INVESTIGATING PALAEO-ESKIMO AND INDIAN SETTLEMENT PATTERNS ALONG A SUBMERGING COAST AT BURGEO, NEWFOUNDLAND

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by

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ABSTRACT

This thesis is the result of two months of fieldwork done during the summer of 1997 along the submerging southwest coast of Newfoundland. In total, 39 archaeological sites were visited, tested, and recorded along the Burgeo coast from Connoire Bay to Bay de Loup. There is evidence for Maritime Archaic Indian, Groswater Palaeo-eskimo, Dorset Palaeo-eskimo, and Recent Indian occupation in the area. New surveys and private artifact collections supplemented previous research. This thesis considers the relationship of the sites with their environment and provides a new perspective on the precontact settlement patterns of the southwest coast.

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For Mom.

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CHAPTER 1 BACKGROUND AND OBJECTIVES

History of Research on the Southwest Coast of Newfoundland

In 1847 a Beothuk burial was found on Rencontre Island[1], one of the Burgeo Islands on the southwest coast of Newfoundland. The human remains and the grave goods were given to the Museum of McGill University and were reported by Rev. Dr. George Patterson to the Royal Society of Canada in 1891. In 1915 James P. Howley published illustrations of Maritime Archaic axes and adzes found on Morgan Island[2], a second Burgeo Island, but provided no further information on the site they came from (Howley 1915: plate XVI). For the next 64 years there were no new archaeological finds reported for the Burgeo area.

Between 1979 and 1981 Gerald Penney surveyed and excavated sites along the southwest coast (Penney 1985). He found nine sites (CjBj-1 to 9) in the Burgeo area and was able to document both a Palaeo-eskimo presence for the area and describe the precontact Beothuk culture, which he called the Little Passage complex (Penney 1985).

Throughout 1996 Ken Reynolds, working for Culture and Heritage, Department of Tourism, Culture and Recreation of the Province of Newfoundland and Labrador, was in contact with two Burgeo residents who had assisted Penney in the early 1980s: brothers Gus and William Melbourne. Reynolds received and catalogued dozens of artifacts from the Melbournes' collections. In August 1996 Reynolds visited Burgeo for a day and

[1] See CjBj-2 in Appendix II
[2] See CjBj-13 in Appendix II

recorded four new sites in the Big Barasway and four new sites on the Burgeo Islands. From this brief visit and conversations with Gus Melbourne it was clear that there were more sites that needed to be recorded. An interesting pattern in site placement was also emerging: the Recent Indian sites so far discovered clustered in the Big Barasway while the Palaeo-eskimo sites were more common on the islands.

Burgeo Coast Archaeological Research Project

To follow up on Reynolds' visit, I initiated the Burgeo Coast Archaeological Research Project (BCARP) with three goals in mind:

1) To work cooperatively with local collectors and to visit, sample, and record undocumented sites and survey for new sites between Connoire Bay and Bay de Loup. (Figure 1-1)
2) To photograph and catalog the private artifact collections of Burgeo residents.
3) To measure and document the environmental parameters of all precontact sites in the area in order to:
    a) determine if there are different patterns in site placement between the Maritime Archaic Indian, Groswater Palaeo-eskimo, Dorset Palaeo-eskimo, and Recent Indian sites.
    b) describe and interpret these patterns.

The first two goals were accomplished in the field between July 1st and August 26th, 1997. In total, 39 archaeological sites were visited and documented and five private

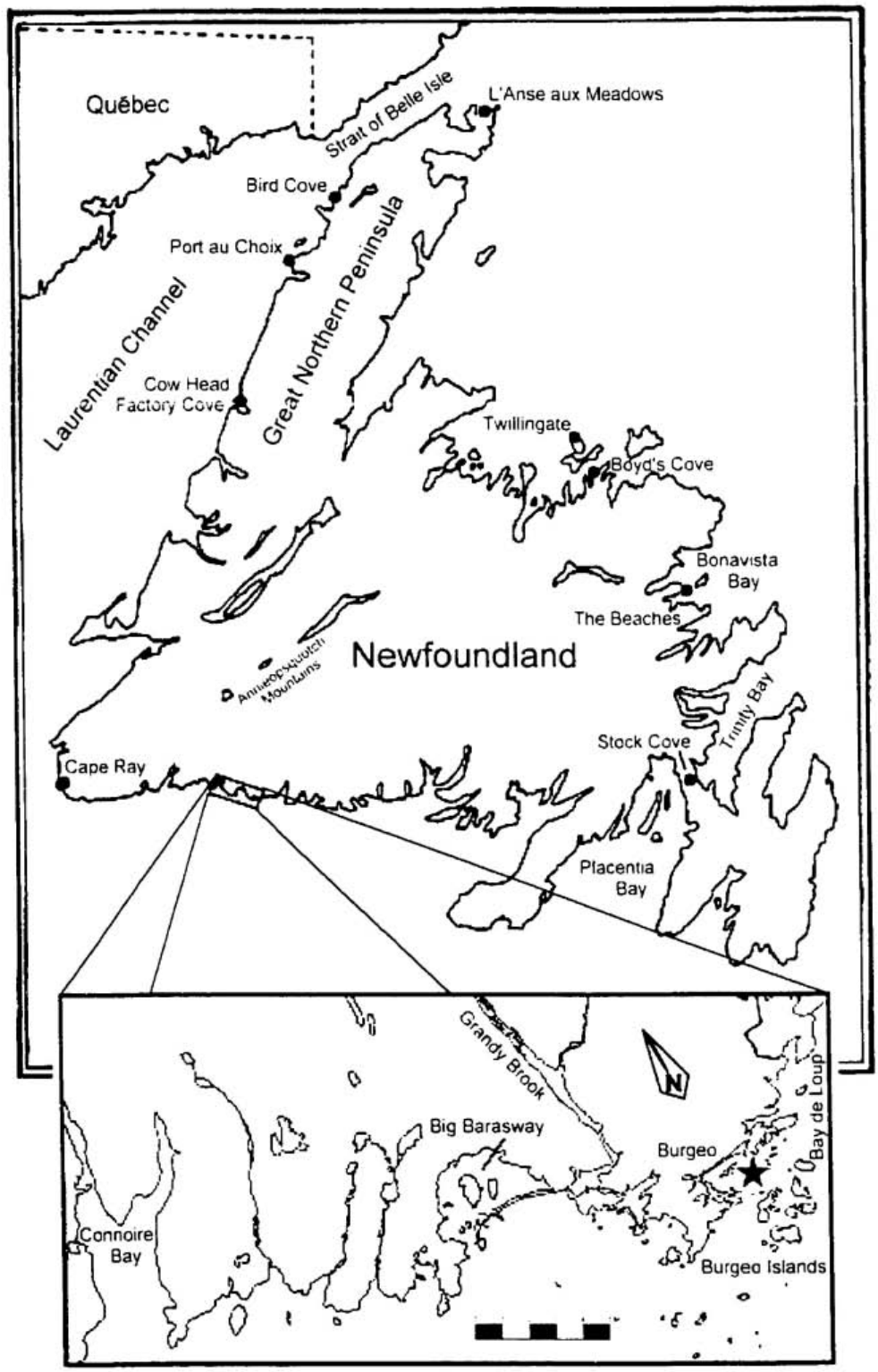

Figure 1-1 Map of Newfoundland showing study area and places mentioned in the text

collections were fully photographed and catalogued by myself and the BCARP crew: Gus Melbourne and Amanda Cossar. The results of this aspect of the project are presented in the appendix and a preliminary report (Rast 1998). The remainder of this thesis is dedicated to the third goal: discerning, describing, and interpreting patterns in site placement.

In Chapter 2, I establish the theoretical context of the research and discuss previous research in the Province regarding the placement of archaeological sites.

In Chapter 3, I establish the geographical and environmental context for all of the sites. This is important because the physical geography of Burgeo is unique along the southwest coast of Newfoundland and there are many biotic and abiotic factors which influenced the placement of sites.

In Chapter 4, I present the Burgeo sites and summarize the arguments for cultural affiliation based on the data reported in Appendix II.

In Chapter 5, I examine the environmental parameters of site location and address two thesis questions: 1) are there patterns in the distribution of Burgeo's precontact sites or are they arranged randomly across the landscape? and 2) if there are patterns in site placement what are they and do they differ between the Maritime Archaic Indians, Groswater Palaeo-eskimo, Dorset Palaeo-eskimo, and Recent Indian?

In Chapter 6, I offer my interpretation of the patterns and attempt to explain them with reference to other research in the province and the geography and resources of Burgeo.

CHAPTER 2 SETTLEMENT AND SUBSISTENCE MODELS IN NEWFOUNDLAND

Introduction

In this chapter I establish the theoretical context of this thesis, discuss previous research in the Province regarding the placement of archaeological sites, and introduce the four cultural groups under examination: the Maritime Archaic Indians, Groswater Palaeo-eskimo, Dorset Palaeo-eskimo, and Recent Indians.

I am examining the physical location of sites around Burgeo to determine if there are different patterns in site placement between the four cultural groups. Different patterns are expected because, as I will describe, the different groups had different strategies for making a living in Newfoundland's environments. Although their strategies differed, none of the precontact people living in Newfoundland were sedentary – they moved their residences throughout the year hunting and gathering for food and other resources.

A mobile lifestyle is a common solution adopted by hunter-gatherers who must deal with variability in the availability of resources (Lee and De Vore 1968, Kelly 1992). Food resources vary temporally, spatially, and in intensity (Halstead and O'Shea 1989:3). For example, harp seals around Newfoundland are available in great numbers only along certain coasts and only during their late winter and spring migrations. Other resources such as salmon, caribou and berries are available in different areas, in different abundances, and at different times of the year.

O'Shea and Halstead (1989:3-4) describe four cultural buffering mechanisms available to people to offset the risk and uncertainty of variability in the availability of resources: mobility, diversification, storage, and exchange (O'Shea and Halstead 1989:3-4). All these mechanisms are seen in the archaeological record in Newfoundland and will be discussed here, but because mobility has the most direct impact on the patterns of site location that I am addressing it will be the focus of this chapter.

Kelly (1992:45) identifies four levels of mobility: migration, territorial mobility, residential mobility, and logistical mobility. Migration is the permanent movement of people from one region to another (Kelly 1992:45). Territorial mobility deals with the total area used by people over several years because "the land required ... over the long term is much larger than the area used during a single year" (Kelly 1992:45). Residential mobility is the movement of people between living sites (Kelly 1983, Binford 1982). Logistical mobility is the small scale movement to and from a residential camp on forays to gather resources and/or information (Kelly 1983:298, Binford 1982).

Binford (1982) introduced the concepts of residential mobility and logistical mobility as two extremes on a mobility continuum. Because these two types of mobility are linked and together have the greatest impact on the patterns seen in the locations of Burgeo sites they will be discussed together throughout this chapter.

Each level of mobility influenced the placement of archaeological sites in Newfoundland and Labrador. Reconstructions of settlement and subsistence patterns at any scale in Newfoundland have been hampered by poor faunal preservation and, because of this, reconstructions of people's movements and subsistence have been inferred from

site locations and artifact assemblages (Fitzhugh 1972, Cox and Spiess 1980, Pastore 1986a, Schwarz 1994, Rowley-Conwy 1990, Renouf 1993, 1994, LeBlanc 1996, Stopp 1997). There is also a strong bias in favour of coastal sites because Newfoundland's population is concentrated on the coast and the interior is difficult to survey. Settlement and subsistence reconstructions will be discussed in terms of the four levels of mobility, beginning with migration and progressing down to residential and logistical mobility.

Migration

Eighteen thousand years ago Newfoundland was covered by ice. Between 13,000 and 8,000 years ago this ice was retreating and plants and animals were able to begin moving onto the island (Dyke and Prest 1987:237, Grant 1989). Around 5000 years ago people began migrating to the Island of Newfoundland.

Maritime Archaic Indian

The earliest humans to migrate to Newfoundland were the Maritime Archaic Indians, who came from the Labrador side of the Strait of Belle Isle (Figure 1-1) (Carignan 1975, McGhee and Tuck 1975). McGhee and Tuck found evidence for *in situ* development of the Maritime Archaic Indians in southern Labrador stretching back to approximately 9000 BP (McGhee and Tuck 1972). The early Maritime Archaic Indian projectile points appear to be derived from Paleo-Indian fluted points used by people elsewhere in northeastern North America, suggesting a southerly origin for the ancestors of the Maritime Archaic Indians (Renouf 1976).

The earliest reported radiocarbon date for the Maritime Archaic Indians in Newfoundland is 4900 +/- 230 BP and comes from The Beaches site (Carignan 1975). The Maritime Archaic Indians in Newfoundland are known primarily from burial sites at Port au Choix (Tuck 1976) and Twillingate (McLeod 1968) and lithic reduction sites (Tuck 1978, Carignan 1975). However, ongoing research at two Maritime Archaic Indian living sites at Port au Choix and Bird Cove on the Great Northern Peninsula (Figure 1-1) will help flesh out the day-to-day lives of the earliest Newfoundland residents (Reader 1998, Renouf and Bell 1998).

The most recent Maritime Archaic dates on the island are approximately 3200 BP from the Port au Choix and Twillingate burials and from the living site at Port au Choix (Tuck 1988, Renouf pers. comm. 1998). At this time the Maritime Archaic Indians disappear from the Island, although Indian sites continue to be found in Labrador.

Groswater Palaeo-eskimo

Following the disappearance of the Maritime Archaic Indians from Newfoundland the Groswater Palaeo-eskimo (2800 - 1900 BP) made their appearance on the Island. Unlike the Maritime Archaic Indians whose lineage can be traced to the south, the ancestors of the Groswater Palaeo-eskimo are found to the north in the Arctic.

The Early Palaeo-eskimo ancestors of the Groswater Palaeo-eskimo were sea mammal hunters who migrated from the Arctic into Northern Labrador by 3800 BP (Tuck 1988:100); however they did not extend south of Makkovik until after 3500 BP (Fitzhugh and Tuck 1985:163). Interaction with the Maritime Archaic Indian populations who were

already on the coast may account for this relatively slow advance to the south (Fitzhugh and Tuck 1985). Until 3000 BP the Early Palaeo-eskimo were concentrated in the Nain-Okak region of the Labrador coast (Fitzhugh and Tuck 1986:164).

Around 3000 BP the Groswater Palaeo-eskimo culture developed out of the Early Palaeo-eskimo culture and expanded into central Labrador (Fitzhugh and Tuck 1986:164) and by 2800 BP Groswater Palaeo-eskimos migrated to Newfoundland's Great Northern Peninsula (Tuck 1988:112). Although the Groswater Palaeo-eskimo culture developed *in situ* in Labrador, it is part of a much larger transitional period across the Eastern Arctic (Tuck 1988:112). From 2800 - 1900 BP, the Groswater Palaeo-eskimo culture, with its distinctive toolkit[1] made on colourful, high-quality cherts, is found throughout Newfoundland, Labrador, and the Quebec Lower North Shore (Renouf 1993:190, LeBlanc 1996:6).

Dorset Palaeo-eskimo

Following the Groswater Palaeo-eskimo occupation of Newfoundland, the related[2] Dorset Palaeo-eskimo culture dominates the archaeological record from 2000 to 900 BP (Renouf 1993:190). Unlike the physical movement of people migrating into Newfoundland previously, the Dorset Palaeo-eskimo appearance is more complex and controversial. Around 2500 BP a new culture, Early Dorset Palaeo-eskimo, began encroaching from the Arctic on the Groswater Palaeo-eskimo groups in Labrador (Tuck

[1] See Chapter 4

[2] The nature of this relationship is currently not agreed on nor understood

1988). Elsewhere in the eastern Arctic the Early Dorset Palaeo-eskimo gave rise to the Middle Dorset Palaeo-eskimo. Dorset Palaeo-eskimo appear to replace the Groswater Palaeo-eskimo on the Island of Newfoundland around 2000 years BP, but whether this is a physical movement of people into the Province and the extinction of the previous inhabitants or the diffusion of a new way of life to a healthy Groswater population is not known (Fitzhugh and Tuck 1986:164, Renouf 1990).

Recent Indian

In Newfoundland the term 'Recent Indian' refers to the historic Beothuk and their archaeologically known ancestors stretching back to 2000 BP. It appears as though the Maritime Archaic Indians abandoned Newfoundland after 3200 BP and contracted back into Labrador to become Intermediate Indians, while Palaeo-eskimo groups flourished in Newfoundland. Indians began trickling back onto the Island 2000 years BP and were well represented in Newfoundland by 1100 BP (Tuck 1988:158-160).

In Labrador there is evidence to suggest continuity from Maritime Archaic Indian to the historic Innu (Loring 1988, Tuck 1988); however, as there are no Maritime Archaic Indian sites present on the Island after 3200 BP the same argument cannot be presently made with regard to the Beothuk. There are no Indian sites on the Island during the span between the end of the Maritime Archaic Indian and the Recent Indian period; instead the Island was occupied by Palaeo-eskimo groups.

The earliest Recent Indian culture is the poorly understood Cow Head complex, which dates from 2000 - 1400 BP (Tuck 1988:163). The Cow Head complex has been

found at lithic reduction sites in Bonavista Bay and along the west coast of the Great Northern Peninsula from Cow Head to L'Anse aux Meadows (Tuck 1988:158). Following the Cow Head complex is the slightly better understood Beaches complex (ca. 1400 - 800 BP) which is found across the Island (Tuck 1988). The origins of the Beaches complex is vague and it may have evolved from the Cow Head complex, although there are similarities with the contemporaneous Point Revenge complex of Labrador (Tuck 1988:160). The Beaches complex is ancestral to the Little Passage complex (800 BP to European contact) which is the immediate precontact culture of the Beothuk (Penney 1984, Tuck 1988:162). The Recent Indian period in Newfoundland ended with the death of Shawnadithit in 1829, who was certainly one of the last, if not *the* last Beothuk (Howley 1915, Pastore 1992).

Migration - Conclusion

All of the precontact cultures in Newfoundland migrated to the Island from Labrador after 5000 BP. The Palaeo-eskimo groups have marine-adapted ancestors from the eastern Canadian Arctic, while the Indian groups can ultimately trace their ancestry to the south. These different cultural origins provide a historical context for the marine focus of the Palaeo-eskimo and the interior focus of the Recent Indians which will be discussed in the next section.

Regional Level - Territorial Mobility

The total area used by a hunter-gatherer group in one year is their annual range (Binford 1982) although the same people may use different annual ranges from one year to the next. The movement between ranges is called territorial mobility and the cumulative range used over many years is the long-term territory (Kelly 1992). This is a useful concept for archaeologists because we rarely see all the sites left behind during a single year and only those sites. Instead we see a palimpsest of sites left over many years by many individuals belonging to many annual ranges. The distribution of sites may provide insight into the size of the long-term territory, and patterns detected in the long-term territory may assist in deducing the annual ranges within that territory.

Maritime Archaic Indian

There has been work done on settlement and subsistence strategies for Maritime Archaic Indians in Labrador, but little is known about their strategies on the Island of Newfoundland (Fitzhugh 1948, 1985, Spiess 1993, Hood 1995). The Maritime Archaic Indian settlement and subsistence pattern in Labrador has been described as "Interior-Maritime" (Fitzhugh 1972:158). According to Fitzhugh this system "is typified by a winter interior caribou hunting economy with a summer adaptation to the coast." (Fitzhugh 1972:159). However, based on faunal collections, Spiess (1993) argues that caribou hunting was secondary and that the Maritime Archaic Indian diet was primarily focused on seal and walrus and supplemented by caribou and furbearers hunted and trapped in the near-shore woodlands (Spiess 1993:97).

Hood (1995:96) suggests that the Maritime Archaic Indians in Labrador had "considerable seasonal mobility". This is based on Fitzhugh's suggestion that they made seasonal movements which would take them not only from the coast to the interior but up and down the coast from central Labrador to northern Labrador (Fitzhugh 1985:50). The annual range would require a coastal area during the spring to fall for seal and walrus hunting, fishing, bird hunting, and caribou hunting (Spiess 1993), while the winter season would be spent on the interior hunting caribou and fishing at hypothesized camps in inner bays (Fitzhugh 1985:50). Most of this activity took place within the limits of the treeline in central Labrador although summer movements north of the treeline to collect Ramah Bay quartzite have been hypothesized by Fitzhugh (1984, 1985) based upon the presence of large longhouse sites in northern Labrador.

There are too few sites known on the Island to determine if these models are applicable to the Island of Newfoundland.

Groswater Palaeo-eskimo

Groswater Palaeo-eskimo settlement and subsistence has been described as "Modified-Maritime" for Hamilton Inlet (Fitzhugh 1972) and Factory Cove (Auger 1986:114) and as "Interior-Maritime" at the Postville Pentecostal site (Loring and Cox 1986) and for much of Newfoundland (Tuck 1988:100). The difference between these two systems is small. "Modified-Maritime" describes a people who are restricted to the coast and specialize in marine resources. An "Interior-Maritime" adaptation, as applied to the Groswater Palaeo-eskimo, suggests a coastal adaptation concentrating on bays and

inner islands, with winter sites located to exploit interior resources. Groswater Palaeo-eskimo sites in Newfoundland have been observed to cluster in inner bay and inner island locations (Tuck 1988:100).

Groswater Palaeo-eskimo settlement and subsistence studies in Newfoundland have focused on the west coast (Renouf 1993, LeBlanc 1996). The Groswater Palaeo-eskimo in the Gulf of St. Lawrence likely covered a large long-term territory, including the Quebec Lower North Shore, southern Labrador, and the west coast of Newfoundland from at least Factory Cove to Port au Choix (Figure 1-1) (LeBlanc 1996:121). LeBlanc speculates that "the Quebec/Labrador sites represent a fall occupation and the Newfoundland sites a spring/summer occupation of the same people" (LeBlanc 1996:121). If this is correct, it seems unlikely that the range of these people extended as far south and east as Burgeo and more likely that the Groswater Palaeo-eskimo on the southwest coast were part of a separate as yet undefined territory.

Dorset Palaeo-eskimo

The Dorset Palaeo-eskimo annual round has been described as 'outer-coast-oriented' in both Newfoundland (Schwarz 1990:169, Pastore 1986a:133) and Labrador (Stopp 1997:133). Pastore (1986a:127) suggests that the Dorset Palaeo-eskimo in Newfoundland possessed a "Modified-Maritime" subsistence settlement pattern. The Modified-Maritime system is "characterized by a coastal settlement pattern and year-round adaptation to marine fauna." (Fitzhugh 1972:161). Caribou hunting is carried out for clothing and food, but this is done in the coastal zone (Fitzhugh 1972: 162).

It appears that the Dorset Palaeo-eskimo were specialists – focused on harp seal hunting and likely possessed a more constrained territorial mobility, seasonally returning to a pivotal harp sealing site on the coast (Renouf 1993). The extent of the Dorset Palaeo-eskimo long-term territories is not known, although two territories may be suggested for the west coast – one focused on the harp sealing station at Port au Choix and one centered around Cape Ray (Fogt 1998:81-84). Harp seals are less predictable resources along the south and southeastern coasts (including Burgeo) and Dorset Palaeo-eskimo living in these regions may have participated in one or more long-term territories which did not have a large harp sealing site as their focal point, or else focused on other marine resources.

Robbins (1985) suggests three Dorset Palaeo-eskimo adaptations to Newfoundland: the western expression, northeastern expression, and southern expression[3]. The west coast Dorset Palaeo-eskimo were focused on harp seals as outlined by Renouf (1993). The northeastern Dorset Palaeo-eskimo were also harp seal-focused but harp herds are somewhat less predictable in this region and large residential sites like those at Port au Choix and Cape Ray were not established here. Instead Robbins (1985:140) suggests a "more mobile [harp seal] hunt". The southern Dorset Palaeo-eskimo were outside of the range of large harp seal herds and likely broadened their focus to include caribou, salmon, and harbour, hooded, and grey seals.

[3] I use the term "expression" here, in deference to Robbins (1985). Although it has yet to be formally argued, we may be discussing separate Dorset Palaeo-eskimo complexes. A complex refers to "a consistently recurring assemblage of artifacts or traits which may be indicative of a specific set of activities or a common cultural tradition" (Fladmark 1978:150).

The Dorset Palaeo-eskimo artifacts found at Burgeo appear closely related to "southern expression" artifacts found at Stock Cove in Trinity Bay (Figure 1-1) and other sites in Placentia Bay and Hermitage Bay (Robbins 1985, Penney 1985, Tuck pers. comm. 1998). The endblades, their manufacture techniques, and the materials used do not bear much resemblance to the artifacts found at Cape Ray, despite the closeness of the site (Fogt 1998).[4] The "southern expression" type site at Stock Cove, excavated by Robbins in the early 1980s probably serves as a better analog to the Burgeo sites than the west coast sites. Burgeo appears to be the western limit of a Dorset Palaeo-eskimo territory focused on caribou, salmon, hooded, harbour, harp, and grey seals which stretched from as far east as Placentia Bay and Trinity Bay.

Recent Indian

Recent Indian sites have been found across the entire island, both on the coast and in the interior. It has been suggested that the Recent Indian had a settlement and subsistence system similar to what Fitzhugh called "Modified-Interior" (Schwarz 1984, Pastore 1986a). Fitzhugh defined Modified-Interior as "a winter interior caribou hunting economy with a summer adaptation to the coast" (Fitzhugh 1971:159). Discussing Modified-Interior adaptations in Hamilton Inlet, he says:

> "Coastal activities appear to be the result of transference of interior adaptations from interior game to coastal resources. As such, the Modified-Interior type of adaptation involves seasonal use of a rich environment without

[4] Dorset Palaeo-eskimo toolkits will be discussed in Chapter 4

specialized techniques for utilizing its full range of resources." (Fitzhugh 1972:159)

Given the apparent importance of caribou to the Recent Indians, Rowley-Conwy (1990) considered the effects of fluctuations in the caribou populations on Recent Indian settlement and subsistence patterns. While episodes of caribou maxima and minima are not documented for the Island of Newfoundland, periodic "peak and crash" cycles are the norm for caribou herds elsewhere (Rowley-Conwy 1990:24). Holly (1998) examined the frequencies of interior versus coastal sites for Beothuk and other Recent Indian groups in northeastern Newfoundland and found that 70% of Beothuk sites were on the interior compared to only 30% for the previous Recent Indian groups. While Pastore (1989) argues that the expanding European presence on the coast likely helped push the Beothuk to the interior, Rowley-Conwy suggested that the territory and annual range documented for the historic Beothuk was a response to caribou maxima and that a different territory and annual range was used by the Little Passage people in response to a caribou minima. Citing ethnographic evidence from Alaska and Greenland, Rowley-Conwy argued that maintaining a fall-winter focus on caribou would be impossible during times of caribou population minima (ibid:24-25). He suggested that two settlement strategies were used by Recent Indians, depending on the state of caribou herds on the Island. During caribou population maxima, as was the case during the historic period, winter was spent inland exploiting the abundant caribou herds from base camps located along major rivers. However, during periods of caribou population minima when the resource was unpredictable, the best place for winter base camps, argues Rowley-Conwy, would be

much closer to the coast at a location where both interior and coastal resources could be monitored and a broad resource base could be exploited. The distribution of Little Passage sites, with few interior sites, may represent a response to an unpredictable caribou resource by shifting the winter base camp from the deep interior to the near-coastal zone.

The implication of Rowley-Conwy's argument is that the annual range used in years of caribou maxima was different from the annual range which would have been used during caribou minima. Together, these two types of ranges would encompass the long-term territory of the Recent Indians. The number of discrete long-term territories of this type that could be supported in Newfoundland is not known. The importance of Rowley-Conwy's model for this thesis is that the study area along the southwest coast from Bay de Loup to Connoire Bay (Figure 1-1) possesses all of the resources which Rowley-Conwy suggests were necessary for both the spring/summer component of a long-term territory (seals, birds, fish) and the fall/winter component (furbearers, caribou, seal, and shelter).

Territorial Mobility - Conclusion

Current models of settlement and subsistence suggest that there are different settlement and subsistence strategies for the four different cultures on the Island of Newfoundland. Maritime Archaic Indian settlement is poorly understood but it is likely that both coastal and interior sites were used. The Groswater Palaeo-eskimo and Dorset Palaeo-eskimo both focused on marine resources, but the Groswater Palaeo-eskimo

concentrated in the inner coastal zone while the Dorset Palaeo-eskimo concentrated on the outer coast. The Recent Indian who seasonally used the coast during the summer would make fall/winter camps in the interior. However, most settlement and subsistence research has focused on regions of the Province other than the southwest coast. The mobility decisions appropriate for western or northeastern Newfoundland may not be the same as those best suited to the southwest coast.

Local Level - Residential and Logistical Mobility

Residential mobility is the scale of mobility that examines movement of people between base camps within an annual range (Kelly 1983). The residential movement of hunter-gatherers is motivated by the seasonal availability of resources spread across the territory in which they live. Residential sites, or base camps, are placed at locations near food, fuel and water (Binford 1982:10). The decision to relocate the residence may be influenced by the depletion of optimal levels of resources in the current area and/or knowledge that a new, more desirable, or more productive resource is available elsewhere.

In contrast to residential mobility, "logistical mobility is the movement of individuals or small parties to and from a residential site on daily forays or extensive trips" (Kelly 1983:298).

Logistical forays may show up in the archaeological record as hunting blinds and caches or as more substantial sites with "the remains from exploitation and processing for transport, from consumption, and of creature comfort accommodations of the task group"

(Binford 1982:8). Groups with high residential mobility will tend to have low logistical mobility and vice-versa (Figure 2-1).

Mobility decisions are informed by individuals' knowledge of their surroundings and are influenced by the risk associated with each choice (Kelly 1983). Sites are placed strategically to exploit specific resources and to take advantage of desirable aspects of the landscape. Knowledge of the location of predictable resources is important in the placement of sites.

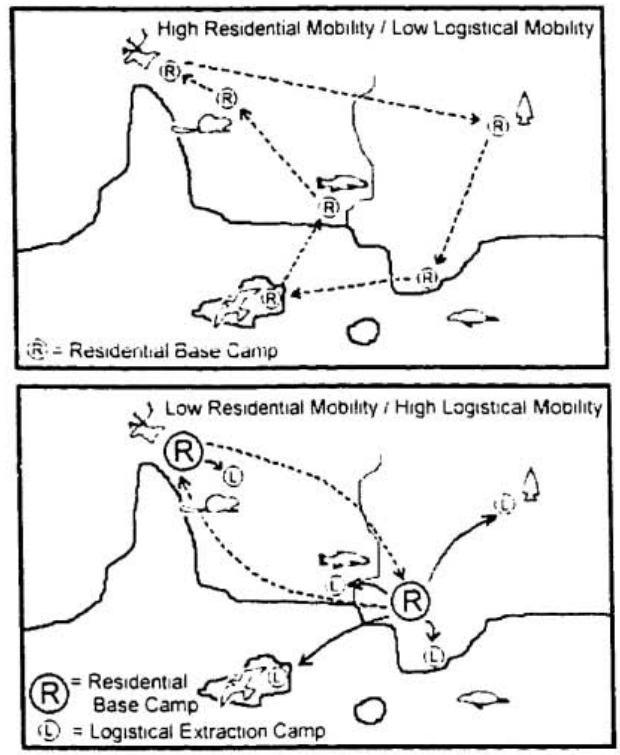

Figure 2-1 Two strategies for moving camps within an annual range. The upper diagram illustrates frequent movements between resources throughout the year. The bottom diagram illustrates how the same resources could be exploited by establishing two central base camps and making logistical trips to the resources.

The most predictable resources are stationary ones such as streams, plants, wood for fuel or dwellings, and shellfish. These are resources which have both predictable timing and location.

Other resources are less predictable. The location of caribou crossings, seal whelping grounds, or salmon runs may be known and reliable intercept points may exist, but the timing of these events is not always easy to predict. In situations where the location, but not the timing, of a resource is known it is necessary to continuously

monitor the location (Kelly 1983:300). Monitoring the unpredictable resources will take precedence over easy accessibility to predictable resources in making decisions about where to place a site (Kelly 1983:300). Residential sites will be placed in a location suitable for monitoring the unpredictable resources because the predictable resources do not need to be watched.

Alternatively the timing of some resources, but not their location may be known. In this situation, "the group must attempt to collect information on that resource through logistical mobility" (Kelly 1983:30). Fur-bearing mammals, non-migratory birds, and fish fall into this category. Most of these resources are found in the near-coastal interior, suggesting that high logistical mobility would be an appropriate solution for exploiting this zone.

Maritime Archaic Indian

The late Maritime Archaic Indians in Labrador appear to have set up large residential base-camps with communal longhouses from which they could exploit the surrounding resources through logistical mobility. Fitzhugh (1985) suggests that the longhouse sites in central and northern Labrador were occupied during the spring, summer, and fall. From these large residential sites they would launch logistical trips to collect Ramah Bay quartzite and hunt caribou, seal, and walrus (Fitzhugh 1985:50, Spiess 1993). The late Maritime Archaic Indian longhouses found in Labrador reached lengths of 50 to 80 m and a single house may have been home to between 50 and 100 people (Fitzhugh 1984).

Whether or not the Maritime Archaic Indians living on the Island of Newfoundland had similar settlement and subsistence strategies cannot be determined at this time.

Groswater Palaeo-eskimo

Groswater Palaeo-eskimos appear to have had high residential mobility throughout the year (similar to upper diagram, Figure 2-1). This is suggested by their small sites, generalized toolkit which could be adapted to a variety of resources and situations, and the absence of large communal base camps seen in the later Dorset period (Renouf 1993, LeBlanc 1996).

Increased residential mobility and a diversified resource base may be an adaptation to a cooler and less predictable climate (Renouf 1990). Renouf considered the effects of a fluctuating climate on the scale of decades and even years, where the resolution of palaeo-environmental records permitted (Renouf 1990). The Groswater Palaeo-eskimo period appears to have been a time of climate instability. There was a general trend towards cooling, but there was also evidence for rapid and unpredictable fluctuations in temperature and precipitation. As a result, the resource base could change dramatically between cold and warm years. It is precisely this sort of unpredictability which the Groswater Palaeo-eskimo were responding to. The Groswater Palaeo-eskimo period "is not one of cultural instability but is an adaptive shift in response to a period of environmental instability." (Renouf 1990:3)

Renouf suggests that this adaptive shift was to become 'generalists' (Renouf 1990). Groswater Palaeo-eskimos could not rely too heavily on one food source, but instead had to be able to exploit a diverse and unpredictable resource base. They needed to be flexible. They left small sites, apparently occupied for brief periods by small numbers of people. LeBlanc's (1996) detailed examination of Groswater lithic assemblages indicates a generalized marine focused toolkit with many small expedient tools that suggest a mobile generalist adaptation.

If Renouf and LeBlanc are correct, then logistical mobility played less of a role in the lives of the Groswater Palaeo-eskimo than either the Dorset Palaeo-eskimos or Recent Indians. The Groswater Palaeo-eskimos lacked the large base camps which were necessary staging areas from which to launch logistical forays (Renouf 1993). Instead they adopted a generalized subsistence strategy and relied more on small group size and high residential mobility than high logistical mobility. The Groswater Palaeo-eskimo residential sites served a similar purpose as the logistical extraction camps of the Dorset Palaeo-eskimos and Recent Indians, which will be discussed in the upcoming sections.

Dorset Palaeo-eskimo

The Dorset Palaeo-eskimos appear to have been less mobile than the Groswater Palaeo-eskimo in that they moved their residences fewer times throughout the year. At Port au Choix, the Dorset Palaeo-eskimos had a large 'central site, which in a sense acted as a pivot to the otherwise mobile annual round'(Renouf 1994:191). Pastore (1986a) suggested that this pattern is Island-wide. These large coastal residential sites tend to be

located at the best locations for exploiting seasonally available herds of harp seals (Pastore 1986a). Linnemae suggested that access to harp seal, salmon, and caribou influenced the placement of Dorset Palaeo-eskimo sites (Linnemae 1975:89).

Renouf contrasted the Groswater Palaeo-eskimo 'generalists' with the following Dorset Palaeo-eskimo harp seal 'specialists' (Renouf 1993, 1994). In response to a more stable climate the Dorset Palaeo-eskimo were able to narrow their use of marine resources and specialize on harp seals (Renouf 1993:207).

Dorset Palaeo-eskimos on the west coast and, perhaps, the south coast de-emphasized residential mobility. They moved less frequently than the earlier Groswater Palaeo-eskimos and established larger living sites, such as those at Port au Choix, Cape Ray, and Stock Cove which were occupied year after year by multiple families (Robbins 1985, Renouf 1993, Fogt 1998). Large sites such as these must have served as a foci for logistical forays to surrounding areas. The Dorset Palaeo-eskimo also had a variety of special purpose satellite camps (Renouf 1990). On the west coast the large residential sites are positioned to exploit harp seals, but logistical forays could have been directed to exploit small game, waterfowl and seabirds, capelin, or even caribou (Fogt 1998:82-83). The south coast site at Stock Cove provides access to both caribou and harbour seals. Robbins (1985) suggested that Stock Cove was unique along the south coast because the interior resources could be exploited from a coastal site where harbour seals could be hunted. I will try to show in this thesis that Burgeo also has caribou, salmon, hooded, harbour, harp and grey seals in close proximity and could have offered a similar blend of interior and coastal resources in one location.

