/	/	/	/
T	1	R	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
B	1	R	B	C
A	2	R,I	A	C
/	/	/	/	/
B	2	S	0	0
A	1	R	0	0
T	2	R	0	0
M	M	M	M	M
T	2	R,I	/	/
A	1	S	B	S
/	/	/	/	/
/	/	/	/	/
A	1	R	B	R
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	R	B	R
T	1	R	0	0
B	1	R,C	0	0
B	2	R,C	0	0
A	1	R	B	R,C
B	1	R	/	/
B	1	R,S	0	0
T	1	R,S	A	R,S
/	/	/	/	/
B	1	R	/	/
B	1	R	/	/
/	/	/	/	/
A	1	R	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	0	0	
/	N	N	1
/	3	2	1
/	N	N	1
/	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	3	2	1
/	/	/	1
0	0	0	
2	N	N	1
1	3	3	1
/	3	3	1
0	N	N	1
0	3	3	1
0	N	N	1
M	M	M	/
/	3	3	1
1	/	/	1
/	/	/	1
/	3	3	1
1	/	/	1
/	/	/	1
/	3	3	1
/	/	/	1
1	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
2	N	N	1
/	N	N	1
0	N	N	1
2	N	N	1
/	N	N	1
/	N	N	1
/	3	2	1
/	3	1	1
/	3	3	1
/	3	3	1
/	/	/	1
/	/	/	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1838	FDC/C/5	184		D11
1839	FDC/C/5	184		D12
1840	FDC/C/5	184		D13
1841	FDC/C/5	184		D14
1842	FDC/C/5	184		D15
1843	FDC/C/5	184		D16
1844	FDC/C/5	184		D17
1845	FDC/C/5	184		D18
1846	FDC/C/5	184		V10
1847	FDC/C/5	184		V11
1848	FDC/C/5	184		V12
1849	FDC/C/5	184		V13
1850	FDC/C/5	184		V14
1851	FDC/C/5	184		V15
1852	FDC/C/5	184		V16
1853	FDC/C/5	184		V17
1854	FDC/C/5	184		V18
1875	FDC/F/22	186		D10
1876	FDC/F/22	186		D11
1877	FDC/F/22	186		D12
1878	FDC/F/22	186		D13
1879	FDC/F/22	186		D14
1880	FDC/F/22	186		D15
1881	FDC/F/22	186		D16
1882	FDC/F/22	186		D17
1883	FDC/F/22	186		D18
1884	FDC/F/22	186		V10
1885	FDC/F/22	186		V11
1886	FDC/F/22	186		V12
1887	FDC/F/22	186		V13
1888	FDC/F/22	186		V14
1889	FDC/F/22	186		V15
1890	FDC/F/22	186		V16
1891	FDC/F/22	186		V17
1892	FDC/F/22	186		V18
1855	FDC/F/39	185		D8
1856	FDC/F/39	185		D9
1857	FDC/F/39	185		D10
1858	FDC/F/39	185		D11
1859	FDC/F/39	185		D12
1860	FDC/F/39	185		D13
1861	FDC/F/39	185		D14
1862	FDC/F/39	185		D15
1863	FDC/F/39	185		D16
1864	FDC/F/39	185		D17

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	/	/
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	0	/	/
/	/	/	/
0	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
B	1	R,I	0	0
0	0	0	0	0
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	2	R,I	T	R
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
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/	/	/	/	/
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/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R	B	C
B	1	R	B	C
B	1	R	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	N	N	1
0	N	N	1
/	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
1	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
1	N	N	1
2	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	/	/	1
/	N	N	1
/	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			A
			A
			A
			A
			A
			A
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			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1865	FDC/F/39	185		D18
1866	FDC/F/39	185		V10
1867	FDC/F/39	185		V11
1868	FDC/F/39	185		V12
1869	FDC/F/39	185		V13
1870	FDC/F/39	185		V14
1871	FDC/F/39	185		V15
1872	FDC/F/39	185		V16
1873	FDC/F/39	185		V17
1874	FDC/F/39	185		V18
1813	FDC/F/43	183		D7
1814	FDC/F/43	183		D8
1815	FDC/F/43	183		D9
1816	FDC/F/43	183		D10
1817	FDC/F/43	183		D11
1818	FDC/F/43	183		D12
1819	FDC/F/43	183		D13
1820	FDC/F/43	183		D14
1821	FDC/F/43	183		D15
1822	FDC/F/43	183		D16
1823	FDC/F/43	183		D17
1824	FDC/F/43	183		D18
1825	FDC/F/43	183		V7
1826	FDC/F/43	183		V8
1827	FDC/F/43	183		V9
1828	FDC/F/43	183		V10
1829	FDC/F/43	183		V11
1830	FDC/F/43	183		V12
1831	FDC/F/43	183		V13
1832	FDC/F/43	183		V14
1833	FDC/F/43	183		V15
1834	FDC/F/43	183		V16
1835	FDC/F/43	183		V17
1836	FDC/F/43	183		V18
1789	FDC/F/46	182		D7
1790	FDC/F/46	182		D8
1791	FDC/F/46	182		D9
1792	FDC/F/46	182		D10
1793	FDC/F/46	182		D11
1794	FDC/F/46	182		D12
1795	FDC/F/46	182		D13
1796	FDC/F/46	182		D14
1797	FDC/F/46	182		D15
1798	FDC/F/46	182		D16
1799	FDC/F/46	182		D17

Scar Type	Scar Distributior	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
R	R	/	/
R	R	/	/
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
B	D	2	2
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
B	D	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	2	1	2
N	N	N	N
1	2	1	2
/	2	1	2
N	N	N	N
/	/	/	/
/	2	1	1
N	N	N	N
/	2	1	1
/	2	1	1
N	N	N	N
/	2	1	1
3	/	/	/
N	N	N	N
3	2	2	2
/	/	/	/
N	N	N	N
/	2	2	2
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,C	0	0
A	1	S	T	R
T	1	R	B	C
/	/	/	/	/
B	1	R	B	C
/	/	/	/	/
/	/	/	/	/
B	1	R	0	0
/	/	/	/	/
/	/	/	/	/
B	1	C	0	0
/	/	/	/	/
B	2	R,C	0	0
B	2	R,C	T	C
/	/	/	/	/
/	/	/	/	/
T	2	R	T	C
/	/	/	/	/
T	2	R,S	B	R
T	2	R,S	B	R
/	/	/	/	/
/	/	/	/	/
B	2	R	B	R
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
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/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
0	N	N	1
2	3	3	1
1	N	N	1
/	N	N	1
1	N	N	1
/	N	N	1
/	N	N	1
0	0	0	1
/	N	N	1
/	N	N	1
0	N	N	1
/	N	N	1
0	N	N	1
2	N	N	1
/	N	N	1
/	N	N	1
2	N	N	1
/	N	N	1
1	N	N	1
1	N	N	1
/	N	N	1
/	N	N	1
1	N	N	1
/	N	N	1
/	N	N	1
/	/	/	1
/	/	/	1
/	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			S
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			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1800	FDC/F/46	182		D18
1801	FDC/F/46	182		V7
1802	FDC/F/46	182		V8
1803	FDC/F/46	182		V9
1804	FDC/F/46	182		V10
1805	FDC/F/46	182		V11
1806	FDC/F/46	182		V12
1807	FDC/F/46	182		V13
1808	FDC/F/46	182		V14
1809	FDC/F/46	182		V15
1810	FDC/F/46	182		V16
1811	FDC/F/46	182		V17
1812	FDC/F/46	182		V18
2043	FDM 002	194		D7
2044	FDM 002	194		D8
2045	FDM 002	194		D9
2046	FDM 002	194		D10
2047	FDM 002	194		D11
2048	FDM 002	194		D12
2049	FDM 002	194		D13
2050	FDM 002	194		D14
2051	FDM 002	194		D15
2052	FDM 002	194		D16
2053	FDM 002	194		D17
2054	FDM 002	194		D18
2055	FDM 002	194		V7
2056	FDM 002	194		V8
2057	FDM 002	194		V9
2058	FDM 002	194		V10
2059	FDM 002	194		V11
2060	FDM 002	194		V12
2061	FDM 002	194		V13
2062	FDM 002	194		V14
2063	FDM 002	194		V15
2064	FDM 002	194		V16
2065	FDM 002	194		V17
2066	FDM 002	194		V18
2007	FDW 001	192		D7
2008	FDW 001	192		D8
2009	FDW 001	192		D9
2010	FDW 001	192		D10
2011	FDW 001	192		D11
2012	FDW 001	192		D12
2013	FDW 001	192		D13
2014	FDW 001	192		D14

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
/	/	3	3
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	4	4
N	N	N	N
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	4	4
N	N	N	N
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	4	4
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
/	/	/	/
3	/	/	/
N	N	N	N
3	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
4	/	/	/
N	N	N	N
4	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
4	2	1	2
N	N	N	N
4	3	2	2
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
4	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
B	1	C	/	/
B	1	C	/	/
/	/	/	/	/
T	2	R	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	2	R	B	R,C
B	3	R,C	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R	/	/
B	1	R	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	3	R,S	B	R,C
T	2	R,I	B	C
/	/	/	/	/
T	2	R,S	B	R,C
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	3	R,S	/	/
A	3	R,S	B	R,C
/	/	/	/	/
/	/	/	/	/
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/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	/	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	/	/	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
1	N	N	1
/	3	2	1
/	3	3	1
/	3	3	1
/	N	N	1
/	/	/	1
/	N	N	1
/	/	/	1
/	0	0	1
/	N	N	1
/	3	3	1
/	N	N	1
/	N	N	1
1	N	N	1
1	3	3	1
/	N	N	1
2	N	N	1
/	N	N	1
/	N	N	1
/	3	3	1
/	N	N	1
/	3	2	1
/	3	2	1
/	/	/	1
/	3	3	1
2	N	N	1
/	N	N	1
/	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	3	3	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
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			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
2015	FDW 001	192		D15
2016	FDW 001	192		D16
2017	FDW 001	192		D17
2018	FDW 001	192		D18
2019	FDW 001	192		V7
2020	FDW 001	192		V8
2021	FDW 001	192		V9
2022	FDW 001	192		V10
2023	FDW 001	192		V11
2024	FDW 001	192		V12
2025	FDW 001	192		V14
2026	FDW 001	192		V15
2027	FDW 001	192		V16
2028	FDW 001	192		V17
2029	FDW 001	192		V18
2030	FDW 001	192		V13
1953	FDY 001	190		D4
1954	FDY 001	190		D5
1955	FDY 001	190		D6
1956	FDY 001	190		D7
1957	FDY 001	190		D8
1958	FDY 001	190		D9
1959	FDY 001	190		D10
1960	FDY 001	190		D11
1961	FDY 001	190		D12
1962	FDY 001	190		D13
1963	FDY 001	190		D14
1964	FDY 001	190		D15
1965	FDY 001	190		D16
1966	FDY 001	190		D17
1967	FDY 001	190		D18
1968	FDY 001	190		V4
1969	FDY 001	190		V5
1970	FDY 001	190		V6
1971	FDY 001	190		V7
1972	FDY 001	190		V8
1973	FDY 001	190		V9
1974	FDY 001	190		V10
1975	FDY 001	190		V11
1976	FDY 001	190		V12
1977	FDY 001	190		V13
1978	FDY 001	190		V14
1979	FDY 001	190		V15
1980	FDY 001	190		V16
1981	FDY 001	190		V17

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	2
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
B	D	2	1
N	N	N	N
B	D	3	3
B	D	3	3
N	N	N	N
B	D	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	2
N	N	N	N
/	/	3	3
/	/	3	2
N	N	N	N
/	/	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
2	/	/	/
N	N	N	N
3	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
2	1	1	2
N	N	N	N
3	/	/	/
3	1	2	2
N	N	N	N
3	3	1	1
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
2	/	/	/
N	N	N	N
3	3	1	1
2	/	/	/
N	N	N	N
3	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	3	R,S	B	R,S
A	3	R,S	B	R,C
A	3	R,S	B	C
/	/	/	/	/
A	2	S	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R,I	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R	/	/
/	/	/	/	/
B	1	R,I,C	B	C
T	1	R,I	B	C
/	/	/	/	/
0	0	0	0	0
T	1	R	A	I
/	/	/	/	/
B	1	C	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,C	B	S
B	1	R,C	B	S
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
3	N	N	1
2	N	N	1
1	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	2	3	1
/	N	N	1
/	2	3	1
/	/	/	1
/	/	/	1
/	N	N	1
/	N	N	1
/	2	3	1
/	N	N	1
/	N	N	1
/	3	2	1
/	N	N	1
/	N	N	1
/	2	2	1
/	N	N	1
/	N	N	1
/	2	3	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
1	N	N	1
1	N	N	1
/	N	N	1
0	N	N	1
1	N	N	1
/	N	N	1
/	1	3	1
/	/	/	1
/	0	0	1
1	0	0	1
1	0	0	1
/	0	0	1
/	0	0	1
/	0	0	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			S
			S
			S
			S
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1982	FDY 001	190		V18
53	FEK 001	31		D1
54	FEK 001	31		D2
55	FEK 001	31		D3
56	FEK 001	31		D4
57	FEK 001	31		D5
58	FEK 001	31		D6
59	FEK 001	31		D7
60	FEK 001	31		D8
61	FEK 001	31		D9
71	FEK 001	31		V1
72	FEK 001	31		V2
73	FEK 001	31		V3
74	FEK 001	31		V4
75	FEK 001	31		V5
76	FEK 001	31		V6
77	FEK 001	31		V7
78	FEK 001	31		V8
79	FEK 001	31		V9
1670	FEK 011	176		D1
1671	FEK 011	176		D2
1672	FEK 011	176		D3
1673	FEK 011	176		D4
1674	FEK 011	176		D5
1675	FEK 011	176		D6
1676	FEK 011	176		D7
1677	FEK 011	176		D8
1678	FEK 011	176		D9
1679	FEK 011	176		D10
1680	FEK 011	176		D11
1681	FEK 011	176		D12
1682	FEK 011	176		V1
1683	FEK 011	176		V2
1684	FEK 011	176		V3
1685	FEK 011	176		V4
1686	FEK 011	176		V5
1687	FEK 011	176		V6
1688	FEK 011	176		V7
1689	FEK 011	176		V8
1690	FEK 011	176		V9
1691	FEK 011	176		V10
1692	FEK 011	176		V11
1693	FEK 011	176		V12
1694	FEK 015	177		D1
1695	FEK 015	177		D2

