FISHING STATIONS AND THE LOW COUNTRY:
A CONTRIBUTION TO HUDSON BAY LOWLAND ETHNOHISTORY

By

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ABSTRACT

The Hudson Bay Lowland - often referred to in fur-trade records as the "low country" - has been the subject of much research within the natural sciences; however, research pertaining to the region's human history and ecology is not as well advanced. This study employs ethnohistorical methodology integrating ethnographies, exploration literature, fur-trade records, archaeological data, and Native advisor consultations in an attempt to elucidate culture history and patterns of Native occupation within the Lowland region.

Hudson's Bay Company fur-trade journals, reports, and maps indicate that within the Lowland the Indian population harvested fish at "fishing stations" where "weirs" were constructed, maintained, and operated. Fur-trade records in combination with information provided by Native advisors illustrate that fishing stations were operational on a year-round basis and that fish played a significant role within Native economic strategies. Based upon an 1815 Severn District report and accompanying maps, recorded fishing station locations were identified on the Shamattawa

River and at the southern junction of Spruce Lake and the North Washagami River. Activity areas at these fishing station locations yielded evidence of substantial occupation over time and space and they provided insight into economic strategies and adaptations.

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CHAPTER ONE

AN INTRODUCTION TO THE PROBLEM AND RESEARCH STRATEGY

> Our understanding of the past is dependent upon the integration of diverse approaches (Janes 1983:3).

> ... if ethnohistory is itself a method or technique, it is one which makes use of a number of other methods (Gadacz 1982:150).

Fundamental to the study of Native history is the researcher's perspective on what constitutes history and historical data. The two are interrelated in that history is based upon the interpretation of historical data and one's view of history determines the type of data to be studied; the sources of data, in turn, are the limiting factors in historical method and analysis. As such, it is prudent to delineate this study's predisposition toward history which is a view of history firmly anchored in an anthropological foundation.

In the context of this study, Amerindian history is not limited to that portion of the past documented by written sources of data (see discussion in Dymond

1974:50-74) and it rejects the notion that prior to European contact the Amerindian was "without history" (see discussion in Trigger 1987:6; Wolf 1982). Native history is concerned with the events, structures, and processes inherent throughout the entire past and the European presence is viewed as a graft on to what Calvin Martin (1987:12) has called an "older history." Given the premise that Amerindian history not only includes but predates a European presence, then along with written data, archaeological data and various other sources of information have significant roles to play in the interpretation and understanding of Native history. This diversity in the use of historical resources is inherent in, and fundamental to, ethnohistorical methodology within an anthropological context.

In Axtell's (1982:5, 15) terminology, ethnohistory is a blending of history and anthropology into a "distinctive hybrid" with the purpose of producing the "... diachronic dimensions of history and the synchronic sensitivities of ethnology." The salient characteristic of ethnohistorical methodology is its reliance upon a diversity of data sources (Axtell 1982:8; Schwerin 1976:327; Spores 1980:576; Trigger 1978:19, 1982:16, 1985a:34), such as written documents, ethnographic and archaeological data, oral history, and linguistics. When these sources are measured and integrated under an historiographical umbrella they contribute to a holistic anthropological synthesis of cultural reconstruction and explanation.

Much ethnohistory, as noted by Trigger (1978:18, 1982:2, 1985a:23, 1985b:166, 1986:257), has focused upon written documents and oral traditions in analyses intended to elucidate culture change since the time of European contact. Archaeological methods and techniques, however, are of equal value to ethnohistorical methodology as archaeology is fundamental to studies of cultural continuity and change during the initial years of European contact (see discussions in Morantz 1984:72; Trigger 1978:21, 1982:13, 1984:20, 1985a:28, 1985b:116, 118, 163, 171-172, 1986:260), to understanding the course of Native history prior to European records, and to providing concrete or real evidence of past human behaviour as compared to the "always suspect accounts" furnished in written documents (Morantz 1984:69). With respect to the last point, and similar to the view pertaining to the value of ethnographic fieldwork within ethnohistorical studies expressed by Rogers and Black Rogers (1982:169-170), archaeological data provide comparative material and contexts for the interpretation of written documents.

Within the ethnohistorical method, archaeology - including those methods subsumed under the title of ethnoarchaeology (for discussions and views on ethno-archaeological method, theory, and practice see Binford 1978b; Charlton 1981; Gould 1980; Hodder 1982; Janes 1983; Kent 1987; Kolb 1985; Kramer 1979; Stiles 1977; Yellen 1977) - is not ancillary to more "traditional" forms of historical data, but archaeological data is fundamental to an under-standing of Native history within its own context (for a discussion of cultural context and archaeology see Hodder 1986:77-102, 118-146, 1987).

Ethnohistory, therefore, is a methodology that seeks to integrate the techniques of history and anthropology. Ethnohistorians recognize the inherent weaknesses of written documents begotten through the observations of foreigners; thus, with a mind-set acknowledging the dynamic nature of Native cultures throughout time, the methodological advantage of using diverse sources becomes axiomatic. As Trigger (1985b:166) points out, ethnohistory is a "set of techniques" the integration of which is necessary for reconstructing and explaining the long-term history of those who did not leave written records of their own past.

This study employs ethnohistorical methodology integrating ethnographies, exploration literature, fur-trade records, archaeological data, and Native advisor consultations in an attempt to elucidate culture history and patterns of Native occupation within the Hudson Bay Lowland region of northern Ontario (Figure 1).

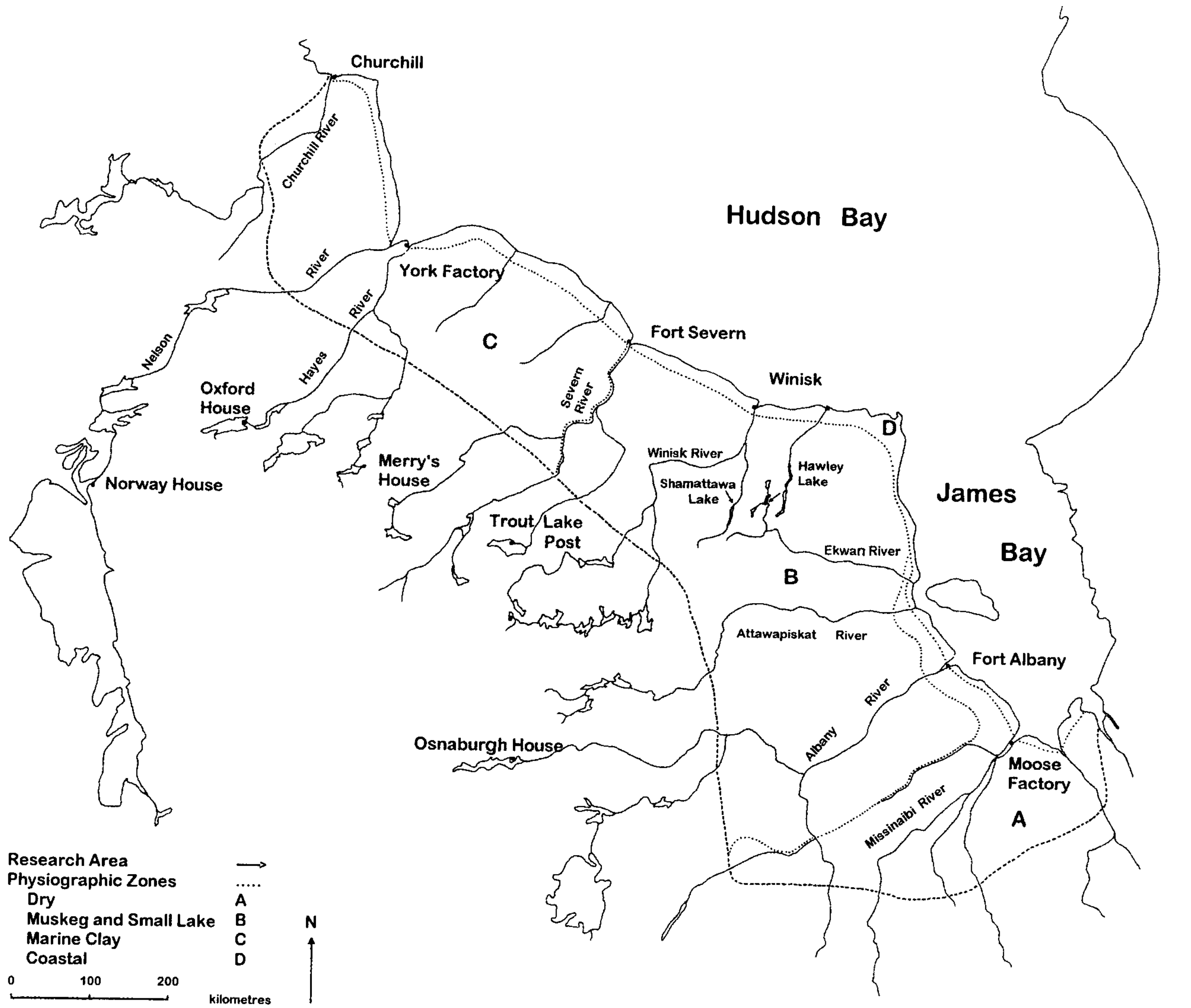
The Hudson Bay Lowland - often referred to in fur-trade records as the "low country" - has been the subject of much research within the natural sciences (for extensive bibliographies refer to Haworth et al. 1978; Norris et al. 1968; Sims et al. 1979); however, research pertaining to the region's human history and ecology is not as well advanced. The invaluable records of the Hudson's Bay Company provide a wealth of data pertaining to Native-European relations, Native demography, and Native social and economic adaptations, but to date historical research addressing such issues within the Lowland has been sparse. As well, Hudson's Bay Company records relating to the Lowland region remain largely unpublished apart from a few noted manuscripts by such writers as James Isham (1949) and Andrew Graham (1969). Similarly, ethnographic studies among Lowland Natives have not been extensive although significant contributions have been provided through field studies conducted among the Attawapiskat Cree (Honigmann 1956, 1961), the Fort Severn Cree (Hurlich 1976), the Fort Albany Cree (Skinner 1911), and the Winisk Cree (Trudeau 1966). Archaeological studies conducted at fur trade sites, such as Fort Albany (Kenyon 1986) and Fort Severn (Christianson 1980; Pilon 1987), have assisted in the documentation of the fur trade period, but the pre-European

Figure 1

Hudson Bay Lowland

Physiographic Zones are taken from Coombs (1954).

Hudson Bay Lowland



period remains sketchy. Northeastern Ontario archaeological research in general has not been extensive (see overview of research in Dawson 1984; Noble 1972, 1982a) and in particular archaeological research within the Hudson Bay Lowland is a relatively recent endeavour. Therefore, the current picture of the Lowland's cultural-chronological history is far from complete (for a cultural-chronological sequence of the height of land region to the south see Noble 1982b).

Prior to the findings of relatively recent archaeological research (post-1972) the general thinking among historians and anthropologists was that the region was largely devoid of a human presence during the pre-European period (Bishop 1972:66; Dawson 1983:55; Ray 1984:7-8; Rogers 1967a:84; Wright 1972a:33). Evidence of pre-contact occupation within the Lowland was limited to the isolated finds of two Blackduck ceramic rim sherds found at the mouth of the Nelson River by Dr. Robert Bell of the Geological Survey of Canada (Wright 1968:66) and to one Selkirk ceramic rim sherd found at the mouth of the Hayes River by Kenneth Dawson (Dawson 1976a:79). In 1962 and 1966 the first archaeological surveys within the Lowland were conducted by Dawson (1976a:79) along the lower reaches of the Albany and the Hayes Rivers. However, with the exception of the Selkirk ceramic rim sherd found at the mouth of the Hayes

River, Dawson located no evidence of pre-contact settlement. A 1976 northern Manitoba survey conducted by Wood and Trott (Wood et al. 1976) along the Tyrrell Sea Beach between the Churchill and the Nelson Rivers also uncovered no evidence of pre-European occupations, and based upon their negative data the Lowland was labelled a "demographic vacuum" (1976:41). Dawson (1983:55) concurs with this opinion by stating that the Hudson Bay Lowland "... appears to have been virtually unoccupied in prehistoric times..." although he would agree - based upon an earlier paper (1976a:79) - that the region may have been subjected to seasonal visits.

In this vein, it is argued by Bishop (1972:66, 1984:31), Dawson (1976a:79), and Ray (1984:7) that specific resources, such as geese that were seasonally concentrated in the coastal region, were exploited during the summer months with the foragers moving to the more sheltered and resource secure Shield uplands for the winter period. In these arguments the interior region of the Lowland - that area between the Coastal Zone and the Shield (Figure 1) - is treated as a wasteland to be avoided apart from the need to travel through it in order to "get somewhere else" (Wood et al. 1976:34). The assumption that the Lowland was a harsh environment with resource paucity influenced the view that the region was unattractive for occupation, or at best its appeal was seasonal. The adaptive strategy was altered, it is argued, with the establishment of European trading posts on the Hudson and James Bay coasts: Native hunters were employed by the Hudson's Bay Company during spring and fall geese migrations and the need to take full advantage of this resource on the traders' behalf prolonged the Natives' annual stay in the coastal region which influenced a change in the pre-contact adaptive strategy and led to the permanent occupation of the Lowland (for a discussion of relationships that developed between the Natives and the trading posts see Preston 1975a:327-330 and Russell 1975).

A major breakthrough came with Tomenchuk's and Irving's (1974) 1972 investigation of a late pre-contact site located west of Cape Henrietta Maria on the western bank of the Brant River in the Lowland's coastal zone. This site, which is referred to as the Brant River Site Number 2, included lithic, ceramic, and faunal remains and on the basis of recovered goose bones the site is considered to represent a warm-weather occupation. The Brant River Site Number 2 represents the first significant evidence of pre-European occupation in the Lowland.

In 1974, the inventory of sites was substantially increased by the important work of Pollock and Noble (Pollock 1974; Pollock and Noble 1975). Working within Polar Bear Provincial Park, along the Sutton River, and at Hawley Lake a total of seventeen pre-European and post-European sites were uncovered. The latest sites were located within Polar Bear Provincial Park and along the Sutton River. One site, located within the Park and referred to as the Cache site, is attributed to the late pre-European period while two sites, situated along the Sutton River, date to the post-1900 A.D. period. Hawley Lake (Figure 1) - situated within the Sutton Inlier - was the source of the remaining fourteen sites. The Hawley Lake sites all date to the pre-European period and it is these sites that first established evidence of more than casual pre-European occupations within the Lowland.

In addition to the significant number of sites found, Pollock and Noble were also able to furnish the first radiocarbon dates for the Lowland establishing a cultural-chronological sequence beginning by the end of the first millennium A.D. From a charcoal sample the Hawley Lake site yielded a date of 915 A.D. ± 100. Taking into consideration the nature of the lithic remains and the absence of ceramics the site has been attributed to the late Shield Archaic tradition. The Cowell site yielded two dates: 1410 A.D. ± 95 and 1240 A.D. ± 80. The material remains, which include five ceramic sherds attributed to early Selkirk or late Blackduck traditions, indicate a late pre-European Algonkian representation. Finally, the Cache site, located within Polar Bear Provincial Park and comprised of six subterranean caches, produced a date of 1590 A.D. ± 80 suggesting a late pre-European occupation (W.C. Noble personal communication 1996). With these sites, and especially due to the acquisition of four radiocarbon dates, Pollock and Noble were able to formulate a cultural-chronological sequence for the Hawley Lake area thereby providing a foundation for future work in the Lowland as a whole.

Julig (1982), in 1981, conducted an archaeological survey along the lower reaches of the Albany River and he was convincingly successful in documenting pre-European occupations. His work, therefore, effectively refuted the results of Dawson's earlier survey. From a total of 21 sites, Julig recorded four Archaic, two Initial Woodland, one Terminal Woodland, fifteen unknown pre-European, and seven post-contact components. The Archaic components were identified on the basis of diagnostic lithic artifacts. The Woodland components were identified on the basis of ceramic attributes with nine laurel-like ceramic sherds (Initial Woodland) and one undifferentiated Terminal Woodland sherd represented. Unfortunately, Julig was unable to support his identifications with radiocarbon dates; nevertheless, his findings on the lower Albany River provide evidence of pre-European occupations in an area where it was previously suggested no such evidence existed.

In the more northerly region of the Lowland, during the summers of 1981, 1982, and 1983 Pilon (1987) conducted extensive archaeological surveys along the lower Severn and Sachigo Rivers. A total of 20 sites were discovered representing 14 post-European and 17 pre-European components. On the basis of typology, stratigraphy, and radiocarbon dates, Pilon constructed a cultural-chronological sequence for the lower Severn River that includes late Shield Archaic, Initial Woodland, Terminal Woodland, and post-European manifestations with the sequence commencing around the beginning of the first millennium A.D. Seven charcoal samples submitted for radiocarbon analysis dated associated components to the post-1000 A.D. period; components assigned to the first millennium A.D. were determined by reference to typology and stratigraphy. In addition to pre-European lithic, bone, antler, and native copper artifacts a small sample of ceramic sherds representing Laurel and Blackduck traditions were recovered.

On the basis of faunal remain analysis Pilon explicates a settlement pattern along the lower Severn River that was oriented to the movements of caribou: warm-weather months were spent in the coastal zone taking advantage of a variety of resources - including caribou - whereas for the cold-weather months of the year foragers moved inland following the caribou into their interior Lowland wintering grounds. At the inland sites caribou remains dominate the faunal assemblages which, in Pilon's view, indicates a correlation between inland sites, cold-weather occupations, and an emphasis upon caribou as a focal resource.

Since Tomenchuk's and Irving's 1972 work at Brant River archaeological research has made significant contributions to our understanding of Lowland history dispelling the region's image as a pre-contact "demographic vacuum." By furnishing evidence of pre-European adaptations that were more substantial and dynamic than previously recognized archaeological findings have forced a reassessment of the Lowland's role in Native history.

In order to provide focus for a research strategy oriented toward furthering our understanding of Hudson Bay Lowland ethnohistory two hypotheses were formulated out of which developed this study's methodological approach.

The first hypothesis is founded on the results of previous research and states that further archaeological fieldwork in the Lowland will show a human presence in both the pre-European and post-European periods. This hypothesis negates the view that the Lowland was unoccupied during the pre-European period and suggests that through additional archaeological efforts evidence will arise to support and strengthen previous findings.

The second hypothesis addresses the nature of Native adaptation and is formulated in a settlement pattern model that is based upon the notion that efficient foraging is dependent upon the ability of foragers to make knowledgeable decisions regarding resource availability and dependability for a given time of year and place. These decisions are based upon personal experience within a given environment (see Feit 1983:11-12; Winterhalder 1977:551-553). The nature of the environment where harvests can be variable - due to spatial movements, temporal perturbations, and low visibility of resources - underscores the need for foragers to have extensive knowledge of specific tracts of land referred to as "passive territories" or "home ranges" (Winterhalder 1977:283). Resource knowledge empowers foragers to make decisions that concentrate their attention toward specific resources that can be optimally harvested (Feit 1987:78-79). In other words, foragers will be able to evaluate success in one area of the home range relative to expectations for success in other areas (Winterhalder 1981a:28) so that decisions can be made to ensure the foragers maintain the "... highest possible net rate of energy capture while foraging" (Winterhalder 1983:202).

With reference to the Eastern Cree, Preston (1975a: 325, 1980:44-46) describes Cree foragers as maintaining "portable" communities and based upon resource knowledge extend foraging energy within areas where specific resources are efficiently captured (for a discussion of cultural transformations that have resulted due to the twentieth century transition from traditional foraging to more village-oriented living see Preston 1979, 1986). These areas and the resources sought will vary depending upon the time of year: in the Lowland, for instance, foraging activities may be focused upon the coastal region during geese migrations, upon known river crossings during caribou migrations, and upon appropriate rivers and lakes during fish spawning periods. This knowledge of resource availability as it relates to the environment and the time of year is the result of a "...long term accumulation and integration of experience by cultural means" (Winterhalder 1981a:17).

For specific areas during particular times foraging plans focus upon a focal resource; however, the availability of other resources also receives careful consideration. This strategy is recorded among the Waswanipi Cree (Feit 1987:78-79), as well as among the Muskrat Dam Lake Cree (Winterhalder 1977:489). This strategy is also the basis of Winisk Cree thinking and it is the context for the following statement by John Michael Hunter (personal communication 1985):

> It has never occurred to the people that no one sets out to any area without planning ahead of

> time what is going to take place and what he is going to need and which particular area he is heading toward to make sure that he already knows what he is going to get and what he is going to plan or depend upon as a food supply or any other supplies he may need during the winter for his family.

Within the chosen foraging area, fish are a significant resource emphasized by the Winisk Cree. When compared to other resources, fish, as noted by Winterhalder (1977:501, 1981b:79), have the highest reliability and the Winisk Cree indicate that fish can be depended upon more that any other resource. Although a variety of resources would be sought, in relation to other species the harvest of fish is seen as most reliable.

On the basis of this model the second hypothesis states that pre-European Native adaptation in the Hudson Bay Lowland was based upon a diverse economy within which fish played an important role. Relying upon extant archaeological evidence of warm and cold season occupations in concert with the characteristics of the foraging model the view that a pre-European Native adaptation was not limited to a seasonal orientation is inherent within the second hypothesis.

This study's methodological approach developed directly out of the second hypothesis by making the inference that significant fishing locations were/are revisited through time; therefore, areas around fishing locations may tend to exhibit lengthy occupation histories. It became axiomatic, therefore, that archaeological investigations needed to concentrate upon historically known fishing locations. It was felt that known fishing locations held potential for testing both hypotheses. A fieldwork and research strategy based upon the above hypotheses lends itself to ethnohistorical methodology integrating archaeological, ethnographic, and historical sources of data. Archaeological data are necessary for addressing both hypotheses and archaeological data could lend support to the historical identification of the study areas. Data from ethnographic fieldwork in combination with information from historical documents and previous ethnographies serve to illuminate relatively recent adaptations which can be compared and integrated with the archaeological evidence.

The identification of an appropriate study area within the Hudson Bay Lowland was furnished by an 1815 report (HBCA B.198/e/1) pertaining to the Hudson's Bay Company's Severn District. The report - penned by the Master of Severn House, James Swain Sr. - discussed the District's boundaries, river navigation, resources, climate, posts, company men, trade, cultivation, and Natives. It also included three maps (HBCA G.1/33, G.1/34, G.1/35) "taken down from Indian information" detailing the

District's lakes and river systems (Figures 2, 3, 4). The maps are accurate to the degree that major river systems and lakes can be identified with reference to current topographical maps. In a north-south axis the maps provide greatest detail to the land between the Ekwan River in the south and the Severn River in the north. In the west, Severn Lake - a major body of water in the Severn River system - is included as is the Sachigo and Little Sachigo Lakes that drain into the Severn River by way of the Sachigo River.

In addition to rivers and lakes the maps detail the positions of rapids, falls, portages, and distances between water bodies. Many of the lakes also bear captions expounding their virtues as productive fishing areas. As well, Swain's Indian advisors pin-pointed the locations of fish "weirs" which are marked on the maps with single straight lines drawn at right angles across the rivers. The maps, therefore, provided the desired geographical data specifying historically known fishing locations and in order to effectively test the above hypotheses it was considered necessary to investigate at least two of the locations marked.

Two weir locations south of the Winisk River, as marked on Swain's eastern map (HBCA G.1/33; Figures 2 and 5), were chosen for archaeological investigation: one weir

Figure 2

Map of Severn District laid down from Indian Information by James Swain.

Date: 1815

Source: HBCA G.1/34

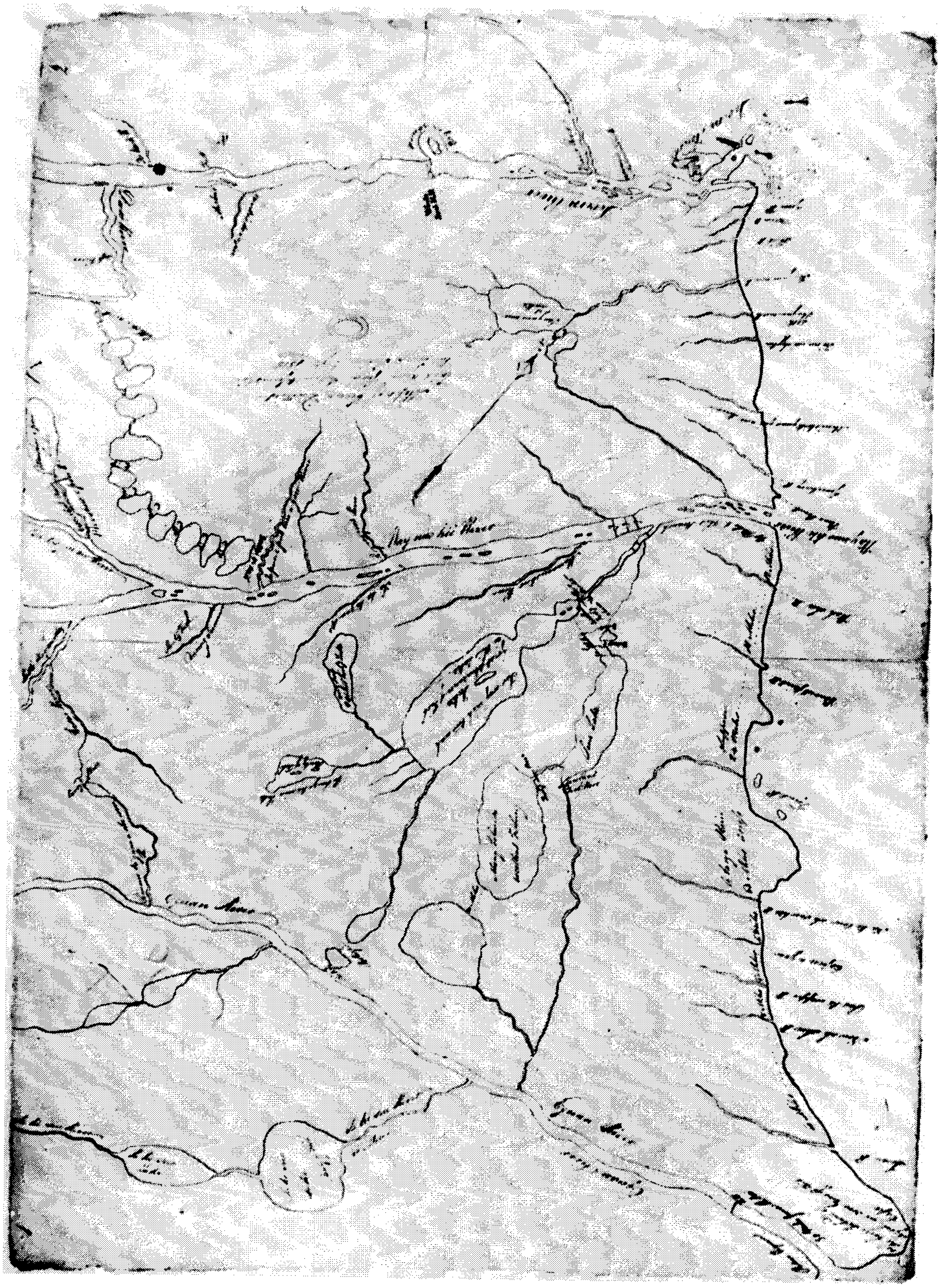


Figure 3

Map of Severn District laid down from Indian Information by James Swain.

Date: 1815

Source: HBCA G.1/33

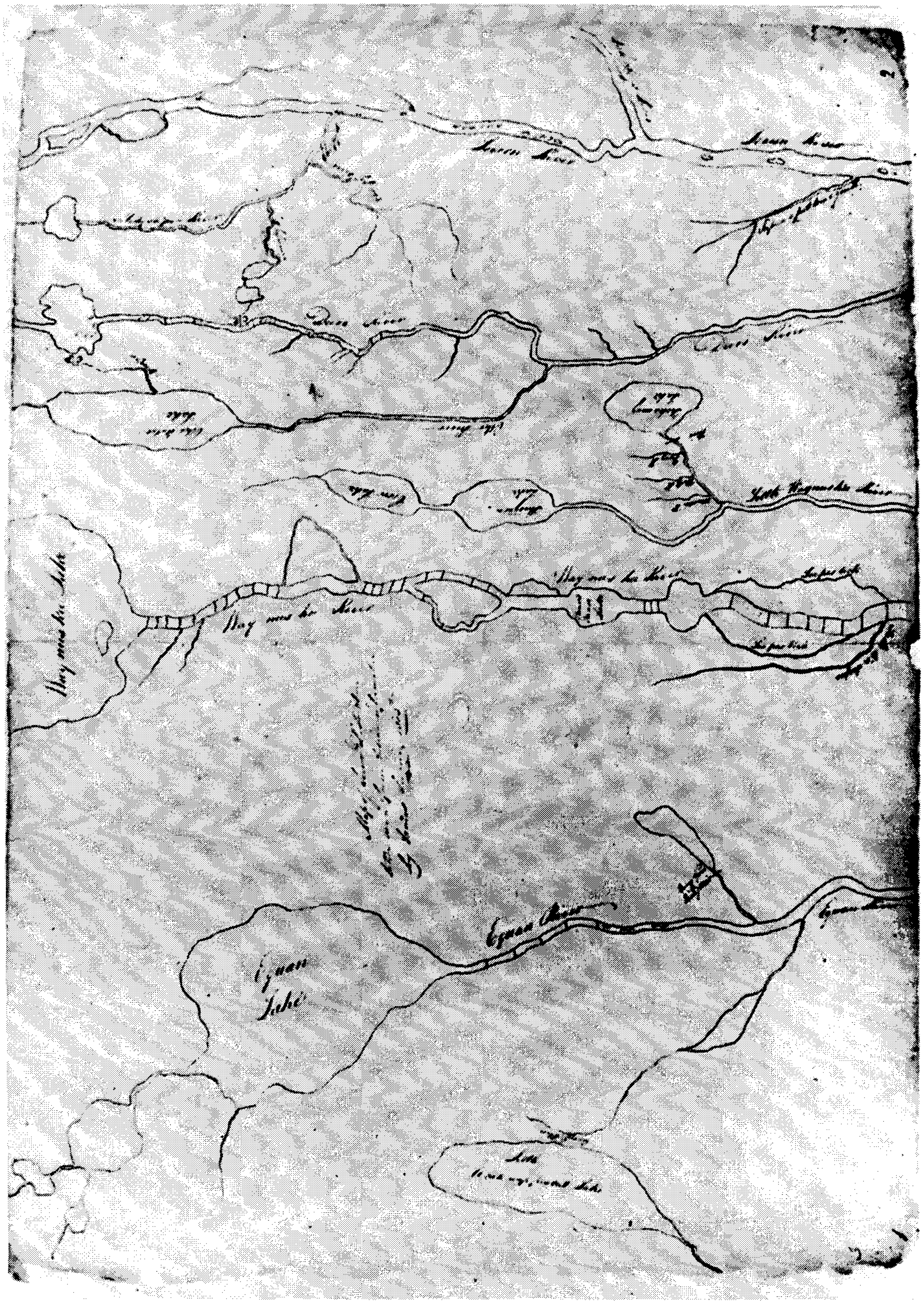


Figure 4

Map of Severn District laid down from Indian Information by James Swain.

Date: 1815

Source: HBCA G.1/35

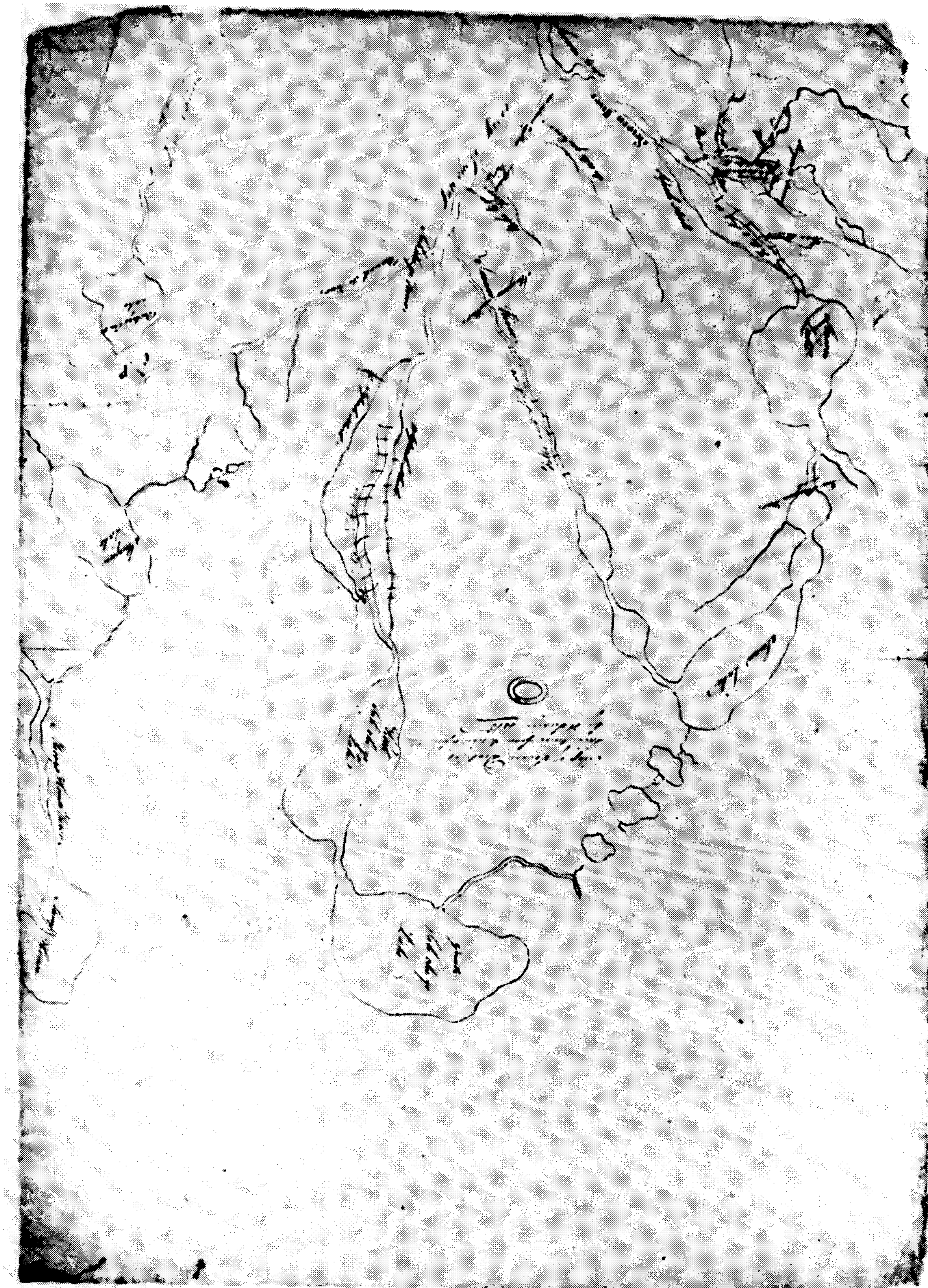


Figure 5

Map of Severn District laid down from Indian Information by James Swain.

Detail of Map HBCA G.1/34 with the addition of arrows indicating the locations of the two study areas and their associated fish trap-weirs.

Date: 1815

Source: HBCA G.1/34

was marked on the Shamattawa River north of Shamattawa Lake and the other weir was shown to be at the southern junction of the North Washagami River and Spruce Lake (Figure 1). These two locations were considered appropriate since the specific locations for both weirs could be accurately identified on their respective river systems and the 40.5 kilometre distance between the two areas was reasonable from the point of view of logistics. As well, both locations are isolated from the Lowland's major river/transportation channels: to support the notion of an occupied Lowland entrenched within the posited foraging model, evidence from the more isolated reaches of the region is requisite. Sites from the Brant River and the Sutton Inlier - due to their locations removed from major rivers - provide supporting evidence and it was anticipated that positive results from the Shamattawa River and Spruce Lake regions would render additional strength to the position that the Lowland was subjected to more than seasonally-based occupations.

With the hypotheses formulated and the study area isolated, the summer of 1984 was spent investigating the two fish weir locations. In addition to the archaeological data recovered, ethnographic field data were collected during the winter of 1985 through directed interviews with Winisk Cree elders, who on the basis of experience and memory, offered their insight into resource utilization and technology.

The final point of introduction pertains to the remaining structure of the study. Chapter Two presents a brief discussion of the Hudson Bay Lowland environment furnishing an environmental context to human adaptation within the region. Chapter Three relates to the historical context of the two study areas and through the integration of historical and ethnographic data the chapter develops a synthesis of fish "weir" technology and use in the Hudson Bay Lowland and adjacent areas. Chapter Three concludes with a discussion pertaining to the position of fish in Hudson Bay Lowland foraging patterns. Chapters Four and Five present the description and analysis of the archaeological remains recorded and recovered from the Shamattawa River and North Washagami River-Spruce Lake study areas respectively. Chapter Six concludes the study with a critical review of the methodology that directed the research, as well as a summary of the evidence that was found to sustain the hypotheses.

CHAPTER TWO

THE HUDSON BAY LOWLAND ENVIRONMENT: PHYSIOGRAPHY, CLIMATE, VEGETATION, AND FAUNA

> The long winter, although it is always cold, is not, however, equally so at all times. There are often, in truth, excessively cold days on which one does not venture out of doors without paying for it.... If I had to choose between winter and summer in this country I do not know which I should prefer, for, in summer, besides the scorching heat, the frequent changes from extreme heat to extreme cold, and the rarity of three fine days on end, there are so many mosquitoes or black flies as to make it impossible to go out of doors without being covered and stung on all sides. These flies are more numerous here and stronger than in Canada. Add that the woods are full of water and that there is no going far into them without going up to the waist (Father Gabriel Marest, York Factory, 1694, in Tyrrell 1931:126-127).

Introduction

The Hudson Bay Lowland is an ecologically distinct area representing the terrestrial portion of one of Canada's major geological regions known as the Hudson Platform (Stockwell et al. 1970:137-145). The region's physical boundaries are delineated by the coasts of Hudson and James Bays to the north and east respectively, and by Precambrian bedrock to the south and west. Situated between 50 and 60 degrees of latitude, the Lowland involves 324,000 square kilometres of territory (Sims et al. 1979:2) extending from the Nottaway River at the bottom of James Bay in Quebec through Ontario to the Churchill River in Manitoba. The area has a maximum east to west width of 523 kilometres (Combs 1954:1) with a configuration that roughly follows the contour of its Hudson Bay and James Bay boundaries.

Physiography

> ... To the extent of one hundred and fifty miles into the interior the general surface of the Country is a deep Morass with a tough Floating Moss; small elevated Spots and ridges without order or regularity are numerous and Covered with brushy Pine and Larch (HBCA B.198/e/1:3d).

The geological sequence underlying the Hudson Bay Lowland is comprised of a Precambrian rock basement blanketed by Phanerozoic strata referred to as the Hudson Platform (Stockwell et al. 1970:137). The Precambrian rock basement is an extension of the Canadian Shield which, on the basis of structure and folding differences, is divided into seven Structural Provinces (Stockwell et al. 1970:44).

Two Structural Provinces of Precambrian rock - the Superior and the Churchill - extend beneath the Lowland's Phanerozoic strata but border the Lowland's inland boundaries (Sanford et al. 1968:2; Stockwell et al. 1970:137). The Churchill Province in the north and the Superior Province in the south share a boundary that runs in a southeasterly direction from the Nelson River to at least the Sutton Lake area before turning to the northeast across James Bay (Sanford et al. 1968:2). Both Structural Provinces emerge from the Phanerozoic rock blanket in the Sutton Inlier - a narrow belt of Precambrian rock outcropping on the Cape Henrietta Maria Arch (Bostock 1969:209; Hawley 1926:2).

The Cape Henrietta Maria Arch - an upward thrusting basement of Precambrian rock extending in a northeasterly direction across the width of the Lowland - separates two basins of relatively flat layers of Phanerozoic strata (Norris and Sanford 1969:169). The Moose River Basin to the south is comprised of rocks belonging to the Paleozoic and the Mesozoic ages (Sanford et al. 1968:17-38). The Paleozoic rocks of sandstone, shale, limestone, dolomite, and evaporite are largely marine in origin and represent Ordovician, Silurian, and Devonian ages. The Mesolithic rocks of Lower Cretaceous age are non-marine clastic rocks that were likely derived from underlying Devonian age sediments (Norris and Sanford 1969:173; Whitmore and Liberty

1968:555-556). In the northern part of the Lowland the Phanerozoic sequence belongs to the larger Hudson Basin which is situated predominantly beneath Hudson Bay with only a small section of its area present on the mainland. The mainland Hudson Basin sequence is restricted to the Paleozoic age. Of similar composition to the Paleozoic rocks in the Moose River Basin, rocks of the Hudson Basin are marine in origin and represent Ordovician, Silurian, and Devonian ages (Norris and Sanford 1969:173).

During the Quaternary, the Phanerozoic strata were overlaid with Pleistocene deposits of glacial and non-glacial sediments (Shilts 1984:120-123; Terasmae and Hughes 1960:1-3). Throughout the Pleistocene, the Hudson Bay Lowland was subjected to a least six major glacial events identified by glacial till sheets and intertill waterlaid sediments (Shilts 1984:120-123). The glacial advances were interrupted by a major interglacial period marked by the Missinaibi Formation - a formation of non-glacial organic sediments situated between deposits of glacial till (Shilts 1984:120-121). The last glacial event over the area of the Hudson Bay Lowland was the advance and retreat of the Laurentide Ice Sheet during the Late Wisconsinan glacial stage. The origin of the Laurentide Ice Sheet has been the subject of much debate (see Prest 1984:24; Shilts 1984:119-120) and current thought identifies three sectors of ice dispersal - Labradorean, Keewatin, and Foxe-Baffin sectors - that converged to form a single ice mass.

During and following the collapse of the Laurentide Ice Sheet, which on the basis of radiocarbon dated marine shells was complete in the Hudson Bay area by about 7,000 B.P. (Craig 1969:70), extensive areas of Quebec, Ontario, and Manitoba were inundated by the Tyrrell Sea. Fed by Atlantic waters the Tyrrell Sea spread over the Hudson Bay Lowland due to the downwarping of the earth's crust during the glacial period (Lee 1968:514). Post-glacial uplift following deglaciation caused the Tyrrell Sea to recede leaving silt and clay marine deposits blanketing both glacial till (Lee 1968:516) and western and southern fringe lacustrine sediments deposited by proglacial lakes Barlow-Ojibway and Agassiz (Craig 1969:67-68; Shilts 1984:123). Rates of isostatic rebound have differed through time and over space (Andrews 1969, 1970); however, in the Cape Henrietta Maria area, Webber et al. (1970:325) have determined that over the past 1,000 years the Lowland has rebounded at a rate of 1.2 metres per century. The remaining relic of the Tyrrell Sea is represented by Hudson and James Bays.

The southern and western boundaries of the Hudson Bay Lowland roughly coincide with the extent of the Hudson

Platform and the limits of the Tyrrell Sea (Hustich 1957:4). Extending through the Lowland from sources in the Precambrian upland, ten major rivers drain into Hudson and James Bays: Harricanaw, Moose, Albany, Attawapiskat, Ekwan, Winisk, Severn, Hayes, Nelson, and Churchill. Divided by the Cape Henrietta Maria Arch the river systems reflect the Moose River and the Hudson Phanerozoic Basins (Cumming 1969:148).

The Lowland is characterized as a relatively flat plain noted for its gentle slope: between Big Trout Lake and the coast the Lowland dips at an average rate of 75 cm to 100 cm per kilometre (Riley 1982:544). The result is poor drainage and extensive wetlands:

> Over the greater part of its surface there occurs a patchwork of lakes, rivers, and streams, as well as extensive areas of swamp and muskeg, resulting in a watery panorama covering practically the whole of the plain. For the most part, dry land is at a premium, occurring only in the form of moraine or beach ridges, and in the better-drained regions bordering the numerous lakes, rivers, and streams. These moraines and ridges break the monotony of an almost completely flat surface (Coombs 1954:2-3).

Riley (1982:544) refers to the Lowland as a "semi-continuous peatland" since much of the wetland area is covered with accumulations of over 30 cm of peat. The topographic appearance of the Lowland, however, is not uniform and based upon climate, drainage, and geological history, Coombs

(1954:4-15) has divided the region into four physiographic zones (Figure 1): (A) a Dry Zone, located in the south, is comprised of a 30:30:40 percent division between muskeg and swamp, lakes and rivers, and dry land respectively; (B) a Muskeg and Small Lake Zone, located in the central section and covering over 50 percent of the total Lowland area, is characterized by a "soggy sphagnum-covered" surface with numberless small lakes and ponds; (C) a Marine Clay Zone, located north of the Severn River, is comprised of a "complex network of sluggish dendritic streams" and prone to extreme flooding due to a "widespread mantle of marine clay" combined with permafrost and annual freezing; and (D) a Coastal Zone is characterized by tidal flats and, with the exception of storm beaches, its terrain is generally featureless.

Climate

> On and near the Sea Coast the Commencement of Spring is observable often some time in the first fortnight of May, on some late years not before the beginning of June.... The Commencement of thaw is equally uncertain and precarrious some years great thaw prevails in the beginning of April at other Times scarcely any is perceivable before the middle of May.... The Fall of the leaf commences from the fifteenth to the twenty fifth of September. The Setting in of Winter sometimes takes place as Early as the Tenth of October, on some extraordinary late Seasons not until the middle of November. The

> commensement of Winter more frequently happens between the twentieth and latter end of October (HBCA B.198/e/1:5).

Following deglaciation, a warming trend beginning between 6,000 and 5,500 years B.P. covered the eastern Arctic and lasted to between 2,500 and 2,000 years B.P. after which the climate deteriorated (Andrews 1985:443-445; Andrews et al. 1981:165-166). In the Hudson Bay Lowland this sequence is recorded in a pollen diagram constructed from a lake core taken in the Sutton Inlier (McAndrews et al. 1982). The presence between 6,500 and 3,000 years B.P. of Najas flexilis - an aquatic plant located 300 kilometres north of its current range - suggests a hypsithermal interval; after 2,500 years B.P. a cooling trend ensued marked by an increase in sphagnum and a decrease in tree macrofossils. The region has also experienced minor climatic perturbations; as example, an analysis (Ball 1985) of climatic data from fur trade records indicates that around 1760 A.D. the climate in the area of York Factory was affected by a shift in the Arctic Frontal zone which resulted in moving York Factory from a Tundra zone to a Boreal zone. Currently, the climate of northern Ontario is classified as modified continental with summer temperatures modified by Lake Superior and Hudson Bay (Chapman and Thomas in Hutton and Black 1975:13).

The climate of the Lowland is greatly influenced by prevailing winds and by the cold waters of Hudson and James Bays (Thompson 1968:265-267). During winter, low-pressure areas that pass below Hudson Bay in their counter-clockwise flow around a low-pressure vortex located over northern Baffin Island induce strong arctic north-to-northwest winds across the Bay (Thompson 1968:265-266). In the winter months, the Lowland and much of northern Ontario are engulfed within the Arctic air stream (Royal Commission on the Northern Environment 1985: Plate 5). During the summer months, the Arctic Frontal zone retreats to the northern side of the Lowland (Royal Commission on the Northern Environment 1985: Plate 5) and northward routed low-pressure areas create winds and storms hailing from the west and southwest (Thompson 1968:266). The result of prevailing wind patterns in combination with the lack of protective mountain ranges means that "... Hudson Bay lies exposed to cold outbreaks from Arctic regions during all seasons, and to occasional thrusts of warm air from the south in summer" (Thompson 1968:266). Although the west and southwestern air masses carry warm winds the ice and cold waters of the Bays have the greatest influence on the region's summer air temperatures (Thompson 1968:267). Hudson Bay is not clear of ice until August and ice again begins to form by mid-October (Danielson 1971). As a result, the long-lasting ice and the incessant cold water retards spring and promotes early winter. Much of the Lowland is also affected by permafrost with a continuous zone stretching along the Hudson Bay coast followed by a discontinuous zone and then scattered patches as latitude decreases (Hutton and Black 1975: Map 3, Bog and Permafrost). In the Lowland, temperatures undergo a gradient rise from the arctic conditions on the Hudson Bay and northern James Bay coasts to temperate boreal conditions in the south (Sims et al. 1979:4; Thompson 1968:267). Roughly 52 degrees latitude marks the border between the southern Albany Climatic Region and the northern Patricia Climatic Region (Ontario Ministry of Natural Resources 1985: Map 3). The Shamattawa River and the Spruce Lake-North Washagami River study areas are located within the Patricia Region. In comparison to the Albany Region, the Patricia Region has colder mean daily maximum and minimum temperatures, fewer frost free days, a shorter growing season, and less mean annual precipitation and mean annual snowfall (Ontario Ministry of Natural Resources 1985:33). In the study area, the mean daily temperatures to the nearest isotherm for January and July are -24 degrees C and 13 degrees C respectively (Royal Commission of the Northern Environment 1985: Plate 7). The study area experiences between 70 and 80 frost free days (consecutive days with minimum temperatures above 0 degrees

C) and a growing season (the number of days with an average temperature above 5.6 degrees C) of less than 140 days (Royal Commission on the Northern Environment 1985: Plate 7). Mean annual precipitation for the study area equals between 558 mm and 610 mm (Royal Commission on the Northern Environment 1985: Plate 8). Mean annual snowfall equals between 2,032 mm and 2,438 mm with a mean maximum depth of 635 mm to 762 mm (Royal Commission on the Northern Environment 1985: Plate 8). As shown by climatic data entered in fur trade records the annual dates of first snowfall in the Lowland exhibit wide variety (Catchpole and Ball 1981). At Fort Albany - in the Albany Climatic Region - between 1705 and 1869 the dates of first snowfall ranged between the third week of August and the second week of November. At York Factory - in the Patricia Climatic Region - between 1715 and 1940 the dates of first snowfall ranged between the first week of August and the third week of November. As such, in the study area, the dates of first snowfall are expected to range between early August and mid-November.

Dates of freeze-up and break-up are of prime importance since in purely practical terms these periods mark a change in travel methods. In the study area, on average, lakes freeze-up in early to mid-November and break-up after mid-May (Ontario Ministry of Natural

Resources 1984:25). Rivers, on the other hand, tend to freeze later and break earlier. Hydrometric records (Environment Canada) pertaining to the daily discharge of the Shamattawa River indicate that within the 1968 to 1984 period ice conditions formed between the last week of October and the last week of November (median = second week of November) and dissipated between the second week of April and the third week of May (median = second week of May).

Vegetation

> Our astonishment at the delightful prospects of Hill River [Hayes River], was in proportion to the strength of our prejudices against the imagined barrenness and desolation of this country.... Along the bank at the water's edge, the poplars are ranged, now in the fading yellow garb of autumn, but still tinged with bright orange at the summits. The larch is interspersed among them, in the light green hue of spring, which it preserves to the last, and behind, the tall dark wintry pine [spruce] lifts its head above all, its unchanging foliage defying alike the wintry blast and the summer's heat (Hood 1974:27).

The Hudson Bay Lowland is a wetland of bogs, fens, and tundra intermingled with forested banks of rivers and streams. Riley (1982:559-553) has divided the Ontario section of the Lowland into four wetland regions - Midboreal Wetland, High Boreal Wetland, Low Subarctic Wetland, and High Subarctic Wetland - on the basis of changes in dominant vegetation types. In terms of latitudinal zones, the Lowland extends over four floristic divisions (Riley 1980:47, 103) sandwiched between the Boreal Forest on the Precambrian upland and the Hudson and James Bay coasts. From south to north the floristic divisions include Boreal Muskeg (High Temperate), Open Wetland/Muskeg (Low Subarctic), Wooded Tundra/Open Wetland (High Subarctic), and a coastal zone of Maritime Tundra (Low Arctic).

The coastal Maritime Tundra zone is a narrow strip of land that roughly parallels the Hudson and James Bay coasts. The zone widens to its broadest section at Cape Henrietta Maria and narrows to its thinnest section along the James Bay coast. Along the coast of Hudson Bay the Maritime Tundra zone is within a corridor of continuous permafrost (Hutton and Black 1975: Map 3, Bog and Permafrost) and the zone's vegetation is characterized by sparsely vegetated salt marshes, tundra heath with lichen-dominated beach ridges, and coastal fens with peat plateaus (Sims et al. 1979:21). Within the James Bay Maritime Tundra zone where permafrost ranges from discontinuous to scattered patches (Hutton and Black 1975: Map 3, Bog and Permafrost) the vegetation is dominated by willow (Salix) thickets; denser vegetated salt and freshwater marshes; and treed fens, swamps, and ridges (Sims et al. 1979:21).

Further inland the wetlands are dominated by peat bogs and fens. Bogs are dependent upon atmospheric moisture for nutrients (Sjörs 1959:3; Sparling 1973:5) and display a relatively poor vegetation cover characterized by black spruce (Picea mariana), shrubs such as leatherleaf (Chamaedaphne calyculata), bog mosses, and lichens (Sparling 1973:6-9). Fens, on the other hand, receive water from mineral soils, as well as precipitation (Sjörs 1959:3; Sparling 1973:5-6). As a result of their greater nutritional base, fens support a richer vegetation cover, such as grass and sedge meadows and shrub thickets of willow (Salix), alder (Alnus), and sweet gale (Myrica gale). Wooded upland vegetation has greater prominence in the drier Boreal Muskeg zone adjacent to lower James Bay (Sims et al. 1979:32), within the Sutton Inlier (Sjörs 1961:6-7), and along the banks of rivers and streams flowing through the Lowland (Hustich 1957:29-32).

Superior drainage conditions along river and lake edges support a relatively dense vegetation growth including willow (Salix), balsam poplar (Populus tacamahaca), and white (Picea glauca) and black spruce (Picea mariana) before being replaced by the ubiquitous fen and bog terrain a short distance inland (Baldwin 1962:20-21; Hustich 1957:29-32). The river drainage characteristics are largely responsible for extending the distribution of such trees as trembling aspen (Populus tremuloides), balsam poplar (Populus tacamahaca), white birch (Betula papyrifera), northern white cedar (Thuja occidentalis), balsam fir (Abies balsamea), and white spruce (Picea glauca) into the Lowland area (Hustich 1957:17-27). The forested cover of the river banks provides stark contrast to the more widespread wetlands and for river travellers the wooded embankments conceal the barrenness of the inland terrain. During a journey down the Hayes River in 1819, Robert Hood (1974:26) referred to the "spacious lawns" beyond the trees. Similarly, reporting on an inspection trip down the Churchill River in 1907, Inspector E. A. Pelletier (1908:134) of the Royal Canadian Mounted Police also referred to this characteristic of river bank vegetation:

> All along the Churchill fair-sized timber is to be had anywhere. One can hardly conceive the state of barrenness of the inland when one follows the well-timbered and sheltered valley of the Churchill River. The river is full of islands, and these islands are a mass of beautiful green timber of good size, and this all the way down to about nine or ten miles from the mouth of the river.

As defined by Riley (1982:551-552), the Shamattawa River and Spruce Lake-North Washagami River study areas lie within the Low Subarctic Wetland Region which is characterized by open fen throughout, peat plateaus in the coastward half, and fire-related bog and peat plateaus in the west. Situated within Coomb's (1954:6-10) Muskeg and

Small Lake physiographic zone, the study areas are located in the southern portion of the High Subarctic floristic division (Riley 1980:47, 103) labelled as Woodland Tundra/Open Wetland. The well-drained river margins of the Shamattawa River study area support a black spruce (Picea mariana) dominated forest with balsam poplar (Populus tacamahaca) and shrub thickets of sweet gale (Myrica gale), sage-leaved willow/hoary willow (Salix candida), and red osier dogwood (Cornus stolonifera). The embankments of the Spruce Lake - North Washagami River study area are dominated by black spruce (Picea mariana) and balsam poplar (Populus tacamahaca) with a shrub cover that includes red osier dogwood (Cornus stolonifera), willow (Salix myrtillifolia) and/or green alder/mountain alder (Aluns viridis), high-bush cranberry (Viburnum trilobum), and creeping juniper/creeping savin (Juniperus horizontalis) (Deborah Metsger personal communication 1984).

Fauna

> Of the Provisions that can be obtained there is a variety, and consist of Venison, Wild Geese and other Waterfowl, Partridges [willow ptarmigan], Rabbits & Fish. Venison is only on the Coast during the Summer season, more inland it is at times very plentiful both summer and winter. Wild Geese are very numerous in the Spring and Fall Seasons. Partridges are very numerous, and some Winters many

> Thousands can be taken with nets on the Coast of Hudson's Bay. Rabbits are numerous and after five Seasons are to be found more or less in all the Woody parts of this Country (HBCA B.198/e/1:4-4d).

Mammalia

The Lowland is home for a variety of mammal species ranging from small insectivores to large carnivores. Table 1 lists the species of economic value that are hunted and trapped for food and/or raw materials. The majority of the species listed (n=21, 87.50%) are widely distributed throughout the Lowland: five species (20.83%) range over the complete area while sixteen species (66.67%) range over the total region with the exception of the Hudson Bay Maritime Tundra zone. Three species (12.50%) have limited distributions: the polar bear - when not hibernating - and the arctic fox are generally found within the Hudson Bay Maritime Tundra zone and the northern range of the white-tailed deer includes only the Lowland's extreme southern end. Over the past half century the range of the white-tailed deer has expanded northward; however, the population density to actually reach the Lowland is insignificant (Banfield 1974:394; Cumming and Walden 1970: 5). In addition to the species of economic value, six

Table 1. Terrestrial Mammalian Species. *

Common Name	Scientific Name	Distribution
	Small Sized Herbivores	
American Red Squirrel	<u>Tamiasciurus hudsonicus</u>	B
Northern Flying Squirrel	<u>Glaucomys sabrinus</u>	B
	Medium Sized Herbivores	
Snowshoe Hare	<u>Lepus americanus</u>	B
Woodchuck	<u>Marmota monax</u>	B
American Beaver	<u>Castor canadensis</u>	B
Muskrat	<u>Ondatra zibethicus</u>	B
American Porcupine	<u>Erethizon dorsatum</u>	B
	Large Sized Herbivores	
Woodland Caribou	<u>Rangifer tarandus caribou</u>	A
Moose	<u>Alces alces</u>	B
White-tailed Deer	<u>Odocoileus virginianus borealis</u>	C
	Medium Sized Carnivores	
Arctic fox	<u>Alopex lagopus</u>	D
Red Fox	<u>Vulpes vulpes</u>	A
American Marten	<u>Martes americana</u>	B
Fisher	<u>Martes pennanti</u>	B
Ermine	<u>Mustela erminea</u>	A
Least Weasel	<u>Mustela rixosa</u>	B

Table 1. Continued.

Common Name	Scientific Name	Distribution
American Mink	*Mustela vison*	B
Wolverine	*Gulo gulo*	A
Striped Skunk	*Mephitis mephitis*	B
River Otter	*Lutra canadensis*	B
Lynx	*Lynx canadensis*	B
	Large Sized Carnivores	
Wolf	*Canis lupis*	A
American Black Bear	*Ursus americanus*	B
Polar Bear	*Ursus maritimus*	D

A General distribution including the Hudson Bay Maritime Tundra zone.

B General distribution with the exception of the Hudson Bay Maritime Tundra zone.

C Distribution is restricted to the extreme southern region.

D Distribution is generally restricted to the Hudson Bay Maritime Tundra zone.

* (Banfield 1974; MacPherson 1968)

insectivores, such as the masked shrew (*Sorex cinereus*) and the star-nosed mole (*Condylura cristata*) and two small herbivores - least chipmunk (<u>Eutamias minimus</u>) and northern bog lemming (<u>Synaptomys borealis</u>) - also share the Lowland region (Banfield 1974; MacPherson 1968).

The abundance and distribution of mammal species have fluctuated in response to natural alterations and human derived pressures, such as animal population cycles, forest fires, and the fur trade. Due to disease the population density of the snowshoe hare oscillates with mode population peaks spaced at nine or ten year intervals (Banfield 1974: 82-83). As the snowshoe hare population fluctuates, so also do the populations of its predators, such as the red fox and lynx. Fire, started by lightning or by human intervention, in the short term makes the burned areas inhospitable; therefore, the native animal populations of the areas are temporarily decimated (Feit 1969:88-89).

Following European contact the trade in furs greatly stressed the populations of fur bearers reducing the numbers of marten, fisher, wolverine, otter, mink, lynx, and beaver (MacPherson 1968:484-485). During the nineteenth century the decline in beaver populations prompted the Hudson's Bay Company to instigate conservation measures (Frances and Morantz 1983:128); however, in the Severn District the Company's attempt to limit the kill of beaver was not entirely successful as the Native population argued that the beaver was needed for both food and clothing (HBCA

B.198/a/71:8). In the lands west of Hudson Bay the decline in the beaver population marked an increase in the demand for muskrat fur (Bishop 1974:36; Ray 1974:121; Thistle 1986:77).

In a June 1773 entry, the Severn House Journal (HBCA B.198/a/17:43) recorded "thousands" of caribou making a northward crossing of the Severn River. In the early nineteenth century, based upon information provided by York Factory residents, Richardson (1829:250) also reported the occurrence of large herds crossing the Nelson River:

> I have been informed by several of the residents at York Factory that the [caribou] herds are sometimes so large as to require several hours to cross the river in a crowded phalanx.

Through excessive kills, however, caribou populations were greatly reduced and during the eighteenth and nineteenth centuries these large-scale caribou migrations were virtually eliminated (Banfield 1961:85; Bergerud 1974). The extensive lichen growth within the Hudson Bay Lowland provides excellent caribou habitat (Ahti and Hepburn 1967:49-51), but within the Ontario portion of the Lowland the caribou population is currently limited to an estimated population of between 3,362 and 5,485 animals (Thompson n.d.:30).

With respect to moose, Peterson (1978:45-49) argues that much of northern Ontario was devoid of moose until their relatively recent entry into the area during the nineteenth and early twentieth centuries. This hypothesis is supported by Preble (1902:43) who learned from Hudson Bay Company officers that at the turn of the century moose were "formerly almost unknown" in the Oxford House area; however, at that time they were extending their range toward Hudson Bay. Although James Isham (1949:154) and Andrew Graham (1969:16-17) - who were writing from the Hudson Bay coast during the eighteenth century - complicate the matter slightly by referring to a numerous inland population of moose to the south, the expansion of moose range at least into the Hudson Bay Lowland area appears to be a late-contact period phenomenon.

In addition to terrestrial mammals, marine mammals including bearded seal (Erignathus barbatus), harbour seal (Phoca vitulina), ringed seal (Phoca hispida), white whale (Delphinapterus leucas), and to a limited extent walrus (Odobenus rosmarus) frequent the Hudson Bay Lowland coast (Banfield 1974). Although white whales and seals were numerous during specific periods of the year, Isham (1949:166-167) and Graham (1969:115-118) indicate that these species were not of major significance to the Indian economy.

