PRE-CONTACT PERIOD TECHNOLOGICAL ORGANIZATION AT NACHVAK FJORD, NORTHERN LABRADOR

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Pre-Contact Period Technological Organization at Nachvak Fjord, Northern Labrador

by

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Abstract

This thesis presents the results of one season's fieldwork at three pre-contact period sites in Nachvak Fjord, northern Labrador. It includes a detailed description of the fieldwork conducted by the author as well as the material culture collected. The thesis follows a research design rooted in technological organization method and theory. An analytical framework has been established which has been systematically applied to the dataset. This analysis has allowed for a comprehensive interpretation of the data which demonstrates that many aspects of technological organization varied between cultural groups and between sites in this setting. In particular, important insights are drawn on the technological organization strategies used by the Labrador Archaic, as well as the Early (Pre-Dorset) and Late Palaeoeskimo (Middle and Late Dorset) groups occupying the sites in question.

Acknowledgements

In a round about kind of way, my career in archaeology was sparked by my wonder with dinosaurs. In my grade six yearbook I said that I wanted to be either a hockey player or an archaeologist, even though I had a false conception of what an archaeologist actually was. As the years passed and the hockey thing didn't pan out as planned, I began my undergraduate work with no direction known! By my third year at Memorial I still felt misplaced. While flipping through an old yearbook one day I was bewildered that I had not given archaeology a shot. Thinking what the heck, I registered for an introductory course the following winter and from that point on...I never looked back.

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CHAPTER ONE

Introduction

1.1 Introduction to thesis and research design

The different means by which small-scale hunter-gatherers obtained, made and used stone tools were influenced by a variety of physical, economic, and social forces. In other words, whatever technological strategies these ancient people chose to employ, environmental constraints and social and economic conditions would have had a profound influence on both artefact design and distribution, and ultimately on the archaeological record. The goal of my thesis is to understand some of the variability that exists in the technological organization within and between hunter-gatherer cultures in northern Labrador. In particular I will explore differences in technological strategies between cultural groups, and illustrate how and why stone-tool technologies may have changed over time and space. More specifically this research aims to demonstrate lithic technological variability between archaeological assemblages ascribed to Labrador Archaic[1], Pre-Dorset Palaeoeskimo, and Dorset Palaeoeskimo occupations within Nachvak Fjord, located in Labrador's Torngat Mountain region (Figure 1.1). This thesis primarily presents results from one season of fieldwork at three archaeological sites within Nachvak Fjord (Figures 1.2 and 1.3). The first site, Kogarsok Brook-1 (IgCx-8), is a multi-component Labrador Archaic, Pre-Dorset, and Dorset site situated near the mouth of Kogarsok Brook in the inner fjord. The site bears no evidence of substantial habitation

[1] Labrador Archaic will be used to refer to the Maritime Archaic Indian (MAI) culture. This contemporary terminology is less confusing then separating the culture into 'northern branch' MAI for Labrador and 'southern branch' MAI for Newfoundland, as was done in the past.

Figure 1.1: Location of Nachvak Fjord Within the Eastern Canadian Arctic

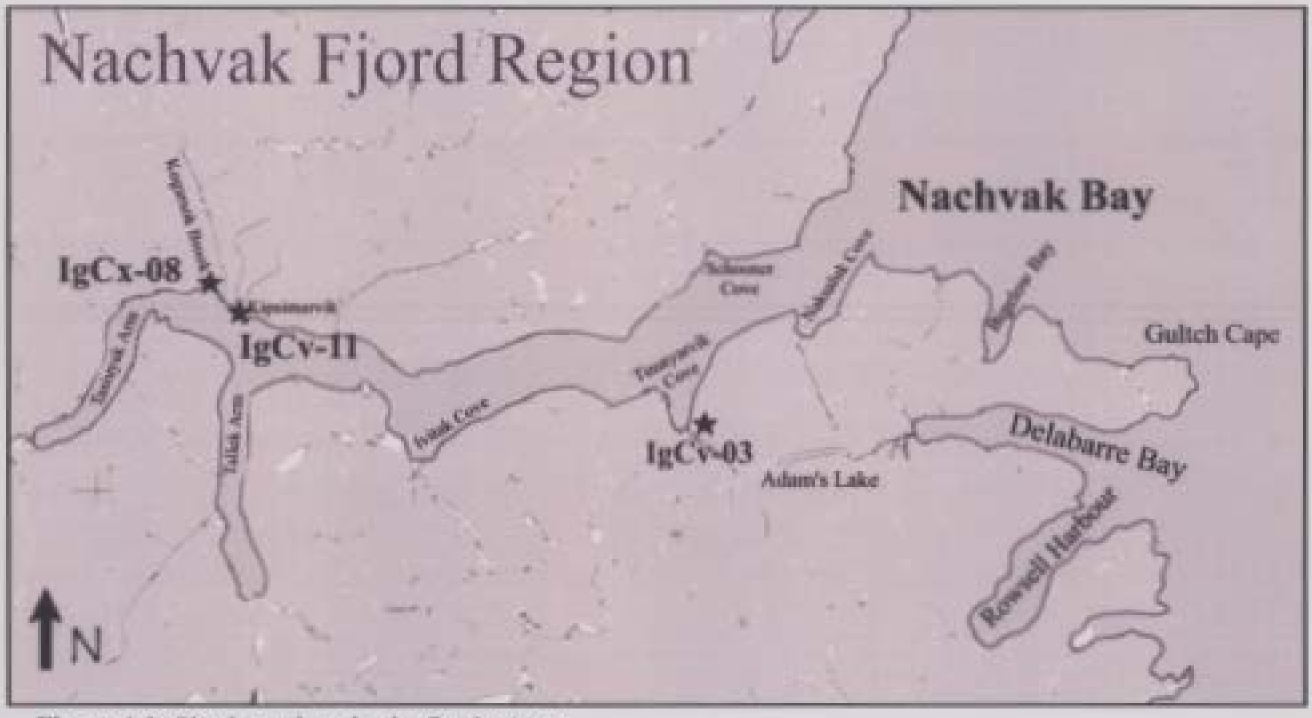

Figure 1.2: Site Locations in the Study Area.

Figure 1.3: Nachvak Archaeology Project 2004 Research Locales in the Inner Fjord.

and was likely occupied during the warmer months as a camp. The second inner fjord site, the Lower Terrace (IgCx-11), is most strictly a Late Dorset multi-component site containing ephemeral Thule and Labrador Inuit evidence. This site, located adjacent to a large Thule winter village and a small recurring polynya[2] has been interpreted as a cold-season habitation site. Finally, Tinutyarvik Cove-02 (IgCv-03) is a single component Late Dorset habitation site situated on the south side of Nachvak in the mid-fjord zone.

In many ways this thesis is a first-step in the explicit interpretation of pre-contact period hunter-gatherer lifeways in Nachvak Fjord, and by no means does the research present final conclusions on how all groups managed and organized their lithic technology. What this thesis does do is reconstruct the technological strategies that were likely in place at the sites in question during the time of occupation as revealed by the archaeological evidence. Insights on these various technological strategies will also allow for inferences on socio-economic dynamics such as site function, group identity, and mobility organization. Since this research recognizes that the technological organization is a dynamic human process, responsive to a variety of environmental, economic, and social factors, the thesis offers a number of hypotheses that should be addressed by future work in the region. With that being said, even though many hunter-gatherer assemblages from across the Eastern Arctic are solely comprised of lithics, approaches focussed on technological organization are uncommon, and this mode of explanation is rare in Labrador archaeology (however see Nagle 1984a). This research relies heavily on a body

[2] A polynya, or "rattle", is an open pond in the sea ice, which does not freeze due to strong tidal currents and is an attractive niche for marine animals (Stirling 1980).

of archaeological theory not previously fully applied in this regional context. I believe this thesis will demonstrate the utility of examining lithic assemblages in this light.

1.2 Technological organization

Technological organization is the study of the selection and integration of strategies for acquiring, making, using, transporting, and discarding tools and materials needed for their manufacture and maintenance (Binford 1977, 1979; Carr 1994b; Nelson 1991; Odell 1996a; Ricklis and Cox 1993). Such studies provide a framework for assessing variability in archaeological lithic assemblages, while considering a range of variables that may influence technological strategies. A common thread in many definitions of technological organization is that 'technology' is viewed as a practical means to solve problems posed by the physical, economic and social environments. Thus, particular physical, economic and social conditions will favour choosing one technological strategy, or combination of strategies over others.

I have chosen a theoretical approach rooted in technological organization because it is very well suited to the data, and because it allows me to shed light on lithic assemblage variability in the region. As stated, the assemblages are from three sites in a confined region, spanning three cultures and more than 4000 years. Thus, this data set made up of stone tools and debitage, when viewed in this light, will portray technology as a dynamic adaptive strategy responsive to ever-changing environmental, economic and social conditions. This research will allow for suggestions to be made about the connections between lithic technology and other aspects of society. Finally, this study will help determine how changes in technological strategies between groups reflect large-scale variability in hunter-gatherer society and culture. These changes in behaviour are reflected in the archaeological record and are a reflection of strategies used to maintain efficiency in areas such as stone acquisition, manufacture, use, and discard.

1.3 Research questions

Prior to conducting fieldwork, a set of research questions was designed to explore associations between lithic technology and other socio-economic pursuits. An analytical framework rooted in technological organization was chosen since past research demonstrated a strong presence of stone tool using people in the region.

What effects do environmental conditions have on the technological organization of pre-contact period hunter-gatherers in Nachvak Fjord?

In an arctic setting such as Nachvak, environmental conditions were a major variable in many facets of hunter-gatherer life, including how people organized their technology. An important first step of this thesis is to consider regional environmental factors. Since local environment conditions are the structure that mediates human adaptations, and technological organization is a result of adaptive behaviour, variation in environmental conditions affect technological variability. The unique environmental conditions of Nachvak should have had significant effects on the technological strategies of Indian and Palaeoeskimo peoples. Most important is the availability of suitable raw material and how both the quality and abundance of such resources would have stimulated technological decision-making (Andrefsky Jr. 1991). On another level, the animal resources of the region would have been a critical part of the structure of hunter-gatherer settlement-subsistence systems and would have called for different technological strategies from site to site, season to season, year to year, and so on. Finally, other environmental characteristics such as localized sea ice conditions, most notably the small polynya, would have affected group mobility, subsistence, and technology.

What effects do social and economic conditions have on the technological organization of pre-contact period hunter-gatherers in Nachvak Fjord?

While environmental conditions would have guided different methods for technological organization on a structural level, the medium and small-scale conditions of specific cultural groups would have had a profound effect on technological strategies. These conditions, also referred to as socio-economic strategies, were major variables in the day-to-day lives on the level of the group and the individual. While less direct than environmental constraints, socio-economic factors have considerable effects across space and time. The socio-economic strategy this thesis is most concerned with is that of mobility organization. Hunter-gatherer mobility plays a large part in determining the organization of lithic technology as mobility strategies affect both tool requirements and access to raw materials (Carr 1994b; Kelly 1983, 1992). It is important that this research considers socio-economic factors since many relevant insights on hunter-gatherer technological organization relate mobility strategies to particular technological strategies (Bamforth 1991; Binford 1977, 1979, 1980; Carr 1994b; Habu and Fitzhugh 2002; Kelly

1988; Kuhn 1994; Nagy 2000; Nelson 1991; Odell 1996a, 2004; Parry and Kelly 1987; Torrence 1989a).

What do the assemblages from the sites tell us about variability in the technological strategies used by pre-contact period hunter-gatherers in Nachvak Fjord?

The overall aim of this thesis is to get a sense of the different technological strategies used by the groups occupying the sites. Caught up in this is the goal of gaining an understanding at the assemblage and artefact levels in order to recognize technological variability across time and space, within and between cultural populations. At the assemblage level, variability can be viewed as the similarities and differences between lithic assemblages in the types and amounts of artefact forms present. Interpreting this level gives clues about the overall stone-tool production, reduction, sharpening and discard strategies through the kinds and frequency of artefacts and debris present. Explanation of assemblage variability has the potential to provide information on site function and activity areas, group mobility, settlement-subsistence systems, and other socio-economic strategies (Binford 1977, 1979, 1980; Carr 1994a; Cowan 1999; Keeley 1982; Kooyman 2000; Milne 2000; Nagle 1986; Nelson 1991; Odell 2004; Odess 1998; Torrence 1989b). At the level of the individual artefact, variability can be viewed as the similarities and differences in artefact design and attributes. Inference at this level not only provides insights on behaviour and design consideration, but also of strategies for stone procurement, manufacture, use and discard at site during a particular place and time (Hayden et al. 1996; Kuhn 1994; Nelson 1991, Odell 2004).

1.4 Organization of chapters

In this thesis I consider the effects of environmental, social, and economic constraints in order to present a well structured view of technological strategies developed by hunter-gatherers in Nachvak Fjord. Chapter Two explains the overall theoretical approach used for interpreting the data in terms of technological organization. It focuses on the relationship between environmental conditions, socio-economic pursuits and technological strategies. Chapter Three presents the methodological approach used to acquire the archaeological data for the analysis, including the study of the raw material, the debitage analysis, and the analysis of the artefacts. These methods allow me to understand the data in terms of what activities were taking place at the sites and how it relates to technological organization. Chapters Four, Six, and Eight each contain a summary of the data recovery procedures used in the field and in the laboratory, including descriptions of the assemblages. Chapter Four describes the work and materials from the Kogarsok Brook-1 site, Chapter Six deals with the Lower Terrace assemblage, while, finally, Chapter Eight comments on the evidence from Tinutyarvik Cove-2. Chapters Five, Seven and Nine contain analyses of the data and my interpretations of each site. Each chapter is essentially a lithic analysis and in them I will provide an interpretation of the raw material, debitage, and tool assemblages from each site as well as offer my understanding of the technological organization of each culture. Finally, in Chapter Ten I will provide my overall conclusions on the research in an attempt to provide a cohesive summary of the analysis and how it relates to the research questions.

CHAPTER TWO

Theoretical Approach

2.1 Introduction to theoretical approach

This thesis presents a research design for the analysis of lithic remains based on a technological organization approach. Developed during the 1980's and having grown since, technological organization studies provide a framework for understanding and assessing variability within and among archaeological lithic assemblages. As defined by Nelson (1991: 57), technological organization "...is the study of the selection and integration of strategies for making, using, transporting, and discarding tools and the materials needed for their manufacture and maintenance. Studies of the organization of technology consider economic and social variables that influence those strategies". This research views technology as a dynamic human adaptive process, and as a means to solve problems posed by both the physical and social environments. It views technology as a problem solving process and a set of conscious and unconscious behaviours contributing to human adaptation in response to changing environmental constraints and socio-economic conditions (Binford 1979; Jochim 1981; Odell 1996a; Ricklis and Cox 1993).

The core goal of this research is to understand types of technological strategies used by stone-tool using people in Nachvak Fjord, and to hypothesise about how and why environmental, economic, and social conditions may have influenced technology and stimulated variability through time. In essence, this research attempts to expand our knowledge of prehistoric lithic assemblages in northern Labrador beyond the more basic assumptions about style, function and cultural chronologies, to include variables of technological strategies. Using a theoretical framework of technological organization put forth by Nelson (1991) this research is designed to analyse different levels of behaviour and how they relate to actual materializations of artefact design and activity distributions.

The selection of technological organization studies covering a wide variety of analytical levels that seek out evidence of human behaviour is substantial (Andrefsky Jr. 1991; Bamforth 1986, 1991; Binford 1979; Bleed 1986; Carr 1994a; Ingbar 1994; Johnson 1987; Kuhn 1994; Milne 2000; Odell 1996b, 2004; Parry and Kelly 1987; Ricklis and Cox 1993; Torrence 1989b). Nelson (1991) presents an integrated review of the techniques useful for addressing the organization of technology of small, stone tool using societies. Nelson's framework arranges the levels of behaviour in a hierarchy, based on the distance of the behaviour realm from actual material implications (Figure 2.1). No level in the framework is better or more informative than any other. Nelson (1991:58) states that while a research design would ideally include facets of every level in the model, the realities are that we are often only able to focus on limited aspects of human behaviour in the hope of contributing to the whole. This research will apply all levels of the model to the Labrador Archaic, Pre-Dorset, and the Dorset archaeological record in Nachvak Fjord, as much as the data will allow. Where possible the thesis will utilize data about environmental conditions, economic strategies and social practices.

2.2 Environmental conditions

The physical environment, including the geology, ecology and natural resources, climate, and topography, was a primary variable governing the potentialities of human

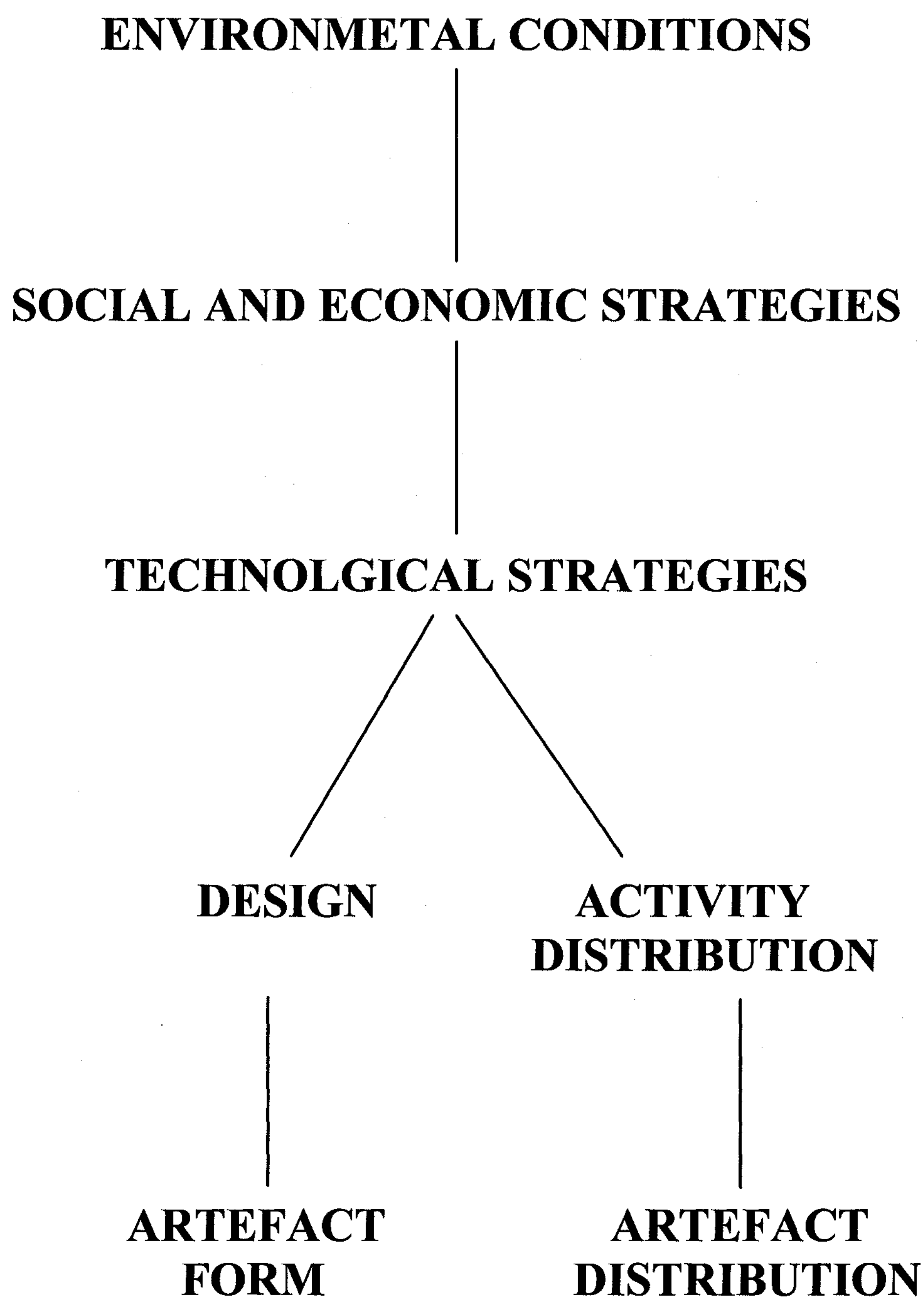

Figure 2.1: Schematic of Technological Organization Research Design (adapted from Nelson 1991).

systems. The environment had both a constraining and opportunistic affect on the types of possible large-scale human systems such as mobility and technological organization (Hodder 1987). With this being said, variability in long-term environmental structures would ultimately manifest changes and variability in human systems in diverse ways. From a technological organization standpoint, different environmental conditions such as resource and climate predictability, productivity, patchiness, and periodicity were influential and would have stimulated changes in technological strategies (Bamforth 1986; Binford 1980, 1990; Jochim 1976; Kelly 1988; Marquardt 1992; Nelson 1991).

Technological organization is largely affected by local conditions but it is not predetermined at the level of overall systemic cultural organization (Bamforth 1986). All humans, hunter-gatherers included, are viewed as decision makers within and part of a variable physical and socio-historical environment (Marquardt 1992). The physical structure of this environment is viewed as influencing human behaviour in some way. For technological organization strategies, it may involve choices concerning lithic resource acquisition, reduction and design strategies, re-use, and discard. Thus, in order to be in a position to reconstruct and assess technological strategies, local environmental factors must be given careful consideration. While we may never be able to fully reconstruct past environments, it is important to incorporate all available evidence in our models. Only in the context of environmental conditions, and technological capabilities and requirements, can we begin to understand technological choices within a specific prehistoric situation (Bamforth 1991, Nelson 1991; Odell 1996b).

2.21 Raw material availability

For a study such as this, information on raw material availability and quality are fundamental data sets (Andrefsky Jr. 1991, Ingbar 1994; Kuhn 1991; Ricklis and Cox 1993). As Ricklis and Cox (1993:444) state "the organization of technology involved an interrelationship among people, their location, the demand for tools, and the availability of lithic raw materials". Without disregarding more perishable items, workable lithics were used to make numerous tools and must have been a central element of the economic, social and spiritual existence of hunter-gatherers in northern Labrador (Loring 2002). With that being said, it is inevitable that the availability of raw material affected the ways that stone tools were made and used. Thus, in order to begin to assess particular archaeological situations, a fundamental step is to evaluate lithic resource availability and requirements for each cultural group in question (Odell 1996b). Past geological and archaeological reconnaissance in northern Labrador has made this possible.

Before a stone tool can be created, the maker must acquire suitable raw material that meets both economic and social demands. Not only must the raw material display the appropriate functional characteristics, but it should also be culturally acceptable. This notion of raw material procurement is especially relevant for studying stone-tool using people of northern Labrador. Here we have a culture-history of stone-using people that spans 7000 years[1] and has allowed archaeologists to associate particular raw material choices with different cultural groups over the long-term. For instance it is well

[1] By 7000 years ago Maritime Archaic people were at least entering northern Labrador and making use of the Ramah chert sources as the raw material shows up in central Labrador sites after this date (Loring 2002).

understood that the Labrador Archaic became increasingly fond of Ramah chert over time, especially during the Rattler's Bight Phase (Fitzhugh 1978; Loring 2002). Ramah chert, which will be discussed in greater detail later, could be quarried only in the mountainous region of Labrador between Saglek Bay and Nachvak Fjord (Figure 2.2). This is an area that does not seem to have been habitually occupied for any duration by the Labrador Archaic. The current archaeological information leads us to believe that these peoples left their habitation sites farther south to acquire bounties of this material, and possibly to hunt game, and return again as additional materials were required (Loring 2002). While the Labrador Archaic technological requirements for producing large bifaces certainly made Ramah chert an ideal choice, the high frequency of its use over time, the distances groups would travel to acquire it, and its use in ceremonial contexts and as long distance trade items, reflect its cultural significance (Loring 2002).

Besides the Labrador Archaic, Middle and Late Dorset groups in northern Labrador and beyond have shown an affinity for Ramah chert. While it is supplemented in small quantities by other fine-grained cherts, Ramah chert is the dominant raw material choice in Dorset culture in Labrador (Nagle 1984b, 1986). While the social implications of Ramah chert use among the Dorset have not really been systematically or theoretically explored, the excellent quality and flaking properties of this stone (Rast 2001), along with its abundance and relatively "cheap" availability made it an obvious choice for stone implements from a economic standpoint. For instance, Nagle (1986) has suggested that over the course of the Dorset period in Labrador there were some shifts in Ramah chert procurement strategies. Nagle recognized a distance-decay relationship for Ramah chert

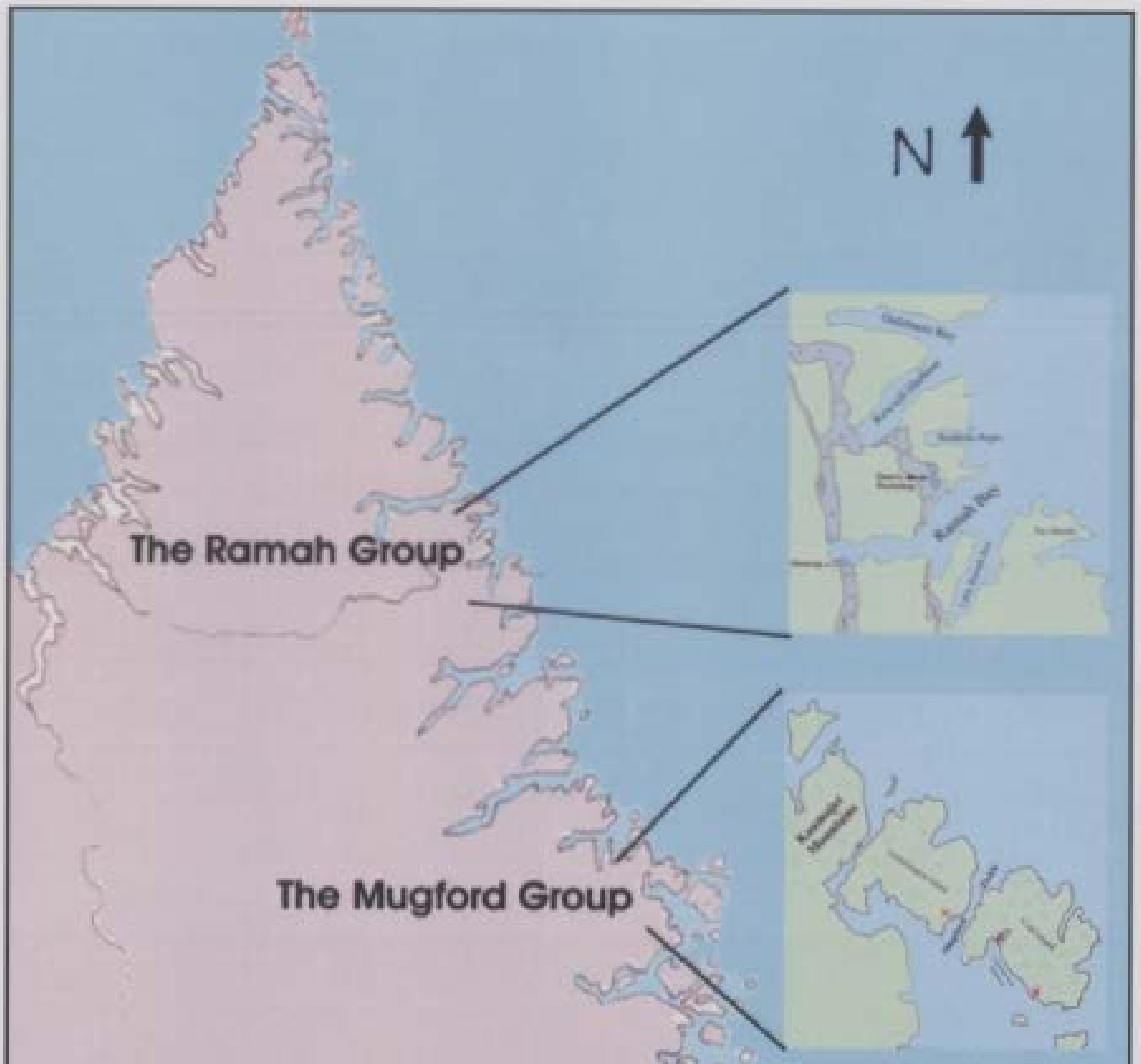

Figure 2.2: Map of Major Chert Sources in Northern Labrador.

in all Late Palaeoeskimo groups but that there was greater supplementation of other raw materials as site distance from the Ramah chert quarries increased in Early and Late Dorset periods. However, for the Middle Dorset period, he noted that the frequencies of Ramah chert were higher in these periphery areas, possibly as a result of more efficient procurement networks during this middle period.

The second major raw material choice in northern Labrador is Mugford chert, found only in the Mugford Tickle region of the north coast (Figure 2.2). While these high quality cherts occasionally used by Labrador Archaic and Dorset groups, they were the primary lithic choice for Pre-Dorset people. The two varieties of Mugford chert, Kaumajet black chert and Cod Island chert, were the most common types of raw material used by Pre-Dorset knappers. Even at sites at some distances from the source, Pre-Dorset assemblages from the Saglek Bay and Nain regions are predominately made up of Mugford Cherts (Cox 1977, 1978; Fitzhugh 1976, 2002; Tuck 1975, 1976b). It is important to note here is that the Pre- Dorset people throughout their history had well developed acquisition strategies for procuring this chert via either direct or indirect acquisition strategies. Unlike the previously discussed groups who occasionally supplemented their Ramah supplies with Mugford cherts, the Pre-Dorset rarely used Ramah chert (Fitzhugh 2006). This is so even though Pre-Dorset groups occasionally acquired other fine-grained cherts from north and south of the Mugford quarries, and often set up habitation sites in proximity to Ramah chert sources and at great distances from the Mugford quarries. While there may well be functional and economic factors for not using Ramah chert, it seems that social and cultural factors were significant.

A fundamental part of technological studies is the identification of raw material sources. Since raw material sources are stable and fixed aspects on the prehistoric landscape, and are at the top of the technological organization hierarchy, they are a fitting starting point for this research. It is also recognizable that particular lithic sources were of variable importance over time, both within and between cultural groups, as technological strategies varied in both the short and long-term (Ingbar 1994).

A leading researcher on prehistoric technological organization and how it is associated with raw material availability is William Andrefsky Jr. In a 1991 paper, Andrefsky Jr. considered the availability of stone raw materials, namely their abundance and quality, as a primary factor in hunter-gatherer lithic technological organization. While Andrefsky (1991) acknowledges the importance of other influencing factors associated such as settlement patterns and mobility strategies, he takes the premise that the first step must be to assess raw material availability. His research allowed him to conclude that attributes such as lithic abundance and quality would most influence tool manufacture and primary technological strategies, notably the production of either *formal* or *informal* tool types. *Formal* tool types represent those that have undergone extra effort in manufacture and are often considered to be a 'curated' tool form (Binford 1979) possessing characteristics such as flexibility, transportability, and maintainability (Andrefsky Jr. 1991). These types would include items such as bifaces, prepared cores, and formal flake tools such as scrapers, endblades, and flake knives that have been typically associated with more highly mobile groups. The logic for this assertion is that mobile groups may find themselves in areas where there are no suitable raw materials and thus there is a greater need to have portable, ready-made, reliable tools at their disposal. On the other hand, *informal* tools are those that have undergone little by way of extra effort in manufacture. With respect to form, informal tools are unstandarized with no or little consideration of shape or style. They were likely produced, used, and discarded over a short period of time. These types are also often referred to as expedient or 'situational' tools (Binford 1979) and were used in response to immediate task requirements rather than as a form of anticipation of use (Andrefsky Jr. 1991). These types of tools are generally more wasteful of raw material than formal tools and they do not require the skilled craftsmanship or amount of work of formal tools. Informal tool types include utilized flakes and minimally retouched flakes and have been linked with less mobile groups who have longer-term site occupations (Andrefsly Jr. 1991).

While many researchers of technological organization recognize that raw material availability plays a role in tool production (Bamforth 1991; Kuhn 1994; Parry and Kelly 1987; Ricklis and Cox 1993) most are more inclined to primarily link tool production types with mobility organization. Andrefsky Jr. however suggests that " the availability of lithic raw materials will influence the kinds of stone tools produced at a site, and that such influences may be only indirectly related to settlement configurations" (Andrefsky Jr. 1991: 23). Basically what he is saying is that sedentary groups, without easy access to suitable raw materials, would not necessarily produce informal tool types. Similarly, mobile prehistoric populations would not necessarily produce formal tools if high quality lithics could be obtained as needed at various locations (Andrefsky Jr. 1991).

Andrefsky Jr. (1991) drew upon archaeological and ethnographic data to propose that raw material availability plays a fundamental role in the organization of technology, notably how it relates to the amount of effort needed to manufacture different types of lithic artefacts. This research makes the important point that if we do not consider raw material costs then the designations of formal and informal tools may be misleading. From the perspective of raw material abundance, the amount of raw material nearby and its associated procurement costs or expenditures will have a direct affect on the degree to which it utilized. Thus, theory dictates that when local raw material is limited in abundance, nonlocal lithics will be procured. Because non-local materials are likely to be scarce due to high economic cost (transport weight and distance) or social value associated with them (exchange, trade, or exotic value), they will be made into formal tools. From the standpoint of raw material quality, notably the ease with which it can be manufactured and controlled in the tool creation process, plays an important part in technological decision-making. High quality fine-grade lithics are easily worked and shaped into formal tools while coarse-grained materials are difficult to control and these low quality lithics are likely to be produced as informal tools (Andrefsky Jr. 1991: 29).

When lithic quality and abundance are viewed together, the role of raw material in tool production becomes clearer. At the most basic level, raw material availability affects technological strategies as they relate to the manufacture of either formal or informal tools. As demonstrated in Figure 2.3, when formal and informal tool assemblages are viewed in the context of abundance and quality, a pattern presents itself. To summarize, at sites where there is an abundance of high quality lithics we can expect to see both

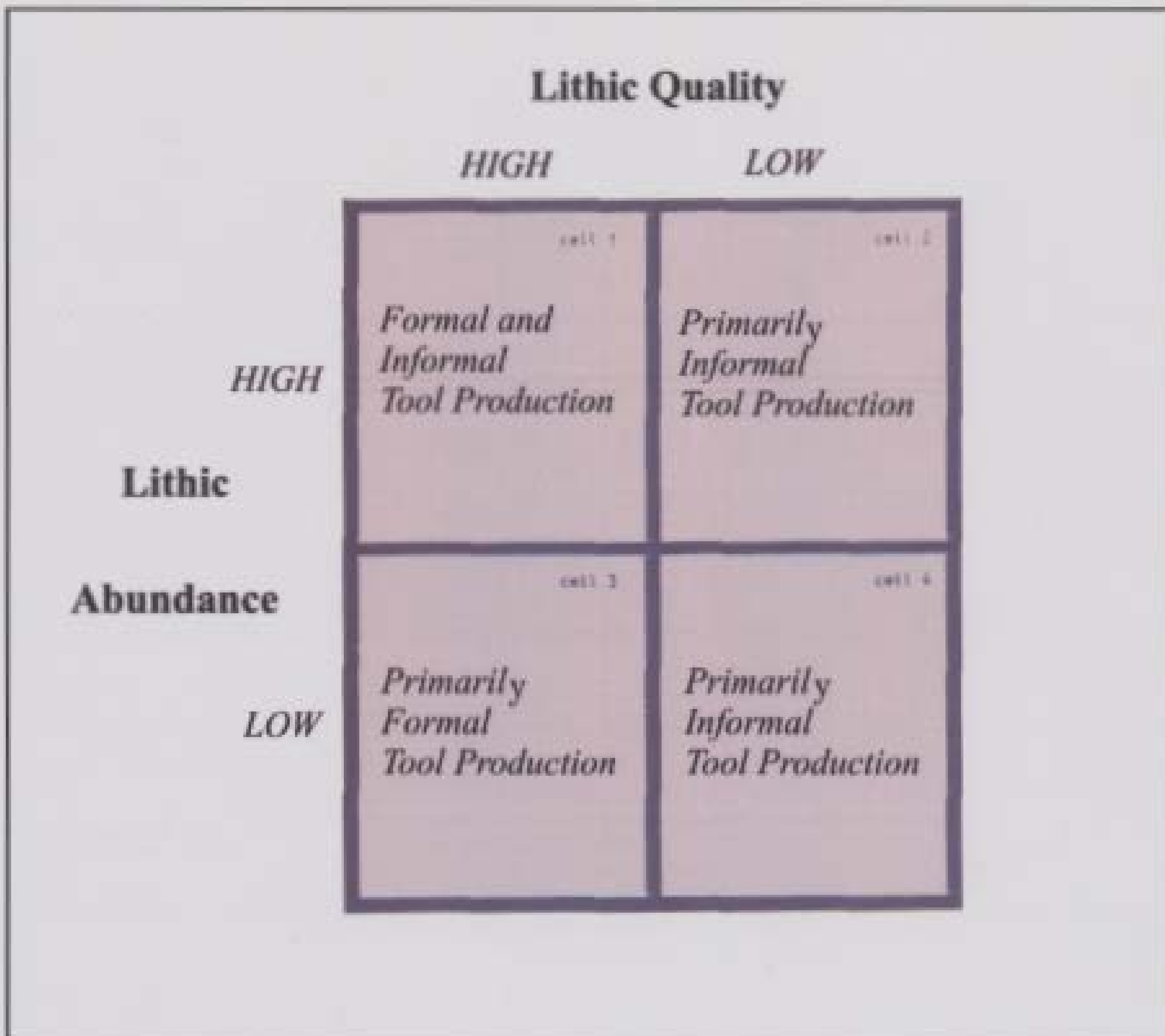

Figure 2.3: The Relationship Between Lithic Quality and Abundance (after Andrefsky Jr. 1991).

formal and informal tools. We would expect formal tools because of the workability and flaking properties of the stone and we would also expect informal tools because of the lack of need for material conservation. Where low quality lithics existed in high quantities, we should expect to find mainly informal tools, the primary premise for this being that the poor quality stone was not suitable for making much in the way of formal tools. On the other hand where high quality lithics were in low abundance, we could predict primarily formal tool production at the site. The reason for this being that one could not afford to waste raw material through informal tool production and thus the practice of economizing behaviour would be favoured (Jeske 1994). Formal tool design is the more efficient form of technological organization in this scenario due to the inherent qualities of formal tools, including durability, maintainability and transportability. Finally, at times when there were low amounts of poor quality materials, we would largely see informal tool production, the rationale behind this being that not only would it have been difficult or impossible to fashion formal tools out of poor grade materials, but it may have very well been uneconomical and wasteful to do so (Andrefsky Jr. 1991:30).

As Andrefsky (1991: 31) notes, "if all other variables held constant, quality and abundance of raw materials may structure stone-tool production in a predictable manner". However, there are other variables that need to be considered when attempting to explain lithic technological strategies of production with respect to raw material availability. While abundance and quality of raw materials should be the starting point of such research, there is an assortment of variables, unique to different situations, that condition technological organization. While many variables are economic in nature, such as procurement and transport costs, distance to lithic source, systemic utility, etc (Ricklis and Cox 1993), there are also connections between raw material and technological organization that are purely socio-cultural in nature (Gero 1989; Jeske 1994; Loring 2002). As will be discussed, many of these socio-economic variables are tied up in *mobility organization*. For instance as mobility relates to raw material procurement, there is the argument over whether or not hunter-gatherers obtained raw materials as part of an embedded[2] mobility strategy or if they practiced a direct procurement strategy whereby the primary motive was to acquire lithics (Binford 1979). While mobility organization operates on a set of separate principles and on different levels than technological organization, it encompasses such things as site structure and settlement patterns, and acts in concert with technological organization (Kelly 1988; Ricklis and Cox 1993). In essence, "the effect of mobility on technological organization is clear because mobility simultaneously dictates tool needs and access to raw materials" (Carr 1994b).

2.22 Ecological resource availability

Subsistence is one of the most basic of all human requirements. Arctic hunters and gatherers were highly dependent upon the successful harvesting of animals not only for food, but also for other by-products that could be made into fuel, shelter, clothing, and equipment. Through the constant use and reliance upon animals of both the land and sea, people adjusted their land-use patterns in response to different socio-economic and ecological pressures. Changes in subsistence pursuits were set in motion by the regular seasonal and annual movements of prey animals within the exploitable region. It is apparent that to survive and thrive in an area such as Nachvak, hunters must have possessed an innate knowledge of animal behaviour, both in terms of locating and capturing prey. Not only must societies have been able to predict the best locations for

[2] Binford (1979) used the term "embedded" to refer to the practise of groups acquiring stone raw materials while conducting other pursuits in areas were materials can be obtained. For Binford's study group, the Nunamiut Eskimo, they never made special trips or expended extra effort to procure lithics but rather did so when the opportunities arose when traveling, hunting etc.

hunting but they must have possessed the technological capabilities to kill and transport game and the social organization necessary to utilize and process it (Freeman 1984).

The cultural ecological approach has served the goals of providing the descriptive, culture-history oriented explanations of cultural change as it relates to the environment for the last half-decade in arctic archaeology (Hood 1998). While there is still a utility in cultural ecology as strictly a processual approach, notably in areas such as northern Labrador where we still do not have a lucid story of the regions prehistoric past, its application is also a vital part of studies such as this that attempts to incorporate more of a human element. Technological organization, the tools and techniques required for providing the necessities of life, interact simultaneously with the three components of the environment; the physical (e.g. raw material, geography, climate), the cultural (e.g. society, agency, ideology), and the biological (e.g. plants and animals). The connections between the environment and technology are subtle, and research inquiring into the human adaptive process can gain information by focusing on technological organization.

The environment does not determine cultural manifestations; it simply provides opportunities for human exploitation. A society's mobility and technological organization determine which, and to what extent resources will be exploited in any given time and space. In other words, not all cultural variability is caused by environmental change, as other factors such as technology and social organization alter cultural make-up. For this research it is important to integrate as much data as possible with regards to both the natural environment, as well as the archaeological information as it relates to hunting techniques and social structure of the cultures in question. We should expect to see variability in subsistence-settlement systems between different social groups that inhabited the Nachvak Fjord region, as well as recognize commonalities between them.

While the technological and hunting strategies, or core hunting areas may have altered over time at Nachvak, the need for meat, fat, skins, bones and other resources from animals of the land and sea have always existed. For all hunter-gatherers, and especially for those in a northern setting with limited floral resources, patterns of human subsistence are rooted in the people's knowledge of the habits, behaviours, and movements of animals (Tanner 1979). As revealed both archaeologically and ethnographically, animals were also very much a part of prehistoric cultures' social and ideological belief system (McGhee 1996; Rasmussen 1929; Tanner 1979). Animals of the land, sea and ice are constantly on the move as they migrate amid the changes in the seasons. People had to be aware of subtle cues in their landscape and be mobile like the animals they pursued in order to maximize their harvest each season. More specifically, "knowledge of feeding, nesting, or denning sites; of the routes followed by migratory caribou, seals, char, or salmon; and the habits or 'tricks' of a species of animal was an important part of a hunter's skill and of his success in securing whatever game was at hand" (Brice-Bennett 1977: 155). The amounts and types of food, and the seasonal and yearly variation of the species surely affected the demographic makeup of band society.

An important step in this research is to try to figure out which animals were available to past hunters in the Nachvak Fjord region, including how things such as population levels, migrations, and habitats of animals may have altered over time and space. While lacking direct archaeological or faunal evidence of what food resources particular cultural groups were exploiting on a regular basis, there are avenues that allow us to attempt to reconstruct the 'menu" of what may have been available.

For areas of northern Labrador there is good data available that provides insights on the ecological structure of the region. In particular, ethnographic data on land-use patterns of the Labrador Inuit from the early historic period (Taylor 1974) and more recent Inuit cultural-ecological data (Brice-Bennett 1978; Kaplan 1983) offer understanding for human-animal relationships in the region and provide useful analogues for interpreting the socio-economic variability of prehistoric populations at Nachvak Fjord. More specifically, Taylor's (1974) anthropological examination of Labrador Eskimo settlements of the early contact period (1771-1784) incorporated the data of Moravian missionary records and provides insight into aspects of whale hunting, shifts in seasonality, ice conditions, and other clues for better interpreting the archaeological record. Brice-Bennett (1978) provides an in-depth report on Labrador Inuit land-use practices in northern Labrador, including the Nachvak region, and how land-use demonstrated variability from the pre-settlement period to the post-settlement period. Brice-Bennett (1978) provides great detail and descriptions on not only settlement patterns of the areas but also on all of the available species, the importance of animals, the variability and subtleties of the seasons, and importantly the intrinsic movement of animals throughout the year. As for Kaplan's PhD research (1983) on economic and social change on the Labrador Neo-Eskimo, she built on the previous land-use information for Nachvak Fjord. By incorporating the land-use data from Brice-Bennett (1978) with the archaeological reconnaissance data from the Torngat Archaeological

Project (Fitzhugh 1980) and with Hudson Bay Company post records from the Nachvak Post Journals, Kaplan was able to present a more detailed and specific and outlook on the animal resource availability of the region.

Although Kaplan's research (1983) deals with Neoeskimo occupancy of Labrador, her investigations of the Nachvak region provide useful analogies and a vital starting point for other hunter-gatherer studies. The archaeological and ethno-historical data revealed that Neo-Eskimo groups employed different settlement strategies at Nachvak Fjord. In particular, there are remains of three large Neoeskimo winter villages dispersed throughout the fjord, two of which are located in the inner fjord zone. One of these, Nachvak Village (IgCx-3) is at the junction where the fjord splits into two arms, and coincidently is where Palaeoeskimo habitation remains were also located and where the polynya opens regularly (Kaplan 1983). This alone suggests that winter occupation in the area was a viable, if not an optimal option for particular years or periods.

By looking at the ethnographic data (Kaplan 1980, 1983; Taylor 1974), we have also learned that for Inuit populations, settlement aggregations were variable as a result of changing socio-economic demands. While this broad statement may be applied to prehistoric Indian and Paleaoeskimo groups, certainly there were different demands acting upon them due to their technological capabilities and mobility strategies (Kelly 1982). Form the perspective of ecological resource availability; Kaplan was able to conclude, "suitability of hauling out locations, good denning locations, feeding grounds, water temperature, ice cover, and snowfall are among the factors determining the distributions of animals throughout Labrador" (Kaplan 1983: 106).

2.23 Other environmental conditions

For this research, there are other environmental conditions in the Nachvak region worth exploring besides those directly associated with the procurement of critical resources. These concerns are broader in nature and are in many ways influential upon many of the variables already discussed. Throughout human history in the Eastern Arctic changes in environmental factors and climatic variability have had significant influences on the movements of animals and on human populations (Fitzhugh 1997). For this post-glacial, arctic setting, the research is concerned primarily with medium-term palaeoclimatic variability in northern Labrador, as well as the short-term variability in localized sea ice and weather conditions. While past research has tended to focus on the large-scale hemispheric environmental patterns as the driving force behind cultural developments in the Arctic, the idea of the short-term as more significant is not new for Labrador prehistory. Tuck (1976a) noted the that the often severe and unpredictable weather conditions, and their effects on animal populations and snow and ice conditions, of northern Labrador were a more likely cause of regional abandonment in the area throughout prehistory. Unfortunately, the current palaeo-environmental data is not precise enough to record the short-term, extreme events, which may have been historically important in effecting cultural change. However, we do know that both the marine and terrestrial environments of the Eastern Arctic are sensitive to small climatic fluctuations and we are able to discuss some of the possible conditions and outcomes that may have occurred as they relate to Nachvak Fjord and its human and animal inhabitants.

By the time the first humans entered the Nachvak Fjord region of northern Labrador from the south nearly 7000 years ago, the area would have been classified as being in the *shrub tundra zone*, as it is today (Fitzhugh and Lamb 1981). During this period, Labrador Archaic populations were already adapted to the coastal areas of Labrador and the shrub tundra areas, with their pockets of small stands of dwarf birch, alder, and willow in the inner fjord valleys, would have proved suitable for their short-term needs. Fitzhugh and Lamb (1981: 363) suggested that the Labrador Archaic "were capable of living north of the forest, although not north of the shrub tundra zone". Besides shifts in forest-tundra type boundaries, change in sea-ice conditions and thus that of marine life may have affected large-scale population movements of people (Fitzhugh and Lamb 1981). This principle may be exceptionally applicable for at least the initial movement of Palaeoeskimo peoples into northern Labrador from the north, which may be linked to climatic cooling and other environmental changes.

Whatever large-scale changes were occurring in northern Labrador, it is much more likely that the medium-trends and short-term environmental events were having the most effects on hunter-gatherers and in turn on technological organization. Of major concern for Nachvak are the possible changes in sea-ice conditions that would have altered the seasonal movements of animals and in turn the settlement-subsistence pursuits of people. The relationship between humans and the environment in this setting is largely dictated by sea-ice and depends on the marine-terrestrial economic balance. For much of the year sea-ice is a dominant part of the land/seascape in northern Labrador as it greatly influences the animals hunters depend on to meet their socio-economic requirements.

While surely sea-ice condition variability such as time of freeze-up and melting, location of the *sina* edge, roughness and snow cover all played an important role, the variability in the dynamics of the polynya at the inner reaches of Nachvak Fjord was a primary influence on where people chose to establish winter settlements.

Polynyas vary greatly in terms of their size and shape and their integrity is influenced by a variety of factors, including tidal fluctuations, currents, winds, and upwellings, or a combination of the above (Stirling 1980, 1997). The type of polynya of interest in this study is the type that recurs in the same locality each year, termed a *recurring polynya* (Stirling 1980). There are two types of recurring polynyas; those that remain open throughout the coldest winter months and those that may become ice covered during particular winters but can be relied upon to be the first bodies of water to open in early spring (Stirling 1980, 1997). It is the latter type of polynya that exists at the Nachvak Fjord and has historically demonstrated an increased abundance in marine life. As reported by the factor at the Hudson Bay Company post and by Inuit ethnographies (Kaplan 1983) strong winds and current activity caused the formation of the small polynya at the junction of Tallek Arm and the main body of the fjord that was usually open for most of the winter. When it did freeze, the area was first to open in the spring.

The most basic factor linking human settlement and polynyas "is the presence of available and potential food resources in the open water area" (Schledermann 1980: 294). Marine animals such as various types of seals, walrus and even whales and polar bears, as well as sea-bird populations, are known to be abundant in areas close to these smaller recurring polynyas (Stirling 1980). Not only do polynyas provide an open niche for animals, they have been reported to be more biologically productive than pack-ice edge habitats (Stirling 1980, 1997). Small recurring polynyas provided higher levels of primary biological production, which in turn would support a larger biomass of benthic and pelagic organisms and thus greater numbers of birds and mammals (Stirling 1997). With that being said, and in the context of other environmental factors, polynya habitats are susceptible to changing climatic conditions. Severe short-term weather phenomena such as colder temperatures would affect sea-ice conditions and possibly restrict polynya formation (Henshaw 2003). Research in the Beaufort Sea region has shown that a couple of consecutive years of this type of occurrence can greatly affect the population numbers and reproduction rates of species. Thus research has demonstrated that "an increase in ice severity affects the biological productivity of polynyas" (Henshaw 2003: 3).

While not all polynya areas were equally important in terms of human settlement and hunting areas, archaeological and ethnohistorical data provides evidence that the polynya at Nachvak Fjord was very attractive to past hunter-gatherers in the area (Kaplan 1983; Whitridge 2004b). The large multi-component winter village site (Nachvak Village) contains evidence of Pre-Dorset, Groswater, Dorset Palaeoeskimo as well as prehistoric Thule and Labrador Inuit occupations. Located more than 40 kilometres from the *sina*, the polynya must have provided available and dependable food resources.