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
/	/	/	/
/	/	/	/
V	C	4	4
B	C	3	3
B	D	4	4
0	0	0	0
/	/	3	3
M	C	4	4
0	0	0	0
F	D	4	4
V	C	4	4
M	C	4	4
V	C	4	4
B	D	4	4
B	D	4	4
/	/	/	/
0	0	0	0
0	0	0	0
V	D	4	4
/	/	3	3
N	N	N	N
/	/	3	3
/	/	3	3
N	N	N	N
/	/	3	3
R	R	3	3
N	N	N	N
R	R	3	3
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
/	/	4	4
/	/	4	4
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	3	3
R	R	2	2
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
/	/	/	/
/	0	/	/
4	4	2	2
3	2	2	1
4	2	1	1
0	2	1	5
3	/	/	/
4	4	2	1
0	0	0	0
4	3	1	2
4	2	2	2
4	4	2	2
4	2	2	2
4	3	2	2
4	3	1	1
/	/	/	/
0	4	2	1
0	0	0	0
4	4	3	3
3	/	/	/
N	N	N	N
3	/	/	/
3	/	/	/
N	N	N	N
3	2	2	4
3	/	/	/
N	N	N	N
3	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
4	/	/	/
N	N	N	N
4	2	2	3
4	2	2	3
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
3	/	/	/
2	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
A	2	R,I,S	B	S
A	1	I,S	B	R
T	2	R,I	B	I,S
T	1	R,C	A	I,S
T	1	I	/	/
B	2	R,I,S	T	I
T	2	R,S	0	0
T	2	R,S	0	0
0	0	0	0	0
A	2	R,I	B	I,S
A	2	R,I	T	C
0	0	0	0	0
T	2	R,C	A	S
0	0	0	0	0
T	1	R,S	B	0
T	2	R	B	C
T	2	R	0	0
A	2	R,I	0	0
A	1	R,I	T	R
A	1	R,I	0	0
B	2	R,C	0	0
B	2	R,C	A	C
B	1	R	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
B	1	R,C	T	R,I
B	2	R,S	B	R,S
A	3	R,I,S	B	C
B	1	C,I	/	/
B	1	C,I	/	/
A	1	R,I	T	R,C
T	1	R	B	R
T	1	R,C	0	0
A	1	R,I	T	R,I
B	1	R,S	0	0
A	1	R,I	B	R,C
A	1	R,I	/	/
/	/	/	/	/
A	1	R	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	0	0	1
/	/	0	1
1	0	0	1
1	0	0	0
1	0	0	1
1	1	0	1
/	/	0	1
1	2	0	1
0	0	0	1
0	0	0	1
0	0	0	1
1	0	0	1
1	0	0	1
0	0	0	1
1	0	0	1
0	/	0	0
1	2	0	1
2	0	0	1
0	2	0	1
0	N	N	1
1	2	3	1
0	2	3	1
0	N	N	1
1	2	2	1
0	N	N	1
0	N	N	1
0	3	3	1
0	N	N	1
0	N	N	1
/	2	3	1
/	N	N	1
2	N	N	1
2	N	N	1
1	N	N	1
/	N	N	1
/	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
1	N	N	1
0	N	N	1
1	N	N	1
/	N	N	1
/	2	2	1
0	2	3	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			S
			S
			S
			S
			S
			S
			S
			S
			B
			S
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1696	FEK 015	177		D3
1697	FEK 015	177		D4
1698	FEK 015	177		D5
1699	FEK 015	177		D6
1700	FEK 015	177		D7
1701	FEK 015	177		D8
1702	FEK 015	177		D9
1703	FEK 015	177		D10
1704	FEK 015	177		D11
1705	FEK 015	177		D12
1706	FEK 015	177		D13
1707	FEK 015	177		D14
1708	FEK 015	177		D15
1709	FEK 015	177		D16
1710	FEK 015	177		D17
1711	FEK 015	177		D18
1712	FEK 015	177		V1
1713	FEK 015	177		V2
1714	FEK 015	177		V3
1715	FEK 015	177		V4
1716	FEK 015	177		V5
1717	FEK 015	177		V6
1718	FEK 015	177		V7
1719	FEK 015	177		V8
1720	FEK 015	177		V9
1721	FEK 015	177		V10
1722	FEK 015	177		V11
1723	FEK 015	177		V12
1724	FEK 015	177		V13
1725	FEK 015	177		V14
1726	FEK 015	177		V15
1727	FEK 015	177		V16
1728	FEK 015	177		V17
1729	FEK 015	177		V18
199	FEK 016	32		D1
200	FEK 016	32		D2
201	FEK 016	32		D3
202	FEK 016	32		D4
203	FEK 016	32		D5
204	FEK 016	32		D6
205	FEK 016	32		D7
206	FEK 016	32		D8
207	FEK 016	32		D9
208	FEK 016	32		D10
209	FEK 016	32		D11

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
/	/	3	2
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
R	R	2	2
/	/	2	2
/	/	3	1
N	N	N	N
R	R	3	1
/	/	3	1
N	N	N	N
R	R	3	3
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	/	/
F	D	2	2
/	/	/	/
0	0	4	4
0	0	0	0
0	0	3	0
L	D	3	1
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
2	3	1	2
N	N	N	N
/	/	/	/
/	3	2	4
N	N	N	N
/	/	/	/
/	2	1	2
N	N	N	N
/	2	1	2
/	2	1	2
N	N	N	N
/	2	1	2
/	2	1	2
N	N	N	N
/	2	1	2
3	3	1	2
2	2	2	2
1	0	0	0
1	2	1	1
N	N	N	N
1	/	/	/
1	/	/	/
N	N	N	N
2	2	1	1
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
2	3	2	2
/	/	/	/
1	4	3	2
0	4	3	5
0	3	2	2
1	0	0	0
/	4	2	5
/	/	/	/
/	3	2	5
/	3	2	5

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
B	3	R,S	/	/
B	1	R,S	A	S
A	1	S	0	0
A	1	S	/	/
T	3	R,S	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R,I	0	0
/	/	/	/	/
A	1	R	T	R
A	1	R	B	C
T	1	R	B	R
B	1	R,S	0	0
T	2	R,S	0	0
T	1	R,S	A	R
T	2	R,I,S	B	C
B	2	R,I	/	/
A	1	R	B	R
B	2	R,S	/	/
T	3	R,S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
T	2	R,S	0	0
0	0	0	0	0
A	2	R,S	T	R,S
T	1	R,S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	3	3	1
1	N	N	1
0	3	3	1
/	N	N	1
0	N	N	1
0	3	3	1
/	3	3	1
/	3	3	1
/	3	3	1
/	/	/	1
/	/	/	1
/	3	3	1
/	/	/	1
/	/	/	1
0	3	3	1
/	/	/	1
1	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
1	N	N	1
1	N	N	1
/	N	N	1
2	N	N	1
/	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
/	0	0	1
/	0	0	1
/	0	0	1
/	0	0	1
/	0	0	1
/	/	0	/
0	4	3	1
/	/	0	/
0	0	0	0
0	4	3	1
2	0	0	0
0	0	0	1
/	4	3	1
/	/	0	/
/	2	0	/
/	2	0	/

Extract Ref No	Source	Starch Present	Cleaning
			B
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			S
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
210	FEK 016	32		D12
211	FEK 016	32		D13
212	FEK 016	32		D14
213	FEK 016	32		D15
214	FEK 016	32		D16
215	FEK 016	32		D17
216	FEK 016	32		D18
217	FEK 016	32		V1
218	FEK 016	32		V2
219	FEK 016	32		V3
220	FEK 016	32		V4
221	FEK 016	32		V5
222	FEK 016	32		V6
223	FEK 016	32		V7
224	FEK 016	32		V8
225	FEK 016	32		V9
226	FEK 016	32		V10
227	FEK 016	32		V11
228	FEK 016	32		V12
229	FEK 016	32		V13
230	FEK 016	32		V14
231	FEK 016	32		V15
232	FEK 016	32		V16
233	FEK 016	32		V17
234	FEK 016	32		V18
1783	FEK 025	181		D1
1784	FEK 025	181		D2
1785	FEK 025	181		D3
1786	FEK 025	181		V1
1787	FEK 025	181		V2
1788	FEK 025	181		V3
1640	FEK 029	175		D4
1641	FEK 029	175		D5
1642	FEK 029	175		D6
1643	FEK 029	175		D7
1644	FEK 029	175		D8
1645	FEK 029	175		D9
1646	FEK 029	175		D10
1647	FEK 029	175		D11
1648	FEK 029	175		D12
1649	FEK 029	175		D13
1650	FEK 029	175		D14
1651	FEK 029	175		D15
1652	FEK 029	175		D16
1653	FEK 029	175		D17

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
B,L	D	2	3
/	/	/	/
F	D	4	4
0	0	0	0
B	D	4	4
B	D	4	2
0	0	0	0
B	D	4	4
/	/	4	4
/	/	/	/
/	/	4	4
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
R	R	3	3
N	N	N	N
R	R	2	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
/	/	/	/
/	3	2	5
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
3	3	1	1
/	/	/	/
4	2	1	2
0	0	0	5
4	2	1	1
2	3	2	2
0	0	0	0
4	2	1	2
4	/	/	/
/	/	/	/
4	/	/	/
/	2	1	2
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
3	2	3	3
N	N	N	N
2	/	/	/
/	2	1	1
N	N	N	N
/	2	1	1
3	2	1	2
N	N	N	N
/	/	/	/
/	2	1	1
N	N	N	N
/	2	1	1
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	2	1	3
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R,S	0	0
/	/	/	/	/
A	1	I	T	I
A	2	R	T	C
A	2	R,S	T	R
0	0	0	T	S
T	2	R	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,C	0	0
B	1	R,C	B	R
B	1	R,C	0	0
T	2	R,I	0	0
0	0	0	0	0
B	1	C	0	0
B	1	C	0	0
B	1	C	0	0
0	0	0	0	0
T	2	R,I	A	R
B	1	R,C	0	0
B	1	R,C	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	0	/
/	2	0	/
/	/	0	/
/	/	0	/
/	/	0	/
/	/	0	/
/	/	0	/
/	/	0	/
0	0	0	0
/	/	0	/
1	0	0	1
1	0	0	0
1	0	0	1
1	0	0	0
0	0	0	0
0	0	0	1
/	/	0	1
/	/	0	0
/	/	0	1
/	0	0	1
/	/	0	1
/	/	0	1
/	/	0	1
/	/	0	1
/	/	0	1
/	3	3	1
/	3	3	1
/	3	3	1
0	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
0	3	3	1
0	N	N	1
0	N	N	1
0	3	3	1
0	N	N	1
1	N	N	1
0	3	3	1
0	N	N	1
/	N	N	1
/	4	3	1
/	/	/	1
0	N	N	1
/	3	1	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			A
			B
			B
			B
			B
			A
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1654	FEK 029	175		D18
1655	FEK 029	175		V4
1656	FEK 029	175		V5
1657	FEK 029	175		V6
1658	FEK 029	175		V7
1659	FEK 029	175		V8
1660	FEK 029	175		V9
1661	FEK 029	175		V10
1662	FEK 029	175		V11
1663	FEK 029	175		V12
1664	FEK 029	175		V13
1665	FEK 029	175		V14
1666	FEK 029	175		V15
1667	FEK 029	175		V16
1668	FEK 029	175		V17
1669	FEK 029	175		V18
1730	FEK 032	178		D7
1731	FEK 032	178		D8
1732	FEK 032	178		D9
1733	FEK 032	178		D10
1734	FEK 032	178		D11
1735	FEK 032	178		D12
1736	FEK 032	178		V7
1737	FEK 032	178		V8
1738	FEK 032	178		V9
1739	FEK 032	178		V10
1740	FEK 032	178		V11
1741	FEK 032	178		V12
3062	FEK 032	178		D7
3063	FEK 032	178		D8
3064	FEK 032	178		D9
3065	FEK 032	178		D10
3066	FEK 032	178		D11
3067	FEK 032	178		D12
3068	FEK 032	178		V7
3069	FEK 032	178		V8
3070	FEK 032	178		V9
3071	FEK 032	178		V10
3072	FEK 032	178		V11
3073	FEK 032	178		V12
1771	FEK 052	180		D1
1772	FEK 052	180		D2
1773	FEK 052	180		D3
1774	FEK 052	180		D4
1775	FEK 052	180		D5

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
/	/	4	4
N	N	N	N
/	/	4	4
/	/	4	4
N	N	N	N
/	/	4	4
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	/	/
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	3	3
N	N	N	N
R	R	/	/
R	R	2	/
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
/	/	/	/
4	/	/	/
N	N	N	N
4	/	/	/
4	/	/	/
N	N	N	N
4	/	/	/
/	/	/	/
N	N	N	N
/	/	/	0
/	/	/	/
N	N	N	M
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	2	2	2
N	N	N	N
/	2	1	1
/	2	1	1
N	N	N	N
/	2	1	1
3	3	1	1
N	N	N	N
/	3	1	1
/	/	/	/
N	N	N	N
/	/	/	/
/	2	2	2
N	N	N	N
/	2	1	1
/	2	1	1
N	N	N	N
/	2	1	1
3	3	1	1
N	N	N	N
/	3	1	1
/	/	/	/
N	N	N	N
/	/	/	/
3	2	1	1
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
B	2	R,I	0	0
0	0	0	0	0
T	1	R,C	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
A	2	R,S	B	R,C
T	1	R	0	0
T	3	R	0	0
0	0	0	0	0
T	1	S	0	0
M	M	M	M	M
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
B	1	R,C	0	0
B	1	R,C	0	0
T	3	R	0	0
/	/	/	/	/
A	1	S	0	0
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
0	0	0	0	0
B	1	R,C	0	0
B	1	R,C	0	0
T	3	R	0	0
/	/	/	/	/
A	1	S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	C,S	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	2	1	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
M	N	N	1
/	N	N	1
/	N	N	1
/	2	3	1
/	N	N	1
0	N	N	1
0	3	2	1
0	N	N	1
/	N	N	1
/	3	2	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1
0	N	N	1
/	N	N	1
0	N	N	1
0	3	2	1
0	N	N	1
0	N	N	1
/	3	2	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1
0	N	N	1
/	N	N	1
/	0	0	1
/	3	3	1
/	/	/	1
/	/	/	1
0	3	3	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			S
			S
			S
			S
			S
			S
			B
			B
			B
			B
			B
			B
			S
			S
			S
			S
			S
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
1776	FEK 052	180		D6
1777	FEK 052	180		V1
1778	FEK 052	180		V2
1779	FEK 052	180		V3
1780	FEK 052	180		V4
1781	FEK 052	180		V5
1782	FEK 052	180		V6
1742	FEK 109	179		D4
1743	FEK 109	179		D5
1744	FEK 109	179		D6
1745	FEK 109	179		D7
1746	FEK 109	179		D8
1747	FEK 109	179		D9
1748	FEK 109	179		D10
1749	FEK 109	179		D11
1750	FEK 109	179		D12
1751	FEK 109	179		D13
1752	FEK 109	179		D14
1753	FEK 109	179		D15
1754	FEK 109	179		D16
1755	FEK 109	179		D17
1756	FEK 109	179		D18
1757	FEK 109	179		V4
1758	FEK 109	179		V5
1759	FEK 109	179		V6
1760	FEK 109	179		V7
1761	FEK 109	179		V8
1762	FEK 109	179		V9
1763	FEK 109	179		V11
1764	FEK 109	179		V12
1765	FEK 109	179		V13
1766	FEK 109	179		V14
1767	FEK 109	179		V15
1768	FEK 109	179		V16
1769	FEK 109	179		V17
1770	FEK 109	179		V18
235	FQT 039	42		D1
236	FQT 039	42		D2
237	FQT 039	42		D3
238	FQT 039	42		D4
239	FQT 039	42		D5
240	FQT 039	42		D6
241	FQT 039	42		D7
242	FQT 039	42		D8
243	FQT 039	42		D9