Aves

The Hudson Bay Lowland is an important region in the life cycles of various species of migratory waterfowl. Table 2 lists the major species of waterfowl currently known to use the Lowland for nesting and/or migratory staging purposes. The coastal region of Hudson and James Bays serves as spring and fall migratory staging areas for geese, as well as spring and fall concentration areas and summer moulting areas for ducks (Ontario Ministry of Natural Resources 1985: Maps 14 and 15). Along with waterfowl, additional nonpasserine bird species that share the Lowland include the American bittern (Botaurus lentiginosus); spruce and ruffed grouse (Canachites canadensis and Bonasa umbellus); willow ptarmigan (Lagopus lagopus); shore birds, such as the greater yellowlegs (Tringa melanoleuca) and common snipe (Capella gallinago); the herring gull (Larus argentatus) and arctic tern (Sterna paradisaea); owls, such as the great horned owl (Bubo virginianus) and short-eared owl (Asio flammeus); diurnal birds of prey, such as the goshawk (Accipiter gentilis) and osprey (Pandion haliaetus); and woodpeckers, such as the black-backed three-toed woodpecker (Picoides arcticus) and the northern three-toed woodpecker (Picoides tridactylus) (Godfrey 1966; Peck and James 1983). Lowland bird species also include a variety of

Table 2. Avian Species: Waterfowl.*

Common Name	Scientific Name
	Loons
Common Loon	_Gavia immer_
Arctic Loon	_Gavia arctica_
Red-throated Loon	_Gavia stellata_
	Swan
Whistling Swan	_Olor columbianus_
	Geese
Canada Goose	_Branta canadensis_
Brant	_Branta bernicla_
Snow Goose	_Chen caerulescens_
Ross's Goose	_Chen rossii_
White-fronted Goose	_Anser albifrons_
	Surface Feeding Ducks
Mallard	_Anas platyrhynchos_
Black Duck	_Anas rubripes_
Pintail	_Anas acuta_
Green-winged Teal	_Anas carolinensis_
Blue-winged Teal	_Anas discors_
American Widgeon	_Anas americana_
Northern Shoveler	_Anas clypeata_

Table 2. Continued.

Common Name	Scientific Name
	Diving Ducks
Greater Scaup	_Aythya marila_
Lesser Scaup	_Aythya affinis_
Common Goldeneye	_Bucephala clangula_
Bufflehead	_Bucephala albeola_
Oldsquaw	_Clangula hyemalis_
Common Eider	_Somateria mollissima_
King Eider	_Somateria spectabilis_
White-winged Scoter	_Melanitta deglandi_
Surf Scoter	_Melanitta perspicillata_
	Mergansers
Hooded Merganser	_Lophodytes cucullatus_
Common Merganser	_Mergus merganser_
Red-breasted Merganser	_Mergus serrator_

* (Godfrey 1966; Ontario Ministry of Natural Resources 1985; Peck and James 1983)

passerine, or perching species, such as the horned lark (Eremophila alpestris), tree swallow (_Iridoprocne bicolor_), gray jay (_Perisoreus canadensis_), common raven (_Corvus corax_), boreal chickadee (_Parus hudsonicus_), ruby-crowned kinglet (*Regulus calendula*), common redpoll (*Acanthis flammea*), and white-throated sparrow (*Zonotrichia albicollis*) (Godfrey 1966).

With respect to the economic strategy of the Lowland Native population, waterfowl represents an important resource with Canada geese and snow geese forming the bulk of the current harvests (Ontario Ministry of Natural Resources 1985:102). The taking of waterfowl has undoubtedly been a significant pursuit throughout the human history of the Lowland although the harvests likely increased substantially in the historic period with the introduction of the shotgun (Honigmann 1956:32). The trumpeter swan (*Cygnus buccinator*) was also an important resource prior to elimination from its eastern range - a victim of overhunting in the pursuit of swan skins for the European market (Alison 1975; Lumsden 1984). In addition to waterfowl, the willow ptarmigan is highly important. During the eighteenth century, James Isham (1949:123-124) reported that "willow partridges" were the "...chiefest provision we have in the winter fresh...." They occurred in such quantities that over the period of one winter on the Severn River, Andrew Graham (1969:109) wrote that upward of ten thousand "willow partridges" were caught with nets.

Osteichthyes

The Hudson Bay Lowland exhibits a network of lakes, rivers, and streams supporting a fish population that has played a major role in human subsistence patterns. Currently, Lowland fish resources are exploited for Native food, sport, and commercial enterprises (Ontario Ministry of Natural Resources 1985:85). Of these three activities, Native food harvests produce the greatest yearly yield with lake whitefish and suckers representing the bulk of the fish species caught (Ontario Ministry of Natural Resources 1985: 95). Table 3 lists the distribution and respective spawning periods for the major fish species known to inhabit the Lowland's water systems.

In addition to those fish species listed in Table 3, the Lowland supports a variety of less economically valuable species, such as the northern redbelly dace (*Chrosomus eos*), finescale dace (*Chrosomus neogaeus*), lake chub (*Couesius plumbeus*), fathead minnow (*Pimephales promelas*), longnose dace (*Rhinichthys cataractae*), pearl dace (*Semotilus margarita*), shorthead redhorse (*Moxostoma macrolepidotum*), burbot (*Lota lota*), brook stickleback (*Culaea inconstans*), threespine stickleback (*Gasterosteus aculeatus*), trout-perch (*Percopsis omiscomaycus*), yellow perch (*Perca flavescens*), johnny darter (*Etheostoma nigrum*), logperch (*Percina

Table 3. Major Osteichthyes Species. *

Fish	Distribution	Spawning Periods
Arctic Char _Salvelinus alpinus_	A	Fall
Brook Trout _Salvelinus fontinalis_	B	Fall
Lake Trout _Salvelinus namaycush_	C	Fall
Cisco _Coregonus artedii_	D	Fall
Lake Whitefish _Coregonus clupeaformis_	D	Fall
Northern Pike _Esox lucius_	D	Spring
Longnose Sucker _Catostomus catostomus_	D	Spring
White Sucker _Catostomus commersoni_	D	Spring
Walleye _Stizostedion vitreum_	D	Spring-early summer
Lake Sturgeon _Acipenser fulvescens_	E	Spring-early summer

A Coastal and short distance inland; specifically the Severn and Winisk Rivers

B Coastal streams and rivers and a few lakes

C Sutton Inlier: Aquatuk Lake, Hawley Lake, North Raft Lake, Sutton Lake

D Widespread in larger rivers and lakes

Table 3. Continued

E	Largest rivers
*	(Ministry of Natural Resources 1985:85-100; Ryder et al. 1964; Scott 1967; Scott and Crossman 1973)

caprodes), and mottled sculpin (Cottus bairdi) (Ryder et al. 1964; Scott 1967; Scott and Crossman 1973).

Within the study area, major fish species known to occur within Shamattawa Lake and Spruce Lake include cisco, lake whitefish, northern pike, walleye, longnose sucker, and white sucker. Additional species within Shamattawa Lake include yellow perch, johnny darter, trout-perch, logperch, and mottled sculpin (Ontario Ministry of Natural Resources 1985:86-90; Kenneth Abraham personal communication 1983).

In summary, the Hudson Bay Lowland is noted for its physiological contrasts ranging from barren tundra to forested river and lake edges to inland muskeg. The region is recognized less, however, for its diversity of resources, such as timber, shrubs with edible fruit - dwarf raspberry (Rubus pubescens) and wild gooseberry (Ribes hirtellum) - and variety of mammal, bird, and fish species. In this regard, it is instructive to conclude with a citation from Claude Charles Le Roy de la Potherie (in Tyrrell 1931:221) who in the late seventeenth century refers to the abundance of the region's resources:

Although this country is so cold, Divine Providence has not failed to provide for the subsistence of its inhabitants. The rivers are full of fish. The game is plentiful. There are such great numbers of partridge that it would appear incredible if I were to assert that one might kill fifteen to twenty thousand of them in a year....

The wild geese and ducks are so plentiful in spring and autumn that the banks of the river [Hayes River]... are all covered with them.... Caribou are to be seen almost all the year, but especially in spring and autumn, in herds of seven to eight hundred....

There is much fine peltry, such as very black martens, black foxes, otters, bears, wolves, whose skin is very fine, and, above all, beavers which have the best fur in all Canada....

CHAPTER THREE

FISH WEIR; FISH BASKET; FISH TRAP-WEIR

> Passed a fishing station of the Crane tribe, where they bar up the River, tho'it be full 150 Yds across, and have a Basket at one side, on which they take some seasons an immense number of sturgeon (HBCA B.234/a/1:7).

The three maps of the Severn District (Figures 2, 3 and 4) that accompanied James Swain's 1815 report are central to this study's philosophical position and methodology. The inclusion of fish "weir" locations correlates with the hypotheses discussed in Chapter One and it was fundamental to the identification of the geographical areas of study.

Seventeen weirs are located on the maps and many of the weirs are identified according to harvest productivity, such as "Very Good Fishg Weir," "Excellent Fishg Weir," "An Abundt Weir," and "Indifferant Weir." On some rivers the seasonal use of specific weirs is noted with captions, such as "Plenty Fish During Summer" and "Excellent fishg Weir Sum & Winter." Prevalent fish species trapped are also identified in such captions as "Fine Sturgeon Weir" and "Sturgeon & Succors Weir." Swain's attention to detailing weir locations and productivity is significant in the context of his report wherein he identifies the importance of fish to the Natives' economy: "By fishing and attending Fish Weirs a great portion of their [the Indians'] Sustenance is...obtained" (B.198/e/1:8d).

In order to appreciate the economic value of weirs it is necessary to understand their structural composition and functional characteristics. Swain, however, leaves the physical attributes of the fish weirs undescribed. Therefore, with attention to data derived from ethnographies, exploration literature, primary documents, and Native advisor consultations this chapter will present a discussion of fish weir technology that relates to the eastern Subarctic region west of Hudson and James Bays. This will provide the background for a concomitant discussion pertaining to the role of fish in the Lowland adaptive strategy.

A fish weir is an obstruction that has little effect upon the natural flow of water but serves to prevent the passage of fish (Oswalt 1976:120; Rostlund 1952:101). A weir constructed across a river obstructs the progress of fish up and/or down the river, but it does not in itself impound fish. Therefore, a weir is often built in conjunction with a trap; in seeking passage around the weir, fish are guided into a trap where further movement is restricted. A structure that includes both a weir and a trap is here referred to as a trap-weir.

Objects designed to control the movement and/or capture of animals - terrestrial and marine - are termed facilities (Oswalt 1976:105). A facility, such as a trap-weir, is composed of technounits and subsistants. A technounit is defined as "... an integrated, physically distinct, and unique structural configuration that contributes to the form of a finished artifact" (Oswalt 1976:38). Technounits are individual elements of like nature that characterize an artifact's structure. The structure formed by combinations of technounits is termed a subsistant when the technounits are combined to make a structure that is specifically designed for the purpose of obtaining food (Oswalt 1976:46). Therefore, a weir, which could be the sum of a number of technounits, is one subsistant. Likewise, a trap is one subsistant. In a trap-weir structure, the weir and trap are designated as separate subsistants since they are distinct from one another in the configuration of their structural units (Oswalt 1976:51).

Oswalt (1976:50) distinguishes between subsistants that are complex and those that are simple. A subsistant that experiences a change during use in the relationship between its technounits is considered complex. For instance, Oswalt (1976:50) provides the example of a toggle harpoon head that detaches from the harpoon's foreshaft after a seal has been struck. In this case, the harpoon head changes its relationship with the harpoon shaft. A simple subsistant, on the other hand, does not change in physical form during use. An example of a simple subsistant is a fish weir since it performs its function without a change in form. In sum, a fish trap-weir is a facility composed of two simple subsistants. Its function is to control the movement of fish and while performing its role the technounits that compose the facility's subsistants retain their physical relationships.

Fish weirs and fish traps have a wide distribution within the North American continent (see Birket-Smith 1929: 332-333; Rostlund 1952:169-173) and archaeological evidence suggests that their use has considerable antiquity. For instance, on the basis of radiocarbon dates that averaged "slightly older than 2500 B.C.," Johnston and Cassavoy (1978:707-708) attribute weir remnants found at Atherley Narrows, Lake Simcoe, to the late Archaic Period.

In the western Subarctic region the use of fish weirs and traps are reported among a number of Native groups including the Carrier (Harmon 1957:248; MacKenzie

1971:320-321; Morice 1895:84-86), Ingalik (Osgood 1970: 226-237), Tanaina (Osgood 1966:99-100), Upper Tanana (McKennan 1959:62), Han (Osgood 1971:68-69), and Chipewyan (Birket-Smith 1930:27). Within the eastern Subarctic recognition pertaining to the use of fish weirs and traps has been problematic. It is of interest to note that on Rostlund's (1952:292) fish weir and fish trap distribution map the use of such facilities among the Swampy Cree is labelled as unknown. In a similar vein, Skinner (1911) does not mention Eastern Cree use of weirs and traps and among the Northern Ojibway he reports only the use of fish traps - not weirs (1911:137). Nevertheless, in the eastern Subarctic region fish weirs and traps have been documented among the Lake Winnipeg Saulteaux (Hind 1971:163, 490-491), Northern Ojibway (Camsell 1912:93; McInnes 1912:134; Rogers 1967a:84; Rogers and Black 1976:7-9), and Swampy Cree (Hanks 1980:79, 108; Honigmann 1956:37; Mason 1967:33). East of Hudson and James Bays the use of weirs and traps seem to have been less intense although stone structures designed to control the movements of fish have been recorded among the Cree east of Rupert House (Clouston 1963:30) and among the Montagnais along the northern shores of the Gulf of St. Lawrence (Le Jeune 1634:309).

To the west of Hudson and James Bays among the Chipewyan, Lake Winnipeg Saulteaux, Northern Ojibway, and

Swampy Cree fish trap-weirs with two distinct forms of trap subsistants have been recorded. Both trap subsistents include ramps or troughs upon which fish ascend. One type of ramp, however, extends above water level while the other type of ramp remains below water level and includes a box-like extension, or pound. Their methods of operation also differ representing "tended" and "untended" facilities respectively (see discussion below; Oswalt 1976:105-149).

Among the Chipewyan, Birket-Smith (1930:27) recorded a fish trap-weir consisting of a weir that directed fish onto a ramp structure. One end of the ramp was bound to the river bottom while the opposite end reached above the surface of the water. Fish were scooped off the ramp with a hand net:

> Fish weirs are made in the form of a fence of branch-work leading obliquely from the deep part of the river into the bank, where a kind of slip is built. This consists of thin stems bound together, resembling in form a cone cut down the middle. The device is placed with the lower, wider end tramped firmly into the river bed and bound to a pair of posts, the upper end being fastened to a platform that is built over the surface of the water out of posts that lie across those of the slip. On this platform the fisher takes up his position and scoops up the fish with a kind of racket consisting of a coarse network of bass stretched in an oval frame with a short handle.

In 1858, Henry Hind (1971:163) recorded a "fishing weir" west of the Lake of the Woods and in the same year

John Flemming (Hind 1971:491) - a member of Hind's Canadian Red River Exploring Expedition - described a "basket" of the Lake Winnipeg Saulteaux that was located on the "Pike or Jack-Fish River." The nature of the subsistants described by Flemming are comparable to the Chipewyan example:

> The one [trap-weir] by which we were fortunately enabled to procure a supply of fish at the Pike River consisted of a fence of poles, stretching from one side of the river to the other; they were sloping in the direction of the current, like the inside of a mill-dam, and allowed the water to pass through but not the fish. Near the river bank, on one side, there was an opening in the weir about a yard in width to allow the fish descending the river to pass into a rectangular box, with a grated bottom sloping upwards, through which the water flowed and left the fish dry. The fish very seldom entered this pound in daylight, but during the night they poured in great numbers. In order to secure all that come into the trap when it is prepared for catching fish, an Indian sits beside it all night with a wooden mallet in his hand, with which he strikes the larger fish on the head to prevent them jumping out. He is kept busily employed pitching them out on the bank, and in the morning there is a large heap for the women to clean and cut up.

Among the Weagamow Ojibway in northwestern Ontario a fish trap-weir similar in form to the Lake Winnipeg Saulteaux and the Chipewyan structures is reported by Rogers and Black (1976:7-9). A description of the trap-weir is not provided; however, a diagram and photograph clearly depict a weir of poles with a pole ramp oriented downstream from an opening in the weir. As the fish pass through the weir opening and onto the ramp the water slides between the ramp poles leaving the fish stranded.

In the headwaters area of the Severn River, Camsell (1912:93) reports "... the natives have gone to a great deal of trouble in building weirs across the [Cedar] river..." and among people identified as Ojibway in the headwater areas of the Winisk and Attawapiskat Rivers, McInnes (1912:134) provides a clear description of a trap-weir consisting of a weir in conjunction with a ramp type of trap:

> These [trap-weirs] are constructed of spruce poles driven in a line into the bottom of streams, and interwoven with twigs so as to fence off the greater part of the water, and force it to run in volume only through a gate arranged so that the water flowing through the opening quickly drops away through the interstices of a platform of poles, leaving stranded all fish coming down with the current.

A similar fish facility was reported to Honigmann (1956:37) by the Attawapiskat Cree:

> September and October were mentioned as favorite months for weir fishing. In building the trap, people first made a fence that converged toward the center of a creek. For this they used stakes of spruce or other available wood, driving them into the water bed with mauls. Set close, these stakes were never lashed together. In the apex of the angle formed by the converging arms of the fence the workers set a basket trough made of thin poles lashed with willow bark line. The trap measured about three feet in width.... A sweep... serving to push fish

> into the trap, consisted of a three or four foot willow pole bent at one end to form an oval two feet wide. Here went a filling of willow bark line. The remaining length of the stick provided the handle.

Further north, in northern Manitoba, Hanks (1980:79, 108) documents the historic use of fish weirs in the Island Lake District and Mason (1967:33) provides a description of fish trap-weirs built in the mid-twentieth century by the Oxford House Cree. Particular note is made of this trap-weir type for the structure of the trap subsistant differs from the previous examples. The trap is comprised of a ramp and a pound. The ramp directs the fish into the pound where they are held until collected:

> A barricade of sticks is set in the bed of a shallow stream leaving only a two-foot opening where the current is strongest. As the fish swim downstream they are directed through the opening, up a narrow ramp of closely laid branches, to drop into a walled trap on the far side. Here, unable to jump over the walls or to retreat against the raised edge of the ramp, they remain helpless until the fisherman removes them.

Similar to the fish trap-weir type constructed by the Oxford House Cree, Winisk Cree elders - John Michael Hunter and John Crowe (personal communication 1985) - provided descriptions of fish trap-weirs they constructed and used that also consisted of ramp and pound components. During ice-free seasons a location is chosen where the river current is swift. A weir is constructed across the width of the river with the exception of an opening left where the river has a strong flow. The structure of the weir consists of closely placed, vertically aligned poles that rest at an angle against horizontal support beams. The ends of the horizontal beams are cradled in the apex of crossed poles that serve to hold the beams aloft. The weir obstructs the passage of fish, but it allows the water to pass through. The trap consists of a ramp that angles obtusely from the river bottom to a pound situated on the downstream side of the weir.

John Michael Hunter described the ramp as a series of long poles that are fastened side by side across flexible willow sticks. The ramp is pushed down between the sides of the weir opening forcing the ramp to take a trough-like form. The weir end of the ramp is secured to the river bottom and the ramp is angled so that the downstream end is situated slightly below the water surface. Approximately 30 cm of the downstream end of the ramp overhangs into a pound which has walls reaching above the level of the water. The size of the pound can vary according to water depth and builder preference. Blocked by the weir, fish pass through the only available opening onto the trough-like ramp which channels them up and over into the pound. The swift current and the ramp overhang impede the fish from escaping back down the ramp and the fish remain trapped within the pound until they are scooped out with a dip net. These structures capture fish without human operators although periodically the fish need to be removed to prevent overloading and subsequent damage to the trap element. This type of trap-weir is an untended facility (Oswalt 1976:131-149) and, as such, is efficient in that it allows the concurrent pursuit of other harvesting strategies (cf. Driver 1990:24).

The trap-weirs described above may possess structural similarities to the weirs referenced on Swain's maps. As such, the above descriptions present a background against which references to weirs in the records of the Hudson's Bay Company can be viewed. References to weirs in the journals and reports are primarily related to weir harvest and they are rarely explicit on the subject of structural characteristics. The entries evoke a sense of indifference to physical qualities as if knowledge pertaining to the nature of such facilities was common place. Even the more literary Company employees, such as James Isham (1949) and Andrew Graham (1969) who produced substantial manuscripts pertaining to the natural and human history of the Hudson Bay area, mention weirs only in passing. James Isham (1949:168) epitomizes the above notion of common knowledge by limiting his discussion of weir structures to the following statement: "...these [sturgeon] are Catch't, by the Natives in Wair's, - made after the same manner as in other parts',...." Although the lack of attention to trap-weir details creates a challenge for reconstructing structural characteristics, in the context of writing daily journals it is not difficult to understand why writers ignored such discussions in favour of noting the harvests produced by these facilities.

Valuable insight into the nature of structural characteristics, however, can be gleaned from terms that have been employed to label such facilities. In journals from Severn House (HBCA B.198/a/8, 60, 70, 71, 78, 79, 80, 84, 85, 88, 90, 92, 94, 96, 99, 101, 103, 106, 108), Trout Lake (HBCA B.220/a/ 1, 4, 30, 31, 33, 34, 36, 37, 39, 43-48), Beaver Lake House (HBCA B.250/a/1), and Merry's House (HBCA B.125/a/1) "weir" and its variant spellings - waire, wear, weire, were, wier, wir, wire, and wires - are the dominate terms employed. At Severn House (HBCA B.198/a/8:7d), Andrew Graham also used the term "Lock" which was clearly used as a synonym for "Wear." Technically, these terms refer to the weir element; without qualification they do not imply the presence of a trap although the writers may have used the terms in a generic sense and the contribution of the trap is inferred. The opposite situation arises in journals from Fort Hope (HBCA B.291/a/1), Martin Falls (HBCA B.123/a/93) and Cat Lake

(HBCA B.30/a/16). At these posts the writers employed the terms "basket" and "fish basket." The facilities alluded to in these journals either did not include weir subsistants or weirs were inferred within the term.

Clarification of this issue is provided by George Barnston in the Winisk River Journal of 1833-1834 (HBCA B.234/a/1). In a rare instance of elucidation, on August 27, 1833 Barnston (HBCA B.234/a/1:7) records passing an Indian fishing station that was comprised of both a weir and a basket-like trap (italics are for emphasis and are not part of the original text):

> Passed a fishing station of the Crane tribe, where they *bar up* the River, tho'it by full 150 Yds across, and have a *Basket* at one side, in which they take some seasons an immense number of sturgeon.

On September 30th of the same year (HBCA B.234/a/1:11d) Barnston sent a servant, John Beads, to make a "wear" at a lake where it was known that whitefish could be taken:

> Dispatched John Beads to a Small Lake, where it is said Whitefish may be taken in the fall. William Peebles and the Boy Nebuooitum accompany him, to assist in making a *wear*, but they are to return as soon as it should be finished.

Beads returned in early October and informed Barnston that he was getting few fish. Barnston's journal entry for

October 7, 1833 (HBCA B.234/a/1:11d) refers to Beads' use of a facility composed of both weir and "basket" components:

> John Beads who has just paid me a visit, informs me, that he is doing little or nothing where he is. He has *dammed up* the small Creek, which empties the Lake, and from the *Basket* which he has there, he draws only 10 or 15 White fish nightly.

With these three citations, Barnston identifies the combined use of a weir and trap, and he indicates that his use of the term "wear" implies a trap-weir.

Although the writers of the journals were inconsistent and employed loose terminology this evidence suggests that it is highly likely that the facilities to which these various terms referred consisted of both weir and trap subsistants. As such, it seems appropriate to forward the notion that in the Hudson Bay Company journals studied, as well as on Swain's maps and in his report the facilities referenced bore similarities to the fish trap-weirs described above. The term "basket" is a clear reference to a trap and it is an appropriate label for the basket-like characteristics of the ramp and pound subsistants.

The earliest reference to a trap-weir in the documents studied was written at Severn House on October 3, 1766 by Andrew Graham noting that he received "... 230 fine fish called Tickameg from a Lock, or Wear Made by the Indians..." (HBCA B.198/a/8:6d). The most recent reference was written in the Trout Lake journal on March 3, 1918 when the writer noted the "... Men have been hauling fish from the wire..." (HBCA B.220/a/48:164). In addition to representing beginning and end dates for references to fish facilities used in this study, these two citations also represent contexts that are common to the entries. The successes and failures of fish trap-weirs in producing fish is a prevalent theme and one of clear importance when it is realized that fish were depended upon for both human and dog consumption. A "good" harvest from a "weir" operated for the benefit of Severn House was noted on January 5, 1848: "... our weir is Given in I have Got nearly 1000 Succors from it which is very Good Such a year as this when there is no partridges to be Got" (HBCA B.198/a/92:25). However, on December 26, 1851, John Cromartie at Severn House noted the failure of an Indian operated "weire": "... ther weire has given in or at least getting little or nothing out of it..." (HBCA B.198/a/99:20d). Along with harvest references, entries pertaining to the retrieval or hauling of fish from trap-weir locations are common. For instance, at Trout Lake the journal entry for February 14, 1894 noted: "... men came back from the wire brought home 269 Sockers..." (HBCA B.220/a/45:12). Similarly, at Trout Lake on March 17, 1862, the arrival of fish was recorded in an entry stating: "... the Dogs Arived to Day with fish from the wire..." (HBCA B.220/a/34:22d).

When the entries are amalgamated from all of the journals, references to weirs or fish baskets occur within every month of the year. However, the references do not always refer to the operation of these facilities, nor can it be assumed that the references imply their operation. Fish were often preserved where they were caught (HBCA B.220/a/1:24); therefore, when reference is made simply to men who returned from the weir with fish (HBCA 220/a/45:12) the stock may have represented cached supplies rather than fish freshly trapped. Nevertheless, when entries indicating facility operation are indexed only the months of August and September are without such references. August and September, however, are included with March, May, June, July, and October through December as months when trap-weir construction took place indicating that the lack of references to operating facilities in August and September is likely related to the limitations of the historical record rather than actual custom.

The journals clearly indicate that fish trap-weirs were operated during ice-free, as well as ice-covered seasons. This is in keeping with James Swain's description of a Shamattawa River weir as "... a most Abundant weir that produced Fish of various kinds almost the whole year March and April excepted" (HBCA B.198/e/1:4d). The construction and operation of such fishing facilities during the extremes of the Subarctic winter would seem to be untenable; however, Cree elders support the historical evidence with the following descriptions of trap-weirs they built and used in the ice-covered periods.

The ice is removed for the placement of the weir which consists of poles and branches vertically angled between the river bottom and the ice-cover. An opening in the weir is left where enough ice is removed from the downstream side to accommodate the length and width of the ramp. The weir end of the ramp is secured to the river bottom and the ramp is angled so that the downstream end rests against the ice. This type of trap-weir is most productive at night; therefore, the bark is stripped from the ramp poles in an effort to lighten the colour of the ramp and thus increase the visibility of the fish. As the fish swim up against the ramp, an operator - who stands on a platform built along beside the ramp - forces the fish up the remainder of the incline and onto the ice with a hand net or wooden scoop. At daybreak the frozen fish are gathered from the ice. This type of trap-weir with a ramp that extends above the water-line is referred to as a "tended" facility (Oswalt 1976:105-130) in that the ramp channels the fish to where an operator completes the capture.

Trap-weirs were not discriminatory in the type of fish species they trapped and in certain seasons, such as during spawning periods, they produced "vast quantities" of fish (HBCA B.198/e/1:4d). Trout, sturgeon, pike, sucker, and whitefish are all mentioned in references to trap-weirs, but it is the suckers and whitefish that were captured in great numbers. Andrew Graham (1969:122) wrote in the late eighteenth century that during fall spawning periods "weirs" commonly produced five to six hundred whitefish a day. Similarly, Hugh Leslie, writing at Merry's House in the spring of 1818, wrote in the March 25th entry that the "... Indians are getting thousands of Suckers at the waire" (HBCA B.125/a/1:8d). Trap-weirs, however, were not always productive: during the winter of 1848 a "weire" operated by Indians in the Severn House area produced no fish (HBCA B.198/a/94:16d) and in the depth of winter some trap-weirs stopped producing fish due to the excessive thickness of the ice (HBCA B.198/a/96:23d; B.198/a/101:25). Nevertheless, both tended and untended fish facilities were effective in controlling the movement of fish and by making subsistant adjustments commensurate with seasonal conditions trap-weirs were operational on a year-round basis.

Based upon conversations with Cree elders in concert with historical evidence, the view is forwarded that fish played a major role within Lowland adaptive strategies. This is not, however, an argument that favours fish as the sole primary subsistence resource for as discussed in Chapters Four and Five the archaeological record demonstrates the exploitation of a wide variety of resources. As well, when consideration is given to the faunal remains recovered from such sites as the Ile de L'Ourson 1 and Niapscaou sites along the Severn River (Pilon 1987) and the Hawley Lake and Cowell sites on Hawley Lake (Hamalainen 1974; Pollock and Noble 1975) there can be little doubt that caribou represented a major Lowland focal resource in both the pre- and post-European periods. For meat, bone and antler for constructing tools, and the all important skins for shelter and clothing the caribou was clearly important for successful Lowland adaptation.

Within the eighteenth and nineteenth centuries, however, the Severn House journals document numerous instances of Native people subsisting largely upon fish (HBCA B.198/a/22:29d; B.198/a/28:20; B.198/a/29:14, 37, 38d; B.198/a/65:65; B.198/a/69:13d; B.198/a/70:10d; B.198/a/72: 12d). This evidence is forwarded with the recognition that the direction of emphasis given toward harvesting resources fluctuated over time due to changes in resource availability. For instance, in the face of declining caribou populations during the nineteenth century, Rogers and Black (1976) documented a period when the Weagamow Ojibway were forced to depend upon fish and hare. Although this historical reality (i.e. resource fluctuations and behavioural responses) is wise caution for the use of relatively recent data to suggest the value of fish within earlier periods it is, nevertheless, important to recognize that in the early years of contact Indians traded large quantities of fish with the foreign traders (HBCA B.3/d/1 in Bishop 1984:32) indicating that fish harvests, at that time, were well entrenched within the Native adaptive strategy.

An adaptive strategy is fundamentally a set of decisions and actions oriented toward maintaining greater energy gain relative to energy expenditure (Cleland 1976: 60). It is a fluid process dependent upon the inter-relationship of resource availability, human need, and the intimate knowledge of a given environment upon which is based short-term and long-term decisions pertaining to movement and resource harvest. In this regard it is instructive to cite Feit's (1983:11-12) discussion of the value of knowledge and territories as it pertains to the Waswanipi Cree:

> ... the hunters must have detailed knowledge of: 1) one or more wildlife populations, and with non-migratory species, they therefore must know the wildlife on a given, more or less precisely defined,

> piece of territory; 2) they must know the history of the wildlife populations on that piece of territory because the entire system is based not on knowing exact numbers, but on comparative evaluations, on knowing trends in commonness of animals, trends in size and composition of aggregates, and; 3) they must know the history of harvests because they must be able to judge if trends in the populations are related to trends in harvests, and they must be able to anticipate the consequences of future harvesting decisions.

In effect, resource knowledge, specifically as it applies to predictable resources, reduces search time (Keene 1981:27) and tends to integrate harvest activities with periods of high resource vulnerability (Feit 1987:78-79; for discussions pertaining to related issues of stewardship, sustainable yields, and rotational hunting see Feit 1983, 1986, 1987, 1988; Tanner 1987).

Inherent in the accumulation of knowledge and foraging action are communication and planning. Sharing information pertaining to past foraging successes and failures will decrease search time (Keene 1981:23), but more importantly, through information sharing and planning, areas are managed by preventing conflicts between intra- and inter-group foraging activities (see Tanner 1987:71). Information sharing and planning also "map" the locations of support groups if help is needed:

> Every spring every year people come together from any place in the community [area], even before the

> European settlement, and they used to come down and meet each other and discuss their traplines last winter. And they know that they can exchange information and say well I have trapped that area as much as I can and they know that there won't be much there. They always make known to each other where they are going to go next winter. They always discuss that during the summer. That was planned. Thinking about trapping in that area this winter. So everybody else knows the whereabouts they are going to be - where about in the area they are going to go trapping. That is the reason that the people in the area know already where to seek help when, during the winter, there is help needed. You know, when they need help, they know where about in the area that person is located - that family, or certain families. Because they already planned in summer time. That is the reason. Because of this planning in the summer time...[you know] where to go for rich hunting ground [and] if they are going to go with an individual family or families. For that reason, if families are running into a problem out of sickness or anything like that they always know where to reach and where to go - to seek help from other families. This is always planned (John Michael Hunter personal communication 1985).

As noted in Chapter One, resources that are considered focal receive specific foraging attention, but it is important not to assume that any one focal resource equates with dependency. Indeed, a focal resource may contribute little to the daily maintenance of a foraging group if the pursuit of the resource is unsuccessful. The adaptive strategy outlined here is based upon this premise in conjunction with the recognition that women, as well as children and elders play vital roles in group maintenance. Among the !Kung Bushman of the Kalahari Desert, for instance, Lee (1968:33) found that women produced two to three times as much food as the men. Women pursued the harvests of the abundant and stable vegetable foods while the men devoted their energy to the less reliable but more valued small and medium mammals. The following passage (Lee 1968:41) pertaining to the Bushman's production of food also has validity for considering Lowland subsistence patterns:

> The essence of their successful strategy seems to be that while they depend primarily on the more stable and abundant food sources (vegetables in their case), they are nevertheless willing to devote considerable energy to the less reliable and more highly valued food sources such as medium and large mammals. The steady but modest input of work by women provides the former, and the more intensive labors of the men provide the latter.

Inherent in the above passage is the notion that cultural emphasis among the !Kung Bushman is given to hunting - and hunting is performed by men. This also applies to foragers in the eastern Subarctic. Writing about the Attawapiskat Cree, Honigmann (1961:189) indicates that hunting large game animals - the role of the male - is associated with a feeling of exhilaration and hunter prestige. Harvesting fish, on the other hand, does not embrace kindred values for the male hunter and among the Attawapiskat Cree (Honigmann 1961:149) and the Winisk Cree (Trudeau 1966:47) harvesting fish is largely the women's responsibility. Referring to the Winisk Cree daily pattern, Trudeau (1966:47) recorded that following the morning departure of male hunters women checked rabbit snares and retrieved fish from fish weirs. These contributions, if not allotted high prestige, are nevertheless recognized by the Cree people as significant within their adaptive strategy:

> ... when a family goes out to the hunting ground they have to consider all of these things. They have to plan the activities of the women to supply themselves with food as they are able to do it - as they are capable of catching the fish in the camp area. And also, children that are able catch the food stuff while the men folk are out hunting other items.... That is the major planning. They choose an area where everybody can participate in providing food for the family. And in the old days that was the actual planning for the year round living (John Michael Hunter personal communication 1985).

In the context of the settlement pattern model formulated in Chapter One, the general adaptive strategy within the Hudson Bay Lowland was based upon a diverse economy and a long-term accumulation of knowledge and experience. The value of long-term experience within a given environment, or home range, is the accumulation of knowledge that advises where, when, and what resources can be efficiently harvested in relation to all other resources. On the basis of ethnographic and archival sources of data, fish - within the diverse economy - are given a high profile. Although the gathering of fish lacks the prestige of the hunt this attribute bears little relation to the value of the overall contribution made by fish to Native subsistence.

When read in the context of a diverse economy the following citation taken from a letter written by James Sutherland, December 1824, provides insight into the nature of Native adaptation:

> Of the possibility of their being able to subsist without supplies from us we have convincing Proof as there is now in the Weenusk Country three Indians & their Familys who through some Disgust has not been at the House for the last three Years & live Idly and Easy at Fishing Stations seldom in want of Food & warmly apparelled in Furs (HBCA B.198/a/67:24d).

A superficial study of Sutherland's comment may suggest that the "three Indians & their Familys" were depending upon fish; however, a critical interpretation intimates diversity in available resources. Fish were undoubtedly being utilized, but, presumably, so was the meat from the animals who provided the skins by which the Indians were "warmly apparelled." Regulated by knowledge, experience, and tradition the Lowland adaptive strategy was an interrelationship of foraging activities oriented toward the exploitation of a range of seasonally available and efficiently harvested focal resources in concert with the harvest of fish:

It is a culture tradition...[among]...the Indian people [that] the first priority for the planning is to go to the hunting area - hunting ground - and then to select...a certain lake...[for]...the fish that will be there. Even though other things are depended upon as food...the main planning is to make sure that there is fish...where you are going to go so you will catch as much fish as you can. You can depend on fish more that any other. You can be certain that you will get a fish. And it has happened...ever since I can remember. And even though there were settlements around the Bay,...when the families were asked to leave for their hunting ground no matter how far they may be...their first priority is to select the area where there is plenty of fish, and, where there is a good place, they will set a fish trap. And this is the original procedure. It is tradition. It is a culture tradition. And...even before the European...it was always the same. Because that is all the people can depend on is actually fish. They can catch [fish] more easily than any other kind of food stuff (John Crowe personal communication 1985).

CHAPTER FOUR

SHAMATTAWA RAPIDS SITE (GbIj-2)

Introduction

> Waynuskee [Winisk River] is ... productive of the several kinds of Provisions, particularly Geese Fish and Venison. About twenty Miles up the River is a large rivulet on the south side called by the Natives Sas way mah tow ah up which is a most Abundant Weir that produces Fish of various kinds almost the whole year March and April excepted (HBCA B.198/e/1:4d).

The above citation appears in James Swain's 1815 report in a section pertaining to the resources of the Severn District. The two rivers referred to in the statement are clearly delineated in the central section of Swain's eastern map (HBCA G.1/34; Figures 2 and 5). A river leading from "Sas way mah tow wah Lake" joins the south side of the "Way nus kee River" at a point that is indicated to be 20 miles from the Hudson Bay coast. Along the river that enters into the "Way nus kee River" a fish trap-weir - which is with little doubt the trap-weir referred to above - is labelled as "Excellent Fishg Weir Sum^{r} & Winter."

Currently, the "Way nus kee River" is known as the Winisk River and "Sas way mah tow wah Lake" is known as Shamattawa Lake.

The "Sas way mah tow wah Lake" and the river that joins the "Way nus kee River," as shown on Swain's map, share a general similarity in overall configuration with the same area shown on a contemporary 1:250,000 scale topographic map. Current renderings - which are based upon aerial photographs - show the river immediately north of Shamattawa Lake to expand in width before it finally assumes a relatively uniform width for its last reach to the Winisk River. Swain's map also shows this characteristic expansion in river width. The fish trap-weir is located at the point where the river narrows and this location is further identified by the existence of two islands in the expanded area of the river that appears on both the historic and the current maps. Therefore, the relative position of the "Sas way mah tow wah River" fish trap-weir can be accurately located on the Shamattawa River.

As marked on Swain's map, the fish trap-weir was located on a river that drained a lake noted for its "Great Abundance of Fish." Similarly, the trap-weir produced fish of "various kinds" in both the summer and winter periods. Therefore, given the apparent significance of the area - at least in the early nineteenth century - along with the productivity of the fish trap-weir, this location was considered to possess considerable potential for having received recurrent and sustained occupation.

During the historic period, and perhaps earlier, the Shamattawa River played a significant role as a travel route between the area north of the Winisk River and the James Bay coast (John Michael Hunter personal communication 1985). By taking an inland route the hazards of sea travel around Cape Henrietta Maria were avoided. In 1895, for instance, this route was followed by Bishop J. A. Newnham during his tour of the Moosonee Diocese (NAC. MG 29 D49 Album:7).

In travelling south from the Winisk River, the Shamattawa River is followed into Shamattawa Lake. At the southern end of Shamattawa Lake a northward flowing river is followed to where two short portages, separated by a small lake, connect with the Ekwan River. The Ekwan river is then followed to the James Bay coast. The two portages and small lake that connect the Shamattawa route system to the Ekwan River, as described by John Michael Hunter, are shown on Swain's 1815 map (Figure 5) indicating that in the early nineteenth century the Shamattawa River was an established route of travel.

The Shamattawa River flows north draining into the Winisk River approximately 35 kilometres from the Hudson Bay coast. The study area is located 85 kilometres south of the

Winisk River and seven kilometres north of Shamattawa Lake. At this point (Figure 6), the river expands to one kilometre in width within which the two small islands are centrally located. The river narrows approximately one kilometre north of the islands. The current is relatively swift and 300 metres downstream two arm-like bank extensions of river rubble direct the flow of water into two series of small rapids. Behind the cobble beaches the vegetation is dominated by black spruce (Picea mariana), balsam poplar (Populus tacamahaca), sage-leaved willow/hoary willow (Salix candida), sweet gale (Myrica gale), and red osier dogwood (Cornus stolonifera) (Deborah Metsger personal communication 1984).

Situated in the expanded portion of the Shamattawa River the northern tip of the largest island was the site of our field camp and it was considered to hold potential as a location of past occupation. It allowed an excellent northern view of the Shamattawa River and it was pleasantly exposed to the westerly breezes that aided the battle against biting insects. Nevertheless, in spite of the area's positive qualities, thirty-three 25 cm square test squares failed to reveal any evidence of human activity.

The interior region of the island, however, exhibits a substantial clearing with structures and remains from a winter camp. Referred to as the Cabin Island site (Appendix

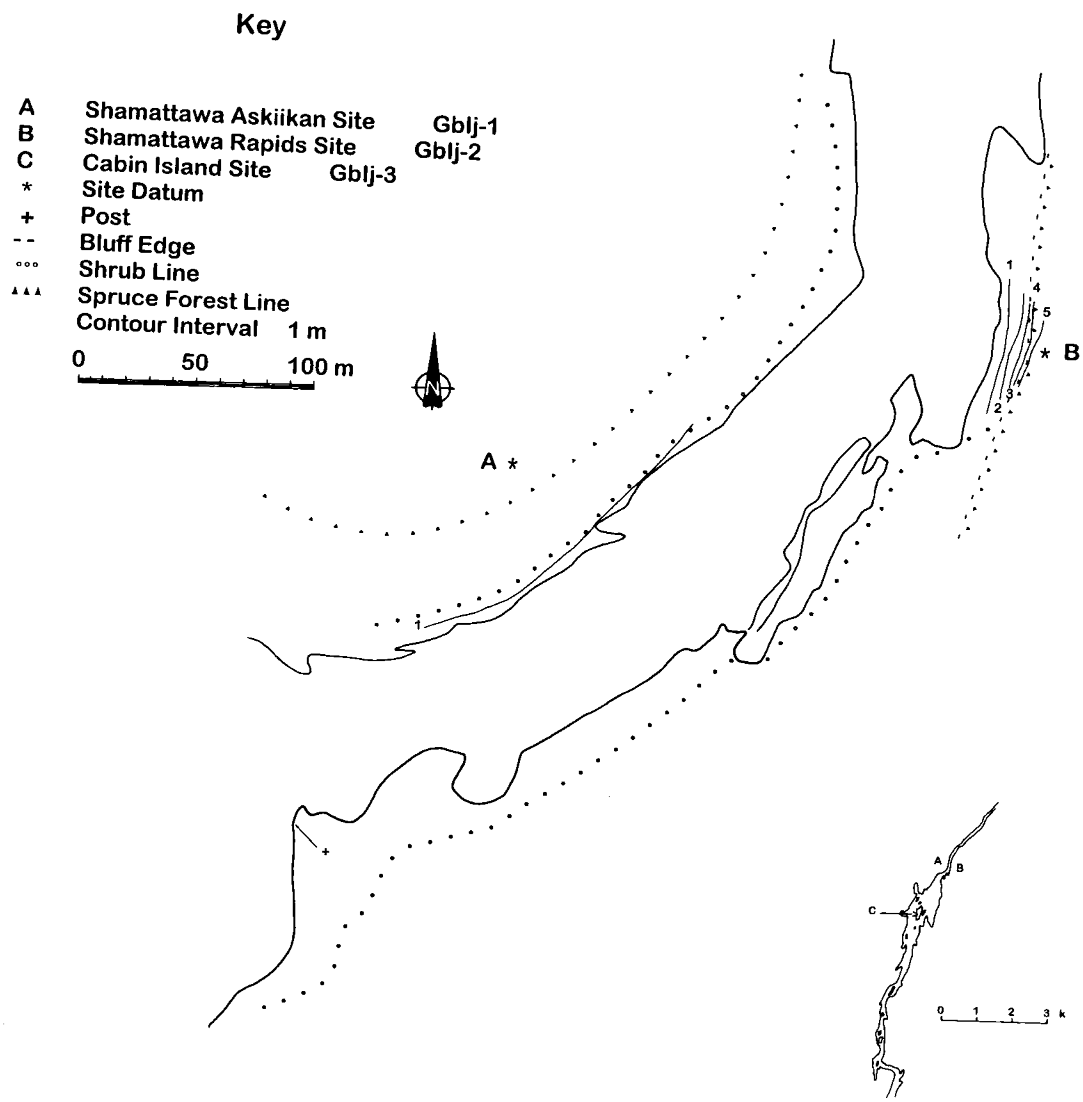
Figure 6. Shamattawa River Sites.

Shamattawa Askiikan Site (GbIj-1)

Shamattawa Rapids Site (GbIj-2)

Cabin Island Site (GbIj-3)

Shamattawa River



A) the camp is engulfed and protected by the spruce forest with very little of the site visible from the water. Occupied during the late 1970s and early 1980s by two Winisk Cree families the salient features of the camp are the remains of two log cabins, two tent frames, two storage racks, and a smoking rack.

To the north of the island the remains of an older winter camp dating to the middle years of the present century were found on the northwest side of the river adjacent to where the river narrows. At this location, the edge of the river bank is seven to ten metres from the water edge and one to two metres above the July 30th water level. The contour of the area back from the river bank is relatively flat. For approximately 25 metres inland the vegetation is characterized by a dense thicket of deciduous bushes, but beyond the deciduous bushes a markedly more open spruce dominated forest prevails. The camp, referred to as the Shamattawa Askiikan site (Appendix B), is located inland within the cover of the spruce forest with only the top of a conical smoking/cooking rack revealing the site's presence from the river. Formerly occupied by Winisk Cree families the site's structures include the remnants of a moss-covered conical lodge, or askiikan, a conical tent frame, bases for two tents, three storage racks, a smoking rack, and a smoking/cooking rack. In addition to the above structures, the site bears the remains of two ladders and a metal stove.

Within the deciduous bush thicket between the site and the river, 25 cm square test squares were dug every five metres along inland oriented transverses that were placed ten metres apart. These excavations, however, produced no evidence of cultural remains.

On the opposite side of the river, downstream approximately 370 metres from the point where the river narrows and adjacent to a set of rapids, the Shamattawa Rapids site was found situated on top of the river bank (Figure 6). The area within which the site lies is a relatively flat plain 5.5 metres above the water surface. The area of the site is dominated by black spruce trees. A thick growth of deciduous bushes extends one to two metres down the bluff keeping bank erosion to a minimum. The edge of the bluff provides a fine unobstructed southerly view of the river.

Over a distance of 30 metres along the top of the bank three individual concentrations of burned logs were found partially buried in the moss surface layer. The most northerly log concentration was less confined in its spatial organization than the other two and it was associated with a tree that also bore evidence of burning on its southeastern base. The more northerly of the two southern log concentrations rested approximately four metres east of the bluff edge. A 25 cm square test square was dug to the southeast of this concentration and at a depth of 8 - 9 cm below the surface two retouched flakes (Figure 21A and B) and one utilized flake (Figure 13F) were recovered. These finds, in conjunction with the burned log concentrations, indicated that a more extensive investigation of the area was warranted.

A grid consisting of 27 one metre squares was strung extending 10 metres along a north-south axis and three metres along an east-west axis. The mid-point along the main north-south axis was situated 6 metres east of the bluff edge. The excavation advanced in checkerboard fashion so that adjacent squares were excavated at different times. In total, fifteen one metre square units were opened. Each one metre square was divided into four 50 cm square sub-squares and the excavation proceeded by sub-square. The squares were excavated according to stratigraphic levels and all soil was screened through a 1/8 inch (3.4 mm) metal mesh. Finds recovered during trowelling were located horizontally by triangulation and vertically by reference to a fixed datum. Through the procedure of excavating by sub-square, items recovered from the screened soil could be identified to a specific quarter of the one metre square. Following the excavation of the main unit a total of 18 test squares were dug to the south, west, and east in an attempt to determine the limits and/or continued direction of the cultural remains.

Two levels of occupation were unearthed at the Shamattawa Rapids site. The remains of the most recent occupation were limited to the hearth and a small collection of faunal material. Evidence of this occupation came from Level 1 of the site's strata and it is thought to represent the late historic period dating to approximately the turn of the present century. The remains of the older occupation were lithic in nature and came from the site's Level 3 stratum. Results pertaining to the analysis of two carbon samples date the remains from this stratum to include the beginning centuries of the first and third millennia B.C. These dates, in combination with the morphology of a side-notched point, suggest that the Level 3 collection is representative of the Shield Archaic period.

Stratigraphy

The stratigraphy of the site was a relatively simple layering of four strata. Level 1 consisted of a layer of moss that blanketed the forest floor. The moss level generally ranged between 5 cm and 10 cm in thickness; however, thicknesses as thin as 1 cm and as thick as 15 cm were also recorded. This level produced the remains of the above mentioned fire along with a small amount of faunal material. Immediately beneath the moss lay a relatively thin, culturally sterile layer of soil with a sandy silt loam texture (for attributes of soil description see Limbrey 1975:254-268). Level 2 was black in colour (Munsell Color 7.5YR 2/0) and possessed a high organic content. Its structure was structureless to very weak in that when disturbed it disintegrated into separate particles. This layer ranged between .5 cm and 6 cm in thickness. Level 3 was comprised of soil with a sandy clay loam texture. The structure of this horizon was moderate: small aggregates, or peds of soil, were common, but the peds easily disintegrated. The colour of Level 3 ranged from dark brown (Munsell Color 7.5YR 3/2) to strong brown (Munsell Color 7.5YR 4/6). In depth the horizon reached a maximum of 25 cm within which occurred boulders and stones of various sizes. This level produced the bulk of the site's cultural remains. Level 3 was underlain by the site's subsoil. Level 4 - the subsoil - was a horizon of sandy clay textured soil intermixed with gravel. Its structure ranged between moderate and strong as some of the peds remained intact during rough handling. In colour this level ranged between dark grayish brown (Munsell Color 2.5Y 4/2) and dark brown (Munsell Color 10YR 4/3). Following the completion of the excavation the stratigraphy was preserved in a soil peel taken from the east wall of square S8W1 using the technique described by Golberg (1974).

Level 1

The cultural remains from Level 1 were embedded and/or partially embedded in the moss layer. The remains that were visible on the surface consisted of nine partially burned logs and pieces of wood that were mapped in squares S6W2, S6W3, S7W1, and S7W2 (Figure 7). One additional log that was largely located in square S6W3 was buried in the moss layer. This accumulation of wood represents the remains of a hearth. In addition to the wood remains, in the subsurface the hearth was marked by concentrations of charcoal and fire reddened soil. In profile the hearth basin reached a maximum depth of 9 cm that included a 5.5 cm dip into the Level 3 horizon. The logs and pieces of wood displayed evidence of axe cuts and they represented the only form of cultural material found within the hearth.

The balance of the Level 1 cultural materials consists of faunal specimens from square S8W2 and from a test square dug to the southwest of the main excavated unit (Table 4). The S8W2 square faunal assemblage consists of

Figure 7. Shamattawa Rapids Site GbIj-2.

Levels 1 and 2: Floor Plan.

Shamattawa Rapids Site   GbIj-2

Levels 1 & 2   Floor Plan

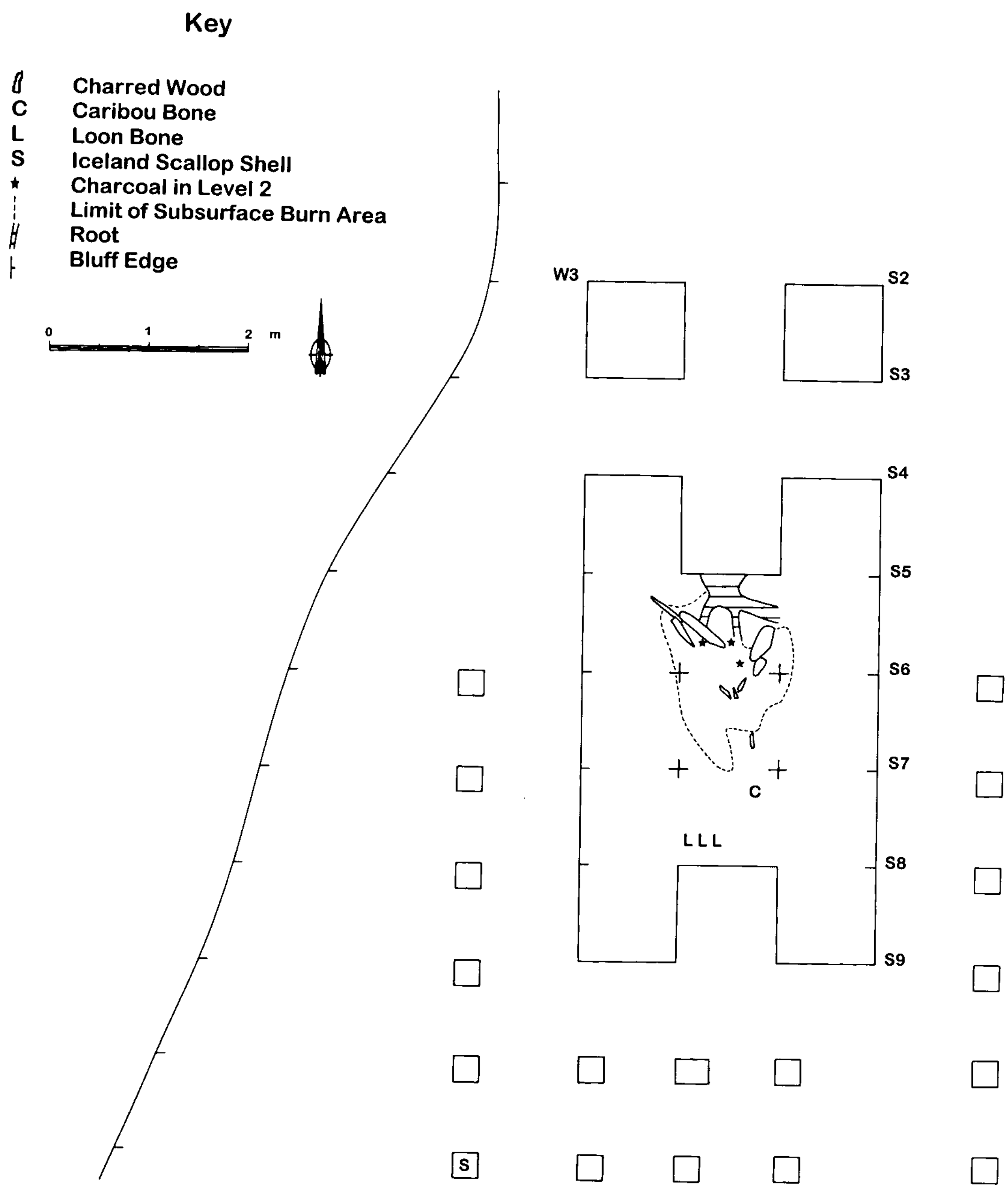


Table 4. Level 1: Faunal Remains.

Common Name	Element	Side	Age	n
Caribou	Radius/Ulna	Left	Sub.+	1
Common Loon	Ulna	Left	Imm.+	1
	Radius	Left	Imm.+	1
	Carpometacarpus	Left	Imm.+	1
Iceland Scallop	Shell			1
Total				5

one caribou (<u>Rangifer tarandus caribou</u>) and three common loon (<u>Gavia immer</u>) bones. The test square assemblage is comprised of the basal portion of an Iceland scallop shell (<u>Chlamys islandica</u>).

Caribou are permanent residents of the Hudson Bay Lowland. They are moderately gregarious and they undertake "local seasonal migrations" (Banfield 1961:70; see Chapter Five, Discussion of Faunal Remains). The common loon, on the other hand, is migratory: the loon nests in the Lowland (Peck and James 1983:15), but it winters to the south (Godfrey 1966:10). The caribou and common loon bones recovered from Level 1 are spatially associated and therefore a harvest restricted to the months of the loon's summer range is suggested for both species.

The Iceland scallop is a cold water bivalve, or pelecypoda with a North American range that includes both the east and west coasts. In the east the Iceland scallop ranges from the North Atlantic - including the waters of Hudson Bay - to Cape Cod (Pelletier et al. 1968:575). It is found from extreme low water to 100 fathoms and it is often washed ashore at the drift-line (Bousfield 1960:29). Iceland scallop shells are also found in deposits of the Tyrrell Sea (Pelletier et al. 1968:575). The concave structure of the shells make them useful as spoons and ladles; therefore, at the site the cultural significance of the Iceland scallop was likely related to the utilitarian value of its shell rather than to any value the animal may have had as a source of food. In the early part of this century, for instance, McInnes (1912:135) noted the significance of these shells when referring to debris found in Native camps along the Attawapiskat River:

> At camping-places of the Indians broken specimens of Pecten islandicus [Iceland Scallop] were noticed among the debris of the camps. These shells occur in a very perfect state of preservation in the marine clay, and are still used by the Indians along the river as very convenient substitutes for spoons.

The hearth feature and the bone assemblage are considered to be temporally related and represent a single component. The relationship of the Iceland scallop to the hearth and bone assemblage, however, is inconclusive although it is reasonable to assume that an association exists. The Level 1 assemblage appears to represent the remains of a camp that was occupied around the turn of the present century during ice-free months of the year.

Level 3

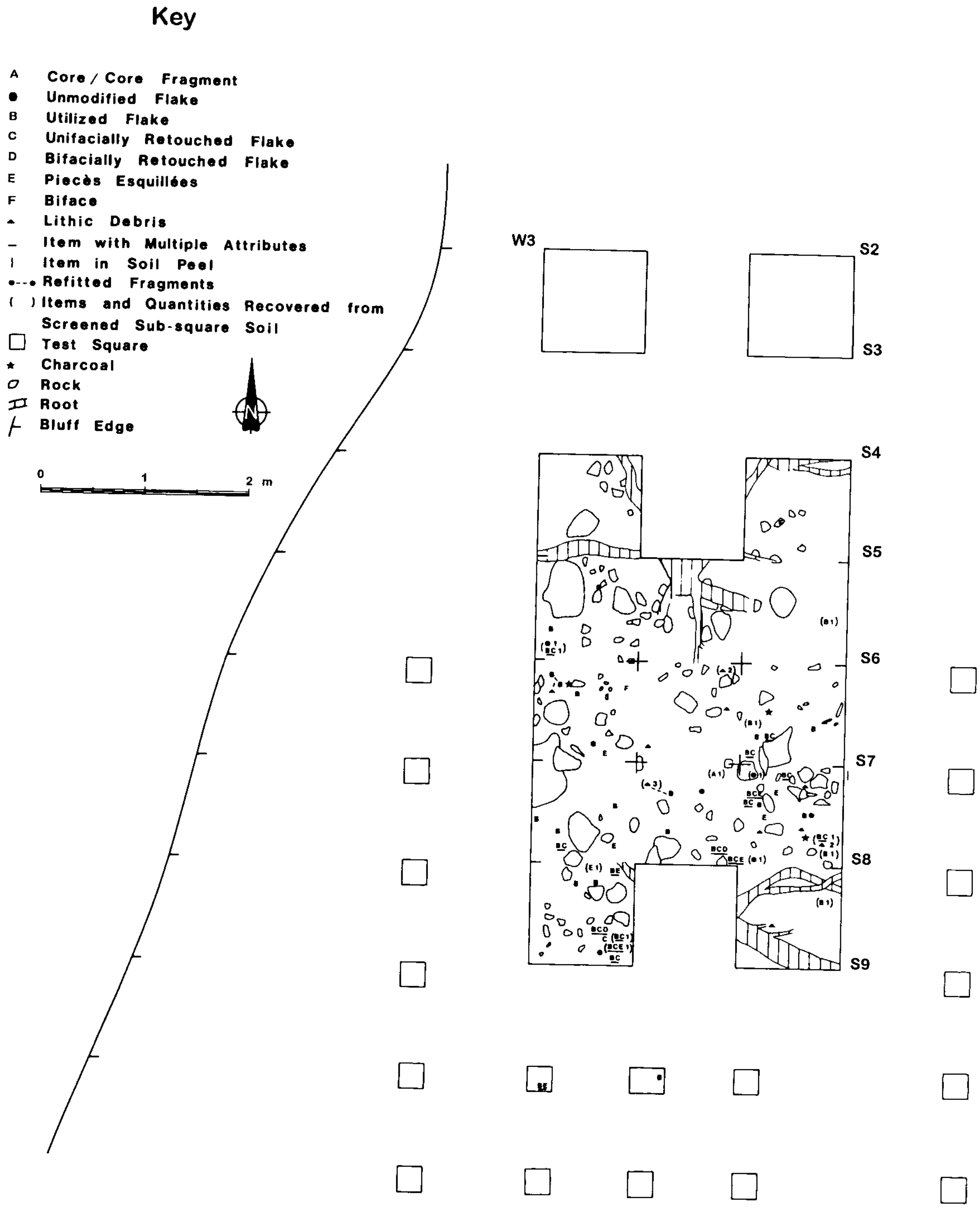
Level 3 was a relatively homogenous layer of sandy clay textured soil. It exhibited an irregular depth ranging in thickness between 1 cm and 25 cm; however, the extremes in thickness were not common as the more prevalent depth ranged between 10 cm and 20 cm. In addition to the boulders and stones uncovered throughout this level a scattering of fire-cracked rock was located in squares S3W1, S5W1, S6W2, and S7W1 with the largest concentration occurring in the northeast quarter of square S7W1. The cultural remains recovered from Level 3 consisted solely of lithic specimens (Figure 8). Ceramics were absent and with the exception of one intrusive unidentified mammal specimen from square S8W1 any organic materials - faunal remains and bone, antler, and wood tools - that were deposited at the site have long since decomposed due to the destructive nature of the acidic soil.

Figure 8. Shamattawa Rapids Site GbIj-2.

Level 3: Floor Plan.

Shamattawa Rapids Site Gblj-2

Level 3 Floor Plan



Within Level 3, stratigraphic separation of the lithic remains was not apparent. It is appropriate to view the spatial organization of the lithic collection in the context of "compressed stratigraphy" in that multiple occupations of the site are likely represented, but the remains of each occupation are not differentiated from each other due to slow soil accumulation and to the mixing effects of repeated site use, roots, frost-heave, and rodents (Reid 1988:191; Syms 1977:4). Therefore, the lithics are presented as a single collection although it is recognized that the Level 3 occupation is non-stratified and likely multi-component.

The term "collection" refers to the total number of artifacts recovered from Level 3. This particular collection is thought to represent the accumulation of a number of non-stratified assemblages. The term "assemblage" refers to the remains of a single component as defined by Syms (1977:70):

> The term assemblage refers to the surviving materials, features, and evidence of activities of a single residential group over a short period of time at one site. It is used in the same sense as the term component and represents the remains of a single occupation, or multiple occupations that are so closely spaced that no differentiation can be made between the occupations.