2.3 Socio-economic strategies

Patterns of culture history and change are clearly more dynamic than those of large-scale environmental factors. While environmental variability was meaningful and did indeed prompt changes in human behaviour, cultural adaptations are made when a balance is reached between economic and social requirements. Having reviewed some of the environmental conditions of Nachvak Fjord, I now turn to some of the economic and social strategies that ultimately had direct effects on technological organization. These various socio-economic strategies "are viewed as problem-solving processes that are responsive to conditions created by the interplay between humans and their environment" (Nelson 1991:58). In order for hunter-gatherers to overcome various constraints they had to find appropriate solutions in order to overcome adversities. From an economic standpoint for instance, people are faced with the ongoing problem of acquiring food resources. We must view subsistence-settlement systems as goal oriented decision-making systems with an awareness of future consequences and conditions. Mobility theory is one such avenue that can be used as a middle-range theory to help interpret this level of technological organization research. Besides the economic aspects of mobility organization, there are also a number of purely social strategies that had very real effects on technological organization by means of *artefact design* and *artefact distribution* (Nelson 1991). While studies of this type are not as common in technological organization research, there are methods to help get at the core of these issues.

2.31 The organization of mobility

Mobility refers to the ways in which hunter-gatherers move across the landscape during their seasonal round, and vary this round year to year. It is largely related to the structure of food resources in a region (Kelly 1993) but is mediated by social demand, information, transport and processing costs, technology etc. Exploiting food and other vital animal resources when they became available and carrying out the socio-economic requirements, including ritual, cultural, and political needs of the group, was part of an integrated strategy of movement across the landscape referred to as the *organization of mobility* (Kelly 1993, Odell 2004).

Mobility organization involved a number interrelated strategies that not only concerned locating, capturing, and processing available natural resources, but it also included decision making processes concerned with where to establish camps and for how long, which parts of the social group to have participate in particular subsistence activities, and other group logistics including the types of technologies that would be required to fulfill the resource acquisition goals of the group. The most influential researcher in the issue of hunter-gatherer mobility organization and human-decision making has been Lewis Binford. In his 1980 article *Willow Smoke and Dog's Tails: Hunter-Gatherer Settlement Systems and Archaeological Site Formation,* Binford recognizes two types of hunter-gatherer settlement systems, those of *foragers* and those of *collectors*. The distinctions between the two groups should be manifested in the archaeological record through varying site types, distributions and assemblages, which reflect the degree of logistical mobility of a group.

Binford's (1980) first settlement-subsistence system is a foraging system. Generally, foragers do not store food; they live in areas with evenly dispersed resources, and acquire these resources by moving frequently over short distances using an opportunistic mobility strategy. Since one area is as likely to have a foodstuff or raw material as the next, foragers map onto resource patches, gathering on an encounter basis and displaying a high degree of residential mobility.

Binford (1980) feels that a foraging society will utilize two different site types: the residential base camp, and locations. The residential base camp is the center of subsistence activities for the group. This is where people eat and sleep, and where most of the processing, manufacturing, and maintenance activities take place. Locations are defined as extraction sites. They are low bulk, often isolated, procurement areas such as a lithic outcrop quarry, a kill site, or berry-picking patch. Locations are sites specifically designed for resource extraction tasks.

The second settlement-subsistence system characterized by Binford is the collecting system. Binford (1980) views collectors as occupying areas where resources are not evenly distributed. Collectors are logistically organized, acquiring specific resources at specific times of year via specially organized task groups. Collectors store food, they display lower residential mobility than foragers, and their settlement-subsistence systems result in three additional site types. Besides the residential base camp and extraction locations, collectors exhibit field campsites, stations, and cache locations.

In summary, "foragers move consumers to goods with frequent residential moves, while collectors move goods to consumers with generally fewer residential moves" (Binford 1980: 15). While this generalization appears simple, of interest to archaeologists is why these differences come about. Binford's (1980) understanding of patterning in the ways hunter-gatherers are organized for subsistence purposes is based on the influence of environmental factors on a specific culture. He raises the question of what clues should we look for which may characterize hunter-gatherer adaptations, and which factors favour either a foraging or a collecting strategy. Binford (1980: 13) recognizes that mobility is a strategy employed as part of any human adaptive system, and that it should be most responsive to the ecological make-up of the environment. While there are limitations in the model, the most important insight to take away from it is to recognize the allowance of cultural variability. Forager and collector variability are not to be viewed as opposing polar principles but rather, "organizational alternatives along a spectrum which may be employed in varying mixes in different settings" (Binford 1980: 19). With Binford's theory in mind, successful mobility strategies were made possible through technological choices that allowed groups to achieve immediate goals such as procuring and processing food, and providing shelter and warmth. This integration of technological organization and the forager-collector theory has been one aspect of the growing trend for researchers to reevaluate and expand Binford's original applications (Habu and Fitzhugh 2002; Nagy 2000).

2.32 Other socio-economic factors

Besides the relationship between the organization of mobility and technology, there are many other social and economic factors that were caught up in the organization of technology that can be examined archaeologically. Technology is much more than a material outcome of making objects to perform a task. It is a dynamic phenomenon embedded in the worldviews of particular social groups and in the minds of individual agents (Dobres and Hoffman 1994; Gero 1989). For the prehistoric groups of Labrador there were certainly social dynamics at play in structuring the stone tool technologies in the form of procurement and exchange, use, style and form to name a few.

2.4 Technological strategies

A major goal of studies in technological organization is to figure out which technological strategy or combination of strategies were used and how these relate to behaviour and cultural change over time. Studies in technological organization have typically recognized *curation* and *expediency* as the two most common strategies of prehistoric stone technology. In addition, a third strategy referred to as an *opportunistic* strategy, is thrown into the mix as I feel it was a distinct technological strategy that is represented archaeologically, as are curation and expediency. These designations vary from more traditional categorizations of technological strategies that view curation as planned and expediency as situational. I view opportunistic strategies as technological responses to situations whereas expediency and curation demonstrate higher levels of technological effort. Opportunistic strategies are expected to have been implemented by groups in areas where knowledge of raw material sources was not extensive and lithics are made use of on an encounter basis. All three concepts represent different plans for reaching a goal and do not restrict a type of tool or assemblage make-up (Nelson 1991).

The term "curation" has been defined many ways in studies of technological organization (Bamforth 1986; Binford 1977, 1979; Bleed 1986; Kuhn 1994; Odell 1996b; Odell et al. 1996). A strategy of curation involves designing tools and tool-kits with the intention of some type of extended use-life. Curated tools may include those that have undergone a technique of advanced manufacture or special care that would allow for a tool to be maintained, reshaped, recycled, resharpened, and or transported from site to site (Bamforth 1986; Bleed 1986; Kooyman 2000; Kuhn 1994). A curated tool does not have to include all of these characteristics, however, a major variable that separates a curated strategy from an expedient strategy is the "preparation of raw materials in anticipation of inadequate conditions (materials, time, or facilities) for preparation at the time and place of use" (Nelson 1991: 63). Since a curated strategy involves some degree of advanced planning it is often associated with residential mobility (Binford 1976) and was particularly important for mobile groups that were forced to constantly carry all of their gear. Curation, however, is one planning option that may be altered depending on the situation. Thus, a group that may be viewed as being logistically organized may or may not exclusively utilize a curated strategy all of the time.

The second technological strategy, expediency, has usually been defined as one in which tools are manufactured, used, and discarded according to the needs of the moment (Bamforth 1986). In the thesis expedient artefacts are also referred as those that have undergone a smaller degree of technological effort than curated technologies but still possess some degree of maintainability or design not found in opportunistic strategies. For instance some expedient tools may have been quickly shaped to give it a form similar to a curated tool that is similar in function. However, unlike the curated artefact the expediently made tool will not be transported to another site or recycled and it was not made in advance of use. As well, unlike an opportunistic strategy, the expedient tool usually received an extra effort in manufacture to produce the working edge and it was not necessarily abandoned after task completion. We should expect to locate signs of an expedient strategy where time and location of use are more predictable. As well, we should expect that raw material availability not be an issue when an expediency strategy is in use, as it is often associated with situations when stockpiling or caching of raw materials were planned or when people had anticipated on being in proximity to raw material sources (Bamforth 1986; Parry and Kelly 1987).

Making this issue more complicated is the fact that curated and expedient technologies are often used together by the same groups at varying points in time, making the archaeological record increasingly complex. Not only can the same group use different strategies at the same time but the artefacts themselves can also move between technological classes. The realization that foragers and collectors are both likely to use curated, expedient and opportunistic production systems underlines the notion that mobility and technological strategy are not directly correlated. For these reasons it is important that researchers do not view curation and expediency as mutually exclusive technological systems, but "as planning options that suit different conditions within a set of adaptive strategies" (Nelson 1991: 65).

As mentioned this research recognizes a third technological strategy that is not planned and is purely a response to the immediate task at hand. This is referred to as an opportunistic technological strategy and it involves little or no tool modification and the abandonment of a tool either after the completion of a task or after the working edge of the tool is no longer performing at the desired rate of function. An important feature of opportunistic behaviour is the availability of raw material as this strategy may usually be linked with a group taking advantage of a 'cheap' raw material supply. Opportunistic strategies are shaped by specific environmental and socio-economic situations and they do not factor in the broader context of technological planning, as is the case with curated and expedient technologies. Fortunately for archaeologists concerned with variability in technological organization, the different characteristics of curation, expediency, and opportunistic strategies have implications on artefact design and artefact distributions.

2.41 Artefact design

Since stone tools are the outcome of human responses to particular tasks, tool design plays an important role in the success of task achievement. Researchers on technological organization have identified various critical dimensions of tool design and manufacture including reliability, transportability, maintainability, versatility and flexibility (Bleed 1986; Nelson 1991). Some of these concepts are difficult to apply to stone-tool assemblages, either because most artefacts and assemblages include a combination of the ascribed design characteristics, or because it is difficult to accurately determine if the design criteria were in fact those chosen by the toolmaker. Finally, because the stone artefact was only a small part of a larger composite tool, and it was the entire tool that was given design consideration, I feel it is more productive for this research to use these design characteristics as descriptive terms to aid in the interpretations of the technology and instead focus on the types of lithic production and resharpening strategies that were in play (Hayden et al. 1996).

2.5 Production/reduction/sharpening strategies

Stone tools that demonstrate similar procurement, core reduction, and use-life qualities are attributed to distinct lithic production/reduction/sharpening strategies (Hayden et al. 1996). This research recognizes different tool production systems utilized by the prehistoric peoples of northern Labrador as revealed through the archaeological evidence. The major strategies identified in this study include: 1) the expedient block core strategy; 2) the bifacial strategy; 3) specialized prepared core strategy (microblade); and 4) the groundstone strategy. I will explain the characteristics of these systems and comment on the strategies, constraints, and design considerations associated with each.

2.51 Expedient block core strategy

This tool production strategy involves the utilization of unprepared cores, sometimes referred to as amorphous cores (Johnson 1987). These cores are usually kept at habitation sites and the strategy has been linked to groups that typically display limited residential mobility; however it can be a sign of more highly mobile people in an area of abundant raw material (Parry and Kelly 1987). Core reduction involves the removal of flakes as the need arises and modification to the flake is either absent of kept to a minimum. Flake tools are often discarded after task completion unless large, still-usable flakes are involved. Core material is typically readily available due to stockpiling and/or proximity to a quarry (Hayden et al. 1996). The cores in this system of reduction demonstrate little platform preparation and minimum regard for establishing subsequent flake removals. This method does not conserve raw material well, and yields unstandardized flakes but it requires little knapping skill and a low investment in time (Johnson 1987). Tools resulting from this strategy are often referred to as *informal tools* and include utilized and retouched flakes, expedient flake knives and expedient scrapers, but also include more formalized flake tools such as flake knives and endscrapers.

2.52 Bifacial strategy

A bifacial strategy is associated with groups that display a high degree of residential mobility, especially when there are constraints on the amount of suitable lithics that can be transported when traveling during the seasonal rounds (Hayden et al 1996). The presumed advantages of bifaces include their multifunctionality, long use-life, reliability and strength, transportability, and their conservation of raw material (Figure 2.4). To take this a step farther, large bifaces can be used as cores and tools, and can be an economic method for mobile people to carry around a large number of thin, sharp flakes in a compact form. I use the term biface to refer to fairly large, bifacially reduced tools, including knife blades, stemmed points, and bifacially worked endblades and other bifacial tools suitable for hafting.

2.53 Specialized prepared core strategy (microblade strategy)

Microblades, also referred to as prismatic blades (Parry 1994), are manufactured via a formalized core reduction strategy. The formalized cores, referred to as prepared cores, are those in which the platform is shaped and maintained by specific knapping procedures, excluding the occasional edge grinding which is evident in the production of

COSTS & BENEFITS	Flake Tools from Cores	Bifacial Tools
Production Costs	***Low***	***High***
Tool Use-Life	***Short***	***Long***
Raw Material Consumption	***High***	***Low***
Multifunctional Utility	***Low***	***High***
Hafting Costs	***High***	***Low***
Portability	***Low***	***High***

Figure 2.4: The Cost-Benefit Relationship Between Flake Tools and Bifacial Tools (After Cowan 1999).

some amorphous cores (Parry 1994). Prepared core technologies involve forming the surface from which the flakes will be removed in order to predetermine the flake or blade size. The associated goal of this system is to allow groups exhibiting a high degree of mobility to be able to carry specialized blade tools that reduce the need to transport excess amounts of stone (Hayden et al. 1996; Johnson 1997). Microblades maximize the amount of cutting edge in relation to mass and represent an efficient use of material. These tools were often made on fine-grained, durable stone such as quartz crystal and chert and were probably produced by skilled flintknappers.

2.54 Groundstone technology

A groundstone manufacturing technique involves grinding, abrading and polishing suitable stone to shape desired tool forms and working edges (Kooyman 2000).

Working lithics in this manner is typically a slow process but tool use-life is also quite long as these artefacts are also durable. The most common types of stone tools encountered in Labrador pre-contact assemblages include ground celts, polished slate endblades, slate and nephrite burin-like tools, and soapstone vessels.

2.6 Artefact distribution

One of the best areas of inquiry that a lithic analysis can address is the ways in which technological organization influences site formation processes. Artefact distributions, including the discard and distribution of tools and their manufacture debris, allow researchers to make inferences on site function and activity, especially when viewed in the light of technological organization (Nelson 1991). In this section I will briefly discuss some of the inferences that may be made on site function, with particular emphasis on residences, camps, and specialized activity sites.

Residential sites are generally expected to contain a wide range of tool and debitage types because a wide variety of activities take place at these sites (Kooyman 2000). A great deal of time at these sites is spent manufacturing and repairing lithic tools and these types of debris should be present. As well, if raw material is readily available in proximity to residential sites and base camps then we could expect to find increasing amounts of cores, blanks, and primary reduction debris. With respect to curated technological strategies, we should expect to see evidence of all stages of tool manufacture, including evidence of repair and rehafting in the form of basal sections, and tools that were broken or rejected during manufacture. The presence of raw material at these types of sites also makes an expediency technology possible. In this case we should expect to witness tools that display a low investment in retouch, an adequate supply of raw material that favours minimizing time spent manufacturing tools, and finally evidence of cores having undergone different stages of reduction (Kooyman 2000; Nelson 1991).

Unlike longer-term sites, shorter-term specialized activity sites, such as those associated with food procurement and or processing, will have a limited range of artefacts but possibly a wider range of raw material types as more mobile groups from other areas use the site. The tools and debris present will directly reflect the particular activities taking place at the site. Since these sites usually represent groups displaying logistical mobility finished tools and blanks were likely transported to the site. With this in mind we should expect to find mostly small retouch and sharpening flakes as well as discarded exhausted handheld tools and broken fragments of curated hafted tools. As well, we could expect to find evidence of more standardized core technology. This could mean bifacial core tools as they represent a ready supply of expedient flake tools, in addition to evidence of microblade technology, which lends itself to times of high mobility and task efficiency (Kooyman 2000; Nelson 1991). While evidence of curated, likely bifacial, strategies should dominate these site types, where raw material availability is not an issue we would expect evidence of expediency technology too. At specialized activity sites that were not used regularly by groups, we could expect to see evidence of opportunistic technological behaviour, depending on the situational contingencies at the site.

CHAPTER THREE

Research Methodology

3.1 Methodological approach

In this section I explain the methodological approaches used to integrate my theoretical format with the archaeological data as a means to answer the proposed research questions. The method involves dividing the data into three expansive variables (raw material, debitage, artefacts), with each variable allowing for analytical interpretations. The next stage involves synthesizing the information in an effort to infer the probable technological elements from the archaeological data. This format will be used for each of the three sites under investigation in the thesis and will allow me to interpret the technological organization strategies utilized at the sites.

The excavation methodology used for the sites was fairly standard. The first step was always to clear the surface vegetation from each unit. Next, all surface artefacts and debitage was collected, with the individual artefacts being given north and west provenience. All units were excavated with trowels according to assigned stratigraphic levels, and then soils were screened through ¼" mesh. Artefacts were recorded with three-dimensional measurements and all manufacture debitage was collected by quadrant. Photo records and plan maps were completed, before, during, and after the excavations.

Artefacts and debitage cleaned and then sorted. Rough sorting was done according to site, site area, cultural affiliation (where possible), typological designation, raw material type, etc. The next stage of analysis was cataloguing the collection. All information for individual artefacts was written on customized artefact record forms and flake information was recorded on customized debitage record forms. Artefact record forms included fields such as object name, design class, provenience, raw material type, colour, measurements of dimensions and mass, and other descriptive information. Debitage record forms included similar data with regards to provenience and such but it also recorded the results of the debitage analysis including flake size counts and weights and raw material identification. The final stage of cataloguing involved creating a database that all the data could be entered into. After the cataloguing process was completed all artefacts were labelled and photographed in order to create a permanent record of the collection and to aid in the interpretation process.

3.2 Raw material procurement

The first archaeological variable in the research is the analysis of raw material types utilized by the occupants of the sites. This section describes the most important types of raw materials encountered, and the locations at which they were likely gathered. While the availability of lithic raw material in northern Labrador has already been discussed, I will explain the methods used in identifying these materials, as well as present descriptions of their characteristics and sourcing. Materials encountered in this research include Ramah chert, Mugford Group cherts[1], quartzite, Ryan's quartz, quartz crystal, soapstone, diabase, slate, nephrite, and other flakable lithics considered to be "exotic" to the Nachvak Fjord area.

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[1] Mugford Group chert, also referred to as Mugford cherts, include both Kaumajet (Black) chert and Cod Island cherts.

Since chemical composition studies and other analytical methods were beyond the scope of this project, raw material identification relied on the eyeball "expertise" of the researcher with advice from geologists familiar with stone from the region (Knight and Ryan 2005). Raw material availability and the visual characteristics of the various lithic of northern Labrador are well documented in the literature. (Gramly 1978; Lazenby 1980; Nagle 1984a, 1984b, 1986). The highest numbers of source locales that have been identified are for flaked stone types such as cherts and quartzite, and soapstone. In addition, the lithics are visually distinct and archaeological specimens may be attributed to source (Nagle 1984b). Thus, this simple and most common method of sourcing and identifying raw materials can be utilized with confidence.

Researchers have associated different raw materials in northern Labrador with particular cultural groups (Cox 1977; Fitzhugh 1972; Gramly 1978; Hood 2000; Lazenby 1980; Loring 2002; Nagle 1984b; and Tuck 1975). For instance, for the Labrador Archaic, Ramah chert use evolved from no or little use and progressed to near exclusive use during particular times and places, notably the Rattler's Bight Phase (4200-3500 BP). In fact, the oldest Labrador Archaic sites contain large quantities of quartzite with no or little Ramah chert (Thomson 1985; Tuck 1975).

Ramah chert was the most popular choice among Dorset knappers in northern Labrador as well, particularly during Middle Dorset times Nagle 1984b). Dorset people also used quartz crystal to manufacture microblades, and minor amounts of Ryan's quartz, Mugford cherts and other exotic cherts (e.g. Newfoundland cherts, quartzite, and chert from northern Quebec) in their chipped stone industry (Nagle 1984b). Pre-Dorset knappers, rarely utilized Ramah chert and probably only did so during periods of raw material shortage or when extraordinary opportunities arose (Fitzhugh 2006). The choice stones for these people were those from the Mugford region of northern Labrador, including Kamaujet black chert and Cod Island chert. The sourcing of these raw materials and their attributes is described in greater detail below.

From a geological perspective Ramah chert's only source is in the Ramah Group, a 1700 metre thick outlier of lower Aphebian sedimentary strata in northern Labrador. The Ramah Group strata includes chert, quartzite, slate, a volcanic flow, and several diabase fills, and is situated 225 kilometres north of Nain (Knight and Morgan 1981; Lazenby 1980). The Ramah Group rocks extend for about 75 kilometres from Saglek Fjord north to Nachvak Fjord with chert beds measuring up to 4.5 metres thick locally (Knight and Morgan 1981; Morgan 1975). According to geological maps (Morgan 1975) it appears that actual outcrops of Ramah chert are most likely where the narrow zone of chert occurrence is exposed. These potential chert areas are confined to the central and north sections of the Ramah Group for about 30-40 kilometres (Nagle 1984b). Areas where actual Ramah chert workshops have been discovered include the "quarry bowl" in a cirque on the north side of Ramah Bay and along the shores and talus slopes in Rowsell Harbour, with lesser amounts available at Little Ramah Bay and near Delabarre Bay and Reddicks Bight (Gramly 1978; Lazenby 1980) (Figure 3.1). In fact, Gramly (1978) reports that evidence of some type of quarrying activity has been observed along all sections where chert beds outcrop in the region. Ramah chert was by far the most common raw material type utilized by the prehistoric people of northern Labrador.

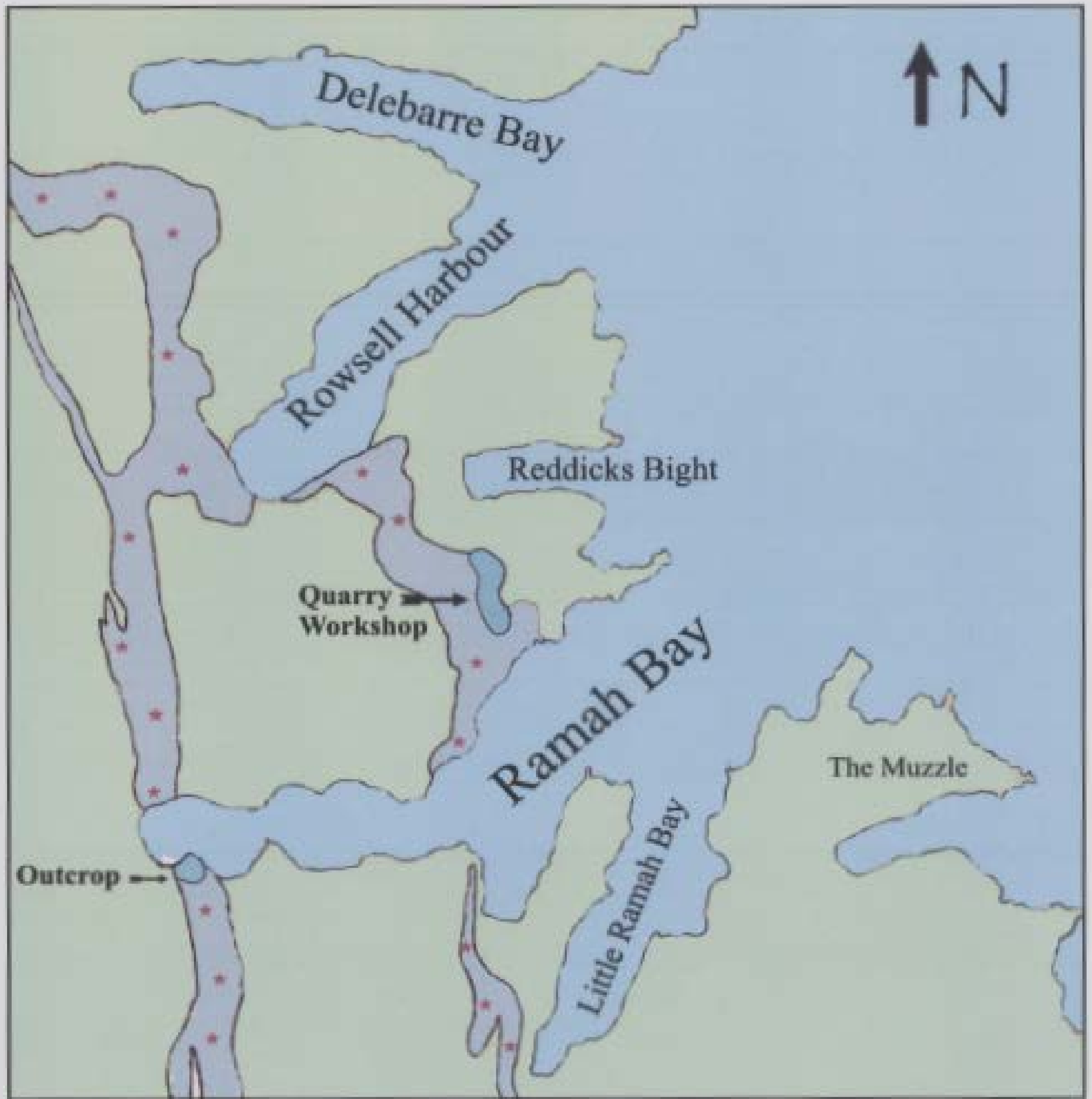

Figure 3.1 Map of Ramah Group Rocks with Chert Outcrop Areas (adapted from Gramly 1978).

The second most common raw material for chipped stone tool industries in northern Labrador are cherts from the Mugford region. These fine-grained, high quality cherts were the primary ones utilized by Pre-Dorset people, (Fitzhugh 2002; Gramly 1978; Lazenby 1980) although Dorset assemblages from sites situated in proximity to the Mugford quarries demonstrate increased amounts of Mugford cherts (Nagle 1984b). The attributes of Mugford Cherts are well described in the literature (Gramly 1978; Lazenby 1980).

Mugford cherts have been sourced to the Kaumajet Mountains region of northern Labrador and are part of the Mugford Group of rocks (Gramly 1978) (Figure 3.2). The Mugford Group, located 145 kilometres north of Nain, consists of 1600 metres of slightly metamorphosized, mixed sedimentary and volcanic rock sequences, including cherts and slates. The Mugford chert types can be divided into two main types, namely Cod Island chert and black Kaumajet chert (Gramly 1978). The chert bearing deposits are located at or near sea-level and it is rare to locate unflawed pieces of chert larger than 10 cm in size from the thin chert beds. Gramly (1978) states that the major differences between Ramah chert and Mugford cherts, are not in the flaking properties, but in the size of the supply.

Another common raw material that is potentially hard to identify is quartzite belonging to the Ramah Group. Named "Saglek Quartzite" by Lazenby (1980) because of where the samples were collected, this variety of quartzite can be found occasionally throughout the Ramah Group zone (Knight and Ryan 2005) and will be referred to as "Ramah Quartzite" in this research. Some quartzite samples were easy to recognize however other samples were sometimes hard to distinguish from Ramah without the aid

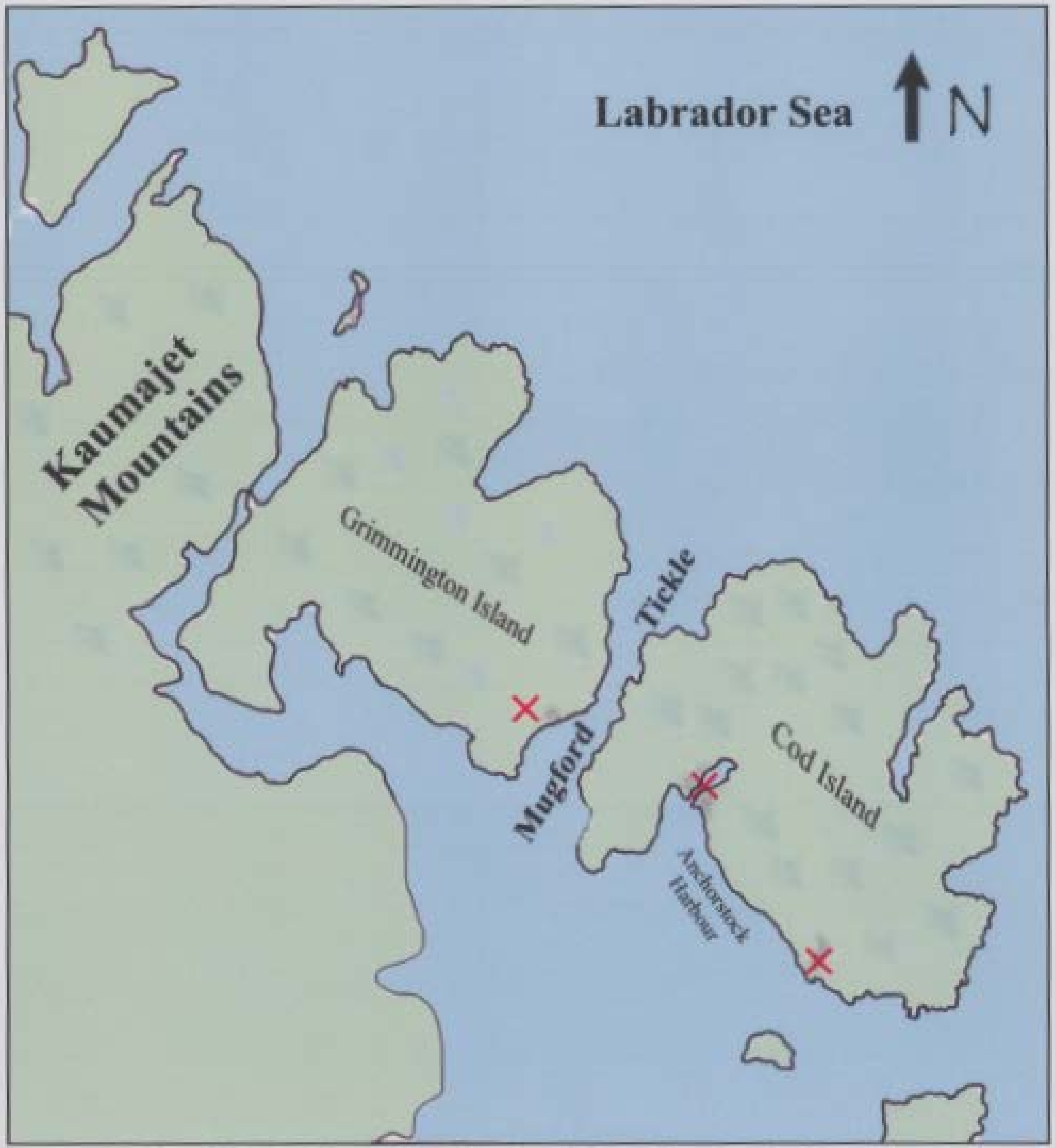

Figure 3.2: Map of Mugford Chert Outcrop Locations (adapted from Gramly 1978).

of microscopic identification. Some of these Ramah quartzite samples look like a hybrid of quartzite and Ramah chert, as it has undergone a unique geological process that compressed the grains that are normally round or stretched and may be geologically termed "meta-quartzite's" (Knight and Ryan 2005). No specific source of the Ramah Group quartzite and meta-quartzite is known, besides that fact that they could have easily been picked up as nodules anywhere in the Ramah group's geological region.

Another type of flaked stone that was easily identifiable was Ryan's quartz, vein quartz sourced to Ryan's Bay in northern Labrador (Gramly 1978; Lazenby 1980). This smooth, transparent quartz has the look and feel of glass and is distinguishable from other quartz's because of the inclusions of swirls or streaks of white (Lazenby 1980). Ryan's quartz has been found in Dorset Palaeoeskimo contexts in northern Labrador sites (Nagle 1984b). Small samples of "exotic" cherts were those that did not match the descriptions of the Ramah chert, Mugford Group cherts, and Ryan's quartz. These are most likely either cherts that found their way north from the west coast of Newfoundland or they came from interior regions of Labrador or from Nunavik in northern Quebec[2] or from Baffin Island, seeing as artefacts and debris of Ramah chert occurs there (Odess 1996).

Moving onto lithic artefacts not produced from chipping stone, the most common material was soapstone (actually steatite), followed by minor amounts of ground-slate and polished nephrite. Soapstone is of metamorphic origin and it contains a wide variety of materials, most notably talc. The talc makes steatite easy to carve and shape and it was

[2] It is notable that respectable amounts of Ramah Chert have been recorded at Palaeoeskimo sites in northern Quebec (Pinard 2002).

used by prehistoric groups to fashion lamps for burning sea-mammal fat in, as pots, and also as a medium in northern Labrador in which to carve figurines (Thomson 1988), pendants (Fitzhugh 1985) and plummets (Tuck 1975). Soapstone was only collected from the Late Dorset assemblage at The Lower Terrace Site (IgCx-11) and it has not been sourced to its original quarry location. Of note, Schooner Cove (IgCv-04) on the north shore in the outer fjord was a known source of high quality soapstone used by the Inuit (Kaplan 1983), but one cannot be 100% certain that the people at IgCx-11 took advantage of such resources. Even if they did, other research (Allen et al. 1984; Nagle 1984b) has illustrated that soapstone was a readily traded item in Dorset society and culture and that people did not necessarily exclusively utilize the resource that was close at hand.

3.3 Debitage/flake analysis

Flake debris from archaeological sites does not often enough receive the analytical scrutiny it deserves as compared to actual lithic tools as there is a common misconception that little information can be gained from waste flakes (Baumler and Davis 2004). However, the information that can be obtained from debitage can vastly outweigh that gained from straightforward artefact analysis alone. Flakes offer evidence of the processes that produced them and of stages of manufacture. In other words, debitage analysis can give a good indication as to what technological strategies were used at the site (Andrefsky Jr. 1998, 2004; Bradbury and Carr 2004; Carr and Bradbury 2004). Not only does flake analysis provide insights on stages of tool manufacture and other aspects of technological organization such as raw material use, but it can also be helpful in identifying activity areas and the actual activities within those areas at the site (Andrefsky Jr. 1998, 2004; Cowan 1999; Keeley 1982). Finally, behavioural information can be derived from flakes by combining the analytical techniques of mass analysis with the theoretical approach of technological organization.

The flake analysis conducted in this research can be classified as mass analysis, a special type of aggregate analysis that concentrates on the size of flakes from loads of flake debris (Carr and Bradbury 2004), and it was chosen for a number of reasons. The approach is that stone tool manufacture is a reductive strategy that can be modelled in terms of stages of manufacture. As a general rule of thumb for mass analysis, one should recognize that as tool production increases, the number of small flakes also increases. With this increase in production one should also expect a decrease in average flake weight in the small flake class sizes. Finally, as core reduction continues, one should expect a decrease in the proportion of flakes with cortex present (Baumler and Davis 2004; Bradbury and Carr 2004). A major benefit of mass analysis is that it allowed the entire debitage collection to be processed and analysed in a reasonable amount of time, using simple techniques and procedures. This method was also chosen because it had been used before on Palaeoeskimo collections from northern Labrador (Nagle 1984b) which allowed for comparisons. Mass analysis separates the lithic waste into groups or grades based on the size of the flakes. By using flake counts and flake weight measurements and frequencies, the premise is that generalizations can be made about the technology used to create them (Andrefsky Jr. 2004).

The fundamental goal in conducting the debitage analysis was to differentiate the debris in a way that would allow me to say something more about the site types and technological organization. The methodology for this was to pass the flake debris through a series of size-graded screens and then compare the resulting data. The advantages of this approach were that the low processing times allowed quantification of a large number of flakes simultaneously and it was easy to generate data that is easily comparable with existing reports (Bradbury and Carr 2004). Debitage was processed for the research by gentle screening through four nested standard sieves of 2" (Size Grade 4), 1" (Size Grade 3), ½" (Size Grade 3), and ¼" (Size Grade 1) mesh sizes. All flake debris was processed using this method. Flakes remaining in each sieve were sorted by raw material, counted and then weighed as a group to the nearest tenth of a gram. Items passing through the ¼" were mostly shatter and their totals were only occasionally weighed when amounts were substantial. The data generated by the debitage processing procedures are broken down in tables, graphs and bar charts that illustrate each class size for each type of raw material. The scale of the analysis of the assemblages varies from entire site collections, to areas within a site, to individual one by one metre units, to quadrants within the units, and finally to single test squares. Flake class sizes are listed from smallest (size 1) to largest (size 4). I have also calculated the average weight of each flake in each size class, and the flake to artefact ratios. As well, I have computed flake count numbers and flake count frequencies as well as the flake weights and flake weight frequencies for each of the four size grades for the analysis. While the numbers of count and weight demonstrate the quantity of debitage at each area, it is the frequencies that reveal the proportions between flake sizes and thus the stages of reduction. These statistics have been plotted in tables and bar charts in order to demonstrate flake size characteristics for different assemblages at the sites.

3.4 Tool assemblage/artefact analysis

Any study of technological organization must pay specific attention to the actual artefacts recovered and tools are often the main concern of a lithic analysis. In order to give meaning to tools in the assemblage and how they relate to the technologies of the people who created them, a great deal of time was spent visually analyzing the individual pieces and comparing them to others collected from the region. As well, in accordance with most lithic analyses each artefact was assigned typological classifications. The purpose of this classification system is to arrange the artefacts into mutually exclusive groups based on shared attributes (Odell et al. 1996). Although this *type-variety system* has the benefit of comparability with other studies using the same type-varieties, there are associated disadvantages, notably the subjectivity in such an approach. In order to get a sense of the particular technological strategies employed by the ancient toolmakers of Nachvak Fjord, I created a second system based on different technological design traits and assigned each artefact to one of those trait-classes. This system allowed me to break the collection down into more manageable categories, without relying on classifications that had more to do with artefact style or presumed function.

Most of the comparative analysis of the artefact assemblages was conducted by studying available literature on archaeological collections from northern Labrador. In particular the most valuable aids were reports from the archaeology of Saglek Bay (Thompson 1981, 1982, 1985, 1988; Tuck 1975), research in the Okak region (Cox 1977, 1978) and publications and reports that stemmed from the Torngat Archaeology Project (Cox and Spiess 1980; Fitzhugh 1976, 1978, 1980, 1985; Jordan 1980). These were invaluable aids for better understanding the lithic material culture of northern Labrador and they were supplemented by literature on nearby sites in the Eastern Canadian Arctic (Maxwell 1973, 1976, 1980, 1984, 1985; Milne 2000; Nagy 2000). In addition, I examined a Dorset lithic collection from Shuldam Island in Saglek Bay, and Palaeoeskimo material culture collected from other sites in Nachvak Fjord, namely from Nachvak Village (IgCx-3), Gulch Cape (IgCt-02), and Schooner Cove (IgCv-04).

With respect to choosing a method for creating categories in a lithic assemblage, the goal was to characterize the collection and be able to discriminate among different parts of it. I implemented a type-variety system whereby artefacts were classified according to different types or varieties traditionally used on Labrador Archaic and Palaeoeskimo collections. These classifications allowed for easier comparative analysis with regional collections in the literature as it helps in dealing with more local situations.

I believe there are weaknesses in trying to make sense of the collections by simply assigning a typology that infers function rather than the technology that created the artefact. Thus there was the need to breakdown the artefacts in terms of technological design classes. This aided in the large task of trying to study the entire collection by breaking it down into smaller, more meaningful units (Odell et al. 1996). On a broad level of analysis all artefacts were assigned data categories ranging from details on provenience, to material type, and form. In addition, I created seven unique design classes that represent all of the lithic artefacts in the assemblages from the three sites (Table 3.1). This *design classification system* adds logical order to the collection and has allowed for meaningful correlations to be made among the different design classes. This classification system allows for inferences on technological strategies in place at the sites for each cultural group and will be implemented in the analysis.

3.5 Technological strategies

Based on the methodology discussed, this research was able to interpret the technological strategies for each culture at each site by applying the system put forth by Nelson (1991) regarding levels of technological organization. After assessing the raw material use, understanding the tool assemblage, and interpreting a debitage analysis of the data it was possible to comment on the production/reduction/sharpening strategies carried out at the sites, including the artefact design and artefact distributions. This method allowed for insights on how the environmental constraints, the socio-economic strategies, and the technological strategies come together, thus demonstrating variability in artefact design and distribution between groups.

Technological Design Class	Material Implications
Informal Flake Tools	• No/Minimum flaking modification. • Handheld Flake Tools. • Likely abandoned after task completion. • E.g. Utilized Flakes, Retouched Flakes.
Semi-Formal Flake Tools	• Increase in flaking modifications in order to produce a working edge. • Handheld Expedient Flake Tools. • Not necessarily abandoned after task completion, but not likely part of a mobile tool-kit. • E.g. Expedient Scrapers, Heavily Retouched Flake Tools, Multi-Edge Flake Tools.
Formal Flake Tools	• Tools made on flakes that have received an extra effort in shaping and working edge production. • Usually evidence of hafting. • Maintained, well-designed, curated flake tools. • E.g. Flake Knives, Flake Scrapers, Unifacial Projectile Points, Unifaces.
Formal Bifacial Tools	• Fully bifacially flaked tools. • Curated tools usually displaying evidence of hafting and advanced preparation. • Possess design qualities of transportability, maintainability, style, and flexibility. • E.g. Bifaces (Knife Blades, Stemmed Spear Points, Bifacial Endblades).
Special Core Technology Tools	• Tools produced via a prepared core technological strategy. • E.g. Microblades, Microblade Cores
Other Curated Stone Artefacts	• Other stone artefacts that were not manufactures by a chipping technological strategy. • Curated and maintained artefacts made by a groundstone or other technological strategy. • E.g. Ground Slate Artefacts, Soapstone Vessels, Polished Nephrite.
Tools Associated with Manufacturing	• Artefacts that were used during the process of tool manufacture. • Artefacts used to manufacture items. • E.g. Hammerstones, Cores, Preforms.

Table 3.1: Technological Design Classes and Material Implications.

CHAPTER FOUR

Data Recovery and Description at Kogarsok Brook-1 (IgCx-8)

4.1 Introduction

This chapter describes the survey, excavations, and material collections at the Kogarsok Brook-1 site, a multi-component, pre-contact period site situated in the inner reaches of Nachvak Fjord (Figure 4.1). Perched on a low, level terrace at an elevation of about 5.5 metres above sea level, near the mouth of Kogarsok Brook, the site is located about 90 metres from the saltwater and a few hundred metres from the brook. Shallow caribou trails dissect the shrub and bush laden area, and have cut through the thin layer of topsoil, displacing samples of stone tools and debitage to the surface. To the west of the site, the topography is marked by a narrow and elongated boulder field, which dips down into a tundra and shrub zone that continues to the edge of Kogarsok Brook. On the east, the land rises to another terrace 8-10 metres above sea level and it continues to rise as the land skirts deeper towards the mountains. Behind the site, to the west and north, the land rises, gently at first over a succession of terraces, followed by a steep incline. From here a view of much of the inner and mid fjord zone, as well as up Kogarsok Brook, can be obtained (Figure 4.2).

As mentioned earlier, this site was first discovered as part of a foot reconnaissance during the 2003 field season of the Nachvak Archaeology Project (Whitridge 2004b). Flakes of Ramah chert were the first pieces recovered and after a more thorough survey across the site, a wide variety of raw material types, including

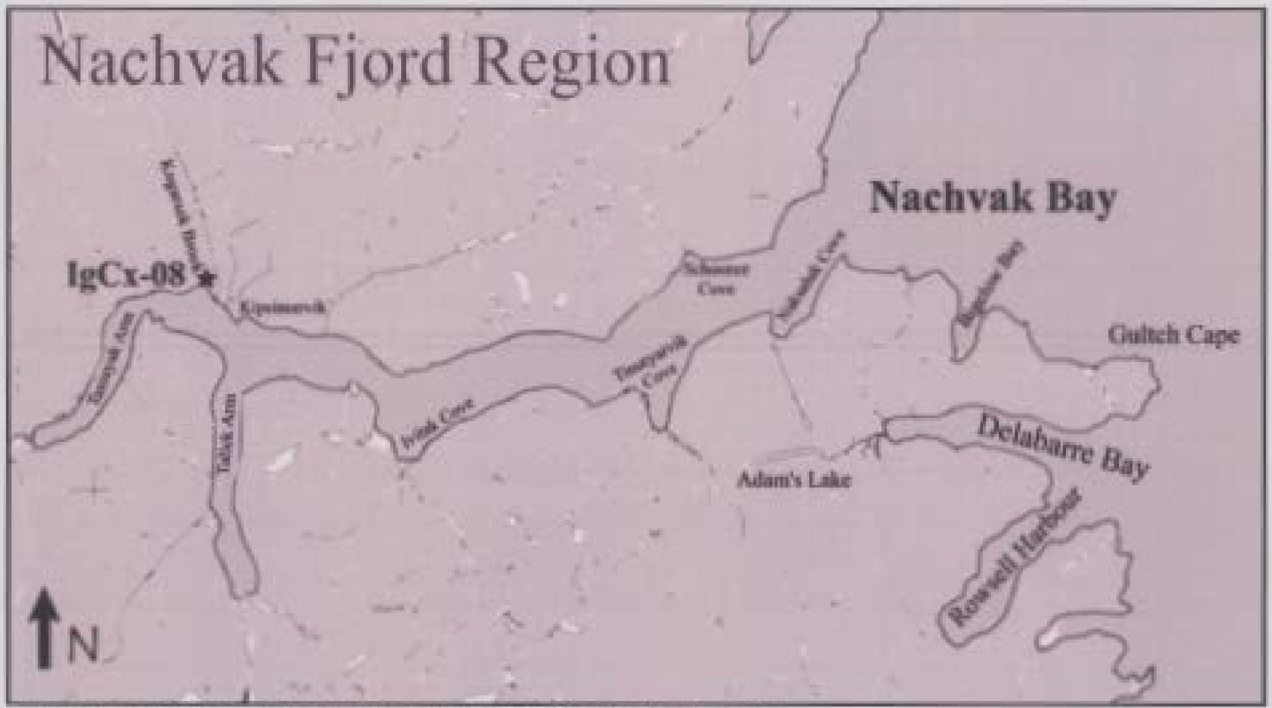

Figure 4.1: Map of Nachvak Fjord with IgCx-08 Site Location.

Figure 4.2: Site Location and Southeast View from the Height of Land Behind IgCx-8.

Mugford Group and other cherts, quartzite, quartz, and slate had been collected. In addition to the flake samples recovered, we also found a serrated ground slate tool, and a Ramah chert biface fragment on the site. As well, not far from the site near the edge of Kogarsok Brook, a portion of a large Ramah chert endblade was located. Based on these finds, the potential of the site looked good for future research in the following year. Based on the artefacts and raw material types recovered in 2003 it seemed likely that the site was perhaps affiliated with the Late Dorset period, however surprises were in store.

4.2 Site survey

We arrived at Kogarsok Brook-1 on July 19th, 2004. The research began by establishing a grid across the the site, with the aid of a Total Station which covered most of the visible flake scatters and more probable areas for features based on the lay of the site. 50 x 50 cm test squares were excavated to sterile at each 5-metre interval along the three established base lines. In addition, test pits were also dug both off and within the grid in an attempt to establish some site boundaries or locate features (Figure 4.3). Next, based on an examination of the test square findings and visible surface flake scatters, we set-up three separate excavation areas (A, B, and C) across the grid (Figure 4.4).

4.3 The excavation

In 2004, a total of 14 m^2 were completely excavated across the site. For the most part all of these units were part of three separate excavation areas with the exception of

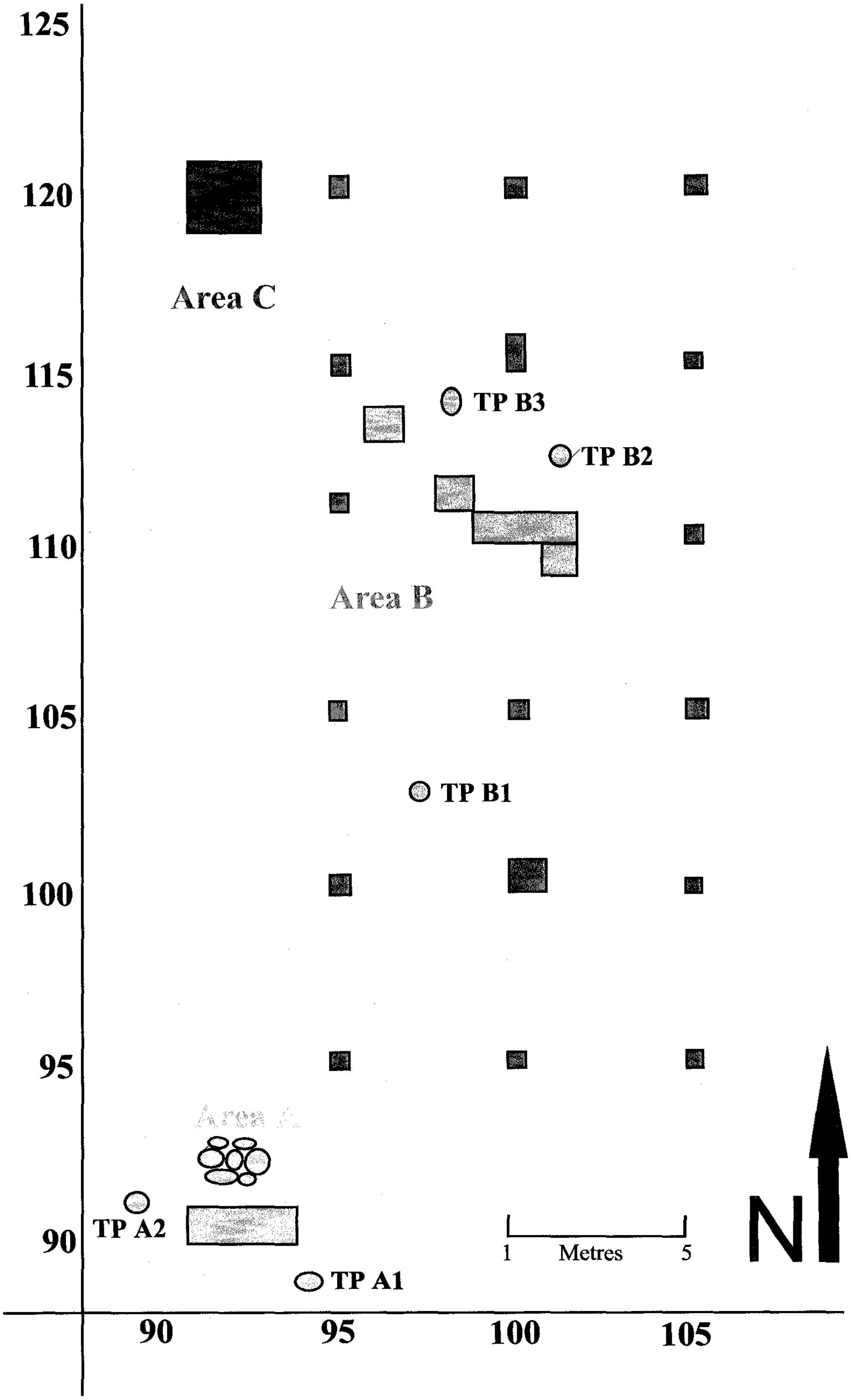

Figure 4.3: IgCx-8 Plan Map.

one 1 x 1 metre unit that was excavated in isolation. The arbitrary areas were chosen to roughly divide the length of the site into three sections for ease of recording and comparing data. I came to realize that each of these areas demonstrated significant differences with respect to cultural material culture deposition.

