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KaVn-2: An Eastern Beringian Tradition Archaeological Site in West-central Yukon Territory, Canada.

by

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A thesis submitted to the faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Arts

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled *KaVn-2: An Eastern Beringian Tradition Archaeological Site in West-central Yukon Territory, Canada* submitted by Ty Alexander Heffner in partial fulfillment of the requirements for the degree of Master of Arts.

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ABSTRACT

This thesis examines the archaeological and palaeoenvironmental record of the Beaver Creek area of west-central Yukon, through detailed excavation and analysis of cultural materials from KaVn-2, a late Pleistocene multi-component archaeological site located in the Shakwak Trench, and literature review.

KaVn-2 contains evidence of initial human occupation dating to between 10,670 and 10,130 C^{14} years BP. The site, positioned approximately one kilometre within the maximum extent of ice during the last glaciation, became ice-free about 11,000 C^{14} years BP and was inhabited shortly thereafter. Later occupations span most of the Holocene.

Lithic artifacts recovered from the early component show affinities to those from other Eastern Beringian sites. Analysis of these artifacts supports the Eastern Beringian Tradition as the most suitable cultural historical scheme for organizing Late Pleistocene cultural materials. At present, artifacts derived from the later components can best be interpreted within the southwest Yukon cultural historical framework.

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CHAPTER ONE

Introduction

Late Pleistocene archaeological sites are rare and valuable because they have the potential to contribute to our understanding of a poorly known period in the prehistory of North America. The survival and subsequent discovery of such sites reflects a fortuitous sequence of events since innumerable environmental and cultural factors act to erase these sites from the archaeological record. In the area of former Beringia, these sites are occasionally found in central Alaska, owing mainly to the unusually deep deposits of loess that have served to cap and protect them for over ten thousand years. Late Pleistocene sites are even more rarely encountered in the Yukon. Archaeological site KaVn-2 represented one of those rare discoveries when it was located as a result of a proposed highway realignment. Archaeological research at KaVn-2 has since demonstrated the importance of this site in the understanding of the precontact human history of northwestern North America.

This thesis presents the results of four seasons of field research, including three seasons of excavation, at archaeological site KaVn-2. The site was discovered in 1991 by Heritage North Consulting Services during an archaeological impact assessment of the proposed Shakwak Highway Upgrading project (Walde 1991). Given that little was known of the archaeology of the Beaver Creek area, KaVn-2 was considered to be a valuable source of archaeological information. A site salvage program was begun in 1993 and was continued in 1994 because an early radiocarbon date of 7,810 BP was obtained from above a cultural layer during the 1993 field season. This early date represented a *terminus ante quem* for the early occupation of the site and made KaVn-2 one of the earliest known sites in the Yukon. A radiocarbon sample obtained from the early component during the 1994 field season was subsequently dated to 10,130 BP. Because of this early date, KaVn-2 was considered to be a unique heritage resource and the proposed highway realignment was modified to avoid the site.

In 1998, I was approached by Ruth Gotthardt and Greg Hare of the Yukon Heritage Branch to see if I was interested in completing the work began by Heritage

North Consulting Services by conducting further excavation at the site as the basis for this thesis. I enthusiastically agreed, recognizing its importance in the archaeological record of the Yukon. The White River First Nation embraced the proposed research and a community-based archaeology project was planned. In 1999, during a six week field project, I conducted detailed excavation at the site, assisted by a field crew of youths from the White River First Nation. Our efforts did not result in the recovery of a significant number of additional lithic artifacts but we were able to identify more evidence of spatial organization at the site, clarify site stratigraphy, and refine the cultural chronology through further radiocarbon dating. Our fieldwork brought the total number of units excavated at the site to 93.

The primary objectives of the research were: (1) the refinement of the cultural chronology of KaVn-2, and (2) the investigation of the technological affiliations of the artifact assemblage recovered from the late Pleistocene cultural component at the site. We were able to corroborate the late Pleistocene age of the deposit with a newly acquired radiocarbon date of 10,670 BP that augmented the previously obtained date of 10,130 BP on the same component. Detailed analysis of the artifact assemblage resulted in the discovery of artifact types that are considered to be diagnostic of the Nenana and Denali complexes of central Alaska. This situation was not surprising, given the early age of the site, but the fact that the artifacts were recovered from the same stratigraphic context was unexpected and remarkable because these technological traditions have typically been considered to be temporally discrete entities. These findings lend support to the concept of the Eastern Beringian Tradition (West 1996, 2000a, 2000b) as the most practical cultural historical classification when dealing with late Pleistocene archaeological sites in the area of former Beringia. This topic is discussed in detail within this thesis.

Background information in Chapter Two provides the environmental and cultural context for the discussions that follow. Chapter Three contains an account of the physical setting of KaVn-2, including site stratigraphy and chronology, and discussions of excavation methods and the history of research at the site. Results of the lithic analysis, accompanied by detailed artifact descriptions, are presented in Chapter Four, along with results of the spatial analysis and artifact refitting endeavours. Finally, Chapter Five provides interpretations of the lithic assemblages and places KaVn-2 in the greater context of the archaeology of northwestern North America.

CHAPTER TWO

Environmental and Cultural Background

2.1 Modern Environment

2.1.1 Physiography

The study area (Figure 2.1) encompasses a portion of the Shakwak Valley and parts of the neighbouring Yukon-Tanana Uplands (part of the Yukon Plateau) and Nutzotin Mountains (part of the St. Elias Mountains) in west-central Yukon Territory, Canada. Major geographic features within the study area include Miles Ridge, a front range of the Nutzotin Mountains, at an elevation of 1,621 m above sea level (asl) and Horsecamp Hill, on the northeast side of the trench opposite Miles Ridge, at an elevation of 1,407 m asl. The linear Shakwak Valley trends northwest - southeast and is a trench that formed along a tectonic fault (Rampton 1971a). The trench is approximately 15 km wide in the study area and exerts considerable influence over regional drainage patterns.

2.1.2 Hydrology

On the Alaskan side of the international boundary, the Tanana River, a major tributary of the Yukon River, flows westward through interior Alaska from its headwaters near the Yukon border (Hosley 1981). The Tanana River basin drains south-flowing clear water streams from the Yukon-Tanana Uplands and north-flowing silt-laden streams from the glacier-strewn Nutzotin Mountains. On the Yukon side of the boundary, a similar situation prevails but with the White River, also tributary to the Yukon River, as the major drainage system. The study area lies on the Yukon side of the international boundary but this is an arbitrary division and the environment is similar on both sides of the border. Permafrost is discontinuous throughout the study area.

2.1.3 Climate

The climate of the Yukon is classified as Subarctic continental. The study area lies within the Central Yukon Basin climatic division of Wahl *et al.* (1987), which has the most continental climate in the territory. The St. Elias Mountains create an effective orographic barrier that blocks moist and mild Pacific air from reaching the study area. Because of this 'rain shadow' effect, the study area receives only 300 to 400 mm of precipitation per year, most of which falls in the summer as rain. Weather observation stations within the study area are located at the settlements of Beaver Creek and Snag, where detailed climatological data are only available for the past 30 years (Wahl *et al.* 1987: 17). Summers are warm with hot spells and winters are cool with frequent periods of extreme cold. Indeed, the lowest temperature ever recorded in North America (-63°C) was measured at Snag (Wahl *et al.* 1987: 33). Mean annual daily temperatures are –6°C to -8°C. The continentality of the study area is demonstrated by the fact that in January the mean annual daily temperature is -30°C to -35°C while in July the mean annual daily temperature is 10°C to 15°C. Temperature inversions are common in the winter, which generally begins September 29th and ends April 24th, a period of 207 days (Wahl *et al.* 1987: 198).

2.1.4 Vegetation

The marshes and small lakes that cover the lowland areas of the study area support a rich riparian vegetation of aspen (*Populus tremuloides*) and willow (*Salix* sp.) (Hosley 1981). White spruce (*Picea glauca*) and birch (*Betula papyrifera*) dominate the closed forest of the Yukon-Tanana Uplands, while black spruce (*Picea mariana*) and tundra are the dominant vegetation types in the Nutzotin Mountains.

2.1.5 Fauna

Characteristic animal communities include mountain sheep (*Ovis dalli*) and grizzly bear (*Ursus arctos*) in the mountains; and moose (*Alces alces*), black bear (*Ursus americanus*), beaver (*Castor canadensis*), muskrat (*Ondatra zibethica*), and snowshoe hare (*Lepus americanus*) in the lowlands (Hosley 1981). Large caribou (*Rangifer* *tarandus*) herds migrate twice annually to their Yukon-Tanana Uplands winter grounds in the fall and to their Nutzotin Mountains summer range in the spring. Fish are relatively abundant in the many small lakes but Pacific salmon (*Oncorhyncus sp.*) do not ascend this far up the Tanana or White rivers. Clearwater tributary streams of the rivers and lakes host major whitefish (*Coregonus sp.*) and Arctic grayling (*Thymallus arcticus*) spawning runs in the early summer. Waterfowl are seasonally abundant during their summer occupation of the Tanana River Lowlands.

2.2 Palaeoenvironment

2.2.1 Glacial History

Much of the study area was ice-free throughout the last glaciation but the southern portions of the area were covered with ice derived from piedmont glaciers in the Nutzotin Mountains and the entire area was subjected to extreme glacial influences (Figure 2.2). The northern portion of the study area would have been coterminous with the large ice-free landmass known as Beringia (Figure 2.3), which existed during the last glaciation from approximately 30,000 to 10,000 years ago. During this time, sea levels dropped as much as 125 meters and exposed the floor of the Bering Sea, thus linking Siberia and Alaska with a large land bridge.

Rampton (1971a) developed a glacial chronology for the Snag-Klutlan area, the same region as the study area. The Macauley Glaciation started at around 40,000 BP and ended at about 13,500 BP. It appeared that the nonglacial interval seen in adjacent areas between 40,000 and 30,000 BP did not occur in this region. A radiocarbon date of 11,000 BP obtained from organic sediments directly overlying Macauley till at the White River bridge probably signified the approximate time that the study area (and archaeological site KaVn-2, located just 10 km north of the bridge) became free of ice.

2.2.2 Palaeobotany

Only three pollen cores have been recovered from the study area and analyzed for their fossil pollen content. Rampton (1971b) obtained and analyzed one from Antifreeze

Pond (located 35 km north northwest of KaVn-2). MacIntosh (1997) recently obtained and analyzed two pollen cores from Daylight Coming Out Lake (located 80 km north northwest of KaVn-2) and Island Lake (located 115 km north northwest of KaVn-2). He then reinterpreted the core from Antifreeze Pond using the cores from Daylight Coming Out Lake and Island Lake as comparative resources. Since MacIntosh's (1997) work provides a regional perspective on the palaeoecology of the study area, the following summary is based on his findings.

MacIntosh recognized three different vegetation periods that have a bearing on the palaeoecology of the study area during the time interval for which there is evidence of human occupation. Based on pollen evidence, he inferred vegetation cover, mean July temperatures, and relative moisture levels. Starting with the earliest, these periods are as follows.

Late Glacial (13,500 to 11,000 BP)

During this period, vegetation was a herbaceous tundra dominated by grasses (*Graminae* sp.), sedges (*Cyperaceae* sp.), willow (*Salix* sp.), and *Artemisia*. The lakes sampled lie at different elevations, however, and there were slight differences in their pollen assemblages. This situation led MacIntosh to believe that there was some evidence to support Schweger's (1982) model in which the environment was divided into two habitats based on the influence of elevation. In this case, a dry upland habitat supporting a grass and *Artemisia* plant community and a wetter lowland habitat with sedge, grass, and willow vegetation is hypothesized. Based on the tolerances of the plants represented in the pollen cores during this time period, MacIntosh (1997: 88) inferred a very cold and dry climate with a mean July temperature of 5°C to 7°C.

Late Glacial – Holocene Transition (11,000 to 8,000 BP)

An abrupt increase in birch pollen at around 10,950 BP, an event that occurred about 1,000 years earlier in neighbouring regions, is the major feature of this time period. The delay in the birch increase is probably a result of proximity to the glacial margin and the higher elevation of the area relative to adjacent regions. Since dwarf birch (*Betula pumila*) requires a mean July temperature of 9°C, its arrival suggests climatic warming.

Also during this time interval, wind velocity peaked due to the mixing of air masses along the glacial margin. Loess transport and deposition climaxed because silts in glacial meltwater channels were exposed to the strong winds when deglaciation rates decreased.

Holocene (8,000 BP to Present)

Spruce and *Populus* pollen show up in the cores at around 8,700 BP, an arrival date for spruce that is substantially later than in neighbouring areas. After Ritchie (1984) and Ritchie and MacDonald (1986), MacIntosh explains this as being the result of the indirect route taken by spruce in their revegetation of interior northwestern North America following deglaciation rather than being due to climatic factors. Spruce require only slightly warmer July temperatures than birch so climate may have warmed slightly or stabilized since the preceding period. Alder (*Alnus*) arrived in the region at around 5,500 BP and may have heralded an increase in moisture levels. After the arrival of alder and except for fluctuations in the elevation of treeline, vegetation in the study area remained stable.

2.2.3 Palaeofauna

As part of the same highway upgrading project that led to the discovery of archaeological site KaVn-2, numerous Pleistocene-aged faunal remains were recovered in 1993 from buried contexts in the unglaciated area just north of the community of Beaver Creek. In 1994, MacIntosh (1997) recovered and examined 36 bones and bone fragments of which only 18 were identifiable to genus. Twelve of these bones were identified as bison (*Bison* sp.), four as horse (*Equus* sp.), and one each as caribou (*Rangifer* sp.) and mammoth (*Mammuthus*). The stratigraphic context of the remains suggested a late Pleistocene age. A horse bone recovered from a nearby construction-related disturbance in 1993 by the Yukon Heritage Branch that was dated to 20,660 ± 100 BP (Hare, personal communication 2001) tends to support that assessment. Otherwise, information on the ancient animal community for the region is virtually nonexistent, so it is necessary to incorporate data from neighbouring areas to gain an understanding of what types of animal resources were likely available to the human inhabitants of the study area.

In addition to the large mammals that were present at the time of European contact, wood bison (*Bison bison athabascae*), wapiti (*Cervus elaphus canadensis*), and muskox (*Ovibos moschatus*) existed in at least portions of interior Yukon and Alaska in prehistoric times. In his investigations, MacNeish (1964: 311,467) found remains of muskox and wapiti at the Pelly Farm site (KfVd-2), which lies to the northeast of the study area and may date to 7,500 - 8,500 BP. Greer (1986) tentatively identified wapiti remains at the Kusawa Bluff site (JdVa-5), southeast of the study area. MacNeish (1964) found caribou represented in interior Yukon sites spanning the entire archaeological sequence, while bison were present in sites until about 3,000 years ago, and moose were only found in sites younger than 6,000 years. Very little data have been collected on the history of any of these species since MacNeish's pioneering work, with the exception of bison.

Both MacNeish (1964) and Workman (1978) believed that bison had become extinct in the southwest Yukon prior to the onset of Neoglaciation because of the expansion of the boreal forest. Workman (1978, 1979) and Morlan and Workman (1980) also added the deleterious effects of the White River Ash (had bison been around at the time), habitat loss at the expense of neoglacial lakes, and hunting pressure as possible contributing factors in the extinction. There is now adequate evidence to show that bison survived in the southern Yukon, although not necessarily in the study area, until very recently.

For example, 16 radiocarbon dates have been obtained on bison remains in the southern half of the Yukon (Table 2.1). These dates suggest that bison have been present there for much of the Holocene, even up to the historic period. Oral traditions of some Yukon First Nations record the presence of bison in their traditional territories in finer detail. Recently, Lotenberg (1996) researched the subject. She found that knowledge of bison, bison hunting practices, and the uses of bison products still existed among many First Nations elders. Many aboriginal languages in the territory have a word for bison, which is highly suggestive of their recent presence. Further traditional information allowed Lotenberg to estimate that bison were relatively abundant until approximately 400 years ago, that their numbers began to decline after 300 years ago, and that remnant populations existed until about 50 years ago in the eastern Yukon. Bison densities appear

Table 2.1: Dated Bison Remains from the Southern Yukon. Data derived from the Yukon Heritage Branch C14 Database (Gotthardt, personal communication 1998).

Borden Number	Location	Radiocarbon Date
JfVg-1	Canyon Creek	7,195 ± 130 BP
JiVi-7	Chimi	6,420 ± 110 BP
JeUs-20	McIntyre Creek	5,800 ± 70 BP
JdVa-5	Kusawa Bluff	5,380 ± 100 BP
JfVg-1	Canyon Creek	4,730 ± 320 BP
JdVa-5	Kusawa Bluff	4,490 ± 130 BP
KfVd-2	Pelly Farm	3,100 ± 70 BP
KfVd-2	Pelly Farm	2,920 ± 140 BP
	Montague Road House	2,720 ± 60 BP
	Finlayson River	2,130 ± 60 BP
	Congdon Creek	2,130 ± 30 BP
	Takhini River	2,110 ± 40 BP
	Quartz Creek	1,350 ± 95 BP
KaTx-6	Frenchman Lake	>1,250 BP (based on stratigraphy)
	Carcross	930 ± 90 BP

to have been highest near the present Ross River townsite, a location known in the Tlingit language as *Xas Hini*, which translates directly as 'Buffalo River' (Lotenberg 1996:10). Oral history also suggested that moose were less common when bison were around and that there were fewer trees at the time. One aboriginal consultant claimed that bison were around until the ash fell (presumably referring to the White River Ash, see next section), which may account for their higher numbers in the eastern Yukon, which received relatively small amounts of ash.

In ethnographic times, the most important large mammals to Athapaskan subsistence were the moose and caribou, but moose seem to have only moved into the southwest Yukon near the end of the 19th century, and caribou were displaced in the process (McClellan 1975: 108). Despite oral traditions to the contrary (i.e., Lotenberg 1996; McClellan 1975) moose appear to have a considerable time depth in the southern Yukon as shown by the presence of their remains in archaeological sites dating throughout the last 6000 years (MacNeish 1964; Workman 1978). It seems likely, then, that they have recently returned to the area after a relatively brief absence. This also appeared to be the case in Alaska. In his review of zooarchaeological remains there, Yesner (1989) found that caribou were by far the dominant species and that moose only appeared within the last 400 years. He proposed that the cooling effect of the Little Ice

Age and the subsequent expansion of willow and sedge habitat as probable causes for this shift. He also suggested that fire may have played a major role in the maintenance of large game habitat. Moose numbers in Alaska have been increasing rapidly during the last fifty years in areas that have been recently burned or cleared. The relative recency of moose in Alaskan archaeological sites prompted Yesner (1989) to question the validity of the ethnographically derived Athapaskan moose-hunting stereotype when using the direct historic approach to interpret archaeological remains.

Fisheries resources, likewise, have undergone considerable changes during the Holocene. Since the study area was almost entirely glaciated, it was not until during deglaciation that fish entered its lakes and rivers (Lindsey *et al.* 1981). At this time much of the region was covered by glacial meltwater, and fish that survived glaciation in the Beringian Refugium entered the upper Yukon River drainage. It appears that the species composition of the fish fauna for the study area has remained stable since that time although fluctuations in their population size and their availability to people have undoubtedly occurred.

2.2.4 White River Eruption

A large volcanic eruption centered at Mt. Bona near the Yukon-Alaska border spread an ash layer across the entire study area at around 1,250 BP (Lerbekmo *et al.* 1975). There were, in fact, two such events. The earlier eruption, at around 1,900 BP, was smaller and its ash was deposited northward from the vent. The later eruption, at around 1,250 BP, was much larger and spread ash eastward as far as the Yukon – Northwest Territories border. The study area is approximately 150 km northeast of Mt. Bona and would have been affected by both eruptions, but primarily the earlier one that spread ash northward (Figure 2.4). Workman (1973, 1978, 1979) has written extensively on the probable effects of the White River Ash on the environment of the southwest Yukon and the following summary will be based on his work. He noted that there was no direct evidence for the ecological consequences of the White River Ash and he based his interpretation on the observed effects of historically recorded eruptions.

Being only a short distance from the volcano, the short-term effects of the ash fall on the study area would have lasted for at least a few years, with potentially disastrous results. Mudflows triggered by the unstable ash may have cascaded down the hillsides, ash-choked streams may have been prone to flooding, water sources may have been contaminated, low growing plants may have been smothered, the weight of the ash may have broken many tree limbs, and the scouring effects of wind carried ash probably damaged exposed vegetation. This damage may have had a profound impact on herbivorous animals, particularly grazers. Ash-saturated waters would have been harsh on their gills, so fish may have taken refuge in deeper waters. In fact, Lindsey *et al.* (1981) found that a level of total dissolved solids of over 200 mg / L in Yukon lakes coincided with the distribution of the White River Ash. In general, Workman suggested that the region might have been uninhabitable following the ash fall, with a severely limited carrying capacity for years thereafter. In fact, Workman believed that the ash forced people to abandon the area and move north or south, away from the ash, for a period of time.

Building on some of Workman's earlier research, especially the hypothesis that people could only move north or south to effectively escape the effects of the eruption, Derry (1975) postulated a link between the timing of the ashfall and a dispersal of Athapaskan-speaking peoples northward as far as the north slope of Alaska. He based his hypothesis on the distribution of 'Athapaskan' artifact types, particularly Kavik type projectile points, which exhibit a spatial and temporal pattern that can be seen as reflecting a migration of people from the southwest Yukon along major drainage systems to northern Alaska.

More recently, Moodie *et al.* (1992) reviewed much of the scientific evidence regarding the White River eruption and incorporated a previously neglected data source: the oral traditions of Athapaskan peoples whose ancestors may have witnessed the event. These researchers found numerous references in the oral histories of the Mackenzie River Dene, especially in those recorded by the missionary Émile Petitot, that referred to their migration from across the western mountains due to the eruption of a volcano near the "western ocean" (*ibid* : 163-164). Since they found no recorded evidence of active volcanism during the past two thousand years in any other volcanoes meeting the descriptions in the oral histories, these researchers concluded that the stories referred specifically to the White River eruption.

This hypothesis that people moved east is in sharp contradiction with Workman's (1973, 1978, 1979) and Derry's (1975) belief that people could only have moved north or south to escape the effects of the eruption. Each of these hypotheses formulated over the years by various researchers, however, assume that the effects of the ashfall would have been so detrimental as to preclude any substantial human occupation of the region for years after the eruption. MacIntosh (1997: 96), conversely, found no evidence in his pollen assemblages for any impact on vegetation as a result of the ashfall.

2.3 Upper Tanana Ethnography

The Upper Tanana are a northern Athapaskan group indigenous to the upper Tanana River region. Upper Tanana social organization operated on a few major levels and was based on a kinship system of exogamous matrilineal descent groups that were composed of clans (Hosley 1981; McKennan 1959, 1964). The basic socioeconomic unit was the household that consisted of two families. Usually the women of the household were related and the men were hunting partners. Two to five households composed the local band. They cooperated during the fall caribou migration and summer fish runs, and they shared a winter village location. The Scottie Creek Band, whose traditional territory covers the study area, is a local band that was composed of 25 members in 1929 (McKennan 1959: 18). Together with four other local bands, they made up an endogamous regional band (the Upper Tanana) who shared a common dialect and culture. In 1929 the Upper Tanana regional band had 152 members (*ibid.*: 18).

The Upper Tanana made use of a highly mobile seasonal round to position themselves advantageously relative to areas of seasonal resource concentrations (Hosley 1981; McKennan 1959, 1964; Shinkwin and Aigner 1979), the most important of which were caribou in the fall, and whitefish and waterfowl in the summer (Shinkwin and Aigner 1979). The fall caribou migration was the Upper Tanana's most significant resource. In early fall an entire local band would build or maintain a caribou fence at the margins of the Yukon-Tanana Uplands in order to hunt the caribou along their northward migration routes. The winter village was positioned close to the caribou fence and enough caribou were usually taken and cached to sustain the local band for much of the winter.

While living off of these stores, people hunted and fished locally but during mid-winter most subsistence activities were suspended as people visited relatives at neighbouring villages to trade and socialize. Stores often ran low in late winter so households dispersed to areas where they could procure moose, small game and fish.

Just before the spring thaw, the dispersed households congregated at the local band's summer fish camp to await the annual whitefish and Arctic grayling spawning runs that ascended the clear northern tributaries of the Tanana River. The fish camp location often corresponded to that of the caribou fence and winter village. Salmon did not ascend this far up the Tanana River so the annual whitefish and grayling runs had added significance. Major activities undertaken at this time included local hunting (especially of the dispersed spring caribou migration) and trapping, and the repair of the wooden fish dams, weirs, nets, and drying racks. While the fish were running nearly everybody was engaged in fish procurement, processing, and drying. The fish runs usually ended in July.

The rest of the summer presented numerous options to the people: waterfowl, moose, black bear, beaver, muskrat, hare, ground squirrel (*Citellus parryi*), and fish could be obtained in the lowland river and marsh areas; and caribou, sheep, marmot (*Marmota caligata*), and ground squirrel were present in the Nutzotin Mountains. Often, the men would form parties to hunt in the mountains while the women and children remained in the lowlands to fish, trap, and pick berries and roots. Prior to the fall caribou migration, people returned to the upland winter village location to prepare the caribou fence and ready their equipment.

2.3.1 Boreal Forest Ecology and Upper Tanana Land Use

Complex ecological fluctuations inherent in boreal forest environments, coupled with chronologically imprecise palaeoecological and archaeological records, prohibit easy interpretation of prehistoric subsistence systems and settlement patterns beyond those generalizations that can be made using ethnographic data and archaeological models. Human adaptations in the upper Tanana River drainage of the Yukon-Alaska border region have probably always approximated ethnographically recorded Northern Athapaskan practices. Prehistoric land-use strategies were likely based on the geography of locally available resources and had to be responsive to periodic fluctuations in the availability of those resources. Hunter-gatherer land-use models can be employed in the interpretation of archaeological sites but a full understanding of past land-use dynamics requires customization of such models to include local cultural and environmental information as well as traditional knowledge.

In this section I will explore some of the theoretical considerations underlying our understanding of prehistoric hunter-gatherer land-use strategies. My purpose is to customize existing archaeological models to facilitate the interpretation of archaeological sites and materials in the upper Tanana River basin of the Yukon-Alaska border region, particularly in the traditional territory of the Upper Tanana Scottie Creek Band (Figure 2.5). To begin I will describe some useful archaeological models that pertain to hunter-gatherer land-use. Following this I will provide a cultural and environmental context for the region that will allow the postulation of hypotheses regarding prehistoric seasonal land-use patterns and their expected archaeological correlates in the study area. I will then test the utility of these hypotheses for the interpretation of the limited archaeological data available for the study area, particularly that from archaeological site KaVn-2. Finally, I will comment on the ways in which traditional knowledge (as yet not available in published form for the study area) could be used to provide a more complete interpretation of the archaeological record.

2.3.2 Hunter-gatherer Land-use Models

Lewis Binford (1980, 1982, 1983, 1990) has presented a number of models that provide a means of explaining hunter-gatherer mobility, land-use patterns, and subsistence orientations and can be used to interpret archaeological materials. These models can be fruitfully applied to archaeological materials produced by most ethnographically recorded hunter-gatherer groups through use of the direct historical approach, providing some adjustments are made to the local cultural and environmental context. Here, I will briefly describe some of Binford's ideas and later in the section I will explain how they relate to Upper Tanana environmental relationships.

Binford (1980) views hunter-gatherer land-use as an economic means by which human populations position themselves in the environment to make the most efficient use of the available resources. This is done through mobility. People have a choice of moving their base camp periodically to new areas after the surrounding area has become depleted of resources ("residential mobility") or they can send out task groups who procure spatially and temporally restricted resources and bring them back to the base camp ("logistical mobility"). Binford terms people who use residential mobility "foragers", while "collectors" are those who use logistical mobility to exploit the landscape. Foragers tend to live in environments, particularly tropical regions, where seasonality is low and resources are evenly spaced. They procure resources as needed on a daily basis and, hence, do not need food storage. Collectors, conversely, live in regions with pronounced seasonality and spatially and temporally restricted critical resources. This resource incongruity is overcome through the use of logistical mobility, procurement of excess resources, and food storage.

All human groups utilize defined geographical areas, although the limits of these areas may not be strictly defined in terms of territories. Binford (1982) categorizes the space that can be exploited by a hunter-gatherer population as follows: the camp range is the area that can be exploited from a camp location, including the foraging and logistical limits; the annual range is the area that can be exploited over the course of an annual cycle; the extended range is that area which is monitored but not exploited; and the visiting range is the surrounding area that is occupied by neighbouring people.

Because of their differing relationships to the land, collectors and foragers produce characteristic types of sites (Binford 1982). Foragers tend to produce numerous residential camps and locations (extraction points) within the foraging radius of the camp. Residential moves tend to be progressive, in that the foraging radius of the new camp often overlaps with that of the old. Collectors produce both of these site types (but in lower quantities) along with field camps, temporary camps used during logistical forays, stations where information on resources is gathered, and caches where resources are stored for later use. Collectors also move residential camps short distances so that the new and previous foraging radius overlap, but more commonly the camp is moved a longer distance to a new area as irregularly spaced resources become available.

2.3.3 Cultural Factors Affecting Land-use

Ideology is of the utmost importance to the subsistence pursuits of Athapaskan peoples. Many rules and taboos govern how people interact, at all levels, with animals (living or dead) and natural features of the land (McClellan 1975). This ideology has produced an intimate familiarity with natural ecology as well as an embedded conservation ethic. Cultural factors would have had a profound effect on human interactions with the landscape. Some animal species (e.g., land otters) were not hunted at all, most animal remains had prescribed treatments so as not to offend animal spirits, and some places were not used at all because they were inhabited by malevolent entities. These factors would have affected the use of land and resources and would have conditioned the archaeological record so they should be considered as fully as possible when attempting to reconstruct prehistoric land-use practices. For most of this information the only sources lie in ethnography, oral history, and place names. These sources will be discussed further later.

Another cultural practice that would have an impact on resource availability and, consequently, land use is intentional cultural burning. Lieutenant Henry Allen of the United States military, who was the first white person to visit the study area in 1885, reported that "the country...was covered with a luxuriant growth of grass, and countless roses were in bloom." (Allen 1985: 64). The cultural burning almost certainly responsible for this landscape would have limited local vegetation to early seral stages most suitable for herbivores. In this regard it is important to keep in mind that people are active transformers of their environment.

2.3.4 Environmental Factors Affecting Land-use

The nature of boreal forest ecology imposes a number of constraints on human subsistence (Nelson 1980). Most resource species undergo drastic periodic population changes, with some of these fluctuations occurring in cycles. The boreal forest contains a mosaic of habitat types so that resources are localized, but in an irregular and complex pattern which shifts through time. This situation places a premium on mobility, hunting experience, knowledge of animal ecology, and familiarity with the landscape. At any one time some resources may be exceptionally abundant, while others are at "normal" levels and some are extremely low in availability. At other times there may be virtually nothing to eat. Athapaskans adapted their subsistence strategies to resource availability and because of this they cannot easily be characterized simply as fishermen, large mammal hunters, or small mammal hunters.

The coarse nature of the palaeoecological and archaeological records makes it extremely difficult to evaluate settlement pattern reconstructions. Given that the area has been predominantly boreal forest for the past 8,000 years and the fluctuations commonly exhibited by boreal subsistence resources are virtually invisible in these records, it seems unlikely that such evaluations can be made. It does seem likely that, although species absences probably did occur, most species available today and in the recent past were probably also available for much of the Holocene. This being the case, settlement patterns have probably remained much the same, with periodic shifts in subsistence orientation according to both periodic and unpredictable resource fluctuations. These fluctuations would have occurred on two scales (Yesner 1989): long-term changes owing to climate and population cycles, and short term changes in the boreal forest habitat mosaic and associated seral stages. During periods when a major resource (e.g., moose) was unavailable because of climatic or population oscillations, people would have shifted their subsistence orientation to other resources that were available (Yesner 1989). On the shorter time scale, because of the mosaic resource pattern, people would have been able to find most resources in at least a portion of their territory. Because of this environmental dynamism, sites having a particular function in one time period may have had a quite different function at another time.

2.3.5 Expected Archaeological Signatures of Upper Tanana Land-use

Using Binford's ethnoarchaeological hunter-gather land-use models, and with knowledge of Upper Tanana culture and environment, we can begin to produce hypotheses regarding the likely patterns of land-use in the study area during pre-contact times. In Binford's (1980, 1982, 1983, 1990) terms, the Upper Tanana cannot be easily classified as either foragers or collectors, as they implemented both strategies at various times of the year to position themselves advantageously relative to the desirable resources available at that particular time. Binford (1982: 11) acknowledges that "...human groups may move through seasonal phases in which their coverage and positioning tactics change" and suggests that "...in some environments we might see high residential mobility in the summer or during the growing season and reduced mobility during the winter, with accompanying increases in logistical mobility." (Binford 1980: 18). These exceptions to the model are relevant to our understanding of the land-use strategies employed by the Upper Tanana. We must, therefore, customize the model in order for it to be applied to the study area.

Starting with the fall caribou migration, we can see the communal operation of the caribou fence as a highly logistical undertaking. Although typically associated (in Binford's model) with a field camp and a cache, the caribou fence location would lack the former because of its proximity to the winter village. Stations would probably have been placed near the fence location in order to gather information about the approaching caribou. Archaeologically, in this setting, we would expect to find the caribou fence location near the margins of the uplands where topography would funnel the caribou herd. A lookout would be located nearby on a hill or promontory. Heavy processing implements and faunal remains should dominate the assemblage of the caribou fence location while meager faunal and lithic materials would have been deposited at the lookout. Nearby, probably on the bank of a small tributary stream or lake, we should find a large site (the winter village) with a diverse artifact and faunal assemblage, owing to its multiple and varied uses throughout the year. Bessie Johns (personal communication 1991, as cited in Walde 1994a) mentioned that an old village site was located at Scottie Creek, a location that corresponds in type to that postulated here.

In the winter, as food stores ran low, households dispersed to undertake hunting, trapping, and ice-fishing. Given that none of the resources available at this time of year are abundant or concentrated (lake fish may be an exception), residential mobility was probably used extensively and the camp may have been moved progressively through an area or in longer trips to distant places where resources were obtainable. Given the small human groups and dispersed nature of land-use at this time of year, archaeological remains should be scant and relatively evenly distributed across the landscape, save some concentrations at lakes where ice-fishing was known to be reliable and productive. Winter residential site assemblages should be less varied than at the winter village site and may contain multiple occupations from differential use of the site through time (e.g., for hunting moose one year and trapping beaver the next).

In spring, people moved to their fish camps before the thaw in order to cooperate in the early summer fishing for whitefish and grayling, another highly logistical activity. Often these fish camps coincided in location with the winter village, but when they did not we should find these field camps in a setting similar to that of the winter village. A more limited and focused material assemblage at fish camp locations should allow us to distinguish between the two. Also at this time, local hunting and trapping was undertaken from the fish camp. These activities would have produced procurement locations only and would not be very visible archaeologically.

During the remainder of the summer, a great diversity of land-use activities could potentially be initiated. Some of these can be considered foraging while others are quite clearly collecting. Duck, black bear and moose hunting, as well as gopher snaring, root digging and berrying in the lowlands was probably undertaken from residential camps occupied by households. Archaeological remains should show a great deal of diversity between sites. Logistical hunting trips into the mountains by the men in late summer would have produced field camps with associated procurement locations, and stations but not caches, as the animal products would be transported back to the residential camp(s). Mountain sites should be characterized by field camp sites, hunting blinds, and kill and butchering sites.

On a broad seasonal level, fall and winter sites should be concentrated near the margins of the upland with some late winter sites being located in the lowlands near lakes. Sites in the lowlands probably have a greater affinity to summer activities, however, and sites in the mountains were likely a product of summer use only.

2.3.6 Place Names, Oral History, and Traditional Knowledge

There is currently considerable interest in the use of traditional information in archaeological and other scientific research and in the ways that such information can be incorporated into research projects that involve aboriginal people or their environment, particularly in northern regions (e.g., Agrawal 1995; Cruikshank 1981, 1990; Greer 1991; Lawson 1998). Here I will use place names as an example of traditional information that can be used to inform research into past land-use activities and to provide a fuller understanding of hunter-gatherer relationships with the landscape.

Place names hold a wealth of information pertaining to the land and the relationships people enjoyed with it. For instance, Cruikshank (1990: 55) has noted the "...intricacy of Athapaskan languages and the ways in which 'a name is like a picture' encompassing and expressing precise and accurate information about observable features of the landscape." Likewise, McClellan (1975: 86) observed that "The bulk of the place names...describe distinct characteristics of the environment that are of special interest to those trying to gain a livelihood from it."

Cruikshank (1990: 59) found that Athapaskan place names serve four main functions: (1) they describe the landscape, as in *Netadiinlin* 'current runs down hill through the rocks'; (2) they record events, as in *Tthel Tadetthat* 'stone axe got lost'; (3) they may allude to mythology, as in *Ts'al Cho An* 'giant frog's den'; and (4) names can indicate resource locations as in *Lu Tse'eda Chu* 'water with lots of fish in it'. In this manner, place names serve to communicate information about the places, in addition to differentiating between them. Athapaskans almost never named places after people because it was against religious practice, although people could be named after places (Kari 1987). Because place names were not written down they were recited from memory, without the aid of maps, and children learned these names by listening to stories told by the elders. In this way, they also served as mnemonic devices. Archaeologically, place names can be used to determine past residence locations of specific people, to locate possible archaeological sites, and to learn about site characteristics and past use of a site (Greer 1991: 1). Place names clearly have considerable potential to elucidate the dynamic past land-use activities of a given region and at the same time lend more of a human dimension to archaeological interpretations in that it includes considerable collaboration with native peoples whose own views of the past are addressed in the process.

Like place names, traditional knowledge and oral history have vast potential to inform us about past land-use, particularly with regards to those aspects of human agency that condition the archaeological record but are not directly observable from it. Lawson (1998: 38) contrasts the archaeological record with oral historical information in saying that archaeological information "...represents an 'unintentional' record of past human behavior. Oral tradition on the other hand, is an intentional record; it is a record of the knowledge and information that is considered important." Unfortunately, in the study area, such information on place names, traditional knowledge, and traditional land-use activities is not easily accessible. Future archaeological research in the study area would greatly benefit by the collection of this information.

2.3.7 Summary of Ethnographic Considerations

Complex ecological fluctuations inherent in boreal forest environments, coupled with chronologically imprecise palaeoecological and archaeological records, prohibit easy interpretation of prehistoric subsistence systems and settlement patterns beyond those generalizations that can be made using ethnographic data and archaeological models. Human adaptations in the upper Tanana River drainage of the Yukon-Alaska border region have probably always approximated ethnographically recorded Northern Athapaskan practices. Prehistoric land-use strategies were likely based on the geography of locally available resources and had to be responsive to periodic fluctuations in the availability of those resources. Hunter-gatherer land-use models can be employed in the interpretation of archaeological sites but a full understanding of past land-use dynamics requires customization of such models to include local cultural and environmental information as well as traditional knowledge.

2.4 Cultural Historical Sequences

It is important in the analysis of any archaeological site to place it in a cultural historical context. This placement facilitates the interpretation of important archaeological variables such as cultural affiliation and technological influences. In the case of archaeological site KaVn-2, it is necessary to view the artifact assemblage as being composed of two discrete components: an early component with closest analogs in central interior Alaska, and a late component or components which can best be interpreted within the cultural historical framework of the southwest Yukon.

2.4.1 Culture History of Eastern Beringia (Early Period)

Research into the culture history of central interior Alaska, and of extreme northwestern North America as a whole, has a tangled past and is currently in a state of disarray, with numerous complexes, cultures, and traditions challenging one another for typological dominance. The presence or absence of microblade technology is a pervasive variable used by archaeologists in their attempts at classifying archaeological assemblages. Brief descriptions of the major cultural historical classifications (guided somewhat by the summary provided by Clark and Gotthardt 1999) are as follows.