As an archaeological unit the Level 3 collection of lithics is viewed as a "complex" (Syms 1977:70-71), whereby the collection is an accumulation of assemblages that are culturally and historically related.

Dates

Two charcoal samples extracted from Level 3 were submitted for radiocarbon analysis using the Accelerator Mass Spectrometry (AMS) technique. The samples were located at opposite sides of the excavation (Figure 8) from regions with different layer thicknesses. Both samples were associated with artifact bearing areas and the western sample was found in close horizontal and vertical proximity to conjoinable segments of a utilized flake. The samples yielded dates of 3920 ± 180 B.P. (Beta-11642) and 2360 ± 100 B.P. (Beta-11641) thereby providing an average date of 3140 B.P. (1190 B.C.). Although the dates reflect a difference of 1,560 years, in the context of slow soil accumulation and compressed stratigraphy both dates are considered to be valid. Therefore, the time of use is considered to include the period bracketed by the beginning centuries of the first and third millennia B.C. With these radiocarbon ages the Shamattawa Rapids site currently represents the earliest evidence of human occupation within the Lowland.

Lithics

The Shamattawa Rapids Site lithic collection includes 71 chipped stone specimens grouped into core, flake, biface, and debris classes (Table 5). With the exception of two flakes all of the lithic specimens were recovered from level 3 of the main excavated unit. The two additional flakes were excavated from two test squares situated south of the main excavation (Figure 8). The test square flakes were recovered from level 3 and, as such, they are considered to be related to the main lithic collection; thus, they are included in the same analysis.

Table 5. Lithic Collection.

Item	n	%
Core	1	1.41
Flake	54	76.06
Biface (non-flake nucleus)	1	1.41
Debris	15	21.13
Total	71	100.00

Initial consideration is given to a discussion of the lithic raw material. The discussion will then address each of the four classes listed in Table 5. Appendix C details the quantitative and qualitative attributes recorded for catalogue and analytical purposes.

Raw Material

The total lithic collection is comprised of chert. The collection was all, or in part, independently analyzed and viewed by the following individuals: Ms. Betty Eley and Dr. Peter von Bitter, Department of Invertebrate Palaeontology, Royal Ontario Museum; Dr. Robert Gait, Department of Mineralogy, Royal Ontario Museum; Dr. Sydney Lumbers and Mr. Vincent Vertolli, Department of Geology, Royal Ontario Museum; Mr. Wm. A. Fox, former Regional Archaeologist for Southwestern Ontario; and Dr. Janet Springer, Ontario Geological Survey. The chert is considered to be non-exotic in that the source of the chert is likely Hudson Bay Lowland chert bearing formations. However, more extensive geo-archaeological research is required to identify the formation from which the raw material originated.

In the Hudson Bay Lowland, chert bearing rock formations are included in the Paleozoic rocks of Ordovician, Silurian, and Devonian ages (Sanford et al.

1968:16-37; Stockwell et al. 1970:137-145). Due to the Pleistocene deposits over top of the Paleozoic, exposures of these formations are generally limited to the coastal regions, as well as to the banks of the rivers flowing into Hudson and James Bays (Sanford et al. 1968:17). Formations in the Bad Cache Rapids and Churchill River Groups of the Ordovician, the Ekwan River Formation of the Silurian, and the Stooping River and Kwataboahegan Formations of the Devonian all possess chert inclusions and have various exposures in the Hudson Bay Lowland (Sanford et al. 1968:16-37). One such river exposure - exposed by the cutting action of the river - is located on the Ekwan River and reported by Dowling (1912:145; Geological Survey of Canada 1912: Map no. 21f). Named by the Indians as "Piwana powestik" or Flint Rapid, the exposure exhibits limestone beds containing inclusions of chert.

In addition to river bank and coastal exposures of chert bearing formations, Hawley (1926:10-21) has reported chert breccia and outcroppings of dolomite with bands of chert exposed in the Sutton Hills area of the Hudson Bay Lowland. These exposures are located approximately sixty kilometres northeast of the Shamattawa Rapids site.

The potential significance of this type of exposure for the quarrying of chert should not be underestimated, but the occurrence of nodular chert scattered over beaches and river beds may prove to be the more important source for this form of raw material. For instance, in the Sutton Hills area of the Hudson Bay Lowland, Pollock and Noble (1975:75) suggest that nodular chert was the form of raw material utilized at the Hawley Lake sites. Likewise, it is assumed that the chert utilized at the Shamattawa Rapids site was from a kindred source. In this light, it is significant to note that throughout most of the Hudson Bay Lowland nodular chert is a characteristic of the Silurian age Ekwan River Formation (Sanford et al. 1968:25).

Core Class

The term core refers to chert specimens that exhibit negative flake scars produced from previous flake removals (McMillan 1979:162). The nucleus of cores consists of chert nodules (White 1963:6) or thick flakes (Le Blanc 1984:62). In the Shamattawa Rapids site lithic collection there is only one specimen, accounting for 1.41% of the total, that is classified as a core. The specimen is a core fragment produced from a mottled dark gray and light gray split chert nodule. The ventral, or inner face, displays moderately distinct ribs and a negative bulb of force. This specimen has similarities to the "split bipolar core" variety described by McPherron (1967:138). The proximal end of the core is comprised of a flat, plain platform area with an obtuse angle of 110 degrees. The distal end on the dorsal face exhibits evidence of battering.

The dorsal face of the core displays prior flake removals; however, some of the scars may have been the result of heat fracturing. Crazing, interpreted as thermally produced, appears on the core's dorsal and ventral faces. One negative scar clearly shows flake removal in a variant orientation to the force that split the core's nucleus. As such, the core fragment is considered to belong to the multi-platform category. The core is 36.4 mm long, 22.0 mm wide, 8.1 mm thick, and 6.2 grams in weight.

Flake Class

In this analysis, the flake class includes those specimens considered to be by-products of core reduction, or tool production. Following the work of Bonnichsen (1977: 213) and Sullivan and Rozen (1985:758) flakes display single interior surfaces and exhibit platforms, lips, bulbs of force, eraillure flakes, and/or ribs.

Thermal Alteration

With reference to the total lithic collection, 23

(32.39%) of the 71 specimens exhibit thermal alteration leaving 48 specimens (67.61%) without any visible signs of heat exposure. Within the flake class, 11 (20.37%) of the 54 specimens display thermal alteration characteristics while 43 specimens (79.63%) lack such characteristics. The thermal alteration types represented include heat fracture (n=12, 80.00%) and crazing (n=3, 20.00%). The heat fracture type is largely represented by scars left from the removal of potlid spalls (n=8, 66.67%).

Much research has been undertaken pertaining to the heat treatment of chert and the studies indicate that exposure to intense heat changes the parameters of the material which in turn increases the workability of the chert. Improvement in flaking qualities, such as better controlled flaking and ease of fracture, are the salient characteristics of thermally altered chert (see Bonnichsen 1977; Collins and Fenwick 1974; Crabtree 1975; Crabtree and Butler 1964; Flenniken and Garrison 1975; Mandeville and Flenniken 1974; Rick 1978). However, as noted by Purdy and Brooks (1971) and Purdy (1974), the mere occurrence of thermal alteration characteristics does not indicate intentional heat treatment by human agents. In this light, the relatively low frequency of thermally altered flakes in the Shamattawa Rapids site lithic collection suggests unintentional thermal alteration.

Heat fracture and crazing on the ventral faces of flakes indicate that the flakes were exposed to intense heat after removal from their parent material. Although this does not preclude the intentional heat treatment of flakes to increase their workability for retouch purposes, only 3 (15.79%) of the retouched flakes in this collection display heat alteration characteristics suggesting that such practice was unlikely. In addition, among the specimens displaying characteristics of thermal alteration, seven items - of which four are classified as debris - were rejoined to form two separate flakes. In one case, the distal and proximal sections were separated and when the two sections were rematched continuous utilization wear spanned the break on the flake's left lateral margin. This indicates that the flake was thermally damaged after it had been utilized. On this basis, it is suggested that thermal alteration of the flakes at the Shamattawa Rapids site occurred after the flakes had been discarded or misplaced. The heat source may have been from a hearth utilized during the site's occupation, or the heat may have come from a forest fire sweeping over the site sometime after the site was abandoned. Forest fires are prevalent in the Hudson Bay Lowland and during the 1984 field season smoke from a number of fires were visible in the distance. A large section of land to the south of the site had also been burned in the recent past. As such, although a small percentage of the lithic collection has been thermally altered this alteration is not considered to be part of the cultural matrix of the site.

Flake Subclasses

The flake class is divided into the following five subclasses: unmodified flakes, utilized flakes, unifacial retouch flake tools, bifacial retouch flake tools, and pièces esquillées. The total number of items in the flake class equals 54; however, for this analysis the two flake sections separated by the effects of heat exposure discussed above are joined and considered as one flake. The third section of the flake is a potlid spall which was separated from the ventral face of the flake. Therefore, the total number equals 53 specimens.

The five subclasses are not exclusive in that any one flake may exhibit more than one type of modification and, therefore, belong to more than one subclass. In the Shamattawa Rapids lithic collection, 17 (32.08%) of the flakes exhibit attributes characteristic of two or more subclasses while 36 (67.92%) flakes are exclusive to one subclass. Table 6 lists individual and combined subclass frequencies.

Table 6. Flake Subclass Frequencies.

Subclass	n	%
Unmodified	8	15.09
Utilized	19	35.85
Unifacial Retouch	4	7.55
Bifacial Retouch	0	0.00
Pièce Esquillée	5	9.43
Utilized; Unifacial Retouch	8	15.09
Utilized; Pièce Esquillée	3	5.66
Utilized; Unifacial Retouch; Bifacial Retouch	2	3.77
Utilized; Unifacial Retouch; Pièce Esquillée	3	5.66
Unifacial Retouch; Bifacial Retouch	1	1.89
Total	53	100.00

In addition to subclasses, the flakes are classified according to condition, or physical completeness. Similar to the classification system presented by Sullivan and Rosen (1985) the categories are "interpretation-free" in that they do not relate to a specific method of production or sequence of reduction. In the Shamattawa Rapids site flake collection the proximal flake category occurs with the highest frequency (n=15, 28.30%) followed by the distal (n=12, 22.64%) and complete (n=12, 22.64%) categories.

Lateral (n=7, 13.21%), medial-horizontal (n=5, 9.43%), and medial-vertical (n=2, 3.77%) categories occur with the least frequencies respectively.

Flakes are produced by means of two processes: pressure flaking and percussion flaking (Speth 1972:37). Variables pertaining to the determination of mode of flake production include flake size, bulb of force, eraillure flake, and ribs (Patterson 1983; Patterson and Sollberger 1978).

The mean flake length and width dimensions as shown in Table 7 (see also Figures 9 and 10) equal 27.46 mm and 24.34 mm respectively. These statistics signify that the Shamattawa Rapids site flake collection as a whole is relatively large in length and width dimensions. In view of Patterson's (1983:300) argument that flakes greater than 18.0 mm square are likely the result of percussion flaking, the mean values cited above suggest percussion as the mode of flake production for the Shamattawa Rapids site flake collection.

In total, 40 specimens (75.47%) are greater than 18.0 mm square. Four specimens (7.55%) are less than or equal to 18.0 mm square, but their values rest at the high end of the range. The mean length for this group equals 14.3 mm with a range between 7.3 mm and 17.4 mm. Three of the values are greater that 15.0 mm. Additionally, two of the specimens

Table 7. Flake: Length, Width, Thickness, Weight.

Statistic	Length	Width	Thickness	Weight
n	53	53	53	53
$\bar{x}$	27.46	24.34	6.02	3.88
med	27.2	23.0	6.2	3.2
r	7.3-56.4	10.5-41.6	2.6-11.5	0.2-15.0
s	9.56	6.82	1.90	2.91
v	34.81	28.01	31.56	75.00
sk	0.08	0.59	-0.28	0.70

Figure 9. Flake Lengths.

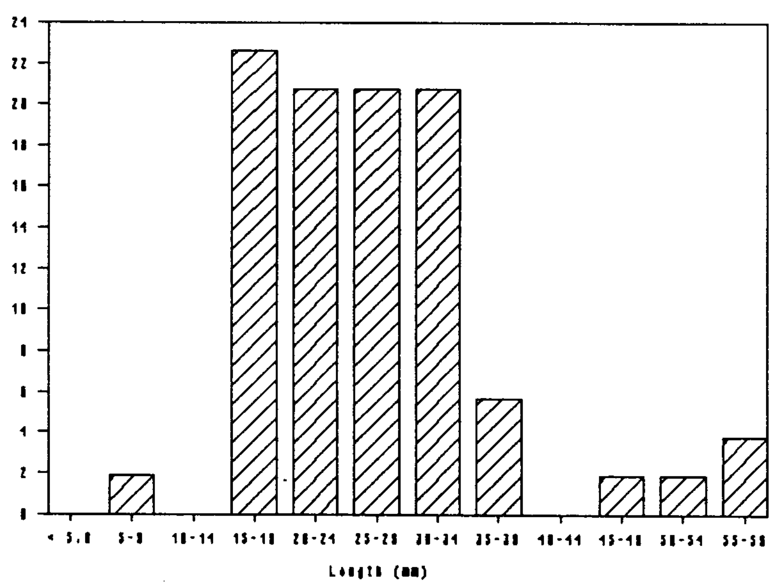
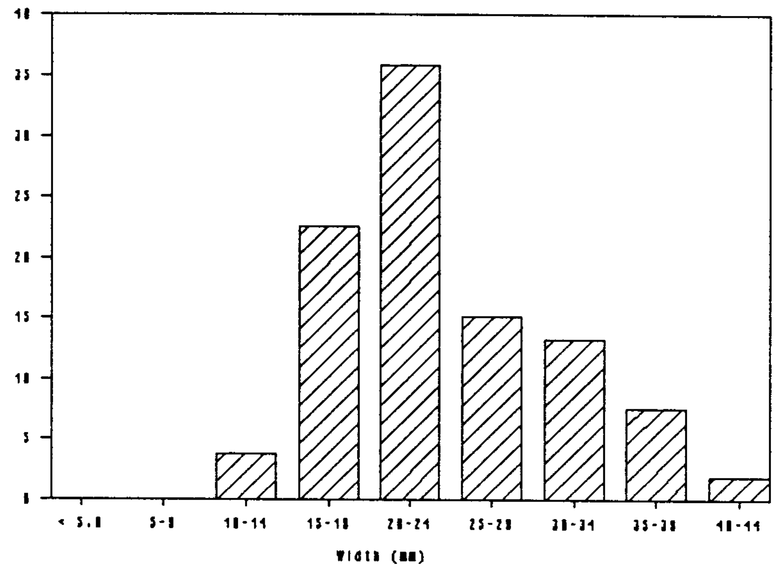


Figure 10. Flake Widths.



are categorized as medial-horizontal and two are distal indicating that their lengths are not complete. The value of the mean widths equals 15.53 mm with a range of 10.5 to 16.0 mm. Three of the values are greater than 15.0 mm. Similar to the lengths, the widths are not complete with the flakes displaying one retouched and three fractured lateral edges.

Six specimens (11.32%) have lengths greater than 18.0 mm and widths less than or equal to 18.0 mm. However, the widths are all at the high end of the scale with a mean value of 16.67 mm and a range of 14.2 mm to 17.9 mm. Only two of the specimens possess intact lateral edges while the remaining four edges are fractured.

Three specimens (5.66%) have lengths less than or equal to 18.0 mm and widths greater than 18.0 mm. The lengths have a mean value of 16.33 and a range of 15.7 mm to 17.8 mm. Only the length of one flake is considered to be complete.

Length and width values show a high percentage of flakes greater than 18.0 mm square; therefore, the flakes are considered to be products of percussion. Most of the flakes with dimensions less than 18.0 mm square were likely also produced in this manner. This is suggested by the high percentage of flakes with dimensions resting at the high end of the range while the majority of these flakes are not complete indicating that they were originally larger in size.

The prominence of bulbs of force and ribs, as well as the presence or absence of eraillure flakes have also been cited as variables useful for determining percussion or pressure flakes. Patterson (1983:300) argues that flakes produced by percussion will usually display a high percentage of bulbs of force and eraillure flakes, as well as prominent ribs. The presence or absence of eraillure flakes as a determinate of percussion flaking, however, has been refuted by other analysts (Cotterell and Kamminga 1979:110).

In the Shamattawa Rapids site flake collection, 36 specimens (67.92) display either salient or diffuse bulbs of force while bulbs of force on 3 specimens (5.66%) are undetectable. Bulbs of force on 14 specimens (26.41%) are indeterminate due to incomplete flakes. A relatively high percentage (n=27, 50.94%) of the specimens display indistinct ribs with 47.17% of the specimens displaying ribs that are prominent (n=4, 7.55%) or moderately distinct (n=21, 39.62%). Eraillure flakes are present on 20 specimens (37.74%), absent on 17 specimens (32.07%), and indeterminant on 16 specimens (30.19%) due to incomplete flakes. The high incidence of bulbs of force is commensurate with percussion flaking, but the high percentage of indistinct ribs and possibly the high incidence of absent eraillure flakes are traits more suggestive of pressure flaking. However, the above argument pertaining to flake size generally precludes pressure flaking and these inconsistencies are considered to be either deviations from the expected norm, or not robust variables for this purpose.

Percussion flakes are produced with either a soft or hard impactor and some analysts (Bonnichsen 1977:164; Newcomer 1975:98; Ranere 1975:185; Shafer 1985:296, 294) argue that impactor type can be determined by the appearance of discrete attributes on the flake's ventral face and platform. For instance, Ranere and Shafer suggest that hard hammer percussion produces pronounced bulbs of force and eraillure flakes, whereas soft hammer percussion creates a diffuse bulb of force and a lip on the ventral edge of the platform. Patterson and Sollberger (1978:107-108), however, disagree with some of the above points. On the basis of their lithic experiments they argue that bulbs of force and eraillure flakes are not necessarily determined by type of impactor, but may be controlled by platform type, preparation, and angle. Additionally, they found that only 10% of their flakes exhibited lips when produced with a soft hammer.

In the Shamattawa Rapids site flake collection 7 (13.21%) of the specimens display lips and they occurr in association with salient (n=3, 42.86), diffuse (n=3, 42.86), and undetectable (n=1, 14.28%) bulbs of force. Eraillure flakes, as noted above, are present on 20 specimens (37.74%) and absent (n=17, 32.07%) or indeterminate (n=16, 30.19%) on the remainder. The collection includes 15 flakes (28.30%) with salient bulbs of force and 21 flakes (39.62%) with diffuse bulbs of force. The bulbs of force on the remaining examples are undetectable (n=3, 5.66%) or indeterminate (n=14, 26.41%). In the light of this debate, an interpretation pertaining to impactor type is avoided with the discussion simply limited to noting the bulb of force types and the frequencies for lip and eraillure flake occurrences.

For this analysis, lithic reduction is divided into early and late stages. The early stage includes core reduction, as well as the initial trimming stages of unifacial and bifacial tools. This stage compares to the early and middle stages described by Magne (1985:106-107) and to the primary flaking stage described by Storck (1979:6). The late stage includes the refining of unifacial and bifacial tools for the purposes of producing final form and functional edge. This stage compares to Magne's (1985: 106-107) late stage and Storck's (1979:6) secondary flaking stage.

The differentiating criteria with respect to flakes produced in the early and late stages of reduction pertain to flake width, cortex on the dorsal face, and dorsal flake scars. Early stage flakes are generally larger than late stage flakes and for this analysis a flake width of 10.0 mm is considered to be the dividing value (Ahler in Rajnovich 1983:31). Dorsal face cortex is not considered to be a trait of the late flaking stage, but rather flakes displaying cortex on their dorsal faces are thought to belong to the early stage of reduction. The final criterion pertains to the dorsal flake scars: through the reduction sequence the number of flake scars on the dorsal face is expected to increase (Magne 1985:113). For this analysis, all flakes displaying 0-2 dorsal flake scars are considered to be products of early stage reduction. Flakes with three or more dorsal flake scars, that also fill the conditions pertaining to width and cortex, are considered to be products of late stage reduction. Therefore, a late stage reduction flake has a width less than 10.0 mm, no cortex on the dorsal face, and displays three or more dorsal flake scars. All flakes that do not fill these conditions are considered to be products of early stage reduction.

Widths for the Shamattawa Rapids site flakes range between 10.5 mm and 41.6 mm (Table 7). As such, on the basis of size, the total collection falls within the size range of flakes produced in the early stage of reduction. Approximately 25% of the flake collection exhibits dorsal cortex and all of these flakes are "secondary cortex flakes" (Shafer 1985:294) in that none of the dorsal faces are completely covered with cortex. One (1.89%) specimen can be referred to as a "decortication flake" (Cook 1976:52) with over 50% of its dorsal face cortex covered. The Shamattawa Rapids site flake collection does include specimens with dorsal flake scars equal to three or greater (n=30, 56.60%), but since they do not occur on flakes with widths less than 10.0 mm they are all considered to belong to the early stage of reduction.

In summary, the flakes recovered from the Shamattawa Rapids site appear to be early reduction stage percussion flakes. The varied occurrences of flake scar patterns on dorsal faces including complex (n=22, 41.51%), longitudinal (n=18, 33.96%), and marginal (n=4, 7.55%) orientations indicate that flakes were removed from cores in both random and uniform fashions. As well, the occurrences of abrasion, faceting, and trimming on many of the platform dorsal edges suggest a certain amount of platform preparation. The high percentage of flakes without dorsal face cortex (n=40, 75.47%) and the lack of totally cortical dorsal faces indicate that the cortex was largely removed from core nodules off site. Finally, the lack of pressure and late stage reduction flakes signify that unifacial and/or bifacial tools were generally not being manufactured, or at least shaped into their final forms, at the site. The evidence seems to indicate that the lithics were initially reduced from their parent materials elsewhere and then transported to the site at later dates.

Unmodified Flakes

Unmodified flakes are defined as flakes that exhibit neither unintentional utilization wear nor intentional retouch scars. In the Shamattawa Rapids site flake collection this subclass is comprised of eight flakes which accounts for 15.09% of the flake class (Table 6). Unmodified flake totals according to category include five proximal (62.50%), one distal (12.50%), and two complete (25.00%). Four flakes (50.00%) are considered to possess intact lateral edges while lateral edges on four flakes (50.00%) are fractured. Measurements pertaining to length, width, thickness, and weight are summarized in Table 8. Figures 11 and 12 display length and width frequencies.

Table 8.

Unmodified Flakes: Length, Width, Thickness, Weight.

Statistic	Length	Width	Thickness	Weight
n	8	8	8	8
$\bar{x}$	22.94	27.86	6.0	3.71
med	19.7	26.9	5.7	2.0
r	15.7-33.5	17.4-38.1	3.6-10.4	0.9-11.7
s	6.90	6.74	2.37	3.58
v	30.08	24.19	39.50	96.50
sk	1.41	0.43	0.38	1.43

Figure 11. Unmodified Flakes: Length.

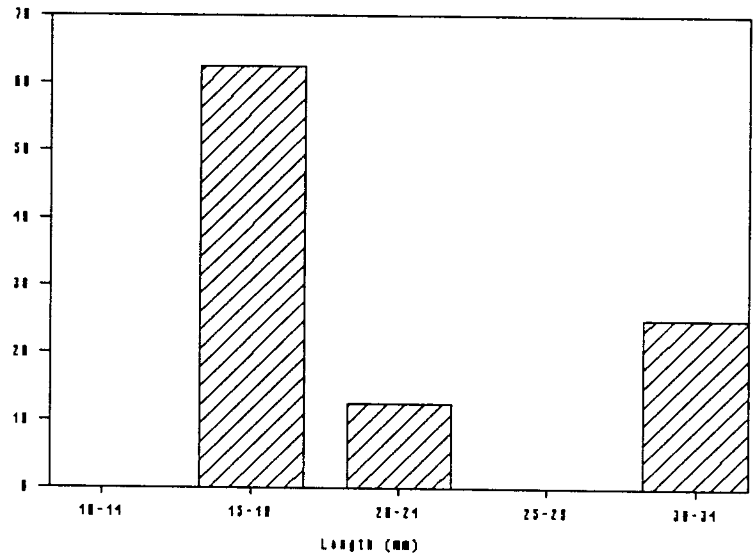
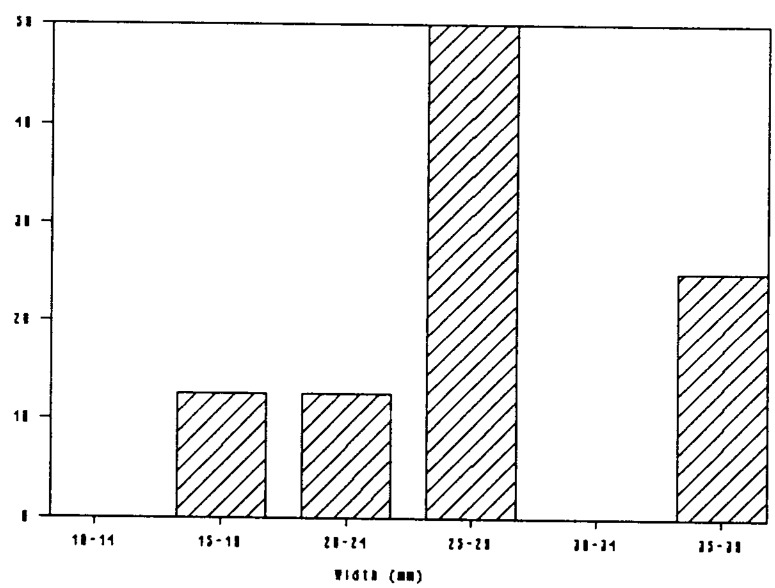


Figure 12. Unmodified Flakes: Width.



Utilized Flakes

The term utilized flakes refers to those flakes that exhibit unintentional utilization wear along one or more edges (Figures 13 and 14). The edge wear analysis for the Shamattawa Rapids site collection employs a "low-power approach" similar to that described by Odell and Odell-Vereecken (1980) and Tringham et al. (1974). This approach concentrates upon tool edge damage characterized by microflake scars. Although it is becoming increasingly clear that microwear polishes - requiring high-power microscopy - have greater significance for specific functional interpretations (Keeley 1980; Vaughan 1985) the analysis of microscar patterns and morphology is nevertheless useful for the initial identification of utilized edges and for recognizing tool manipulation (transverse or longitudinal motion) and the nature of materials manipulated (soft, medium, or hard).

The criteria for the identification of utilization wear pertain to "... its regularity of scar orientation on each edge and its concentration in a particular area or areas of the flakes [*sic*] perimeter" (Tringham et al. 1974:192). Such utilization wear is distinguished from intentional modification on the basis of scar size and patterning (Tringham et al. 1974:181). Utilization damage

Figure 13. Utilized Flakes.

A	984.245.4	Utilized Flake
B	984.245.14	Utilized Flake
C	984.245.15	Utilized Flake
D	984.245.16	Utilized Flake
E	984.245.17	Utilized Flake
F	984.245.19	Utilized Flake

Letter	Face	Modified Edge	Edge Type
A	Dorsal	Left Right	Bifacial Bifacial
B	Dorsal	Distal Right	Bifacial Bifacial
C	Dorsal	Left	Bifacial
D	Dorsal	Distal	Unifacial (dorsal face)
		Right	Bifacial
E	Dorsal	Distal (left side) Distal (spur)	Bifacial Unifacial (dorsal face)
F	Dorsal	Left Right	Bifacial Bifacial

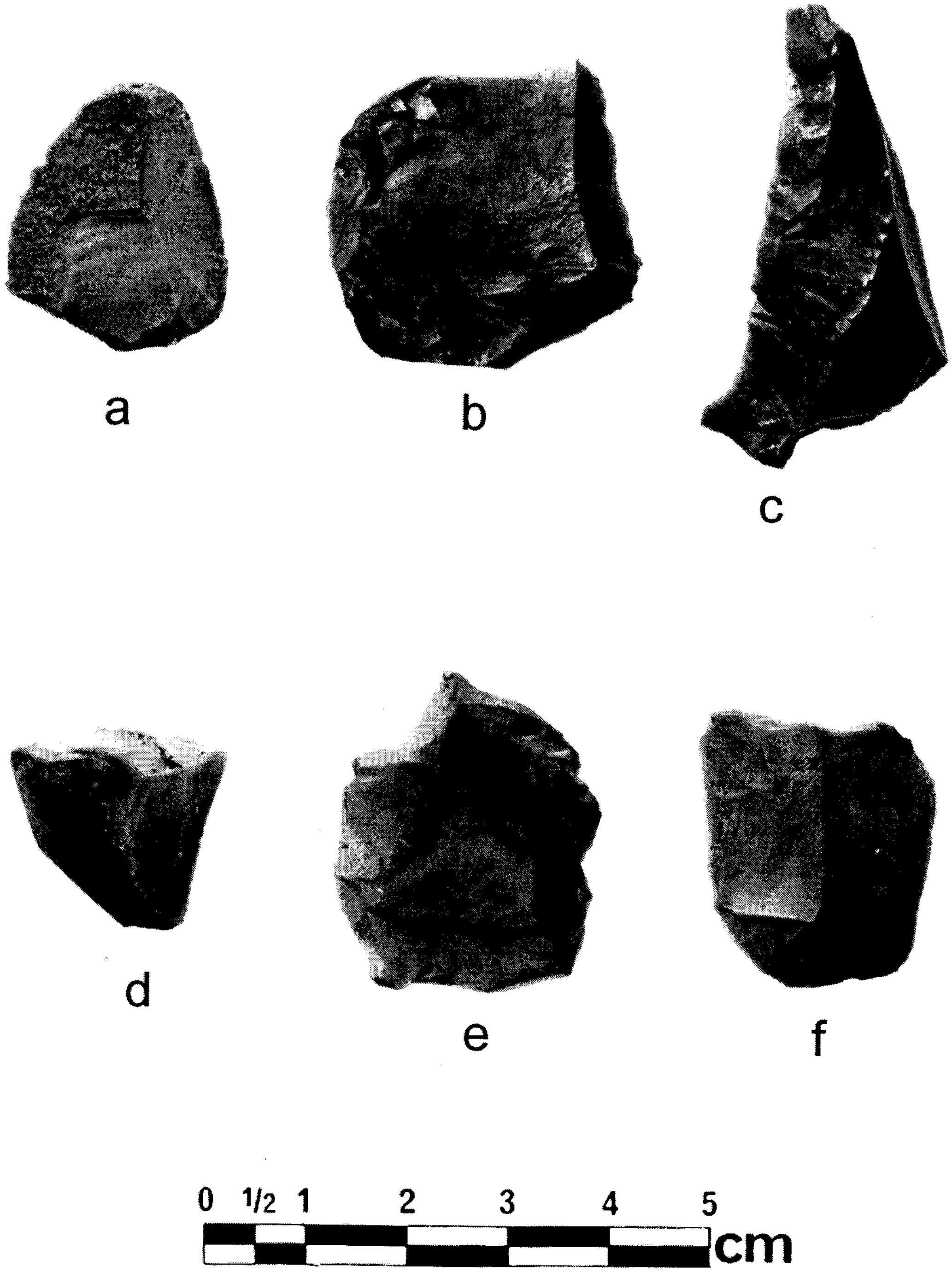

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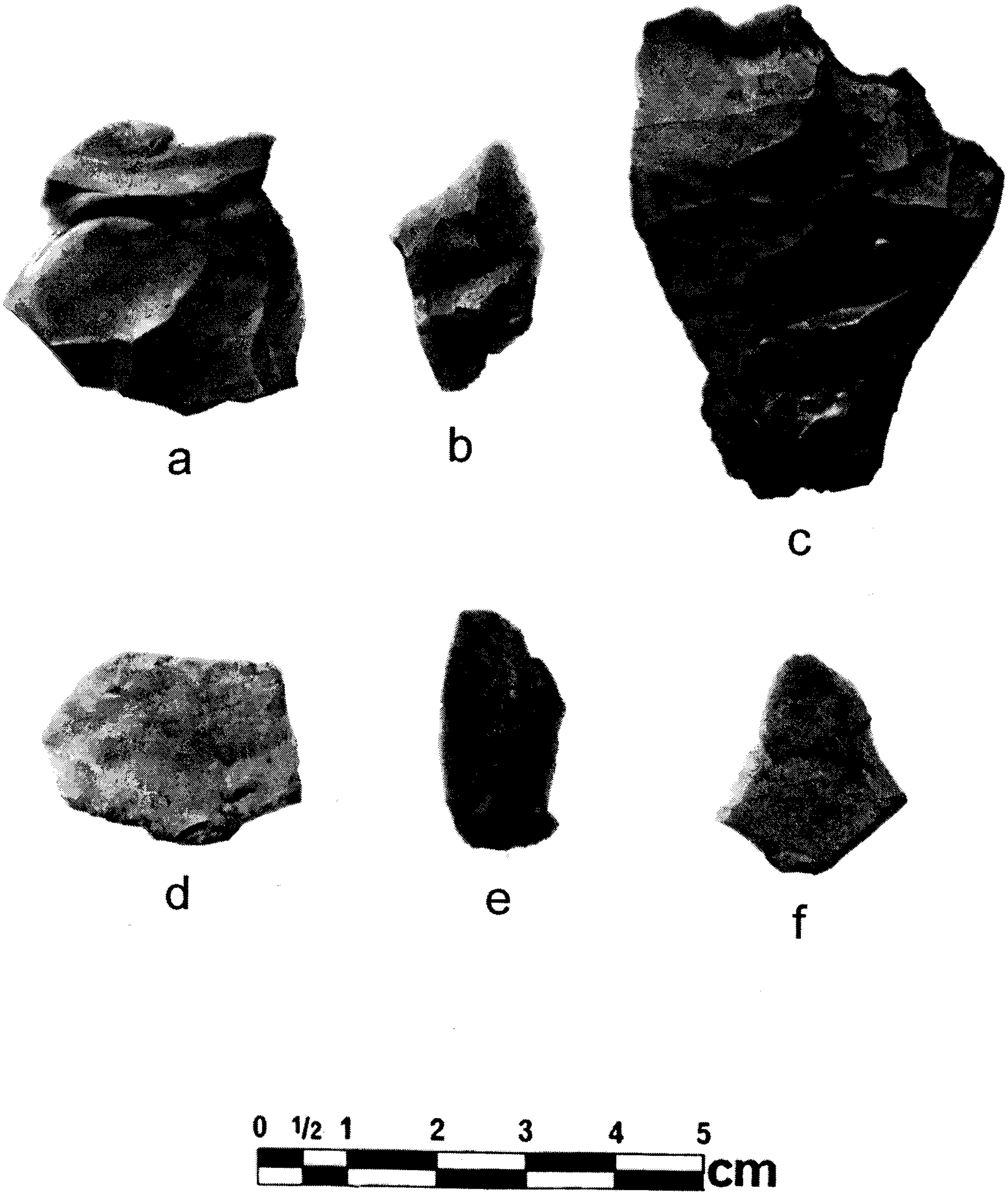
Figure 14. Utilized Flakes.

A	984.245.20	Utilized Flake
B	984.245.22	Utilized Flake
C	984.245.23.1.2	Utilized Flake
D	984.245.26	Utilized Flake
E	984.245.27	Utilized Flake
F	984.245.28	Utilized Flake

Letter	Face	Modified Edge	Edge Type
A	Dorsal	Distal (right side)	Bifacial
		Distal (left side)	Unifacial (dorsal face)
B	Dorsal	Distal	Unifacial (dorsal face)
		Left (distal end)	Bifacial
		Right (distal end)	Bifacial
C	Dorsal	Left	Unifacial (ventral face)
D	Dorsal	Left	Bifacial
E	Dorsal	Left	Primarily Unifacial (dorsal face)
F	Dorsal	Right	Primarily Unifacial (dorsal face)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is represented by flake scars that are generally smaller and less evenly patterned than intentionally produced retouch scars. With respect to size, values such as 1.5 mm (Le Blanc 1984:117) and 1.0 mm (Lennox et al. 1987:86) have been cited as distinguishing length dimensions between the two types of modification; however, in the Shamattawa Rapids site flake collection the values for the maximum unintentional modification scars and the minimum intentional retouch scars have a general overlapping pattern in the 1.0 mm to 1.5 mm range. Within this range, the distinction between the two types of modification involves the consideration of scar size and pattern along the total modified edge.

The interpretation of edge wear patterns on archaeological materials are based upon comparisons with wear patterns produced upon experimental tools (for examples of experimental wear pattern studies see Brink 1978; Hayden 1979a; Keeley 1978, 1980; Keeley and Newcomer 1977; Lawrence 1976; Newcomer et al. 1986; Newcomer and Keeley 1979; Odell 1980, 1981; Odell and Cowan 1986; Odell and Odell-Vereecken 1980; Plew and Woods 1985; Ranere 1975; Semenov 1964; Symens 1986; Tringham et al. 1974; Vaughan 1985). On the basis of experiments, flake edges exhibiting unifacial microflaking are generally considered to have been worked in a transverse manner (Odell and Odell-Vereecken 1980:99; Tringham et al.

1974:188-189) although, as noted by Vaughan (1985:20), transverse motions can also produce bifacial scarring. Transverse motions include scraping, whittling, and planning where pressure is largely maintained against one edge and microflakes are removed from the face opposite the point of pressure. Conversely, flake edges exhibiting bifacial microscarring are considered to have been worked in a longitudinal manner (Odell and Odell-Vereecken 1980:98; Tringham et al. 1974:188). The longitudinal motion includes cutting and sawing actions and as the point of pressure alternates from one edge face to the other microflakes tend to be removed from both the dorsal and ventral faces. The angle of the cutting edge to the worked material contributes to the pattern of scarring on the edge faces: obtuse or acute working angles (cutting) produce a higher proportion of scarring on the edge opposite the point of greatest pressure, whereas edges manipulated 90 degrees to the worked material (sawing) tend to display an equal distribution of scars on both edge faces.

Results of experiments performed by Odell and Odell-Vereecken (1980) and Tringham et al. (1974) indicate that the morphology of microflake distal terminations are largely dependent upon the type of materials worked. Vaughan's results (1985:21-22) are not as conclusive, but they do support the general tendencies reported in the previous two studies. In general, the manipulation of soft materials (meat, hide) tend to produce microflake scars with feather terminations. Soft medium materials (fresh soft wood) also tend to produce microscars with feather terminations, but harder medium materials (fresh hard wood, fresh bone) have a tendency to create microscars with hinge terminations. Edges worked against hard materials (bone, dry wood) tend to exhibit microscars with step terminations.

In the Shamattawa Rapids site flake collection, 35 flakes, accounting for 66.04% of the flake class (Table 6), have edges exhibiting microscars thought to have been produced through utilization. In this analysis, pièces esquillées which are also unintentionally modified are discussed as a separate subclass. Utilized flake totals according to category include eight proximal (22.86%), eight distal (22.86%), six lateral (17.14%), three medial-horizontal (8.57%), and ten complete (28.57%). Thirteen flakes (37.14%) are considered to possess intact lateral edges, 19 flakes (54.29%) have fractured edges, one flake (2.86%) has crushed edges, and two flakes (5.71%) have retouched edges.

Length, width, thickness, and weight values are summarized in Table 9. Figures 15 and 16 display length and width frequencies.

Table 9.

Utilized Flakes: Length, Width, Thickness, Weight.

Statistic	Length	Width	Thickness	Weight
n	35	35	35	35
$\bar{x}$	29.02	23.74	6.08	4.08
med	28.1	21.8	6.2	3.4
r	7.3-56.4	10.5-41.6	2.6-11.5	0.2-15.0
s	9.73	6.95	1.83	2.91
v	33.53	29.28	30.10	71.32
sk	0.28	0.84	-0.20	0.70

Figure 15.

Utilized Flakes: Length.

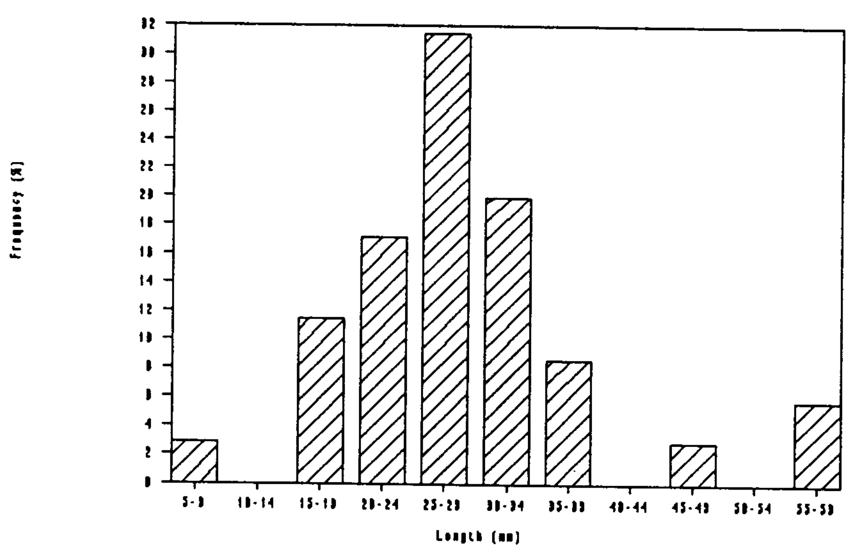
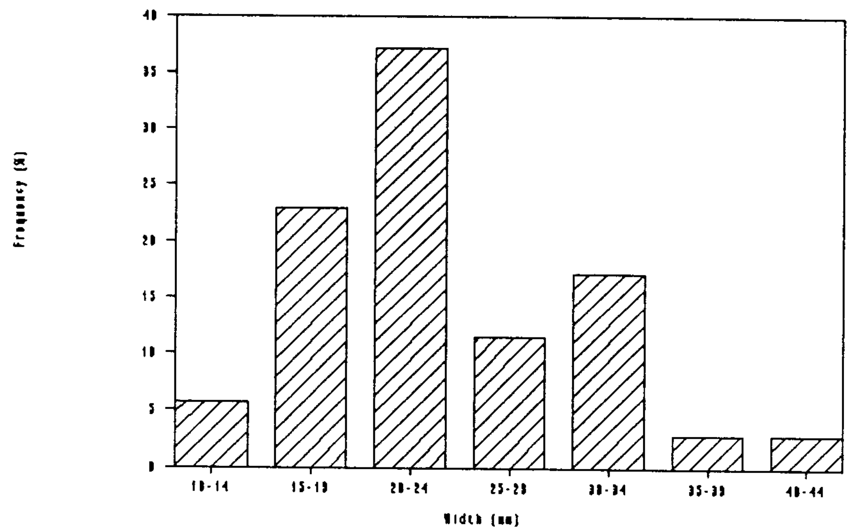


Figure 16.

Utilized Flakes: Width.



In total, 53 edges exhibit microscarring characteristics consistent with reported patterns of utilization wear (for discussions of natural and accidental causes of edge damage refer to Newcomer 1976; Tringham et al. 1974; Vaughan 1985). Twenty-two flakes (62.86%) exhibit one modified edge, nine flakes (25.71%) exhibit two modified edges, three flakes (8.57%) exhibit three modified edges, and one flake (2.86%) exhibits four modified edges. Fourteen edges (26.42%) are unifacially scarred and may have been produced through a transverse form of motion. On the other hand, 39 edges (73.58%) display various patterns of bifacial scarring suggesting production through longitudinal edge manipulation.

Among all of the unifacially scarred edges the scar intensity is pronounced. In terms of modified faces, the dorsal face exhibits a higher proportion of scarring (n=10, 71.43%) than does the ventral face (n=4, 28.57%). The left lateral (n=7, 50.00%) and distal edges (n=5, 35.71%) of the flakes received the greatest degree of modification while the right lateral (n=1, 7.14%) and proximal edges (n=1, 7.14%) were utilized with the least frequency. Both the left and right lateral edges indicate a tendency toward the utilization of the mid to distal portions of the edges.

Continuous and semi-continuous scar spacing types predominate with representation on 12 edges (85.71%). Two edges (14.29%) exhibit the discontinuous (heavy) scar spacing type with clustered and isolated flakes spaced at close intervals. On all of the edges, feather scar terminations occur with the greatest frequency. Seven edges (50.00%) display only feather scar terminations while the remaining edges exhibit feather terminations in combination with hinge, step, and snap fractures (Table 10). Evidence of rounding is present on all edges with distinct rounding represented on nine edges (64.29%), slight rounding appears on four edges (28.57%), and both slight and distinct categories are represented on one edge (7.14%).

Table 10.

Unifacial Utilized Flakes: Scar Termination Type.

Type	n	%
Feather	7	50.00
Hinge		
Step		
Feather; Hinge	3	21.43
Feather; Hinge; Step	3	21.43
Feather; Snap	1	7.14
Total	14	100.00

Spine-plane angles, scar lengths, and edge lengths pertaining to unifacially scarred edges are summarized in Table 11. Figures 17 and 18 display spine-plane angle and scar length frequencies.

Among the bifacially scarred edges, 25 edges (64.10%) display pronounced scar intensity, two edges (5.13%) exhibit moderate scar intensity, and 12 edges (30.77%) display both moderate and pronounced scar intensities. The left (n=17, 43.59%) and right lateral edges (n=18, 46.15%) display the greatest frequency of bifacial scarring while the edges least frequently scarred are the distal (n=3, 7.69%) and proximal (n=1, 2.56%).

Table 11. Unifacial Utilized Flakes:

Spine-Plane Angle, Scar Length, Edge Length.

Statistic	Spine-Plane Angle	Scar Length	Edge Length
n	14	14	14
$\bar{x}$	45.43	0.9	10.56
med	41.50	0.9	7.8
r	29-66	0.5-1.4	3.3-24.2
s	12.67	0.27	6.66
v	27.89	30.00	63.07
sk	0.93	0.00	1.24

Figure 17.

Unifacial Utilized Flakes: Spine-Plane Angle.

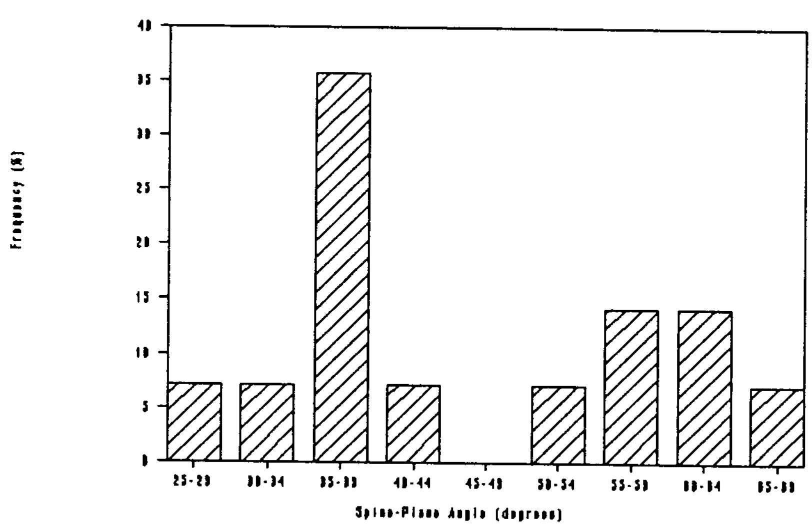
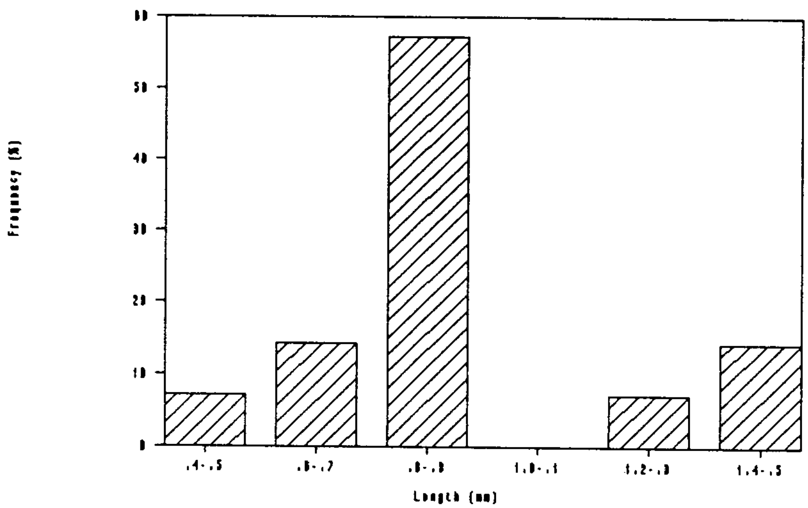


Figure 18.

Unifacial Utilized Flakes: Scar Length.



The pattern of bifacial scarring is characterized by scars appearing on the dorsal and ventral faces in opposite and/or alternate fashions. Scars with opposite patterns of occurrence appear on 20 edges (51.28%), alternate patterns of scarring are represented on seven edges (17.95%), and both opposite and alternate scarring patterns appear on 12 edges (30.77%). Comparison of dorsal and ventral scar spacing indicates that eight edges (20.51%) are relatively equivalent in terms of degree of modification. This suggests that these edges were likely manipulated in a sawing manner with the cutting edges aligned roughly 90 degrees to the worked material. Nineteen edges (48.72%)

display heavy scarring on the dorsal face and light scarring on the ventral face suggesting a cutting angle with greatest pressure exerted upon the ventral face of the edge. Similarly, 11 edges (28.21%) exhibit heavy scarring on the ventral face and light scarring on the dorsal face; therefore, a cutting angle with the greatest pressure exerted upon the dorsal face is suggested. A number of the edges possess continuous or heavy scarring on one face and very light scarring on the other. These edges are classified as bifacial, but the damage may have been the result of transverse and/or longitudinal actions. One edge (2.56%) with minimal scarring is identified as a spur which may have been utilized in a graving type of action (Figure 13E). The edge consists of a small hinge fracture on the ventral face and a snapped tip.

Similar to the edges with unifacial scarring, feather terminations dominate on both the dorsal and ventral faces. However, hinge terminated fractures, and to a much lesser degree step fractures, are present (Tables 12 and 13). Rounding is absent on two edges (5.13%), distinct on six edges (15.38%), slight on 27 edges (69.23%), and both distinct and slight on four edges (10.26%).

Spine-plane angles, scar lengths, and edge lengths pertaining to bifacially scarred edges are summarized in Table 14. Figures 19 and 20 display spine-plane angles and

Table 12. Bifacial Utilized Flakes:

Dorsal Face Scar Termination Type.

Type	n	%
Feather	6	15.38
Hinge	1	2.56
Feather; Hinge	25	64.10
Feather; Hinge; Step	1	2.56
Hinge; Feather	4	10.26
Hinge; Step; Feather	1	2.56
Snap	1	2.56
Total	39	99.98

Table 13. Bifacial Utilized Flakes:

Ventral Face Scar Termination Type.

Types	n	%
Feather	18	46.15
Hinge	1	2.56
Step		
Feather; Hinge	19	48.72
Hinge; Feather	1	2.56
Total	39	99.99

Table 14. Bifacial Utilized Flakes:

Spine-Plane Angle, Scar Length, Edge Length.

Statistic	Spine-Plane Angle	Scar Length	Edge Length
n	39	39	39
$\bar{x}$	39.77	0.88	14.82
med	40	0.8	14.1
r	20-60	0.3-1.7	1.4-40.7
s	11.09	0.31	6.81
v	27.89	35.23	45.95
sk	-0.06	0.77	0.32

Figure 19.

Bifacial Utilized Flakes: Spine-Plane Angle.

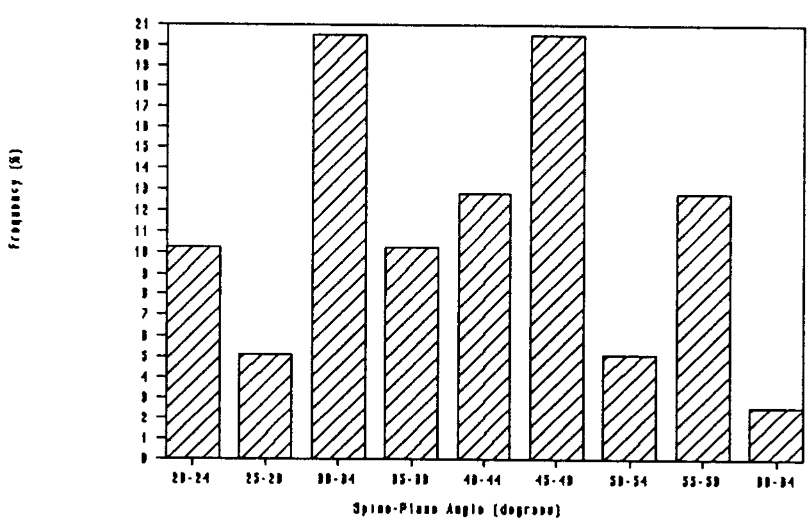
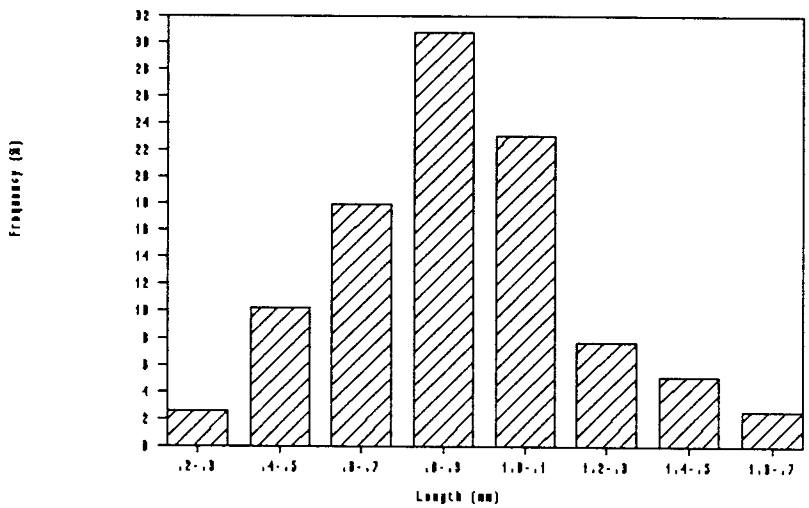


Figure 20.

Bifacial Utilized Flakes: Scar Length.



scar lengths.

The above analysis of microflake scar patterns indicates that unretouched flakes were a significant form of tool utilized by the inhabitants of the Shamattawa Rapids site. It is evident that unretouched edges were manipulated in both transverse and longitudinal manners; however, longitudinal motions were likely the predominant forms of action. Table 11 shows that the mean spine-plane angle for unifacially scarred edges equals 45.43 degrees with a 29 degree to 66 degree range which are angles thought to be efficient for cutting activities (Lawrence 1976:103; Symens 1986:219; Wylie 1975:30). Although the mean spine-plane angle for unifacially scarred edges is greater than the same for bifacially scarred edges (39.77 degrees, Table 14) - which is expected when comparing edges used for transverse and longitudinal motions - the spine-plane angles for the unifacial edges are considered to be low for scraping purposes. As such, some of these edges may be the result of longitudinal motions.

The almost total lack of step-terminated microscars on any of the edges suggests that the working of hard materials was not a significant activity at the site. Instead, the predominance of feather-terminated microscars indicates that soft substances may have been the primary material manipulated. The occurrence of hinge-terminated microscars also indicates the likely manipulation of medium materials.

Any suggestion pertaining to the identification of the salient activities performed with unretouched flakes on the basis of microflake patterns can only be forwarded as hypotheses subject to additional analysis and testing. In this spirit, the apparent dominance of cutting and sawing characteristics, in combination with attributes related to soft material manipulation, suggests that the edges of unretouched flakes were generally utilized for the processing of food (Odell and Odell-Vereecken 1980:102). Given the site's position on the river bank adjacent to an historically productive fishing location, the processing of fish is an activity with a high degree of probability. The occurrence of hinge-terminated microscars on both unifacially and bifacially scarred edges may be a function of edge contact with fresh bone during the fish cleaning and cutting processes.

In addition to edge wear resulting from utilization, damage can also be the result of prehension (Odell 1981:207; Odell and Odell-Vereecken 1980:102-108; Newcomer and Keeley 1979:202). Similar to utilization wear, prehension damage is characterized by the removal of microflakes from faces opposite the points of applied finger pressure. Four flakes exhibit edges with microflake scarring identified as prehension wear. All four edges are bifacially scarred and consist of alternate scar patterning. Two of the edges display microflake scars solely with feather terminations and two edges have microflake scar terminations that include both feather and hinge types. Two of the areas identified as prehension damage are aligned with utilized edges and two are associated with edges of intentional retouch. Related to prehension damage discussed above, four flakes exhibit snapped edge sections that are aligned with utilized or retouched edges. These fractures may have been caused by grip tension while pressure was being exerted against the opposite working edges.

Retouched Flakes

The term retouched flakes refers to those flakes that have been intentionally modified for the purpose of forming a specific tool and functional edge (Figures 21 and 22). Retouch flakes can be removed by both pressure and low impact percussion techniques of flaking and they are inherent in both early and late stages of reduction. Flakes exhibiting retouch are generally characterized by the presence of continuous overlapping scars that are predominantly greater than 1.0 mm in length.

In the Shamattawa Rapids site flake collection, 18 flakes, accounting for 33.96% of the flake class (Table 6), possess evidence of intentional modification. Thirteen of the retouched flakes (72.22%) also possess edges bearing evidence of utilization wear and pièce esquillée characteristics. Retouched flake totals according to category include seven proximal (38.89%), four distal (22.22%), two lateral (11.11%), three medial-horizontal (16.67%), one medial-vertical (5.56%), and one complete (5.56%). Three flakes (16.67%) are considered to possess intact lateral edges, eight flakes (44.44%) have fractured edges, one flake (5.56%) has crushed edges, and six flakes (33.33%) have retouched edges.

Length, width, thickness, and weight values are

Figure 21. Retouched Flakes.

A	984.245.3	Retouched Flake
B	984.245.4	Retouched Flake
C	984.245.5	Retouched Flake
D	984.245.6	Retouched Flake
E	984.245.8	Retouched Flake
F	984.245.9	Retouched Flake

Letter	Face	Retouched Edge	Edge Type
A	Dorsal	Left	Unifacial (dorsal face)
B	Dorsal	Distal	Unifacial (dorsal face)
C	Dorsal	Distal	Unifacial (dorsal face)
		Left	Unifacial (dorsal face)
		Right	Unifacial (dorsal face)
D	Ventral	Proximal, Left (right side in photograph)	Unifacial (ventral face)
E	Dorsal	Distal	Unifacial (dorsal face)
F	Dorsal	Distal	Unifacial (dorsal face)

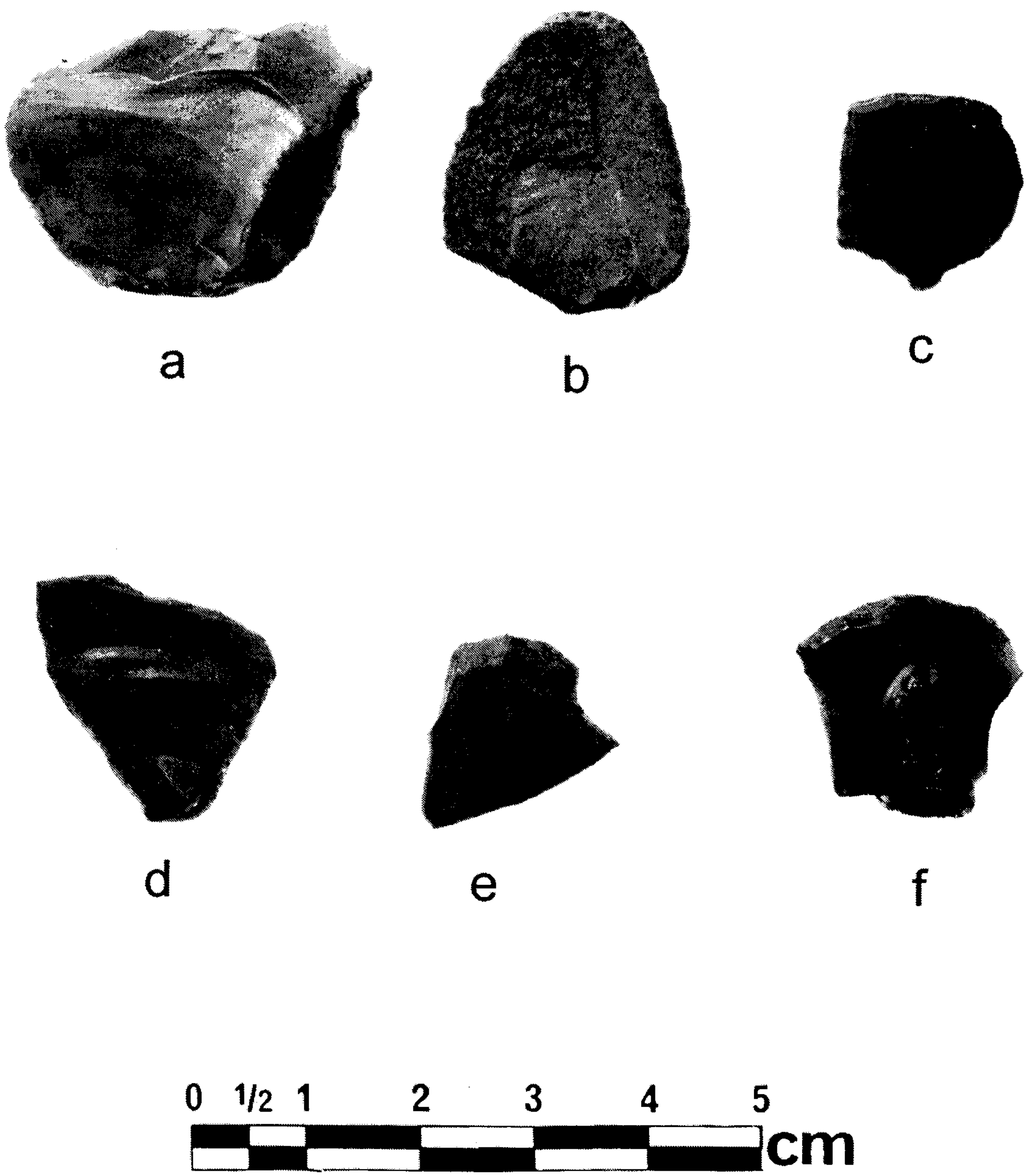

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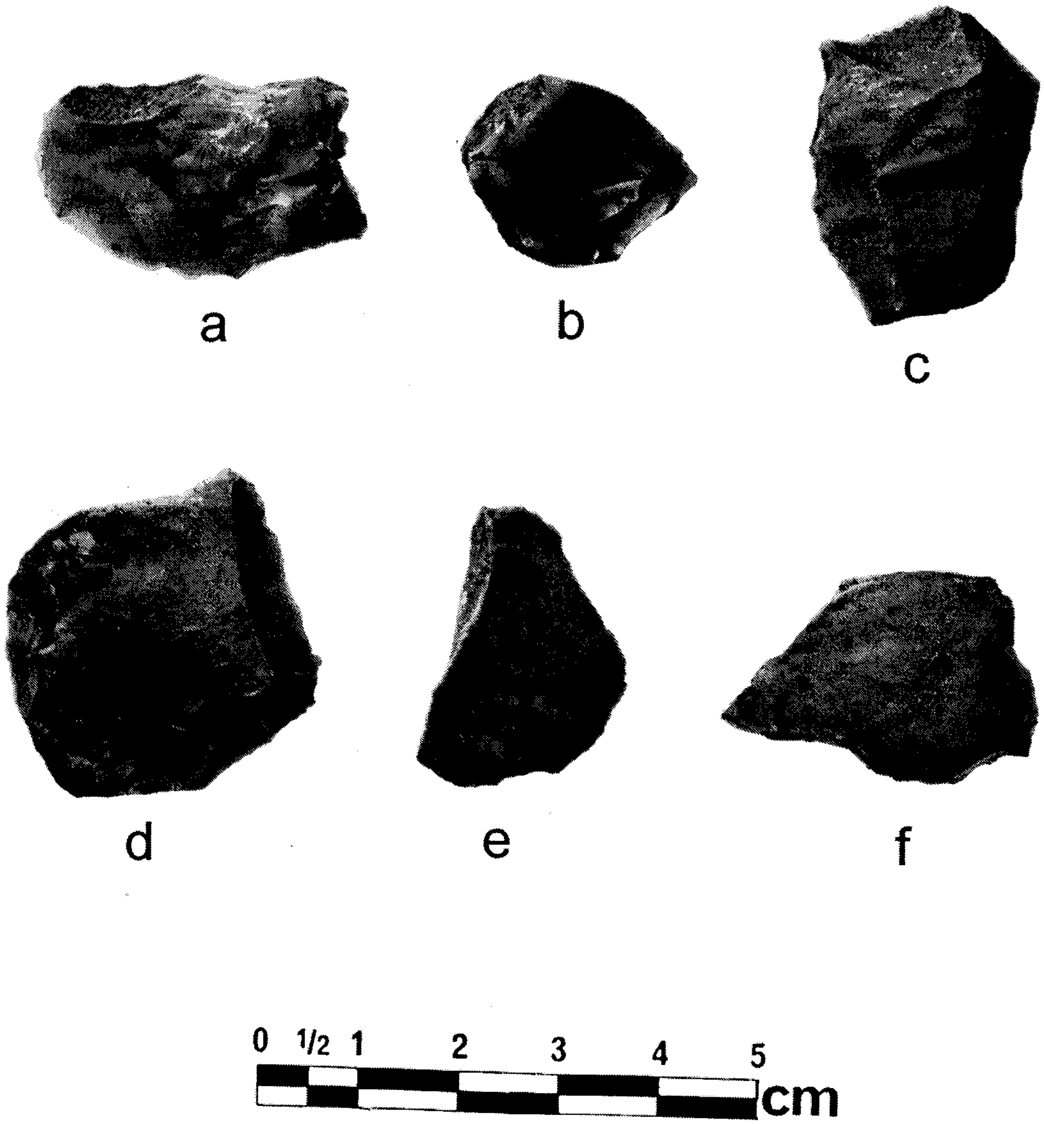
Figure 22. Retouched Flakes.