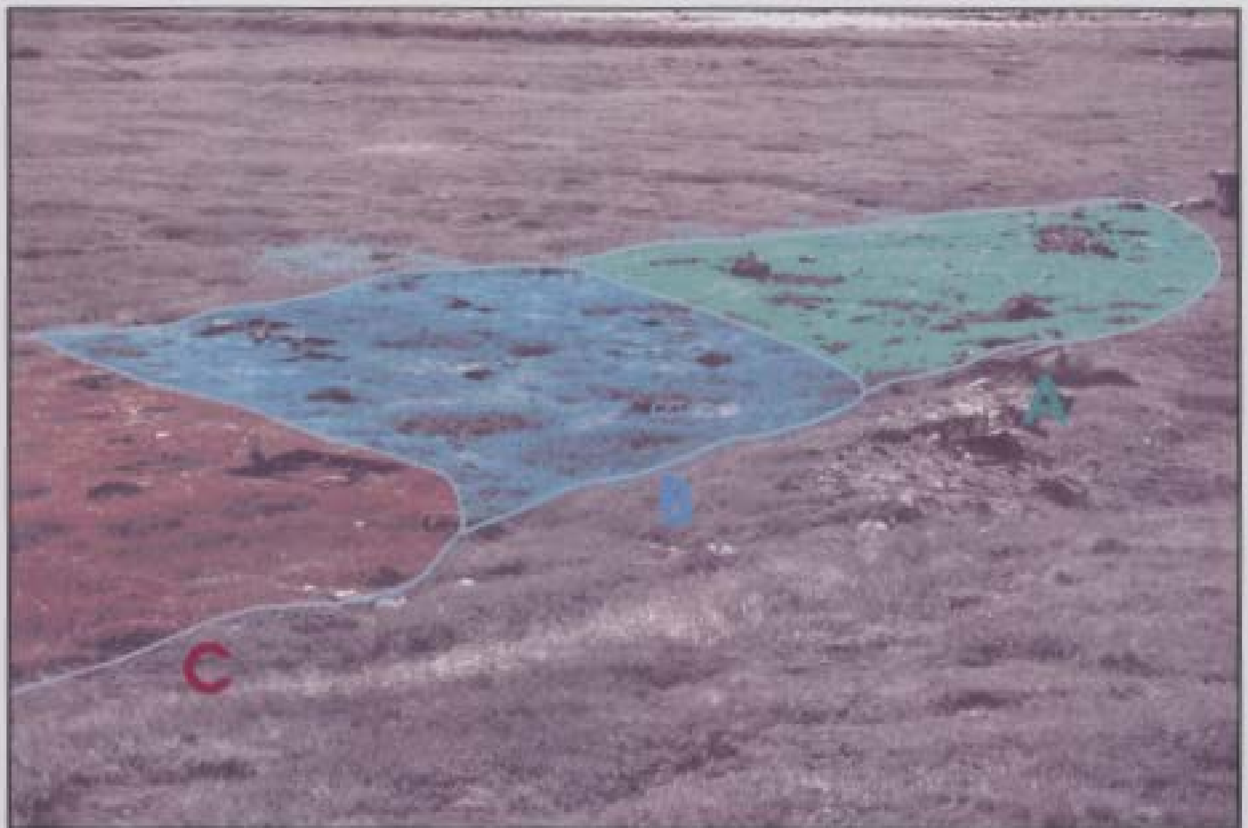

Figure 4.4: Image of Designated Areas of IgCx-8.

4.31 Area A

Area A consists of the southern portion of IgCx-8, and includes all units and test squares/pits north to and including N100 (Figure 4.3). The principal excavation area consisted of a 3 x 1 metre trench set-up over a surface flake scatter at N90/E91-93 (Figure 4.5). An unexcavated rock feature, probably a cache based on its size and shape, is located one metre north of the excavation area (Figure 4.6). No efforts were made to

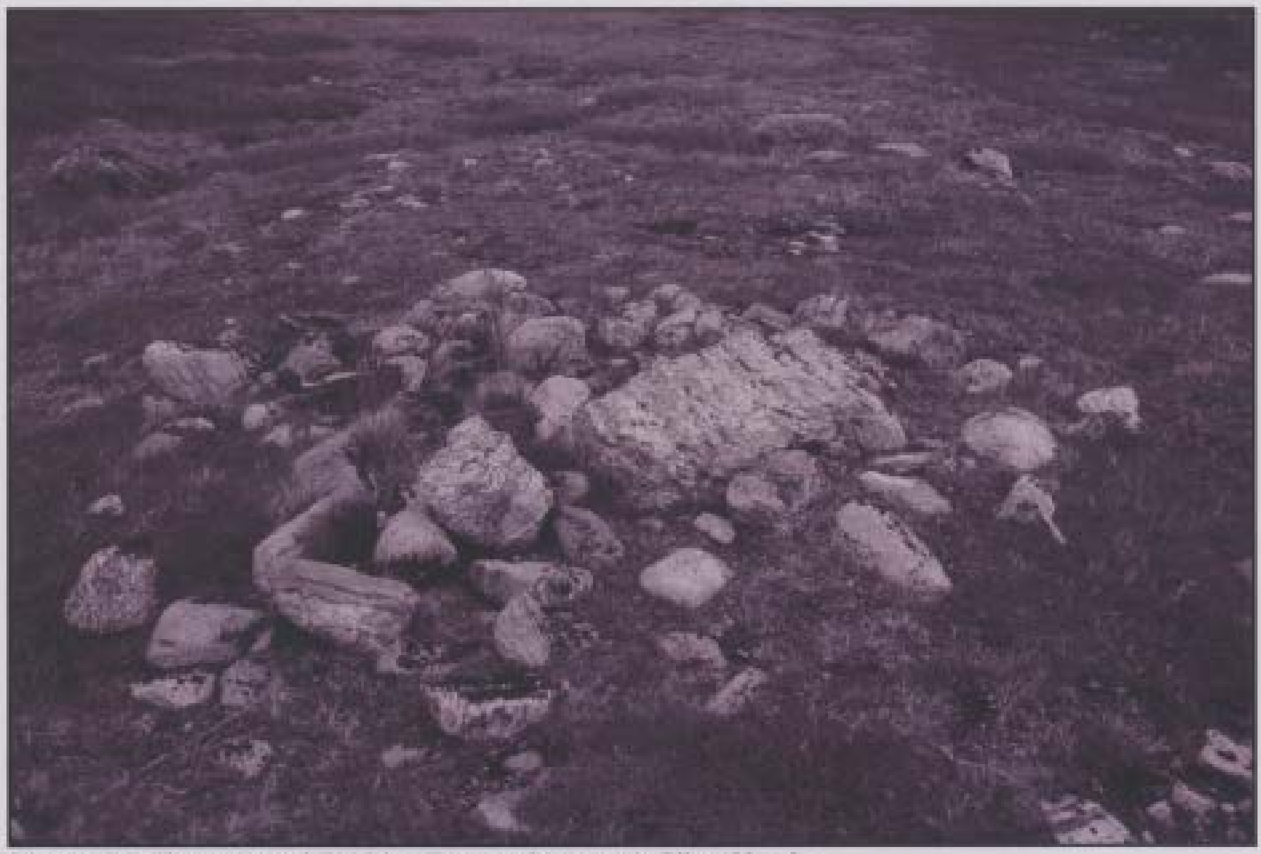

Figure 4.5: Unexcavated Boulder Feature in Area A, View North.

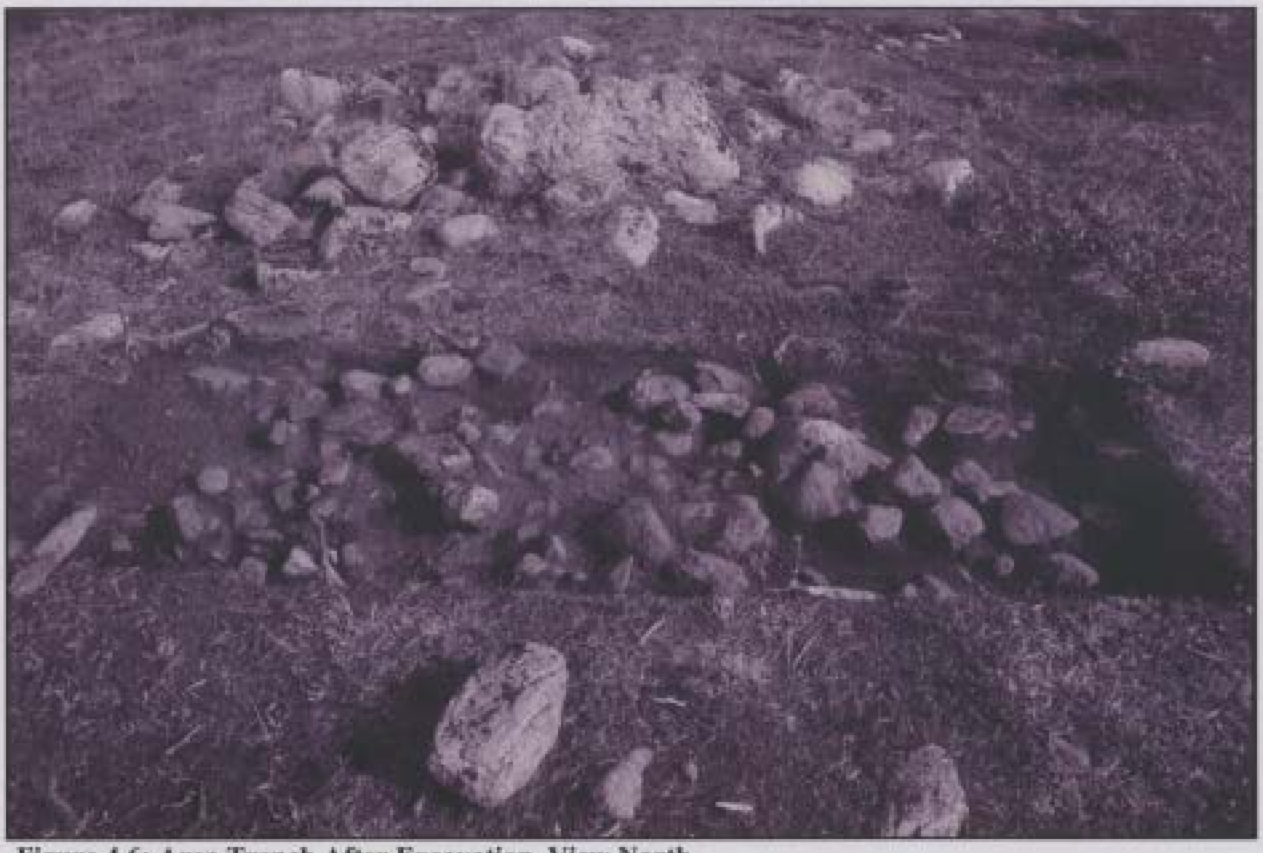

Figure 4.6: Area Trench After Excavation, View North.

excavate the cache feature as I felt that in order to do so accurately would have been too time consuming and would have interfered with more pertinent goals. In these three units, a total of 36 lithic artefacts were recovered in addition to 1142 stone flakes. Ramah chert was the most common raw material used in this specific area and the majority of the tools were retouched and utilized flakes and small cutting and processing tools.

The stratigraphy of this part of the site is composed of the surface, a Level 1 (cultural level) and a sterile Level 2. Level 1 began as a rich black peaty soil, that gradually turned sandier and grey/charcoal colour with increasing depth. Artefacts and flakes were initially collected according to sub-levels, however the thinness of the layer made stratigraphic control difficult. Field observations and data analysis suggest that both natural (freeze-thaw, caribou trails) and cultural site formation processes (human land-use activities) have considerably disrupted the stratigraphic integrity of the site, and smeared cultural separation. For example, artefacts and raw material types belonging to Pre-Dorset, Dorset, and Labrador Archaic have all been recovered from the surface and at varying depths below surface, making vertical provenience difficult to interpret.

Including the trench and test squares/pits in Area A, the artefact assemblage and raw materials represent Labrador Archaic, Pre-Dorset, and Dorset occupations. The most notable find was a complete and exquisite Labrador Archaic type stemmed point found in test square N100/E100. The point is skilfully flaked and made on fine-grained, black Kaumajet chert (See Figure 4.7). The style and form design correspond to that of Rattler's Bight Phase (Fitzhugh 1978), notably those points recovered from the burials at Nulliak Cove (Fitzhugh 2006). While the raw material has been traditionally connected with Pre-Dorset peoples (Gramly 1978; Lazenby 1980), Labrador Archaic artefacts made of Mugford cherts are not atypical (Rankin 2005).

Figure 4.7: Labrador Archaic Point *in situ* in Test Square N00/E100.

4.32 Area B

Area B includes the middle portion of the site, and it encompasses all excavated units and test squares/pits between Area A and the N116 line (Figure 4.3). In particular, a 5 m^2 zigzag trench in close proximity to a 1 m^2 metre unit was completely excavated (Figure 4.8). The stratigraphy of Area B is the same as that of Area A. The main area of excavation (6 m^2) proved to be quite productive, yielding 156 lithic artefacts and more than 2800 stone flakes. As will be discussed in detail later, this part of the site seems to represent specific activities, as there is consistency in the types of artefacts and debitage present. No discernable features were identified in Area B. Charcoal ash was present in most areas but samples were primarily small and of poor quality. However, one charcoal sample (RC04-01) produced a date of 3830+/-90 BP that sits comfortably within the Labrador Archaic and Pre-Dorset time frame (Hood 2000). In addition to the charcoal, small amounts of fire-cracked rocks suggested hearth activity in the area. Ramah chert represented the majority of the lithics, however Mugford cherts were also common, and there were lesser amounts of quartz crystal, slate, and Ryan's quartz. This excavation area is associated with a substantial Pre-Dorset component as well as different Dorset elements. Also, the presence of quartzite flakes, a meta-quartzite core fragment and crudely worked Ramah chert artefacts in other parts of Area B provide additional evidence of an early Labrador Archaic presence at the site (Tuck 1975).

Figure 4.8: Unit N110/E101 Area B During Excavation

4.33 Area C

Located in the north end of the site, Area C consists of a 2 x 2 metre (4 m^2) excavation area and all test squares/pits north of N116 (Figure 4.3). The stratigraphy is different here as Level 1 consists of a deeper, brown, mixed soil and sand matrix that ends at sterile at a depth between 20-25 cm below surface. Throughout the testing and excavation of Area C, Level 1 often contained lenses of a red ochre like substance. Artefacts and flakes recovered from these areas were often heavily stained deep red. In the main excavation area, the lens was of variable thickness and was bounded on the top by a thin layer of charcoal ash. One charcoal sample (RC04-06) collected from a 50 cm X 100cm test square at N115/E100 was AMS dated to 4670 +/- 50 BP, and the results will be discussed later. In total, the primary excavation area (4 m^2) (Figure 4.9) produced 203 lithic artefacts, 1445 stone flakes, and a dissimilar assemblage than the rest of the site. Quantities of ash, fire-cracked rock, and fire-exposed flakes suggest that a hearth was nearby and associated with the activities. While there are minor amounts of material that may be attributed to Pre-Dorset and Dorset occupations, the main cultural component of Area C is linked with a Labrador Archaic occupation. The presence of Ramah chert and quartzite debris and artefacts indicate an early Labrador Archaic presence.

4.5 Artefact description

In 2005, a total of 470 artefacts were collected at the Kogarsok Brook-1 site and the majority of artefacts came from the excavation trenches in Area B and Area C, at 33% and 43% respectively. A modest amount of artefacts were found in the various


Figure 4.9: Area C Primary Excavation Area.

testing areas (test pits, test squares, and one 1 x 1 [N100/E100] metre unit) spread across the site, accounting for 16% of the total. The 1 x 3 metre trench in Area A accounted for 8% of the total site assemblage.

The artefacts demonstrated particular patterns of raw material usage across the site (Table 4.1). Again, Ramah chert was the most popular raw material for flaked stone industries, representing 68% of the chipped stone artefacts and 66% of the total artefacts at the site. Both Labrador Archaic and Dorset Palaeoeskimo diagnostic implements manufactured out of Ramah chert were recovered throughout IgCx-8. Quartzite was the second most common raw material type represented in artefacts, making up 10% of the total. More than 80% of the quartzite artefacts however were unearthed in the Area C units and all were most likely utilized by the Labrador Archaic. The Kaumajet chert and Cod Island chert of the Mugford Group combined to account for 14% of the total artefact

Artefact Totals	Ramah Chert	Quartzite	Kaumajet Chert	Cod Island Chert	Quartz Crystal	Ryan's Quartz	Other[1]	Total
Area A	31	0	1	3	1	0	-	36
Area B	99	7	30	5	5	3	5	154
Area C	131	39	9	7	0	1	16	203
Test Pits	47	2	6	7	5	1	8	76
Site Total (%)	**308 (66)**	**48 (10)**	**46 (9)**	**22 (5)**	**11 (2)**	**5 (2)**	**29 (6)**	**470**

Table 4.1: IgCx-8 Artefacts by Raw Material Type.

[1] Includes slate, nephrite, pumice, diabase, and unidentified cherts.

collection at 9% and 5% respectively. While it is not certain that Mugford chert use was exclusive to Pre-Dorset peoples, I feel confident that the vast majority of Mugford chert artefacts at Kogarsok Brook-1 were deposited there as a result of Pre-Dorset activity. With the exception of the Rattler's Bight style bifacial point made of Kaumajet black chert, every other diagnostic piece made on Mugford cherts can be assigned with confidence to the Pre-Dorset. Other raw materials represented at the site include quartz crystal (2%), Ryan's quartz (1%), and a group designated as other (6%) that includes a small amount of unidentifiable chert and non-flaked artefacts made of slate, nephrite, pumice, diabase, iron pyrite and stone cobbles.

Focusing more on the kinds of artefacts recovered from the site, Table 4.2 illustrates the variety and frequencies of artefacts recovered from all areas of IgCx-8. To summarize, retouched and/or utilized flakes with little or no modification were the most common artefact types across the site, making up 33% of the total assemblage. These flake tools were followed in popularity by core and core fragments at 20% of the total. Many of these exhibited some degree of retouch and utilization and 83% of them were found in the Labrador Archaic component of Area C. Microblade fragments were the third most common artefact at the site, making up 10% of the collection. However, microblades often represent a large proportion of assemblages on pre-contact sites in Labrador (Cox 1977, 1978; Fitzhugh 1976; Nagle 1984b; Tuck 1975, 1976a, 1976b) and 10% may be considered low. Bifaces, making up 8% of the site artefacts, were fairly common and were an important part of the tool-kit for some of the groups occupying the site. The same may also be said about triangular endblade/points, which account for 5%

of the artefact total. The majority of these, often culturally diagnostic artefacts, were recovered from Area B and represent Pre-Dorset and Dorset activity. These examples and the rest of the collection will be discussed in greater detail in the following sections.

Artefact Type	**Area A**	**Area B**	**Area C**	**Test Areas**	**Total**	**%**
Adze	-	-	-	1	1	*<1*
Awl/Graver	-	1	1	-	2	*<1*
Axe	-	-	1	-	1	*<1*
Biface/Biface Fragment	3	18	7	9	37	*8*
Burin	1	10	3	-	14	*3*
Burin Spall	-	-	1	2	3	*<1*
Burin Like Tool	-	2	-	-	2	*<1*
Core/Core Fragment	-	7	79	6	92	*20*
Endblade	-	13	3	6	22	*5*
Expedient Flake Tool	-	2	6	-	8	*2*
Fire Striker	-	1	-	-	1	*<1*
Flake Knife	4	13	5	5	27	*6*
Flake Point	-	-	1	-	1	*<1*
Ground Slate Tool	-	1	5	1	7	*1*
Hammerstone	-	-	2	-	2	*<1*
Microblade	6	28	4	10	48	*10*
Microblade Core	-	-	-	1	1	*<1*
Preform	-	2	3	1	6	*1*
Pumice Stone	-	-	-	1	1	*<1*
Retouched/Utilized Flake	17	45	66	25	153	*33*
Scraper	-	4	1	2	7	*1*
Side Scraper	1	1	6	1	9	*2*
Stemmed Flake	1	-	7	3	11	*2*
Uniface/Uniface Fragment	3	6	2	2	13	*3*
TOTAL	36	154	203	76	469	

Table 4.2: IgCx-8 Artefact Type Frequencies By Area.

4.51 Area A artefact summary

The 3 X 1 metre excavations at Area A produced 36 chipped stone artefacts distributed throughout the trench (Table 4.3).

Artefact Type	90/91	90/92	90/93	Total Count	%
Biface/Fragment	1	1	1	**3**	**8**
Burin	1	0	0	**1**	**3**
Core/Fragment	0	0	1	**1**	**3**
Flake Knife	0	3	1	**4**	**11**
Microblade/Fragment	2	3	1	**6**	**31**
Ret./Utl. Flake	8	4	5	**17**	**47**
Scraper	0	1	0	**1**	**3**
Uniface	2	0	1	**3**	**8**
TOTALS	14	12	10	**36**	**100**

Table 4.3: Area A Artefact Type Frequencies By Unit.

Biface/Biface Fragments (3)

There were three artefacts designated as bifaces, and all were fragments made out of Ramah chert. One specimen, a Rattler's Bight style stemmed point basal section, is diagnostic of types found in Labrador Archaic assemblages from Nulliak Cove (Fitzhugh 1978), Saglek Bay (Tuck 1975) and elsewhere in northern Labrador. A different piece appears to be the medial section of the body of another Rattler's Bight style point. Lastly, the third example, found on the surface is a small basal section of an unknown type of biface and contains a single side notch. It may in fact be part of a knife.

Burin (1)

A single burin made on high quality grey Cod Island chert exhibits steep retouch on one side and has evidence of a single burin spall removed.

Core (1)

A single exhausted core fragment of Kaumajet Black chert is completely covered in rusty coloured cortex.

Flake Knives (4)

Four specimens were grouped as flake knives. Made on flakes, these examples all display evidence of minor retouch to either facilitate hafting and/or edge preparation. Two are complete while the other two are fragments. Three are made on Ramah chert while there is one made out of grey-banded Cod Island chert. The complete Cod Island chert example is large with fine retouch along the working edge and base.

Microblades (6)

Six incomplete microblades fragments were collected; four medial sections and two proximal sections. Five were made from Ramah chert and one is quartz crystal.

Re*touched/Utilized Flakes (17)*

The most common artefacts represented in Area A were unmodified and minimally retouched flakes. All examples were made from Ramah chert.

Scraper (1)

A single spoke-shave style, concave side scraper, made on greenish Cod Island chert was recovered. The piece is complete and is Pre-Dorset in origin.

Unifaces (3)

A total of three incomplete Ramah chert unifacially worked pieces were found. One is ovate in shape and bears evidence of basal thinning or fluting. A second near complete specimen has one visible side notch and may in fact be a fragment of a unifacially worked triangular point or flake knife. The last example is a medial section of what may again be part of a small unifacially worked point or endblade.

4.52 Area B artefact summary

A total of 155 artefacts were unearthed in the 6m^2 units of Area B (Table 4.4). The area was a smorgasbord of material types and diagnostic artefacts, representing Palaeoeskimo activity with minor evidence of a Labrador Archaic in this part of the site.

Artefact Type	Unit 113/96	Unit 111/98	Unit 110/99	Unit 110/100	Unit 110/101	Unit 109/101	Total Count	%
Awl/Graver	-	-	-	-	-	2	**2**	***3***
Biface/ Fragment	**1**	**2**	**1**	**5**	**2**	**7**	**18**	***11***
Burin	-	-	-	1	5	4	**10**	***4***
Burin Like Tool	-	-	-	-	-	2	**2**	***1***
Core/Fragment	4	1	1	1	-	-	**7**	***5***
Endblade	-	3	-	4	4	2	**13**	***8***
Expedient Flake Tool	-	1	-	1	-		**2**	***3***
Fire Striker	1	-	-	-	-	-	**1**	***<1***
Flake Knife	-	1	3	2	3	4	**13**	***8***
Microblade/Fragment	1	2	2	9	4	10	**28**	***18***
Preform	-	1	1	-	-	-	**2**	***<1***
Ret/Utl Flake	2	15	4	7	5	12	**45**	***29***
Scraper	-	1	-	1	2	1	**5**	***5***
Uniface	-	2	-	1	3	-	**6**	***5***
Worked Slate	-	-	1	-	-	-	**1**	***<1***
TOTALS	**9**	**29**	**13**	**32**	**28**	**43**	**154**	

Table 4.4: Area B Artefact Typology Frequencies By Unit.

Awls/Gravers (2)

Two awls/graving instruments were found in Area B. One is made of Ramah chert and has extensive edge retouch on both faces resulting in the shape of a graving point.

The piece is snapped at the base obscuring any evidence of hafting. The other specimen is made on Kamaujet chert.

Bifaces (18)

Three black chert examples are all small bifacially worked fragments and are not identifiable to type. As for the Ramah chert samples, seven are small unidentifiable biface fragments. One specimen is a small, complete asymmetric knife blade and two more are tips of possible triangular points or knives. One nearly complete example appears to have been a side blade. Finally, four Ramah chert biface fragments are diagnostic Labrador Archaic point fragments. More specifically, two pieces are the stems of Rattler's Bight style points; one is the medial section of a Labrador Archaic lanceolate point; and the final piece is the medial section of a Rattler's Bight style point.

Burins (10)

Burins are one of the most diagnostic artefacts for Pre-Dorset material culture (Tuck 1975). In Area B the Pre-Dorset presence is exemplified by the presence of nine true burins. Nine examples are made from Mugford Group cherts and one from an exotic waxy grey chert. All examples demonstrate basal and stem retouch in order to facilitate hafting and all but one have one or more burin spalls removed.

Burin-Like-Tools (2)

Two burin-like tools (BLT), diagnostic of Dorset culture were recovered adjacent to one another in Area B. The first made on tan coloured slate is completely polished on both faces, has one side notch to facilitate hafting, and has a small amount of loss at the tip and base. The second piece is made on hard, dark green nephrite. This complete artefact is polished on both faces and has two side notches on one side.

Cores/Core Fragments (7)

Of the seven amorphous cores, two are completely exhausted examples; one of Ramah chert and one of black chert. In addition there are three more Ramah chert core fragments, one of which is utilized. There are also two quartzite core fragments.

Expedient Flake Tools (2)

The artefacts in this class are essentially retouched flakes with an extra amount of effort put in to the flaking in order to create a substantial scraping edge. Neither tool bears any evidence of hafting and they are made on large Ramah chert flakes.

Fire Striker (1)

This specimen appears to be a piece of iron pyrite and may have been used as a fire striker. It reddish-brown in colour.

Flake Knives (13)

Flakes knives are essentially retouched flakes that have undergone additional modification in order to permit hafting by means of notches or basal thinning, and in many cases create a more sustainable working edge. In some instances, shape or style also seems to have been important in making these flake knives as sometimes they resemble the form or outline of bifacially made examples. Of the thirteen pieces in this assemblage, twelve are of Ramah chert and just one on black chert. Two pieces appear to have functioned more as gravers than as knives.

Microblades (28)

Area B was by far the most productive area of the site for microblade utilization, accounting for 58% of all recovered. In this assemblage twenty-two (22) were made from Ramah chert, just four (4) from quartz crystal, and two (2) out of Kaumajet black chert. Two of the pieces displayed evidence of hafting, in the form of a single side notches

Preform (2)

One perform made on Ramah chert is a bifacial knife blade blank and it resembles styles attributed to the Late Dorset culture (Cox 1977). The other preform is an unfinished or rejected scraper blank, also of Ramah chert.

Retouched/Utilized Flakes (45)

All artefacts classified as retouched and/or utilized flakes display either evidence of use in the form of edge striations and other use-wear visible with a hand lens, or minor retouch to facilitate or prolong a working edge. All examples are presumed to have been hand held tools with short or one time use lives. In the assemblage, thirty-seven are Ramah Chert, and there is one example each of grey Cod Island chert, Kaumajet chert, and an exotic waxy chert, possibly Newfoundland chert (Nagle 1984b, 1986).

Scrapers (5)

Of the two Ramah chert scrapers, one is incomplete and identifiable only by the steep retouch typical of endscrapers. The other is made on a thick flake with retouch on two lateral sides. A complete thumbnail scraper made on black chert has steep retouch on the distal end. Another complete thumbnail scraper is made on a high quality quartzite, while the final specimen is a diagonally angled scraper made of Cod Island chert.

Triangular Points (13)

The general term triangular point is used here are as there is no attempt here to formally distinguish between harpoon endblades and arrow tips. Of the three Ramah chert points, two are tip-fluted and were presumably Middle Dorset endblades (Nagle 1984b; Plumet and Lebel 1997). The other Ramah example is not tip fluted and is missing the base. Two examples are made on Ryan's quartz with one being a tip of a point while the other one is a complete specimen found in two pieces. Eight of the points are made on Kaumajet black chert and all may have functioned as arrow tips. While none of the pieces are complete, each is extremely small yet masterfully bifacially flaked.

Unifaces (6)

Of the six pieces classified as unifaces, three are made of Ramah chert and three of black chert. Two of the Ramah pieces are incomplete and unidentifiable as to form while the third complete specimen demonstrates fine serration along two lateral edges and may have been hafted and used as a cutting instrument. As for the black chert unifaces, two are unidentifiable while one is triangular in shape and may be a crude example of a projectile point.

Worked Slate (1)

The single slate artefact is a tabular piece of material with some polishing on one face. It was likely a rejected preform for some unknown tool type.

4.53 Area C artefact summary

The artefact count from Area C totalled 203 pieces and amounts were concentrated in the two eastern units (Table 4.5). The $4m^2$ excavation area displayed quite a difference in the assemblage from the rest of the site, as about 90% of the artefacts have been attributed to Labrador Archaic. A minor amount of Mugford cherts and diagnostic Pre-Dorset tools comprises the Palaeoeskimo component of Area C.

Artefact Type	119/91	120/91	120/92	119/92	Total Count	%
Awl	-	1	-	-	**1**	*<1*
Axe	-	-	1	-	**1**	*<1*
Biface/Fragment	2	2	2	1	**7**	*3*
Burin	1	-	1	1	**3**	*1*
Burin Spall	-	-	1	-	**1**	*<1*
Core/ Core Fragment	15	36	15	13	**79**	*39*
Endblade	1	2	-	-	**3**	*1*
Expedient Flake Tool	-	4	1	1	**6**	*3*
Flake Knife	-	2	1	2	**5**	*2*
Flake Point	-	-	1	-	**1**	*<1*
Hammerstone	-	-	2	-	**2**	*<1*
Microblade/Fragment	1	2	1	-	**4**	*2*
Preform	1	-	2	-	**3**	*1*
Retouched/Utilized Flake	5	17	37	7	**66**	*33*
Scraper	1	-	5	1	**7**	*3*
Stemmed Flake	1	2	3	1	**7**	*3*
Uniface	-	-	2	-	**2**	*<1*
Worked Slate	1	2	1	1	**5**	*2*
TOTALS	**29**	**70**	**76**	**28**	**203**	***100***

Table 4.5: Area C Artefact Type Frequencies By Unit.

Awl (1)

This awl is made on white quartzite and has a very pronounced point suitable for piercing. The base is thick and crudely flaked and does not appear suitable for hafting.

Axe (1)

This Labrador Archaic ground slate axe is completely polished on one face, has a symmetrical working edge and has reddish staining from the ochre-like substance it was deposited in.

Bifaces (7)

Of the seven bifaces recovered from Area C, three made from Mugford Cherts (2 black, 1 green) were completely unidentifiable to specific type. One Ramah chert specimen is a Palaeoeskimo style knife blade with a small amount of loss at the base. Another Ramah piece is the tip of what may be either be a triangular point or side blade. The medial section of a black chert biface may also be a knife or point fragment. The final diagnostic piece is the medial section of a Pre-Dorset style bifacial knife (Figure 4.10). Similar artefacts with the signature tangs or lugs for hafting purposes have been recovered from other Pre-Dorset sites in northern Labrador (Tuck 1975).

Burins (3)

Three true burins are all made on Kaumajet black chert. One specimen has no spalls removed and may have been abandoned before use.

Burin Spall (1)

A Cod Island chert burin spall was removed during the process of rejuvenation.

Cores/Core Fragments (79)

Cores and core fragments make up 39% of the assemblage from Area C. Of that group, 57% are Ramah chert, 38% are Ramah Group quartzites, while there are three diabase core fragments and one Ryan's quartz core. The majority of this collection is associated with Labrador Archaic knapping activity and much of the core reduction debris bears substantial amounts of cortex. In addition, many of the pieces display evidence of retouch and or utilization and were likely used in activities such as butchering and hide processing. The fact that some of the pieces are heat altered, charred, or covered in red-ochre suggests that these activities took place around a hearth(s).

Expedient Flake Tools (6)

Each of these expedient flake tools is made from Ramah chert and displays well thought out edge retouch that has produced a very suitable scraping edge. All pieces are manufactured for hand held usage with well-defined working edges.

Flake Knives (5)

Five flake knives, three quartzite and two Ramah chert examples, all demonstrate evidence of hafting in the form of notches and/or basal retouch, and the working edges of the tools demonstrate utilization.

Flake Point (1)

This specimen made of Ramah chert, is identical to examples of early Labrador Archaic style flake points from Saglek as identified by Tuck (1975). Tuck (1975) thought these crudely made projectile points represent the first evidence of bow and arrow use by the Labrador Archaic.

Hammerstones (2)

The first example is a small, incomplete ochre-stained cobble while the second is a larger granite cobble possessing evidence of fire exposure or charring, battered edges and polishing on one face. Both were likely used to produce the stone debris in Area C.

Microblades (4)

The microblades in Area C are part of the small Palaeoeskimo presence there. All four are incomplete with two made out of Ramah chert and two from Mugford cherts.

Preforms (3)

All the preforms are bifacially worked and made on Ramah chert. One in particular is unusual for its " bi-pointed" shape. It resembles a bi-pointed slate point reported by Fitzhugh (1978 pp.76 Fig 9) as being affiliated with the Naksak phase of the Labrador Archaic culture in Labrador.

Retouched/Utilized Flakes (66)

All sixty-six retouched and utilized flakes seem consistent with the Labrador Archaic deposit, as all are either Ramah chert or Ramah Group quartzite flakes.

Scrapers (7)

Each artefact classified as a formal scraper was made on Ramah chert. These examples demonstrate more flaking preparation than the expedient scrapers in order to achieve a well-defined scraping edge(s). Most of the specimens can be termed side scrapers and often there are two distinct, deep concave working edges on one side of each piece. Some specimens are identical to early Labrador Archaic examples recovered from Band 7A at Site Q on Rose Island in Saglek Bay (Tuck 1975).

Stemmed Flakes (7)

The term "stemmed flake" was coined by Tuck (1975) for a group of unusual artefacts unique to Saglek Bay, primarily an early Labrador Archaic component at Site Q. In Area C at Kogarsok Brook-*1* seven of these flake knife-like specimens were recovered (6 Ramah chert, 1 quartzite) similar to those discovered by Tuck. Each specimen is made on relatively thick flakes and demonstrate basal retouch in order to facilitate hafting, thus creating a stemmed artefact. The lateral edges display visible utilization, yet there is no evidence of retouch along the working edges.

Triangular Points (3)

The lone Ramah chert point is unifacially worked, has fine serration along both lateral edges and is relatively small in size. The tip is missing and its function as an endblade or arrow point is uncertain. Of the two grey Mugford chert points, one is the tip portion of a bifacially flaked miniature point, presumably an arrow tip, while the second is a nearly complete unifacial example. All three appear Pre-Dorset in origin.

Unifaces (2)

These two ovate shaped items were found in close proximity to each other and are presumed to have been used for the same type of task.

Worked Slate (4)

The four artefacts classified as worked slate bear no resemblance to one another. One piece is a preform on grey slate. The shape is knife-like but no grinding has taken place. A second piece, which may also be an unfinished tool, is or was on its way to being a ground slate point. It is brown in colour and is completely polished on one face. Another artefact is a tiny fragment that was the tip of a grey slate ground point. Finally, the most peculiar piece is an incomplete, ground, brown slate tool that I have not seen in other collections. It may have functioned as a stylized knife.

4.54 Testing area artefact summary

Throughout the site, numerous test pits/squares as well as one additional 1 x 1 metre unit were excavated away from the primary excavation zones. As a result of these efforts, a total of 76 additional artefacts were collected (Table 4.6). All major raw material types were represented with Ramah chert accounting for 62% of the total and Mugford Group cherts making up 17%. The largest proportions of artefacts were retouched/utilized flakes at 33%, followed by microblades making up10% of the total. The test excavations revealed specimens similar to those already discussed however there were a few artefacts that were unique and deserve a more complete description.

Artefact Type	**Test Area Totals**	**%**
Adze	**1**	**1**
Biface/Biface Fragment	**9**	**12**
Burin Spall	**2**	**3**
Core/Core Fragment	**6**	**8**
Endblade	**6**	**8**
Flake Knife	**5**	**7**
Ground Slate Tool	**1**	**1**
Microblade	**10**	**13**
Microblade Core	**1**	**1**
Preform	**1**	**1**
Pumice Stone (Abrader?)	**1**	**1**
Retouched/Utilized Flake	**25**	**33**
Scraper	**2**	**3**
Side Scraper	**1**	**1**
Stemmed Flake	**3**	**4**
Uniface/Uniface Fragment	**2**	**3**
TOTAL	**76**	**100**

Table 4.6: IgCx-8 Test Finds Artefact Frequency by Type.

Adze

This chipped and ground slate adze was found in test square N120/E105 in a reddish-brown matrix, common in much of the northern portion of the site. Chipping has shaped the stemmed part of the adze and only the two faces of the working edge portion of the tool has undergone grinding. Although no comparative examples have been noted, I believe the piece to be part of the early Labrador Archaic collection from IgCx-8 based on context and the culture's affinity with ground stone technology of this type.

Stemmed Bifaces (3)

One of the most exciting find of the 2004 season, was this skilfully crafted bifacial stemmed point is an exquisite example of a Rattler's Bight style point. The piece is extraordinarily made as it exhibits very fine flaking and perfect symmetry. A most interesting aspect of the artefact is that it is made out of Kaumajet black chert, a raw material more traditionally associated with Pre-Dorset knappers. While Rattler's Bight points recovered at the large Nulliak Cove site have also been made from Mugford Group cherts (Rankin 2005), this find raises questions about its manufacture.

Scrapers (120/95)

These two Ramah chert scrapers were found less than 20cm from one another in test square N120/E95. During excavations it was noted that the bases of each artefact were lined up in perfect orientation as if they had been part of a composite tool, whereby a scraper was hafted at each end of a handle. Further research has indeed found intriguing support for composite fish processing tools at archaeological sites (Rousseau 2003) and due to the likelihood of IgCx-8 having been such a site, these specimens seem to be a great candidate for such an item in the Dorset char processing tool-kit.

4.4 Debitage description

4.41 Area A

The stone debitage data gathered from the excavated trench in Area A presented an interesting arrangement (Tables 4.7, 4.8 and 4.9). In total, 1142 flakes weighing 698.2 grams were collected across the area. The western section of Unit 90/91 yielded just 9 flakes while three quadrants produced more than 200 flakes in each. In particular, the southern quadrants of Unit N90/E93 contained 515 flakes (45% of the total count) and are a candidate for a possible knapping or dumping area. The fact that part of Unit 91/90 was completely sterile and demonstrated a slightly different soil matrix then the rest of the area, leads me to think something was preventing material culture from being deposited in that area during the time of occupation, such as a structural boundary, hides, or rocks.

Besides the possible value gained from the counts of weights of the debitage, the chipping debris provides an interesting look into raw material use, not always obtained from finished tools alone. As indicated in Tables 4.7 and 4.8 the flake assemblage at Area A is about 95% Ramah chert, supplemented Mugford Group cherts (5%) and a very small amount of other debitage (6 flakes of unidentifiable chert).

Debitage	Ramah Chert	Kaumajet Chert	Cod Island Chert	Other	Totals
N90/E91	45	6	5	4	60
N90/E92	375	14	11	1	401
N90/E93	662	10	8	1	681
Total	**1082**	**30**	**24**	**6**	**1142**

Table 4.7: Area A Flake Count By Raw Material.

Debitage	Ramah Chert	Kaumajet Chert	Cod Island Chert	Other	Totals
N90/E91	44.9	4.3	7.8	0.4	57.4
N90/E92	216.5	6.3	5.7	3.5	232.0
N90/E93	388.0	11.9	8.8	0.1	408.8
Total	**649.4**	**22.5**	**22.3**	**4.0**	**698.2**

Table 4.8: Area A Total Flake Mass By Raw Material (g).

Debitage	Ramah Chert	Kaumajet Chert	Cod Island Chert	Other	Totals
N90/E91	1.00	0.72	1.56	0.10	0.96
N90/E92	0.57	0.45	0.52	3.50	0.58
N90/E93	0.59	1.19	1.10	0.10	0.60
Total	**0.61**	**0.75**	**0.93**	**0.67**	**0.61**

Table 4.9: Area A Mean Flake Mass By Raw Material (g).

4.42 Area B

In Area B's excavation zone (6 m^2), a total of 2836 flakes (1271.1 grams) were collected (Tables 4.10, 4.11). While all units were fairly productive, the 3 eastern squares (N110/E100, N110/E101 and N109/E101) contained dense deposits of chipping debris. While the eastern side of the trench contained higher numbers of flakes, debitage in the western part were on average a little heavier (Table 4.12). With regards to raw material, Ramah chert was again the most popular choice in both overall flake count (82%) and mass (80%). An increased presence of Pre-Dorset activity is suggested by Mugford Group chert data. Kaumajet black chert and Cod Island chert accounted for 15% of the total count and 17% of the total flake weight. Less than 3% of the flakes were that of other materials, mainly quartz crystal, unidentifiable cherts, Ryan's quartz, and quartzite.

Debitage	Ramah Chert	Kaumajet Chert	Cod Island Chert	Other	Totals
113/96	100	3	8	11	**122**
111/98	361	61	8	13	**443**
110/99	327	25	16	7	**375**
110/100	496	118	12	19	**645**
110/101	532	53	13	11	**609**
109/101	512	100	14	16	**642**
TOTAL	**2328**	**360**	**70**	**77**	**2836**

Table 4.10: Area B Flake Count By Raw Material.

Debitage	Ramah Chert	Kaumajet Chert	Cod Island Chert	Other	Totals
113/96	64.3	1.7	7.8	3.0	**76.8**
111/98	246.6	41.7	3.3	4.4	**296.0**
110-99	146	13.6	6.6	4.2	**170.4**
110/100	274.4	80.6	6.8	22.2	**384.0**
110/101	278.0	23.3	11.9	4.4	**317.6**
109/101	262.4	46.8	20.4	7.1	**336.7**
TOTAL	**1271.7**	**207.7**	**56.8**	**45.3**	**1581.5**

Table 4.11: Area B Total Flake Mass By Raw Material (g).

Debitage	Ramah Chert	Kaumajet Chert	Cod Island Chert	Other	Totals
113/96	0.64	0.57	0.98	0.27	**0.63**
111/98	0.68	0.68	0.41	0.34	**0.69**
110-99	0.29	0.54	0.41	0.60	**0.45**
110/100	0.55	0.68	0.57	1.17	**0.60**
110/101	0.52	0.44	0.92	0.40	**052**
109/101	0.51	0.47	1.46	0.44	**0.52**
TOTAL	**0.55**	**0.58**	**0.80**	**0.59**	**0.56**

Table 4.12: Area B Mean Flake Mass By Raw Material (g).

4.43 Area C

Lastly the 2 x 2 metre area opened up in Area C yielded 1145 stone flakes with a total mass of 1975.5 grams (Table 4.13 and 4.14). Overall, the flakes in this part of the site were much larger than elsewhere (Table 4.15), and the data provides clues about the activities that took place here. One square in particular, N119/E91, contained nearly 45% of the total count and weight of all debitage. While there were minor amounts of Mugford Group cherts in Area C (2% of total mass), Ramah chert and quartzite debitage defined the collection. This was the only area in which quartzite was a significant part of an assemblage at IgCx-8 and it accounted for 28% of the total flake count and 41% of the total mass. This along with quantities of Ramah chert, has provided a unique data set that reflects Labrador Archaic flint knapping activities (Tuck 1975).

Debitage	Ramah Chert	Quartzite	Mugford Group	Other	Totals
N119/E91	342	249	15	16	622
N120/E91	167	63	10	4	244
N120/E92	381	21	31	9	442
N119/E92	58	67	5	7	137
TOTAL	**948**	**400**	**61**	**36**	**1445**

Table 4.13: Area C Flake Count By Raw Material.

Debitage	Ramah Chert	Quartzite	Mugford Group	Other	Totals
N119/E91	387.2	417.1	12.3	28.0	844.6
N120/E91	200.6	151.6	6.2	11.4	369.8
N120/E92	342.3	63.2	20.8	33.5	459.8
N119/E92	94.3	186.0	2.8	28.2	301.3
TOTAL	**1014.4**	**817.9**	**42.1**	**101.1**	**1975.5**

Table 4.14: Area C Total Flake Mass By Raw Material (g).

Debitage	Ramah Chert	Quartzite	Mugford Group	Other	Totals
N119/E91	1.13	1.68	0.82	1.75	1.36
N120/E91	1.20	2.41	0.62	2.85	1.52
N120/E92	0.90	3.01	0.67	3.72	1.04
N119/E92	1.45	2.78	0.56	4.03	2.20
TOTAL	**1.07**	**2.04**	**0.69**	**2.81**	**1.37**

Table 4.15: Area C Mean Flake Mass By Raw Material (g).

4.44 IgCx-8 debitage summary

Looking back over the stone debitage data collected from Kogarsok Brook-1, there are intriguing statistics from each area on the amounts and types of raw materials used. The relative proportions of Ramah chert, Ramah Group quartzite, and Mugford cherts, in addition to the minor amounts of other lithic types, provides useful insights into which people may have been utilizing the site and what activities and technological choices may have been implemented there. While Ramah chert was by far the most popular lithic used, representing 80% of the total flake count and 70% of the total weight, it was supplemented by modest amounts of quartzite and Mugford Group cherts.

4.6 Radiometric samples

As previously mentioned, two charcoal samples from IgCx-8 were sent to Beta Analytic Incorporated for radiocarbon dating analysis. The first (RC04-01) was collected from the bottom of Level 1 in Test Square N115/E100 (50cm X 100 cm) situated at the northern limit of Area B. There was charcoal present throughout most of the unit and a lens of the red ochre-like substance encountered in much of Area C. No diagnostic artefacts were recovered from this test square but the flakes were Ramah chert. The sample quality and quantity was excellent and analysis produced a radiocarbon age of 3830+/-90 BP (Figure 4.10). This date range sits comfortably within both the Labrador Archaic and Pre-Dorset periods in northern Labrador, however the charcoals context leads me to believe the former group deposited it.

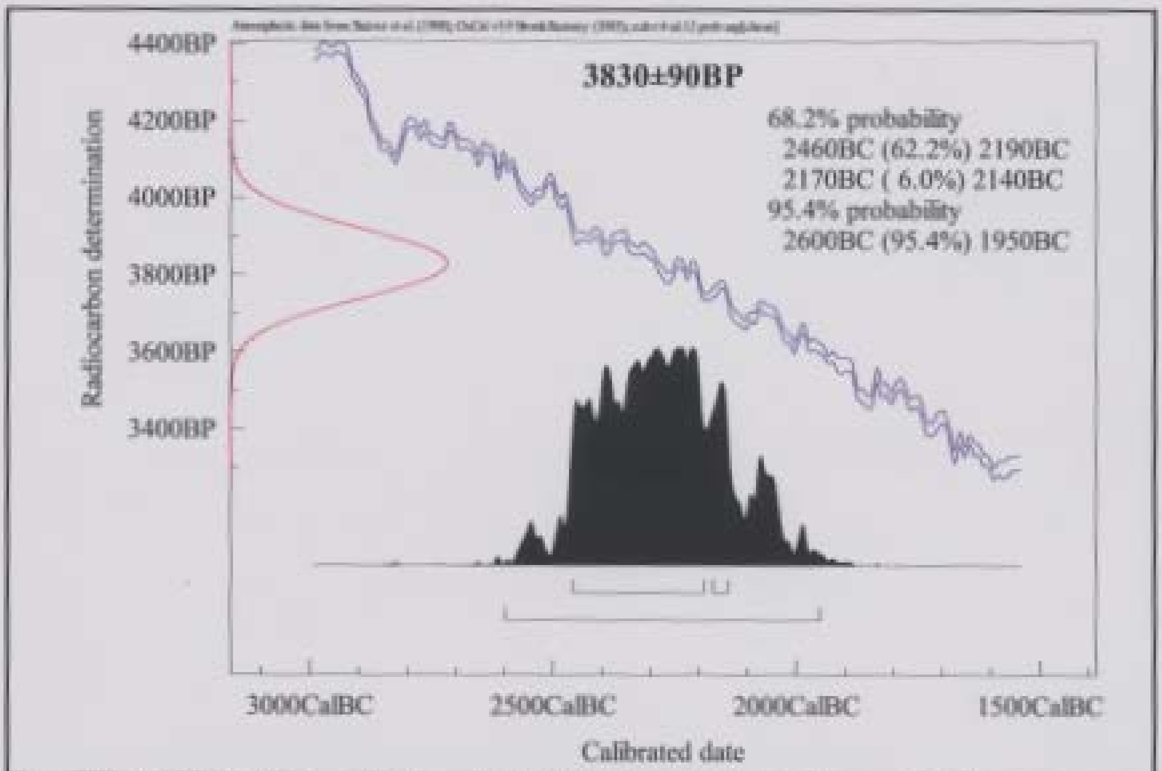

Figure 4.10: IgCx-8 (Radiometric Sample RC04-01 from L1B, Test Square 115/100)

A second sample (RC04-06) was collected from the charcoal lens in Unit N120/E91 in Area C. This sample was not as large as the previous one, but the context was in excellent association with a Labrador Archaic component, consisting of charcoal, ash, the ochre lens, and numerous artefacts and flakes. While not suitable for conventional radiometric testing, the sample was AMS dated. The radiocarbon analysis produced an age of 4670+/-50 BP (Figure 4.11). When calibrated, and put in the context of other reported Labrador Archaic radiocarbon dates from northern Labrador, the Kogarsok Brook-1 dates fit well within the chronology (Figure 4.12). When the IgCx-8 dates are viewed in the context of the artefact collections from the site, they make sense. With respect to the 4670+/-50 BP date, it was associated with an assemblage very similar to other early Labrador Archaic assemblages, notably that of Band 7A at Site Q in Saglek Bay (Tuck 1975). It seems appropriate that based on the similarities of the material culture between those two sites that the date comparisons are also quite close. Finally, the 3830+/-90 BP date fits well with the assemblage at IgCx-8 because there are Labrador Archaic artefacts here that fit the later Rattler's Bight period (Fitzhugh 1978).