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
R	R	2	2
N	N	N	N
R	R	2	2
R	R	3	3
N	N	N	N
R	R	3	3
/	/	3	3
N	N	N	N
/	/	4	4
/	/	4	4
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
N	N	N	N
/	/	3	3
/	/	3	3
N	N	N	N
/	/	3	3
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
M	D	3	2
V	C	3	3
V	C	3	3
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
/	/	/	/
3	3	1	1
N	N	N	N
3	2	1	1
3	3	1	1
N	N	N	N
3	0	0	0
3	2	1	2
N	N	N	N
4	3	2	2
4	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
4	2	2	2
N	N	N	N
4	2	2	2
4	2	2	1
N	N	N	N
3	2	2	2
N	N	N	N
/	2	1	1
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
2	/	/	/
3	4	2	2
3	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
A	2	S	B	C
A	2	R,S	B	S
B	1	C,S	0	0
B	1	C	0	0
B	1	R,C	0	0
B	1	R,S,C	0	0
A	2	R,I	B	C
A	3	R,I	B	C
A	1	S	/	0
B	2	R,I	0	0
0	0	0	0	0
0	0	0	0	0
T	2	R	B	C
T	2	R	A	R
B	1	R,C	0	0
B	1	C	0	0
B	1	C	0	0
/	/	/	/	/
B	1	C	0	0
B	1	C	0	0
/	/	/	/	/
A	1	R,S	/	/
T	1	R,I	B	C
B	1	R,I	0	0
0	0	0	0	0
B	1	R,I,C	0	0
B	1	R,I,C	0	0
0	0	0	0	0
B	1	R,S,C	0	0
B	1	R,S,C	0	0
B	1	R,S,C	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R,S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	/	1
1	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
1	N	N	1
1	3	3	1
0	3	3	1
0	N	N	1
0	N	N	1
0	N	N	1
1	N	N	1
3	3	3	1
0	N	N	1
0	N	N	1
0	3	3	1
/	/	/	1
0	/	/	1
0	/	/	1
/	/	/	1
/	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	0	0	
0	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
0	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0

Extract Ref No	Source	Starch Present	Cleaning
			B
			S
			B
			B
			B
			B
			B
			S
			B
			B
			B
			B
			B
			S
			S
			B
			B
			B
			S
			B
			B
			B
			S
			S
			S
			S
			S
			B
			B
			B
			B
			B
			B
			B
			B
		0	A
			A
		0	A
			A
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
244	FQT 039	42		D10
245	FQT 039	42		D11
246	FQT 039	42		D12
247	FQT 039	42		D13
248	FQT 039	42		D14
249	FQT 039	42		D15
250	FQT 039	42		D16
251	FQT 039	42		D17
252	FQT 039	42		D18
253	FQT 039	42		V1
254	FQT 039	42		V2
255	FQT 039	42		V3
256	FQT 039	42		V4
257	FQT 039	42		V5
258	FQT 039	42		V6
259	FQT 039	42		V7
260	FQT 039	42		V8
261	FQT 039	42		V9
262	FQT 039	42		V10
263	FQT 039	42		V11
264	FQT 039	42		V12
265	FQT 039	42		V13
266	FQT 039	42		V14
267	FQT 039	42		V15
268	FQT 039	42		V16
269	FQT 039	42		V17
270	FQT 039	42		V18
579	FR 1052	93		D15
644	FRL 1004	101		D10
645	FRL 1004	101		D11
646	FRL 1004	101		D12
647	FRL 1004	101		D13
648	FRL 1004	102		D14
649	FRL 1004	101		D15
650	FRL 1004	101		D16
651	FRL 1004	101		D17
652	FRL 1004	101		D18
653	FRL 1004	101		V10
654	FRL 1004	101		V11
655	FRL 1004	101		V12
656	FRL 1004	101		V13
657	FRL 1004	101		V14
658	FRL 1004	101		V15
659	FRL 1004	101		V16
660	FRL 1004	101		V17

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
0	0	4	4
/	/	4	4
B	D	4	4
V	D	3	3
/	/	/	/
V	C	3	3
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
0	0	0	0
/	/	/	/
/	/	/	/
/	/	4	4
/	/	2	2
N	N	N	N
R	R	1	1
R	R	1	1
N	N	N	N
R	R	0	0
R	R	0	0
N	N	N	N
R	R	0	0
R	R	1	1
N	N	N	N
R	R	2	2
/	/	3	3
N	N	N	N
R	R	3	3
R	R	3	2
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
4	2	1	2
4	2	1	2
4	2	2	2
3	0	0	0
/	/	/	/
3	1	2	2
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
0	1	2	1
/	/	/	/
/	/	/	/
4	2	3	4
3	2	2	2
N	N	N	N
1	0	0	0
1	2	3	3
N	N	N	N
0	0	0	0
0	0	0	0
N	N	N	N
0	0	0	0
1	0	0	0
N	N	N	N
1	1	1	1
2	1	2	3
N	N	N	N
3	2	3	3
2	2	3	3
N	N	N	N

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	R,I	0	0
/	/	/	/	/
A	3	R	0	0
T	2	R,I	B	R
/	/	/	/	/
A	2	R,S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	S	B	S
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	2	R	0	0
0	0	0	0	0
B	2	R,I	A	R,S
0	0	0	0	0
B	1	R,S	0	0
B	1	R,S	0	0
0	0	0	0	0
B	1	R,S	0	0
0	0	0	0	0
A	2	R,I	T	R,I
T	1	R,S	A	R,I
B	1	R,I	T	R
B	2	R	B	R
B	1	R	B	R
B	1	R	B	R
B	1	R,C	0	0
B	1	R	B	C

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
0	0	0	0
/	0	0	0
0	0	0	0
2	0	0	0
/	/	0	0
0	0	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
/	/	0	0
1	2	0	0
/	/	0	0
/	/	0	0
/	N	N	1
0	N	N	1
0	3	2	1
1	N	N	1
0	N	N	1
0	3	3	1
0	N	N	1
0	N	N	1
0	3	3	1
0	N	N	1
2	N	N	1
2	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
1	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			A
			A
			A
			A
		0	A
			A
			A
		0	A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
661	FRL 1004	101		V18
563	FRL 101	92		D4
564	FRL 101	92		D5
565	FRL 101	92		D6
566	FRL 101	92		D7
567	FRL 101	92		D8
568	FRL 101	92		D9
569	FRL 101	92		V4
570	FRL 101	92		V5
571	FRL 101	92		V7
572	FRL 101	92		V8
573	FRL 101	92		V9
592	FRL 1012	94		D13
593	FRL 1012	94		D14
594	FRL 1012	94		D15
595	FRL 1012	94		D16
596	FRL 1012	94		D17
597	FRL 1012	94		D18
598	FRL 1012	94		V13
599	FRL 1012	94		V14
600	FRL 1012	94		V15
601	FRL 1012	94		V16
602	FRL 1012	94		V17
603	FRL 1012	94		V18
487	FRL 1017	86		D13
488	FRL 1017	86		D14
489	FRL 1017	86		D15
490	FRL 1017	86		V13
491	FRL 1017	86		V15
562	FRL 1017	86		V14
686	FRL 1048	99		D1
687	FRL 1048	99		D2
688	FRL 1048	99		D3
689	FRL 1048	99		D4
690	FRL 1048	99		D5
691	FRL 1048	99		D6
692	FRL 1048	99		V1
693	FRL 1048	99		V2
694	FRL 1048	99		V3
695	FRL 1048	99		V4
696	FRL 1048	99		V5
697	FRL 1048	99		V6
307	FRL 1049	74		D1
308	FRL 1049	74		D2
309	FRL 1049	74		D3

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
R	R	3	2
/	/	3	3
N	N	N	N
F	C	3	4
V	C	3	2
N	N	N	N
R	R	R	R
0	0	3	3
N	N	N	N
/	/	3	4
N	N	N	N
/	/	4	3
R	R	2	2
N	N	N	N
R	R	R	0
0	0	0	0
N	N	N	N
R	R	0	0
R	R	1	1
N	N	N	N
R	R	2	1
R	R	3	2
N	N	N	N
R	R	2	1
R	R	R	R
N	N	N	N
R	R	R	R
M	D	0	0
F	D	3	2
N	N	N	N
H	D	3	3
R	R	0	0
/	/	/	/
R	R	R	R
N	N	N	N
H	D	1	1
/	/	3	3
/	/	2	1
F	D	1	1
/	/	3	3
N	N	N	N
/	/	/	/
/	/	3	3
R	R	/	/
B	D	3	3

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
3	2	3	3
4	0	0	0
N	2	1	2
4	0	0	0
3	1	1	1
N	N	N	N
R	2	2	4
3	2	1	2
N	N	N	N
4	2	3	4
N	N	N	N
4	2	3	4
2	2	1	1
N	N	N	N
0	0	0	0
0	0	0	0
N	N	N	N
0	0	0	0
1	1	1	1
N	N	N	N
1	2	1	1
2	1	1	1
N	0	0	0
2	3	1	2
R	1	3	5
N	2	3	5
R	2	3	5
0	3	2	4
2	2	2	4
N	2	1	N
2	3	1	2
0	0	0	0
/	/	/	/
R	0	0	0
N	N	N	N
1	0	0	0
3	2	2	3
1	2	1	1
1	0	0	0
3	1	2	3
N	N	N	N
/	2	1	1
2	1	1	1
/	2	1	5
2	0	0	0

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
0	0	0	0	0
A	2	R,S	T	R
B	3	R,S	0	0
B	2	R	A	S
B	2	R	B	C
T	1	R	0	0
T	1	R,S	B	C
A	1	R,S	B	C
T	1	R	B	C
T	3	R,S	B	C
A	2	R,S	T	R
T	1	S	B	S
A	1	R,S	0	0
B	2	R	0	0
B	1	S	0	0
T	2	S	0	0
T	1	R	B	C,I
T	2	R,S	B	C
B	1	R,S	T	S
A	1	R,S	T	R,C
/	/	/	/	/
T	2	R,S	B	C
T	2	S	B	C
T	1	R	B	C
0	0	0	0	0
T	1	R	0	0
T	1	R,I	B	R,I
B	1	R,C	0	0
T	2	R,I	B	R,C
B	1	S	0	0
0	0	0	0	0
B	1	C	0	0
A	1	R,S	0	0
0	0	0	0	0
B	1	R	B	C
B	1	R	B	C
B	1	R	0	0
B	1	R,S	B	C
0	0	0	0	0
T	1	R,S	B	C
T	1	R,S	B	C
A	1	R,I	0	0
0	0	0	B	R,S
B	1	R,S	T	S

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	3	3	1
0	0	0	
1	0	0	1
0	1	3	1
1	3	2	1
1	0	0	1
0	1	3	1
1	0	0	0
1	0	0	
2	0	0	1
1	0	0	1
1	0	0	1
1	0	0	1
0	3	2	1
0	0	0	1
0	0	0	1
0	0	0	1
2	3	2	1
1	0	1	
2	0	1	
2	0	0	1
/	/	/	1
1	0	0	1
1	0	0	1
1	1	1	1
0	2	2	1
0	2	2	1
1	3	3	1
0	2	2	1
1	2	2	1
0	N	N	1
0	/	/	1
0	/	/	1
0	/	/	1
0	3	3	1
1	N	N	1
1	N	N	1
0	N	N	1
2	N	N	1
0	N	N	1
1	N	N	1
1	N	N	1
0	0	0	1
1	2	1	1
1	0	0	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			A
			B
			B
			B
			B
			B
			B
			A
			B
			A
			A
			A
			A
			A
			B
			B
			A
			A
			B
			B
			A
			A
			A
			N
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
310	FRL 1049	74		D4
311	FRL 1049	74		D5
312	FRL 1049	74		D6
313	FRL 1049	74		V1
314	FRL 1049	74		V2
315	FRL 1049	74		V3
316	FRL 1049	74		V4
317	FRL 1049	74		V5
318	FRL 1049	74		V6
698	FRL 1050	98		D9
699	FRL 1050	98		D10
700	FRL 1050	98		D11
701	FRL 1050	98		D12
702	FRL 1050	98		D13
703	FRL 1050	98		D14
704	FRL 1050	98		D15
705	FRL 1050	98		D16
706	FRL 1050	98		D17
707	FRL 1050	98		D18
708	FRL 1050	98		V8
709	FRL 1050	98		V10
710	FRL 1050	98		V11
711	FRL 1050	98		V12
712	FRL 1050	98		V13
713	FRL 1050	98		V14
714	FRL 1050	98		V15
715	FRL 1050	98		V16
716	FRL 1050	98		V17
717	FRL 1050	98		V18
574	FRL 1052	93		D10
575	FRL 1052	93		D11
576	FRL 1052	93		D12
577	FRL 1052	93		D13
578	FRL 1052	93		D14
580	FRL 1052	93		D16
581	FRL 1052	93		D17
582	FRL 1052	93		D18
583	FRL 1052	93		V10
584	FRL 1052	93		V11
585	FRL 1052	93		V12
586	FRL 1052	93		V13
587	FRL 1052	93		V14
588	FRL 1052	93		V15
589	FRL 1052	93		V16
590	FRL 1052	93		V17