A	984.245.10	Retouched Flake
B	984.245.11	Retouched Flake
C	984.245.12	Retouched Flake
D	984.245.14	Retouched Flake
E	984.245.36	Retouched Flake
F	984.245.53	Retouched Flake

Letter	Face	Retouched Edge	Edge Type
A	Dorsal	Distal (right side)	Unifacial (dorsal face)
		Proximal (medial area)	Unifacial (ventral face)
B	Dorsal	Left (distal end)	Unifacial (dorsal face)
		Left (proximal end)	Unifacial (ventral face)
C	Dorsal	Left (proximal end)	Bifacial
		Left (distal end terminating in spur)	Unifacial (dorsal face)
D	Dorsal	Proximal (right side)	Unifacial (dorsal face)
E	Ventral	Distal	Unifacial (ventral face)
F	Ventral	Proximal (left side; right side in photograh)	Unifacial (ventral face)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summarized in Table 15. Figures 23 and 24 display length and width frequencies.

Table 15.

Retouched Flakes: Length, Width, Thickness, Weight.

Statistic	Length	Width	Thickness	Weight
n	18	18	18	18
$\bar{x}$	24.42	23.28	5.13	3.36
med	22.9	21.75	5.1	2.65
r	7.3-51.6	10.5-39.1	2.6-7.7	0.2-8.3
s	9.26	7.17	1.68	2.44
v	37.92	30.80	32.75	72.62
sk	0.49	0.64	0.05	0.87

In total, there are 29 discrete edge margins with retouch modification. Eleven flakes (61.11%) exhibit one retouched edge, five flakes (27.78%) exhibit two retouched edges, one flake (5.56%) exhibits three retouched edges, and one flake (5.56%) - classified as a stemmed biface (point) - exhibits five retouched edges. Twenty-three edges (79.31%) are unifacially retouched while six edges (20.69%) display bifacial retouch.

Two edges are not included in the following

Figure 23.

Retouched Flakes: Length.

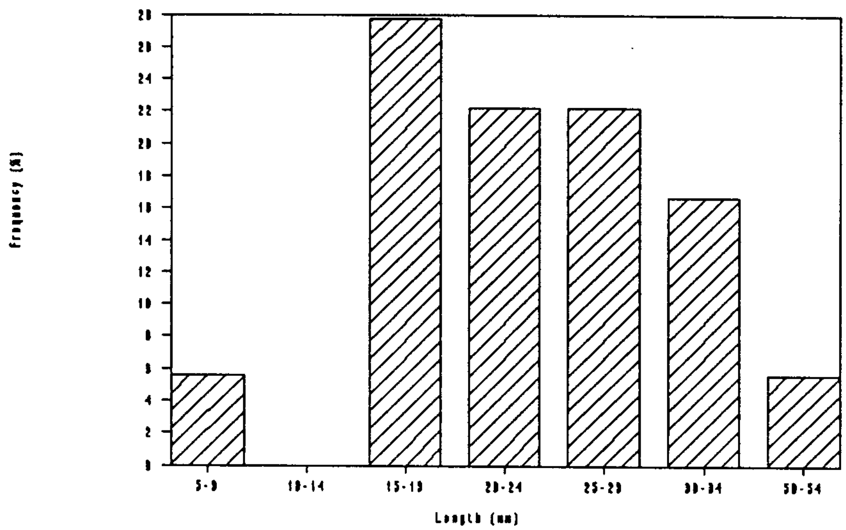
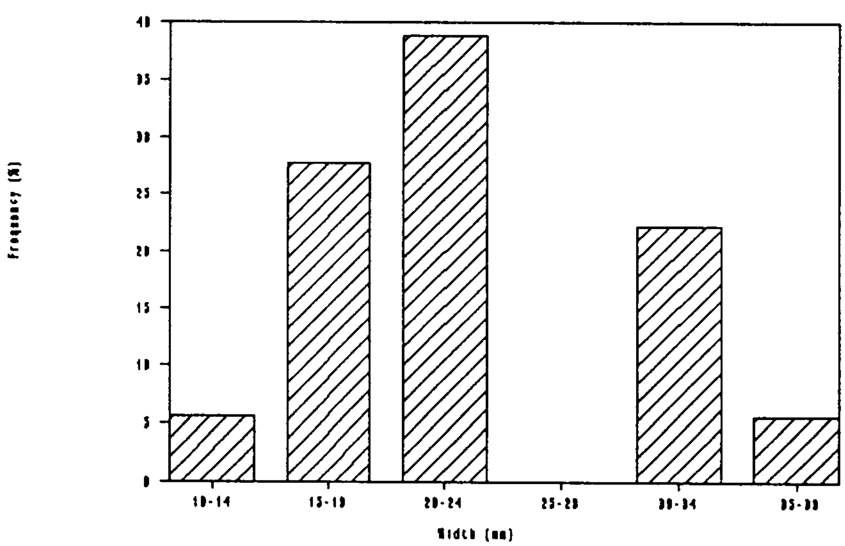


Figure 24.

Retouched Flakes: Width.



discussion of unifacially retouched margins. 984.245.2 is an unidentified retouched fragment which seems to have been detached from a larger implement. The second edge represents the right blade section of a point (984.245.1) which will be discussed in the section pertaining to bifaces.

The remaining 16 flakes possess a total of 21 unifacially retouched edges. Table 16 summarizes edge angle, scar length, edge height, and edge length values. Appendix D lists attributes pertaining to all of the unifacial retouched edges. Figures 25 and 26 display edge angle and scar length frequencies.

The greatest frequency of retouching occurs on the dorsal faces (n=15, 71.43%) with the ventral faces (n=6, 28.57%) receiving the least. With respect to individually retouched edge positions, the distal edge (n=7, 33.33%) is retouched with the greatest frequency while the right lateral edge (n=3, 14.29%) is retouched the least. The proximal (n=4, 19.05%) and left lateral edges (n=4, 19.05%) are retouched with equal frequency. Additionally, three retouched sections (14.29%) involve combined edge positions: two sections span left lateral and distal margins and one section spans distal, left lateral, and proximal margins. Retouched edge configurations are predominantly convex (n=13, 61.90%); however, concave (n=4, 19.05%), rectilinear

Table 16. Unifacial Retouched Flakes:

Edge Angle, Scar Length, Edge Height, Edge Length.

Statistic	Edge Angle	Scar Length Max	Scar Length Min	Edge Height	Edge Length
n	21	21	21	21	21
$\bar{x}$	64.67	3.97	1.61	3.3	11.42
med	63	3.5	1.3	3.0	11.3
r	45-83	1.5-7.7	0.5-3.6	1.1-6.7	4.0-20.7
s	11.42	1.87	0.87	1.58	4.79
v	17.66	47.10	54.04	47.88	41.94
sk	0.44	0.75	1.07	0.57	0.08

Figure 25.

Unifacial Retouched Flakes: Edge Angle.

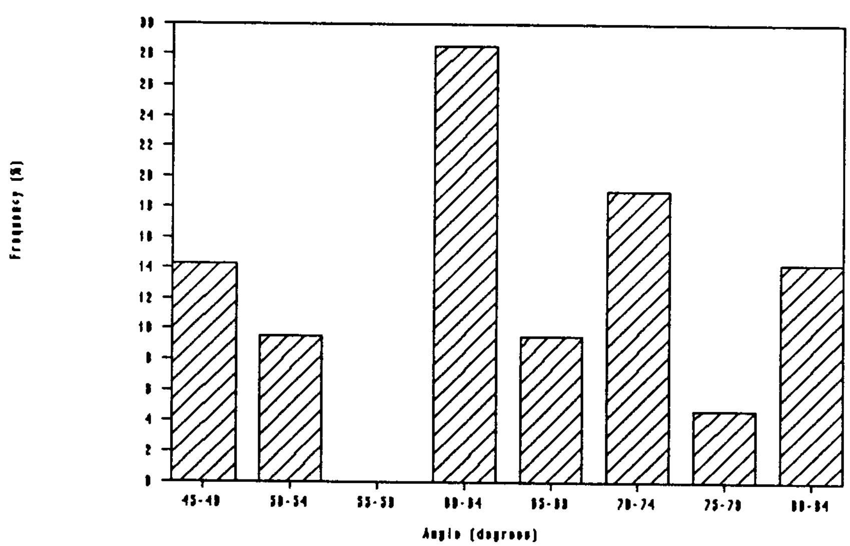
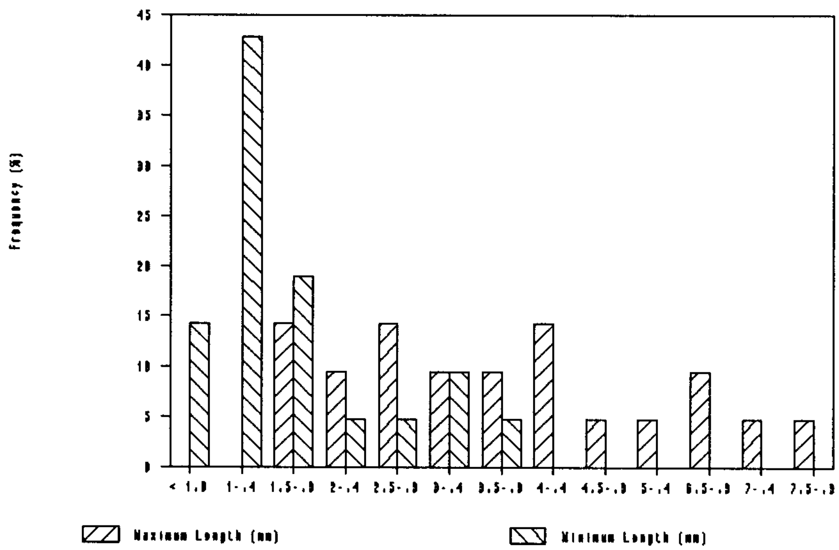


Figure 26.

Unifacial Retouched Flakes: Scar Length.



(n=2, 9.52%), and recurvate (n=2, 9.52%) configurations are represented. One retouched edge with a recurvate configuration ends in a spur (Figure 22C).

On all of the retouched edges, the retouch scars possess a high frequency of feather terminations. Fourteen edges (66.66%) exhibit feather terminations solely while seven edges (33.33%) include a smaller percentage of hinge terminations. Proximal edge damage is represented by both pronounced (n=14, 66.66%) and moderate (n=7, 33.33%) intensities with damage characterized by feather, hinge, step, and compound fractures. All of the edges display various degrees of rounding with distinct (n=15, 71.43%), slight (n=5, 23.81%), and both distinct and slight (n=1, 4.76%) categories represented.

Edge angles range between 45 degrees and 83 degrees with a mean value of 64.67 degrees (Table 16). Edges with high unifacially retouched angles such as those represented in this collection are not considered efficient for cutting or sawing types of activities, but rather they are viewed as having been utilized in some form of scraping or transverse motion.

Scraping motions include both pulling and pushing actions. The pulling form of motion is characterized by drawing the implement toward the worker with the retouched edge oriented toward the surface being worked (Ranere 1975: 197). Many of the edges in the Shamattawa Rapids site collection were likely utilized in this manner and three flakes with retouched distal margins (Figure 21C, E, and F) exhibit snapped proximal ends which may have been caused by grip tension while pressure was being applied to the retouched edge. The pushing motion utilizes the implement with the unretouched face oriented toward the worked material and the retouched edge is pushed away from the worker (Ranere 1975:197). For example, hafted Inuit skin scrapers are manipulated in this manner (for a discussion of wear patterns on Inuit skin scrapers see Hayden 1979b). Ranere (1975:197) suggests that edges with steep angles ranging between 70 degrees and 95 degrees were utilized in a pushing fashion. Callahan (1976:393) argues that the pushing of "end scrapers" is efficient for chiselling wood. Three specimens (Figure 21A and C; Figure 22C) with 65, 83, and 70 degree edge angles exhibit sections of polish on their undersides away from their edges. The occurrence of polish on the unretouched faces of steep edged tools suggests that these faces may have been in contact with the worked material; therefore, the tools were likely oriented for the pushing type of motion (Ranere 1975:197). However, consideration should also be given to the possibility that such polish was the result of a rubbing thumb while the edge was being manipulated in a pulling manner.

Unifacially retouched edges could serve a number of purposes, but the preparation of skins and/or the processing of food are suggested as the most likely activities to which these edges were employed at the Shamattawa Rapids site. The dominance of convex edge configurations over concave, rectilinear, and recurvate shaped edges may indicate concentration upon skin dressing (Semenov 1964:88); however, the dominance of unifacially retouched edges over those that are bifacially flaked may equally imply that the major activity at the site pertained to the processing of fish (Fitting 1967:241).

Three intentionally modified flakes (16.67%) display edges that are bifacially retouched. One flake (984.245.1) is classified as a point and the basal and notched sections are included in the total number of retouched margins. Attributes pertaining to this artifact are presented in the section that discusses bifaces. Two bifacially retouched margins on the remaining two flakes are not considered to be working edges. The morphology of these edges is rough in comparison to other examples of retouched margins and it is thought that they may have been flaked for reasons other than raw material manipulation. Both margins occur in association with unifacially retouched edges which suggests that they may have been flaked for the purpose of increasing the efficiency and ease of edge manipulation.

Pièces Esquillées

The term pièces esquillées is one of a number of labels (e.g. fabricators, outils ecailles, scalar cores, bipolar cores, gouged-end artifacts, wedges) employed in the archaeological literature pertaining to lithic objects displaying evidence of damage on opposed margins (refer to Forsman 1975; Hayden 1980; Le Blanc 1984:183-200; Leaf 1979; Lothrop and Gramly 1982; MacDonald 1968:85-90; Ranere 1975; White 1968). Margin damage includes opposed crushed margins (Le Blanc 1984:183), crushed margins opposite relatively flat surfaces that could have been used as "areas of percussion" (Binford and Quimby 1972:356), or crushed edges and area surfaces opposite margins that are fractured or absent (Figures 27 and 28).

The manner by which the damage was formed is an issue of debate focussed upon views of 1) production through bipolar core reduction or, 2) production through utilization (for discussions of this debate refer to Hayden 1980; Le Blanc 1984:183-185; White 1968). It is not the purpose of this analysis to discuss the merits of each view, but rather to suggest that all of the pièces esquillées comprising this subclass from the Shamattawa Rapids site are likely the products of utilization. Damage, such as flake removals, battering, and crushing, on both margins generally extend down a fraction of the original flake faces. This characteristic is in contrast with bipolar cores. According to Hayden (1980:2-3) flakes are generally not utilized as bipolar cores and such cores often have flake scars that extend down their full length.

The method of utilization is thought to be similar to that of a wedge or chisel where one margin receives a blow from a hard or soft impactor, thereby driving the opposite margin into the desired raw material. Consequently, both the impact and bit margins receive damage. The raw materials manipulated are uncertain; however, the chiselling

Figure 27. Pièces Esquillées.

A	984.245.7	Pièce Esquillée, Flake
B	984.245.10	Pièce Esquillée, Flake
C	984.245.14	Pièce Esquillée, Flake
D	984.245.23.1.2	Pièce Esquillée, Flake
E	984.245.36	Pièce Esquillée, Flake

Letter	Face	Axis of Crushing
A	Ventral	Horizontal
B	Ventral	Horizontal
C	Ventral	Horizontal
D	Dorsal	Vertical
E	Ventral	Vertical

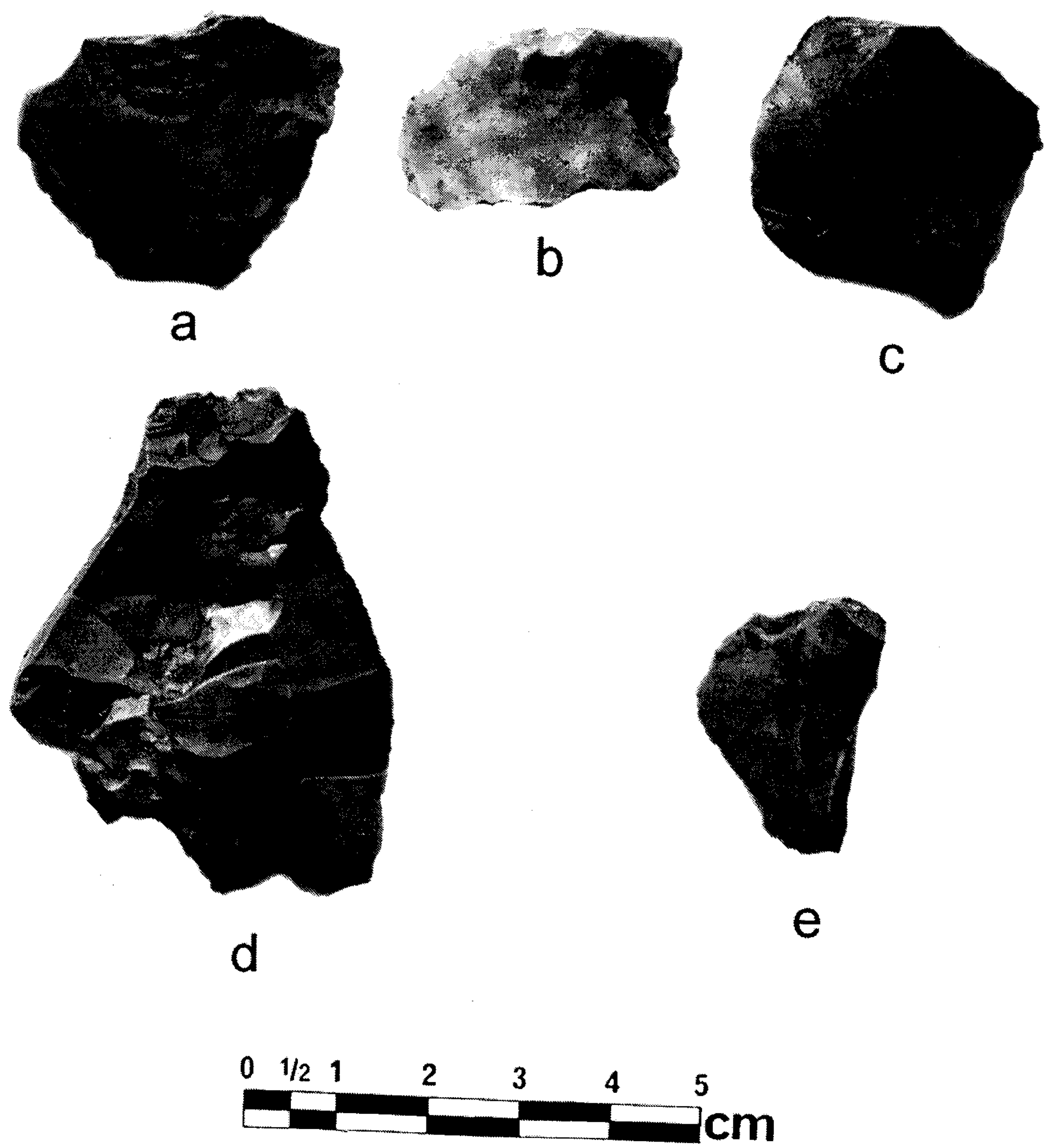
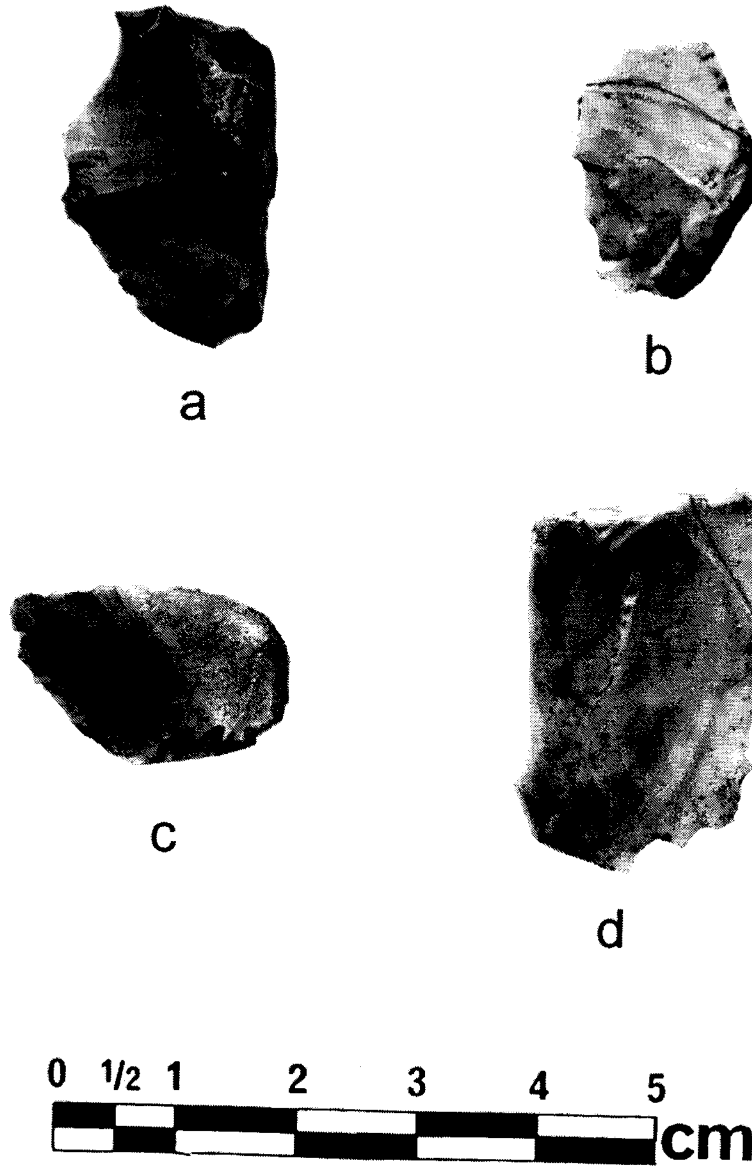

a
b
c
d
e
0 1/2 1 2 3 4 5
cm

Figure 28. Pièces Esquillées.

A	984.245.39	Pièce Esquillée, Flake
B	984.245.43	Pièce Esquillée, Flake
C	984.245.48	Pièce Esquillée, Flake
D	984.245.54	Pièce Esquillée, Flake

Letter	Face	Axis of Crushing
A	Dorsal	Horizontal and Vertical
B	Dorsal	Horizontal
C	Dorsal	Horizontal
D	Dorsal	Vertical


a
b
c
d
0 1/2 1 2 3 4 5
cm

or wedging of bone and antler (Lothrop and Gramly 1982:13; MacDonald 1968:88-90), wood (Ranere 1957:191) or even frozen flesh (Le Blanc 1984:188) are all possibilities. The use of flakes in a chiselling fashion may also be beneficial for slicing through the hard scale layer of fish in the initial stages of fish processing. Experimentation would benefit the interpretation of pièce esquillée function; however, given their association with other forms of modified flakes in combination with the site's location, a function pertaining to food processing is tentatively proposed.

In the Shamattawa Rapids site flake collection, 11 flakes, accounting for 20.75% of the flake class (Table 6), are considered to have been used as pièces esquillées. Six of these flakes (54.55%) also possess edges bearing evidence of utilization or retouch. Pièces esquillées according to flake category include two proximal (18.18%), two distal (18.18%), four lateral (36.36%), two medial-horizontal (18.18%), and one medial-vertical (9.09%). None of the flakes possess intact lateral edges which are retouched (n=1, 9.09%), crushed (n=1, 9.09%), or fractured (n=9, 81.82%).

Length, width, thickness, and weight values are summarized in Table 17. Figures 29 and 30 display length and width frequencies.

Table 17.

Pièces Esquillées: Length, Width, Thickness, Weight.

Statistic	Length	Width	Thickness	Weight
n	11	11	11	11
$\bar{x}$	30.47	25.85	6.99	5.22
med	28.5	23.0	6.2	4.6
r	15.5-56.4	16.4-41.6	4.7-9.7	1.2-15.0
s	11.76	8.20	1.59	3.99
v	38.60	31.72	22.75	76.44
sk	0.50	1.04	1.49	0.47

Figure 29.

Pièces Esquillées: Length.

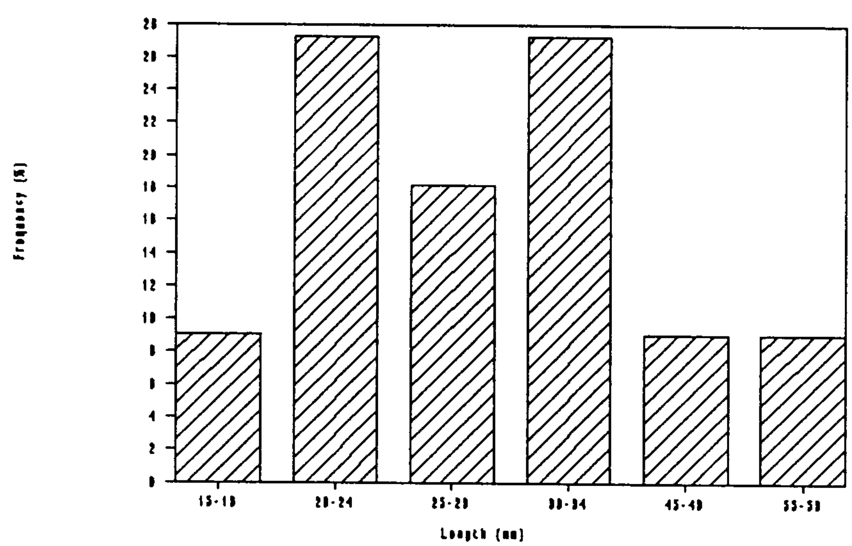
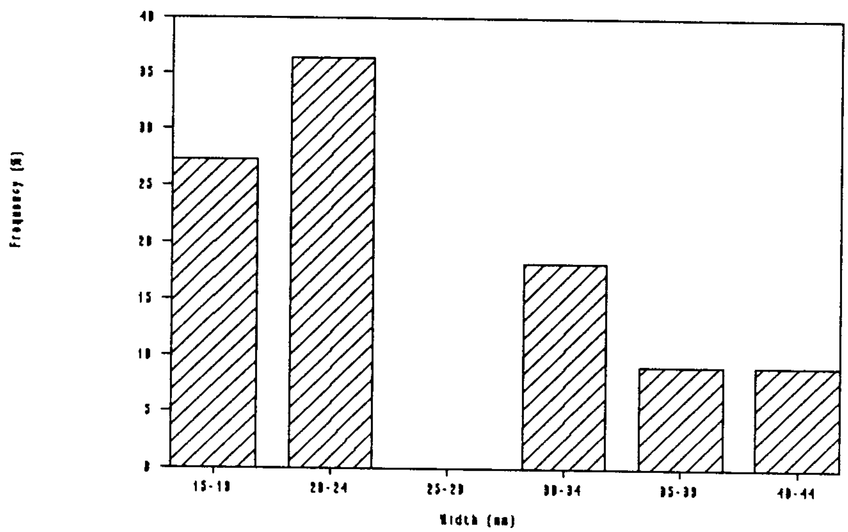


Figure 30.

Pièces Esquillées: Width.



In terms of pièce esquillée categories, ten flakes (90.91%) possess evidence of both impact edges, whereas one flake (9.09%) has one of its impact edges missing. The axes of impact are represented by horizontal (n=6, 54.55%), vertical (n=4, 36.36%), and both horizontal and vertical (n=1, 9.09%) orientations. Similar to Le Blanc's analysis (1984:183-200) the identification of damaged margin types follows the system for bipolar cores described by Binford and Quimby (1972:356-361). The vertical axis of impact is represented by area-ridge (n=2, 40.00%), ridge-ridge (n=2, 40.00%), and area-area (n=1, 20.00%) margin types. The horizontal axis of impact exhibits a greater variety of types with ridge-ridge (n=2, 28.57%), point-area (n=1, 14.29%), ridge-area (n=1, 14.29%), area-ridge (n=2, 28.57%), and ridge-indeterminate (n=1, 14.29%) type combinations. Among the 21 damaged edges present, damage on both ventral and dorsal faces occurs with the greatest frequency (n=14, 66.67%); however, unifacial scarring (n=4, 19.05%) and scarring that is limited to area surfaces (n=3, 14.29%) are also represented. On all flakes where the impact was oriented along the vertical axis the distal margin is considered to have been the bit, or primary edge. With flakes having impact oriented along the horizontal axis the bit edge utilized with the greatest frequency was the left lateral edge (n=4, 57.14%); the right lateral margin (n=2, 28.57%) was utilized the least. The bit edge on one flake (14.29%) is indeterminate.

Biface Class

The biface class consists of chert objects that display retouch on opposed surfaces and exhibit various degrees of facial flaking. In the Shamattawa Rapids site lithic collection, two specimens - accounting for 2.82% of the total collection - are classified as bifaces with stemmed and unstemmed subclasses represented. Tables pertaining to non-metric attributes, as well as metric measurements and angles for both bifaces are presented in

Appendix E.

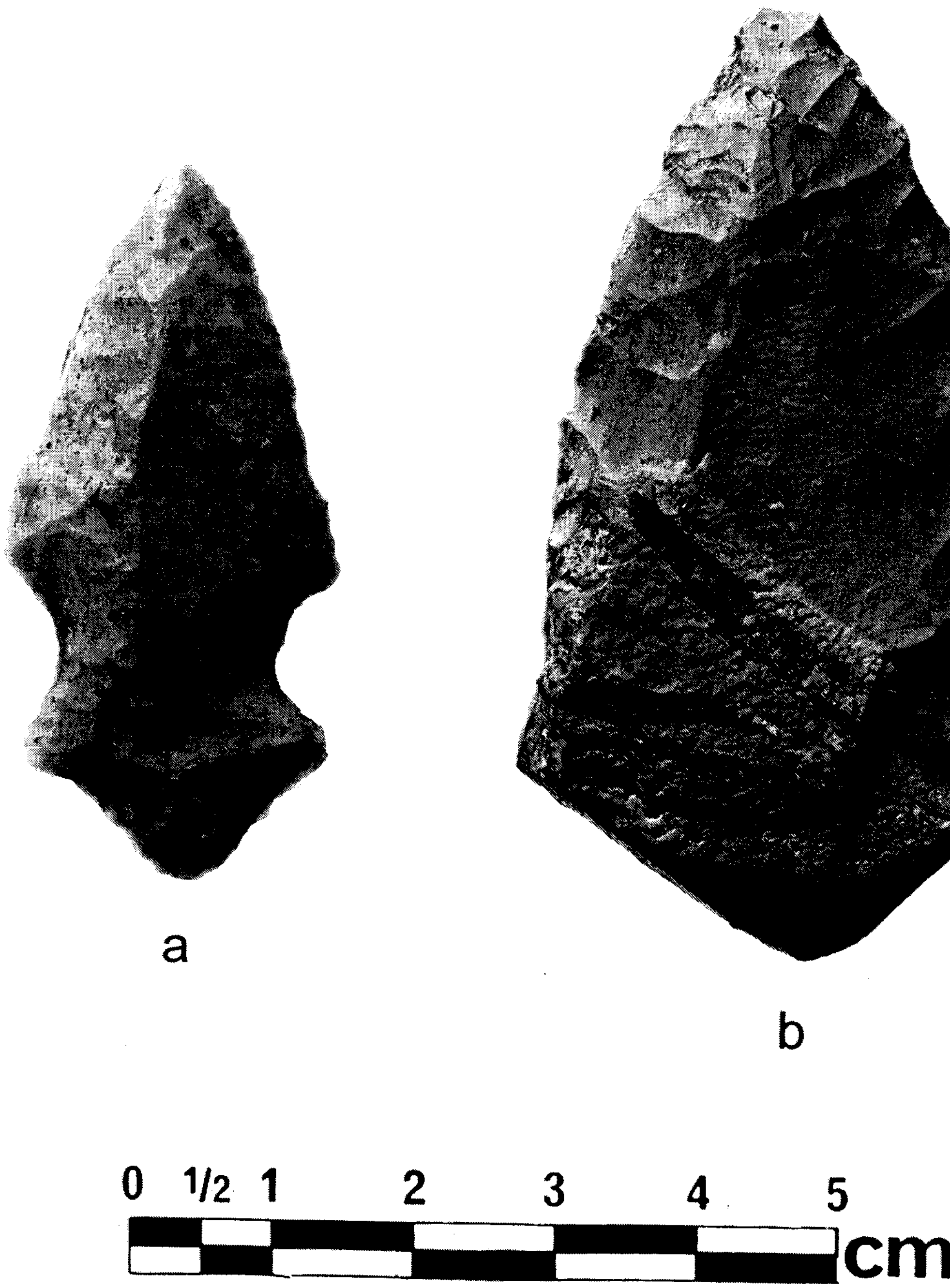
The stemmed biface (Figure 31A) is a side-notched point with a bivectorial base and asymmetrical convex blade margins. It is mottled light grey and strong brown in colour and shaped from a chert flake nucleus. The bifacially retouched margins include two side notches, the base, and the left lateral blade edge. Both faces of the left lateral blade display feather, hinge, and step retouch flakes. The proximal edge damage is represented by compound fractures and slight rounding. The right lateral blade edge, however, is unifacially flaked on the dorsal face. Feather, hinge, and step retouch scars are represented and proximal edge damage consists of distinct rounding.

A platform remnant is present on the point's proximal end which forms the apex of the base. The ventral face of the haft section is characterized by a diffuse bulb of force and the point displays the concave-distal longitudinal shape of the original flake blank. According to the size classification system of Curry et al. (1985:89) the 51.6 mm length of the point places it into a medium sized category.

The point's salient characteristic is that it is retouched predominantly on the dorsal face. The ventral face possesses minimal retouch and this contributes to the point's general plano-convex cross section. The haft section of the dorsal face has been thinned by edge flaking,

Figure 31. Bifaces.

A	984.245.1	Biface
B	984.245.13	Biface


a
b
0 1/2 1 2 3 4 5
cm

but the bulb of force dominates the haft area on the ventral face. Evidence of grinding is lacking in the haft area.

On the basis of morphology the point is attributed to the Shield Archaic tradition. Similar to Shield Archaic points discussed by Wright (1972b:42) the biface has affinity to points that are generally lanceolate in shape with the addition of side-notches. The point's distinctive bivectorial base, however, does not easily compare with specimens recovered from the Lowland or its surrounding area. Although the base is more pointed than convex its closest affinity appears to be with side-notched points bearing convex bases. The difference in base configurations notwithstanding, similarities in form and metrical attributes with two Shield Archaic points from the Aberdeen site, Keewatin District, are striking (see Wright 1972b:37 and Plate XXI fig. 4; Wright 1972c:65 and Plate V fig. 11). Likewise allowing for base differences, sites with Shield Archaic affiliations from Attawapiskat Lake immediately west of the Lowland in north central Ontario have also produced points with comparable form and metrical attributes (see Riddle 1982:17 and fig. 6m, 21 and fig. 12a, 30 and fig. 23d).

Although the specimen has been classified as a point this designation is not intended to define its use. As noted by Callahan (1976:391) and Wheat (1976:9-10) points could serve various cutting, sawing, and scraping functions in addition to their use as projectiles. Due to the concave-distal end of this point it would be inefficient as a projectile; therefore, its intended function may have related more to food processing activities. As well, this specimen may not have reached its final intended form before being discarded or lost: its width/thickness ratio equals 3.13 (width is equal to 3.13 times the thickness) which according to Callahan's (1976:382) thinning stage classification suggests that the specimen has undergone a primary thinning stage, but the secondary thinning stage - which flattens the cross section in order to increase the object's cutting efficiency - has not been accomplished.

The unstemmed biface (Figure 31B) is fashioned from a flat nodule of mottled light gray and strong brown chert. The specimen has a trianguloid configuration with sinuous, convex shaped blade margins. Feather, hinge, and step retouch scars are represented and proximal edge damage is characterized by both microflake fractures and rounding. The right blade edge exhibits feather and compound fractures and distinct rounding. The left blade edge shows feather, hinge, and compound fractures but rounding is absent.

With respect to condition the biface is considered to be incomplete: very little "edge-straightening" (Young and Bonnichsen 1984:64-65) is apparent and facial flaking is limited to the initial edging and primary thinning stages (Callahan 1976:382; Young and Bonnichsen 1984:73-82). Few of the facial flakes reach the centre of the biface which leaves the mid-section of the specimen in a general unthinned condition. The width-thickness ratio of 3.43 and the occurrence of cortex on both faces supports the suggestion that the biface is in an unfinished state.

Debris Class

The term debris refers to those items that cannot be positively identified as cores or flakes. It is a general morphological designation that does not preclude utilization. Therefore, an item could be classified as debris in that it does not belong in the core or flake categories, and yet it could have been utilized as a tool.

In the Shamattawa Rapids site lithic collection, 15 specimens, accounting for 21.13% of the total collection (Table 6), are classified as debris. These are grouped into five subclasses including unutilized chips (n=2, 13.33%), unutilized chunks (n=3, 20.00%), utilized chunks (n=1, 6.67%), potlid spalls (n=3, 20.00%), and explosion spalls (n=6, 40.00%).

The subclass totals indicate that 60.00% of the debris class are specimens fractured from their parent materials as a result of exposure to heat (potlid spalls, explosion spalls). The remaining 40.00% is composed of chert chunks (26.67%) and chips (13.33%). One of the potlid spalls was fractured from an unutilized chunk and one chip also exhibits potlid fractures. On both of these specimens the heat fractures cover 1-24% of their surfaces.

Measurements including length, width, thickness, and weight values for each debris subclass are summarized in Table 18.

The one specimen that is classified as a utilized chunk exhibits utilization wear, as well as pièce esquillée characteristics. The convex utilized edge displays bifacial modification characterized by pronounced discontinuous (heavy) scarring on both edge faces. The utilized margin exhibits hinge and feather scar terminations and slight edge rounding. The spine-plane angle equals 49 degrees and the maximum scar length measures 0.9 mm. The morphology of the utilized edge is comparable to similar edges on flake specimens; therefore, it is suggested that the edge was used for the manipulation of soft and/or medium material in a longitudinal manner. As a pièce esquillée, impact orientation was along the specimen's longest dimension. Both impact edges are present represented by ridge-point margin types. The ridge margin exhibits heavy crushing and it is the edge considered to have received the external

Table 18. Debris:
Length, Width, Thickness, Weight.

Subclass		N	Length	Width	Thickness	Weight
Chip	(r)	2	11.3-32.5	10.8-29.2	1.5-7.5	0.2-5.1
	($\bar{x}$)		21.9	20.0	4.5	2.65
Chunk	(r)	4	18.2-30.6	17.7-22.7	9.2-17.8	3.3-8.8
	($\bar{x}$)		25.18	19.25	12.80	5.55
Potlid Spall	(r)	3	13.5-29.7	9.9-18.8	2.5-5.4	0.3-1.9
	($\bar{x}$)		19.27	13.97	3.93	1.07
Explosion Spall	(r)	6	10.3-25.5	7.8-20.4	1.9-3.2	0.1-0.9
	($\bar{x}$)		15.15	11.17	2.67	0.38

force that pushed the point, or bit margin, into the raw material.

Discussion of Lithic Collection

The above discussion separates the lithic collection into classes and focuses upon physical and cultural attributes pertinent to each class. The discussion now turns to the lithic collection in the context of the site and the site's place within a cultural system.

Over the past number of years major contributions have been made with respect to technological organization and the notion of "curated" and "situational" technologies (see Bamforth 1986; Binford 1976, 1979; Torrence 1983). In this context, a curated technology refers to tools that are produced and maintained for future use (Binford 1979:269). On the other hand, situational tools are produced in response to immediate needs and conditions (Binford 1979:265-266).

Pertaining to the stimulus for tool curation, three views are prevalent in the literature: technological efficiency, time stress, and the availability of raw materials. In Binford's view, curated tools that are maintained over time, recycled, and transported between activity areas increase the efficiency of the technology. At the same time, the investment of time and energy in the procurement of raw materials is decreased. Torrence relates tool curation to time stress so that technological behaviour is scheduled to make optimal use of limited time. Curated tools are produced prior to their anticipated need. As well, in view of limited time, curated tools are more efficient than non-curated tools; therefore, in time-stressed environments, production and maintenance of curated tool kits are anticipated. On the other hand, Bamforth argues that tool curation is a function of raw material availability: tools produced from non-local materials display a higher level of curation than those made from materials acquired from local sources. Therefore, in Bamforth's view the conservation of limited raw materials has greater value as a determinant of tool curation than time stress or technological efficiency.

In a curated technology, tool production and maintenance activities may follow a "staged" pattern (Binford 1979:268); therefore, such activities would be expected to take place at different locations. The presence of the two unfinished bifaces in the lithic collection may represent artifacts that were being transported in a staged pattern of production. With staged tool production, sites with curated artifacts could be expected to display an inverse relationship between tools and production and/or maintenance refuse (Binford 1976:344-345). Stated in another way, tools that are transported, maintained, and recycled will not likely be discarded in the areas where they were produced and maintained. It follows that a lithic collection with a paucity of production and/or maintenance refuse will likely represent a curated collection in that the specimens were removed from their locations of production and/or maintenance.

Overall the lithic collection from the Shamattawa Rapids site is relatively homogenous in nature: homogenous in the sense that the collection is largely comprised of percussion flakes that have been intentionally or unintentionally modified. One of the collection's salient characteristics is its lack of refuse from tool production and/or maintenance. Small pressure or percussion retouch flakes are not present and cores and/or exhausted cores from which the extant flakes were produced are absent. The one core specimen that is present is a core fragment, but its presence in the collection is likely related to its flake-like and, thus, functional qualities as opposed to its initial role as a core. This characteristic of the collection suggests that the production of the flakes and the shaping of the formal tools were performed elsewhere. Thus, the collection appears to have been part of a curated technology that was produced in anticipation of future use. Given this belief it is of interest to note that this interpretation contradicts Bamforth's view that artifacts from locally derived materials will tend to display low levels of curation. Commensurate with this interpretation of the site - i.e. a curated technology - is the dominance of tools in the form of bifaces, retouched flakes, and modified flakes suggesting that the collection had special-purpose orientations.

In his ethnoarchaeological study of the Nunamiut, Binford (1976, 1978a, 1979, 1980, 1983a, 1983b) has effectively shown that the Nunamiut economic strategy is logistically organized around movements between residential and special-purpose locations. The residential site is a "home base" to which foragers return following excursions of various lengths within a foraging range (see Binford 1983b: 358-361; see also Rogers and Black 1976 for a discussion of a similar strategy among the Weagamow Ojibway). Inherent in this form of economic adaptation is a detailed knowledge of resource distributions and the employment of specific foraging tactics based upon this knowledge.

Residential camps (Binford 1979:269) are locations where a variety of activities take place including the production and maintenance of tools intended for future use. Tool production and maintenance refuse, as well as discarded worn-out items are therefore characteristics of residential camps or home bases. Special-purpose sites, on the other hand, are locations that are visited and used temporarily for the purposes of gathering resource information, planning, and/or executing foraging tactics aimed at specific resources (Binford 1980:10-12). Due to the direct relationship between the location of special-purpose sites and specific resource distributions such sites tend to be reused (Binford 1983a:328-330). The occupation of special-purpose sites will involve discrete activities and, therefore, the archaeological remains - in Binford's terminology (1983a:328) - will tend to be "redundant." Residential sites adhere to a more flexible spatial patterning with more diverse activities; thus, less redundant archaeological remains are expected.

The Shamattawa Rapids site fits well into the pattern discussed by Binford and it is suggested that the foragers who utilized the area likely followed a similar type of logistically organized strategy. The Shamattawa Rapids site lithic collection is clearly redundant in the sense that little diversity is represented: the collection is largely comprised of processing tools. With the possible exception of the point (Figure 31A), hunting weapons are absent. The intended function of the point is ambiguous, and as discussed earlier, the point may well relate to processing activities as opposed to activities related to hunting. Although different classes of processing tools are represented in the collection their functional characteristics may be related. This attribute of the collection, in conjunction with a dearth of production and/or maintenance refuse, indicates that the collection represents a curated collection of artifacts that was deposited at a location that had a specific function in the adaptive strategy of the resident foragers.

With reference to Figure 8, the greatest concentration of lithic specimens occurs in the southern portion of the excavated unit. There appears to be, however, a general pattern of lithic remains among rocks that together form a rude circular pattern with a relatively barren central section. Although it is tempting to relate the apparent pattern to that of a shelter base and interior, such a conclusion is inconclusive. Nevertheless, the site clearly represents an activity area and the archaeological remains from the activities performed at the site may represent an accumulation of lost and/or discarded items during numerous occupations over a lengthy period of time.

Chapter Summary

Evidence excavated to date from the Hudson Bay Lowland reveals an extensive time span for the region's human history. Although the sample is still small, the data, nevertheless, denotes the Lowland as sustaining a human presence as early as the Shield Archaic period. Within the Lowland, in addition to the Shamattawa Rapids site on the Shamattawa River, Shield Archaic remains have been recovered from the Albany River, Severn River, and Hawley Lake.

Along the lower Albany River and its tributaries, Julig (1982) identified four sites with deposits attributed to the Shield Archaic tradition. The attributions are, however, tentative in that they are based upon point typology (two sites have points with affinities to Archaic point types) and the lack of ceramics.

On the lower Severn River, evidence of Shield Archaic remains are limited to one site (Pilon 1987:163-165). The Kitche Ouessecote site yielded over 3,000 lithic artifacts that in addition to retouched flakes, utilized flakes, unmodified flakes, cores, and debris, included five corner-notched and two side-notched points. By comparison with dated sites in northwestern Ontario and Manitoba that produced similar corner-notched points, Pilon (1987:181) assigns the site to the Archaic period around the beginning of the first millennium A.D.

The Hawley Lake site (Pollock and Noble 1975:79-83, 90-91) represents the only other known Lowland Archaic occupation. It is also the only other Archaic site to have a radiocarbon age determination. Charcoal in direct association with the cultural level yielded a date of 915 ± 100 A.D. With this date, combined with the site's attributes, the site is interpreted as representing a late regional phase of the Shield Archaic tradition.

Comparison of the artifact assemblages between the Hawley Lake and Shamattawa Rapids sites shows general similarities in that both sites are without ceramics and include one point, bifaces, unifacially worked flakes, and utilized flakes. With respect to the points, form attributes differ - especially in the basal regions - but the metrical attributes are within a comparable range. The Hawley Lake site is geographically the closest Archaic site to the Shamattawa Rapids site and it seems clear that they belong to a similar tradition, albeit at opposite ends of the time span as it is currently understood.

Three sites, represented by the Hawley Lake site, the Kitche Ouessecote site, and the Shamattawa Rapids site document the existence of the Shield Archaic tradition with a history in the Lowland that may have persisted over three thousand years. Level 3 of the Shamattawa Rapids site - with its two radiocarbon dates and diagnostic point - provides significant additional and firm testimony for a Shield Archaic occupation; an occupation that is also the earliest evidence for a human presence in the Lowland.

The location of the Shamattawa Rapids site on the eastern bank of the Shamattawa River was likely conducive to a warm weather occupation as westerly winds blowing over the area lessened the effects of biting insects. During winter, similar to the twentieth century Shamattawa Askiikan and Cabin Island sites, the protection of the bush would have been sought. Such an interpretation, however, is not commensurate with the model developed by Pilon (1987:201).

Pilon argues that in the pre-European period inland sites along the Severn River represent winter, or cold weather occupations. The argument is based upon the belief that the Lowland inhabitants followed the caribou and that caribou migrated to the coastal areas for the warm months and then back inland for the winter. Due to the nature of these caribou migrations in combination with a dependence upon caribou it is believed that the inland region did not have the necessary resource base to allow for warm weather occupations. The application of this model to the Shamattawa Rapids site would suggest that it was a cold season site. Pilon's model, however, does not take into account the total range of known caribou behaviour. Relatively recent field research, for instance, has recorded caribou populations inland during the summer months (Simkins 1965:48). These observations are also in keeping with the following statement made by James Swain in his 1815 report pertaining to the Severn District: "Venison is only on the Coast during the Summer season, more inland it is at times very plentiful both summer and winter" (HBCA B.198/e/1:4). Therefore, if it is surmised that caribou behaviour in the pre-European period can be favourably compared to that of the Historic period (see also Chapter Five, Discussion of Faunal Remains) then even with the acceptance of the belief that Lowland occupants were dependent upon the caribou it should not be assumed that interior sites were limited to cold weather occupations.

A warm weather occupation for the Shamattawa Rapids site is supported by the presence of common loon bone within the Level 1 assemblage. Since the common loon would have been available only while in its summer range the Level 1 occupation likely relates to the warmer months. On the basis of the Level 1 evidence in combination with the location of the site, seasonal use limited to the warmer months of the year is suggested for the Level 3 remains as well.

The "redundant" nature of the lithic remains from Level 3 indicates a special-purpose orientation; thus, this particular area is viewed as having had seasonal significance in the annual movement of the foragers while they pursued a predetermined foraging strategy. As a special-purpose site the location may have been advantageous for spotting game, such as caribou, and therefore used as an information gathering site during periods of known game movements. At the same time, the location is near an historically productive fishing area and during spring and fall spawning periods this section of the river may also have had particular importance for the occupants of the site.

The three sites located in this small section of the

Shamattawa River document human use of the area during the late Historic and the Archaic periods. The Cabin Island site and the Shamattawa Askiikan site represent the remains of twentieth century winter base camps that were built and occupied by Winisk Cree families. The remains recovered from Level 1 of the Shamattawa Rapids site also belong to the late Historic period and are interpreted as representing a temporary camp occupied during the warmer months of the year. The remains from Level 3 of the Shamattawa Rapids site, on the other hand, represent an Archaic occupation and signify that the area was exploited possibly as much as 4,000 years before present.

Intermediate cultural traditions, such as Initial Woodland, Terminal Woodland, and early Historic cultures, spanning a possible two thousand years of history were not found. Interestingly, cultural evidence pertaining to the early years of the nineteenth century when a Native fish weir was documented to be operating on the river was also not recovered. A stake, or the remains of a post was found inserted in the river bed (Figure 6), but the function of the post is uncertain and as an isolated find it cannot be assumed to represent a remnant of a fish trap-weir.

The documentation of late Historic and Archaic occupations on the Shamattawa River provides a glimpse into the nature of the river's cultural history. In comparison to the time span represented the extant physical evidence of the area's use is still small; neverthless, the Shamattawa River sites manifest a human history that is long in duration.

CHAPTER FIVE

Washagami Point Site (GbIg-1)

Introduction

> There are almost innumerable places convenient for Weirs, in the interior most of which produce vast quantities in the proper seasons (HBCA B.198/e/1:4d).

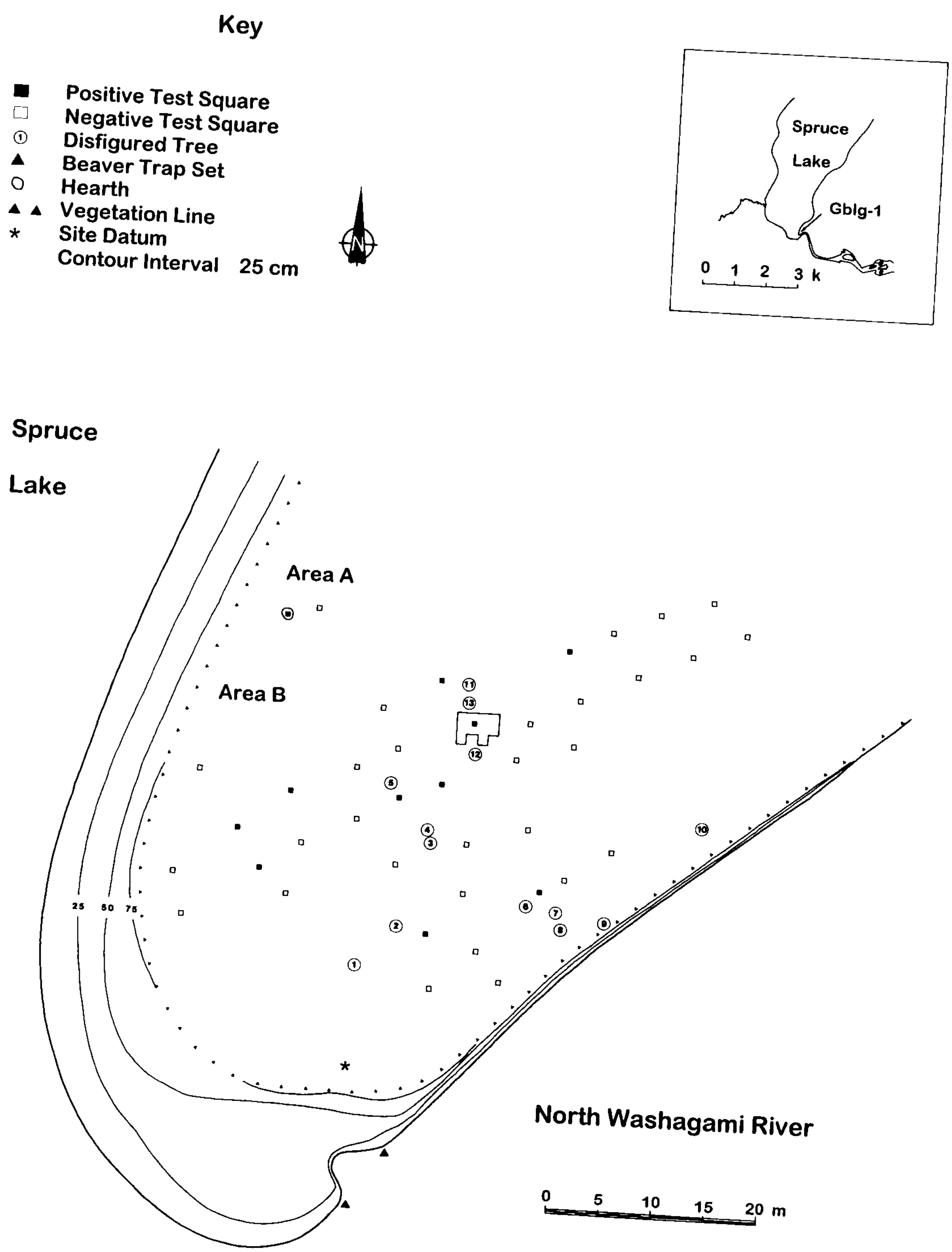
Directly east of "Sas way wah tow mah Lake," Swain's 1815 map delineates "Pine Lake" connected to the "Equan River" by a river flowing from the lake's southern end (Figures 2 and 5). Close to the junction of "Pine Lake" and its southern river, Swain indicates the presence of an "Excellent Fishg Weir." On the southwest side of "Pine Lake" a short river connects with a lake labelled "Many Islands Excellent Fishing." A "Fishg Weir" is also marked close to the junction of this river and the connected lake. With reference to a current 1:250,000 scale topographical map the southern configuration of "Pine Lake" on Swain's map clearly identifies the lake as Spruce Lake which is situated approximately 40 kilometres east of the Shamattawa River study area. At its southern end Spruce Lake drains south to the Ekwan River by way of the North Washagami River. As well, in the southwest corner of Spruce Lake a river connects with an unnamed lake that possesses a number of islands.

At the junction of Spruce Lake and the North Washagami River - where Swain's map indicates the presence of a trap-weir - the river bends to the northeast creating a point of land between it and the southeastern shore of the lake (Figure 32). For approximately two kilometres the river is shallow and swift before it deepens and separates into a number of channels forming an archipelago of low-lying swampy islands. All of our attention was given to the point of land bounded on the west by Spruce Lake and on the east by the North Washagami River.

The major area of the point displays a relatively flat contour that lies approximately one metre above the mid-August water level. Back from the sand and cobble beach the vegetation is dominated by black spruce (*Picea mariana*) and balsam poplar (*Populus tacamahaca*). As well, the point has a shrub cover of willow (*Salix myrtillifolia*), green alder/mountain alder (*Alnus viridis*), red osier dogwood (*Cornus stolonifera*), high-bush cranberry (*Viburnum trilobum*), and creeping juniper/creeping savin (*Juniperus horizontalis*)(Deborah Metsger personal communication 1984).

Figure 32. Washagami Point Site (GbIg-1).

Washagami Point Site Gblg-1



A number of poplar trees have been felled by beavers or display the diagnostic evidence of the rodents' work.

The following discussion is a presentation of the cultural remains recovered from the point area. The point is considered to represent a single site with horizontally stratified occupations pertaining to the relatively recent, late historic, and late pre-European periods.

An indication of the relatively recent use of the point area was immediately evident by the presence of four open-water beaver trap sets situated along the northern bank of the North Washagami River. On the point itself, thirteen disfigured spruce trees (Figure 32) were found displaying areas of peeled bark, slashes, and removed slabs of wood. Some of the damaged areas are covered with spruce gum and some indicate considerable age as they have been partially or completely recovered with bark. As well, one tree was found with two wedges inserted into its trunk. On many of the trees the disfigurements are clearly associated with axe cuts. Two suggestions pertaining to their cultural context are forwarded: 1) some were cut to facilitate the collection of spruce gum for seaming bark vessels, and/or 2) some are the result of removing slabs of wood to be used in the manufacture of utensils. John Michael Hunter (personal communication 1985) suggests that large slabs of wood - leaving substantial gashes - were required for the manufacture of snow shovels while smaller wood slabs - leaving smaller gashes - were required for ladles. Among the Mistassini Cree, Rogers (1967b:33) records a similar practice of removing sections of birch tree trunk and root for the manufacture of grease ladles. Appendix F details the character and dimensions of the disfigurements.

A total of 40, 25 cm square test squares were dug in the point area and eleven of the test squares proved positive (Figure 32). On the basis of these results, two spatially distinct areas - Areas A and B - representing different time periods were selected for further work.

Area A

Introduction

Area A of the Washagami Point site refers to a large fire-pit that was located along the southeastern shore of Spruce Lake. The hearth was situated 61 metres north of the entrance to the North Washagami River and 5 metres east of the beach-vegetation line (Figure 32). The hearth was found when a test square excavation revealed a considerable quantity of ash. The clearing of the shrub overburden exposed a large, roughly circular undisturbed ash feature.

The feature covered an area of 9,160 square cm with a maximum diameter of 112 cm.

The salient characteristic of the ash concentration was that it contained a clearly visible and copious amount of small bone and bone fragments. This concentration of bone held excellent potential for providing insight into the utilization of animal resources.

A two metre square grid of four one metre sub-squares was placed over the hearth (Figure 33). As such, the hearth was divided into four quadrants and each quadrant was excavated separately. The total hearth was excavated in 6 cm levels, bagged, and labelled accordingly. With the exception of one negative test square, time did not allow for the excavation of the surrounding area. Further work in this area, however, is considered necessary in order to gain a fuller understanding of the hearth and its cultural significance.

In order to recover as much of the faunal material as possible the hearth was systematically bagged for transportation south where it could be processed under more favourable conditions than those attainable in the field. Following the field season, the complete hearth was dry-sieved through a 2.0 mm screen mesh yielding five Euro-Canadian artifacts (0.17%) and 2,939 fragments (99.83%) of bone and shell. The following discussion presents the

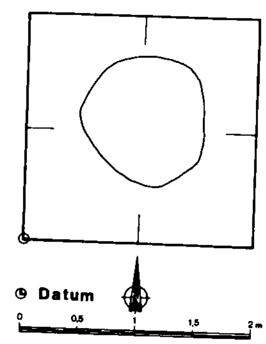
Figure 33. Washagami Point Site GbIg-1

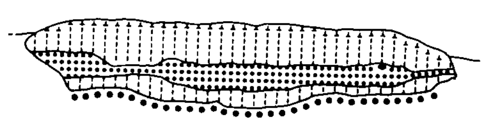
Area A

Hearth Outline and Stratigraphy.

Washagami Point Site Gblg-1

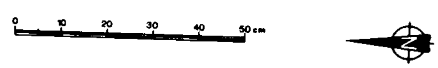
Area A
Hearth Outline and Stratigraphy





Key

- Ash
- Ash and Humus
- Ash/Silt and Gravel
- Gravel
- Root



stratigraphy of the hearth followed by discussions of the hearth's Euro-Canadian artifacts and the faunal remains.