Northern Cordilleran Tradition

Clark (1983) tentatively defined this tradition in order to account for archaeological site components in the Yukon and District of Mackenzie that exhibited lithic technology that excluded microblade production and that predated sites of the Northwest Microblade Tradition. Clark and Clark (1993) would classify any interior site older than 7,000 - 8,000 BP and lacking microblades as Northern Cordilleran. Subsequent work by others (e.g., Gotthardt 1990; Hare 1995) has supported the tradition as being a viable classification when applied to early Yukon sites that lack evidence of microblades. Site components often subsumed under this tradition include the basal occupation of the Canyon site (JfVg-1), the early component at Moose Lake (KaVn-2, the subject of this thesis), Healy Lake, Dry Creek Component I, Batza Tena, and Putu.

Northwest Microblade Tradition

MacNeish (1964) proposed the Northwest Microblade Tradition to account for sites in northwestern North America that contained evidence of microblade technology. MacNeish also recognized an entity similar to the Northern Cordilleran Tradition that he saw as preceding the use of microblades. The Northwest Microblade Tradition is still in use today by Canadian archaeologists, perhaps because MacNeish's start date for the tradition (7,000 BP) better fits the Canadian archaeological data and also because Alaskan archaeologists had competing classifications in the Denali Complex and American Palaeo-Arctic Tradition.

Nenana Complex

This complex was proposed by Powers and Hoffecker (1989) to account for sites located in the Tanana Valley of central Alaska that dated earlier than Denali Complex sites and that lacked evidence of microblade technology. Instead, the artifact assemblages from these sites appeared to represent an emphasis on bifacial technology. Site components often grouped within the Nenana Complex include Dry Creek Component I, Walker Road Component I, Moose Creek, and Owl Ridge.

Denali Complex

The Denali Complex defined by West (1967) and the American Palaeo-Arctic Tradition defined by Anderson (1968), as used by most archaeologists today, are essentially equivalent entities and only the Denali Complex will be described here. West first proposed the Denali Complex to classify apparently early Alaskan archaeological assemblages that contained evidence of microblade technology that was clearly derived from the Dyuktai Culture of northeastern Asia. Since its inception, the Denali Complex has become widely accepted and used by most Alaskan archaeologists, in one form or another, to classify early archaeological components that contain evidence of microblade technology. Site components often grouped within the Denali Complex include Dry Creek Component II, Panguingue Creek, Donnelly Ridge, Campus, and Healy Lake.

Apparently late occurrences of Denali Complex type microblade technology in interior Alaska have led some archaeologists (e.g., Dixon 1985) to postulate a Late Denali Complex. As noted by Powers (1990), this interpretive problem has not been resolved. In the Yukon (Hare and Hammer 1997; Clark 1999) and in the District of Mackenzie, Northwest Territories (Clark 1999) there are also late occurrences of microblade technology. Clark (1999) sees these late manifestations of Denali technology as being clearly derived from the Denali Complex proper and suggests that temporal gaps in our knowledge of microblade technology may result from interpretive difficulties or a lack of exploration. The problem of interpreting microblade technology in northwestern North America is a complex spatial and temporal one, as microblades appear to have been present, at least in some areas, be they widespread or isolated, throughout the Holocene.

Discussion of Current Trends

It has been thirty-four years since West (1967) first defined the Denali Complex in central Alaska. The Denali Complex has proven its utility to classify early archaeological components that contain microblades but, in the past fifteen years, sites were found that appeared to be earlier than Denali Complex sites by as much as a thousand years and that lacked microblades. These and other differences in the cultural materials led archaeologists (i.e., Powers and Hoffecker 1989, followed by others) to define the Nenana Complex, an early complex preceding Denali that is characterized by blades, an emphasis on bifacial technology, and a lack of microblades. Since Nenana's conception, however, similarities have been found to exist between Denali and Nenana Complex artifact assemblages. These perceived technological similarities caused some archaeologists (e.g., West 1996b) to question the basis for dividing early Alaskan sites into two separate complexes based on the presence or absence of microblade technology, which had previously not been found to date earlier than 11,000 BP. Recently, however, a microblade component has been found at the Swan Point site that dates to around 11,800 BP (Holmes 2000). This early occurrence of microblades in a context that is as old as, if not older than, any Nenana Complex assemblage lends support to West's (1981, 1996b, 2000) Beringian Tradition (or Eastern Beringian Tradition) as the cultural historical classification that has the most utility for classifying early interior Alaskan and Yukon archaeological assemblages.

As usual in archaeology, though, the matter is still open for debate. At present, there appear to be two competing models for early Beringian culture history:

> 1) The Nenana Complex was the original technological complex in eastern Beringia and was transformed either through diffusion or migration by the Denali Complex after 11,000 BP.
>
> 2) The Nenana Complex and the Denali Complex are equal parts of a larger technological tradition (i.e. the Beringian Tradition of West [1981, 1996b, 2000], and Holmes [2000]) and that perceived differences in assemblage composition can be explained by regional variation, seasonal factors, site use, site age, and other factors (Robinson 2000; Holmes 2000; West 1996b).

In a recent conference symposium entitled *Technological Traditions in Eastern Beringia* held at the 33rd Annual Meeting of the Canadian Archaeological Association, a number of researchers met to discuss the subject. These archaeologists appeared to reach a general consensus that the differences between Nenana and Denali were few and that future work will probably show that the two complexes are closely related, if not one and the same. Perhaps the clearest statement of this conviction is that of West (2000:4)

> *There is no unique Nenana artifact. Every Nenana artifact form can be duplicated in Denali.* The absence of microblades surely has simpler explanations than the anfractiousness involved in calling upon a different culture – and one without antecedents at that. This certainly suggests that Nenana is, at best, a Denali variant. (emphasis in original)

Following the results of that symposium, and for the purposes of this thesis, I will use the Eastern Beringian Tradition as a classificatory tool to articulate archaeological site KaVn-2 with the early culture history of central Alaska. I will not, however, alter the cultural historical classification of those sites from that interpreted by the original investigator(s). Undoubtedly, the early cultural history of eastern Beringia will be the subject of future debate as new data are presented and new hypotheses are formed. For now, I believe the Eastern Beringian Tradition offers the greatest potential to incorporate the effects on archaeological assemblage composition of such integral factors as regional variation, seasonal variation, site use, and site age. Use of this tradition also allows the definition of regional phases and complexes that better reflect the culture history of eastern Beringia.

Eastern Beringian Tradition

The Beringian Tradition "...encompasses all sites in all of Beringia which are clearly within the Upper Palaeolithic fold...that, in fact, translates to all sites, west and east, that date in the period 35,000 to 9,500 years ago" (West 1996b:549). West (1996b, 2000) further divides the Beringian Tradition geographically, into western and eastern parts, and temporally, into early and late components. The early part of the Eastern Beringian Tradition, with a time range of 12,000 to ~9,500 BP, is of interest here.

As can be surmised, the artifact forms included within the technological repertoire of the Eastern Beringian Tradition are representative of the generally reoccurring artifact types contained in archaeological site components that date to the time period that it covers. Major types include those related to blade and microblade manufacture (i.e., cores, core tablets, blades, etc.), lenticulate and lanceolate bifaces (projectile points or knives), discoidal bifaces, burins, scrapers, gravers, pièces esquillées, limaces, and large chopper/scraper/plane tools (Holmes 2000; West 1981, 1996b, 2000).

In a later section that presents the description and analysis of the artifacts from the early component at KaVn-2, the artifact assemblage will be compared to those from similarly dated components in Alaskan archaeological sites and not simply to trait lists of the defined archaeological complexes, cultures, or traditions. This approach will allow the identification of commonalities and differences in the assemblages without further clouding the cultural historical framework.

2.4.2 Southwest Yukon Culture History

Later occupations at KaVn-2 can best be viewed within the cultural historical framework of the southwest Yukon, since this area has a well-defined technological chronology. The most comprehensive culture history for the southwest Yukon was compiled by Workman (1978) and the following description will follow his work, except where otherwise cited. Major differences between Workman's chronology and that in use today include the conception of a Northern Cordilleran tradition (Clark 1983, 1991; Clark and Clark 1993; Clark and Morian 1982; Gotthardt 1990; Hare 1995), the recognition of the mid-Holocene Annie Lake Complex (Greer 1993; Hare 1995), and the combination of Workman's Aishihik and Bennett Lake Phases into the Late Prehistoric Period (Hare 1995).

Northern Cordilleran Tradition (>7000 BP)

Increasing evidence for a pre-microblade technological tradition in the Yukon has led many researchers to adopt the Northern Cordilleran tradition as a viable construct in Yukon archaeology. Clark and Clark (1993) would classify any interior site older than 7,000 - 8,000 BP and lacking microblades as Northern Cordilleran. In many places this technological tradition existed contemporaneously with users of the microblade technology of the Little Arm Phase and this appears to have been the case in the southern Yukon (Hare 1995). Characteristic artifact forms included large bifaces; blades from informal cores; tools on blades (transverse notched burins, and burin/scraper/notch combinations); and large, convex based and side notched or lobate stemmed Kamut points (Gotthardt 1990). To this list can be added elongate stone knives (Clark 1991) and bipoints (Hare 1995). The basal occupation of the Canyon site (JfVg-1), which is dated to 7,195 ± 130 BP, as well as Moose Lake (KaVn-2), which is dated to between 10,670 ± 80 BP and 10,130 ± 50 BP, have both been identified as Northern Cordilleran occupations (Hare 1995).

Little Arm Phase (8,000 - 5,000 BP)

After about 8,000 BP a distinctive microblade technology spread to many areas of the Yukon and, while it was thought that this technology became obsolete after around 5,000 BP, reevaluations suggest that it was present much later (Hare 1995; Hare and Hammer 1997). Clark (1991) accounted for these later microblade assemblages by suggesting that they resulted from hybridization with subsequent cultures. This phase was characterized by microblades, tabular and wedge-shaped microcores, burins, geometric round-based points, and the absence of Taye Lake diagnostics (see below). There were no notched points, and large bifaces and other heavy implements were very rare or absent. Endscrapers were large and narrow, but not abundant and gravers also occurred. Sites probably represented short stays by small groups and evidence suggested that subsistence resources were much like the early Taye Lake Phase, and included bison, caribou, moose, and birds.

Annie Lake Complex (5,100 - 4,600 BP)

Greer (1993) reviewed evidence of a distinctive technological complex in southwestern Yukon that consisted of concave based lanceolate projectile points. She noted that these points have morphological similarities to McKean points on the Plains and Shuswap points from the Plateau and suggested that this may represent a broad cultural interaction sphere. During initial excavations at the Annie Lake site (JcUr-3)

Greer (1993) was able to provide bracketing dates of 4,900-2,000 BP for this complex. With additional work at the site Hare (1995) determined that the complex dated between 6,200-2,900 BP and probably was restricted to 5,100-4,600 BP (Hare 1995: 130, Table 6), although he feels that this is tentative. Hare (1995) also added the use of high quality lithic materials and highly curated multipurpose tools as traits of the complex.

Taye Lake Phase (5,000 - 1,250 BP)

Part of the widespread Northern Archaic Tradition, which Clark (1991) believes developed out of the Northern Cordilleran tradition, this phase consists of all archaeological materials that are younger than 5,000 BP but predate the White River Ash. This phase was characterized by notched or lanceolate points with straight or slightly concave bases, an abundance of large bifaces, thick unifaces, a variety of endscrapers, and a developed bone industry. Ground stone was present but native copper was not in use. Burins were rare and gravers were only found sporadically. Endscrapers were profuse, of either rounded or angular form, possibly with multiple working edges. This was the only phase where endscrapers had been prepared for hafting. Workman suggested a division of this phase at 3,000 - 3,500 BP with late traits being tabular schist bifaces and stone wedges, and early traits being notched cobbles and shaped, beveled blades. He saw this division as coincidental with the onset of Neoglaciation, the resulting formation of proglacial lakes, and the probable disappearance of grasslands and bison. Large, rich sites were suggestive of seasonal return to favourable locations over a long period of time. Big game hunting was likely supplemented by trapping, fishing, and bird hunting. On technological grounds, Workman proposed a population replacement or absorption at the beginning of this phase to explain the many differences and very few similarities between it and the Little Arm Phase but, as Hare (1995: 104-105) noted, technological traditions are not the equivalent of cultural traditions so population movements are not necessary to account for the differences.

The Taye Lake Phase is somewhat arbitrarily separated from the Late Prehistoric Period by the White River Ash, a useful stratigraphic marker, and while Workman (1978) saw a great deal of cultural continuity across this horizon, he also felt that the ashfall had catastrophic effects on the people living in the southwest Yukon at the time of the eruption. Coincidental with the eruption, people were coping with other significant changes to the landscape: Neoglacial ice had restricted access to the mountains and had caused flooding of the valleys, while at the same time salmon were prevented from reaching the interior, and bison, an important resource, may have disappeared (Workman 1973). As a result, he believed that the area was probably abandoned for a number of years and people dispersed either north or south, out of the path of the ash. This proposed exodus may have caused hostility with neighbouring groups, whose territory was restricted by the newcomers. Workman (1973, 1978, 1979) also believed that the migrations, which resulted in the arrival of Athapaskan speakers to the American Pacific Coast and Southwest, were triggered by this eruption. Moodie *et al.* (1992) offered corroborating evidence by recording oral traditions among Mackenzie Dene that tell of a large volcanic eruption, widespread ashfall, and of their coming to the Mackenzie Valley from over the western mountains. Otherwise, Workman's arguments for cultural upheaval as a result of the volcanic explosion remain circumstantial.

Late Prehistoric Period (1,250 - 50 BP)

This period postdates the fall of the White River Ash and includes the introduction of European trade goods near its terminus. It was characterized by native copper implements and flaked stone to a lesser degree. Characteristic artifact types included endscrapers with rounded outlines and thin working edges, and bifaces and unifaces with thin working edges. Burins were absent or very rare and tabular bifaces and stone wedges (pièces esquillées) reached maximum popularity. Unique traits were native copper, abraded cobbles, multi-barbed bone points, small stemmed Kavik-like points, small side-notched points, and slate pieces with thick, flat ground edges. Those types shared with the Taye Lake Phase were geometric and notched points, multi-barbed bone points, stone wedges, boulder spalls, two endscraper types, flake blade cores, blunted discoids, tabular bifaces, stemless points, broad, thin endscrapers, discoidal flake cores, and other general traits. Small sites probably reflected the ethnographic settlement pattern. Workman (1978) agreed with MacNeish (1964) that forest expansion was probably responsible for the decrease in site size and number but, unlike that author, saw no evidence for increased fishing and trapping at the expense of large game hunting.

Near the end of the Late Prehistoric Period an elaborate bone industry and a growing significance of European trade goods were in evidence. Not present, but expected characteristics of this phase included the increased use of metal tools at the expense of stone and native copper, the use of metal pots instead of skin or bark bags and boiling stones, an increase in axe-chopped bones with fewer calcined fragments, an increased emphasis on fur-bearing animals because of the fur trade, and increased sedentism with log cabin villages being occupied at least seasonally.

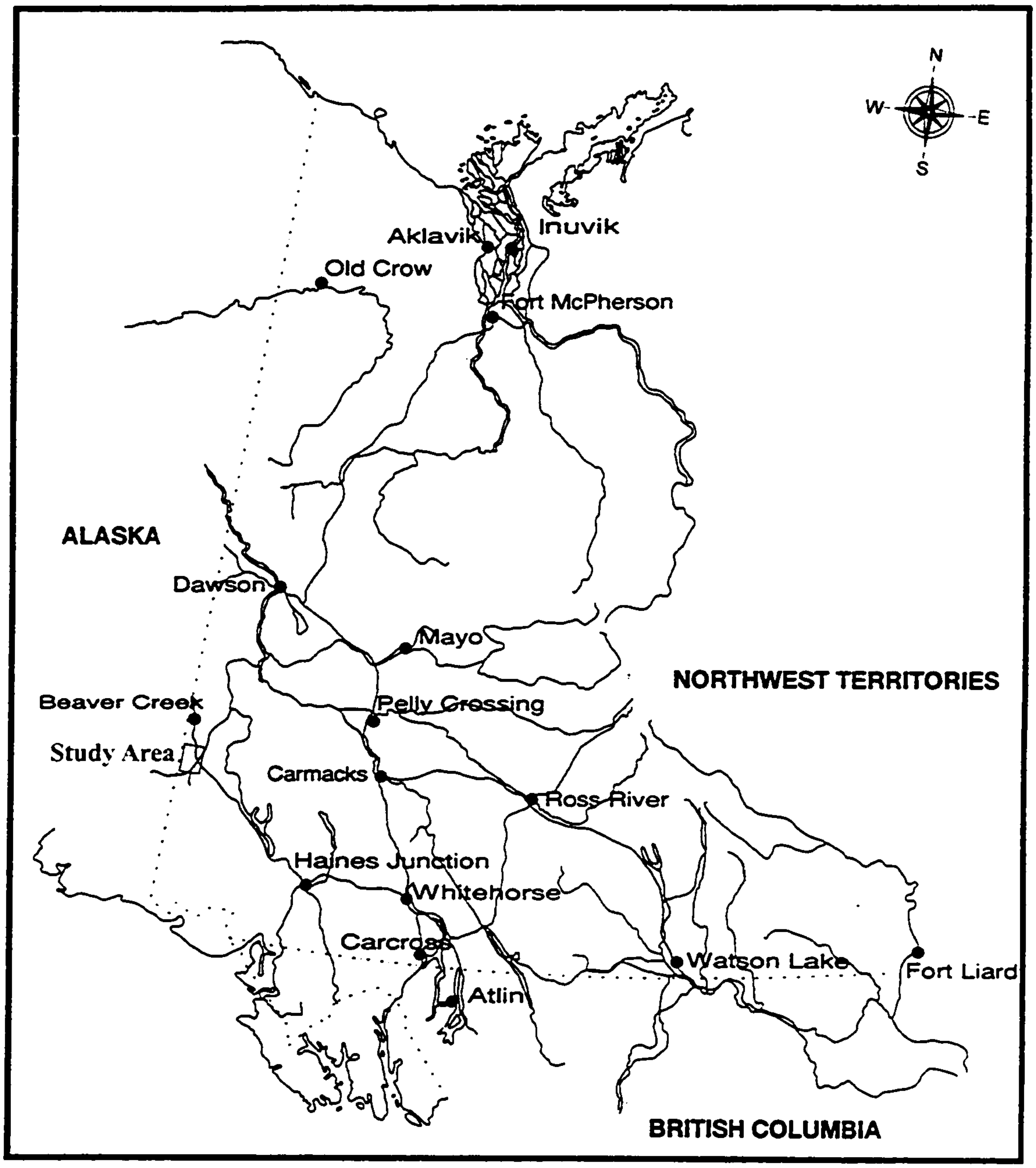

Figure 2.1: Location of the study area in Yukon Territory.

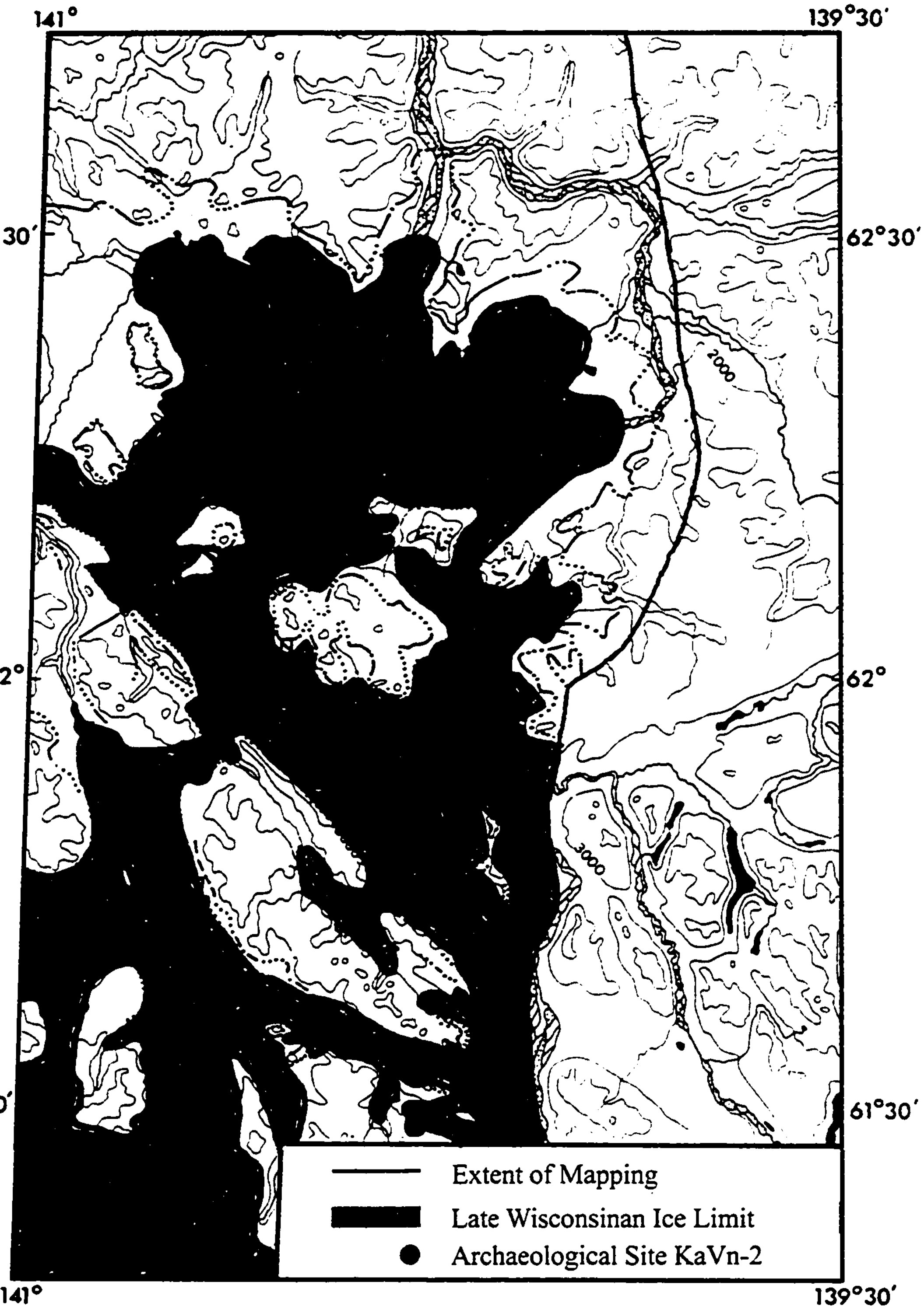

Figure 2.2: Extent of glacial ice in the study area at the Last Glacial Maximum, around 13,500 BP (adapted from Rampton 1971a: 282).

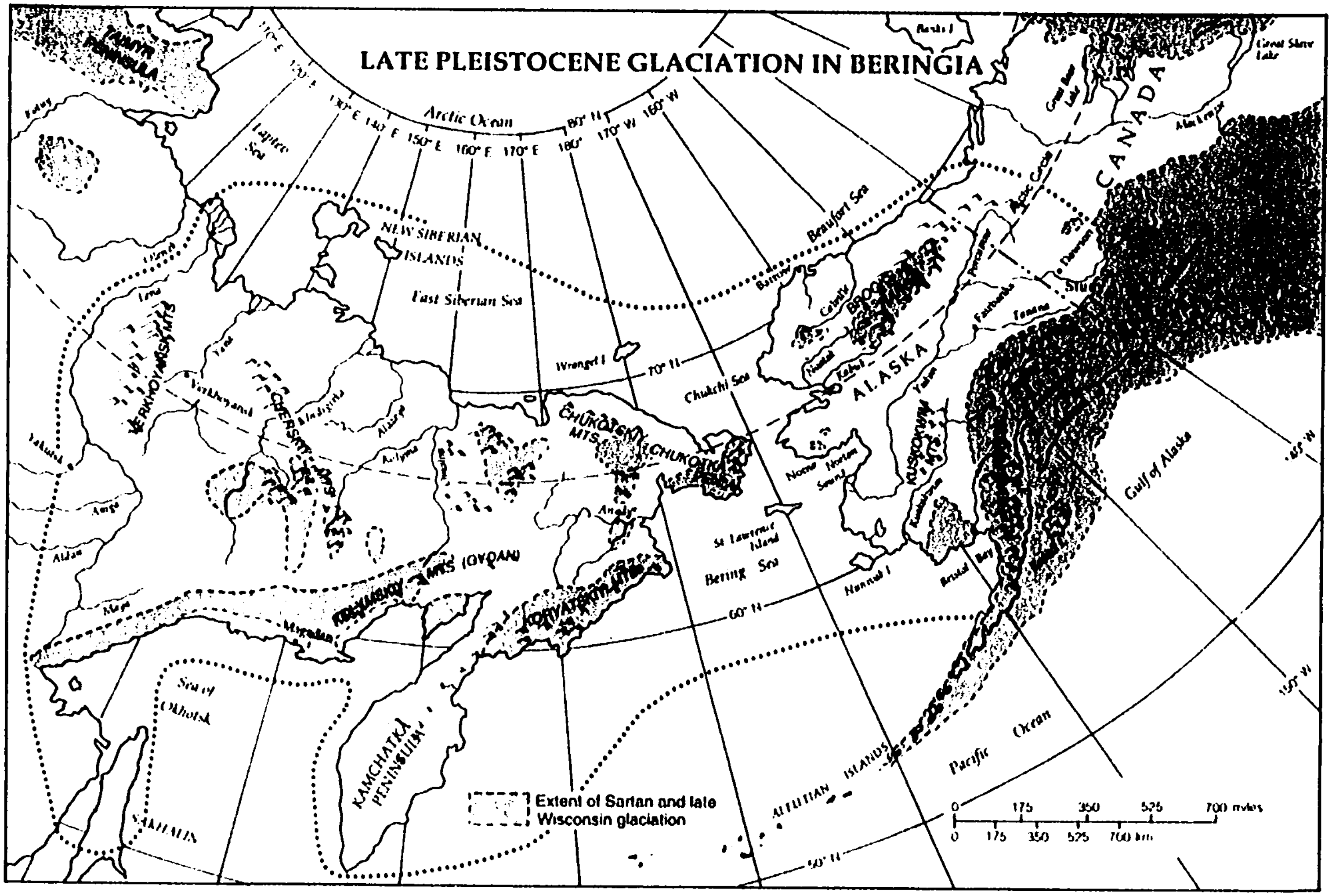

Figure 2.3: Location of the study area in relation to the Beringian land mass (adapted from West 1996: 3).

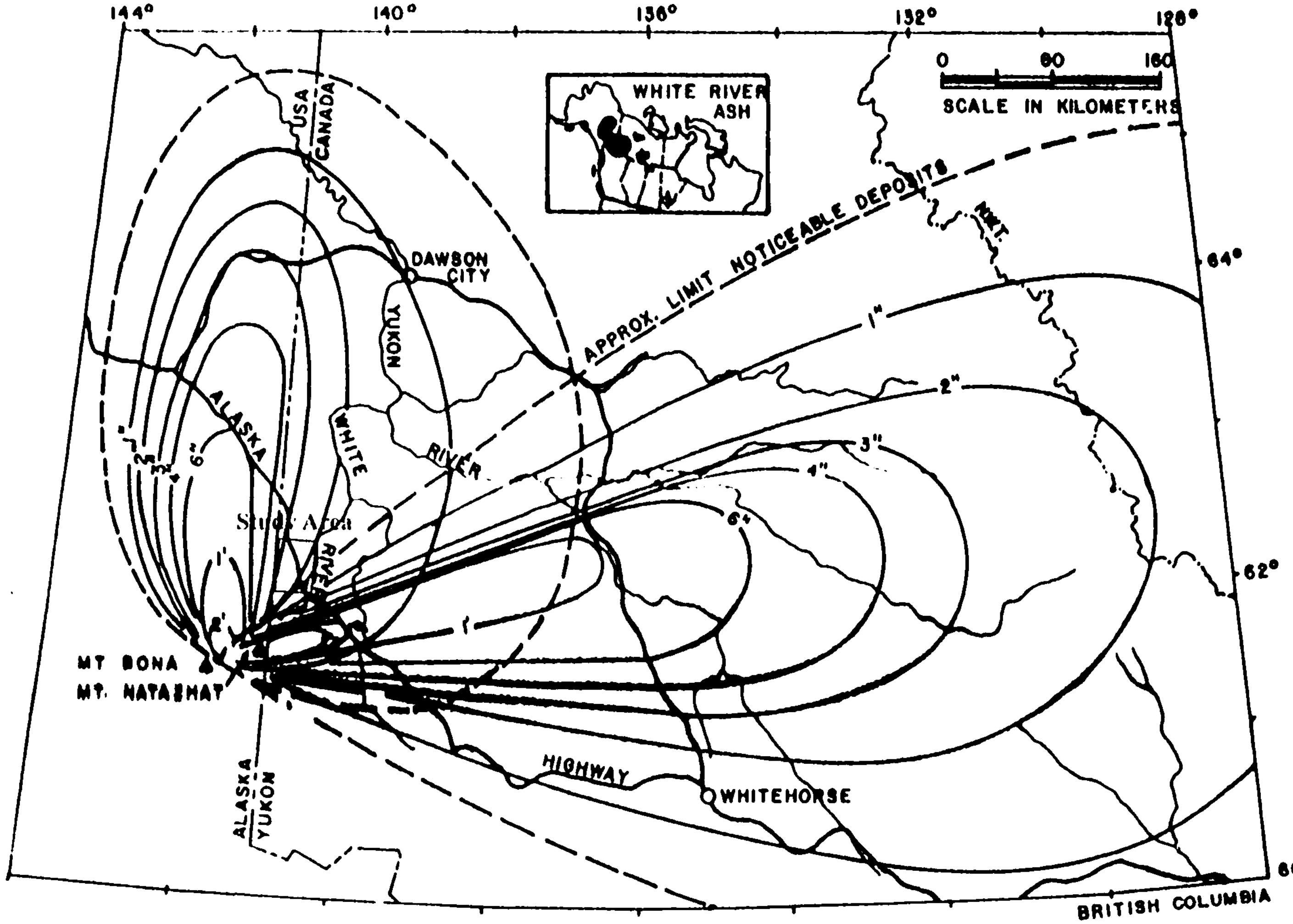

Figure 2.4: Location of the study area in relation to the distribution of the White River Ash (adapted from Lerbekmo *et al.* 1975).

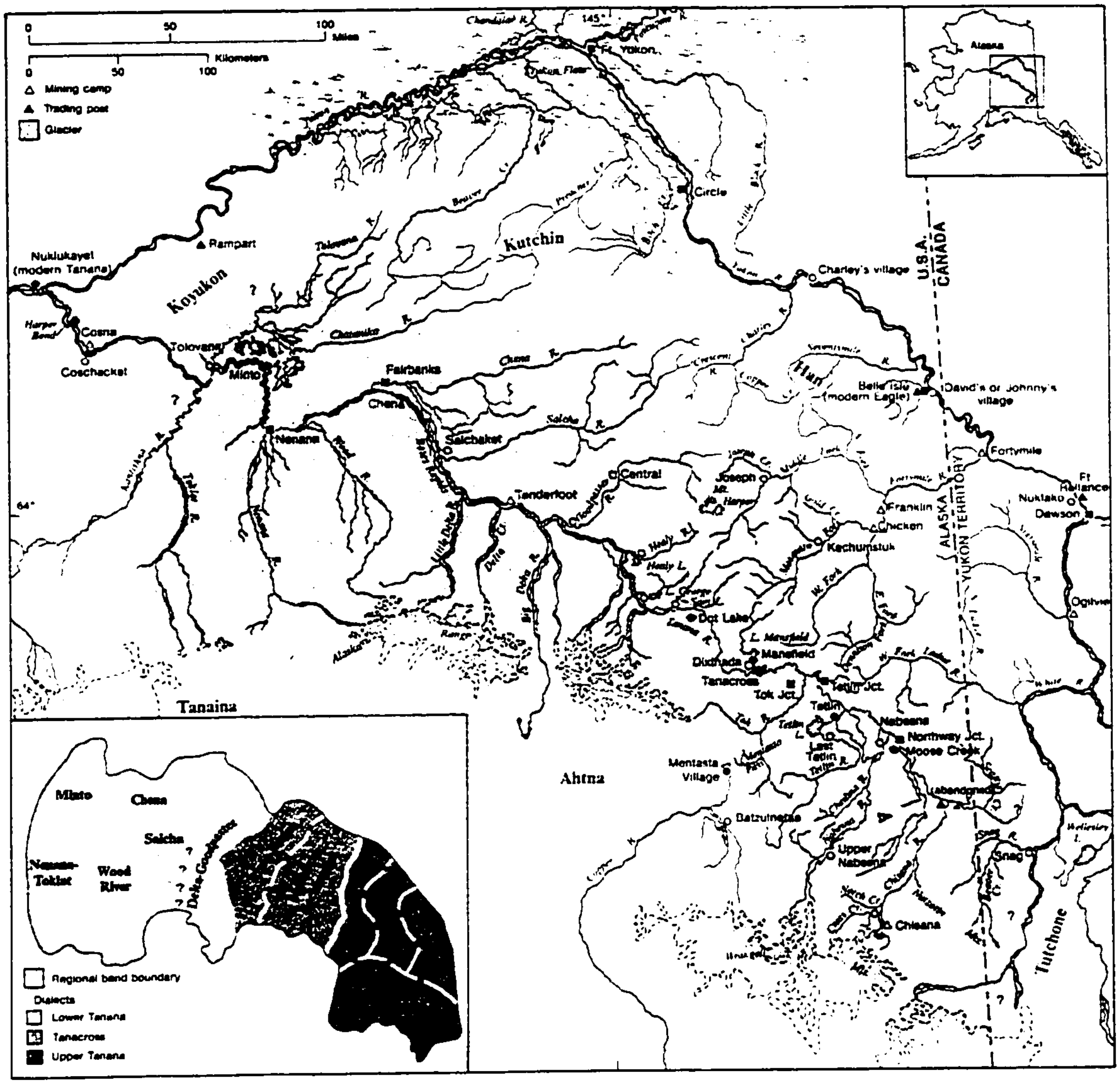

Figure 2.5: Distribution of Tanana-speaking peoples at the time of European contact. The traditional territory of the Scottie Creek local band is the shaded area on the far right of the map (see inset for location) (After McKennan 1981).

CHAPTER THREE
Archaeological Site KaVn-2

3.1 Discovery of the Site

KaVn-2 was discovered in 1991 during an archaeological impact assessment conducted by Heritage North Consulting Services (Walde 1991). The aim of the impact assessment was to locate archaeological sites that would sustain damage as a result of the proposed Shakwak Highway Upgrading Project. The site was discovered when cultural materials were found eroding from the exposed bank that was modified during the construction of the original Alaska Highway. These initial surface finds included various unmodified flakes of assorted materials, a chert scraper, and three retouched flakes. These artifacts were considered to be very significant since little was known about the archaeology of this region. A salvage archaeology project was proposed to recover information from the site because of the imminent impact that would be caused by the highway upgrading project. Heritage North Consulting Services conducted that work in 1993 (Walde 1994a) and 1994 (Walde 1994b).

3.2 Physical Setting

KaVn-2 is located in the Shakwak Valley on the east side of the Alaska Highway 10 km north of the White River Bridge and 40 km south of the community of Beaver Creek (Figure 3.1; Figure 3.2; Plate 3.1; Plate 3.2; Plate 3.3). The site lies at latitude 62° 03', longitude 140° 38' and at an elevation of 705 m asl. The site is situated on a sand hill that lies at the base of the northwest corner of Horsecamp Hill and overlooks Moose Lake. The sand hill is approximately 5 m above lake level. A small intermittent stream, emanating from Horsecamp Hill, flows past the south side of the site and into Moose Lake. Moose Lake drains via a small, unnamed stream into Sanpete Creek, which empties into the White River, a tributary of the Yukon River. Terrain in the vicinity of the site is characterized by hummocky, poorly drained ground that supports an open canopy of stunted black spruce (*Picea mariana*) with an understory of scrub birch (*Betula* *glandulosa*), Labrador tea (*Ledum groenlandicum*), dwarf blueberry (*Vaccinium caespitosum*), mosses, and lichens. The sand hill occupied by KaVn-2 is flat and well drained and supports a mature, closed stand of white spruce (*Picea glauca*) and paper birch (*Betula papyrifera*) with an understory of green alder (*Alnus crispa*) and red-stemmed feathermoss (*Pleurozium schreberi*). Moose frequent the area around KaVn-2 and they are often seen in the shallow ponds and small lakes feeding on the rich sedges and other aquatic plants.

3.3 History of Field Research

In 1993 twenty-five 1 m^2 units were excavated at KaVn-2 (Walde 1994a). At least two cultural deposits were identified: an upper component located below the White River Ash in a Red - Brown Loess layer and a lower component situated in an older Yellow - Tan Loess layer. All other sedimentary layers were culturally sterile. A radiocarbon sample obtained from the base of the Red - Brown Loess soil horizon returned a date of 7,810 ± 80 BP. Artifacts found during the 1993 excavation included seven utilized flakes, five retouched flakes, five projectile points and bifaces, eleven obsidian pebbles, one abrader, and 152 pieces of lithic debitage. Of these artifacts, six modified flakes, and three projectile points were associated with the lower component. These three projectile points were large and leaf-shaped with thick cross-sections, irregular flaking patterns and were made of gray siltstone; two appeared to be unfinished, while the third was a wide tip fragment. Raw material types included obsidian (restricted to the upper component), gray basalt, green and gray siltstone, brown chert, gray chalcedony, and sandstone. Obsidian cores appeared to have been cached at the site during the upper occupation. Since obsidian was absent from the lower component but present in the upper component and at all other more recent occupations at the sites he excavated in the area, Walde speculated that the lower component might have represented a colonizing population unaware of local obsidian sources. Faunal remains included 715 burnt or mineralized, unidentifiable bone fragments. The upper component was identified as a Little Arm Phase occupation while the lower component was believed to represent a pre-microblade technology, possibly the Northern Cordilleran Tradition.

Because of the significant finds made at KaVn-2, the Yukon Heritage Branch requested Heritage North Consulting Services to conduct further excavations in 1994. As a final report has not yet been written, the following information was obtained from the summary report submitted to the Yukon Heritage Branch (Walde 1994b). During the 1994 field season 38, 1 m^2 units were excavated. Artifact finds included a nearly complete basalt lanceolate point, two basalt point tips, a round basalt point base fragment, and miscellaneous biface fragments from the lower tan silt layer. Artifacts recovered from the upper component consisted of a basalt stemmed point base fragment, as well as two endscrapers, one of basalt, the other of obsidian. Numerous radiocarbon samples were taken for dating purposes, but results were not available at the time Walde's (1994b) summary report was written. Fortunately, these results were later obtained by the Yukon Heritage Branch (Gotthardt 1998, personal communication). A date of 1,720 ± 80 BP was acquired from a wood sample recovered from the base of the White River Ash. This date suggested that the ash layer present at the site was the result of the earlier eruption of Mount Bona that spread ash northward (the north lobe of Figure 2.4). A charcoal sample associated with artifacts in the upper component returned a date of 4,740 ± 60 BP. A date of 7,770 ± 70 BP was obtained from a charcoal sample recovered from the interface of the Red - Brown Loess and Yellow - Tan Loess layers, the same stratigraphic position from which the aforementioned date of 7,810 ± 80 BP was derived. Finally, a charcoal sample collected from near the base of the Yellow - Tan Loess returned a date of 10,130 ± 50 BP for the early component at the site. Because of the early age of the site and its significance to the Yukon's cultural heritage, the site was avoided during the highway upgrading project. The radiocarbon chronology of the site will be treated in more detail in a later section.