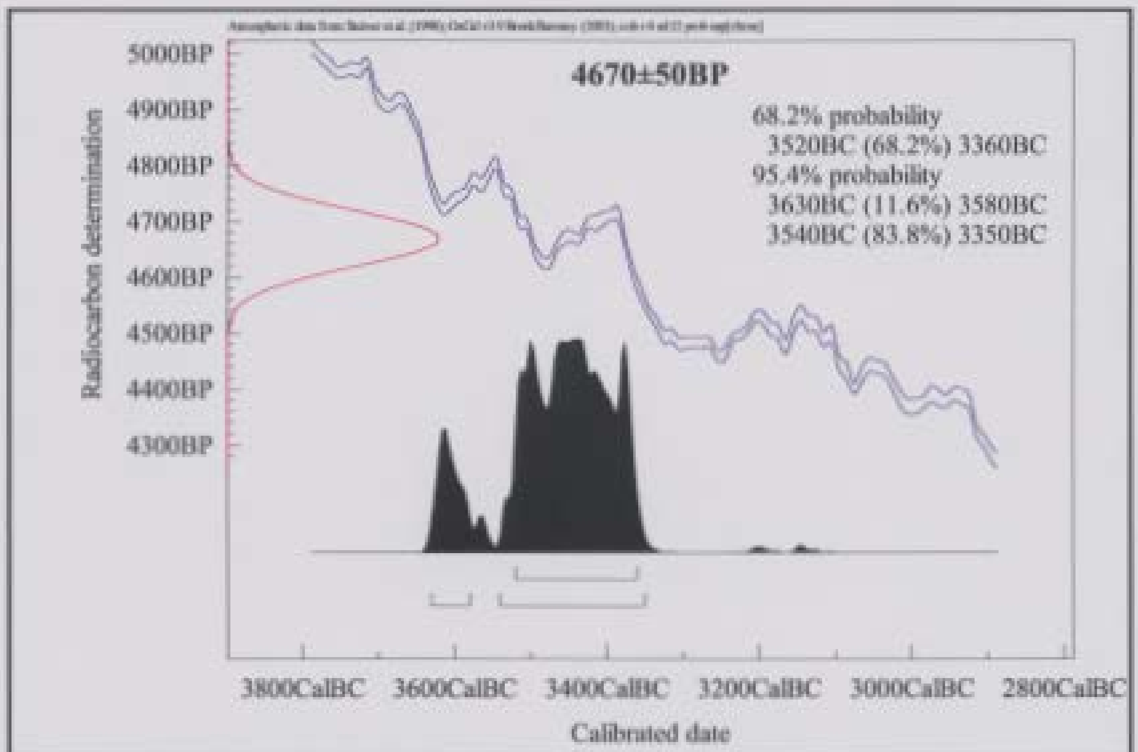

Figure 4.11: IgCx-8 (AMS Dated Sample RC04-06 from L2, Unit N120/E91).

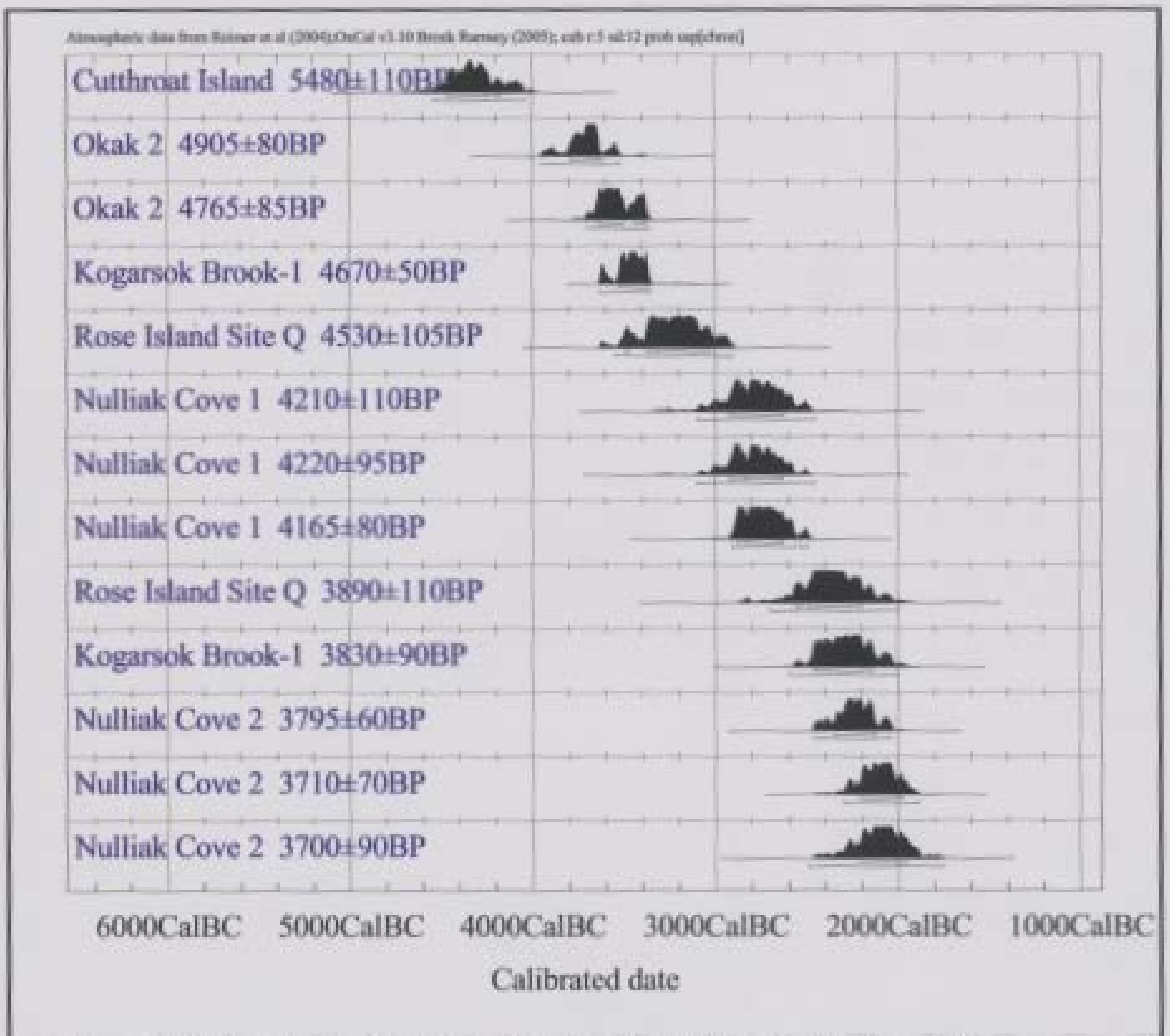

Figure 4.12: Labrador Archaic Calibrated Dates from Labrador North Coast Sites.

CHAPTER FIVE

Data Analysis and Interpretation at Kogarsok Brook-1 (IgCx-8)

5.1 Introduction

This chapter examines the assemblages from the Kogarsok Brook-1 site as a means to answer questions on technological strategies of the Labrador Archaic and Early and Late Palaeoeskimo people. By incorporating data pertaining to raw material, stone debitage and artefacts, with the theoretical and methodological paradigms previously discussed, this chapter considers artefact design strategies and distribution at the site.

5.2 Raw material analysis

Much of the raw material data from IgCx-8 has already been presented and discussed in Chapter Four. In this section stone debitage counts and weights are examined for each area, and conclusions drawn about the quantities and types of raw materials utilized at the site. Artefact materials and distributions will also be discussed.

5.21 Area A raw material

In Area A Ramah chert accounted for more than 95% of the debitage count and 98% of the mass. Less than 5% of the flake count assemblage (2% of total mass) was Mugford Group cherts and less than 1% were unknown/other chert types. As with the flakes, Ramah chert dominated the collection accounting for 86% of the artefacts. Mugford cherts made up 11% of the artefacts while a single quartz crystal specimen represented 3% of the total.

5.22 Area B raw material

In Area B, the situation alters a little as Ramah chert makes up 82% of the flake count and accounts for 80% of the total flake mass in the area. The presence of Mugford cherts increases to 15% and 17% of Flake count and mass respectively. Flakes from other chert, quartzite's and quartz's represent 3% of the debitage from Area B. With respect to the artefact collection, 99 Ramah chert artefacts make-up 64% of the assemblage followed Mugford chert artefacts at 22%. A few quartzite artefacts represent 5% of the total while artefacts made from either quartz crystal, Ryan's quartz, slate, and nephrite or another lithic type account for 8% of the total artefacts from Area B.

5.23 Area C raw material

The raw material arrangement in Area C is quite different from the rest of the site as there are large increases in quartzite for both debitage and artefacts. Ramah chert remains the most popular raw material, accounting for 66% of the flake count and 51% of the flake mass. Quartzite use is well represented as it accounts for 28% of the flake count and a notable 41% of the total weight for the debitage. Although scarce, Mugford chert makes up 4% of the flake count and just 2% of the flake mass in Area C. Finally lithics in the other/unknown category represent 2% and 3% of the flake count and mass respectively. With regards to artefacts, Ramah chert makes up 65% of the assemblage, while quartzite comes second with 19% of the total. Mugford chert artefacts are better represented than the flakes were as they make-up 8% of the total. Lastly, artefacts in the other/unknown grouping (mostly ground slate), account for the final 8% of the collection.

5.24 Raw material at IgCx-8

The information obtained on raw material at IgCx-8 from the three excavation areas and test squares present an interesting picture of lithic procurement and use in the region (Figures 5.1, 5.2 and 5.3). On the whole, the data illustrates that Ramah chert was the most well-represented lithic type right across the site. With respect to debitage totals, Ramah chert makes-up 80% of the flake count and 70% of the flake mass, while 66% of the artefacts were manufactured on Ramah chert. For each area within the site, Ramah chert was also the highest represented lithic type in debitage and artefacts.

The second most common raw materials used at the site are Mugford Group cherts (Kaumajet and Cod Island chert). In terms of debitage, Mugford cherts account for 10% of the flake count from across the site and 8% of the flake mass. With respect to artefacts, Mugford cherts account for a modest 14% of the collection. It is worth noting that Area B contains the highest quantities of Mugford cherts.

The third highest quantity of raw material used at Kogarsok Brook-1, at least in terms of total count and not weight is Ramah Group Quartzite. While quartzite accounts for just 7% of the total flake count it does make-up 19% of the total flake mass. In addition, quartzite artefacts represent 10% of those recovered from the entire site. While there were occasional pieces of quartzite in Area B (none in Area A), over 99% of the quartzite flake totals and more than 80% of the quartzite artefacts came from Area C.

Finally it must also be pointed out that other types of lithics, including quartz crystal, Ryan's quartz, slate, nephrite, pumice, diabase, and unidentified cherts are present in the collection as flakes and/or artefacts. From the excavation areas the "other"

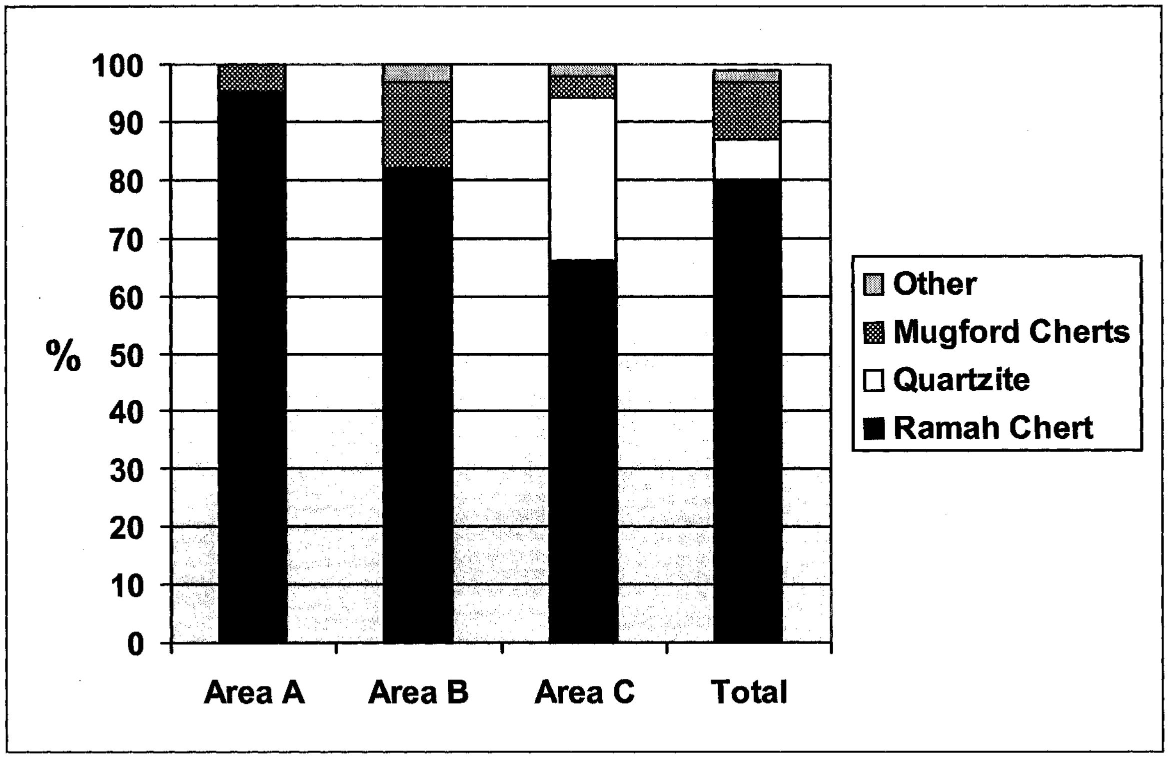

Figure 5.1: IgCx-8 Flake Count Frequency By Raw Material Type.

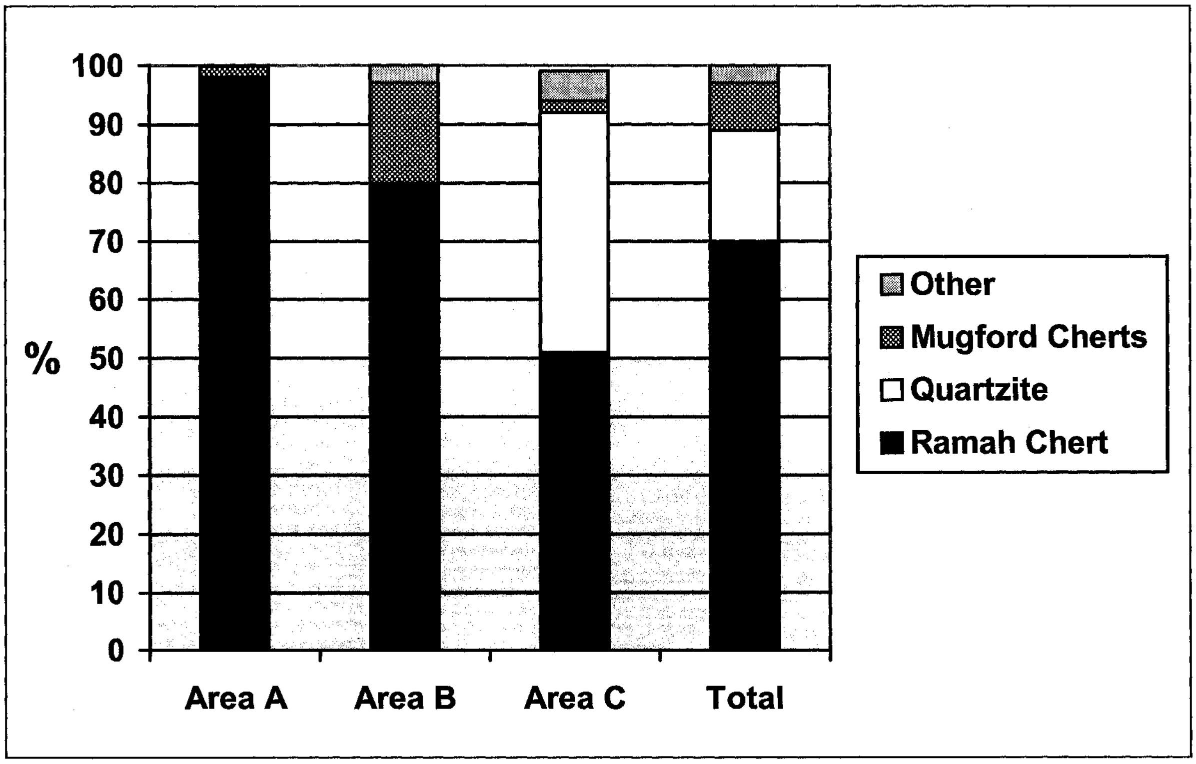

Figure 5.2: IgCx-8 Flake Mass Frequency By Raw Material Type.

category accounts for 2% of the flake count and 3% of the flake weight. With regards to the artefacts these raw materials as a whole account for 10% of the collection.

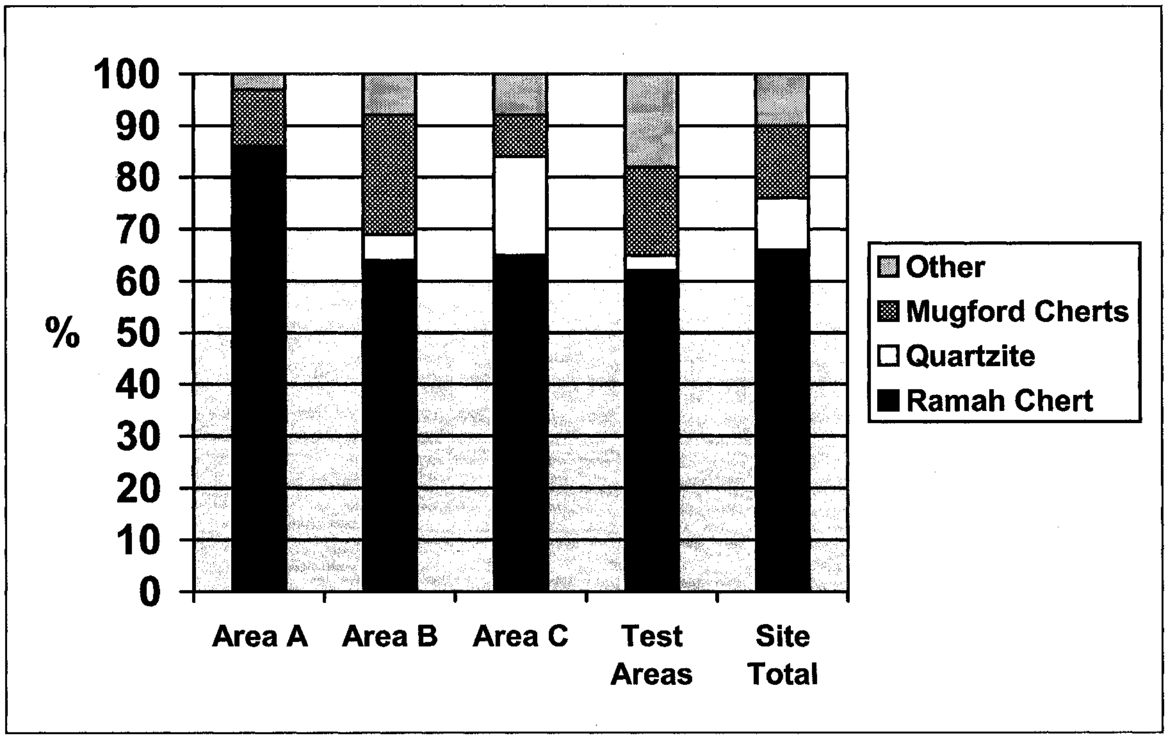

Figure 5.3: IgCx-8 Artefact Distribution and Quantity By Raw Material.

5.3 Debitage analysis

The debitage analysis was conducted on all flakes collected from the main excavation areas on the site (A, B & C). The results from each area will be discussed separately at first and then as a group in the following sections.

5.31 Area A debitage analysis

Debitage in Area A was not distributed evenly across the three units (Figure 5.4). Unit N90/E91 was partially sterile and contained a small percentage (<10%) of the debitage. The majority of the flakes recovered were Ramah chert (95%) and small amounts of Mugford chert (5%) supplemented the assemblage.

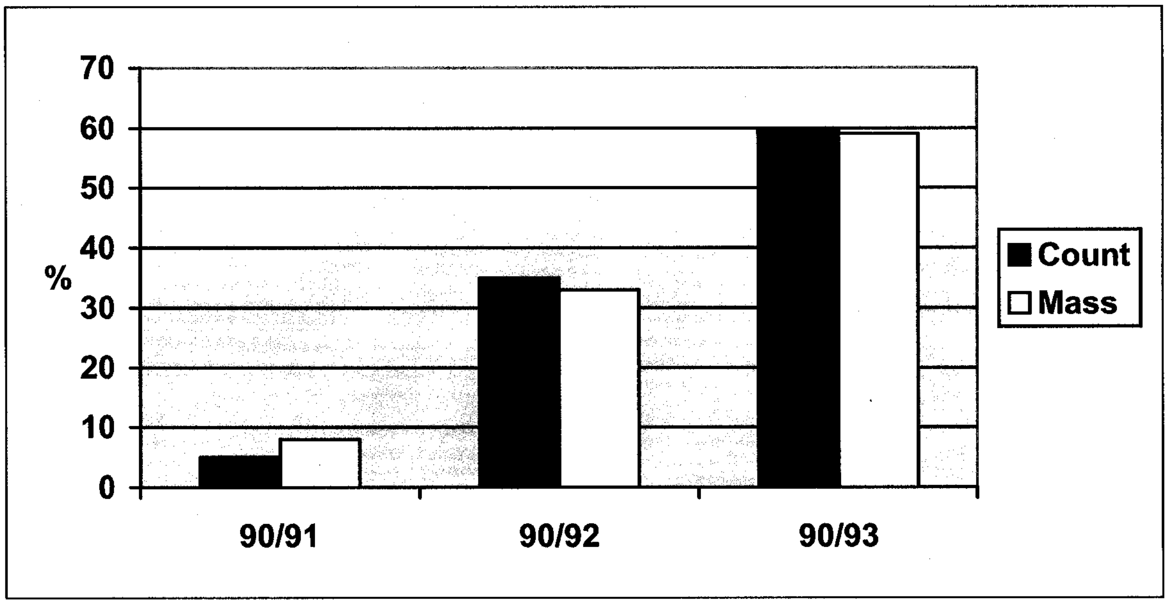

Figure 5.4: Area A Debitage Count and Weight By Unit.

In order to best distinguish between cultural depositions, the flake-size data has been separated into Ramah chert and Mugford chert debitage samples. For Ramah chert (Table 5.1 and Figure 5.5), small retouch flakes dominate the collection as Size 1 flakes make-up 75% of the assemblage, suggesting a great deal of effort tied up with tool maintenance. The remaining flakes are larger and fall in the Size 2 and Size 3. This suggests that both middle and late stage lithic reduction was taking place in Area A. To bring the focus down in scale, even though the eastern portion of Area A contained comparatively few flakes, debitage in this section was on average larger. In contrast the western side of the trench contained minor proportions of Size 3 flakes. This data suggests that different cultural site formation processes were at play in this area.

Flake Size	Flake #	# %	Flake Mass (g)	Mass %	Avg. Flake Mass (g)
1	813	*75*	203.3	*31*	0.25
2	206	*19*	204.2	*31*	0.99
3	73	*7*	242.9	*37*	3.33
4	0	*0*	0	*0*	-
Total	**1092**	***100***	**650.4**	***100***	**0.60**

Table 5.1: Area A Size Grade Data for Ramah Chert Flakes.

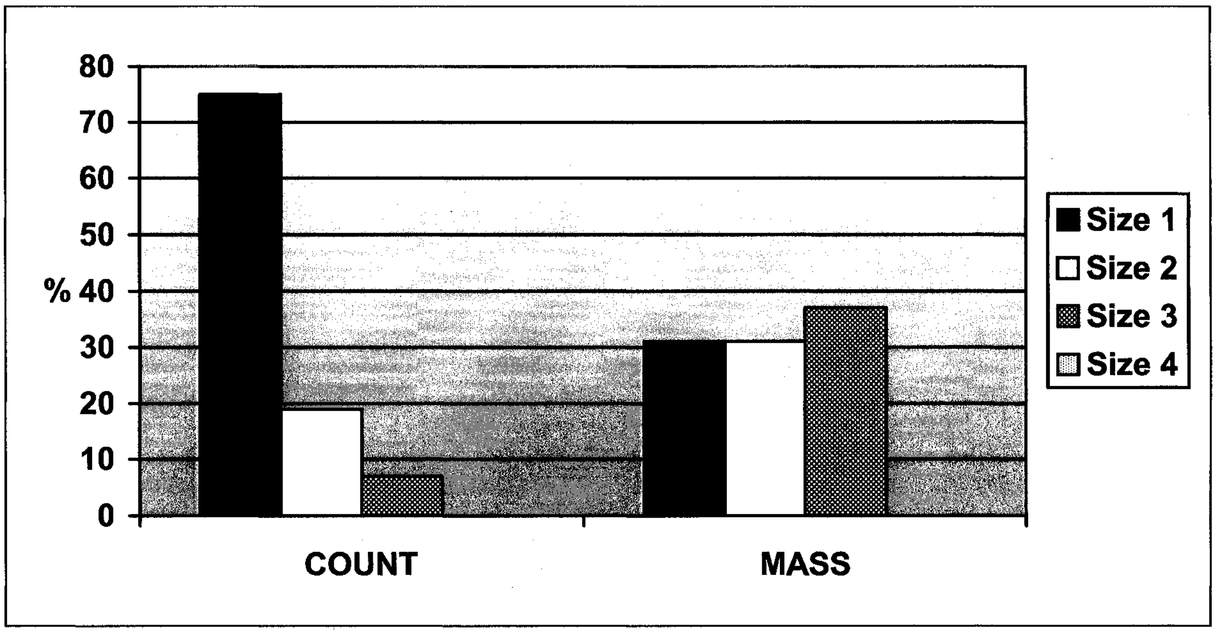

Figure 5.5: Area A Size Grade Data for Ramah Chert Flakes.

In terms of the Mugford chert debitage in Area A (Table 5.2 and Figure 5.6), although there were only 54 flakes recovered, it seems as if the flaking activities were slightly different from Ramah chert knapping activities. The average flake mass of Mugford chert is more than that of Ramah chert, suggesting that more weight is tied up in larger flake sizes. While most the flakes were produced from retouch activities, nearly half the mass was attributed to Size 3 debitage. This was possibly the result of early stage bifacial reduction.

Flake Size	Flake #	# %	Flake Mass (g)	Mass %	Avg. Flake Mass (g)
1	34	*63*	8.5	*30*	0.25
2	10	*19*	11.5	*22*	1.15
3	10	*19*	26.2	*48*	2.62
4	0	*0*	0	*0*	-
Total	**54**	***100***	**46.2**	***100***	**0.85**

Table 5.2: Area A Size Grade Data for Mugford Group Chert Flakes.

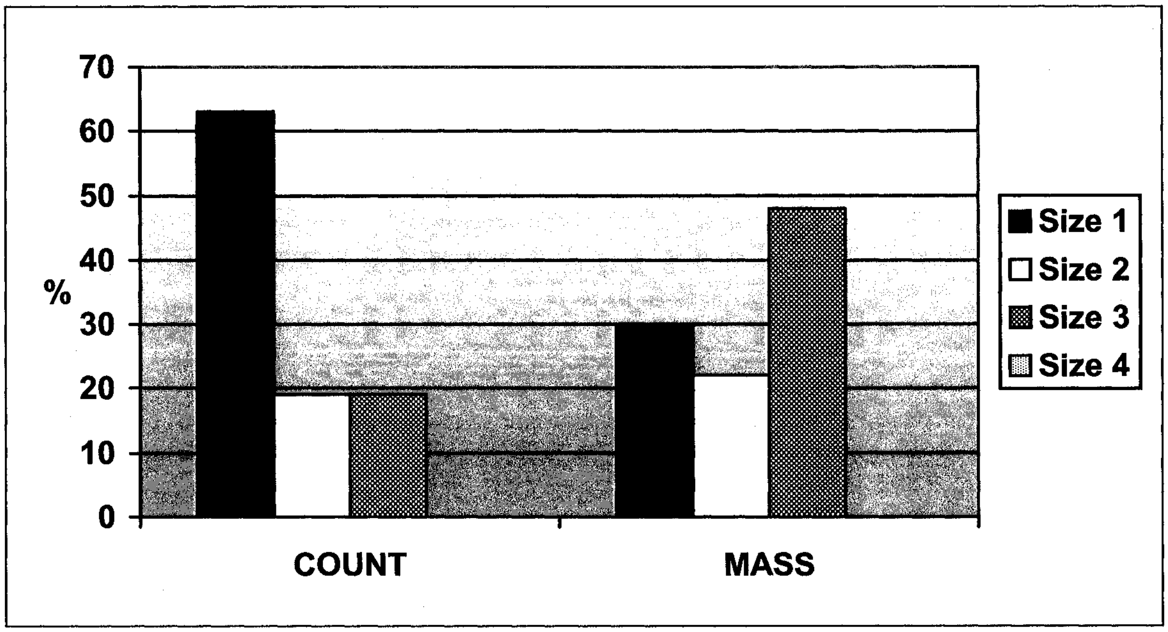

Figure 5.6: Area A Size Grade Data for Mugford Chert Flakes.

5.32 Area B debitage

As with parts of Area A, much of Area B contained a dense deposit of different types of flaking debris, implying a long and multifaceted history at the site. Figure 5.7 demonstrates that the eastern half of the area contained the majority of the debitage

(67%) yet average weights were fairly consistent throughout. Units 113/96, 111/98 and 110/100 demonstrate higher mass than count frequencies which means that flakes were generally bigger in these units.

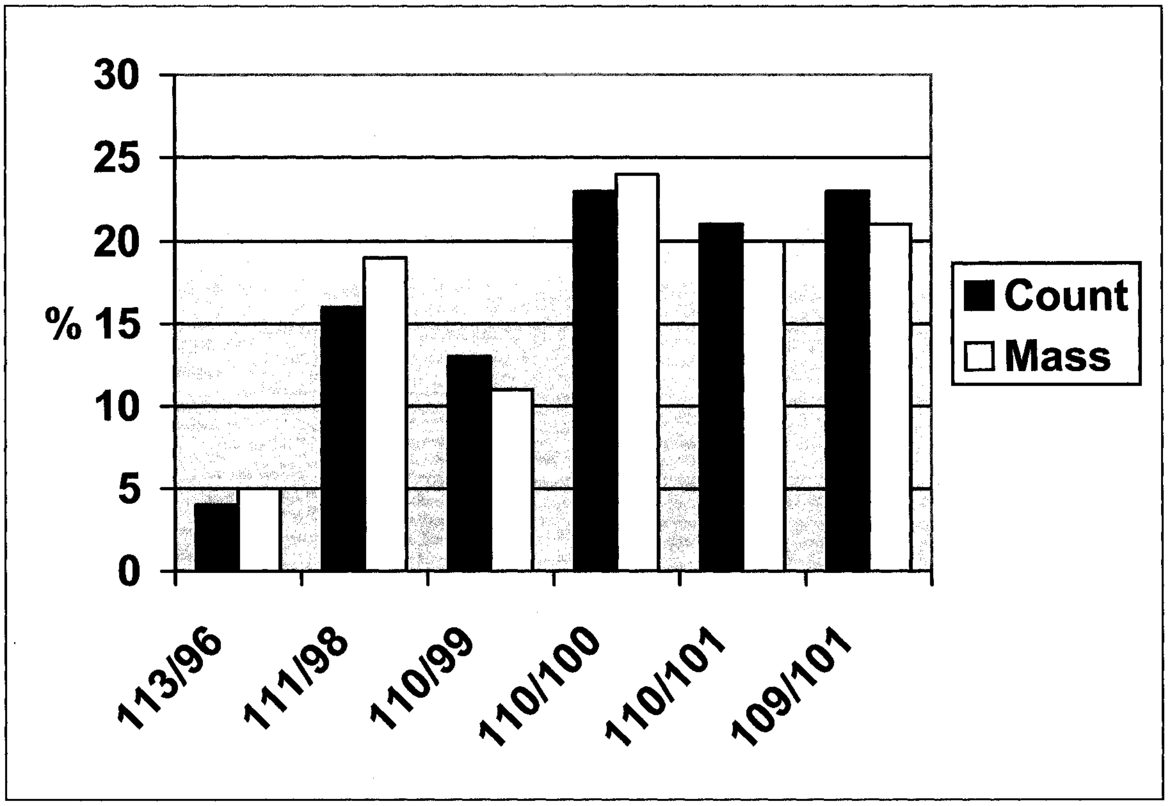

Figure 5.7: Area B Flake Count and Mass By Unit.

With regards to raw material data collected from the flake analysis Ramah chert is still the most frequent, accounting for 82% of the count and 80% of the flake mass in Area B. Mugford Group cherts are well represented totalling 15% of the total count and 16% of the flake count in the area. The remaining 5% or so is made up of flakes of quartzite, quartz crystal, Ryan's quartz, and some unknown chert types.

Turning to the flake-size grade division of the analysis, Ramah chert and Mugford chert debitage have been seperated. Referring first to Table 5.3 and Figure 5.8, the Ramah chert assemblage is dominated by retouch flakes and late-stage manufacture

Flake Size	Flake #	# %	Flake Mass (g)	Mass %	Avg. Flake Mass (g)
1	1637	*70*	375.2	*30*	0.23
2	563	*24*	518.2	*40*	0.92
3	131	*6*	378.5	*30*	2.89
4	0	*0*	0	*0*	-
Total	**2331**	***100***	**1271.9**	***100***	**0.55**

Table 5.3: Area B Size Grade Data for Ramah Chert Flakes.

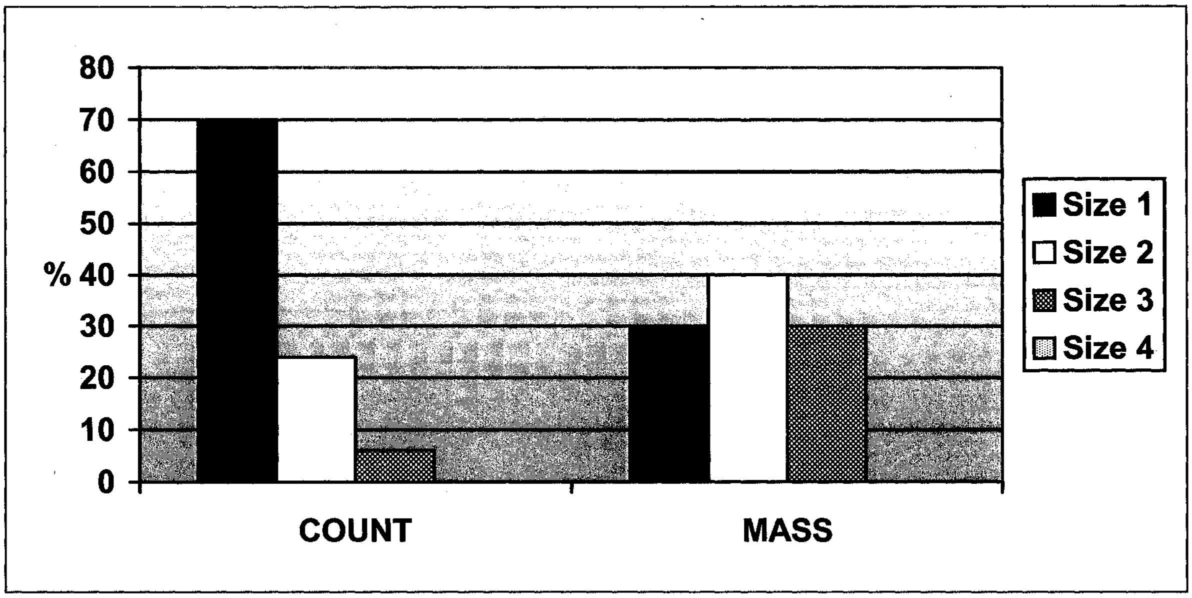

Figure 5.8: Area B Size Grade Data for Ramah Chert Flakes.

debitage with only a small amount of Size 3 flakes. The high proportions of Sizes 1 and 2 suggest that retouching the edges of flake tools and maintaining bifaces and other formal tool types were the most common knapping activities occurring within Area B. Nevertheless, since Size 3 flakes account for 30% of the total flake mass for the area, some early stage manufacturing activity. It is likely that bifacial reduction was occurring.

Looking at the Ramah chert assemblage among the units, the flaking activities appear fairly consistent across Area B. Small retouch flakes make up between 61% and

73% of the total counts and based on the lack of Size 4 and low counts of Size 3 flakes, it seems as if early and middle stage manufacture rarely occurred. Size 2 flakes make up the largest percentage of total flake mass in all units and it seems likely that knapping activities were focused on maintaining implements used in activities taking place in this part of the site and possibly retooling/rehafting broken tools.

Turning to the Mugford chert debitage, the most noticeable feature about the assemblage is the increase in the count and mass percentage of Size 2 flakes compared with Ramah chert debitage (Table 5.4 and Figure 5.9). This obviously represents a difference in flaking behaviour and it seems reasonable to assume that the pattern signifies an increase in late stage manufacturing such as biface thinning and shaping. The lack of Size 4 flakes and small amount of Size 3 flakes demonstrates that bifaces were not being produced from cores here, but that that biface performs were likely carried to the site and final shaping did take place as the need arose. The high amounts of Size 1 debitage show that tool maintenance and retouch were common activities.

Flake Size	Flake #	# %	Flake Mass (g)	Mass %	Avg. Flake Mass (g)
1	245	*58*	51.3	*20*	0.21
2	150	*36*	118.5	*48*	0.79
3	28	*7*	78.5	*32*	2.8
4	0	*0*	0	*0*	-
Total	**423**	***100***	**248.3**	***100***	**0.59**

Table 5.4: IgCx-8: Area B Size Grade Data for Mugford Group Chert Flakes.

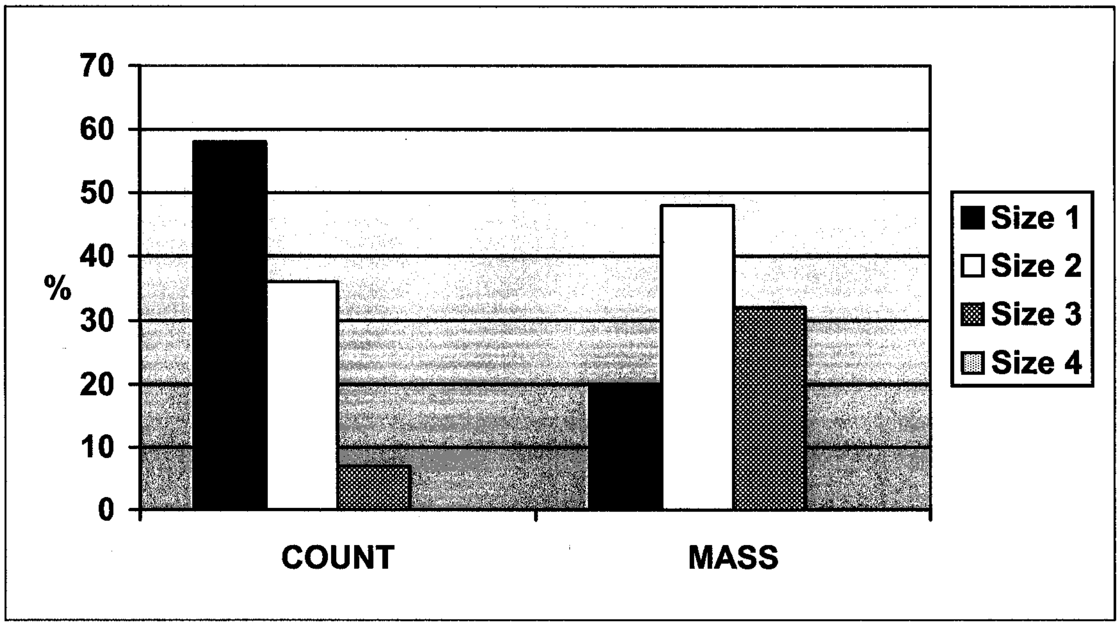

Figure 5.9: Area B Size Grade Data for Mugford Group Chert Flakes.

5.33 Area C debitage

The flaking debitage recovered from Area C (Figure 5.10) was quite different from the rest of the site. While the overall deposit was dense like in other areas, this collection contrasted mainly in the raw material make-up and the average sizes of the flakes. The average flake mass from the four units was 1.38 grams per flake, meaning that on average, flakes were bigger, thicker and heavier, thus suggesting early stage manufacture and reduction activities were taking place.

Ramah chert frequency has been displaced by increased amounts of quartzite, all of which may be classified as Ramah Group quartzite. Ramah flakes are still the most popular in terms of overall count and mass frequency and the numbers fluctuate between the four units. The quartzite debitage deposit was fairly dense throughout the area.

Additionally, the average size and mass of individual flakes is much larger than that for Ramah chert flakes, and for that matter from anywhere else encountered on the site.

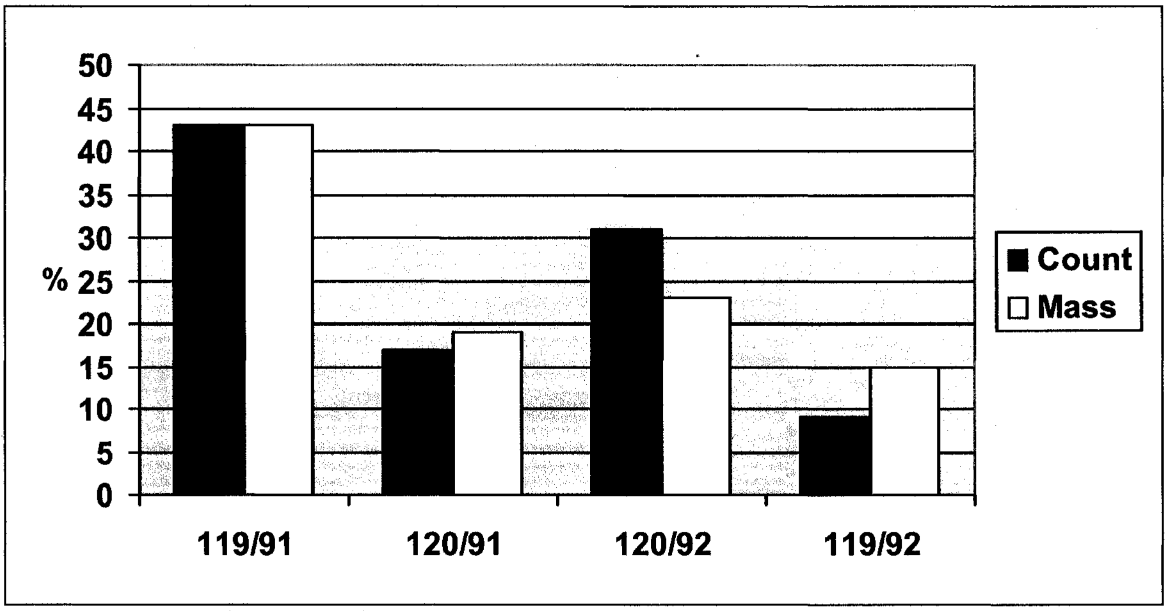

Figure 5.10: Area C Debitage Count and Mass Frequencies By Unit.

Turning attention to the flake-size grade data, I will discuss Ramah chert and quartzite debitage separately. Beginning with the Ramah chert flake assemblage (Table 5.5 and Figure 5.11), the majority (58%) of the flakes were small Size 1 flakes, indicative of retouch activities such as tool maintenance and final shaping. A significant amount of Size 2 flakes also points to late stage knapping behaviour associated with biface thinning. Finally the 105 Size 3 flakes, that account for nearly half the overall mass (49%), reveal that early and middle stage activity such as core reduction and maybe blank preparation were common actions.

To narrow the focus towards individual units in Area C, there are no major differences in the debitage deposits in terms of the ratios between flake-sizes. Two units have a higher amount of count and mass tied up in Size 2 flakes and this may indicate

Flake Size	Flake #	# %	Flake Mass (g)	Mass %	Avg. Flake Mass (g)
1	567	*58*	169.8	*16*	0.30
2	307	*31*	376.6	*35*	1.23
3	105	*11*	527.2	*49*	5.02
4	0	*0*	0	*0*	-
Total	**979**	***100***	**1073.6**	***100***	**1.10**

Table 5.5: Area C Size Grade data For Ramah Chert Flakes.

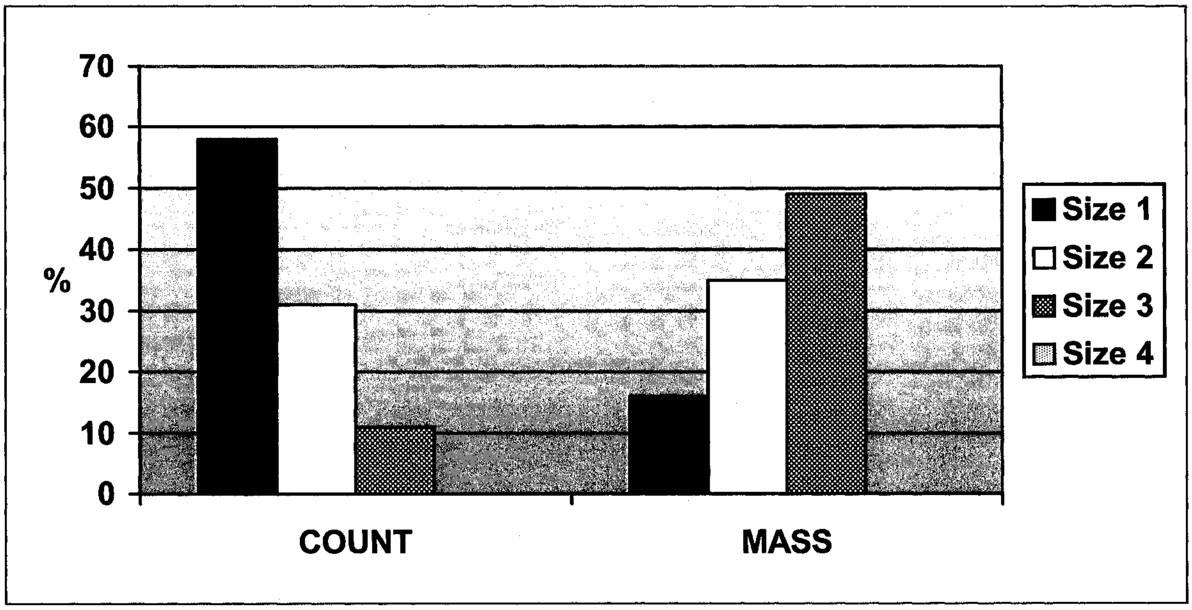

Figure 5.11: Area C Size Grade Data for Ramah Chert Flakes.

different reduction activities took place separately from final manufacturing and maintenance activity. Since a great deal of the overall flake mass is tied up in Size 3 flakes, it means that many large flakes were left unused at the site, suggesting that raw material shortage was not an issue.

Shifting the focus from Ramah chert to quartzite, there are visible differences in the flake-size distributions (Table 5.6 and Figure 5.12). While Size 1 flakes are still the

Flake Size	Flake #	# %	Flake Mass (g)	Mass %	Avg. Flake Mass (g)
1	176	*44*	68.7	*8*	0.39
2	134	*34*	189.9	*23*	1.42
3	89	*22*	549.3	*66*	6.17
4	1	*<1*	20.0	*2*	20.0
Total	**400**	***100***	**827.9**	***100***	**2.07**

Table 5.6: Area C Size Grade data For Quartzite Flakes.

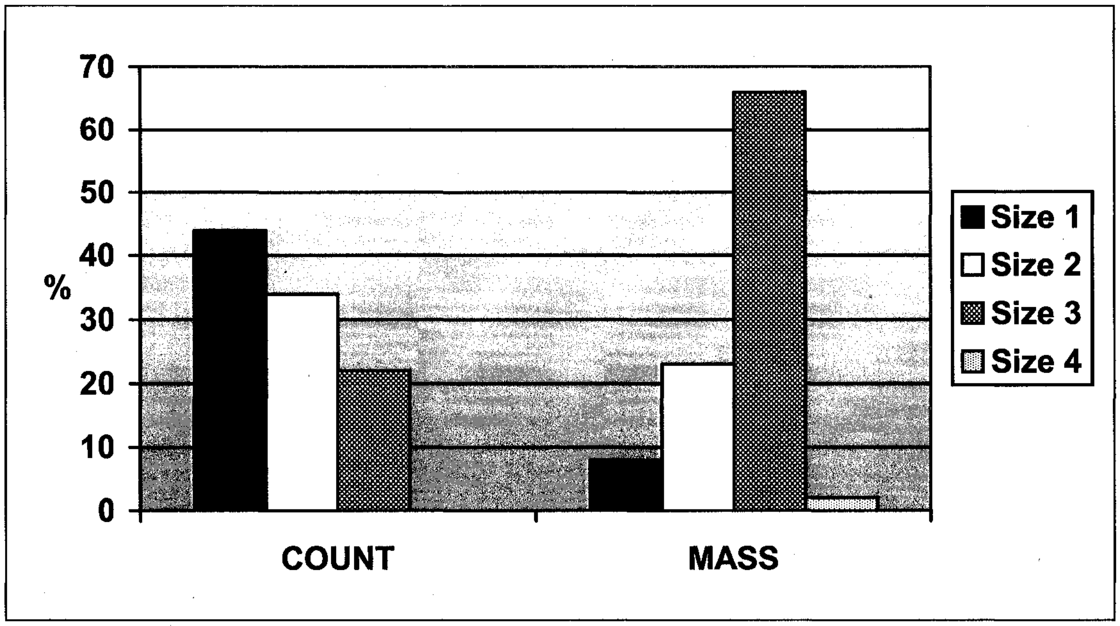

Figure 5.12: Area C Size Grade Data for Quartzite Flakes.

most common, Size 2 and notably Size 3 flakes make up a larger portion of the assemblage. Over 65% of the total debitage mass comes from the Size 3 class and it suggests that different knapping behaviour was expressed for working the quartzite material. It appears as if there was little need to conserve raw material and that not a lot of effort was spent performing maintenance and edge retouch. The high amounts of Size 3 flakes and the single Size 4 flake, point towards early and middle stage manufacture such as core reduction and large flake and core production.

The overall pattern of quartzite use in Area C is for the most part consistent across the units. Only in Unit N119/E91 does Size 1 flake counts account for the majority of the assemblage. Maybe a small amount of retouch activity on quartzite was taking place in a confined area. In addition, in each unit 50%-80% of the overall mass is a result of the Size 3 debitage.

5.34 IgCx-8 debitage

To look at Ramah chert debitage as a whole and compare flake-size data between the excavation areas(Figures 5.13 and 5.14), some points may be made. The count and mass frequencies for Area A and Area B are comparable as each have similar patterns in Size's 1, 2 and 3 flake-size data. Obviously, retouch flakes prevail in these areas and the majority of flaking behaviour revolves around late stage manufacture and tool maintenance. Some middle stage, and possibly early stage knapping and flake production did occur in these areas, but it appears as if raw material was brought to the site in an already reduced state. Area C however was somewhat different as there were notable increases in Size 2 and Size 3 flakes. This data indicates that different technological strategies were at play in Area C and thus behaviour was more geared towards middle and earlier stage manufacture such as producing large flakes and thinning and shaping the chert for tools. The visible increase of cortical flakes and the vast amount of core fragments and large utilized flakes in Area C reveal that unworked or minimally prepared blocks of raw material were being carried to the site.