Stratigraphy

The hearth consisted of three strata with a combined maximum depth of 18.5 cm (Figure 33). The first level consisted of a light grey (Munsell Colour 10YR 7/2) layer of ash with a maximum thickness of 10.0 cm. The matrices of the ash layer ranged from a mixture of humus and ash in the upper portion to concentrated ash in the lower portion. This initial level was elevated to a maximum of 5 cm above the hearth's perimeter. The second level was comprised of a layer of dark grey (Munsell Colour 10YR 4/1) ash/silt and gravel with a maximum thickness of 6.0 cm. The bottom level of the hearth was represented by another light grey (Munsell Colour 10YR 7/2) layer of ash 5.0 cm thick. A gravel base underlaid the upper layers and it appears that this base was the bottom of a shallow basin excavated to form the foundation for the hearth.

The two ash layers may represent distinct components isolated by an intentionally placed separating layer. The thick top layer of ash may have been built up over time by the cumulated remains of successive fires. In comparison, the relatively thin lower level may represent the remains of a single fire, or a succession of fires over a shorter duration.

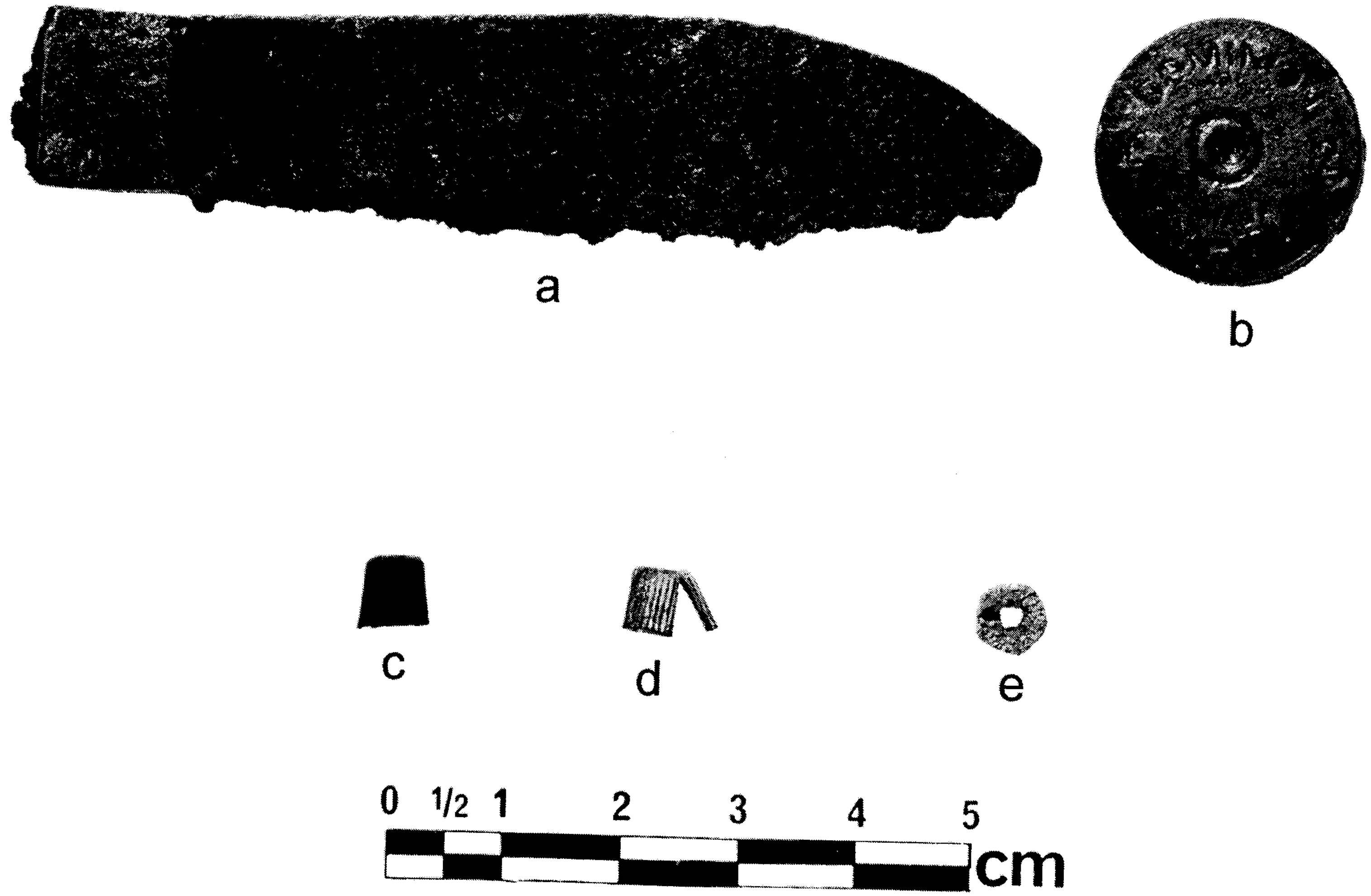
Euro-Canadian Artifacts

Five artifacts of non-indigenous origin were exhumed from the hearth: two percussion caps, a glass bead, a jack-knife blade, and the head of a shotshell (Figure 34). The percussion caps and the glass bead were recovered from the lower portion of the hearth; the jack-knife blade and the shotshell were from the hearth's upper portion.

A percussion cap is a primer that explodes upon being hit by the hammer of a gun-lock thereby igniting a powder charge in the barrel of the gun. Although there is much controversy surrounding the invention of the percussion cap, the percussion cap type of ignition was clearly developed during the second decade of the nineteenth century and by the third decade the percussion cap gun was gaining in popularity (Winant 1959:32-50, 101). However, almost half a century would pass before percussion cap technology would become part of the Indian trade in western Hudson Bay: at York Factory percussion caps initially appeared in the Indian ledger in 1864 (HBCA B.239/d/1063:11) and they

Figure 34. Hearth: Euro-Canadian Artifacts.

A	984.246.91	Jack-Knife Blade
B	984.245.90	Shotshell Head, Dominion Cartridge Company Empty Series, 12 gauge
C	984.246.92	Percussion Cap
D	984.246.93	Percussion Cap
E	984.246.94	Glass Bead



a
b
c
d
e
0 1/2 1 2 3 4 5
cm

appeared in the Severn House ledger in 1872 (HBCA B.198/d/192a:3). The metal percussion caps (Figure 34 C, D) recovered from the hearth are the Common type with side flutes, or reeds, and trimmed rims (see Gooding 1979:113 for percussion cap attributes). Although both caps have split sides they do not exhibit characteristics of having been fired. The two caps measure 5.5 mm (984.246.93) and 6.1 mm (984.246.92) in length.

The glass bead (Figure 34 E) is heavily devitrified giving the specimen a porous crystalline appearance (chemical analysis to confirm the bead's glass structure was performed by Julia Fenn, Ethnographic Conservator, Royal Ontario Museum). In colour the bead is a monochrome pink (Munsell Colour 7.5YR 7/4) to pinkish grey (Munsell Colour 7.5YR 7/2). The bead's shape is pentagonal and appears to have been formed by the wire wound method of manufacture (Kidd and Kidd 1970:49). The bead has an outside diameter of 6.1 mm. Its length is 5.9 mm and its bore diameter is approximately 2.2 mm.

The jack-knife blade (Figure 34 A) was found in a highly corrosive state and the metal surface is substantially pitted. The blade and the metal clasp joining the blade and handle are all that remain. The length (not including the clasp), width, and thickness of the blade measure 74.9 mm, 19.7 mm, and 2.1 mm respectively.

The head of the shotshell (Figure 34 B) is brass and bears corrugated sides and a headstamp. The headstamp indicates that the shotshell was 12 gauge and a member of the Dominion Cartridge Company's Empty series. The Empty series began circulation around the time of the First World War and continued in production until 1948 (Provick and Krevosheia 1966:10). A "Made in Canada" inscription incorporated into the headstamp, however, dates the shotshell to post-1927 (Provick and Krevosheia 1966:2); therefore, the shotshell head dates to the 1927-1948 period. The diameter of the shotshell head equals 22.4 mm.

A relative date for the formation of the hearth is provided by the presence of the two percussion caps and the shotshell head. In the Severn-Winisk area, percussion cap firearms were not likely used on a regular basis by the Indian population until post-1872 - the year when percussion caps first appear in the Severn House Indian ledger. Percussion cap firearms, however, were available and used well into the twentieth century (Edward Denby and Rene Chartrand personal communication 1987). Therefore, given the 1927 to 1948 date for the shotshell head, the hearth was likely formed within the second quarter of the twentieth century. The lower portion of the hearth where the percussion caps were located may date slightly earlier, but the total hearth is considered to represent the remains of similar activities performed by the same or related foraging community.

Faunal Remains

The faunal specimens recovered from the hearth were distributed throughout the hearth's depth. Specimen frequency differed between upper and lower portions of the hearth, but the classes of animals represented remained similar. The following presentation concentrates upon class and specimen representation and for this purpose the total faunal assemblage is presented as a single unit (see Discussion of Faunal Remains).

The hearth yielded a total of 2,939 fragments of bone and shell that were analyzed by Cathy Yasui (1985, 1988). Consistent with the collection's retrieval from a hearth feature the faunal remains are highly fragmented and a high proportion of the specimens exhibit calcination and/or charring as a result of exposure to heat (n=2,766, 94.11%). The bone and shell assemblages total 2,886 (98.20%) and 53 (1.80%) fragments respectively. The shell or Mollusca fragments have not been identified beyond the phylum level and the small size of the shell fragments and their eroded surface features make further identifications difficult.

Additionally, all but two of the shell specimens were recovered from the lower portion of the hearth; thus, their presence in the feature is considered to be associated with the natural occurrence of shell fragments in the underlying gravel level. Within the bone assemblage, 1,225 specimens (42.45%) could not be identified to the class level. The remaining 1,661 pieces (57.55%) that are identifiable belong to the Mammalia (30.04%), Aves (14.57%), and Osteichthyes (55.39%) classes. From the identifiable total, 1,097 specimens are further classified into family (n=46, 4.19%), subfamily (n=5, 0.46%), genus (n=673, 61.35%), or species (n=373, 34.00%) levels. Table 19 details the total faunal assemblage to the class level.

Table 19. Hearth: Faunal Assemblage to the Class Level.

Classification	n	%
Mammalia	499	16.99
Aves	242	8.23
Osteichthyes	920	31.30
Mollusca	53	1.80
Unidentified to Class	1225	41.68
Total	2939	100.00

Mammalia

Among the faunal remains identified to the class level, 30.04% (n=499) of the specimens belong to the Mammalia class. Within this group, 286 fragments (57.31%) are not sufficiently complete to allow for further classification. The remaining 213 fragments (42.69%) are identified beyond the class level and represent the Leporidae, Sciuridae, Muridae, and Mustelidae families. All but one of these specimens are identified to the species level and the species represented include snowshoe hare (*Lepus americanus*), American red squirrel (*Tamiasciurus hudsonicus*), muskrat (*Ondatra zibethicus*), and American mink (*Mustela vison*). The remaining fragment belongs to a Sciuridae species represented by the American red squirrel or northern flying squirrel (*Tamiasciurus hudsonicus* or *Glaucomys sabrinus*). In addition to the above small-to-medium sized species, medium-to-large sized mammals are represented by 22 specimens; however, these 22 bone fragments are not identifiable below the class level. Appendix G lists the identified mammalian elements.

The muskrat represents the largest proportion of identified mammalian remains both in specimen frequency (n=196) and in minimum number of individuals (MNI=7; see Area B Discussion of Faunal Remains for a discussion of the

MNI statistic). In order of specimen frequency, the muskrat is followed by the American red squirrel (n=9, MNI=3), American mink (n=5, MNI=3), snowshoe hare (n=2, MNI=1), and the American red/northern flying squirrel (n=1).

The ages represented by the mammalian specimens range from juvenile to adult. However, with respect to specimen frequency, bones representing young mammals (juvenile = 9; juvenile or older = 31; immature = 5; juvenile to immature = 89: total = 134, 62.91%) dominate over those bones representing older mammals (immature or older = 71; adult = 1: total = 72, 33.80%). The ages of seven specimens (3.29%) are uncertain.

In the mammalian bone assemblage, 434 fragments (86.97%) exhibit calcination and/or charring as a result of heat exposure. Specimens in both the identified (n=191, 89.67%) and the unidentified (n=243, 84.97%) categories display this form of modification. In addition to heat damage, rodent gnawing is apparent on two of the unidentified mammalian fragments.

Aves

Within the identifiable faunal assemblage, 14.57% (n=242) of the specimens belong to the Aves class. Among this group, 139 fragments (57.44%) defy further classification. The remaining 103 fragments (42.56%) are identified beyond the class level and represent six avian families: Gaviidae, Anatidae, Tetraonidae, Scolopacidae, Laridae, and Picidae. Of these, 58 specimens can be further classified to subfamily (n=5), genus (n=10), or species (n=43) levels. The specimens identified to the family level represent ducks (Anatidae sp.) and spruce/ruffed grouse (Tetraonidae sp.). Those specimens identified to the subfamily level represent Canada/snow geese (Anserinae sp.) and common/red-breasted mergansers (Merginae sp.). Genus level identifications include the common/arctic loon (*Gavia* sp.) and the black-backed three-toed/northern three-toed woodpecker (*Picoides* sp.). Finally, species level identifications include the Canada goose (*Branta canadensis*), greater scaup (*Aythya marila*), surf scoter (*Melanitta perspicillata*), common and red-breasted mergansers (*Mergus merganser* and *M. serrator*), spruce and ruffed grouse (*Canachites canadensis* and *Bonasa umbellus*), herring gull (*Larus argentatus*), and greater yellowlegs (*Tringa melanoleuca*). Appendix H lists the identified avian elements.

Specimens identified as belonging to the duck subfamilies occur with the greatest frequency (n=71, MNI=12: greater scaup n=2, MNI=2; surf scoter n=13, MNI=2; common merganser n=2, MNI=1; red-breasted merganser n=15, MNI=2;

common/red-breasted merganser n=3, MNI=1; ducks n=36, MNI=4). Ducks are followed in frequency by the grouse family (n=15, MNI=6: spruce grouse n=2, MNI=1; ruffed grouse n=4, MNI=1; spruce/ruffed grouse n=9, MNI=4) and the loon family (n=9, MNI=3). Least frequently represented remains pertain to the geese (n=5 MNI=1: Canada goose n=3, Canada/snow goose n=2, MNI=1), greater yellowlegs (n=1, MNI=1), herring gull (n=1, MNI=1), and woodpecker (n=1, MNI=1).

The ages represented by the avian remains range from juvenile to adult. However, in terms of specimen frequency, older bird remains (immature or older=85; adult=2: total=87, 84.47%) clearly dominate the assemblage over younger bird remains (juvenile=8; juvenile or older=2; immature=1: total=11, 10.68%). The ages of the remaining five specimens (4.85%) are uncertain.

In the avian bone assemblage, 200 fragments (82.64%) exhibit calcination and/or charring caused by heat exposure. Specimens in both the identified (n=71, 68.93%) and unidentified (n=129, 92.81%) categories display this form of modification. Additionally, cut marks on two specimens - a loon humerus and a surf scoter furcula - suggest modification through butchering activities.

Osteichthyes

Fish remains recovered from the hearth feature account for 55.39% (n=920) of the specimens identified to the class level. Among this group, 139 fragments (15.11%) are not sufficiently complete to allow for further classification. The remaining 781 specimens (84.89%) are identifiable beyond class with four families represented: Salmonidae, Esocidae, Catostomidae, and Percidae. All of these specimens are further classified to the genus (n=663, 84.89%) or species (n=118, 15.11%) levels. Genus level identifications include longnose/white sucker (*Catostomus* sp.) and cisco/lake whitefish (*Coregonus* sp.). Specimens identified to the species level include lake whitefish (*Coregonus clupeaformis*), northern pike (*Esox lucius*), walleye (*Stizostedion vitreum*), and brook trout (*Salvelinus fontinalis*). Appendix I lists the identified Osteichthyes elements.

Specimens identified as belonging to the cisco/lake whitefish genus occur with the greatest frequency (n=430, MNI=6). In number the sucker genus specimens (n=233, MNI=4) follow the cisco/lake whitefish and in declining order of specimen frequency the suckers are succeeded by northern pike (n=55, MNI=1), lake whitefish (n=49, MNI=1), walleye (n=12, MNI=1), and brook trout (n=2, MNI=1).

Fish bones are delicate and in a fire context they are highly susceptible to complete disintegration. However, the vertebra - which are more densely compacted than the other bones in the fish skeleton - have a greater chance of survival (Cathy Yasui personal communication 1985). Within the hearth faunal assemblage, 84.78% (n=780) of the recovered fish bone are vertebra; therefore, a significant amount of non-vertebra bone appears to have succumbed to the fire. As expected, a large proportion (n=910, 98.91%) of the fish remains in both the identified (n=775, 99.23%) and unidentified (n=135, 97.12%) categories exhibit calcination and/or charring due to heat exposure.

Unidentified to Class

In total, 1,225 specimens (41.68%) in the bone assemblage are not sufficiently complete to allow identification to the class level. Similar to the identified specimens, high proportions of the unidentified bones (n=1,205, 98.37%) are calcined and/or charred due to heat exposure.

Discussion of Faunal Remains

The faunal remains were distributed both vertically and horizontally throughout the hearth. With respect to vertical distribution, bone fragments were recovered from the two ash layers, as well as their separating layer of ash/silt and gravel. In addition, bone fragments were also recovered from the underlying gravel level. However, this distribution notwithstanding, the concentration of specimens occurring through the hearth's levels was not equal. Encompassing the thick upper ash layer the top 12 to 13 cm of the hearth produced 89.99% (n=2,597) of the total bone assemblage. The remaining 10.01% (n=289) of the bone assemblage was recovered from the hearth's lower portion which included the bottom ash layer. Although bone fragments were found within all levels of the hearth the disparate distribution between the upper and lower portions may reflect specific associations with the two ash layers: the larger proportion of specimens with the thick upper ash layer and the smaller proportion of specimens with the thinner lower ash layer. If this association is real the lack of clear definition in specimen distribution between the upper and lower portions of the hearth may be due to the natural effects of leaching and root action.

Although specimen frequency was considerably less in the lower portion of the hearth the classes of animals represented in both portions were similar. The number of species in the lower portion were fewer, but all of the identified species - muskrat (n=26, 30.23%), surf scoter (n=1, 1.16%), duck species (n=2, 2.33%), lake whitefish (n=2, 2.33%), cisco/lake whitefish (n=24, 27.91%), longnose/white sucker (n=30, 34.88%), and northern pike (n=1, 1.16%) - were also represented in the upper portion. Since mammal, bird, and fish remains were found throughout the hearth the discrepancies in the representation of species between levels is considered to be related to bone preservation, limitations in bone identification, and/or variety in the hearth's utilization over time, not to differences in resource exploitation.

The bone specimens that were recovered from the hearth cannot be assumed to represent a random sample of the harvested species: it is not known if remains from all species hunted/trapped were discarded in the fire and the sample that did enter the fire was likely skewed due to the fire's destructive force. Nevertheless, the bone sample that did survive does allow insight - albeit fragmented - into resource utilization and seasonality.

The representation of three faunal classes and the presence of various species within each class indicate that the people responsible for the hearth were following an economic pattern that was diverse in nature. At this time, the specific economic activities associated with the hearth are unclear although the quantity and variety of bone that was discarded in the fire suggests that the hearth was associated with food preparation and waste disposal. For instance, the majority of the recovered muskrat bones relate to low meat content areas of the body, whereas the higher meat-associated bones, such as the thoracic vertebra and ribs, are generally missing (Cathy Yasui personal communication 1985). Although this situation may relate to preservation discrepancies it may also relate to the immediate consumption and/or discard of less valued body parts while the more valued parts were saved for consumption and discard elsewhere. In addition to food preparation and waste disposal, hearth recovered bone may also represent the remains of animals that were cremated as an act of respect. Further excavation of the area around the hearth in combination with Native advisor discussions may provide a clearer understanding of this aspect of the hearth.

The seasonal use of the hearth is addressed by considering the seasonal availability of species and known patterns of harvest. Fish remains are poor indicators of seasonality because through different fishing procedures fish can be caught throughout the year. Ease of capture and locations, however, fluctuate seasonally depending upon water temperature, food, and spawning requirements. For instance, fish visibility increases dramatically during spawning periods when fish seek shallow waters. In this assemblage, two spawning periods are represented: the suckers, walleye, and northern pike spawn in the spring to early summer period and the brook trout, cisco, and lake whitefish spawn in the late summer to fall period (Scott and Crossman 1973). These periods, however, represent times of harvest increase rather than harvest restriction.

Different from the fish species represented, the bird remains include species that are seasonally restricted. All of the bird species represented in the hearth remains are known to currently breed in the Hudson Bay Lowland (Peck and James 1983), but only the grouse and woodpecker species are permanent residents of the area. The remaining species - common/arctic loon, Canada/snow goose, greater scaup, surf scoter, common/red breasted merganser, unidentified ducks, herring gull, and greater yellowlegs - are migratory and winter to the south (Godfrey 1966). Therefore, the harvest of the migratory species is restricted to the ice-free period of the year between mid-April to mid-May break-up and mid-October freeze-up. Migratory species dominate the avian assemblage in both specimen frequency (n=87, 84.47%) and minimum number of individuals (n=18, 72.00%). As well, all of these species - with the possible exception of the greater yellowlegs - have economic value. In this light, the avian remains indicate that the hearth area includes - if not restricts - occupation to within the ice-free period when migratory birds were in their summer range.

All of the identified mammalian remains recovered from the hearth represent animals that are permanent residents of the Hudson Bay Lowland (Banfield 1974). Therefore, each of these species - snowshoe hare, American red/northern flying squirrel, mink, and muskrat - are available throughout the year. Based upon ethnographic information from the eastern Subarctic, however, the harvest of these animals follows seasonal patterns.

Snowshoe hare is sought for both its fur and food value although its importance in the subsistence economy has fluctuated over time (Rogers and Black 1976). Hare can be trapped year round (Rogers 1973:50; Winterhalder 1977:379), but the fall, winter, and spring seasons are considered to be the more common periods of intense hare trapping (Rogers 1962:C45-C46, 1973:50-51; Winterhalder 1977:379).

Squirrel is of minor importance and among the Mistassini Cree, Rogers (1973:54) notes that squirrels are pursued for sport, as well as for pelts and food. Squirrels are killed throughout the year by the Mistassini Cree (Rogers 1973:48, 54), whereas squirrel harvest by the Weagamow Ojibway is restricted to the fall through spring period (Rogers 1962:C41).

During the time of Rogers' 1958-59 fieldwork among the Weagamow Ojibway mink were one of the most valued fur-bearing animals: mink pelts provided between one-quarter and one-half of the community's total fur income (1962:C30). The Weagamow Ojibway (Rogers 1962:C34, C41) and the Mistassini Cree (Rogers 1973:48, 53) trap mink during the winter period lasting from November through May.

Muskrats are valued as fur-bearing animals, as well as a seasonal food resource. Similar to the hare, the historical importance of muskrat has fluctuated: by the 1820s in northern Ontario (Bishop 1974:36), Manitoba, and Saskatchewan (Ray 1974:121; Thistle 1986:77) the value of muskrat pelts increased substantially when over-trapping limited the availability of other species of fur-bearing animals. For the year 1870, muskrat pelts represented 41.07% of the Hudson's Bay Company's total fur returns almost doubling the realized volume of beaver pelts (Ray 1990:20-23).

Among the Mistassini Cree (Rogers 1973:54-55), Weagamow Ojibway (Rogers 1962:C40-C41), and Muskrat Dam Lake Cree (Winterhalder 1977:406) muskrat hunting and trapping spans the fall to spring period; however, trapping during the winter months is less intense than that which occurs during the fall and spring. Trapping muskrats in the depth of winter is difficult due to severe ice and snow conditions (Dunning 1959:26-27; Winterhalder 1977:406). As well, muskrat are not pursued during the summer months since summer muskrat meat is poor and the summer pelts are of little value.

The Ojibway of Weagamow Lake (Rogers 1962:C41) and the Cree of Muskrat Dam Lake (Winterhalder 1977:414) conduct fall muskrat hunts around the time of freeze-up. According to Winterhalder the fall hunt is specific to the initial phase of freeze-up when ice begins to form along the edges of lakes and rivers. During the fall hunt muskrats are shot with .22-calibre rifles as they sit on the ice margins. In the past, muskrat were also pursued during the late-summer and early-fall periods. At Trout Lake Post in 1898, the fall trade in muskrat pelts began as early as September 8th (HBCA B.220/a/46:28d). This is commensurate with Rogers' (1973: 55) experience with the Mistassini Cree when, in 1953, muskrat were hunted in the fall immediately prior to the freeze-up period.

Spring break-up, however, is the period of intense muskrat trapping (Dunning 1959:26-27; Rogers 1962:C40; Winterhalder 1977:409-414). In 1958-59 over 90% of the muskrat trapped at Weagamow Lake were trapped in April and May (Rogers 1962:C40). This timing is consistent with Winterhalder's (1977:409-414) data from Muskrat Dam Lake where muskrat trapping takes place around the break-up period from mid-April to the end of May. The spring break-up period corresponds to the time when the pelts are still prime and the muskrats are fat and good for eating (Rogers 1973:51; Winterhalder 1977:427).

In considering the above discussion pertaining to the availability of species and harvest patterns, the mammals and migratory birds are of value for determining the hearth's seasonality. The harvest of migratory birds in the Hudson Bay Lowland is restricted to the ice-free period between spring break-up and fall freeze-up. All of the mammals represented in the hearth faunal remains are available to the Lowland inhabitants throughout the year, but the most likely times of harvest - based upon ethnographic data - is generally limited to the fall-winter-spring period. Therefore, when the total faunal assemblage is considered as a unit, the periods of availability in combination with ethnographically known patterns of harvest suggest that the hearth was utilized during the spring and/or fall periods.

The spring and fall periods were the times of year when all of the species represented in the hearth faunal remains were available and could have been harvested. Occupation in the winter months was unlikely since migratory birds were not present and the location of the hearth adjacent to the beach would have provided little protection from the winter elements. On the other hand, occupation throughout the summer months could have been a possibility although the timing of the harvests would have differed according to their appropriate seasons. Nevertheless, due to the proliferation of muskrat bone throughout the depth of the hearth, an interpretation - subject to further archaeological and ethnographic fieldwork - is forwarded suggesting that the hearth was associated with spring and/or fall occupations and the area was revisited over time for the purpose of exploiting seasonally appropriate resources.

Area B

Introduction

Encompassed within Area B are all of the remaining ten positive test squares (Figure 32). One test square that was situated twenty-eight metres east of the beach yielded bone and lithic specimens, as well as a copper awl. Following the discovery of the awl the test square was enlarged to a 50 cm square unit. The materials recovered from this small unit were intriguing for they not only identified the location of past cultural activities, but the diversity of the remains - including a unifacially retouched flake, a carved and inscribed bone fragment, faunal remains, and the copper awl - signalled a site with the potential of providing greater cultural and resource data than that furnished by the Shamattawa Rapids site.

In recognition of the area's potential an initial grid consisting of nine one metre squares was laid incorporating the test square. As the excavation proceeded two more squares were added to the grid. In total, ten one metre squares were excavated using the method employed at the Shamattawa Rapids site.

Area B produced 95 lithic specimens, one copper awl, and 275 faunal specimens among which five items of bone and antler exhibit evidence of modification. Both test square and excavated grid specimens are discussed together in sections pertaining to their appropriate industry or material.

Stratigraphy

The stratigraphy of Area B was limited to a layering of three strata. Level 1 consisted of a layer of moss with a thickness ranging between extremes of 3.5 cm and 25.5 cm. Cultural remains from this level were limited to one specimen of modified bone. Below the moss level was a layer of soil with a sandy silt loam texture. The soil was black (Munsell Colour 10YR 2/1) in colour with a weak structure.

Throughout the depth of this level, gravel was mixed with the soil although the concentration of gravel increased toward the level's bottom. As well, the gravel content was not horizontally uniform for the gravel concentration within this horizon decreased toward the northern portion of the site. The depth of the level varied between 5.0 cm and 20.0 cm with a general tendency toward a shallower depth in the site's northern region. The bulk of the site's cultural remains were recovered from this level. Stratigraphic separation between the remains within Level 2 was not apparent and for reasons discussed in the Chapter Summary the remains in this level are considered to represent a single component. Level 3 represents a subsoil of gravel. The gravel subsoil accounts for the greater concentration of gravel in the lower regions of Level 2 which in some areas made the distinction between levels difficult to recognize.

Date

Initially, 184 Level 2 bone fragments possessing a combined weight of 122.5 grams were submitted to Teledyne Isotopes for radiocarbon age determination. All of the bone fragments were unidentifiable and 42.93% of the sample was calcined or partially calcined. Unfortunately, the sample only yielded approximately 12% of the carbon necessary for dating (James Buckley personal communication 1985). Subsequently, seven identifiable and uncalcined bone and antler specimens weighing a combined 104.65 grams were submitted for analysis and this second sample yielded a date of 440±80 B.P. (I-15,389). This age determination is considered acceptable thereby dating Level 2 of the site to the fifteenth and/or sixteenth centuries in the late pre-European period.

Lithics

The Washagami Point site lithic assemblage includes 95 chipped stone specimens which are grouped into core, flake, and debris classes (Table 20). With the exception of two cores - excavated from a test square - all of the lithic specimens were recovered from level 2 of the main excavated unit (Figure 35). The test square specimens are considered to be related to the main lithic assemblage; therefore, they are included in the lithic analysis as part of the same component.

Initial consideration is given to a discussion of the raw material that comprises the lithics excavated from the site. The discussion will then address each of the three

Table 20. Lithic Collection.

Class	n	%
Core	6	6.32
Flake	47	49.47
Debris	42	44.21
Total	95	100.00

classes listed in Table 20.

Raw Material

Similar to the lithics from the Shamattawa Rapids site, the Washagami Point site lithic assemblage is comprised of chert. The collection was examined in total, or in part, by the same individuals cited in the discussion of raw materials pertaining to the Shamattawa Rapids site. The source of the raw material is considered to be local chert bearing formations; however, further research is required before the source formation can be identified. Nodular chert found on beaches and in river beds is a potential source; therefore, the Silurian age Ekwan River Formation (Sanford et al. 1968:25) deserves geo-archaeological consideration.

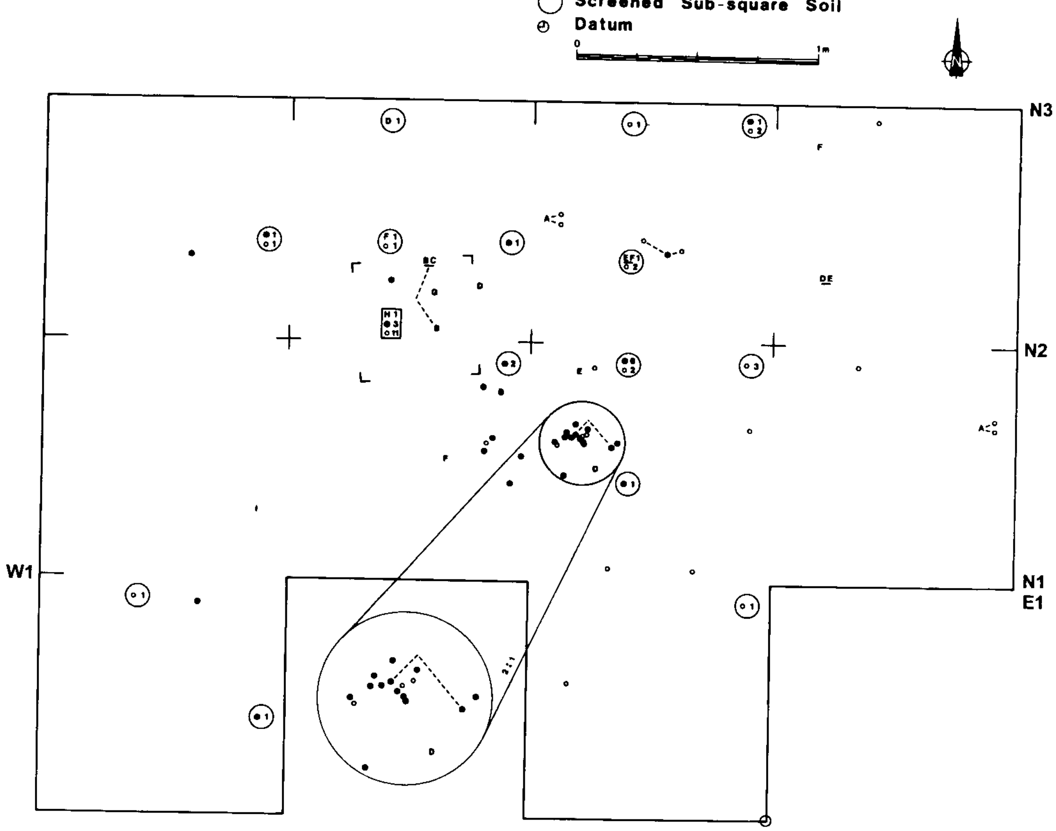
Figure 35. Level 2: Artifact Distribution.

Washagami Point Site Gblg-1

Level 2
Artifact Distribution

Key

A Core / Core Fragment
B Pieces Esquillées (Core Nucleus)
C Retouched Core / Core Fragment
• Unmodified Flake
D Utilized Flake
E Unifacially Retouched Flake
F Pieces Esquillées (Flake Nucleus)
o Lithic Debris
— Item with Multiple Attributes
G Copper Awl
H Incised Bone Fragment
I Modified Antler
•--• Refitted Fragments
⌐ Test Square Corner
Items and Quantities Recovered from
□ Screened Test Square Soil and
○ Screened Sub-square Soil
⊘ Datum



Core Class

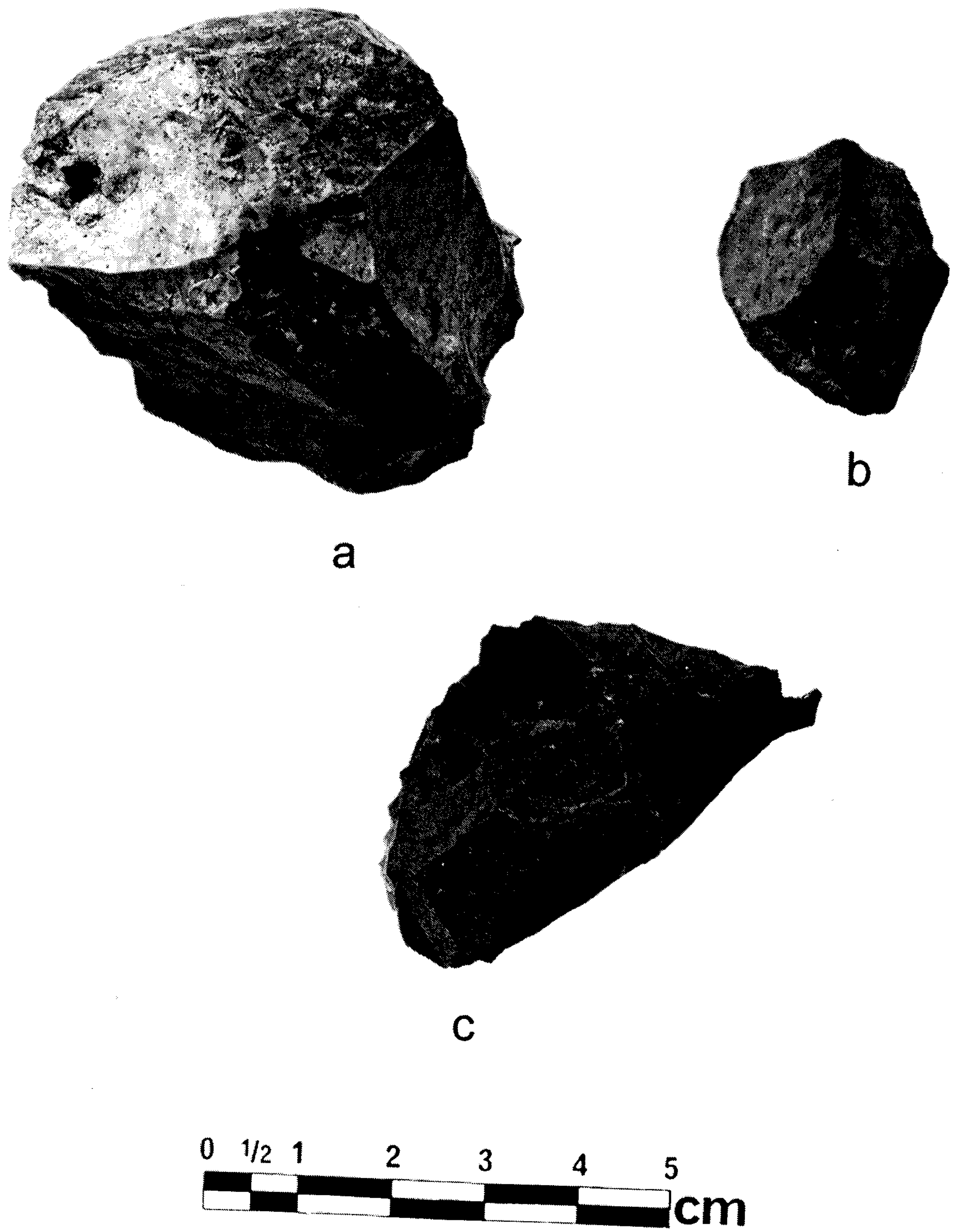
In the Washagami Point site lithic assemblage, six specimens accounting for 6.32% of the total collection (Table 20) are classified as cores (Figure 36). The core class is subdivided into unmodified nodular chert cores (n=3, 50.00%) and nodular chert cores that appear to have been utilized as pièces esquillées (n=3, 50.00%). With respect to the first subclass, two specimens are comprised of composite parts; however, for this analysis they are considered in their unified condition. In the latter subclass, two specimens are thought to be sections of split cores and both flake-like sections possess pièce esquillée characteristics. The remaining specimen in this subclass appears to be a small core that was also utilized as a pièce esquillée. As a result of this function, however, the core split into two sections and one of the two sections was subsequently retouched. For the current discussion this specimen will be considered in its unified condition and attributes pertaining to the specimen's retouched margin will be discussed separately.

Two cores exhibit evidence of thermal alteration: one core exhibits heat fracture attributes and the other core displays attributes pertaining to both heat fracture and crazing. Each thermal characteristic covers 1-24% of

Figure 36. Cores.

A	984.246.55	Core
B	984.246.56.1	Core
C	984.246.57.1.2.3	Core

Letter	Subclass	Category
A	Unutilized Nodule	Multi-Platform
B	Unutilized Nodule	Multi-Platform
C	Unutilized Nodule	Multi-Platform


a
b
c
0 1/2 1 2 3 4 5
cm

the specimen's surface.

Cortex is lacking on two specimens (33.33%) and present on four specimens (66.67%). Cortex coverages include 1-24% (n=2, 50.00%), 50-74% (n=1, 25.00%), and 75-99% (n=1, 25.00%).

With respect to category, four cores (66.67%) are multi-platform; one core is single platform (16.67%); and one core is indeterminate (16.67%) due to the excessive amount of crushing caused by the specimen's use as a pièce esquillée. On the five cores exhibiting platform remnants, both cortex (n=2, 40.00%) and secondary (n=3, 60.00%) platform varieties are represented. Two specimens (33.33%) exhibit two flake scars and the remaining four specimens (66.67%) display three or more flake scars. Flake scar terminations include hinge (n=1, 16.67%), hinge and feather (n=3, 50.00%), and indeterminate (n=2, 33.33%) termination types.

Measurements pertaining to core length, width, thickness, and weight are summarized in Table 21. Figures 37 to 39 display length, width, and thickness frequencies.

The three specimens that appear to have been utilized as pièces esquillées retain evidence of both impact edges (for discussion of possible uses refer to the pièces esquillées section for the Shamattawa Rapids site). The axes of impact are represented by specimens with vertical

Table 21. Core: Length, Width, Thickness, Weight.

Statistic	Length	Width	Thickness	Weight
n	6	6	6	6
$\bar{x}$	34.93	30.28	21.57	29.62
med	32.0	30.25	19.75	17.85
r	20.2-55.0	18.5-47.1	7.8-42.0	2.7-102.2
s	12.49	10.29	13.63	37.13
v	35.76	33.98	63.19	125.35
sk	0.70	0.01	0.40	0.95

Figure 37.

Cores: Length.

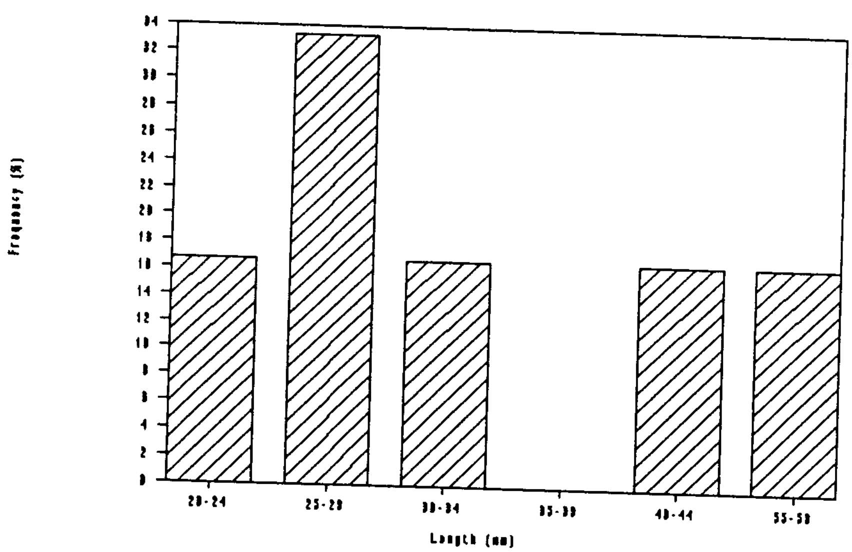


Figure 38.

Cores: Width.

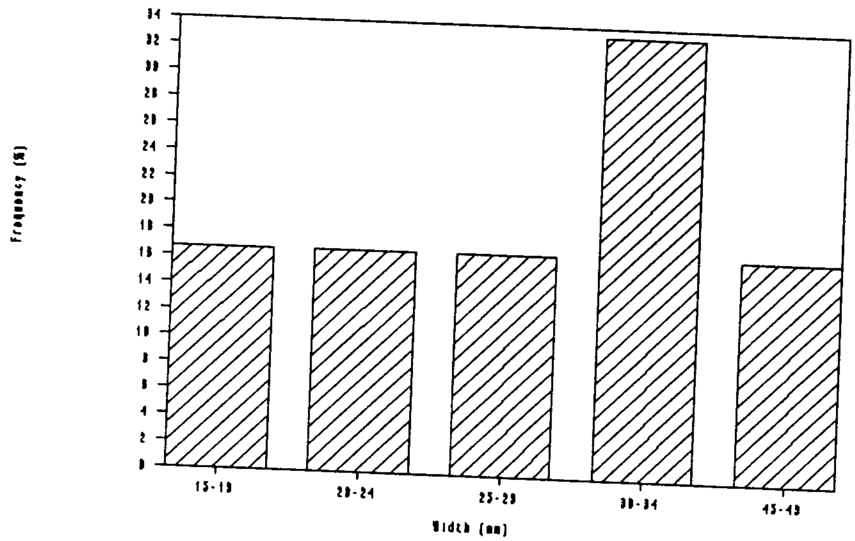
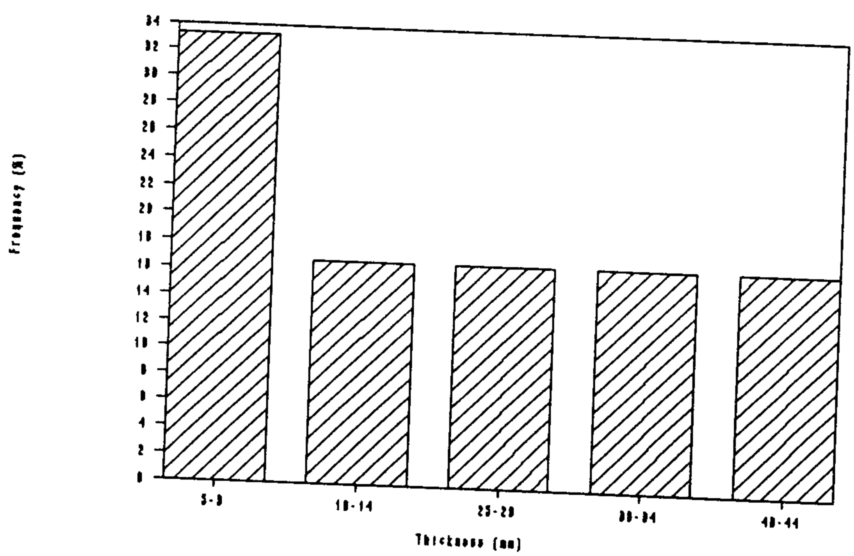


Figure 39.

Cores: Thickness.



(n=1, 33.33%) and both vertical and horizontal (n=2, 66.67%) impact orientations. The vertical axis of impact is represented by ridge-area/ridge (n=1, 33.33%), ridge-ridge (n=1, 33.33%), and area-ridge (n=1, 33.33%) margin types. The margin type for the horizontally oriented axis of impact are ridge-ridge (n=1, 50.00%) and area-ridge (n=1, 50.00%). Among the ten edges present, five edges (50.00%) exhibit both ventral and dorsal face damage and one edge also displays damage on its area surface. Five edges (50.00%) are unifacially modified, but the ventral face displays a greater frequency of damage (n=4, 40.00%) over the dorsal face (n=1, 10.00%). With respect to the vertical axis of impact, the primary edges (bit edge) on two specimens (66.67%) are thought to be the distal margins while the primary edge on one specimen is considered to be the proximal margin. For the two specimens showing horizontal impact orientations their left lateral margins are thought to be the primary edges.

One edge of a split core section is unifacially retouched on the specimen's dorsal face. The retouched edge is concave in configuration and involves the proximal section of the specimen's left lateral edge. The retouch flake scars all display feather terminations. Proximal edge damage is moderate in intensity and damage is characterized by compound and hinge fractures. Rounding on this retouched edge is slight.

The retouched edge angle equals 65 degrees. The relatively high edge angle combined with unifacial retouch suggests that this edge was likely intended for scraping or transverse manipulation. The maximum and minimum retouch scar lengths equal 1.7 mm and 0.9 mm respectively. The retouched edge length equals 9.1 mm and the height of the edge equals 1.2 mm.

Flake Class

Thermal Alteration

With reference to the total lithic assemblage, 28 (29.47%) of the 95 specimens exhibit characteristics representative of heat exposure. Within the flake class, seven (14.89%) of the 47 specimens display thermal characteristics. Thermal alteration types include attributes characteristic of heat fracture (n=4, 36.36%), crazing (n=6, 54.55%), and lustre (n=1, 9.09%). Two of the four examples in the heat fracture category pertain to scars left by the removal of potlid spalls.

The low frequency of thermally altered flakes suggests that the use of heat for the purpose of altering the flaking parameters of the raw material was not a salient practice at the Washagami Point site. This view is supported by the occurrences of heat fracture and crazing characteristics on the ventral faces of flakes suggesting that the specimens were subjected to heat after they were removed from their parent materials.

One flake, which exhibits noticeable lustre, may represent a possible exception. The flake displays unifacial retouch and the ventral surface of the flake and the dorsal retouch scars all exhibit vitreous surfaces with a "waxy" appearance. The unflaked dorsal surface of the flake is without comparable lustre. Surfaces flaked before and after exposure to heat will display a noticeable contrast in lustre: the surface created after heating will exhibit a much more vitreous appearance in comparison (Purdy 1974:44; Rick 1978:57). As such, the parent material of this specimen may have been exposed to heat prior to the flake's removal and subsequent retouching. A determination pertaining to this specimen's intentional or unintentional exposure to heat, however, is not possible in the absence of additional specimens with similar characteristics. Although some of the specimens excavated from the Washagami Point site were exposed to heat the circumstances of the exposure remains a question.

Flake Subclasses

The flake class is divided into the following four subclasses: unmodified flakes, utilized flakes, unifacial retouched flake tools, and pièces esquillées. A total of 47 specimens comprise the flake class and, in contrast to the Shamattawa Rapids site flake collection, only one flake (2.13%) exhibits more than one of the above subclass characteristics. Table 22 lists individual and combined subclass frequencies.

Table 22. Flake Subclass Frequencies.

Subclass	n	%
Unmodified	38	80.85
Utilized	3	6.38
Unifacial Retouched	2	4.26
Pièces Esquillées	3	6.38
Unifacial Retouched; Pièce Esquillée	1	2.13
Total	47	100.00

Flake Morphology

In addition to subclass, the flakes are classified according to condition, or physical completeness. The medial-horizontal category occurs with the highest frequency (25.53%) followed by the complete (19.15%), distal (19.15%), and lateral (19.15%) categories. The proximal (14.89%) and medial-vertical (2.13%) categories occur least often.

The method of lithic reduction is considered to have included both percussion and pressure techniques. In view of the argument (Patterson 1983:300) that flakes greater than 18.0 mm square are likely the products of percussion flaking, the length and width values (Table 23; Figures 40, 41) indicate a size range appropriate to both techniques of reduction. In other words, since the flake assemblage includes flakes that are both greater and less than 18.0 mm square it is appropriate to consider the use of percussion and pressure flaking as possible reduction techniques within this assemblage.

In total, ten specimens (21.28%) are greater than 18.0 mm square while 23 (48.94%) of the flakes are less. The mean length of the latter group equals 11.65 mm with a range of 5.9 mm to 17.9 mm. However, only a small percentage (n=4, 17.39%) of the flakes in this group are considered to be complete. Five flakes (21.74%) are

Table 23. Flake: Length, Width, Thickness, Weight.

Statistic	Length	Width	Thickness	Weight
n	47	47	47	47
$\bar{x}$	17.26	15.49	4.18	1.54
med	16.3	14.3	3.3	0.6
r	5.9-37.3	4.1-33.1	1.0-14.2	0.0-10.1
s	8.45	7.66	2.82	2.15
v	48.96	49.45	67.46	139.61
sk	0.34	0.47	0.94	1.31

Figure 40. Flake Lengths.

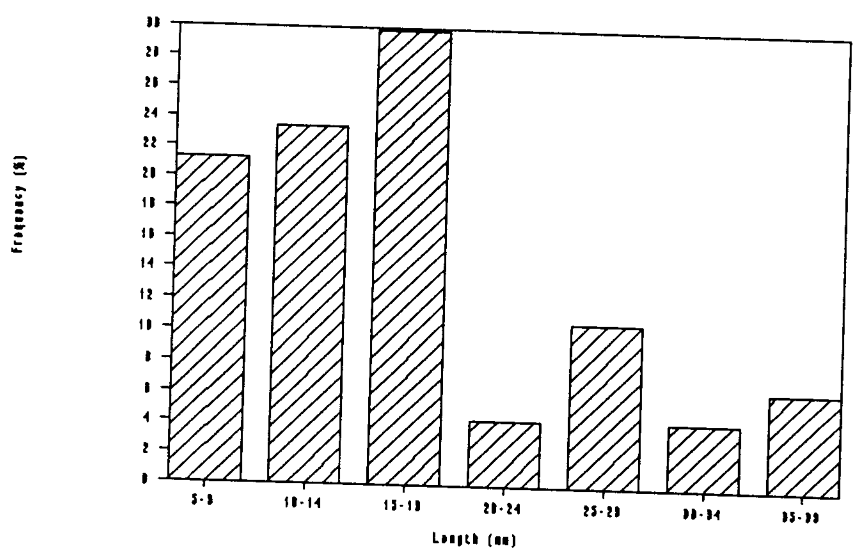
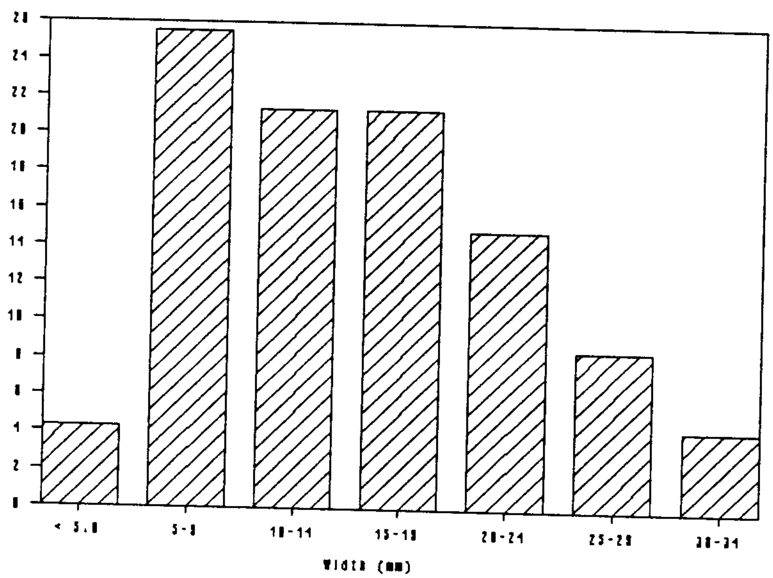


Figure 41. Flake Widths.



categorized as distal and eight flakes (34.78%) are considered to be medial-horizontal. The mean width value for this group equals 9.95 mm with a range of 4.1 mm to 17.9mm. In terms of completeness, only six (26.09%) of the flakes possess intact lateral edges while the edges on 17 flakes (73.91%) are fractured.

Seven specimens (14.89%) have lengths greater than 18.0 mm and widths less than or equal to 18.0 mm. The mean width value equals 13.06 mm and the range is 8.9 mm to 16.8 mm. However, with the exception of one specimen (14.29%) all of the edges on these flakes are fractured (n=5, 71.43%) or retouched (n=1, 14.29%). As such, the widths on 85.72%

of these flakes are considered to be incomplete.

Seven specimens have lengths less than or equal to 18.0 mm and widths greater than 18.0 mm. The mean length equals 13.96 mm and the range is 8.6 mm to 17.8 mm. Only the lengths of two flakes (28.57%) are considered to be complete. With respect to ventral face attributes consideration is given to the eraillure flake, bulb of force, and ribs. The presence or absence of eraillure flakes as criteria for determining reduction techniques has been criticized by Cotterell and Kamminga (1979:110); however, it is noted that of the seven flakes with eraillure flakes present only one flake is less than 18.0 mm square. As such, with one exception this finding is consistent with the view that eraillure flakes are products of percussion flaking (Patterson 1983:300).

Greater significance is given to bulbs of force and ribs since flakes produced by pressure do not generally display salient bulbs or prominent ribs (Patterson 1983:300). Thus, pressure flakes are expected to be less than or equal to 18.0 mm square and possess diffuse or undetectable bulbs of force and moderately distinct or indistinct ribs. In the Washagami Point site assemblage, 13 (40.63%) of the 32 flakes with discernible bulb and rib conditions possess these attributes. Of these, four flakes (30.77%) are considered to be complete. The remaining nine flakes (69.23%) have fractured edges and/or incomplete lengths.

In view of the above data, an identification pertaining to the techniques of reduction is made difficult by the incomplete nature of many of the flakes. However, the combination of flake size with bulb of force and rib characteristics at least support the presence of pressure flakes within the assemblage. Although definite numbers and percentages for each reduction technique are difficult to determine both percussion and pressure flakes are considered to be present.

The flakes are divided into early or late stages of reduction on the basis of flake width, cortex on the dorsal face, and the number of dorsal flake scars. Late stage reduction flakes have widths less than 10.0 mm and display no cortex on their dorsal faces. Additionally, flakes produced in the late stage of reduction display three or more dorsal flake scars. Early stage reduction flakes, on the other hand, include flakes with widths greater than or equal to 10.0 mm, dorsal face cortex, and/or less than three dorsal flake scars. This group also includes those flakes with widths less than 10.0 mm but possess cortex and/or dorsal flake scars characteristic of the early stage of reduction.

Widths for the Washagami Point site flakes range between 4.1 mm and 33.1 mm (Table 23). Fourteen flakes (29.79%) possess widths less than or equal to 10.0 mm while the remaining 33 flakes (70.21%) have widths greater than 10.0 mm. Within the total assemblage, 22 (46.81%) of the flakes display dorsal cortex. Three (13.64%) of these flakes have completely cortical dorsal faces; thus, they are referred to as "cortex flakes." The remaining nineteen flakes (86.36%) are "secondary cortex flakes" in that their dorsal faces are not completely cortex covered. Eleven (57.89%) of the secondary cortex flakes possess cortex covering over 50% of the dorsal surfaces and in Cook's (1976:25) terminology they are referred to as "decortication flakes." With respect to dorsal flake scar counts, 16 flakes (34.04%) display three or more flake scars while the remaining 31 flakes (65.96%) have less than three, or an indeterminate number of scars. When the above data is applied to the reduction stage conditions the early reduction stage is represented by 41 flakes (82.23%) and the late reduction stage is represented by six flakes (12.77%). All of the latter six flakes possess three or more dorsal flake scars, no dorsal cortex, and widths less 10.0 mm.

The flake assemblage recovered from the Washagami Point site includes flakes produced by both percussion and pressure techniques. As well, the early and late stages of reduction are represented. The presence of dorsal face cortex on many of the flakes implies core reduction and the varied dorsal flake scar patterns suggest both random and uniform flake removal. A certain amount of platform preparation is also indicated by the presence of abrasion, faceting, and trimming characteristics on the dorsal edges of platforms. In sum, flake attributes and frequencies within this assemblage suggest that activities related to core reduction, initial tool trimming, and the refinement of tool edges were performed at the site.

Unmodified Flakes

Unmodified flakes account for 80.85% (n=38) of the Washagami Point site flake assemblage (Table 22). Unmodified flake totals according to category include four proximal (10.53%), eight distal (21.05%), nine lateral (23.68%), nine medial-horizontal (23.68%), and eight complete (21.05%). Ten flakes (26.32%) are considered to possess intact lateral edges while lateral edges on 28 flakes (73.68%) are fractured.

Measurements pertaining to length, width, thickness, and weight are summarized in Table 24. Figures 42 and 43 display length and width frequencies.

Table 24.

Unmodified Flakes: Length, Width, Thickness, Weight.

Statistic	Length	Width	Thickness	Weight
n	38	38	38	38
$\bar{x}$	15.49	14.61	3.81	1.23
med	15.25	11.65	3.0	0.45
r	5.9-31.1	4.1-33.1	1.0-14.2	0.0-10.1
s	6.94	8.09	2.73	1.91
v	44.80	55.37	71.65	155.28
sk	0.10	1.10	0.89	1.23

Figure 42. Unmodified Flakes: Length.

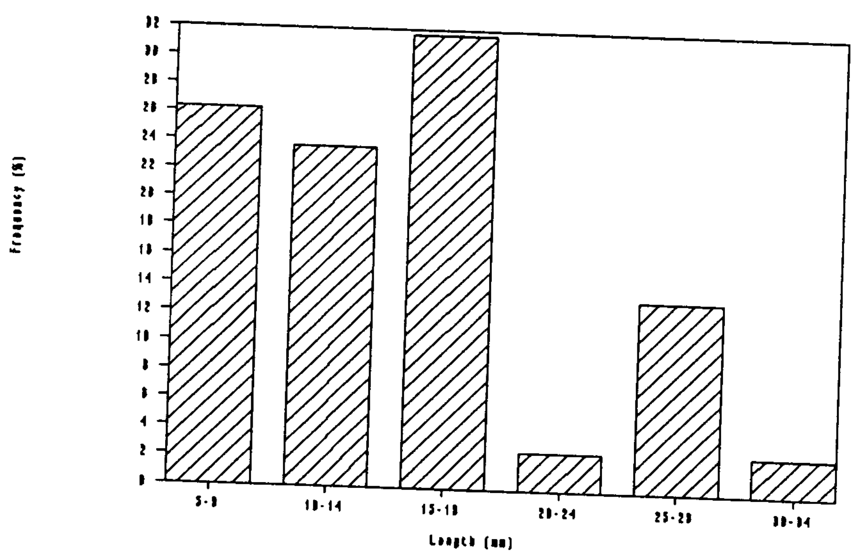
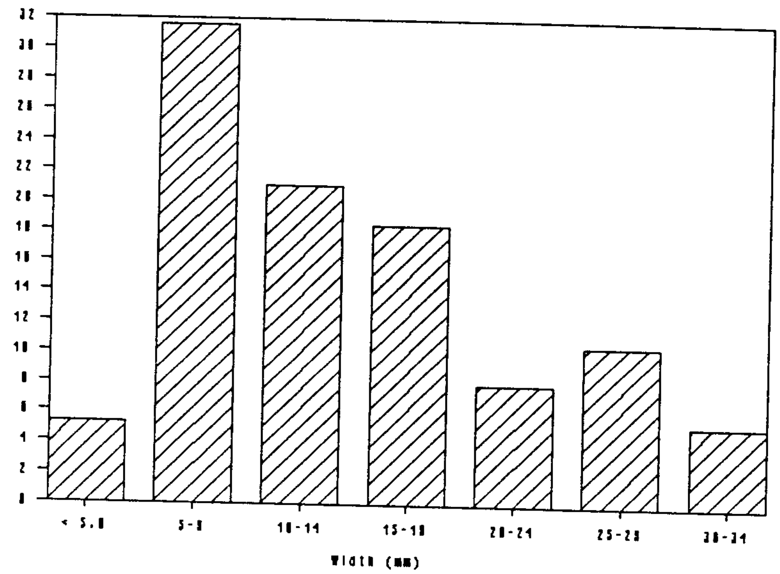


Figure 43. Unmodified Flakes: Width.



Utilized Flakes

In the Washagami Point flake assemblage, three flakes, accounting for 6.38% of the flake class (Table 22), have edges exhibiting microscars thought to have been produced through utilization (Figure 44). Utilized flake totals according to category include one proximal (33.33%) and two medial-horizontal (66.67%). The edges on all three flakes have been fractured.

Length, width, thickness, and weight values are summarized in Table 25. Figures 45 and 46 display length and width frequencies.

Figure 44.

Retouched and Utilized Flakes.