The 1999 field research was conducted from June to August with a field crew that consisted of youth from the White River First Nation. Thirty 1 m^2 units were excavated around the periphery of the previously excavated portion of the site, bringing the total number of units excavated at the site to 93 (Figure 3.3). From these excavation units we recovered 28 modified lithic artifacts, 211 pieces of lithic debitage, one unidentified botanical macrofossil, and 11 charcoal samples, of which two were submitted for radiocarbon dating. Our work brought the totals for cultural materials recovered from the site to 179 modified lithic artifacts (numerous modified artifacts, mostly utilized flakes, were found in the debitage from previous field seasons), 2,215 pieces of lithic debitage, one unidentified botanical macrofossil, and 24 charcoal samples, seven of which have been dated by radiocarbon.

We were able to substantiate many of the observations made by Heritage North Consulting Services regarding the archaeological materials at KaVn-2. Like Walde (1994a) we found the sediments above the White River Ash to be culturally sterile. Obsidian, chert, and chalcedony raw materials used in lithic production were confined to the Red - Brown Loess layer at the site, a situation also noted by Walde. Unlike Walde, however, I did not believe that the archaeological materials present in the Red - Brown Loess layer could be characterized as a single component. Walde identified the 'upper component' as a Little Arm Phase occupation, whereas I thought the concentration of artifacts in this layer were the result of repeated occupations between 7,800 BP and 1,900 BP, a time period which encompassed the Little Arm Phase and Taye Lake Phase of the culture history of the southwest Yukon. The (probably) single occupation represented by the materials in the Yellow - Tan Loess layer was interpreted as the result of an occupation by people whose technology was similar to that of the Northern Cordilleran Tradition, the Yukon technological equivalent of the Nenana Complex in Alaska. Further analysis presented in this thesis suggests that technological elements of both the Nenana and the Denali Complexes are present in the assemblage. Here, those cultural historical classifications are subsumed under the Eastern Beringian Tradition. The glacial history of the area, which made the site uninhabitable until after 11,000 BP confirmed the suspicion voiced by Walde that the people responsible for the early occupation were new to the recently deglaciated region.

Over the winter of 1999 - 2000, all of the cultural materials recovered from KaVn-2 during all three field seasons were analyzed and catalogued. This process made it possible to view the site and the artifact collections, for the first time, in their entirety. I will describe the site and artifact collection in more detail following a brief description of how the cultural materials were recovered.

3.4 Methods

A grid system composed of 1 m^2 units was set up and was based on the highway right of way survey marker datum point used by Heritage North Consulting Services during their field research at the site (Walde 1994a: 22). This situation allowed for the accurate recording of provenience and allowed easy comparison of artifact locations during the mapping stages of the research project. Vertical provenience was measured as depth below the distinctive White River Ash layer because this was the marker used in the previous excavations and the results needed to be comparable. Sediments at KaVn-2 were excavated with trowels in natural layers and by 5 cm levels within those layers. Sediments were screened through 5 mm mesh to recover small cultural materials missed during trowelling. Artifacts were mapped and photographed *in situ* during the excavation. All carbonized remains were sampled for dating purposes when they were encountered. Following the 1999 field season, all cultural materials recovered during the four years of research at the site were cleaned and analyzed and their attributes were recorded in a comprehensive database. The complete results of all research activities conducted at KaVn-2 are summarized below.

3.5 Geomorphology and Stratigraphy

Geomorphologically, the location of archaeological site KaVn-2 is somewhat unique. It appeared that the sand ridge, upon which KaVn-2 rested, was deposited as a point bar on the inside bend of a glaciofluvial meltwater channel. During deglaciation, with most of the ice mass located south of the site location, great quantities of glacial meltwater would have flowed northward towards the unglaciated and better drained region to the north. It appeared that Dry Creek, located just north of the site, occupied one such glacial meltwater channel (Hughes *et al.* 1969: accompanying map). Given this drainage direction and the topographical control exerted by Horsecamp Hill, the water would have had to flow northwestward past the site location and then northward after passing the hill in order to reach the Dry Creek Valley. The site location is positioned in such a way that it would have been on the inside bend of the glaciofluvial channel, an ideal place for the deposition of sand with relatively homogeneous grain size. The sediments at the site were not subjected to any compositional analysis but this scenario seemed most likely to explain the geological origin of the sand ridge upon which the site was located.

After the cessation of glacial melting and flooding, at around 11,000 BP, it appeared that loess deposition began, with sediments probably derived from the glacial silts left in dry meltwater channels. The beginning of loess deposition more-or-less coincided with the movement of people into the region, as represented by the early human occupation of the site just after that time. Loess deposition was maintained at a relatively steady rate until the first eruption of Mount Bona at around 1,900 BP that blanketed the region with volcanic ash. Loess deposition resumed after the eruption and the slow process of loess accumulation is probably still occurring. Glaciofluvial processes and loess deposition were the primary factors responsible for the stratigraphic composition of the site.

The stratigraphy of KaVn-2 was fairly simple as far as archaeological sites are concerned. There were seven distinct stratigraphic layers represented in the profile (Figures 3.4 and 3.5 and Plate 3.4). These layers were present in all of the units excavated although their thicknesses varied slightly from unit to unit. From the base of the deposit to the modern ground surface, these layers were: (1) Brown - Gray Sand of unknown depth; (2) Yellow - Tan Loess, about 20 cm thick; (3) Red - Brown Loess, about 20 cm thick; (4) White River Ash, around 5 cm thick; (5) Red - Brown Loess, about 10 cm thick; (6) Humus - Rootmat, around 5 cm thick; and (7) Moss - Littermat, about 5 cm thick.

In their site notes, Heritage North Consulting Services noted that a few units exhibited a slight mixing zone between the Red - Brown and Yellow - Tan Loess layers. This mixing was not observed in any of the units excavated in 1999. The vertical distribution of raw material types, with numerous types being found only in the Red - Brown Loess, suggested mixing of deposits was negligible. Although KaVn-2 is located in an area of discontinuous permafrost, the sand hill on which it lies is very well drained and no permafrost was in evidence. The internal consistency of radiocarbon dates and the vertical proveniences of refitted artifacts (see below) also supported the belief of stratigraphic integrity at the site.

3.6 Radiocarbon Chronology

Two of eleven charcoal samples collected during the 1999 excavations were submitted to the Waikato Radiocarbon Laboratory in Hamilton, New Zealand for radiocarbon dating. Samples were selected that would date the early occupation at KaVn-2. Sample 99-4ASR-1 was collected in unit W631, S2 from 18 cm below ash. It was chosen for dating because there was sufficient material present to obtain a conventional radiocarbon date. The sample was dated at 3,740 ± 170 BP (Wk-7840), a determination that is considered much too young given the context of the sample; this sample represented the only anomaly of the site's radiocarbon chronology. Because of this inconsistency, the charcoal in the sample was considered to be intrusive (probably as a result of root burn) and therefore the date is considered erroneous. Sample 99-4ASR-2 was obtained from unit W638, S5 from 29 cm below ash (the base of the Yellow - Tan Loess layer). Because of its small size, the sample was submitted for Accelerator Mass Spectrometry dating, and returned a date of 10,670 ± 80 BP. This estimation agreed with the radiocarbon chronology established by Heritage North Consulting Services for the site. Since this date was obtained on a sample recovered from the base of the Yellow - Tan Loess that contained artifacts from the earliest human occupation of the site it probably represented the minimum possible age of that occupation. It must be noted here that no hearths or cultural features containing charcoal were found at KaVn-2. All radiocarbon assays were obtained on charcoal samples recovered from the site matrix. Because of this situation, the radiocarbon dates provide a chronology of site sedimentation and must be considered as approximate when applied to cultural materials within those layers.

3.6.1 Discussion of Radiocarbon Chronology

Seven of the 24 charcoal samples recovered during three seasons of fieldwork at KaVn-2 were dated (Table 3.1). A date of 1,720 ± 80 BP (Beta-75869) on wood from immediately below the White River Ash provided strong evidence that the ash layer present at the site represented the north lobe, deposited as a result of the early eruption of

Table 3.1: Radiocarbon dates obtained from charcoal samples from KaVn-2. The positions of these samples relative to the site stratigraphy is shown in Figure 3.4. Dates in brackets were calibrated using Oxcal 3.3 (Ramsey 2000) and are expressed as 95% confidence intervals.

Sample Number	Unit	Horizontal Provenience	Vertical Provenience	Sample Material	Age Determination (Calibrated)	Comments
Beta-75869	W635,S6	?	0 cm BA	Wood	1,720 ± 80BP (1,821-1,418 BP)	Dated ash layer
Wk-7840	W631,S2	63 cm N, 40 cm E	18 cm BA	Charcoal	3,740 ± 170BP (4,548-3,636 BP)	Probably root burn. Only inconsistency
Beta-75867	W633,S5	?	7 cm BA	Charcoal	4,740 ± 60BP (5,592-5,322 BP)	Dated part of late component
Beta-75866	W628,S6	?	15 cm BA	Charcoal	7,770 ± 70 BP (8,721-8,393 BP)	Dated red / yellow interface
Beta-68509	W628,S6	?	12 cm BA	Charcoal	7,810 ± 80 BP (8,979-8,412 BP)	Dated red / yellow interface
Beta-75868	W635,S6	?	30 cm BA	Charcoal	10,130 ± 50 BP (12,275-11,343 BP)	Dated part of early component
Wk-7841	W638,S5	16 cm N, 78 cm E	29 cm BA	Charcoal	10,670 ± 80 BP (12,974-12,338 BP)	Minimum date for early component

Mount Bona that occurred sometime between 1,900 BP and 1,500 BP (Clague *et al.* 1995; Figure 2.4). A charcoal sample that was associated with cultural materials in the Red - Brown Loess yielded a date of 4,740 ± 60 BP (Beta-75867). Because this charcoal may not have been cultural in origin, it should only be considered a relative date on the cultural materials associated with that stratigraphic layer. Dates of 7,770 ± 70 BP (Beta-75866) and 7,810 ± 80 BP (Beta-68509) were obtained from samples at the interface of the Red - Brown and Yellow - Tan Loess layers. The one sigma standard deviations of these two samples overlap and the approximate date of 7,800 BP marks the chronological separation of these two layers. Consequently, any artifacts that were recovered from the Yellow - Tan Loess were older than this age and artifacts recovered from the Red - Brown Loess were younger. Finally, the two dates of 10,130 ± 50 BP (Beta-75868) and 10,670 ± 80 BP (Wk-7841) provided bracketing dates for the earliest human occupation of KaVn-2. Although the older of the two dates was obtained from a sample that was collected at a shallower (by 2 cm) depth below ash than the other, this was a result of slight variations in the thickness of stratigraphic layers between units and did not represent an inconsistency. The older sample was collected from the base of the Yellow - Tan Loess whereas the younger of the two was collected from just above the base of that layer.

Ignoring the spurious date of 3,740 BP, the radiocarbon chronology of KaVn-2 consisted of six reliable and internally consistent radiocarbon dates that clearly defined the age of the sediment deposit. It must be kept in mind, however, that no features were found at KaVn-2 so the charcoal samples recovered could not be confidently attributed to a cultural source. Therefore, the radiocarbon dates give accurate ages for the stratigraphy of the site but provide only a general chronological framework within which to view the archaeological remains.

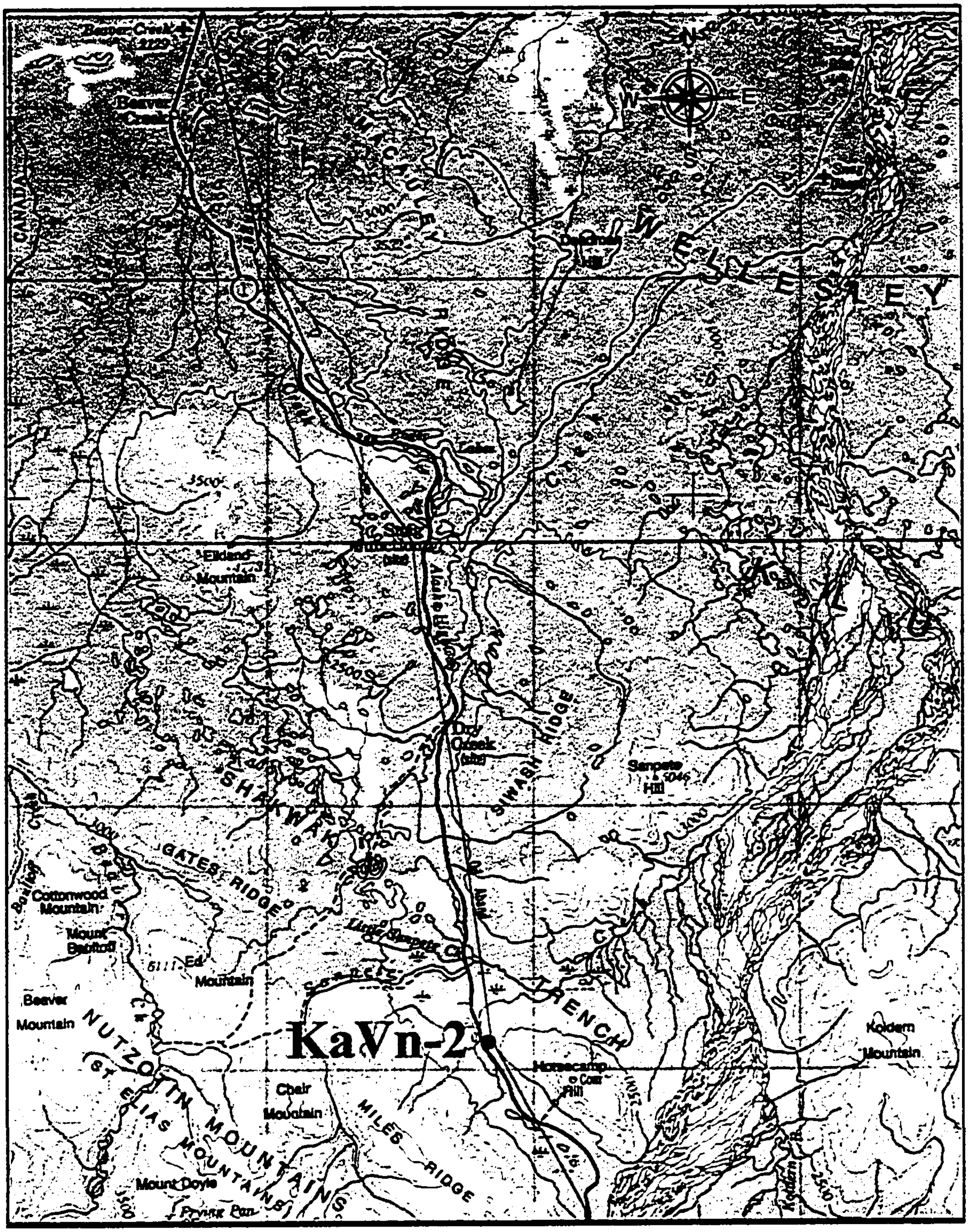

Figure 3.1: Location of archaeological site KaVn-2 in the study area (adapted from NTS map sheets 115J and 115K).

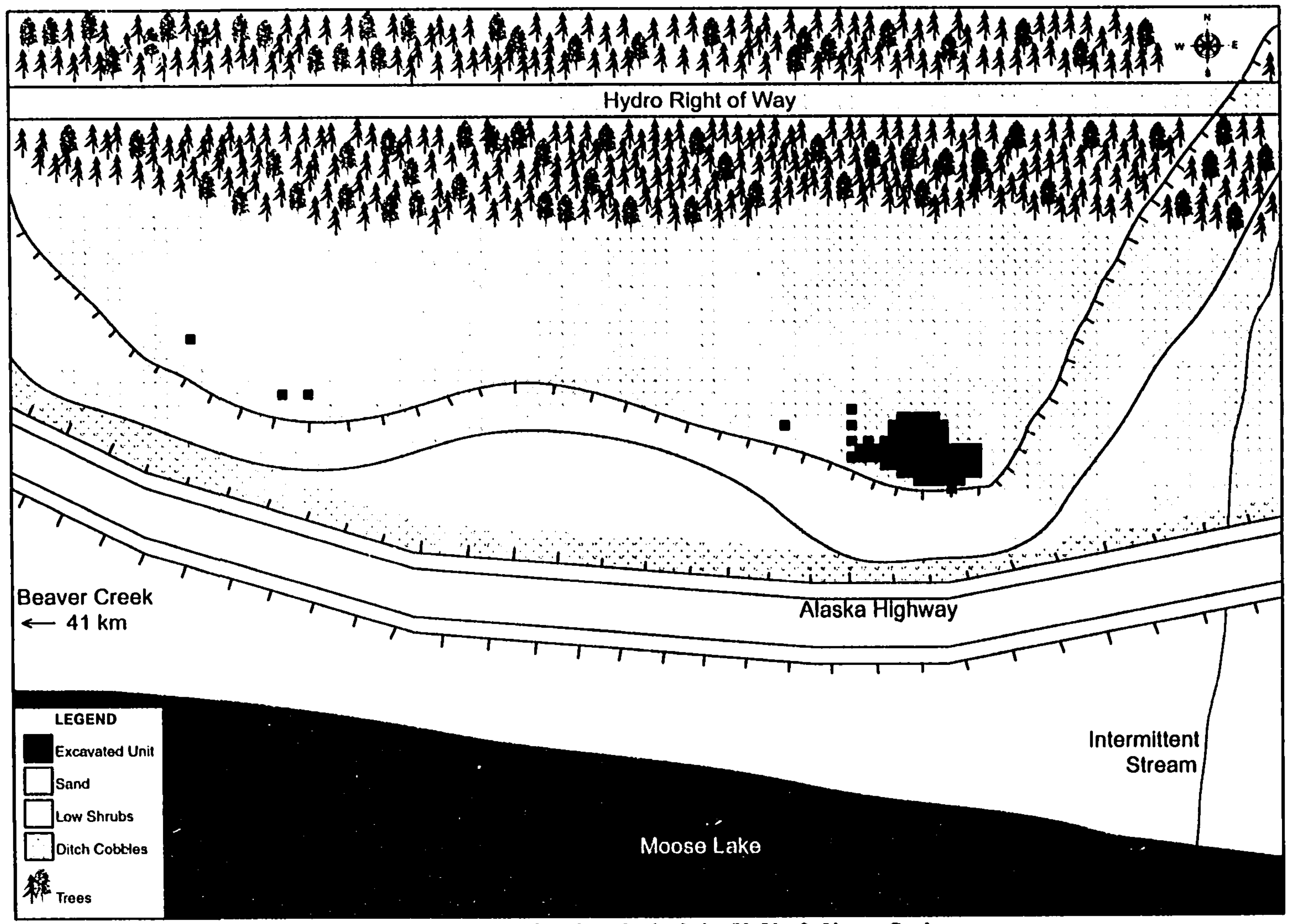

Figure 3.2: Map of archaeological site KaVn-2. Not to Scale.

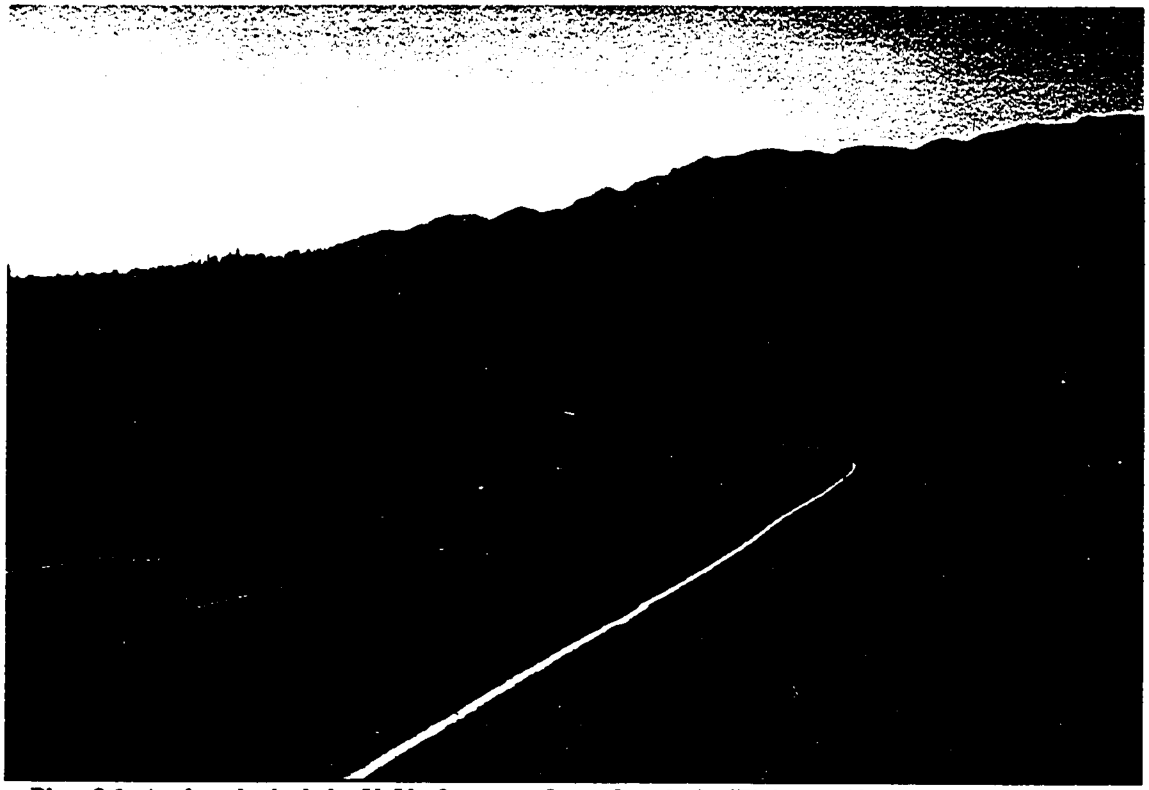

Plate 3.1: Archaeological site KaVn-2 as seen from the Alaska Highway. View is to the southeast.

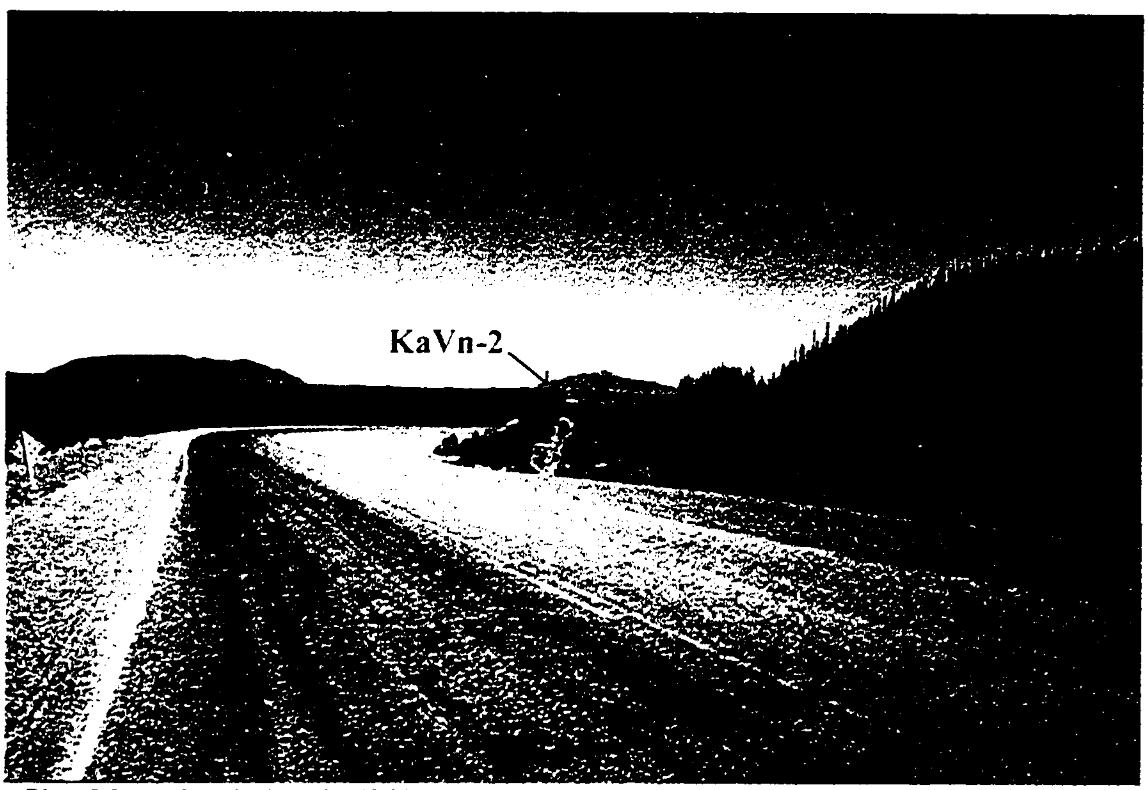

Plate 3.2: Archaeological site KaVn-2 as seen from the Alaska Highway. View is to the northwest.

Plate 3.3: The main excavation area at KaVn-2 (tripods and blue tarp) on the southeast corner of the ridge. View is to the northwest from the Alaska Highway.

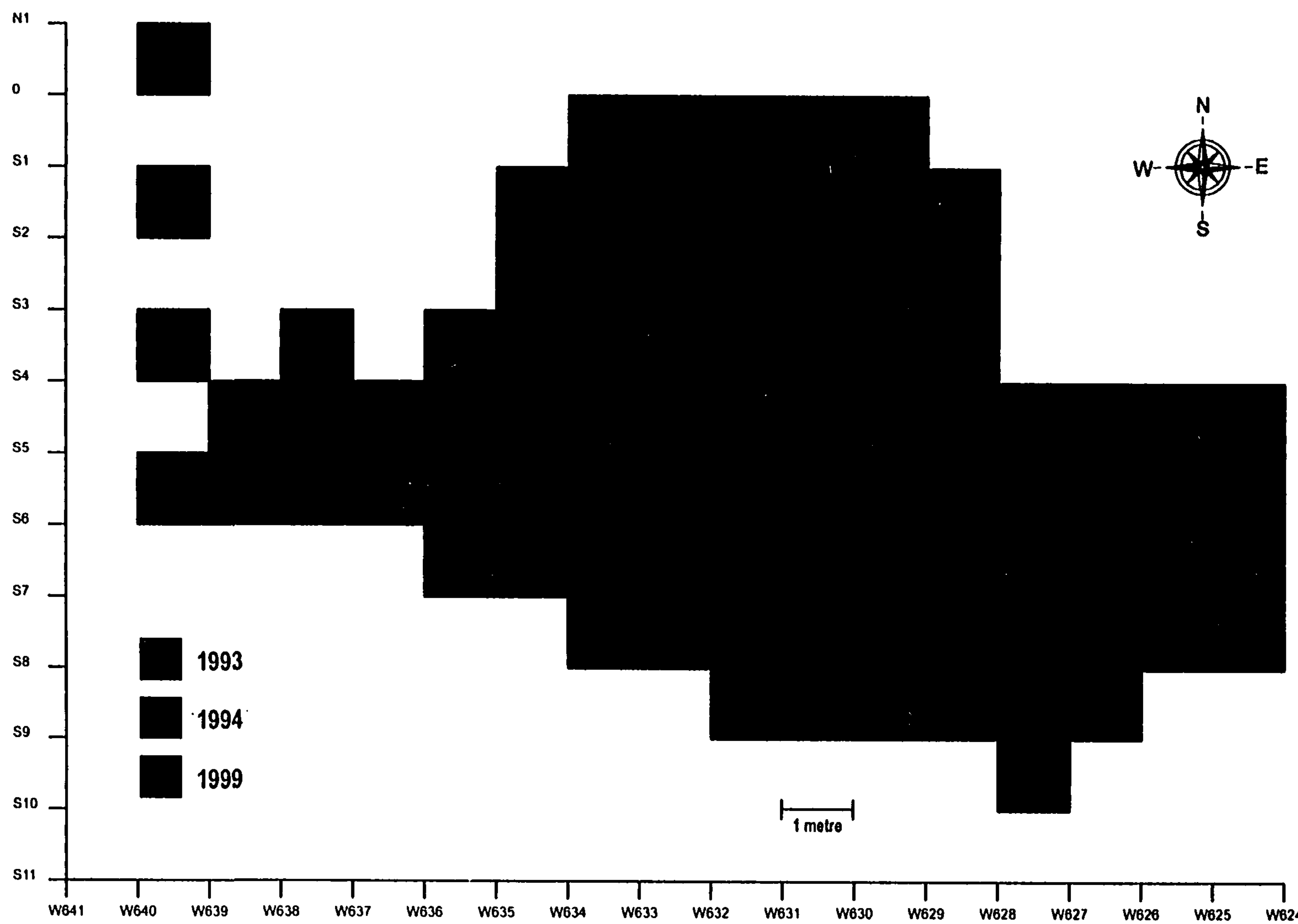

Figure 3.3: The main excavation area at KaVn-2 showing the units excavated during three seasons of research at the site.

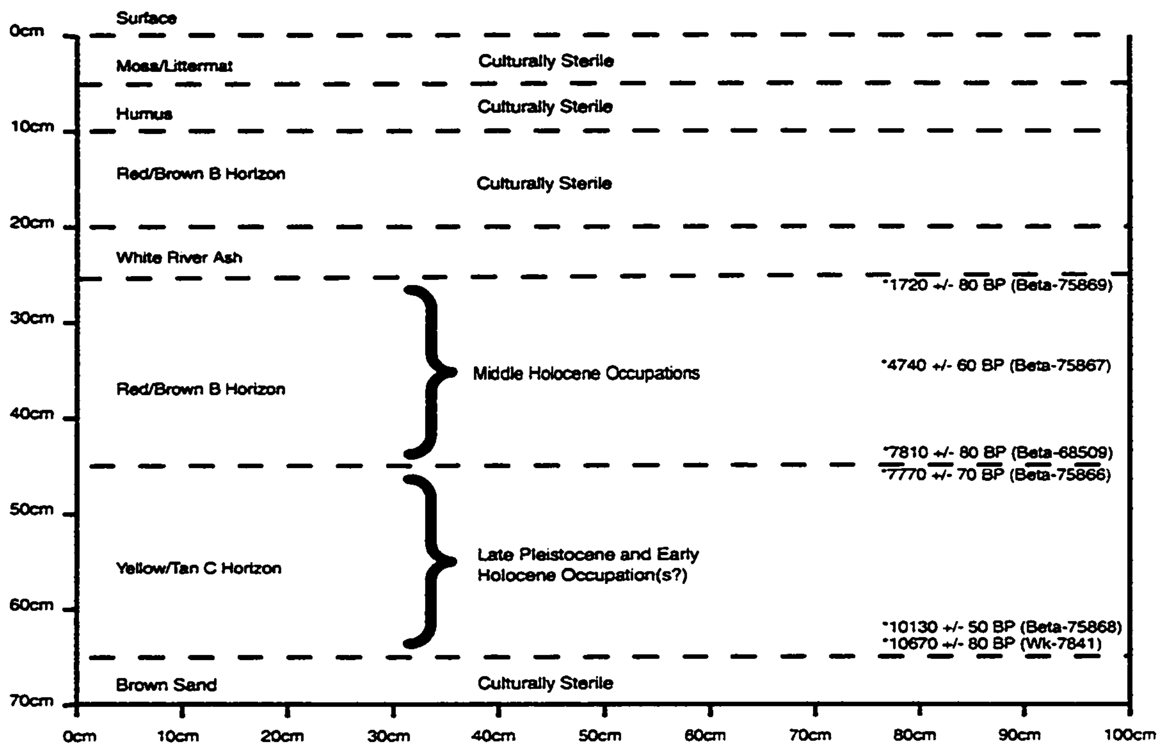

Figure 3.4: Generalized stratigraphic profile showing relative locations of dated radiocarbon samples.

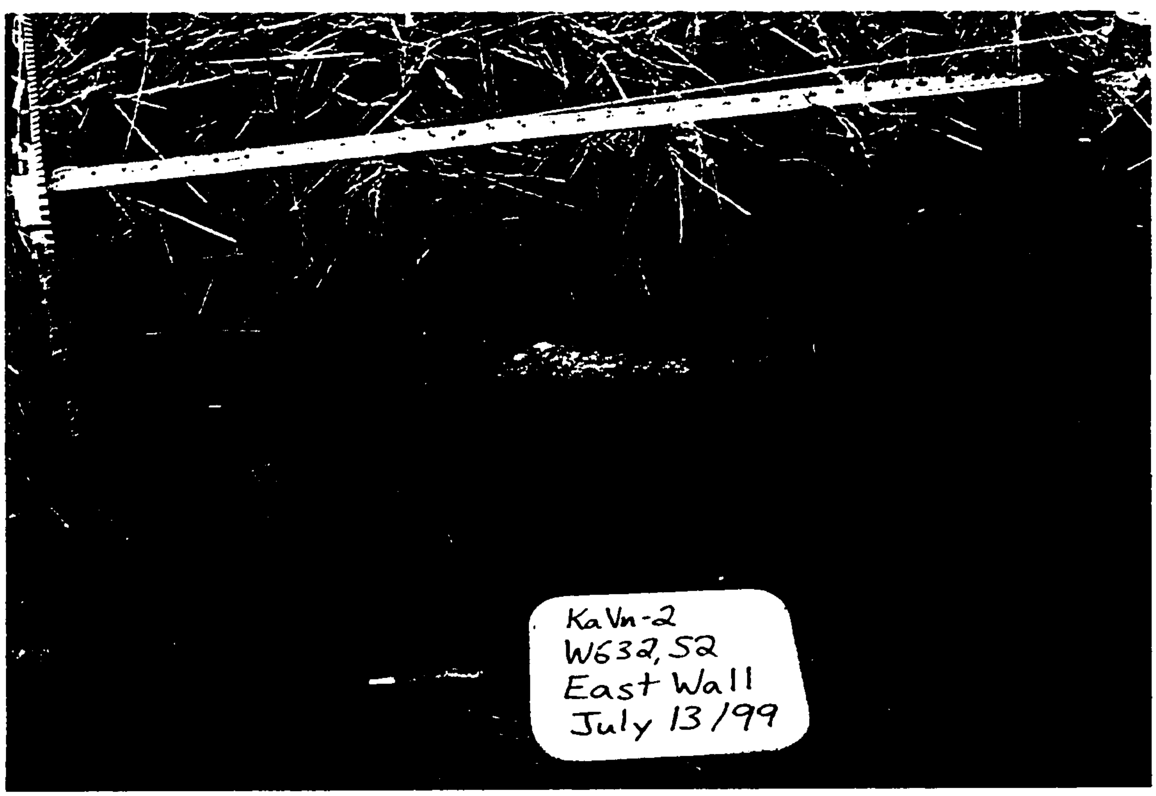

Plate 3.4: Representative stratigraphic profile showing the layers in Figure 3.4.

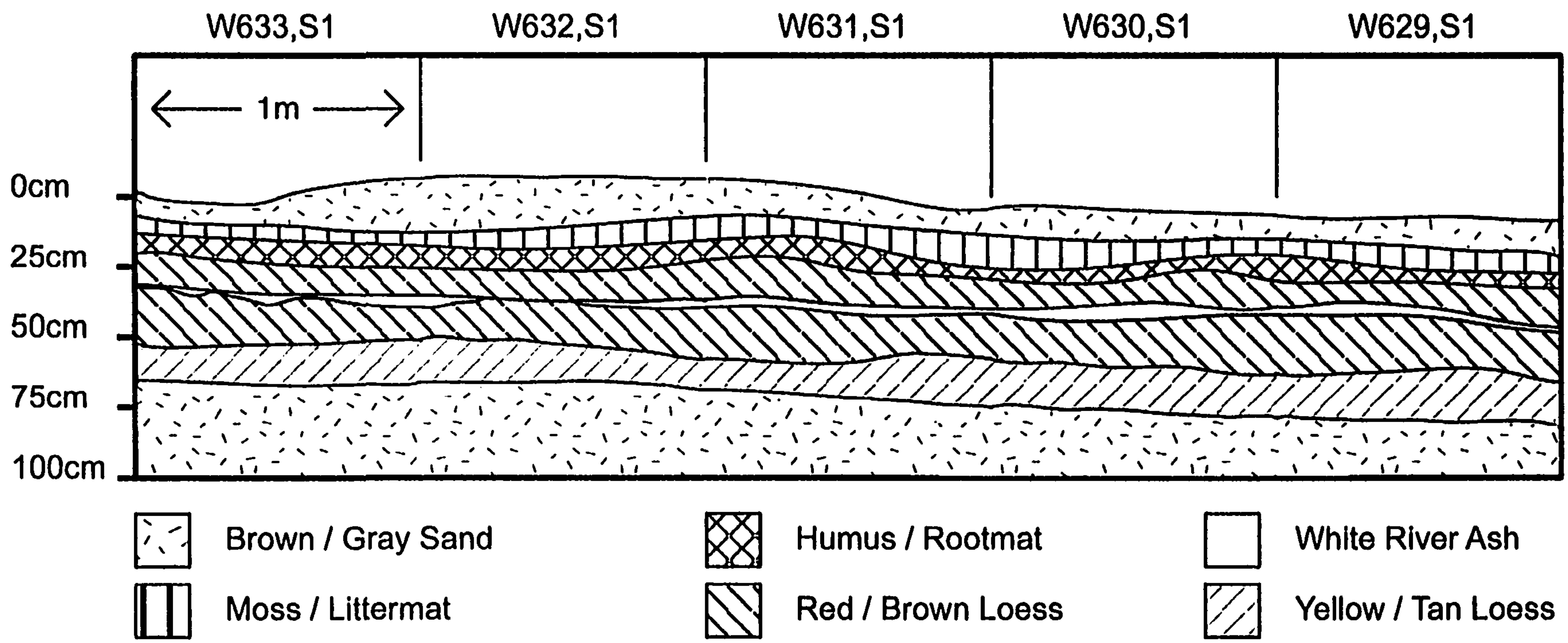

Figure 3.5: Stratigraphic profile of the north wall of a trench composed of units W633, S1; W632, S1; W631, S1; W630, S1; and W629, S1. The brown - gray sand at the top of the deposit is the result of backfilling activities in 1994.

CHAPTER FOUR

Description and Analysis of Cultural Materials

There were 2,394 lithic artifacts recovered from KaVn-2. Of these, 177 were classifiable as modified artifacts, artifacts that were modified to some extent after initial reduction stages, either unintentionally through use or intentionally through secondary retouch. Also included within this category are lithic artifacts that do not exhibit any post-reduction modifications but nevertheless have significant interpretive value (e.g., microblades, obsidian pebbles, cores). The remaining 2,217 lithic artifacts represent lithic debitage. These artifacts are simply the byproducts of lithic reduction processes. Debitage, particularly the lithic reduction stages or modes represented, and its spatial distribution, can provide information on lithic technology, lithic strategies, and internal site patterning.

4.1 Raw Materials

The lithic assemblage at KaVn-2 (N=2,394) was dominated by basalt (N=1,710). Other common lithic raw material types at the site included obsidian (N=255), light gray chalcedony (N=168), black chert (N=128), and ten other varieties (Table 4.1). There is a marked difference between the raw material types used during the two occupation periods at KaVn-2, represented by the two cultural layers at the site, as well as between the modified artifacts and the debitage. For example, in the Red – Brown Loess, basalt dominated but obsidian was by far the favoured raw material type for modified artifact production. Of the total Red - Brown Loess lithic artifact assemblage (N=1,256), 653 specimens were of basalt, while there were 246 obsidian pieces, 164 light gray chalcedony pieces, 125 black chert pieces, and 68 pieces were of other, less frequent raw material types (Figure 4.1). Conversely, of the modified artifacts recovered from this layer (N=125), however, 71 were of obsidian, 27 were basalt, six were light gray chalcedony, five were black chert, and 16 were of other, less frequent raw material types (Figure 4.2).