Recent Indian

Based on the research of Schwarz (1994) and Rowley-Conwy (1990) it appears that the Recent Indians were less residentially mobile than the Groswater Palaeo-eskimos and may have been comparable to Dorset Palaeo-eskimos. Schwarz (1994) has suggested an even less residentially mobile pattern for the Recent Indian than the Dorset Palaeo-eskimos – at least during the winter.

Schwarz (1994) suggests that throughout most of the year the Recent Indians and Dorset Palaeo-eskimos of Newfoundland would have used similar resources at similar times. Both Palaeo-eskimo and Recent Indian groups would hunt harp seals in the spring on the 'outer coast', spend the summer exploiting a variety of resources in the inner coastal patch, and in the autumn trek to the interior to exploit caribou and "the relatively high resource diversity of the near-coastal interior" (Schwarz 1990, 1994:66-67). Schwarz suggests that the primary difference in the round was the placement and subsistence base of the winter camps (Schwarz 1994:66-67). The late winter is a resource-poor time of year for much of Newfoundland; most plants are unavailable, much of the Island is surrounded by sea ice, the caribou are at very high elevations, and the herds of harp seals have not yet returned to their breeding and whelping grounds. Based on the frequencies of Newfoundland site locations in the interior versus on the coast, Schwarz (1994:66-67) suggests that during the winter the Dorset Palaeo-eskimos moved to the outer coastal area where they subsisted off stored surplus and the harp seal herds, while the Recent Indian groups appear to have stayed inland, living off stored caribou meat and near-coastal resources (Schwarz 1994:66-67). In terms of residential mobility,

the Recent Indians chose to stay in the interior, while the Dorset Palaeo-eskimos chose to make another move. The elaborate storage techniques observed in use by the Beothuk indicate a people willing to spend energy creating and storing a surplus of food rather than spending the energy on another camp move (Rowley-Conwy 1990).

Even when the Recent Indians were along the coast the placement of their sites indicate a strong tie to the interior and its resources (Schwarz 1984). Schwarz notes that "With the exception of the Cape Cove Beach, Shamblers Cove and Upper Burgeo sites, the sites are uniformly situated in sheltered locations in what might be termed the 'inner coastal zone,' in narrow arms and runs, and on the landward side of islands."(Schwarz 1984:28). He further observes that "Within the inner coastal zone, preferred locations seem to be the mouths of major river systems, and the shores of bays and arms reaching deep into the interior." (Schwarz 1984:29). The sites, although located along the coast and apparently intended to provide access to marine resources are nevertheless situated along routes leading into the interior. Early historic sources such as John Cartwright's journal state that the Beothuk spent the summer on the coast and wintered on the interior living on caribou (Howley 1915:33-39).

As outlined in the section on Recent Indian long-term mobility, Rowley-Conwy suggested two annual ranges for the Recent Indian, depending on the state of the caribou herds (Rowley-Conwy 1990). During times of low caribou populations Recent Indians would have had higher logistical mobility than during times of high caribou populations. During caribou minima the Recent Indians would have had to winter in the near-coastal interior which was relatively resource rich, but which had resources with unpredictable

locations. Logistical trips were necessary to search for these resources in the near-coastal interior as well as to monitor the caribou farther inland and the non-migratory seals and other resources at the coast (Rowley-Conwy 1990:25-26). During caribou maxima the logistical mobility would have been reduced and winter residential sites could remain further inland with sufficient stored caribou meat to last the winter.

These patterns could be very different in Burgeo. Unlike most areas of the Island sea ice is absent from Burgeo and caribou, sea birds, and harbour, hooded, and harp seals frequent the coast during the winter. The relatively mild weather along the coast may actually be more desirable than the barren interior during the winter.

Residential and Logistical Mobility - Conclusion

Current archaeological information suggests that the Groswater Palaeo-eskimo had high residential mobility, while Dorset Palaeo-eskimo and Recent Indian moved between residential sites less frequently. Rowley-Conwy's arguments remind us that mobility patterns can change within each cultural period, as environmental conditions change. Similarly, Robbins' work suggests that the same culture may use different mobility strategies in different parts of the Island.

When the decision to exploit a new resource was made the Groswater Palaeo-eskimos moved to a new residential site at the new resource. In contrast, the Dorset Palaeo-eskimos and Recent Indians established residential 'base camps' from which a variety of resources could be monitored (Renouf 1993, Rowley-Conwy 1990). The Dorset Palaeo-eskimo base camps concentrated on either harp seals or caribou and

harbour seals while the Recent Indian concentrated on caribou. Again, these patterns were observed in regions of Newfoundland and Labrador other than the southwest coast, but they may assist in interpreting the patterns in site placement at Burgeo.

Discussion and Summary

This chapter has introduced the 5000 year long human history of Newfoundland and discussed the mobility strategies for the Maritime Archaic Indians, Groswater Palaeo-eskimo, Dorset Palaeo-eskimo, and Recent Indians. These patterns are summarized in Table 2-1.

In Labrador, the late Maritime Archaic Indians appear to have, at least seasonally, established large residential longhouse sites from which logistical forays were launched. They moved up and down the coast exploiting different faunal resources and the very important lithic source at Ramah Bay. Spiess (1993) suggests that caribou and trips to the interior played relatively small roles in the Maritime Archaic Indian subsistence base and instead suggests that seals, walrus, and possibly whales were primary resources. If this marine mammal focus is correct, then the implication for this study is that the Maritime Archaic Indian sites in Burgeo may be in similar locations as the maritime focused Palaeo-eskimo groups.

It is suggested that Groswater Palaeo-eskimos had high residential mobility and low logistical mobility. It appears that they covered wide territories and preferred to relocate their residential sites rather than set up large base camps from which to launch logistical forays. Therefore, in Burgeo their sites should be small, with little planning

Table 2-1 Suggested mobility strategies of precontact cultures of Newfoundland

	Maritime Archaic Indian	Groswater Palaeo-eskimo	Dorset Palaeo-eskimo	Recent Indian
Migration	from Strait of Belle Isle to Newfoundland	from Labrador to Newfoundland	diffusion of culture or migration from Labrador	from Labrador to Newfoundland
Territorial Mobility	up and down the Labrador coast, perhaps into the interior	probably large long-term territories, emphasis on inner coast	tied to coastal sealing stations, emphasis on outer coast	ranged from the deep interior to the coast
Residential Mobility	low	high	low	low
Logistical Mobility	high	low	high	high

apparent in location, because they are not meant to provide long-term habitation. These sites may be in locations which allowed a diverse and flexible resource base to be monitored. The Groswater Palaeo-eskimos were marine-oriented so access to the ocean may have been more important than access to interior resources, although they seem to have preferred inner bay and inner island locations over outer coastal islands.

In Newfoundland, in general, the Dorset Palaeo-eskimo were more likely to establish larger residential sites from which logistical forays were based. If this pattern is true for Burgeo, there may be more than one type of Dorset Palaeo-eskimo site found – larger residential sites and smaller logistical extraction sites. The larger sites may be expected in locations that are central to more than one resource, but still more marine-oriented than Recent Indian residential sites. The smaller logistical extraction camps may be found closer to individual resources, have a more limited array of artifacts and be in

settings less suitable for an extended stay. Most or all of these sites may be expected to cluster on outer coastal islands.

Recent Indian groups in Newfoundland tended to rely more strongly on interior resources than the Palaeo-eskimos, suggesting that in Burgeo, most of their sites should be found along the coast in areas providing good access to the interior, such as along streams, bays, and fjords. Their low level of residential mobility and high logistical mobility may produce a few large residential sites and larger numbers of smaller logistical foray camps. Residential sites may be expected to have good access to the interior, but the logistical foray camps may be found on islands or other areas to exploit specific marine resources.

Discussion

Newfoundland has a simple terrestrial environment and complex marine environment which have marked differences in the availability of resources. There are several migratory species which are available in great numbers for relatively brief periods of time each year (Tuck and Pastore 1986:74). Caribou, harp seals, and salmon are the three most important species and each is available during a different season[5]. However, different forms and combinations of mobility, diversification, storage, and exchange have allowed the various hunter-gatherers living on the Island to exploit these resources in different ways and intensities.

[5] The seasonal availability of these and other resources will be examined in greater detail in Chapter 3.

Models of settlement and subsistence have been developed for precontact groups in Newfoundland and Labrador (see Fitzhugh 1972, Tuck and Pastore 1985, Pastore 1986a, Schwarz 1994, Rowley-Conwy 1990, and Stopp 1997). The models proposed by Pastore (1986a), Rowley-Conwy (1990), and Schwarz (1994) suggest seasonal rounds for both the Recent Indians and Palaeo-eskimos based on the exploitation of two primary prey species – the caribou and the harp seal. Dependence on the harp seal was especially strong for the Palaeo-eskimos (see Renouf 1994, LeBlanc 1997, Fogt 1998). However, these models are based on research from the west coast where harp seals are abundant. The absence of winter sea ice on the southwest coast means that harp seals do not arrive in the Burgeo area in large herds. Instead the major resources were caribou, a mix of seal species, sea birds and salmon. It will be interesting to see if the settlement and subsistence models for precontact groups hold outside the range of the large harp seal herds.

CHAPTER 3 GEOGRAPHY AND RESOURCES OF BURGEO

Introduction

The archaeological sites discussed in this thesis are located along the southwest coast of Newfoundland, between Connoire Bay and Bay de Loup (ca. 30 km). Most sites are near Burgeo: either on the Burgeo Islands or in the Big Barasway which lies 8 km northwest of the town (Figure 1-1).

In this chapter I establish the geographical and environmental context for these sites. I discuss the physical environment of the southwest coast, including its geology, geomorphology, and relevant resources.

Geology

Newfoundland has four geologic zones which formed separately and coalesced during the Paleozoic (Figure 3-1). From west to east, they are the Humber zone, the Dunnage zone, the Gander zone, and the Avalon zone (Rogerson 1981:28).

During the Early Palaeozoic the Humber zone was part of the eastern shoreline and shelf of the North American continental

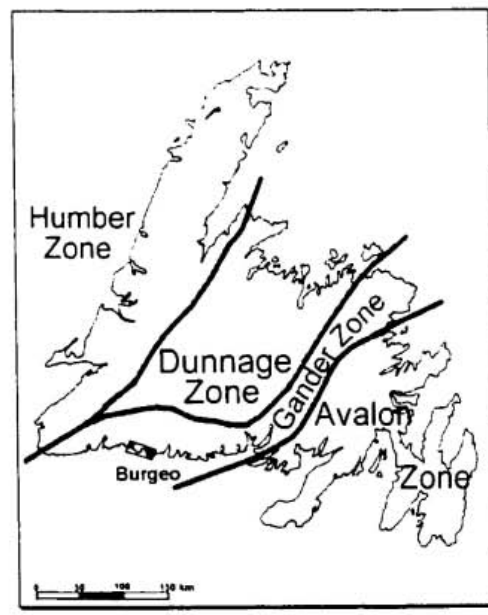

Figure 3-1 Tectonic Zones of Newfoundland (after Rogerson 1981)

plate (Rogerson 1981). The Avalon zone sat on the North African plate which was separated from North America by the Iapetus Ocean. During the Palaeozoic the Iapetus Ocean closed and the two plates collided. The Dunnage zone is the remnant of a volcanic island arc which formed as the two continental plates compressed together. The Gander zone is metamorphosed sediments and ocean crust which was pushed ahead of the Avalon zone as the two continental plates merged (Rogerson 1981:33).

Burgeo lies in the Gander zone. During the Silurian/Devonian the region of the Gander zone underlying Burgeo was intruded by granite plutons (Rogerson 1981:34, Map 90-01, Geologic Survey Branch). This granitic bedrock was subsequently covered by Mesozoic and early Cenozoic sediments but was scraped bare by glaciers during the Quaternary.

Glacial History - The Quaternary

The ice ages of the Quaternary Epoch (1.65 mya - present) carved deep fjords, exposed bedrock, deposited sediments and had profound effects on sea level along the southwest coast (Fulton and Prest 1987:181-182, Meltzer 1996:3-4 to 3-7).

During the Wisconsinan Glaciation (80 - 10 ka), northern North America was blanketed by the Laurentide Ice Sheet; however, Newfoundland lay beyond its southeast perimeter and was covered by its own independent ice caps (Fulton and Prest 1987).

The initial build up of Wisconsinan ice occurred between 80 an 65 ka and may have been more extensive than later build ups (Vincent and Prest 1987:200, Grant 1989). According to Grant, Laurentide ice lying over Labrador pushed south and east along two

arms, one which moved uniformly across New Brunswick and Nova Scotia onto the Scotian Shelf, and one which flowed through the Gulf of St. Lawrence and joined with ice from the Newfoundland ice cap (Grant 1989:426).

Following this initial build up of the ice sheets there was a period of ice retreat between 65 ka and 23 ka (Dredge and Thorleifson 1987:216). The most recent ice advance, the Last Glacial Maximum peaked at 18 ka, but began to retreat slowly until 13 ka, after which a rapid retreat between 13 and 8 ka occurred (Dyke and Prest 1987:237).

During the Last Glacial Maximum localized ice domes formed over Newfoundland, New Brunswick and Nova Scotia (Grant 1977). The ice that flowed over Burgeo originated in an ice cap that formed over the Annieopsquotch Mountains and flowed south and southwest to the coast (Taylor 1994).

Quaternary glaciers shaped Burgeo's geography by:

1) Carving a rugged fjord coast east of Burgeo with fjord plateaus between 150 and 450 m above sea level.
2) Stripping Mesozoic and early Cenozoic surficial sediments from the interior leaving exposed granite bedrock, with rôche moutonnées and basins which were eventually filled by bogs (Rogerson 1981:39, Batterson and Liverman 1995:32).
3) Depositing unconsolidated glacial material at an emerged ice-contact marine delta near the mouth of Grandy Brook (Meltzer 1996: 3-6 to 3-7). This sand and gravel has been shaped by wave action into coastal dunes, beaches, barriers and eroding bluffs along the low-lying coast west of Burgeo (Meltzer

1996: 3-4). One such barrier at the mouth of Grandy Brook creates the sheltered, sandy bottomed Big Barasway.

Relative Sea Level

During a glacial period, massive amounts of water are removed from the oceans' basins and stored on the continental crust as ice. When the ice melts this pattern is reversed. The removal or addition of water from the oceans' basins creates a change in sea level called *eustasy*. The shifting weight of water and ice deforms the crust and underlying mantle, causing the earth to sink or rise relative to sea level, which is called *isostasy*.

Eustasy and isostasy act simultaneously to produce a relative sea level (RSL) change (Quinlan and Beaumont 1981:1154). It is rarely possible to separate an observed change in RSL into its eustatic and isostatic components (Quinlan and Beaumont 1981:1154). The change in RSL can be illustrated as a curve and constructed by dating markers with known relationships to past sea levels. Figure 3-2 depicts Burgeo's preliminary relative sea level curve. It shows an initial

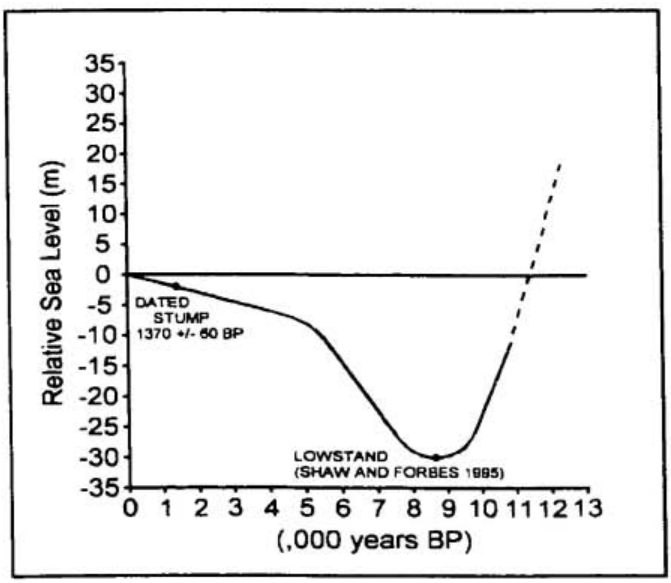

Figure 3-2 Preliminary relative sea level curve for Burgeo

period of emergence until 8650 BP (Shaw and Forbes 1996:1316), followed by continuing submergence to the present sea level. Before discussing the specifics of this curve, some general points on relative sea level curves are made in the next section.

Interpreting Relative Sea Level Curves

Isostatic changes in relative sea level in Newfoundland are dominated by the effects of a collapsing bulge of viscous mantle which formed around the periphery of the Laurentide Ice Sheet. This forebulge is composed of mantle displaced by the weight of the ice sheet (Quinlan and Beaumont 1981:1148). Now that the ice sheet has melted and its weight has been removed the forebulge is slowly collapsing and migrating towards the center of the former ice mass (Clark et al. 1978:269). As the crest of the migrating forebulge approaches a point of land the point will rise relative to sea level and as the crest moves away, the point will subside (Quinlan and Beaumont 1981)(see Figure 3-3).

Quinlan and Beaumont (1981) outlined four types of RSL curves which could be expected in a region where sea level was dominated by glacio-isostatic leveling of a peripheral forebulge. They labeled these types A through D (Figure 3-3).

Sea level curves of type A show continual emergence because the crest of the forebulge continues to approach these points (Quinlan and Beaumont 1981:1156). Type B curves have an initial period of substantial emergence as the crest approaches, followed by lesser submergence as the crest passes (Quinlan and Beaumont 1981:1156). Type C curves also have a period of emergence followed by submergence; however, the amount of submergence is greater than the amount of emergence so all signs of emergence are

below present sea level (Quinlan and Beaumont 1981:1157). Type D curves come from areas on the seaward side of the bulge and exhibit only submergence as the crest migrates away (Quinlan and Beaumont 1981:1148).

Burgeo has a type B curve. This means that the coast has been submerging since at least 8650 BP (Shaw and Forbes 1995:1316), erasing coastal archaeological sites and altering the coastal geography as the land isostatically subsides.

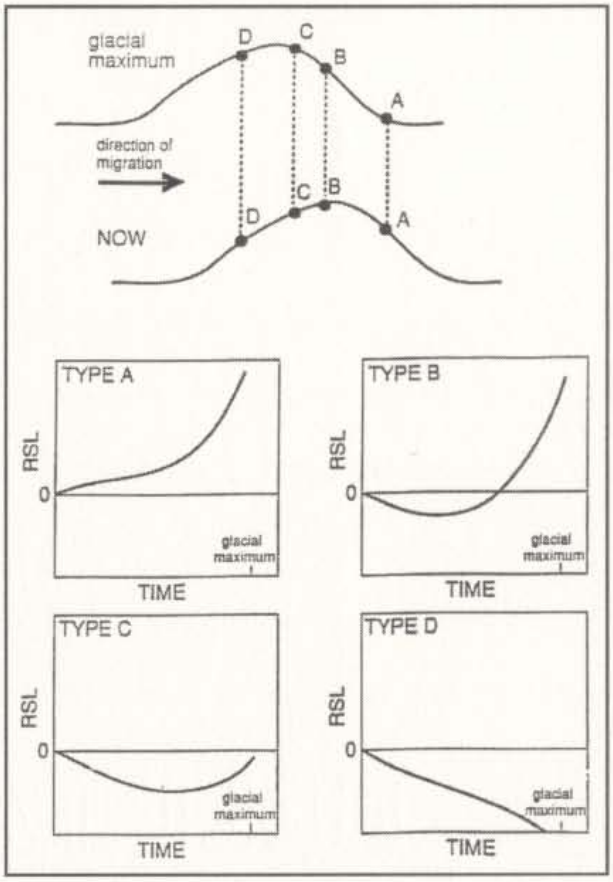

Figure 3-3 Characteristic relative sea level curves for an area on the forebulge (from Liverman 1994)

Local RSL in Burgeo

The rate of submergence has not been constant since 8650 BP because of changes in the isostatic and eustatic rates of change. Isostatic change has decreased because the amplitude of the forebulge has reduced as it collapses. Before 5000 BP water was being added to the oceans' basins from glacial meltwater and sea level was rising. Eustatic sea level change diminished after 5000 BP when the glaciers finally stopped melting and adding water to the oceans (Fairbanks 1989).

The relative sea level curve illustrated in Figure 3-2 is based on the sea level lowstand for the area established by Shaw and Forbes (1995) and refined by a new radiocarbon date on a submerged tree stump[1] collected by David Liverman and Trevor Bell, from Morgan Island (1370 +/- 60 BP, WAT 92613). Shaw and Forbes (1995:1316) determined that the relative sea level lowstand for the Burgeo area was approximately 30 m below present sea level and that it predated 8650 BP. The relative sea level lowstand was the point when the crest of the forebulge passed and the land began submerging.

The radiocarbon-dated stump is a useful benchmark for determining the rate of sea level change since 1370 BP. The root was one of several stumps found firmly *in situ* in a layer of peat buried below a 10 - 20 cm thick layer of sand, gravel, and cobbles in the active beach. The root was pulled from below the waterline during low tide and would have been submerged by approximately 2 meters of water during high tide. When the tree was alive around 1370 years ago it must have been growing above its contemporaneous high tide mark indicating the relative sea level has risen at least 2 m. Assuming a constant rate of change since 1370 BP, the relative sea level must have risen at a rate of at least 15 cm per century.

To summarize: following deglaciation the land emerged at an undetermined rate until it was 30 m above present sea level at 8650 BP. At that time the crest of the forebulge passed Burgeo and the land began submerging quickly, perhaps as much as 60 - 70 cm/century, because the crust began subsiding and glacial meltwater was still being added to the ocean basins. Around 5000 BP the ice sheets had stopped melting and water

[1] Probably *Picea sp.*

was no longer being added to the ocean basis, which slowed submergence down to average 15 cm/century in the last 1400 years BP. However, this rate appears to have fluctuated, perhaps from as low as 5 cm/century to 40 cm/century (Shaw pers. comm. 1998). Presently the southwest coast is experiencing rapid submergence on the order of 25-30 cm/century (Shaw pers. comm. 1998, Meltzer 1996:3-4).

The Coastal Environment

The rising relative sea level impacted different sections of the study area in different ways. The shallow sandy coast west of Burgeo has undergone dramatic changes while the steep-sided islands and fjords to the east experienced minor changes.

The Big Barasway

The Big Barasway is a shallow sandy-bottomed lagoon which up until the 1920s served as the outlet for Grandy Brook. The lagoon lies behind a barrier beach which is anchored on its eastern end to the mainland and to a series of rocky bedrock islets on its west end. Until the 1920s the east end of the barrier was attached south of the outlet for Grandy Brook; however, a storm repositioned the bar to the north of Grandy Brook, cutting it off from the Big Barasway.

The source of the material in the barrier comes from the glacial sediments deposited at the mouth of Grandy Brook (Meltzer 1996: 3-6 to 3-7). The barrier likely originated in the mid-Holocene, although it was probably anchored to Mile Rocks, a bedrock shoal which is now several kilometers south of the barrier (Shaw pers. comm. 1998). As sea level rose in the area the old anchor point was abandoned and the barrier

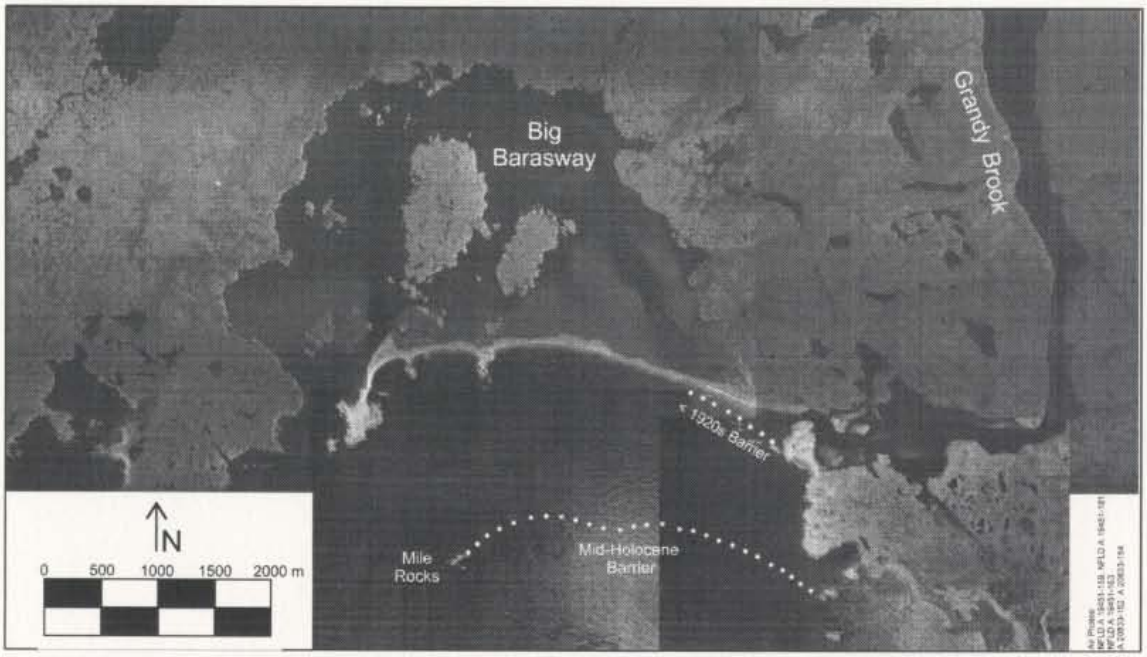

Figure 3-4 Evolution of the Big Barasway

moved landward towards its present location. The barrier is continuing to move landward and will eventually switch anchor points to one of the islands inside the Big Barasway (Shaw pers. comm. 1998). The Big Barasway, in one form or another, appears to have existed throughout the span of human habitation in the area.

The Burgeo Islands

The Burgeo Islands are irregular outcrops of granite bedrock, intersected by salt water channels. Their coastlines tend to be steep and rocky although they are dotted with small sand, gravel, and cobble beaches. Burgeo is situated on the largest of these islands, Grandy Island. Today the islands are covered in thick peat and tuckamore, although they were more heavily treed in the past. The rising relative sea level has not altered the coastal geography of the Burgeo Islands significantly during the span of human

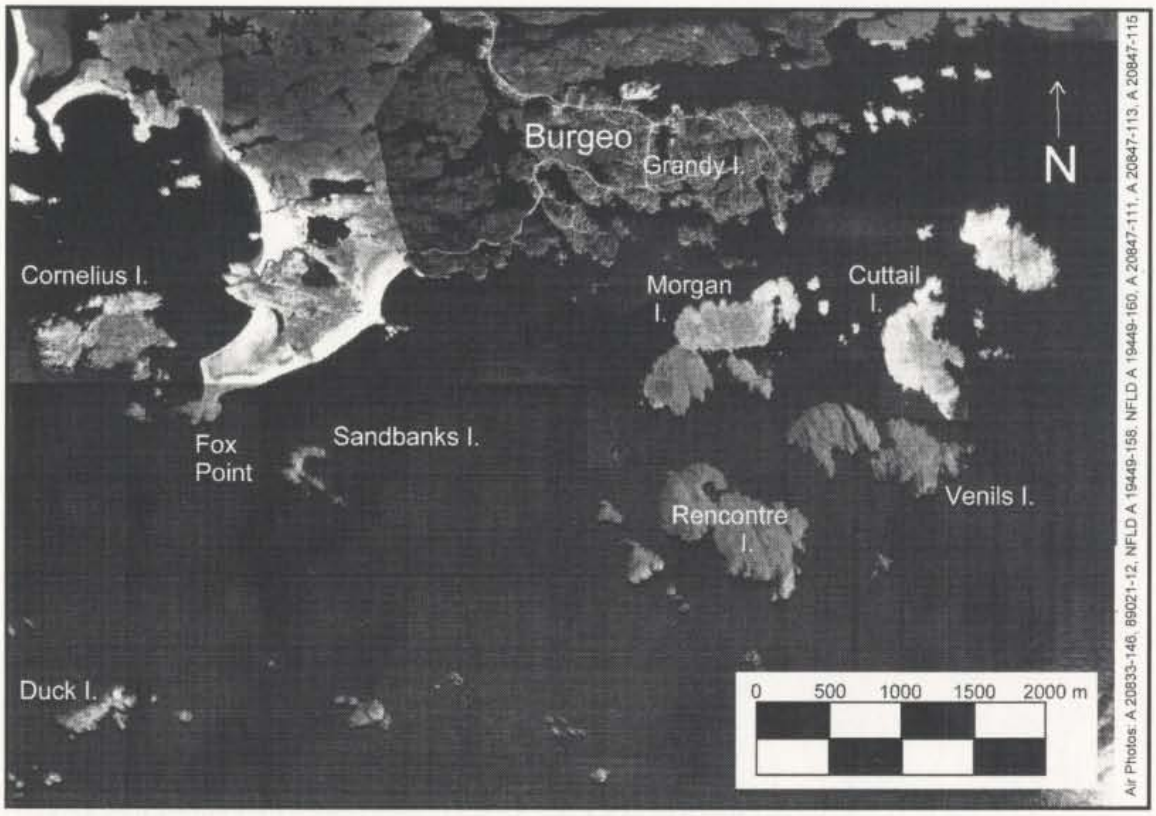

Figure 3-5 Aerial view of the Burgeo Islands

occupation of the area. The islands tend to drop off sharply below sea level, so that a vertical change in RSL will have a very small impact on the horizontal position of the shore. However, the rising RSL has separated several islands from the mainland since they were occupied by precontact groups. For example, Sandbanks Island was connected to the mainland by a sand barrier until the 19th century and Grandy Island was joined to the mainland until sometime within the last one or two millennia.

Bay de Loup

Bay de Loup is one of the westernmost fjords along the south coast. This bay and the other fjords to the east have very high relief and are entirely bedrock, without any

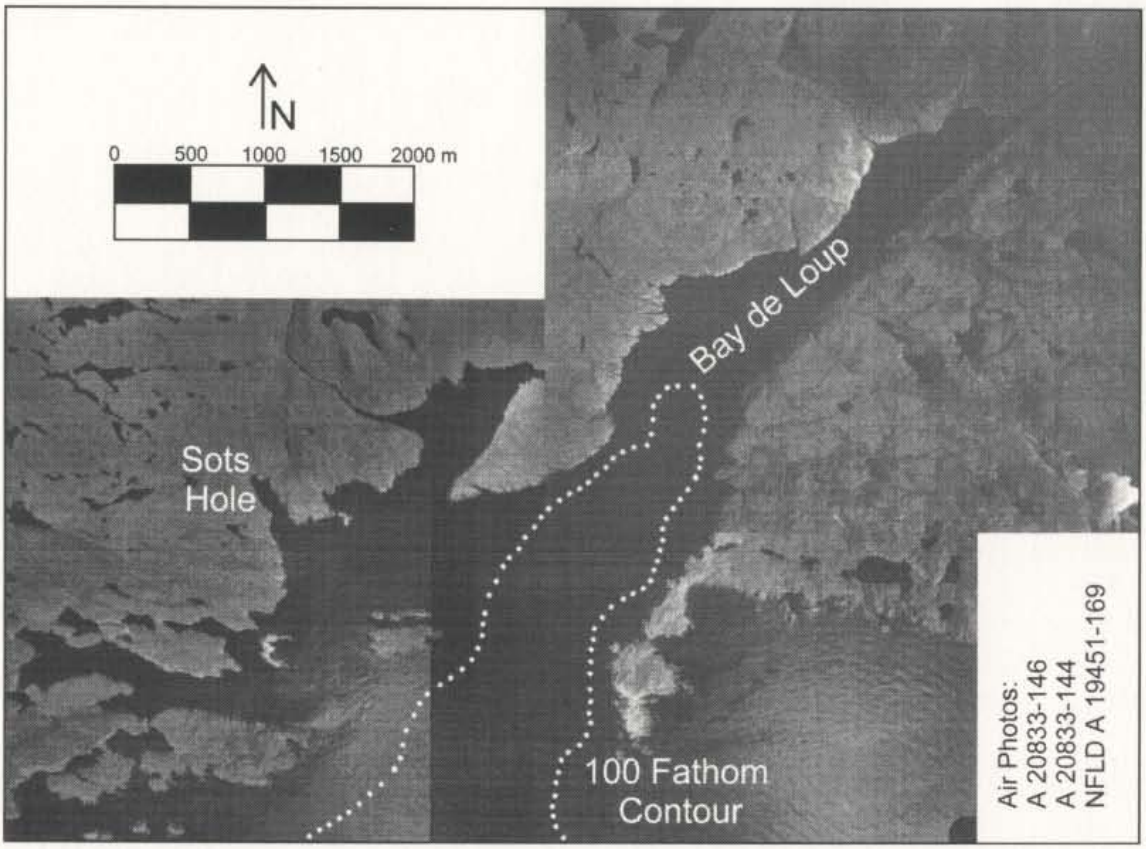

Figure 3-6 Bay de Loup

beaches (Meltzer 1996: 3-6). It rises steeply to 150 to 170 m plateaus and drops just as abruptly to depths of over 100 fathoms within several hundred meters of the shore. The upwelling that occurs at the edge of this deep channel creates a nutrient rich trough which attracts fish and marine mammals.

Climate

Newfoundland's climate has fluctuated following deglaciation. Using pollen cores, Macpherson reconstructed Newfoundland's climate during the Holocene and found that between 6000 and 4500 BP there was a warming trend in the Province (Macpherson

1995). Since 4500 BP there has been an overall cooling trend towards present day temperatures (Macpherson 1995:177).

On a smaller scale, Burgeo's local climate is dominated by maritime influences (Banfield 1983:50). Winters are relatively mild with intermittent snowfall and the summers are cool with frequent sea fog (Banfield 1983:50, Damman 1983:186). The mean precipitation is 1525 mm, with most of the precipitation falling as rain (Banfield 1981:147). Burgeo remains free of sea ice year round (Farmer 1981:72-73), although fresh water sources and the Big Barasway freeze between December or January and April (Banfield 1993:21). Predominant wind directions at Burgeo are east from April to August, and west and west-northwest from September to March (Environment Canada, 30 year mean 1951-1980).

Table 3-1 30 year mean (1951-1980), Wind (m/sec), from Burgeo Weather Station (Environment Canada)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Mean
speed	29.1	28.5	27.5	24.3	21.6	18.3	15.7	17.3	20.1	23.3	27.6	29.2	23.5
direction	WNW	WNW	W	E	E	E	E	E	W	W	W	WNW	W

Flora

The Island of Newfoundland is in the Boreal vegetation zone. Burgeo is in the south coast subregion of the Maritime Barrens, one of nine ecoregions suggested for the Island (Dumman 1983:166). The Maritime Barrens are characterized by "extensive barren areas with dwarf shrub heaths, bogs, and shallow fens" (Damman 1983:185). The

vegetation of the south coast Maritime Barrens ecoregion is summarized in Appendix I. Boreal type forest is restricted to valleys and occasional hill tops and slopes (Damman 1983:185). Extensive basin bogs are found throughout the interior surrounding Burgeo (Wells and Pollet 1983:213).

The Burgeo Islands were deforested for firewood and lumber in the past two centuries; however, they would have been more heavily treed when the Recent Indian and Palaeo-eskimo were in the area. Burgeo residents recall stories of schooner masts being cut from trees on Morgan Island, and the dated stump from the submerged forest on the same island indicates that trees were more abundant 1370 years ago.

Fauna

Burgeo has a rich fauna because of the diversity of its habitats. Deep water is found comparatively close to land in Bay de Loup as the continental shelf drops off abruptly into the Laurentian Channel (Farmer 1981). This brings deep-sea life close to the shore, which when combined with the fjords, rocky channels around the Burgeo islands, and the shallow sands of the Big and Little Barasways create diverse marine habitats and attracts an array of marine life not paralleled on the southwest coast. Nor are terrestrial habitats lacking; the Burgeo Islands are home to colonies of sea birds, caribou are abundant inland and Grandy Brook is a major salmon run. The marine and terrestrial fauna found near Burgeo are presented in Appendix I.