A	984.246.1	Retouched Flake
B	984.246.2	Retouched Flake
C	984.246.3	Retouched Flake
D	984.246.4.1	Retouched Core Fragment
E	984.246.8	Utilized Flake
F	984.246.9	Utilized Flake
G	984.246.10	Utilized Flake

Letter	Face	Modified Edge	Edge Type
A	Dorsal	Left (distal end)	Unifacial (dorsal face)
B	Dorsal	Left	Unifacial (dorsal face)
C	Dorsal	Distal (left side)	Unifacial (dorsal face)
D	Dorsal	Left (proximal end)	Unifacial (dorsal face)
E	Dorsal	Left (distal end; right side in photograph)	Unifacial (dorsal face)
F	Dorsal	Right	Bifacial
G	Dorsal	Distal	Unifacial (dorsal face)

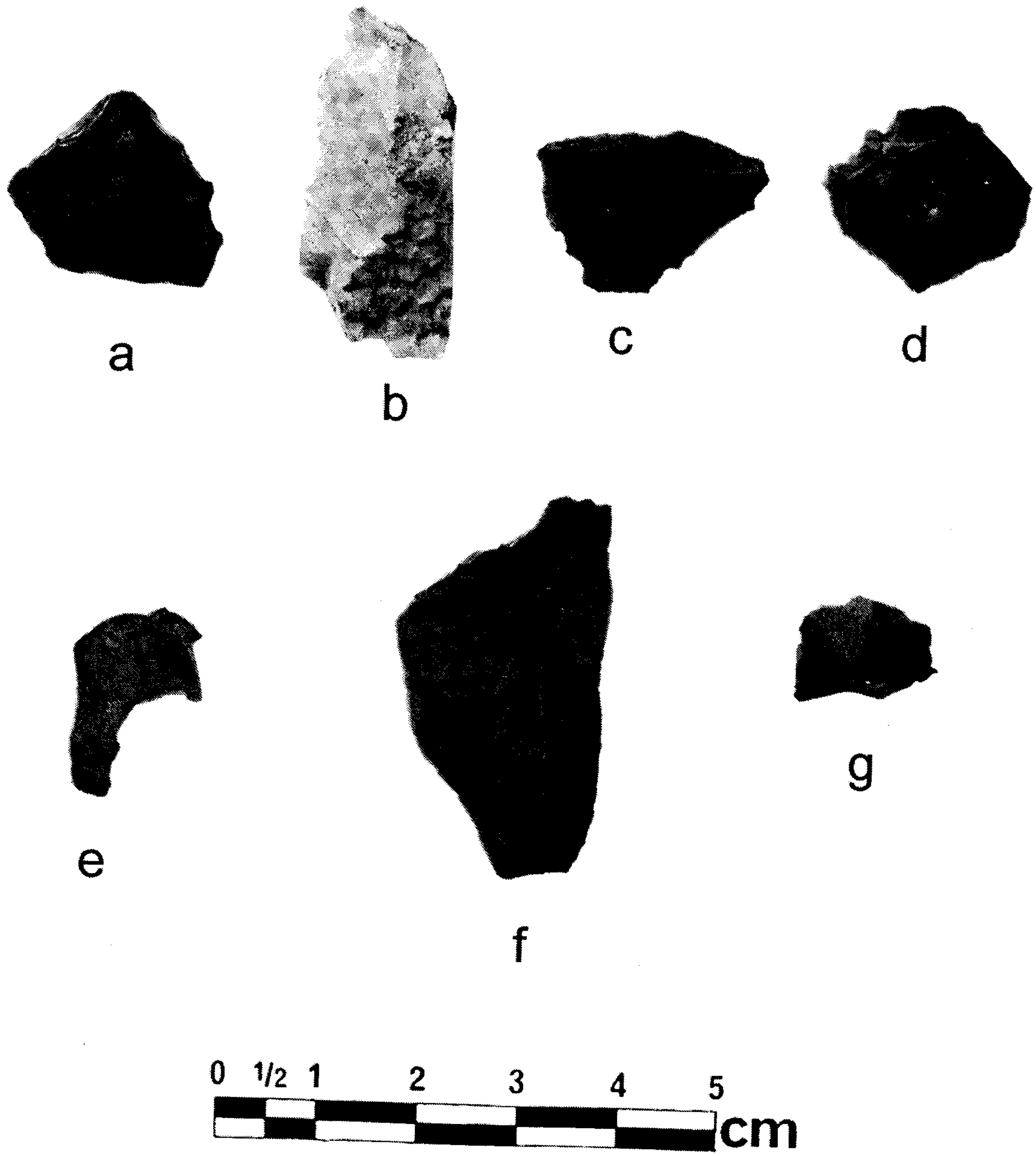

a
b
c
d
e
f
g
0 1/2 1 2 3 4 5
cm

Table 25.

Utilized Flakes: Length, Width, Thickness, Weight.

Statistic	Length	Width	Thickness	Weight
n	3	3	3	3
$\bar{x}$	23.27	17.1	4.6	1.93
med	20.5	14.3	4.1	0.5
r	12.0-37.3	13.6-23.4	3.0-6.7	0.4-4.9
s	12.87	5.47	1.9	2.57
v	55.31	31.99	41.30	133.16
sk	0.65	1.54	0.79	1.67

Figure 45. Utilized Flakes: Length.

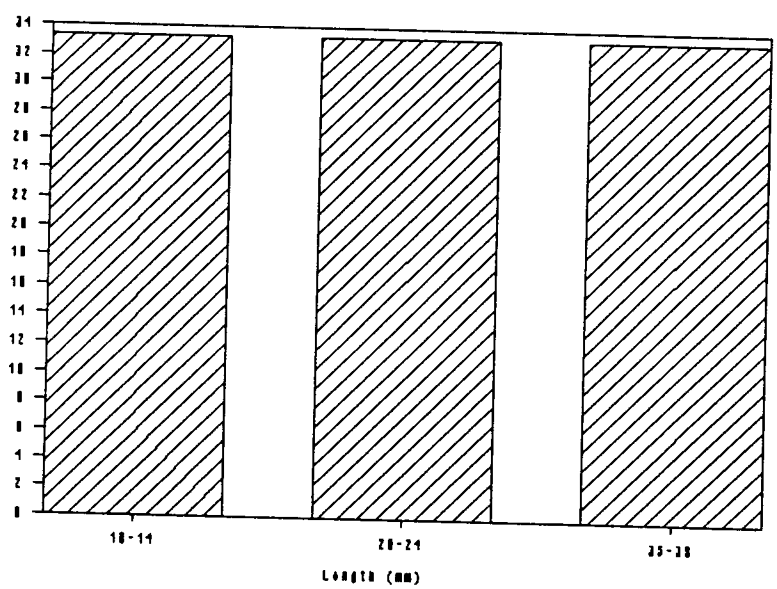
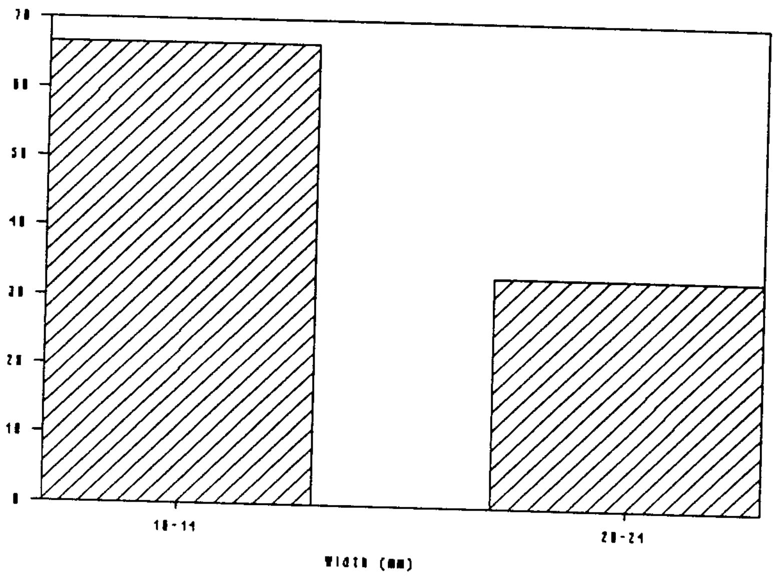


Figure 46. Utilized Flakes: Width.



In total, four edges exhibit microscarring characteristics consistent with patterns of utilization wear. Two flakes (66.67%) each display one modified edge and one flake (33.33%) exhibits two modified edges. Three (75.00%) of the edges are unifacially scarred suggesting the edges were manipulated in a manner transverse to the worked material. The remaining one edge (25.00%) exhibits bifacial scarring suggesting production through longitudinal edge manipulation.

Pronounced scar intensity is a characteristic of the three unifacially scarred edges. All three edges display dorsal face modification and they involve the medial (n=1, 33.33%) and distal (n=1, 33.33%) sections of one flake's left lateral edge and the total span of another flake's distal edge (33.33%). The configurations of two edges are concave (66.67%) while the remaining edge configuration is convex (33.33%).

All three edges display continuous scar spacing and the feather type of scar termination predominates: two edges (66.67%) display only feather terminated scars while one edge (33.33%) possesses both feather and hinge termination types. Evidence of rounding is present on all edges and distinct (n=1, 33.33%), slight (n=1, 33.33%), and slight-distinct (n=1, 33.33%) categories are represented.

Spine-plane angles, scar lengths, and edge lengths pertaining to unifacially flaked edges are summarized in Table 26. Figures 47 and 48 display spine-plane angle and scar length frequencies.

The one bifacially scarred edge also exhibits pronounced scar intensity. The edge's configuration is rectilinear and the utilization scars appear along the total length of the flake's right lateral section. The edge on both the dorsal and ventral faces display discontinuous-light scar spacing characterized by clustered and isolated flakes. The ventral face edge exhibits hinge and feather scar terminations while the dorsal edge displays feather,

Table 26. Unifacial Utilized Flakes:
Spine-Plane Angle, Scar Length, Edge Length.

Statistic	Spine-Plane Angle	Scar Length	Edge Length
n	3	3	3
$\bar{x}$	37.33	0.7	6.4
med	39	0.7	4.2
r	34-39	0.5-0.9	3.7-11.3
s	2.89	0.2	4.25
v	7.74	28.57	66.41
sk	-1.73	0.00	1.55

Figure 47.
Unifacial Utilized Flakes: Spine-plane Angle.

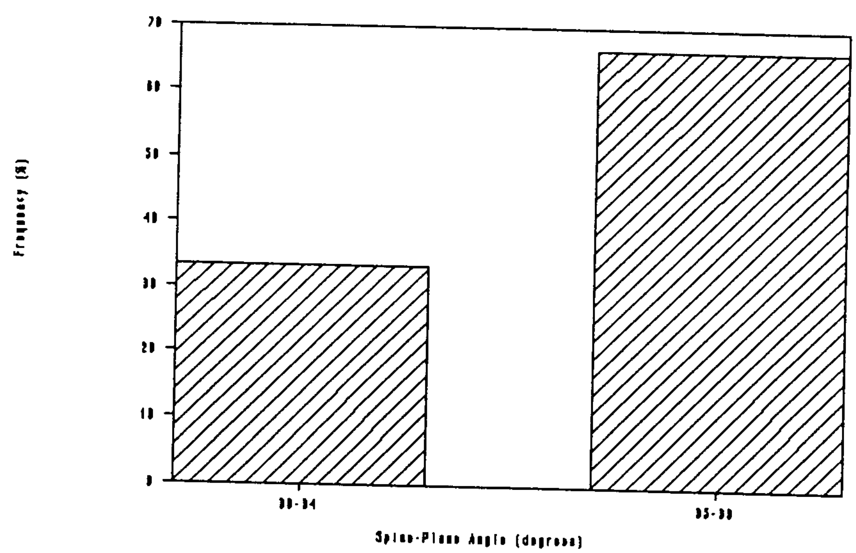
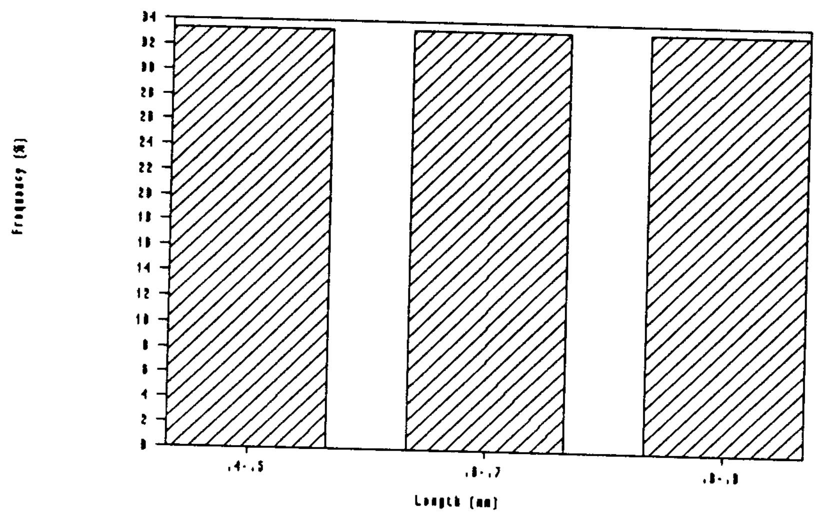


Figure 48.

Unifacial Utilized Flakes: Scar Length.



hinge, and step scar terminations. Rounding on this edge is categorized as slight. The spine-plane angle for this edge equals 53 degrees; the scar length is 0.8 mm; and the utilized edge has a length of 34.2 mm.

The small representation of utilized flakes recovered from the Washagami Point site indicate that the use of unretouched flake edges was not a prominent activity at the site. However, the three flakes that display apparent utilization at least suggest limited use of such edges in scraping and sawing types of edge manipulations. The domination of feather and hinge scar terminations indicate that the edges were likely used against soft and medium materials.

In addition to flakes with utilized edges, two flakes possess edges with microflake scarring identified as prehension wear. Three separate bifacially flaked edges are involved. Two of the edges display alternate scar spacing while the remaining one edge has both opposite and alternate forms of scarring. Feather terminated scars predominate; however, all but one face edge includes hinge terminated scars as well. Two of the areas identified as prehension damage occur on one flake in alignment with a retouched edge. The other area of prehension occurs opposite a utilized edge. Related to the form of prehension damage addressed above, the proximal section of one utilized flake has been fractured or snapped. The fracture of the flake may have been caused by grip tension while pressure was being exerted against the distal edge.

Retouched Flakes

In the Washagami Point site flake assemblage, three flakes accounting for 6.38% of the flake class (Table 22), exhibit edges that have been intentionally modified (Figure 44). One (33.33%) of the retouched flakes also possesses pièce esquillée characteristics. Retouched flake totals according to category include one medial-vertical (33.33%), one medial-horizontal (33.33%), and one complete (33.33%). One flake (33.33%) is considered to possess intact lateral edges while the edges on two flakes (66.67%) are retouched.

Length, width, thickness, and weight values are summarized in Table 27. Figures 49 and 50 display length and width frequencies.

Table 27.

Retouched Flakes: Length, Width, Thickness, Weight.

Statistic	Length	Width	Thickness	Weight
n	3	3	3	3
$\bar{x}$	23.73	20.13	5.27	2.53
med	19.1	21.8	6.3	3.2
r	17.1-35.0	15.4-23.2	3.1-6.4	1.0-3.4
s	9.81	4.16	1.88	1.33
v	41.34	20.67	35.67	52.57
sk	1.42	-1.20	-1.64	-1.51

In total, there are six discrete edge margins with retouched modification. Two flakes (66.67%) exhibit one retouched edge each while the remaining one flake (33.33%) displays four retouched edges. With respect to the latter flake (Figure 44 A) only one of the four retouched margins

Figure 49. Retouched Flakes: Length.

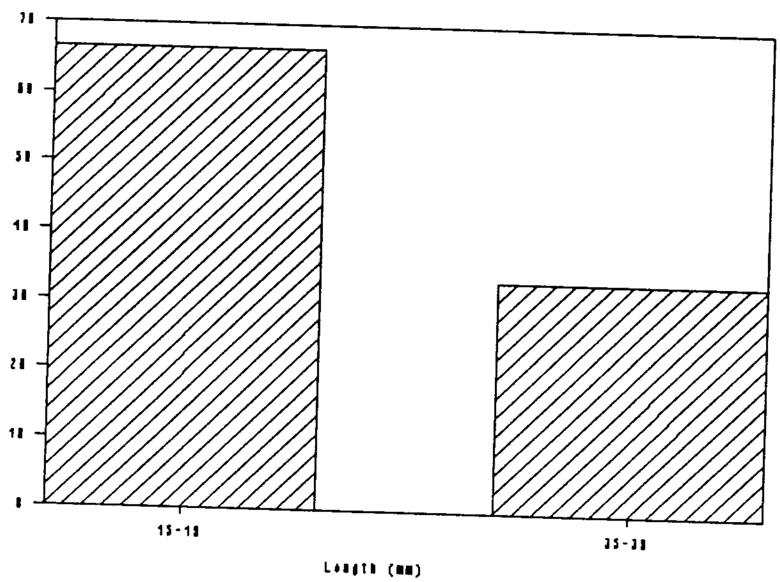
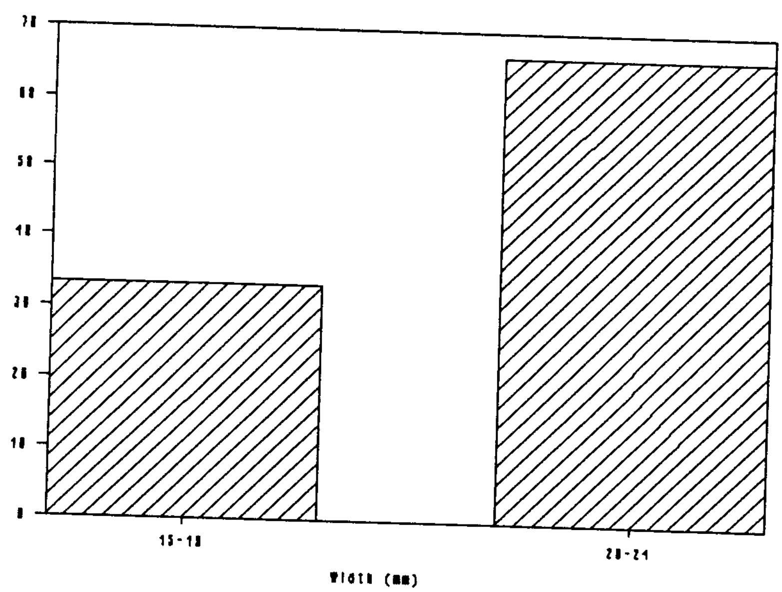


Figure 50. Retouched Flakes: Width.



is considered to have been flaked for the purpose of raw material manipulation. The three remaining retouched areas are thought to have been modified for other purposes, such as handling comfort or to facilitate the attachment of a haft.

Table 28 summarizes edge angle, scar length, edge height, and edge length values. Figures 51 and 52 display edge angle and scar length frequencies. Attributes pertaining to all of the unifacially retouched edges are listed in Appendix J.

Table 28. Unifacial Retouched Flakes: Edge Angle, Scar Length, Edge Height, Edge Length.

Statistic	Edge Angle	Scar Length Max	Scar Length Min	Edge Height	Edge Length
n	3	3	3	3	3
$\bar{x}$	72.67	3.47	1.23	3.27	14.73
med	75	2.7	1.1	2.5	16.0
r	53-90	1.7-6.0	0.8-1.8	1.4-5.9	3.9-24.3
s	18.61	2.25	0.51	2.35	10.26
v	25.61	64.84	41.46	71.87	69.65
sk	-0.38	1.03	0.76	0.98	-0.37

All three edges are unifacially retouched on the

Figure 51.

Unifacial Retouched Flakes: Edge Angle.

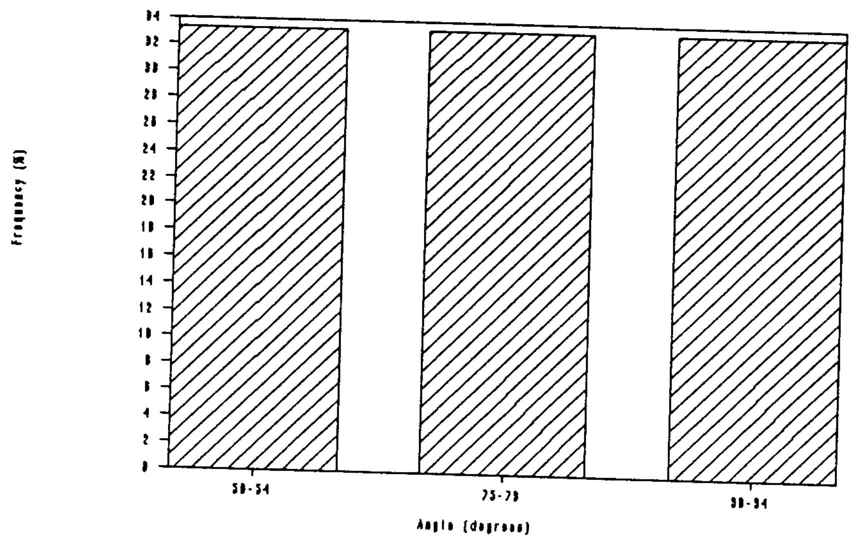
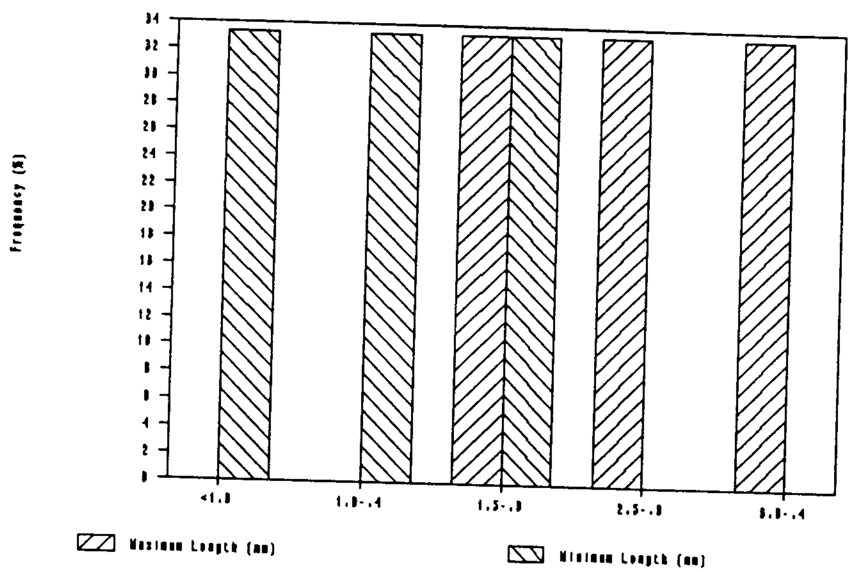


Figure 52.

Unifacial Retouched Flakes: Scar Length.



flakes' dorsal surfaces. With respect to individually retouched edge positions, two flakes are modified on their left lateral edges and involve the total edge of one and the medial and distal sections of the other. On the remaining flake the retouched edge appears on the medial and left sections of the flake's distal end. The configuration of two edges (66.67%) are rectilinear and the configuration of the remaining one (33.33%) is convex.

On all of the retouched edges the retouch scars are dominated by feather terminations. However, all three edges also possess hinge terminated scars. Proximal edge damage is represented by pronounced (n=2, 66.67%) and moderate (n=1, 33.33%) intensities with damage characterized by feather, hinge, and compound fractures. The three edges display various degrees of rounding with both distinct (n=1, 33.33%) and slight (n=2, 66.67%) categories represented.

Retouched edge angles range between 53 degrees and 90 degrees with a mean value of 72.67 degrees. The relatively high edge angles on these unifacially retouched margins suggest that they were likely utilized in scraping or transverse types of motions. The thick, steep angled edge (90 degrees) on one flake (Figure 44 A) may have been used in a pushing manner (Ranere 1975:197) similar to the way in which Inuit hafted scrapers are manipulated. The remaining two edges with less acute edge angles are thought to have been utilized in a pulling fashion. On the basis of edge retouch, identifications pertaining to the types of materials manipulated are difficult to determine; however, food processing and the manipulation of skin, wood, and/or bone are all considered to be possible activities performed at the site.

Pièces Esquillées

Pièces esquillées (Figure 53) - referring to specimens displaying damage on opposed margins - account for 8.51% (n=4, Table 22) of the Washagami Point site flake assemblage (for a discussion of possible uses refer to the pièces esquillées section for the Shamattawa Rapids site). One of the flakes (25.00%) also possesses unifacial retouch on its left lateral edge. According to flake category, pièces esquillées include two proximal (50.00%), one medial-horizontal (25.00%), and one distal (25.00%). None of the flakes possess intact lateral edges: the lateral edges are fractured (n=3, 75.00%) or retouched (n=1, 25.00%).

Length, width, thickness, and weight values are summarized in Table 29. Figures 54 and 55 display length and width frequencies.

In terms of pièce esquillée categories, two flakes (50.00%) retain evidence of both impact edges, whereas the

Figure 53. Pièces Esquillées

A	984.246.2	Pièce Esquillée, Flake
B	984.246.4.1.2	Pièce Esquillée, Core
C	984.246.5	Pièce Esquillée, Core
D	984.246.6	Pièce Esquillée, Core
E	984.246.7	Pièce Esquillée, Flake

Letter	Face	Axis of Crushing
A	Ventral	Vertical
B	Dorsal	Vertical
C	Dorsal	Vertical and Horizontal
D	Ventral	Vertical and Horizontal
E	Dorsal	Vertical

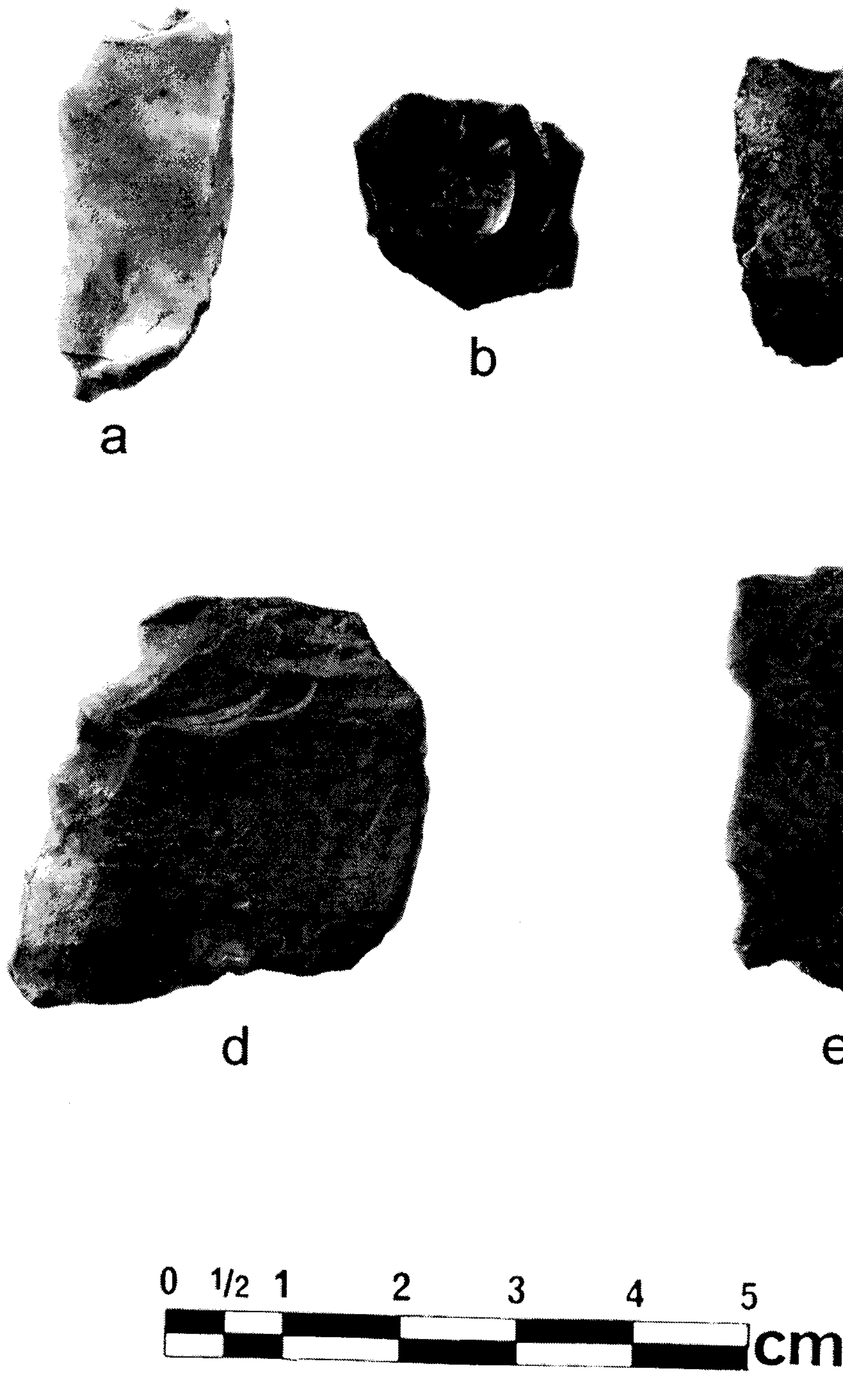

a
b
c
d
e
0 1/2 1 2 3 4 5
cm

Table 29. Pièces Esquillées:

Length, Width, Thickness, Weight.

Statistic	Length	Width	Thickness	Weight
n	4	4	4	4
$\bar{x}$	29.08	19.08	7.38	3.93
med	33.3	18.8	6.15	3.05
r	12.5-37.2	15.4-23.3	5.1-12.1	0.9-8.7
s	11.29	3.24	3.20	3.35
v	38.82	16.98	43.36	85.24
sk	-1.12	0.26	1.15	0.79

Figure 54. Pièces Esquillées: Length.

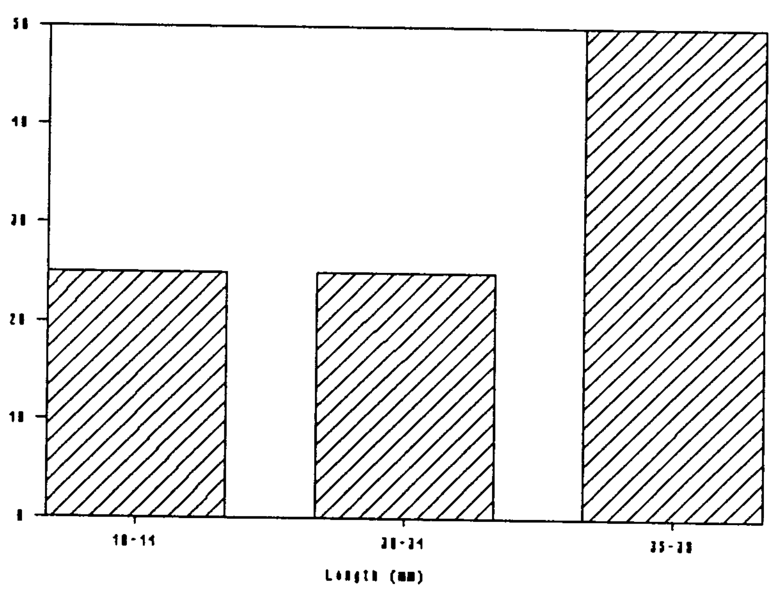
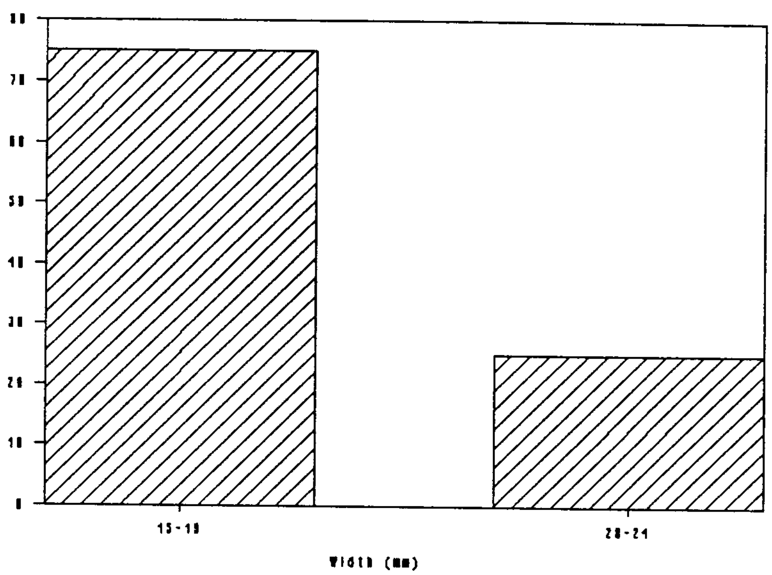


Figure 55. Pièces Esquillées: Width.



remaining two flakes (50.00%) each have one of their impact edges missing. The axes of impact are represented by vertical (n=3, 75.00%) and horizontal (n=1, 25.00%) orientations. The vertical axis of impact is represented by ridge-ridge (n=1, 33.33%), area-ridge (n=1, 33.33%), and area-indeterminate (n=1, 33.33%) margin types. The margin type for the horizontally oriented axis of impact is area-indeterminate. Among the six edges present, four edges (66.67%) exhibit both ventral and dorsal face damage while damage on two edges (33.33%) is limited to the ventral face. On the three flakes with vertical impact orientations the distal margin is considered to have been the bit, or primary edge. The bit edge for the specimen displaying a horizontal axis of impact is thought to have been the left lateral edge.

Debris Class

In the Washagami Point site lithic assemblage, 42 specimens accounting for 44.21% of the total collection are classified as debris (Table 20). These are grouped into four subclasses: unutilized chips (n=15, 37.71%), unutilized chunks (n=9, 21.43%), potlid spalls (n=7, 16.67%), and explosion spalls (n=11, 26.19%). The subclass totals indicate that 42.86% of the debris class are specimens fractured from their parent materials as a result of exposure to heat (potlid spalls; explosion spalls). The remaining 58.14% of the debris class is composed of chert chunks and chips. In addition to potlid and explosion spalls, crazing covers 1-24% of the surface of one unutilized chunk. Cortex is present on 20 specimens (46.51%) and lacking on 23 specimens (53.49%).

Measurements including length, width, thickness, and weight values for each subclass are summarized in Table 30.

Table 30. Debris:

Length, Width, Thickness, Weight.

Subclass		N	Length	Width	Thickness	Weight
Chip	(r)	15	9.6-22.8	4.7-20.7	1.1-8.6	0.1-3.5
	($\bar{x}$)		15.41	11.15	4.13	0.97
Chunk	(r)	9	11.4-21.9	5.2-19.2	3.5-12.7	0.3-5.8
	($\bar{x}$)		17.46	11.94	8.1	2.18
Potlid Spall	(r)	7	7.3-13.6	6.1-12.6	1.5-5. 9	0.1-0.8
	($\bar{x}$)		10.8	8.43	2.89	0.31
Explosion Spall	(r)	11	8.5-33.3	7.0-19.7	1.8-9.9	0.1-5.2
	($\bar{x}$)		23.47	14.7	6.66	2.27

Discussion of Lithic Assemblage

The lithic assemblage is largely comprised of unmodified flakes and debris with a lesser presence of cores and tools. Early stage (82.23%) and late stage reduction (12.77%) are represented, but the largest percentage of the flakes pertain to the early stage. In combination with the presence of cores these percentages suggest that the early stage of core and tool reduction was a major activity at the site.

The horizontal distribution of the lithics (Figure

35) shows a relatively tight concentration in the central portion of the excavated unit with a light scattering in the fringe areas. Particular attention is directed toward a lithic cluster located in sub-squares C and D of square N1W1 (Figure 35 inset). The cluster presents a roughly T-shaped distribution of flakes and debris. This pattern is thought to have been formed by specimens falling between and in front of a knapper's legs while the individual was working in a kneeling position. A similar interpretation is forwarded by Stevenson (1986:49-52) for a kindred type of pattern at the Peace Point site in Alberta. Only one flake in this cluster is considered to possess late stage reduction characteristics. The remaining flakes possess attributes of early stage reduction. The refitted specimen that is associated with the cluster is a relatively large decortication flake. A small flake representing a portion of the larger flake's right lateral edge was deposited within the central area of the cluster while the larger flake was discarded to the side. In the context of this specific cluster the refitted specimen may represent initial flake reduction and its subsequent abandonment. The pattern of the cluster and the nature of the lithics suggest an interpretation that relates the lithic remains to a discrete activity oriented toward early stage core and tool reduction by a single individual.

In addition to unmodified flakes, cores, and debris the lithic assemblage is comprised of utilized flakes, unifacial retouched flakes, and pièces esquillées. As a whole, therefore, the lithic remains bear witness to a variety of tasks performed at the site that include lithic reduction, as well as food, hide, wood and/or bone processing activities.

Native Copper

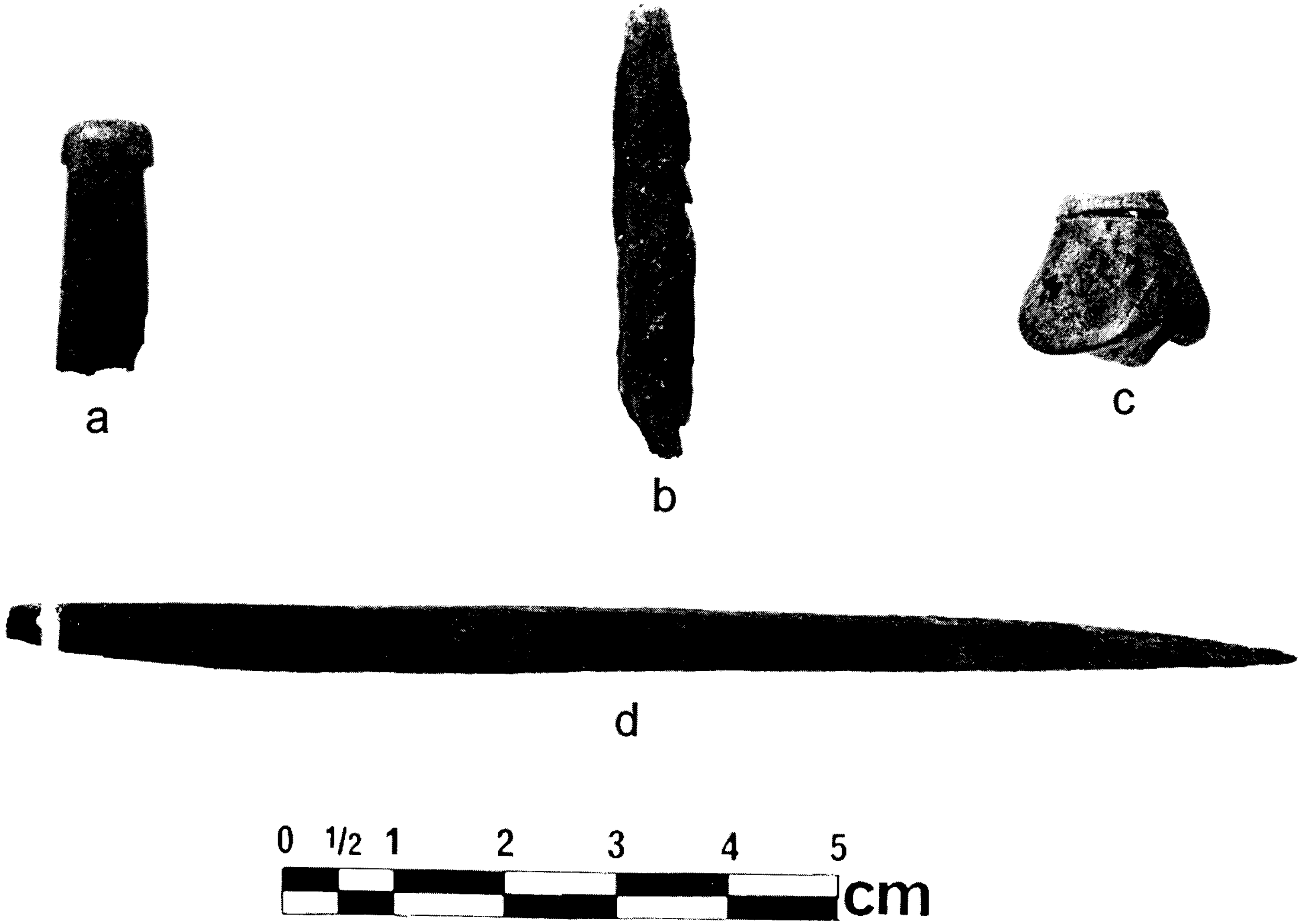
A copper awl (Figure 56 D) - inferring hide-working related tasks - was recovered from Level 2 in square N3W2 (Figure 35). In outline the specimen has an elongated form with a sharp, pointed distal end and a blunt, square-shaped proximal end. In cross-section the awl is quadrilateral and it fits into the bar category discussed by Franklin et al. (1981:24-26). The maximum length of the awl measures 118 mm. Its maximum width and maximum thickness equal 5.9 mm and 3.6 mm respectively.

Metallurgical analysis undertaken to determine the nature of the awl's parent material - native copper or smelted copper - was performed by Dr. M.L. Wayman (1985; 1987). Optical microscopy was conducted in the Department of Metallurgy and Materials Science, University of Toronto,

Figure 56.

Native Copper and Modified Bone.

A	984.246.86	Bone Fragment, Incised
B	984.246.88	Bone Point, Unilaterally Barbed
C	984.246.84	Snow Goose Ulna, Circumferentially Cut
D	984.246.87	Awl, Native Copper


a
b
c
d
0 1/2 1 2 3 4 5 cm

and neutron activation analysis was carried out at the University of Alberta SLOWPOKE Reactor Facility.

The analysis of the awl's microstructure and elemental composition required the preparation of a metallographic section from the specimen. For this purpose, an 8 mm section was removed from the awl's proximal end. Optical microscopy of the section showed the microstructure of the awl to have large grain size and few non-metallic inclusions which are qualities diagnostic of native copper (Wayman et al. 1984:6). In contrast, smelted copper displays finer grain size and a higher density of non-metallic inclusions (Wayman et al. 1984:6).

The elements are measured in parts per million (ppm) by weight with $\pm$ 1 standard deviation (Table 31). Chromium, nickel, selenium, and gold were not detected in the analysis which is commensurate with the elemental composition of native copper (Wayman et al. 1984:8-9). Therefore, the elemental composition of the awl (chromium, nickel, selenium, and gold below the detection level) and the awl's microstructure (large grain size and low density of non-metallic inclusions) identify the raw material as native copper.

Optical microscopy of the awl's section revealed the presence of "voids" of which the larger examples appear to

Table 31. Copper Awl: Elemental Composition.

Element	ppm
Arsenic	5.52 ± 0.77
Iron	179 ± 68
Cobalt	6.9 ± 0.5
Scandium	0.044 ± 0.004
Antimony	0.43 ± 0.12
Silver	88.8 ± 1.1
Zinc	109 ± 5
Tin	42 ± 12
Mercury	4.13 ± 0.25

represent forging laminations. These laminations are interpreted by Wayman (1985:1) as representative of the folding technique of manufacture. This technique involves hammering a piece of unmodified native copper into a sheet and then by either annealing between coldwork or by hot forging, the copper sheet is hammered and folded into the desired shape (Franklin et al. 1981:24-26). The exact process by which the awl was folded is not known, but it is significant that the awl is currently in an annealed state. In other words, the awl has been heated to above 300 degrees centigrade, but it has not undergone the hardening process through hammering (Franklin et al. 1981:26). For use as a tool, it is thought that the annealed or soft condition of the awl would not have been desirable; therefore, its current annealed state suggests that the awl was in the process of being shaped or modified prior to abandonment, or it was accidentally subjected to fire. Accidental annealing is possible through exposure to fire by means of localized burning, such as a dwelling, or through the more generalized sweep of a forest fire.

In the Hudson Bay Lowland only one other sample of native copper has been found to date. Although the specimen has not been subjected to metallurgical analysis, a copper band bent into the shape of a ring - identified as native copper by Jean-Luc Pilon (1987:132, 281) - was recovered from a late pre-European occupation at the Kakago site on the Severn River.

The source areas of native copper are removed from the Hudson Bay Lowland indicating that access to the raw material, blanks, and/or finished artifacts was through long distance travel or trade networks. The major source areas for native copper are restricted to the central Arctic and to the Lake Superior regions. In the Arctic region native copper is found in the Bathurst Inlet, Melville Sound, Victoria Island, and Coppermine River areas (Franklin et al. 1981:4-5). Sources of native copper in the Lake Superior region are found on Isle Royal and along the southern shore of Lake Superior on the Keweenaw Peninsula (Vastokas 1970: 23-26). It was initially hoped that insight into the nature of contact between the Lowland and other areas would be provided through the identification of the awl's raw material source. However, although it is thought that different copper deposits will display "diagnostic patterns of elemental concentrations," the relationship between deposits remains uncertain (Franklin et al. 1981:13-14). In support of this view, Wayman (1985:3; 1987:2) states that data banks of deposit compositions are not currently available to predict the geographical origin of copper.

In the vicinity of the Lake Superior copper deposits, Shield Archaic populations utilized the resource as a raw material (Dawson 1983:68). This metal-working tradition continued into the Initial Woodland period and Dawson (1983: 73-75) suggests that the occurrence of copper on sites in the more northern parts of Ontario indicates contact with the Lake Superior populations. Copper was traded into southern Ontario during the Woodland period and, as documented in the accounts of Jacques Cartier (Trigger 1985b:104-105), by the early sixteenth century copper was traded from Lake Superior east to the St. Lawrence Valley. On the basis of this movement of copper out of the Lake Superior region it is tempting to associate the Washagami

Point site awl to this source and, thus, to trading or contact relationships oriented to the west and south. With reference to the Severn River specimen, Pilon (1987:187) suggests such a relationship.

Contacts to the north, however, are also worthy of consideration. Franklin et al. (1981:1-3) document an extensive movement of copper radiating out of the central Arctic source area. In the early historic period, through their Native contacts, Hudson's Bay Company men on the western shores of Hudson Bay were familiar with northern derived native copper. In 1716 James Knight (1965:62) brought the native metal to the attention of the London Committee:

> I have sent you home a few bits of copper I had from the northward; it was never run but naturally virgin copper, which I understand by the Indian's that the northern country produces a great deal of.

Half a century later, Samuel Hearne (1958:113) indicates that among the Chipewyan - or northern Indians as they were called at the time - working with native copper was a traditional skill:

> Before Churchill River was settled by the Hudson's Bay Company, which was not more than fifty years previous to this journey being undertaken, the Northern Indians had no other

> metal but copper among them,.... This being the case, numbers of them from all quarters used every Summer to resort to these hills [Coppermine River] in search of copper; of which they made hatchets, ice-chissels, bayonets, knives, awls, arrowheads, &c.

Since it seems likely that Natives bordering the northwest shores of Hudson Bay - in at least the late pre-European period - knew native copper technology and had native copper tools, such finished items and/or technology could have been made available to southern neighbours through either friendly or hostile relations.

Both the Lake Superior and Arctic deposits of copper remain possible sources of the awl's parent material. Major rivers flowing through the Lowland provided easy transportation routes along which copper could have been carried from the Lake Superior region (for discussions of northeastern Ontario trade routes connecting Lake Superior, Lake Huron, and the Ottawa River with James Bay see Herrick 1967:19-31; Noble 1982a:37-38; Pollock 1975:19). On the other hand, copper from the Arctic could have been acquired through relations with northern groups. For instance, it is known that the Cree were in contact with the Chipewyan for during the late sixteenth century European traders at York Factory met Chipewyan women and children who were captives of the Cree (Smith 1981:273).

In addition to the uncertainty of the awl's source, the nature of the awl's movement is not clear. The lack of native copper blanks or raw material so far recovered from Lowland sites supports the notion that the awl was shaped elsewhere and entered into the Washagami Point site tool kit as a finished product. However, knowledge of native copper technology and thus local manufacture may be supported by the awl's annealed condition.

Modified Bone and Antler

The Area B collection of worked bone and antler is comprised of five specimens. Three of the worked specimens were recovered from the excavated unit, whereas two were found in test squares. Table 32 lists the worked bone and antler classes, as well as the raw materials.

Unilaterally Barbed Point

One specimen (Figure 56 B) is identified as the distal section of a unilaterally barbed point. The point is fashioned from a longitudinally split mammal bone; the point's dorsal face is the bone's exterior surface and the ventral face displays the bone's sectioned marrow cavity.

Table 32. Modified Bone and Antler.

Class	Material	n	%
Unilaterally Barbed Point	Mammal Bone	1	20.00
Incised Bone Fragment	Mammal Bone	1	20.00
Circumferentially Cut Ulna	Snow Goose Ulna	1	20.00
Miscellaneous	Mammal Bone	1	20.00
	Caribou Antler	1	20.00
Total		5	100.00

The point exhibits three barbs and three barb notches along the specimen's right lateral margin. Two barbs and notches are positioned within the distal half of the point and the third barb and notch is located at the point's extreme proximal end. The barbs were formed by notches cut on oblique angles oriented toward the point's tip, or distal end. The notches were cut on both the dorsal and ventral faces. The barb points are rounded and excessive wear is displayed on the extreme distal and proximal barbs. The tip of the point exhibits a round shape and the ventral face of the tip has been thinned by the removal of a flake. The flake scar is hinge terminated with the proximal end intersecting the point's tip. Limited scar damage is also apparent on the tip's dorsal surface. It is assumed that the damage represents unintentional impact modification caused during the point's use.

The point was recovered from a test square situated immediately northwest of the excavated unit (Figure 32). The piece measures 40.5 mm in maximum length; 7.7 mm in maximum width; and 3.3 mm in maximum thickness. The point weighs 0.85 grams.

Incised Bone Fragment

An incised bone fragment (Figure 56 A) is the end section of a larger bone object. The piece displays two elements consisting of a tapered shaft and a knob termination. In total length the specimen measures 23.0 mm: the shaft has a maximum length of 18.8 mm and the knob has a maximum length of 4.2 mm. Close to the object's severed end the shaft has a width of 8.1 mm. At the base of the knob the shaft tapers to a width of 7.3 mm. The object's greatest width is 8.6 mm measured between the lateral margins of the knob. In cross-section the specimen is plano-convex with a maximum thickness of 3.5 mm. The piece weighs 0.75 grams.

Two finely incised zigzag lines are inscribed on the specimen's convex face running parallel to the longitudinal axis. The two lines are restricted to the shaft element beginning at approximately the junction of the knob and the shaft. On the original complete object the inscribed lines continued along the shaft beyond the point where the object was severed. The lines are inscribed asymmetrically on the shaft: with the knob end oriented closest to the observer one line runs slightly left of centre and the adjacent line runs closer to the right lateral margin. The zigzag arms exhibit concave contours so that each peak bends toward the severed end of the shaft. With respect to dimensions, the continuous zigzag line is formed of relatively tall peaks (approximately 1.8 mm in height) and comparatively narrow bases (approximately 0.9 mm in width).

The function of the object is not known and this is complicated by the object's incomplete condition. Its small size and apparent fragility, however, indicates that it was light-task oriented. In the spirit of speculation, if the severed section of the piece matched the extant section, such an object could have functioned as a fastener - perhaps for clothing or a roll-up type of bag. The prevalence of polish - especially noticeable on the convex face - suggests that some form of friction was present during the object's usable lifetime. The relevance of the incised zigzag lines is also unknown. It is believed, however, that similar to Great Lakes Native design the zigzag lines express symbolic rather than purely decorative significance and may relate to the manifestation of spirit power (cf. Phillips 1984a, 1984b).

This specimen was recovered from Level 2 of the excavated unit. It came to light in a portion of the test square that was later partially encompassed by square N3W2 (Figure 35).

Circumferentially Cut Ulna

A cut bone fragment, recovered from the excavated unit of Level 1 in square N2W2, is not a formal artifact but represents the debris left from artifact manufacture. The piece is the proximal end of a snow goose (Chen caerulescens) right ulna and it exhibits a circumferential cut located to assist in the separation of the articulator end from the shaft (Figure 56 C). The cut encircled the bone and when the articulator end was snapped from the shaft the break produced a clean fracture along the ventral face cut, but it broke distally of the dorsal face cut. Therefore, the complete cut is intact on the dorsal face.

The desired segment was the shaft of the bone which was likely used for the manufacture of a hollow cylindrical object. Bone of this nature could have been used for the manufacture of such objects as sucking tubes, beads, and/or needle cases.

Miscellaneous Bone and Antler

Two specimens of bone and antler exhibit modification; however, the significance of the modification is not apparent. One longitudinally split mammal bone fragment displays a cut or sawn feature across the bone's sectioned face in a transverse orientation to the longitudinal axis. The bone is 87.3 mm long with a weight of 10.00 grams. This specimen was found in a test square that was situated to the southeast of the excavated unit (in Figure 32 the test square is adjacent to disfigured tree number 6). The second piece is a section of caribou (Rangifer tarandus caribou) antler that exhibits an obliquely sawn or cut surface located at one of the antler's ends. The antler is 171.0 mm long with a weight of 51.30 grams. This specimen was recovered from the excavated unit in Level 2 of square N2W3 (Figure 35).

Faunal Remains

The faunal collection from Area B of the Washagami Point site is derived from eight test squares and the excavated unit of ten metre squares. The total collection consists of 275 pieces: 54 fragments (19.64%) came from the test squares and the remaining 221 fragments (80.36%) were yielded from the larger excavated unit. Since the exact relationship between the faunal remains from the test squares and excavated unit cannot be determined with a high degree of certainty these two sources of faunal material will be discussed separately.

Identifications of the bone and antler remains were performed by Patricia Austin and Cathy Yasui. One shell specimen was identified by Sheila Byers. An attempt was made to rejoin fragments and the refitted specimens are counted as one.

Test Squares

Among the total 54 bones excavated from the test squares, four fragments (7.41%) could not be identified to the class level. The remaining 50 fragments belong to the Mammalia (83.33%) and Aves (9.26%) classes. Of the 50 fragments identified to class, one is further identified to the subfamily level; one to the genus level; and two to the species level. All of these identified fragments belong to the Aves class. Table 33 details the faunal collection by class. The collection by test square is listed in Appendix K.

Table 33. Test Squares: Faunal Collection by Class.

Class	n	%
Mammalia	45	83.33
Aves	5	9.26
Unidentified to Class	4	7.41
Total	54	100.00

Mammalia

Among the bones identified to class, 90.00% (n=45) of the fragments belong to the Mammalia class. These specimens, however, are not sufficiently complete to allow for identifications beyond the class level. Twenty-nine (64.44%) of the mammalian fragments are calcined indicating that they have been thermally altered. Additionally, two of the mammalian fragments have been culturally modified (see discussion pertaining to Modified Bone and Antler).

Aves

Among the avian remains, four fragments are identified beyond the class level. The fragments all belong to the Anatidae family and they include the Anserinae, Anatinae, and Cygninae subfamilies. Trumpeter swan (*Cygnus buccinator*) - a member of the Cygninae subfamily - is the only species with a specific identification. However, the black duck (*Anas rubripes*) or mallard duck (*Anas platyrhynchos*) and the Canada goose (*Branta canadensis*) or snow goose (*Chen caerulescens*) are the species identified as representing the Anatinae and Anserinae subfamilies respectively. None of the avian remains show evidence of heat exposure or cultural modification. The identified avian elements and species are listed in Appendix L.

Unidentified to Class

In total, four fragments (7.41%) were not sufficiently complete to allow for identification to the class level. Of these, three (75.00%) are calcined indicating that they have been exposed to heat. None of these unidentified fragments display additional forms of modification.

Excavated Unit

The faunal collection from the main excavated unit was recovered from Levels 1 and 2 and in total the collection numbers 221 fragments of bone, antler, and shell.

The Level 1 sample is restricted to one bone fragment recovered from sub-square C in square N2W2. The bone is identified as the proximal end of a snow goose (Chen caerulescens) right ulna and it clearly displays cultural modification in the form of a cut (see discussion pertaining to Modified Bone and Antler).

The occurrence of only one specimen in Level 1 raises the notion that natural forces may have altered the specimen's stratigraphic position. However, until a larger portion of the site is opened the stratigraphic interpretation of the site - suggesting non-contemporaneity between the assemblages of Levels 1 and 2 - is maintained.

The remainder of the faunal collection was recovered from Level 2 (Figure 57); in total this assemblage numbers 220 fragments (99.55%). Among this total, 37 fragments (16.82%) could not be identified to the class level. The remaining 183 fragments are divided between the Mammalia (87.98%), Aves (9.84%), Osteichthyes (1.64%), and Pelecypoda (0.55%) classes. One specimen is further identified to the family level and 20 specimens are identified to the species level. Table 34 details the faunal assemblage by class. The assemblage according to square is listed in Appendix M.

Figure 57.

Area B

Level 2: Faunal Remain Distribution.

Washagami Point Site Gblg-1

Level 2
Distribution of Faunal Remains

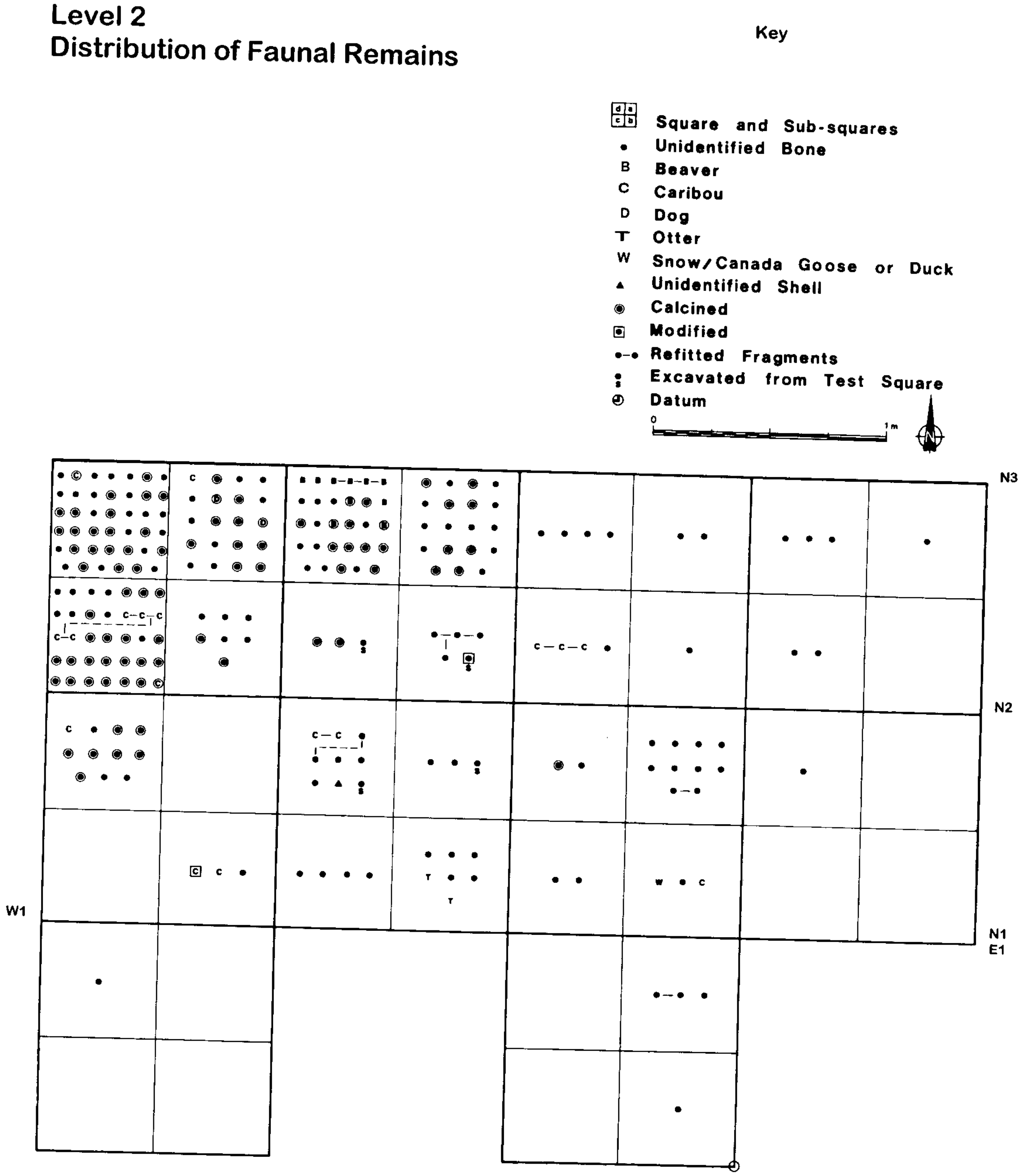


Table 34. Level 2: Faunal Assemblage by Class.

Class	n	%
Mammalia	161	73.18
Aves	18	8.18
Osteichthyes	3	1.36
Pelecypoda	1	0.45
Unidentified to Class	37	16.82
Total	220	99.99

Mammalia

Among the faunal remains identified to class, 87.98% (n=161) of the fragments belong to the Mammalia class. From this group, 140 fragments (86.96%) are not sufficiently complete to allow for further classification. The remaining 21 fragments (13.04%) are identified beyond the class level and represent the Cervidae, Mustelidae, Castoridae, and Canidae families. All of these specimens are identified to the species level and include caribou (*Rangifer tarandus caribou*), river otter (*Lutra canadensis*), beaver (*Castor canadensis*), and dog (*Canis familiaris*). The identified mammalian elements and species are listed in Appendix N.

In this assemblage, 36.65% (n=59) of the mammalian fragments are calcined indicating they were exposed to heat. A large percentage (n=50, 84.75%) of the calcined remains are unidentified beyond the class level; however, fragments showing calcination that are identified include beaver (n=3), dog (n=2), and caribou (n=4). The mammalian fragments showing calcination were concentrated in the northwest corner of the unit with 7, 9, and 43 fragments recovered from squares N2W3, N3W2, and N2W3 respectively.

Two specimens from Level 2 display evidence of cultural modification. A caribou antler showing an obliquely flattened surface comes from square N2W3 and a shaped and inscribed mammalian fragment comes from the initial test square that was latter encompassed within squares N2W1, N2W2, N3W1, and N3W2 (see discussion pertaining to Modified Bone and Antler).

Aves

Among the fragments identified to the class level, 9.84% (n=18) belong to the Aves class. Of these only one fragment is identified beyond class to the family level. The remaining 17 fragments (94.44%) are not sufficiently complete to allow for further classification.

The identified fragment is the distal section of the left tibiotarsus from a species in the Anatidae family. It is suggested that the tibiotarsus is from one of the duck species or possibly from the Canada goose (<u>Branta canadensis</u>) or snow goose (<u>Chen caerulescens</u>). This specimen was recovered from square N2W1 in the central section of the excavated unit.

In total, seven avian fragments (38.89%) are calcined indicating thermal alteration. Similar to the mammalian calcined fragments, the avian calcined specimens were recovered from the northwest section of the unit and involve squares N3W2 (n=2) and N3W3 (n=5). None of the avian remains in Level 2 display additional forms of modification.

<u>Osteichthyes</u>

Only a small proportion of the faunal assemblage identified to the class level belongs to the Osteichtyes class (n=3, 1.64%). Unfortunately, none of the fish specimens are identifiable beyond the class level. The fish remains came from squares N2E1, N3W2, and N3W3 and they all lack calcination.

<u>Pelecypoda</u>

One small shell fragment is identified as belonging to the Pelecypoda class (bivalvia). The shell was located in the "mixed" area between Levels 2 and 3 in square N2W2. Due to the single frequency of this class and its location at the extreme bottom of the cultural level it is suggested that the occurrence of this specimen is the result of natural rather than cultural forces.

Unidentified to Class

In total, 37 fragments (16.82%) were not sufficiently complete to allow for identification to the class level. Of these, 20 (54.05%) fragments have been thermally altered. One calcined piece was recovered from square N2W1 and the remaining 19 were from the northwest section of the unit in squares N3W2 (n=11) and N3W3 (n=8). None of these unidentified fragments display additional forms of modification.