Table 4.1: Frequency of raw material types in the entire KaVn-2 lithic artifact assemblage.

Raw Material	Quantity	Percentage
Basalt	1,710	71.43 %
Obsidian	255	10.65 %
Light Gray Chalcedony	168	7.02 %
Black Chert	128	5.35 %
Siltstone	51	2.13 %
Gray Chalcedony	26	1.09 %
Brown Chert	16	0.67 %
Jasper	13	0.54 %
Quartz	8	0.33 %
Granitic Rock	3	0.13 %
Light Brown Chalcedony	2	0.08 %
Sandstone	2	0.08 %
Green Quartzite	1	0.04 %
Quartz Crystal	1	0.04 %
Unknown	10	0.42 %
Total	**2,394**	**100 %**

Compared to the Red - Brown Loess, the Yellow – Tan Loess had a limited variety of raw material types. Of the total lithic artifact assemblage (N=1,101), 1052 are of basalt, 34 are siltstone, and 15 are of other less frequent raw material types (Figure 4.3). Of the modified artifacts (N=47), 39 are of basalt, four are siltstone, and four are of other coarse-grained raw material types (Figure 4.4).

Finally, 37 lithic artifacts were recovered from a surficial context at the site and have limited interpretive value. More correctly, these artifacts were collected from an erosional exposure on the south side of the site, and not from the surface of the site, which was intact and culturally sterile. Raw materials found on the surface included all of the major types mentioned above. Only the modified artifacts recovered from the surface will be considered further below.

4.1.1 Discussion of Raw Materials

The most striking aspect of raw material use at KaVn-2 is the contrast between the two cultural layers. Obsidian was only used at a time after 7,800 BP. There are a few possible reasons for this. The earlier occupants of the site may have been unaware of the source of the obsidian (if local) or, if it came from farther afield, then the necessary trade networks may not yet have been established at that time. Another possibility is that the obsidian source may have still been covered by glacial ice at the time KaVn-2 was first occupied, which was soon after glacial retreat. The site is located within 1 km of the maximum extent of the ice and, since ice retreated in a southward direction, any locations south of KaVn-2 may still have been covered by glaciers during initial occupation of the site. The source of the obsidian has not been established. After excavations at KaVn-2 in 1993, Walde (1994a) submitted twelve obsidian samples to the X-Ray Fluorescence Laboratory at Simon Fraser University for analysis. These samples were derived from KaVn-2 and three other nearby archaeological sites (KbVo-1, KbVo-2, and KbVo-3) but, unfortunately, the samples did not match any known source (Bailey 1993, in Walde 1994a: Appendix B).

Since this initial obsidian sourcing work, additional samples from Yukon archaeological sites have been subjected to X-Ray Fluorescence analysis at Simon Fraser University (Bailey 1998). An obsidian flake from archaeological site JhVj-2 near Aishihik Lake in the southwestern Yukon and an obsidian artifact from the Dog Creek site (NcVi-3) in the northern Yukon had trace element signatures that matched those of the obsidian pebbles from KaVn-2. Evidently, obsidian from this source was a widely circulated trade item. An obsidian pebble core fragment was recovered from an archaeological site at the south end of Tchawsahmon Lake in 1999 (Heffner 2000) and, although it was not sourced, it is similar in appearance to the pebble cores from KaVn-2 and may be derived from the same source.

Two anecdotal accounts provide information on the possible source of the obsidian. The operator of the Koidern River Gas Station (personal communication 1999), located about 15 km south of KaVn-2 on the Alaska Highway, remembered speaking to a geologist in the 1960s who mentioned finding obsidian in the bed of the Generc River. In 1979, Rick Staley, a warden in Kluane National Park, reported a large tabular obsidian boulder at the headwaters of Brooks Creek, a tributary of the Generc River (Yukon Heritage Branch Archaeological Sites Database, record for JjWe-1). The Generc River drains Klutlan Glacier and flows for only 25 km before it meets the White River, only 16 km south southwest of KaVn-2. The Generc River is a braided glacial meltwater stream and, if it is the source of the KaVn-2 obsidian, it could explain the rounded, water worn appearance of the obsidian pebbles. That the obsidian is from a local source is suggested by a cache of obsidian pebbles at KaVn-2 (see below). This uninvestigated obsidian source in the Generc River watershed should be investigated in the near future to add important new information to our database of obsidian sources in northwestern North America. Only after obsidian from this source has been subjected to X-Ray Fluorescence can it be determined if the KaVn-2 obsidian (and that from the other sites) is derived from it.

Many of the other raw materials (e.g., cherts, chalcedonies) used at the site during the later occupations are also exotic lithic types derived from unknown sources. The basalt that it is ubiquitous in the lithic assemblages of both cultural layers, on the other hand, appears to be of local derivation, particularly when debitage characteristics are taken into account.

4.2 Debitage

4.2.1 Debitage Analysis

All debitage excavated during the 1999 field season had three-dimensional provenience recorded. This method of recording was also followed during previous field seasons but, unfortunately, following their initial analysis of the flakes, those researchers then bagged flakes according to layer and unit. In this way, much of the provenience information specific to individual flakes was lost. All debitage collected from KaVn-2 was reexamined. Each individual flake was closely inspected using a 10X hand lens and several attributes were recorded.

Over the past thirty years there has been a great deal of effort expended on experimental studies that aim to determine which flake attributes have the greatest utility in determining lithic reduction stages from debitage assemblages and in assessing the relationship between lithic reduction strategies and the flake assemblages produced. Many of these studies (e.g., Mauldin and Amick 1989; Hayden and Hutchings 1989; Bradbury and Carr 1995; Odell 1989; Magne 1989, 1985; Patterson 1990; Ingbar *et al.*

1989; Tomka 1989) were consulted to determine the flake attributes that would be recorded during the analysis of the KaVn-2 debitage assemblage. Although the authors of those studies disagreed as to which attributes provided the soundest basis for analysis, most were in agreement that the use of several attributes provides more reliable results than studies emphasizing one or only a few attributes; moreover, some attributes have greater interpretive value than others (cf., Magne 1985). The attributes selected for the KaVn-2 debitage analysis included those used traditionally in archaeological debitage analyses as well as those deemed to have the highest interpretive value in experimental studies. The following attributes were recorded for each flake.

Flake Type

Flake types offer a great deal of information concerning reduction stages, method of manufacture, and the types of modified artifacts being produced. As there are many different flake classifications in use by archaeologists, it was important to use one that is widely accepted and simple to understand. The classification method employed here was adapted slightly from that of Hayden and Spafford (in press). The following is a list of the flake types used with reference to their salient features:

Biface Reduction Flake: pronounced lip; broad fracture front; absence of point impact features; small platform area in relation to flake size; little crushing of platform; possible evidence of platform preparation. This category also includes pressure flakes. These flakes are produced through the use of soft hammer percussion or pressure and are typically associated with bifacial reduction strategies (Hayden and Hutchings 1989).

Primary Flake: flake suitable for use as a tool; maximum dimension greater than 2 cm; at least 1 cm of edge robust enough (edge angle >45°) for retouch. By inference, the presence of unaltered primary flakes suggests adequate availability of lithic raw material and initial stages of lithic reduction.

Secondary Flake: flakes with a recognizable ventral surface not classified as bipolar, primary, or biface reduction. This category includes broken flakes with recognizable ventral surfaces as well as cortex flakes too small to be classified as primary flakes. The presence of secondary flakes reflects further lithic reduction.

Shatter: debitage lacking a recognizable ventral surface. This type of debitage may result from use of unsuitable lithic raw materials.

Flake Size Category

The maximum dimension of all flakes was measured using digital callipers. Flakes were then assigned to the following flake size classes: 1 (<1 cm), 2 (≥1 cm but < 2 cm), 3 (≥2 cm but <5 cm), 4 (≥5 cm). Generally, flake size decreases as lithic reduction progresses. One problem with quantification of the larger size classes, however, is the possibility that large flakes were removed at the time of reduction for manufacture into tools (Magne 1989). This situation may lead to an inaccurate representation of the original flake size distribution. Mauldin and Amick (1989), however, support flake size as an appropriate attribute for reduction sequence analysis.

Platform Angle

The platform angle for each flake was measured using a contact goniometer. Flakes were then assigned to a platform angle category: 1 (1-10°), 2 (11-20), etc. This attribute was not evaluated during any of the experimental studies consulted but intuition suggests that platform angles decrease during simple core reduction and as edges become sharper during bifacial reduction. Acute platform angles should represent later stages of lithic reduction.

Fracture Termination Type

The fracture termination of each flake was visually inspected and categorized as either a feather fracture, a step fracture, or a hinge fracture. None of the studies consulted examined the relationship between fracture terminations and lithic reduction (but see Cotterell and Kamminga [1987] for a detailed discussion of the physics involved). This attribute was recorded for all flakes nonetheless. It will not be considered further in this analysis.

Number of Dorsal Scars

The number of dorsal scars was counted for each flake. Dorsal scars result from previous flake removals and their numbers increase as lithic reduction progresses (Odell 1989). While some archaeologists have suggested that the analytical utility of dorsal scars is hampered by the fact that flakes get smaller as reduction proceeds, Magne (1989: 17) argues that the flake scars also get smaller so that the relationship remains intact.

Percentage of Cortex

The percentage of cortex on the dorsal surface of each flake was subjectively assessed. Flakes were then assigned to a cortex percentage category: 1 (0%), 2 (1-10%), 3 (11-20%), and so on. Cortex develops on rocks subjected to the elements and is chipped away during lithic reduction. Flakes with cortex on the dorsal surface were produced during an earlier reduction stage than flakes lacking cortex on their dorsal surface (Magne 1989; Odell 1989).

Reduction Stage

This was the final attribute recorded for each flake. Stage of reduction was recorded as a subjective assessment based on all recorded flake attributes. Reduction stage was categorized as: (1) primary reduction, (2) secondary shaping, and (3) tertiary sharpening and resharpening. For example, a large flake with 100% cortex and an obtuse platform angle is produced early during the reduction process (i.e., a primary reduction flake) while a small flake with numerous dorsal scars and an acute platform angle is produced late in the reduction process (i.e., a tertiary sharpening or resharpening flake). Flakes exhibiting attributes between these extremes were classified as secondary shaping flakes. This classification of the flakes reflects a more traditional approach to lithic debitage classification which Bradbury and Carr (1995: 100) term the Primary / Secondary / Tertiary or "PST" typological approach.

4.2.2 Red - Brown Loess Debitage (N=1,131)

Debitage recovered from this cultural layer was dominated by secondary (N=491) and biface reduction flake (N=480) types, with lesser numbers of primary flakes (N=10) and shatter (N=85) (Figure 4.5). These flakes were generally small in size, with a high number of flakes in size classes 1 (N=469) and 2 (N=422) and fewer large flakes in classes 3 (N=167) and 4 (N=8) (Figure 4.6). The frequency distribution of platform angles approximates a normal curve with the mean platform angle being between 41° and 50° (Figure 4.7). Most flakes had fewer than five dorsal scars and only five flakes had over ten dorsal scars (Figure 4.8). Cortex was absent from the dorsal surface of most flakes but the amount of cortex present on flakes with cortex was fairly evenly distributed across the possible range (Figure 4.9). A subjective assessment made during the analysis with regards to the reduction stage represented by each flake indicates that 65% of the flakes resulted from tertiary sharpening and retouch, while 24% resulted from secondary shaping, and only 5% of the flakes resulted from primary core reduction activities (Figure 4.10).

The lack of primary flakes in the Red - Brown Loess debitage assemblage may suggest that primary core reduction was not a frequent activity or, alternatively, that large flakes were removed for use as tools. In fact, the only firm evidence for core reduction in this cultural layer was the presence of nine obsidian pebble cores, and even these appear to have been "tested" for suitability without subsequent reduction and then cached (or abandoned) at the site (see below). A high proportion of biface reduction flakes indicated that bifacial reduction was a primary activity that contributed to the formation of the lithic assemblage. The overall small size of the flakes reflects the late stages of reduction. This also appears to be the case when the amount of cortex on the flakes is considered. Basalt, the most frequent raw material type, was probably derived from local riverbed sources and, if primary reduction was a significant undertaking at the site, then high frequencies of cortex flakes would be expected. Few of the flakes exhibited cortex, however, which indicates late stage reduction activities instead. Platform angles tended to cluster in the 30° to 70° interval. This range of platform angles may imply secondary stage reduction but this has not been established through experimental study. Most flakes had two, three, or four dorsal scars and many more flakes were scarred to a greater extent than to a lesser extent. The level of dorsal scarring, likewise, indicated late stage reduction. These findings, based on the analysis of independent attributes, corroborate the subjective late reduction stage assessments made for the majority of flakes in the assemblage.

4.2.3 Yellow - Tan Loess Debitage (N=1,054)

Debitage recovered from the Yellow - Tan Loess was characterized by secondary (N=490) and biface reduction flakes (N=426), with lesser numbers of primary flakes (N=12) and shatter (N=93) (Figure 4.5). This frequency distribution is similar to that of the Red - Brown Loess but the same is not true for flake size. Flakes in the Yellow - Tan Loess were mainly within Class 2 (N=496), while there were almost equal portions of Class 1 (N=258) and 3 (N=255), and only 13 Class 4 flakes were found (Figure 4.6). Most flakes had platform angles greater than 30° and flakes with edge angles between 31° and 40° were the most frequent (Figure 4.7). Dorsal scar frequency shares a similar distribution to that of the flakes in the Red - Brown Loess. Most flakes had less than five dorsal scars and very few had more than ten (Figure 4.8). The frequency of cortex cover was also similar to the flakes in the Red - Brown Loess: most flakes (N=926) had none (Figure 4.9). A subjective assessment made during the analysis with regard to the reduction stage represented by each flake indicated that 53% of the flakes resulted from tertiary sharpening and retouch, while 34% resulted from secondary shaping, and only 4% of the flakes resulted from primary core reduction activities (Figure 4.10).

The lack of primary flakes in the Yellow - Tan Loess debitage assemblage may suggest that primary core reduction was not a frequent activity or, alternatively, that large flakes were removed for use as tools. In fact, the only firm evidence for core reduction in this cultural layer was the presence of five cobble cores (see below) of poor quality raw material that were not flaked to any great extent. A high proportion of biface reduction flakes indicated that bifacial reduction was a primary activity that contributed to the formation of the lithic assemblage. The overall small size of the flakes suggests secondary and tertiary reduction stages (i.e., sharpening and resharpening). Few of the flakes exhibited cortex, which also indicates late stage reduction activities. Platform angles tended to cluster in the 30° to 60° interval. This range of platform angles may imply secondary stage reduction but this has not been established through experimental study. Most flakes had two, three, or four dorsal scars and many more flakes were scarred to a greater extent than to a lesser extent. The level of dorsal scarring, likewise, indicated late stage reduction. These findings, based on the analysis of independent attributes, corroborate the subjective middle to late reduction stage assessments made for the majority of flakes in the Yellow - Tan Loess debitage assemblage.

4.3 Cores and Unmodified Pebbles and Cobbles

4.3.1 Red - Brown Loess

Pebble Cores (N=9)

Nine obsidian pebble cores (KaVn-2: 137, KaVn-2: 138, KaVn-2: 23, KaVn-2: 24, KaVn-2: 25, KaVn-2: 28, KaVn-2: 30, KaVn-2: 32, and KaVn-2: 219)[1] were recovered from the Red - Brown Loess (Plate 4.1). These cores are uniformly small in size (all are less than 30 g) and have a water worn appearance that suggests a streambed derivation. Only three cores have been flaked to any great extent (six or more flake removals) but all retain large amounts of cortex. The six remaining cores that exhibit only minor amounts of flaking (i.e., one or a few flake scars) have the appearance of having been "tested" for suitability as a raw material. This testing appears to have taken place predominantly at the source location since only one obsidian flake (#160) found at the site could be refitted to a core (Plate 4.2), despite considerable effort to find others. All flaking appears to have been done in a random fashion and cores were rotated so that flake scars are multidirectional. Metric attributes for the cores are presented below (Table 4.2). Since all cores were roughly ovoid to rectangular in shape, length was considered to be the longest axis of the core, while width was the widest axis perpendicular to the length, and thickness was measured at a 90° angle to the width.

Given the small size of these cores, it is hard to imagine that they had any great utility. The size of flakes that could be removed from the cores was extremely limited and

[1] Note that the KaVn-2 designation will be dropped from all subsequent catalogue numbers given in brackets since all artifacts mentioned are derived from KaVn-2.

Table 4.2: Metric attributes of the obsidian pebble cores recovered from the Red - Brown Loess. Note that all dimensions are in mm.

Catalogue Number	Length	Width	Thickness	Weight (g)	Flake Removals	Refits
23	63.77	30.35	16.08	33.4	4	—
24	36.67	31.17	23.24	32.8	2	—
25	43.32	29.04	25.23	36.7	2	—
28	43.80	37.66	19.98	34.5	4	—
30	51.13	40.84	21.45	39.0	2	—
32	41.35	26.93	21.37	29.1	1	160
137	43.05	38.82	13.13	30.7	12	—
138	47.56	49.93	15.35	33.6	11	—
219	45.07	32.43	13.43	16.6	6	—
Means	46.19	35.24	18.81	31.8	4.9	—

there is no evidence of any intent to prepare the cores for reduction using any specialized techniques (e.g., bifacial reduction or blade manufacture). Probably the only productive method of reducing these small cores to obtain useable flakes would be through use of the bipolar technique but none of the cores exhibited evidence for the use of this technique and no bipolar flakes were recognized in the debitage assemblage.

As mentioned earlier, the spatial distribution of these pebble cores and the unmodified obsidian pebbles (discussed below) suggests the possibility that they were cached at the site. Perhaps, given their limited utility, they were discarded at the site instead, or perhaps they had some other type of cultural value not linked to lithic reduction.

Unmodified Pebbles (N=7)

Seven unmodified pebbles (#26, #27, #29, #31, #33, #79, #80) were recovered from the Red - Brown Loess. Five are obsidian and similar in most respects to the obsidian pebble cores, except that they lack flake scars (Plate 4.1). The other two pebbles are rounded and derived from a fine-grained sedimentary rock, probably siltstone. They are unsuitable for use as cores but may have been used as light hammerstones, although neither pebble exhibits battering indicative of such use. Alternatively, they may have been used as shot in a sling, but this is purely conjectural. The occurrence of these pebbles can confidently be interpreted as resulting from human activity, however, since only sand and silt sized sediments are natural to the stratigraphy of KaVn-2. Metric attributes of these pebbles are summarized in Table 4.3.

Table 4.3: Metric attributes of unmodified pebbles recovered from the Red - Brown Loess. Pebbles were measured in the same manner as the pebble cores. Note that all dimensions are in mm.

Catalogue Number	Length	Width	Thickness	Weight (g)	Material
26	35.08	22.44	19.60	17.0	Obsidian
27	44.07	28.36	24.47	29.3	Obsidian
29	38.23	29.87	23.89	26.7	Obsidian
31	32.64	29.61	19.42	25.1	Obsidian
33	38.67	31.04	22.77	30.0	Obsidian
79	35.20	26.49	16.39	18.2	Siltstone
80	42.76	33.99	33.94	59.3	Siltstone
Means	38.09	28.83	22.93	29.37	—

If the obsidian pebble cores discussed previously were not flaked extensively because they were too small (mean weight = 31.80 g) then perhaps the unmodified obsidian pebbles were not flaked at all because they were even smaller in size (mean weight = 25.62 g) and, hence, were even less useful.

4.3.2 Yellow - Tan Loess

Cobble Cores (N=5)

Five large cobble cores (#82, #84, #85, #125, #184) were recovered from the Yellow - Tan Loess (Table 4.4). Two of these are siltstone while the others are basalt, massive quartz, and green quartzite. Only three of the cores exhibit extensive (five or more) flake scars. The larger of these cores (#125; Plate 4.3) began as a sub-rounded basalt cobble. Three large flakes were struck from one surface to create a broad, flat platform. Eighteen flakes were then removed from the perimeter of that platform. Many of the flake scars derive from large flake removals but none of the large basalt flakes or modified artifacts from this cultural layer could be refitted to the core. These flakes were either removed from the main (i.e., excavated) site area following core reduction or they were refashioned into tools and became altered to such an extent that they could not be refitted. This core appears to have been used to produce a number of primary flakes and was then discarded after that had been accomplished, although a series of steps around the platform may indicate that further attempts at flake removal would have been futile.

In either case, there was no attempt to rejuvenate the core platform by striking off large, transverse flakes (core tablets).

The green quartzite cobble core (#85) contains numerous fracture planes and impurities. This polyhedral core exhibits no evidence of platform preparation and was rotated during flaking. It appears that at least five flakes were removed. Chunky pieces of shatter undoubtedly were produced during flaking. Curiously, no debitage matching this raw material type was discovered at the site. This core may have been brought to the site after initial reduction or it may have been flaked at a part of the site that has not yet been excavated. It does not exhibit any further evidence of modification or use.

A third cobble core (#84) of siltstone originated as a tabular cobble that was then split in half. The resulting piece was wedge-shaped (on the horizontal axis) and was subsequently bifacially flaked on the thinnest end to produce eight flakes. Although 37 other pieces of siltstone were found in this component, none could be refitted to this core. The core was by no means exhausted and appears to have been discarded after the flake removals. In its end state, this core was of a size and shape that it could have made an effective chopping tool but there is no evidence of it having been used in such a manner. It is questionable whether the other two cobbles can be considered cores at all. One siltstone specimen (#184) has only one flake removal, consisting of a cobble spall (#220) that was recovered from 2.5 m northeast of the core (see Figure 4.19). The spall does not exhibit any modification or signs of use. This core appears to have been "tested" for suitability as a raw material source and then discarded as unsuitable for that purpose. It does not exhibit evidence of further modification. The other questionable example (#82) is a large massive quartz cobble, full of internal flaws and irregularities, that when struck (or used to strike with) produced many hundreds of small polyhedral pieces of shatter. This shatter was found associated with the cobble but it was not included with the debitage because it would grossly alter the characteristics of the debitage assemblage from the Yellow - Tan Loess (N=1,054). If used as a core, it was discarded as an unsuitable flake source, or, if used as a maul, it was discarded as too unstable to sustain high impact percussion. The possibility exists that it was used as an anvil.

None of these cores exnibit evidence for any patterned and deliberate effort at lithic reduction for the purpose of producing flakes for further manufacture into tools.

Table 4.4: Metric attributes of cobble cores recovered from the Yellow - Tan Loess. Cobbles were measured in the same manner as the pebble cores from the Red - Brown Loess. Note that all dimensions are in mm.

Catalogue Number	Length	Width	Thickness	Weight (g)	Material	Flake Removals▪	Refits
82	178	131	104	2610	Quartz	2	—
84	107	104	54	681	Siltstone	9	—
85	103	74	53	630	Quartzite	5	—
125	132	92	93	1124	Basalt	21	—
184	97	61	72	646	Siltstone	1	KaVn-2:220
Means	123.4	92.4	75.2	1138.2	—	7.6	—

▪ **Due to the coarse nature of the raw materials, the number of flake removals may not be entirely accurate.**

Instead, the properties of these cores give the impression that their reduction was rather expedient, with nearby rocks of poor quality material chosen for immediate reduction for the express purpose of producing flakes with sharp cutting edges in order to serve the task at hand.

Unmodified Cobbles (N=3)

Three unmodified cobbles (#77, #78, #81) were recovered from the Yellow - Tan Loess (Table 4.5). Two of these cores are rounded pieces of siltstone, while the third is an angular granite fragment. The larger of the two siltstone cobbles (#78) is rectangular in form and thin relative to its other dimensions. There are natural indentations on all four sides which may have made it suitable for use as a net weight or sinker. This cobble is also of an appropriate size for use as a hammerstone but there are no indications that it was used in that way. The smaller siltstone cobble (#77) is roughly egg-shaped. It could have been used as a small hammerstone but there are no markings on the rock to indicate that function. The last cobble (#81) is an angular piece of granite. It may have some battering or flaking along one margin but, given the extremely large grain size of this rock, it is impossible to determine modification with any certainty. This piece could have been used for scraping or pecking but, again, there are no solid indications that it was used in that way.

As mentioned previously in the discussion of the unmodified siltstone pebbles in the Red - Brown Loess, that these unmodified cobbles are cultural in origin is certain since the natural stratigraphy of KaVn-2 does not contain sediments larger than sand-

Table 4.5: Metric attributes of cobble cores recovered from the Yellow - Tan Loess. Cobbles were measured in the same manner as the pebble cores from the Red - Brown Loess. Note that all dimensions are in mm.

Catalogue Number	Length	Width	Thickness	Weight (g)	Material
77	64.46	51.97	26.74	126.0	Siltstone
78	114.34	113.10	35.56	935.1	Siltstone
81	107.45	61.92	31.59	173.4	Granite
Means	95.42	75.66	31.30	411.5	---

sized particles. Their function can only be speculated but use as hammering and pecking implements seems to be the most plausible explanation.

4.4 Modified Artifacts

4.4.1 Red - Brown Loess

Unifaces

Utilized Flakes (N=55)

Utilized flakes were classified as flakes with evidence of unintentionally produced use retouch for a length of greater than 1 cm on any edge. Utilized flakes were predominantly of obsidian (N=33), but basalt (N=12) was also used to a greater degree than the other raw materials, perhaps because of its characteristically larger flake sizes. Biface reduction and secondary flakes appear to have been selected for use but this may reflect their frequency in the available debitage. Likewise, the stage of reduction represented by the flakes when they were removed for use may also reflect the characteristics of the debitage assemblage more than any deliberate selective process. Most flakes represented secondary (N=27) and tertiary (N=21) stages of reduction. Utilized flakes were relatively large in size (compared to the debitage assemblage) with a mean length (23.24 mm) that would put them in the Class 3 category. During the analysis, patterning in flake utilization was explored by examining the frequencies with which the different sides of the flakes underwent utilization. No clear pattern was distinguished: eighteen flakes were utilized on the distal margin while fourteen exhibited use-wear on the left lateral, eleven on the right lateral, and seven were utilized on multiple edges. The mean edge angle of the utilized flakes was 34°.

Retouched Flakes (N=29)

Retouched flakes are classified here as flakes with evidence of intentional retouch for a length of greater than 1 cm along any margin. These are flakes that have been retouched to maintain a sharp, durable edge for cutting purposes. Retouched flakes in this cultural layer had a mean length in the Class 3 flake size category. Their overall size was only slightly larger than that of the utilized flakes. Again, obsidian (N=12) was the most common raw material type but basalt (N=8) and gray chalcedony (N=7) were also used to a greater degree than the other materials. Base flake types were predominantly secondary (N=19) or biface reduction (N=8) flakes. Billet flaking, using a soft hammer percussor, has been said to be a reduction technique that results in more flakes per volume that are suitable for cutting purposes (Hayden and Hutchings 1989). A larger proportion of the retouched flakes were generated during the earlier stages of reduction than were the utilized flakes. Perhaps the most substantial difference between these tool types, however, is in the angle of their working edges. Flakes with stronger, more obtuse, edge angles appear to have been selected for retouching (mean edge angle = 58°) as compared to the more acute (mean = 34°) edge angle of the utilized flakes. Like the utilized flakes, the location of edge alteration was fairly evenly distributed on the retouched flakes: nine flakes were retouched on the distal edge, while nine were retouched on the right lateral and four on the left lateral. One flake had alternate retouch, five flakes had inverse retouch, and one flake had regular retouch on multiple edges.

End-of-Blade Scraper (N=1)

A chert end-of-blade scraper was refitted from three fragments (#55, #152, #141) recovered from the Red - Brown Loess (Plate 4.4). It is not immediately apparent as to what caused the scraper to fracture but the texture on the break surfaces resembles that inside potlid scars on chert (see Patterson 1990) so exposure to heat from a fire may have caused the scraper to break. Frost spalling could also be responsible. The parent double arris blade blank was 2 cm wide at its proximal end and the dorsal surface exhibits evidence of platform preparation and four previous blade removals. At a length of only 24 mm, it was probably once larger and its present size represents its exhausted state. Retouch on the distal end of the scraper is steep at 75° and there is use retouch on both lateral edges. The working end is convex shaped. Although the scraper may have been hafted, it did not exhibit any polish or wear on the proximal end.

Context, Chronology, and Distribution

Two fragments (#55, #37) of this scraper were recovered from unit W630, S3, while the third fragment (#152) was recovered 3 m away in unit W630, S6. The two fragments that had vertical provenience information came from 1 and 2 cm below the White River Ash. This context suggests an age for this artifact of about 2000 BP. Because Workman (1978) used morphological rather than technological criteria to organize his endscraper collections, he did not recognize this artifact type so comparisons could not be made. MacNeish (1964: 432), on the other hand, recognized this artifact type in his analysis and found that end-of-blade scrapers were present during much of southwest Yukon prehistory but they appeared to be more common during his Taye Lake and Gladstone Complexes, or from roughly 6,000 BP to 2,000 BP. The KaVn-2 end-of-blade scraper was made and used at the more recent end of that age range.

Endscrapers (N=3)

These three endscrapers (#39, #59, #16) are all obsidian. The largest (#39; Plate 4.5) was made on a large (Class 3), significantly curved secondary flake. The edge has been retouched so that the plane between the edge and the proximal end is straight, probably to reduce bending stress and avoid snapping. The working edge is convex, 3.1 cm wide, 1.0 cm high, and has an abrupt edge angle of 78°. A small amount of cortex is present on the right lateral edge. The next largest obsidian endscraper (#59) was produced from a large (Class 3), thick secondary flake. The edge is retouched in a way that produces a 2 cm wide convex edge with a slightly crenulated pattern. The working edge is very abrupt at 85°. There is use retouch on the right lateral edge. The third obsidian endscraper (#16) was manufactured from a thin, narrow secondary flake. The working edge is convex but only 1 cm wide. Retouch is semi-abrupt at 49°. Use retouch is present on both lateral edges.

Context, Chronology, and Distribution

Two of these endscrapers came from nearby contexts and similar depths: KaVn-2: 39 was recovered from unit W627, S9 at a depth of 2 cm below the Ash and KaVn-2: 16 was found in unit W627, S8 also at a depth of 2 cm below the Ash. The other endscraper (#59) came from unit W631, S5 and was recovered from 10 cm below the Ash. Based on vertical provenience, these artifacts should date to between 2,000 and 5,000 BP. KaVn-2: 39 is most similar to Workman's (1978: 278) Large Moderately Thick End Scrapers (ES4) endscraper category, while KaVn-2: 16 can be categorized as a Narrow Relatively Thin-Bitted End Scraper (ES2; Workman 1978: 271), and KaVn-2: 59 is a Large End Scraper with an Irregular Retouched End (ESL; Workman 1978: 279). Unfortunately, none of these types has a typical age range.

<u>Multi-edged Scrapers (N=1)</u>

The single multi-edged scraper (#124; Plate 4.6) recovered from the site was produced from a large (Class 3), thick secondary flake. Its platform area and a portion of the right lateral edge have snapped off, but otherwise, it has continuous semi-abrupt to abrupt retouch around all edges. The primary working edge, however, appears to have been the distal end where the edge angle is 56°. Some cortex remains on the dorsal surface.

Context, Chronology, and Distribution

This specimen was recovered from unit W628, S2 at a depth of 3 cm below the Ash, which suggests an age of about 2,000 BP. Morphologically, it can be grouped with Workman's (1978: 283) Typical Angular Side and End Scraper (ESSA1) category. Workman (1978: 287) observed a trend towards simpler, single-edged scraper forms in the southwest Yukon while at Onion Portage in Alaska multi-edged scrapers became more frequent through time.

Miscellaneous Scrapers (N=3)

These artifacts (#143, #57, #200) are scrapers that could not be classified because they lack distinguishing morphological characteristics. The largest of these (#143) is a chunky piece of basalt that could not be oriented according to flake morphology. Its working edge is 3.1 cm wide, convex, and bifacially flaked. It is classified here as a scraper because it is not a biface fragment and it appears to have been flaked in order to produce an abrupt (83°) edge angle suitable for scraping purposes. A small amount of cortex is present on one surface. The next largest of these artifacts (#200) is a large basalt secondary flake with a snap fracture. Abrupt retouch along the snap edge has produced a steep (81°) edge angle suitable for scraping. The working edge is 2.4 cm wide and flat. The smallest miscellaneous scraper (#57) is an edge fragment from a larger basalt scraper. It is 1 cm wide and has continuous abrupt (53°) retouch along its flat working edge.

Context, Chronology, and Distribution

KaVn-2: 143 was recovered in unit W634, S6 at a depth of 4 cm below the Ash, which suggests an age of 2,000 to 3,000 BP for this artifact. Neither MacNeish (1964) nor Workman (1978) recognized bifacial scrapers in their collections. This piece may represent a previously unrecognized artifact type or it could be a unique occurrence. KaVn-2: 200 was recovered from unit W634, S4 at a depth of 16 cm below the Ash, a context that suggests an age of 6,000 to 8,000 BP. This artifact was retouched along the steep edge of a snap fracture and is not comparable to any other specimens in the published literature. KaVn-2: 57 was recovered from unit W630, S3 at a depth of 1 cm below the Ash. This context suggests an age of about 2,000 BP for this artifact. The small size of this edge fragment prevents morphological comparisons.

Notches (N=5)

Five modified artifacts (#13, #179, #43, #15, #42) were classified as notches because they had been notched through the removal of a large flake along one edge and this appeared to be the dominant working edge on the tool. All notches are obsidian and exhibit use retouch inside the notch. KaVn-2: 13 (Plate 4.7) was produced from a large

(Class 3) triangular secondary flake that retains a significant amount of cortex. It has a large (15 mm wide) notch with an abrupt (86°) edge angle. There is extensive crushing and use retouch inside the notch. On one side of the notch is a broken spur with use retouch along the break indicating that this tool may also have been used for etching or piercing. KaVn-2: 42 is a large (Class 3) obsidian core fragment with two separate notches on alternate sides of one edge and a small notch and short (6 mm) segment of abrupt scraper retouch on the opposite edge. There is crushing and use retouch inside all three notches but to a higher degree in the alternate notches on the dominant working edge of the tool. KaVn-2: 15 is a fragment of a large (Class 4) primary obsidian flake that broke into three pieces during initial core reduction. The other two pieces (#163, #164) were unmodified and could be refitted to it. It retains a significant portion of cortex and has a broken platform. The broken platform area became the focus for retouch. This tool has a shallow notch with use retouch along the right lateral edge and 23 mm of intentional retouch on the left lateral edge that was done for the purpose of forming a sharp point where the platform snapped off. This point snapped off as well, probably during use. KaVn-2: 43 is a thin biface reduction flake with a small (6 mm) notch exhibiting use retouch on the left lateral edge near the distal corner. On the opposite corner is a natural (i.e., not intentionally produced) sharp projection that exhibits use wear on its tip. There is also use retouch along the right lateral margin. KaVn-2: 179 is a small (Class 2) secondary flake with a dorsal surface almost fully covered with cortex. This flake has a small (5 mm) notch on its left lateral edge with extensive use retouch on the working edge. Given its minute size, this tool must have been made for fine, detailed work.

Context, Chronology, and Distribution

KaVn-2: 42 was found in unit W628, S4 at a depth of 10 cm below the Ash, which suggests an age of about 5,000 BP. It is a Unifacial "spokeshave" (USP) in Workman's (1978: 269) classification. KaVn-2: 13 was recovered from unit W629, S6 at a depth of 8 cm below the Ash, which suggests an age of about 4,500 BP. It also fits the USP classification. The following three pieces belong to Workman's (1978: 296) Notched Pieces (UN) category. KaVn-2: 15 was recovered from unit W631, S7 at a depth of 4 cm below the Ash, which suggests an age of about 2,500 BP. KaVn-2: 43 was found in unit W627, S9 at a depth of 1 cm below the Ash, which suggests an age of about 2,000 BP. KaVn-2: 179 was recovered from unit W628, S9 at a depth of 14 cm below the Ash, which suggests an age of about 6,500 BP. Workman (1978: 296) noted that notched pieces occur in relatively uniform frequencies throughout the cultural historical record of the southwest Yukon. The four Unifacial "spokeshaves" recorded by Workman were all found in pre-Ash contexts in assemblages lacking microblades.

Piercer (N=2)

Two piercers were recovered from the Red - Brown Loess. The larger of these (#10) is a roughly key-shaped obsidian secondary flake, with cortex on its dorsal surface, and a very pointed dorsal extremity. Without any additional modification, the dorsal tip of this flake was used for either etching or piercing as evidenced by use retouch at that extremity. There is also use retouch along the left lateral edge. The smaller piercer (#114) is an obsidian secondary flake. This artifact was created through the removal of a flake to create a notch. Retouch adjacent to the notch then created a sharp projection for piercing. This artifact also exhibits use retouch on a pointed corner of its proximal end.

Context, Chronology, and Distribution

The large piercer (#10) was recovered from unit W630, S5 at a depth of 5 cm below the Ash, which suggests an age of about 2,500 BP to 3,000 BP. It differs from Workman's (1978: 295) pointed uniface categories (UPL, UPS) only in the fact that the point on this artifact was fortuitous rather than intentionally produced through retouch. Pointed unifaces are present throughout the southwest Yukon cultural historical sequence but only occur in low frequencies. The smaller piercer (#114) was recovered from unit W624, S6 at a depth of between 5 and 10 cm below the Ash, which suggests an age range of about 2,000 to 5,000 BP. This artifact accords well with Workman's (1978: 295) Small Pointed Uniface (UPS) category. See comments for other piercer (above).

Bifaces

Discoid Biface (N=1)

One discoid basalt biface was recovered from the Red - Brown Loess. It was found in two fragments (#65, #66; Plate 4.8) in direct association (i.e., less than 4 cm apart). It was manufactured from a large, thin flake. The edges have been completely bifacially retouched except for the distal end of the base flake, which retains its hinge fracture. The retouch extends no further than 1.5 cm from any edge. The break surface exhibits traits of a snap fracture so this biface was probably broken during use and then discarded.

Context, Chronology, and Distribution

This biface was recovered in two pieces in unit W633, S5 at depths of 7 cm and 8 cm below the Ash. The vertical provenience of these artifacts suggests an age of about 3,500 BP to 4,000 BP for this discoid biface. Workman (1978) does not make the distinction between discoid and ovoid bifaces that I have made here. This discoid biface accords well with Workman's (1978: 283) Ovoid Edge-Retouched Tabular Biface (TB2) classification. This type of biface, made from coarse-grained raw materials, was intended for use in dressing skins and the majority of specimens recorded by Workman (1978) came from assemblages that slightly predated the White River Ash.

Ovoid Biface (N=2)

Two ovoid bifaces were recovered from the Red - Brown Loess. The larger of the two is basalt and was found in two pieces (#64, #116; Plate 4.9) located 4 m apart. One fragment was excavated in 1994, while the other was found in 1999. Both were recovered from a depth of 7 cm below the Ash, a situation that supports the interpretation of stratigraphic integrity at the site. This biface is thin, well made, and retains no features of the blank. A ridge at one end of the biface, however, appears to have been the object of some dissatisfaction and a series of stepped flake scars reflect unsuccessful attempts to remove it. This biface broke in half during a resharpening episode. This is known because one flake (#155) refitted to the biface traverses the break and was necessarily removed before the biface broke. After that flake was removed the biface was turned over and two additional flakes were removed. The removal of the second of these flakes evidently caused the break. It appears that the half with the ridge and step fractures was discarded immediately while the better half of the biface (#166) underwent further reduction. An attempt was made to trim the break surface. Numerous flakes were removed from the margins of the break. One of these flakes (#154) could be refitted to KaVn-2: 166. Its platform was the break surface. Although that refit flake was found within 1 cm of the flake that was removed before breakage, KaVn-2: 166 was found 4 m to the northwest. Either it was discarded immediately in that location or else it was put back to use and then discarded. In either case, the break surface was not flaked any further. Had that flaking been completed, this biface would probably have become teardrop-shaped in form.