Few of the plants or animals are available year round. Figure 3-7 illustrates the seasonal availability of the most important species along the Burgeo coast. Harbour seals, caribou, arctic hare, beavers, muskrats, snails, crabs, mussels, clams, and whales may be found in the area during any season. The remainder of the species tend to be available in either the cold season between November or December and April, or during

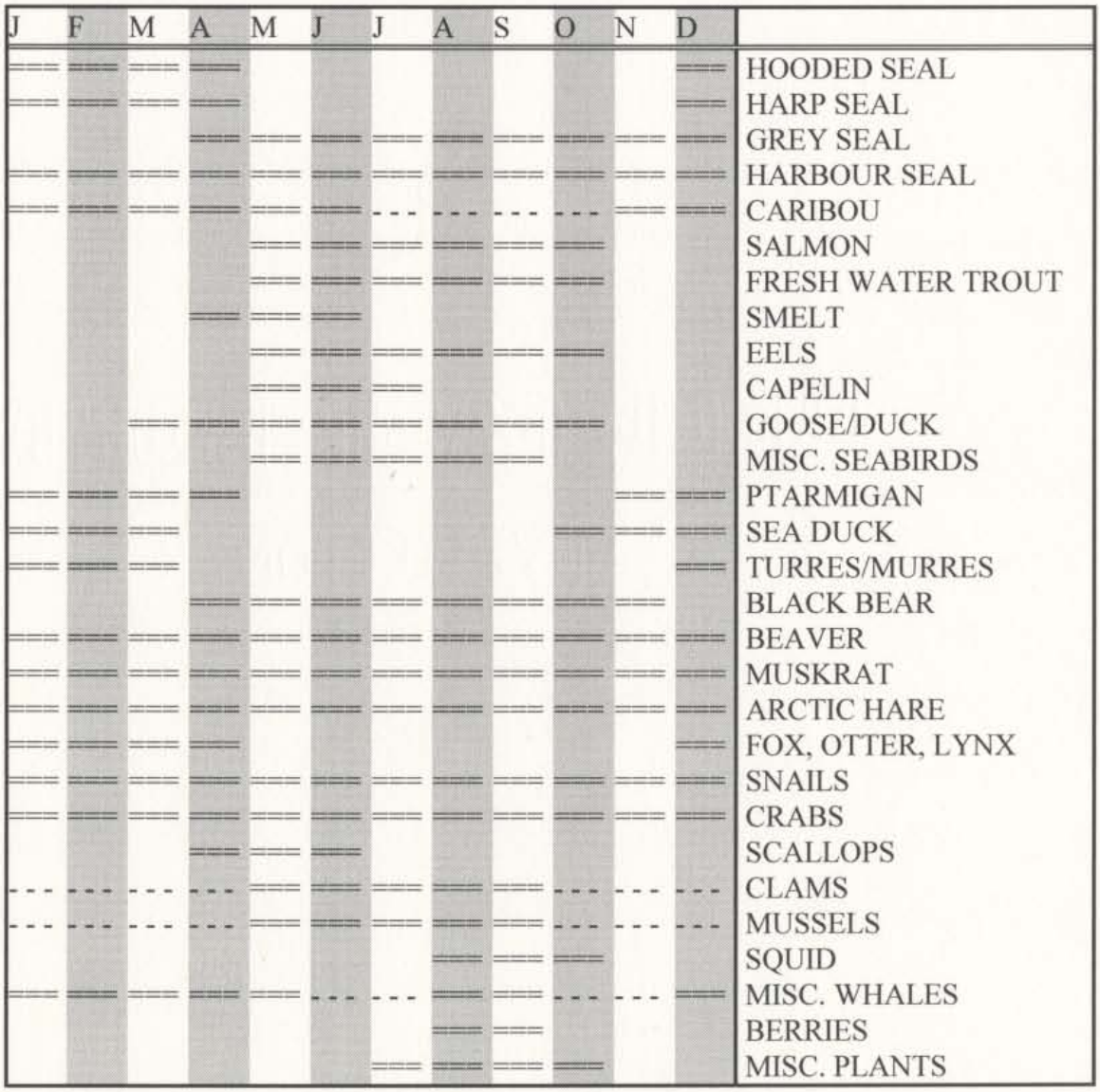

Figure 3-7 Seasonal availability of Burgeo's most important resources, based on Tuck and Pastore 1985 (===) available (- - -) may be available

the warm season between May and October. Burgeo is very productive during the summer and in addition to those species found year round, the summer resources include grey seals, salmon, freshwater trout, smelt, eels, capelin, geese, ducks, seabirds, black bear, squid, scallop, berries, and other edible plants. The mild climate and abundant resources set Burgeo apart from other areas of Newfoundland during the winter. Winter fare includes hooded seals, harp seals, fox, otter, lynx, ptarmigan, sea ducks, turres and murres in addition to the year round resources. During the winter the caribou are drawn to the coast to lick salt off of the rocks and eat kelp. Additionally, hooded seals and harp seals migrate along the coast from December until April, at about the same time that large colonies of sea ducks, turres, and murres flock to the Burgeo islands.

Summary

Burgeo is a central point on the southwest coast where the rugged fjord coast of the east meets the estuaries, tidal flats, and beaches of the west. It is a point where the resources of the interior and the coast meet, where fresh water and salt water mingle, and where shallow waters and the depths of the Laurentian Channel can be found side-by-side. This diversity of geography and resources throughout the year was attractive to hunter-gatherers. With so many potential resources to exploit how did people decide where to locate their sites? The distribution of these sites is discussed in the next chapter, and patterns are described and discussed in subsequent chapters.

CHAPTER 4 SUMMARY OF CULTURES FOUND IN BURGEO

Introduction

In this chapter, I summarize the evidence presented in Appendix II for the cultural affiliations of the Burgeo sites. The sources of the artifactual data are discussed, followed by discussions of the Maritime Archaic Indian, Groswater Palaeo-eskimo, Dorset Palaeo-eskimo, Recent Indian, and historic European occupations around Burgeo.

In the course of the Burgeo Coast Archaeological Research Project, I visited and recorded 39 archaeological sites (see Figure 4-1) and photographed and cataloged five private collections. Based on shovel tests all of the sites appear to be small, ranging in size from several dozen to several hundred square meters. Although most of the sites were well known to local collectors, this was the first visit by an archaeologist to 26 of them. Cultural affiliation could be determined for 28 of the 39 sites. Of these 28 sites, 20 were single component sites. The other eight were represented by more than one cultural group; including four precontact sites which also had historic components, two Groswater Palaeo-eskimo sites which also had a Dorset Palaeo-eskimo component, one Groswater Palaeo-eskimo/Recent Indian site and one Maritime Archaic Indian/Dorset Palaeo-eskimo site. There are descriptions of individual sites in Appendix I and their cultural affiliations are summarized in Table 4-1.

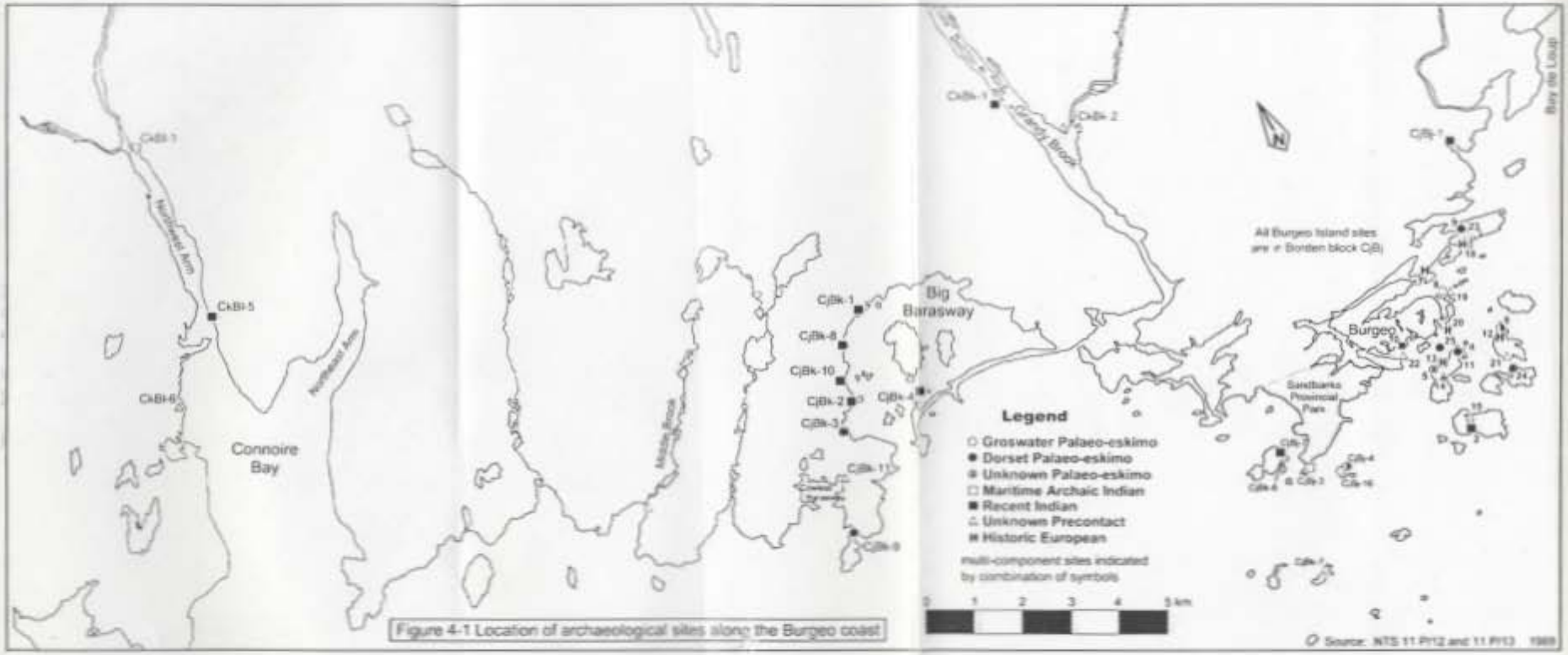

Figure 4-1 Location of archaeological sites along the Burgeo coast

Table 4-1 Summary of sites by cultural affiliation

Culture	Count	Borden Numbers
Maritime Archaic Indian	4	CjBj-3, CjBj-13, CjBk-3, CkBl-1
Groswater Palaeo-eskimo	6	CjBj-4, CjBj-6, CjBj-8, CjBj-10, CjBj-16, CjBj-20
Dorset Palaeo-eskimo	8	CjBj-4, CjBj-6, CjBj-9, CjBj-11, CjBj-24, CjBj-25, CjBk-3, CjBk-9
Recent Indian	10	CjBj-1, CjBj-2, CjBj-7, CjBj-10, CjBk-1, CjBk-2, CjBk-4, CjBk-8, CjBk-10, CkBl-5
Unknown Precontact	11	CjBj-14, CjBj-15, CjBj-19, CjBj-21, CjBj-22, CjBj-23, CjBk-5, CjBk-6, CjBk-7, CjBk-11, CkBl-6
Unknown Palaeo-eskimo	1	CjBj-5
Historic European	7	CjBj-12, CjBj-13, CjBj-14, CjBj-17, CjBj-18, CjBj-20, CjBk-6

Data Sources

Burgeo's acidic soils did not preserve any organic artifacts and so cultural affiliation was determined from the diagnostic lithics found at each site. Radiocarbon dates, historic references, and stratigraphy could rarely be used to determine cultural affiliation because of the survey nature of this study.

Not all of the diagnostic artifacts discussed here were recovered by the Burgeo Coast Archaeological Research Project. This information is drawn from four sources: 1) Penney's field work in Burgeo between 1979 and 1981 (Penney 1985), 2) Ken Reynolds' visit to the Big Barasway in August 1996 (Reynolds pers. comm. 1996-1998), 3) the collections of five Burgeo residents, and 4) the surface collections and shovel tests carried out by the Burgeo Coast Archaeological Research Project. The contribution of each of

these four sources to the determination of cultural affiliation is documented for each site in Appendix II.

The artifacts Penney collected were available for study from the Newfoundland Museum in St. John's. In August 1996 Reynolds made a one day trip to Burgeo to record four new sites[1] in the Big Barasway and four new sites[2] on the Burgeo Islands. The artifacts from Reynolds' work and those given to him by Burgeo residents were available for study from Culture and Heritage, Department of Tourism, Culture, and Recreation of the Province of Newfoundland and Labrador.

Working in cooperation with local collectors I visited Burgeo for eight weeks in July and August of 1997. Gus Melbourne, William Melbourne, Derrick Mercer, Perry Young, and Sidney Bagg were all very generous with their artifacts collections and allowed them to be fully catalogued and photographed. I visited the sites where the artifacts were found and used bad weather days to record the collections. I am confident that the collections came from the sites that the collectors say they did, because the artifacts we found on the surface and in shovel tests correlated with those in collections.

Material Culture from Burgeo

In the following sections I summarize the evidence for each of the precontact cultures in Burgeo, as well as the historic European presence. The diagnostic artifacts for

[1] CjBk-1, CjBk-2, CjBk-3, CjBk-4

[2] CjBj-9, CjBj-10, CjBj-11, CjBj-12

each culture are discussed, followed by the details of each group's material culture in the Burgeo area.

Maritime Archaic Indian

The Maritime Archaic Indians lived in Newfoundland and Labrador for approximately 6000 years, but in Newfoundland we are most interested with the end of the archaic period from 5000 to 3200 BP[3] (McGhee and Tuck 1975). Maritime Archaic Indian mortuary assemblages include ground slate points and bayonets, bone and antler points, barbed and toggling harpoons, leisters, beamers, caribou scapula scrapers, awls, bird bone needles, polished stone axes, adzes, and gouges, zoomorphic pins and pendants. Non-mortuary assemblages include chipped stone ulus, uniface flake scrapers, large Ramah Bay quartzite bifaces, large bipointed and

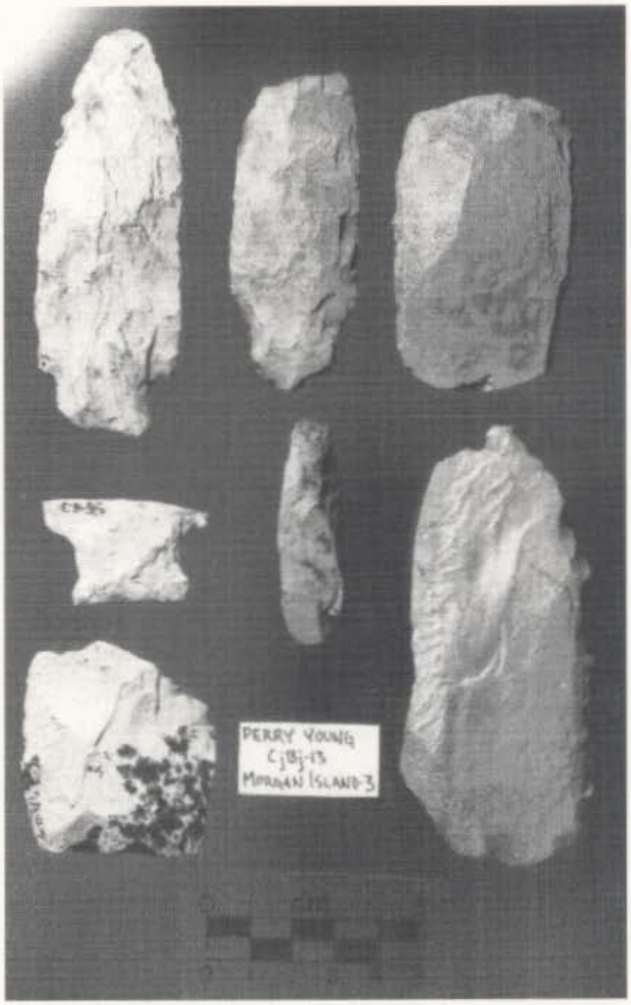

Figure 4-2 Maritime Archaic Indian artifacts from CjBj-3

[3] See Chapter 2

lanceolate bifaces, stemmed bifaces, linear flakes or blades, and abrading stones (Tuck 1988: 49-65).

There are four Maritime Archaic Indian sites along the Burgeo Coast, two of which, CjBj-3 and CjBj-13, have *in situ* deposits. Maritime Archaic Indian artifacts recovered include a plano-convex bayonet fragment, ground slate, stemmed bifaces, linear flakes, side scrapers, bifaces, and a ground and polished adze.

Groswater Palaeo-eskimo

The Groswater Palaeo-eskimo lithic toolkit "is characterized by plano-convex, boxed based, side-notched endblades, circular and ovate sideblades, a large variety of bifaces, chipped and ground burin-like-tools, flared-end unifacial scrapers and a large proportion of microblades" (LeBlanc 1996:6). They often used fine grained colorful cherts, while avoiding slate and soapstone (LeBlanc 1996:6).

Groswater Palaeo-eskimo artifacts were found at six sites (Table 4.1). The artifacts recovered include plano-convex, box based, side notched endblades, stemmed

Figure 4-3 Groswater Palaeo-eskimo endblades and preforms

bifaces, asymmetric knives, burin-like tools, true burins, scrapers, microblades and microblade cores. Stylistically they appear similar to the Groswater Palaeo-eskimo component from Factory Cove (Auger 1986).

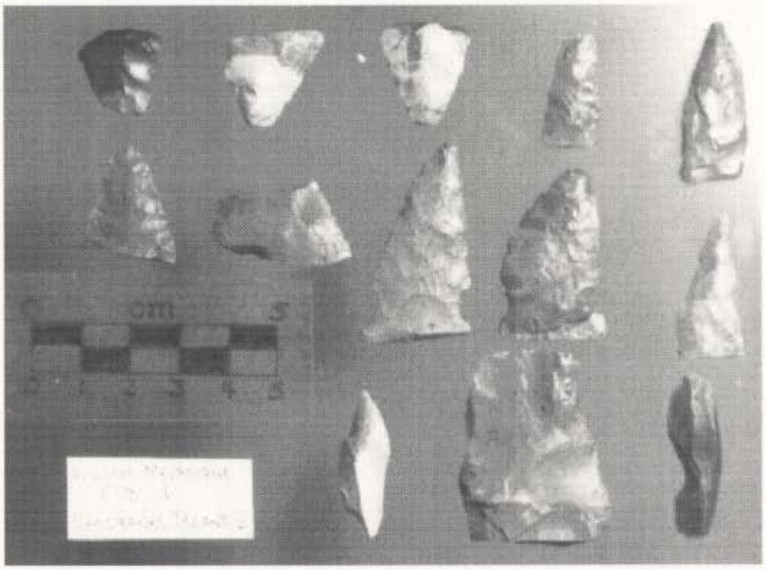

Figure 4-4 Groswater Palaeo-eskimo artifacts from CjBj-16

The Vatcher Island site (CjBj-8) contained artifacts which suggest that it may be one of the oldest Groswater Palaeo-eskimo sites in the area. Two true burins (small gouging or incising tools) were recovered from this completely submerged Groswater Palaeo-eskimo site. True burins are made on bifacially chipped preforms which have a spall removed from one lateral edge leaving a sharp square edge. Later Groswater Palaeo-eskimo groups replaced these 'true' burins with chipped and ground burin-like tools which are ground to mimic the burin edge without actually removing a burin spall. Burin-like tools are a common Groswater Palaeo-eskimo artifact around Burgeo, but Vatcher Island is the only site to yield true burins. These artifacts, coupled with the low

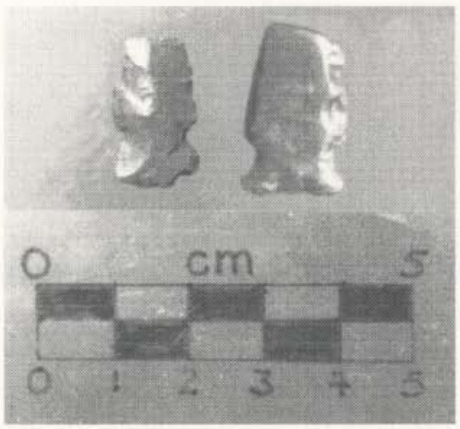

Figure 4-5 True burin (L) and burin-like tool (R)

elevation of the site give the impression that Vatchers Island is one of the oldest surviving Palaeo-eskimo sites in the Burgeo group.

Dorset Palaeo-eskimo

The Dorset Palaeo-eskimo artifacts from Burgeo are stylistically more closely related to the "southern expression" Dorset Palaeo-eskimo sites from Trinity Bay, Placentia Bay, and Hermitage Bay than the west coast sites like Port au Choix or Cape Ray (Robbins 1985, Penney 1985, Fogt 1998, Jim Tuck pers. comm. 1998).

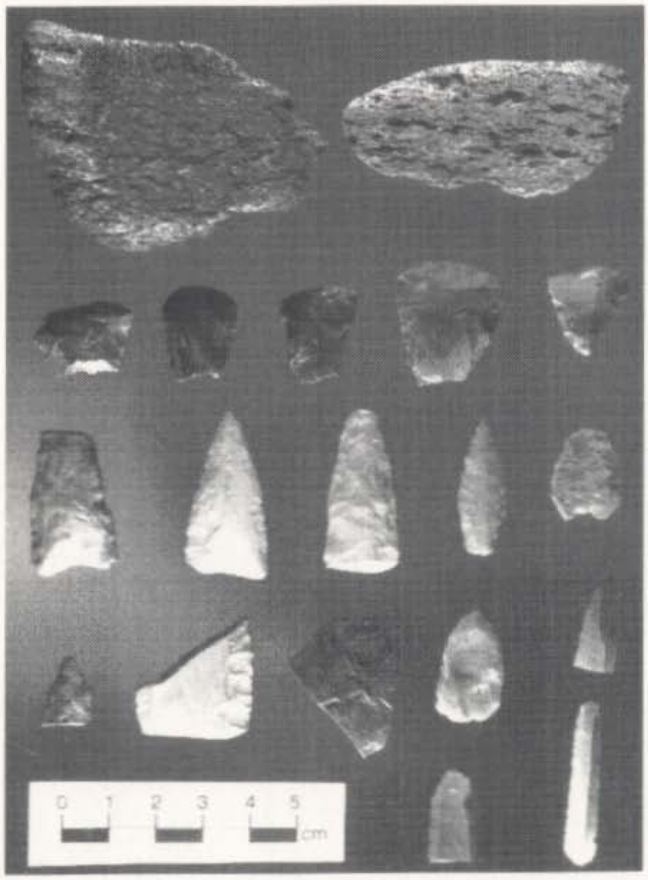

Figure 4-6 Dorset Palaeo-Eskimo artifacts from CjBj-25

The nine Dorset Palaeo-eskimo sites at Burgeo have chipped and ground triangular chert and slate endblades, bipointed endblades, scrapers, microblades, microblade cores, bifaces, and knives. They made frequent use of quartz and infrequent use of soapstone and tipfluting of endblades. These are all attributes of the "southern expression" Dorset Palaeo-eskimo as defined by Robbins (1985) for Stock Cove. The relative absence of soapstone in Burgeo when compared to the nearby west

coast site of Cape Ray may indicate that the smaller Burgeo sites are more temporary camps. However, the wide range of artifacts found at them indicate that a variety of domestic activities were carried out at the sites. They appear to be small residential sites rather than specialized satellite camps. The difference in endblade styles may be related to different game, with tip fluted endblades being more common at harp sealing sites (Cape Ray and Port au Choix) and ground endblades being more common at sites focusing on other marine mammals (Stock cove and Burgeo sites) (Robbins 1985, Fogt 1998).

Recent Indian

The early Recent Indian cultures are poorly understood. The Cow Head complex is known primarily from quarry sites and few finished artifacts have ever been recovered. The Cow Head complex includes ovate and bipointed bifaces, linear or blade-like flakes, small flake endscrapers, large flake side scrapers, lanceolate, round-based, and bipointed, side notched points and bipolar cores (Tuck 1988: 158). The later Beaches complex artifacts include "deeply side- or

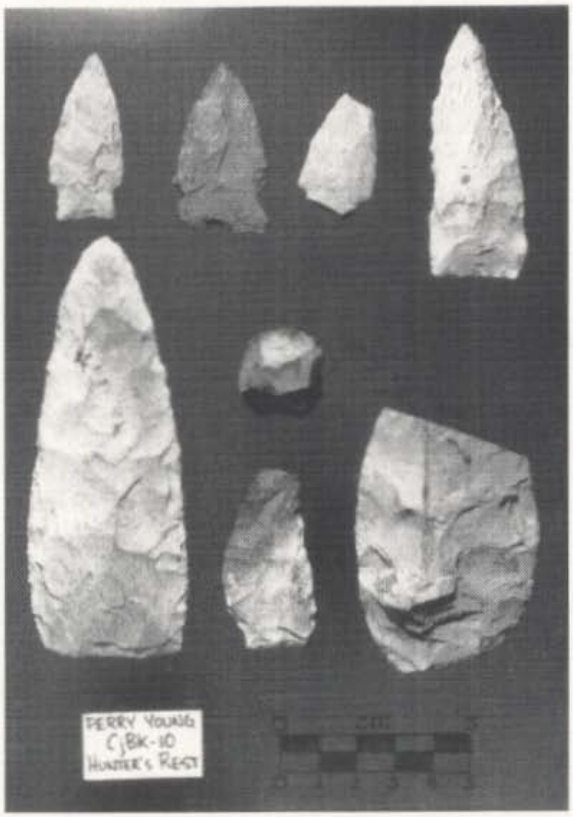

Figure 4-7 Early Recent Indian artifacts from the Big Barasway

corner- notched points, small flake scrapers and triangular bifaces of about the same form and dimensions as projectile points' (Tuck 1988:160).

Penney defined the Little Passage lithic assemblage as including:

> ...stemmed and corner-notched projectile points, which appear to become smaller through time. A decrease in surface retouch and the eventual disappearance of notches produced a true flake point, retouched only along its lateral edges. Triangular bifaces, which possibly functioned as knives or harpoon endblades, appear in two sizes, the smaller of which may be preforms for projectile points. Endscrapers, made on random chert flakes, and retouched and linear flakes were utilized for a variety of cutting and scraping functions. A preference for fine-grained blue-green and green cherts was observed at southwest coast sites. (Penney 1985:184-185)

Recent Indian artifacts were found at 10 Burgeo sites. Artifacts found include side notched projectile points, corner notched projectile points, stemmed projectile points, triangular bifaces, linear flakes, flake scrapers, retouched flakes, unifaces, and cores. At eight sites sufficiently diagnostic artifacts were recovered to determine a more specific Recent Indian cultural affiliation; CjBk-1, CjBk-8, and CjBk-10 all had early Recent Indian material suggestive

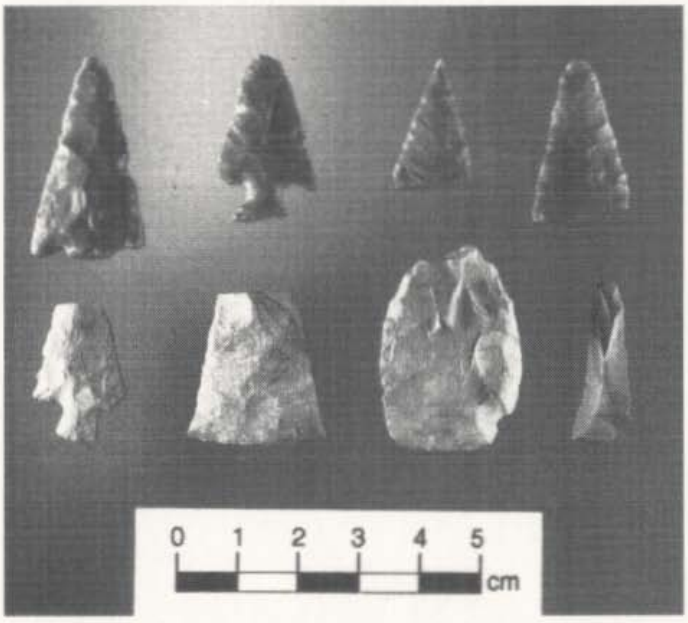

Figure 4-8 Little Passage artifacts from CjBj-4

of either the Beaches or Cow Head complexes and CjBj-1, CjBj-2, CjBj-7, CjBj-10, CjBk-1, and CjBk-4 had later material left by Little Passage or Beothuk peoples. CjBj-7, CjBj-10, and the Beothuk burial, CjBj-2, all have artifacts which indicate some form of contact with Europeans. The Beothuk burial included iron axeheads and a knife and CjBj-7 and CjBj-10 each had a scraper made from European flint. The Burial site was excluded from the settlement pattern analysis because I wanted to focus on living sites. As a result, in most sections of this thesis only the nine Recent Indian habitation sites are referred to.

European Sites

Seven historic European sites were recorded. They were predominantly 19th and 20th century, although two early 18th or late 17th century sites were found (CjBj-12 and CjBj-17). Historic European artifacts recovered include gun spalls, gun flints, ballast flint, pipe fragments, glass and ceramics which include American made earthenware, south Somerset earthenware, and Normandy Brown stoneware (Pope 1986, pers. comm. 1998). French, English, and American influences are all visible in the historic assemblages.

Figure 4-9 Gun flints (Row 1) and gun spalls (Rows 2 & 3)

Conclusions

The private collections, previous archaeological work in the area and BCARP research documented 39 archaeological sites along the Burgeo coast. These included sites left by the Maritime Archaic Indians (n=4), Groswater Palaeo-eskimo (n=6), Dorset Palaeo-eskimo (n=8), Recent Indian (n=10), and Europeans (n=7). In the upcoming chapters the precontact sites will be examined in greater detail to determine if patterns in their placement are discernible.

CHAPTER 5 THE ENVIRONMENTAL PARAMETERS

In this chapter, I will demonstrate that there are different and quantifiable patterns in site placement between the Maritime Archaic Indian, Groswater Palaeo-eskimo, Dorset Palaeo-eskimo, and Recent Indian groups. The patterns are described here but I will reserve my interpretation of them until Chapter 6.

This chapter is arranged in two parts – in the first part I summarize all of the physical parameters measured. For each variable I discuss why it was chosen and how it was measured, supply the descriptive statistics for each culture and provide a critical evaluation of each variable which addresses the question "how do the parameters recorded in the field relate to the sites when they were occupied?" In the second section I use a simple statistical analysis called Pearson's correlation coefficient (see Appendix III) to establish correlations between the physical parameters.

The Environmental Parameters of Site Location

I mentioned in Chapter 1 that the Recent Indian sites along the Burgeo coast tend to be found on the mainland, whereas the Palaeo-eskimo sites are on the islands. The different cultures were using different regions of the Burgeo coast. While I address site location on this regional level I am also interested in examining even smaller scale spatial patterns, for example, *where* on an island or the mainland each culture preferred to camp.

In order to examine this local level of site location I needed to compile a detailed data set of the physical parameters of each site visited. In addition to knowing whether the sites were on the mainland or islands I needed to know the elevation of each site, their distance to salt water, fresh water, and the nearest stream mouth, their degree of shelter, their view of the sea, their slope, their surficial sediment type, vegetation covering and physiographic setting.

There are two types of parameters discussed here: those that were meaningful to the occupants of the sites and those that are the result of post-depositional processes. In this thesis I am most interested in the former because these parameters may have played a role in the decision made with regard to where to place a site. The latter may be useful in locating future sites.

There have been two significant post-depositional agents at work on these sites: 1) the rising relative sea level and 2) the historic European occupation of the area. The effects of these agents on the sites are explored for each parameter. This critical approach is necessary to evaluate the strength of each parameter in answering the thesis questions: 1) are there patterns in the distribution of Burgeo's precontact sites or are they arranged randomly across the landscape? and 2) if there are patterns in site placement what are they and do they differ between the Maritime Archaic Indians, Groswater Palaeo-eskimo, Dorset Palaeo-eskimo, and Recent Indian?

Elevation Above Sea Level

The elevation of archaeological sites relative to sea level has been used to estimate ages of sites (Melgaard 1962, Andrews et al. 1971), address questions of settlement and subsistence (Fedje, McSporran, and Mason 1996, Lambeck 1996), predict site location (Andrews et al. 1971), and determine whether or not sites have survived (Crowell and Mann 1996). It was recognized before entering the field that sea level was rising in the Burgeo area and that some sites had already been submerged and that others were threatened.

This physical parameter was measured at each site using a hand level and a stadia rod. The extent of the site was determined through shovel tests. Two measurements were recorded – one from the lowest elevation of the site and one from its highest elevation. The average of these two measurements was used when comparing the elevations of sites.

As detailed in Chapter 3, the coastline around Burgeo is sinking due to glacio-isostatic delevelling. It was expected that the older sites, which had been sinking the longest, would be at the lowest elevation. However, most sites were found at roughly the same elevations (Table 5-1). This was not because all sites were originally placed at the same elevation but because the lowest sites have been erased by the rising sea level, leaving only the higher sites. Therefore it is impossible to compare and contrast the lower end of this range between cultures, it is only possible to compare and contrast the higher elevation sites. In other words, I can not speculate on how close each culture camped to sea level, but I can determine what elevation was the highest used.

Table 5-1 Elevation of sites above sea level: Descriptive statistics by cultural affiliation

Culture	Sample Size	Range (m)	Mean (m)	Median (m)	Standard Deviation
Recent Indian	9	0-3.5	1.3	1.0	1.1
Dorset Palaeo-eskimo	8	0.3-5.5	2.2	1.8	1.8
Groswater Palaeo-eskimo	5	0-5.5	2.7	3.0	2.1
Unknown Palaeo-Eskimo	1	2.5	n/a	n/a	n/a
Maritime Archaic Indian	4	1-6	3.1	2.8	2.2
Unknown Precontact	11	0-5.5	1.6	1.3	1.5
Total	38	0-6	2.0	1.5	1.6

All of the sites visited are currently 0 to 6 m above sea level, with a mean elevation of 2 m. The standard deviations of the samples indicate that there is overlap between the four groups and t-tests carried out on the data suggest that the differences between the cultures are not significant (Appendix III). All of the sites are at comparable elevations above the present day sea level. But how did they relate to their contemporaneous sea level during occupation?

Using a rate of relative sea level change of 15 cm per century[4] the height above contemporaneous sea level was calculated for each site of known cultural affiliation. All of the sites of known cultural affiliation had a mean age assigned to them based on known dates from elsewhere in the Province (see Chapter 2). Only the Recent Indian site of CjBj-7 could have an absolute age assigned to it because Penney had it radiocarbon dated to 350 +/- 60 BP (Beta-3357). Table 5-3 summarizes the mean dates used, the position of

[4] See Chapter 3 for an explanation of this rate of sea level change

Table 5-2 Adjusted elevation above contemporary sea level

Culture	Sample Size	Mean Date	Calculated Change in Relative Sea Level	Range of Measured Elevations	Range of Adjusted Elevations
Recent Indian	9	1000 BP	+ 1.5 m	0.0 - 3.5 m	1.5 - 5.0 m
Dorset Palaeo-eskimo	8	1600 BP	+ 2.4 m	0.3 - 5.5 m	2.7 - 7.9 m
Groswater Palaeo-eskimo	5	2500 BP	+ 3.8 m	0.0 - 5.5 m	3.8 - 9.3 m
Maritime Archaic Indian	4	4000 BP	+ 6.0 m	1.0 - 6.0 m	7.0 - 12.0 m

relative sea level at the time of the mean date and the resulting range of dates for each precontact culture.

The adjusted elevation gives the impression that sites belonging to the different cultures were originally located at very different elevations. It appears that the Maritime Archaic Indians lived at sites with very high elevations and the Recent Indians at sites with very low elevations. However, any Maritime Archaic Indian site originally lying below 6 metres above its contemporary sea level has been submerged because of the rising relative sea level. The same is true of Groswater Palaeo-eskimo sites below 3.8 m above contemporary sea level and Dorset Palaeo-eskimo sites below 2.4 m above contemporary sea level. The sample is biased against old sites originally placed at low elevations. In Figure 5-1 the change in relative sea level through time is plotted as the diagonal line running through the middle of the graph. The farther back in time we look the more land (and sites) that has been submerged.