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
B	D	2	2
N	N	N	N
B	D	2	2
F	D	0	1
0	0	1	1
F	D	2	1
/	/	3	3
N	N	N	N
/	/	3	3
S	D	0	1
F	D	0	0
N	N	N	N
R	R	R	0
/	/	0	0
N	N	N	N
F	D	0	0
R	R	R	R
N	N	N	N
F	D	2	2
R	R	R	R
/	/	3	2
N	N	N	N
F	D	2	3
/	/	3	2
N	N	N	N
/	/	2	2
/	/	2	2
N	N	N	N
B	D	1	2
R	R	2	2
N	N	N	N
/	/	3	3
V	C	2	2
N	N	N	N
/	/	3	3
N	N	N	N
/	/	2	2
/	/	3	3
N	N	N	N
/	/	3	3
/	/	3	3
N	N	N	N
/	/	3	3
B	D	3	3
0	0	1	1

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
2	0	0	0
N	3	2	5
1	0	0	0
0	0	0	0
1	0	0	0
1	1	1	1
2	1	1	1
N	0	0	0
2	1	1	1
0	0	0	0
0	0	0	0
N	N	N	N
0	0	0	0
0	0	0	0
N	N	N	N
0	0	0	0
R	0	0	0
N	N	N	N
3	0	0	0
R	R	R	R
2	2	2	3
N	N	N	N
3	2	2	3
2	2	2	3
N	N	N	N
2	2	1	1
2	2	1	1
N	N	N	N
1	0	0	0
2	3	1	1
N	N	N	N
3	2	3	3
1	3	1	1
N	N	N	N
3	3	3	4
N	N	N	N
2	3	2	4
3	3	1	2
N	N	N	N
3	3	1	2
3	3	1	2
N	N	N	N
3	2	1	1
3	2	1	1
1	0	0	0

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
T	1	I,S	0	0
A	1	S	B	S
A	2	R,S	B	R
T	1	R,I,S	A	R
T	1	I,S	T	C
T	1	I	0	0
B	1	I	0	0
B	1	R,S	0	0
B	1	R,S	0	0
A	2	R	B	C
A	2	R,I	0	0
0	0	0	0	0
A	3	R,I	0	0
B	2	S	A	R,I
0	0	0	0	0
A	2	I	0	0
0	0	0	0	0
A	1	R	T	S
A	1	R,S	A	C
A	2	R,I	B	C,I
B	1	R,S	0	0
A	3	R,S	A	C
B	2	R,S	A	C
T	1	S	T	C
B	1	C,I	0	0
A	1	R,S	B	C
A	1	R,S	B	C
B	1	R,S	B	C
A	1	R	B	R,I
T	1	R,C	B	C
A	1	R,C	0	0
A	2	R	0	0
0	0	0	0	0
A	2	R	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	3	R	B	C
A	3	R	B	C
/	/	/	/	/
A	2	R	B	C
A	2	R	B	C,S
A	2	R	0	0
0	0	0	0	0
0	0	0	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	0	0	1
1	3	2	1
1	0	0	1
1	0	0	1
1	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
1	N	N	1
0	N	N	1
0	2	1	1
0	3	2	1
2	N	N	1
0	2	1	1
0	N	N	1
0	N	N	
1	N	N	1
1	1	3	1
1	N	N	1
0	N	N	1
2	N	N	1
2	N	N	1
1	N	N	1
0	N	N	1
1	N	N	1
1	N	N	1
1	0	0	1
2	N	N	1
1	N	N	1
0	3	3	1
0	0	0	1
0	N	N	1
0	3	3	1
/	3	2	1
/	4	3	1
/	2	2	1
1	N	N	1
1	0	0	1
/	N	N	1
1	0	0	1
1	N	N	1
0	0	0	1
0	0	0	1
0	0	0	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			A
			A
			B
			A
			A
			A
			B
			B
			B
			B
			B
			B
			B
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
591	FRL 1052	93		V18
510	FRL 1053	89		D7
511	FRL 1053	89		D8
512	FRL 1053	89		D9
513	FRL 1053	89		D10
514	FRL 1053	89		D11
515	FRL 1053	89		D12
516	FRL 1053	89		D13
517	FRL 1053	89		D14
518	FRL 1053	89		D15
519	FRL 1053	89		D16
520	FRL 1053	89		D17
521	FRL 1053	89		D18
522	FRL 1053	89		V7
523	FRL 1053	89		V8
524	FRL 1053	89		V9
525	FRL 1053	89		V10
526	FRL 1053	89		V11
527	FRL 1053	89		V12
528	FRL 1053	89		V13
529	FRL 1053	89		V14
530	FRL 1053	89		V15
531	FRL 1053	89		V16
532	FRL 1053	89		V17
533	FRL 1053	89		V18
319	FRL 1054	75		D1
320	FRL 1054	75		D2
321	FRL 1054	75		D3
322	FRL 1054	75		D4
323	FRL 1054	75		D5
324	FRL 1054	75		D5
325	FRL 1054	75		V1
326	FRL 1054	75		V2
327	FRL 1054	75		V3
328	FRL 1054	75		V4
329	FRL 1054	75		V5
330	FRL 1054	75		V6
718	FRL 1056	96		D1
719	FRL 1056	96		D2
720	FRL 1056	96		D3
721	FRL 1056	96		D4
722	FRL 1056	96		D5
723	FRL 1056	96		D6
724	FRL 1056	96		V1
725	FRL 1056	96		V2

Scar Type	Scar Distributioi	Edge Rounding Prof	Edge Rounding Plan
/	/	2	2
/	/	4	3
N	N	N	N
0	0	1	3
0	0	1	2
N	N	N	N
/	/	/	/
/	/	3	3
N	N	N	N
/	/	/	/
R	R	R	R
R	R	R	R
R	R	R	R
/	/	4	2
N	N	N	N
B	D	2	3
B,F	D	3	4
N	N	N	N
B	D	4	3
B	D	4	4
N	N	N	N
/	/	3	3
B	D	3	3
N	N	N	N
/	/	/	/
/	/	3	3
R	R	3	3
/	/	3	3
/	/	2	2
N	N	N	N
/	/	3	3
F	D	2	2
0	0	2	2
F	D	2	2
0	0	2	2
N	N	N	N
B	D	3	3
F	D	1	1
F	D	1	1
B	D	1	2
0	0	1	1
N	N	N	N
F	D	0	0
V	D	2	1
0	0	0	0

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
2	2	1	2
4	3	1	4
N	3	2	2
3	2	1	1
3	0	0	0
N	0	0	0
/	2	1	3
4	2	2	4
N	2	1	1
/	/	/	/
3	2	3	4
2	0	0	0
R	2	2	4
4	2	2	4
N	0	0	0
3	2	2	3
3	3	2	3
N	0	0	0
4	2	1	4
4	3	2	4
N	N	N	N
3	2	2	3
3	2	1	2
N	N	0	0
/	/	/	/
2	3	1	2
3	2	1	2
2	2	1	2
2	2	1	1
N	2	1	5
2	2	1	1
2	1	1	4
2	0	0	0
2	1	1	0
2	1	1	1
N	0	0	0
3	0	0	0
0	0	0	0
1	0	0	0
1	2	1	1
2	2	3	2
N	N	N	N
1	0	0	0
1	3	1	2
0	0	0	0

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
T	1	R,I	0	0
A	2	R,I	B	R
B	1	R,I,C	0	0
A	3	R,I	0	0
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
A	3	R,I	0	0
A	2	R,I	0	0
/	/	/	/	/
/	/	/	/	/
A	2	R,I	B	C
/	/	/	/	/
T	2	R,I,S	B	R
T	1	R,I	B	R,C
A	3	R	B	R
T	2	R,I	B	R,C
A	2	R,I	B	R
T	2	R,I	B	R
A	3	R,I	0	0
0	0	0	0	0
A	2	R,S	B	R,C
B	2	R,I	B	C
B	2	R,I	A	R,C
T	1	R	B	R
0	0	0	0	0
0	0	0	0	0
B	1	I	0	0
B	1	R,I	0	0
B	1	R	0	0
/	/	/	/	/
0	0	0	0	0
T	2	R	0	0
0	0	0	0	0
0	0	0	0	0
T	2	R	0	0
A	1	R	0	0
A	1	R,S	0	0
A	1	R,S,C	0	0
A	1	R	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	0	0	1
1	0	0	1
0	3	2	1
0	0	0	1
/	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	2	2	1
/	/	0	1
/	/	0	1
2	0	0	1
/	/	0	1
1	0	0	1
1	0	0	1
1	0	0	1
1	0	0	1
1	0	0	1
1	0	0	1
0	0	0	1
0	0	0	1
1	0	0	1
1	0	0	1
1	0	0	1
1	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	2	1	1
/	0	0	0
0	0	0	1
0	1	0	1
0	1	0	
0	0	0	1
0	1	0	1
0	1	0	1
0	0	0	1
0	0	0	1
0	2	3	1
0	1	3	1
0	1	3	1
0	0	0	1
0	N	N	1
0	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
726	FRL 1056	96		V3
727	FRL 1056	96		V4
728	FRL 1056	96		V5
729	FRL 1056	96		V6
403	FRL 1058	79		D4
404	FRL 1058	79		D5
405	FRL 1058	79		D6
406	FRL 1058	79		V4
407	FRL 1058	79		V5
408	FRL 1058	79		V6
21	FRL 116	83		D7
22	FRL 116	83		D9
23	FRL 116	83		D10
24	FRL 116	83		D11
25	FRL 116	83		D12
26	FRL 116	83		D13
27	FRL 116	83		D14
28	FRL 116	83		D15
29	FRL 116	83		D16
30	FRL 116	83		D17
31	FRL 116	83		D18
32	FRL 116	83		V7
33	FRL 116	83		V9
34	FRL 116	83		V10
35	FRL 116	83		V11
36	FRL 116	83		V12
37	FRL 116	83		V13
38	FRL 116	83		V14
39	FRL 116	83		V15
40	FRL 116	83		V16
41	FRL 116	83		V17
42	FRL 116	83		V18
1	FRL 118	88		D10
2	FRL 118	88		D11
3	FRL 118	88		D12
4	FRL 118	88		D13
5	FRL 118	88		D14
6	FRL 118	88		D15
7	FRL 118	88		D16
8	FRL 118	88		D17
9	FRL 118	88		D18
10	FRL 118	88		V10
11	FRL 118	88		V11
13	FRL 118	88		V12
14	FRL 118	88		V13

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
0	0	0	0
B	D	3	2
N	N	N	N
H	D	2	1
B	C	3	3
N	N	N	N
B	D	3	3
F	D	3	2
N	N	N	N
B	D	3	3
0	0	2	2
F	D	2	2
/	/	/	/
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
0	0	1	1
/	/	3	3
R	R	0	0
F	D	1	0
0	0	0	0
R	R	0	/
N	N	N	N
0	0	1	0
0	0	0	0
N	N	N	N
0	0	3	2
R	R	2	1
R	R	R	0
R	R	R	0
R	R	1	0
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
F	D	2	1
N	N	N	N
R	R	2	3
0	0	2	1

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
0	2	2	3
2	2	2	2
N	N	N	N
1	2	1	1
2	2	2	3
N	0	0	0
3	2	1	3
2	1	1	1
N	0	0	0
3	1	1	2
1	3	1	1
1	0	0	0
/	/	/	/
N	0	0	0
R	2	1	3
R	0	0	0
N	0	0	0
0	0	0	0
1	0	0	0
3	0	0	0
0	1	2	3
0	1	1	1
0	0	0	0
1	0	0	0
N	0	0	0
0	0	0	0
0	1	1	1
N	0	0	0
2	1	2	2
1	1	1	3
0	1	1	3
0	1	1	3
1	2	1	2
N	N	N	N
/	0	0	0
/	1	1	2
N	0	0	0
R	/	/	/
R	0	0	0
N	0	0	0
R	0	0	0
1	0	0	0
N	0	0	0
4	0	0	0
2	1	1	5

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
0	0	0	0	0
B	1	R	B	R,S
B	1	R	B	R,S
A	2	R	0	0
0	0	0	0	0
A	1	I	B	C
0	0	0	0	0
T	2	I	B	C
T	2	I	B	C
0	0	0	0	0
T	2	r	t	c
B	1	R	B	C
0	0	0	0	0
0	0	0	0	0
B	1	R	T	I
0	0	0	0	0
T	2	R,C	0	0
A	1	R	B	I
A	1	I,S	0	0
0	0	0	0	0
0	0	0	0	0
T	2	R,C	0	0
T	2	R	B	R
B	1	R,S	0	0
A	2	R,I	B	C
T	1	I,S	0	0
0	0	0	0	0
T	1	C	0	0
T	1	C	0	0
A	1	R	B	C
0	0	0	0	0
0	0	0	0	0
B	1	R,C	A	R
B	1	C	A	R
A	2	S	T	C
0	0	0	0	0
B	1	C	B	R
/	/	/	/	/
/	/	/	/	/
A	2	R,I	B	C
/	/	/	/	/
T	2	R,I,C	B	C
T	3	R,C	B	C
T	2	R	T	C
0	0	0	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
0	0	0	1
1	2	0	1
0	2	1	1
1	0	0	1
1	0	0	1
0	0	0	1
2	0	0	1
1	0	0	1
0	0	0	1
0	0	0	1
1	2	0	1
0	0	0	1
0	0	0	1
1	0	0	1
0	0	0	1
0	0	0	1
0	2	0	1
0	0	0	1
2	0	0	1
0	0	0	1
1	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
1	0	0	1
0	0	0	1
0	0	0	1
1	1	2	1
1	/	/	1
1	0	0	1
0	0	0	1
1	0	0	1
/	0	0	1
/	0	0	1
1	0	0	1
/	0	0	1
1	0	0	1
2	0	0	1
1	0	0	1
0	1	0	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
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			A
			A
			A
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			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
15	FRL 118	88		V14
16	FRL 118	88		V15
17	FRL 118	88		V16
18	FRL 118	88		V18
19	FRL 118	88		V17
20	FRL 118	88		D18
43	FRL 124	73		D2
44	FRL 124	73		D3
45	FRL 124	73		D4
46	FRL 124	73		D5
47	FRL 124	73		D6
48	FRL 124	73		V1
49	FRL 124	73		V2
50	FRL 124	73		V4
51	FRL 124	73		V5
52	FRL 124	73		V6
331	FRL 134	76		D1
332	FRL 134	76		D2
333	FRL 134	76		D3
334	FRL 134	76		D5
335	FRL 134	76		D6
336	FRL 134	76		V1
337	FRL 134	76		V2
338	FRL 134	76		V3
339	FRL 134	76		V4
340	FRL 134	76		V5
341	FRL 134	76		V6
492	FRL 155	87		D10
493	FRL 155	87		D11
494	FRL 155	87		D12
495	FRL 155	87		D13
496	FRL 155	87		D14
497	FRL 155	87		D15
498	FRL 155	87		D16
499	FRL 155	87		D17
500	FRL 155	87		D18
501	FRL 155	87		V10
502	FRL 155	87		V11
503	FRL 155	87		V12
504	FRL 155	87		V13
505	FRL 155	87		V14
506	FRL 155	87		V15
507	FRL 155	87		V16
508	FRL 155	87		V17
509	FRL 155	87		V18