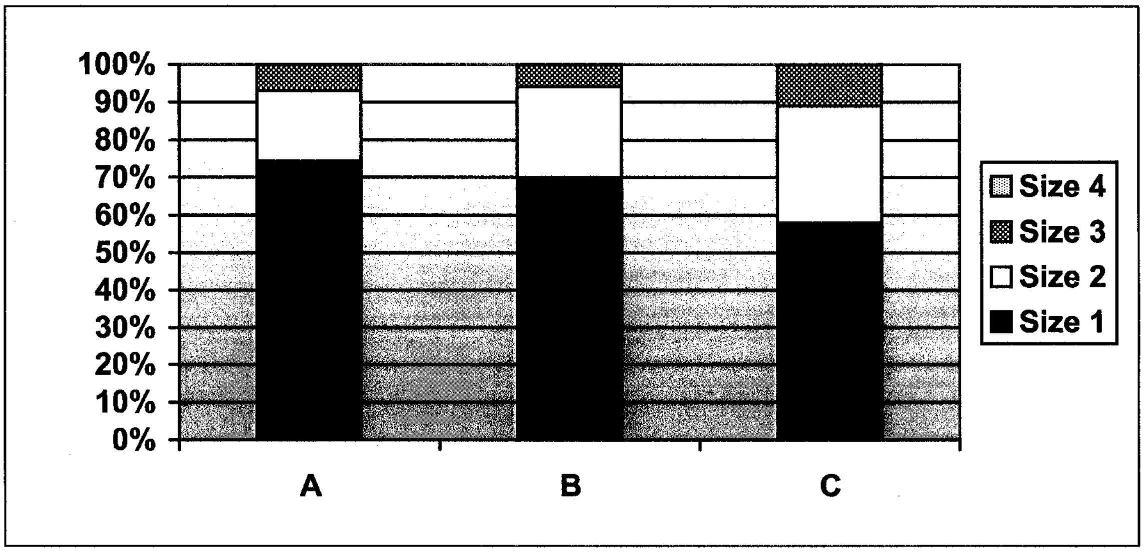

Figure 5.13: IgCx-8 Ramah Chert Flake Size Grade Count Frequency By Area.

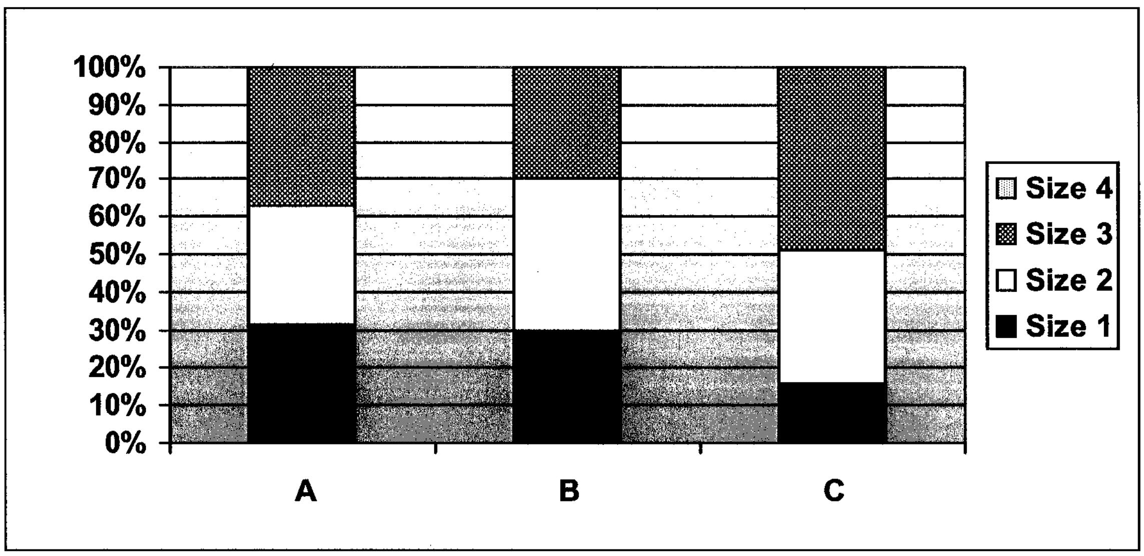

Figure 5.14: IgCx-8 Ramah Chert Flake Size Grade Mass Frequency By Area.

While I have already discussed flake-size data for each area, I have not included an analysis of the state of some of the more 'exotic' raw material debitage. By exotic I mean lithics that could not be acquired directly from a quarry/outcrop in the vicinity of Nachvak Fjord. While these materials may have been acquired indirectly via some form of exchange, the fact that they originated at some distance from the site makes for an interesting enquiry. The main reason that these types of materials have not been examined for each area is that in most cases, with the exception of Mugford chert, the numbers of the exotic material is too low for interpretative value. To correct this and be able to actually say something about how these materials were used at the site I have lumped the debitage data from all areas of the site. More specifically, I have tallied the flake-size data for Mugford chert, "waxy" chert, and Ryan's quartz (Tables 5.7, 5.8 and 5.9.

Flake Size	Flake #	# %	Flake Mass (g)	Mass %	Avg. Flake Mass (g)
1	341	*57*	42.1	*19*	0.12
2	210	*35*	106.0	*47*	0.50
3	46	*8*	76.1	*34*	1.65
4	0	*0*	0	*0*	-
Total	**596**	***100***	**224.2**	***100***	**0.38**

Table 5.7: IgCx-8 Size Grade Data for all Mugford Group Chert Flakes.

Flake Size	Flake #	# %	Flake Mass (g)	Mass %	Avg. Flake Mass (g)
1	42	*58*	29	*22*	0.69
2	29	*40*	15.5	*47*	0.53
3	2	*3*	10.4	*31*	15.5
4	0	*0*	0	*0*	-
Total	**73**	***100***	**33.3**	***100***	**0.46**

Table 5.8: IgCx-8 Size Grade Data for all "Waxy" Chert Flakes.

Flake Size	Flake #	# %	Flake Mass (g)	Mass %	Avg. Flake Mass (g)
1	25	*58*	6.2	*19*	0.25
2	14	*33*	12.5	*37*	0.89
3	4	*9*	14.7	*44*	3.68
4	0	*0*	0	*0*	-
Total	**43**	***100***	**33.4**	***100***	**0.78**

Table 5.9: IgCx-8 Size Grade Data for all Ryan's Quartz Flakes.

The frequency data for flake-size counts and mass for all three groups are remarkably similar to one another (Figures 5.15 and 5.16). The lack of Size 4 flakes and small amounts of Size 3 flakes demonstrate that there was likely no early stage reduction taking place and that middle stage reduction such as biface thinning was not common. This makes a lot of sense, since these materials were not local and we can assume that they were not abundant for any group. At the very least these materials were conserved, and for mobile people the best way to do that would have been to carry around transportable tools or prepared blanks/performs. The fact that for each raw material type, 91%-98% of the flakes are either Size 1 or Size 2, indicates that finished or near finished tools were carried to the site and that knapping activity came in the form of retouching working edges and maintaining tool use-life.

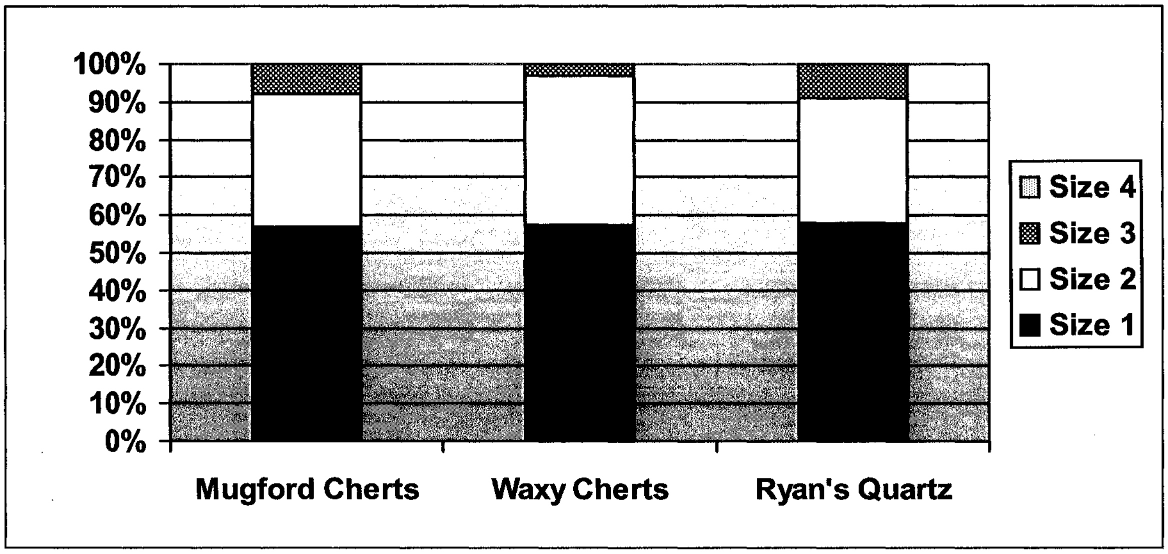

Figure 5.15: IgCx-8 "Exotic" Chert Flake Size Grade Count Frequency.

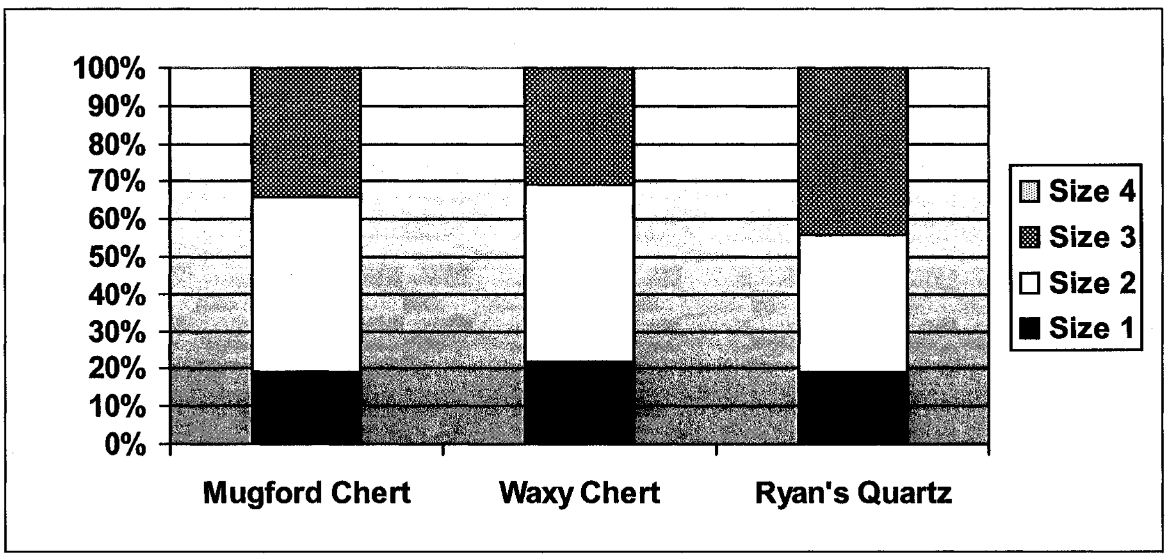

Figure 5.16: IgCx-8 "Exotic" Chert Flake Size Grade Mass Frequency.

5.4 Artefact Analysis

The artefact analysis of the assemblages presented below is based on my proposed technological design class system (Refer to Table 3.1). In the examination I analyze the relationship between artefact types within each excavation area, followed by comparisons of the proportion of artefact types between areas. The analysis allows for comments on the different technological strategies implemented by the different occupants of the site.

541 Area A artefact analysis

The data in Table 5.10 and Figure 5.16 and 5.17 shows the quantities and frequencies of tool design classes. Referring first to the Ramah chert artefacts, 77% are flakes tools, most of which fall under the "informal flake tool" category with lesser amounts of "formal flake tools". Formal bifacial tools are represented while micbroblades produced by a "specialized core technology" were a significant part of the assemblage. Turning to the Mugford chert artefacts, although there are only four specimens, the frequencies of design class are quite different than for Ramah chert. This discrepancy is especially apparent when viewing the chipped stone artefact ratios. Here all of the

Technological Design Class	**Ramah Chert**	**Mugford Cherts**	**Other**	**Total**
Informal Flake Tool	17	-	-	**17**
Semi-Formal Flake Tool	-	-	-	**-**
Formal Flake Tool	7	2	-	**9**
Formal Bifacial Tool	2	1	-	**3**
Specialized Core Technology Tool	5	-	1	**6**
Other Curated Stone Artefact	-	-	-	**-**
Manufacturing Associated Tool	-	1	-	**1**
TOTAL	**31**	**4**	**1**	**36**

Table 5.10: Area A Artefact Design Class By Raw Material.

Mugford chert tools were of the formal variety while for Ramah chert, 65% of all arte facts were informal flake tools and only 35% were classified as being formal tools.

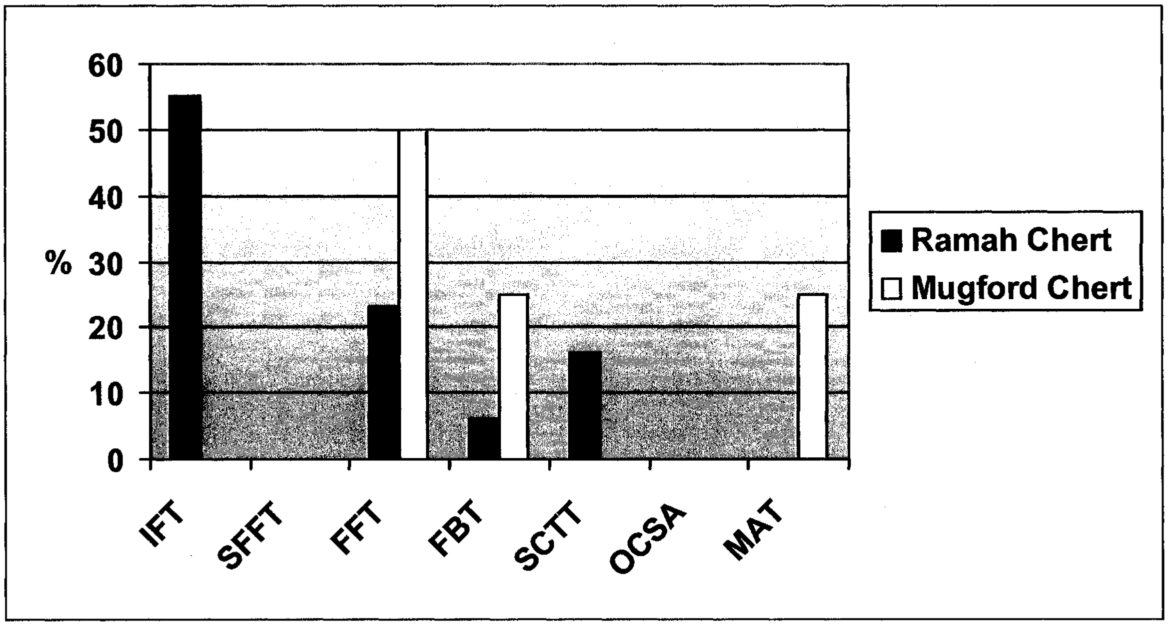

Figure 5.16: Tool Design Class Frequency for Area A.

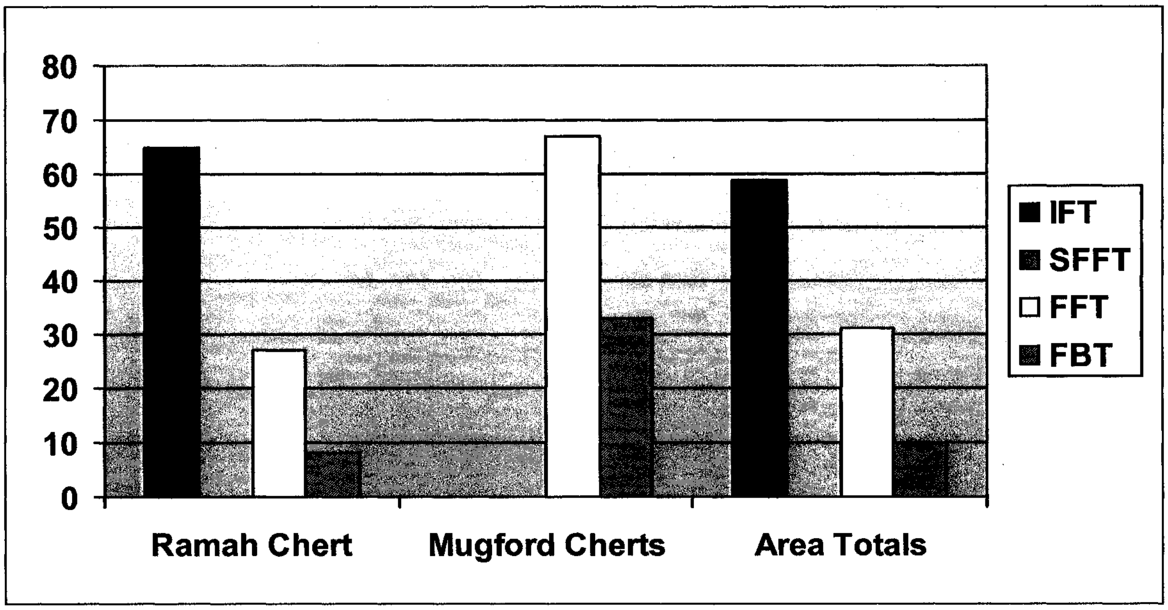

Figure5.17: Chipped Tool Design Frequency By Raw Material Type for Area A.

5.42 Area B artefact analysis

The tool design class data for Area B is presented below in Table 5.11. Since I have considered the Mugford chert to represent Pre-Dorset material and the Ramah chert in this area to be deposited mostly by Dorset occupants at the site, I have separated the design class proportions by raw material type in Figures 5.19 and 5.20. In these graphics the percentages are the representation for each variety of raw material.

Technological Design Class	**Ramah Chert**	**Mugford Cherts**	**Other**	**Total**
Informal Flake Tool	37	5	4	**46**
Semi-Formal Flake Tool	3	2	-	**5**
Formal Flake Tool	21	10	4	**35**
Formal Bifacial Tool	16	14	1	**31**
Specialized Core Technology Tool	20	2	4	**26**
Other Curated Stone Artefact	-	-	4	**4**
Manufacturing Associated Tool	4	1	2	**7**
TOTAL	**101**	**34**	**19**	**154**

Table 5.11: Area B Artefact Design Class By Raw Material.

Beginning with artefacts from the "other" raw material category, they include different materials, often depending on the design class. For instance the four classes falling under the chipped stone classes are either tools made on Ryan's quartz or some other type of chert. With respect to the specialized core technology tools, these are quartz crystal microblades while the ground slate and polished nephrite burin-like tools (BLT) account for the other curated stone artefacts. I believe the most or all of the artefacts under the other raw material designation were of Dorset origin.

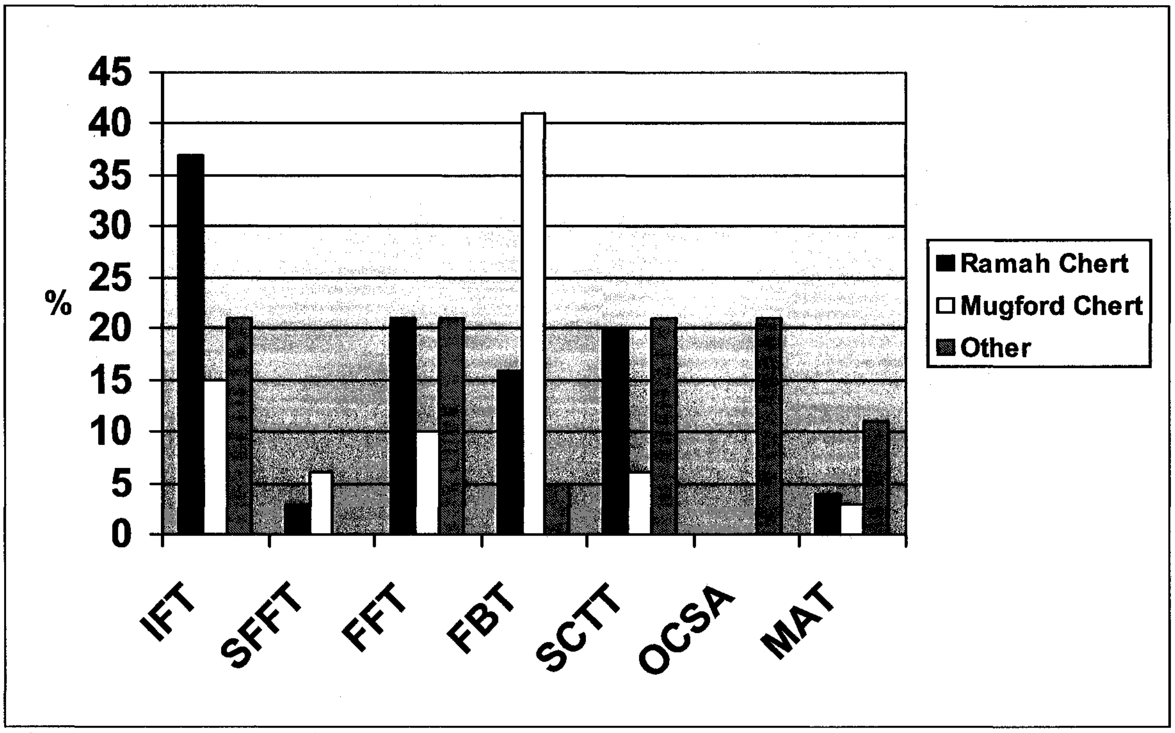

Figure 5.19: Tool Design Class Frequency for Area B.

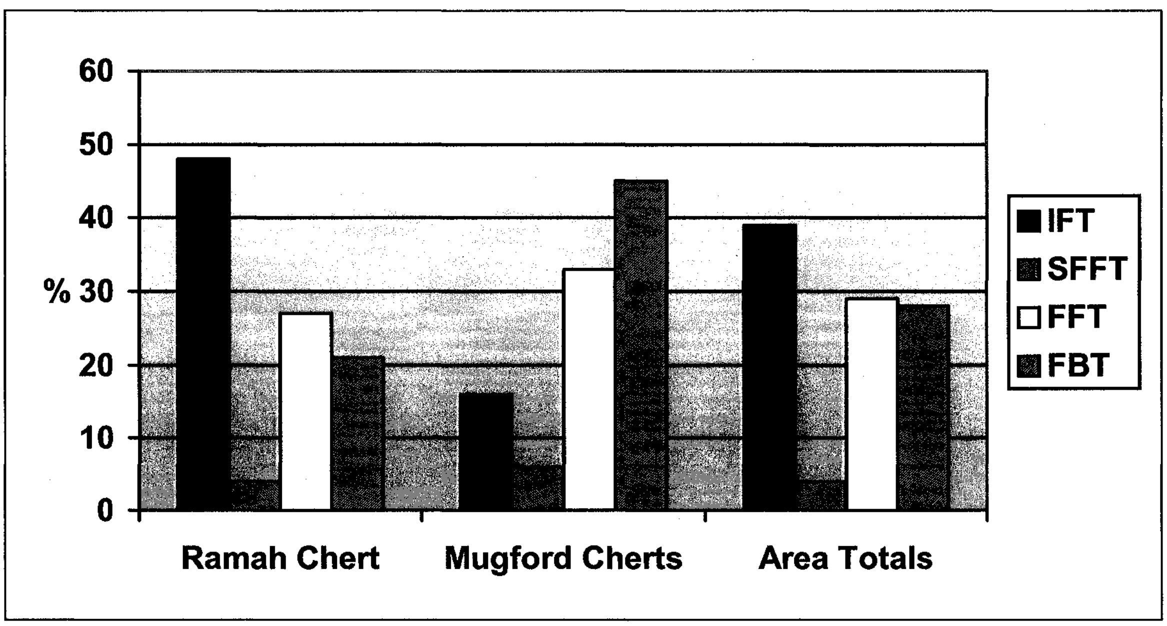

Figure 5.20: Chipped Tool Design Frequency By Raw Material Type for Area B.

Dealing more specifically with Ramah chert and Mugford chert there are some distinct differences in the proportions of design class representation, especially for the chipped stone artefacts. First considering informal flake tools, for Ramah chert these types make-up nearly half of the flaked stone artefacts while for Mugford chert it accounts for a mere 16%. While numbers are low in both materials for semi-formal flake tools, there are slight differences in the ratio of formal flake tools from 27% in the Ramah chert group and 33% for Mugford cherts.

Finally, there is a large discrepancy in the frequency of formal bifacial tools between the raw material types. While only 21% of the chipped Ramah chert artefacts were bifacally worked, bifaces accounted for 45% of all Mugford group flaked tools. Even more staggering is the fact that while 48% of all chipped Ramah chert artefacts were some class of formal tool, the same could be said for 78% of Mugford chert chipped artefacts. I believe that these differences in the degree of formality and flaking strategies are largely a result of raw material type in relation to the availability or quantity and the degree of mobility organization of the people utilizing it.

5.43 Area C artefact analysis

While the majority of the artefacts deposited in Area C are from an early Labrador Archaic component, it has been determined that the few Mugford chert artefacts found in Area C are of Pre-Dorset origin. The breakdown of the artefact design classes according to raw material is presented in Table 5.12 while the proportions of design classes for all artefacts are illustrated in Figure 5.21. It seems clear that informal flake tools and tools associated with manufacturing were the primary types of artefacts recovered from the excavations here.

Technological Design Class	**Ramah Chert**	**Quartzite**	**Mugford Cherts**	**Other**	**Total**
Informal Flake Tool	71	8	3	2	**84**
Semi-Formal Flake Tool	6	-	-	-	**6**
Formal Flake Tool	19	5	1	-	**25**
Formal Bifacial Tool	2	-	9	-	**11**
Specialized Core Technology Tool	2	-	2	-	**4**
Other Curated Stone Artefact	-	-	-	5	**5**
Manufacturing Associated Tool	34	28	1	5	**68**
TOTAL	**134**	**41**	**16**	**12**	**203**

Table 5.12: Area C Artefact Design Class By Raw Material.

Looking first at the manufacturing activity, artefacts of this class account for 21-25% of the "other" and the Ramah chert material respectively, however nearly 70% of the quartzite artefacts fall into this class. These quartzite artefacts are all core fragments and many contain cortex. In addition many of these core fragments bear signs of wear and or retouch/loss at the edges. It appears as if the main purpose of the quartzite reduction was to produce large core and flake tools to be used at the site, likely for various butchering and heavy chopping activities. The other category of material includes some large diabase core fragments similar in form to the quartzite, as well as hammerstones. As for the Ramah chert artefacts associated with manufacturing, they too are comprised mostly of cores and core fragments. It cannot be determined if the Ramah chert core reduction was done in order to make large flake tools, to produce bifaces, or transportable cores, or a combination of all three.

With respect to the "other curated stone", this refers to the worked slate artefacts that have been attributed to the Labrador Archaic component. Two Mugford chert microblades and two Ramah chert blades represent the specialized core technology tools.

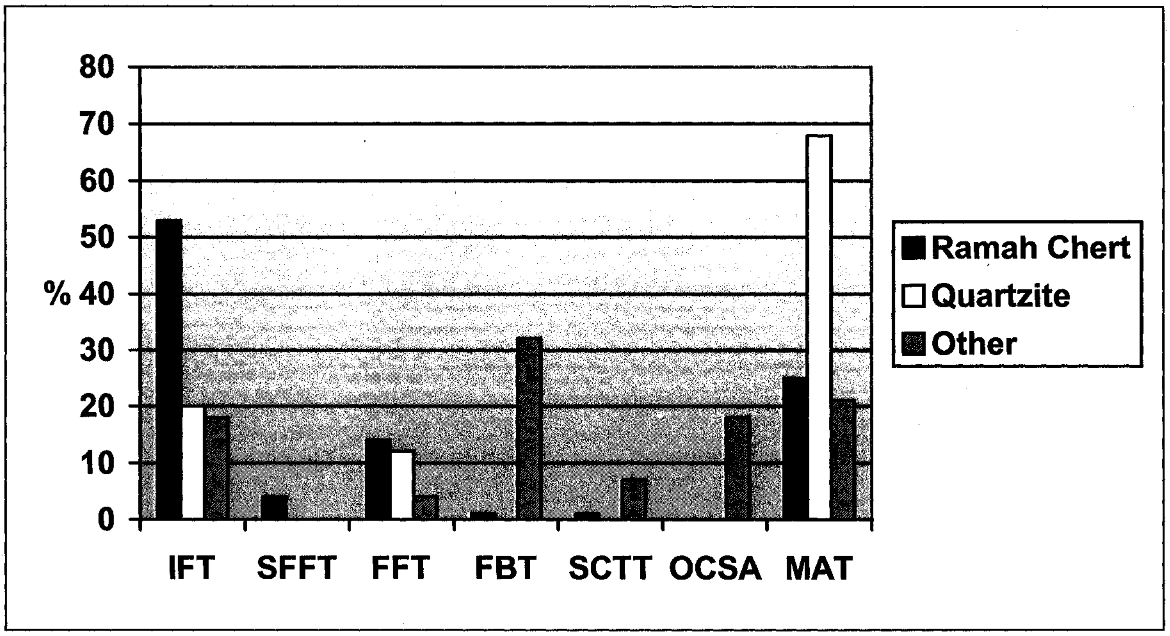

Figure 5.21: Tool Design Class Frequency for Area C.

To discuss the flaked stone artefacts I have separated the collection by raw material type and compiled ratios based on percentages within the four chipped stone artefact classes. The patterns present in Figure 5.22 clearly show the similarities in raw material flaking treatment for Ramah chert and quartzite in Area C, as well as the obvious differences with Mugford chert artefact manufacture. For both Ramah chert and quartzite there are overwhelming proportions of informal flake tools followed by formal flake tools. It is evident that taking the time and effort to make bifaces was not of any concern for the Labrador Archaic occupants at IgCx-8. In comparison, the Mugford chert assemblage is comprised of mostly bifaces and 77% of all chipped artefacts are some type of formal artefact. It is clear that the need of the Pre-Dorset to possess reliable and transportable bifacial tools was an important part of their technological strategy.

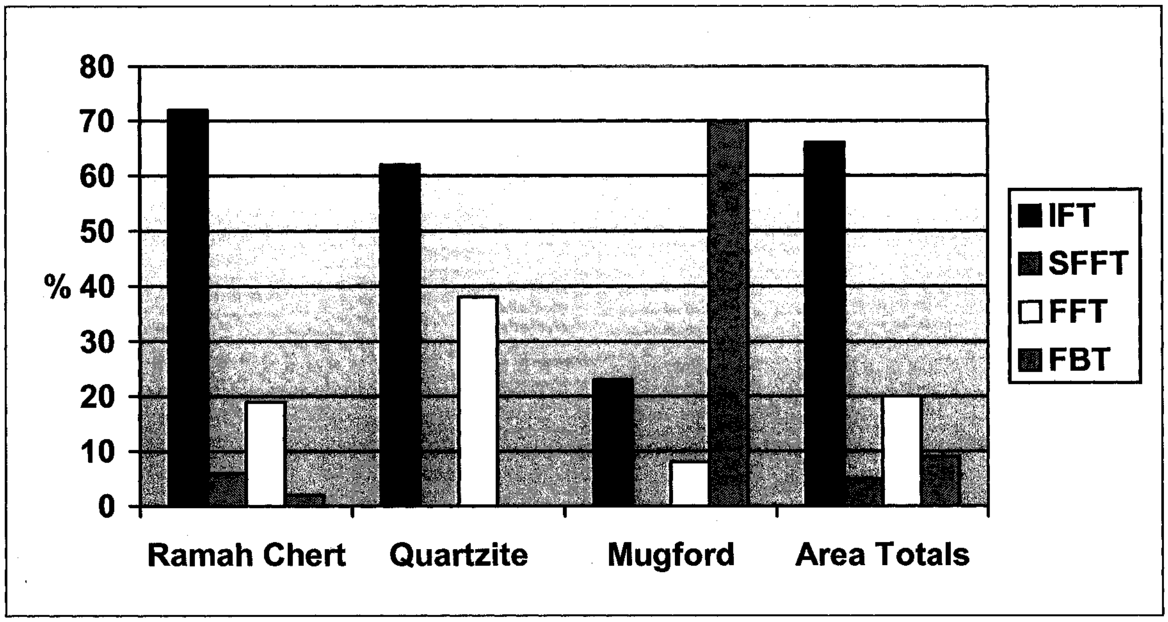

Figure 5.22: Chipped Tool Design Frequency By Raw Material Type for Area C.

5.44 Test Areas artefact analysis

Artefacts recovered from test squares and test pits come from all areas of the site. Since provenience is an issue, my main point in including them in the analysis is not so much to show differences in all design class frequencies, as it is to again demonstrate the differences in the formality of flaked artefacts by raw material (Table 5.13). As illustrated in Figure 5.23, when it comes to chipped stone tool production, informal flake tools dominate Ramah chert use while Mugford chert knappers were more concerned with producing formal tools.

Technological Design Class	Ramah Chert	Quartzite	Mugford Cherts	Other	Total
Informal Flake Tool	22	-	3	-	**25**
Semi-Formal Flake Tool	-	-	-	-	**-**
Formal Flake Tool	11	-	3	1	**16**
Formal Bifacial Tool	11	-	2	-	**12**
Specialized Core Technology Tool	3	-	2	5	**10**
Other Curated Stone Artefact	-	-	-	2	**2**
Manufacturing Associated Tool	3	2	3	3	**11**
TOTAL	**50**	**2**	**13**	**11**	**76**

Table 5.13: IgCx-8 Test Areas Artefact Design Class By Raw Material.

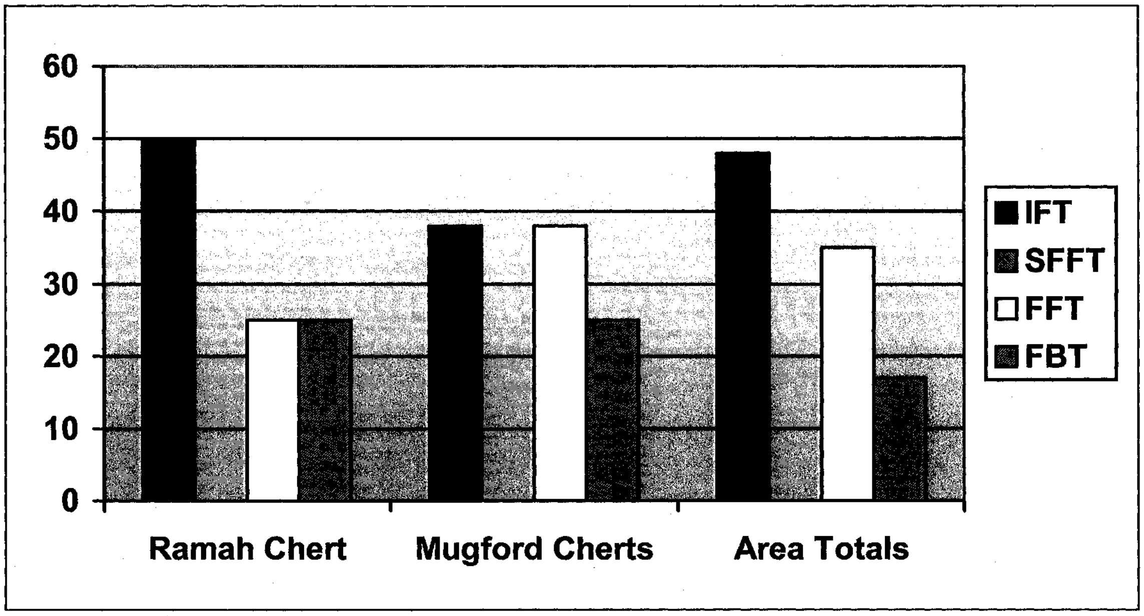

Figure 5.23: Chipped Tool Design Frequency By Raw Material Type for Test Areas.

5.45 IgCx-8 Artefact Analysis

To summarize the artefact design class breakdown for Kogarsok Brook-1 I want to focus on the differences in raw material use throughout the site. I will show the evidence for Ramah chert being used to a high degree to make informal flake tools, while Mugford cherts were largely being manufactured into formal flake tools and bifaces.

As illustrated in Figure 5.24, informal flake tools account for 60% of all Ramah chert flaked artefacts while only 20% of Mugford chert chipped stone artefacts are in this class. Instead, Mugford chert chipped tools are predominately formal tools (75%) in the form of either formal flake tools (29%) or bifaces (45%). In summary, these differences in raw material utilization are likely the result of raw material availability or quantity, as well as cultural differences in socio-economic conditions including mobility organization.

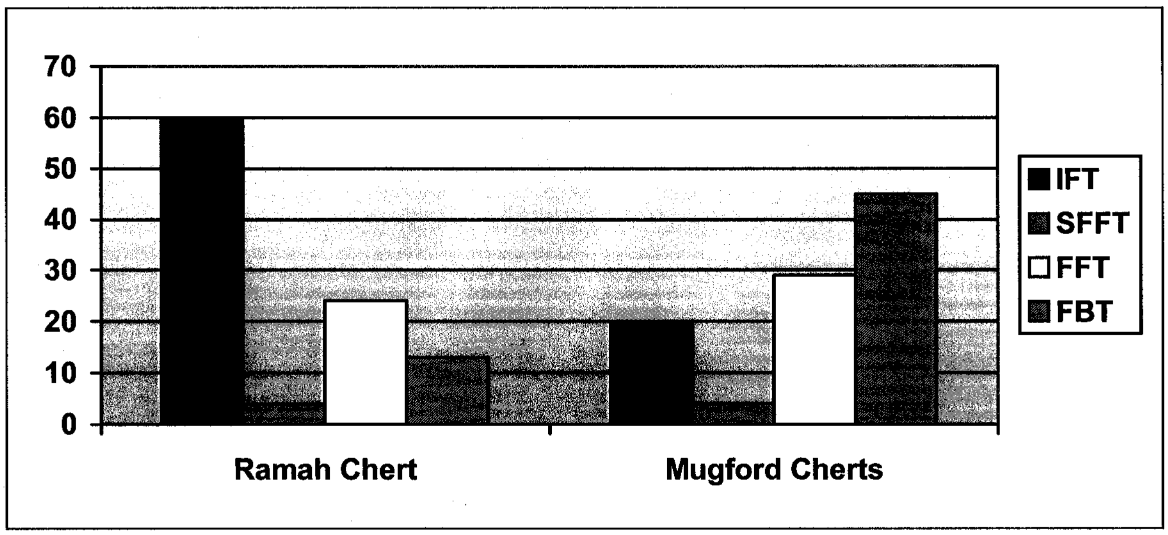

Figure 5.24: Chipped Tool Design Frequency By Raw Material Type for IgCx-8.

5.5 Technological Strategies at IgCx-8

The objective of this section is to address which technological strategies Labrador Archaic and Palaeoeskimo people were employing at the site. More specifically, there will be a focus on the degree different cultural groups were practicing technological strategies associated with curation, expediency, or opportunistic behavior. To do this, aspects of both artefact design and artefact distribution will be examined.

7.51 Artefact design

The concepts of lithic manufacture and artefact design were consciously considered and culturally conscribed by toolmakers and tool-users at *Kogarsok Brook-1*. Different cultural groups at different points in time, under variable circumstances, would have pursued different strategies of tool production/reduction/sharpening. Major factors affecting artefact design for all groups would have been the variables of utility that influence the overall forms of tools and the structure of mobile tool-kits. Tool attributes of utility (e.g. reliability, transportability, maintainability, etc) and style were variable, and there would have been advantages and disadvantages involved with different design strategies. In this section I comment on some of the strategies and design variables manifested by each cultural component at IgCx-8 as revealed by the analysis.

Beginning with the early Labrador Archaic component, the design of the artefacts is mostly atypical for a mobile tool-kit. The assemblage is largely comprised of artefacts that are not easy to transport or flexible in their design. What the tools do possess are elements of reliability. The ground celts for instance would have been securely hafted and would have worked when needed. This element of dependability would also have been true for much of the chipped stone artefacts. Even though this was mostly informal flake and core tools, these large tools would have worked when needed and there was little investment in repair and maintenance. These flake and core tools were also flexible in that they could be used to work a variety of media and perform a number of tasks such as scraping, cutting and chopping. Another aspect of a reliable design is the standardization of replacement parts (Nelson 1991). This assemblage contains artefacts that are quite similar in style and form to those found in Saglek Bay (Tuck 1975), notably scrapers, stemmed flakes and flake points. This consistency between two Labrador Archaic lithic assemblages on the north coast implies duplication of technological behaviour.

Turning to the later Rattler's Bight ephemeral component, even though the diagnostic artefacts are few, there are some recognizable differences in artefact style. Notable is the presence of standardized forms and styles of bifacial hunting implements. The Rattler's Bight style stemmed points possess qualities not only of reliability, but also of transportability. These bifacially worked artefacts are highly standardized in their shape and were also designed to work when needed (i.e., for hunting large game). These points also demonstrate the design element of transportability. They were likely in a finished state when carried to the site and thus they demonstrate anticipated use. Finished bifacial tools such as these are smaller and weigh less than unworked cores and they help accommodate limitations of mobility.

The increase in reliable and portable formal tools is a common element of most Pre-Dorset assemblages in northern Labrador. With reference to the Pre-Dorset component at Kogarsok Brook-1 there are some obvious design strategies at play that go in line with a highly specialized tool-kit designed to meet the requirements of a highly mobile way of life. For example, the small, bifacially worked triangular points and burins demonstrate anticipation of use. The projectile points were reliable and ready to use and the burins could be resharpened many times as a means to extend the uselife of a dependable hafted tool. In most cases the toolkit was carried to the site in the form of finished tools or prepared blanks, preforms and cores, rather than being produced there.

Pre-Dorset artefacts are relatively small and lightweight, meaning that tool-kit weight is reduced and thus well-suited for portability. Not only is a bifacial strategy well suited to high mobility but it is also a more efficient method to utilize raw material and extend tool use-life. Tools could more easily be repaired, reused and intensely worked. As well, bifaces have lower weight to size ratios aiding in transportability (Kelly 1988).

Finally, the Dorset artefacts from the site also show how artefact design contained elements of reliability and transportability. While not as small as the Pre-Dorset types, Dorset triangular points and endblades were made to be reliable, to fit hafts and harpoon heads and be easy to carry to hunting sites. There is not much evidence for flexibility and versatility in Dorset lithic artefacts however. There are no large bifaces at the site that could have been used for a variety of tasks and used to produce more flake tools. For example, the polished burin-like tools and scrapers display a single and specific working edge as opposed to several different working edges. It seems as if informal flake tools would have accounted for the design limitations of the more diagnostic pieces of Dorset material culture. The use of a specialized core tool technology and the production of microblades is another design strategy that demonstrates the importance of reliability as standardized tools could be produced readily.

7.52 Artefact distribution

The above impressions of artefact design cannot be fully appreciated without recognizing the connections between technological organization and distribution of artefacts and manufacture debris (Nelson 1991). Intra-site analysis of the patterns of material culture distribution can provide information about how different technological strategies influenced the locations and types of both tool manufacture and use. Thus, the clustering of various types of lithic remains can tell us about activity areas at the site and in turn allow for inferences on site function.

For all of the groups that occupied Kogarsok Brook-1, the evidence supports the notion that the site functioned as a short-term camp with specialized activity areas. For the early Labrador Archaic component, the large informal Ramah chert and quartzite flake tools would have been suitable for a variety of butchering and animal processesing activities. The large number of scraping implements and the awl also point towards hide processing activity. The fact that many of the tools are found in the context of charcoal suggests that these activities took place around a hearth and may have included smoking hides or meat/fish or roasting game, and the red ochre may be a sign of more ceremonial behaviour at the site. While the tool-kit is restricted in terms of the range of tool types present, there is an absence of formal tools common in short-term sites occupied by mobile people. Instead it seems as if opportunistic technological behavior was at play here as raw material availability was obviously not an issue.

The Pre-Dorset component at the site also demonstrates specialized activity and a restricted range of artefact types. Many of the artefacts are associated with food procurement and weapon and tool replacement and repair. The fact that most of the points found are incomplete suggests that retooling broken hafted tools was conducted at the site. Tips of broken hafted tools and broken handheld tools were discarded at the site and not salvaged. As well, the flake data shows that tools were not manufactured on the site and instead tools were transported there. The large amounts of retouch and biface maintenance flakes suggest that tool sharpening, repair and use-life.

Finally, the Dorset component at IgCx-8 also shows evidence of food procurement and processing. The presence of endblades suggests hunting activity and the expedient flake tools and scrapers are evidence of food and skin processing. The scraping and slicing tools here also hints of animal processing at this site. The flake data shows that the site was not a primary lithic reduction site or workshop, but that most flaking activity was concerned with retouching tools for edge maintenance and tool repair.

For all the groups occupying Kogarsok Brook-1, it appears as if its location in terms of animal resources, raw materials and travel routes was an important factor in its use. Each cultural occupation demonstrated a restricted variety of material culture and it seems as if activities were narrowly focussed on performing tasks that could be done at that site before moving on to the next short-term activity site. The location of the site at the mouth of a waterway also suggests that it was used as a stop over site from return or anticipated travel along the Kogarsok Valley. The range of amounts and types of raw material at the site is also indicative of shorter-term site use by a range of mobile groups at varying distances from their base-camp sites.

5.53 Technological strategies

Referring to the three general technological strategies modelled in the theoretical discussion, this discussion will focus on the ways groups implemented strategies of tool curation and expediency, as well as a strategy that was more opportunistic in nature.

Evidence for curated technological strategies were quite evident at IgCx-8. Since mobile groups were occupying the site for short period of times, it makes sense that a high proportion of tools recovered were designed with some form of extended use-life and transportability in mind. This is even more logical for groups who were using raw materials that were in shorter supply and thus needed to be used in an efficient manner. For example, the artefacts analysis demonstrated that the Pre-Dorset stone tools made out of Mugford chert displayed a much higher proportion of formal tools than informal tools. These formal tools were manufactured by means of a curated strategy that was concerned with extending the use-life of such tools and preparing raw materials in anticipation of inadequate conditions. As well other aspects of curation such as resharpening, recycling and maintainability were also evident in the Pre-Dorset assemblage.

Even though the Dorset people at the site were primarily utilizing Ramah chert for their chipped tool industry, they implemented a curated technological strategy. They too required tools that were designed to last and could be maintained, and these would have also been manufactured in anticipation of use. For the most part these curated lithics were hunting implements or artefacts made on other raw materials (slate, nephrite). However, the Dorset assemblage also contained curated, formal Ramah chert flake tools (e.g. flakes knives and scrapers) that are not bifacial but do possess elements of style and reliability not found in expedient tools. It might also be said that Dorset groups demonstrated elements of curation in their technology, as they would have anticipated raw material use at the site and prepared, transported and maybe even stored cores of Ramah chert there.

However, the manner in which they utilized the Ramah chert when at the site was more in line with an expediency strategy.

Expediency refers to tools that were manufactured, used and discarded according to the needs of the situation (Bamforth 1986). Tools of this type may have undergone a small degree of technological modification and they were not likely transported from site to site. As well, this strategy is relatively more wasteful of raw material than curated technologies. Thus, expedient tools should be found in contexts where raw material availability, time, and mobility are not of major concern and they were not part of mobile tool-kits. This is precisely the case with the expedient tools found in the Dorset assemblage at IgCx-8. As compared to the Pre-Dorset (Mugford chert) artefacts, greater proportions of the Dorset (Ramah chert) artefacts were informal tools. Many of these expedient tools were either unmodified flakes or retouched flake tools that would have been made, used and discarded at the site. Since raw material shortage was not an issue, there would not have been a need to make tools that bear the traits of a curated technological strategy. Thus, at a short-term speciality site like Kogarsok Brook-1 we can see that expediency technological strategies come into play when raw materials and time to make tools are available, and when knowledge of this availability is part of the technological plan.

Besides curation and expedient technologies, a third strategy referred to as opportunistic is represented at IgCx-8. The opportunistic technological behaviour is visible in the early Labrador Archaic component at the site and it applies to both the use of both Ramah chert and quartzite in Area C in particular. Here, the exceptionally high proportion of core and large flake tools have undergone little or no modification and they seem to have been abandoned immediately after task completion or after the working edge was no longer of desirable quality. In this situation it appears as if the people at the site encountered large supplies of both Ramah chert and quartzite somewhere on their expedition in the area. The amount of wastage of material present in the assemblage suggests that they were not concerned with raw material availability. The context of the assemblage suggests that core reduction or cobble testing was occurring and the form of the informal tools suggests that the stone was used for animal processing and butchering activities.

The theory dictates that the material implications of opportunistic technological behavior are hard to predict and should be variable from one context to another (Nelson 1991). These situations are also expected to occur to a greater extent at places that were not regularly used. The technological behaviours in play here are very much a result of the unique contingencies surrounding being in an unfamiliar place (Nelson 1991). Thus, it is possible that the technological strategies represented by the tool types in Area C was as much a response to the unanticipated hunting episode as it was about the unforeseen availability of raw material. To put it another way, if the group knew they were going to hunt caribou at the site, or if an animal was killed at another location and transported to the site, then it is likely that even if raw material supplies were good, we would not see the opportunistic strategy at play. Thus, unlike curation and expedient strategies that contain elements of planning, opportunistic technological designs and site distributions are very much shaped by specific environmental and behavioural contexts (Nelson 1991).

CHAPTER SIX

Data Recovery and description at the Lower Terrace (IgCx-11)

6.1 Introduction

An original research aim of the 2004 field season was to excavate a Late Dorset site. I was aware of another site however, IgCx-1, that was reported by the TAP as being located at an elevation of 11 metres above sea-level, between IgCx-3 and our base camp (Figure 6.1). Since this site on the upper terrace was of Pre-Dorset origin, the terrace below was a suitable candidate for a Late Dorset occupation. Fortunately my assumption turned out to be true.

The site itself is situated in a shallow cove facing southwards towards Mount Kutyaupak, nearly midway between IgCx-3 and the brook draining Mt. Elizabeth (Figure 6.2). Large boulders frame the eastern portion of the site and a small rocky bluff defines the western edge. The site dimensions measure approximately 80 metres in length and 10-12 metres wide. The area gently slopes towards the beach at between 2-3 metres above sea level, while the terrace abruptly ends at the eroding high tide mark. The rear of the site features a steep boulder and earth-strewn slope that briefly levels off at 11 metres above sea level. Here, an upper terrace containing both Neoeskimo graves and the Pre-Dorset site previously mentioned fades away into the height of land of Kipsimarvik Head. Vegetation on the site consists of grasses, mosses, small berry bushes and low- lying shrubs. A reliable source of fresh water is on the doorstep, the beach provides an excellent location to land small watercraft, and finally a view down Tallek Arm and towards the outer fjord can be attained in minutes with a quick trek up the hillside behind the site (Figure 6.3).