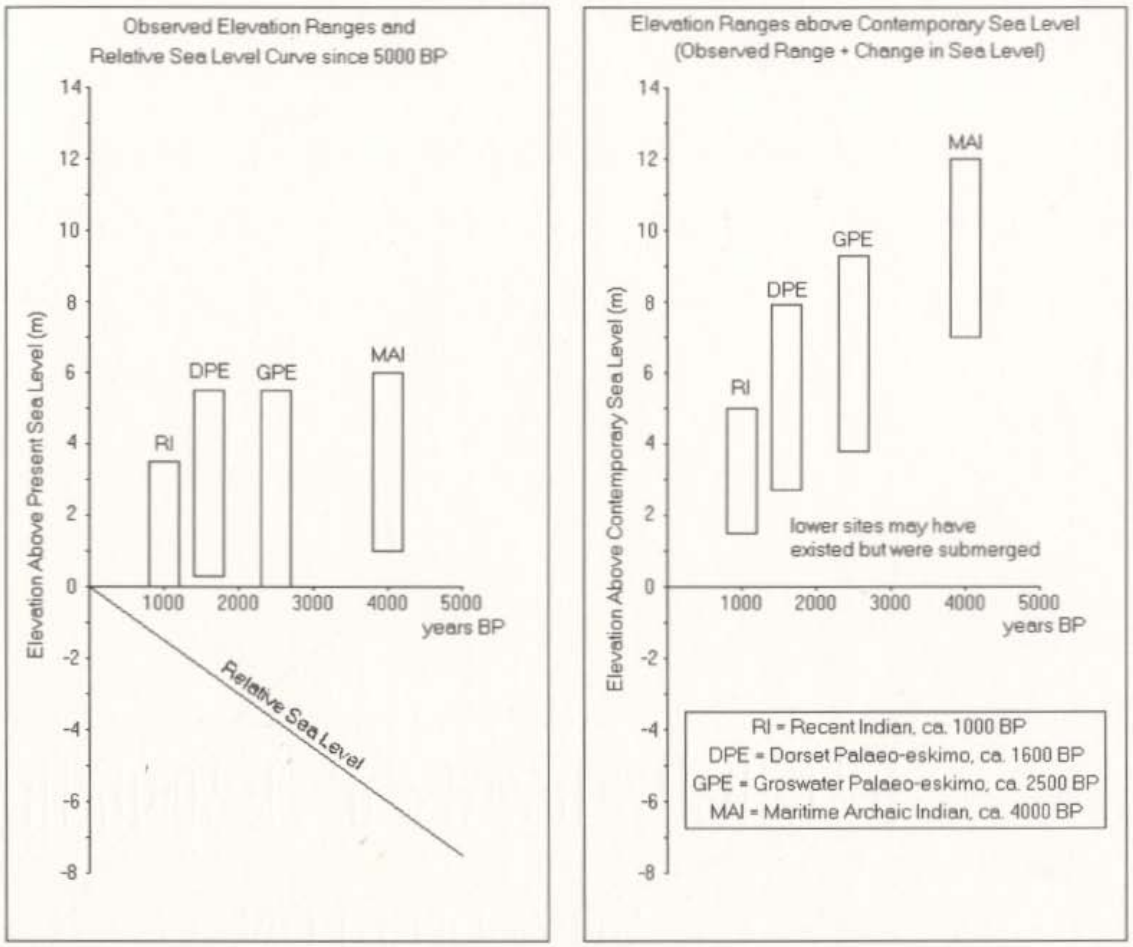

Figure 5-1 Ranges in site elevations above present and contemporary sea levels. The left side illustrates the elevations of the sites as they were recorded. The right side illustrates the original elevation of the sites above their contemporary sea level.

While it is not possible to find very old sites with low elevations, it is still possible to find young sites at high elevations. No Recent Indian sites were found above 5 m above their contemporary sea level, yet the Dorset Palaeo-eskimo, Groswater Palaeo-eskimo and Maritime Archaic Indians must have, at least occasionally, placed sites at higher elevations. If all of the sites were originally placed as low as the Recent Indian

sites then no Maritime Archaic Indian sites and few Dorset Palaeo-eskimo and Groswater Palaeo-eskimo sites would have survived.

The Recent Indian did not place sites at elevations higher than 5 meters, while the Palaeo-eskimo groups did not place sites higher than 9 meters above sea level. The Maritime Archaic Indians used the greatest range in elevations, living as high as 12 meters above sea level.

Island vs. Mainland Location

Prior to traveling to Burgeo I could see that most of the known Recent Indian sites were on the mainland and most Palaeo-eskimo sites were on islands. This is consistent with observations elsewhere in the Province (Chapter 2).

Recording whether sites had been on the mainland or islands was complicated by the rising sea level in the area. This has altered the coastline, so that some sites which were originally on the mainland are now on islands. This is true of all of the sites on Sandbanks Island, the Groswater Palaeo-eskimo sites on Grandy Island, and probably the Groswater Palaeo-eskimo site on Vatchers Island (CjBj-8). The Groswater Palaeo-eskimo coastline (ca. 2400 BP) was reconstructed using the relative sea level curve outlined in Chapter 3 and is illustrated in Figure 5-2. The data presented in Table 5-3 have been corrected to account for rising sea level.

Of the 39 sites visited, 19 (49%) originally had been on islands and 20 (51%) had been on the mainland, which suggests a fairly even split between coastal and island sites. However, when this variable is considered by culture some differences are apparent.

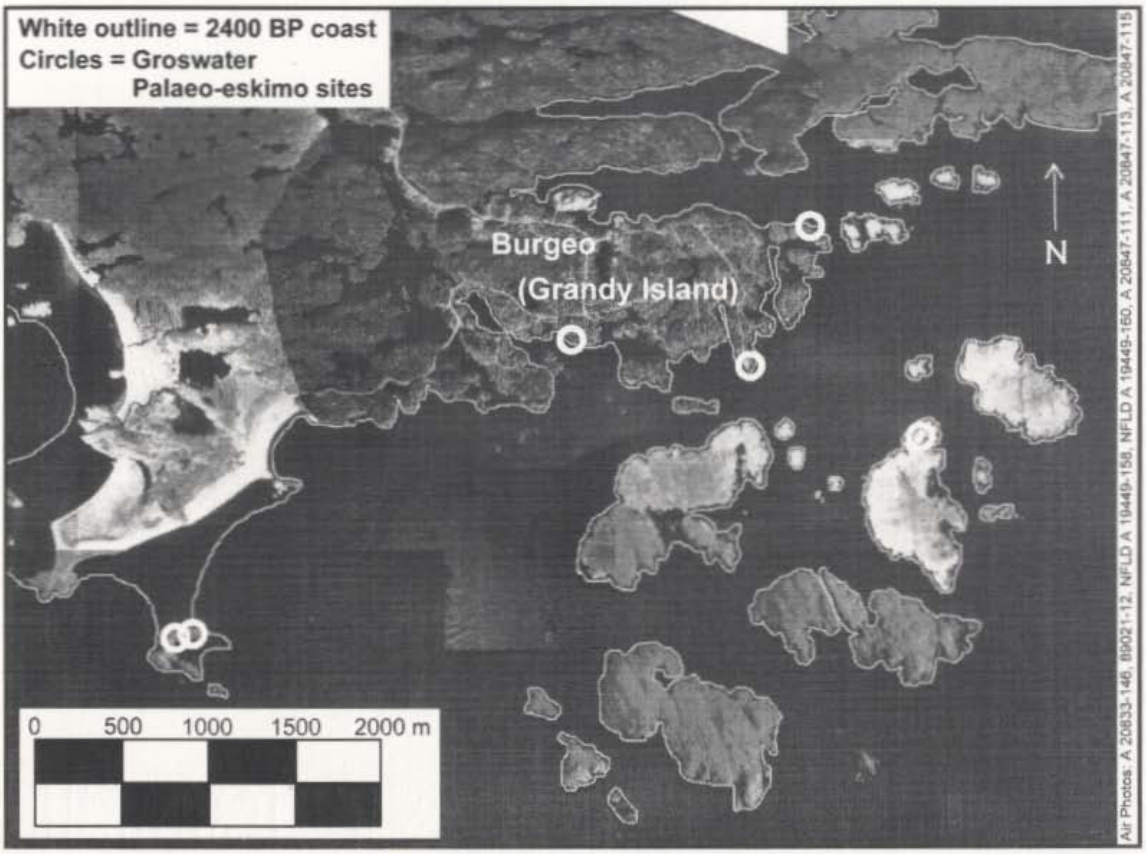

Figure 5-2 Reconstructed Groswater Palaeo-eskimo shoreline. Notice that 5 of their 6 sites were originally on the mainland. This figure also illustrates how the shallow sandy shore to the west of Burgeo has changed more from the rising relative sea level than the steep-sided islands.

Table 5-3 Island vs. mainland location at time of occupation (corrected for RSL change): Descriptive statistics by cultural affiliation

Culture	sample size	Islands # (%)	Mainland # (%)
Dorset Palaeo-eskimo	8	5 (62%)	3 (38%)
Groswater Palaeo-eskimo	6	1 (33%)	5 (67%)
Unknown Palaeo-eskimo	1	1(100%)	0 (0%)
All Palaeo-eskimo	15	7 (47%)	8 (53%)
Recent Indian	9	3 (33%)	6 (67%)
Maritime Archaic Indian	4	1 (25%)	3 (75%)
All Indian	13	4 (31%)	9 (69%)
Unknown Precontact	11	8 (72%)	3 (28%)
Total	39	19 (49%)	20 (51%)

There are twice as many Recent Indian sites on the mainland as there are on the islands (6:3). The small Maritime Archaic Indian sample also indicates a bias towards mainland sites (3:1). The inverse pattern is seen in the distribution of Dorset Palaeo-eskimo sites, with island sites outnumbering mainland sites by nearly two to one (5:3). Today all six of the Groswater Palaeo-eskimo sites are on islands, but when their contemporary shoreline is reconstructed (Figure 5-2) five of the sites were originally on the mainland.

Distance to Salt Water

The distance to salt water was measured because it provides an indication of the importance placed on being near marine resources. It can be surmised from the literature that the "ocean-oriented" Palaeo-eskimo might place their sites closer to the shore than the "interior-oriented" Indians (Schwarz 1994). The Burgeo sites allow this assumption to be quantifiably tested.

The distance to the nearest source of salt water was recorded in meters for each site. This was done using a 50 m tape and was measured from the approximate mid-point of the site to the high tide mark on the shore. If access to the ocean was available in more than one direction, it was noted, but only the shortest distance was used to compare sites.

Like the sites' elevations, their proximity to the shore will have been decreased by the rising relative sea level. The distance to salt water from sites on the islands will not have been greatly affected because the rocky coast is so steep that lowering sea level does not make a significant change in the horizontal position of the coast. The shallow offshore waters on the western part of the study area could create large differences in

distance between the present and when the site was occupied. However, most sites along such shallow coasts, either by coincidence or by design, are Recent Indian and would not have been subjected to more than 1 or 2 meters of change in sea level. This is within the current tidal range for Burgeo and would not significantly affect the sites' distance to salt water.

Table 5-4 Distance to salt water: descriptive statistics by cultural affiliation

Culture	Sample Size	Range	Mean	Median	Standard Deviation
Recent Indian	9	5-20	9.2	7.5	5.2
Dorset Palaeo-eskimo	8	5-20	11.3	7.5	7.4
Groswater Palaeo-eskimo	6	5-20	11.3	8.8	7.0
Unknown Palaeo-Eskimo	1	5	n/a	n/a	n/a
Maritime Archaic Indian	4	5-35	18.1	16.3	12.8
Unknown Precontact	11	5-20	9.3	5.0	6.3
Total	39	5-35	10.6	7.5	7.2

All of the sites visited were located close to the shore. Admittedly, this factor may be biased due to predominantly boat-based survey methods. As well, many of the sites are found because they are being eroded by rising sea levels, which would make the nearshore sites more visible. Nevertheless, all but one were within 20 m of salt water. The exception to this was CkBl-1 which was an isolated find of a Maritime Archaic Indian axe in Connoire Bay (McAleese 1993). The axe was in a secondary context and was located 35 meters upstream from the shore. The distance to salt water is correlated with the mainland/island variable and indicates that sites on islands tend to be closer to salt water than sites on the mainland (Appendix III).

On the basis of mean distance, the Recent Indian sites were located closest to the salt water (9.2 m), followed by Groswater Palaeo-eskimo (11.3 m), Dorset Palaeo-eskimo (11.3 m) and Maritime Archaic Indian (18.1 m). Although the Maritime Archaic Indian sites appear to stand out, their average distance drops to 12.5 m if the isolated axe head at CkBl-1 is removed from the sample. T-tests of the data suggest that only the Dorset Palaeo-eskimo and Groswater Palaeo-eskimo have significantly similar means (α=0.812)[5].

Degree of Wind Protection

The Recent Indian sites along the mainland, in bays and harbours, have been described as better sheltered than exposed Palaeo-eskimo sites on the islands (Schwarz 1994, Penney 1985). In order to test if any culture selected sites with more or less shelter than other sites, the degree of shelter and directions of shelter were recorded at each site. I also thought that the directions of shelter could be used to indicate the season the site was occupied, because today the predominant wind directions change throughout the year, and probably did so in a similar way in the past.

Shelter in the study area was provided predominantly by landforms such as hills and adjacent islands. Trees also provide shelter, but the distribution of forests, especially in the populated areas of Burgeo have been reduced in the past centuries, through cutting for lumber and firewood. Although a submerged forest found on Morgan Island indicates

[5] α = probability that the two samples come from populations with the same mean. In other words, there is an 81.2% probability that the Dorset Palaeo-eskimo and Groswater Palaeo-eskimo sites have identical mean distances to salt water. The t-test is described in Appendix III.

that trees were more common on the Burgeo Islands when the Dorset Palaeo-eskimo and Recent Indian were in the area, it was impossible to fully reconstruct the past distribution of forests in the area, so only the permanent sources of shelter like hills and islands were considered in the study.

Shelter was measured in the field using a compass. I stood in the center of the site and recorded which of the eight points of the compass (N, NE, E, SE, S, SW, W, NW) were sheltered from wind. From each direction a site could either have strong shelter, weak shelter, or no shelter at all. Strong shelter was provided by large nearby hills or islands, while weak shelter came from smaller or more distant windbreaks.

To allow statistical comparisons between the sites I ranked strong shelter as 10, weak shelter as 5, and exposed as 0. These values were summed to calculate the total shelter available at a site out of 80. Finally, each site's score out of 80 was converted to a percent (Table 5-5).

Table 5-5 Percent shelter: Descriptive statistics by cultural affiliation

Culture	Sample Size	Range	Mean	Median	Standard Deviation
Recent Indian	9	0-87.5	61.8	68.8	25.5
Dorset Palaeo-eskimo	8	18.75-100	63.3	62.5	25.1
Groswater Palaeo-eskimo	6	6.25-68.75	50.0	56.3	22.4
Unknown Palaeo-Eskimo	1	62.5	n/a	n/a	n/a
Maritime Archaic Indian	4	43.75-87.5	60.9	56.3	19.3
Unknown Precontact	11	0-100	56.8	62.5	30.3
Total	39	0-100	59.2	62.5	24.5

There were no significant differences between the mean number of directions of shelter for each culture considered. On average, sites were either weakly or strongly sheltered from about 5 directions and exposed in about 3 directions. Expressed as a percentage, most sites were sheltered from approximately 60% of all possible directions. As can be seen in Table 5-5 the mean value is fairly consistent across all cultures, with Groswater Palaeo-eskimo sites averaging less shelter than other groups. T-tests were carried out to compare the means of all four cultures and the results indicate that the degree of shelter at Recent Indian sites is very similar to that of the Dorset Palaeo-eskimo (α=0.906) and Maritime Archaic Indian (α=0.948) (see Appendix III). So, the Recent Indian, Dorset Palaeo-eskimo, and Maritime Archaic Indian sites all tend to be found in comparably well-sheltered areas, with the Groswater Palaeo-eskimo sites tending to be slightly more exposed.

Greater differences do become apparent when the *directions* of shelter are considered. The most common direction of shelter for all sites was southwest. Eighty percent of all the sites were strongly or weakly sheltered from this direction. All 15 of the Palaeo-eskimo sites were sheltered from the southwest. Seventy-eight percent of the Recent Indian sites were sheltered from the west or southwest. However, in the Recent Indian sample the north and northwest were even more likely directions of shelter, both being found at 89% of the Recent Indian sites. The least common directions of shelter were east, southeast, and south – each of which was represented in 50% of the sites (Figure 5-3).

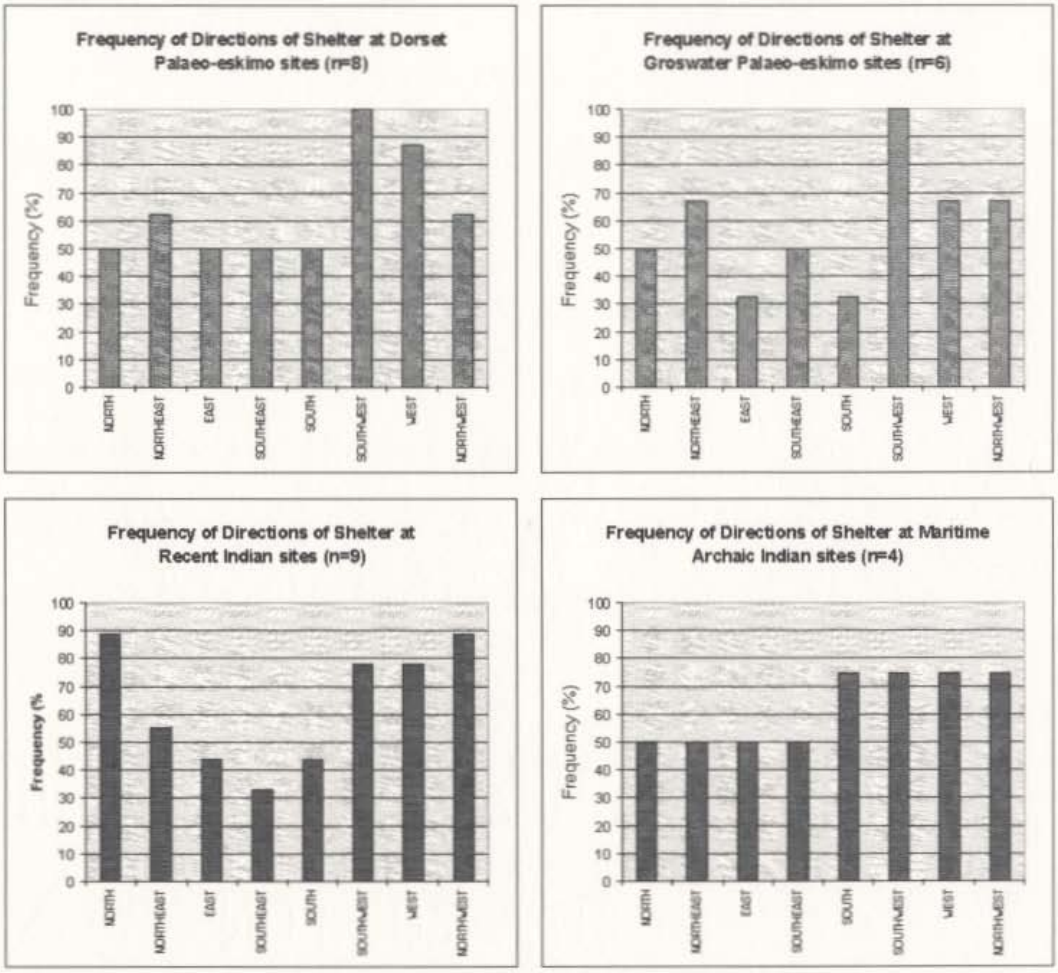

Figure 5-3 Preferred directions of shelter by cultural affiliation. Notice the low emphasis on shelter from the east, southeast, and south in all cultures. All of the Palaeo-eskimo sites are sheltered from the southwest. The Recent Indian frequently have sites sheltered from the north and northwest.

Degree of Ocean View

The degree of ocean view describes the site's relationship to the marine environment. The sites in and around Burgeo were all on the coast and the view of salt water they provided was expected to have been a factor in choosing their location. In Labrador, Stopp and Rutherford (1991) note that a view out of the mouths of bays may

have contributed to the placement of sites within bays. It was also suspected that the degree of ocean view would differ between cultural groups, because of their different emphases on the marine environment (Chapter 2).

The view of salt water was measured using a compass. I took this measurement from the most prominent point within the confines of the site. From this vantage point the horizon was scanned for views of salt water and views of the land. The type of salt water body adjacent to the site was also noted (ie. open ocean, bay, barasway, etc.). The degrees of ocean view and the degrees of land view were marked on a diagram of a compass representing the horizon (Figure 5-4). In order to compare these data between sites the total salt water view at each site was summed, providing the total number of degrees of the horizon filled by a view of ocean water.

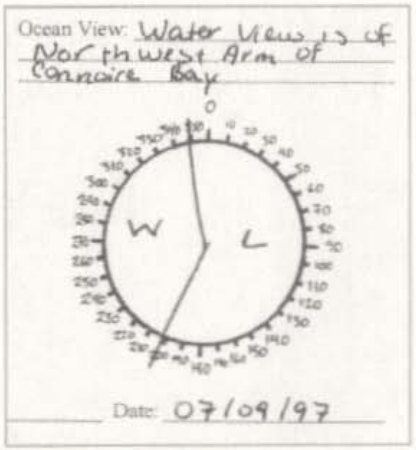

Figure 5-4 Example of water (W) and land (L) view recorded at CkBl-5

I do not believe that the rising sea level would significantly impact this variable. The changes in relative sea level would have the effect of increasing the ocean view from older sites, as land submerged, but the change in sea level that we are discussing is less than 6 meters during the entire span of human occupation in the area. The tides in Burgeo can vary by as much as 2 meters between high tide and low tide so there is already a degree of uncertainty in the measurements of around 2 m. As well, the older sites tend to be found on the islands and because of their steep coasts they have

experienced the least amount of change in the shape of their coastlines as a result of changes in relative sea level.

Table 5-6 Degrees of ocean view: Descriptive statistics by cultural affiliation

Culture	Sample Size	Range	Mean	Median	Standard Deviation
Recent Indian	9	20-330	179	160	87
Dorset Palaeo-eskimo	8	30-160	114	150	56
Groswater Palaeo-eskimo	6	100-330	187	160	80
Unknown Palaeo-eskimo	1	170	n/a	n/a	n/a
Maritime Archaic Indian	4	50-270	160	160	90
Unknown Precontact	11	20-300	135	120	92
Total	39	20-330	152	155	81

The mean ocean view for all the sites in the area is 152° indicating that given a 360° view of the horizon, 152° are salt water and 208° are land. The Recent Indian and Groswater Palaeo-eskimo people selected sites with the highest ocean visibility. The Groswater Palaeo-eskimo mean is 187° and the Recent Indian mean 179°, or approximately half of the horizon. The Dorset Palaeo-eskimo sites averaged the lowest salt water visibility, with sites ranging from 30° to 160° visibility and with a mean value of 114°. However, when the median values are considered instead of the mean values the variability is greatly diminished. The Recent Indian, Maritime Archaic Indian and Groswater Palaeo-eskimo all have medians of 160°, while the Dorset Palaeo-eskimo have a comparable median of 150°, which suggests that the Dorset mean may be thrown off by a few sites with very low salt water visibility.

In all of the cultures this parameter is linked to the shelter at a site. A negative Pearson's correlation coefficient of -0.5036 was calculated between the total degrees of

ocean view and the total degrees of shelter (Appendix III). This means that as the ocean view increases the degree of shelter goes down. For example, a site on a hill might afford a very good view of the water, but would be very exposed. The opposite would be true of a site located deep inside a steep-sided bay.

Distance to Fresh Water

Drinking water is necessary for humans, but whether this water comes from streams, ponds, springs, melted snow or some other source depends on the season, the environment and cultural preferences. I recorded this parameter to answer the question, "are there cultural differences in the placement of sites in relation to a fresh water source?"

The distance to the closest source of fresh water was recorded to the nearest meter using a 50 m nylon measuring tape. Examples of fresh water included brooks and ponds. Brooks were the most common sources of fresh water, and many of the ponds were brackish or boggy and may not have provided as desirable drinking water as running streams. If a fresh water source was not found within 250 meters of the site then it was

Table 5-7 Distance to fresh water: Descriptive statistics by cultural affiliation

Culture	Sample Size	Range	Mean	Median	Standard Deviation
Recent Indian	7	15-200	54	32	66
Dorset Palaeo-eskimo	6	5-150	60	33	58
Groswater Palaeo-eskimo	1	115	n/a	n/a	n/a
Unknown Palaeo-Eskimo	1	25	n/a	n/a	n/a
Maritime Archaic Indian	3	5-25	18	25	12
Unknown Precontact	7	5-92	46	37	28
Total	25	5-200	50	34	48

recorded as absent.

Out of the 39 sites, 25 had a water source within a 250 meter radius, 11 had no obvious fresh water source nearby and 3 were indeterminate. The mean distance to fresh water from the 25 sites with water sources was 50 m. This variable should not have been significantly impacted by changes in the relative sea level.

The mean distance to fresh water for all Palaeo-eskimo sites is 63 m, while the distance to fresh water for the Recent Indian sites averages 54 m. However, the Recent Indian average is skewed by a single site which lies 200 meters away from a fresh water source – the rest of the Recent Indian sites (n=6) range from 15 to 55 meters away from fresh water and average 30 m. The Dorset Palaeo-eskimo sites (n=6) average 60 m, and the single Groswater Palaeo-eskimo site with a nearby water source was 115 m from fresh water. Two additional Dorset Palaeo-eskimo sites and three additional Groswater Palaeo-eskimo sites had no apparent sources of fresh water within 250 m of the site.

To summarize, the Recent Indian sites tended to be very close to fresh water sources. The Groswater Palaeo-eskimo sites rarely had nearby sources of fresh water and when it was available at the sites it was found at considerably greater distances than was commonly seen with other cultures.

Distance to Nearest Stream Mouth

The distance to the nearest stream mouth measures the distance to the nearest source of running water along the shore. In the Burgeo area it is often easier to travel

along the shore than over the bog or tuckamore[6]. In the case of larger brooks and rivers, stream mouths would also be an important area for anadromous fish.

This parameter was measured in meters using a 50 m nylon measuring tape. As it turned out the shortest distance to fresh water and the distance to the nearest stream mouth were nearly always identical. This is because the most direct route to fresh water was usually along the shore. A Pearson's correlation coefficient 0.9987 between the distance to fresh water and the distance to stream mouths confirms that the two values were nearly always identical.

Table 5-8 Distance to stream mouth: Descriptive statistics by cultural affiliation

Culture	Sample Size	Range	Mean	Median	Standard Deviation
Recent Indian	7	15-200	54	32	66
Dorset Palaeo-eskimo	5	5-115	42	25	43
Groswater Palaeo-eskimo	1	115	n/a	n/a	n/a
Unknown Palaeo-Eskimo	1	25	n/a	n/a	n/a
Maritime Archaic Indian	3	25-35	28	25	6
Unknown Precontact	7	5-100	47	37	32
Total	24	5-200	47	35	44

Local Topographic Features

Schwarz (1994:58) noted that Indian sites in Newfoundland tend to be located in "sheltered locations along complex, indented coastlines and along deep bays" while the Palaeo-eskimo sites tend to be located on "exposed outer islands, headlands, and simple exposed coastlines". Two separate parameters are discussed together in these quotes; shelter and topographic setting. The implication is that shelter is related to the type of

[6] Tuckamore is dense, low growing, stunted spruce forest

coastal landform on which the site is located. In order to test this observation in the Burgeo area the topographic setting of each site was recorded. Shelter has already been discussed.

Landform types recorded in the field include: headlands, necks, points, tombolos[7], small islands, peninsulas, linear beaches, rocky shores, beaches, flat ledges and terraces, brook bottoms, coves, sheltered arms, and sheltered harbours. No two sites were in exactly the same type of setting, which made comparisons cumbersome until three categories based on the shape of the coastline were devised to summarize the results. Sites along straight sections of coast were coded as 0, sites on prominences like headlands or points were coded as 10, and sites on indented sections of coastline, like harbours and arms, were coded as -10. These are summarized in Table 5-9.

Table 5-9 Values used in the topographic variable

Assigned Value	Landforms represented by these values
10	headlands, necks, points, tombolos, small islands, peninsulas
0	linear beaches, rocky shores, beaches, flat ledges and terraces
-10	brook bottoms, coves, sheltered arms, sheltered harbours

Table 5-10 Local topography: Descriptive statistics by cultural affiliation

Culture	Sample Size	Range	Mean	Median	Standard Deviation
Recent Indian	9	-10 to 10	5.5	10.0	7.3
Dorset Palaeo-eskimo	8	0 to 10	7.8	10.0	4.6
Groswater Palaeo-eskimo	6	0 to 10	5.0	5.0	5.4
Unknown Palaeo-Eskimo	1	10	n/a	n/a	n/a
Maritime Archaic Indian	4	-10 to 10	2.5	5.0	9.5
Unknown Precontact	11	-10 to 10	5.5	10.0	8.2
Total	39	-10 to 10	5.5	10.0	6.8

[7] A tombolo is a narrow beach connecting an islet or headland to a larger island or the mainland

There was an overall tendency to select coastal landforms which either jut out into the water, such as peninsulas, headlands, and points (coded as 10) or linear landforms like beaches and straight sections of coast (coded as 0), which together account for 90% of the sample. Only 10% of the sites were along indented coastlines (coded as -10). None of the Palaeo-eskimo sites were located in such settings. Only Maritime Archaic Indian, Recent Indian and unknown precontact sites were found on indented landforms.

The strongest pattern for this variable is seen amongst the Dorset Palaeo-eskimo sites. Of all the Dorset Palaeo-eskimo sites found (n=8), 75% were located on prominent points, necks, or headlands. This pattern is even stronger when only the island sites are considered – 5 out of 5 sites on islands were in such prominent settings.

When the Recent Indian sites outside the Big Barasway are contrasted with those inside the Big Barasway a pattern emerges. Inside the sheltered barasway, the Recent Indian pattern is very similar to the Dorset Palaeo-eskimo pattern, with 5 out of 5 sites located on points, headlands, or tiny exposed islands. Outside of the shelter of the Big Barasway sites are found in more protected settings which do not protrude into the water.

Prominent landforms tend to have exposed sites and indented coastlines often have sheltered sites. The degree of shelter at each site was measured separately and the Pearson's correlation coefficient indicates a weak negative correlation between the shape of the coast and shelter (-0.3829, Appendix III). Because view and shelter are linked there is also a weak positive correlation (0.3760) between view and the shape of the coast. This means that sites on prominent coastal landforms tend to be less sheltered and have wider ocean views than sites along indented coastlines, like bays and fjords.

Slope

Humans tend to prefer level ground for habitation sites (Butzer 1982:58). Measuring the slope of the ground might assist in determining if a site could have been used for habitation or if it was a special purpose site. Knowing the range of slopes preferred may also assist in the development of survey strategies by indicating which areas would be too steep to typically contain habitation sites. Any cultural differences in slope would be interesting as well.

The slope of each site was measured to the nearest half degree from the horizontal using a handlevel. Most of the sites were on even ground and sloped towards the ocean. In several cases the surface of the site was irregular, with small hummocks and depressions, but the overall trend in the slope was close to the horizontal. The uneven sites were given the value 0°, because it approximated their true slope and it was undesirable to leave these cases out of the study.

As was expected, the sites had a strong tendency to be located on level or nearly level ground. Most sites fell within the range of 0° - 5° from the horizontal, with only

Table 5-11 Slope in degrees from the horizontal: Descriptive statistics by cultural affiliation

Culture	Sample Size	Range	Mean	Median	Standard Deviation
Recent Indian	9	0-5	1.1	0.0	1.7
Dorset Palaeo-eskimo	8	0-11.5	2.1	0.5	3.9
Groswater Palaeo-eskimo	3	0-2	0.7	0.0	1.2
Unknown Palaeo-Eskimo	1	1	n/a	n/a	n/a
Maritime Archaic Indian	3	2-5	3.0	2.0	1.7
Unknown Precontact	10	0-9	2.2	1.5	2.7
Total	34	0-11.5	2.3	2.0	2.7

two outliers. One site was on a 9° slope and a second was on an 11.5° slope. The mean slope for all sites was 1.81° from the horizontal. Palaeo-eskimo (Dorset Palaeo-eskimo and Groswater Palaeo-eskimo combined) and Indian (Maritime Archaic Indian and Recent Indian combined) sites both averaged 1.6° and the unknown precontact sites averaged 2.2° from the horizontal.

This variable is not useful in distinguishing different patterns for the different groups because there are no significant differences in the slopes preferred by each culture.

Ranked Surficial Sediment Type

The sediments below a site determine how well drained and comfortable it is. A poorly drained area will be wet and boggy, making it a poor choice for a camp site during warm months, while a well drained cobble beach may be equally awkward to live on because of the size and coarseness of the sediments. Cultural preferences and seasonality may affect the placement of sites relative to surficial sediments. Sites that are too boggy in the summer may be quite comfortable in the winter.

At each site the underlying sediments were recorded in the process of digging shovel tests. In most cases a 20-90 cm thick layer of peat had developed over the cultural layer and the original sediments, which ranged from bedrock to gravel. Cobble and boulder beaches were also found in the area, but no sites were found on these beaches. The sediment types were grouped into four ranked classes based on particle size and the results are summarized in Table 5-12. The numerical ranking allowed the data to be summarized and more easily compared between sites and cultures.

Table 5-12 Descriptions of ranked sediment sizes

Surficial Sediment Type	Ordered Drainage	Ordinal Value
Clay & Silt	poorly drained	1
Sand	moderately drained	2
Gravel	well drained	3
Bedrock	very well drained	4

Table 5-13 Ranked sediment size: Descriptive statistics by cultural affiliation

Culture	sample size	Range	Mean	Median	Standard Deviation
Recent Indian	8	1-4	2.6	2.5	1.0
Dorset Palaeo-eskimo	8	2-4	3.1	3.5	1.0
Groswater Palaeo-eskimo	5	2-3	2.4	2.0	0.5
Unknown Palaeo-Eskimo	1	1	n/a	n/a	n/a
Maritime Archaic Indian	4	1-4	2.3	2.0	1.3
Unknown Precontact	11	1-4	2.1	2.0	0.8
Total	37	1-4	2.5	2.0	1.0

Most cultures averaged between 2 and 3, which is in the sand and gravel range of the spectrum. The Dorset Palaeo-eskimo sites tended to be on well drained sites with sand, gravel, or bedrock substrates, while all of the Groswater Palaeo-eskimo sites were found on sand or gravel sediments and never clay, silt or bedrock. The Recent Indian and Maritime Archaic Indian sites were located on the full range of sediment types.

Vegetation Cover

The vegetation growing on a site today cannot be assumed to be the same as the vegetation growing on it when it was occupied. However, the location of buried sites may be indicated by changes in the density, patterning, and type of vegetation found

growing over top of a site (Butzer 1982). Differences in the relative abundance of vegetation covering sites of different cultural affiliations has been noted at Port au Choix (Renouf 1985).

The average amount of vegetation covering each site was recorded, and notes were made of the specific species of plants which were present. In the field this variable was measured as a percent. Four categories were made; 0-25% vegetation, 25-50% vegetation, 50-75% vegetation, and 75-100% vegetation. For the statistical procedures, these categories were ranked on a scale of 1 to 4, with 1 being the least vegetation and 4 being the most.

Table 5-14 Ranked groundcover: Descriptive statistics by cultural affiliation

Culture	sample size	Range	Mean	Median	Standard Deviation
Recent Indian	9	1-4	3.7	4.0	1.0
Dorset Palaeo-eskimo	8	2-4	3.6	4.0	0.7
Groswater Palaeo-eskimo	6	1-4	2.7	3.0	1.5
Unknown Palaeo-Eskimo	1	4	n/a	n/a	n/a
Maritime Archaic Indian	4	4	4.0	4.0	n/a
Unknown Precontact	11	1-4	3.6	4.0	0.9
Total	39	1-4	3.5	4.0	1.0

Most of the sites have a rank of 4, indicating that plants cover most of the ground surface. The most notable exception is the Groswater Palaeo-eskimo sites, which have a mean value of 2.7, which is lower than most other cultures, indicating less vegetation on their sites.

The t-tests indicate that the Dorset Palaeo-eskimo and Recent Indian means are quite similar (α=0.923) and that the Maritime Archaic Indian sample mean differed

significantly from the Groswater Palaeo-eskimo mean (α=0.082) (see Appendix II). This variable indicates that most sites are found in vegetated areas, but cannot contribute to arguments of site patterning because of changes in vegetation over time.

Summary of the Environmental Parameters

In this section 11 environmental parameters were critically examined. Three parameters make weak contributions to our understanding of Maritime Archaic Indian, Groswater Palaeo-eskimo, Dorset Palaeo-eskimo, and Recent Indian site placement in the Burgeo area: vegetation, slope, and the elevations of the sites. Vegetation does not relate to the sites when they were occupied and so it is not useful in distinguishing different patterns in site placement. Slope is a weak variable because there are more similarities across all of the cultures than there are differences. The elevation of the sites has been demonstrated to have significantly changed as a result of rising sea levels. This limits its usefulness for cross-cultural comparisons, although some patterns in the range of elevations were noted.

The remaining eight parameters; mainland versus island location, distance to salt water, distance to fresh water, distance to stream mouths, shelter, view of salt water, the nature of the coast, and surficial sediment type have demonstrable associations with the time of occupation and show strong patterns in site placement. In the course of the discussion some general correlations between different parameters were established. For example, most sites on islands tended to be found closer to the shore than sites on the mainland and sites with good views of salt water often had relatively less shelter than

sites with narrower views. In the upcoming section more of these correlations will be sought for each of the four cultures.