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
N	N	N	N
R	R	2	2
R	R	/	/
R	R	/	/
R	R	2	2
R	R	R	R
B,F	D	2	2
/	/	2	2
F	D	2	2
N	N	N	N
B	D	2	2
/	/	2	2
/	/	2	2
/	/	3	3
N	N	N	N
/	/	3	3
F	D	3	4
R	R	3	3
/	/	2	4
N	N	N	N
/	/	2	2
/	/	2	2
R	R	/	/
/	/	1	1
/	/	1	2
N	N	N	N
/	/	/	/
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
R	R	1	1
R	R	1	1
R	R	1	1
R	R	1	1
R	R	1	1
R	R	1	1
R	R	1	1
R	R	1	1
R	R	1	1

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
N	0	0	0
2	2	1	5
/	0	0	0
/	/	/	/
3	0	0	0
R	0	0	0
2	0	0	0
1	0	0	0
2	0	0	0
N	1	2	5
1	0	0	0
1	0	0	0
1	0	0	0
1	0	0	0
N	0	0	0
3	1	1	1
4	0	0	0
4	0	0	0
4	0	0	0
N	0	1	5
2	0	0	0
2	0	0	0
/	0	0	0
1	0	0	0
1	0	0	0
N	0	0	0
/	0	0	0
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
2	/	/	/
2	/	/	/
1	/	/	/
1	1	2	2
1	1	2	2
1	1	2	2
1	1	2	2
1	1	2	2
1	1	2	2
1	1	2	2
1	1	2	2

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
T	1	R,I	A	R,I
0	0	0	0	0
A	1	C	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
B	1	I	0	0
0	0	0	0	0
0	0	0	0	0
T	1	R,I	0	0
0	0	0	0	0
0	0	0	0	0
T	1	R,I	0	0
T	1	R,I	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
A	1	R,S	0	0
0	0	0	0	0
T	1	R,S	A	R
T	1	R	0	0
T	1	R	0	0
B	1	R	T	R,S
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
1	0	0	1
0	0	0	1
0	0	0	1
/	/	0	1
/	/	0	1
/	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	2	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	2	1	
0	0	0	1
0	0	0	1
1	0	0	1
0	0	0	1
0	0	0	1
1	0	0	1
0	0	0	1
/	1	1	1
/	1	2	1
/	1	2	1
/	1	2	1
/	1	2	1
/	1	2	1
/	1	2	1
0	1	2	1
0	1	2	1
/	1	2	1
/	1	1	1
/	1	1	1
/	1	1	1
/	1	1	1
/	1	1	1
0	1	1	1
0	1	1	1
0	1	1	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
342	FRL 183	77		D4
343	FRL 183	77		D5
344	FRL 183	77		D6
345	FRL 183	77		D7
346	FRL 183	77		D8
347	FRL 183	77		D9
348	FRL 183	77		D10
349	FRL 183	77		D11
350	FRL 183	77		D12
351	FRL 183	77		D13
352	FRL 183	77		D14
353	FRL 183	77		D15
354	FRL 183	77		D16
356	FRL 183	77		D18
357	FRL 183	77		V4
358	FRL 183	77		V5
359	FRL 183	77		V6
360	FRL 183	77		V7
361	FRL 183	77		V8
362	FRL 183	77		V9
363	FRL 183	77		V10
364	FRL 183	77		V11
365	FRL 183	77		V12
366	FRL 183	77		V13
367	FRL 183	77		V14
368	FRL 183	77		V15
369	FRL 183	77		V16
370	FRL 183	77		V17
371	FRL 183	77		V18
604	FRL 185	95		D13
605	FRL 185	95		D14
606	FRL 185	94		D15
607	FRL 185	95		D16
608	FRL 185	95		D17
609	FRL 185	95		D18
610	FRL 185	95		V13
611	FRL 185	95		V14
612	FRL 185	95		V15
613	FRL 185	95		V16
614	FRL 185	95		V17
615	FRL 185	95		V18
355	FRL 186	77		D17
662	FRL 221	100		D7
663	FRL 221	100		D8
664	FRL 221	100		D9

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
/	/	/	/
N	N	N	N
B	D	2	2
B	D	3	3
N	N	N	N
/	/	/	/
R	R	0	0
N	N	N	N
R	R	N	N
R	R	N	N
N	N	N	N
R	R	N	N
R	R	N	N
R	R	R	R
/	/	2	2
N	N	N	N
B	D	2	2
/	/	3	3
N	N	N	N
F	D	1	1
R	R	2	2
N	N	N	N
R	R	1	1
R	R	R	R
N	N	N	N
R	R	3	3
R	R	2	2
R	R	2	2
R	R	2	2
B	D	3	2
N	N	N	N
B	D	3	3
B	D	3	3
N	N	N	N
0	0	3	2
0	0	2	2
N	N	N	N
0	0	2	1
0	0	2	1
N	N	N	N
F	D	2	2
R	R	R	R
0	0	0	0
N	N	N	N
R	R	1	1

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
0	1	1	5
N	0	0	0
1	0	0	0
3	1	1	2
N	0	0	0
/	0	0	0
0	0	0	0
N	0	0	0
N	1	1	2
N	2	3	4
N	2	3	5
N	2	1	3
2	2	2	3
R	2	2	4
4	2	1	3
N	1	1	N
2	2	1	2
3	1	1	1
N	0	0	0
1	0	0	0
2	1	2	3
N	0	0	0
1	0	0	0
R	2	1	5
N	0	0	0
3	0	0	0
2	2	2	4
2	2	2	4
2	2	2	4
2	2	1	2
N	N	N	N
2	1	2	2
3	3	3	3
N	N	N	N
2	2	2	2
1	0	0	0
N	N	N	N
1	/	/	/
1	0	0	0
N	N	N	N
2	1	1	2
R	R	R	R
0	0	0	0
N	N	N	N
1	0	0	0

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
0	0	0	0	0
B	2	C	0	0
B	2	C	0	0
T	1	C	0	0
A	2	I	A	C
T	2	R,I	B	R
T	1	S	0	0
B	1	I	0	0
0	0	0	0	0
A	1	C	B	I
0	0	0	0	0
T	1	C	T	I,S
A	1	I	0	0
A	2	I	0	0
T	1	C	T	R
B	2	R,B	B	C
B	1	R,C	A	I
B	1	C,I	0	0
B	1	C,I	0	0
T	1	C,I	A	R
B	2	R	A	I
T	2	R	B	C
T	2	R	B	C
0	0	0	0	0
T	1	R	B	C
B	1	C	T	R
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
A	1	R,I	0	0
A	1	R,C	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
B	1	R,C,S	0	0
0	0	0	0	0
T	1	S	B	C
0	0	0	0	0
T	1	R,S	0	0
/	/	/	/	/
T	1	R	B	C
T	1	R,S	0	0
0	0	0	0	0

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	/	0	1
0	0	0	1
0	0	0	1
0	0	0	1
1	1	0	1
1	0	0	1
0	0	0	1
0	1	0	1
0	2	0	1
1	2	0	1
0	2	1	1
1	0	0	1
0	0	0	1
0	2	0	1
3	/	0	1
1	1	0	1
1	0	0	1
0	0	0	1
0	0	0	1
1	0	0	1
1	0	0	1
1	0	0	1
1	0	0	1
0	1	0	1
1	0	0	1
1	0	0	1
0	2	0	1
0	2	0	1
0	2	0	1
/	/	/	1
0	0	0	1
0	0	0	1
/	0	0	1
/	2	1	1
/	0	0	1
0	N	N	1
0	N	N	1
0	N	N	1
1	0	0	1
0	0	0	1
0	0	0	1
/	0	0	1
1	N	N	1
0	3	3	1
0	N	N	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
A			A
A			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
665	FRL 221	100		D10
666	FRL 221	100		D11
667	FRL 221	100		D12
668	FRL 221	100		D13
669	FRL 221	100		D14
670	FRL 221	100		D15
671	FRL 221	100		D16
672	FRL 221	100		D17
673	FRL 221	100		D18
674	FRL 221	100		V7
675	FRL 221	100		V8
676	FRL 221	100		V9
677	FRL 221	100		V10
678	FRL 221	100		V11
679	FRL 221	100		V12
680	FRL 221	100		V13
681	FRL 221	100		V14
682	FRL 221	100		V15
683	FRL 221	100		V16
684	FRL 221	100		V17
685	FRL 221	100		V18
629	FRL 230	102		D10
630	FRL 230	102		D11
631	FRL 230	102		D12
632	FRL 230	102		D13
633	FRL 230	102		D14
634	FRL 230	102		D15
635	FRL 230	102		D16
636	FRL 230	102		D17
637	FRL 230	102		D18
638	FRL 230	102		V10
639	FRL 230	102		V11
640	FRL 230	102		V12
641	FRL 230	102		V13
642	FRL 230	102		V14
643	FRL 230	102		V15
439	FRL 335	82		D10
440	FRL 335	82		D11
441	FRL 335	82		D12
442	FRL 335	82		D13
443	FRL 335	82		D14
444	FRL 335	82		D15
445	FRL 335	82		D16
446	FRL 335	82		D16
447	FRL 335	82		D17

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
R	R	1	1
N	N	N	N
R	R	/	/
R	R	2	2
N	N	N	N
R	R	R	R
R	R	2	2
N	N	N	N
R	R	1	1
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
/	/	3	3
/	/	3	3
N	N	N	N
/	/	/	/
/	/	2	2
N	N	N	N
0	0	1	1
/	/	2	1
N	N	N	N
/	/	/	/
R	R	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
R	R	/	/
/	/	2	2
N	N	N	N
/	/	3	2
R	R	/	/
N	N	N	N
/	/	2	2
R	R	1	0
N	N	/	/
R	R	0	0
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
R	R	/	/
N	N	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
1	1	1	2
N	N	N	N
/	/	/	/
1	3	1	1
N	N	N	N
R	/	/	/
1	3	1	1
N	N	N	N
1	2	1	1
R	/	/	/
4	N	N	N
R	2	3	3
R	/	/	/
N	N	N	N
3	2	3	3
3	2	3	3
N	N	N	N
/	/	/	/
2	/	/	/
N	N	N	N
0	0	0	0
1	1	1	1
N	N	N	N
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	2	3	3
N	N	N	N
3	2	3	3
/	2	2	2
N	N	N	N
3	2	2	2
0	/	/	/
/	/	/	/
0	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
B	1	S	A	S
T	1	R	T	C
T	1	R	B	S
B	1	R,C	0	0
B	1	R,C,S	0	0
B	1	R,C,S	0	0
0	0	0	0	0
B	1	R	A	R
A	1	S	B	C,S
0	0	0	0	0
B	2	S	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
B	1	C	0	0
B	1	C	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	N	N	1
0	2	2	1
0	0	0	1
0	N	N	1
0	2	1	1
/	2	1	1
0	N	N	1
0	N	N	1
0	N	N	1
1	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
1	N	N	1
1	N	N	1
0	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1
/	1	1	1
/	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	N	N	1
/	/	/	1
/	N	N	1
0	0	0	1
0	N	N	1
0	0	0	1
0	0	0	1
0	N	N	1
0	N	N	1
0	/	0	1
0	/	0	1
/	/	0	1
/	/	0	1
/	/	0	1
/	/	0	1
/	/	0	1
/	/	0	1
/	/	0	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
448	FRL 335	82		D18
449	FRL 335	82		V10
450	FRL 335	82		V11
451	FRL 335	82		V12
452	FRL 335	82		V13
453	FRL 335	82		V14
454	FRL 335	82		V15
455	FRL 335	82		V16
456	FRL 335	82		V17
457	FRL 335	82		V18
730	FRL 352	97		D4
731	FRL 352	97		D5
732	FRL 352	97		D6
733	FRL 352	97		D7
734	FRL 352	97		D8
735	FRL 352	97		D9
736	FRL 352	97		D10
737	FRL 352	97		D11
738	FRL 352	97		D12
739	FRL 352	97		D13
740	FRL 352	97		D14
741	FRL 352	97		D15
742	FRL 352	97		D16
743	FRL 352	97		D17
744	FRL 352	97		D18
745	FRL 352	97		V4
746	FRL 352	97		V5
747	FRL 352	97		V6
748	FRL 352	97		V7
749	FRL 352	97		V8
750	FRL 352	97		V9
751	FRL 352	97		V10
752	FRL 352	97		V11
753	FRL 352	97		V12
754	FRL 352	97		V13
755	FRL 352	97		V14
756	FRL 352	97		V15
757	FRL 352	97		V16
758	FRL 352	97		V17
759	FRL 352	97		V18
534	FRL 428	91		D10
535	FRL 428	91		D11
536	FRL 428	91		D12
537	FRL 428	91		D13
538	FRL 428	91		D14