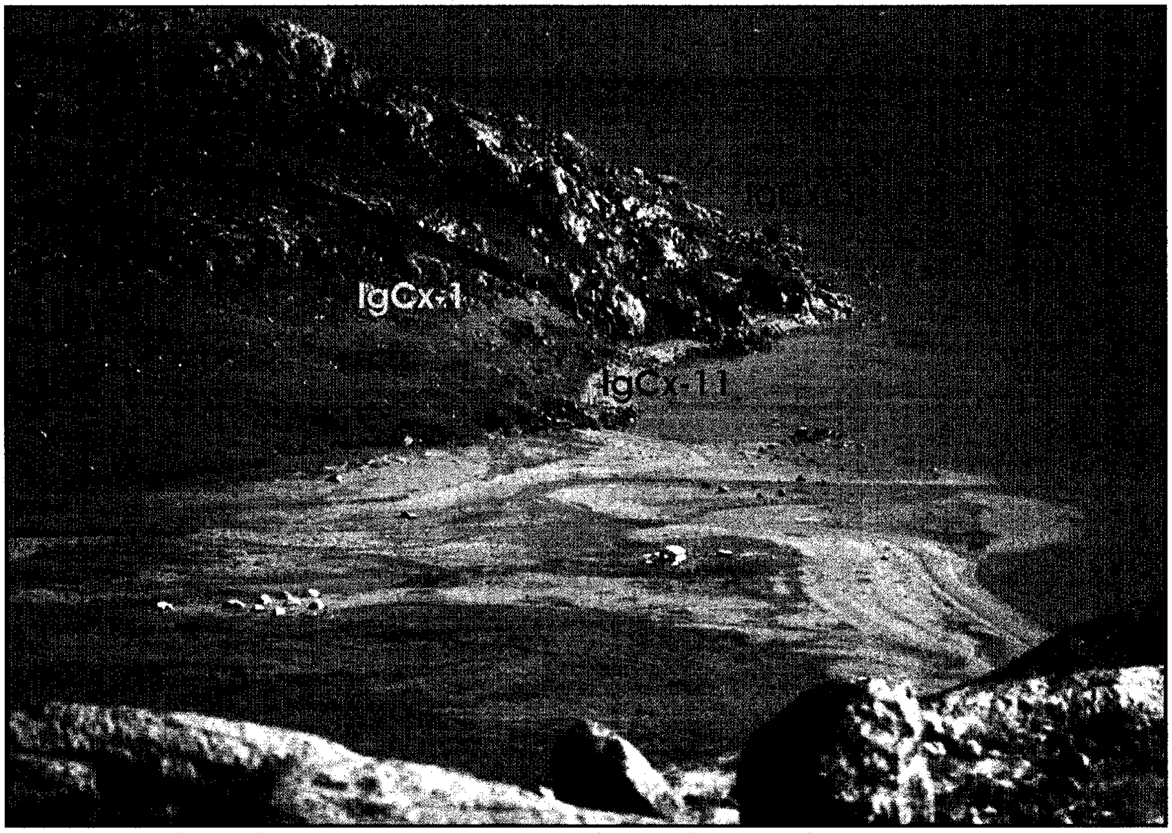

Figure 6.1: IgCx-11 Site Location in Relation to IgCx-1, IgCx-3, and Camp.

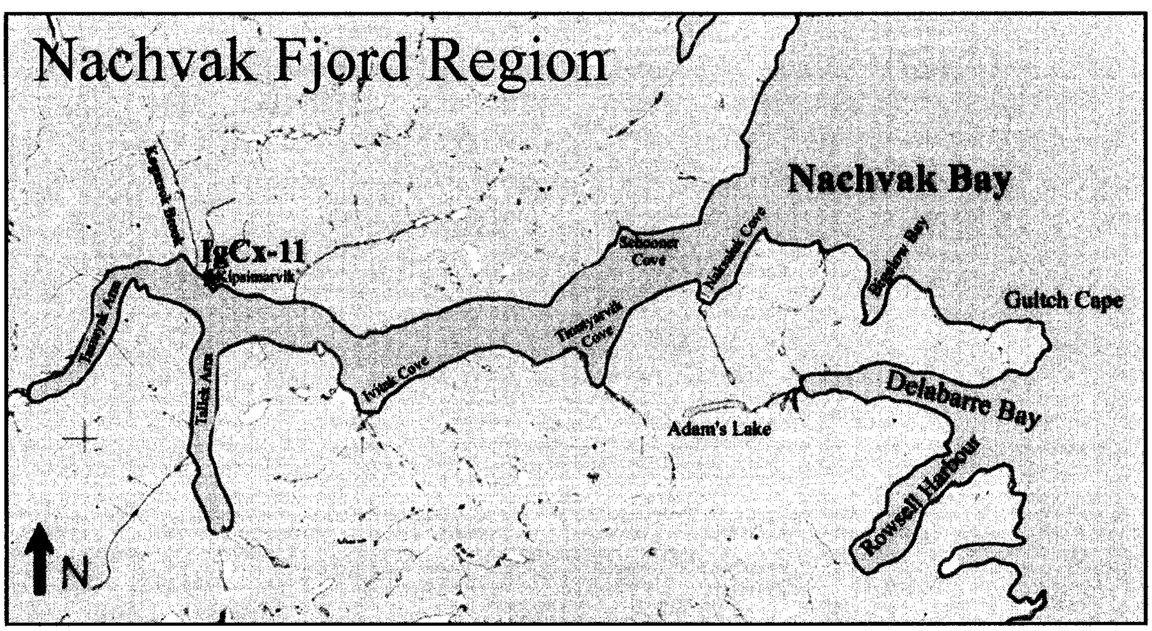

Figure 6.2: Map of Nachvak Fjord with IgCx-11 Site Location.

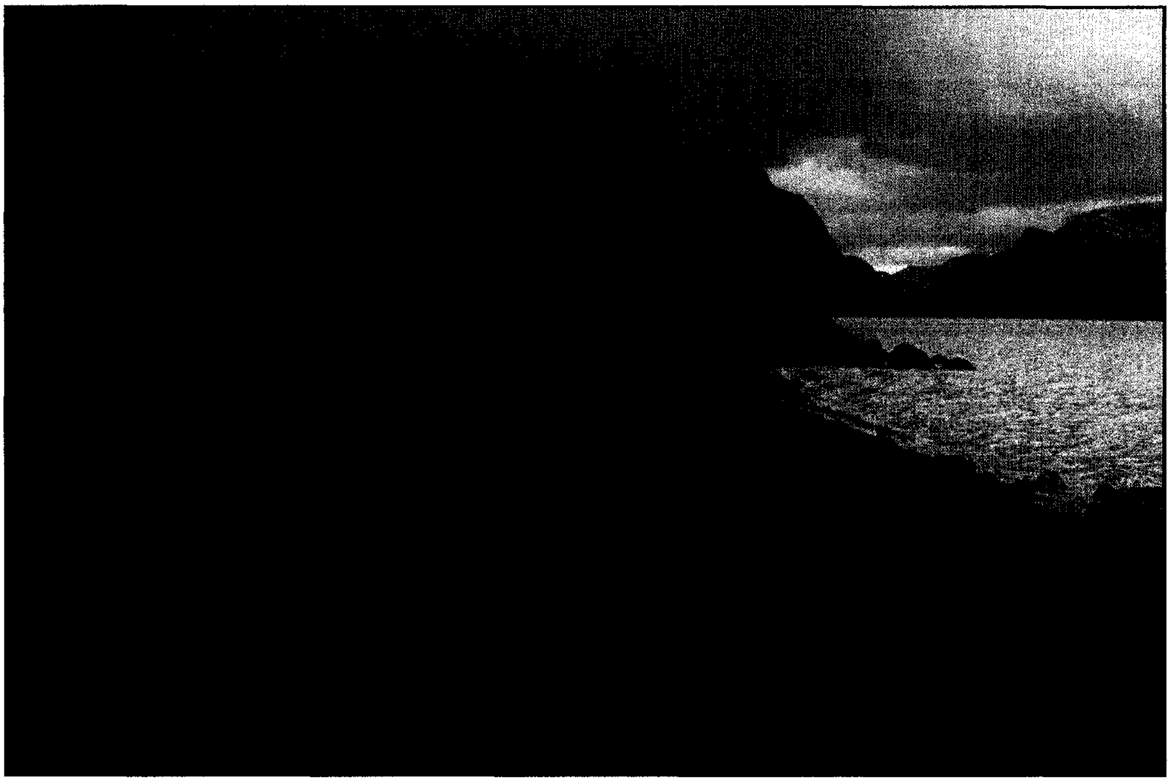
Figure 6.3: View South of the Lower Terrace.

6.2 Site survey

The presence of past human occupation at the Lower Terrace is evident as three recent tent rings are uniformly spaced evenly across the site. We began digging our 50 x 50 cm test squares at the eastern edge of the site above the storm beach, and continued west towards the rocky bluff and the edge of the site (Figure 6.4). After completing 13 test squares, all of which contained cultural material, a sizeable Late Dorset component at the site was verified. When selecting where to concentrate our excavations, there was one test square in particular that stood out as the best candidate for Late Dorset features. Test Square #7 (TS:04-07) included a massive amount of Ramah chert flaking debitage, soapstone manufacture debris, a peculiar diabase[1] hammerstone, charcoal, and an arrangement of rocks that appeared to be part of a more substantial feature.

[1] Diabase is a basaltic rock.

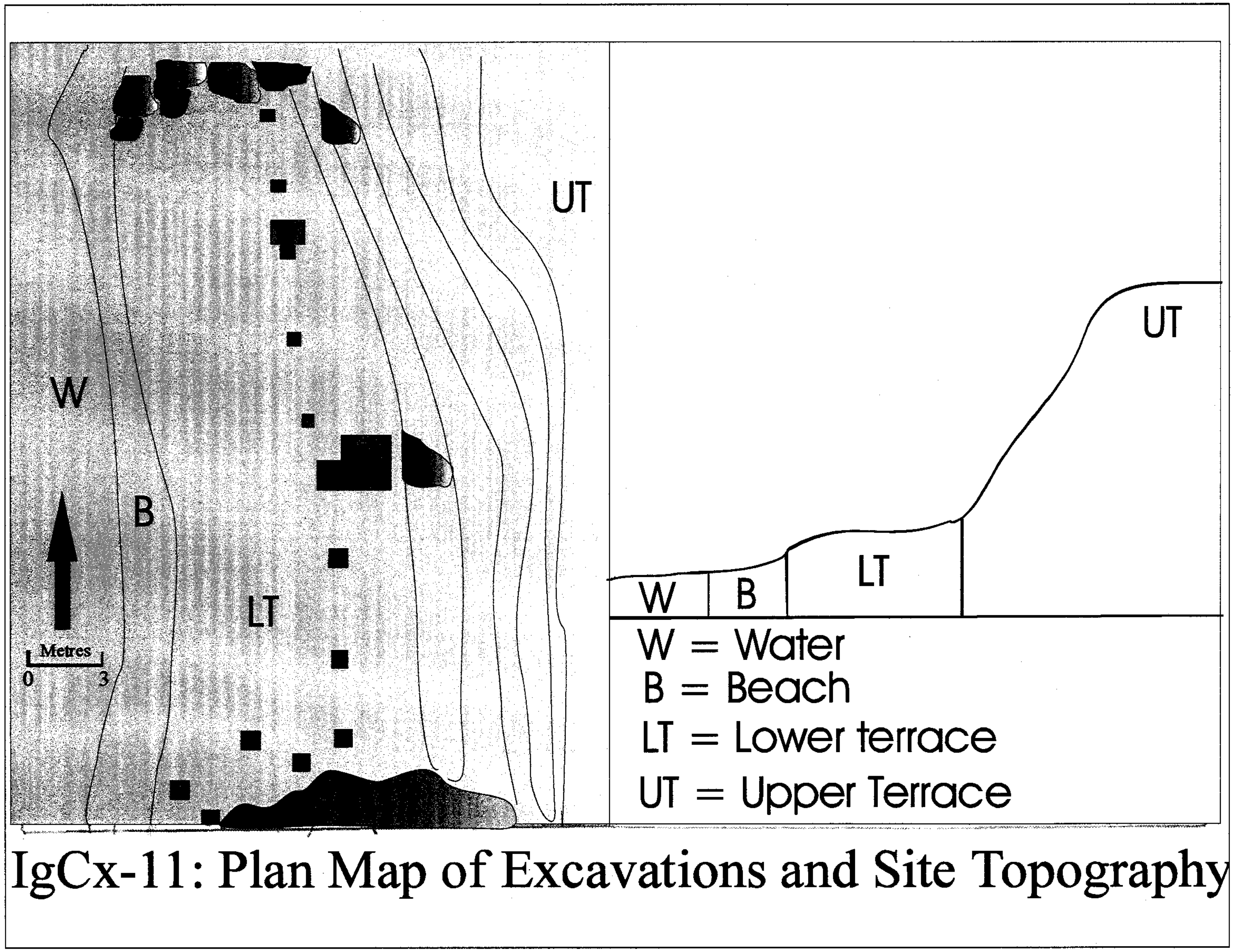

Figure 6.4: Plan Map and Topography at IgCx-11.

6.3 The excavations

Based on the test pits, a stratigraphic sequence was deciphered and all units were excavated according to naturally occurring stratigraphic levels. The first level was the sod surface, which varied between 4-8 cm in thickness. Cultural material associated with this level included the tent ring rocks and some historic period iron fragments and a piece of copper. Level two was fairly thick and penetrated down to between 25-30 cm in most areas. Level 2 was not as thick in test pits excavated closer to beach edge. The matrix of the level consisted of brown peaty soil. As the level deepened, some sand and small cobbles became more of a presence. It was in this lower portion of the level, Level 2B, that there was a thin Neo-Eskimo (Thule) component. Artefacts in this layer consisted of a nephrite drill bit, a couple of drilled slate endblades, slate debitage, and some charcoal. Next was the Late Dorset cultural layer, Level 3, and it was between 15- 20 cm thick in most areas. The matrix was dense black in colour and of a sandy-peaty consistency. The layer was also composed of charcoal deposits and sea-mammal fat residue. The site was bounded on the bottom by the sterile soil of Level 4. Due to the acidic soil conditions, organic artefacts were not preserved. Food bone was only preserved in a few instances in Level 2, but these specimens were already decayed to a state of 'bone mush'. Small amounts of wood were present in Level 2.

In total, 6 m^2 were excavated at IgCx-11. All units and test squares were dug with trowels and all soils were screened through ¼" gauge wire mesh. Artefacts and debitage were collected by each 1 metre squared unit and corresponding level. Three-dimensional measurements were recorded for each individual artefact, chert flakes and slate and soapstone debitage was collected by 50 x 50 cm quadrant. All charcoal was collected as potential radiocarbon samples and measured to exact provenience. Flake concentrations were also recorded in this manner and in all cases flakes were collected in bulk to ensure obtaining the small shatter, and the matrix water-sieved and examined in the lab at the Archaeology Unit, Memorial University. This allowed for the accurate collection of the smallest of flake sizes and provided more detailed data on the deposit. Finally, photo records and plan maps were completed during and after the excavations.

6.31 A Late Dorset dwelling

As already mentioned, TS:04-07 was the most promising area to begin excavations at the site so a five squared metre excavation grid was set-up over, and to the north and west of the test square. Although the excavation is relatively small, a number of factors suggest that the feature in TS:04-07 was part of a Late Dorset dwelling. Excavations through the initial unit around TS:04-07 revealed a large amount of Ramah chert debitage in the crevices between the stones. This has been interpreted as successive cleaning/dumping episodes and it appears this was a high activity area.

In addition to the chert artefacts and flakes, a number of other features similar to another well-documented Late Dorset house at the Okak-3 site in northern Labrador (Cox 1977, 2003) provide supporting evidence for a dwelling (Table 6.1). The line of rocks initially encountered in TS:04-07 continued into other units and appears to be a purposeful arrangement of rocks within the dwelling and part of the Palaeoeskimo axial feature or mid-passage (Renouf 2003). Notably, a large, flat, fat-and-charcoal stained rock has been identified as a lamp-stand (Figure 6.5). This feature and the amount of soapstone and other domestic artefacts here suggest that this is the cooking area of the

House Feature Checklist	Okak-3 (Cox 1977)	Lower Terrace
Entrance Tunnel	✓	X
House Wall Construction	✓	✓
Axial Feature	✓	✓
Lampstand	✓	✓
Sleeping Area	✓	?
Pea Gravel Areas	✓	✓
Post Holes	?	?
Sweeping Episodes	✓	✓
Slab Paving Stones	✓	✓
Notched Rocks/Supports	✓	X
Cache	✓	✓

Table 6.1: Late Dorset Dwelling Feature Checklist.

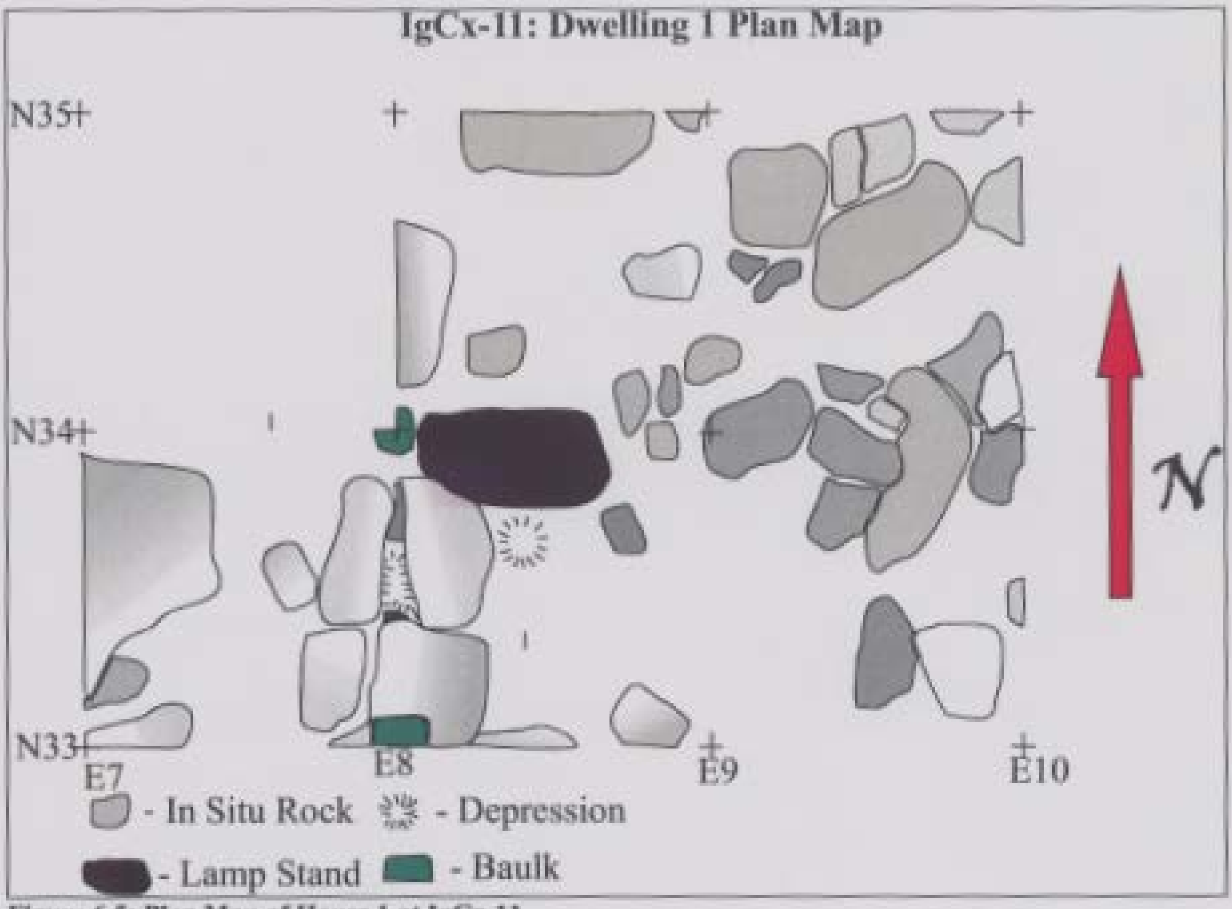

Figure 6.5: Plan Map of House 1 at IgCx-11.

dwelling. While the area is not completely lined with paving stones, there was the occasional flat stone lining the bottom in this area. Other structural elements indicative of a dwelling are the arrangement of earth and rocks in the eastern units to form the base of a wall. At the edges of these units Level two is thin and artefacts are much closer to the surface. The arrangement of the rocks here, in addition to the presence of collapsed rock in the units, suggests that this area was framed out with rocks and earth forming the outline of a semi-subterranean house (Cox 1977, 2003). Besides a small amount of wood in Level 2, and two possible small post-holes in Level 3 in the vicinity of the lampstand, there is little evidence of the type of covering and support construction used on the roof of the dwelling. A very large boulder backs the northeast corner of the area and it defines this portion of the dwelling. Other clues of a dwelling come from the presence of a thin lens of beach cobble in the middle of Level 3 in units N33/E8-E9. This may represent a reoccupation of the house by a later group and a dumping episode of over the existing floor. Finally, part of Unit N33/E7, the area west of TP7, is completely covered with small beach cobble and it continues down to sterile (Figures 6.6 and 6.7). A similar cobble feature at the Okak-3 house was interpreted as a sleeping area (Cox 1977, 2003).

6.32 Unit N52/E6

Besides the dwelling area, I excavated a separate area adjacent to Test Square #10 (TS:04-10). TS:04-10 was productive, containing diagnostic artefacts, a flake concentration, soapstone debitage, and charcoal, but it lacked the structural element. However, as time became available I decided to open a 1 x 1 metre unit (N52/E6). In total 21 artefacts and 179 flakes were obtained from this unit. The stratigraphy was similar to the rest of the site however the depths were greater in the western portion of the

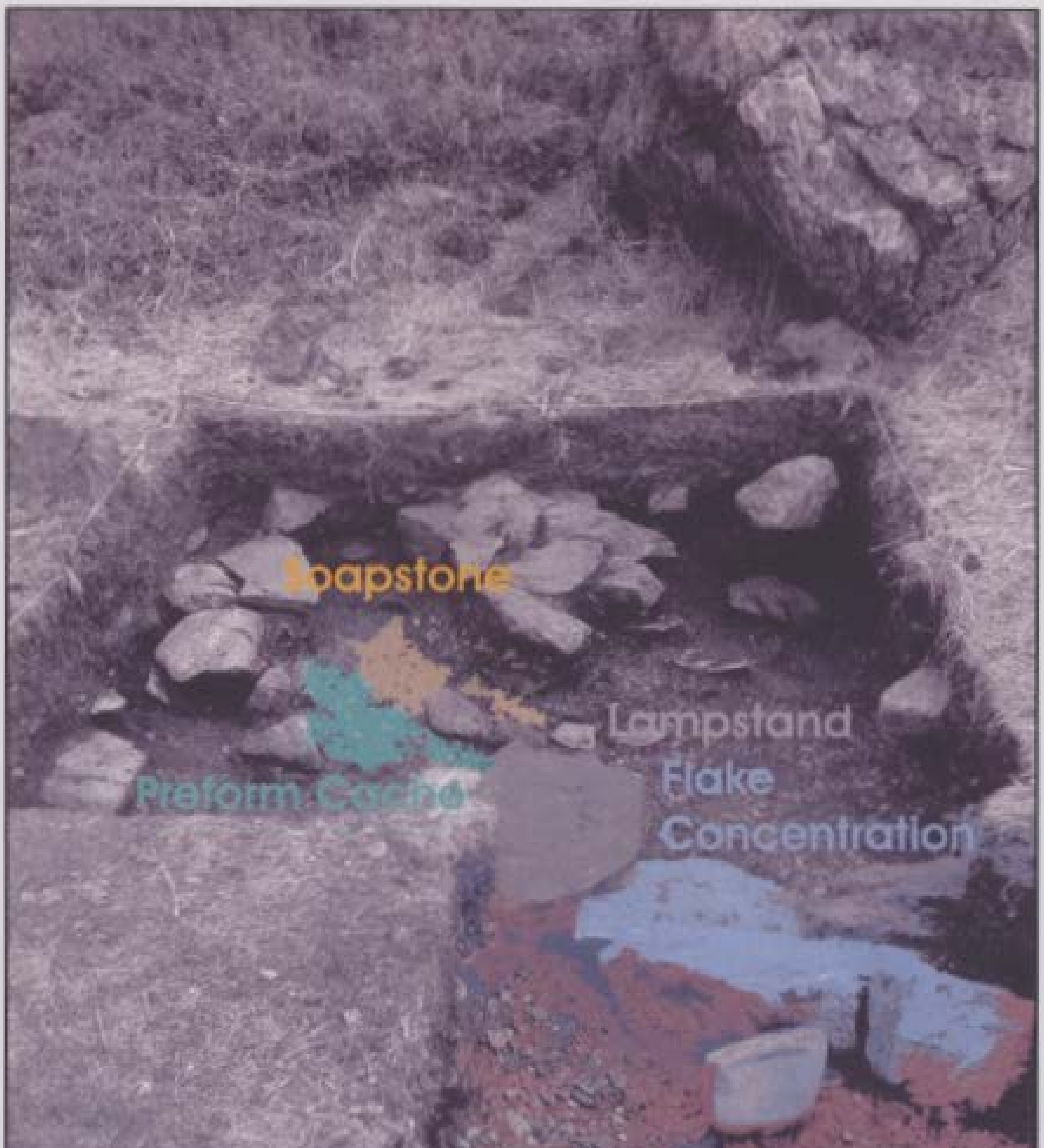

Figure 6.6: House 1 With Features Labelled.

Figure 6.7: House 1 After Excavation, View East.

unit. This area proved to be in an area of a more ancient beach slope, as water-worn artefacts and flakes were common. Based on the lack of features or any arrangement of the artefacts this area seems to be a midden. The percentage of broken artefacts and the dumping of charcoal, flakes, and soapstone debris also support this conclusion.

6.4 Debitage description

One of the most notable features about the collections from the Lower Terrace is the amount of Ramah chert debris. The first sign of how much chert debitage was deposited here came from TP 04-07. In this test pit alone 459 Ramah chert flakes were collected and a very large flake concentration extended beyond this area in the dwelling. Although TP 04-07 and other test pits revealed a large amount of chert flakes, TP04-10 that had the highest total. Here, a flake concentration designated as feature F04-02 produced 702 Ramah chert flakes weighing 418.4 grams. In addition to the flakes, the concentration contained a 250 grams of chert and soapstone shatter (< 6.3 mm).

Shifting to the major excavation area at IgCx-11 this $5m^2$ area (referred to as H1 or the dwelling) contained a large amount of flakes and shatter from chipping activities, and soapstone shatter and dust associated with soapstone artefact production. Of the 5000 chert flakes recovered from the dwelling area, all but five were Ramah chert. Of these five, two were flakes of quartz crystal and three were an unknown type of low lustre green chert. As a whole, the flake assemblage weighed 4873.1 grams, which yielded an average flake weight of nearly one gram per flake. Notably 43% of all flakes recovered came from Unit N33/E7 (including TP:04-07) and this unit was marked by the large flake concentration (F04-01) encompassing the rocks of the axial feature. With respect to the soapstone, 60 small fragments weighing 299.0 grams were recovered from throughout the excavation area. As well, the soil matrix contained soapstone dust or powder that turned white as the metal trowel scraped over the surface of the soil.

Returning to the chipped stone debitage, Table 5.2 presents the flake counts data and flake mass data, as well as the average flake weights for the five units in the excavation area. Most of the counts and weights were tied up in Unit N33/E7. Much of the debitage from Unit N33/E7 was small as revealed by the lower flake mass frequency and lower average flake weight. Unit N33/E9 contained the second highest flake and weight counts accounting for 20% and 22% of the total assemblage respectively. Unit N34/E8 contained on the largest flakes with an average flake weight of 1.30 grams.

UNIT	Flake Count	Flake Count %	Flake Mass (g)	Flake Mass %	Average Flake Mass
N33/E7	2181	*43*	1577.4	*32*	0.72
N33/E8	657	*13*	756.4	*16*	1.15
N33/E9	988	*20*	1048.3	*22*	1.06
N34/E8	677	*14*	883.2	*18*	1.30
N34/E9	497	*10*	607.8	*13*	0.97
Total	**5000**	***100***	**4873.1**	***100***	**0.97**

Table 5.2: Flake Count and Mass Data for H1 at IgCx-11.

Including the already mentioned flake concentration in Unit N33/E7, H1 contained a total of five distinct flake concentrations (Figure 6.8). The first, which began as TP: 04-07 encompassed nearly the entire eastern portion of Unit N33/E7 and flakes filled every crack between the rocks of the mid-passage structure. There was an exceptionally high concentration of flakes in the southeast quadrant. The second concentration, which may be a continuation of the first, was encountered when the baulk shared by Units N33/E7, N33/E8 and N34/E8 was removed. Here another 280 pieces of Ramah chert along with 29.3 grams of shatter was collected. Moving into Unit N34/8 the

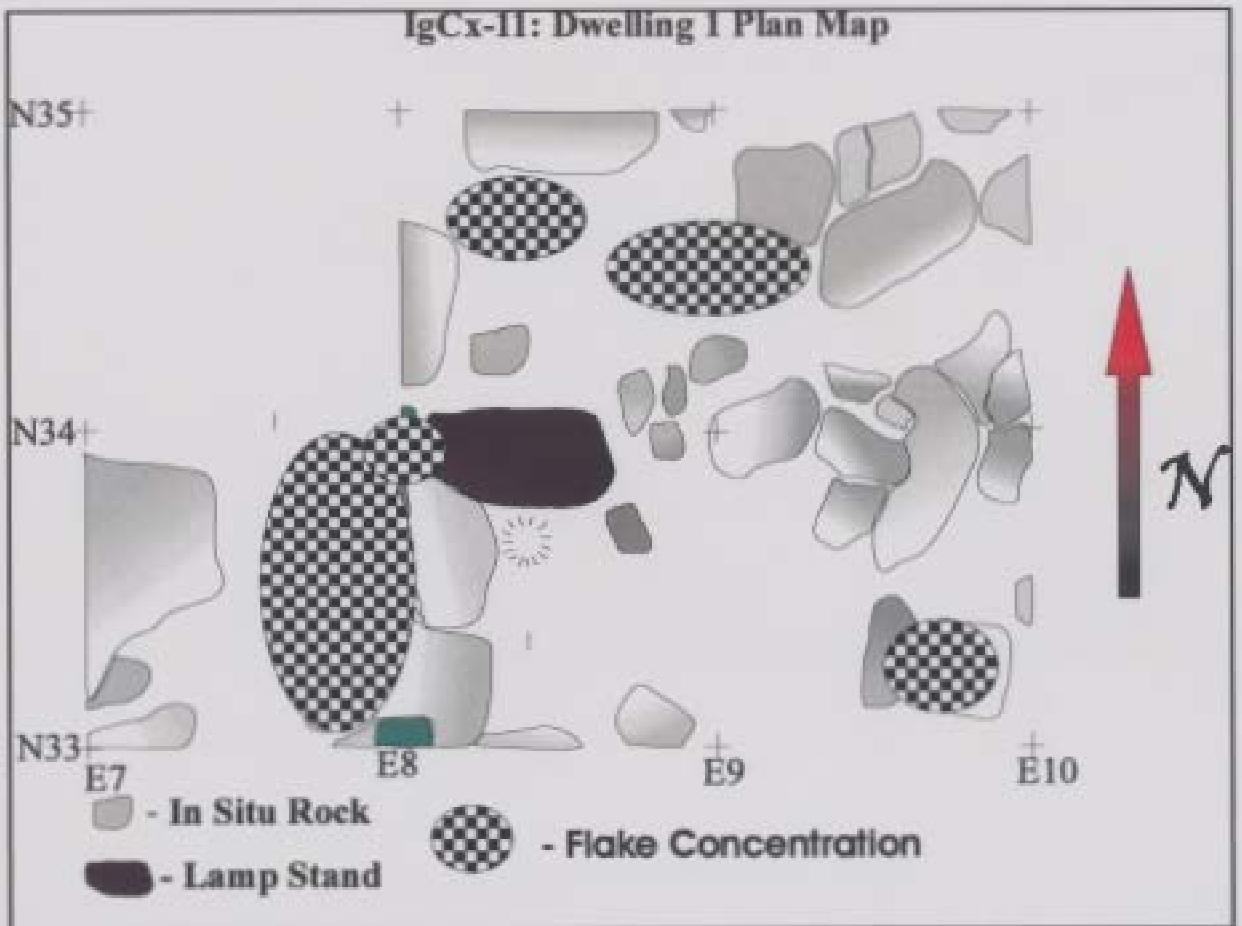

Figure 6.8: Flake Concentrations in H1.

northwest quadrant contained a concentration of flakes, as did the northeast part of the unit. This forth flake concentration spread into the northwest quadrant of N34/E9 and on average the flakes in this concentration were large. It is worth noting that in this general area there were also a high number of chert blanks and preforms. Finally, Unit N33/E9 presented the fifth and final concentration. Located in the southeast quadrant this flake concentration was located close to the internal boundary of the dwelling and it may have been deposited as a result of sweeping and or dumping episodes towards the walls and away from the main living area. To summarize the debitage in the dwelling area, it appears as if the axial feature was a hub of activities, including tool manufacture and maintenance, dumping episodes of small flakes waste and shatter, cooking and many other tasks. Flake concentrations throughout the dwelling demonstrate that knapping and dumping occurred in other places and that larger flakes may have been selected for or intentionally produced in order to make various retouched flake tools.

6.5 Artefact description

A total of 273 Late Dorset stone artefacts were collected at the Lower Terrace. TP: 04-05 produced the first diagnostic Late Dorset style artefact at the site in the form of a stemmed biface fragment. Other test pits contained diagnostic Late Dorset material culture including various biface forms, expedient flake tools, flake knives, scrapers, and soapstone vessel fragments (Cox 1977, 1978; Fitzhugh 1976; Maxwell 1976, 1984, 1985; Thomson 1985, 1988; Tuck 1975, 1976b). One of the most peculiar finds at the site however came from TP: 05-08 where a couple of large pieces of dense volcanic rock were recovered. These large diabase stones appeared to be coarsely flaked and displayed evidence of use-wear, probably from use as a type of hammerstone. One piece in particular also exhibits a residue of what appears to be red ochre.

The excavation of the dwelling area exposed a total of 208 stone artefacts (Table 6.3). Nearly all chipped stone tools were made of Ramah chert, while minor amounts were made of other cherts and quartz's. Soapstone was also well represented in the form of vessel fragments, small worked pieces, and small concentrations debitage caused by manufacture/repair activities. As for the artefacts, a number of diagnostic Late Dorset forms and styles are present. The majority of artefacts are hand-held flake tools, followed by small, hafted cutting/slicing tools presumably associated with processing game and

H1 Artefact Typology	33/7	33/8	34/8	33/9	34/9	Total	%
Biface/ Fragment	1	-	4	1	3	**9**	***4***
Diabase Hammerstone	1	1	1	-	2	**5**	***2***
Endblade	-	1	4	3	-	**8**	***4***
Expedient Flake Tool	7	-	10	1	3	**21**	***10***
Flake Knife	9	6	5	13	8	**41**	***20***
Microblade/Fragment	-	4	1	3	2	**10**	***5***
Microblade Core	-	-	-	1	-	**1**	***<1***
Preform	1	1	13	3	1	**19**	***9***
Ret/Utl Flake	5	9	10	10	9	**43**	***21***
Scraper	-	-	1	3	6	**10**	***5***
Uniface	3	1	4	1	2	**11**	***5***
Worked Slate	3	3	1	1	-	**8**	***4***
Worked Soapstone	4	3	-	5	3	**15**	***7***
Other	2	2	1	2	-	**7**	***3***
TOTALS	**36**	**32**	**55**	**46**	**39**	**208**	***100***

Table 6.3: Artefact Types by Unit For H1 At IgCx-11.

hide preparation. A high percentage of the artefacts are associated with manufacture and chipped stone technology. One unit in particular possessed a number of finished and unfinished Ramah chert biface preforms or blanks, which were probably cached for future use. As well, there were areas where a number of large Ramah chert flakes were found together, suggesting that these informal, expedient tools were either selected or intentionally produced on-site. While all areas of the dwelling were relatively productive, there were pockets or activity areas where artefact densities were greater (Figure 6.9).

Retouched and unmodified utilized flakes make up the largest group of artefacts at 21% of the total assemblage, followed closely by flake knives at 20%. The affinity with flake type tools is further demonstrated with expedient flake tools comprising an additional 10% of the assemblage. A mere 10 blades and just 1 microblade core from the support the trend for a move away from microblade use in Late Dorset times. The high percentage of preforms and bifacial blanks demonstrates the continued importance of

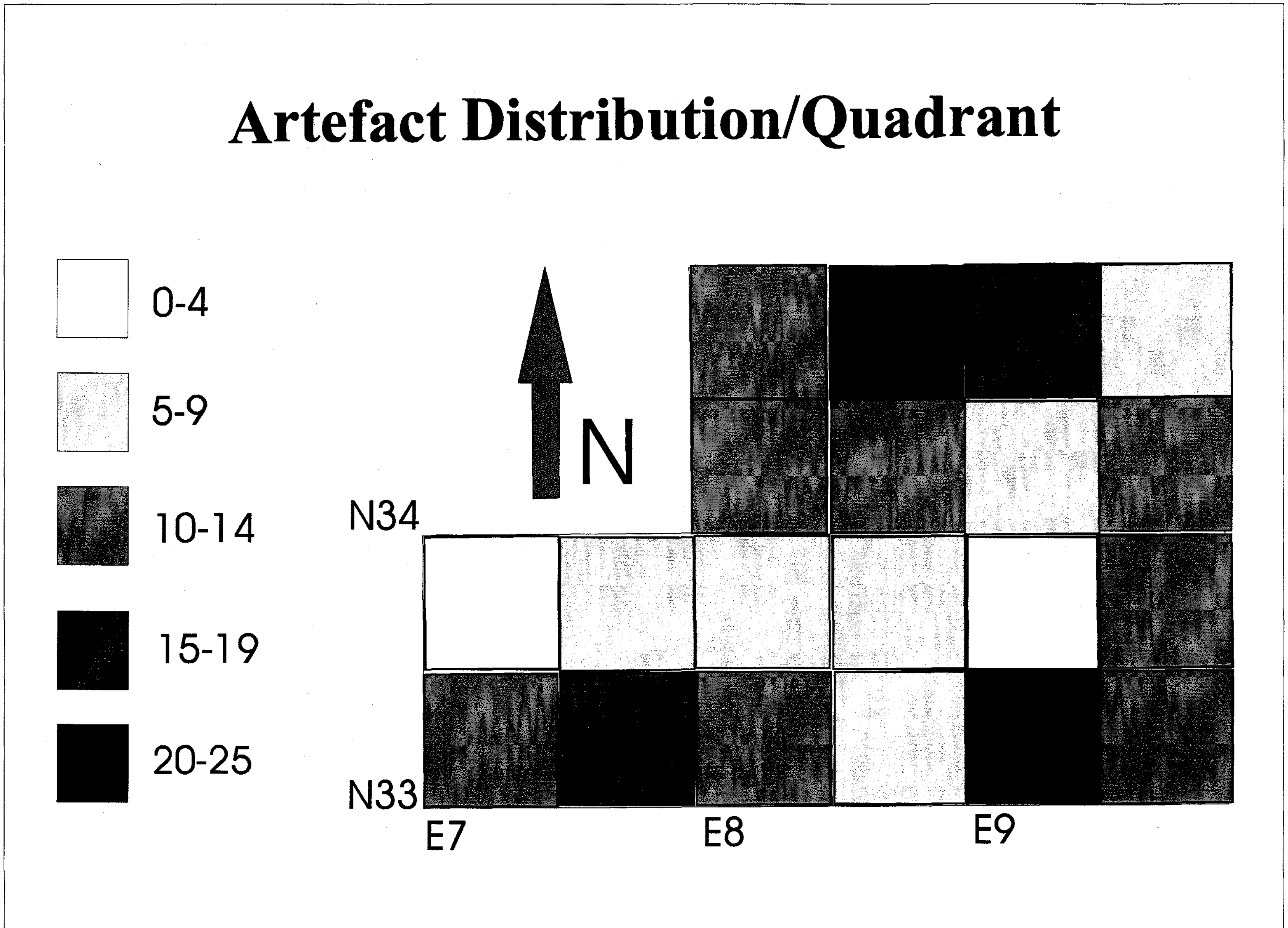

Figure 6.9: Small Multiples Graphic of Artefact Distribution By Quadrant for H1.

particular types of bifacial tools and may actually represent some type of advanced preparation or 'gearing up" activity for future needs (Binford 1977). There are a few endblades and stemmed bifaces but these totals are likely an under-representation of the amount of hunting activity at the site. This may also be the result of sampling. The diabase hammerstones further indicate manufacture activities occurring within H1 and they were likely used for the soapstone artefact production. With reference to worked soapstone, fragments of used and unused bowls and lamps were well represented.

Biface/Biface Fragments (9)

Of the nine artefacts from H1 identified as bifaces only one specimen is complete and six have been identified to type. The complete specimen is either a knife blade or a variety of a Late Dorset point. There are three stemmed bifacial points that are diagnostic of Late Dorset examples from northern Labrador and elsewhere in the eastern Arctic. A common interpretation on the function of these pieces is that they were used to tip lances or spears for sealing and walrus hunting (Cox 1977, 1978; Fitzhugh 1976; Maxwell 1976, 1985; Tuck 1976b). Two other artefacts, both fragments, have been identified as knife blade tips while the three remaining fragments could not be categorized any further.

Diabase Hammerstone (5)

Common characteristics for these hammerstones are their high density, irregular shape, flake scars, and evidence of usage such as battering marks and polish. On at least one example there is red ochre staining on a polished face of the stone. This is not the first evidence however of diabase hammerstones on pre-contact contexts in the Canadian

Arctic. McCartney and Savelle (1989) reported the utilization of diabase hammerstones and picks for steatite vessel manufacture by Thule groups on southeastern Somerset Island. Through experimentation, McCartney and Savelle (1989) demonstrated that the diabase artefacts, along with other tools, were used during vessel construction. Since the diabase hammerstones/peckers from IgCx-11 resemble some of the Somerset Island artefacts, and the fact that soapstone manufacture debris and unfinished vessels were all found at the site, these pieces were likely used for a similar purpose. Adding validity to this is the fact that Late Dorset peoples often applied a red-ochre wash to their finished vessels (Cox 1977, 1978) and red-ochre staining was noted on at least one of the hammerstones. Based on the above evidence, it is reasonable to presume that there are other artefacts in the IgCx-11 assemblage that functioned as tools in the soapstone vessel manufacturing process and I will make reference to such artefacts as they arise.

Endblades/Triangular Points (8)

A total of eight triangular points believed to have been used to as harpoon endblades were recovered from H1. The two complete examples are bifacially flaked and have moderately concave bases. Six specimens are incomplete and include two near complete points, one tip, one medial section, and two basal sections. Two of the endblades have an abnormally high length to width ratio at about 5:1, and resemble darts.

Expedient Flake Tools (21)

Expedient flakes tools are extensively retouched flake tools that have undergone enough intentional edge modification to warrant a typological grouping above retouched flakes. In some instances it appears the toolmaker put enough effort into the design to create a suitable working edge for the task at hand, and in some cases to make the tool rest in the hand. All twenty-one artefacts are made on large Ramah chert flakes and may be sub-divided into three generalized types. Four examples are expedient scrapers as they exhibit steep retouch on the edges of one or more faces to produce a "scraping" edge. Four specimens with more than one type of working edge (e.g. cutting, scraping, graving etc.) have been called expedient multi-tools. Finally, pieces that do not resemble any particular formal tool, were classified as expedient flake tools.

Flake Knives (41)

Notched and stemmed flakes seem to have become an increasingly important part of Late Dorset material culture in Labrador (Cox 1977, 1978). Made on thin flakes, a distinguishing factor separating flake knives from other retouched flake tools is the evidence of hafting. All specimens demonstrate one or more small side notches or some other form of basal retouch (e.g. stems, thinning) to facilitate hafting. Although classified as knives based on the sharp unretouched edges and form of many specimens, some of the more obscurely shaped examples were utilized in other tasks besides cutting, such as graving. With that being said, some of the flake knives from IgCx-11 were quite stylized and formal looking. Some of these were heavily retouched and shaped and similar in style to specimens collected from other Late Dorset sites in Labrador at Okak (Cox 1976, 1977) and at Saglek (Thomson 1988; Tuck 1975). It appears as if toolmakers were concerned with style as some of the more fragile and expediently made pieces maintain and mimic the style of the more formal pieces.

Microblades (10)

Only ten microblades were recovered from the five excavated units of H1. Even though it has been recognized that microblade use generally declined during Late Dorset times (Cox 1977, 1978) this is a very low total. Nine of the ten pieces are microblade fragments and all but one quartz crystal specimen are made on Ramah chert.

Microblade Core (1)

A single exhausted microblade core of clear quartz crystal, weighing nearly 12 grams was recovered near the eastern limit of the excavation area.

Preforms/Blanks (19)

Chipped preforms and/or blanks make up a substantial portion of the assemblage; accounting for 11% of all flaked stone. The majority of these artefacts came from a confined area of H1 and may have been cached there. While it appears as if some of the preforms were broken during manufacture, they were kept, as they were still valuable pieces of material. The complete specimens ranged in form from large scraper preforms, triangular point preforms of large endblades, and generic tear drop shaped biface preforms that could have been further worked into different Late Dorset style bifaces.

Retouched/Utilized Flakes (43)

The most common type of artefact recovered in H1 were minimally retouched and/or utilized flakes. Thirty-nine of the pieces were made on flakes of Ramah chert, while there is one utilized slate flake, and three retouched or utilized flakes of an unknown type of green chert. It is interesting that these three later pieces were recovered at the very bottom of the excavation and were likely deposited by the first occupants of the site. The fine-grained chert is dark green with a dull appearance. It does not resemble any samples of Mugford Group cherts and its origin is unknown.

Scrapers (10)

Of the ten scrapers from H1, eight are made of Ramah chert while there is one quartz crystal example and one made from Ryan's quartz. The latter is a thick thumbnail scraper with a very steep working edge. The quartz crystal specimen is a small side scraper. Of the remaining chert scrapers, one is a large side scraper, two are linear scrapers with steep retouch on three edges, while the remaining five are all end scrapers. Four of these display evidence of hafting in the form of either a stem, basal retouch or side notches. One exhausted scraper was maintained down to the notches.

Unifaces (11)

Of the three unifacially worked pieces three fragmentary artefacts are believed to have been some type of point. The remaining eight examples are fragments of once larger tools and are of an unknown type. Many of the pieces demonstrate extensive edge retouch and may in fact be parts of flake knives or expedient flake tools.

Worked Slate (8)

While slate artefacts did not make up a large part of the assemblage slate was still an important part of Late Dorset groundstone technology (Maxwell 1985). Three pieces, two of which are fragments, appear to be ground slate knife blades. One complete specimen is an unidentifiable ground slate tool. The remaining slate pieces are all small fragments of unidentifiable polished slate artefacts.

Worked Soapstone (15)

H1 contained a number of soapstone vessel fragments. Eleven are identifiable as bowls, pots or lamps while four pieces could not be identified to vessel type. Some of the pieces were unfinished, not having undergone interior polishing as they had deep grooves typical of middle stage manufacture (Pottle 1998). Many of the pieces were completely polished and exhibited evidence of charring.

Other (7)

One slate artefact, tentatively termed an abrader, could not be securely identified through comparative analysis. The object is grey in colour and it is completely polished and tabular in shape. The proximal end has an intentional groove in it, which may have been the working edge. When viewed in isolation it is hard to image the function of this piece, however, when considered in light of the soapstone manufacturing activity at the site. The piece may have been what is referred to as a bowl reamer (Pottle 1998). These tools were used to shape and finish the upper edge of soapstone pots and the groove in this tool is the appropriate size and has the desirable properties to perform such a task.

The remaining artefacts in this category are a utilized diabase flake, a small fragment of ground and polished schist, a piece of iron pyrite that may have functioned as a fire striker, and three water-rolled Ramah chert artefacts.

6.6 Radiometric samples

Of the charcoal samples collected during fieldwork, two samples demonstrating excellent quantity, quality and context were sent away for laboratory carbon analysis to Beta Analytic Inc. The first sample (RC04-05) was collected from Level 3, 33cm below surface in Unit N33/E8 in association with diagnostic artefacts and debris within the dwelling. The radiometric analysis produced a conventional radiocarbon age of 300+/-70 BP, and once calibrated, it produced the probability distribution as seen in Figure 6.10.

The second charcoal sample (RC04-07) was also collected within the dwelling feature, from Unit N34/E9 at a depth of 35 cm below surface. For this one, the analysis came back with a corresponding radiocarbon age of 320+/-60. As seen in Figure 6.11 this sample was dated at being a little older than the first, and with tighter probability ranges.

The interpretation of these dates must be approached with caution as problems associated with dating Late Dorset sites are well documented (Park 1993, 2000). This situation is complicated by the possible contamination of charcoal samples by either sea-mammal fat or over-lying Thule components. While it is quite possible that the Labrador north coast was a last refuge for the Late Dorset, there must be more securely dated sites researched before persistence into the 14^{th} and 15^{th} centuries can be validated. Nonetheless, The Lower Terrace appears to be a very recent Late Dorset habitation site based on the radiocarbon dates and the thin soil accumulation between the Thule and Dorset components.

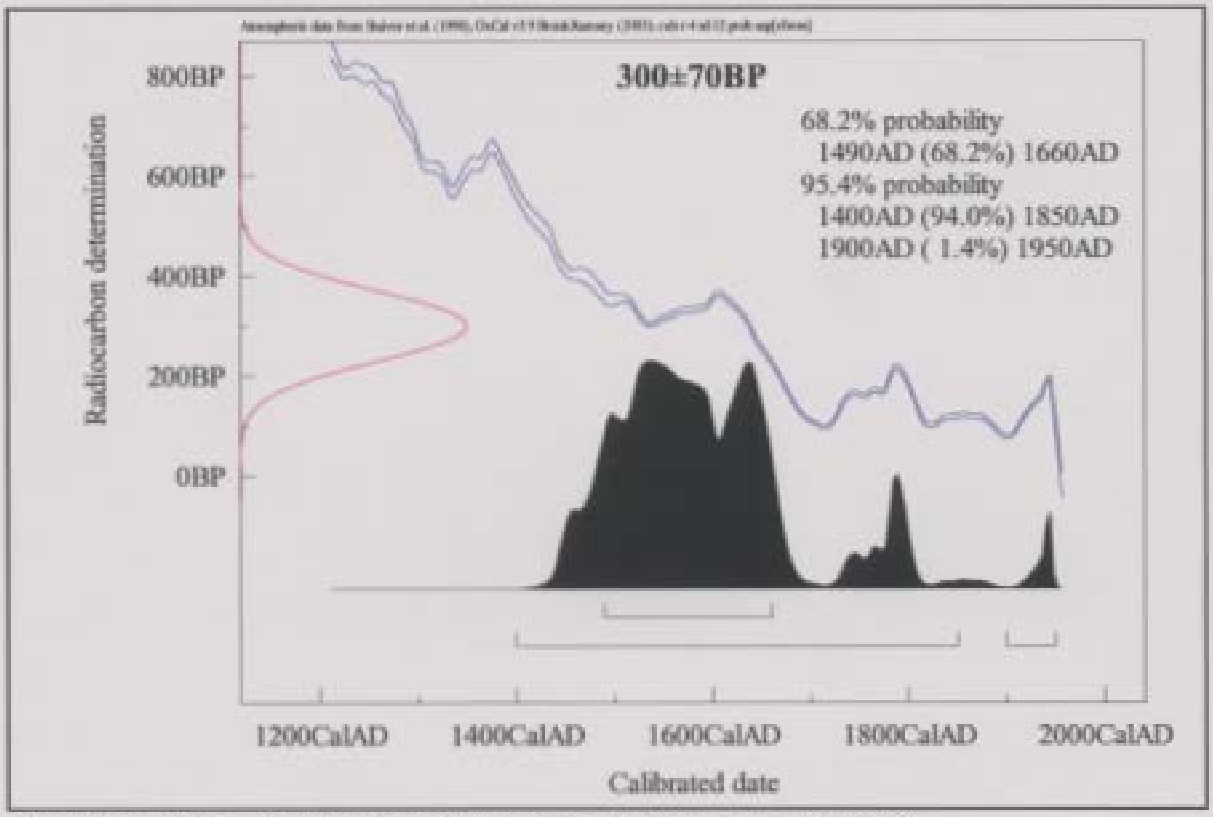

Figure 6.10: IgCx-11 (Radiometric Sample RC04-05 From L3 Unit N33/E8).