Different Patterns for Different Cultures

In this section Pearson's correlation coefficients are used to statistically examine the patterns in the placement of Recent Indian, Dorset Palaeo-eskimo, Groswater Palaeo-eskimo, and Maritime Archaic Indian sites. Instead of exploring a single variable at a time, this section examines the inter-relatedness of variables for each group.

For each culture the Pearson's correlation coefficient was calculated for all possible pairs of the eight strongest variables (Table 5-15). Only those correlations based on four or more cases and that were significant at the 0.1 level (90% confidence) will be discussed here. The Pearson's correlation coefficient is explained in Appendix III.

Table 5-15 Variables used in the Pearson's correlation coefficients

Variable Name	Variable Description	Range of Values
saltdist	distance to salt water in meters	5-35
shelter	shelter expressed as a percentage	0-100
view	total view in degrees	20-330
freshwat	distance to fresh water in meters	5-200
stream	distance to the nearest stream mouth	5-200
location	1=island 0=mainland	0-1
topo	local topography: indented, straight, or protruding coastline	-10-10
drain	drainage ranked on a scale of 1 to 4	1-4

Maritime Archaic Indian

Table 5-16 Summary of strongest Pearson's correlation coefficients for Maritime Archaic Indian sites

Positive Correlations	Strength	Significance	Number of Cases
freshwat & stream	0.9924	0.008	4
Negative Correlations	**Strength**	**Significance**	**Number of Cases**
saltdist & topo	-0.9683	0.032	4

The Maritime Archaic Indian sample is very small (n=4) and for this reason the analysis contains very high margins of error and few correlations were significant at the 0.1 level. As with all the other cultures, the distance to fresh water and the distance to stream mouths are nearly identical, creating a very strong positive correlation between the two. Maritime Archaic sites located on points, peninsulas or headlands are found closer to salt water, than sites on less prominent topographic features.

Groswater Palaeo-eskimo

Table 5-17 Summary of strongest Pearson's correlation coefficients for Groswater Palaeo-eskimo sites

Positive Correlations	Strength	Significance	Number of Cases
freshwat & stream	1.0000	0.000	4
Negative Correlations	**Strength**		**Number of Cases**
freshwat & drain	-1.0000	0.000	4
location & saltdist	-0.9646	0.002	6
shelter & view	-0.8330	0.020	6

The Groswater Palaeo-eskimo sample (n=6) is slightly larger than the Maritime Archaic sample. As before, the fresh water and stream mouth variables correlate

perfectly. Island sites tend to be found closer to salt water than mainland sites and well sheltered sites tend to have a much reduced view compared to more exposed sites. There is a perfect negative correlation between sediment type and the distance to fresh water and stream mouths, indicating that well drained sites are closer to fresh water sources.

Dorset Palaeo-eskimo

Table 5-18 Summary of strongest Pearson's correlation coefficients for Dorset Palaeo-eskimo sites

Positive Correlations	Strength	Significance	Number of Cases
freshwat & stream	1.0000	0.000	7
location & topo	0.7454	0.034	8
Negative Correlations	**Strength**	**Significance**	**Number of Cases**
shelter & saltdist	-0.6276	0.096	8

The size of the Dorset Palaeo-eskimo sample was eight. The distance to fresh water and the distance to the stream mouths at the Dorset Palaeo-eskimo sites correlated perfectly. There was also a fairly strong positive correlation between island location and prominent landforms. The more sheltered sites tend to be located closer to the shore than unprotected sites.

One interesting correlation that is present in all the other cultures but absent in the Dorset Palaeo-eskimo sample is the strong negative correlation between ocean view and shelter. At other cultures' sites, as shelter increases the view is diminished and as shelter decreases the view is wider. In the Dorset Palaeo-eskimo sample these variables show no such correlation.

Table 5-19 Summary of strongest Pearson's correlation coefficients for the Recent Indian sites

Positive Correlations	Strength	Significance	Number of Cases
freshwat & stream	1.0000	0.000	8
saltdist & freshwat	0.8024	0.017	8
saltdist & stream	0.8024	0.017	8
view & freshwat	0.7662	0.027	8
view & stream	0.7662	0.027	8
saltdist & view	0.7344	0.024	9
view & topo	0.7210	0.028	9
Negative Correlations	**Strength**	**Significance**	**Number of Cases**
saltdist & shelter	-0.8976	0.001	9
shelter & freshwat	-0.8584	0.006	8
shelter & stream	-0.8584	0.006	8
shelter & view	-0.8371	0.005	9
drain & freshwat	-0.6849	0.090	7
drain & stream	-0.6849	0.090	7

Pearson's correlation coefficients were calculated for the nine Recent Indian sites. The Recent Indian sites, like most of the others, have a perfect positive correlation between the distance to fresh water and the distance to stream mouth. Well sheltered sites tend to be the closest sites to the shore, as well as the closest to fresh water and stream mouths. Well drained sites and those close to the shore also tend to be close to fresh water and stream mouths. The view of salt water at Recent Indian sites has strong positive correlations with peninsulas, points, or headlands, with the distance to salt water, and with the distance to fresh water or stream mouths. View is negatively correlated with shelter. In other words the Recent Indian sites with the most panoramic views are

found on headlands, peninsulas, or points, far from salt water and fresh water, and in fairly exposed areas.

All Palaeo-eskimo

To generate a larger sample size the Groswater Palaeo-eskimo, Dorset Palaeo-eskimo, and Unknown Palaeo-eskimo samples were combined into a generic Palaeo-eskimo category (n=15) which allows some general differences between Indian and Palaeo-eskimo patterns to be examined.

Table 5-20 Summary of strongest Pearson's correlation coefficients for all Palaeo-eskimo sites

Positive Correlations	Strength	Significance	Number of Cases
freshwat & stream	1.0000	0.000	12
saltdist & freshwat	0.5806	0.037	13
saltdist & stream	0.5839	0.046	12
Negative Correlations	**Strength**	**Significance**	**Number of Cases**
location & saltdist	-0.7578	0.001	15
shelter & view	-0.4496	0.093	15

As usual the fresh water and distance to stream mouth variables were perfectly positively correlated. Sites which are more distant from fresh water/stream mouths are found farther from the shore. The sites on the mainland tend to be placed farther from the shore than sites on the islands. The best sheltered Palaeo-eskimo sites tend to have the narrowest view while the sites with wider views tend to be poorly sheltered.

All Indian

Table 5-21 Summary of strongest Pearson's correlation coefficients for all Indian sites

Positive Correlations	Strength	Significance	Number of Cases
freshwat & stream	0.9960	0.000	12
view & freshwat	0.7880	0.002	12
view & topo	0.7625	0.002	13
view & stream	0.7614	0.004	12
Negative Correlations	**Strength**	**Significance**	**Number of Cases**
shelter & view	-0.7542	0.003	13
shelter & freshwat	-0.6073	0.036	12
shelter & stream	-0.5859	0.045	12
topo & shelter	-0.4994	0.082	13

The Maritime Archaic Indian and Recent Indian samples were also combined to see if a generalized Indian pattern could be determined. The distance to stream mouths and the distance to fresh water again correlated nearly perfectly. The Indian sites with the greatest view tend to be located on coastal features such as points, peninsulas or headlands, have the poorest shelter, and are the farthest from fresh water/stream mouths. Well sheltered sites tend to be situated along straight or indented sections of coast and are found close to fresh water and stream mouths.

Summary

In this chapter the environmental parameters measured at each site were explained and critically examined. By recording the sites' individual physical features it was possible to pick out culturally specific patterns in site placement. There is quantifiable evidence, for example, that Recent Indian sites tend to be closer to fresh water than all

other cultures and that Groswater Palaeo-eskimo have wider views and less shelter than other sites. In the final chapter I will pull these individual elements together and attempt to make sense of each culture's patterns in site placement.

CHAPTER 6 SUMMARY AND INTERPRETATIONS

In this chapter I compile the patterns described in Chapter 5, interpret them with reference to the geography and resources of Burgeo, and relate them to other settlement and subsistence research in the Province. The general trends seen in the data are discussed first, followed by the specific patterns of the Maritime Archaic Indian, Groswater Palaeo-eskimo, Dorset Palaeo-eskimo, and Recent Indian peoples living in the Burgeo area.

General Site Patterns

Before considering the differences between the four groups it is useful to consider the qualities that all of their sites share. The sites are not arranged haphazardly across the landscape - their locations were carefully considered by the people who inhabited them.

All of the sites are close to the shore. The mean distance from a site to the present shore is around 10 meters, with no sites farther than 35 meters from the present coast. The sites are also located at low elevations, with none found above 6 m above present sea level. However, when the rising sea level is considered some sites were originally as high as 12 meters above their contemporary sea level. This survey was focused on a coastal area so it may be expected that people were there to exploit the marine environment and would choose to camp as close to the shore as was comfortable. The same pattern is seen

in the placement of houses and cabins around Burgeo today. People living along the coast now place their homes just as close to the sea as did the ancient inhabitants.

Sites were always found on level or nearly level ground, with a mean slope of 2.3° from the horizontal. No sites had slopes greater than 11.5°. This is a significant limiting factor to site location. The Burgeo Islands and the coast to the east are extremely steep and rugged. In many of the long bays and fjords, level ground is rare and often the only suitable ground for an encampment is located at the head of the bay and around smaller stream mouths entering the bay. The islands are equally steep and a circumnavigation of any one of them will reveal only a handful of locations level enough to camp on with an adjacent beach for landing small watercraft, such as kayaks or canoes.

Level ground makes the sites more comfortable and accessible, which may also be why most sites are found on sand or gravel. These sediments offer better drainage than clay or silt, but are not as irregular and uncomfortable as beach cobbles.

The majority of sites had a fresh water source within 50 meters, although, as will be discussed, the mean distance to water varied with each culture. The greatest distance to fresh water was 200 m. In addition, the most direct route to fresh water was usually along the shore to where a stream flowed into the ocean, which gives the impression that people moved up and down the coast in search of resources rather than back and forth into the interior. This is another indication that the people were focused on coastal and marine resources.

This focus on the marine environment can also be seen in the importance placed on sites with good access to salt water. Protruding coastal features like headlands,

peninsulas, tombolo necks and points were favourite locations for sites, as were straight stretches of coast like linear beaches and rocky shores. Only 10% of the sites were placed on indented landforms such as bays and fjords. These indented sections of coast afford improved shelter from the elements, but do not provide the wide panoramic views of the ocean available from more prominent points.

A consistent pattern in most of the cultures is that sites with good views of the water have poor shelter and vice versa. The desire to be near to the water and have a good view of the ocean must be balanced with the need to be sheltered from the elements. On average this balance was tipped slightly in favour of shelter with most sites being sheltered from 5 of 8 directions (60% of the horizon) and having open salt water views of at least 152° (42% of the horizon).

Sometimes it is not enough to have a well-sheltered site, especially if that shelter does not protect you from the most severe weather. Most sites are sheltered from the southwest. Wind throughout the year is predominantly from the west or east, but weather from the southwest is often very severe because the wind is crossing the open Atlantic. The wind piles the water against the shore, creating very rough seas. On the other hand, wind from the north is off the land and pushes the water away from the shore producing relatively calm water. The southwest sides of most of the islands are very steep and rugged, scarred by the greater wave action and fierce storms from this direction. Spring and summer winds are frequently from the east while fall and winter winds are from the west. All of the cultures are relatively exposed to the east and sheltered from the west.

which may suggest fall or winter occupations for the sites. Seasonality of the sites will be discussed in greater detail for each of the cultures in the upcoming sections.

- ☑ Near shore location: within 35 m of the coast
- ☑ Low elevations: below 6 meters above present sea level/ 12 meters above contemporary sea level
- ☑ Level ground: no sites on slopes exceeding 11.5° from the horizontal
- ☑ Well drained, comfortable ground: most commonly sand or gravel
- ☑ Available fresh water along the coast: most within 50 m
- ☑ Prominent topographic feature or straight sections of coast are preferred
- ☑ Shelter and view are both related to the type of landform the site is on
- ☑ Good shelter: especially from the southwest & west, often exposed to east

Figure 6-1 Patterns visible in all sites (n=39)

In this section I established a baseline pattern, a set of environmental parameters which all of the sites share. As these parameters were consistent across all of the cultures they may provide useful references for future site surveys along the southwest coast. In the upcoming sections the unique patterns of each of the four cultures are discussed. Patterns will emerge as the environmental parameters for each culture deviates from the baseline pattern established above.

Maritime Archaic Indian

Four Maritime Archaic Indian sites were recorded and several more isolated finds were reported. The sites visited this summer must have originally been at unusually high elevations, from 7 to 12 m above their contemporary sea level, in order to have survived rising relative sea level. Maritime Archaic Indians appear to have located sites at higher elevations than later cultures, although lower sites must have also existed and been submerged. At least one Maritime Archaic Indian artifact was found below sea level off of Upper Burgeo (CjBk-6) (Figure 6-2). It seems plausible that there were more sites located at lower elevations and that they have all been lost due to rising relative sea level.

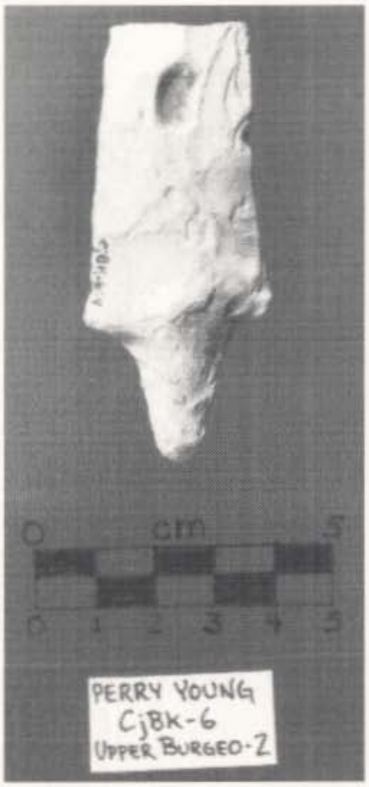

Figure 6-2 Maritime Archaic stemmed point found off of Cornelius Island

Today the Maritime Archaic Indian sites which are found closest to salt water are located along protruding coastlines, although with approximately 6 m of sea level rise since these sites were occupied it is difficult to say if this was true in the past. I can say with more confidence that three of the four sites were originally on the mainland, and only one was on an island.

Two Maritime Archaic Indian sites shared a topographical feature that was not present at any other site of any other culture. They were located in the lee of rocky ledges

which, judging by the depth of cultural deposits, would have been several feet high at the time of occupation. These ledges were on the north (CjBj-3) and northeast (CjBj-13) edges of the sites. Gus Melbourne excavated the shovel tests at both sites and observed that the artifacts, especially debitage, were more abundant closer to the cliff.

☑ Unusually high elevations/greatest range – up to 12 m above contemporary sea level
☑ Submerged sites
☑ Sites along protruding coastlines are the closest to salt water
☑ Rocky ledges may have been preferred

Figure 6-3 Patterns visible in Maritime Archaic Indian sites (n=4)

The Maritime Archaic Indian sample was very small, but it still suggests that these earliest inhabitants of Burgeo preferred mainland sites over island sites, used a wide range of elevations, and may have selected sites sheltered by low rocky ledges.

Groswater Palaeo-eskimo

Six Groswater Palaeo-eskimo sites were visited and recorded. They were all on the mainland and islands adjacent to the town of Burgeo.

Groswater Palaeo-eskimo sites afforded the widest view of the ocean of any of the cultures studied, averaging a view of greater than half the horizon (187°). Having a panoramic ocean view to monitor marine resources seems to have been more important than having a well-sheltered site, since the Groswater Palaeo-eskimo sites also had lower than average shelter. The most exposed sites the Groswater Palaeo-eskimo people

occupied were on points and headlands. The more sheltered sites were found along straight sections of coast, facing the ocean in only one direction.

The Groswater Palaeo-eskimos were especially careful to place their sites so that they would be sheltered from the southwest and west. As the westerly winds are most common and severe along the Burgeo coast between September and March this may indicate that the Groswater Palaeo-eskimos were in the area during the fall or winter.

Despite the emphasis on the marine environment implied by their wide ocean views the Groswater Palaeo-eskimo sites are rarely found on what would have been islands at the time of occupation (Figure 6-4). The Groswater Palaeo-eskimo sites on the mainland outnumber island sites by 5:1. The reason for this may be that the mainland sites would offer a more flexible and diverse resource base. From them the marine environment could be monitored as well as the caribou and furbearers which frequent the mainland coast during winter.

The Groswater Palaeo-eskimos placed an extremely low emphasis on access to fresh water. Only one site had a nearby water source and it was 115 m away. Three others did not have fresh water sources within 250 m of the site. There are two explanations for this: 1) the sites may have been occupied in the winter or 2) the monitoring of unpredictable resources took precedence over convenient access to fresh water.

The first explanation assumes that they were not transporting water from great distances and that they were occupying the sites at a time when snow could be melted for water. The Burgeo Coast Archaeological Research Project was biased in its approach to

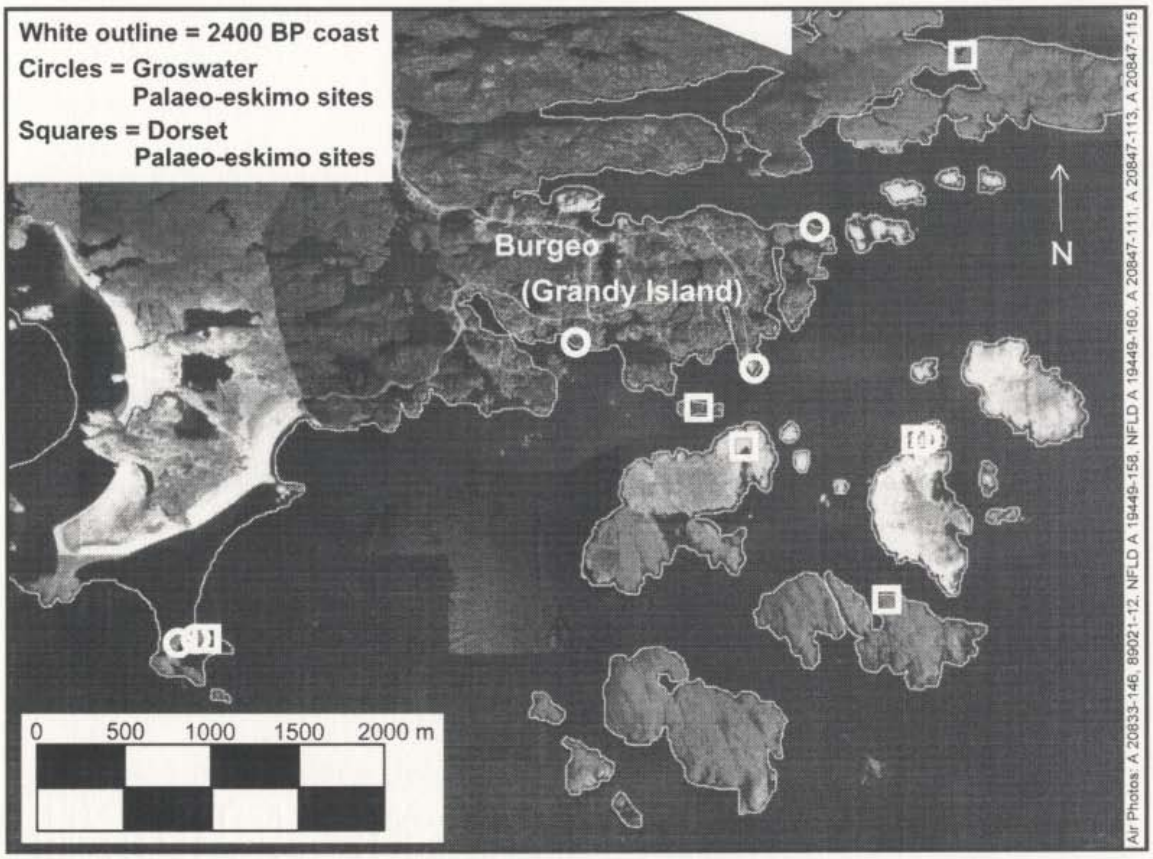

Figure 6-4 Inner and outer coast Palaeo-eskimo sites: notice that the Groswater Palaeo-eskimo sites hug the mainland, while the Dorset Palaeo-eskimo sites are concentrated on the islands.

recording the availability of fresh water because the survey was conducted in the summer. The most obvious source of fresh water in the summer, and the primary one recorded for Indian sites is running streams. However, in the winter these streams are not reliable sources of fresh water, as they freeze and are blanketed by snow and ice. In the winter, the most reliable source of fresh water is snow. It is plausible that the Groswater Palaeo-eskimos were visiting the Burgeo coast during a time of the year when snow was a more reliable source of fresh water than were running brooks.

The second possible reason for the low emphasis on fresh water could be related to resource monitoring. The position of the sites and the panoramic views recorded at them suggest that the Groswater Palaeo-eskimos were interested in monitoring many different resources. When people are faced with resources which have a known location but unpredictable timing, such as migrating seals, they position themselves to monitor those resources at the expense of predictable resources, like fresh water. The ocean must be continuously watched for seals but the fresh water brooks could be left unsupervised because they are not going to swim away.

Groswater Palaeo-eskimo sites were originally placed as high as 9.3 m above contemporary sea level, this is not so high as some of the Maritime Archaic Indian sites, but it is twice as high as the later Recent Indian sites. Higher elevations may have been selected to provide better vantage points for monitoring resources. The elevations may also support the idea that the Groswater Palaeo-eskimo were visiting Burgeo in the winter. It makes sense that they would place their sites at higher elevations than people visiting the area in the summer, because winter storms are severe and it would be desirable to put a couple of extra meters of dry land between the floor of one's home and the frigid waters of the Atlantic.

☑ Widest ocean view of all the cultures (mean=187°)

☑ Lower than average shelter

☑ Exposed sites on points and headlands, sheltered sites along straight coastlines

☑ Frequent shelter from the southwest and west

☑ Preferred mainland over island sites 5:1

☑ No emphasis on fresh water: most sites have no fresh water sources

☑ Elevations up to 9.3 m above contemporary sea level

Figure 6-5 Patterns visible in Groswater Palaeo-eskimo sites (n=6)

The Groswater Palaeo-eskimo sites were established in exposed areas on the mainland which provided wide panoramic views of the ocean. The locations appear to have been selected to monitor a wide range of terrestrial and marine resources. Cold season occupation of the area is suggested by 1) the directions of shelter preferred, 2) the de-emphasis on streams as fresh water sources, and 3) the frequent use of high elevations.

The flexible, generalist Groswater Palaeo-eskimo settlement and subsistence strategies observed by Renouf (1993) and LeBlanc (1996) on the west coast of Newfoundland can also be seen in the Burgeo area. The Groswater Palaeo-eskimo sites are placed on the mainland and inner islands, very close to the present day community of Burgeo (Figure 6-4). From this position they could monitor a wide range of terrestrial and marine resources. They had access to deep-water resources to the east in Bay de Loup, to shallow-water resources around Sandbanks Park, to the islands and channels south of Burgeo and to the interior resources to the north.

Dorset Palaeo-eskimo

Most of the eight Dorset Palaeo-eskimo sites are clustered in the same general area as the Groswater Palaeo-eskimo sites – around the town of Burgeo. However, the Dorset Palaeo-eskimos focused on the islands in the Burgeo group rather than the mainland (Figure 6-4). They preferred island sites over mainland sites (5:3). This is consistent with their settlement patterns elsewhere in Newfoundland and Labrador. This outer coastal setting gave them better access to the channels and islands around Burgeo, the deep-water resources in Bay de Loup, and the shallow water resources off of Sandbanks Park. However, it limited their access to the interior resources. The Groswater Palaeo-eskimo emphasis on mainland and inner island locations placed them in a flexible position to exploit a variety of marine and terrestrial resources. The Dorset seal hunting specialists focused on the outer islands and the various seal species available.

When their sites are on the mainland they tend to be on less prominent sections of coast, which do not jut out into the water. However, the Dorset Palaeo-eskimo sites on islands are in completely different settings – they are on necks, headlands, and points extending out into the water. The principle motive behind the placement of Dorset Palaeo-eskimo sites on such protruding land features appears to be a desire to maximize access to the marine environment. Sites on the mainland are not placed on prominent landforms and do not appear to have been selected for maximum access to the ocean.

The Dorset Palaeo-eskimo seem to have placed sites near attractive waterways, rather than terrestrial pathways. They were very comfortable moving across open water. Sites on tiny islands, like CjBj-25 on Eclipse Island, were definitely placed to exploit the

marine environment, as the island itself is too small to offer anything in the way of terrestrial resources (Figure 6-6). The Dorset Palaeo-eskimos appear to have been trying to live as close to the salt water as possible. This suggests they were more focused on marine resources and placed less emphasis on interior resources than the earlier Groswater Palaeo-eskimos.

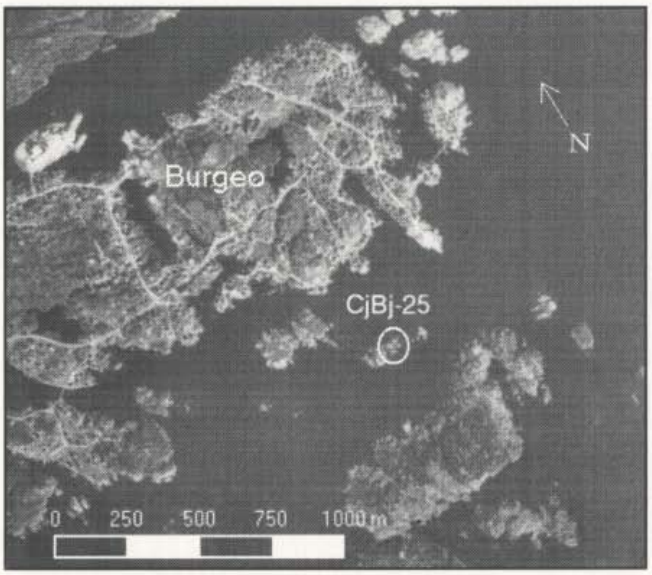

Figure 6-6 Aerial Photo of CjBj-25 on Eclipse Island

The Dorset Palaeo-eskimo sites were closer to the shore than Groswater Palaeo-eskimo sites with ranges in elevation up to approximately 8 m above their contemporary sea level. The Dorset Palaeo-eskimo sites also average 10 or 11 m from the present shore.

The Dorset Palaeo-eskimo people had very specific taste in islands and locations on islands, often selecting sites with access to the sea in more than one direction. Shallow coves suitable for launching or landing watercraft are rare on the Burgeo Islands, but five of the eight Dorset Palaeo-eskimo sites are located on very narrow necks of land or tiny islands, with access to two or more such coves. This pattern does not show up for either the Groswater Palaeo-eskimo or Recent Indian sites.

One of the unusual features of the Dorset Palaeo-eskimo sites is a relatively narrow view of the salt water. It seems odd that a group who preferred to place their sites on islands or on prominent coastal features would have a mean view of ocean water of only 114°. The high Groswater Palaeo-eskimo mean (187°) seems more in line with an ocean-oriented culture who tend to locate themselves relative to the marine environment. Perhaps this apparent anomaly may be explained by the Dorset Palaeo-eskimo preference for sites with access to more than one channel or body of water. These sites may provide better access to marine resources in different directions from the site, but they do not provide as wide of an ocean view as a site located at the tip of a narrow headland jutting out into the Atlantic (see Figure 6-7). The Dorset Palaeo-eskimo appear to be de-emphasizing resource monitoring in order to improve physical access to specific channels and harbours.

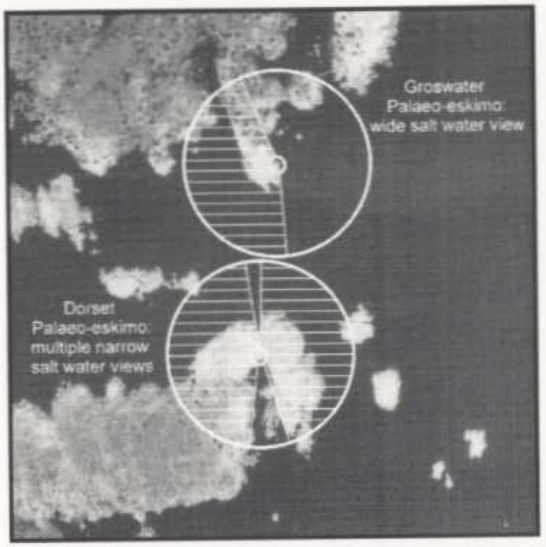

Figure 6-7 Impact of topography on view and access to salt water. Hatching = land view, Open = salt water view. The Groswater Palaeo-eskimo site is located on the east side of a headland and has a panoramic view of the ocean to the east, but a blocked ocean view to the west. The bottom Dorset Palaeo-eskimo site sits on a narrow neck which provides access to salt water channels to the north and south, but a very poor view of the ocean.

☑ Prefer islands over mainland 5:3

☑ Island sites are located on prominent headlands, necks, and points

☑ Mainland sites are on less conspicuous sections of beach or rocky shores

☑ Sites were originally up to 7.9 meters above sea level

☑ Access to salt water in two or more directions

☑ Very narrow ocean view; average 114°

Figure 6-8 Patterns visible in Dorset Palaeo-eskimo sites (n=8)

Schwarz (1994) suggested that the Dorset Palaeo-eskimo made winter and spring use of Newfoundland's coast. The fact that all of the Dorset Palaeo-eskimo sites at Burgeo were sheltered from the southwest or west suggests that they were occupied during the winter. The winter, especially from December to April, also sees small but predictable numbers of harp and hooded seals migrating into the area. We know from elsewhere in the province that the Dorset Palaeo-eskimo relied on harp seals, so they may have been attracted to the mild climate and harps available at Burgeo in the winter.

Models of Dorset Palaeo-eskimo settlement patterns in Newfoundland suggest that they established large residential base camps and smaller satellite camps. In his examination of Palaeo-eskimo settlement patterns, Pastore (1986a) distinguished base camps from satellite or logistical extraction camps by their size. He considered sites over 1000 m^2 to be base camps. Based on limited shovel testing, none of the Burgeo sites appear to exceed 1000 m^2. The two Dorset Palaeo-eskimo sites approaching this size, CjBj-6 and CjBk-3, are multi-component sites whose size may be a factor of the same

area being used by different cultures at different times, rather than a large or recurrent Dorset Palaeo-eskimo occupation.

Given the frequency of Dorset Palaeo-eskimo sites on the islands surrounding Burgeo and the intensity of European occupation on Grandy Island, it is possible that large residential base camps existed on Grandy Island and were destroyed by the development of modern day Burgeo. However, none of the local collectors were aware of large sites on Grandy Island even though several small sites are known. If any large sites had been found, then someone would have artifacts in their collection. I think it is unlikely that the Dorset Palaeo-eskimo base camps ever existed, because the resources around the Burgeo Islands could be more efficiently exploited by small numbers of people and would not support large base camps. The resources are very diverse and most are predictable temporally and/or spatially, but they lack the intensity of numbers seen at locations where the Dorset Palaeo-eskimo established large sites, such as Cape Ray, Port au Choix, or Stock Cove. Burgeo's resources require a more flexible response and could not support large numbers of people without impacting the resources. This is especially true of non-migratory species, like the harbour seal, who are vulnerable to over-exploitation. It does not appear that the Dorset Palaeo-eskimo established large residential base camps within the study area. They appear to have adopted high residential mobility and low logistical mobility, moving their residence from resource to resource (Figure 2-1). Even sites on tiny islands, such as CjBj-25 (Figure 6-6) have every indication that they were small residential sites and not special-purpose satellite camps tied to a larger base camp. The artifacts found on the surface of CjBj-25 included

endblades, bifaces, unifaces, scrapers, microblades, microblade cores, and soapstone which suggests that a variety of domestic activities were carried out at the site. The wide range of artifacts found at most of the Palaeo-eskimo sites gives the impression that they were small, self-contained residential sites.

Dorset Palaeo-eskimo settlement along the Burgeo coast fits with the observations elsewhere in Newfoundland and Labrador that they preferred outer coastal locations. This, combined with their preference for sites providing access to salt water channels and not terrestrial habitats further gives the impression that they focused more narrowly on marine resources than the preceding Groswater Palaeo-eskimo. However, the apparent absence of large base camps in the area suggests that they adopted a more residentially mobile settlement strategy in the Burgeo area than on the west coast or farther east at Stock Cove. While the enormous herds of harp seals migrating along the west coast allowed the Dorset Palaeo-eskimo to specialize on a single species in that area, their settlement and subsistence strategies were flexible enough to allow them to adapt to the diverse, although less abundant, resources along the Burgeo coast.

Recent Indian

The Recent Indians, especially the earlier Recent Indian groups, focused on a completely different section of the coast than the Palaeo-eskimos. Instead of clustering on the Burgeo Islands five of their nine living sites are found in the Big Barasway. The Big Barasway offers protection from storms off of the Atlantic and its waters are always

calmer than the seaward side of the barrier. It would also give the Recent Indians better access to the interior.

In contrast to the island-hopping Dorset Palaeo-eskimos, the Recent Indians preferred to stay on the mainland. Six of the nine Recent Indian living sites were on the mainland, with only three sites being found on islands. This is the inverse of the Dorset Palaeo-eskimo pattern, and argues for stronger ties to the interior and relatively less comfort in crossing open salt water.

However, not *all* Recent Indian sites are on the mainland. One of the most notable exceptions is the Beothuk burial site on Rencontre Island (CjBj-2) which, when combined with little evidence for camp sites on the islands, suggests a different attitude towards the Burgeo Islands from the earlier Palaeo-eskimo inhabitants. The islands may have made good places for the dead to rest, but they were not good places to live. The two other Recent Indian sites on the Burgeo Islands appear to be later sites than most found in the Big Barasway. CjBj-7 on Cornelius Island was dated to 350 +/- 60 BP and had a scraper made from European flint, as did CjBj-10 on the Recent Indian site on Grandy Island. The Beothuk may have been attracted to the islands by a seasonal European presence[1] while earlier Recent Indian cultures shunned the islands and avoided the Dorset Palaeo-eskimo who used the area.

The Indian sites are found very near major brooks. The average for both the Maritime Archaic Indians and the Recent Indians was between 20 and 30 m to the nearest

[1] See Pastore's (1984, 1985, 1986b) research at the large Beothuk site at Boyd's Cove in Notre Dame Bay for a precedent.

source of fresh water. Aside from the basic need for drinking water there are a number of factors which may contribute to the Indian preference to be near to fresh water brooks: 1) the brooks provide passageways to the interior, 2) they are seasonally full of salmon, smelt, eels, and trout, and 3) the Indians may have been in the area during a warm season when brooks were flowing and provided the most reliable source of fresh water. Following this project's fieldwork, Gus Melbourne found two sites along Grandy Brook, including one with Recent Indian artifacts. These sites are several kilometres from the coast and must have been placed to exploit interior and fresh water resources.

The Recent Indian sites show the greatest variability in their view of the ocean. Salt water views ranged from 20° to 330°. Part of this variability can be explained by whether or not the site is located inside the Big Barasway. The five Recent Indian sites inside the Big Barasway had a mean ocean view of 210°, while sites located outside the barasway averaged an ocean view of only 140°. A recurring theme in the selection of sites is the balance between view and shelter. Along much of the Burgeo coast a site with a good ocean view will be exposed and poorly sheltered, and a well sheltered site will afford a poor ocean view. The Big Barasway, however, allows good access to salt water and offers better than average protection from the elements. The Recent Indian preference for sites in the Big Barasway takes advantage of the natural shelter of the area and also allows a wide view of the waters inside the barasway. This was an important solution to resolving the balance between shelter and view.

The balance between shelter and view was also affected by the shape of the coast that the site was sitting on. To increase their view of the ocean both the Recent Indians

and Maritime Archaic Indians placed sites on protruding coastal features like headlands, necks, and points. However, this was at the cost of shelter. To increase shelter and protection from the elements they would select sites along straighter sections of coast or on indented bays and coves.

The Recent Indian sites also have the lowest range of elevations, with no sites found exceeding 5 m above their contemporary sea level. This may be related to seasonality or the frequency of site's located within the Big Barasway. Unlike the Palaeo-eskimo sites on the Burgeo Islands the sheltered Recent Indian sites inside the Big Barasway did not need to be protected from tall waves crashing against the shore.

For most cultural groups, the southwest is the only direction that is consistently sheltered. The Recent Indian sites, however, are also frequently sheltered from the north or northwest. This may be in response to storms from those directions, but it is also very likely related to the decision to place sites on the mainland and inside the Big Barasway. These areas are exposed to the south and protected from the north by default – it would be difficult to place a site in these areas which were *not* sheltered from the north or northwest.