The other ovoid biface recovered from the Red - Brown Loess was made of chert and was found in three fragments (#12, #14, #158). Five flakes (#151, #159, #153, #156, #157) were refitted to those fragments. The colour of the chert grades from brown to green and many pieces of very different colour conjoin (Plate 4.10). Post-depositional chemical or heat alterations must be responsible for these changes in colouration. This small (58 mm long, 30 mm wide) biface has a large raised area on its dorsal surface (this distinction can be made because the piece retains evidence of its origin as a large flake). This raised area makes the biface a full 10 mm thicker in the middle than nearer the edges where it is only 5 mm thick. Reducing the raised area appears to have become the focus of reduction as evidenced by the locations of the scars that the flakes could be reattached to. Four of these flakes were removed from one side of the middle of the biface. Previous, unsuccessful attempts were made to reduce the raised area from the opposite side but only one of those flakes was found. That the majority of prior reduction occurred away from the site or at an unexcavated portion of the site is known because, of all the brown or greenish-brown chert artifacts (N=16), eleven pieces were already refitted to either this biface or to the end-of-blade scraper and the remaining five pieces could not be refitted to either tool. The following reduction sequence can be reconstructed from these remains. The four flakes on the one side of the biface were removed in sequence. The first of these was KaVn-2: 157, followed by KaVn-2: 159, then KaVn-2: 153, and finally KaVn-2:

151. The biface was then rotated and an attempted flake removal caused a large portion (#12) of the biface (approximately 1/3) to break away. Additional flakes were struck near the same point of impact but it is not apparent what the aim of these removals was. KaVn-2: 156 was then removed from adjacent to those flake removals. At that time, or possibly during the attempted removal of the next flake, the remaining portion of the biface broke into two (#158, #14). Apparently, the artifact was then discarded. All pieces of it were found within a 3 m radius. The analysis of this artifact was quite interesting and one cannot help but have the nagging feeling that there is more to learn about it, particularly with regards to its relationship to the end-of-blade scraper that was made of a similar material.

Context, Chronology, and Distribution

The two fragments and two refit flakes of the basalt ovoid biface were recovered from various contexts at depths ranging between 7 cm and 10 cm below the Ash. KaVn-2: 64 was recovered from unit W633, S5 at a depth of 7 cm below the Ash. KaVn-2: 116 was found in unit W631, S1 at a depth of 7 cm below the Ash. Both refit flakes were recovered from unit W633, S4 at depths of 10 cm below the Ash. The vertical provenience of the two large fragments suggests an age for this biface of 3,500 to 4,000 BP. Refitted, this biface can be grouped into Workman's (1978: 229) Large Broad Biface with Convex Edges (BS2) category. These bifaces were probably used as knives or scrapers and appear to have been most common in early post-microblade assemblages in southwest Yukon (Workman 1978).

The other ovoid biface was made of brown to green coloured chert and was found in three fragments with five flakes that could be refitted. Of the three fragments, KaVn-2: 12 was recovered from unit W630, S6, KaVn-2: 14 was found in unit W628, S7, and KaVn-2: 158 was found in unit W629, S7 at a depth of 11 cm below the Ash. Of the five refitted flakes, KaVn-2: 151 came from unit W630, S6, KaVn-2: 153 was recovered from unit W633, S6 at a depth of 11 cm below the Ash, KaVn-2: 156 was found in unit W629, S3 at a depth of 9 cm below the Ash, KaVn-2: 157 was found in unit W630, S5 at 14 cm below the Ash, and KaVn-2: 159 was found in unit W630, S4 at 15 cm below the Ash. Unfortunately, the vertical provenience for many of these pieces was not recorded by

Heritage North Consulting Services. Since these pieces also a had wide horizontal distribution, the differences in vertical provenience can best be explained by slight differences in the thickness of stratigraphic units in various parts of the site. Given an average depth of 12 cm below the Ash for these pieces, this biface probably dates to around 5,000 BP. This small ovoid biface does not appear to have analogs in the archaeological record of the southwest Yukon.

Pentagonal Biface (N=1)

This basalt biface was found in two pieces. The main portion (#68) was found 1.5 m away from the tip fragment (#73). This biface was 65 mm long and pentagonal-shaped (Plate 4.11). All evidence of the flake blank had been trimmed away. Although relatively thin (11 mm), this biface had a raised portion on one side that the knapper had been unsuccessful at removing. The tip appears to have been removed by a direct blow, perhaps signifying an intentional removal. The biface was apparently discarded immediately afterwards given the close proximity of the two fragments.

Context, Chronology, and Distribution

The main portion (#68) of this biface was recovered from unit W633, S4 at a depth of 23 cm below the Ash in an apparently mixed soil zone. The tip fragment (#73) was found in unit W634, S6 at a depth of 1 cm below the Ash. Unfortunately, since notes were unavailable for the 1994 field season, it cannot be determined whether this mixing was natural in origin or if it was caused by some cultural process. Based on similarities in form and raw material with other bifaces, this specimen was assigned to the Red - Brown Loess component. The age of this artifact is unclear because of the significant vertical separation of the two pieces. Workman (1978) did not recognize this biface type in his analysis, but it accords well with the description and illustrated specimen of MacNeish's (1964: 443) Square-Based Bifaces. MacNeish (1964) states that this biface type is most common in the Gladstone and Taye Lake Horizons of southwest Yukon prehistory, or roughly 6,000 to 1,200 BP.

Lanceolate Point (N=1)

The largest point recovered from the Red - Brown Loess (#6; Plate 4.12) is an almost complete, finely made black chert point that is lanceolate in shape and shouldered with slightly concave lateral margins and a slightly concave base. The resulting shape led Walde (1994a: 32) to describe it as a "fish-tail" point. This point was complete, except for the tip, which was snapped off, probably during the final pressure flaking. A parallel, collateral flaking technique was used to finish most edges but one edge has flat, broad flake scars that hint of the use of a small billet. Slight grinding is evident on the lateral margins. This point is 57 mm long, 24 mm wide, and 6 mm thick. It is a beautiful piece of craftsmanship.

Context, Chronology, and Distribution

This projectile point was recovered from the Red - Brown Loess in unit W626, S7 immediately below the Ash layer, suggesting an age of about 1,700 BP. No comparable specimens could be found in the published literature of archaeological remains in northwestern North America. Given the fine crafstmanship exhibited by this piece, perhaps it was intended more as an artistic expression of the knapper's skill than as a functional projectile point.

Side Notched Triangular Point Base (N=1)

One small basalt projectile point base fragment (#47; Plate 4.12) has a straight, thinned basal margin and a shallow side notch on one side that begins just above the basal corner. This notch is not mirrored on the opposite side, however, so it may have been damaged or unfinished. Just above the notch, this point apparently reached its maximum width and the edge was starting to converge towards the tip. This suggests that it was a short, triangular-shaped point.

Context, Chronology, and Distribution

This point base was recovered from unit W626, S9 in the Red - Brown Loess at a depth of 4 cm below the Ash. This specimen is similar to a point recovered from the Swan Point site, located 375 km in a straight line distance to the northwest. That point is a side-notched, triangular-shaped, straight-based point that was recovered from the upper component that is dated to between 1,200 and 1,800 BP (Holmes *et al.* 1996: 320, 322). The KaVn-2 point base was found 4cm below the Ash and must predate the Ash (c. 1,900 BP) by at least a few hundred years so the chronology of these points is comparable. The KaVn-2 point base has a basal width of 23 mm and a 2 mm deep side notch. The Swan Point example has a basal width of 26 mm and notches that are both about 2.5 mm deep. The bases of these points are only comparable on a general level and further comparisons are limited by the small size of the KaVn-2 specimen.

Straight-Based Point Base (N=1)

The last projectile point is a basal fragment (#17; Plate 4.12) made of basalt. This base is straight and narrow and the lateral edges quickly expand away from the base. Lateral edges are ground while the base is not. Given the small size of this tool fragment it is difficult to conduct further analysis.

Context, Chronology, and Distribution

This point base was recovered from the Red - Brown Loess in unit W630, S6 at a depth of 4 cm below the Ash, which suggests an age of about 2,000 to 2,500 BP.

Blade Technology

The end-of-blade scraper (described previously) and a single microblade fragment (discussed next), provide the only evidence of blade technology recovered from KaVn-2.

Microblades (N=1)

A single light gray chalcedony proximal microblade fragment (#121; Plate 4.13) was recovered from test unit W647, S2 that lies west of the main excavation area. This double arris microblade segment (12.44 mm long, 8.14 mm wide, 1.51 mm thick) exhibits platform preparation and has parallel sides.

Context, Chronology, and Distribution

This microblade segment was recovered from test unit W647, S2 at a depth of 18 cm below the Ash, which suggests an age of about 7,000 BP. This date accords well with the traditional association of microblade technology with the Little Arm Phase of the southwest Yukon (Workman 1978; MacNeish 1964). A recent reassessment (Hare and Hammer 1997) of the chronology of microblade technology in the area, however, suggests that microblades are present until well after the end of the Little Arm Phase. Microblades are present throughout northwestern North America from the time of the very earliest sites in Alaska and Yukon (i.e., Swan Point [Holmes 2000], Bluefish Caves [Cinq-Mars 1979]) possibly until relatively recent times (cf., Hare and Hammer 1997). Although further comparisons could be made if other elements of microblade technology (e.g., cores, core tablets) were present at the site, it is impossible to determine the specific mode of microblade production based on a single microblade fragment.

Groundstone Artifacts and Heavy Implements

Abrader (N=1)

One sandstone abrader (#5; Plate 4.14) was recovered from KaVn-2 in two directly associated (i.e., within 4 cm) pieces. It is rhomboidal in shape (L 109 mm; W 53 mm; T 12 mm), both faces are worn smooth, there are abrasion facets on one edge, and three linear grooves are present on one face. One of those grooves weakened the abrader enough to result in a snap along that groove (Plate 4.15). This abrader must have been used to shape soft materials, such as bone, antler, or copper. The linear grooves suggest the sharpening of tipped objects, such as awls or points, while the facets suggest general shaping and grinding. This tool was evidently discarded after it broke, given the close association of the two pieces.

Context, Chronology, and Distribution

This abrader was recovered from unit W628, S8 in two pieces, both of which were at a depth of 4 cm below the Ash. The vertical provenience of these pieces suggests an age of about 2,000 to 2,500 BP. Workman (1978) found a sandstone abrader just below the White River Ash at JjVi-7 on Aishihik Lake. He notes that they are present at both early and late sites in northwestern North America but that they are not frequently found artifacts. MacNeish's (1964) discovery of one abrader in a middle prehistoric context and two in a late prehistoric context corroborate that view.

<u>Hammerstone - Abrader (N=1)</u>

The single hammerstone - abrader (#21; Plate 4.16) recovered from the Red - Brown Loess is an oblong, rounded cobble of a granitic rock. There is evidence of battering on both ends and one edge exhibits significant evidence of grinding.

Context, Chronology, and Distribution

This hammerstone - abrader was recovered from unit W638, S6 at a depth of 5 cm below the Ash which suggests an age of about 2,500 BP. Workman's (1978: 321) review of this artifact class suggested that they are widespread in western North America and that they tend to occur in late prehistoric contexts.

4.4.2 Yellow - Tan Loess

Unifaces

<u>Utilized Flakes (N=15)</u>

Utilized flakes in the Yellow - Tan Loess were all made on basalt base flakes. Secondary flakes (N=12) appear to have been selected for use, but this may reflect their frequency in the available debitage, and a higher percentage of primary flakes were used compared to later occupations at the site. Most flakes represented primary (N=4) and secondary (N=9) stages of reduction. Utilized flakes were relatively large in size (compared to the mean size of the debitage, which was between one and two cm) with a mean length of 25.84 mm. During the analysis, patterning in flake utilization was explored. The frequencies with which the different sides of the flakes underwent utilization were examined. No clear pattern was distinguished: six flakes were utilized on the distal margin while four exhibited use-wear on the left lateral, and four on the right lateral. The mean edge angle of the utilized flakes was 41°. A small sample size prohibits the identification of any clear trends in the data.

Retouched Flakes (N=11)

Retouched flakes in this cultural layer had a mean length in the Class 3 flake size category. Their overall size was only slightly larger than that of the utilized flakes. Again, basalt was used to the exclusion of other materials. Flake blank types were evenly distributed between secondary (N=5), biface reduction (N=2), and primary flakes (N=4), with one on a piece of shatter. The retouched flakes were generated during similar stages of reduction to that of the utilized flakes. There is less difference between the edge angles of retouched and utilized flakes in this cultural layer than there was in the Red - Brown Loess assemblage. Still, flakes with stronger, more obtuse, edge angles appear to have been selected for retouching (mean edge angle = 52°) as compared to the more acute (mean = 41°) edge angle of the utilized flakes. Like the utilized flakes, the location of edge alteration was fairly evenly distributed on the retouched flakes: four flakes were retouched on the distal edge, while three were retouched on the right lateral and one on the left lateral. Two flakes had inverse retouch, and three flakes had regular retouch on multiple edges. A small sample size prohibits the identification of any clear trends in the data.

Side Scraper (N=2)

Two side scrapers were found in the Yellow - Tan Loess. One of these, a large (Class 4) tool, was found in two fragments (Plate 4.17). One fragment (#167) was recovered from an excavation unit, while the other piece (#217) was found eroding from the Yellow - Tan Loess in a slumping section at the southeast corner of the main excavation area, 4.5 m away. This scraper was made on the ventral surface of the left lateral margin of a primary basalt flake. The edge angle grades from abrupt (69°) at the proximal end of the working surface to semi-abrupt (38°) at the distal end. The distal margin of the flake exhibits a snap fracture and, since retouch continues right to that edge, the tool had a wider working surface than indicated by the two fragments recovered. This tool was fragmented diagonally, possibly during a retouching episode.

After breakage, the larger piece was retouched further; when refitted, it is slightly shorter (2.9 mm) than the adjoining piece at the break margin.

An edge fragment (#136) from a side scraper was also recovered. This piece retains 28 mm of working edge. It was difficult to orient this piece, given its small size and coarse-grained texture, but the pattern of rippling on its ventral surface suggests that it was from the right lateral margin of a larger flake. It appears that the parent tool was snapped transversely and then this piece was removed, in the manner of a burin spall, using the break surface as a platform.

Context, Chronology, and Distribution

One fragment of the large scraper (#167) was recovered from the Yellow - Tan Loess in an actively slumping deposit. The other fragment (#217) was recovered from unit W626, S6 at a depth of 23 cm below the Ash. No comparable specimens were found in the published literature. The small side scraper edge fragment was recovered from the Yellow - Tan Loess in unit W628, S9, but its precise vertical provenience was not recorded. Given its small size, comparisons with side scrapers from other sites is not possible.

Endscraper (N=1)

This endscraper (#100; Plate 4.18) was made on the distal margin of a relatively small (Class 3) basalt biface reduction flake. The working edge is 17 mm wide but may have once been as wide as the flake (27 mm); retouch is truncated by a snap fracture. Retouch was done carefully, judging by the small size of the scars, and the resulting edge angle was 69°.

Context, Chronology, and Distribution

This artifact was recovered from unit W633, S4 at a depth of 15 cm below the Ash.

Miscellaneous Scraper (N=1)

This scraper fragment (#117) could not be properly oriented due to its small size. It retains a corner of the parent artifact. Retouch is continuous around the edge (34 mm wide) and a small step plateau is present inward from the edge. The fracture exhibits evidence of a snap that likely occurred during retouch and this piece was apparently discarded immediately, as no further retouch traverses the snap margin.

Context, Chronology, and Distribution

This scraper fragment was found in unit W624, S6 at a depth of between 15 and 20 cm below the Ash. Its small size and lack of features prevents comparison with scrapers from other sites.

Bifaces

Miscellaneous Biface Fragment (N=1)

Evidence of only one large biface was recovered from the Yellow - Tan Loess. This triangular edge fragment (#196) is evidently from a large, thick basalt biface. There is a portion of a step plateau on one face and both of the fractures appear to have been caused by attempts to remove that plateau. Further insights into the manufacture or form of the parent biface are limited due to the small size of this edge fragment.

Context, Chronology, and Distribution

This biface fragment was recovered from unit W633, S4 at a depth of 15 cm below the Ash. The small size of this fragment prohibits any comment on the distribution of the biface form from which it is derived.

Lanceolate Point (N=1)

The lanceolate projectile point was found in two fragments (#41, #45; Plate 4.19) with the break being across the midsection of the point's long axis. These conjoining pieces were found approximately 1.25 m apart at a depth of 19 cm below the Ash. This point was apparently unfinished. The base retains some evidence of the flake blank, there was no evidence of pressure flaking, and slight step plateaus were evident on both faces of the point. These plateaus made the basal half of the point thicker than the distal end and the point may have been snapped during attempts to remove them. The sides of the point are uneven but generally straight and the widest portion was located 2/3 nearer the tip than the base. The base retains some evidence of a hinge termination and was evidently the distal end of the parent flake. Because of its unaltered state, nothing can be said about the desired form of the base, although it is possible that the hinge termination may have been retained in the final product.

Context, Chronology, and Distribution

The tip of this lanceolate point was recovered from unit W626, S9 at a depth of 19cm below the Ash in the Yellow - Tan Loess, while the base was recovered from unit W628, S9, also at 19 cm below the Ash in the Yellow - Tan Loess. Given its context in the Yellow - Tan Loess this point should date to between 10,080 and 10,750 BP. Although lanceolate points are a common form in early archaeological sites in northwestern North America, the only point illustrated in the published literature that bore resemblance is from the Moose Creek site in Alaska. This site is located a straight line distance of 500 km west-northwest of KaVn-2. The lower component of this site is dated to between 8,000 and 12,000 BP but stratigraphic correlations made with other Nenana Valley sites suggest that it is nearer the older limit of that time range (Hoffecker 1996). The basal half of a lanceolate point was recovered from the lower component. It is similar in morphology to the base of the KaVn-2 lanceolate point. Approximate measurements taken from the illustration of this point (Hoffecker 1996: 366) accord well with the metric attributes (Table 4.6) of the KaVn-2 point. The Moose Creek lanceolate point has a base width of 14 mm, a maximum width of 22 mm, and a maximum thickness of 7 mm. The base of the KaVn-2 point has a basal width of 15 mm, a maximum width of 21 mm, and a maximum thickness of 8 mm. The Moose Creek point has the slightest of basal concavities while the KaVn-2 point does not but the retained hinge feature and unfinished appearance of the base must be kept in mind. Clearly, these points are similar in many ways.

Bipoint or Biconvex Knives (N=2)

A basalt bipoint (#8) was found 1 m north of the foregoing point and at a comparable depth (21 cm) below the Ash. It was shaped on all sides by biface reduction flaking and all traces of the flake blank have been obliterated. It seems to be unfinished, however, as indicated by a series of step terminations on one face that may have prevented thinning of this biface and may have been the reason that it was apparently discarded during manufacture.

A second siltstone bipoint (#7) was recovered from approximately 4 m northwest of the other one, and at 11 cm below the Ash near the top of the Yellow - Tan Loess. This artifact is weathered and all flake scars are notably blurred. It seems likely that this artifact belongs to the lower component of the site, given its form (comparable to 8), and raw material (siltstone is more abundant in the lower component). No other artifacts were recovered from the same unit, however, so it is difficult to assign it to a component based on associations. Unfortunately, the 1993 excavation notes were unavailable and it could not be determined whether the shallower depth of this tool could be explained by compressed stratigraphy.

Context, Chronology, and Distribution

This general artifact form is variously referred to as 'bipoint', 'biconvex knife', 'elliptical knife', or 'foliate biface'. These leaf-shaped bifaces have been included as traits of the Northern Cordilleran Tradition and the Denali Complex in Yukon and Alaska and in the Old Cordilleran Culture or Pebble Tool Tradition of British Columbia. Consequently, they are generally considered to be in the age range of those cultural historical classifications, which is approximately 11,000 to 7,000 BP. At least in Yukon and Alaska, these assignments are based on limited information. Hare (1995: 110) included bipoints in the definition of the Northern Cordilleran Tradition based, apparently, only on their occurrence at KaVn-2, and Alaskan archaeologists (e.g., Powers and Hoffecker 1989; Powers 1990; Hoffecker *et al.* 1993) included them in the Denali Complex based on the sole occurrence of one specimen (at least it is the only one ever mentioned or illustrated) in the microblade bearing level of Component II at Dry Creek (Powers and Hoffecker 1989: 275, fig. 6f; Powers 1990: 63, fig. 5f; Hoffecker *et al.*

1993: 50, fig. 5c). In British Columbia foliate bifaces have been found in the early period (6,000 – 10,000 BP) component at Namu (Carlson 1996b), the Milliken component (8,000 – 9,000 BP) at the Milliken Site (Mitchell and Pokotylo 1996), and in the Old Cordilleran Component (5,000 – 8,000 BP) at the Glenrose Cannery site (Matson 1996), among others. Complicating matters further, Carlson (1996a: 9) believes that the Old Cordilleran Culture is derived from the Nenana Complex of Alaska. Essentially, these leaf-shaped bifaces have been included in the trait list of every major early cultural historical classification in northwestern North America. Based on the limited number of known and dated examples (especially in the north), it would appear that this artifact originated in the north and diffused southward, but only further finds can corroborate this statement.

Of the leaf-shaped bifaces at KaVn-2, the basalt bipoint (#8) was recovered from unit W628, S8 at a depth of 21 cm below the Ash and can confidently be assigned an age of between 10,080 and 10,750 BP based on its stratigraphic context. The siltstone bipoint (#7) was recovered at a depth of 11 cm below the Ash in unit W632, S7 and, as mentioned above, probably belongs to the lower cultural layer, and is therefore similarly aged. If, on the other hand, it results from a later, unidentified occupation at the site, then its context near the top of the Yellow - Tan Loess suggests an age in excess of 7,800 BP. This age would still be within the proposed ranges of the Northern Cordilleran Tradition and the Denali Complex.

Miscellaneous Point Tips (N=2)

Two basalt point tips (#44, #52) are alike in form so they will be discussed here together. Both tips appear to have snapped off. In the case of KaVn-2: 52, this appears to have been aided by a weakness caused by a quartz crystal in the basalt grain. In the case of KaVn-2: 44, there is a small step plateau on one face and the tip may have snapped off during attempts to remove it. Both tips appear to have been flaked with a billet and neither has evidence of pressure flaking. One tip (#44) contains the portion of maximum width of the parent point but the other tip (#52) expanded beyond the location of the snap fracture. It is possible that these tips snapped off of either end of a single bipoint but the intervening midsection would need to be found to demonstrate this.

Table 4.6: Metric attributes of projectile points and bifacial knives recovered from the Yellow - Tan Loess. Note that all dimensions are in mm.

Catalogue Number(s)	Artifact Type	Material	Length	Base Width	Maximum Width	Maximum Thickness	Weight(g)
41, 45	Lanceolate Point	Basalt	89	15	21	8	16.0
8	Bipoint	Basalt	64	—	26	10	13.4
7	Bipoint	Siltstone	79	—	24	10	21.3
44	Point Tip	Basalt	33	—	25	6	4.1
52	Point Tip	Basalt	28	—	29	6	3.9
46	Poss. Point Base	Basalt	11	Expanding	18	4	0.8

Context, Chronology, and Distribution

These artifacts were recovered in contexts separated by about 3 m. KaVn-2: 52 was recovered from unit W629, S7 at a depth of 17 cm below the Ash while KaVn-2: 44 was recovered from unit W628, S9, which was in the process of slumping over the bank but nevertheless had intact stratigraphy. It came from the Yellow - Tan Loess layer but no other provenience was recorded when this artifact was excavated in 1993. Given the small size of these point tips and the resulting lack of information on the form of the points they are derived from, it is difficult to suggest a distribution or chronology.

Possible Point Base (N=1)

A possible point base recovered from the Yellow - Tan Loess (#46) may be derived from a convex-based point. It is made of basalt and all margins are ground extensively.

Context, Chronology, and Distribution

This possible point base was found in unit W625, S8 at a depth of 13 cm below the Ash near the top of the Yellow - Tan Loess. As discussed for the siltstone bipoint, this artifact probably belongs to the lower Yellow - Tan Loess cultural layer and the shallow context can be explained by compressed stratigraphy in this unit. Alternatively, if it is from an unidentified cultural component at the site, then its context suggests an age of older than 7,800 BP. Although it cannot be determined with certainty that this is a projectile point base, round-based points have been attributed an early age in northwestern North America. Irving and Cinq-Mars (1974:77) assigned them to what is now called the Northern Cordilleran Tradition (Clark 1983).

Groundstone Artifacts and Heavy Implements

Modified Cobble (N=1)

This artifact (#83) is a large basalt cobble that weighs 2.66 kg (L 206 mm, W 99 mm, T 87 mm). It is roughly rectangular and exhibits scars from spall removals. These scars are not patterned and probably result from fracturing during use rather than as a result of intentional removal. This artifact would have been suitable as a maul, a chopper, an anvil, or a myriad of other heavy-duty uses, but its actual function can only be speculated.

Context, Chronology, and Distribution

This large cobble tool was recovered from unit W631, S8 at a depth of 27 cm below the Ash. Undoubtedly, such large implements had uses to all precontact cultures of northwestern North America.

Plane (N=1)

This tool (#22; Plate 4.20) was unique at the site and was manufactured from a large (L 167.0 mm, W 92.3 mm, T 54.9 mm) sandstone cobble that weighed 861.8 g. A flat face was used as a platform to remove flakes from about 60% of the edge. The resulting edge is v-shaped (convergent) and strong with an abrupt (76°) edge angle. The proximal end of the tool is, likewise, v-shaped and much thicker (54.9 mm) than the thinner (31.0 mm) working end. It appears to have been designed for use as a heavy-duty scraping or planing instrument.

Context, Chronology, and Distribution

This large plane was recovered from unit W628, S7 at a depth of 26 cm below the Ash. Morphologically comparable artifacts with similar functional potential have been recovered from Whitmore Ridge in a context dating to between 9,820 and 10,700 BP

(West *et al.* 1996: 393), from Component I (10,000 to 11,200 BP) at Dry Creek (Hoffecker *et al.* 1996: 349, fig. 7-8t), and from Walker Road in a context dating to between 10,900 and 12,000 BP (Goebel *et al.* 1996: 362). These large tools are variously called 'planes', 'scraper planes, 'carinate scrapers', and 'plano-convex tools'.

4.4.3 Surface

Unifaces

Utilized Flakes (N=3)

Three utilized flakes (#102, #103, #168) were recovered from the eroding bank of the site. All can be assigned to the Red - Brown cultural layer based on raw material type. KaVn-2: 102 is an obsidian secondary flake with utilization along the entire distal margin, KaVn-2: 103 is an obsidian secondary flake with utilization along its distal and right lateral margins, and KaVn-2: 168 is a Jasper secondary flake with utilization on both lateral margins.

Retouched Flakes (N=1)

This obsidian secondary flake (#139) has two small segments (combined width = 10 mm) of intentional retouch along its distal margin.

Endscraper (N=1)

A single obsidian endscraper (#133) recovered from the eroding bank of the site can confidently be attributed to the Red - Brown Loess cultural layer since obsidian is absent from the Yellow - Tan Loess. It was manufactured from a secondary flake removed from an obsidian core during the early stages of reduction, as evidenced by the significant cortex cover on its dorsal surface. The working edge is 15 mm wide and the edge angle approaches 90°, but could not be accurately measured because pronounced ventral curvature prohibited use of a contact goniometer.

Context, Chronology, and Distribution

This artifact is almost certainly derived from the Red - Brown Loess because it is obsidian. It may belong to Workman's (1978: 271) Narrow, Relatively Thin-Bitted Endscraper (ES2) category.

4.5 Faunal Remains

Faunal remains recovered from KaVn-2 consisted solely of burnt and calcined bone fragments, none of which were identifiable. These bone fragments were recovered from various units with only a few being derived from the Yellow - Tan Loess.

4.6 Macrobotanical Remains

A single macrobotanical fossil (Plate 4.21) was recovered from the Yellow - Tan Loess layer of unit W624, S5. It was roughly spherical in shape with a height of 6 mm and a diameter of 8 mm. It had a mass of 0.1 g and a small stem was present on the top. It was a dull brown colour on its exterior but, after being sliced in half, it could be seen that the interior was a creamy yellow colour. The interior was hollow and contained septa, or chambers. Preliminary analysis undertaken to determine the species represented by this fossil (Zazula, personal communication 2001) suggests that it is a saskatoon (*Amelanchier alnifolia*) berry. At present, the study area is located at the northern limits of the range of saskatoon and this fossil may provide important information on the post-glacial history of this species.

4.7 Spatial Analysis

Analysis of the KaVn-2 artifact assemblage was undertaken in order to determine the spatial organization of the cultural components at the site. One objective of this analysis was the identification of activity areas, as indicated by artifact density and distribution. As before, the total artifact assemblage was divided into two: the Red - Brown Loess assemblage and the Yellow - Tan Loess assemblage. Modified artifacts were treated differently from debitage. All modified artifacts were piece-plotted on a grid map of the main excavation area. In this way, the spatial relationships of all modified artifacts in each cultural component could be viewed on the assemblage level. Debitage, on the other hand, was plotted using symbols representing different densities of debitage per excavation unit. Further, debitage was divided into raw material types that were then plotted separately in order to determine if those types had different spatial distributions.

Another goal of the spatial analysis included the mapping of refitted modified artifacts. Fragments of single modified artifacts that could be refitted and flakes that could be refitted to modified artifacts were piece-plotted on a grid map of the main excavation area. Two types of refits were recognized during the analysis: breakage refits, in which modified artifacts became broken during use or retouch; and manufacturing refits, in which the by-products of lithic reduction could be refitted to the parent artifact. The refitting of artifacts provides information on the loci of lithic reduction activities, on lithic reduction strategies and sequence, and on the stratigraphic integrity of the cultural component (cf., Cahen *et al.* 1979). The latter topics were discussed earlier in this chapter in the detailed analysis of each modified artifact so the emphasis here, with respect to refits, will be on the loci of lithic reduction.

4.7.1 Red - Brown Loess Spatial Distributions

Debitage

Basalt (Figure 4.11) and obsidian debitage (Figure 4.12), with a few areas of concentration, were fairly evenly distributed in the main excavation area whereas light gray chalcedony (Figure 4.13) and black chert (Figure 4.14) were concentrated in the southeast corner of the main excavation area. The spatial distributions of the different raw material types are clearly different. It appears that basalt and obsidian, the dominant raw material types, were used during repeated occupations of the site whereas chalcedony and chert were restricted to single occupations and perhaps distinct lithic reduction events. The low frequencies and restricted distributions of these two raw material types may, in fact, represent the manufacture or retouching of only two or a few more lithic artifacts. It was noted earlier that obsidian was the favoured raw material for the production of modified artifacts and that it was the subject of primary reduction activities. Not surprisingly, it exhibits spatial patterning intermediate between the ubiquitous basalt distribution and the much more restricted distribution of chalcedony and chert.

The southeast corner of the main excavation area corresponds to the southeast corner of the ridge. This location on the ridge provides the best view (i.e., an overlook) of the Shakwak Valley and would have been the natural focal point of short-term visits to the site. Lithic remains in this location could represent short-term visits or the remains of specific activity areas used during more prolonged occupations of the site. The western portion of the main excavation area, conversely, provides a more stable, level, and sheltered location. If these properties also prevailed in the past, then it would have provided an ideal location for a shelter. High concentrations of debitage, particularly basalt, may have accumulated around a shelter. Also, the seemingly ready availability of basalt and its coarse texture may have made it suitable for the production of general-purpose, expedient (i.e., domestic) implements, as appears to be the case in the modified artifact assemblage of the Red - Brown Loess cultural component.

Modified Artifacts

Modified artifacts in the Red - Brown Loess exhibited significantly less clustering than did the debitage but the western and southeastern portions of the excavation area still contained the largest concentrations of lithic materials (Figure 4.15). Retouched flakes and utilized flakes shared this type of distribution. Other artifact types, however, had quite divergent distributions. Projectile point fragments are only located in the eastern area, whereas biface fragments are concentrated in the western area. Scrapers of various types are evenly distributed but notches appear to be limited to the central area. Perhaps the most striking spatial distribution, though, is that of the obsidian pebbles and pebble cores. Only one obsidian pebble core was found outside of the eastern area and ten of the fourteen obsidian pebbles and pebble cores were located within one metre of one another. These obsidian pebbles appear to have been cached at the site, as discussed earlier in reference to raw material use at the site.

Although the spatial distribution of the modified artifacts in the Red - Brown Loess does not exhibit any clear trends, it is nevertheless consistent with the spatial division of the site into a western residential area and an eastern special purpose activity area. Unfortunately, no features were discovered to lend support to this suggestion.

Artifact Refits

A number of artifacts and pieces of lithic debitage in the Red - Brown Loess could be fitted back together (Figure 4.16). Refitted artifact types were dominated by bifaces but a core, a notch, and an end-of-blade scraper could also be refitted. The four bifaces were refitted from large biface fragments. One of these biface had two biface reduction flakes that could be refitted to it and a small chert biface found in three fragments had five flakes that could be reattached to it (Figure 4.17). The bifaces with associated refit flakes appear to have broken during manufacture or retouch, while the other two bifaces seem to have broken during use. An obsidian pebble core could be refitted with the only flake that had been detached from it. It was apparently tested before being placed in a cache with the other obsidian pebbles and pebble cores. The notch was not refitted into a complete artifact. Rather the primary flake fragment upon which the notch was made was refitted to the other two fragments of that flake. Fragmentation of the flake occurred during initial core reduction and the notch was made on the break surface of one of those fragments. The end-of-blade scraper was very small and close to being exhausted. As mentioned previously, the fracture surfaces resemble the texture of potlid scars so this scraper may have been discarded and then fractured subsequently by the heat of a nearby fire. No hearths were found at the site, however, so this suggestion has no further support. The reduction sequence responsible for the fragmentation of the chert biface was treated in detail earlier and will not be repeated here.

4.7.2 Yellow - Tan Loess Spatial Distributions

Debitage

Unlike that of the Red - Brown Loess, the debitage from the Yellow - Tan Loess cultural component consisted almost entirely of one raw material type so plotting of different raw material types did not reveal any spatial patterns. Like the distribution of basalt in the Red - Brown Loess, however, two concentrations of debitage were observed:

one in the northwest corner of the main excavation area and one in the southeast corner (Figure 4.18). This similar distribution may also represent a spatial division of the site into a specialized activity area (southeast corner) and a domestic area (northwest corner). Alternatively, this distribution could reflect separate short-term occupations separated by a few years. The density of debitage around the southeast corner is especially dense and may support the aforementioned suggestion that the earliest use of the site was mainly as a special purpose hunting camp / lookout.

Modified Artifacts

Like the debitage, modified artifacts in the Yellow - Tan Loess clustered in two areas of the main excavation area, the northwest corner and the southeast corner (Figure 4.19). Also like the debitage, this spatial distribution is most likely the result of site topography, with specialized activities represented at the southeast corner of the ridge where the view was best and more general-purpose, domestic activities represented in the western area away from the edge of the ridge. The types of artifacts represented in the two areas supports this assessment. In the western area, artifact types are dominated by general-purpose implements like retouched and utilized flakes, and cobble cores. Artifact types in the southeast area, on the other hand, consist mainly of more specialized tools such as projectile points, scrapers, and a plane.

Artifact Refits

Only three artifacts from the Yellow - Tan Loess could be refitted (Figure 4.20). These artifacts were described in detail earlier in this chapter. The core and flake (#184, #220) from the middle of the excavation area may represent either the testing of a core for suitability as a raw material or the spall may have become detached when the cobble was used as a hammer. Projectile point fragments (#41, #45) in the southeast corner represent the two halves of the lanceolate projectile point. This point appeared to be unfinished and probably broke during the later stages of its manufacture. One of the two side scraper fragments was found eroding from the Yellow - Tan Loess layer at the edge of the bank and its horizontal provenience should be considered as approximate. This artifact was broken either during manufacture or resharpening. The portion recovered in an excavated context (#217) was apparently discarded immediately, while the piece with the majority portion of the working edge (#167) was retouched and used further before being discarded.

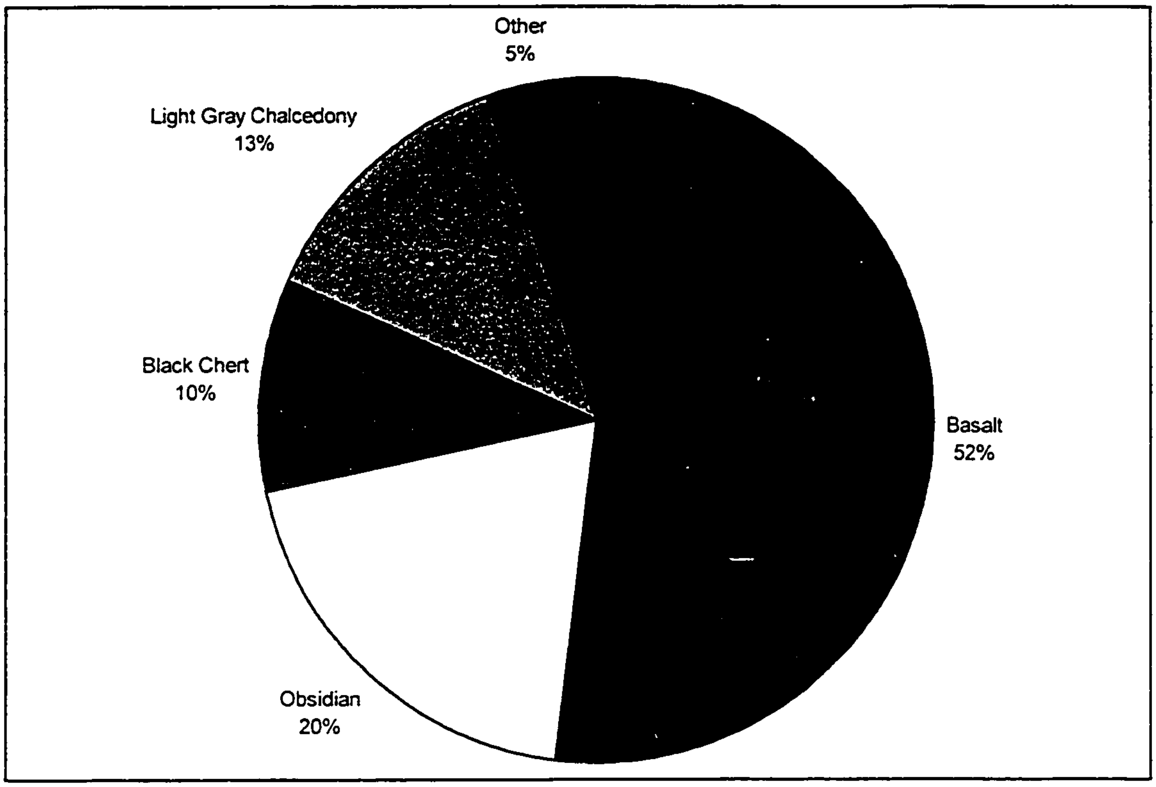

Figure 4.1: Raw Material Frequency in Red - Brown Loess (N=1,256).