Discussion of Faunal Remains

Many of the faunal specimens excavated from the site were recovered from the screens. As such, for consistency and ease in recognizing horizontal distributions all of the specimens are positioned on the distribution map in the context of the sub-squares from which they were recovered (Figure 57). The distribution of the Level 2 faunal remains in the excavated unit clearly depicts a concentration of bone debris in the unit's northwestern section. Additionally, almost all of the calcined specimens were recovered from this concentration. Fire-cracked rock also revealed a similar distribution being thinly scattered over the southern and eastern sections of the unit and concentrated in the northern and western sections. The largest quantity of fire-cracked rock was located in square N3W3 with 156, 89, 129, and 206 pieces recovered from sub-squares A, B, C, and D respectively. In the absence of any overt evidence of a hearth the significance of these distributions is difficult to determine. The fire-cracked rock - likely used as boiling stones - and the bone fragments were undoubtedly associated with food preparation and consumption; however, whether the concentrations were in close proximity to a hearth, or represent refuse that was swept away from a hearth, remains unclear.

The faunal assemblage is highly fragmented and low in total numbers. The fragmentary nature of the assemblage is responsible for the relatively few identifications which precludes useful species frequency computations. A common technique for quantifying taxonomic abundance pertains to computing a statistic representative of the "minimum number of individuals" (MNI). The MNI statistic is based upon a raw count of bone elements that occur once in a skeleton and therefore reflect the least number of creatures capable of producing the recovered remains (Gilbert and Singer 1982: 31-32). The MNI statistic, however, has a number of problems relating to sample emphasis (Gilbert and Singer 1982:32; Payne 1972:69; Uerpmann 1973:311) and assemblage size (Hesse and Perkins 1974:151). With respect to the latter, Hesse and Perkins (1974:151) state that accurate probability statements using the MNI quantification technique requires large samples of well over 300 identified specimens. Therefore, given this limitation and the nature of the Washagami Point site faunal assemblage, the MNI statistic for this site possesses very little, if any, value for predicting the quantity or variety of faunal resources exploited by the inhabitants of the site.

In the faunal assemblage that was recovered from both the test squares and the excavated unit, the identified bones reflect a minimum of one animal per identified species. With little doubt, this number under-represents the faunal resources exploited. Not only are the number of identified specimens low in comparison to unidentified specimens but natural and cultural factors may dictate against retrieving representative faunal collections. With respect to the latter point, biases in the deposition of faunal remains are related to soil chemistry, cultural practices, scavenger activities, and the excavation itself.

Acid soils induce bone destruction (Gordon and Buckstra 1981:569; Hamalainen 1974:1) and bones with different structural features deteriorate at different rates (Gilbert and Singer 1982:29; Uerpmann 1973:319). Therefore, the archaeologist can never assume that the assemblage excavated represents the full scope of the faunal remains that were originally present. Important too, remains from exploited fauna may have been removed from, or never became part of the site's physical composition for reasons related to off site butchering practices; food sharing; food preparation techniques; dog food; use of bone, antler, and shell for tool manufacture; ritual disposal of bone; waste disposal practices; and dog and wildlife scavenging activities (Binford 1978b:9-10, 462-482; Gilbert and Singer 1982:22-28; Hodder 1982:155-163; Janes 1983:29-34; Preston 1964, 1975b:483; Rogers 1973: 17-68; Tanner 1979:171-172; Uerpmann 1973:319; Walters 1985: 642-643; Yellen 1977:102-103). The techniques of excavation (see discussion in Lennox et al. 1987:100) and the limits of the excavation in comparison to the site's total area also contribute to biases in the faunal sample. In summary, when faunal sample biases are considered it is instructive to recall Ian Walters (1985:642-643) ethnoarchaeological study at a campsite in the southern Northern Territory of Australia where over a six month period of recording bone discard, attempts to recover the bone remains resulted in the retrieval of only 3% of the total amount of discarded bone.

Notwithstanding the problems related to sample size and representation, the faunal collection does provide insight into the seasonal use of the site. With respect to the three major classes of fauna represented the mammals and birds provide the most interpretative value for seasonal determination. Fish is the faunal class of least value for this purpose.

The fish assemblage from Area B includes only three specimens and each specimen is unidentified to species. In the absence of species identifications the discussion is restricted to noting the fish that were potentially available to the site's inhabitants. The fish species of economic value currently known to occur in Spruce Lake include lake herring (Coregonus artedii), lake whitefish (Coregonus clupeaformis), walleye (Stizostedion vitreum), northern pike (Esox lucius), longnose sucker (Catostomus catostomus), and white sucker (Catostomus commersoni) (Dr. K.F. Abraham personal communication 1985; Ontario Ministry of Natural Resources 1985:89). Additionally, brook trout (Salvelinus fontinalis) inhabit the waters of the North Washagami River (Ontario Ministry of Natural Resources 1985:90). Dependent upon spawning periods and the presence of ice the availability of fish differs over the course of a year. With respect to spawning periods the suckers, walleye, and northern pike spawn in the spring/early summer period and the brook trout, lake herring, and lake whitefish spawn in the late summer/fall period (Scott and Crossman 1979). In these periods the fish seek shallow waters which increases their visibility and ease of harvest.

The mammal remains that have been identified to the species level include caribou (Rangifer tarandus caribou), river otter (Lutra canadensis), beaver (Castor canadensis), and dog (Canis familiaris). The dog was the Natives' hunting assistant and beast of burden (Isham 1949:164; Graham 1969:33). Although the value of dogs may have differed over the seasons it is expected that dogs were constantly present in Native camps. The river otter and beaver are non-migratory and through different techniques of hunting they are exploitable throughout the year. Caribou, on the other hand, follow migration patterns that may affect their seasonal availability in the Spruce Lake area.

Caribou was an essential resource for the inhabitants of the Lowland. Relative to other available species, per animal caribou provided a large quantity of meat. Caribou also provided skins required for clothing (Isham 1949:110), lodge covers (Isham 1949:89), and snowshoe netting (HBCA B.198/a/12:6d); B.198/a/57:11d; B.198/a/60:13). The nature of caribou availability over time, however, is not fully understood. As currently known, woodland caribou are moderately gregarious and undertake "local seasonal migrations" (Banfield 1961:70). In the Hudson Bay Lowland the caribou tend to migrate from their winter range in the Northern Boreal Lichen Belt to the Tundra Coastal Zone where they spend the summer months feeding on sedges, grasses, and deciduous shrubs while taking advantage of the open area winds - allies in the battle against biting insects (Thompson n.d.:29). For the winter months the caribou return to the shelter of the interior's wooded areas where they feed primarily upon lichens (Thompson n.d.:29-30).

In 1982 and 1983 winter aerial caribou inventories conducted by the Ontario Ministry of Natural Resources located no caribou on the Coastal Tundra Zone (Ontario Ministry of Natural Resources 1982a, 1982b, 1983). The closest caribou sighted to the coast was 52.5 kilometres inland on the east side of the Shamattawa River (Ontario Ministry of Natural Resources 1983). Throughout the Moosonee District the aerial survey located four caribou winter concentrations one of which was located south of the Winisk River between the Shamattawa River and North Washagami Lake (Thompson n.d.:13). In February of 1983, fifty-five caribou in seven aggregates were sighted within 60 kilometres of the Washagami Point site (Ontario Ministry of Natural Resources 1983). One herd of twenty-three caribou - the largest of these herds - was sighted 31 kilometres to the northwest of the site. In the late eighteenth century this local migratory behaviour was noted by Andrew Graham (1969:14-15):

> The musketoes in the summer season drive them [caribou] out of the plains to the sea-shores, and then we meet with them in our marshes. From November to the month of April the track of deer is rarely seen within eighty or one hundred miles of the coast.

On the other hand, Simkin (1965:64) suggests that in the past, when large areas of northern Ontario were covered with "continuous caribou habitat," caribou may have undertaken regular and predictable large-scale migrations over extensive areas. Historical evidence seems to support this notion: in June 1773 thousands of caribou were reported crossing the Severn River (HBCA B.198/a/17:43) and the predictability of the migration was noted in an April 1769 journal entry that indicated the Natives were waiting for the usual spring passing of the caribou (HBCA B.198/a/11:23). However, over the past two centuries caribou populations of this size were greatly reduced due to excessive kills (Banfield 1961:85; Bergerud 1974) and changes in habitat (Simkin 1965:67).

In the post-contact period - either through localized or large-scale migrations - for the Natives who remained near the coast the return of the caribou in the spring provided welcome relief from winter food shortages. The timing of the caribou return, however, varied between years: in 1824 caribou had returned to the Fort Severn area by the beginning of April (HBCA B.198/a/66:26), whereas in 1789 there had been no caribou sightings near the coast by as late as the 26th of May (HBCA B.198/a/38:32d). Following the fall rut and the retreat of the caribou to their winter ranges the Natives near the coast were generally forced to subsist without caribou (HBCA B.198/a/60:23-24) and in some years the lack of caribou near the coast was stated as the cause of the Natives' "starving" condition (HBCA B.198/a/35:27; B.198/a/47:20).

The movement of caribou from the coastal areas to the inland winter ranges is documented in historical sources and by recent aerial caribou surveys. However, in spite of Graham's (1969:14-15) generalized observation, the number of caribou that may remain in the interior over the warm months is not known. Calving takes place in late May (Banfield 1961:70) and in addition to calving on the coast, parturition also occurs further inland (Simkin 1965:48). Statements by Samuel Hearne (1958:129) and James Swain (HBCA B.198/e/1:4) written in the late eighteenth and early nineteenth centuries respectively, support this notion by indicating that caribou could be found in inland areas year round. Therefore, although there seems to be a general trend for Lowland caribou to migrate to the coastal zone for the summer months the migration does not necessarily involve the total caribou population.

The faunal assemblage of the Washagami Point site includes ten specimens identified as caribou. From the foregoing discussion it is apparent that the site is located in a general area associated with caribou winter range which is consistent with the knowledge that the land south of the Winisk River has been a productive hunting area for caribou in both the recent (Former Chiefs Committee of Winisk 1982: 24) and the more distant pasts (HBCA B.198/a/60:28d). The area's potential for winter caribou exploitation is a factor that supports an argument in favour of assigning this site a fall/winter occupation; the November to April/May period was likely the season that provided the greatest accessibility to caribou for the inhabitants of this site. However, due to unknown numbers of caribou that may have remained in the interior throughout the summer the availability of caribou in this area may not have been exclusive to the colder months.

The occurrence of two antler specimens also provides support for a fall/winter occupation, but this factor similarly requires qualification. Among Subarctic peoples, caribou antler was used as a raw material for the manufacture of tools, such as wedges, arrow points (Osgood 1970:102, 203-206), and ice chisels (Birket-Smith 1930:25). The flexible bone core of caribou antler hardens in the fall period (Banfield 1974:384); therefore, as a raw material fall and winter antlers would be of greater utility than spring or summer antlers. As such, if the antler recovered from this site was intended as raw material for tool manufacture then the likely period of collection was during the fall/winter seasons. The presence of antler, however, does not necessarily indicate the site was occupied in the fall/winter period since raw materials such as antler can be transported over space and time and, consequently, the commensurability between the seasonality of the site and the season of the antlers' collection could be skewed.

In summary, the caribou specimens that were recovered from the site support the suggestion that this site could represent a fall/winter occupation. On the other hand, caribou remains found in an interior site does not completely exclude the possibility that they are the vestiges of a summer harvest.

From both the test squares and the excavated unit the avian remains that are positively identified to species, or listed as potential species alternatives, include trumpeter swan (Cygnus buccinator), snow goose (Chen caerulescens), Canada goose (Branta canadensis), black duck (Anas rubripes), and mallard duck (Anas platyrhynchos). All of these species are migratory and their availability to the inhabitants of this site was at best limited to the non-winter period.

In addition to migratory behaviour, nesting location is also a factor affecting waterfowl availability. Black duck, mallard duck (Peck and James 1983:54-57), and the Canada goose (Hanson 1965:46; Peck and James 1983:49; Raveling and Lumsden 1977:2) are currently known to nest in the Hudson Bay Lowland. With respect to the trumpeter swan little is known of its eastern nesting range due to the decrease in its former distribution (see Alison 1975 for a discussion of historical occurrences). However, Lumsden (1984:420-423) suggests that on the basis of habitat requirements at least part of the Hudson Bay Lowland could have supported a breeding population. As such, assuming similar nesting patterns in the past, each of these species would have been exploitable between and including the spring and fall migration periods.

The breeding grounds of snow geese, on the other hand, are historically further north and in the eastern Arctic the breeding grounds include Baffin and Southampton Islands (Hanson and Currie 1957:213). Although snow geese currently breed along the Hudson Bay Lowland coast (Hanson et al. 1972:2-3; Kerbes 1975:9; Peck and James 1983:50-51) on the basis of post-glacial emergence rates Hanson et al. (1972:10) suggest that this region may have become available to nesting snow geese only within the last 250 years. There is also currently a nesting colony of snow geese at Eskimo Point (Hanson et al. 1972:3; Kerbes 1975:9). The historical significance of this area for nesting purposes, however, is questionable since in the late 1700's both Samuel Hearne (1958:283) and his Inuit informants were unaware of coastal nesting areas north of the Churchill River (see also Hanson et al. 1972:13). Therefore, prior to the establishment of the current breeding populations, the availability of snow geese in the Hudson Bay Lowland would have been limited to the two migration periods.

In the last half of the eighteenth century, Samuel Hearne (1958:283) noted that a harvest amounting to five or six thousand snow geese frequently took place during the spring migration in the vicinity of the Churchill River. The snow geese remained for a short duration after which they departed for their northern breeding grounds. At that time, according to both Hearne (1958:283) and Graham (1969:43), the location of the breeding grounds was unknown. James Isham (1949:120), in his 1743 Observations on Hudsons Bay, wrote that the snow geese arrived in May and stayed for three to four weeks; they then returned again in August and were gone to the southward by October:

> ... they Come from the Southward to go to the Northward the beginning of may staying 3 week's or a month in the marshes, and Return from the Northwd. in august, and are all gone again to the Southward by the first of october....

Information taken from the late eighteenth and early nineteenth century Severn House journals is generally consistent with the geese migration periods noted by Isham. In 1782 snow and Canada geese made their first appearances in the Severn House area on May 16th (HBCA B.198/a/27:29d). In comparison to previous years, however, this date may have been late for in 1771 (HBCA B.198/a/14:22d) and 1780 (HBCA B.198/a/24:36d) the first geese were seen on April 27th and May 1 respectively. In 1761 the geese were gone from the coast by May 25th (HBCA B.198/a/2:20) and in 1791 they were gone by May 30th (HBCA B.198/a/40:30d). In the fall - consistent with Isham's statement - the geese left for the south in the late-September to mid-October period: in 1779 (HBCA B.198/a/24:8) and 1820 (HBCA B.198/a/60:15d) the geese were gone from the Severn House area by September 28th and October 11th respectively.

During spring migration, snow geese pass over the frozen interior section of the Hudson Bay Lowland on their rapid flight to the coast (Hanson and Currie 1957:218). As such, in the spring migration period snow geese were not available to Natives residing in the interior area of the

Lowland. On the other hand, the fall migration spans a longer period of time (Hanson and Currie 1957:218) and occurring prior to freeze-up the snow geese frequent interior Lowland waterways in addition to the coastal areas (Harry G. Lumsden personal communication 1985). Therefore, since snow geese historically passed over the interior Lowland in the spring and spent their summer on northern breeding grounds the availability of snow geese in the interior section of the Lowland would have been limited to the months of September and October.

With reference to the above discussion, it is suggested that the Level 1 snow goose ulna is associated with the exploitation of the area at least during the time of the snow goose fall migration. The occurrence of snow geese bone in Level 2 is not conclusive, but on the basis of the Level 1 specimen the presence of snow geese bone in Level 2 is a reasonable possibility. Although the Level 1 and Level 2 components are not considered to be contemporaneous both components likely represent fall occupations. This determination is based upon the presence of a snow goose bone in Level 1; the possible presence of snow geese remains in Level 2; and the inshore location of the site.

Chapter Summary

Through comparison of the two maps pertaining to the distribution of faunal (Figure 57) and artifact (Figure 35) remains in the Area B excavation, separate concentrations are apparent. A heavy concentration of faunal remains, as well as fire-cracked rock were located in the northwestern sector of the site, whereas the artifacts had a more centrally located concentration. Although no other features, such as concentrations of ash were apparent, the distribution suggests that the faunal and fire-cracked rock concentrations were probably associated with a hearth while the artifacts identify an activity area located adjacent to but outside the hearth zone. The large amount of calcined bone in the northwestern sector of the site in comparison to the near absence of calcined specimens in the remainder of the site supports the notion that the remains in the northwestern sector were probably in physical proximity to a hearth.

The diverse nature of the remains suggests a multi-dimensional occupation in that a number of activities seem to be represented at the site. The processing and cooking/ boiling of meat is indicated by the presence of bone fragments and fire-cracked rock. The lithic specimens suggest processing activities that in addition to meat may also have included the manipulation of wood, bone, and hide. Potential for hide-working activities is supported by the presence of the copper awl. Lithic reduction activities are likewise apparent. In addition to the site's multi-dimensional nature, the distribution of the remains indicate a deposit that has suffered minimal perturbation. The relationship between faunal and artifact concentrations and specifically the extant pattern left from lithic reduction, suggest a single depositional event that was left largely undisturbed. The overall pattern strongly suggests a final phase of occupation immediately prior to the abandonment of the site.

The range of potential activities performed at this site would indicate the remains of a residential camp. This interpretation is commensurate with Binford's (1983a:330) argument that residential camps tend to be variable in content while the contents of special-purpose sites tend to be redundant. The recovered faunal assemblage indicates a diverse subsistence economy during the fall months of the year. An occupation during the colder months of the year is supported by the location of the site within the protection of the bush back from the exposure of the lake. Due to the insect menace experienced during warmer months this interior location would have been sought when the insects were at a low and when it was desirable to seek protection from the elements brought on by fall and winter. The site's location and the nature and distributional characteristics of the cultural remains intimate that this portion of the site may have been located within the interior section of a lodge.

A sample of bone collagen from Level 2 of the Washagami Point site yielded a radiocarbon date of 440 ± 80 B.P. (1510 A.D.), thereby dating the component to the late pre-European period. Given this late date in the pre-European chronological sequence it is notable that ceramics - which assist with relative dating - were absent from the component's material assemblage. Although ceramics, including those dating to the late pre-European period (for example, see the discussion of ceramics from the Cowell Site in Pollock and Noble 1975:85-91), have been recovered from Lowland sites it is meaningful to note that the number of sherds for the total region is limited to a mere 186 specimens (Albany River area 5.4%; Brant River 1.6%; Hawley Lake 2.7%; Severn and Sachigo Rivers 88.7%; Nelson and Hayes Rivers 1.6%). Neutron activation analysis performed on three lower Severn River ceramic sherds (Pilon 1987:330-332) indicated that they were not of local manufacture and on this basis Pilon suggests that the Lowland adaptive pattern may not have included a local ceramic industry. As such, Pilon's argument provides an explanation for the small number of ceramic sherds recovered from the Lowland in general, and for the absence of ceramics at the Washagami Point site in particular. An alternate explanation with relevance to the Washagami Point site, however, is Dawson's (1976b:8-9) argument that ceramic vessels had little functional value during cold weather and if broken they were difficult to replace; therefore, ceramics would not be expected within assemblages associated with cold-weather occupations. Realizing that limited excavations may also account for the non-representation of certain industries, the lack of ceramics from the Washagami Point site adds little to this discussion apart from the interest raised by negative information.

In sum, the point of land at the southern junction of Spruce Lake and the North Washagami River bears evidence of late pre-European human use. The recently set beaver traps indicate that the area continues to have significance in the economy of the contemporary Lowland Cree. The disfigurements on many of the trees tell of past activities and the hearth signifies diversity in the exploitation of the area's resources in the early years of the twentieth century. For the earlier historic period, such as during the time of James Swain's tenure, tangible evidence of the area's use has yet to be confirmed archaeologically; however, exploitation of the area is inferred by the placement of the "weir" on Swain's map.

CHAPTER SIX

CONCLUSION

> Our understanding of the past is dependent upon the integration of diverse approaches (Janes 1983:3).

In the conclusion to his study pertaining to patterns of cultural adaptation along the Severn River, Pilon (1987:223) notes that the examination and amalgamation of various types of information intrinsic to archaeological sites is a requirement for understanding adaptive patterns within the Hudson Bay Lowland. In concurrence with this mind-set, this thesis has attempted to demonstrate the value of utilizing different types of archaeological information, as well as the merit in integrating diverse approaches as expounded in the epigraph. Integrating ethnographies, exploration literature, fur-trade records, various forms of archaeological information, and Native advisor consultations, this study has endorsed an ethnohistorical methodology oriented toward an anthropological enquiry into Native occupation within the Hudson Bay Lowland.

In the context of anticipated results the first hypothesis, as addressed in the Introduction, states that archaeological fieldwork within the Lowland will demonstrate a human presence in both the pre-European and post-European periods. This notion is founded on the positive results of previous archaeological field research (Julig 1982; Pilon 1981, 1983; Pollock and Noble 1975; Tomenchuk and Irving 1974). Challenging the view that the Lowland was without permanent occupation prior to the arrival of the European (Bishop 1972:66; Dawson 1983:55; Ray 1984:7-8; Ridley 1966:42; Rogers 1967a:84; Wright 1972a:33), the first hypothesis suggests that additional archaeological efforts will strengthen previous findings and, thus, sustain the conviction that the Lowland experienced more than intermittent visitation.

The documentation of four sites in the Shamattawa River and Spruce Lake-North Washagami River study areas indeed provide evidence of both pre-European and post-European occupations, thereby supporting the hypothesis. Two sites - the Shamattawa Askiikan and Cabin Island sites - include structural remains and represent sites that were occupied within the past fifty years. The remaining two sites - the Shamattawa Rapids and Washagami Point sites - represent older occupations with both sites yielding pre-European, as well as post-European components. Radiocarbon dates support the identifications of the two pre-European components and when combined with radiocarbon dates from Hawley Lake and the Sachigo and lower Severn Rivers (Table 35) a 4,000 year history of human occupation within the region is revealed.

Two charcoal samples extracted from the Shamattawa Rapids site yielded radiocarbon age determinations that date the Level 3 occupations to the period bracketed by the beginning centuries of the first and third millennia B.C. This component provides radiometric dates for the presence of the Archaic tradition and it currently represents the earliest evidence of human occupation within the Lowland. A sample of bone collagen from Level 2 of the Washagami Point site yielded a radiocarbon date of 440 ± 80 B.P. dating that component to the late pre-European period.

At these sites evidence of much more recent occupations - such as burned logs and faunal remains from Level 1 of the Shamattawa Rapids site; and the hearth, disfigured trees, and beaver trap sets at the Washagami Point site - speak for historic use and possible cultural relationships with the Shamattawa Askiikan and Cabin Island sites. Similar cultural associations, however, cannot at this time be inferred between the pre-European components and the more recent components and sites. Nevertheless, as postulated in the hypothesis, archaeological field research revealing substantial time depth for the human occupation of

Table 35. Hudson Bay Lowland Radiocarbon Dates.

Site	Dates B.P.	Dates A.D./B.C.	*
Fort Nieu Savanne (GlIw-1)	270±170	1680 A.D.	Se; Ch
Kakayo (GkJa-6)	340±90	1610 A.D.	Se; Ch
	510±80	1440 A.D.	Se; Ch
Cache (GeHo-3)	360±80	1590 A.D.	PB; Wd
Pahsagouaou (GgJf-3)	440±120	1510 A.D.	Se; Ch
Washagami Point (GbIg-1)	440±80	1510 A.D.	W; Co
Cowell (GdId-7)	540±95	1410 A.D.	H; Ch
	710±80	1240 A.D.	H; Ch
Amisk (GkJa-1)	720±90	1230 A.D.	Se; Ch
Mahikoune (GlIx-1)	730±90	1220 A.D.	Se; Ch
Ouissinaougouk (GfJi-2)	870±100	1080 A.D.	Sa; Ch
Hawley Lake (GdId-1)	1035±100	915 A.D.	H; Ch
Shamattawa Rapids (GbIj-2)	2360±100	411 B.C.	Sh; Ch
	3920±180	1971 B.C.	Sh; Ch

* Location

H - Hawley Lake (Pollock and Noble 1975)

PB - Polar Bear Provincial Park (W.C. Noble personal communication 1996)

Sa - Sachigo River (Pilon 1986)

Se - Severn River (Pilon 1986)

Sh - Shamattawa River (Chapter Four)

W - North Washagami River (Chapter Five)

Medium

Ch - Charcoal

Co - Collagen

Wd - Wood

the Lowland was indeed unearthed, thereby providing further proof of the region's inherent capabilities for sustaining human foraging activities.

The second hypothesis addresses the nature of foraging strategies within the Lowland. Based upon archival and ethnographic sources of data the hypothesis postulates that the Lowland economy was oriented toward diversity of resource exploitation with an emphasis upon fish. The archaeological data, however, only supports this view in part and this situation therefore espouses the value of employing a methodology for anthropological enquiry that incorporates an integration of approaches.

The faunal collections from both pre-European and post-European sections of the Washagami Point site demonstrate that resource exploitation was diverse. Large, medium, and small mammals along with a range of bird species and fish are represented. Likewise, the limited faunal sample collected from the relatively contemporary Cabin Island site indicates variety in resources exploited and this is commensurate with harvest-related information provided by one of the site's inhabitants.

In the context of the archaeological data produced from the sites the role of fish within the adaptive strategy is more problematic. For instance, from the Washagami Point site - the site with the largest faunal assemblage - fish are represented, but in relation to other faunal groups the MNI statistic is quite low. It is essential to note, however, that due to soil chemistry, cultural practices, scavenger activities, and/or the limits of excavations themselves faunal collections cannot be considered to represent the full scope of original harvests (see Gilbert and Singer 1982:22-29). Notwithstanding the relatively small sample of excavated fish remains, the locations of the sites are significant in that they are all situated in close proximity to recorded fishing grounds. Archival documents identify the Shamattawa River and Spruce Lake-North Washagami River study areas as locales where Native fish weirs were operated during the early nineteenth century. Therefore, although the archival documentation and faunal assemblages do not manifest one-to-one correlations, the locations of the sites along with information provided by Native advisors suggest that fish were more important to the foragers than is at present archaeologically apparent. This view could be further tested, however, by subjecting the lithic collections to a high power and parametric use-wear analysis of the type employed by Storck and Tomenchuk (1990) on the lithics from the Paleoindian Udora Site, southern Ontario.

Based upon the assumption that significant fishing locations were/are revisited through time, suggesting that fishing locations may tend to exhibit lengthy occupation histories, the field strategy was oriented toward investigating river sections historically identified as locations of fish trap-weir operations. By undertaking this approach it was anticipated that archaeological evidence could 1) exhibit the past presence of fish trap-weirs, 2) support the historical time frame of the study areas as documented in the archival records, and 3) demonstrate the region's long-term use. With respect to these three goals, conclusive evidence was limited to the latter.

As discussed in Chapter Three, fish trap-weirs were constructed of poles comprising a structure that had minimal affect upon the flow of water but served to restrict the movement of fish. Due to ice forces during spring break-up such structures were susceptible to yearly destruction. This may explain the reason for finding no evidence of fish trap-weir structures in the vicinity of the Washagami Point site. On the other hand, adjacent to the Shamattawa Askiikan site, the distal portion of a single pointed pole was discovered inserted into the bed of the Shamattawa River. Unfortunately, as an isolated find the pole's association with a fish trap-weir can only be inferred; it may well have served as a chaining post for a leg-hold trap, or even an anchor post for a fish net. Nevertheless, on the basis of information provided by Swain in his 1815 Severn

District Report, as well as knowledge gained through consultations with Winisk elders, the section of the river where the pole was found is a probable location for past fish trap-weir operations.

In the context of the historically identified land-use for the two study areas it was anticipated that archaeological efforts could hold potential for confirming early nineteenth century occupations. However, in the areas examined there was a complete dearth of evidence relating to that period. Although surprising, this lack of evidence clearly supports the need for further archaeological work.

In summary, the sites located on the Shamattawa River and at the southern junction of Spruce Lake and the North Washagami River contribute significantly to the development of a cultural-chronological sequence for the Hudson Bay Lowland. Particular significance is attributed to the Shamattawa Rapids and Washagami Point sites for they both provide evidence of pre-European occupations. The Shamattawa Rapids site is also responsible for adding substantial time-depth to the Lowland's cultural history.

Even though evidence of early nineteenth century occupations has yet to be found, archaeological investigations in the study areas were successful in documenting the region's long-term use. The specific association between the sites and their proximities to historically recorded fish trap-weir operations, however, currently remains unknown. Although physical evidence implicating fish harvests with the long-term use of these areas has yet to be decisively shown the existence of such a relationship remains a valid hypothesis.

The locations of the study areas - isolated from major river routes cutting through the Lowland region - suggest that the sites (pre-European and post-European components) are the remains left by foragers possessing more than warm weather interests in the Lowland. The Shamattawa Askiikan and Cabin Island sites, for instance, are relatively recent winter sites. Area B of the Washagami Point site, likewise, represents a cold weather occupation, albeit in the pre-European period. Even if the use of Area B was limited to the fall period its isolated location would have restricted the foraging group's capacity to reach the Shield prior to the freeze-up period. The location of the site, therefore, was the result of a decision based upon the known availability of food and non-food resources in accordance with the demands of the fall and freeze-up periods.

As noted above, the need for non-food resources was critical for site placement. Within the chosen foraging area decisions pertaining to specific site locations take into consideration the availability of essential non-food resources, as well as the need for protection from the natural elements. Non-food resources include available wood for the construction of storage racks, smoking racks, lodge frames, fur-skin stretchers, and other forms of utensils and tools. Quantities of moss for covering askiikan frames, spruce boughs for carpeting lodge and tent floors, and supplies of wood for food preparation and heat are essential. Fish trap-weir construction and maintenance also demand large quantities of wood. With these camp requirements in mind it is significant to note that adequate drainage conditions along river levees and lake edges allow for relatively dense forest growth (Baldwin 1962:20-21). Although a short distance inland the forest is replaced by the ubiquitous fen and bog terrain it is these "patches" of forest that provide the necessary non-food resources for successful Lowland adaptation.

The relationship between site placement and the natural elements, on the other hand, refers to the need for protection from the cold and insects. During cold months, Winisk Cree camps are enclosed within the bush, and hence, they are protected from the prevailing winds. During warm months, however, there is a tendency to seek exposed beaches and ridges with the aim of utilizing the wind to minimize the insect menace. Camps located upon ridges or high ground back from water edges also provide protection from ice and flood damage during spring break-up periods. The locations of the sites on the Shamattawa River and at the junction of Spruce Lake and the North Washagami River fit well into this model. The Shamattawa Askiikan site is a winter camp situated on the western bank of the river tucked into the coniferous forest; its location is advantageous for a cold weather occupation. Similarly, the Cabin Island site is engulfed within a forest armoured against the winter weather. On the other hand, the Shamattawa Rapids site situated atop of the river's eastern bank is exposed to the force of the westerly winds. Although the location is beneficial for warm weather occupations and could maximize daylight hours, it would provide little protection against winter conditions. The faunal assemblage within the site's Level 1 component supports this view and these attributes are also commensurate with those found in Area A of the Washagami Point site. Area B of the Washagami Point site, however, with its location well protected within the bush inland from the lake's edge, bears closer relationship to the winter camps on the Shamattawa River. Given this characteristic, combined with the nature of the recovered faunal remains, the site is thought to represent a fall hunting occupation.

Finally, the study has demonstrated that human adaptations within the Lowland were based upon a varied subsistence base - an economy made viable by the long-term accumulation of knowledge and experience within a specific territory or home range. The archaeological investigations and the critical use of historical documents have played important roles in both defining the time-depth of the Lowland occupation and the nature of some of the cultural adaptations. They have not, however, allowed cultural identifications for the full breadth of the Lowland's past peoples.

The Native people who currently live in the Hudson Bay Lowland are an intrinsic part of its history and they may indeed enjoy a lengthy ancestry within the area. The elders speak with passion about their cultural patterns, as well as their practical, material, and spiritual relationships with the land. The final voice, therefore, is given to the elders, and by way of closing - for direction and insight - the words of one elder prove significant:

> ...our main concern is that we have to go where the fish will be plentiful. ...our first consideration [is] to locate the place where...we can get the fish - where there is plenty of fish. Be it for the year that...the lynx is plentiful we still have to think about catching the fish at the same time.... Even if there is other food sources that are available. Even when [we] go out to catch the beaver. Even though the beaver is part of our food supply we still have...to choose the area where fishing is easily accessible to us.... It is something that must have to be considered (John Crowe personal communication 1985).

Appendix A

Cabin Island Site (GbIj-3)

The camp known as the Cabin Island site was built by two brothers-in-law, John Wabino and Alfred Metatawabin, who were trapping partners out of Winisk. Circumstances did not allow a meeting with either of the trappers and information pertaining to the use of the site has been derived from conversations with Louis Bird and John Michael Hunter, as well as through correspondence with Janice Graham (former Weenusk Band Socio-Economic Development Officer) who was able to talk with John Wabino on the author's behalf. The site was the winter base camp for the Wabino and Metatawabin families and in total the group consisted of two male trapping partners, two women, and four children. It was occupied during the winter months of 1978-79, 1979-80, and 1980-81.

The total area of the site, including the cleared regions, is in excess of 8,100 square metres. On the basis of structure clusters the site is divided into Areas A, B, and C (Figure 58). In addition to the structures, the site

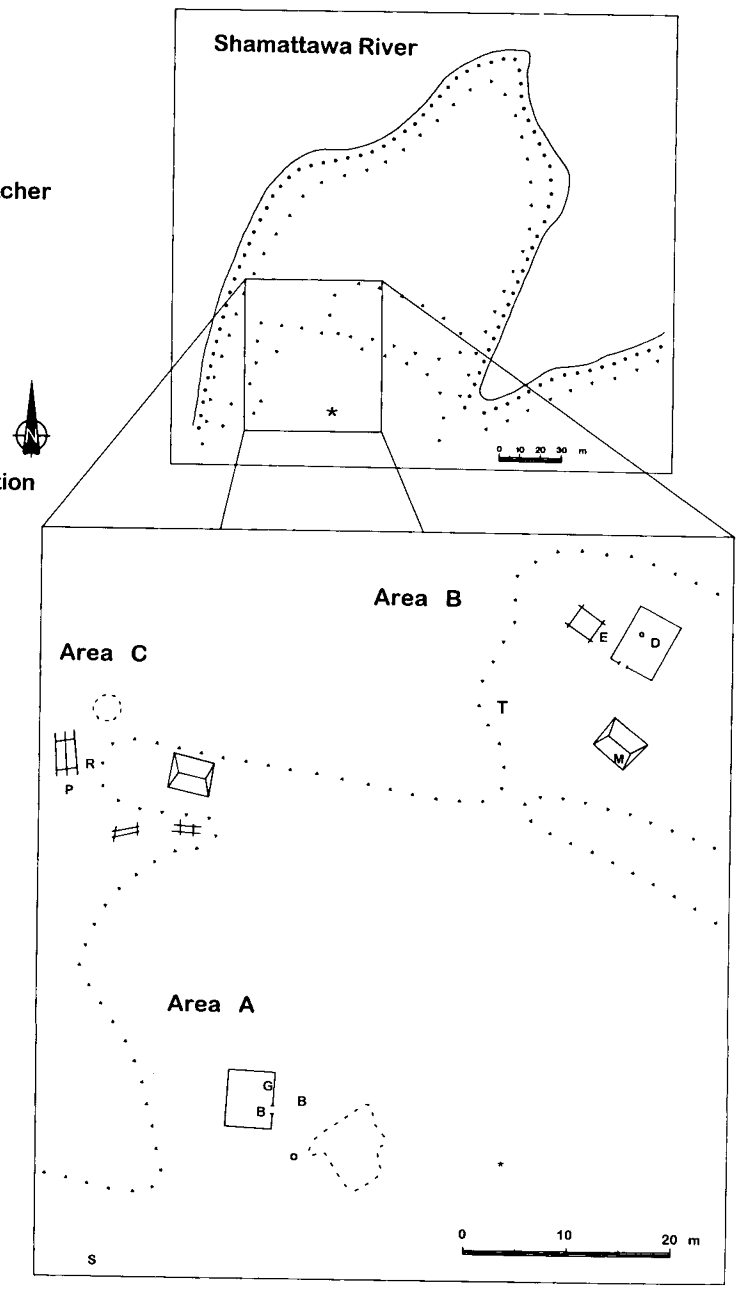
Figure 58. Cabin Island Site (GbIj-3).

Plan of the Cabin Island Site as it appeared in July 1984.

Cabin Island Site Gblj-3

Key

- Log Cabin
- Tent Frame
- Storage Rack
- Smoking Rack
- Moose/ Caribou Skin Stretcher
- B Beaver Skin Stretcher
- O Otter Skin Stretcher
- M Muskrat Skin Stretcher
- E Beamer
- P Paddle
- S Snowshoe Frame
- T Toboggan
- R Roasting Pan
- G Gear Mechanism
- D Oil Drum
- Faunal Remain Concentration
- ° ° ° Shrub Line
- ▴▴▴ Spruce Forest Line
- * Site Datum



includes cabin furniture, concentrations of faunal material, skin stretchers, clothing, utensils, tools, miscellaneous camp supplies, and snowshoe and toboggan remains. A garbage dump was also noted in the southern portion of the island, but time did not allow for an investigation of that area of the site.

Time spent at the site was largely given to recording the structures' salient characteristics and to recording data for the purpose of developing a planimetric site map. The following discussion presents characteristics of the structures within each of the site's three main areas.

Log Cabins

The site has two log cabins both of which are located in clearings opened by the removal of trees: the trees were felled for construction materials and firewood. The cabin located in the southern portion of the site belongs to the Wabino family and it represents the only structure in Area A. The cabin is rectangular in shape with the length roughly aligned in a north-south direction. Windows are located in all four sides of the cabin and the doorway is located in the east facing wall. The walls of the cabin are built of horizontally placed logs joined using the saddle-notched method of construction. The bark on the exterior walls remains intact, but the bark on the interior walls has been removed. With the exception of the area in front of the doorway, earth and moss have been built up against the bottom two or three logs around the cabin's exterior.

In the interior, the cabin has a dirt floor covered with spruce boughs. Since the spruce needles have fallen off, the floor cover is a matrix of bare branches. The roof is peaked and supported by three log rafters running the length of the structure. From the top of the east and west walls - centrally located - a beam runs across the width of the structure. The beam is supported in the middle by a post extending from the beam's underside to the floor. Each rafter is given support by wooden extensions from the central beam. The roof is constructed of unsplit, closely placed logs that angle up from the east and west walls to the central rafter. Similar to the cabin walls, the bark on the roof logs was removed in the interior, but left intact on the exterior. Clear plastic lies over the exterior surface of the roof logs and the plastic in turn is covered with a layer of moss. Table 36 details the cabin's dimensions.

On the floor, situated slightly off centre, is a log frame filled with moss which was used as a base for a drum

Table 36. Area A Log Cabin: Dimensions.

Element	Dimension cm
Exterior West Wall Length	577
Exterior South Wall Width	460
Exterior South Wall Central Height	199
Exterior East Wall Height	175
Interior Length	549
Interior Width	426
Interior Height to Bottom of Central Rafter	220
Door Width	61

stove. The stove, however, is missing. A hole to accept the stove pipe is located in the roof east of the central rafter. The cabin furniture includes a table frame, crib, bed, wall shelf, possible gun rack, and four free standing vertical logs that serve as chairs. All but the latter are attached to the cabin walls. In addition to the interior furnishings, the following items were also located in the cabin: clothing, magazine pages, food boxes, fire wood, a number of 6 volt batteries, an otter skin stretcher, and some feathers and bone.

Fifty-three metres to the northeast of the Wabino cabin is the cabin of the Metatawabin family. This northernmost cabin, plus a tent frame, represent the structures in Area B of the site. The cabin is rectangular in shape and the length is roughly aligned in a northeast-southwest direction. The north wall is the only wall without a window and the door is located in the south facing wall. The overall structure of the cabin is similar to that of the Area A cabin although it differs in three elements: the roof extends 190 cm out from the south facing wall providing shelter over the door, the roof supports are limited to the east and west walls and the central roof rafter, and the floor consists of wood planking laid across the width of the cabin. Table 37 details the cabin's dimensions.

Slightly off centre to the south of the central support post a drum stove rests upon two split logs. The remaining cabin furniture includes a large and small bed, small stool, and four wall shelves. The following items were also located in the cabin: metal pot full of water, metal bowl, metal cup hanging on a wall nail, metal cup on the floor, rubber gloves, key-hole saw, leg hold trap, food boxes and bags, magazines, five plastic motor oil containers, plastic bracelet, firewood, and two wood fire pointers.

Table 37. Area B Log Cabin: Dimensions.

Element	Dimension cm
Exterior West Wall Length	594
Exterior South Wall Width	446
Exterior South Wall Central Height	198
Exterior East Wall Height	156
Interior Length	562
Interior Width	410
Interior Height to Bottom of Central Rafter	204
Door Width	76

Tent Frames

Two tent frames are located on the site with one situated in Area B and the other in Area C. The lengths of both frames are roughly oriented in easterly-westerly directions. The frames are peaked structures comprised of vertical and horizontal poles fitted together and anchored to log foundations. The foundation of the Area B frame is two logs high on all four sides. The Area C foundation, on the other hand, is one log high. The structure of the Area B frame appears to be in excellent condition, whereas the

Area C frame is only partially standing with none of its roof elements in place. Judging by the plastic remnants located around the log foundations the frames were covered with plastic sheeting. Table 38 details the dimensions of each frame.

Table 38. Tent Frames: Dimensions.

Element		Dimension cm
Area B Tent Frame:	Interior Length	376
	Interior Width	315
	Interior Height	248
Area C Tent Frame:	Interior Length	390
	Interior Width	342
	Interior Height	Indeterminate

The tents were used as temporary shelters during the initial period of each annual occupation. The log cabins were repaired during this period after which the tents were abandoned in preference for the greater protection of the cabins.

Storage Racks

In Area C the remains of two storage racks are located a few metres to the south of the Area C tent frame. Storage racks are platforms raised off the ground and used for storing household goods and equipment. Both racks display the same type of construction: horizontally placed platform poles extend across two opposing cross-beams that are secured to vertical uprights. Tree trunks serve as uprights and the cross-beams are either nailed directly to the tree trunks or they are supported by braces placed below. Both platforms have fallen due to the stress caused by the swaying of trees on the cross beams and upright joints. The platform for the western storage rack had a length of 280 cm. It consisted of 15 poles and rested approximately 200 cm above the ground. The platform of the eastern storage rack had a length of 291 cm. It consisted of 12 poles and rested approximately 170 cm above the ground.

Smoking Rack

In addition to the tent frame and two storage racks, Area C also has an intact meat smoking rack that is located near the limit of the spruce forest. The smoking rack is constructed in the same manner as the storage racks although the platform of nine horizontal poles rests on cross-beams that are approximately one metre above the ground. The platform poles are generally 440 cm in length and 6 cm in diameter. The uprights are tree trunks; however, the trees comprising the eastern uprights have been cut off around the 142 cm level to allow clear access to the rack. The platform poles are smoke-blackened and the northeastern upright has been heavily burnt. A fire pit underneath the platform has been dug to a depth of 20 cm below the ground level.

Ground Scatter

Around the structures in all three areas scatters of artifacts and faunal material were recorded. In Area A artifacts include a beaver skin stretcher, otter skin stretcher, and a portion of a snowshoe frame. In addition to the material on the ground, a beaver skin stretcher and a gear mechanism from an unknown piece of machinery are located on the eastern side of the cabin roof. Area B artifacts include a moose skin stretcher, beamer, muskrat skin stretcher, and a toboggan. Additionally, an otter skin stretcher rests against an oil drum on the western side of the cabin roof. Artifacts in Area C include clothing that fell with the storage rack platforms, a paddle, and a metal roasting pan. Two concentrations of faunal material were also noted. One concentration is located east of the smoking rack in Area C and the other is located east of the cabin in Area A. Small samples from both faunal concentrations were collected and identified by Patricia Austen (1984). The faunal identifications are presented in Table 39.

Table 39. Cabin Island Site: Faunal Collection.

Common Name	Element	Side	Age	n
<u>Area A</u>				
Caribou	Skull		Adult	1
	Skull			1
Moose	Humerus	Left	Imm.	1
	Cervical vertebra		19 mos.	1
	Mandible	Right	Imm.+	1
Red Fox	Skull			1
Beaver	Skull		Imm.+	1
River Otter	Innominate	Right	Imm.+	1
	Innominate	Left	Imm.+	1
	Skull/Mandible			2

Table 39. Continued.

Common Name	Element	Side	Age	n
Northern Pike	Dentary	Right		1
	Dentary	Left		1
	Angular	Right		1
	Angular	Left		1
	Parsphenoid			1
	Frontal	Right		1
	Frontal	Left		1
	Hyomandibular	Right		1
	Preoperculum			1
	Vomer			1
	Prootic			1
	Quadrate	Right		1
	Metapterygoid	Right		1
	Postclethrum	Right		1
Area A Total				25
<u>Area C</u>				
Moose	Rib	Right		1
	Scapula	Right		1
Area C Total				2

Moose, caribou, red fox, beaver, river otter, and northern pike are represented in the faunal samples and the presence of these species compares favourably with John Wabino's list of species harvested while occupying the island. Information provided by Wabino indicates that the Shamattawa Lake area is favourable moose country and that Shamattawa Lake is productive for net fishing. Caribou frequent the region between early December and March and it is a good area for trapping otter, beaver, mink, and marten.

Appendix B

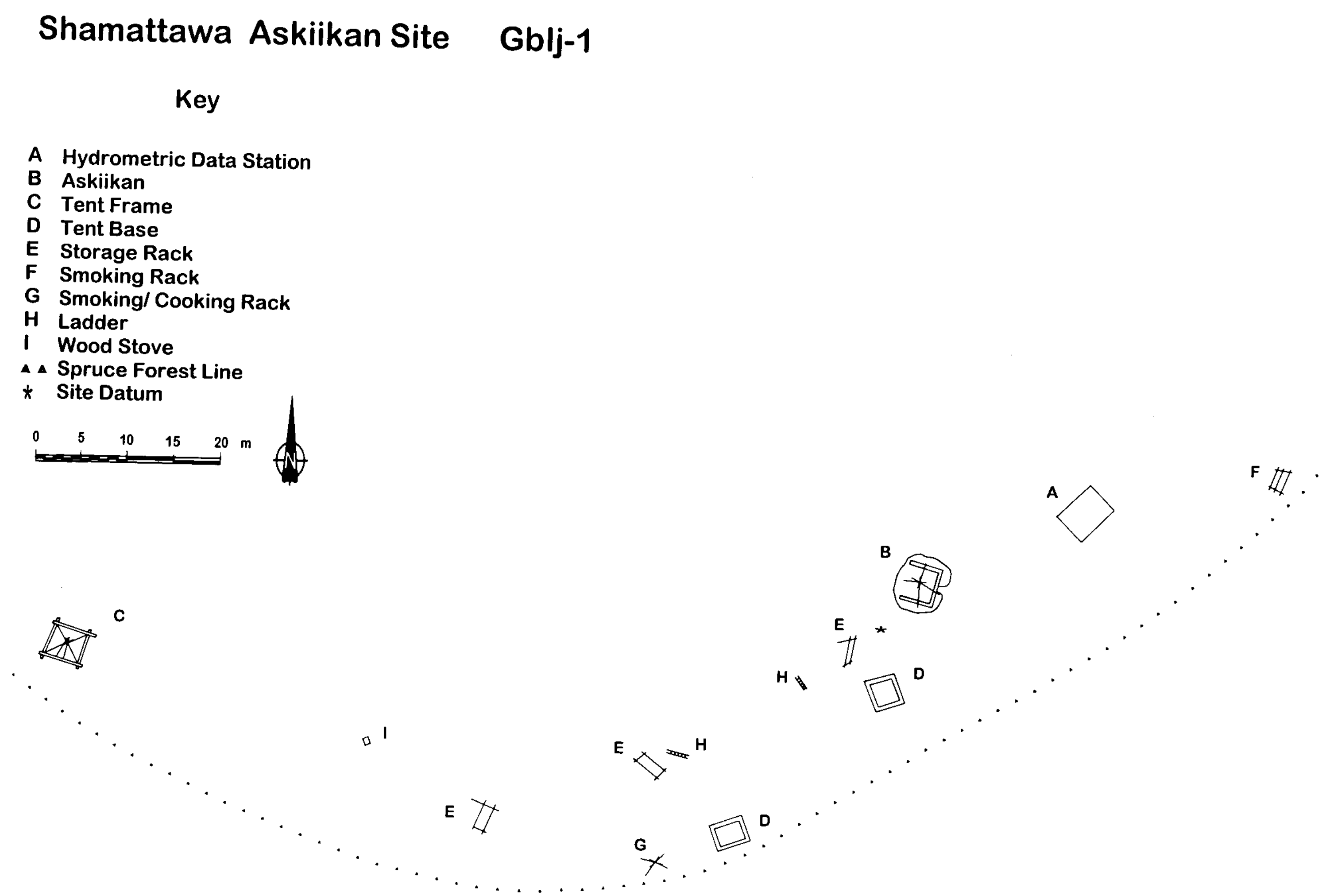
Shamattawa Askiikan Site (GbIj-1)

The Shamattawa Askiikan site is situated within the spruce forest on the northwest side of the Shamattawa River. The site covers a linear distance of 134 metres (Figure 59) and represents the remains of a camp occupied through the fall, winter, and spring periods. From information provided by John Wabino (Janice Graham personal communication 1985) the site was occupied around 1950 by a number of families. John Wabino also remembers living with his father, Xavier Wabino, in an askiikan at the site around 1967 while his sisters - who were attending school - and mother remained in Winisk.

At this location of the river, Environment Canada has established a Hydrometric Data Station to monitor the river's water conditions. The metal building which houses the hydrometric equipment is situated within the area of the site 36 metres inland from the river bank. While following an established path leading to the station an askiikan was the first of the site's structures found. The askiikan

Figure 59. Shamattawa Askiikan Site (GbIj-1).

Plan of the Shamattawa Askiikan Site as it appeared in July 1984.


Shamattawa Askiikan Site Gblj-1
Key
A Hydrometric Data Station
B Askiikan
C Tent Frame
D Tent Base
E Storage Rack
F Smoking Rack
G Smoking/ Cooking Rack
H Ladder
I Wood Stove
▲▲ Spruce Forest Line
* Site Datum
0 5 10 15 20 m
N
A
B
C
D
D
E
E
E
F
G
H
H
I

dominates the site and this characteristic is reflected in the site's name. Time spent at the site was devoted to recording the physical characteristics of the extant structures, as well as recording the configuration of the structures within the site for mapping purposes.

Askiikan

The term askiikan is a Swampy Cree word that refers to a conical structure with a moss or earth exterior covering. The moss or earth covering gives the structure its name: askiikan roughly translates as "earth lodge" (Honigmann 1956:42). The askiikan at this site is in a poor state of repair with much of its framework missing. Decaying elements of the frame were not apparent in the vicinity of the askiikan and the extant frame is relatively robust; therefore, it appears that the missing members were intentionally removed from the frame rather than having succumbed to the decaying process.

For measuring purposes, an eight metre square was strung around the askiikan and at the four metre mark along the north-south axis an east-to-west string was placed through the lodge. Exterior and interior ground measurements were taken off the sides of the grid using a coordinate measurement technique (see Joukowsky 1980:222-223). Height measurements were made possible by the use of a ladder constructed from local materials. Table 40 details the askiikan's dimensions.

The askiikan is semi-subterranean in that the moss ground cover was removed from the floor area leaving a dirt surface. The floor is currently covered with grass and weeds through which a central hearth pit is only slightly discernible. The excavated floor was entirely framed with single logs giving the floor a rectangular configuration. The west floor log, however, has since been removed. Four large vertical support posts are embedded in the ground on the outside of each floor log. The posts angle inward and meet to form the apex of the conical frame. At the top, the southern support post is forked to accept the thinned end of the northern support post in an interlocking fashion. The east and west support posts rest against the north and south interlocking posts completing the frame's major support structure.

Slightly below the apex of the frame, horizontal crossbars which help to maintain the posts' conical formation are secured to each support post. The interior walls of the structure are comprised of straight vertically aligned poles that reach from behind the floor logs to rest against the crossbars just below the structure's apex. In

Table 40. Askiikan: Dimensions.

Element		Dimension cm
North Floor Log	Length	375
	Diameter	9
	Log Top to Floor Level	26
East Floor Log	Length	425
	Diameter	13
	Log Top to Floor Level	13
South Floor Log	Length	335
	Diameter	11
	Log Top to Floor Level	25
North Support Post	Length	454
	Diameter	15
East Support Post	Length	501
	Diameter	15
South Support Post	Length	419
South Support Post	Diameter	16
East Support Post	Length	428
	Diameter	11
Notch in South Support Post	Length	25
	Width	8
Planed End on North Support Post	Length	41
	Depth	14
	Width	6

Table 40. Continued.

Element	Dimension cm
Top of North Support Post to the North - East Crossbar	130
Top of East Support Post to the North - East Crossbar	168
Top of East Support Post to the East - South Crossbar	145
Top of South Support Post to the East - South Crossbar	138
Top of South Support Post to the South - West Crossbar	112
Top of West Support Post to the South - West Crossbar	120
Top of West Support Post to the West - North Crossbar	110
Top of North Support Post to the West - North Crossbar	117
Height of Interior from Apex to Floor	333
Vertical Height of Doorway	154
Width of Doorway at Base	58
Width of Doorway at Top	45
Maximum Exterior Length	600
Maximum Exterior Width	550

total, 27 wall poles - restricted to the <u>askiikan's</u> northern end - remain intact.

The door of the <u>askiikan</u> is oriented to the southeast. The door-frame is comprised of a wall pole on the north side and the east support post on the south side. From the ground a distance of 164 cm along the door wall posts a horizontal crossbar completes the door's frame. A door covering is not present and evidence of a vestibule extending out from the doorway as reported on some askiikans (Honigmann 1956:42-43; Julig 1982: photograph on p. 179; Rogers 1963:223) is also not apparent. Five vertical wall poles span the distance between the crossbars below the apex and the top of the door-frame.

Many of the wall poles, including those above the door, are split with the split side facing into the interior of the lodge. The bark on the interior faces of unsplit poles has been removed. John Michael Hunter (personal communication 1985) explains that walls devoid of bark and with split faces increase the interior light levels by providing the fire with a reflective surface. The exterior surface of the lodge walls and frame are left with the bark intact: the bark provides a rough surface into which the moss cover anchors. The extant moss covering is restricted to the northern side of the lodge where the wall poles are intact; however, layers of moss would have formerly covered the entire surface of the lodge's walls with the exception of a small opening at the apex. The apex opening allowed smoke to escape and light to penetrate. Smoke draft and protection from the weather would have been controlled by canvas or hide coverings over the apex opening.

Rogers (1963:223) has delineated the eastern

Subarctic distribution of earth-covered lodges to include northwestern Quebec, northern Ontario, and northeastern Manitoba. In the Hudson Bay Lowlands, askiikans have been located on the Albany River (Dean 1957:60; Julig 1982:150), in the Attawapiskat area (Honigmann 1956:42; 1961:52), and near the mouth of the Winisk River (McInnes 1912:134). Among the Winisk Cree, askiikans are built at the locations of winter base camps. They are constructed, however, in the fall so that the floors can be excavated prior to the freezing of the ground. Occupied throughout the winter months, askiikans became beneficial for the more sedentary settlement pattern promoted by the fur trade (Rogers 1963:226-227). In the latter years of this century, however, the use of the askiikan has decreased in favour of the European-style log cabin.

Tent Frame

A conical tent frame with a log wall foundation is located at the extreme western end of the site. The wall foundation is roughly square in configuration and built to a height of three logs horizontally placed and joined at the corners using the saddle-notched method of construction. From each corner, secured with nails to the top logs, vertical support posts angle inward and meet to form the apex of the conical frame. The southwest support beam has broken leaving the bottom section of the post on the ground and the top section hanging from the structure's apex. The support posts at the apex of the frame are secured together with wire. Two poles, secured with nails to the top of the south foundation wall, extend to the apex of the structure where they are fastened to the main support posts with wire. It is thought that these two poles served the function of a door-frame. The tent frame was likely canvas-covered and logs situated on the outside of the foundation walls may have served to hold the canvas cover snug against the foundation top. The remains of a hearth are centrally located on the structure's floor. The structure's dimensions are detailed in Table 41.

Table 41. Tent Frame: Dimensions.

Element		Dimension cm
Interior Length of North Wall		375
Interior Length of East Wall		311
Interior Length of South Wall		388
Interior Length of West Wall		333
Diameter of Foundation Wall Logs		11-15
Height of Log Wall Foundation	Northeast Corner	37

Table 41. Continued.

Element			Dimension cm
		Northwest Corner	35
		Southwest Corner	34
		Southeast Corner	34
Northeast Support Post	Length		429
	Diameter		8
Northwest Support Post	Length		456
	Diameter		8
Southwest Support Post	Length		427
	Diameter		10
Southeast Support Post	Length		420
	Diameter		8
West Wall Post on South Side	Length		332
	Diameter		7
East Wall Post on South Side	Length		380
	Diameter		8
Width Between Wall Posts on South Side		Base	71
		Top	30
Distance Between Southeast Corner and East Wall Post			167
Distance Between Southwest Corner and West Wall Post			133
Height of Interior from Apex to Floor			279
Height of Hearth Mound			13

Tent Bases

The log bases for two tents are located in the eastern half of the site. Both bases are comprised of four logs set on the ground forming rectangular configurations. It is thought that the bottom edges of canvas tents were secured to the log bases. The eastern tent base has a length of 350 cm and a width of 320 cm. The western tent base is 340 cm in length and 300 cm in width.

Storage Racks

The remains of three storage racks used for the purpose of storing equipment and household goods above ground level are located in the central area of the site. Similar to the storage racks recorded at the Cabin Island site, these storage racks were comprised of horizontally placed platform poles extended across two opposing cross-beams that were secured to vertical uprights. Tree trunks served as uprights and the cross-beams were secured directly with nails or with rope lashings. Alternatively, the cross-beams were supported within natural and carved angles, or by braces placed below. The platforms of all three storage racks have now fallen. The eastern storage rack has four extant platform poles with general lengths of 372 cm. The platform rested a maximum 138 cm above the ground. The platform of the central storage rack consisted of an undetermined number of poles and rested 143 cm above the ground. The platform of the western storage rack also had an undetermined number of poles and it rested a maximum 188 cm above the ground.

In association with the eastern and central storage racks are the remains of two ladders which would have provided access to the storage platforms. Both ladders are constructed of poles and each ladder has five rungs nailed to two uprights. The eastern ladder is 182 cm in maximum length with rungs that range between 51 cm and 60 cm in length. The western ladder has a maximum length of 232 cm with rungs that range between 55 cm and 69 cm in length.

Smoking and Smoking/Cooking Racks

The remains of a smoking rack and a smoking/cooking rack - both with quantities of burned wood below - are located in the far eastern and central portions of the site respectively. The smoking rack consisted of horizontal poles placed over cross-beams that were secured to vertical uprights. The platform is no longer in place and five poles with lengths around 240 cm are either lying on the ground or resting against one of the cross-beams. The platform rested a maximum 101 cm above the ground.

The smoking/cooking rack is comprised of four vertically placed poles that angle inward meeting to form the apex of a conical frame. The vertical posts are approximately 8 cm in diameter and the distance between the apex and the ground measures 333 cm. The frame provided a structure from which meat and/or hides could have been hung for cooking or smoking purposes.

Faunal Remains

Four bone specimens representing caribou and moose were collected from the surface of the site. The one caribou specimen was recovered from the surface of the *askiikan* floor. The faunal identifications were performed by Patricia Austen (1984) and the results of the analysis are presented in Table 42. In addition, a beaver skull - which was not collected - rested upon the platform poles of the eastern storage rack. The faunal remains collected from the surface of the Shamattawa Askiikan site indicate that hunting and trapping activities were part of the site's economic structure. The *askiikan*, tent frame, storage racks, smoking

Table 42. Shamattawa Askiikan Site: Faunal Collection.

Common Name	Element	Side	Age	n
Caribou	Tibia	Right	Adult	1
Moose	Nasal, Orbit, Maxilla	Right	18-21 mos.	1
	Tibia/Fibula	Right	Imm.+	1
	Tibia	Right	Imm.+	1
Total				4

rack, and smoking/cooking rack suggest that the area was occupied on a long-term basis. As well, the site's structures along with the site's protected location are appropriate for a winter base camp from which the inhabitants dispersed to hunt, trap, and fish. As excellent hunting, trapping, and fishing are cited as reasons for the establishment of John Wabino's and Alfred Metatawabin's recent winter camp on the island one kilometre south, the Shamattawa Askiikan site shows that the region had similar significance for earlier generations.

APPENDIX C

LITHIC ATTRIBUTES

The lithic collections from the Shamattawa Rapids and Washagami Point sites are divided into core, flake, biface, and debris classes. Where appropriate the classes are further subdivided into subclasses. For cataloguing and analysis purposes, qualitative and quantitative attributes for each class and/or subclass are entered into the Ashton-Tate dBASE III PLUS database management program. Hand lenses with 5X, 10X, and 20X magnifications and a Wild Leitz M3C incident light microscope with a five-step magnification changer to 80X magnification are employed where necessary for attribute recognition and measurement. All dimensional measurements are measured with calipers to the nearest tenth of a millimetre. Angle measurements are measured with a gonometer to the nearest degree. Weight is measured with a Ohaus Triple Beam Balance to the nearest tenth of a gram. Specimens weighing less than .05 grams are recorded as 0.00 grams.

Statistics

Qualitative attributes refer to specific characteristics pertaining to individual classes and subclasses. The statistical data recorded for these attributes include number (n) and frequency (%). Quantitative attributes refer to measurements, such as length, width, thickness, weight, and angle. The statistical data recorded for these attributes pertain to frequency and distribution tendencies and include number (n), mean (x), median (med), range (r), standard deviation (s), coefficient of variation (v), and skewness (sk).

a. Number (n): This statistic refers to the total number of specimens.

b. Mean ($\bar{x}$): The mean is a measure of central tendency found by dividing the total value by the number of values (Hammond and McCullagh 1974:7; Howell 1985:38; King 1969:24).

c. Median (med): The median is a measure of central tendency which equals the middle value in the complete ranked distribution of the values. The median is found by adding 1 to the total number of values and dividing the total by 2 (Doran and Hodson 1975:39; King 1969:22-24).

d. Range (r): For this analysis, range does not refer to the difference between the minimum and maximum values (Doran and Hodson 1975:39); it simply refers to the minimum and maximum spread of the values observed.

e. Standard Deviation (s): This statistic is a measure of dispersion that equals the average of the deviations of each value from the mean. The standard deviation equals the square root of the [(sum of each squared value which is then divided by the number of values) minus the squared mean] (Hammond and McCullagh 1974:10-11; Howell 1985:52; King 1969:27).

f. Coefficient of Variation (v): This statistic is a measure of dispersion where the standard deviation is expressed as a percentage of the mean. The coefficient of variation equals the [(standard deviation divided by the mean) times 100] (Hammond and McCullagh 1974:15).

g. Skewness (sk): This statistic is a measure indicating the degree to which a distribution deviates from symmetry. The significant characteristic for this analysis is the recognition of positive and negative skewness. A positively skewed distribution indicates an asymmetrical distribution skewed toward the higher values. A negatively skewed distribution, on the other hand, indicates an asymmetrical distribution skewed toward the lower values. The measure of skewness equals the [(mean minus the median times 3) divided by the standard deviation] (Arkin and Colton 1958:40; Croxton 1953:93-94; Howell 1985:30-31).