Finally, the Recent Indian use of the Big Barasway gives a strong indication of the seasonality of those sites. The Big Barasway freezes over in the winter, suggesting that the sites within it would have been occupied during the summer.

☑ Most common culture in the Big Barasway

☑ Mainland preferred over islands (6:3)

☑ Closest to fresh water - 29.5 m

☑ Excellent view of salt water inside the Big Barasway: average 210°

☑ Reduced view outside of Big Barasway: average 140°

☑ Good view from sites on islands and prominent landforms

☑ Good shelter on straight or indented coasts

☑ 1.5 to 5.0 masl - lowest range of sites

☑ Most sites are sheltered from the north or northwest

Figure 6-9 Patterns visible in Recent Indian sites (n=9)

Although the Recent Indian sites tend to be exposed to the east winds of summer and sheltered from the west winds of winter, I believe that there is stronger evidence to support a warm season occupation of the area. This is suggested by 1) unusually low site elevations, 2) the placement of sites next to fresh water streams which would be frozen in the winter, and 3) the placement of site insides the Big Barasway, which also freezes in the winter.

A summer time occupation of the coast is consistent with both Rowley-Conwy's (1990) and Schwarz's (1994) models of Recent Indian settlement and subsistence. The locations of the Recent Indian sites in the Big Barasway, along Grandy Brook, and in bays also supports the argument that these peoples were interior oriented. The two day BCARP survey of the Big Barasway was not adequate to establish whether or not any of the Recent Indian sites could be considered base camps, such as those hypothesized by

Rowley-Conwy (1990). However, their presence may be inferred. One of the Recent Indian sites in the Big Barasway, CjBk-4 is located on a tiny island near the middle of the lagoon. It was completely exposed, did not have any fresh water on it and seemed too small to live at for very long. The only artifacts found at the site were hunting equipment, including projectile points and simple processing tools like bifaces and linear flakes. This appears to have been a temporary logistical extraction camp. Two modern hunting blinds were located on the same island, evidence that 20th century logistical trips had been made to the same island for goose hunting. If CjBk-4 is a temporary hunting station it implies that a residential base camp is nearby – perhaps one of the well sheltered Recent Indian sites near a brook on the western shore of the Big Barasway.

The Big Barasway is quickly being developed as a summer retreat area for residents of Burgeo and nearly every cabin owner along its west shore has found artifacts around his cabin. Excavations of the sites so far recorded and a survey for additional sites could contribute greatly to our understanding of the last 2000 years of Indian occupation in Newfoundland.

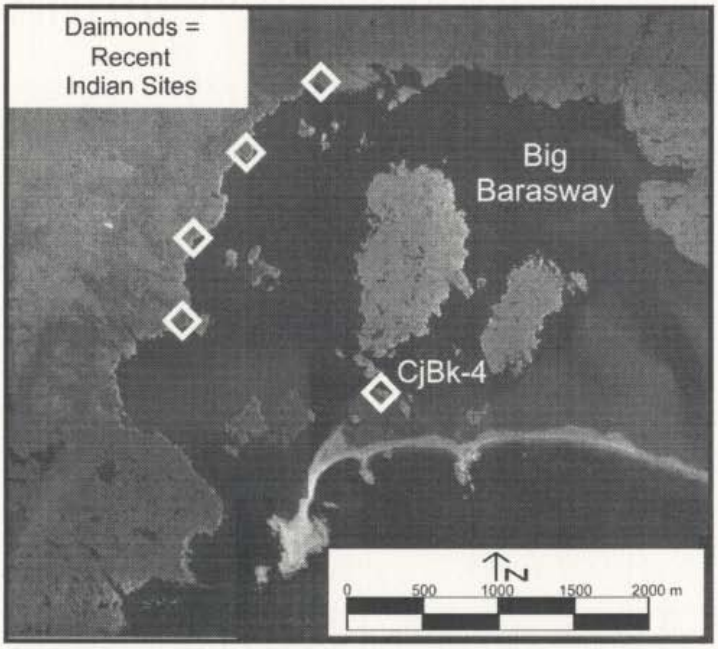

Figure 6-10 Location of CjBk-4; potential Recent Indian logistical extraction camp.

Conclusions

In this thesis I addressed the questions: 1) are there patterns in the distribution of Burgeo's precontact sites? and 2) if there are patterns in site placement, what are they and do they differ between the Maritime Archaic Indians, Groswater Palaeo-eskimo, Dorset Palaeo-eskimo, and Recent Indian?

By measuring the environmental parameters of each of the Burgeo sites I have demonstrated that, yes, there are patterns and that they do differ between the four groups.

The mild climate and absence of sea ice makes Burgeo a comfortable place to live year round. Its diverse marine, terrestrial, and fresh water habitats contain a variety of species which would have been attractive to hunter-gatherers. The first people to visit Burgeo, the Maritime Archaic Indians left behind traces up and down the coast. The combination of deep and shallow water, as well as channels and terrestrial resources attracted the Palaeo-eskimo to the Burgeo Islands. The Groswater Palaeo-eskimos settled on the mainland and inner islands, while the later Dorset Palaeo-eskimos chose the outer islands. In contrast, the combination of shallow water, fresh water, shelter, and interior resources found in the Big Barasway met the needs of the Recent Indians.

This research has contributed to our understanding of precontact settlement patterns in Newfoundland in general, and at Burgeo in particular. In addition, it demonstrated the importance of considering the effects of relative sea level when examining any archaeological sites in Newfoundland and Labrador.

The results also have predictive potential and may be useful in future surveys on the southwest coast. The patterns observed in the locations of known sites may help

predict the locations of unknown sites. The data could be used in conjunction with air photo mapping or in a geographical information system to create sensitivity maps of the southwest coast, showing areas with high or low probabilities of containing archaeological resources. This would benefit research or consulting archaeologists doing working in the area by saving time and money in future southwest coast surveys and assisting in locating sites before they slip beneath the waves.

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APPENDIX I: THE FLORA AND FAUNA OF BURGEO

Table I-1 Flora of Burgeo (Damman 1983: 165, 185-186)

LATIN NAME	COMMON NAME
Pleurozium schreberi	feather-moss
Hylocomium splendens	feather-moss
Cladonia spp.	caribou lichen
Sphagnum spp.	sphagnum moss
Dicranum spp.	moss
Rhytidiadelphus spp.	moss
Diapensia lapponica	moss lily
Loiseleuria procumbens	mayflower
Habenaria blephariglottis	lily
Schizaea pusilla	curly grass
Carex folliculata	sedge
Juncus militaris	rush
Myriophylum tenellum	water milfoil
Empetrum nigrum	crowberry
Empetrum eamesii	blackberry
Kalmia angustifolia	sheep laurel
Rhododendron canadense	rhodora
Vaccinium angustifolium	hurts
Vaccinium vitis-idaea	partridgeberry
Gaylusacia dumosa	huckleberry
Nemopanthus mucronate	foxberry
Viburnum cassinoides	thresher-wood berry
Sorbus decora	dogberry
Larix laricina	tammarack
Acer spicatum	mountain maple
Acer rubrum	red maple
Pinus strobus	eastern white pine
Abies balsamea	balsam fir
Alnus rugosa	red alder
Alnus crispa	brown alder
Picea mariana	black spruce
Picea gluaca	white spruce
Betula papyrifera	silver birch
Betula lutea	yellow birch

Table I-2 Marine fauna and avifauna of Burgeo (Steele et al. 1979)

Latin Name	Common Name
Salmo salar	Atlantic salmon
Anguilla rostrata	American eel
Cancer irroratus	rock crab
Homarus americanus	American lobster
Placopecten magellanicus	giant scallop
Pandalus borealis	pink shrimp
Pseudopleuronectes americanus	winter flounder
Ammodytes hexapterus	sand lance
Pollachius virens	harbour pollock
Gadus Morhua	cod
Urophycis tenuis	white hake
Reinhardtius hippoglossoides	Greenland halibut
Mallotus villosus	capelin
Clupea harengus	herring
Cetorhinus maximus	basking shark
Ilex illecebrosus	short-finned squid
Oceandroma leucorhoa	Leach's storm-petrel
Larus argentatus	herring gull
Larus marinus	great black-backed gull
Larus delewarensis	ring-billed gull
Stern paradisea	arctic tern
Somateria mollissima	common eider
Haliaeetus leucocephalus	bald eagle
Phoca vitulina	harbour seal
Cystophora cristata	hooded seal
Phoca groenlandica	harp seal
Halichoerus grypus	grey seal
Globicephala melaena	long finned pilot whale
Phocoena phocoena	harbour porpoise
Balaenoptera musculus	blue whale
Balaenoptera physalus	fin whale
Balaenoptera borealis	sei whale
Balaenoptera acutorostrate	minke whale
Megoptera novaeanglae	humpback whale

Table I-3 Terrestrial mammals of Burgeo (Dodds 1983)

Latin Name	Common Name
Castor canadensis	beaver
Microtus pennsylvanicus	meadow vole
Ondatra zibethicus	muskrat
Canis lupis (extinct in the Province)	wolf
Vulpes deletrix	red fox
Ursus americanus	black bear
Mustela erminea	ermine
Martes americana	marten
Lontra canadensis	otter
Lynx canadensis	lynx
Myotis lucifugus	little brown bat
Myotis keenii	Eastern long-eared bat
Lepus arcticus	arctic hare
Rangifer tarandus	caribou (La Poile herd)

APPENDIX II: THE SITES

In this appendix I provide a brief description of each site, including a list of the diagnostic artifacts from the site, and a short interpretation of the site's cultural affiliation.

CjBj-1, Melbourne Site (Sot's Hole)

The Melbourne Site is located about 4 km northeast of Burgeo in the 500 m long narrow bay called "Sot's Hole" just south of the mouth of King's Harbour. It is located near a brook along the western shore of a small cove on the north side of Sot's Hole.

A discussion of this site was presented by Penney (1985:60). Penney examined five projectile points and four bifaces from the site and they were important in defining the Little Passage complex (Penney 1985:60,64). When we visited this site in 1997 there was nothing remaining on the surface and all shovel tests were negative. The site has eroded away.

Site Photo: Plate 1
Artifact Plates: none, see plates in Penney 1985
Collectors (Repository): Penney (Nfld. Museum), William Melbourne (Burgeo)

CjBj-2, Rencontre[1] Island

The Rencontre Island site is located on the south side of Rencontre Island, approximately 2 km south of Burgeo. It lies in a boulder rockfall on the north side of a cove.

[1] Rencontre is pronounced locally as "round-counter".

A Beothuk burial was found on this island in 1847, and the remains along with the associated burial items were presented to the Museum of McGill University, Montreal, by the Rev. Mr. Blackmore (Howley 1915:333). The discovery was published in the *Transactions* of the Royal Society of Canada in 1891 by Rev. George Patterson, and reprinted in its entirety in James P. Howley's *The Beothucks or Red Indians* (1915). The location of the burial is described as follows:

> They were (says Mr. Blackmore) found in the year 1847 on an island forming one of the lower Burgeo group called 'Rencontre.' This island is uninhabited and considerably elevated: difficult also of access in rough weather. It is in a great measure covered with broken fragments of rocks which have fallen from the heights. About half way up the mountain (if I may so term it), and in a hollow formed by a large piece of fallen rock, with every opening carefully closed by small pieces of broken rock, we found the bones of a human being wrapped closely round with birch rinds.... The place of interment was singularly wild, high up in a cliff overlooking a little cove facing the open sea, and only accessible on this side in very smooth water. (Howley 1915:334)

The southwest side of Rencontre Island is "facing the open sea", and there is only one cove on this side of the island which can be accessed by boat. This cove matches the description given in Howley's book in all regards and is known locally as the location of the burial. Recent Indian projectile points, birch bark, and lithic cores have been recovered from amongst the boulders in this cove by local collectors.

Site Photo: Plate 2

Artifact Plates: none
Collectors (Repository): Howley (Nfld. Museum). Perry Young (Burgeo). Derrick Mercer (Burgeo)

CjBj-3, Fox Point (Little Barasway 1)

The Fox Point site is located on the eastern end of Fox Point in Sandbanks Provincial Park, approximately 2.5 km southeast of Burgeo. It is unclear if this is the same location on Fox Point where Penney first found artifacts. The black silty cultural layer varies in depth from 20 cm below surface to 70 cm below surface over several square meters.

Penney originally found a flake and a 5.5 cm long tip fragment from a large plano-convex chipped and ground artifact in 1981. In 1997 we recovered slate fragments, fire broken rock, and 270 flakes. It is difficult to determine if the slate has been modified, but even so, it is not native to Fox Point and must have been carried there.

The large plano-convex biface fragment is reminiscent of the ground slate bayonets found in Maritime Archaic Indian contexts, such as the cemetery at Port au Choix. The debitage, which is much larger and of a coarser chert than usually found in association with Palaeo-eskimo artifacts, combined with the presence of fire broken rock also suggest a Maritime Archaic Indian designation for this site.

Site Photo: Plate 3
Artifact Plates: Plate 4
Collectors (Repository): Penney (Nfld. Museum). Rast (Nfld. Museum)

CjBj-4, Sandbanks Island 1

The Sandbanks Island 1 site is located on the north arm of the cove on the east side of Sandbanks Island, which is approximately 3 km southwest of Burgeo. Sandbanks Island has only become an island within the past two centuries. Early European residents of Burgeo walked cattle out to the island along a sandy tombolo beach to graze. On many maps, the island is still referred to as Sandbanks Point.

Artifacts originally recovered from this site by Penney included a tip flute spall, an endscraper, four microblades, a flake scraper and a biface. In 1997 we recovered three additional microblades, an asymmetric knife, and 16 flakes.

The microblades and endscraper indicate that the site was occupied by Palaeo-eskimos. The tip flute spall indicates a Dorset Palaeo-eskimo presence, while the asymmetric knife is typical Groswater Palaeo-eskimo.

Site Photo: Plate 5
Artifact Plates: none, see Penney 1985
Collectors (Repository): Penney (Nfld. Museum), Rast (Nfld. Museum)

CjBj-5, Morgan Island 1

The Morgan Island 1 site is found on the north side of Morgan Island, facing Burgeo. It is located above a storm beach approximately 300 meters northeast of the cemetery.

The site consists of chert flakes exposed on the surface in eroded peat at the shore's edge. Penney recovered a microblade core, three microblades and a biface. In 1997 shovel tests and surface inspection yielded only debitage.

The evidence for microblade manufacture and use at the site argues for a Palaeo-eskimo presence. The biface is not sufficiently diagnostic to determine a more specific cultural affiliation for this site.

Site Photo: Plate 6
Artifact Plates: Plates 7 & 8
Collectors (Repository): Penney (Nfld. Museum), Rast (Nfld. Museum)

CjBj-6, Cuttail Island

The Cuttail Island site is located on the north end of Cuttail Island, approximately 1 km southeast of Burgeo. It lies on a narrow neck of land bound on the east side by a cobble beach. Artifacts tend to be clustered on two small rises. The head at the north end of the neck and a flat area 100 m west of the site were also shovel tested, but both were negative. A feature consisting of three lichen-encrusted cobbles was observed on the surface of the site.

This is one of the most popular sites for collecting artifacts in Burgeo and there are several large collections from it. These collections contain plano-convex side notched endblades, chert burin-like tools, microblades, microblade cores, asymmetric knives, eared endscrapers, triangular endscrapers, large triangular knives, triangular endblades, and soapstone.

All diagnostic artifacts from the site are Palaeo-eskimo, with the majority being Groswater Palaeo-eskimo. Dorset Palaeo-eskimo is represented by a fragmentary rectangular soapstone vessel, a triangular endblade, and a possible tip-fluted preform.

The site is still well represented on the surface by debitage, but too few diagnostic pieces were recovered to determine if there was horizontal separation of Groswater

Palaeo-eskimo and Dorset Palaeo-eskimo at the site, nor could shovel testing confirm any vertical separation of the two occupations. The site has been heavily disturbed by digging for mud and artifacts and is being eroded by rising sea levels. In some areas the peat has been stripped away, exposing the site to additional weathering agents.

Site Photo: Plate 9
Artifact Plates: Plates 10 - 16
Collectors (Repository): Penney (Nfld. Museum), Derrick Mercer (Burgeo), Gus Melbourne (Burgeo), William Melbourne (Burgeo), Rast (Nfld. Museum)

CjBj-7, Upper Burgeo

The Upper Burgeo site is located on the eastern side of Cornelius Island, approximately 3 km southwest of Burgeo. It is located on a narrow grassy neck on the southern shore of a large squarish sandy cove.

Second only to Cuttail Island 1 (CjBj-6) in popularity with local collectors, this site has been extensively mined for its projectile points. Dozens of small corner notched points and triangular bifaces have been collected from this relatively small site, along with linear flakes and debitage. Two artifacts stand out in particular: a large biface of a pinkish mottled rhyolite and a scraper which appears to be made from flint of European origin. The translucent, dark brown flint, with greyish mottles appears identical to ballast flint and the material used for gunflints, and is quite different from the cherts indigenous to Newfoundland in color, texture, and opacity.

This was one of the sites which aided Penney in defining the "Little Passage" complex (Penney 1985). Penney submitted a bark sample from the site for radiocarbon

dating, which returned a date of 350 ± 60 BP (Beta-3357). This date, the stylistically late projectile points, and the ballast flint scraper suggest that this may be an early Beothuk site.

Site Photo: Plate 17
Artifact Plates: Plates 18, 19, 20
Collectors (Repository): Penney (Nfld. Museum), Derrick Mercer (Burgeo), Sidney Bagg (Burgeo), Gus Melbourne (Burgeo), Perry Young (Burgeo), Rast (Nfld. Museum)

CjBj-8, Vatcher Island

The Vatcher Island site is located on a small island at the entrance to the Short Reach on the northeast side of Grandy Island. It is found on a small sandy beach on the north side of the eastern end of the island. Tools and flakes have been collected from the intertidal zone. No *in situ* deposits have been found.

This site was originally investigated by Penney in 1981 (Penney 1985). Penney's work combined with local collections yield a diagnostic suite of artifacts including two true burins, burin-like tools, plano-convex endblades, asymmetric knives, bifaces, and endscrapers.

The artifacts are all Groswater Palaeo-eskimo. The site is in the intertidal zone and has been completely eroded away, the artifacts were found on the beach and at low tide.

Site Photo: Plate 21
Artifact Plates: Plates 22 - 24
Collectors (Repository): Penney (Nfld. Museum), Derrick Mercer (Burgeo), Gus Melbourne (Burgeo), Rast (Nfld. Museum)

CjBj-9, Gut Pond

The Gut Pond site is located on the northwestern tip of Greenhill Island, approximately 1.5 km from Burgeo. It is located on an eroding point that forms the northeast boundary of the Northern Gut of Aldridge's Pond.

Much of the site is eroded away, but an undisturbed gravely sand layer with artifacts was encountered approximately 60 cm below surface under the shrubs and tuckamore. This site has not been heavily disturbed by collection. The area covered by tuckamore is unlikely to be disturbed by collection, although erosion may continue.

William and Gus Melbourne of Burgeo donated a triangular, slightly tip-fluted endblade, two quartz microblades, and 10 flakes to the Province in 1996. We relocated the site in 1997 and recovered a biface, two cores, and several more flakes from the surface and shovel tests.

The microblades indicate a Palaeo-eskimo occupation of the site. This is supported by the endblade, which is a style commonly found in Dorset Palaeo-eskimo collections from the west coast of the island.

Site Photo: Plate 25
Artifact Plates: Plate 26
Collectors (Repository): from Melbourne brothers to Reynolds (Nfld. Museum), Rast (Nfld. Museum)

CjBj-10, Grandy Island 1

The Grandy Island 1 site is located on Grandy Island in Burgeo. It lies above the first cove on the east side of Messieurs Harbour. It is in Roy Spencer's vegetable garden.

behind his house. The garden sits on the only level ground in the vicinity of the site and approximates the distribution of the artifacts, delineating the site.

Mr. Spencer's collection was not available for study, however we were fortunate that the Spencers did not plant a garden this year and were quite generous in allowing access to the potato patch. From this surface inspection and shovel tests dozens of artifacts were recovered, including: an asymmetric knife fragment, four bifaces, a corner notched projectile point, two endscrapers, a core, and debitage.

The asymmetric knife indicates a Groswater Palaeo-eskimo component to the site, while the corner notched projectile point is typical Recent Indian. Two interesting artifacts from the site are a small endscraper made of a translucent material which may be ballast material or a gunflint. A pinkish mottled rhyolite flake was also found at the site. The material is the same as the unusually large corner notched biface found at CjBj-7. Mr. Spencer reported finding a large biface made of the same material at this site, however the biface was kept at his cabin in the Big Barasway and it could not be viewed or photographed in 1997. It is an interesting coincidence that artifacts of this pink rhyolite were found only at the two Recent Indian sites which also contained scrapers made on what appears to be European flint.

Site Photo: Plate 27
Artifact Plates: Plate 28
Collectors (Repository): Roy Spencer (Burgeo), Reynolds (Nfld. Museum), Rast (Nfld. Museum)

CjBj-11, Morgan Island 2

The Morgan Island 2 site is located approximately 0.5 km south of Burgeo on the east end of Morgan Island. The site is on a low-lying neck of land at the head of a small Barasway accessed from the south. The neck of land is peat on bedrock which lies at or below sea level and will be washed away by rising sea levels. The whole neck was tested.

Artifacts were visible on the beach at low tide. Undisturbed deposits were found to the west. A chipped and ground endblade was found on the surface.

The endblade is very similar to chipped and ground endblades recovered by Douglas Robbins at a Dorset Palaeo-eskimo site in Trinity Bay (Robbins 1985, Tuck pers. comm. 1998).

This site was originally reported to the Province by William Melbourne. Mr. Melbourne donated a number of artifacts to the Province, which were subsequently identified by Ralph Pastore as Little Passage or Beothuk and catalogued by Delphina Mercer. The site where the artifacts were found was given the Borden designation CjBj-11.

I was unaware that the artifacts previously reported from the site were Recent Indian and that the Dorset Palaeo-eskimo assemblage represented a different occupation, if not a different site. No trace of the Recent Indian occupation was located in 1997 and its precise location remains unknown.

Site Photo: Plate 29
Artifact Plates: Plate 30
Collectors (Repository): William Melbourne to Ken Reynolds (Nfld. Museum), Rast (Nfld. Museum)

CjBj-12, Cuttail Island 2

The Cuttail Island 2 site is located on northwestern Cuttail Island, approximately 1 km southeast of Burgeo. It is located in a little gully leading down to a small cove approximately 20 m west of a rectangular cove known as Cuttail's Harbour.

This site was discovered by Burgeo residents digging peat for their gardens. All material from the site is early European, including gunflints, pipes, ceramics, and glass. Early Portuguese ceramics may be present. Merrida earthenware, south Somerset earthenware, and Normandy Brown stoneware were all found at the site and suggest a late 17th century to mid 18th century occupation (Pope 1986). The bore diameters from the small sample of pipestems (n=17) suggest a date range of 1710-1750 (Harrington 1954) with a mean date of 1742 (Binford 1961).

Site Photo: Plate 31
Artifact Plates: none
Collectors (Repository): William or Gus Melbourne to Ken Reynolds (Nfld. Museum), Rast (Nfld. Museum)

CjBj-13, Morgan Island 3

The Morgan Island 3 site is located on the north side of Morgan Island approximately 0.5 km south of Burgeo on a small headland 150 m north of the ruins of the old schoolhouse. The site is bound on the west side by a rectangular cove.

Artifacts from this site tend to be larger than average for the Burgeo collections and also of a courser-grained white or buff colored chert. The prehistoric component of this site is known primarily from the collections of Perry Young. Mr. Young's collection

is composed of stemmed bifaces, linear flakes, side scrapers, large bifaces, and large utilized flakes.

The size and coarseness of the material suggests that it is not Palaeo-eskimo in origin, but rather Indian and more likely Maritime Archaic Indian. Three artifacts found on Morgan Island in the 19th Century (Howley 1915:plate XVI) were rediscovered in the Newfoundland Museum by Karen Ryan in 1998. These include two chipped and ground stone adzes (see Plate 35) and one large biface. Of the four known sites on Morgan Island these artifacts appear most consistent with CjBj-13 – supporting the Maritime Archaic Indian affiliation.

Site Photo: Plate 32
Artifact Plates: Plates 33 - 36
Collectors (Repository): Perry Young (Burgeo), Rast (Nfld. Museum)

CjBj-14, Morgan Island 4

The Morgan Island 4 site is located on the south side of Morgan Island approximately 1 km south of Burgeo. It is located on the eastern side of a small cove approximately 25 m west of Frank Strickland's cabin.

Both precontact and historic artifacts were recovered in shovel tests from this site. Unfortunately, there was no stratigraphic separation of artifacts, indicating a disturbed context. The precontact component was represented by culturally non-specific debitage. The historic collection was represented by 19th and 20th century ceramics and glass.

Site Photo: Plate 37
Artifact Plates: none
Collectors (Repository): Rast (Nfld. Museum)

CjBj-15, Rencontre Harbour

The Rencontre Harbour site is located on Rencontre Island approximately 2 km from Burgeo. It is located on a high flat point immediately west of a cobble cove in the southwest corner of Rencontre Harbour, a keyhole shaped harbour on the northeast side of Rencontre Island. The site is found on one of the only patches of level ground in Rencontre Harbour and consists of a few flakes found in a shovel test and the reported discovery of a microblade (Gus Melbourne 1997 pers. comm.). Unfortunately shovel testing did not provide any diagnostic artifacts to strengthen the designation of this site as a Palaeo-eskimo site, as was suggested by the microblade reported by Mr. Melbourne.

Site Photo: Plate 38
Artifact Plates: none
Collectors (Repository): Rast (Nfld. Museum)

CjBj-16, Sandbanks Island 2

The Sandbanks Island 2 site is located at the northern end of the sandy beach on Sandbanks Island, approximately 0.5 km south of Sandbanks Provincial Park, Burgeo. A 2 m high bedrock 'wall' creates a 25 m^2 pocket of sand against the bedrock of Sandbanks northern 'arm'.

The site consists of surface collected artifacts located in the eroded pocket of sand. The area the artifacts are found in is sometimes filled with sand. There was good exposure in August 1997. Flakes were found *in situ* in a dark cultural layer in the northwest corner of the pocket.

William and Gus Melbourne have collections from this site which consist of plano-convex endblades, asymmetric knives, side-knives, bifaces, retouched flakes,

microblades, and endscrapers. The asymmetric knives from this site and others in the Burgeo area are distinctive because of their unique side notches, which give an almost stemmed appearance to the knives. They are made by pressing out two notches very close to each other, leaving a slight ridge in the middle, creating an "E" shaped notch.

The asymmetric knives, side-knives, plano-convex endblade, microblades, and endscrapers are all consistent with the Groswater Palaeo-eskimo toolkit for Newfoundland. No other precontact groups are represented in the collections from this site.

Site Photo: none
Artifact Plates: Plate 39
Collectors (Repository): William Melbourne (Burgeo), Perry Young (Burgeo)

CjBj-17, Richard's Head Cove

The Richard's Head Cove site is located in the northwest corner of Richard's Head cove approximately 0.5 km northeast of Burgeo. Richards Head cove lies at the southern foot of Richards Head.

The site consists of 19th and 20th century artifacts left in the backdirt of local artifact collectors. Although no 18th century ceramics were found, the pipe bore diameters of the 12 pipe fragments found suggest a date range for the site of 1710 - 1750 (Harrington 1954) with a mean date of 1731 (Binford 1961). Shovel tests were dug in an attempt to find a buried precontact component to the site reported by Perry Young, however, no precontact occupation could be located.

Site Photo: Plate 40
Artifact Plates: Plate 41, 42, 44

Collectors (Repository): Gus Melbourne (Burgeo), Perry Young (Burgeo), William Melbourne (Burgeo), Rast (Nfld. Museum)

CjBj-18, Tom Grant's Hole

The Tom Grant's Hole site is located on the southwest corner of Greenhill Island, approximately 1.5 km northeast of Burgeo. The site sits on the head which forms the east side of the south gut of Aldridges Pond.

Two gun spalls and pipestem fragments were found along the beach. William Melbourne reported precontact material from the peninsula southwest of the beach. A total of two flakes were recovered in shovel tests. Unfortunately they were misplaced in the field. No substantial precontact occupation could be located.

Site Photo: Plate 43
Artifact Plates: Plate 44
Collectors (Repository): Rast (Nfld. Museum)

CjBj-19, Minke Site

The Minke site is located on a small, unnamed island, approximately 250 m north of Smalls Island, Burgeo. The island is 10 m south of Vatchers Island and is bound by Grassy Island Passage on the northeast. The site is located on a flat terrace at the southeast point of the island.

Several small chert flakes were found in shovel tests and lying on the beach. However, no diagnostic artifacts were recovered.

Site Photo: Plate 45
Artifact Plates: none
Collectors (Repository): Rast (Nfld. Museum)

CjBj-20, Furbers Point

The Furbers Point site is located behind the outbuildings on Burgeo's government wharf, on the northeast side of Furbers Point. Artifacts are still found occasionally, but the construction of the government wharf and leveling of the point for a parking lot destroyed the site.

Collections predating the construction of the wharf, supplemented by occasional finds since include a chipped and ground chert burin like tool, a biface, and European ceramic pipe fragments.

The burin-like tool is identical to other burin-like tools in the area found in Groswater Palaeo-eskimo collections.

Site Photo: Plate 46
Artifact Plates: Plates 47, 48
Collectors (Repository): William Melbourne (Burgeo), Perry Young (Burgeo), Derrick Mercer (Burgeo)

CjBj-21, Venils Passage

The Venils Passage site is located approximately 1.5 km south of Burgeo on the south side of Cuttail Island, facing Venils Passage. It is located on a rocky point on the southeast foot of the highest hill on Cuttail Island. It faces Our Harbour on Venils Island.

Despite good evidence for prehistoric occupation, including 35 flakes and cores, and a possible stone cobble feature in a shovel test, no culturally specific artifacts could be located. The location of the site on an island and the choice of raw materials seems

more consistent with the Palaeo-eskimo groups who inhabited Burgeo than the Recent Indian, however this can not be confirmed at this time.

Site Photo: Plates 49, 50)
Artifact Plates: none
Collectors (Repository): Rast (Nfld. Museum)

CjBj-22, Messieurs (Mercers, Messers) Island

The Messieurs Island site is located on the eastern end of Messieurs Island, in Messieurs Cove, Burgeo. Waterworn flakes and a large biface were found on the beach in the intertidal zone. The limited peat cover on the eastern end of the island was extensively shovel tested but no artifacts were found. No diagnostic artifacts were found and if this site was ever substantial it has since eroded away.

Site Photo: Plate 51
Artifact Plates: none
Collectors (Repository): Reynolds (Nfld. Museum), Rast (Nfld. Museum)

CjBj-23, Aldridges Pond

The Aldridges Pond site is located on the west side of Greenhill Island, approximately 1.75 km east of Burgeo. It is found in a small cove with a runoff channel draining into Aldridges Pond. The cove is the easternmost point of Aldridges Pond.

Flakes have been observed in the cove at low tide by Gus Melbourne and four flakes were recovered in shovel tests on the south side of the small drainage channel. The extent of the site within the trees is unknown, however the steepness of the slope precludes too large a site. Surface inspection of the cove was hampered by a rising tide.

The flakes could have been left behind by any of the precontact groups inhabiting the area.

Site Photo: Plate 52
Artifact Plates: none
Collectors (Repository): Rast (Nfld. Museum)

CjBj-24, Venils Island

The Venils Island site is located on the Northern shore of Venils Island, approximately 1.5 km south of Burgeo. It faces Venils Passage and lies on the east side of a small cove, approximately 150 m northeast of Our Harbour. Five meters west of the site is a small brook and a rockfall of large (>1 m) granite boulders.

Dozens of flakes and three microblades were observed and collected eroding out of the peat into a small cove. A single soapstone vessel fragment was recovered in a shovel test. Although the site is disturbed by erosion, it was not disturbed by collecting at the time it was found.

The microblades and soapstone fragment are typical of a Palaeo-eskimo artifact assemblage. The soapstone indicates that this was likely a Dorset Palaeo-eskimo site.

Site Photo: Plate 53
Artifact Plates: Plate 54
Collectors (Repository): Rast (Nfld. Museum)

CjBj-25, Eclipse Island

The Eclipse Island site is located on Eclipse Island, approximately 0.25 km south of Burgeo. The site is in an intertidal area on the east side of the island. It can be reached by boat from Burgeo.

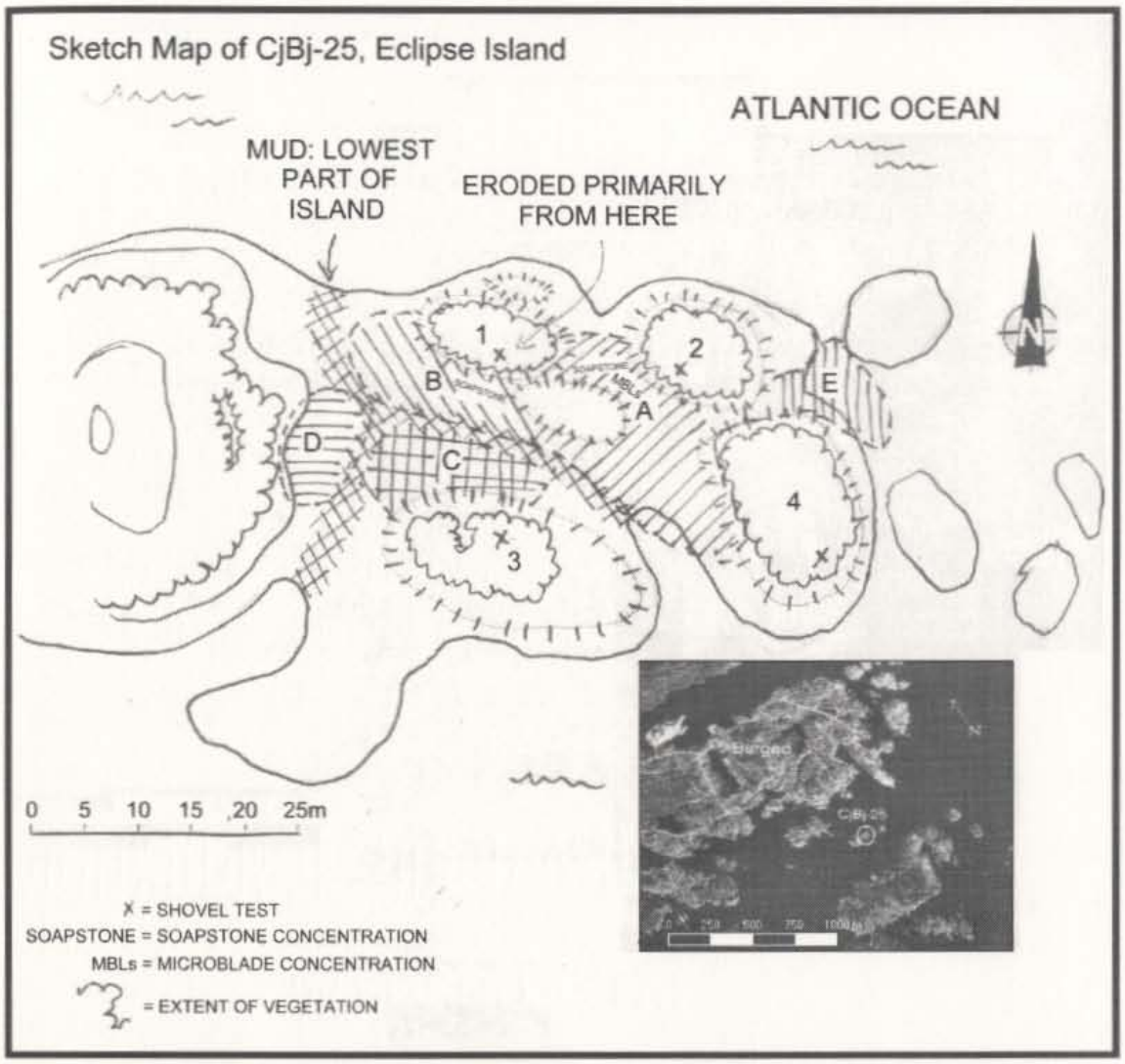

Figure II - 1 CjBj-25, Eclipse Island, sketch map drawn at low tide

Despite its close proximity to Burgeo, and the relative abundance of artifacts visible at low tide on the surface, this site was not previously known to residents of the town. It was located by survey in August 1997. *In situ* deposits were found in four small hills, ringing the low muddy, intertidal flats. These hills were numbered one through four; northwest hill - 1, northeast hill - 2, southwest hill - 3, southeast hill - 4 (Figure II-1). Given the contours of the island it was possible to distinguish five units; labeled A through E. Each unit would have eroded from a different hill or different combination of

hills. These units were surface collected separately in an effort to retain some spatial relationships within the site.