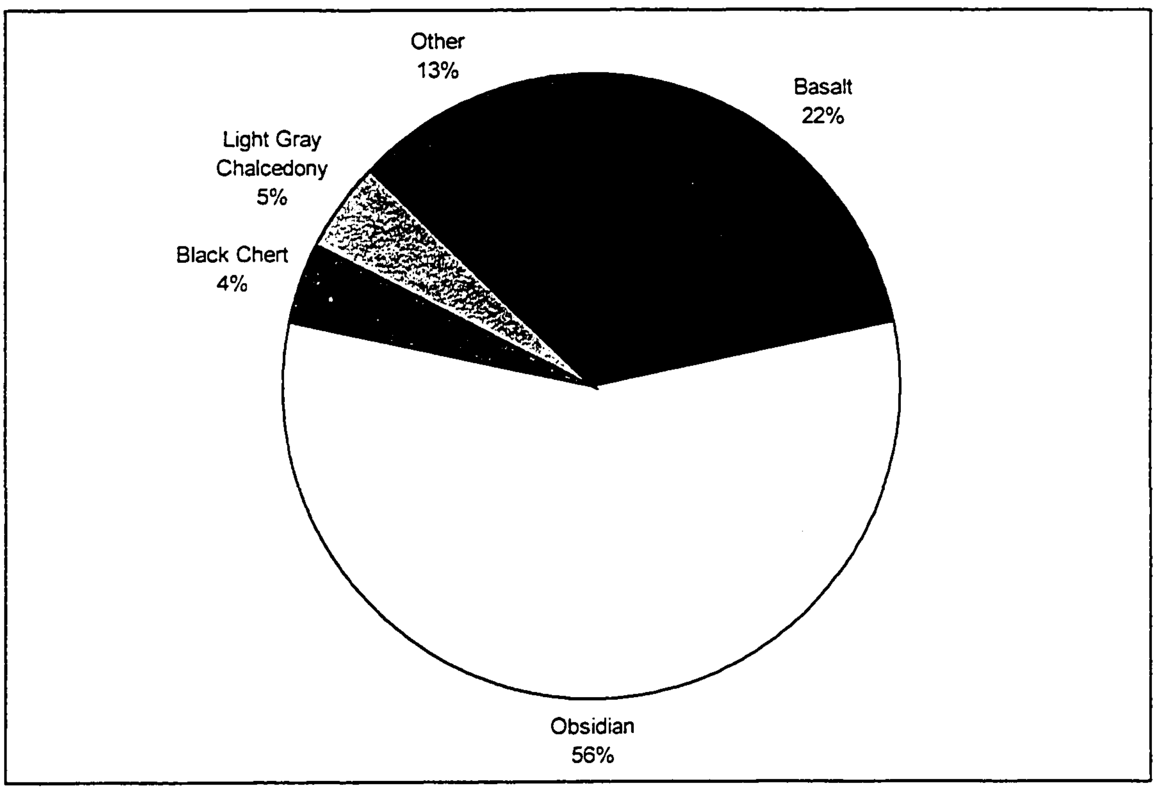

Figure 4.2: Raw Material Frequency for Modified Artifacts in Red - Brown Loess (N=125).

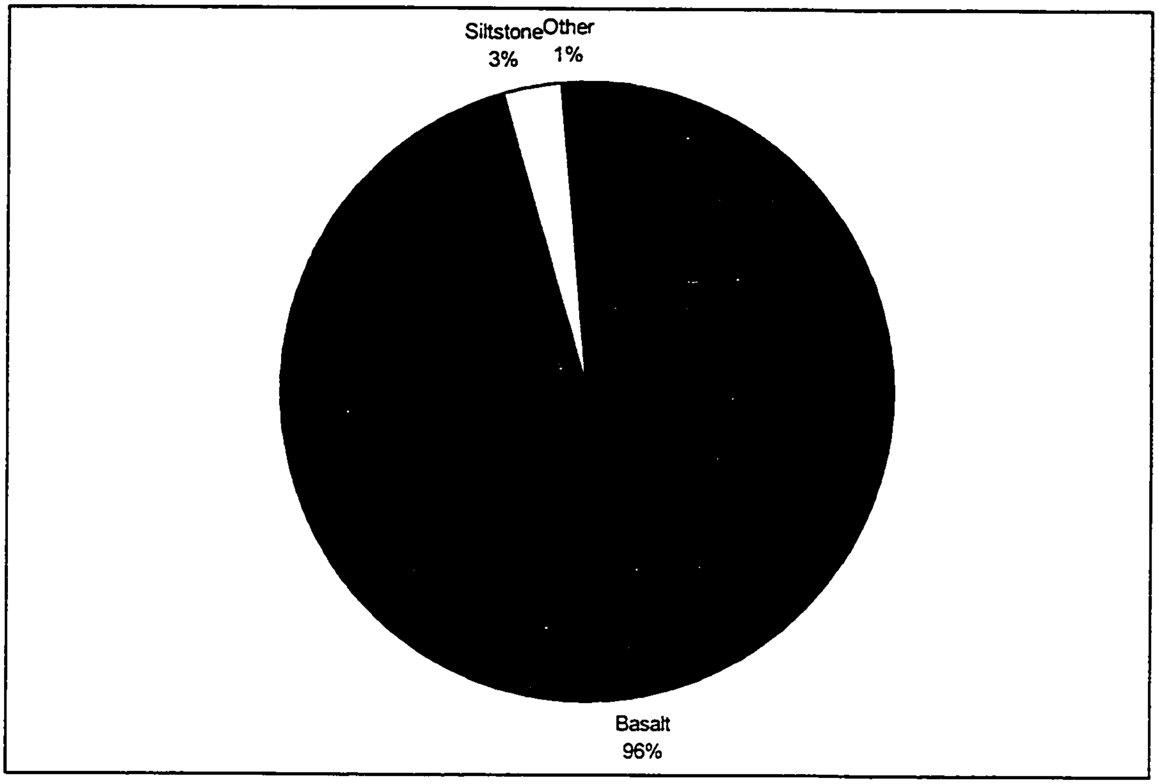

Figure 4.3: Raw Material Frequency in Yellow - Tan Loess (N=1,101).

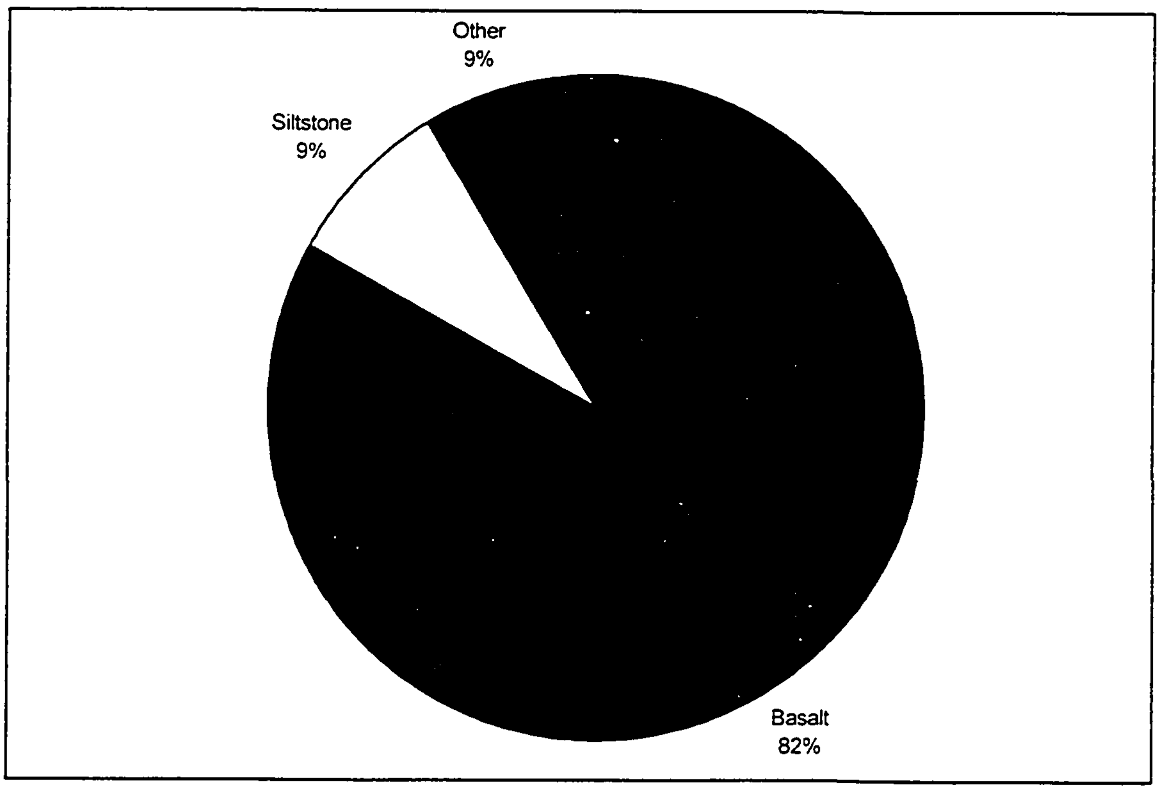

Figure 4.4: Raw Material Frequency for Modified Artifacts in Yellow - Tan Loess (N=47).

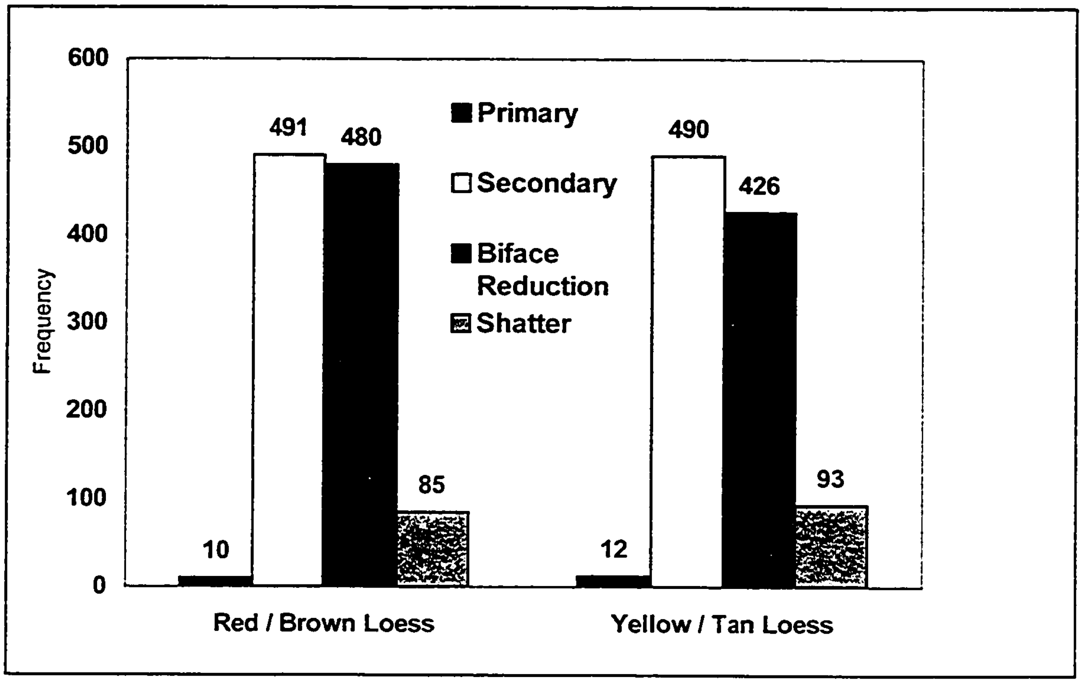

Figure 4.5: Flake type frequency by layer at KaVn-2. Note that this information was unavailable for 98 flakes.

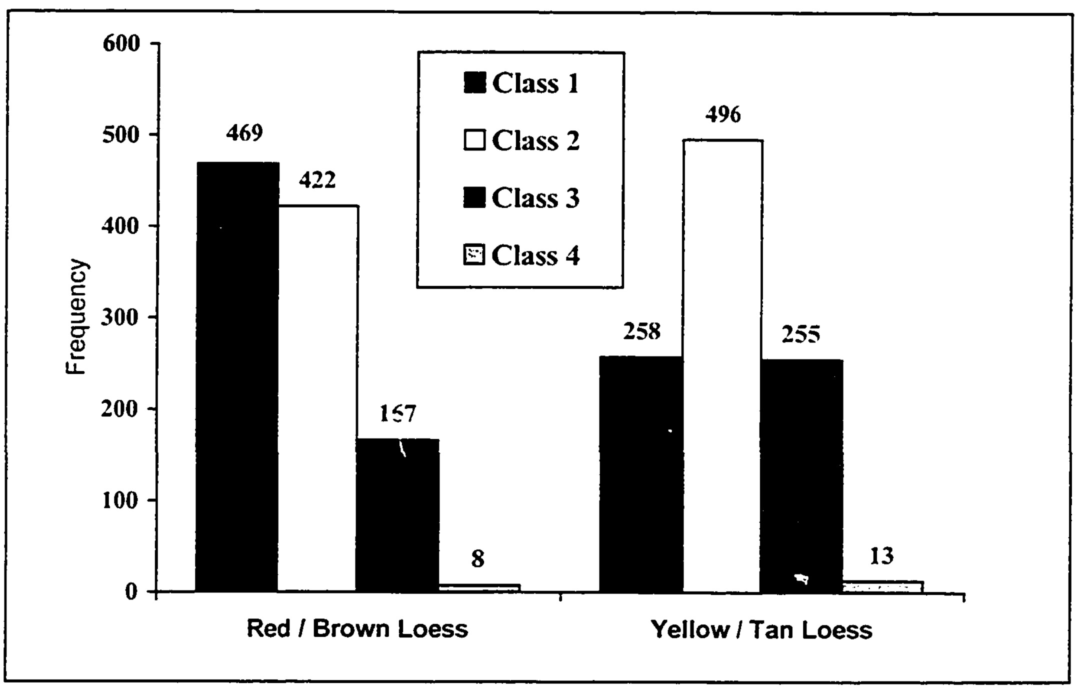

Figure 4.6: Flake Size Frequencies by Layer. Note that 65 flakes from the Red - Brown Loess and 32 flakes from the Yellow - Tan Loess lacked size information.

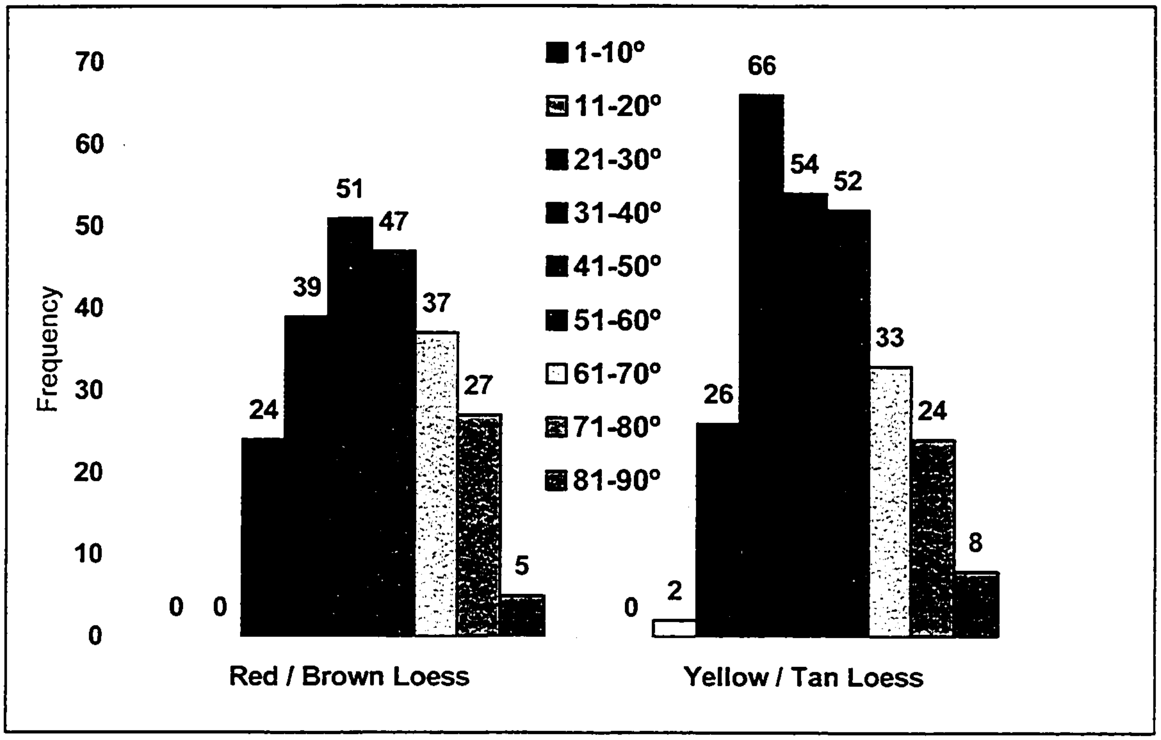

Figure 4.7: Platform angle frequency by layer at KaVn-2. Note that most flakes (N=1,581) lacked platforms and that this information was unavailable for 109 flakes.

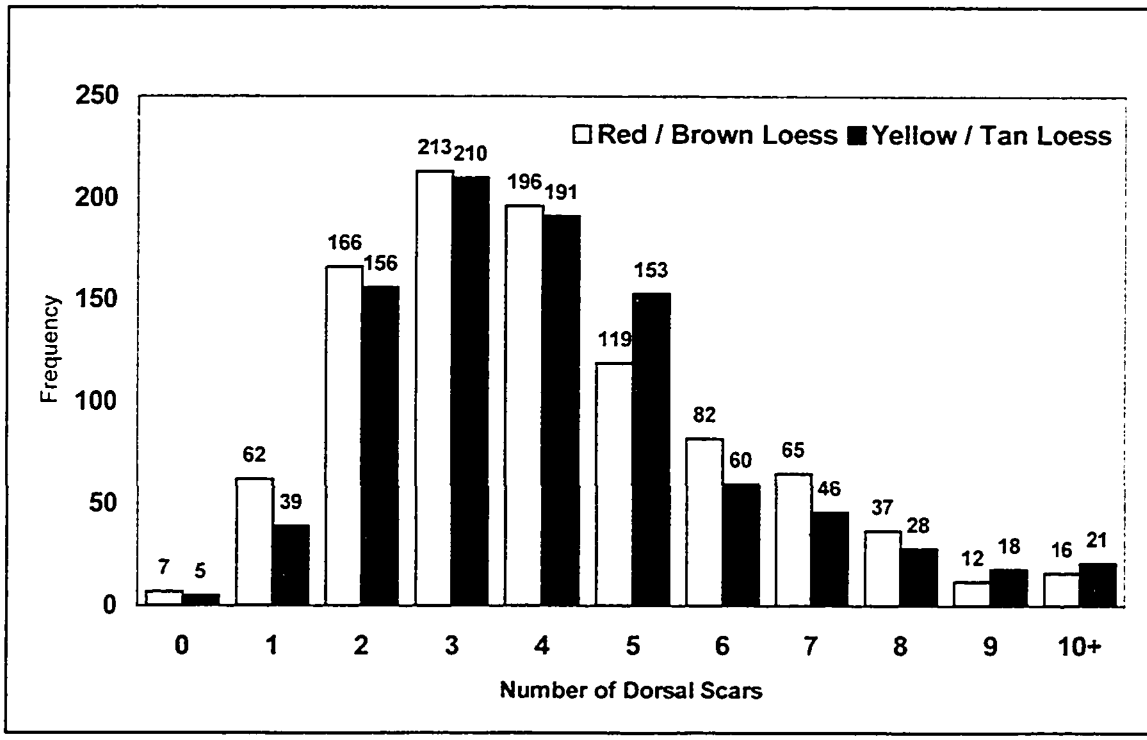

Figure 4.8: Dorsal scar frequency by layer at KaVn-2. Note that this information was unavailable for 283 flakes.

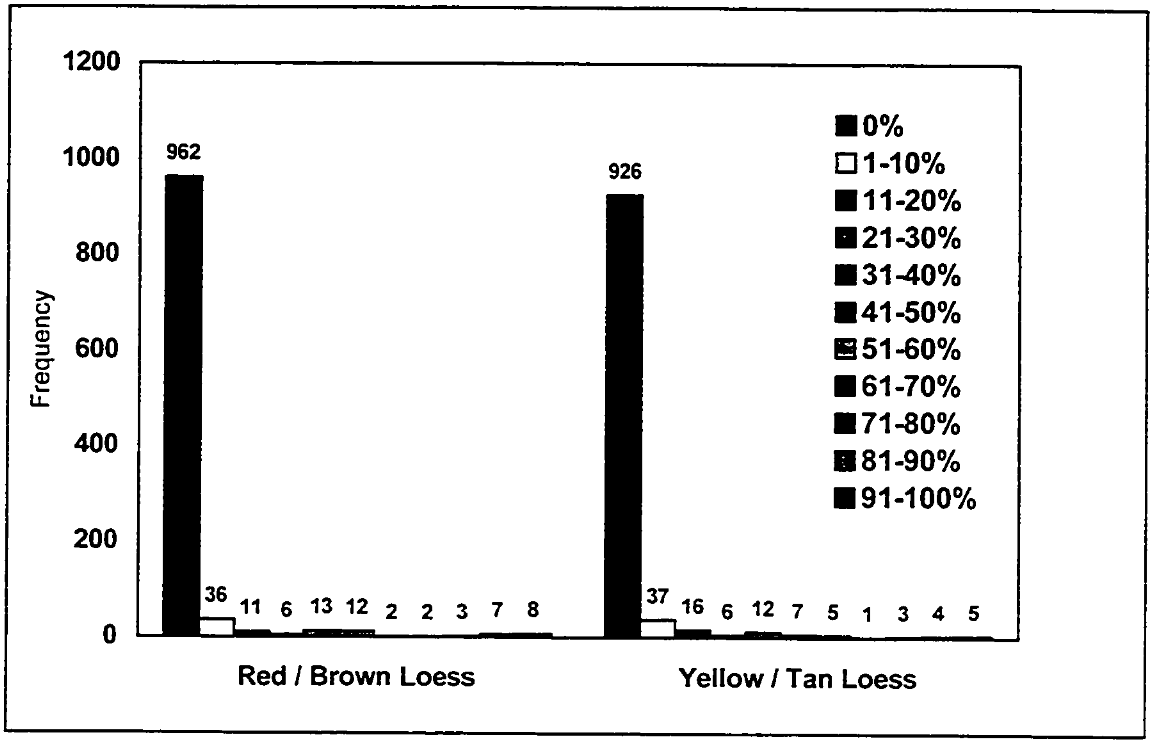

Figure 4.9: Frequency of cortex percentage categories by layer at KaVn-2. Note that this information was missing for 101 flakes.

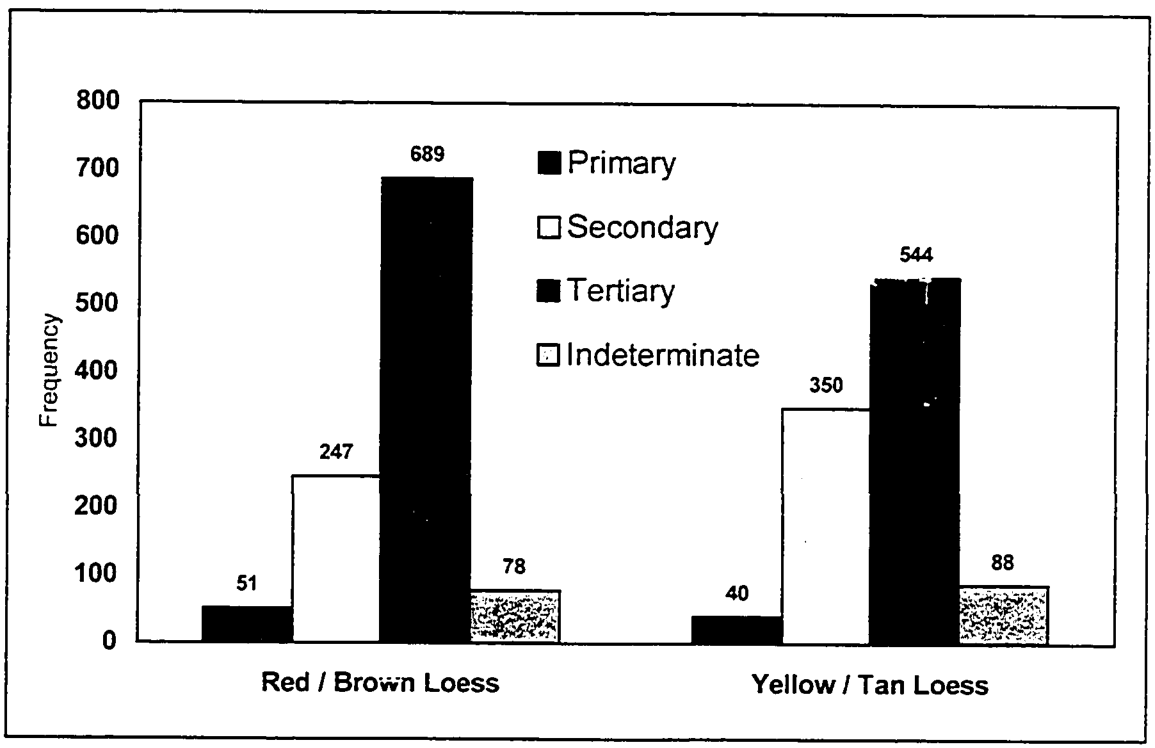

Figure 4.10: Frequency of reduction stages represented by debitage by layer at KaVn-2. Note that this information was unavailable for 66 flakes.

Plate 4.1: Obsidian pebble cores, unmodified pebbles, and primary flakes recovered from the Red - Brown Loess.

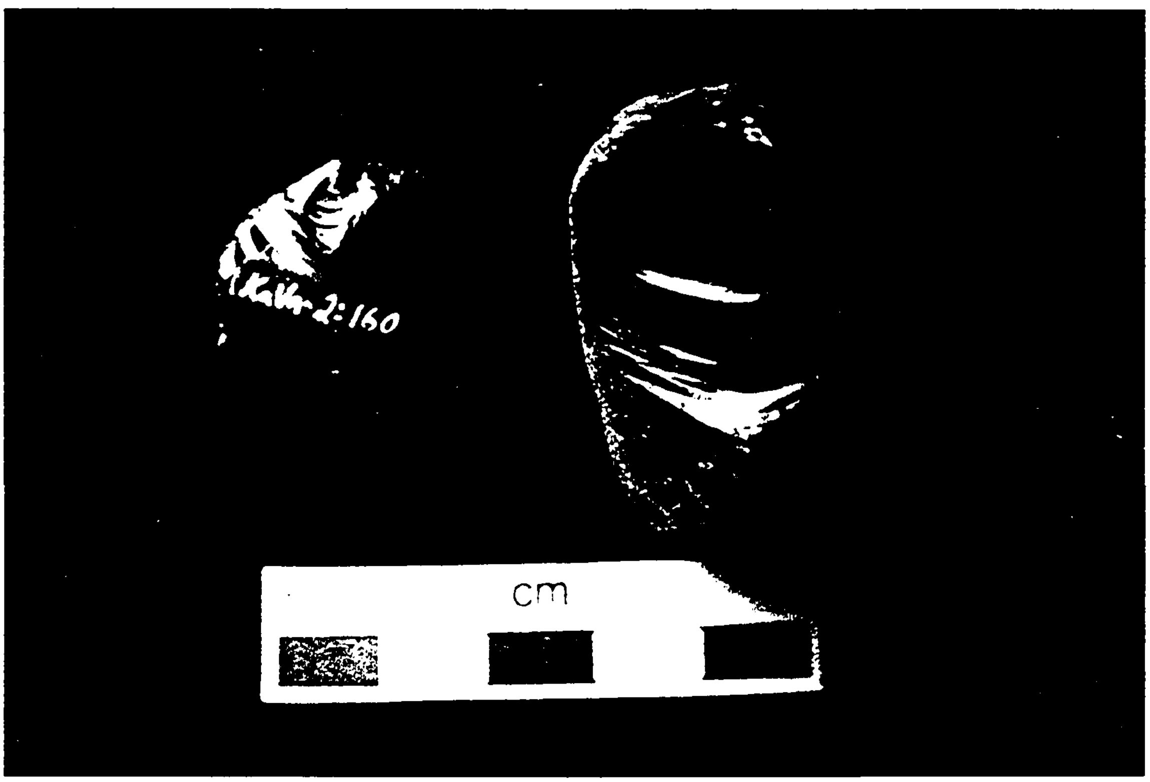

Plate 4.2: Obsidian pebble core (#32) and refitted flake (#160).

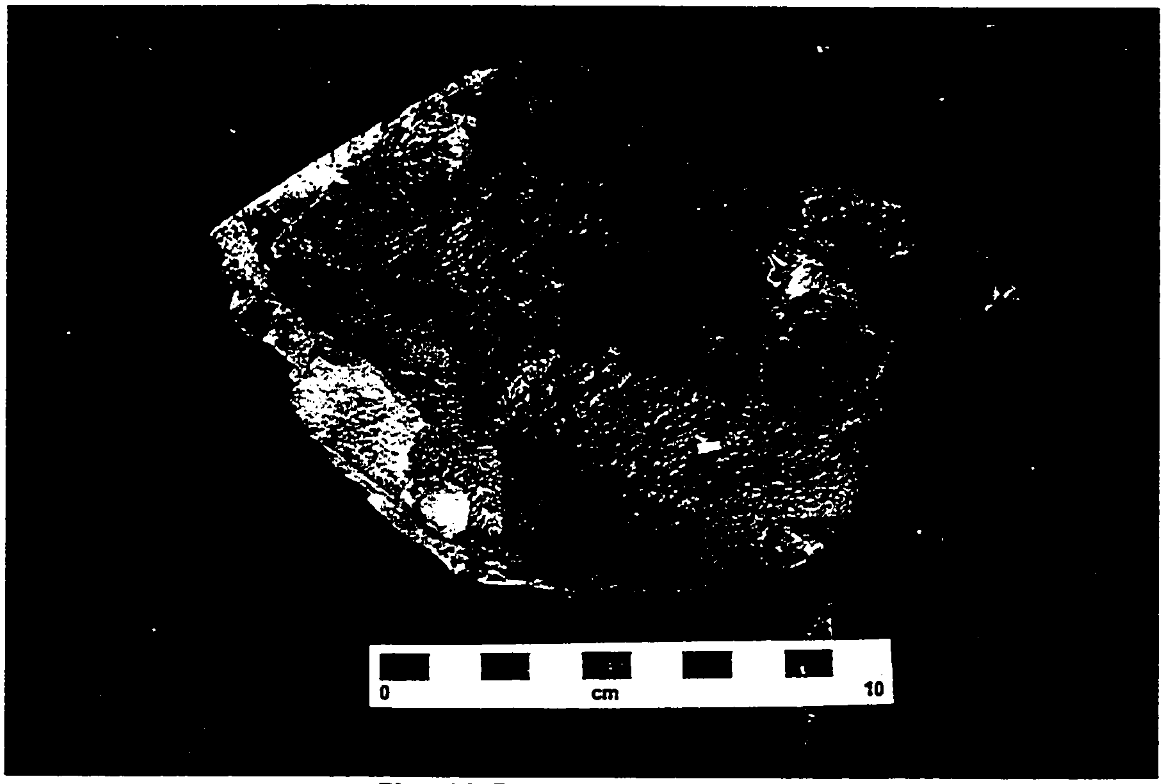

Plate 4.3: Basalt cobble core (#125).

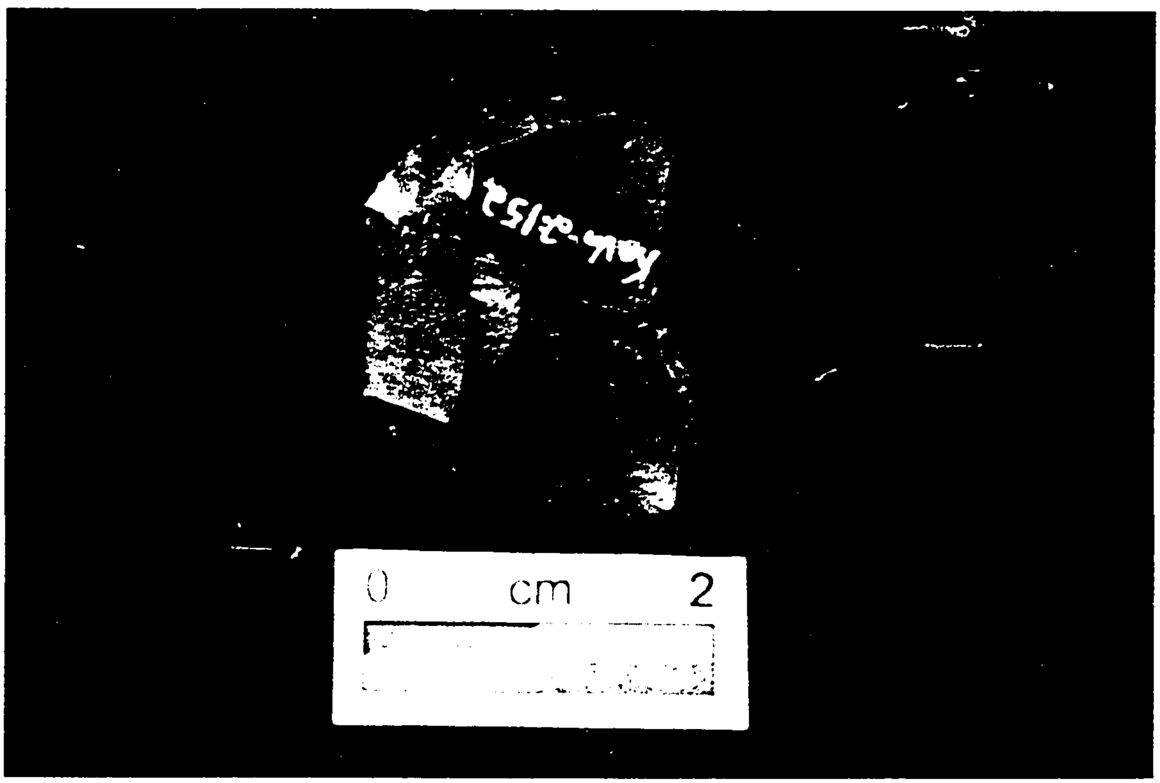

Plate 4.4: Refitted end-of-blade scraper (#55, #141, #152).

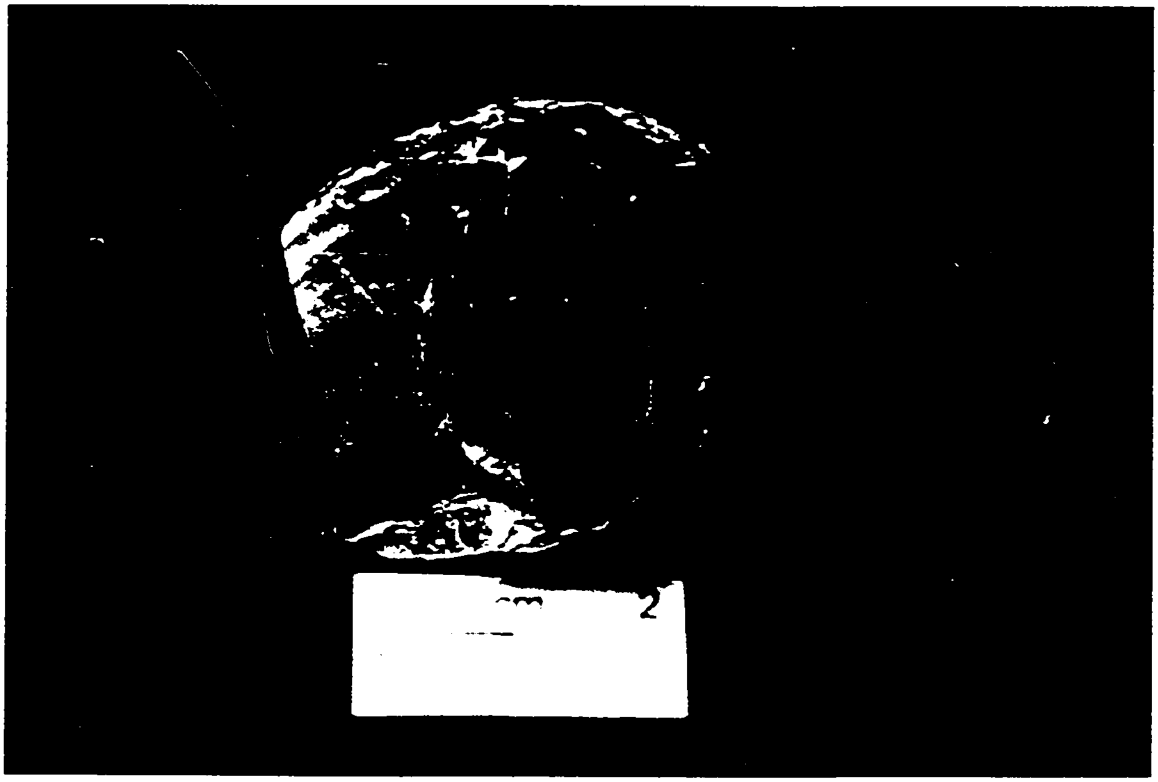

Plate 4.5: Obsidian endscraper (#39).

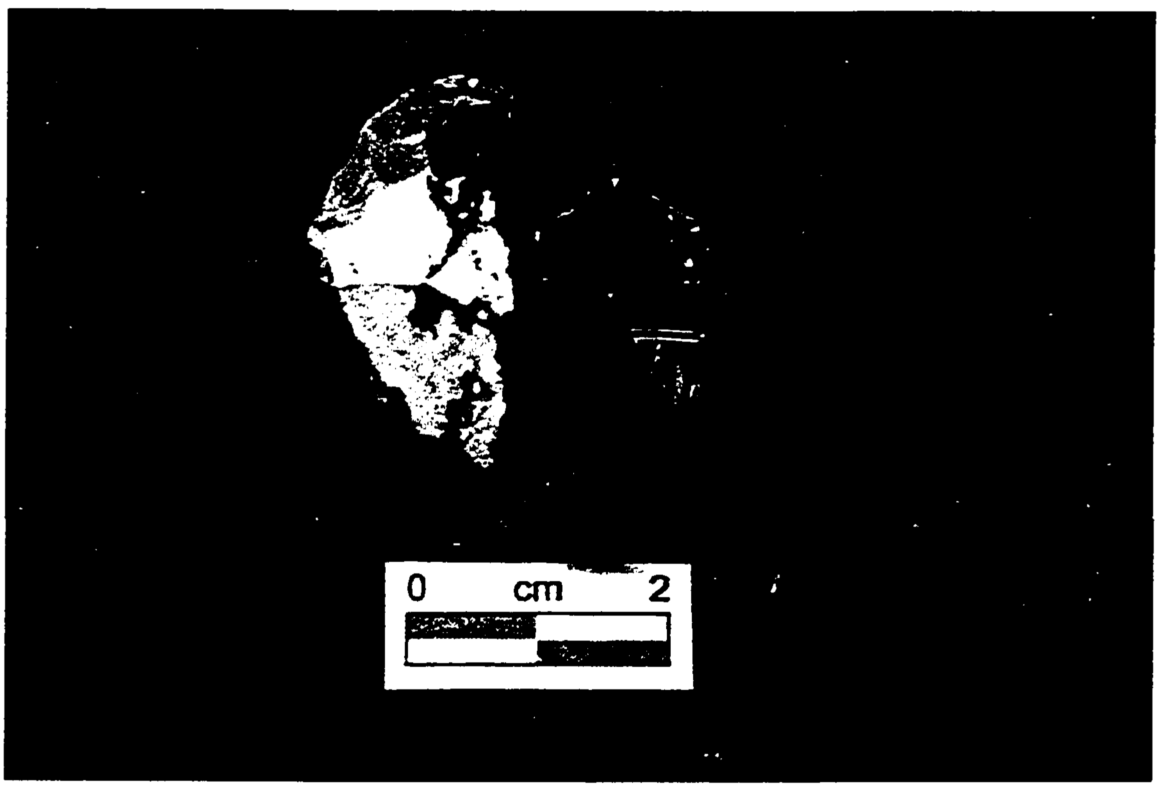

Plate 4.6: Multi-edged scraper (#124).