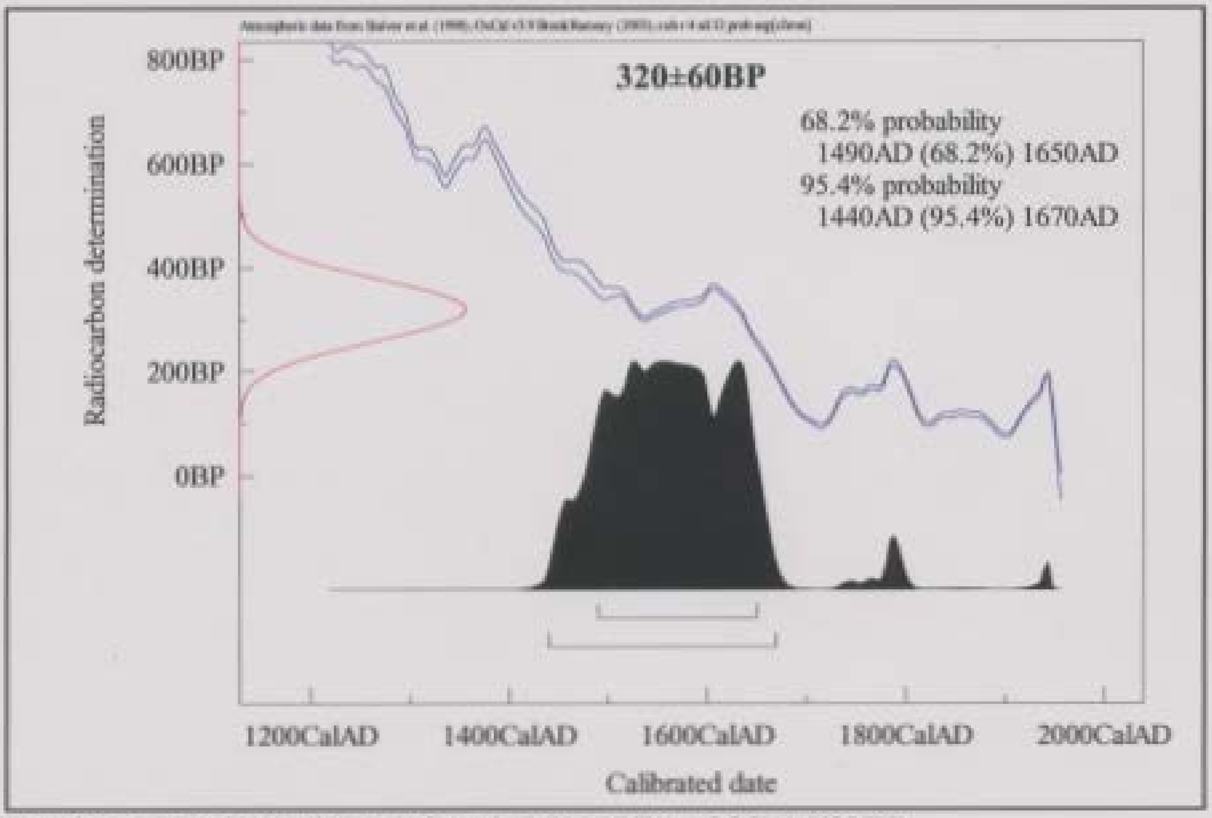

Figure 6.11: IgCx-11 (Radiometric Sample RC04-07 From L3 Unit N34/E9).

CHAPTER SEVEN

Data Analysis and Interpretation at The Lower Terrace (IgCx-11)

7.1 Introduction

In this chapter, the lithic assemblages from the Lower Terrace are examined in order to answer questions regarding technological strategies of the Late Dorset people. By incorporating data pertaining to raw material procurement, stone debitage and artefacts, into the theoretical and methodological paradigms previously discussed, this chapter addresses artefact design strategies and distribution at the site.

7.2 Raw material analysis

This section highlights the examination of the types and amounts of lithic raw material recovered. To evaluate raw material consumption, data obtained from both the debitage and artefact assemblages are considered. To begin, the chert flakes and other stone debitage types offer excellent insight into the utility of various materials in Late Dorset lifeways at the site. Ramah chert accounts for 99.9% of all chipped stone debitage from all areas of the site (in H1, only 5 of the 5000 flakes were not Ramah chert) and its presence dominated the artefact assemblage as well (Table 7.1 and Figure 7.1). In fact, Ramah chert accounted for 78% of the entire artefact assemblage at H1, and 93% of all flaked stone artefacts. Other materials utilized in the chipped stone industry include other types of chert, quartz crystal, quartzite, and Ryan's quartz.

Besides the flaked stone industry, ground stone technology was also significant for the Late Dorset. Nine ground slate artefacts recovered from H1 show that it made up a

	Artefact #	RC	SS	Slate	Chert	Diabase	QC	Q	RQ	Other
33/7	38	28	6	3	-	1	-	-	-	-
33/8	32	22	3	4	1	1	-	1	-	-
33/9	46	34	5	0	3	1	1	-	1	1
34/8	56	50	1	2	1	1	-	-	1	-
34/9	39	30	3	0	1	1	2	1	-	-
Total	208	162	17	9	6	5	3	2	2	1

Table 7.1: Artefacts Totals By Raw Material Type for House 1 at IgCx-11 (RC = Ramah Chert, SS = Soapstone, QC = Quartz Crystal, Q = Quartzite, RQ = Ryans Quartz).

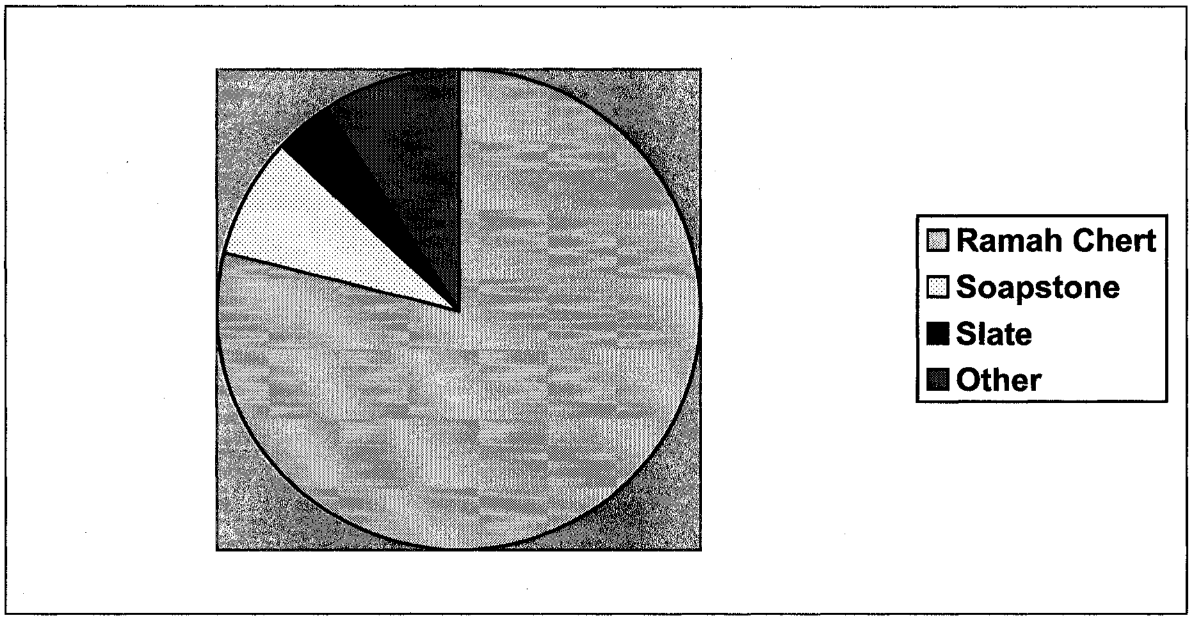

Figure 7.1: Raw Material Frequency for H1 Artefacts at IgCx-11.

meaningful part of their tool kit and technological system. In addition, there were fragments of unworked slate found throughout the excavation area. Soapstone was the most commonly used type of groundstone. While it is not certaint that the soapstone being used at this site came from the local outcrop at Schooner Cove, the inhabitants at the site were obtaining large soapstone blanks as revealed by evidence of manufacturing activities. Pieces of vessel fragments accounted for 8% of the total artefacts from H1 and quantities of worked soapstone and debitage were located throughout the site.

7.3 Debitage analysis

The debitage investigation discusses results from the flake analysis as well an informal account of the debitage resulting from ground stone production. The analysis of the flaked stone debitage from IgCx-11 was conducted on collections from H1, Unit N52/E6, and Test Pits 10 and 11 and the data is presented in terms of flake-size count and mass frequencies. The results of this analysis are presented for each assemblage in isolation from the others, as well as in relation to one another. Each method allows for interesting insights to be made on the technological strategies in play at the site.

7.31 Flaked stone debitage analysis

As already mentioned, nearly all the flakes from IgCx-11 are Ramah chert. To deal with the debitage collections in a coherent manner, each area will be examined in isolation before comparing the patterns of use between areas of the site. Beginning with the area referred to as H1, Table 7.2 and Figure 7.2 illustrate the frequency of both flake

Flake Size	Flake #	# %	Flake Mass (g)	Mass %	Avg. Flake Mass (g)
1	3684	*74*	1342.7	*28*	0.36
2	668	*13*	755.4	*16*	1.13
3	621	*12*	2414.3	*50*	3.89
4	27	*<1*	360.7	*7*	13.4
Total	**5000**	***100***	**4873.1**	***100***	**0.97**

Table 7.2: IgCx-11 H1 Size Grade Data For All Flakes.

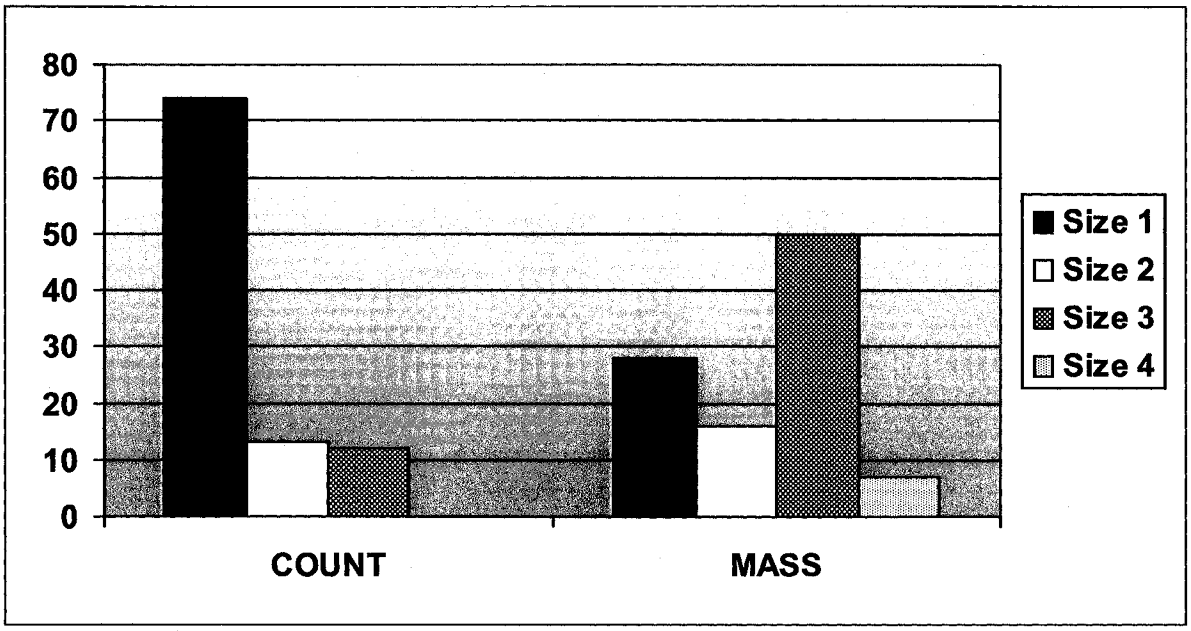

Figure 7.2: IgCx-11 H1 Flake Size Grade Count vs. Mass Frequency.

count and mass for each of the flake-size classes. As a whole, the assemblage shows a variety of flaking activities. The high proportions of Size 1 flakes provide evidence for a great deal of retouch related practices such as edge maintenance and tool shaping. As well, the total of Size 2 flakes suggest that late stage manufacture and biface shaping was occurring in this area. Finally, the amounts of Size 3 and Size 4 debitage, notably in terms of overall mass, reveal that early and middle stage reduction activities such as producing bifacial preforms, transportable cores, or usable flake blanks were a significant part of the flaking activities in the dwelling.

To bring the analysis down in scale, the patterns between the individual units are examined in an attempt to isolate activity areas. As illustrated in Figures 7.3 and 7.4, there are some slight discrepancies between the units. For instance, Units N33/E7 and N33/E8 (lampstand area) exhibit higher proportions of Size 1 retouch flakes than others and this may indicate that retouch activities were occurring here. Unit N33/E9 displays the lowest ratio of small flakes and the highest frequencies of Size 2, 3 and 4 flake counts and weights. This area is located away from the central area of the dwelling. The fact that early manufacturing activities were occurring here may be suggestive of a division of space or labour within the dwelling. The final two units, N34/E8 and N34/E9, present debitage patterns falling somewhere in between those already discussed. Here, flakes from all size classes are represented and all stages of manufacturing were taking place.

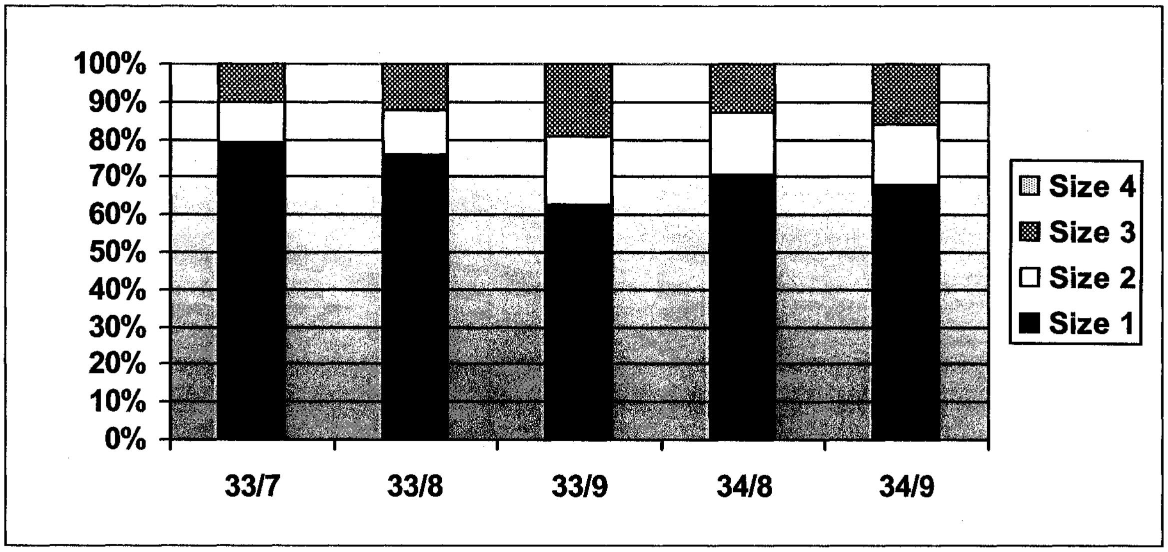

Figure 7.3: IgCx-11 Flake Size Grade Count Frequency.

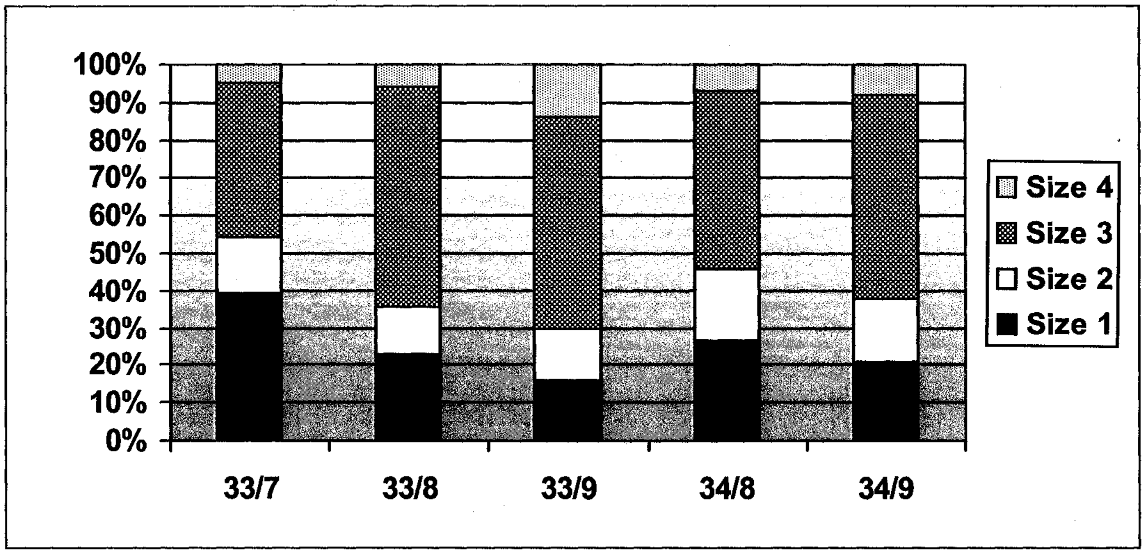

Figure 7.4: IgCx-11 Flake Size Grade Mass Frequency.

To look more specifically at an isolated flake concentration within the dwelling (F04-01), an understanding can be gained on what a high use area and dense deposit of debitage looks like within a Late Dorset dwelling. As described earlier, this flake concentration was situated in and around the mid-passage stones at the western edge of Unit N33/E7. In this small area, there were nearly 2000 chert flakes representing 39% of all debitage recovered from H1. As shown in Table 7.3 and Figure 7.5, the flake-size pattern in this feature is quite different from the debitage examples in the rest of the dwelling. While all flake sizes are present, Size 1 flake count and mass rations are very high. This provides more evidence for the presence of the axial structure in that it appears that this part of the dwelling was a hub for final stage knapping activity. In addition it seems like these retouch and maintenance activities were occurring around the light of a hearth/lampstand. The presence of the Size 3 and Size 4 flakes in the concentration may also indicate that these larger flakes were being cached for future use as blanks to manufacture both bifacial tools as well as to fashion informal and formal flake tools.

Flake Size	Flake #	# %	Flake Mass (g)	Mass %	Avg. Flake Mass (g)
1	1539	*80*	460.3	*35*	0.30
2	199	*10*	220.6	*17*	1.11
3	182	*9*	570.6	*43*	3.14
4	9	*<1*	71.2	*5*	7.9
Total	**1929**	***100***	**1322.7**	***100***	**0.69**

Table 7.3: IgCx-11 F04-01 H1 Size Grade Data For All Flakes.

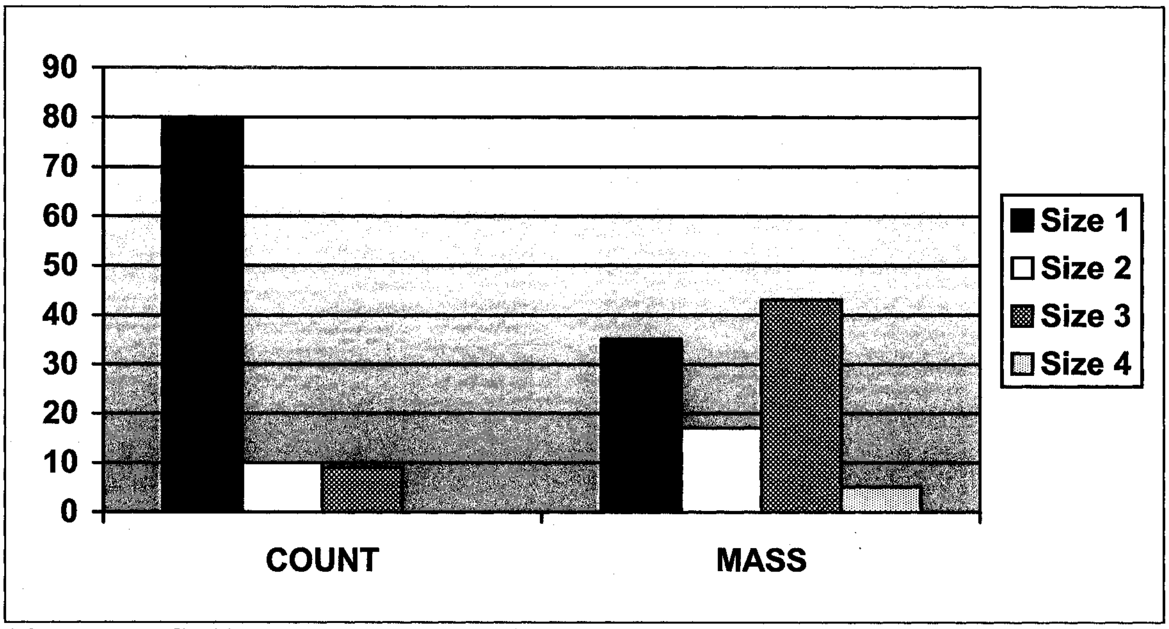

Figure 7.5: IgCx-11 F04-01 H 1 Flake Size Grade Count vs. Mass Frequency.

Moving out of the dwelling and on to other areas at the site, flake-size data illustrates how Ramah chert utilization was occurring elsewhere. Looking at Unit N52/E6 and Test Pit 04-10 (situated adjacent to another), these areas contained fairly dense deposits that appear to represent a midden. Based on this interpretation the debitage should be an indicator of the types of flakes being dumped and discarded at the site.

The data presented in Tables 7.4 and 7.5, show similar patterns of debitage deposition. The high ratios of Size 1 flakes may represent sweeping episodes and the subsequent dumping of refuse into the midden. The fact that Size 2 and 3 flakes are present, even in small amounts, demonstrates that a variety of reduction practices were occurring. Again, the low frequencies of these larger flakes in the midden may represent the intentional selection of useable flake-blanks for later use.

Flake Size	Flake #	# %	Flake Mass (g)	Mass %	Avg. Flake Mass (g)
1	136	*76*	30.0	*24*	0.22
2	33	*18*	28.8	*23*	0.87
3	10	*6*	65.3	*53*	6.53
4	0	*0*	0	*0*	-
Total	**179**	***100***	**124.1**	***100***	**0.69**

Table 7.4: IgCx-11 Unit N52/E6 Size Grade Data For All Flakes.

Flake Size	Flake #	# %	Flake Mass (g)	Mass %	Avg. Flake Mass (g)
1	588	*84*	147.2	*35*	0.25
2	77	*11*	89.7	*21*	1.16
3	33	*5*	136.4	*33*	4.13
4	4	*<1*	45.1	*11*	11.3
Total	**702**	***100***	**418.4**	***100***	**0.60**

Table 7.5: IgCx-11 TP 04-10 Size Grade Data For All Flakes.

One final debitage assemblage that was examined came from Test Pit 04-11. While the context of the deposit for this sample is not known, it has interpretative value. The flake-size data for this group of chipping debitage demonstrates the types of debitage being produced outside of the dwelling and a midden. More importantly it provides a glimpse of types of manufacturing activity taking place. Referring to Table 7.6, a lower ratio of Size 1 to Size 2-4 flakes demonstrates the occurrence of early to middle stage manufacturing. This may be interpreted as an area where bifacial reduction and thinning were taking place more so than final retouch activity.

Flake Size	Flake #	# %	Flake Mass (g)	Mass %	Avg. Flake Mass (g)
1	133	*62*	44.6	*23*	0.34
2	55	*26*	71.3	*37*	1.30
3	24	*11*	70.7	*37*	2.95
4	1	*<1*	5.2	*3*	5.2
Total	**213**	***100***	**191.8**	***100***	**0.90**

Table 7.6: IgCx-11 TP 04-11 Size Grade Data for all Flakes.

To compare the Ramah chert debitage from IgCx-11 at both the intra-site and inter-site levels, some important conclusions can be made on the strategies conducted at the site. Looking at the flake-size ratios for Ramah chert flake count and mass between H1, Unit N52/E6 and Test Pits 10 and 11 there are some notable patterns. First of all, the vast amounts of Size 1 debitage in all areas demonstrates that there was a great deal of activity involved in retouching chert tools. These types of flakes may have been produced from retouching formal tools, shaping, notching, retooling, repairing formal flake tools and bifaces, or performing edge modification on formal and informal flake tools.

Size 2 flake frequencies were similar throughout the site and they typically represent middle to late stage reduction activity, and may be indicative of final bifacial shaping such as transforming preforms into finished tools. The fact that Size 2 flakes do not make-up as large a proportion of the flakes at sites in Nachvak Fjord as they do at sites farther away from the Ramah chert source suggests that final bifacial reduction was a more common technological strategy at those sites. The inverse of this is that the Nachvak sites were witnessing an increase in core reduction and the production of large usable flakes for use as tools or as blanks, as opposed to bifacial reduction.

This point is further demonstrated in Figures 7.6 and 7.7 whereby the counts and mass of Size 3 flakes at Okak-3 (HjCl-3) and Peabody Point (IiCw-1)[1] are quite low and Size 4 flakes are absent. Besides possibly reflecting different technological strategies, it is possible that the low amounts of the larger flakes are also a result of distance from the chert source in that the site occupants would have not discarded large usable flakes as readily as the people at the Lower Terrace and Tinutyarvik Cove-02 who could afford to be more wasteful of their raw material.

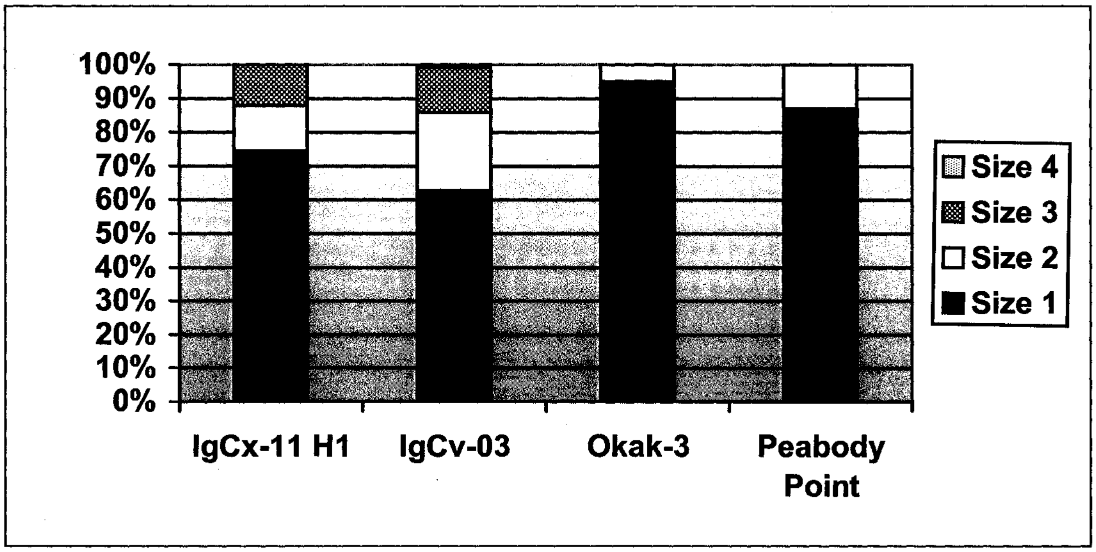

Figure 7.6: Nachvak vs. Okak and Peabody Point Flake Size Grade Count Frequency.

[1] Data for Okak-3 and Peabody Point was obtained from Nagle 1984b.

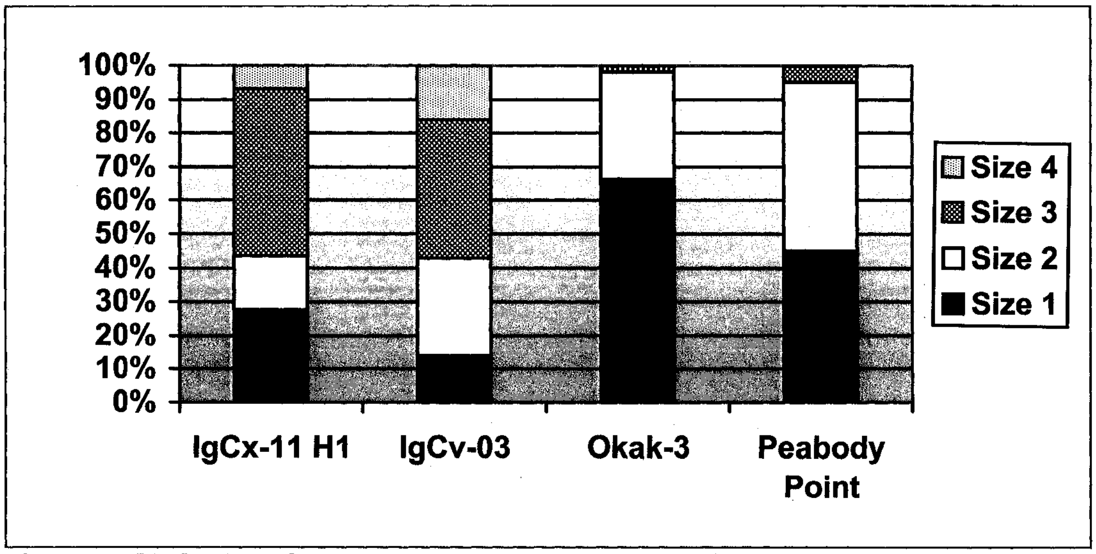

Figure 7.7: Nachvak vs. Okak and Peabody Point Flake Size Grade Mass Frequency.

7.32 Ground stone debitage analysis

While there was no formal analysis conducted on the debitage created by the ground stone industry, there was enough evidence of soapstone manufacture debris to warrant a discussion. In fact, soapstone debitage was recovered from most excavation areas at the site and in a number of test pits. More specifically, the debitage ranged in form from the occasional small chunk of unworked raw material, to increasing quantities of smaller pieces, to an abundance of shatter and powder. The larger pieces of debitage were not as frequent as the smaller ones, but it seemed as if the small shatter and powder was everywhere. This was most notable in the dwelling area where it seems as if the final manufacturing stages of soapstone vessel production, such as final shaping and polishing, were being conducted. It is also worth mentioning that the larger pieces of soapstone that would have been removed from vessel blanks or performs during early stages of manufacture were found in Test Pit 04-10, which was interpreted as a midden area.

7.4 Artefact analysis

The artefact analysis of the collections from the Lower Terrace will follow the format where artefact frequencies were examined in relation to the design classification system. The investigation will examine the artefact assemblages from different areas of the site as well as compare the patterns of artefact form between areas.

As illustrated in Table 7.7 and Figure 7.8 the most popular form of artefacts at IgCx-11 were formal flake tools followed by informal flake tools. Before discussing these and the semi-formal flake tools and formal bifacial artefacts, I will focus on the other three classes. These three groups include artefacts associated with manufacturing activities, specialized core technology tools, and other types of curated stone tools such as groundstone artefacts. These latter three groups account for 27% of the collection at the site and each varied in its importance within Late Dorset technology at the site.

Technological Design Class	**H1**	**52/6**	**Test Pits**	**Total**
Informal Flake Tool	44	6	10	**60**
Semi-Formal Flake Tool	24	1	1	**26**
Formal Flake Tool	64	8	11	**83**
Formal Bifacial Tool	17	2	6	**25**
Specialized Core Technology Tool	10	0	4	**14**
Other Curated Stone Artefact	25	3	3	**31**
Manufacturing Associated Tool	24	1	3	**28**
TOTAL	**208**	**21**	**38**	**267**

Table 7.7: Artefact Design Class By Area at IgCx-11.

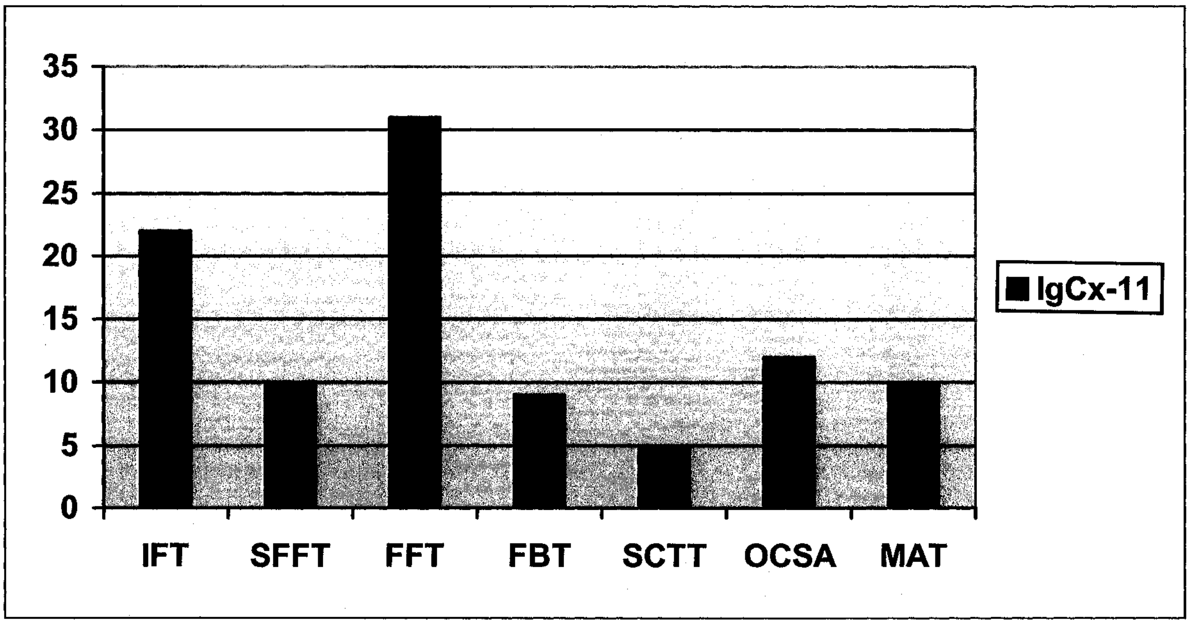

Figure 7.8: Tool Design Class Frequency for IgCx-11.

Accounting for just 5% of the total artefacts, it seems evident that a specialized core technology was not an important aspect of Late Dorset technology. While microblades are often the most common element of Dorset assemblages during earlier periods (Cox 1977, 1978; Fitzhugh 1976; Nagle 1984b), for some reason this technological strategy was not important at this site. While there is a general trend for a decrease in microblade production during the Late Dorset period in the eastern Arctic (Cox 1978, Maxwell 1985), the near absence of microblade production at this site requires comment. Microblade production is a highly specialized technology requiring a high amount of skill on behalf of the maker (Parry 1994), and traditionally the preferred raw material for such technology is quartz crystal. It is quite possible that a combination of 1) a lack of motivation to acquire quartz crystal through either decreased residential mobility (decrease in external contact) or the abundance of Ramah chert, 2) a loss of expertise for producing microblades, or finally 3) abandonment due to socio-economic reasons such as gender division of labour whereby women were making flake tools.

A second important technological class represented at the site, accounting for 12% of the collection is "other curated stone artefacts". At IgCx-11 this class, for the most part, includes soapstone artefacts. Soapstone vessels are fairly common in Dorset assemblages (Maxwell 1985), however the role of soapstone acquisition has not often been explored away from quarry sites. Not only are finished yet broken soapstone pots, lamps and bowls represented in the dwelling, midden, and test pits, but unfinished soapstone artefacts are also present. While soapstone debitage and some of the tools believed to have been used to manufacture vessels has been described, the presence of artefacts at an incomplete stage proves that unfinished soapstone preforms or blanks were being transported to the site and worked into finished products. Whether these vessels were produced in order to be used directly by the people who made them either at this site or another, or were being manufactured as items of trade or exchange (Nagle 1984b) cannot be determined. What can be stated is that the soapstone was an important aspect of Late Dorset technology and that the quantities and types of soapstone may provide additional evidence for cold-season habitation at the site.

Based on the fact that the Lower Terrace is a habitation site in proximity to a high quality chert and soapstone source and that this material could be gathered in abundance and stored, it is not surprising that there is a good representation of artefacts associated with manufacturing. Artefacts under this classification include hammerstones, cores, core fragments, and tool performs. The hammerstones, made of diabase, have been interpreted as being used for working soapstone. Paying closer attention to the flaked artefacts, there was a large proportion of chert preforms, most of which were bifacially worked. The majority of these artefacts were found in proximity to one another and likely represent stockpiling in anticipation of future needs, as well as "gearing up" activity. This behavior, described by Binford (1979) for Nunamiut groups in Alaska may have also been an important technological strategy for Late Dorset people during the short days of winter in anticipation of ice-edge hunting (Cox and Spiess 1980).

Turning the focus to the four classes of chipped stone artefacts, Table 7.8 and Figure 7.9 illustrate the amount of investment in the chipped stone industry (73% of all artefacts) as well as the proportion between the actual classes. Beginning with "informal flake tools", they account for 31% of the flaked artefacts from all areas. It is obvious that utilizing unretouched flakes or minimally retouched flakes was a frequent and effective strategy at this site.

	H1	**52/6**	**Test Pits**	**Total**
IFT	44	6	10	**60**
SFFT	24	1	1	**26**
FFT	64	8	11	**83**
FBT	17	2	6	**25**
TOTAL	**149**	**17**	**28**	**194**

Table 7.8: Chipped Stone Artefact Design Class By Area at IgCx-11.

The second classification type is "semi-formal flake tools" which made up 13% of the total for chipped artefacts. The relative abundance of these types of artefacts indicate that the toolmakers and users at the site were content with having tools that could

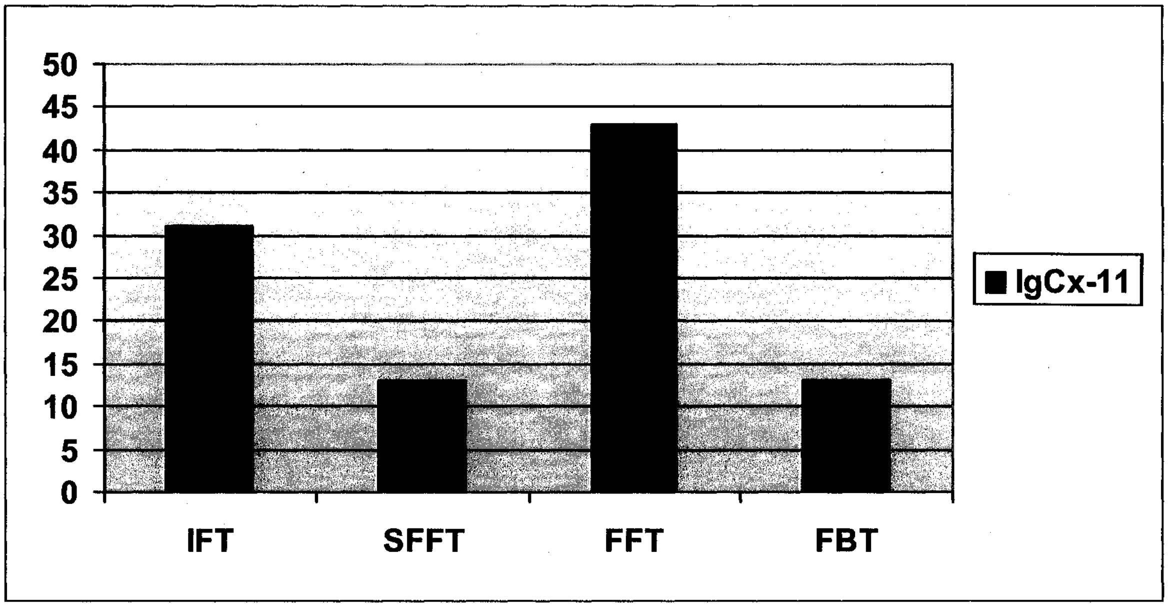

Figure 7.9: Chipped Tool Design Class Frequency for IgCx-11.

perform the tasks of more formal tools but without the increased effort in both flaking and hafting. Unlike pure informal tools, the semi-formal artefacts would not necessarily have been abandoned after task completion. Instead they were likely useful as part of a tool-kit and are a function of raw material availability and mobility (Kelly 1992).

The most abundant type of design class artefacts is "formal flake tools". As with the previous two classes, formal flake tools were made on flakes, however this type received extra effort in production. For instance many of these tools have edges with little or no modification, however they have been modified for hafting. Tools of this type have undergone extra modification not present in the other two classes. These flake tools are mostly hafted tools that demonstrat both unretouched and retouched working edges, and are sometimes subject to some type of style. For example, the most common type of formal flake tool is a flake knife. Flake knives take on a variety of forms from a sharp flake with a single side notch, to stylized notched flake knives exhibiting extensive lateral retouch in order to shape the artefact and produce a working edge. Many of these latter pieces are quite similar in style to bifacial examples and provide evidence of a group conforming to culturally identifiable styles without the requirement of producing a bifacial tool. It should also be noted that making these formal flake tools would not have required a high degree of skill, as with other technological strategies. The quantity and the types of formal flake tools at the site appear to be a result of raw material availability, and possibly changing social and economic conditions during this place and time.

The final and least common class of chipped artefacts is formal bifacial tools. While the overall amounts of bifaces at the site may be low, this technology was still a crucial technological strategy. Even though this was a habitation site, people still required durable, reliable tools for hunting, and as part of a mobile-tool kit when away from the site. Only fully bifacial tools are considered here and they include endblades, knife blades and the unique style of Late Dorset stemmed points. The bifaces were actually produced using two types of reduction strategies. First, the smaller bifacial artefacts such as endblades could have easily been made from moderately large flakes and retouched in order to make a small bifacial point. However, the larger bifaces were more likely made via bifacial reduction whereby a large chert blank was reduced with the end product in mind. In fact the production method may have been a staggered process whereby cores were reduced to bifacial preforms and further worked into the desired biface later.

Evaluating the technological design choices demonstrated at IgCx-11, it is apparent that raw material availability and quality were important factors guiding the types of tools manufactured and used at the site (Andrefsky Jr. 1991). There was no real need to conserve raw material at the site and for the chipped stone artefacts, the production of large chert flakes would have provided blanks for the majority of their tools. For these flake tools the degree of style and formality ranged from no alteration, to some modification, to greatly conforming to shape, style and form. As well, the use of bifaces reflect that flake tools were not always suitable and that a bifacial strategy was still important. Finally, the quantity of soapstone artefacts under various stages of manufacture demonstrates another aspect of Late Dorset curated material culture not often considered along the same line as chipped stone industries.

7.5 Technological strategies at IgCx-11

The goal of this section is to identify which strategy or combination of technological strategies people were employing at the site. In particular comments will be made on the degree to which people were demonstrating technological strategies in tune with curation, expediency, or opportunistic behavior. To do this, aspects of both artefact design and artefact distribution at IgCx-11 will be examined.

7.51 Artefact design

A governing factor affecting Late Dorset artefact design at the Lower Terrace would have been the production/reduction/sharpening strategies employed in a lithic tool industry. Tool attributes of utility and style were variable, and there would have been advantages and disadvantages involved with different design strategies (Odell 2004).

The first point to be made regards the types of reduction or manufacturing strategies used. The most commonly used technology was an expedient block core strategy (also called *flake-core technology*) whereby the production of flakes for tools and blanks from unprepared cores takes place (Odell 2004). Although this technology may be considered wasteful, conservation is not always a concern for more sedentary groups where lithics are easily available (Kooyman 2000). This was the situation at the Lower Terrace. Ramah chert supplies were obviously abundant and the production of flakes for informal flake tools was seemingly optimal for many task requirements. In most cases, elements of curated technological strategies were not required. When there were needs for tools with properties such as multifunctionality, increased reliability, or a desire to possess hafted tools with elements of style, the expedient core technology was still ideal (Odell 2004). All that was required to transform flakes into tools with extended uselife was varying levels of retouch for working edge modification (e.g. expedient scrapers, expedient flake tools), to facilitate hafting (flake knives), or both (endscrapers, stylized flake knives). The technological process was expedient yet the design of the tools was still very much formal. In addition, Late Dorset people here still required tools that had design properties that could not always be achieved from expedient flake core tools.

The Late Dorset at the site also demonstrated curated strategies of technology. Bifaces are important for many reasons, and in the situation at this site, the few examples present show their utility as hunting implements and the need to have reliable, durable stone tools and weapon tips. The three examples from IgCx-11 are bifacially worked triangular endblades, stemmed bifacial points diagnostic only to the Late Dorset period

(Cox 1977, 1978; Fitzhugh 1976), and large bifaces that may have functioned as knife blades. For hunting seals and walrus, hunters would have required reliable and durable stone harpoon tips that could easily be transported to hunting locales and modified to fit into existing composite hafts if need be. The frequency of bifacial performs in H1 at the site likely illustrates that bifacial preform preparation was a way to anticipate needs and in effect gear-up for future situations (Binford 1979). While it cannot be said with certainty whether the stemmed bifaces were used as knives or as weapon tips, they would have also been well suited to a mobile or personal tool kit. This may also be said for large bifacial knives, which would have been hafted and likely maintained over time.

Another common curated technology in Late Dorset culture represented at this site was the groundstone soapstone industry. Soapstone for use as cooking pots and oil lamps was a vital part of Dorset technology (Maxwell 1984,1985). These items were also highly curated and would have had long use lives, as demonstrated through trade, durability and repair (Nagle 1984b). The fact that there is evidence of many stages of soapstone vessel manufacture suggests that raw material was in good supply.

Finally, it is important to recognize that there are very few microblades from this site. Microblades are produced from a specialized prepared core technology (Parry 1994) and the near abandonment of it speaks loudly about possible overall shifts in technological organization. While Ramah chert was used by Dorset knappers to make prepared microblade cores, the choice material for this technology throughout the Dorset period was quartz crystal (Nagle 1984b, 1986). Research elsewhere has also shown that there was a decrease in microblade use during the Late Dorset period (Cox 1976, Nagle

1984b, Thomson 1988). However, microblade frequency at IgCx-11 is so low that it seems as if the technology was being totally replaced by informal and formal flake tools, notably hafted flake knives. Whether or not this technological shift was related to reduced access to quartz crystal due to increased logistic mobility, a decline in regional population and intergroup exchange, or more social reasons such as a lack of skilled knappers cannot be determined. The technological shift away from microblades and burin-like tools indicate that an expedient flake core technology was a better design strategy for the people at the site. Whatever the reason, the loss of a microblade strategy is an interesting problem that demands additional research.

7.52 Artefact distribution

In order to more fully comprehend the significance of artefact design, it is important to recognize the connections between technological organization and the distribution of artefacts and manufacturing debris (Nelson 1991). Intra-site analysis of the patterns of material culture distributions can provide information on how different technological strategies influenced the locations and types of both tool manufacture and use. The clustering of various types of lithic remains can tell us about activity areas at the site and in turn allow for inferences on site function (Kooyman 2000).

In addition to the structural elements of the dwelling, the artefacts and debris distributions at IgCx-11 are consistent with its interpretation as a habitation site. The range of finished and broken tool types, reduction methods, stages of manufacture, and the variety of chert and soapstone debitage was indicative of a long period of use

(Kooyman 2000). Based on the remains of a substantial dwelling and the proximity to the polynya in addition to the artefact types, notably the soapstone, the preform cache, and large bifaces, there is good support to suggest a cold-season occupation. As well the quantities of flaking debris and the apparent dumping episodes of microdebitage helped point out activity areas within the occupation.

7.53 Technological strategies

This final section reviews the technological strategies of expediency and curation and how these were both used at the site. First of all, the situation was seemingly one where neither time, mobility, nor raw material availability or quality was of concern. These conditions allowed for expedient technological strategies, as reflected by the stockpiling of high quality raw material, low investment in tool retouch and material representing different stages of reduction. The artefacts and debris also confirmed that curated strategies were interwoven into the overall levels of technological organization and that formal tool design was important. There are likely always going to be times and situations were hunter-gatherers require tools and tool-kits that allow for transport and possess qualities of durability and maintainability not always found in expediently made tools. Based on the types of tools from this site, it is apparent that individuals engaged in higher mobility activities such as hunting desired curated items. Overall the artefact design/artefact and debitage distribution demonstrate that the technological strategies of curation and expediency are not mutually exclusive. Instead, these two technological options are alternatives that suit the requirements of different situations (Nelson 1991).

CHAPTER EIGHT

Data Recovery and Description at Tinutyarvik Cove-02 (IgCv-03)

8.1 Introduction

The Torngat Archaeology Project (TAP) first recorded Tinutyarvik Cove-02 in the late 1970's. Located on the south side of Nachvak Fjord about midway between Ivitak Cove and the mouth of the fjord (Figures 8.1 and 8.2), the site itself is situated on the eastern edge of a brook on a grassy bank near the river mouth. Based on a few collected artefacts and one radiocarbon date of 665+/-95 BP (Fitzhugh 1994), IgCv-03 was assigned to the Late Dorset Palaeoeskimo period. From an economic standpoint, the site location is ideal for Late Dorset peoples as there are inland travel routes to Ramah chert sources at Rowsell Harbour and Delabarre Bay and the resources in and around Adam's Lake, most notable of which are char and perhaps caribou. Geologists reported several pre-contact period sites containing Ramah chert scatters in this area during the 1980's. At least one such site contained evidence of what appeared to be some type of stone caribou corral system, but unfortunately no diagnostic tools were collected (Provincial Archaeology Office 2005). This evidence does however strengthen the argument that planned caribou hunting was at one time a viable strategy in this area. This valley pass would have also been a favourable route as opposed to trying to round the often times rough seas and heavy swells around Gulch Cape in small watercraft (Kaplan 1983). As well, the cove has been known historically to be a niche for harp and harbour seals, and the *sina* or ice-edge is also nearby (Brice-Bennett 1977).

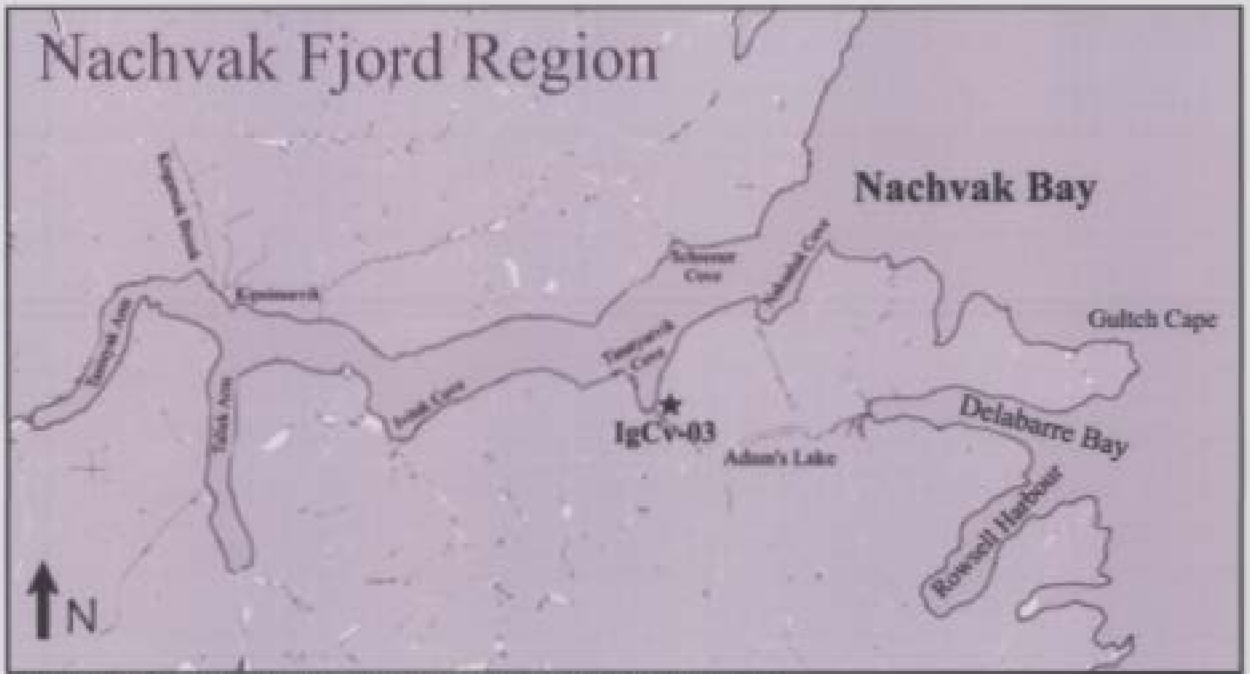

Figure 8.1: Map of Nachvak Fjord with *Tinutyarvik Cove-2* Site

Figure 8.2: Tinutyarvik Cove, Nachvak Fjord.