Unit A: artifacts eroded from hills 1, 2, & 4

Unit B: artifacts eroded from hill 1

Unit C: artifacts eroded from hill 3

Unit D: artifacts eroded from large hill on the island's west end

Unit E: artifacts eroded from hills 2 & 4

Artifacts collected from the surface include triangular endblades, bifaces, retouched flakes, a microblade core, microblades, unifaces, endscrapers, soapstone vessel fragments, and cores.

All the artifacts are Dorset Palaeo-eskimo, and stylistically are more closely related to the Dorset Palaeo-eskimo sites from Trinity Bay, Placentia Bay, and Hermitage Bay than the west coast sites like Port au Choix or Cape Ray (Robbins 1985, Penney 1985, Fogt 1998, Jim Tuck pers. comm. 1998).

Site Photo: Plate 55
Artifact Plates: Plate 56
Collectors (Repository): Rast (Nfld. Museum)

CjBk-1, Big Barasway 1

The Big Barasway 1 site is located near the bottom of the Big Barasway, on its northwest shoreline, approximately 12 km northwest of Burgeo. It is located approximately 100 m east of Derrick Mercer's cabin, near the mouth of a small brook.

The diagnostic artifacts found at CjBk-1 include stemmed bifaces, linear flakes, bifaces, stemmed points, side notched points, corner notched points, triangular bifaces, thumbnail scrapers, and retouched flakes.

These artifacts are consistent with the Recent Indian complexes defined for Newfoundland. The stemmed points and several of the side notched points suggest a Cow Head complex or Beaches complex occupation of the site. The Little Passage complex is indicated by some of the smaller side and corner notched points (Penney 1985, Ralph Pastore 1998 pers. comm.).

Site Photo: Plate 57
Artifact Plates: Plate 58
Collectors (Repository): Derrick Mercer (Burgeo), Perry Young (Burgeo), Reynolds (Nfld. Museum), Rast (Nfld. Museum)

CjBk-2, Big Barasway 2

The Big Barasway 2 site is located on the western side of the Big Barasway at the northern end of the first large cove north of the barasway' mouth. It is approximately 12 km northwest of Burgeo. The site is under and around Jerry Bobbett's cabin.

Artifacts collected from the surface and shovel tests at this site include two bifaces, a Ramah Bay quartzite end and side scraper, a projectile point fragment, and two Ramah flakes. The point fragment is broken through the notches, but appears to have been corner notched.

The artifacts suggest a Recent Indian occupation at the site.

Site Photo: Plate 59
Artifact Plates: Plate 60
Collectors (Repository): Perry Young (Burgeo), Reynolds (Nfld. Museum), Rast (Nfld. Museum)

CjBk-3, Big Barasway 3

The Big Barasway 3 site is located approximately 12 km northwest of Burgeo along the western shore of the Big Barasway. It is located inside of the first large cove north of the outlet of the barasway. The site extends along the shore for at least 300 meters and is now overbuilt by four or more cabins.

Artifacts have been found by the cabin owners around their cabins and in their gardens. The collections include two ground slate endblade preforms, the base of a triangular endblade, a chipped and ground chert endblade, a broad triangular side-notched knife, a large lanceolate biface, a fragmented ground slate bayonet, and a thumbnail scraper.

A Dorset Palaeo-eskimo occupation at the site is indicated by the side-notched knife and by the styles of endblades, which resemble the Trinity Bay Dorset Palaeo-eskimo (Robbins 1985). The bayonet fragment and the lanceolate biface considered together appear to be Maritime Archaic Indian.

Site Photo: Plates 61, 62
Artifact Plates: Plates 63 - 66
Collectors (Repository): William Melbourne (Burgeo), Gus Melbourne (Burgeo), (Roy Spencer, but I didn't see his collection), Reynolds (Nfld. Museum), Rast (Nfld. Museum)

CjBk-4, Big Barasway 4

The Big Barasway 4 site is located approximately 11 km northwest of Burgeo on a small unnamed island in the Big Barasway. The island lies just north of the large sandbar separating the barasway from the Atlantic. At high tide the island is split into a western island and an eastern island, with all artifacts confined to the western half. The eastern

half has two 20th century hunting blinds or 'gauges' built of stone for hunting geese and ducks.

This site was originally surface collected by Ken Reynolds in 1996, and judging from the artifacts found eroding out of the peat seemed quite promising. Reynolds recovered three corner notched projectile point fragments, a triangular biface, three bifaces, and one linear flake/microblade. Surface inspection in 1997 yielded several more artifacts, but shovel testing for *in situ* deposits failed to locate undisturbed deposits. It appears that the site has mostly eroded away.

The artifacts recovered by Reynolds are stylistically Recent Indian, specifically Little Passage.

Site Photo: Plate 67
Artifact Plates: Plate 68
Collectors (Repository): Reynolds (Nfld. Museum), Rast (Nfld. Museum)

CjBk-5, Middle Brook

The Middle Brook site is located south of the mouth of Middle Brook approximately 17 km west of Burgeo by boat. It is located on a low-lying neck immediately south of a small pool which forms at the mouth of the brook.

Surface collection of the site by Derrick Mercer yielded a dozen coarse white chert flakes in 1996. Mr. Mercer was not with us in 1997, but the site's location was found. The surface inspection and shovel tests yielded no artifacts. Stone features may be located on this site but time constraints and inclement weather prevented a thorough investigation of the site.

Site Photo: Plate 69

Artifact Plates: none
Collectors (Repository): Derrick Mercer (Burgeo)

CjBk-6, Upper Burgeo 2

The exact location of the Upper Burgeo 2 site is unknown. It is located somewhere along the northwest shore of a large cove on the southeast corner of Cornelius Island approximately 250 m west of Sandbanks Provincial Park.

Artifacts include a flaring shouldered, contracting stemmed projectile point fragment found in the intertidal zone, a gun spall and three gunflints. The artifacts were found on separate occasions by Perry Young and Derrick Mercer. No *in situ* deposits or additional artifacts could be located in 1997.

Site Photo: Plate 70
Artifact Plates: Plate 71, 72
Collectors (Repository): Derrick Mercer (Burgeo), Perry Young (Burgeo)

CjBk-7, Duck Island

The Duck Island site is located on the eastern end of Duck Island approximately 5 km southwest of Burgeo. It is at the southwestern end of the sand beach on the southeast corner of the island.

One non-diagnostic biface was found here by Perry Young. Unfortunately we were unable to locate any *in situ* deposits in 1997.

Site Photo: Plate 73
Artifact Plates: Plate 74
Collectors (Repository): Perry Young (Burgeo)

CjBk-8, Father Hughes Point

The Father Hughes Point site is located on the western side of the Big Barasway approximately 12 km northwest of Burgeo. It is on Father Hughes Point under and around Levi Billards abandoned cabin.

Artifacts were originally noted by Perry Young in the upturned roots of a tree behind (north of) the cabin. Flakes and a hearth feature were found in shovel tests within 10 m of the cabin. The site appears to lie directly under the cabin. Artifacts in Mr. Young's collection include bifaces, triangular bifaces, stemmed points, side-notched points, corner-notched points, and debitage.

The artifacts are all consistent with what is known of Recent Indian toolkits in the Province. The notched points are likely Little Passage in origin, although the stemmed points may belong to an earlier group, perhaps Beaches or Cow Head complex (Jim Tuck & Ralph Pastore pers. comm. 1998)

Site Photo: Plate 75, 76
Artifact Plates: Plate 77, 78
Collectors (Repository): Perry Young (Burgeo), Rast (Nfld. Museum)

CjBk-9, Doctors Harbour

The Doctors Harbour site is located along the north shore of Doctors Harbour in Barasway Point approximately 12 km west of Burgeo.

Artifacts were found eroding out of peat on the rocky shore by William Melbourne. They include an asymmetrical ground slate tool, a ground slate endblade, a bi-pointed endblade, bifaces, and microblades.

The endblades and the microblades are consistent with the Dorset Palaeo-eskimo toolkit from eastern Newfoundland. An unusual green and white banded chert biface and the elongated ground slate tool are not typical Dorset Palaeo-eskimo artifacts, and their cultural affiliation is not known.

Site Photo: Plate 79
Artifact Plates: Plates 80 - 83
Collectors (Repository): William Melbourne (Burgeo), Rast (Nfld. Museum)

CjBk-10, Hunters Rest

The Hunters Rest site is found on the western side of the Big Barasway approximately 11 km northwest of Burgeo. It shares a point of land with Hubert Anderson's Cabin and an 'Old Tilt' cabin. The point lies directly below (east of) the large white 'scrape' on Father Hughes Hill and is across from Woody Island. The site is approximately 50 m north of a small brook.

A collection of large bifaces and stemmed points were gathered from this site, primarily by Perry Young. Perry Young's notes indicate that most of his artifacts from this site were found in the vicinity of the Old Tilt cabin.

The artifacts indicate a Recent Indian occupation of the site. However, they are unlike Little Passage and Beothuk points and may belong towards the earlier Cow Head and Beaches end of the spectrum.

Site Photo: Plate 84
Artifact Plates: Plate 85, 86
Collectors (Repository): Perry Young (Burgeo), Rast (Nfld. Museum)

CjBk-11, Cowlest[2] Barasway

The Cowlest Barasway site is located in the northeasternmost cove of Cowlest Barasway approximately 12 km west of Burgeo. The site is on a point 50m south of Keith MacDonald's Cabin.

Flakes were collected from the gravel beach at low tie. The site has been collected from for many years and is quite eroded. Erosion was accelerated by timber cutting for firewood. No *in situ* deposits were found and the debitage is not culturally diagnostic.

Site Photo: Plate 8
Artifact Plates: none
Collectors (Repository): Gus Melbourne (Burgeo), William Melbourne (Burgeo), Rast (Nfld. Museum)

CkBl-1, Parson's Cabin

The Parson's Cabin site is located approximately 30 km west of Burgeo in the Northwest Arm of Connoire Bay. It is located around and under Art Parson's cabin approximately 35 m upstream along the unnamed brook closest to the east side of the mouth of Northwest Arm.

McAleese recovered a Maritime Archaic Indian chipped and ground basalt adze from the site (McAleese 1993). No further artifacts were recovered from this site in 1997, nor did Mr. Parson's report finding anything near his cabin.

Site Photo: none
Artifact Plates: none
Collectors (Repository): McAleese (Nfld. Museum)

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[2] Pronounced "co-lease"

CkBl-5, Northwest Arm 1

The Northwest Arm 1 site is located on the east side of the Northwest arm of Connoire Bay, 35 km west of Burgeo. It is cabin on a rocky finger between two small sand and gravel beaches approximately 400 m north of 'the gut' and 50m south of Wilford Compton's.

The site is located 400m north of a well used caribou crossing at the gut where a low sandbar crosses the Northwest Arm. It was initially reported by Derrick Mercer who found a biface and other artifacts in the intertidal zone. *In situ* deposits may be located beneath a stand of alder and birch. The site appears to be extremely densely packed with artifacts, but of very limited extent. One shovel test contained a point, a large short stemmed biface base and over 400 flakes, but tests less than three meters away were completely empty. The projectile point was impact damaged, with a hanging flake initiating at the crushed tip. Ramah Bay quartzite was also present in the debitage.

The point style is unusual and may be Groswater Palaeo-eskimo or Recent Indian (Jim Tuck and Ralph Pastore pers. comm. 1998). The bifaces and material types used, especially the coarse white chert, seems to be more consistent with Recent Indian groups, and the Groswater Palaeo-eskimo affiliation for the point seems unlikely and is rejected.

Site Photo: Plate 88
Artifact Plates: Plate 89
Collectors (Repository): Derrick Mercer to Reynolds (Nfld. Museum), Rast (Nfld. Museum)

CkBl-6, Rocky Barasway Cairn

The Rocky Barasway Cairn is located in the Northwest Arm of Connoire Bay, about 25 km northwest of Burgeo. The cairn is on the west shore of the bay about 500m northeast of the Rocky Barasway. It is on a path between the Rocky Barasway and the sandbar which extends across the Northwest arm.

The cairn was composed of 19 lichen encrusted granite boulders, with one upright stone in the middle. It was built atop a rôches moutonnée, a moundlike glacial feature common in the area. No associated artifacts were recovered or reported.

Site Photo: Plate 90
Artifact Plates: none
Collectors (Repository): none

Additional Sites

In the Spring of 1998 Gus Melbourne reported two new sites along the Grandy Brook. Although they were not used in the analyses presented in this thesis they are still significant for the evidence they provide of the use of Grandy Brook by the Recent Indian.

CkBk-1, Grandy Brook 1

The Grandy Brook 1 site is located on the west side of Grandy Brook approximately 10 km northwest of Burgeo. It is 0.5 km upstream from Carl Barnes new cabin.

A 13 piece surface collection was donated to the Province. Artifacts include a biface fragment, thumbnail scrapers, a retouched flake, and debitage.

The scrapers, the type of chert used, and the location of the site along the river all indicate that this is a Recent Indian site.

Collectors (Repository): Gus Melbourne to Reynolds (Nfld. Museum)

CkBk-2, Grandy Brook 2

The Grandy Brook 2 site is an isolated find of a chert core near the mouth of seal brook along Grandy Brook, approximately 10 km northwest of Burgeo.

Collectors (Repository): Gus Melbourne to Reynolds (Nfld. Museum)

APPENDIX III: THE STATISTICS USED

This appendix explains the two statistical tests used in this thesis: Pearson's correlation coefficient and Student's t-test. All of the statistical procedures reported in this thesis were run in SPSS version 6.1 on the UNIX operating system at Memorial University of Newfoundland.

Patterns in the Data: Pearson's Correlation Coefficient

To test for patterns in the environmental parameters Pearson's correlation coefficients were calculated for 7 variables[1] for all of the sites. A correlation coefficient is a type of bivariate statistical analysis (Thomas 1986:383), which means that it examines the relationship between two variables. When two variables (ie. X & Y) are compared, a positive or negative correlation may be seen. A positive correlation means that as the value of X increases (or decreases), the value of Y also increases (or decreases). A negative correlation indicates that as the value of X increases, the value of Y decreases and vice versa. These correlation coefficients describe the linear relationship between two variables. The coefficients are on a scale from -1 (perfect negative correlation) to 1 (perfect positive correlation). A value of 0 indicates no correlation between the variables. The strength of the correlation is indicated by the value of the coefficient, independent of its sign. The significance level of the results is an important measure of the probability that the correlation is meaningful. Most of the correlations were fairly weak; however 12 correlations were significant at the 0.1 level. This means that there is less than a 1 in 10

[1] location, saltdist, shelter, view, freshwat, stream, topo

probability that the correlation is not true. Given the sample size and the nature of the data, a correlation which is true 9 times out of 10 is worth considering. The variables which correlated and the direction, strength, and significance of those correlations are summarized in Table III-1.

Table III-1 Summary of strongest Pearson correlation coefficients for all sites

Positive Correlations	Strength	Significance	Number of Cases
freshwat & stream	0.9987	0.000	35
view & stream	0.4142	0.013	35
view & freshwat	0.4005	0.015	36
saltdist & stream	0.4053	0.016	35
view & topo	0.3760	0.018	39
saltdist & freshwat	0.3758	0.024	36
masl & saltdist	0.3320	0.042	38
Negative Correlations	**Strength**	**Significance**	**Number of Cases**
shelter & view	-0.5036	0.001	39
location & saltdist	-0.4428	0.005	39
shelter & stream	-0.4232	0.011	35
shelter & freshwat	-0.4164	0.012	36
shelter & topo	-0.3820	0.016	39

Cross Cultural Comparison: Student's t-Test

The primary statistical test used to examine the relationships between each of the cultures for each variable was Student's t-test. As the sample sizes were too small for statistics like Chi-square the t-test was the most appropriate statistic to use. For each variable, the t-test compares the means of two samples and produces a statistic that indicates the probability that the two means could have been derived from two populations with identical means. A score of 1.000 indicates that the two sample means are very similar and could have come from populations with similar means. A score of 0.000 indicates that the two sample means are very different and are very unlikely to have come from populations with similar means .

We are most interested here in very high scores (greater than 0.900) and very low scores (less than 0.100) because they will tell us which variables are very similar or very different between different cultures. For example, the t-test value for the variable "view" when the Dorset Palaeo-eskimo and Recent Indian samples are compared is 0.086. This indicates that 8.6% of the time a difference in the sample of at least this size would occur when the two population means are equal (Norušis 1990:216). This is a very weak argument for the two populations having similar means, instead it is probably safe to say that the Dorset Palaeo-eskimo and Recent Indians selected sites with substantially different views of salt water. The results of the t-tests are summarized in Table III-2.

Table III-2 2-tailed significance of t-test values for all variables
White Cells: t values below 0.100 indicating dissimilar means
Black Cell: t values above 0.900 indicating similar means

	Dorset Palaeo-eskimo/ Recent Indian	Dorset Palaeo-eskimo/ Groswater Palaeo-eskimo	Dorset Palaeo-eskimo/ Maritime Archaic Indian	Recent Indian/ Groswater Palaeo-eskimo	Recent Indian/ Maritime Archaic Indian	Groswater Palaeo-eskimo/ Maritime Archaic Indian
masl	0.215	0.659	0.487	0.204	0.183	0.776
freshwat	0.557	0.055	0.665	0.018	0.976	0.094
stream	0.666	0.058	0.805	0.018	0.937	0.097
location	0.257	0.884	0.270	0.242	0.791	0.245
view	0.086	0.090	0.397	0.862	0.737	0.648
shelter	0.906	0.318	0.863	0.363	0.948	0.437
saltdist	0.520	1.000	0.376	0.550	0.259	0.380
slope	0.540	0.387	0.597	0.632	0.188	0.135
cover	0.923	0.196	0.197	0.191	0.347	0.082
drain	0.346	0.118	0.279	0.626	0.630	0.835
topo	0.517	0.389	0.383	0.869	0.596	0.659
newmasl	0.002	0.022	0.001	0.001	0.001	0.012
water	0.375	0.033	0.688	0.005	0.834	0.083