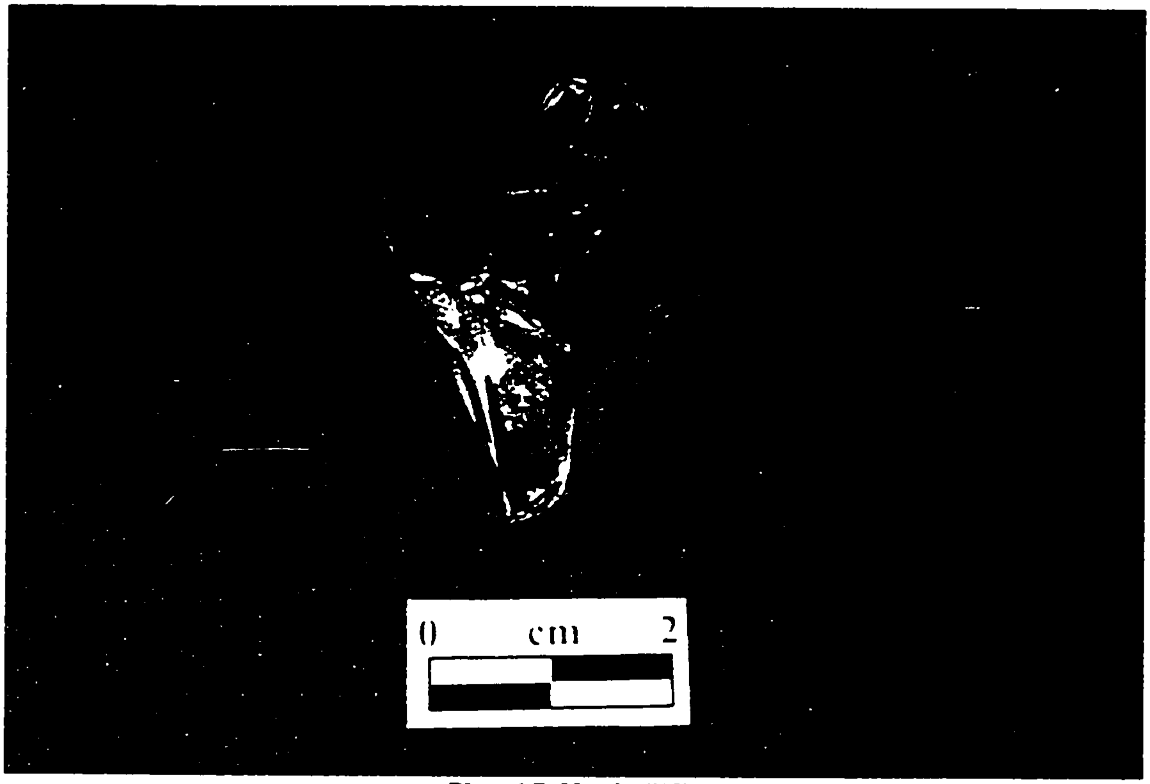

Plate 4.7: Notch (#13).

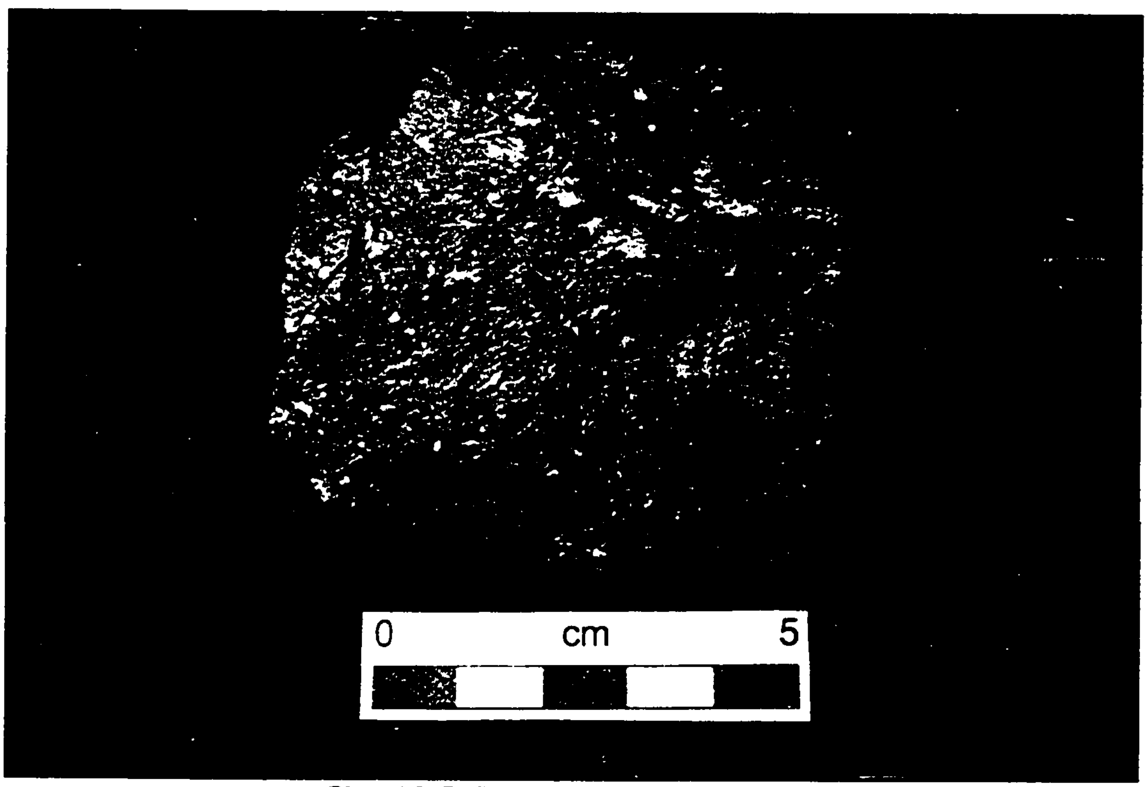

Plate 4.8: Refitted discoid biface (#65, #66).

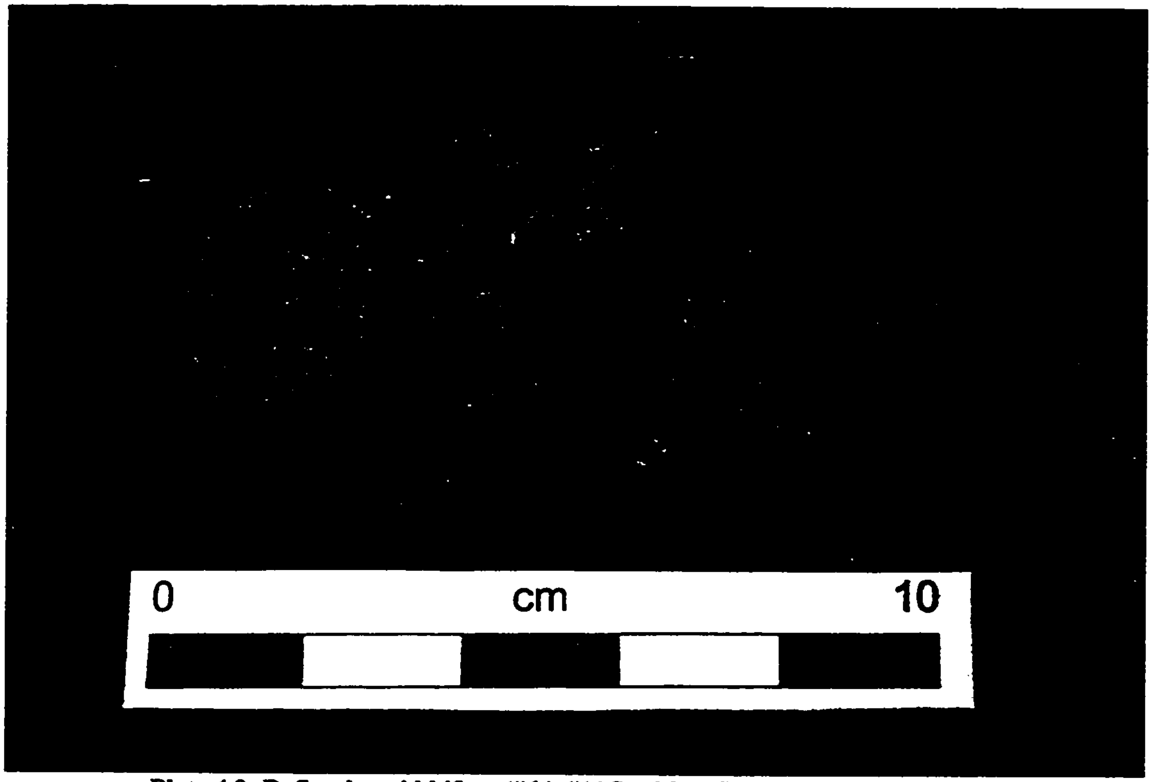

Plate 4.9: Refitted ovoid biface (#64, #116) with refitted flakes (#154, #155).

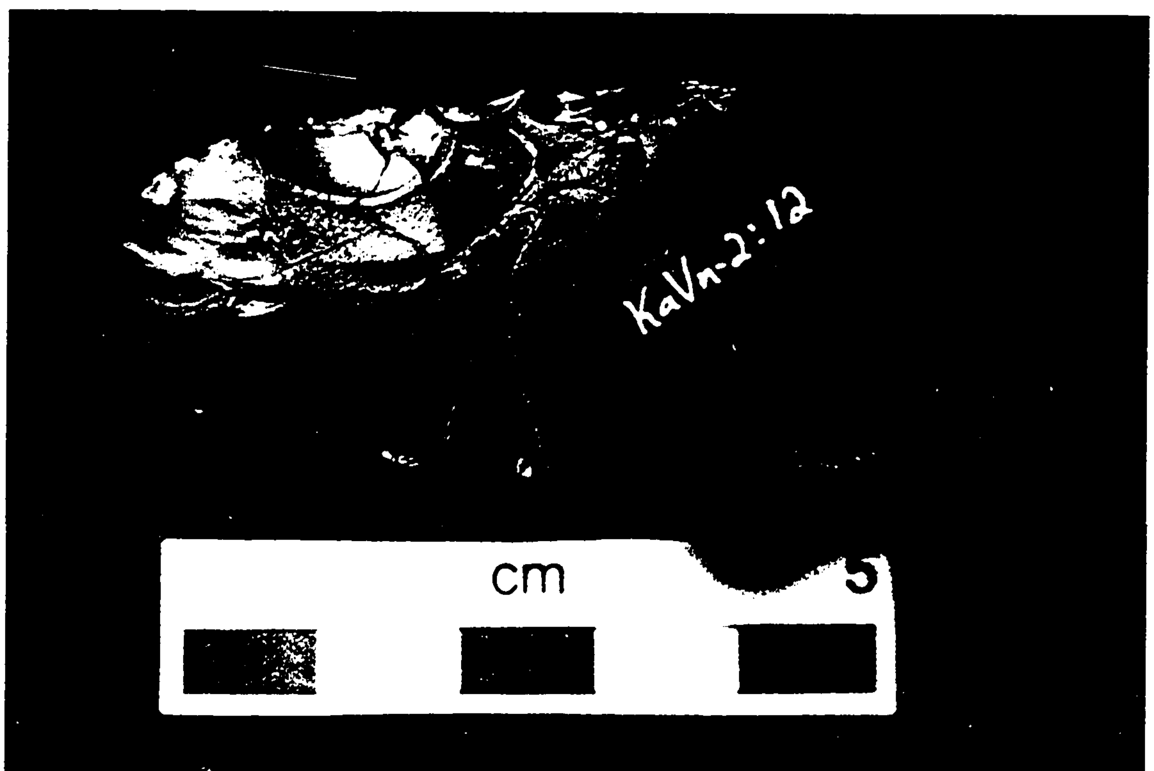

Plate 4.10: Refitted ovoid biface (#12, #14, #158) with refitted flakes (#151, #153, #156, #157, #159).

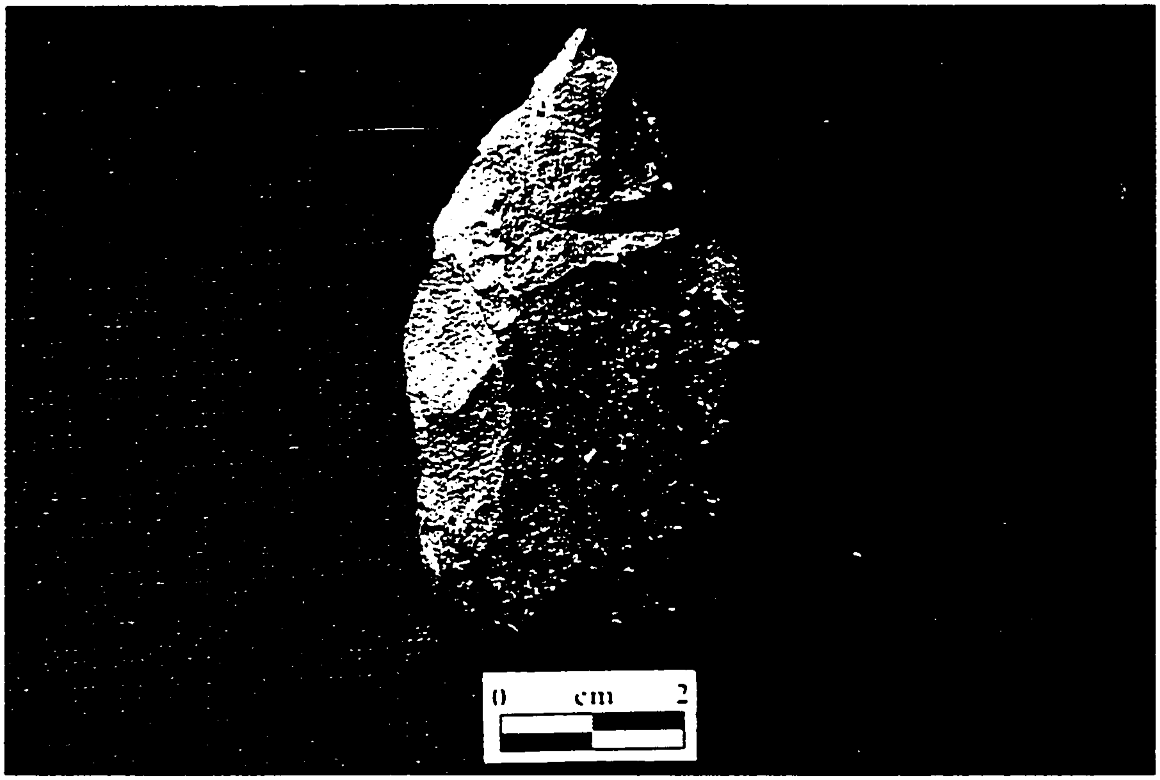

Plate 4.11: Pentagonal biface (#68, #73).

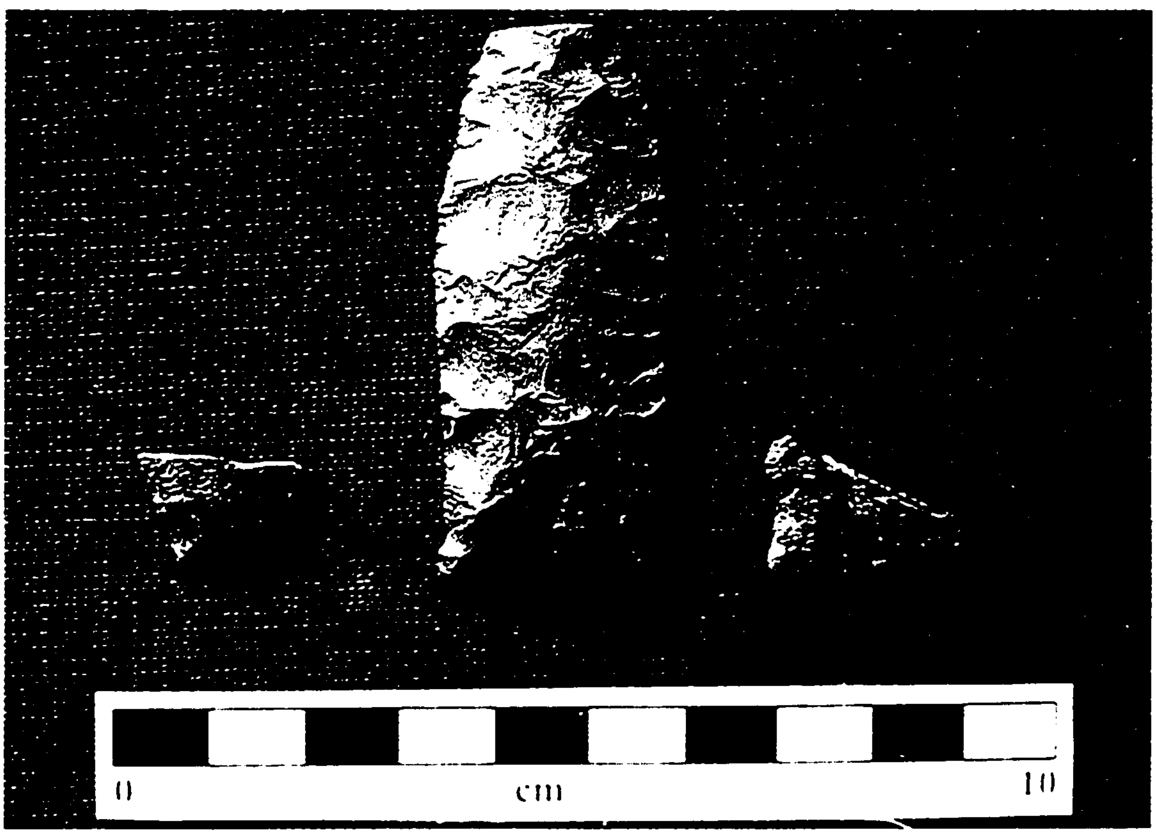

Plate 4.12: Projectile point fragments (left to right, #17, #6, #47)

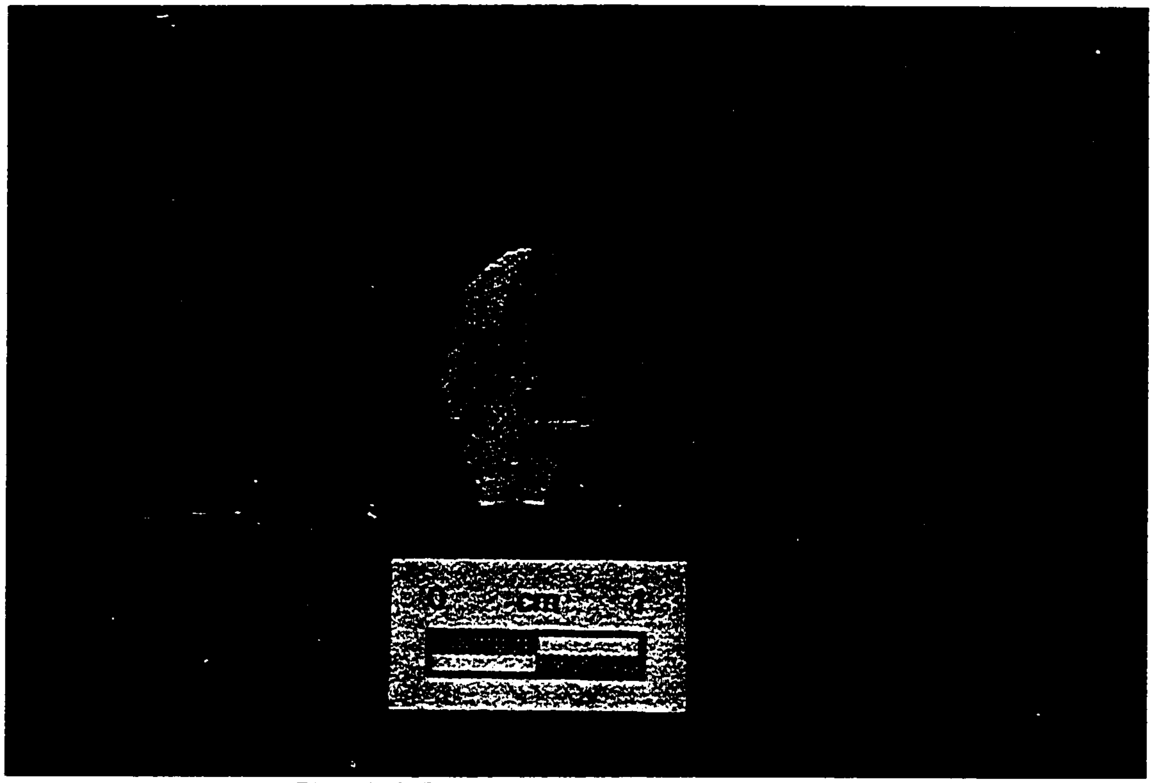

Plate 4.13: Proximal microblade fragment (#121).

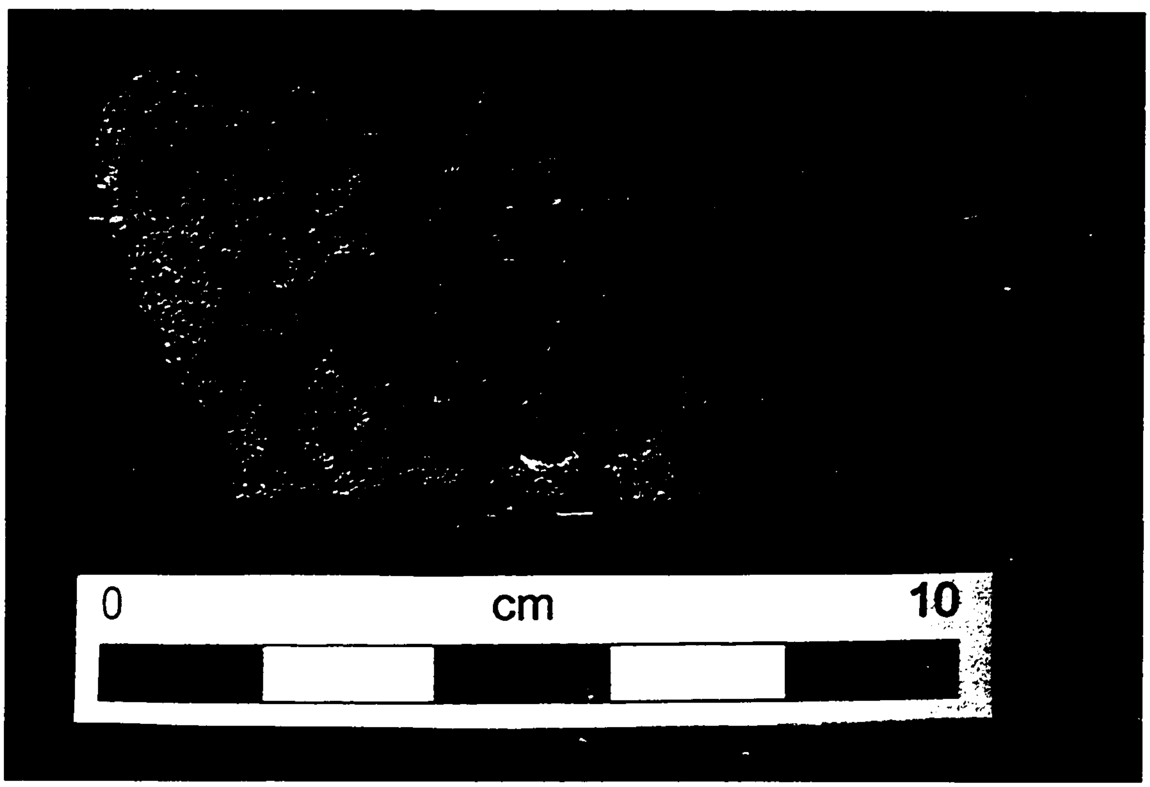

Plate 4.14: Sandstone abrader (#5).

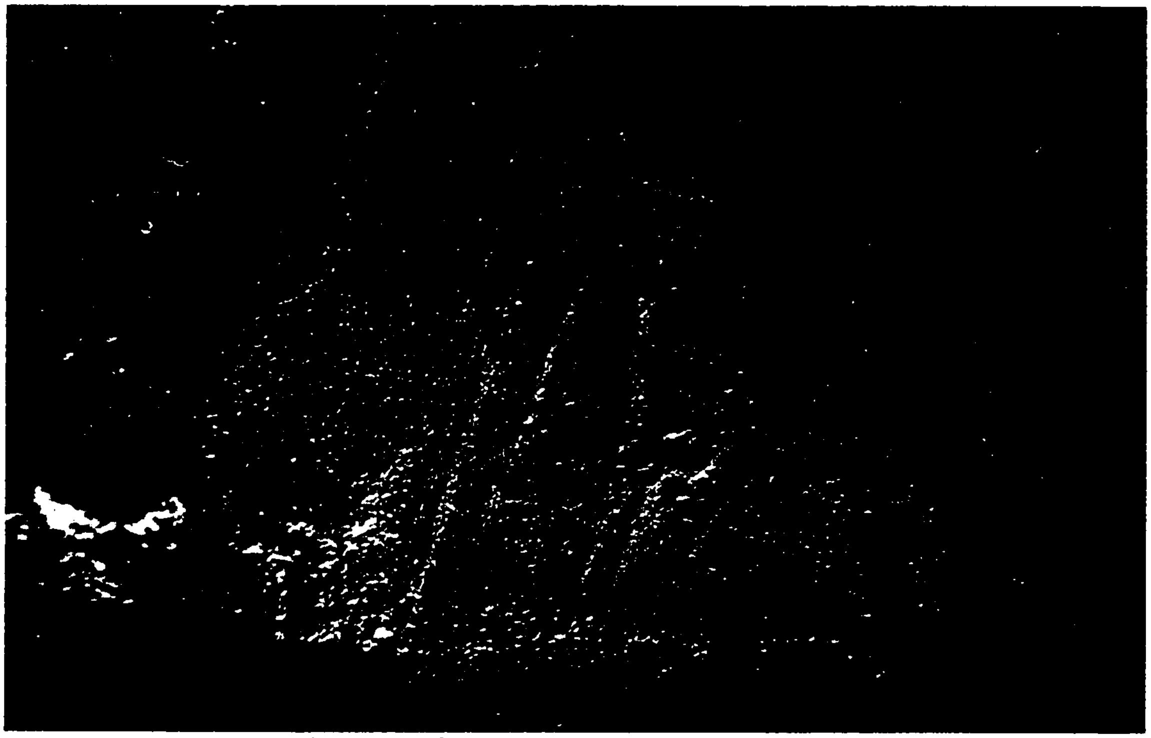

Plate 4.15: Close-up view of abrader (#5) striae.

Plate 4.16: Hammerstone / Abrader (#21).

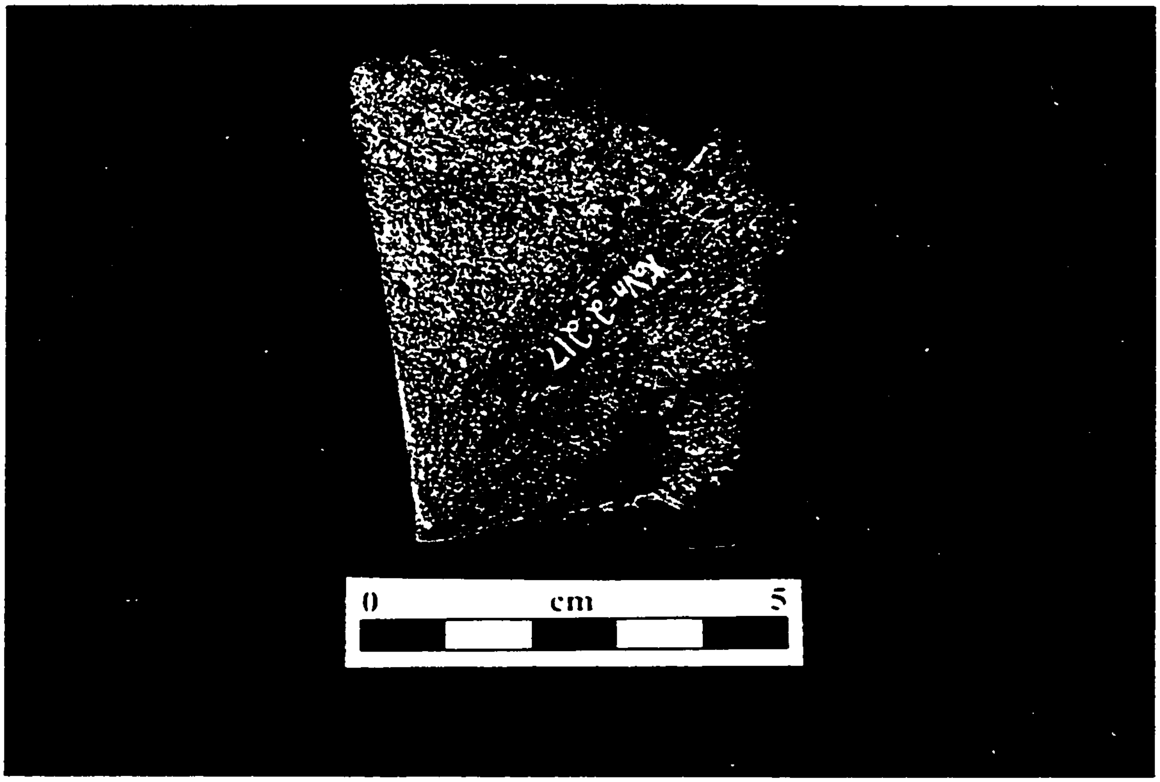

Plate 4.17: Side scraper fragment (#167, #217).

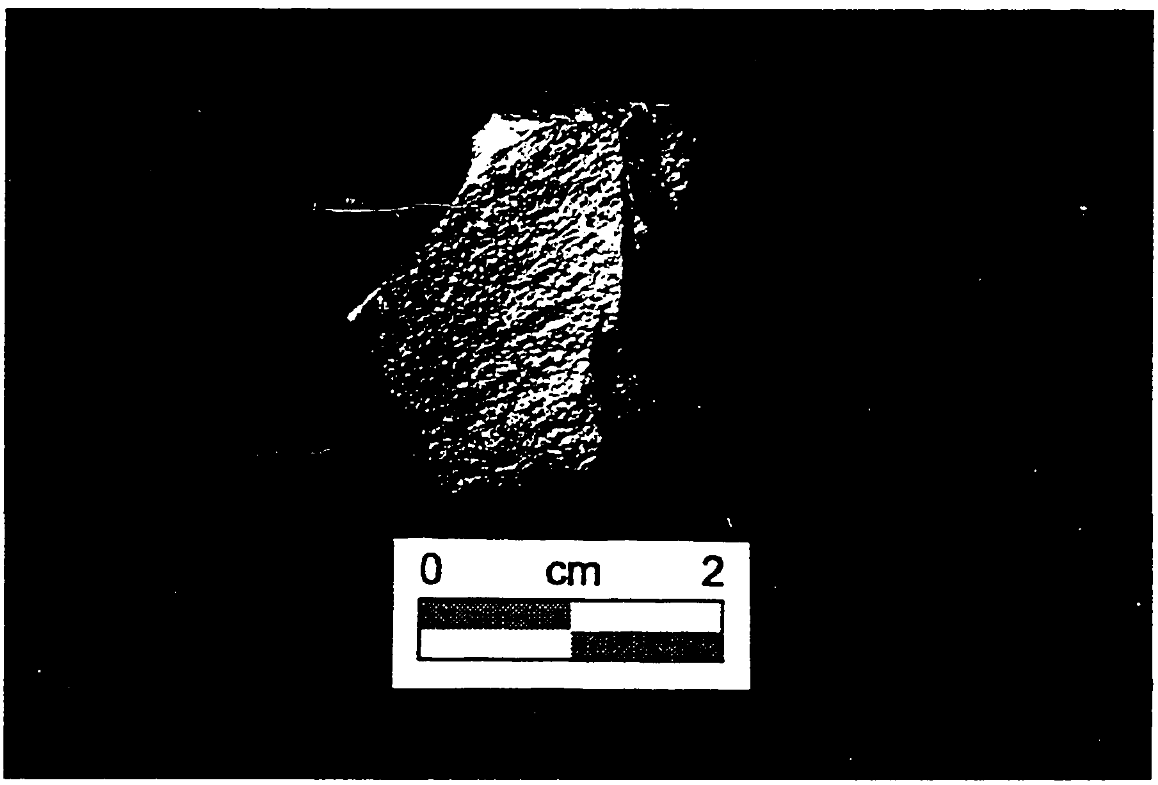

Plate 4.18: Endscraper (#100).

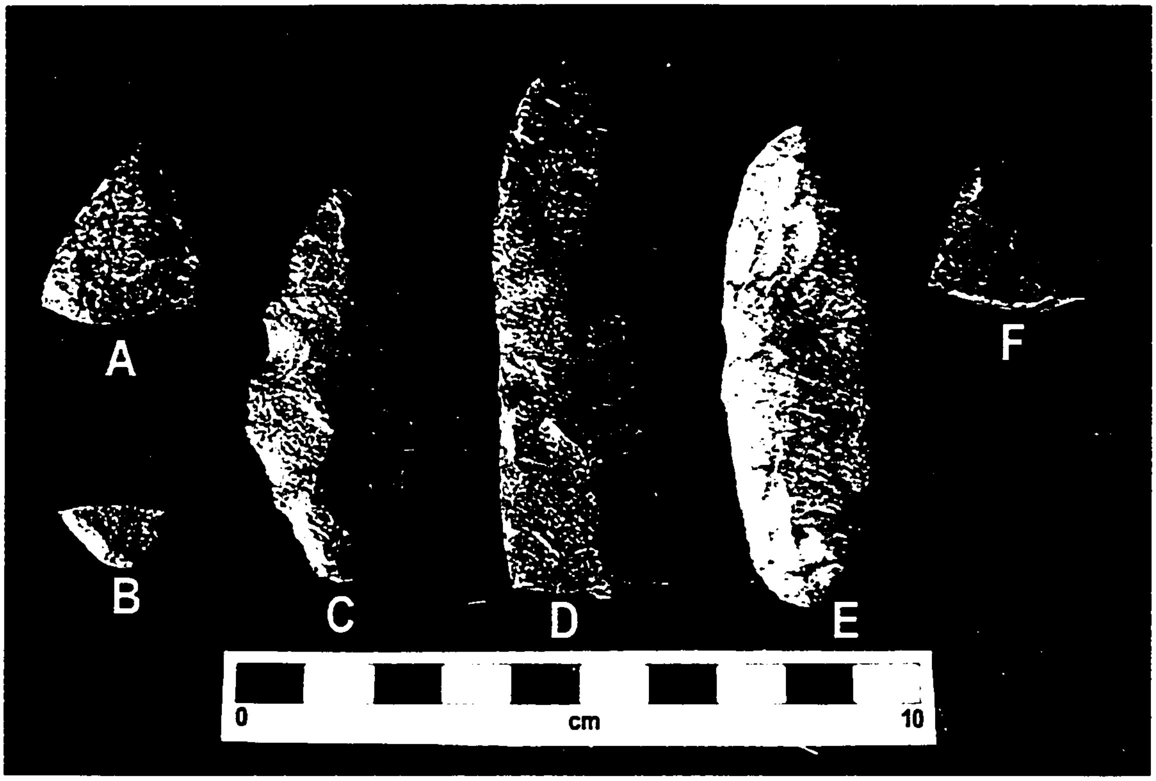

Plate 4.19: Projectile point, point fragments, and biconvex knives (A #44, B #46, C #8, D #41 and #45, E #7, F #52).

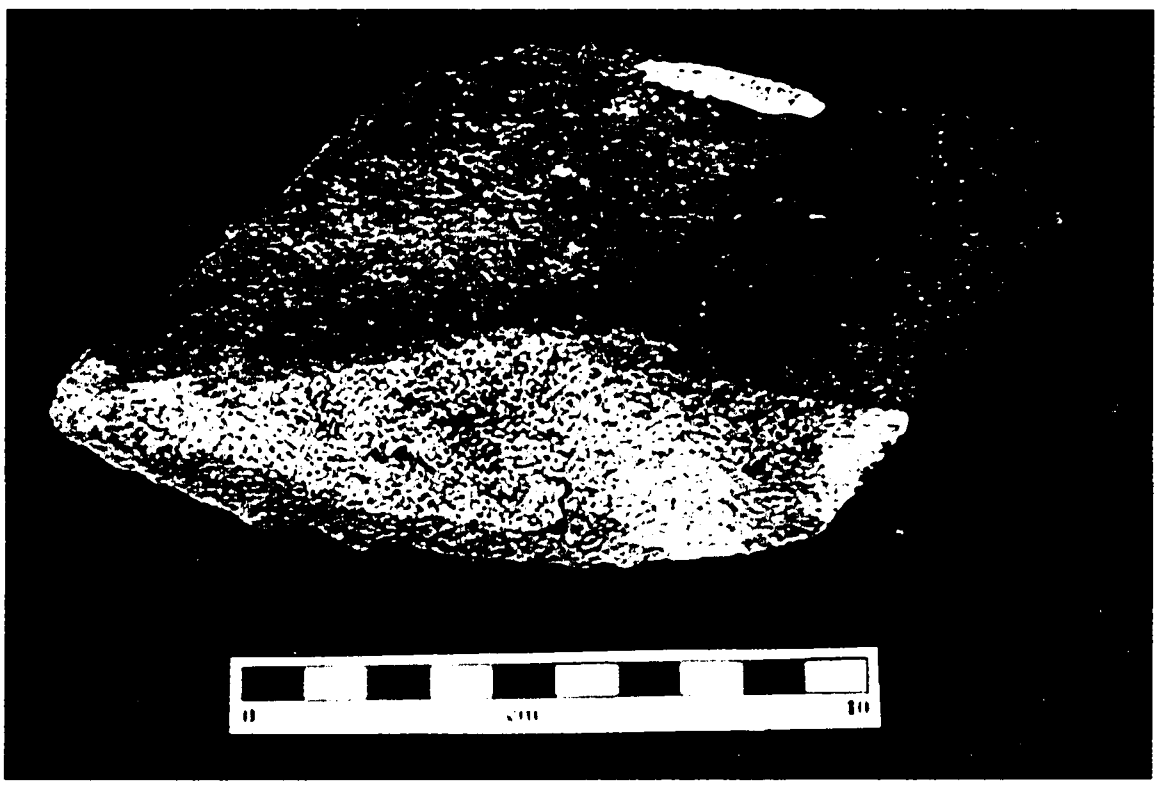

Plate 4.20: Plane (#22).