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
R	R	/	/
R	R	R	R
R	R	R	R
R	R	R	R
R	R	0	0
N	N	0	0
B,L	D	/	/
R	R	1	/
R	R	1	/
R	R	0	0
V	D	1	1
N	N	N	N
F	D	2	1
/	/	/	/
N	N	N	N
/	/	/	/
V	D	/	/
N	N	N	N
R	R	0	0
R	R	0	0
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
B,F	D	0	0
N	N	N	N
B,F	C	3	2
B	D	3	3
N	N	N	N
/	/	4	4
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
R	R	R	R
N	N	N	N
R	R	R	R
V	D	3	3
R	R	R	R
R	R	R	R
/	/	3	2
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
/	/	/	/
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	/	/	/
/	/	/	/
1	/	/	/
1	/	/	/
0	/	/	/
0	0	0	0
N	N	N	N
2	1	1	2
3	/	/	/
N	N	N	N
3	/	/	/
/	/	/	/
N	N	N	N
1	0	0	0
0	0	0	0
N	N	N	N
R	1	1	2
R	R	R	R
N	N	N	N
R	/	/	/
0	0	0	0
N	N	N	N
2	3	1	2
3	2	2	2
N	N	N	N
4	2	3	2
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
N	N	N	N
R	/	/	/
R	/	/	/
N	/	/	/
R	/	/	/
3	1	1	3
R	2	3	3
R	/	/	/
2	2	2	2
N	3	2	2

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
/	/	/	/	/
T	1	R,I	B	C
T	1	R,I	B	I
0	0	0	0	0
B	1	S	0	0
/	/	/	/	/
B	1	R,S	0	0
B	1	S	0	0
A	1	R	T	C
0	0	0	0	0
B	1	C	0	0
A	1	R,I	B	C
A	1	R,I	B	C
A	2	R,I	B	C
A	1	R	B	C
B	1	R	T	C
B	1	R	B	C
/	/	/	/	/
A	1	R,I	B	C
0	0	0	0	0
0	0	0	0	0
A	1	R,I	0	0
T	1	R	0	0
0	0	0	0	0
0	0	0	0	0
A	2	R,S	B	C,S
T	2	R,S	A	R,S
T	1	R,I	B	C
B	1	C	0	0
T	2	R,I	0	0
T	2	R,I,C	0	0
T	2	R,C	0	0
B	2	R,C	0	0
B	2	R,C	0	0
B	2	R,C	0	0
B	2	R,C	0	0
/	/	/	/	/
/	/	/	/	/
T	2	R	0	0
/	/	/	/	/
0	0	0	0	0
B	1	R	T	S
/	/	/	/	/
0	0	0	0	0
T	3	S	B	S

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
/	/	0	1
1	0	0	1
1	0	0	1
0	0	0	1
0	0	0	1
/	0	0	1
0	0	0	1
0	0	0	1
1	0	0	1
0	0	0	1
0	0	0	1
1	N	N	1
2	3	1	1
2	3	1	1
1	/	/	1
2	/	/	1
1	N	N	1
/	3	3	1
1	N	N	1
0	N	N	1
0	3	2	1
0	N	N	1
0	N	N	1
0	/	/	1
0	3	2	1
2	N	N	1
2	N	N	1
1	N	N	1
0	N	N	1
0	0	N	1
0	N	N	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
/	0	0	1
/	0	0	1
0	0	0	1
/	0	0	1
0	0	0	1
2	3	3	1
/	/	/	1
0	3	3	1
1	3	3	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			B
			B
			B
			B

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
539	FRL 428	91		D15
540	FRL 428	91		D16
541	FRL 428	91		D17
542	FRL 428	91		D18
543	FRL 428	91		V10
544	FRL 428	91		V11
545	FRL 428	91		V12
546	FRL 428	91		V13
547	FRL 428	91		V14
548	FRL 428	91		V15
549	FRL 428	91		V16
550	FRL 428	91		V17
551	FRL 428	91		V18
616	FRL 513	103		D13
617	FRL 513	103		D14
618	FRL 513	103		D15
619	FRL 513	103		D16
620	FRL 513	103		D17
621	FRL 513	103		D18
622	FRL 513	103		V12
623	FRL 513	103		V13
624	FRL 513	103		V14
625	FRL 513	103		V15
626	FRL 513	103		V16
627	FRL 513	103		V17
628	FRL 513	103		V18
458	FRL 582	90		D1
459	FRL 582	90		D2
460	FRL 582	90		D3
461	FRL 582	90		D4
462	FRL 582	90		D5
463	FRL 582	90		D6
464	FRL 582	90		V1
465	FRL 582	90		V2
466	FRL 582	90		V3
467	FRL 582	90		V4
468	FRL 582	90		V5
469	FRL 582	90		V6
475	FRL 595	85		D13
476	FRL 595	85		D14
478	FRL 595	85		D16
479	FRL 595	85		D17
480	FRL 595	85		D18
481	FRL 595	85		V13
482	FRL 595	85		V14

Scar Type	Scar Distributioı	Edge Rounding Prof	Edge Rounding Plan
V	C	2	2
F	D	1	1
B	D	3	3
/	/	3	3
R	R	R	R
F	D	2	0
/	/	3	3
R	R	R	R
N	N	N	N
/	/	2	2
0	0	2	2
N	N	N	N
/	/	3	2
B	D	0	2
R	R	/	/
N	N	N	N
R	R	/	/
N	N	N	N
R	R	/	/
V	D	0	0
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
/	/	3	3
/	/	3	4
/	/	3	4
/	/	3	3
N	N	N	N
F	C	1	1
/	/	3	3
0	0	2	0
/	/	3	2
/	/	4	3
N	N	N	N
/	/	3	3
F	D	1	1
N	N	N	N
F	D	3	2
N	N	N	N
0	0	0	0
B	D	0	1
N	N	N	N

Edge Abrasion	Polish on edge Devem	Polish on edge E	Polish distribution relative t
2	3	2	3
1	2	1	1
4	3	2	3
3	3	2	3
R	/	/	/
2	2	1	3
2	2	1	3
R	3	1	1
N	0	0	0
3	2	1	2
3	2	2	3
N	/	/	/
3	3	2	3
2	1	1	1
/	2	1	3
N	N	N	N
/	/	/	/
N	N	N	N
/	/	/	/
0	0	0	0
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
3	2	1	1
4	2	1	1
3	2	2	1
3	3	1	1
N	0	0	0
1	2	1	1
3	2	2	3
2	0	0	0
3	2	2	4
3	1	2	3
N	/	/	/
4	3	1	1
1	2	1	1
N	0	0	0
3	3	1	1
N	0	0	0
0	0	0	0
0	2	1	2
N	0	0	0

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
T	3	S	B	S
/	/	/	/	/
T	2	S	B	S
T	3	S	A	R,I
B	1	R	0	0
T	2	R,I	A	R
0	0	0	0	0
T	2	R,I	B	C,I
T	2	R,I	0	0
T	2	R,I	B	R
T	2	S	B	C
T	2	S	0	0
T	2	S	B	C
T	1	R,C	0	0
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	C	0	0
/	/	/	/	/
B	1	C	0	0
B	1	C	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	1	R,I	B	S
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
B	1	R	B	C
B	1	S	B	C
0	0	0	0	0
/	/	/	/	/
A	2	R	B	R,C
0	0	0	0	0
0	0	0	0	0
B	3	R,C	0	0
0	0	0	0	0
T	1	C	T	I
T	1	I	A	I

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
1	/	/	1
/	/	/	1
1	0	0	1
2	0	0	1
0	0	0	1
2	0	0	1
0	0	0	1
1	0	0	1
0	0	0	1
1	0	0	1
1	0	0	1
0	0	0	1
1	0	0	1
0	N	N	1
0	N	N	1
0	2	3	1
/	/	/	1
/	1	3	1
/	/	/	1
0	N	N	1
/	/	/	1
0	/	/	1
0	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
1	0	0	1
/	0	0	1
/	0	0	1
/	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
0	0	0	1
2	0	0	1
1	0	0	1
0	0	0	1
/	0	0	1
1	0	0	1
0	2	0	1
0	0	0	1
0	0	0	1
0	0	0	1
1	0	0	1
1	0	0	1

Extract Ref No	Source	Starch Present	Cleaning
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A

ID	Lithic Reference	Sheet No	Residue Sheet No	Position on Lithic
483	FRL 595	85		V15
484	FRL 595	85		V16
485	FRL 595	85		V17
486	FRL 595	85		V18
470	FRL 911	84		D1
471	FRL 911	84		D2
472	FRL 911	84		D3
473	FRL 911	84		V1
474	FRL 911	84		V3
477	FRL 995	85		D15
1929	FSZ 141	189		D7
1930	FSZ 141	189		D8
1931	FSZ 141	189		D9
1932	FSZ 141	189		D10
1933	FSZ 141	189		D11
1934	FSZ 141	189		D12
1935	FSZ 141	189		D13
1936	FSZ 141	189		D14
1937	FSZ 141	189		D15
1938	FSZ 141	189		D16
1939	FSZ 141	189		D17
1940	FSZ 141	189		D18
1941	FSZ 141	189		V7
1942	FSZ 141	189		V8
1943	FSZ 141	189		V9
1944	FSZ 141	189		V10
1945	FSZ 141	189		V11
1946	FSZ 141	189		V12
1947	FSZ 141	189		V13
1948	FSZ 141	189		V14
1949	FSZ 141	189		V15
1950	FSZ 141	189		V16
1951	FSZ 141	189		V17
1952	FSZ 141	189		V18
2147	FSZ 205	200		D13
2148	FSZ 205	200		D14
2149	FSZ 205	200		D15
2150	FSZ 205	200		V13
2151	FSZ 205	200		V14
2152	FSZ 205	200		V15

Scar Type	Scar Distributio	Edge Rounding Prof	Edge Rounding Plan
F	D	1	0
/	/	2	2
N	N	N	N
F	D	2	2
B,F	C	3	2
/	/	/	/
F	C	2	2
F	D	1	1
F	D	1	1
F	D	1	1
/	/	/	/
N	N	N	N
/	/	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
S	D	/	2
N	N	N	N
S,F	D	/	2
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/
R	R	/	/
N	N	N	N
R	R	/	/

Edge Abrasion	Polish on edge Devem	Polish on edge E:	Polish distribution relative t
1	1	1	1
3	1	1	2
N	0	0	0
2	0	0	0
2	1	1	1
/	/	/	/
1	2	2	3
1	2	1	1
1	2	1	3
1	2	1	3
/	2	2	2
N	N	N	N
/	3	1	1
/	/	/	/
N	N	N	/
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
1	1	1	1
N	N	N	N
2	/	/	/
/	2	1	1
N	N	N	N
/	1	2	2
/	2	1	1
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/
/	/	/	/
N	N	N	N
/	/	/	/

Primary Orientatio	Primary Density	Primary Descrip	Secondary Orienta	Secondary Descripti
0	0	0	0	0
B	1	S	0	0
B	3	R,C	0	0
T	2	R,I	A	R
T	1	R,I	B	I
/	/	/	/	/
T	1	R,I	A	R
A	2	R	B	R,C
A	2	R	B	R,C
A	2	R	B	R,C
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	2	C,S	0	0
T	3	R,I,S	0	0
T	1	R,S	0	0
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
T	1	R	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Density	Polish on elevation dev	Polish on elevat	Residues Present/Not
0	0	0	1
0	0	0	1
0	0	0	1
1	0	0	1
1	2	0	1
/	/	0	/
1	2	0	1
1	0	0	1
1	0	0	1
1	0	0	1
/	3	1	1
0	2	2	1
0	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	N	N	1
/	2	3	1
/	/	/	1
/	/	/	1
/	2	3	1
/	/	/	1
0	N	N	1
0	N	N	1
0	N	N	1
/	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
0	N	N	1
/	N	N	1
/	N	N	1
/	3	3	1
/	N	N	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1
/	/	/	1

Extract Ref No	Source	Starch Present	Cleaning
			A
			A
			A
			A
			A
			A
			A
			A
			A
			A
			B
			S
			S
			S
			B
			B
			B
			B
			B
			B
			B
			B
			S
			S
			S
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B
			B

ID	Artefact Referen	Sheet No	Context	Spit	Weight (g)
8	E 51028	0080	12		206.03
9	PUN 930	0033			106.92
10	E 65465	0034			153.59
11	A 14158	0035			83.05
12	E 20043	0065			198
13	E 20042	0066			223
14	E 64472	0067			131.37
189	Kandrian	0029	complete		95
191	FRL 150	0028	complete		184

Max Length (mr	Max Width (mr	Max Thickness (	Edge Angle Dors	Edge Angle Dors	Spine Plane Ang
234	57.64	16.05	30	45	20
189	39		30	35	30
188	55.67		42	32	26
144	35		76	75	76
57.41	13.49		28	30	28
230	58.87	23.81	10	16	34
127	53	17	30	42	30
137	53	16	15	15	45
210	61	21	15	15	29

Spine Plane Ang	Stem Type	Blade Cross sect	Hafted
30	None	Trap	Yes
35	None	Trap	Yes
32	None	Tri	Yes
28	None	Trap	Yes
30	None	Trap	Possibly
32	None	Tri	Yes
22	None	Tri	Yes
20	E	TRAP	CERTAIN
42	C	TRAP	CERTAIN

ID	Artefact Referen	Sheet No	Context	Spit	Weight (g)
8	E 51028	0080	12		206.03
9	PUN 930	0033			106.92
10	E 65465	0034			153.59
11	A 14158	0035			83.05
12	E 20043	0065			198
13	E 20042	0066			223
14	E 64472	0067			131.37
189	Kandrian	0029	complete		95
191	FRL 150	0028	complete		184

Max Length (mr	Max Width (mn	Max Thickness (	Edge Angle Dor:	Edge Angle Dor:	Spine Plane Ang
234	57.64	16.05	30	45	20
189	39		30	35	30
188	55.67		42	32	26
144	35		76	75	76
57.41	13.49		28	30	28
230	58.87	23.81	10	16	34
127	53	17	30	42	30
137	53	16	15	15	45
210	61	21	15	15	29

Spine Plane Ang	Stem Type	Blade Cross sect	Hafted
30	None	Trap	Yes
35	None	Trap	Yes
32	None	Tri	Yes
28	None	Trap	Yes
30	None	Trap	Possibly
32	None	Tri	Yes
22	None	Tri	Yes
20	E	TRAP	CERTAIN
42	C	TRAP	CERTAIN