Raw Material

All lithic specimens are analysed for the type of raw material utilized. For both sites the raw material is represented by chert. The chert displays various colours and colour combinations which are recorded according to the colour classification system in the Munsell Soil Color Charts (Munsell Colour 1975).

Thermal Alteration

All specimens are analysed for evidence of heat exposure. The attributes recorded include heat fracture, crazing, and lustre (Collins and Fenwick 1974; Mandeville 1973; Purdy 1974, 1975; Rick 1978).

a. Heat Fracture: refers to conchoidal shaped scars left by the explosive removal of "potlid" spalls. As well, heat fracture results in irregular surfaces as a result of specimen fracture.

b. Crazing: refers to shrinkage cracks caused by exposure to direct heat.

c. Lustre: surfaces that are flaked following heat exposure tend to display a greater degree of lustre in comparison to unflaked surfaces. These vitreous surfaces will often have a "waxy" feel and appearance.

Core Class

The term core refers to chert specimens that exhibit negative flake scars produced from previous flake removals (McMillan 1977:162). The nucleus of cores consists of chert nodules (White 1963:6) or thick flakes (Le Blanc 1984:62).

1. <u>Subclass</u>: The core class is divided into eight subclasses based upon core nucleus type and modification.

a. & e. Nodule and Flake Cores - Unmodified: refer to nodule and flake cores that bear no evidence of having been utilized as tools.

b. & f. Nodule and Flake Cores - Utilized: refer to nodule and flake cores that have edges exhibiting microscars thought to have been produced through utilization. For attributes pertaining to utilization wear refer to utilized flakes.

c. & g. Nodule and Flake Cores - Retouched: refer to nodule and flake cores with intentionally modified edges. For attributes pertaining to retouch modification refer to retouched flakes.

d. & h. Nodule and Flake Cores - Pièces Esquillées: refer to nodule and flake cores possessing opposed margin crushing. This type of damage is interpreted as having been produced through utilization rather than through the bipolar technique of core reduction. For attributes pertaining to pièces esquillées refer to flake class pièces esquillées.

2. Category: Cores are divided into single platform and multi-platform categories based upon the number of remaining platforms.

a. Single Platform Cores: one platform area remains (Le Blanc 1984:62). This category incorporates White's (1963:6) "single-ended" core.

b. Multi-platform Cores: more than one platform area remains (Le Blanc 1984:62). White's (1963:6-7) "double-ended" and "polymorphic" cores are incorporated into this category.

3. <u>Platform Variety</u>: Reference is made to two platform varieties: cortex and secondary.

a. Cortex: platforms are characterized by cortical surfaces (Le Blanc 1984:60-61).

b. Secondary: platforms are characterized by secondary fractures, such as previous flake scars or specimen fracture (see Le Blanc 1984:60-61).

4. <u>Crushed Margins</u>: refers to opposed crushed margins, or areas, that may have been crushed due to bipolar force or due to use as a pièce esquillée. Crushed margins are recorded as present or absent.

5. <u>Flake Scar Number</u>: The number of flake scars exhibited on cores are counted. Due to the difficulty in identifying distinct flake scars when scar overlap occurs, scars are recorded as 1, 2, 3, or 3+ (greater than 3).

6. <u>Flake Scar Termination</u>: As far as is possible, the type of flake scar termination exhibited on cores are identified. These include feather, hinge, and step termination types. Identifying characteristics for

each type are discussed in the section pertaining to flake class scar terminations.

7. <u>Cortex</u>: The amount of cortex remaining on core surfaces is recorded in percentage increments: 0%, 1-24%, 25-49%, 50-74%, and 75-99%.

8. <u>Thermal Alteration</u>: Evidence of heat exposure is recorded as present or absent. On specimens where characteristics of heat exposure are present, the thermal types of modification (see Thermal Alteration section above) are recorded. The degree to which specimens are affected is noted in percentage increments.

a. Alteration: present, absent.

b. Thermal Type: potlid fracture, explosion fracture, crazing, lustre.

c. Coverage: 1-24%, 25-49%, 50-74%, 75-99%, 100%.

9. <u>Measurements</u>: Measurements include length, width, thickness and weight.

a. Length: the specimen's maximum dimension.

b. Width: the maximum dimension perpendicular to the length.

c. Thickness: the maximum dimension perpendicular to the length and rotated 90 degrees on the length axis.

d. Weight: the maximum weight.

Flake Class

The flake class includes those specimens that are considered to be by-products of core reduction, or tool production. Following the work of Bonnichsen (1977:213) and Sullivan and Rozen (1985:758) flakes display single interior surfaces and exhibit striking platforms, lips, bulbs of force, eraillure flakes, and/or ribs. The classification system pertaining to the flake class includes the following categories: raw material, flake orientation, thermal alteration, flake morphology, and subclass attributes.

1. <u>Raw Material</u>: see above discussion.

2. <u>Flake Orientation</u>: All flakes are viewed in a similar orientation (Le Blanc 1984:86). The flake's interior surface (ventral face) is faced down and the proximal end is positioned closest to the analyst. The flake's left and right margins relate to the observer's left and right sides respectively.

3. <u>Thermal Alteration</u>: Evidence of heat exposure is recorded as present or absent. On specimens where characteristics of heat exposure are present, the thermal types of modification (see Thermal Alteration section above) are recorded. The faces of modification affected by each thermal type are noted and positions are recorded. The degree to which each face is affected by each thermal type is recorded in percentage increments.

a. Alteration: present, absent.

b. Face of Modification: dorsal, ventral

c. Thermal Type: potlid fracture, explosion fracture, crazing, lustre.

d. Positions: proximal, medial, distal, proximal and medial, medial and distal, whole.

e. Coverage: 1-24%, 25-49%, 50-74%, 75-99%, 100%.

Flake Morphology

Attributes recorded with respect to flake morphology pertain to category, striking platform, dorsal face, ventral face, distal termination, lateral edge condition, flake shape, and measurements.

4. <u>Category</u>: refers to flake condition.

a. Complete Flake: a flake is considered complete when its striking platform remnant, distal termination, and lateral edges are intact.

b. Distal Flake Fragment: the flake's distal end is present in whole, or in part, but the proximal end with the striking platform is absent.

c. Proximal Flake Fragment: the striking platform is present in whole, or in part, but the distal end is missing.

d. Lateral Flake Fragment: the proximal and distal sections of the flake are present, but due to lateral edge fracture one side of the flake is missing. The loss of the lateral edge prevents a reliable width measurement of the original flake.

e. Medial-horizontal Flake Fragment: both the distal and proximal ends are missing so that the remaining fragment consists of the original flake's central section (horizontal axis). The lateral edges may or may not be intact.

f. Medial-vertical Flake Fragment: portions of the distal and proximal sections of the flake are present (vertical axis), but the lateral edges have been fractured or crushed.

5. Striking Platform: The striking platform is the

surface of the parent material that is struck to remove a flake. This area is often modified (Crabtree 1975:111) in order to prepare a suitable striking surface or angle. The platform refers to that portion of the striking area that was removed from the parent material with the flake (Geier 1973:8; Patterson 1983:302).

a. Condition: absent (crushed, fractured, retouched), present (unreduced, partially crushed, partially fractured, partially retouched).

1 Crushed: the platform is missing and the proximal end is characterized by compound, irregular flake scars.

2 Fractured: the platform, or proximal end, has been snapped off.

3 Retouched: intentional retouching of the platform area has removed the platform surface.

4 Unreduced: the platform area displays little or no crushing, fracture, or retouch.

5 Partially Crushed: a portion of the platform area is crushed while the remaining portion is intact.

6 Partially Fractured: a portion of the platform is fractured while the remaining portion is intact.

7 Partially Retouched: a portion of the platform is retouched while the remaining portion is intact.

b. Platform Surface: plain, faceted, cortical.

1 Plain: the platform surface exhibits no cortex or flake scars (see Ellis 1979:29; Geier 1973:13; Pilon 1980:51).

2 Faceted: the platform surface exhibits portions of flake scars, or facets (see Ellis 1979:27; Geier 1973:12; Pilon 1980:51).

3 Cortical: the platform surface is comprised of the cortex of the original raw material (see Ellis 1979:29; Geier 1973:13).

c. Dorsal Edge Characteristics: abraded, faceted, trimmed, unaltered.

1 Abraded: the dorsal edge of the platform displays evidence of having been battered (compound, irregular step scars with step terminations) or flaked (small, isolated flakes). This abrasion may have been intentional for the purpose of strengthening the edge in order to prevent edge collapse during flake removal (Crabtree 1966:14; Sheets 1973:217).

2 Faceted: scar ridges from previous core/preform flake removals intersect the edge of the platform surface and the dorsal face (Geier 1973:13).

3 Trimmed: ridges that originally intersected the edge of the platform surface and dorsal face have

been removed or trimmed (Geier 1973:13).

4 Unaltered: the platform dorsal edge displays none of the above characteristics.

d. Platform Shape: refers to the combined configurations of the platform's dorsal and ventral edges. No attempt is made to fit the combined configurations into standard geometric shapes; the dorsal shape is merely listed before the ventral shape. In instances where the dorsal and ventral edges have similar configurations the shape is simplified to a single term (e.g. biconvex, biconcave, bipeaked, irregular). Dorsal and ventral edge configurations include convex, concave, rectilinear, peaked, recurvate, and irregular.

e. Platform Contour: refers to the platform's horizontal configuration between its left and right margins. Contour configurations include flat, convex, concave, peaked, and irregular.

f. Platform Scar Count: refers to the number of flake scars that appear on the platform surface (Magne 1985:113-114). The number of scars is recorded as 1, 2, 3, or 3+ (greater than three).

g. Platform Angle: refers to the angle formed by the intersection of the platform surface and the dorsal face of the flake (Geier 1973:8; Patterson 1983:301).

h. Platform Length: the maximum distance between the platform's left and right margins.

i. Platform Width: the maximum distance between the platform's dorsal and ventral margins.

6. <u>Dorsal Face</u>: cortex, flake scar pattern, flake scar count.

a. Cortex: refers to the amount of cortex on the flake's dorsal face. Cortex coverage is recorded in percentage increments: 0%, 1-24%, 25-49%, 50-74%, 75-99%, 100%.

b. Flake Scar Pattern: longitudinal, marginal, complex, unfaceted.

1 Longitudinal: flake scars on the dorsal face run along the longitudinal axis of the flake (Geier 1973:13; Pilon 1980:53).

2 Marginal: flake scars on the dorsal face run perpendicular to the longitudinal axis of the flake (Geier 1973:13; Pilon 1980:53).

3 Complex: flake scars on the dorsal face run in divergent directions (Geier 1973:13; Pilon 1980:53).

4 Unfaceted: the dorsal face displays no flake scars.

c. Flake Scar Count: refers to the number of flake scars that appear on the dorsal face of the flake (Magne 1985:113). The count is recorded as 1, 2, 3, or 3+ (greater than 3).

7. <u>Ventral Face</u>: bulb of force, lip, eraillure flake, ribs.

a. Bulb of Force: refers to a protrusion, or bulb that is often displayed on a flake's ventral face adjacent to the striking platform. The degree of protrusion is measured in three increments: salient, diffuse, and undetectable.

1 Salient: the bulb of force projects prominently above the ventral face of the flake (Ellis 1979:32; Geier 1973:14; Pilon 1980:54).

2 Diffuse: the bulb of force displays a flatter much less conspicuous protrusion (Ellis 1979:32; Geier 1973:14; Pilon 1980:54).

3 Undetectable: the ventral face of the flake lacks a recognizable bulb of force (Ellis 1979:32; Geier 1973:14).

b. Lip: refers to an overhang of the platform edge over the ventral face of the flake (Ellis 1979:29; Pilon 1989:52). The lip may be prominent or poorly defined (Morlan 1973:13); however, only its presence or absence is noted.

c. Eraillure Flake: refers to a small flake scar exhibited on the bulb of force (Geier 1973:7; Patterson 1983:300; Oakley 1968:16). Its presence or absence is noted.

d. Ribs: refers to arcuate ridges that are formed concave to the point of impact and indicate the direction of fracture (Bonnichsen 1977:117; Geier 1973:7). The degree of protrusion is measured in three increments: prominent, moderately distinct, and indistinct.

1 Prominent: the ribs can be seen clearly with the unaided eye and the ridges protrude significantly.

2 Moderately Distinct: the ribs can be seen with the unaided eye, but the ridges protrude insignificantly.

3 Indistinct: the ribs are not apparent to the unaided eye.

8. <u>Distal Termination</u>: The attributes recorded with respect to distal termination pertain to condition and termination type.

a. Condition: absent, present.

1 Absent: crushed, fractured, retouched (for definitions see Platform Conditions).

2 Present: complete, partially crushed, partially

fractured, partially retouched (for definitions see Platform Conditions).

b. Termination Type: feather, hinge, step, block

1 Feather: a feather terminated flake has a distal end that is relatively thin and sharp. A feather terminated scar displays a distal end with a smooth transition to the rock surface (Bonnichsen 1977:132; Brink 1978:51).

2 Hinge: a hinge terminated flake, in cross section, has a convex shaped distal end. The hinge terminated scar displays a distal end with a concave terminus (Bonnichsen 1977:134; Brink 1978:52).

3 Step: a step terminated flake has a transversely broken distal end. The flake detached at a right angle to the direction of fracture and the flake scar displays a right angle terminus (Bonnichsen 1977:134; Brink 1978:51).

4 Block: a flake with a block termination retains a portion of the core base. This type of termination is likely caused by extreme force (Le Blanc 1984:98).

9. <u>Lateral Edge Condition</u>: refers to the completeness of the flake's lateral edges. Four conditions are

recorded: intact, fractured, crushed, retouched.

10. Flake Shape: face shape, face edge shape, longitudinal shape, marginal shape.

a. Face Shape: refers to the geometric shape of the flake's lateral edges (Geier 1973:14). The configurations include expanding, contracting, and parallel.

1 Expanding: the lateral edges expand from the proximal to distal ends.

2 Contracting: the lateral edges contract from the proximal to the distal ends.

3 Parallel: the lateral edges are parallel along the longitudinal axis of the flake.

b. Face Edge Shape: refers to the outline shape of each edge. Both edges with similar types of configurations are recorded as convex, concave, expanding-contracting (outward peaked), contracting-expanding (inward peaked), or rectilinear. Edges with diverse edge outlines are recorded as varied. With varied edge configurations each left and right edge shape is recorded as convex, concave, expanding-contracting, contracting-expanding, rectilinear, or recurvate.

c. Longitudinal Shape: refers to the longitudinal shape of the flake's ventral face: concave-distal, concave-proximal, concave-symmetrical, convex-distal, convex symmetrical, flat, irregular.

1 Concave-Distal: the flake exhibits a concave distal end.

2 Concave-Proximal: the flake exhibits a concave proximal end.

3 Concave-Symmetrical: the flake's longitudinal shape is symmetrically concave.

4 Convex-Distal: the flake exhibits a convex distal end.

5 Convex-Symmetrical: the flake's longitudinal shape is symmetrically convex.

6 Flat: the flake displays no significant curvature; therefore, its longitudinal shape is considered to be flat.

7 Irregular: the flake's longitudinal shape cannot easily be classified according to one of the above configurations.

d. Longitudinal Curve: refers to the degree of longitudinal curvature: substantial, minimal, not applicable.

1 Substantial: the curvature displayed is prominent.

2 Minimal: the curvature is noticeable; however,

its prominence is not well marked.

3 Not Applicable (N/A): refers to flakes with flat or irregular longitudinal shapes.

e. Marginal Shape: refers to the marginal shape of the flake's ventral face: convex, concave, flat, irregular.

f. Marginal Curve: refers to the degree of marginal curvature. Similar to the longitudinal curve, the degree of marginal curvature is recorded as substantial, minimal, or not applicable.

11. Measurements: measurements include length, width, thickness, and weight.

a. Length: the maximum distance between the proximal and distal ends.

b. Width: the maximum distance perpendicular to the longitudinal axis.

c. Thickness: the point of maximum thickness between the ventral and dorsal faces.

d. Weight: the maximum weight.

Subclass

The flake class is divided into five subclasses based upon the presence or absence of modification and modification type: unmodified flakes, utilized flakes, unifacially retouched flake tools, bifacially retouched flake tools, and pièces esquillées. The five subclasses are not mutually exclusive in that any one flake may exhibit more than one type of modification; therefore, one flake may belong to more than one subclass.

Unmodified Flakes

Unmodified flakes are defined as flakes that exhibit neither unintentional utilization wear nor intentional retouch scars.

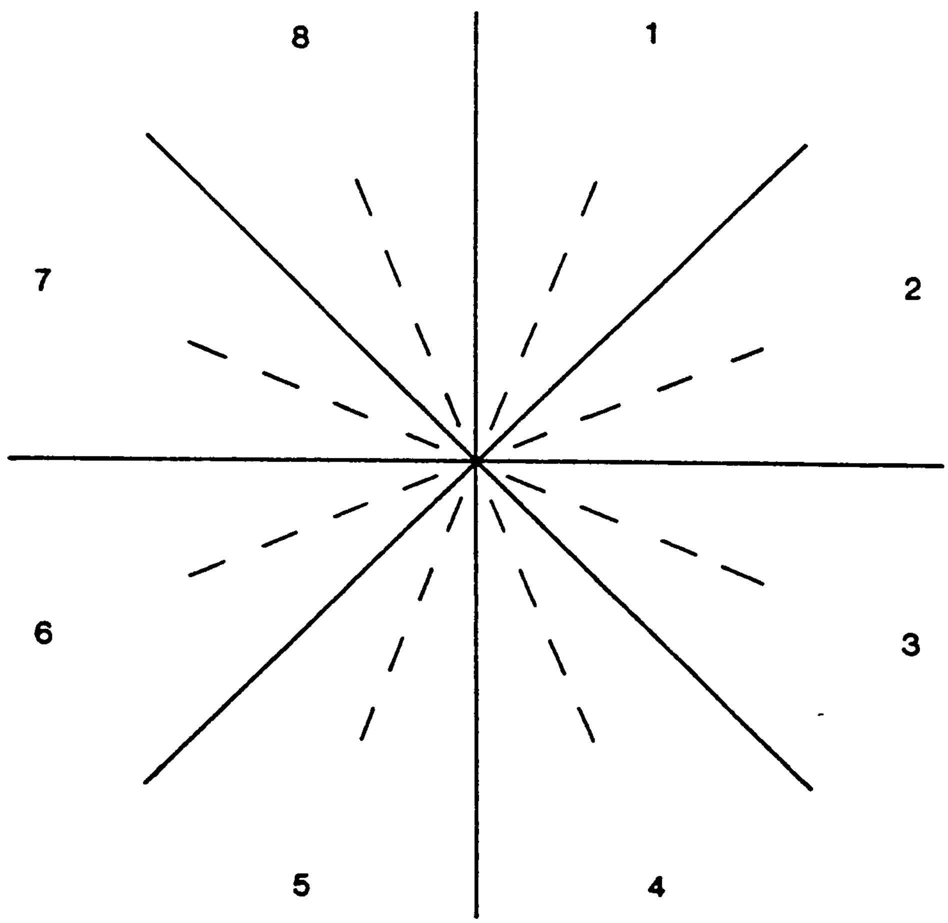
Utilized Flakes

The term utilized flakes refers to those flakes that exhibit unintentional utilization wear along one or more edges. This analysis of utilization wear concentrates upon tool edge damage characterized by microflake scars. This type of scar is produced through the removal of small flakes (microflakes) from edges used for raw material manipulation (Brink 1978:46; Odell 1981; Odell and Odell-Vereecken 1980; Tringham et al. 1974). The attributes recorded with respect to utilization wear include the following: number of locations, location, position, intensity, modified edge type, face of modification, bifacial scar pattern, scar spacing, scar termination, edge configuration, rounding, and measurements.

1. <u>Number of Locations</u>: refers to the number of discrete areas on one flake exhibiting microflake scars that are considered to be the result of utilization.

2. <u>Location</u>: each area of microflaking is located with reference to consistent orientation on a polar co-ordinate grid (Figure 60). The grid consists of eight loci radiating out from a medial point. Each locus is divided in half so that in total there are sixteen sections to the grid. Solid lines demarcate each numerically labelled locus and each locus division is marked by a slashed line. Loci 1,8,4, and 5 are divided into right and left sections while loci 2,3,6, and 7 are divided into proximal and distal sections. The flake is aligned over the medial point according to normal flake orientation (see Flake Orientation above). With the flake in proper orientation, the location of each microflaked area is recorded with reference to its position on the grid. This system is particularly useful for

Figure 60. Polar Co-ordinate Grid.



relocating previously identified microflaked areas (for a similar approach see Tringham 1974:186).

3. <u>Position</u>: refers to the position of each microflaked area according to the four edges of a flake: proximal edge, distal edge, right lateral edge, and left lateral edge. Each edge is divided into three sections.

a. Proximal Edge: left, medial, right

b. Distal Edge: left, medial, right

c. Right Lateral Edge: proximal, medial, distal

d. Left Lateral Edge: proximal, medial, distal

4. <u>Intensity</u>: refers to the degree of visibility exhibited by the modified area (Ahler 1979:314-316): pronounced, moderate, and moderate/pronounced.

a. Pronounced: modification over the complete microflaked area is visible under direct light without the aid of magnification.

b. Moderate: modification is difficult to detect without the aid of magnification, but it is clearly visible with 10X magnification using direct light.

c. Moderate/Pronounced: the intensity of the edge damage varies between moderate and pronounced. Portions of the microflaked area are macroscopically visible while other portions require the aid of up to 10X magnification.

5. <u>Modified Edge Type</u>: refers to facial flaking: unifacial and bifacial.

a. Unifacial: the modified area is flaked on one face.

b. Bifacial: the modified area is flaked on two faces.

6. <u>Face of Modification</u>: the faces of modification are recorded according to the modified edge type: dorsal or ventral (unifacial), dorsal and ventral (bifacial).

7. <u>Bifacial Scar Pattern</u>: refers to the pattern of microscars as they occur along the two faces of the modified edge: opposite and alternate.

a. Opposite: microscars are aligned in direct opposition on the ventral and dorsal faces.

b. Alternate: along the modified edge the microscars alternate between the ventral and dorsal faces in such a manner that they do not occur in direct opposition.

8. <u>Scar Spacing</u>: refers to the distribution of microscars along each face of the modified edge. The

scar spacing categories include the following: continuous, semi-continuous, and discontinuous.

a. Continuous: microflakes occur in an uninterrupted fashion along the modified edge.

b. Semi-continuous: microflakes occur in an uninterrupted fashion along the modified edge with the exception of one narrow unflaked area.

c. Discontinuous: microflakes occur in an interrupted fashion along the modified edge. This type of microflake distribution is classified according to the amount of edge modified (light, heavy), type (isolated flakes, clustered), and interval (close, wide, uneven).

1 Light: microflake scars are exhibited over less than half of the total modified area.

2 Heavy: microflake scars are exhibited over more than half of the total modified area.

3 Isolated Flakes: modification is characterized as separate, individual microflake scars.

4 Clustered: modification is characterized by two or more overlapping flake scars. When edges exhibit both isolated flakes and clustered types, the more prevalent type is listed first.

5 Close: intervals between the isolated microflake scars and/or clusters are narrow and the spacing

is relatively uniform.

6 Wide: intervals between the isolated microflake scars and/or clusters are wide and the spacing is relatively uniform.

7 Uneven: intervals between the isolated microflake scars and/or clusters are not uniform in that spaces are both narrow and wide.

9. <u>Scar Termination</u>: termination types recorded include feather, hinge, and step (for type characteristics refer to the Termination Type discussion under Flake Morphology). When edges exhibit more than one termination type, the types are listed in order of predominance.

10. <u>Edge Configuration</u>: refers to the outline shape of each modified edge. Shapes recorded include convex, concave, rectilinear, recurvate, point (spur), peaked, and irregular.

11. <u>Rounding</u>: refers to abrasion that appears on the modified edge and microflake ridges. Brink (1978:53-54) divides rounding into truncated and smoothing types while Ahler (1979:308) refers to the rounding processes of blunting and smoothing. In

this analysis, rounding is noted as present or absent. Where rounding is present it is classified according to the degree of abrasion by the following categories: slight, distinct, and slight/distinct. Magnifications most useful for rounding identifications are 30X, 50X, and 80X.

a. Absent: crests of microflake scar ridges and modified edges are sharp showing no signs of rounding or abrasive wear.

b. Present: slight, distinct, slight/distinct.

1 Slight: rounding occurs only on the crests of the microflake scar ridges and modified edges. Although rounding of the crests is apparent the degree of wear does not show significant removal of crest peaks.

2 Distinct: the crests of the microflake scar ridges and modified edges display considerable wear so that the crests display well defined rounding. The edges may range from an almost completely flattened surface to rounded denticulation. Although edge denticulation may still be apparent the edge is more undulating than peaked.

3 Slight/Distinct: refers to a medial condition between slight and distinct; however, it also

includes edges that display both slight and distinct characteristics.

12. <u>Measurements</u>: refers to spine-plane angle, microflake scar length, and edge length.

a. Spine-plane Angle: refers to the angle formed by the intersection of the dorsal and ventral faces. This angle reflects the strength and thickness of the modified edge (Tringham 1974:179).

b. Microflake Scar Length: the maximum distance between the proximal and distal margins of the longest scar on the modified edge.

c. Edge Length: the maximum length of the modified edge.

Retouched Flakes

The term retouched flakes refers to those specimens that have been intentionally modified for the purpose of forming a specific tool and functional edge. Flakes exhibiting retouch are generally characterized by the presence of continuous overlapping scars along one or more of their margins. In comparison to utilized edges displaying microflake scars, retouched edges exhibit scars that are generally larger and more evenly patterned (Odell and Odell-Vereecken 1980:96; Tringham et al. 1974:181). The attributes recorded with respect to retouched flake edges include the following: number of locations, location, position, retouched edge type, face of modification, scar termination, proximal edge damage, edge configuration, and measurements.

1. <u>Number of Locations</u>: refers to the number of discrete areas on one flake exhibiting retouch modification.

2. <u>Location</u>: each retouched area is located with reference to consistent orientation on a polar co-ordinate grid (see Location under Utilized Flakes).

3. <u>Position</u>: refers to the position of each retouched area according to the four edges of a flake: proximal edge, distal edge, right lateral edge, and left lateral edge. Each edge is divided into three sections.

a. Proximal Edge: left, medial, right

b. Distal Edge: left, medial, right

c. Right Lateral Edge: proximal, medial, distal

d. Left Lateral Edge: proximal, medial, distal

4. <u>Retouched Edge Type</u>: refers to facial flaking: unifacial and bifacial.

a. Unifacial: the retouched area is flaked on one face.

b. Bifacial: the retouched area is flaked on two faces.

5. <u>Face of Modification</u>: the faces of modification are recorded according to the modified edge type: dorsal or ventral (unifacial), dorsal and ventral (bifacial).

6. <u>Scar Termination</u>: termination types recorded include feather, hinge, and step (for type characteristics refer to Termination Type under Flake Morphology). When retouched edges exhibit more than one termination type, the types are listed in order of predominance.

7. <u>Proximal Edge Damage</u>: refers to the degree and type of damage exhibited on the proximal edge of the retouched scars. The attributes recorded include condition, intensity, and type.

a. Condition: present, absent.

b. Intensity: refers to the degree of visibility exhibited by the damage: pronounced, moderate, moderate/pronounced (for intensity characteristics refer to Intensity under Utilized Flakes).

c. Type: the types of modification recorded include microflaking and rounding.

1 Microflaking: recorded as present or absent. If microflaking is present the type of microflake scar is recorded: feather, hinge, step, and compound (for characteristics pertaining to feather, hinge, and step fractures refer to Termination Type under Flake Morphology). Compound fracture refers to dense concentrations of overlapping scars and the scar terminations are usually of the step type. Compound fracture is similar to Brink's (1978:52) "crushing" category. This form of damage does not imply utilization wear since such damage may be the result of the manufacturing process (Brink 1978:67, 115-116; Binneman and Deacon 1986:225; Lawrence 1975:98-99; Plew and Woods 1985:225; Vaughan 1985:23).

2 Rounding: recorded as present or absent. Where rounding is present it is classified according to the degree of abrasion by the following categories: slight, distinct, and slight/distinct (for characteristics for each rounding category refer to Rounding under Utilized Flakes).

8. <u>Edge Configuration</u>: refers to the outline shape of each retouched edge. Shapes include convex, concave, rectilinear, recurvate, and recurvate (spurred).

9. <u>Measurements</u>: refers to edge angle, maximum scar length, minimum scar length, edge height, and edge length.

a. Edge Angle: refers to the angle formed by the intersection of the bifacially retouched flake faces or the unifacially retouched flake face and the opposed unmodified dorsal or ventral face.

b. Maximum Scar Length: the maximum distance between the proximal and distal margins of the largest scar on the retouched edge.

c. Minimum Scar Length: the maximum distant between the proximal and distal margins of the scar considered to represent the shortest retouch scar on the retouched edge. The purpose of this measurement is for size comparison with utilization microflake scars.

d. Edge Height: the maximum vertical height of the retouched edge.

e. Edge Length: the maximum length of the retouched edge.

Pièces esquillées

The term pièce esquillée refers to lithic specimens that display damage on opposed margins. Margin damage includes opposed crushed margins (Le Blanc 1984:183), crushed margins opposite relatively flat surfaces that could have been used as "areas of percussion" (Binford and Quimby 1972:356), or crushed edges and area surfaces opposite margins that are absent or fractured. The attributes recorded with respect to pièces esquillées include the following: category, axis of crushing, location, margin type, face of modification, bit edge, and measurements.

1. <u>Category</u>: complete, bipolar flake, fragment

a. Complete: refers to those specimens with intact opposed margins.

b. Bipolar Flake: refers to flakes that are products of bipolar force.

c. Fragment: refers to those specimens that possess one margin with the opposed margin absent or fractured.

2. <u>Axis of Crushing</u>: refers to the direction of force and its orientation to the flake's axis: vertical, horizontal, and vertical/horizontal.

a. Vertical: force was directed along the flake's vertical axis. Therefore, the edges affected are the proximal and distal ends.

b. Horizontal: force was directed along the flake's horizontal axis. Therefore, the margins affected are the flake's lateral edges.

c. Vertical/Horizontal: force was directed along both of the flake's vertical and horizontal axes.

3. <u>Location</u>: refers to the location of each affected margin with reference to a polar co-ordinate grid (for details of the polar co-ordinate grid see Location under Utilized Flakes).

4. <u>Margin Type</u>: refers to margin classification based upon the terminology developed by Binford and Quimby (1972:356) for bipolar cores: ridge of percussion, point of percussion, and area of percussion. The margin types are written in hyphenated form (i.e. ridge-ridge, area-point). Opposed margins oriented along the vertical axis are recorded with the proximal end type listed first and the distal end type listed second. Similarly, opposed margins oriented along the horizontal axis are recorded with the right lateral edge type listed first and the left lateral edge type listed second.

a. Ridge of Percussion: refers to the "... line of convergence of the two opposite cleavage faces" (Binford and Quimby 1972:356).

b. Point of Percussion: refers to the "... convergence of three or more cleavage faces resulting in a pyramidal form, the apex of which is the point of percussion" (Binford and Quimby 1972:356).

c. Area of Percussion: refers to a relatively thick edge which lacks a ridge or point distinction.

5. Face of Modification: refers to the face(s) of the flake affected. For each opposed margin the face(s) modified is (are) recorded as ventral, dorsal, or both. In cases where the damage is bifacial the face with the greatest damage is recorded first. If damage occurs on the area of percussion, it is recorded as "area surface."

6. Bit Edge: refers to the edge that is considered to have been the primary edge, or the opposing edge to the one that received the percussive force. The bit edge is recorded for each axis of crushing.

7. Measurements: refers to the lengths of the vertical and horizontal axes of crushing.

a. Vertical Axis Length: the maximum distance between two opposing margins oriented along the flake's vertical axis.

b. Horizontal Axis Length: the maximum distance between two opposing margins oriented along the flake's horizontal axis.

Biface Class

The biface class consists of chert objects that display retouch on opposed surfaces and exhibit various degrees of facial flaking. Bifaces are shaped from flake or non-flake nuclei and the attributes recorded include thermal alteration, subclass, category, cortex, retouch, shape, and measurements.

1. Thermal Alteration: Evidence of heat exposure is recorded as present or absent. On specimens where characteristics of heat exposure are present, the thermal types of modification (see Thermal Alteration section above) are recorded. The faces of modification affected by each thermal type are noted and positions are recorded. The degree to which each face is affected by each thermal type is recorded in percentage increments.

a. Alteration: present, absent.

b. Face of Modification: dorsal, ventral (flake); obverse, reverse (non-flake).

c. Thermal Type: potlid fracture, explosion fracture, crazing, lustre.

d. Positions: proximal, medial, distal, proximal and medial, medial and distal, whole.

e. Cortex: 1-24%, 25-49%, 50-74%, 75-99%, 100%.

2. <u>Subclass</u>: stemmed, unstemmed.

3. <u>Category</u>: refers to the nature of the biface nucleus: flake, non-flake.

4. <u>Cortex</u>: refers to the amount of cortex remaining on both of the specimen's faces. Cortex coverage is recorded for each face in percentage increments: 0%, 1-24%, 25-49%, 50-74%, 75-99%, 100%.

5. <u>Retouch</u>: refers to the retouch characteristics displayed on the biface. For a discussion of the retouch attributes recorded refer to the section pertaining to retouched flakes.

6. <u>Shape</u>: blade, shoulder, base, stem, longitudinal,

and marginal biface shapes.

a. Blade Element: shapes recorded for each blade edge include rectilinear, convex, and concave. The symmetry of the combined blade edges (symmetrical, asymmetrical) is also noted.

b. Shoulder Element: shapes recorded for each shoulder element include rounded and peaked.

c. Base Element: this attribute is recorded for both stemmed and unstemmed specimens. Base shapes include rectilinear straight, rectilinear oblique, convex, concave, bivectorial, trivectorial, basal notch, and irregular.

d. Stem Element: refers to the shape of side notches, tangs, and corner notched stems.

1 Side Notches: attributes recorded pertain to the shape and size of each notch. Notch shape includes rounded curve and elongated curve. Notch size refers to shallow (the notch mouth is greater than the notch depth) or deep (the notch mouth is less than the notch depth).

2 Tangs: shapes are recorded for each tang and configurations include pointed, rounded, and square.

3 Corner Notched Stem: shape refers to the combined configuration of both stem edges: parallel,

expanding (toward the proximal end), and contracting (toward the proximal end).

e. Longitudinal Shape: refers to the combined longitudinal shapes of both specimen faces: convex, concave, and flat. With specimens shaped from flake nuclei the dorsal shape is listed before the ventral shape. With specimens shaped from non-flake nuclei the obverse shape is listed before the reverse shape. In instances where the two faces have similar configurations the shape is simplified to a single term (e.g. biconvex).

f. Marginal Shape: refers to the combined marginal shapes of both specimen faces: convex, concave, flat, and peaked. Similar to the above, dorsal and obverse faces are listed before ventral and reverse faces. Where two faces have similar configurations the shape is simplified to a single term.

7. <u>Measurements</u>: length, width, notch depth, thickness, width/thickness ratio, angles, and weight. The specific measurements recorded are adapted from the attribute list presented by Bonnichsen (1978: 153-176).

a. Length: maximum length, blade length, stem length, base length, and tang length.

1 Maximum Length (stemmed, unstemmed): maximum distance between the extreme proximal and distal margins.

2 Blade Length (stemmed, unstemmed): maximum distance between the most proximal shoulder point (the intersection of the blade with the stem or base elements) and the blade's distal end.

3 Stem Length (stemmed): maximum distance between the proximal end of the biface and the most proximal shoulder point.

4 Base Length (stemmed, unstemmed):

a Stemmed: maximum distance between the proximal end of the biface and the most proximal point marking the intersection of the stem's basal and lateral margins.

b Unstemmed: maximum distance between the proximal end of the biface and the most proximal shoulder point.

5 Tang Length (stemmed): maximum distance between the most proximal and distal points of the basal tangs.

b. Width: includes maximum width, shoulder width, blade mid-length width, blade distal end width, tang width, notch width, and between notch width.

1 Maximum Width (stemmed, unstemmed): maximum

distance between the extreme points on the lateral margins.

2 Shoulder Width (stemmed, unstemmed):

   a Stemmed: maximum distance between the two points marking the intersection of the blade and the stem.

   b Unstemmed: maximum distance between the two points marking the intersection of the blade and the base.

3 Blade Mid-Length Width (stemmed, unstemmed): maximum distance between the two lateral edges of the blade at the biface's mid-length.

4 Blade Distal End Width (stemmed, unstemmed): maximum distance between the two lateral edges of the blade 1/10 of the specimen's length from the blade's distal end.

5 Tang Width (stemmed): maximum distance between the tang's extreme lateral edges.

6 Base Width (stemmed): maximum distance between the two points marking the intersection of the stem's basal and lateral margins.

7 Right and Left Side Notch Widths (stemmed): maximum distance between the two points marking the extreme proximal and distal margins of the notch's mouth.

8 Between Notch Width (stemmed): maximum distance between the extreme internal points of each notch.

c. Right and Left Notch Depths (stemmed): maximum distance between the mid-point of the notch's width and the notch's extreme internal point.

d. Thickness: maximum thickness, stem thickness, mid-length thickness, blade distal end thickness, stem-blade thickness, and base-blade thickness.

1 Maximum Thickness (stemmed, unstemmed): maximum distance between the obverse and reverse faces.

2 Stem Thickness (stemmed): maximum distance between the obverse and reverse faces of the stem element.

3 Mid-Length Thickness (stemmed, unstemmed): maximum distance between the obverse and reverse faces at the specimen's mid-length.

4 Blade Distal End Thickness (stemmed, unstemmed): maximum distance between the obverse and reverse faces 1/10 of the specimen's length from the blade's distal end.

5 Stem-Blade Thickness (stemmed): maximum distance between the obverse and reverse faces at the intersection of the stem and the blade.

6 Base-Blade Thickness (unstemmed): maximum

distance between the obverse and reverse faces at the intersection of the base and the blade.

e. Width/Thickness Ratio (stemmed, unstemmed): a statistic equalling the maximum width divided by the maximum thickness.

f. Angles: right and left base angles, right and left notch angles, right and left shoulder angles, tip angle, and edge angles.

1 Right and Left Base Angles (stemmed): angle formed by the intersection of the stem's basal and lateral margins. The proximal arm of the angle connects the proximal end of the biface and the intersecting point between the stem's basal and lateral margins. The distal arm of the angle follows the immediate lateral edge of the stem.

2 Right and Left Notch Angles (stemmed): angle formed by the intersection of the stem and the notch's proximal margin. The proximal arm of the angle follows the immediate lateral edge of the stem. The distal arm of the angle connects the point marking the extreme proximal edge of the notch's mouth and the notch's extreme internal point.

3 Right and Left Shoulder Angles (stemmed, unstemmed):

a Stemmed: angle formed by the intersection of the blade and stem elements. The proximal arm of the angle connects the shoulder point and the notch's extreme internal point. The distal arm of the angle follows the lateral edge of the blade.

b Unstemmed: angle formed by the intersection of the blade and base elements. The proximal arm of the angle connects the proximal end of the biface and the shoulder point. The distal arm of the angle follows the lateral edge of the blade.

4 Tip Angle (stemmed, unstemmed): angle formed by the intersection of the right and left lateral edges of the blade. The apex of the angle is the blade tip and the arms of the angle intersect the points on the blade's lateral edges 1/10 of the specimen's length from the blade's distal end.

5 Edge Angles (stemmed, unstemmed): angles formed by the intersection of the obverse and reverse faces of the blade. Proximal end, mid-length, and distal end angles of the right and left lateral blade edges are recorded.

g. Weight: maximum weight.

Debris Class

The term debris refers to those items that are not considered to belong to the core, flake, or biface classes. It is a morphological designation and a specimen's inclusion in this class does not preclude its use as a tool. Attributes recorded for this class include subclass, cortex, thermal alteration, and measurements.

1. <u>Subclass</u>: unutilized chip, utilized chip, unutilized chunk, utilized chunk, potlid spall, explosion spall.

a. Unutilized Chip: a chip is a piece of lithic debris with a thickness equal to less than one-half of the specimen's width. The chip displays no evidence of having been used as a tool.

b. Utilized Chip: the chip displays evidence of having been used as a tool.

c. Unutilized Chunk: a chunk is a piece of lithic debris with a thickness equal to or greater than one-half of the specimen's width. The chunk displays no evidence of having been used as a tool.

d. Utilized Chunk: the chink displays evidence of having been used as a tool.

e. Potlid Spall: refers to conchoidal shaped spalls removed from lithic specimens as a result of exposure to heat.

f. Explosion Spall: refers to lithic fragments with markedly irregular surfaces that are thought to have been fractured from the parent material as a result of exposure to heat.

2. Cortex: The amount of cortex remaining on debris surfaces is recorded in percentage increments: 0%, 1-24%, 25-49%, 50-74%, 75-99%.

3. Thermal Alteration: Evidence of heat exposure within the chip and chunk subclasses is recorded as present or absent. On specimens where characteristics of heat exposure are present, the thermal types of modification (see Thermal Alteration section above) are recorded. The degree to which specimens are affected is noted in percentage increments.

a. Alteration: present, absent.

b. Thermal Type: potlid fracture, explosion fracture, crazing, lustre.

c. Coverage: 1-24%, 25-49%, 50-74%, 75-99%, 100%.

4. Measurements: length, width, thickness, weight.

a. Length: refers to the item's maximum dimension.

b. Width: the maximum dimension perpendicular to the length.

c. Thickness: the maximum dimension perpendicular to the length and rotated 90 degrees on the length axis.

d. Weight: maximum weight.

Appendix D. Shamattawa Rapids Site (GbIj-2).

Table 43. Retouched Edges: Unifacial.

Accession Number	Face	Position	Edge Shape	Measurements				
				Scar L		Edge		
				Max	Min	L	H	A
984.245.3	D	L;D	CV	3.3	1.6	20.7	2.9	63
984.245.4	D	D	CV	2.3	1.0	12.1	1.8	45
984.245.5	D	L	R	3.5	1.8	13.0	3.1	63
	D	D	CV	4.9	3.3	12.7	4.3	70
	D	R	CV	2.9	2.6	12.8	2.7	60
984.245.6	V	P;L;D	CV	2.4	0.5	18.1	1.8	62
984.245.8	D	D	CV	4.4	1.9	11.3	2.9	48
984.245.9	D	D	CV	7.2	1.0	19.1	4.5	51
984.245.10	D	D	CC	7.7	0.8	16.8	6.7	65
	V	P	CV	6.6	2.2	8.9	6.1	65
984.245.11	D	L;D	CV	4.1	1.5	11.0	3.5	49
	V	L	CV	3.7	3.0	9.5	3.0	63
984.245.12	D	L	RC(S)	4.1	1.4	15.6	3.8	83
984.245.14	D	P	R	5.3	1.3	14.0	4.4	76
984.245.25	D	R	CC	1.6	1.1	6.3	1.1	50
984.245.34	D	L	CC	1.7	1.2	4.9	1.5	74
984.245.36	V	D	CV	2.9	1.2	9.1	2.7	81

Table 43. Continued.

Accession Number	Face	Position	Edge Shape	Measurements				
				Scar L		Edge		
				Max	Min	L	H	A
984.245.46	V	P	CV	6.9	3.6	7.9	6.0	63
984.245.49	D	D	CV	2.9	0.9	4.0	2.0	72
	D	R	CC	1.5	1.0	6.0	1.3	74
984.245.53	V	P	RC	3.4	1.0	6.0	3.2	81

Face	Position	Edge Shape
D - Dorsal	D - Distal	CV - Convex
V - Ventral	P - Proximal	CC - Concave
	L - Left Lateral	R - Rectilinear
	R - Right Lateral	RC - Recurvate
		RC(S) - Recurvate (Spurred)

Appendix E. Shamattawa Rapids Site (GbIj-2).

Table 44. Biface (984.245.1): Non-metric Attributes.

Attributes		Condition
Thermal Alteration		Absent
Subclass		Stemmed
Category		Flake
Cortex	Dorsal Face:	0%
	Ventral Face:	0%
Shape	Right Blade Edge Shape:	Convex
	Left Blade Edge Shape:	Convex
	Blade Edge Symmetry:	Asymetrical
	Right Shoulder Shape:	Peaked
	Left Shoulder Shape:	Rounded
	Base Shape:	Bivectorial
	Right Notch Shape:	Rounded
	Right Notch Size:	Shallow
	Left Notch Shape:	Rounded
	Left Notch Size:	Shallow
	Right Tang Shape:	Square
	Left Tang Shape:	Square
	Longitudinal Shape:	Convex Concave

Table 44. Continued

Attributes		Condition
	Marginal Shape:	Peaked Convex

Table 45. Biface (984.245.1):

Length, Width, Thickness, Weight.

Length	mm	Width	mm
Length:	51.6	Width:	23.8
Blade:	29.5	Shoulder:	23.4
Stem:	22.1	Blade - Mid-Length:	22.8
Base:	8.3	Blade - Distal:	8.1
Basal Tang:	2.0	Basal Tang:	21.4
		Base:	21.4
Thickness	**mm**	Notch - Right:	10.9
		Notch - Left:	11.7
Thickness	7.6	Notch Depth - Right:	4.0
Stem:	7.6	Notch Depth -Left:	3.3
Mid-Length:	7.2	Between Notch Width:	15.7
Blade - Distal:	3.9		
Stem-Blade:	7.5		
Width/Thickness Ratio:	3.13	Weight:	8.3 grams

Table 46. Biface (984.245.1): Angles.

Angle	Degree	Angle	Degree
Base - Right:	128	Edge - Right Proximal:	51
Base - Left:	127	Edge - Right Mid-Length:	57
Notch - Right:	148	Edge - Right Distal:	48
Notch - Left:	155	Edge - Left Proximal:	60
Shoulder - Right:	131	Edge - Left Mid-Length:	77
Shoulder - Left:	127	Edge - Left Distal:	70
Tip:	76		

Table 47. Biface (984.245.13): Non-Metric Attributes.

Attributes		Condition
Thermal Alteration		Absent
Subclass		Unstemmed
Category		Non-flake
Cortex	Obverse:	1-24%
	Reverse:	25-49%
Shape	Right Blade Edge Shape:	Convex
	Left Blade Edge Shape:	Convex
	Blade Edge Symmetry:	Asymmetrical
	Right Shoulder Shape:	Peaked

Table 47. Continued.

Attributes		Condition
	Left Shoulder Shape:	Rounded
	Base Shape:	Bivectorial
	Longitudinal Shape:	Biconvex
	Marginal Shape:	Biconvex

Table 48. Biface (984.245.13):

Length, Width, Thickness, Weight.

Dimension	mm
<u>Length</u>	
Total Length:	67.7
Blade:	53.7
Base:	14.0
<u>Width</u>	
Total Width:	36.4
Shoulder:	36.0
Blade - Mid Length:	31.4
Blade - Distal:	7.8
<u>Thickness</u>	
Total Thickness:	10.6

Table 48. Continued

Length, Width, Thickness, Weight.

Dimension	mm
Base - Blade:	10.6
Mid-Length:	9.3
Distal:	5.4
Width/Thickness Ratio:	3.43
Weight	
Total Weight:	24.4 grams

Table 49. Biface (984.243.13): Angles.

Angle	Degrees
Right Shoulder:	115
Left Shoulder:	122
Tip:	86
Edge - Right Proximal:	89
Edge - Right Mid-Length:	65
Edge - Right Distal:	57
Edge - Left Proximal:	45
Edge - Left Mid-Length:	50
Edge - Left Distal:	56

Appendix F. Washagami Point Site (GbIg-1).

Table 50. Tree Disfigurements:
Character and Dimensions (cm).

Tree	Character	Length	Width	Depth	Bearing
1	slash	21.0	10.0	9.5	East
2	slash	29.0	6.0	2.0	Northeast
3	slab removed	43.0	26.0	9.0	North
4	slab removed	20.0	18.0	5.0	Southwest
5	slab removed	57.0	12.0	9.0	North
6	slash & two wedges	20.0	11.0	4.0	Southeast
7	slash	27.0	10.0	5.5	East
8	slab removed	140.0	26.0	5.0	Southwest
9	slab removed	153.0	26.0	8.0	South
10	peeled bark	105.0	13.0		Northwest
11	slab removed	89.0	22.0	5.0	North
12	A number of narrow slashes were cut into the trunk on all sides but the north. Specific dimensions were not recorded.				
13	slab removed	72.0	24.0	17.5	South
14	slab removed	135.0	36.0	5.0	West
	Tree 14 is located north of the point area				

Appendix G. Washagami Point Site (GbIg-1).

Table 51. Hearth: Identified Mammalian Remains.

Common Name	Element	Side	Age	n
Snowshoe Hare	Tibia	Right	Juv-Imm	1
	Phalanx	?	Juv+	1
American Red Squirrel	Incisor	Right	Juv+	1
	Innominate	Right	Juv+	1
	Innominate	Left	Imm+	1
	Lumbar Vertebra		Imm+	2
	Femur	Left	Imm+	2
	Tibia	Left	Juv	1
	Calcaneum	Left	Juv+	1
American Red/ Northern Flying Squirrel	Incisor	Left	?	1
Muskrat	Mandible	Right	Juv-Imm	2
	Mandible	Right	Juv+	1
	Mandible	Right	Imm+	4
	Mandible	Left	Juv+	1
	Mandible	Left	Imm+	2

Table 51. Continued.

Common Name	Element	Side	Age	n
Muskrat	Maxilla		Imm+	1
	Premaxilla		Imm+	1
	Zygomatic Process	Left	Imm+	1
	Incisor	Right	Imm+	1
	Incisor	Left	Imm+	1
	Molar	?	?	2
	Molar	?	Imm+	1
	Sternal Segment		Juv+	1
	Cervical Vertebra		Juv-Imm	1
	Thoracic Vertebra		Juv-Imm	2
	Lumbar Vertebra		Juv-Imm	2
	Sacral Vertebra		Juv-Imm	4
	Sacral Vertebra		Juv+	1
	Caudal Vertebra		Juv-Imm	52
	Innominate	Right	Juv+	1
	Innominate	Right	Imm+	4
	Innominate	Right	?	1
	Innominate	Left	Juv+	2
	Innominate	Left	Imm+	5
	Innominate	Left	?	1
	Scapula	Right	Juv-Imm	1

Table 51. Continued.

Common Name	Element	Side	Age	n
Muskrat	Scapula	Left	Juv+	1
	Scapula	Left	Imm+	1
	Scapula	Left	?	1
	Humerus	Right	Juv-Imm	4
	Humerus	Right	Juv+	2
	Humerus	Right	Imm+	2
	Humerus	Left	Juv-Imm	1
	Humerus	Left	Juv+	2
	Humerus	Left	Imm+	1
	Ulna	Right	Juv-Imm	1
	Ulna	Right	Juv	1
	Ulna	Right	Juv+	3
	Ulna	Right	Imm+	3
	Ulna	Left	Juv-Imm	3
	Ulna	Left	Juv+	1
	Ulna	Left	Imm	1
	Ulna	Left	Imm+	3
	Radius	Right	Juv-Imm	1
	Radius	Right	Imm+	1
	Radius	Left	Imm+	6
	Femur	Right	Juv-Imm	1

Table 51. Continued.

Common Name	Element	Side	Age	n
Muskrat	Femur	Right	Imm	1
	Femur	Right	Imm+	3
	Femur	Left	Juv-Imm	3
	Femur	Left	Juv+	1
	Femur	Left	Imm	1
	Femur	Left	Imm+	1
	Tibia-fibula	Right	Juv-Imm	1
	Tibia-fibula	Left	Juv-Imm	1
	Tibia-fibula	Left	Juv+	1
	Tibia-fibula	Left	Imm+	2
	Tibia	Right	Juv	1
	Tibia	Right	Juv-Imm	1
	Tibia	Right	Imm	1
	Tibia	Right	Imm+	1
	Tibia	Left	Juv	2
	Tibia	Left	Ad	1
	Metatarsal	Right	Juv	2
	Metatarsal	Left	Juv-Imm	3
	Astragalus	Right	Juv-Imm	1
	Astragalus	Right	Juv+	2
	Astragalus	Left	Juv+	3

Table 51. Continued.

Common Name	Element	Side	Age	n
Muskrat	Astragalus	Left	Imm+	1
	Astragalus	Left	?	1
	Calcaneus	Right	Juv+	1
	Calcaneus	Left	Imm+	3
	Tarsal	Right	Juv-Imm	1
	Tarsal	Right	Imm+	1
	Tarsal	Left	Imm+	2
	Phalanx	Right	Juv+	1
	Phalanx	Right	Imm+	5
	Phalanx	Left	Juv-Imm	2
	Phalanx	Left	Juv+	1
	Phalanx	Left	Imm	1
	Phalanx	Left	Imm+	5
	Phalanx	?	Juv+	1
	Phalanx	?	Imm+	1
American Mink	Mandible	Left	Imm+	1
	Innominate	Right	Juv+	1
	Humerus	Right	Imm+	1
	Ulna	Left	Imm+	1
	Metatarsal	Right	Imm+	1
Total				213

Appendix H. Washagami Point Site (GbIg-1).

Table 52. Hearth: Identified Avian Remains.

Common Name	Element	Side	Age	n
Common/Arctic Loon	Humerus	Left	Imm+	4
	Ulna	Left	Imm+	1
	Carpometacarpus	Right	Imm+	1
	Tarsometatarsus	Right	Imm	1
	Phalanx	Right	Juv	2
Canada Goose	Coracoid	Right	Imm+	1
	Coracoid	Left	Imm+	1
	Radius	Right	Imm+	1
Canada/Snow Goose	Humerus	Left	Imm+	1
	Carpal Ulnare	Right	Imm+	1
Greater Scaup	Coracoid	Right	Imm+	2
Surf Scoter	Furcula		Juv	1
	Sternum		?	1
	Coracoid	Left	Ad	1
	Scapula	Left	Imm+	1

Table 52. Continued.

Common Name	Element	Side	Age	n
	Humerus	Right	Imm+	2
	Humerus	Left	Imm+	1
	Ulna	Left	Imm+	1
	Ulna	Left	?	1
Surf Scoter	Carpometacarpus	Right	Imm+	1
	Carpometacarpus	Left	Imm+	1
	Tibia	Left	Imm+	1
	Metacarpal	Left	Imm+	1
Common Merganser	Scapula	Left	Imm+	1
	Ulna	Right	Imm+	1
Red-breasted Merganser	Cervical Vertebra		Juv+	1
	Cervical Vertebra		Imm+	1
	Scapula	Right	Imm+	1
	Scapula	Left	Imm+	1
	Coracoid	Right	Imm+	1
	Coracoid	Left	Imm+	1
	Coracoid	Left	?	1
	Humerus	Right	Imm+	1
	Radius	Right	Imm+	1
	Scapholunar	Left	Juv+	1

Table 52. Continued.

Common Name	Element	Side	Age	n
	Phalanx	Right	Imm+	1
	Femur	Right	Imm+	2
	Femur	Left	Imm+	2
Common/Red-breasted Merganser	Coracoid	Right	Imm+	1
Common/Red-breasted Merganser	Carpometacarpus	Left	?	1
	Tarsometatarsus	Right	Imm+	1
Ducks	Cervical Vertebra		Imm+	8
	Synsacrum		Imm+	1
	Furcula		Imm+	2
	Scapula	Left	Juv+	1
	Scapula	Left	Imm+	1
	Coracoid	Right	Imm+	2
	Coracoid	Left	Imm+	5
	Humerus	Right	Juv+	1
	Humerus	Right	Imm+	1
	Ulna	Right	Imm+	1
	Ulna	Left	Imm+	2
	Radius	Right	Juv+	2

Table 52. Continued.

Common Name	Element	Side	Age	n
	Carpometacarpus	Left	Imm+	1
	Scapholunar	Right	Juv+	1
	Carpal Ulnare	Right	Imm+	1
	Pollex	Right	Imm+	1
	Phalanx	Right	Imm+	1
	Femur	Left	Imm+	2
	Tarsometatarsus	Right	Imm+	1
	Tarsometatarsus	Left	Imm+	1
Spruce Grouse	Coracoid	Right	Imm+	1
	Tibiotarsus	Left	Imm+	1
Ruffed Grouse	Coracoid	Right	Imm+	1
	Tarsometatarsus	Right	Imm+	1
	Tarsometatarsus	Left	Imm+	1
	Tibiotarsus	Left	Imm+	1
Spruce/Ruffed Grouse	Humerus	Right	?	1
	Radius	Right	Imm+	1
	Carpometacarpus	Left	Imm+	1
	Phalanx	Left	Imm+	1
	Tibiotarsus	Right	Imm+	5

Table 52. Continued.

Common Name	Element	Side	Age	n
Herring Gull	Humerus	Left	Imm+	1
Greater Yellowlegs	Tarsometatarsus	Right	Ad	1
Black-Backed Three-Toed/ Northern Three-Toed Woodpecker	Carpometacarpus	Left	Imm+	1
Total				103

Appendix I. Washagmi Point Site (GbIg-1).

Table 53. Hearth: Identified Osteichthyes Remains.

Common Name	Element	Side	Age	n
Lake Whitefish	Angular	Left	?	1
	Ceratohyal	Left	?	1
	Trunk Vertebra			47
Cisco/Lake Whitefish	Trunk Vertebra		?	430
Northern Pike	Dentary	Right	?	1
	Palatine	?	?	1
	Trunk Vertebra			53
Walleye	Dentary	Right	?	1
	Dentary	Left	?	1
	Truck Vertebra			10
Brook Trout	Trunk Vertebra		?	2
Longnose/White Sucker	Maxilla	Right	?	2
	Dentary	Right	?	4
	Dentary	Left	?	5

Table 53. Continued.

Common Name	Element	Side	Age	n
	Operculum	Right	?	2
	Autopalatine	Left	?	1
	Ceratohyal	Right	?	1
	Ceratohyal	Left	?	1
Longnose/White Sucker	Urohyal		?	2
	Pectoral Spine	Left	?	1
	Trunk Vertebra		?	214
Total				781

Appendix J. Washagami Point Site (GbIg-1).

Table 54. Retouched Edges: Unifacial.

Accession Number	Face	Position	Edge Shape	Measurements				
				Scar L		Edge		
				Max.	Min.	L	H	A
984.245.1	D	L	R	6.0	1.8	16.0	5.9	90
984.246.2	D	L	R	2.7	0.8	24.3	2.5	75
984.246.3	D	D	CV	1.7	1.1	3.9	1.4	53

Face	Position	Edge Shape
D - Dorsal	D - Distal	CV - Convex
V - Ventral	P - Proximal	CC - Concave
	L - Left Lateral	R - Rectilinear
	R - Right Lateral	RC - Recurvate
		RC(S) - Recurvate (Spurred)

Appendix K. Washagami Point Site (GbIg-1).

Table 55. Test Squares: Faunal Remains by Test Square.

Square	Class	Species	n	%
2	Mammalia	Unidentified	6	11.11
3	Aves	Black/Mallard Duck	1	1.85
13	Mammalia	Unidentified	32	59.26
	Unidentified		3	5.56
17	Aves	Trumpeter Swan	2	3.70
22	Mammalia	Unidentified	5	9.26
	Unidentified		1	1.85
23	Mammalia	Unidentified	1	1.85
31	Aves	Unidentified	1	1.85
35	Mammalia	Unidentified	1	1.85
	Aves	Canada/Snow Goose	1	1.85
Total			54	99.99

Appendix L. Washagami Point Site (GIg-1).

Table 56. Test Squares: Identified Avian Remains.

Common Name	Element	Side	Age	n
Trumpeter Swan	Cervical Vertebra		?	1
	Cervical Vertebra		?	1
Black Duck/ Mallard Duck	Humerus	Right	?	1
Canada Goose/ Snow Goose	Radius	Left	?	1
Total				4

Appendix M. Washagami Point Site (GbIg-1).

Table 57. Excavated Unit Level 2: Faunal Remains by Square.

Square	Class	Species	n	%
N1W1	Mammalia	Unidentified	3	1.36
N1W3	Mammalia	Unidentified	1	0.45
N2E1	Osteichtyes	Unidentified	1	0.45
N2W1	Mammalia	Unidentified	11	5.00
		Caribou	1	0.45
	Aves	Canada/Snow Goose or Duck Species	1	0.45
	Unidentified		4	1.82
N2W2	Mammalia	Unidentified	16	7.27
		Caribou	1	0.45
		River Otter	2	0.91
	Pelecypoda	Unidentified	1	0.45
N2W3	Mammalia	Unidentified	10	4.55
		Caribou	3	1.36
	Aves	Unidentified	1	0.45
N3E1	Mammalia	Unidentified	3	1.36
	Aves	Unidentified	3	1.36
N3W1	Mammalia	Unidentified	7	3.18

Table 57. Continued.

Square	Class	Species	n	%
		Caribou	1	0.45
		Unidentified	3	1.36
N3W2	Mammalia	Unidentified	15	6.82
		Beaver	7	3.18
N3W2	Aves	Unidentified	3	1.36
	Osteichtyes	Unidentified	1	0.45
	Unidentified		22	10.00
N3W3	Mammalia	Unidentified	74	33.64
		Caribou	4	1.82
		Dog	2	0.91
	Aves	Unidentified	10	4.55
	Osteichtyes	Unidentified	1	0.45
	Unidentified		8	3.64
Total			220	99.95

Appendix N. Washagami Point Site (GbIg-1).

Table 58. Excavated Unit Level 2:

Identified Mammalian Remains.

Common Name	Element	Side	Age	n
Caribou	Antler		?	2
	Radius	?	?	1
	Radius	Right	?	1
	Tibia	Right	Imm	1
	Radius/Ulna	Right	?	1
	Radius/Ulna	?	?	1
	Phalanx	?	?	2
	Lumbar Vertebra		?	1
River Otter	Humerus	Left	Imm+	1
	Ulna	Left	Imm+	1
Beaver	Phalanx	?	?	4
	Humerus	Right	Ad	2
	Ulna	Left	Imm+	1

Table 58. Continued.

Common Name	Element	Side	Age	n
Dog	Rib	Right	?	1
	Rib	Left	?	1
Total				21

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