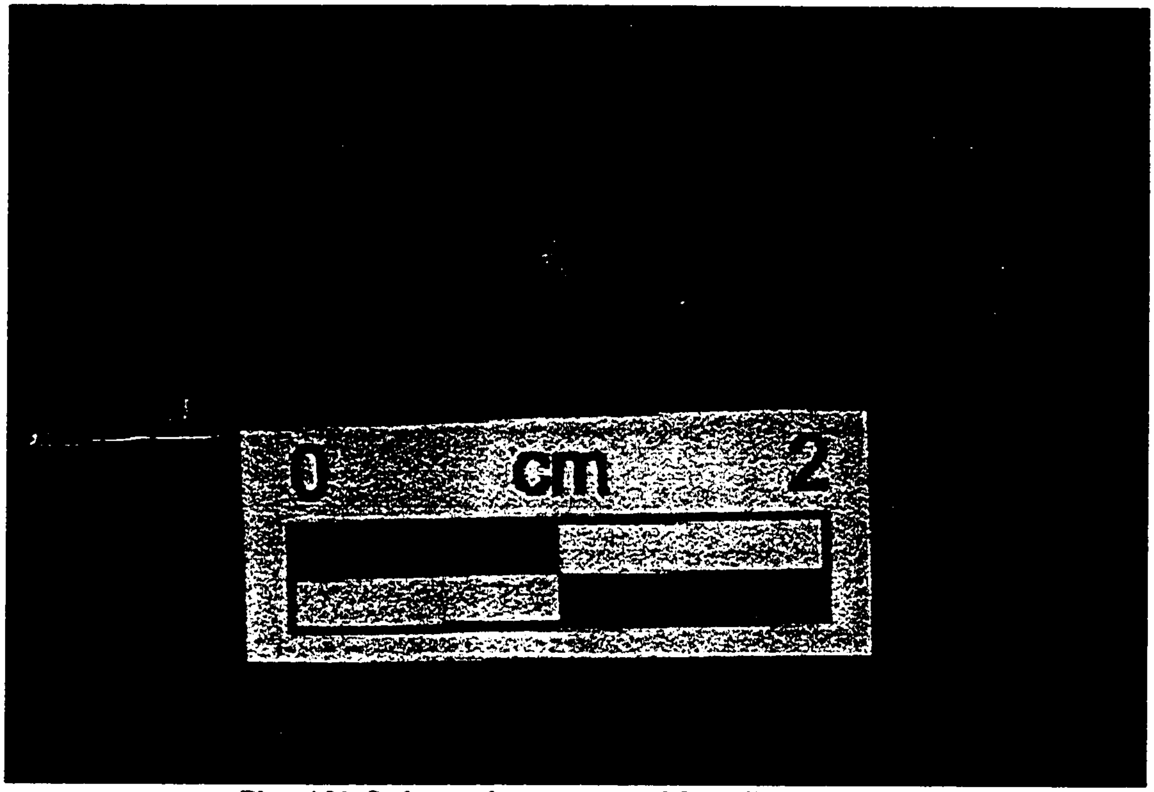

Plate 4.21: Saskatoon berry recovered from Unit W624, S5.

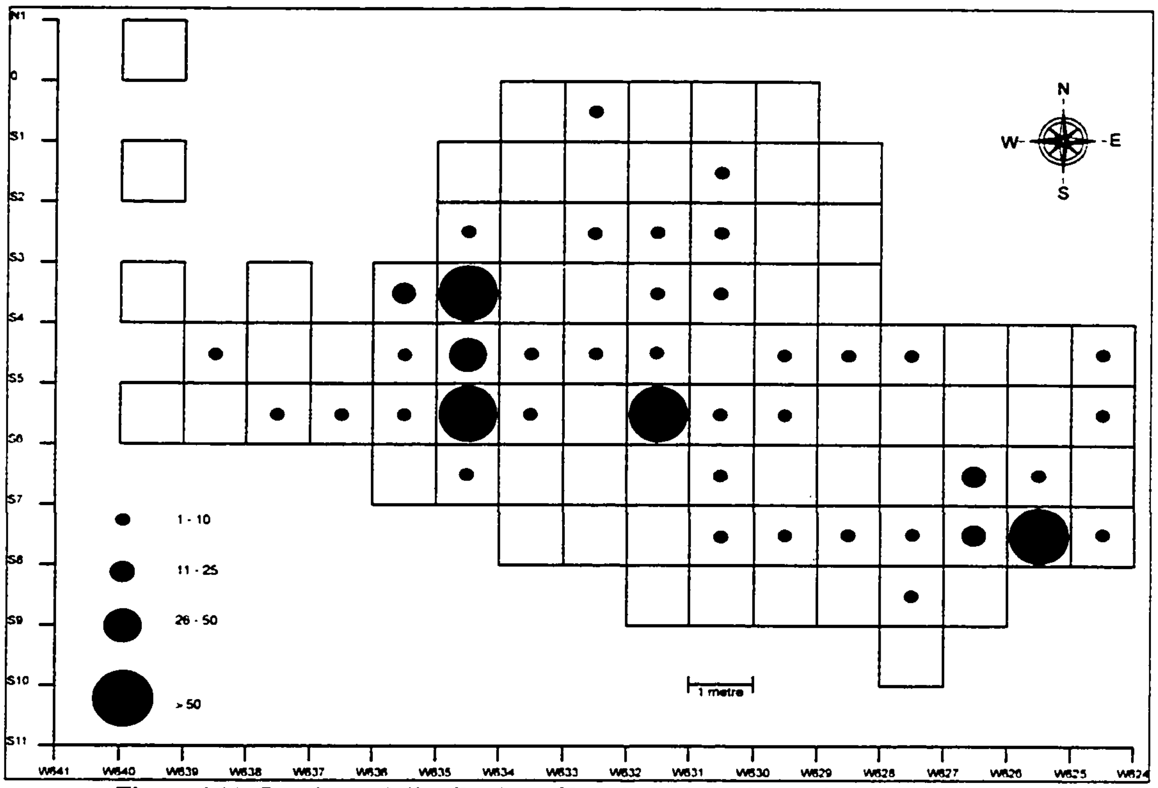

Figure 4.11: Density and distribution of basalt debitage in the Red - Brown Loess.

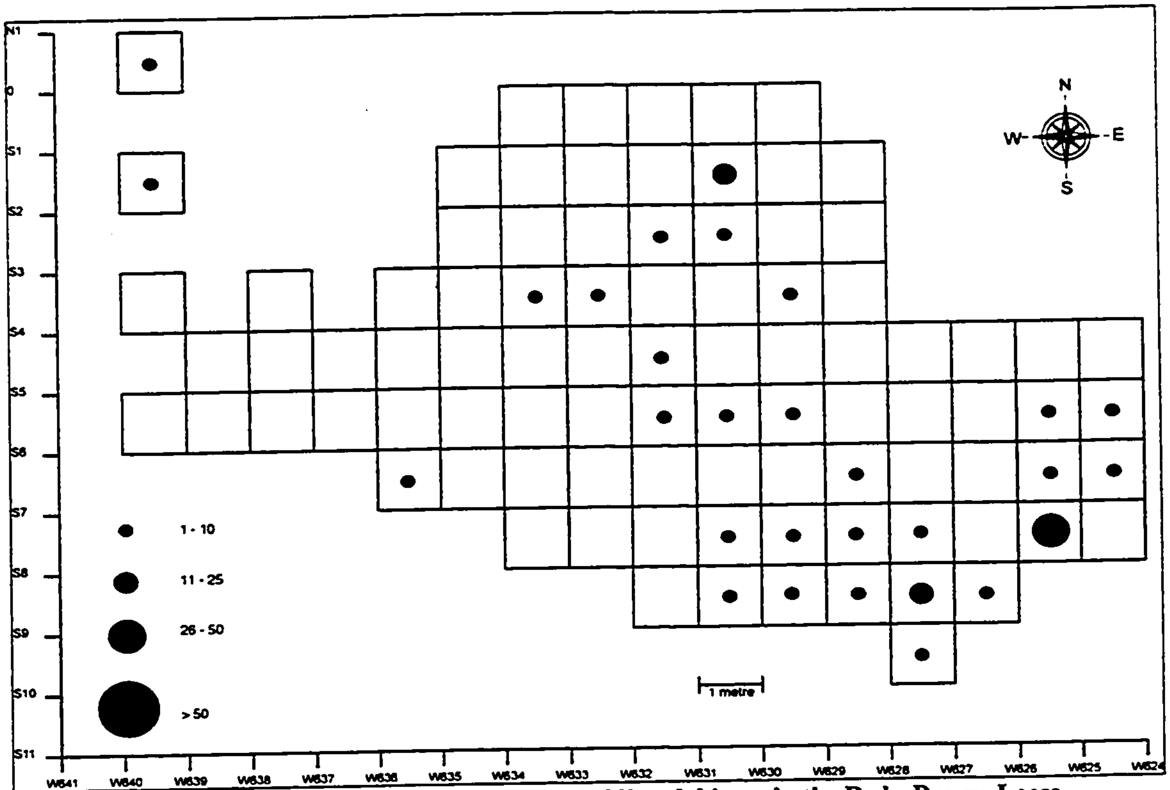

Figure 4.12: Density and distribution of obsidian debitage in the Red - Brown Loess.

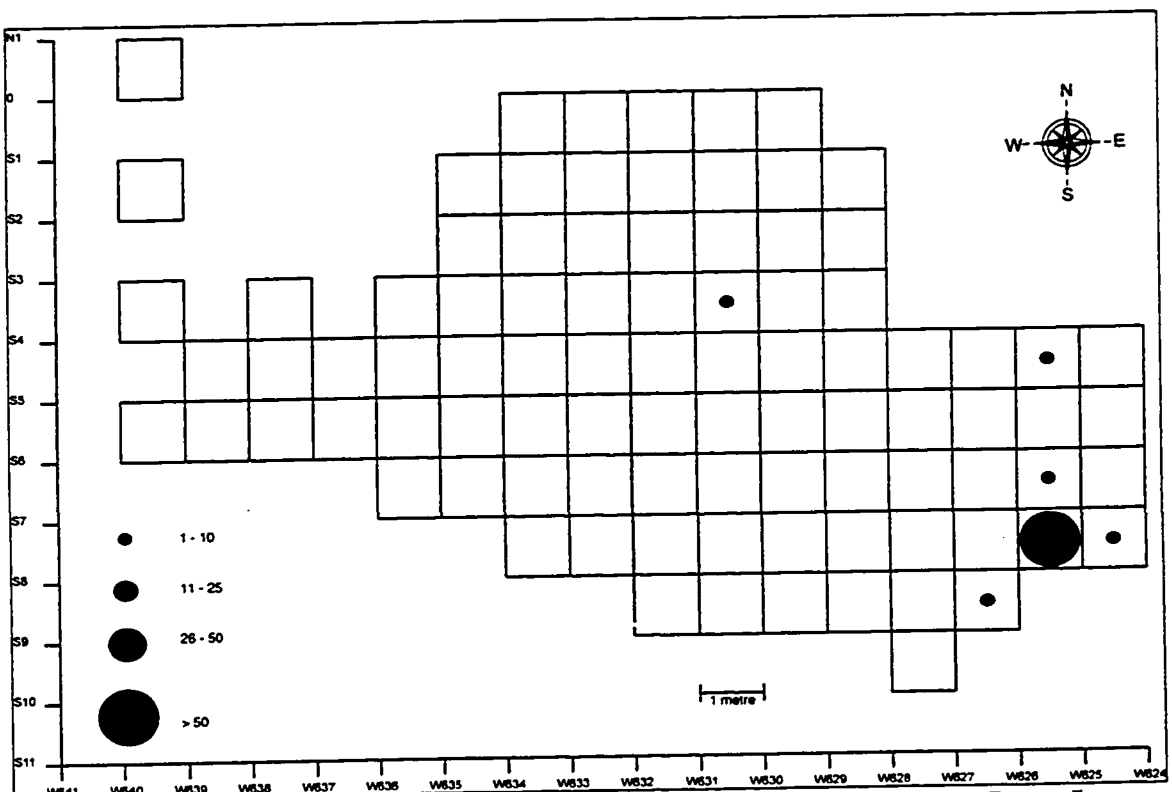

Figure 4.13: Density and distribution of light gray chalcedony debitage in the Red - Brown Loess.

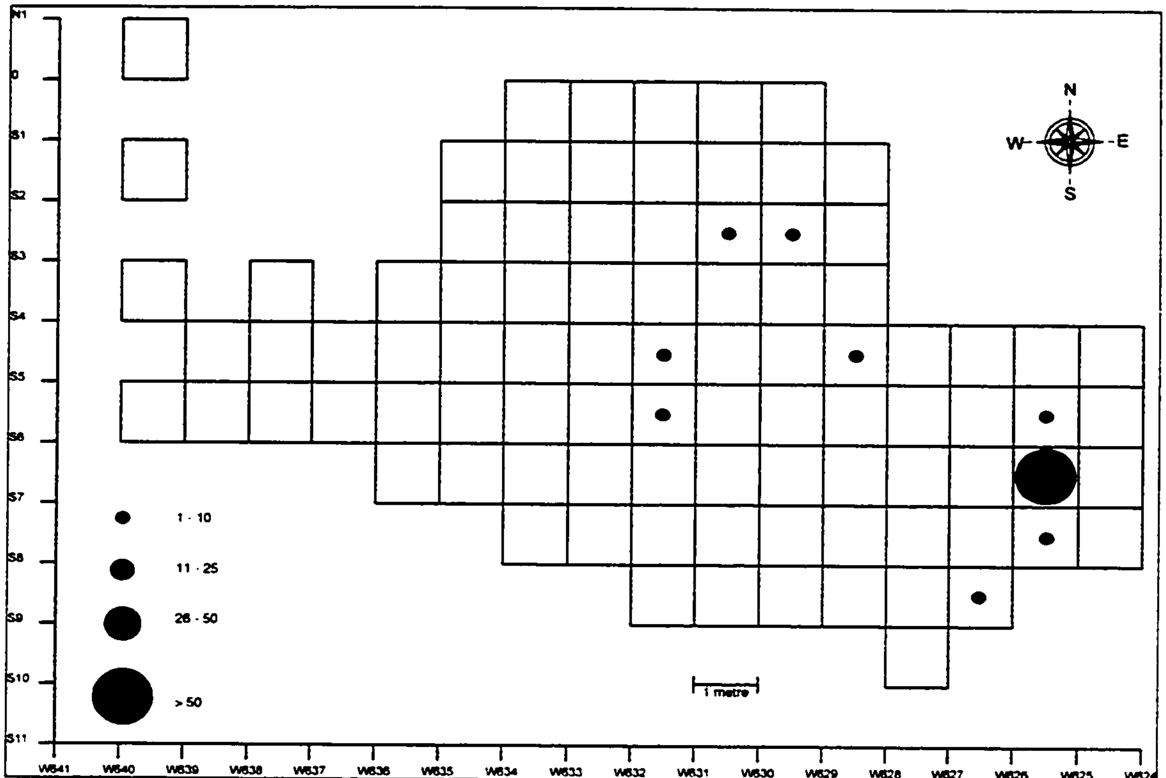

Figure 4.14: Density and distribution of black chert debitage in the Red - Brown Loess.

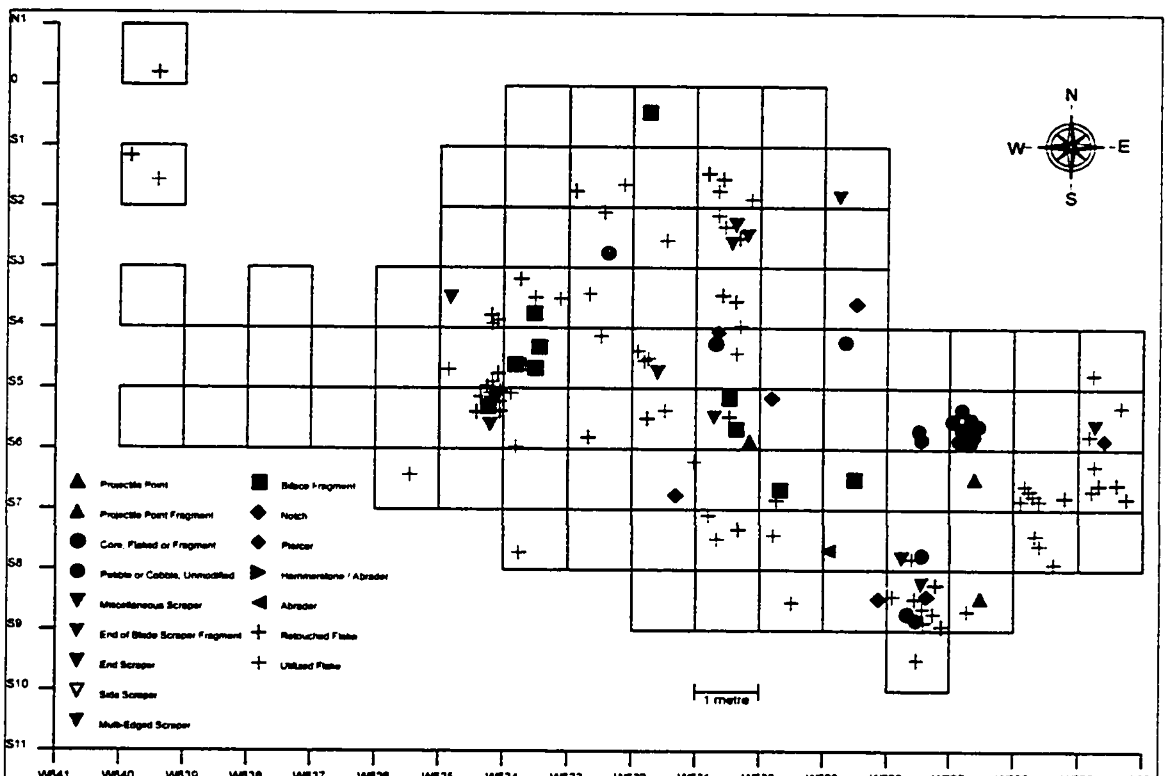

Figure 4.15: Distribution of modified artifacts in the Red - Brown Loess. Note that one utilized flake is not shown because of missing provenience.

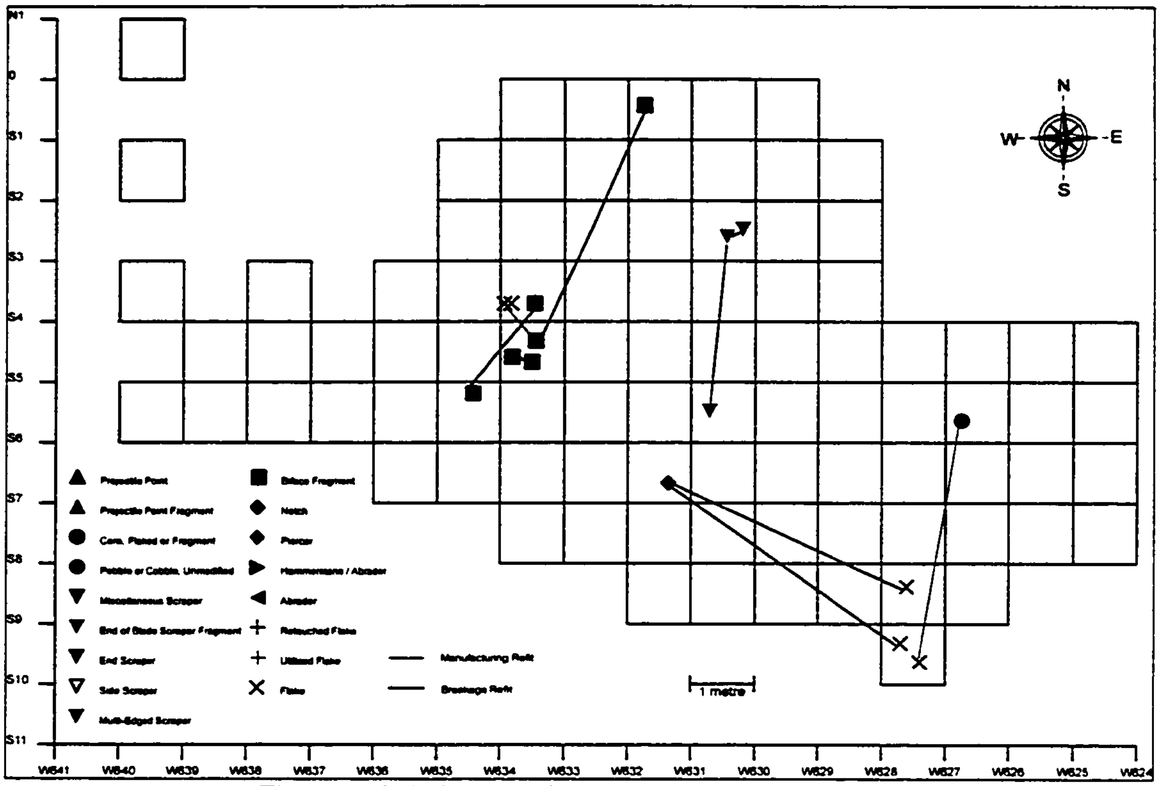

Figure 4.16: Refitted artifacts in the Red - Brown Loess.

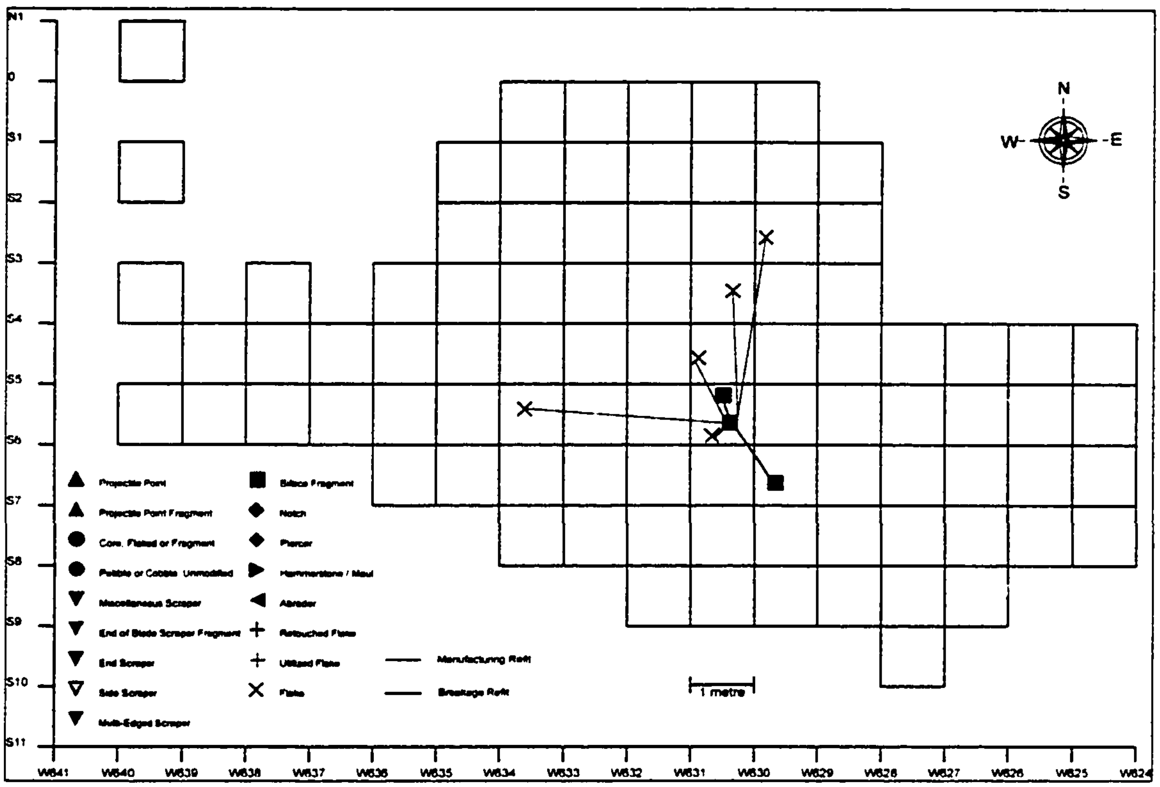

Figure 4.17: Refitted ovoid chert biface in the Red - Brown Loess.

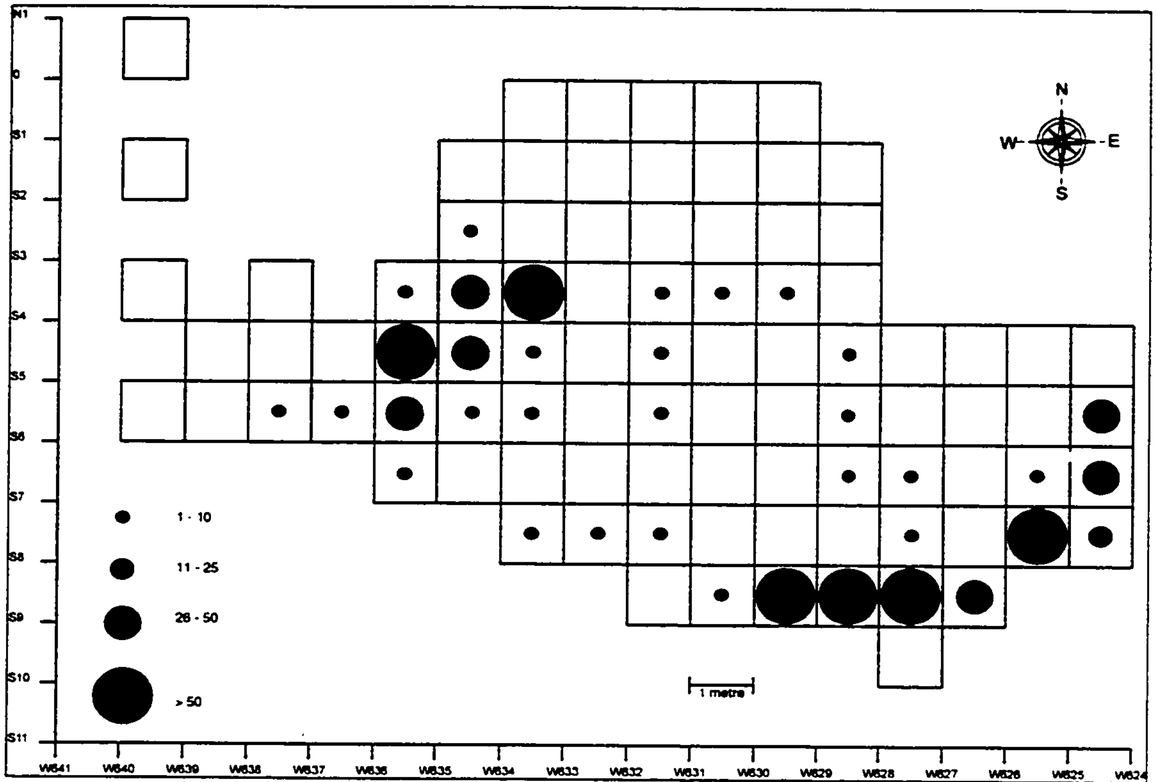

Figure 4.18: Density and distribution of all debitage in the Yellow - Tan Loess.

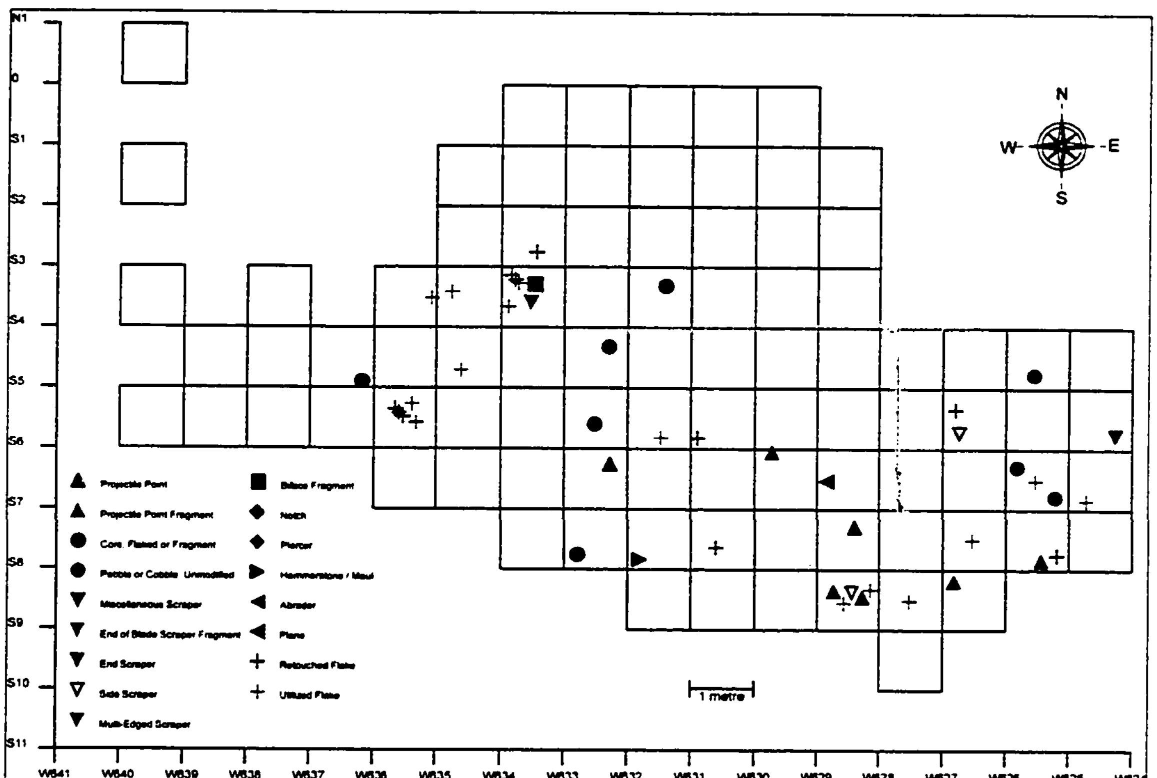

Figure 4.19: Distribution of modified artifacts in the Yellow - Tan Loess.

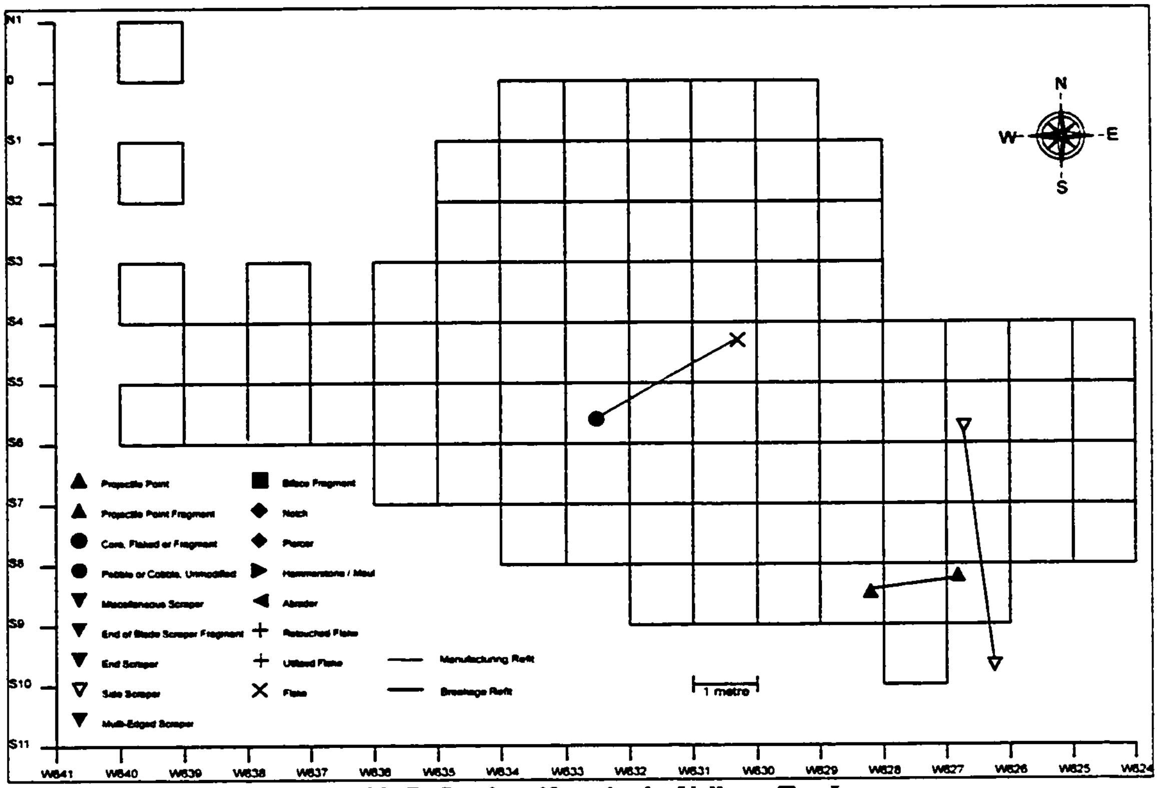

Figure 4.20: Refitted artifacts in the Yellow - Tan Loess.

CHAPTER FIVE

The Place of KaVn-2 in the Precontact Human History of Interior Northwestern North America.

5.1 Significance of KaVn-2

Archaeological site KaVn-2 is a currently unique occurrence in the archaeological record of northwestern North America. Not only does it date to the terminal Pleistocene, it is also positioned on the fringe of Eastern Beringia. Because of this spatial and chronological context, KaVn-2 occupies an important position in the precontact human history of interior northwestern North America. It represents the articulation point between the Pleistocene archaeology of glacially circumscribed Eastern Beringia and the postglacial Holocene prehistory of Yukon, northern British Columbia, and Alaska. In fact, KaVn-2 is the oldest known site in northwestern North America that was not a part of Beringia proper: it was located 1 km inside the maximum extent of ice during the last glaciation. This unusual situation makes the archaeology of KaVn-2 all the more significant in terms of its potential to elucidate the cultural history of the Pleistocene - Holocene Transition.

5.2 Interpretation of KaVn-2

5.2.1 Early Component(s)

The earliest traces of human use of KaVn-2 suggest that initial occupation occurred between 10,670 BP and 10,130 BP, about 500 years after the site location became ice-free at around 11,000 BP. Palaeogeography suggests that people came to the site from the north or east, since areas to the south and west were still covered in glacial ice. Artifactual remains are limited in diversity, are highly concentrated in the southeastern portion of the site, and appear to represent either a single occupation of the site or successive short-term occupations of the site during a brief time interval at the end of the Pleistocene. During this time period KaVn-2 was a sand ridge of glaciofluvial origin overlooking the meltwater scoured Shakwak Valley. Environmental conditions at the time must have been extremely dynamic, given the unstable nature of a landscape recovering from glaciation. Climatic warming was occurring, wind velocities reached their highest, and vegetation was characterized by a birch-shrub tundra. Since few faunal remains were recovered from this cultural layer and none were identifiable, it can only be speculated that the surrounding tundra provided caribou habitat and that the presence of this significant resource attracted people to the site. The sand ridge may have been one of the few high, dry, flat locations suitable for human occupation in the immediate vicinity. These properties, coupled with the excellent vantage point provided by the ridge, made KaVn-2 a useful hunting lookout. Additionally, the topographic control created by the trench may have funneled caribou through the valley below the site. Artifactual remains of the occupation(s) also suggest use as a seasonal hunting lookout. Artifact types are dominated by a relatively high frequency of specialized hunting tools (i.e., projectile points) and general purpose expedient tools (e.g., scrapers and utilized and retouched flakes). Accepting the ethnographically and theoretically derived land use model presented in Chapter 3, the physical properties of the site and its environmental context also suggest use as a logistical summer hunting field camp (in the sense of Binford 1980, 1982, 1983, 1990). Spatially, the site seems to have been organized so that the southeastern corner of the ridge was a lookout and special activity area and the area back from the edge of the ridge was a residential or general purpose activity area. This type of spatial organization is consistent with a hunting field camp site function.

Technologically, the artifacts from this assemblage can be seen as intermediary between the Nenana Complex or Northern Cordilleran Tradition and the Denali Complex or American Palaeo-Arctic Tradition. The KaVn-2 lanceolate point is so similar to the base of a point from the contemporary Nenana Complex Moose Creek site that they are probably related. Similarly, the KaVn-2 plane tool shares morphological characteristics with planes from the Nenana Complex components at Whitmore Ridge (West *et al.* 1996: 393), Dry Creek (Hoffecker *et al.* 1996: 349, fig. 7-8t), and Walker Road (Goebel *et al.* 1996: 362). A complicated scenario is presented by the occurrence of bipoints at KaVn-2. These bipoints or biconvex knives are similar to one from the Denali Complex component at Dry Creek (Hoffecker *et al.* 1996: 351, fig. 7-10k). Similar artifacts termed foliate bifaces or elliptical knives, however, are also found in the Old Cordilleran Culture or Pebble Tool Tradition of British Columbia, that archaeologists there see as being related to the Nenana Complex of Alaska (Carlson 1996a). Additionally, based on their occurrence at KaVn-2, Yukon archaeologists (i.e., Hare 1995) have added this type to the trait list of the Northern Cordilleran Tradition. Apparently these bifaces are widespread in northwestern North America, where they are temporally restricted to early archaeological manifestations. This property, along with their occurrence in the early component at KaVn-2 in association with diagnostic Nenana Complex artifacts lends support to the Eastern Beringian Tradition as the most appropriate cultural historical classification for early sites in interior northwestern North America. The Eastern Beringian Tradition posits that the Nenana and Denali Complexes of Central Alaska, and by extension the Northern Cordilleran Tradition and American Palaeo-Arctic Traditions as well, are technologically related and that assemblage differences in early archaeological sites can be better explained by site location, site function, and site seasonality. The early component at KaVn-2, given its lack of microblade technology, then, is probably more closely related in terms of location, function, or seasonality to Eastern Beringian Tradition archaeological sites that have traditionally been affiliated with the Nenana Complex.

5.2.2 Later Components

After a hiatus of nearly 3,000 years, after 7,800 BP, the site was occupied periodically over a span of 6,000 years, or until about 1,900 BP when Mount Bona erupted and the site became covered by the distinctive White River Ash. Characteristics of the artifact assemblage during this later time interval support the suggestion that these later occupations were ephemeral and infrequent. The lithic assemblage resulting from these occupations, although greater in diversity than the earlier component, contains about the same number of artifacts. Consideration of the vertical provenience of artifacts in the upper components and comparison of artifact types to nearby regional culture histories suggests that occupations occurred numerous times during those 6,000 years. Although no indisputably diagnostic artifact types were represented in the assemblage, many of the artifact types have relatively limited (spatially and / or temporally) distributions that suggest occupations of the site during each of the major recognized mid-Holocene cultural historical divisions. Clear examples include the microblade fragment that, given its vertical provenience, indicates a Little Arm Phase occupation of the site and the side-notched point base that is clearly affiliated with the Northern Archaic Tradition and the Taye Lake Phase of southwest Yukon prehistory.

During these later occupations, KaVn-2 was similarly organized into two areas, a lookout or special purpose activity area at the break in slope, and a residential or general purpose activity area away from the edge of the ridge. The ethnographically and theoretically derived land use model developed in Chapter 3 can be more confidently applied to this component of the site since environmental conditions were probably relatively similar during the times of occupation. KaVn-2 was probably a logistical summer hunting field camp (in the sense of Binford 1980, 1982, 1983, 1990) during most, if not all, episodes of human occupation.

5.3 Conclusion

Culture history in northern archaeology is constantly evolving as new sites are discovered and as old hypotheses are reevaluated in light of the new data. In this thesis I have tried to present the data obtained from my research at KaVn-2 in such a way that future researchers can use it as a comparative resource for their own archaeological investigations. Undoubtedly, some of the ideas and conclusions presented in this thesis may be questioned and the data may be reevaluated. Such is the nature of scientific inquiry and our understanding of northern archaeology will only benefit from those endeavours.

At present, the early component at KaVn-2 can best be interpreted within the framework of the Eastern Beringian Tradition. This cultural historical classification allows for the interpretation of assemblage variability within a broad framework of technological relationships. The separation between the Nenana and Denali Complexes of central Alaska has been a temporal one – the sites of these complexes overlap spatially and sometimes occur in close proximity. With the recent discovery of microblades at the Swan Point site in a context that is as old as, or older, than nearby Nenana Complex sites, these two complexes must now be seen as coeval and as parts of a greater technological tradition, namely the Eastern Beringian Tradition. Archaeological research into the early archaeology of interior northwestern North America must now go beyond the level of culture historical classification and attempt to determine the relationships between site location, function, and seasonality and the ways in which these factors condition the archaeological record and create dichotomous lithic assemblages in nearby and contemporary archaeological sites.

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