ID	Lithic Reference	Sheet No	Residue Sheet N	Position on Lithic	Polish Devemnt
2	PUN 930	0033		D8	3
3	PUN 930	0033		D9	2
4	PUN 930	0033		D4	0
5	PUN 930	0033		D3	2
6	PUN 930	0033		V8	3
7	PUN 930	0033		V9	3
8	PUN 930	0033		V7	2
9	A 14158	0035		D8	3
10	A 14158	0035		D6	2
11	A 14158	0035		D2	3
12	A 14158	0035		V7	3
13	A 14158	0035		D9	3
14	A 14158	0035		V4	0
15	A 14158	0035		V2	3
16	E 64465	0034		D8	3
17	E 64465	0034		D7	3
18	E 64465	0034		D9	2
19	E 64465	0034		D6	2
20	E 64465	0034		D3	2
21	E 64465	0034		D2	4
22	E 64465	0034		V8	3
23	E 64465	0034		V7	2
24	E 64465	0034		V2	3
25	E 20043	0065		D1	/
26	E 20043	0065		D2	/
27	E 20043	0065		D3	/
28	E 20043	0065		D4	1
29	E 20043	0065		D5	0
30	E 20043	0065		D6	1
31	E 20043	0065		D7	1
32	E 20043	0065		D8	2
33	E 20043	0065		D9	0
34	E 20043	0065		D10	/
35	E 20043	0065		D11	/
36	E 20043	0065		D12	/
37	E 20043	0065		D13	/
38	E 20043	0065		D14	/
39	E 20043	0065		D15	/
40	E 20043	0065		D16	/
41	E 20043	0065		D17	/
42	E 20043	0065		D18	/
43	E 20043	0065		V1	0
44	E 20043	0065		V2	/
45	E 20043	0065		V3	1
46	E 20043	0065		V4	2

Polish Extent	Polish Relative t	Polish on elevations and arrises De	Polish on Elevations and /
2	5	0	0
3	5	2	2
0	0	0	0
1	2	0	0
3	5	2	2
3	5	2	2
3	5	2	2
2	2	2	2
3	5	2	2
2	2	0	0
3	5	2	2
2	2	0	0
0	0	0	0
1	2	0	0
2	3	1	1
3	5	2	2
3	3	2	2
2	3	0	0
2	3	0	0
2	2	0	0
2	5	2	2
2	3	2	2
2	3	0	0
/	/	0	0
/	/	/	/
/	/	/	/
2	2	0	0
0	0	3	3
2	2	0	0
1	3	0	0
1	2	0	0
0	0	0	0
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
/	/	/	/
0	0	0	0
/	/	/	
1	1	0	0
1	1	0	0

Primary Orienta	Primary Density	Primary Descrip	Secondary Orie	Secondary Density
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	2	R	A	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	1	R	B	1
A	1	S	B	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	1	S	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	2	R	0	0
A	1	S	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
A	2	R	A	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	1	R	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	2	S	0	0
/	/	/	/	/
0	0	0	0	0
0	0	0	0	0

Secondary Desc	Scar Type	Scar Distributio	Edge Rounding	Edge Rounding	Edge Abrasion
0	R	D	0	0	
0	F	C	4	4	
	F, B	C	0	0	
S	F	D	0	0	
0	0	0	0	0	
0	F, B	D	1	2	
0	0	0	3	3	
0	0	0	0	0	
0	0	0	0	0	
0	B	D	3	3	
0	0	0	0	0	
S	0	0	0	0	
S	F, B	C	0	1	
0	B	D	2	1	
0	0	0	4	4	
0	0	0	0	0	
0	0	0	0	0	
0	0	0	3	4	
0	0	0	3	4	
0	F	D	3	3	
0	0	0	0	0	
0	0	0	0	0	
0	B	D	3	3	
0	/	/	/	/	0
/	/	/	/	/	0
/	/	/	/	/	0
0	B	c	2	2	2
S	0	0	0	0	0
0	/	/	/	/	0
0	B	D	1	1	1
0	L	/	2	1	1
0	F	C	3	1	2
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
0	F, B	D	1	0	0
/	/	/	/	/	/
0	B, F	D	3	3	3
0	B,F,L	C	3	2	2

Residues Preser	Extract Ref No	Source	Starch Present	Cleaning
1	0	0	0	B
1	0	0	0	B
0	0	0	0	B
0	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
0	0	0	0	B
0	0	0	0	B
1	0	0	0	B
0	0	0	0	B
0	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	/	/	/	B
0	/	/	/	B
0	/	/	/	B
0	/	/	/	B
0	/	/	/	B
0	/	/	/	B
0	/	/	/	B
0	/	/	/	B
0	/	/	/	B
0	0	0	0	B
0	0	0	0	B
1	0	0	0	B
1	0	0	0	B

ID	Lithic Reference	Sheet No	Residue Sheet N	Position on Lithic	Polish Devemnt
47	E 20043	0065		V5	0
48	E 20043	0065		V6	2
49	E 20043	0065		V7	2
50	E 20043	0065		V8	/
51	E 20043	0065		V9	2
52	E 20043	0065		V10	/
53	E 20043	0065		V11	/
54	E 20043	0065		V12	/
55	E 20043	0065		V13	/
56	E 20043	0065		V14	/
57	E 20043	0065		V15	/
58	E 20043	0065		V16	/
59	E 20043	0065		V17	/
60	E 20043	0065		V18	/
61	E 20042	0066		D1	/
62	E 20042	0066		D2	4
63	E 20042	0066		D3	0
64	E 20042	0066		D4	0
65	E 20042	0066		D5	0
66	E 20042	0066		D6	3
67	E 20042	0066		D7	0
68	E 20042	0066		D8	0
69	E 20042	0066		D9	/
70	E 20042	0066		D10	/
71	E 20042	0066		D11	/
72	E 20042	0066		D12	/
73	E 20042	0066		D13	/
74	E 20042	0066		D14	/
75	E 20042	0066		D15	/
76	E 20042	0066		D16	/
77	E 20042	0066		D17	/
78	E 20042	0066		D18	/
79	E 20042	0066		V1	2
80	E 20042	0066		V2	3
81	E 20042	0066		V3	3
82	E 20042	0066		V4	3
83	E 20042	0066		V5	0
84	E 20042	0066		V6	1
85	E 20042	0066		V7	2
86	E 20042	0066		V8	0
87	E 20042	0066		V9	0
88	E 20042	0066		V10	/
89	E 20042	0066		V11	/
90	E 20042	0066		V12	/
91	E 20042	0066		V13	/

Polish Extent	Polish Relative t	Polish on elevations and arrises De	Polish on Elevations and /
0	0		
1	1		
2	2	4	3
/	/	/	
1	2	0	0
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
3	3	3	3
0	0	0	0
0	0	0	0
0	N	3	3
1	5	3	
0	0	0	0
0	0	3	3
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
1	2	0	0
1	1	0	0
2	2	0	0
1	1	0	0
0	0	0	0
1	2	1	
1	2	0	0
0	0	0	0
0	0	0	0
/	/	/	
/	/	/	
/	/	/	
/	/	/	

Primary Orienta	Primary Density	Primary Descrip	Secondary Orie	Secondary Density
0	0	0	0	0
0	0	0	0	0
B	1	S,I	0	0
/	/	/	/	/
T	2	R,I	B	1
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
A	1	I	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
T	1	R,I	A	1
A	2	R,I	0	0
T	2	R,S	B	1
A	1	S	0	0
T	2	R,S	0	0
T	3	R,S	0	0
T	3	R,I	0	0
T	1	R,S	0	0
A	1	S	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/

Secondary Desc	Scar Type	Scar Distributio	Edge Rounding	Edge Rounding	Edge Abrasion
0	0	0	0	0	0
0	B,F	C	3	2	2
0	B,F	C	3	2	3
/	/	/	/	/	/
I	B,F,L	C	2	1	2
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
0	0	0	4	4	4
0	M,B,F	C	0	0	0
0	M,B,F	C	0	0	0
0	N	N	N	N	N
0	0	0	0	0	
0	/	/	/	/	/
0	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
S	B,F	C	3	2	3
0	B,F	C	4	3	3
S	V	C	4	3	4
0	V	C	4	3	3
0	/	/	/	/	/
0	V	C	3	1	2
0	V	C	3	2	2
0	/	/	/	/	/
0	M	C	0	0	0
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/

Residues Preser	Extract Ref No	Source	Starch Present	Cleaning
0	0	0	0	B
1	0	0	0	B
1	0	0	0	B
0	0	0	0	B
1	0	0	0	B
/	/	/	/	B
/	/	/	/	B
/	/	/	/	B
/	/	/	/	B
/	/	/	/	B
/	/	/	/	B
/	/	/	/	B
/	/	/	/	B
/	/	/	/	B
0	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
/	/	0	0	B
/	/	0	0	B
/	/	0	0	B
/	/	0	0	B

ID	Lithic Reference	Sheet No	Residue Sheet N	Position on Lithic	Polish Devemnt
92	E 20042	0066		V14	/
93	E 20042	0066		V15	/
94	E 20042	0066		V16	/
95	E 20042	0066		V17	/
96	E 20042	0066		V18	/
97	E 64472	0067		D1	/
98	E 64472	0067		D2	/
99	E 64472	0067		D3	/
100	E 64472	0067		D4	0
101	E 64472	0067		D5	3
102	E 64472	0067		D6	/
103	E 64472	0067		D7	0
104	E 64472	0067		D8	3
105	E 64472	0067		D9	/
106	E 64472	0067		D10	/
107	E 64472	0067		D11	/
108	E 64472	0067		D12	/
109	E 64472	0067		D13	/
110	E 64472	0067		D14	/
111	E 64472	0067		D15	/
112	E 64472	0067		D16	/
113	E 64472	0067		D17	/
114	E 64472	0067		D18	/
115	E 64472	0067		V1	/
116	E 64472	0067		V2	/
117	E 64472	0067		V3	/
118	E 64472	0067		V4	3
119	E 64472	0067		V5	0
120	E 64472	0067		V6	0
121	E 64472	0067		V7	3
122	E 64472	0067		V8	/
123	E 64472	0067		V9	/
124	E 64472	0067		V10	/
125	E 64472	0067		V11	/
126	E 64472	0067		V12	/
127	E 64472	0067		V13	/
128	E 64472	0067		V14	/
129	E 64472	0067		V15	/
130	E 64472	0067		V16	/
131	E 64472	0067		V17	/
132	E 64472	0067		V18	/
133	E 51028	0080		D5	3
134	E 51028	0080		D6	3
135	E 51028	0080		D7	0
136	E 51028	0080		D8	3

Polish Extent	Polish Relative t	Polish on elevations and arrises De	Polish on Elevations and /
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
0	0	0	0
3	5	3	3
/	/	/	
0	0	0	0
2	N	4	3
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
1	1	0	0
0	0	0	0
0	0	0	0
2	3	0	0
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
/	/	/	
3	5	3	3
1	2	0	0
0	0	0	0
2	5	2	3

Primary Orienta	Primary Density	Primary Descrip	Secondary Orie	Secondary Density
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
/	/	/	/	/
/	/	/	/	/
0	0	0	0	0
A	2	R	0	0
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
B	1	R,B	0	0
T	2	R	T	1
0	0	0	0	0
A	2	R,I	T	1
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
/	/	/	/	/
A	3	R,S	T	2
A	1	S	B	1
0	0	0	0	0

Secondary Desc	Scar Type	Scar Distributio	Edge Rounding	Edge Rounding	Edge Abrasion
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
0	B	C	0	0	0
/	N	N	N	N	N
/	/	/	/	/	/
0	B	D	0	0	0
0	B	D	N	N	N
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
0	0	0	B,F	D	2
S	/	/	/	/	/
0	B,F	C	2	1	1
R	F	D	2	0	0
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	/	/	/	/	/
/	N	N	N	N	N
S	V	C	3	2	3
S	B,F	C	2	2	2
0	N	N	N	N	N

Residues Preser	Extract Ref No	Source	Starch Present	Cleaning
/	/	0	0	B
/	/	0	0	B
/	/	0	0	B
/	/	0	0	B
/	/	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
0	0	0	0	B
0	0	0	0	B
0	0	0	0	B
1	0	0	0	B
1	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
1	1	1	0	B
1	0	0	0	B
1	0	0	0	B
1	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
/	0	0	0	B
1				B
1				B
1				B
0				B

ID	Lithic Reference	Sheet No	Residue Sheet N	Position on Lithic	Polish Devemnt
137	E 51028	0080		D9	0
138	E 51028	0080		V1	1
139	E 51028	0080		V2	3
140	E 51028	0080		V3	0
141	E 51028	0080		V4	2
142	E 51028	0080		V5	0
143	E 51028	0080		V6	1
144	E 51028	0080		V7	0
145	E 51028	0080		V8	0
146	E 51028	0080		V9	4
257	Kandrian	0029		V2	3
258	Kandrian	0029		D1	0
259	Kandrian	0029		D2	/
260	Kandrian	0029		D3	0
261	Kandrian	0029		D4	0
262	Kandrian	0029		D5	0
263	Kandrian	0029		D6	0
264	Kandrian	0029		D7	0
265	Kandrian	0029		D8	0
266	Kandrian	0029		D9	0
267	Kandrian	0029		D10	0
268	Kandrian	0029		D11	0
269	Kandrian	0029		D12	0
270	Kandrian	0029		D13	0
271	Kandrian	0029		D14	0
272	Kandrian	0029		D15	0
273	Kandrian	0029		D16	0
274	Kandrian	0029		D17	0
275	Kandrian	0029		D18	0
276	Kandrian	0029		V1	0
277	Kandrian	0029		V2	3
278	Kandrian	0029		V3	2
279	Kandrian	0029		V4	0
280	Kandrian	0029		V5	0
281	Kandrian	0029		V6	3
282	Kandrian	0029		V7	2
283	Kandrian	0029		V8	4
284	Kandrian	0029		V9	3
285	Kandrian	0029		V10	0
286	Kandrian	0029		V11	0
287	Kandrian	0029		V12	0
288	Kandrian	0029		V13	0
289	Kandrian	0029		V14	0
290	Kandrian	0029		V15	0
291	Kandrian	0029		V16	0