8.2 Salvage collections at IgCv-03

Using descriptions from TAP site record forms as a guide, it was possible to locate the site in question. The site appeared to be a habitation area as there are at least two rectangular dwelling depressions that are faintly visible from the surface. More interesting however was the eroding riverbank, a mere two-three metres in front of these depressions. Here, Late Dorset artefacts and debitage were spilling onto the rocks from the eroding sod bank (Figure 8.3).

Excavation efforts were concentrated on salvaging the large pieces of sod hanging over the riverbank. In total about an hour was spent slicing off the drooping sod bank flaps with trowels, turning them over, and collecting all of the lithic debris and artefacts. These sections of earth were literally filled with Ramah chert flakes. The soil matrix was rich, black and peaty. One charcoal sample of excellent quantity and quality was collected.

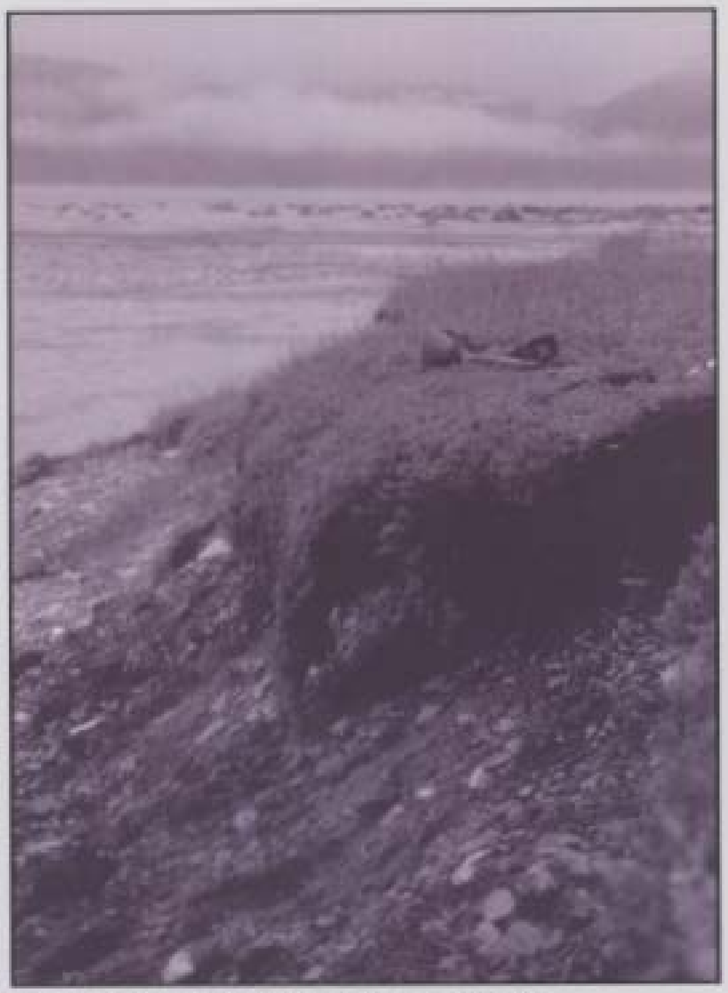

Figure 8.3: Eroding River Bank at IgCv-03.

8.3 Collection description

In total, 30 Late Dorset artefacts and 1209 Ramah chert flakes were collected during the brief reconnaissance at IgCv-03. The flakes, all of which were Ramah chert, demonstrated considerable range in size, from large early stage manufacture thinning flakes to bifacial reduction flakes to numerous small retouch flakes and shatter. With respect to the artefacts collected, not much can be said with regards to site function, however there are some noteworthy characteristics of this small assemblage (Table 8.1).

	Artefact n	Flake n	Flake Mass (g)	Avg. Flake Mass (g)	Shatter Mass (g)
IgCv-03	30	1209	2320.3	1.92	162.9

Table 8.1: Artefact and Debitage Totals For IgCv-03.

The most apparent feature about the artefact type frequencies (Table 8.2) is the proportion of retouched and utilized flakes and other similar informal tools such as the retouched core fragments. Together, these fifteen artefacts make up half of the tools recovered. The obvious trait about the scrapers in the collections is their substantial size. These specimens are quite long and would suggest that they were very early into their lifecycle when they were abandoned or discarded.

Artefact	Count	%
Retouched/Utilized Flakes	13	43
Scrapers	3	10
Preforms	3	10
Unifaces	3	10
Retouched Core Fragments	2	7
Expedient Scraper	1	3
Bifacial Core/Adze Preform	1	3
Biface	1	3
Microblade	1	3
Hammerstone	1	3
Ground Nephrite	1	3
TOTAL	30	-

Table 8.2: Artefact Counts and Frequencies at IgCv-03

Size also comes into the forefront when considering the large bifacial core/adze blank. While the function of this piece is not clear, it demonstrates that raw material availability was probably not an issue at the site. A single hammerstone is fairly small and it rests quite comfortably in the hand. A beautiful and peculiar piece of completely polished tabular nephrite has no particular style and its function is completely unknown.

The collection from Tinutyarvik Cove-02 offers an intriguing glimpse at what may have been a very prominent site for Late Dorset peoples in Nachvak Fjord. While the front of the site is gradually eroding, the possible dwelling feature does not appear threatened for the time being (Figure 8.4). I believe that the excavation of this site could offer a fascinating look into Late Dorset lifeways in a time period that is not well understood.

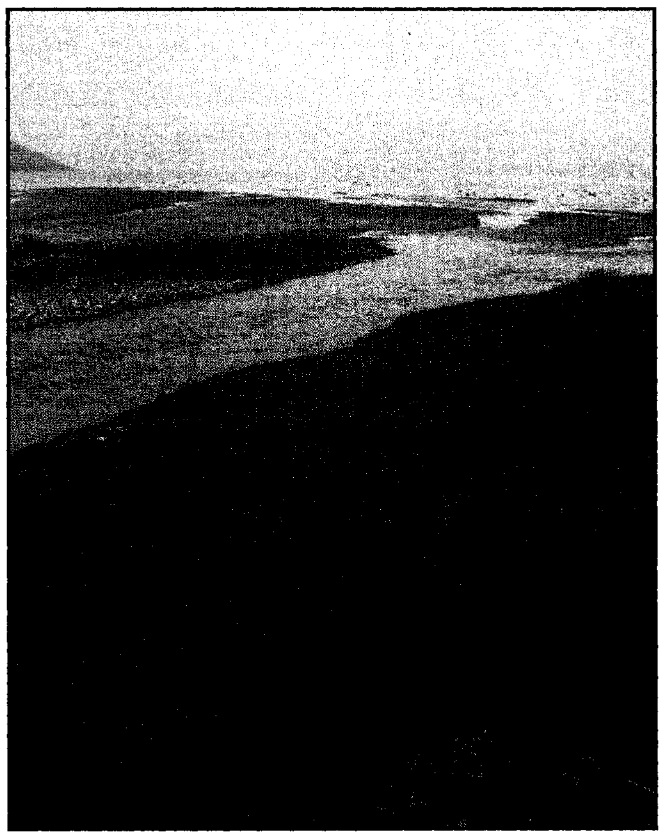

Figure 8.4: IgCv-03, View North With Depression.

CHAPTER NINE

Data Analysis and Interpretation at Tinutyarvik Cove-02 (IgCv-03)

9.1 Introduction

In this chapter, I examine the lithic assemblages from Tinutyarvik Cove-02 in order to answer some questions regarding technological strategies of the Late Dorset people who occupied the site. While only a small amount of material was collected, I will attempt to make some statements nonetheless. By incorporating data on raw material procurement, stone debitage and artefacts, with the theoretical and methodological examples, this chapter proposes possible artefact design strategies at the site.

9.2 Raw material analysis

As noted, Tinutyarvik Cove is located in close proximity to Ramah chert sources to the south at Rowsell Harbour and Delabarre Bay. It lies at the beginning of a valley that runs south to Adam's Lake and continues towards Ramah Bay. It is therefore no surprise that Ramah chert dominates the raw material collection from the site. In fact Ramah chert accounts for 100% of all the flaked stone artefacts and flaking debitage at the site. In the artefact assemblage, the only other stone materials recovered were a cobble hammerstone and an unidentified piece of polished nephrite.

9.3 Debitage analysis

With respect to the stone debitage at the site it was possible to combine my records (Figure 9.1) with data collected by the Torngat Archaeology Project (Figure 9.2) previously presented by Nagle (1984b). Based on the materials obtained at Tinutyarvik Cove-02, Table 9.1 demonstrates that wide ranges of manufacturing activities were taking place. As reported earlier, the collection was gathered in front of a shallow depression interpreted as a dwelling feature. I assumed that the material culture deposited here was displaced as a result of dumping episodes from either house sweeping and/or from direct knapping activities at this locale.

Flake Size	Flake #	# %	Flake Mass (g)	Mass %	Avg. Flake Mass (g)
1	619	*51*	167.4	*7*	0.27
2	243	*20*	272.2	*12*	1.12
3	311	*26*	1369.8	*59*	4.40
4	32	*3*	510.9	*22*	15.97
Total	**1205**	***100***	**2320.3**	***100***	**1.93**

Table 9.1: IgCv-03 Size Grade Data For Ramah Chert Flakes.

The large numbers of Size 1 and Size 2 flakes (plus 162.9 grams of chert shatter) demonstrate that late stage manufacture and retouch were common activities, as one would expect at any habitation site. Edge maintenance, the final shaping of tools and repair activities would produce such debris. An interesting statistic from Table 9.1 is the amounts of flakes and flake mass tied up in the Size 3 category. This, along with the presence of 32 Size 4 flakes clearly demonstrates that early reduction and early and middle stage manufacturing activities were important at the site. I believe that Ramah chert blocks and cores would have been in great supply at the site since people were located so close to the lithic source. Large cores were brought to the site and further reduced into smaller cores, blanks, performs and tools. As well many of the larger flakes

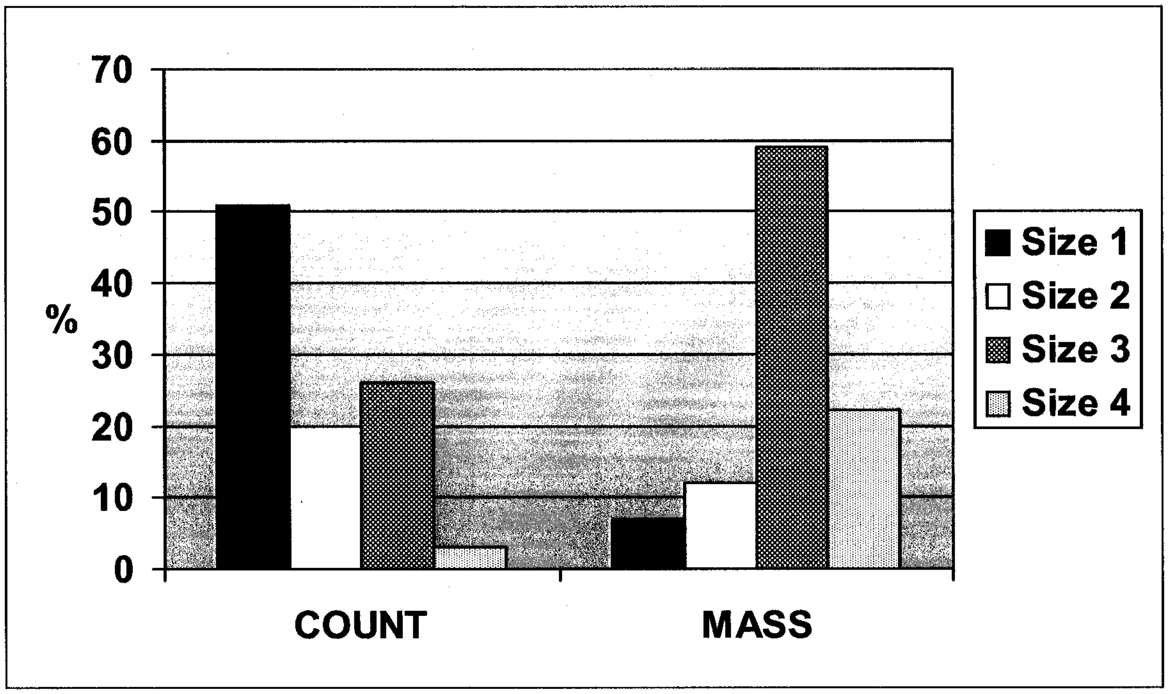

Figure 9.1: IgCv-03 Ramah Chert Flake Size Grade Frequency.

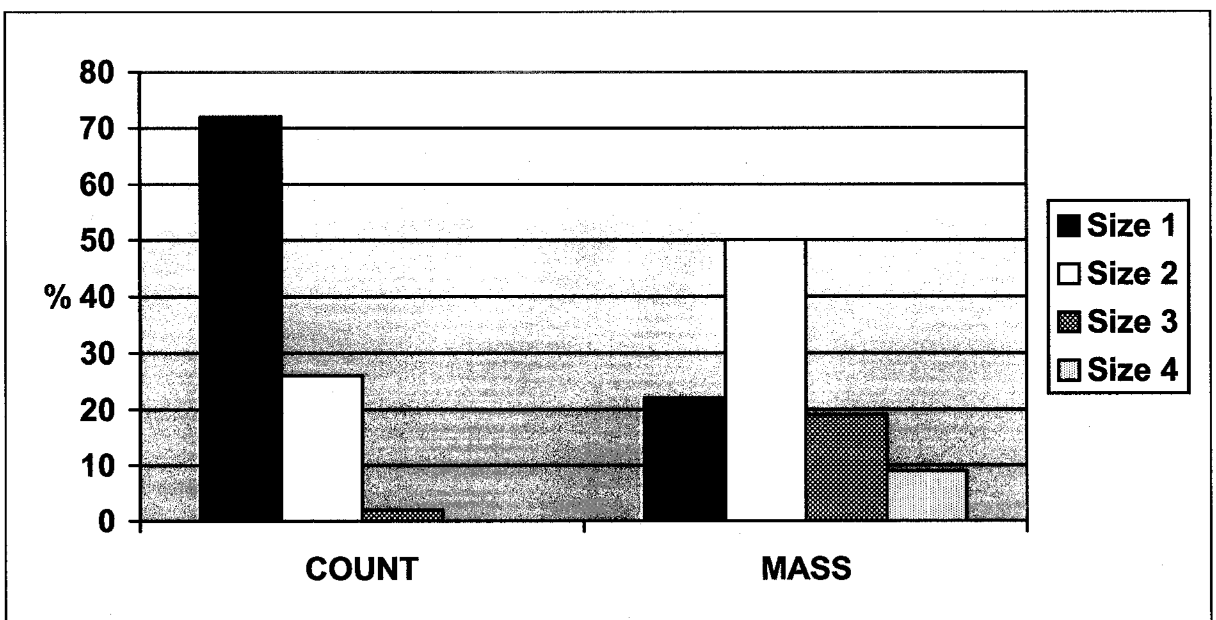

Figure 9.2: IgCv-03 (TAP Collection[1]) Ramah Chert Flake Size Grade Frequency.

[1] TAP data obtained from Nagle 1984b.

would have made excellent informal flake tools or could have served as blanks for manufacturing formal flake tools. As well, since the Late Dorset were mobile, this site would have been occupied for a particular time of year. Thus, the flake data may also reflect gearing up behavior (Binford 1979) in order to prepare for times when people were located at greater distances from the source and Ramah chert supplies were lower.

9.4 Artefact analysis

As in previous chapters, the artefact analysis is conducted in line with the proposed technological design classes. The 30 stone artefacts collected have each been designated into one of seven possible design classes or types. This information has been presented in Figure 9.3 in terms of frequencies.

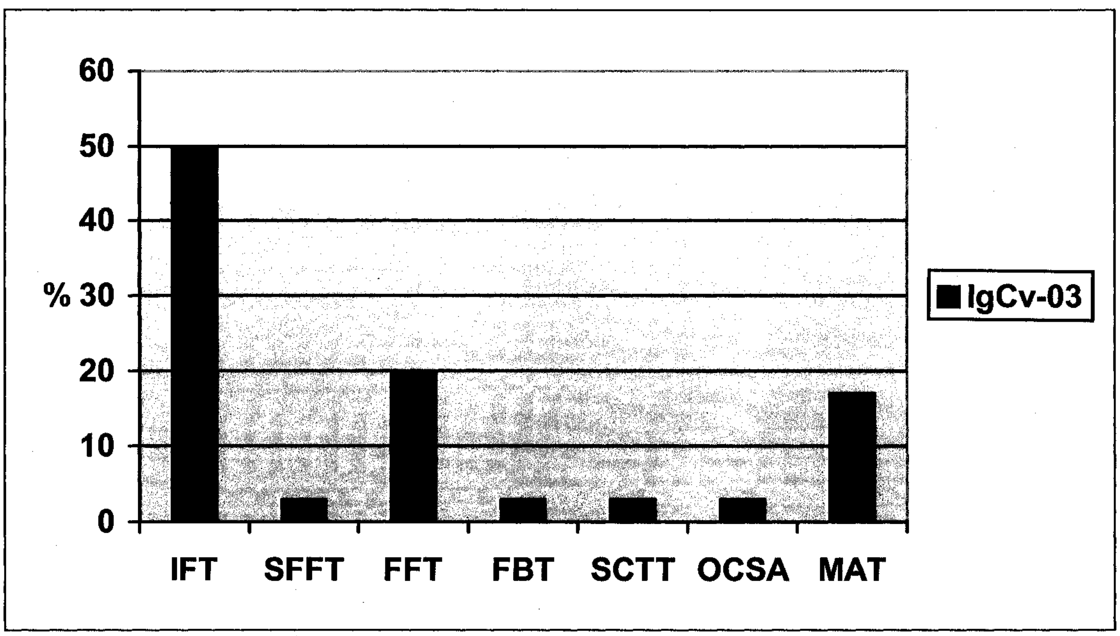

Figure 9.3: Tool Design Class Frequency for IgCv-03.

While there is not a great deal of interpretative value in an assemblage comprised of just 30 artefacts, the pattern does offer some clues about the technological strategies in place at the site. Informal flake tools (IFT) account for half of the collection. These types of tools are common in areas where lithic quality and quantity are high (Andrefsky Jr. 1991). The second most common design class type was formal flake tools (FFT). These tools, which are shaped tools made on flakes that often conform to some distinctive style or form, are expected to be popular at Palaeoeskimo sites as scrapers and unifacially worked endblades are common examples of Dorset material culture (Cox 1978; Fitzhugh 1976; Tuck 1976b). A hammerstone, core fragments and preforms account for the tools associated with manufacturing (MAT) and based on the site location and its proximity to the Ramah chert outcrops, it is not surprising that core reduction and preform preparation were occurring at the site. The single microblade in the specialized core technology tools category (SCTT) continues with the pattern observed at IgCx-11 and in Late Dorset times in general (Cox 1978), that the specialized technology of microblade production was not as important as in earlier Dorset periods.

9.5 Technological strategies at IgCv-03

The aim of this section is to comment on which strategy or combination of technological strategies Late Dorset people were employing at the site. This will include speculation about the level of curation, expediency, or opportunistic behavior.

With such a small assemblage it is difficult to say a lot about artefact design. However, based on the design class artefact structure it is apparent that informal tools were commonly employed. These types of artefacts are typical of an expedient strategy whereby little extra technological effort has been put into tool manufacture design. In fact this strategy makes sense at this site since it appears to be a habitation near a high quality and culturally preferred lithic source (Andrefsky Jr. 1991). Late Dorset people at the site would have been able to secure sufficient raw materials for such a strategy because of the longer occupation at the site and the consequent stockpiling of lithic material. In fact, raw material acquisition from this site may very well have been embedded with other subsistence activities (Binford 1979) thus further reducing time stress.

Staying with the idea of subsistence, it is likely that the function of IgCv-03 for Late Dorset people was to establish a residence for a particular period to take advantage of available resources. These would have likely been the harp seals that fill the cove in the fall migration and the potential caribou populations and char found near Adam's Lake a short distance to the south (Kaplan 1983). Although not largely represented in the assemblage, it is likely that people would have also practiced curated behavior with respect to their technological organization (Odell 1996b). In particular, in order to pursue seals and large game such as caribou, hunters would have required tools that were manufactured in advance and were reliable and strong (Bleed 1986).

Until more work is conducted at IgCv-03 not much more can be said about the technological strategies used there. With that being said I think this site is of high priority for future work. Not only is part of the site eroding away, but it has the potential to offer a unique look at Late Dorset lifeways in northern Labrador. It appears to be a residential site with what seems to be an undisturbed dwelling feature, and its proximity to Ramah chert outcrops and lucrative animal resources makes for some interesting investigations.

CHAPTER TEN

Summary, Discussion and Conclusions

10.1 Summary of archaeological data

The lithic data from the three sites indicate that a variety of technological strategies were in use among pre-contact period cultural groups in Nachvak Fjord. The analysis of stone artefacts and debitage from the Kogarsok Brook-1 site revealed that different inhabitants were treating a number of raw material types in different ways.

Early Labrador Archaic people at the site made use of both Ramah chert and Ramah Group quartzite, likely acquired during expeditions into this mountainous region. Flaking debitage varied from small retouch debris to large primary reduction flakes and core fragments. This demonstrates that various stages of reduction were occurring. Chipped stone tools consisted mainly of unmodified and slightly modified informal flake tools. A few groundstone artefacts in the assemblage do however show that formal, highly curated tools were actually used and abandoned at IgCx-8.

A substantial Pre-Dorset presence at this site is marked by the presence of two distinct types of Mugford Group cherts. With the exception of a single Rattler's Bight style stemmed point made on Kaumajet chert, only diagnostic Pre-Dorset artefacts are made from Mugford cherts. As well, the only other material type that was definitely used for Pre-Dorset artefacts is Ryan's quartz, with a couple of formal specimens. If Pre-Dorset people were utilizing Ramah chert at this site they must have been doing so for informal tool types not distinguishable on stylistic grounds. These people were using raw material sourced to quarry locations at some distance, and this is reflected in their technological strategies. Flaking debris analysis showed that not only did reduction activities involve tool retouch/maintenance, but also involved middle stage reduction such as bifacial trimming and shaping. The artefact analysis was in line with the debitage data and showed that a larger emphasis was placed on carrying small, finished bifacial tools to the site and that weapons were being retooled there (Keeley 1982).

Finally, Dorset lithic material at IgCx-8 showed a heavy reliance on Ramah chert for their flaked stone industry, supplemented by minor amounts of quartz crystal for a specialized microblade technology and even smaller quantities of exotic cherts for flaking. The Ramah chert debitage indicates that flaking activity was nearly entirely focused on retouching flake tools and possibly maintaining and retooling formal tools. The artefact analysis also showed that the bulk of the artefacts were informal flake tools while there were still fair amounts of formal flake tools and some bifacial artefacts.

At the Lower Terrace, the investigation of a Late Dorset habitation site yielded some interesting data on stone tool technology. The lithic analysis demonstrated the near exclusive use of Ramah chert for flaking stone and that soapstone was also a very important material at this site. The debitage research revealed that all stages of lithic reduction from core reduction to perform preparation and bifacial manufacture, to flake production and tool retouch were occurring. The examination of the lithic debris also illustrated that at least late stage soapstone vessel manufacture was also occurring at the site. Investigations into the artefact assemblage showed that while bifaces did have a place in Late Dorset material culture, it was the production, use, and discard of both informal and formal flake tools that dominated the flaked stone industry here. As well, unfinished soapstone vessel fragments and tools associated with soapstone manufacture confirm that vessel blanks were carried to the site and worked into complete forms.

While there was not a great amount of data collected at Tinutyarvik Cove-02, it was possible to deduce aspects of technological behaviour. Based on the proximity to outcrop locations and the Late Dorset affinity with it (Nagle 1984b), all flaked tools were made of Ramah chert. The flake data showed all stages of chert reduction, including primary and secondary reduction and retouch. Artefacts were mostly informal flake tools rounded out by formal flake tools and artefacts associated with manufacture. More work at this site would yield a range of Late Dorset material culture and provide an interesting look at a site where there were likely no concerns with raw material availability.

	Informal vs. Formal	**Reduction Strategies**	**Manufacturing Stages**	**Technological Strategies**
IgCx-8 Early Labrador Archaic	Informal & Formal	Block Core Groundstone	Early & Middle	Opportunistic & Curated
IgCx-8 Late Labrador Archaic	Formal	Bifacial	Late	Curated
IgCx-8 Pre-Dorset	Primarily Formal	Bifacial	Late	Curated
IgCx-8 Dorset	Informal & Formal	Block Core Bifacial Groundstone	Middle & Late	Expedient & Curated
IgCx-11 Late Dorset	Informal & Formal	Block Core Bifacial Groundstone	Early Middle Late	Expedient & Curated
IgCv-03 Late Dorset	Informal & Formal	Block Core Bifacial Groundstone	Early Middle Late	Expedient & Curated

Table 10.1: Summary of Results from IgCx-8, IgCx-11 and IgCv-03.

10.2 Addressing the research questions

As a means to illustrate the key points this thesis has made, it is useful to revisit the research questions proposed at the beginning. This will allow for a summary of the important issues emerging from the analysis and help demonstrate some of the complex connections between technological organization and pre-contact period lifeways.

What effects do environmental conditions have on the organization of technology for pre-contact period hunter-gatherers in Nachvak Fjord?

Environmental variables were significant in the technological organization of stone-tool using people in the Nachvak region. The most influential of these was the availability of raw material and its relative quality and abundance across time and space. Whether or not lithic quality was high or low, and whether lithic abundance was high or low, these basic realities influenced how technology progressed from procurement, manufacture, use, reuse and ultimately discard. As observed with the Labrador Archaic component at Kogarsok Brook where Ramah chert was in good supply and of high quality and abundant amounts of quartzite was of poor quality, informal tools dominated. In contrast, the high quality Mugford chert, which was scarce at such a distance from its source, was fashioned primarily into formal tool types such as small bifaces and burins.

Considering animal resources and their effect on technology, there is the more obvious connection that the type of hunting dictates weapon choice and processing technology. Seal hunters have to have a certain type of tool-kit as did caribou hunters. However, not all groups practicing the same types of activities were implementing the same technological strategies. This is one of the cultural constructs that make groups unique, and these differences have more to do with socio-economic variability than with environmental factors.

What effects do social and economic conditions have on the technological organization for pre-contact period hunter-gatherers in Nachvak Fjord?

Socio-economic conditions were very powerful variables guiding and being guided by technological organization (Odell et al. 1996). Social and economic strategies used by different groups and individuals were tangled up with technological decision-making. Nowhere else is this more evident than the connection between mobility and technology as each simultaneously dictated the needs of tools and access to raw material (Carr 1994b; Kelly 1992). Obtaining and using lithic materials was as much as part of their mobility organization as it was their technological organization strategies.

Mobility organization included locating, capturing, and processing available natural resources, where to establish camps and for how long, which parts of the social group to have participate in particular subsistence activities, and other group logistics (Binford 1980; Kelly 1983). It also included the types of technologies needed to fulfill the resource acquisition goals of the group. For the Labrador Archaic occupation here I have argued that the large informal chert and quartzite tools were opportunistically used for intense animal hide working activity and they appeared to have had good access to lithics. These mobile people may have traveled in search of caribou and unexplored places. They may have had larger carrying capacities and different transportation methods then other groups, which in turn influenced their technological strategy.

For the Pre-Dorset utilizing Mugford cherts, their access to raw material was restricted and both mobility and technology were affected. At such a distance from the source, trips by groups to acquire material must have been extensive or else raw material acquisition was caught up in an acquisition/exchange network at some point in the annual round. Whatever the case, these people were very mobile and they possessed a transportable toolkit. As highlighted in the analysis, the Pre-Dorset assemblage at Kogarsok Brook-1 contained small, reliable and portable stone tools and the flaking patterns indicated a lot of retouch and maintenance activity.

Finally, for Late Dorset groups establishing residential sites close to a high quality chert that could be gathered and stockpiled, they were able to acquire raw material in a way that was embedded in their mobility strategy. Groups did not have to make special trips to outcrops to quarry chert. Rather it is more likely that when bands were passing through areas or when special task groups were near these locations doing other things, they would also take raw materials as their needs and capacities would allow (Binford 1978). This behavior would permit stockpiling and caching stone in many different locations as a risk management strategy. At the habitation sites where there were no restrictions on time or raw material, we witnessed a collection of informal and formal flake tools that were expediently produced.

This discussion is not complete without addressing the curious relationship between social variables and technological organization. The most notable issues surrounding this connection are for instance raw material preference (e.g. the later Labrador Archaic and Ramah chert), exchange/interaction (e.g. Labrador Archaic and Pre-Dorset or Late Dorset and Point Revenge Indians), and art (e.g. Dorset soapstone carving industry at in northern Labrador). This research is able to comment of some of these issues and it also provides insights into other social issues such as gender, landscape, and style.

With respect to cultural affinities towards raw material use, the Palaeoeskimo components from the sites exemplify this behavior. In particular, the fact that Pre-Dorset groups seemingly chose not to utilize a stone that was of high quality and in high abundance, at a time and place when their supplies of Mugford cherts were getting low, is interesting. While it is possible that the reasons were more economic in nature (e.g. stone quality) it seems probable that lithics represented some form of social boundaries between cultures (Hood 2000; Loring 2002). Surely these social factors would have been complex, representing an array of cultural symbols.

While the extensive use and procurement of Ramah chert has been well documented for the late Labrador Archaic period (Loring 2002), the evidence at Nachvak presents a more complete look at raw material use over time. While the data for the later period is sparse, it demonstrates exclusive use of Ramah chert as expected for the period (Hood 1993; Loring 2002). The early component, which is extremely comparable to that of Site Q in Saglek (Tuck 1975), shows that both Ramah chert and quartzite were utilized. It appears as if the strong social connection and affinity for Ramah chert was not yet developed during this earlier period. This study concurs with ideas put forth by other researchers that Labrador Archaic procurement and use of Ramah chert changed over time in northern Labrador and beyond (Fitzhugh 1978; Hood 1993, 2000; Loring 2002; Tuck 1987). While the relationship between the Labrador Archaic and Ramah (both the stone and the place) is a curious one, future research at more northern sites should help elucidate some of the underlying social questions.

Finally, comments on the Late Dorset assemblage from at IgCx-11 are warranted. Since much of the collection in H1 came from the area around the lampstand, it is assumed that there may be a connection between these artefacts and women (LeMoine 2003; McGhee 1996). Many of the tools have been interpreted as being functional for cutting, slicing, scraping and other activities thought to have occurring around a hearth in a Dorset dwelling. With that being said, it is likely that women manufactured many of the semi-formal and formal flake tools. Since time or raw material constraints were not an issue, and the manufacture of these tools required a low investment, it is possible that this represents a female designed tool kit. This small aspect of technology may in fact be a clue into some greater changes in overall social organization within the society such as different gender roles and divisions of labour. To take this inquiry a step further, if Late Dorset groups were engaged in walrus hunting (Cox and Spiess 1980; Fitzhugh 1996; Maxwell 1985), that were once available at Nachvak (Brice-Bennett 1977) then it is possible that they were demonstrating a higher degree of social organization required for this type of group hunting (McGhee 1996).

What do the lithic assemblages from the sites tell us about variability and evolutionary change in the technological strategies selected by pre-contact period hunter-gatherers in Nachvak Fjord?

The lithic analysis has provided an interesting viewpoint on how different groups at different points in time used various technological organization strategies to accomplish both social and economic goals. Not only did the research demonstrate that groups used different technological strategies, it suggested reasons why such variability can occur. As well, this study illustrated that stone technology is a multidimensional aspect of hunter-gather society and culture, and is not simply stimulated by economic pressures. Rather, the factors that account for a group's technological organization are an array of strategies that consider environmental, economic, and social conditions.

For instance, the early Labrador Archaic data from Kogarsok Brook showed a technological strategy that was opportunistic in nature, taking advantage of supplies of both high and low quality raw material, and probably animal resources as well. Here they fashioned primarily informal flake tools, though elements of cultural artefact design are visible in the diagnostic stemmed flakes, transverse scrapers, flake points and ground stone tools. Unlike the later Rattler's Bight phase where research has shown an increase in biface production and affection for Ramah chert (Fitzhugh 1978; Hood 1993; Loring 2002), the evidence from this site provides a glimpse into the lives of these people during their initial forays into this unfamiliar and unique landscape.

Pre-Dorset groups implemented a very different technological strategy than other groups in this region. Largely related to the fact that they were using a chert sourced at some distance away, they compensated for a lack of quantity by adopting a more highly curated lithic industry. By making more formalized tools that were not only durable and maintainable, but were also smaller and more portable, they were able to reduce the risks of raw material availability, with strategies rooted in their technological organization (Bamforth 1986; Bleed 1986; Odell 1996b).

Finally for Dorset groups, the data from all three sites show how group technology varied from the perspective of both evolutionary time and seasonal variability. For example, the Middle Dorset material culture at IgCx-8 revealed a technology containing elements of expediency and curation by utilizing different stone reduction strategies. The production of informal flake tools, bifacially worked hunting implements, specialized microblades, and groundstone all formed part of the Dorset mobile toolkit at these types of specialized short-term sites. However, by the Late Dorset period we see shifts that are not seemingly a factor of site function, but also of changes in environmental variables, mobility and other socio-economic factors. While the habitation sites are going to have different assemblages than short-term camps, it appears that during this terminal period of Dorset culture, there is an overall decrease in residential mobility in the Nachvak region, and possibly lower population levels in Labrador and the eastern Arctic (Fitzhugh 1996; Maxwell 1985; Park 1993, 2000). The exclusive use of Ramah chert and lack of raw materials from other areas may demonstrate a lack of interaction and exchange with other social groups (Odess 1998). It is obvious that people were making use of the raw material available and they were doing so in a way that met their needs.

10.3 Conclusions

When assessed at the assemblage and artefact levels, explanations of variability can allow for inferences on site function and structure, and how those activities fit into the overall aspects of group mobility organization. When this level of analysis considers local environmental conditions and possible economic and social strategies, we can begin to better interpret the technological strategies carried out at the sites. With that being said variability between assemblages and artefacts is expected, not only between cultures but also within the same cultural group, as changing socio-economic needs require different technological responses. Each cultural population required stone-tool technology under a variety of environmental and socio-economic conditions. Thus, it makes sense that they would have demonstrated variability in tool production and use to effectively fulfill their technological needs. How these adaptive response mechanisms were manifested in material culture is what makes this level of inquiry interesting and informative.

In addition to variability at the artefact and assemblage levels, this research has demonstrated shifts in technological strategies over a vast time scale. This level of inference was possible by viewing variability in stone-tool procurement, manufacture, use, and discard by cultures over the course of hundreds and thousands of years. On the level of evolutionary change the artefact and assemblage variability has demonstrated long-term changes in Indian and Palaeoeskimo cultural succession, and is suggestive of how changing levels of technological organization may reflect differences in group mobility organization which in turn reflect variability in the physical environmental, economies, and culture.

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APPENDIX 1

IgCx-8 artefact photos

Pre-Dorset Lithics

Figure A1.1: Biface fragment with lateral tangs

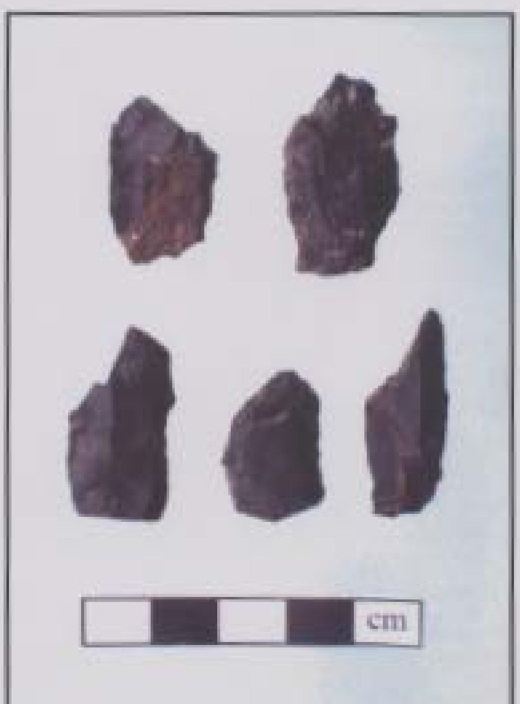

Figure A1.2: Selection of burins forms from Kogarsok Brook-1

Figure A1.3: Selection of lithic artefacts.

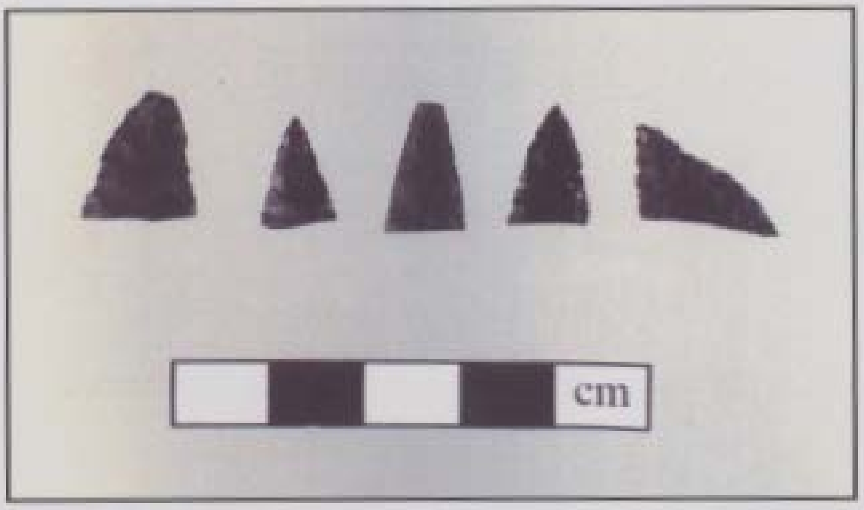

Figure A1.4: Kaumajet black chert bifacial points from Area B.

Labrador Archaic Lithics

Figure A1.5: *Rattler's Bight Phase* Labrador Archaic biface/biface fragments (complete stemmed point is on Kaumajet black chert while remaining biface fragments are Ramah chert examples of different froms from the same phase.

Figure A1.6: Labrador Archaic ground slate artefacts(*a: Unidentified polished blade-tool; b: axe; c: triangular point; d: serrated point; e: beveled celt.*)

Early Labrador Archaic Lithics from Area C

Figure A1.7: Ramah chert
Utilized/retouched care fragments.

FigureA1.8:Meta-quartzite
core fragment.

Figure A1.19: Quartzite
core fragment.

Figure A1.10: Ramah chert flake point.

Figure A1.11: Stemmed Ramah chert flake.

Figure A1.12: *Naksak style* Ramah chert biface preform.

Figure A1.13: Ramah chert side scraper with 2 concave working edges.

Figure A1.14: Ramah chert expedient scrapers, Area C.

Figure A1.15: Retouched and stemmed Ramah chert flake, Area C.

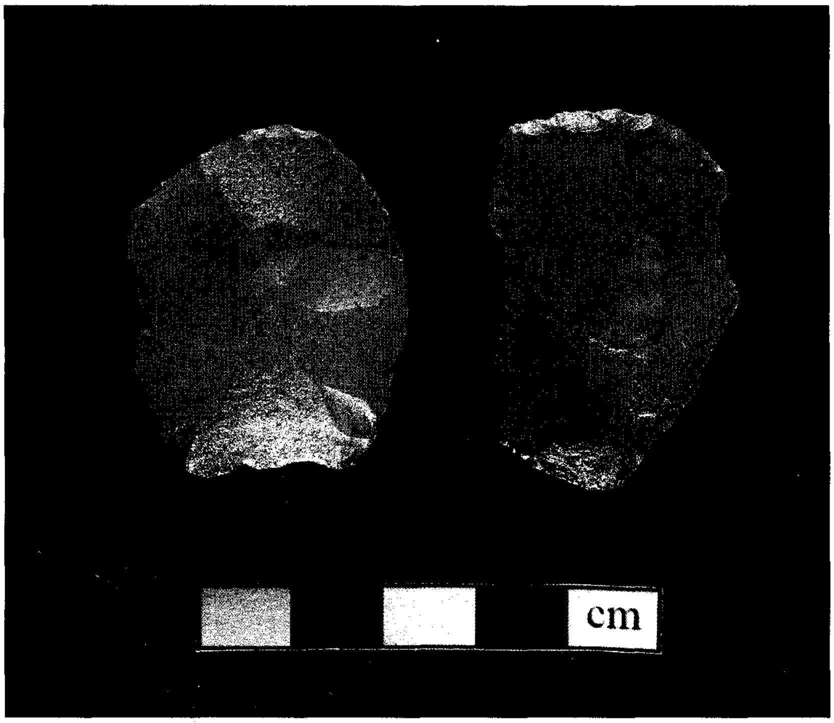

Figure A1. 16: Ramah chert scrapers endscrapers.

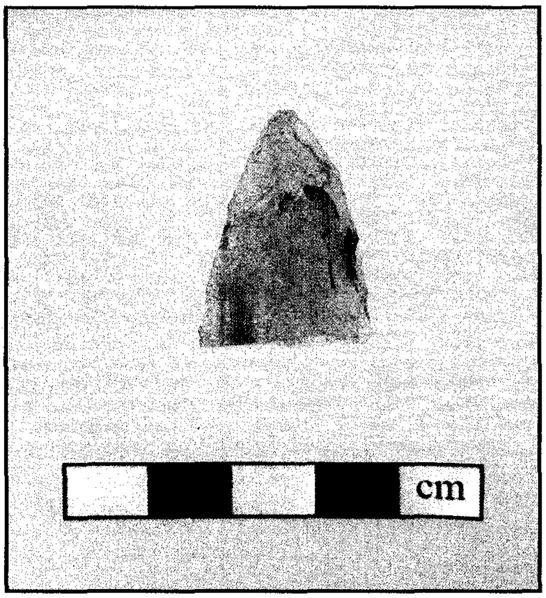

Figure A1.17: Tip-fluted Ramah chert point.

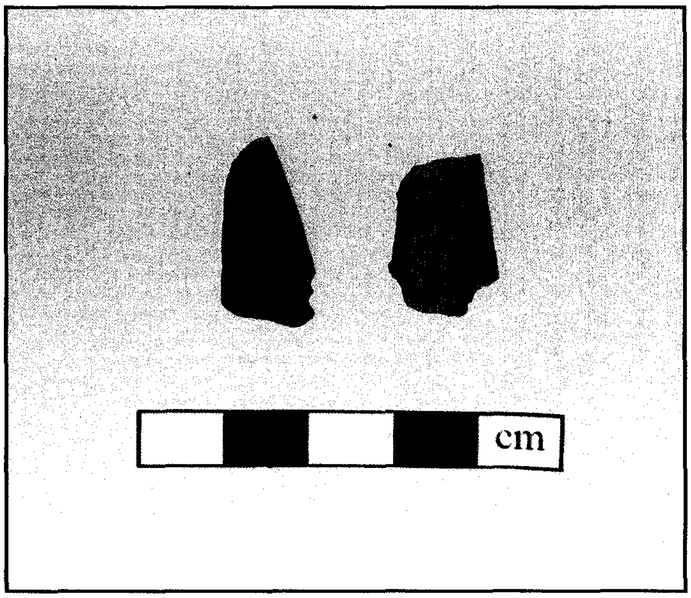

Figure A1.18: Ground nephrite, and slate burin-like tools.

APPENDIX 2

IgCx-11 artefact photos

Late Dorset Lithics

Figure A2.1: Late Dorset artefacts from IgCx-11 (clockwise from top-left, endscrapers, stylized flake knives, endblades/bifaces, soapstone vessel fragment, stemmed points).

Figure A2.2: Artefacts possible associated with the manufacture of soapstone (clockwise from top-left, diabase pecking stone, soapstone perform vessel fragment, unidentified groundstone tool, retouched flake tools).


Figure A2.3: Ramah chert bifaces from House 1.


Figure A2.4: Size-graded soapstone manufacturing debitage.

Figure A2.5: Ramah chert notched flake knife (ulu-like style).

Figure A2.6: Fire exposed Ramah Chert flake knife.

Figure A2.7: Notched and/or stemmed Ramah Chert flake knives from House 1.

Figure A2.8: Assorted flake knife forms.

Appendix 3

IgCv-03 Artifact Photos

Figure A3.1: Ramah chert bifacially worked core.

Figure A3.2: Ramah chert bifacial knife.

Figure A3.3: Ramah chert scrapers.

Figure A3.4: Unidentified polished nephrite artefact.

Appendix 4

Maps

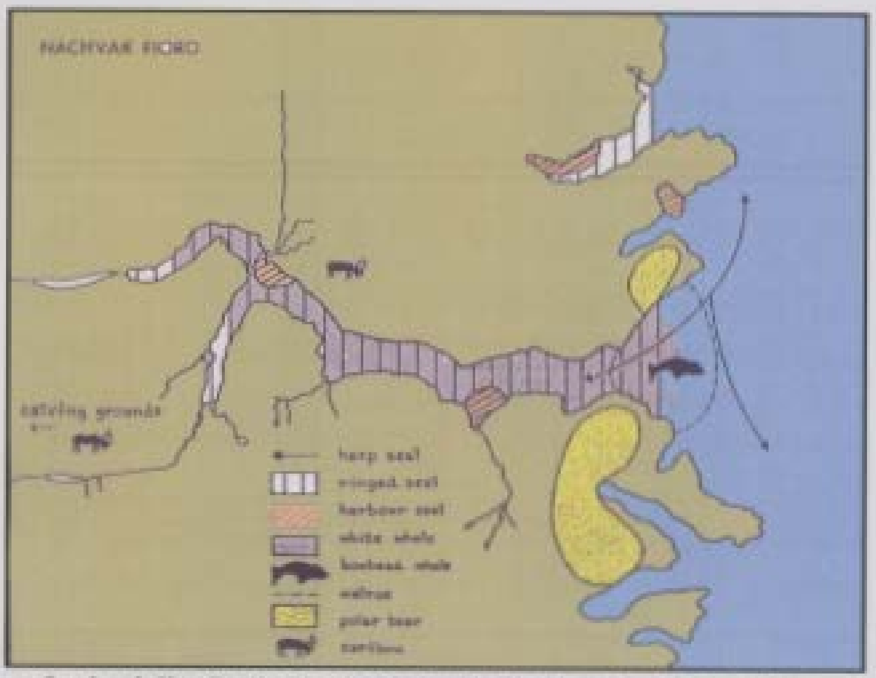

Figure A4.1: Map of animal distribution in the Nachvak Fjord region (adapted from Kaplan 1983).

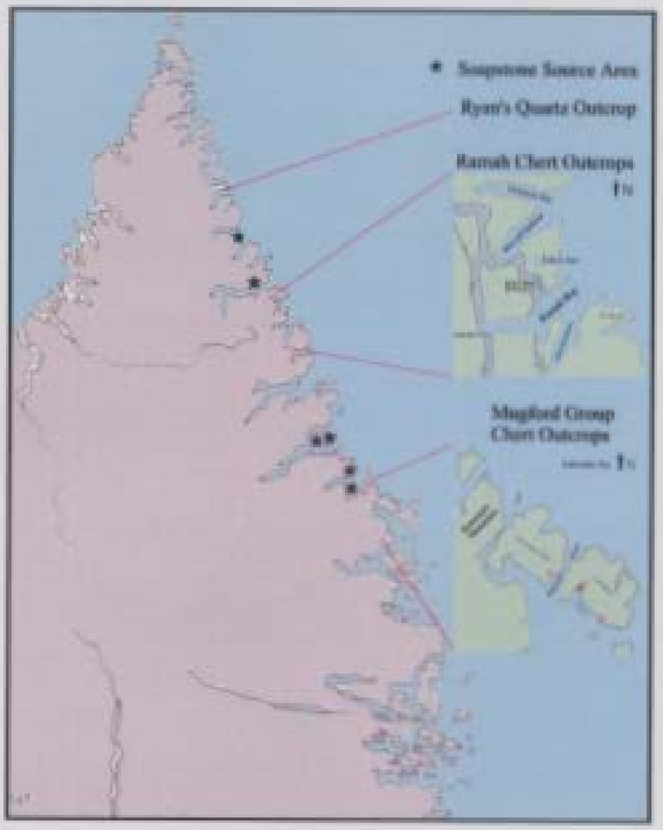

Figure A4.2: Lithic raw material source locations in northern Labrador.

Appendix 5

	Ramah Chert	Cod Island Chert	Kaumajet Black Chert	Ramah Group Quartzite
Colour	- white to greyish, blue-grey to charcoal grey to black, yellowish to greenish, translucent grey to translucent white. - clouds, specks and bands of black colour; - iron staining along fractures and some surfaces.	- white to cream to greyish, blue-grey to black, yellowish-green to green-grey to deep "sea green"; - iron staining on fractures - black inclusions.	-dense black; - fine joints filled with quartz are characteristic.	- milky white to grey to grey-black; - dark coloured inclusions; - distinctive white and grey elongated grains are visible.
Gross Crystalline Appearance	- like "sleet on a windshield" or "sugary" or "like caribou back fat"; - homogeneous; - microcrystalline, but quite coarse-grained.	- smooth, homogeneous and fine-grained; - microcrystalline.	- smooth, homogeneous and fine-grained; - microcrystalline.	- generally a course-grained rock, however some "meta-quartzite's" have compressed grains; - individual grains visible in fine-grained cement.
Lustre	- glassy lustre and slick appearance.	- dull and somewhat "waxy"	- dull and somewhat "waxy"	- generally dull, some individual crystals are glassy.
Opacity	- all colours are translucent in flakes (even in the black dark charcoal variety).	- all colours translucent in flakes.	- completely opaque	- translucent to opaque.
Fracture	- conchoidal; - massive pieces, 20 to 30 cm long are common with some fracturing.	Specifically: - conchoidal; Generally: - most samples are severely jointed and fractured.	- conchoidal	- subconchoidal; - massive unfractured pieces are common.
Other	- pyrite crystals up to 4mm are visible. - specimens may feel "slick" in the hand.		- feldspar grains are visible.	- pyrite crystals and feldspar grains are visible.

A5.1: Physical descriptions of common northern Labrador lithics (adapted from Gramly 1978 and Lazenby 1980).