Polish Extent	Polish Relative t	Polish on elevations and arrises De	Polish on Elevations and /
0	0	0	0
3	1	0	0
1	1	0	0
0	0	0	0
1	1	0	0
0	0	0	0
1	1	0	0
0	0	0	0
0	0	0	0
2	2	0	0
1	2	0	0
0	0	0	0
/	/	3	2
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	4	3
0	0	0	0
0	0	0	0
0	0	4	2
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
1	2	0	0
1	1	0	0
0	0	0	0
0	0	0	0
2	2	0	0
1	2	0	0
3	5	2	3
2	2	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

Primary Orienta	Primary Density	Primary Descrip	Secondary Orie	Secondary Density
A	1	S	T	1
B	1	S	0	0
A	1	S	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
B	1	S	0	0
A	2	R	T	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
B	1	R,S	0	0
0	0	0	0	0
0	0	0	0	0
T	2	R	B	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
A	2	R	T	1
A	1	S,I	B	1
0	0	0	0	0
0	0	0	0	0
T	3	R,I	A	2
T	2	R	A	1
T	3	R	A	1
T	3	R,I	A	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

Secondary Desc	Scar Type	Scar Distributio	Edge Rounding	Edge Rounding	Edge Abrasion
S	B	C	3	3	3
0	0	B	D	3	2
0	B	C	3	2	3
0	B	C	3	1	0
0	B,F	C	3	2	2
0	0	0	0	0	0
0	0	B,F	D	1	1
0	0	B,F	D	1	1
0	0	0	0	0	0
0	B	C	3	1	2
R	B	D	2	3	3
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	2	0
0	0	0	0	0	0
0	0	0	0	0	0
S,R	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
R	B	D	2	3	3
R	B	C	3	3	3
0	0	0	0	0	0
0	0	0	0	0	0
S,I	F	D	3	2	2
S	B	D	2	3	3
R	0	0	0	0	0
S,I	B	D	4	4	3
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Residues Preser	Extract Ref No	Source	Starch Present	Cleaning
O				B
2	1			B
1				B
1				B
1				B
0				B
0	1			B
0	1			B
0				B
0				B
1				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
1				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
1				B
1				B
1				B
0				B
0				B
0				B
1				B
1				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B

ID	Lithic Reference	Sheet No	Residue Sheet N	Position on Lithic	Polish Devemnt
292	Kandrian	0029		V17	0
293	Kandrian	0029		V18	0
294	FRL 150	0028		D1	0
295	FRL 150	0028		D2	0
296	FRL 150	0028		D3	1
297	FRL 150	0028		D4	0
298	FRL 150	0028		D5	0
299	FRL 150	0028		D6	0
300	FRL 150	0028		D7	0
301	FRL 150	0028		D8	0
302	FRL 150	0028		D9	0
303	FRL 150	0028		D10	0
304	FRL 150	0028		D11	0
305	FRL 150	0028		D12	0
306	FRL 150	0028		D13	0
307	FRL 150	0028		D14	4
308	FRL 150	0028		D15	0
309	FRL 150	0028		D16	0
310	FRL 150	0028		D17	0
311	FRL 150	0028		D18	0
312	FRL 150	0028		V1	1
313	FRL 150	0028		V2	3
314	FRL 150	0028		V3	3
315	FRL 150	0028		V4	3
316	FRL 150	0028		V5	0
317	FRL 150	0028		V6	3
318	FRL 150	0028		V7	3
319	FRL 150	0028		V8	0
320	FRL 150	0028		V9	1
321	FRL 150	0028		V10	0
322	FRL 150	0028		V11	0
323	FRL 150	0028		V12	0
324	FRL 150	0028		V13	0
325	FRL 150	0028		V14	0
326	FRL 150	0028		V15	0
327	FRL 150	0028		V16	0
328	FRL 150	0028		V17	0
329	FRL 150	0028		V18	0

Polish Extent	Polish Relative t	Polish on elevations and arrises De	Polish on Elevations and /
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
2	2	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
3	5	2	3
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
1	1	0	0
1	2	0	0
1	3	0	0
1	3	0	0
0	0	0	0
2	2	3	
3	2	/	/
0	0	0	0
1	1	/	/
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

Primary Orienta	Primary Density	Primary Descrip	Secondary Orie	Secondary Density
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
A	2	R	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	2	S,I,R	B	2
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
A	2	R,I	B	1
A	2	R,I	0	0
A	2	R,I	B	1
A	1	R	0	0
T	2	R	B	1
A	1	I	0	0
A	1	S,I	0	0
0	0	0	0	0
T	3	R,I	B	2
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
T	3	S,I,R	A	1
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0
0	0	0	0	0

Secondary Desc	Scar Type	Scar Distributio	Edge Rounding	Edge Rounding	Edge Abrasion
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	B	C	1	1	1
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
S,I,R	/	/	/	/	/
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
R	B,F	D	2	2	2
0	V	C	2	2	2
S,R	V	C	3	3	3
0	V	D	3	4	3
I	0	0	0	0	0
0	/	/	3	3	3
0	B	D	3	3	3
0	0	0	0	0	0
S,I	V	D	4	3	3
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
R	/	/	/	/	/
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0

Residues Preser	Extract Ref No	Source	Starch Present	Cleaning
0				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
1				B
0				B
0				B
0				B
0				B
0				B
0				B
1				B
1				B
1				B
1				B
1				B
0				B
1				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B
0				B

ID	Lithic Reference No	Sheet No	Experiment No	Residue Sheet
1	Prac 001	1	000	0
2	Prac 002	2	000	0
3	Prac 006	3	000	0
4	Prac 003	4	000	0
5	Prac 005	5	000	0
6	Prac 004	6	000	0
7	Prac 007	7	000	0
8	Prac 008	8	000	0
9	Exp 009	9	001	0
10	Exp 010	10	002	0
11	Exp 011	11	003	0
12	Exp 012	12	004	0
13	Exp 021	22	013	0
14	Exp 013	13	005	0
15	Exp 014	14	006	0
16	Exp 015	15	007	0
17	Exp 016	16	008	0
18	Exp 017	17	009	0
19	Exp 026	18	018	0
20	Exp 018	10	010	0
21	Exp 019	20	011	0
22	Exp 020	21	012	0
23	Exp 021	22	013	0
24	Exp 022	23	014	0
25	WNB 241	24		0
26	WNB 092	25		0
27	WNB 094	26		0
28	WNB 005	27		0
29	WNB 228	36		0
30	WNB 186	37		0
31	WNB 033	38		0
32	WNB 073	40		0
33	WNB 133	39		0
34	WNB 076	47		0
35	WNB 327	43		0
36	WNB 264	44		0
37	WNB 139	51		
38	WNB 139	51		0
39	WNB 069	48		0
40	WNB 069	48		0
41	WNB 225	52		0
42	WNB 028	50		0
43	WNB 225	52		0
44	WNB	54		0
45	WNB 150	55		0

Material Used	Direction of Action	Time Elapsed (mi	Polish Developn
Microscope Practice no photos	0	0	0
Microscope Practice Photo 0001	0	0	0
Microscope Practice	0	0	0
Microscope Practice, new unused flake	0	0	0
Microscope Practice	0	0	0
Microscope Practice	0	0	0
Microscope Practice	0	0	0
Extraction Practice	0	0	0
Green Bambusa		5	2
Green Bambusa		15	2
Green Bambusa		30	2
Green Bambusa		5	1
Green Gnetum Gnemon		30	2
Green Bambusa		15	2
Green Bambusa		30	2
Dry Bambusa		5	1
Dry Bambusa		15	2
Dry Bambusa		30	3
Dry Bambusa		5	1
Green Nipholphilla gunnii		5	2
Green Nipholphilla gunnii		15	2
Green Nipholphilla gunnii		30	2
Green Gnetum gnemon		30	1
Green Gnetum gnemon		5	2
Carving Red Cedar, No haft			3
sawing Callophyllum Malus		5	2
Carving Red Cedar			1
Taro		5	0
Inner part Black Palm		5	3
Black Palm		10	2
Taro		15	1
Mango wood		30	3
Casaurina wood		30	2
Fish, handling wrapped Banana leaf		15	1
Pig Skin scarification		15	1
Chicken skin piercing tattoo replication		30	2
Cutting/whittling green Cane, Banana lea		30	2
Banana Leaf Hafting of tool 139	0	30	1
Carving/Engraving Octomeles sumatrana,		240	0
Banana Leaf Hafting of tool 69	0	240	0
Calamus muelleri (Rattan)		5	1
Cutting/Scraping Pandanus (conoideus?)		17	2
Sawing large 'Lawter Vine' Calmus muelle		5	1
Cutting and gutting fish		75	
Cutting/sawing coconut shell		60	0

Polish Extent	Relationship to	Polish away fro	Primary Orienta	Primary Density	Primary Descrip
0	0	0	A	2	I
0	0	0	T	2	R
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
2	2	1	T	1	S
2	4	2	T	2	R
1	1	2	0	0	0
1	1	0	A	1	S
2	1	2	T	2	S
2	1	0	0	0	0
2	2	2	A	1	s
1	1	1	0	0	0
2	2	2	A	2	S
2	2	2	T	2	R
1	1	2	A	1	I
2	2	2	0	0	0
1	2	1	A	1	I
2	3	2	A	2	I
1	3	3	T	2	I
2	2	2	A	2	I
2	2	1	A	3	R
2	2	1	A	2	R
1	1	0	A	2	R
0	0	0	T	1	S
2	3	3	B	2	R
1	1	0	A	3	R
1	1	0	A	1	S
2	2	0	A	2	I
2	2	0	A	2	I
1	1	0	A	1	R
1	1	0	B	2	R
1	1	0	B	2	S
1	2	1	A	2	R
1	5	3	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
1	1	2	A	2	R
2	2	3	A	1	S
1	1	0	A	3	R
			/		/
0	0	0	0	0	0

Secondary Orier	Secondary Dens	Secondary Descript	Edge Scar Type	Distribution	Edge Rounding
0	0	0	0	0	2
A	1	S	0	0	0
0	0	0	m	d	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
B	1	S	b, m	c	2
0	0	0	m	c	3
0	0	0	m	d	3
0	0	0	s	d	1
A	1	S	m	c	1
0	0	0	0	0	0
0	0	0	m	c	3
0	0	0	0	0	0
t	1	S	M	C	2
A	1	S	m	C	0
A	1	S	m	c	0
0	0	0	0	0	0
0	0	0	m	C	1
B	1	I	0	0	0
A	1	I	m	C	2
0	0	0	m	c	0
B	2	I	f	C	0
A	1	S	m	c	0
0	0	0	0	0	0
0	0	0	0	0	0
0	0	0	0	0	0
A	2	S	0	0	0
0	0	0	M	C	0
A	2	S	0	0	0
0	0	0	M	C	0
0	0	0	M	C	3
0	0	0	M	C	0
0	0	0	F	D	2
0	0	0	F, L	C	3
0	0	0	M	C	3
0	0	0	F, L	C	2
0	0	0	0	0	0
0	0	0	B,F	C	2
0	0	0	M, B, F	C	3
0	0	0	B, F	C	2
/		/	M	C	2
0	0	0	M, F	C	1

Edge Rounding	Edge Abrasion
2	
0	
0	
0	
0	
0	
0	
0	
2	
3	
3	
1	
1	
0	
3	
0	
2	
0	
0	
0	
1	
0	
2	
0	
0	
1	
0	
0	
0	
0	
0	
0	
0	
3	
0	
1	
3	
3	
2	
0	
2	
3	
2	
2	
1	

ID	Lithic Reference No	Sheet No	Experiment No	Residue Sheet
46	WNB 163	56		0
47	WNB 163H	56		0
48	WNB 231	57		0
49	WNB 231H	57		0
50	WNB 217	58		0
51	WNB 324	59		0
52	WNB 013	60		0
53	UWR 011	61		0
54	WNB 508	62		0
55	UWR 005	63		0
56	WNB 304	64		0
57	WNB 307	68		0
58	WNB 074	69		0
59	WNB 074	69		0
60	WNB 262	70		0
61	WNB 237	71		0
62	EXP new	72		0
63	WNB 62 05	235		

Material Used	Direction of Action	Time Elapsed (mi	Polish Developm
Paring coconut leaf mid-rib		23	0
Banana leaf hafting of above	0	23	0
sawing green Bamboo stem, hafted with		15	3
Banana Leaf hafting of above	0	15	0
Cutting 'Aibika' Abelmoschus manihot - H		15	1
Incising clay tablet			4
Whittling soft wood Fresh Red Cedar		15	2
Scraping Hardwood 'Ton'		30	1
Scraping Hardwood Black Palm		60	2
Scraping Hardwood 'Lipi'		30	1
Sawing Fresh Eucalypt		20	2
Scraping fresh cow bone		45	0
Sawing 1/2 dry Erima		240	2
Banana leaf hafting of above	0	240	1
Scarping Shell, Katylesia sp.		25	3
Whittling Fresh green Hibiscus		30	2
Scraping Hardwood unidirection hand hel		5	1
Whittling Erima prehension with Rattan		30	

Polish Extent	Relationship to	Polish away fro	Primary Orienta	Primary Density	Primary Descrip
0	0	0	A	1	I
0	0	0	0	0	0
2	2	0	A	3	R
0	0	0	0	0	0
1	1	0	B	1	S
4	3	0	A	1	R
1	4	1	0	0	0
1	2	1	T	1	R,S
2	2	2	A	2	R
0	0	1	0	0	0
1	2	1	A	2	R, I
0	0	0	T	3	R
2	2	1	0	0	0
1	1	0	0	0	0
2	2	0	B	2	R, S
2	0	2	B	1	R
1	2	1	T	1	I

Secondary Orie	Secondary Dens	Secondary Descript	Edge Scar Type	Distribution	Edge Rounding
0	0	0	F,S	D	2
0	0	0	F,L	C	0
0	0	0	F	C	4
0	0	0	F, M	D	1
0	0	0	M, F,B	D	3
0	0	0	A	C	4
0	0	0	B	D	3
0	0	0	F	C	2
0	0	0	B, F	C	2
0	0	0	F, M	D	3
A	1	S	L	D	4
0	0	0	F	C	4
0	0	0	B	D	3
0	0	0	0	0	2
0	0	0	L	D	4
T	1	S	M	C	3
0	0	0	F	C	2
			M, F	C	

Edge Rounding	Edge Abrasion
2	
0	
4	
1	
3	
4	
4	
4	
2	
4	
4	
4	
3	
2	
4	
3	
2	