Plate 1 CjBj-1 Sot's Hole: view northwest

Plate 2 CjBj-2 Rencontre Island: view southwest

Plate 3 CjBj-3 Fox point: view east

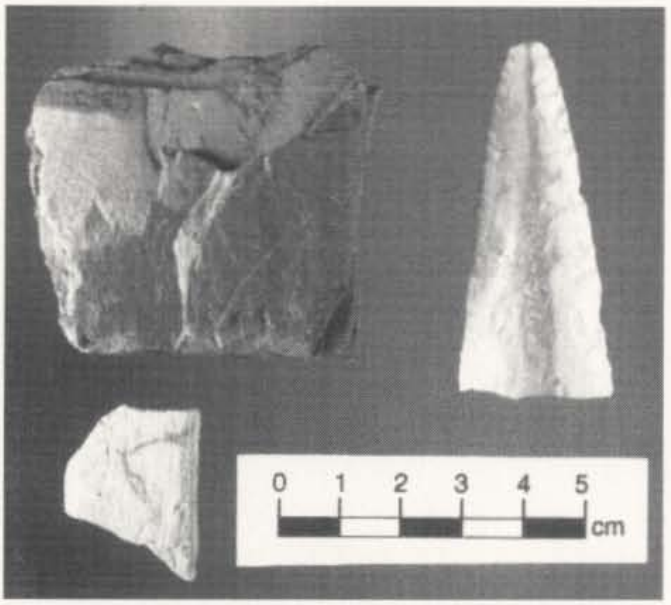

Plate 4 CjBj-3 Fox point: slate & chipped and ground chert

Plate 5 CjBj-4 Sandbanks Island 1: view northeast

Plate 6 CjBj-5 Morgan Island 1: view west

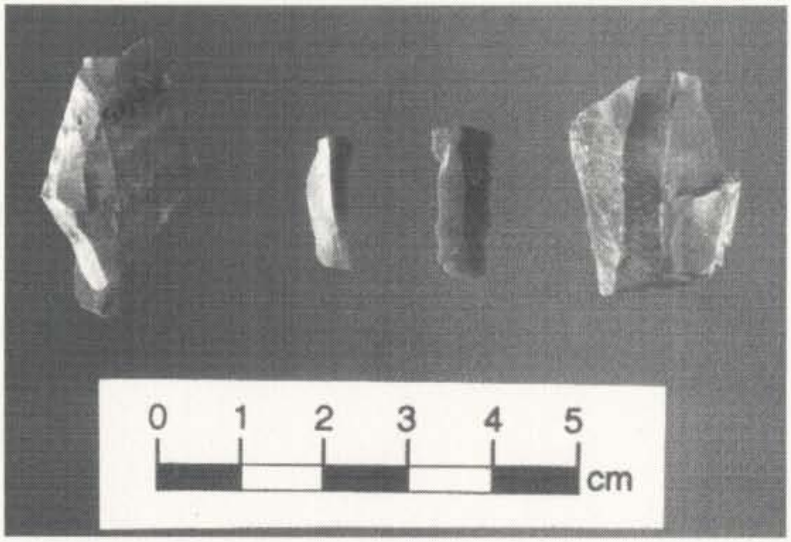

Plate 7 CjBj-5 Morgan Island 1: biface, microblades & microblade core

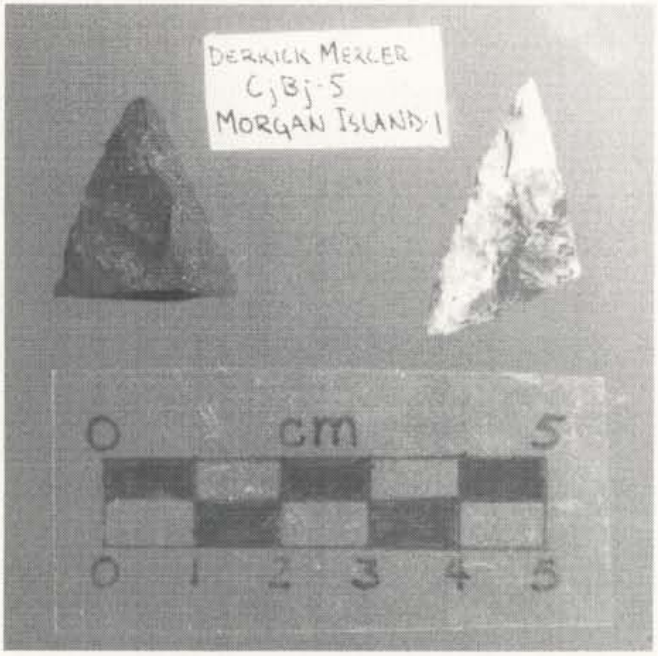

Plate 8 CjBj-5 Morgan Island 1: bifaces

Plate 9 CjBj-6 Cuttail Island: view north

Plate 10 CjBj-6 Cuttail Island: Feature 1, view northwest

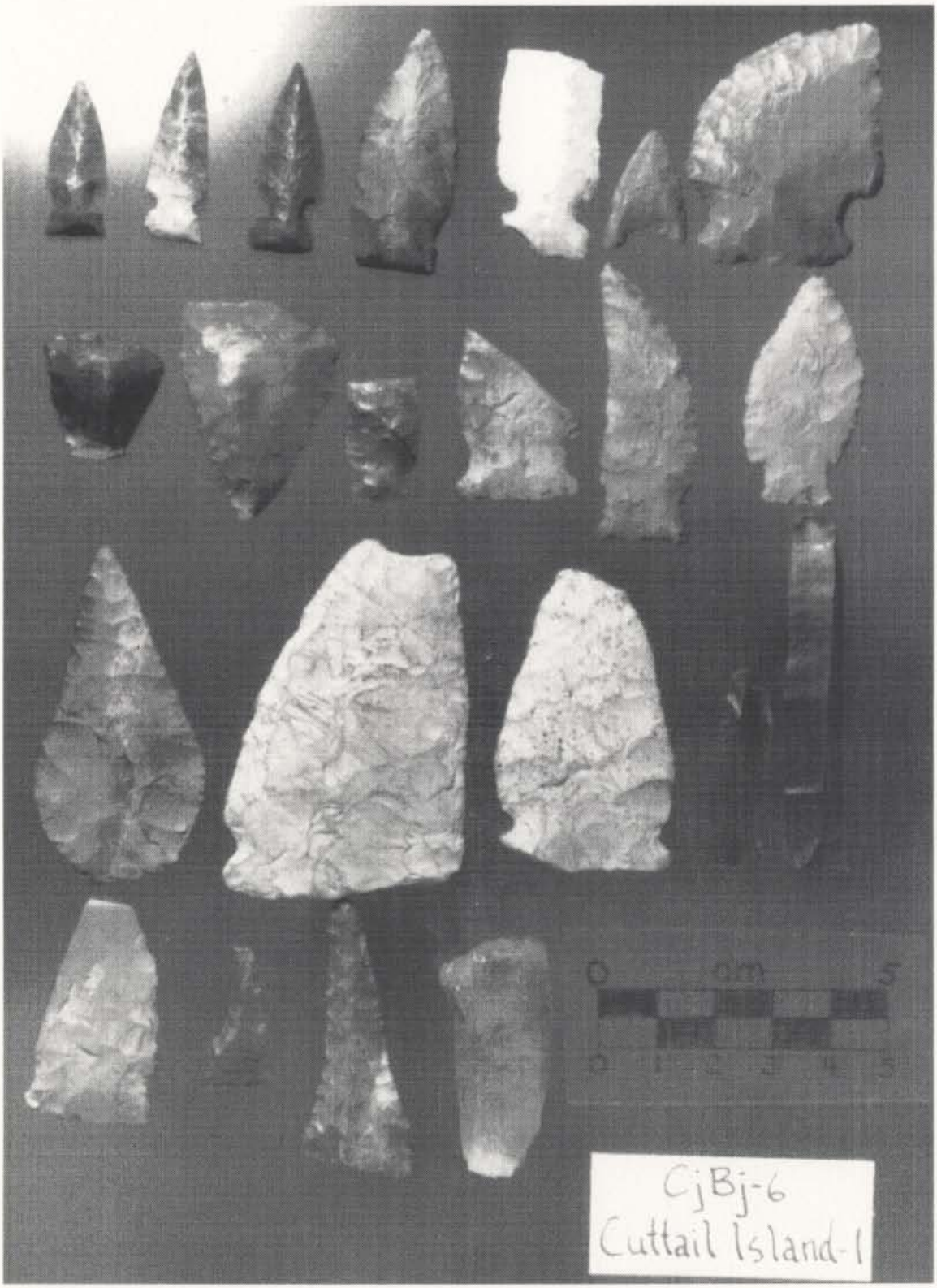

Plate 11 CjBj-6 Cuttail Island: Palaeo-eskimo artifacts

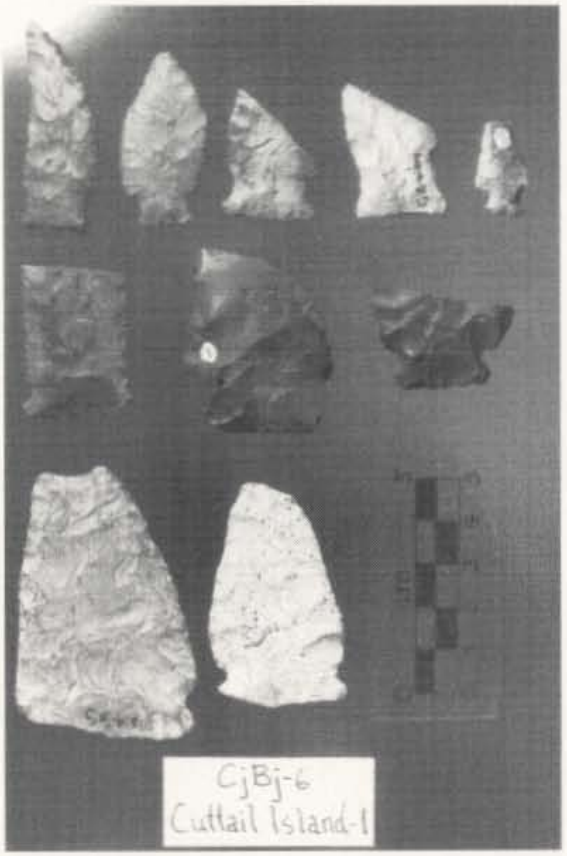

Plate 12 CjBj-6 Cuttail Island: stemmed bifaces

Plate 13 CjBj-6 Cuttail Island: endblades and endblade preforms

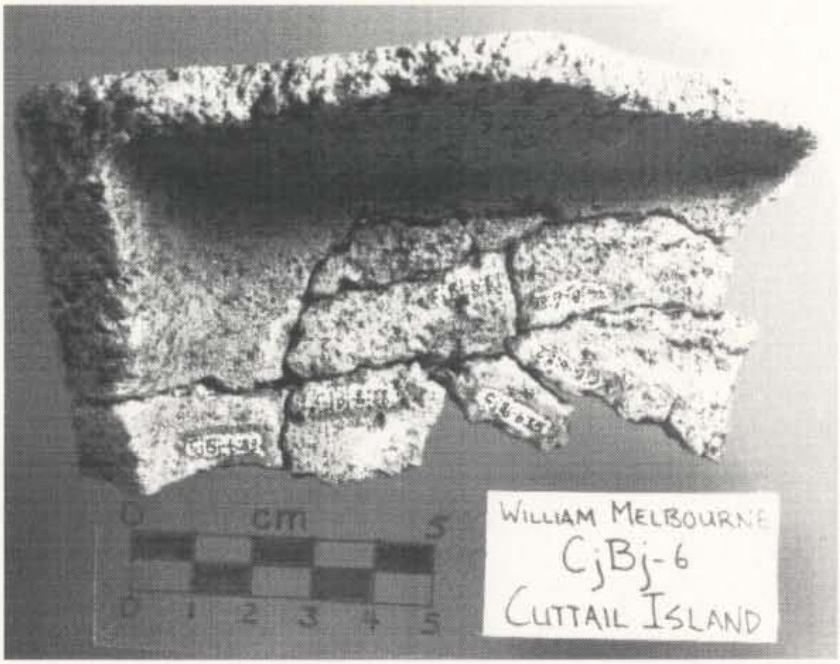

Plate 14 CjBj-6 Cuttail Island: soapstone vessel

Plate 15 CjBj-6 Cuttail Island: burin-like tools

Plate 16 CjBj-6 Cuttail Island: scrapers

Plate 17 CjBj-7 Upper Burgeo: view west

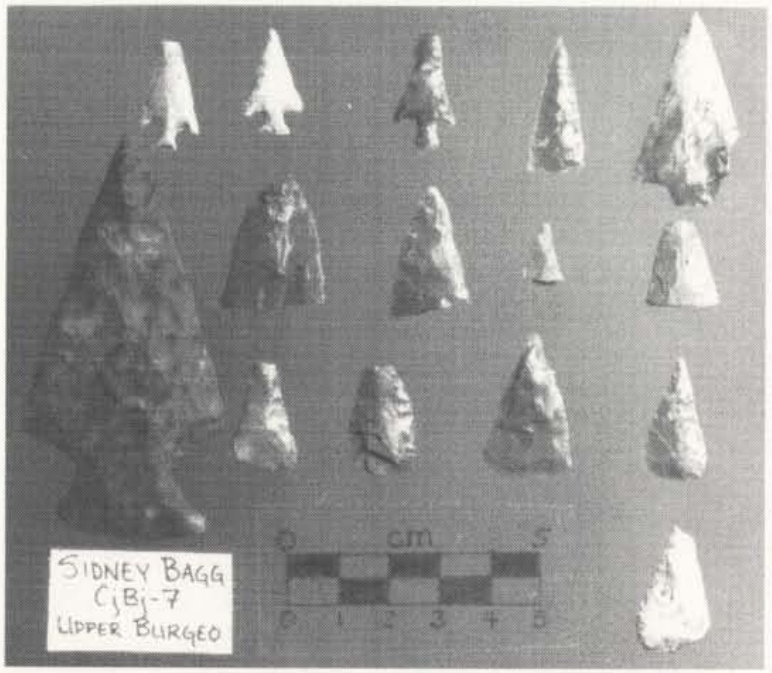

Plate 18 CjBj-7 Upper Burgeo: Recent Indian points and triangular bifaces

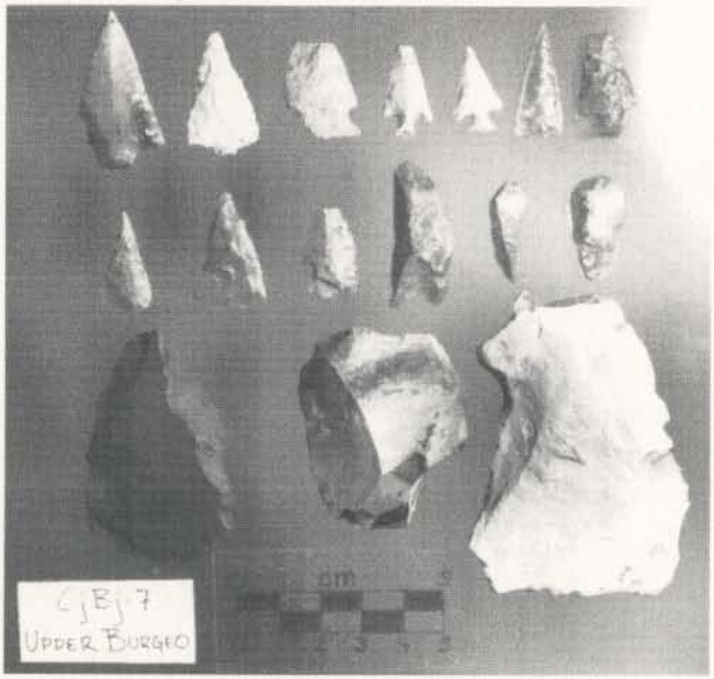

Plate 19 CjBj-7 Upper Burgeo: Recent Indian artifacts

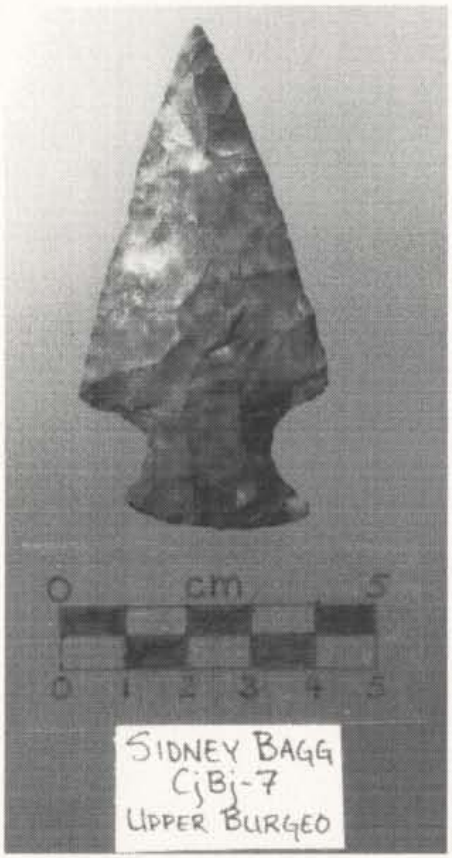

Plate 20 CjBj-7 Upper Burgeo: biface

Plate 21 CjBj-8 Vatcher Island: view east

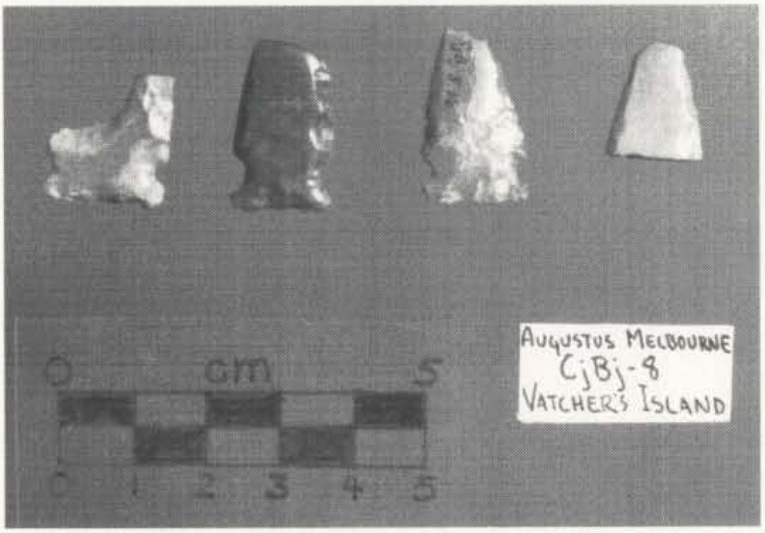

Plate 22 CjBj-8 Vatcher Island: burin-like tools

Plate 23 CjBj-8 Vatcher Island: true burin

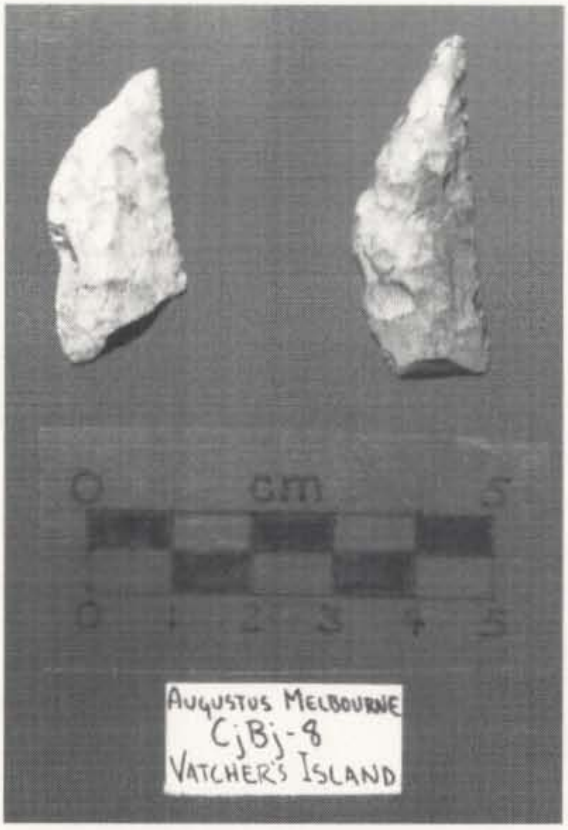

Plate 24 CjBj-8 Vatcher Island: asymmetric knives

Plate 25 CjBj-9 Gut Pond: view west

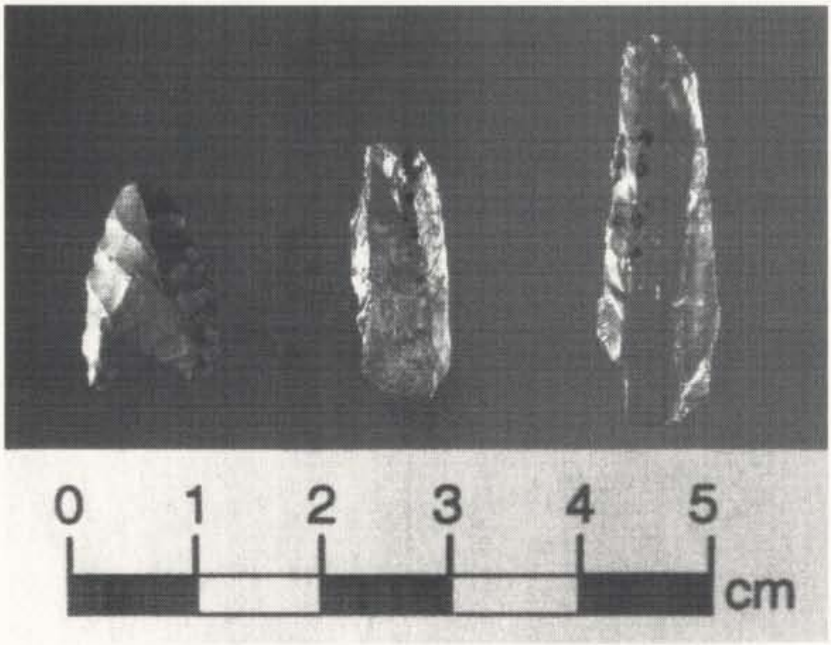

Plate 26 CjBj-9 Gut Pond: endblade and microblades

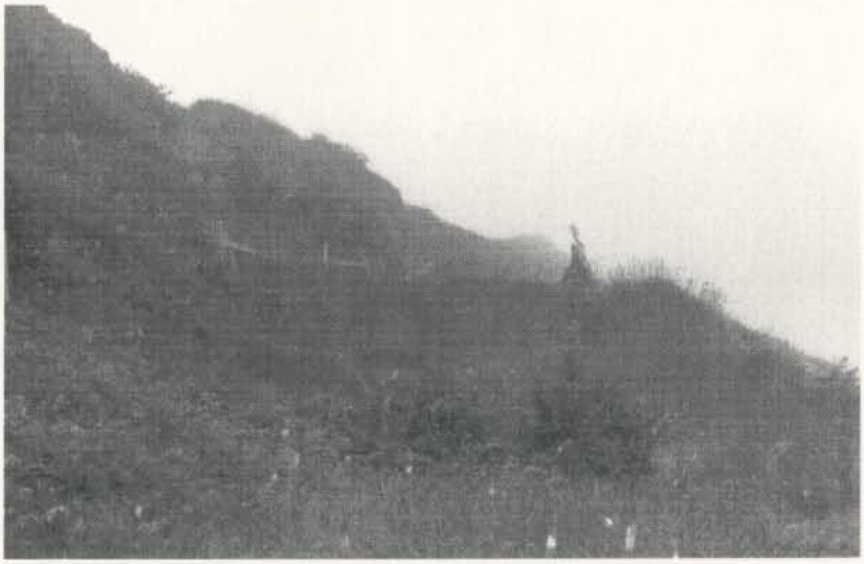

Plate 27 CjBj-10 Grandy Island 1: view south

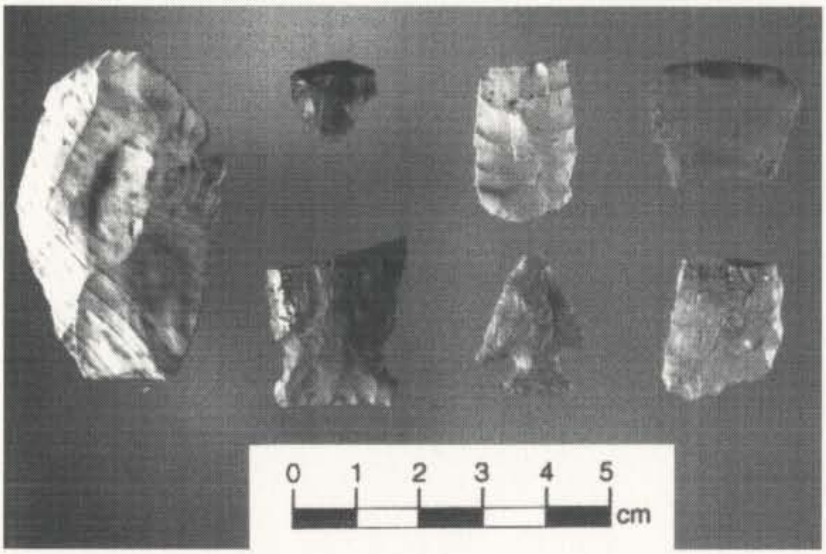

Plate 28 CjBj-10 Grandy Island: Groswater Palaeo-eskimo and Recent Indian artifacts

Plate 29 CjBj-11 Morgan Island 2 (Dorset Palaeo-eskimo site): view northeast

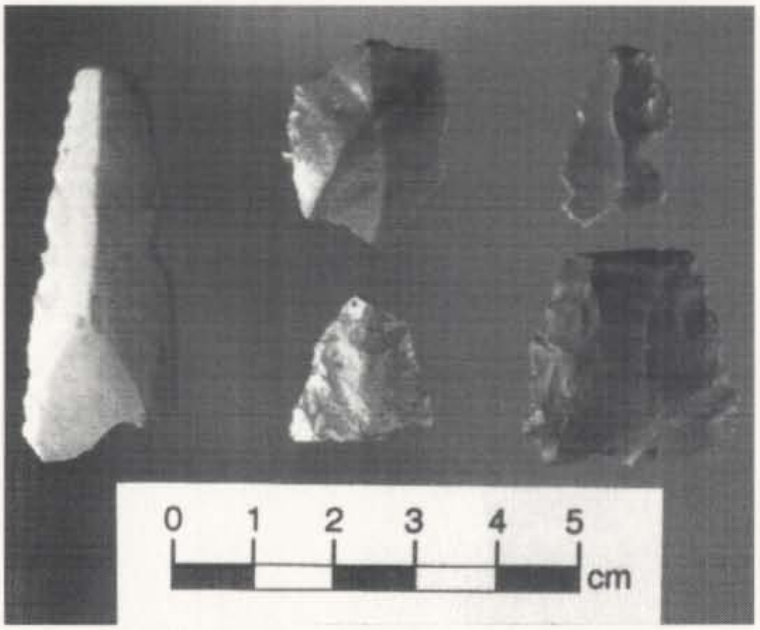

Plate 30 CjBj-11 Morgan Island 2 (Dorset Palaeo-eskimo site): Dorset Palaeo-eskimo artifacts

Plate 31 CjBj-12 Cuttail Island 2: view northwest

Plate 32 CjBj-13 Morgan Island 3: view north

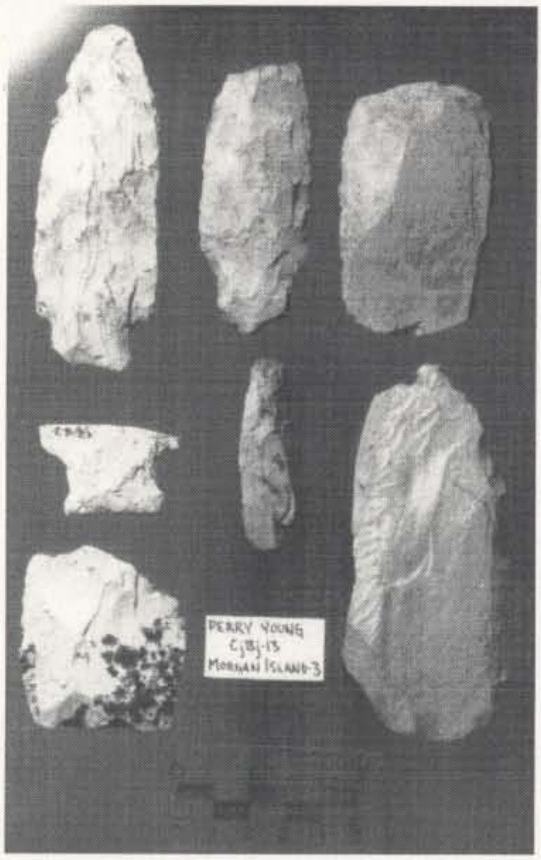

Plate 33 CjBj-13 Morgan Island 3: bifaces, retouched flakes & linear flakes

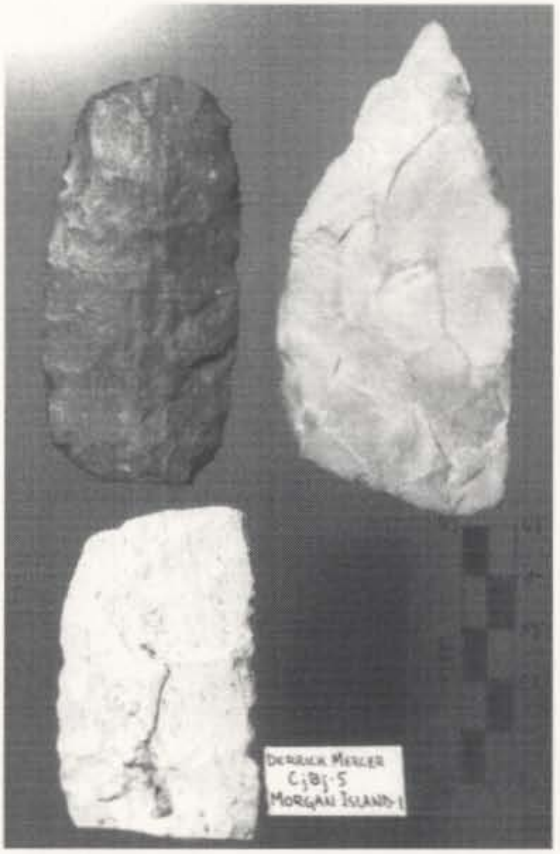

Plate 34 CjBj-13 Morgan Island 3: ***Borden Number is incorrect on photo tag***

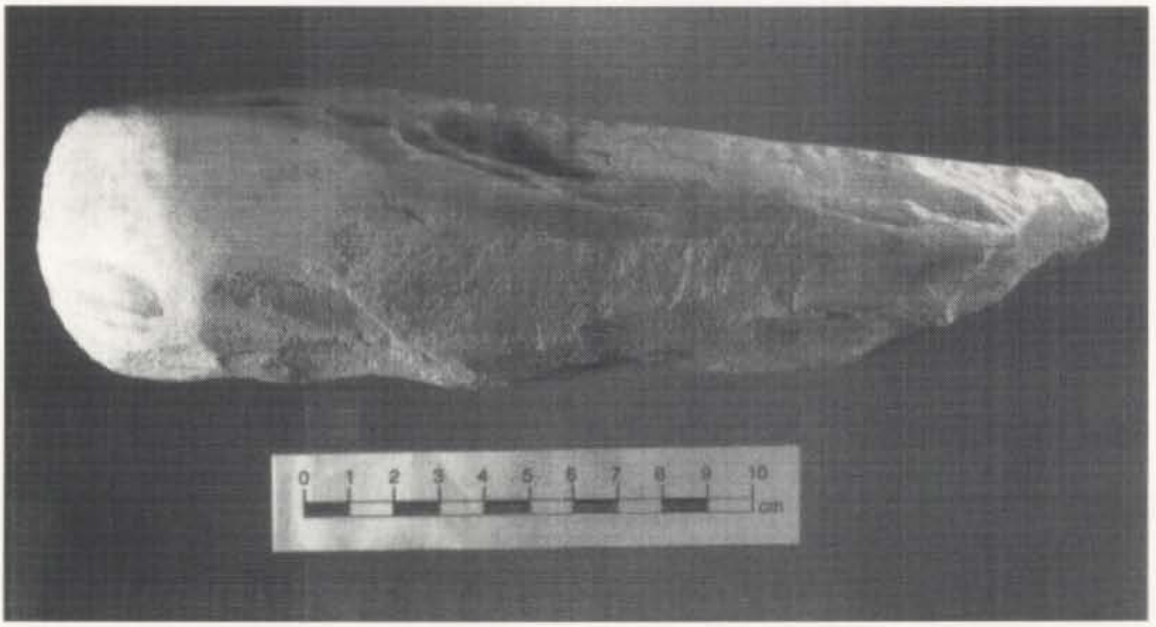

Plate 35 Unknown Morgan Island location: ground stone adze

Plate 36 Unknown Morgan Island location: side scraper

Plate 37 CjBj-14 Morgan Island 4: view southwest

Plate 38 CjBj-15 Rencontre Harbour: view north

Plate 39 CjBj-16 Sandbanks Island-2: Groswater Palaeo-eskimo artifacts

Plate 40 CjBj-17 Richard's Head Cove: view east

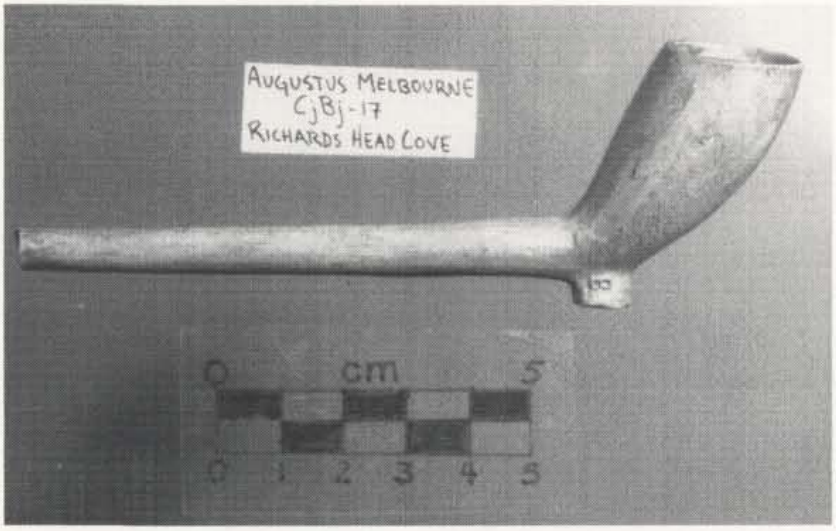

Plate 41 CjBj-17 Richard's Head Cove: 'BW' pipe

Plate 42 CjBj-17 Richard's Head Cove: gun spalls

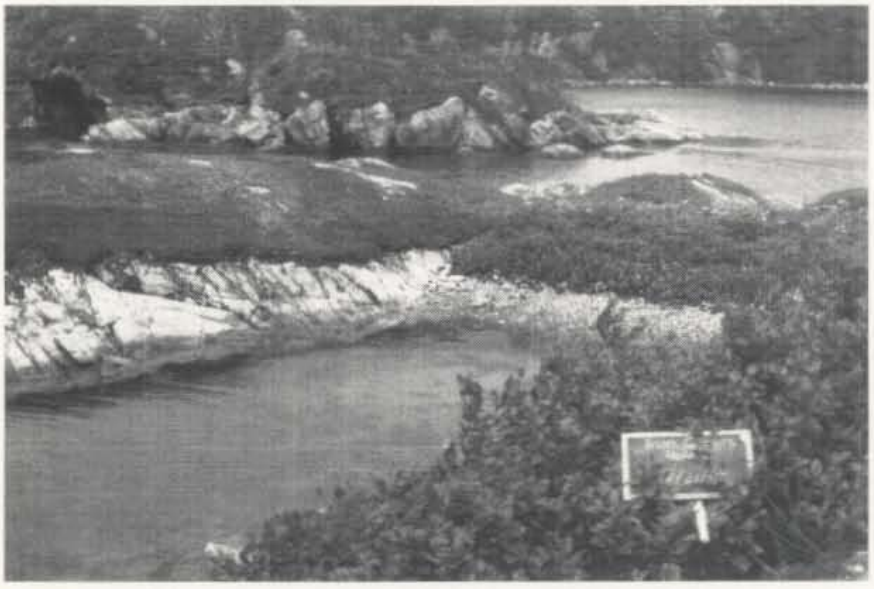

Plate 43 CjBj-18 Tom Grants Hole: view north

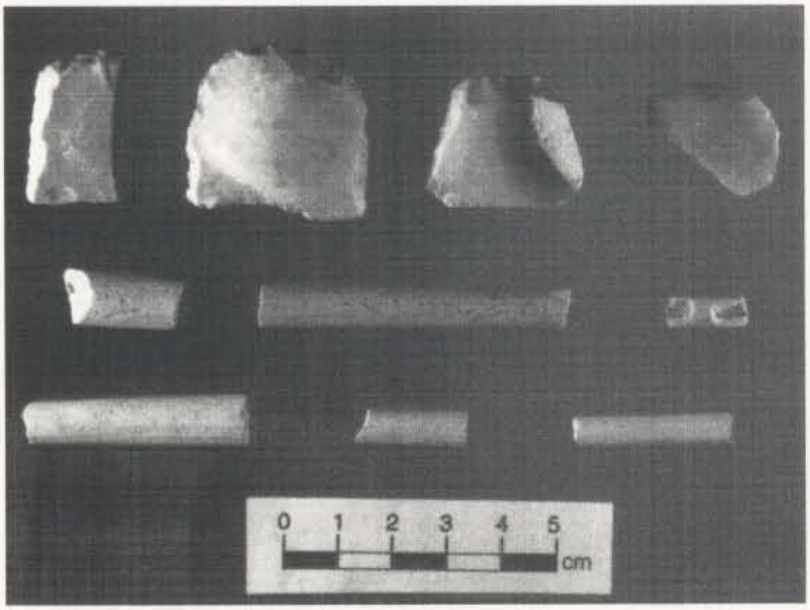

Plate 44 CjBj-17 & CjBj-18: gun spalls and pipe stems

Plate 45 CjBj-19 Minke Site: view east

Plate 46 CjBj-20 Furbers Point: view north

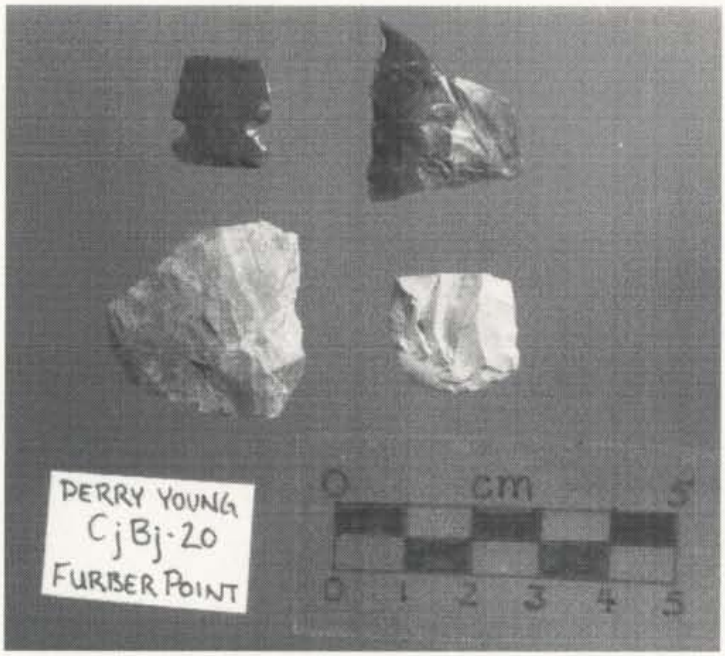

Plate 47 CjBj-20 Furbers Point: burin-like tool & bifaces

Plate 48 CjBj-20 Furbers Point: pipestems

Plate 49 CjBj-21 Venils Passage: view southwest

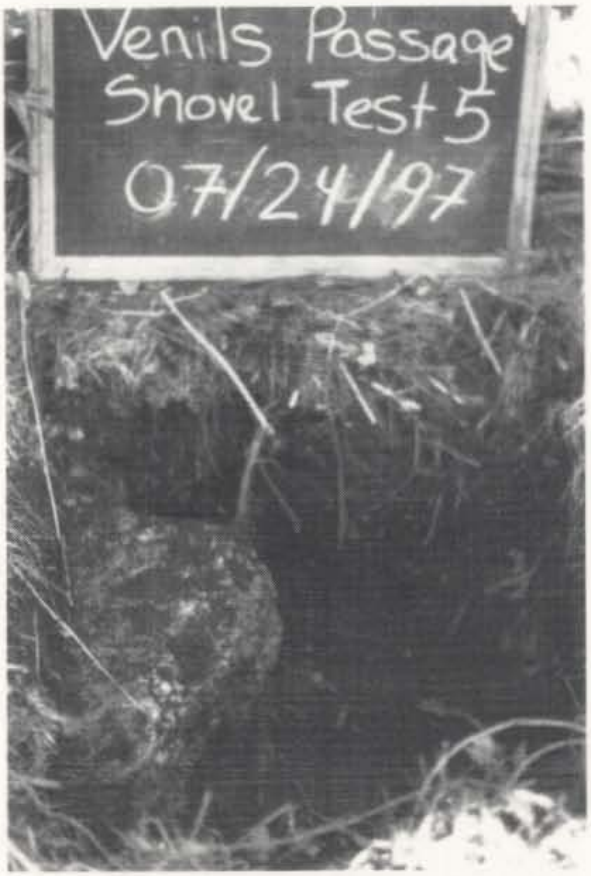

Plate 50 CjBj-21 Venils Passage: Shovel Test 5, Feature 1 (cobbles in peat)

Plate 51 CjBj-22 Messieurs Island: view northwest

Plate 52 CjBj-23 Aldridges Pond: view southeast

Plate 53 CjBj-24 Venils Island: view northeast

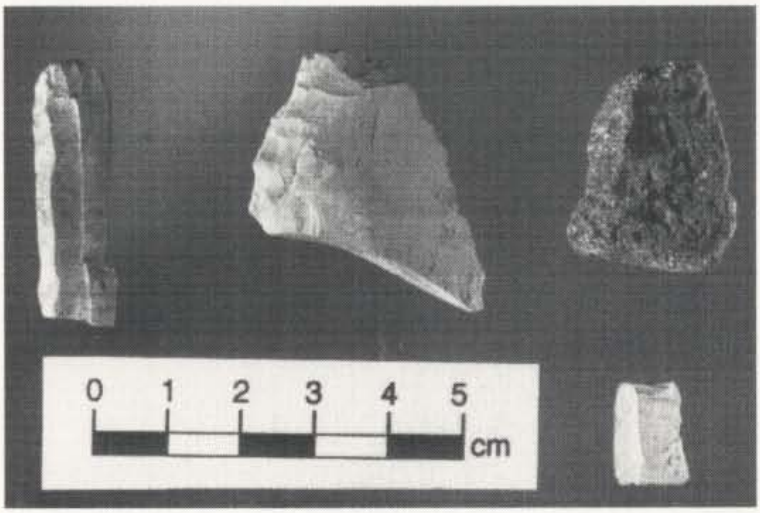

Plate 54 CjBj-25 Venils Island: microblade, biface, soapstone, and tip flute spall

Plate 55 CjBj-25 Eclipse Island: view east

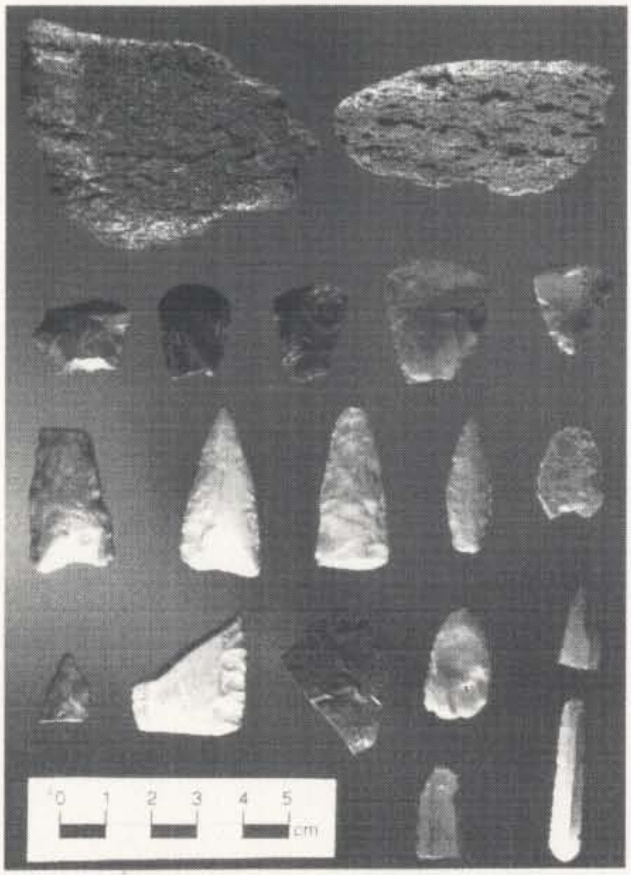

Plate 56 CjBj-25 Eclipse Island: Dorset Palaeo-eskimo artifacts

Plate 57 CjBk-1 Big Barasway 1: view west

Plate 58 CjBk-1 Big Barasway 1: projectile points

Plate 59 CjBk-2 Big Barasway 2: view west

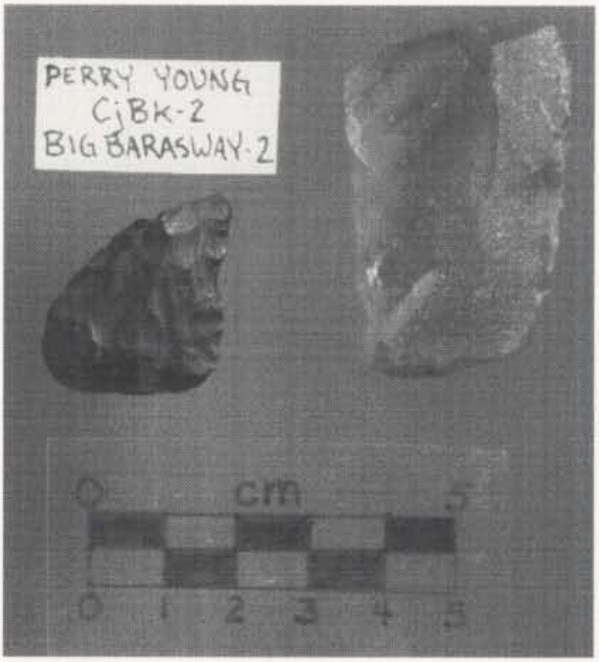

Plate 60 CjBk-2 Big Barasway 2: biface & Ramah Bay quartzite scraper

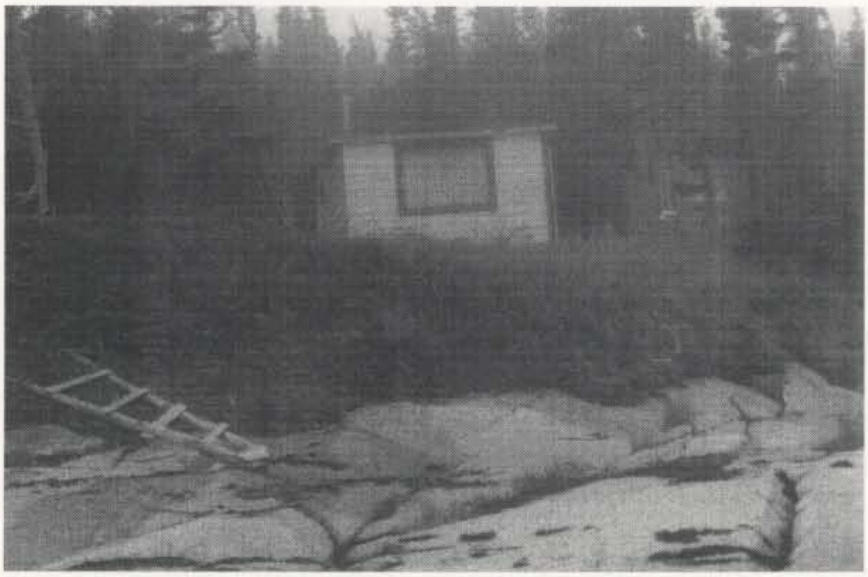

Plate 61 CjBk-3 Big Barasway 3: Bill Melbourne's cabin

Plate 62 CjBk-3 Big Barasway 3: Austin Green's cabin

Plate 63 CjBk-3 Big Barasway 3: ground slate preforms & chipped and ground chert endblade

Plate 64 CjBk-3 Big Barasway 3: ground slate

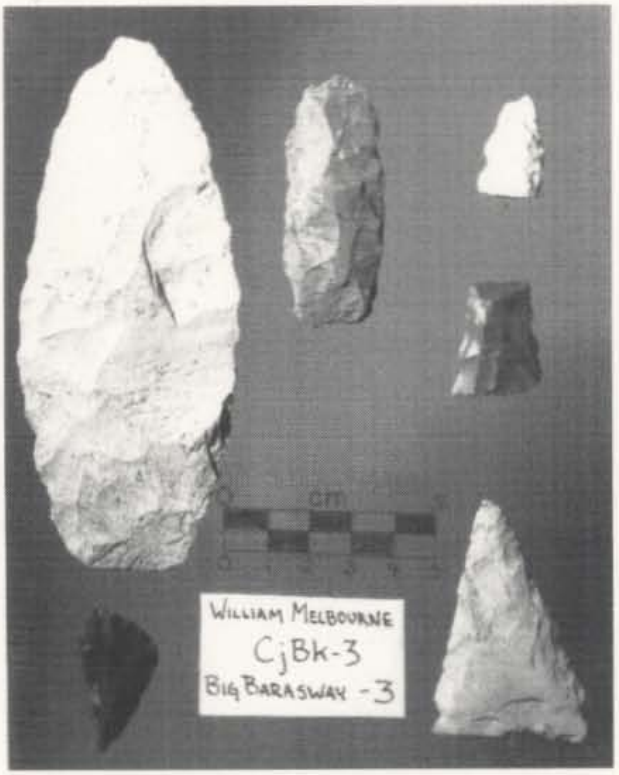

Plate 65 CjBk-3 Big Barasway 3: bifaces

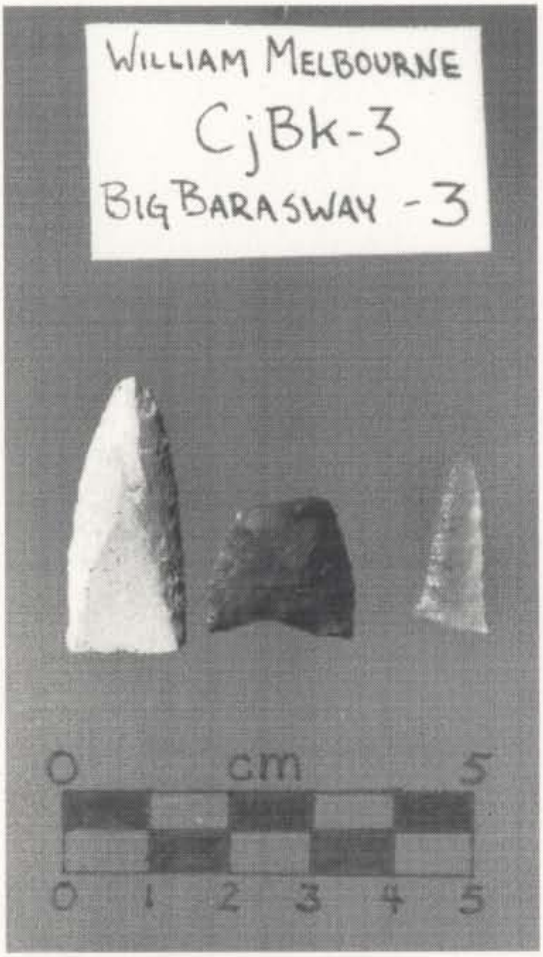

Plate 66 CjBk-3 Big Barasway 3: endblades & Ramah Bay quartzite tip fragment

Plate 67 CjBk-4 Big Barasway 4: view west

Plate 68 CjBk-4 Big Barasway 4: Recent Indian artifacts

Plate 69 CjBk-5 Middle Brook Burgeo: view west

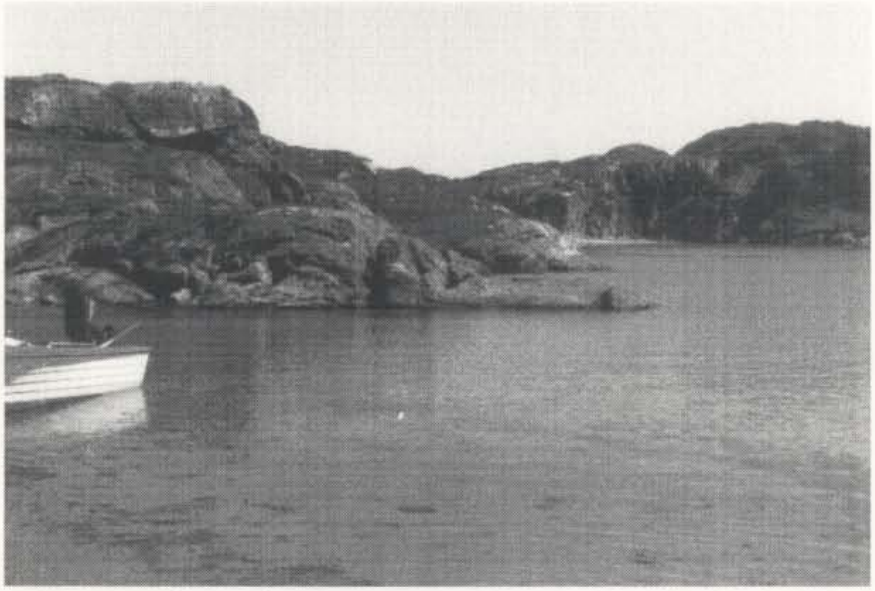

Plate 70 CjBk-6 Upper Burgeo 2: view north

Plate 71 CjBk-6 Upper Burgeo 2: gun flints and gun spalls

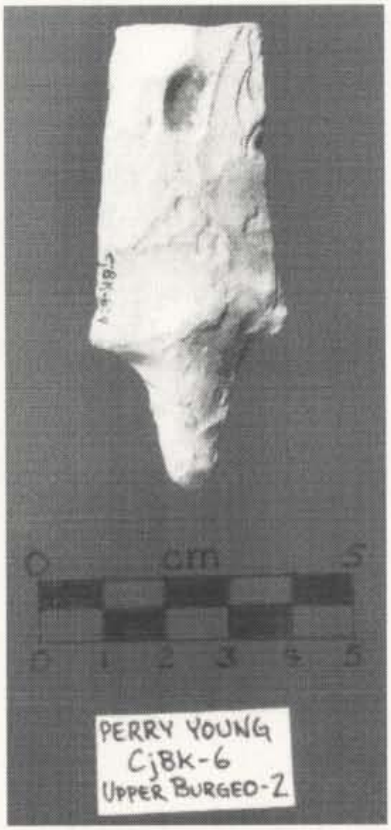

Plate 72 CjBk-6 Upper Burgeo 2: stemmed biface

Plate 73 CjBk-7 Duck Island: view west

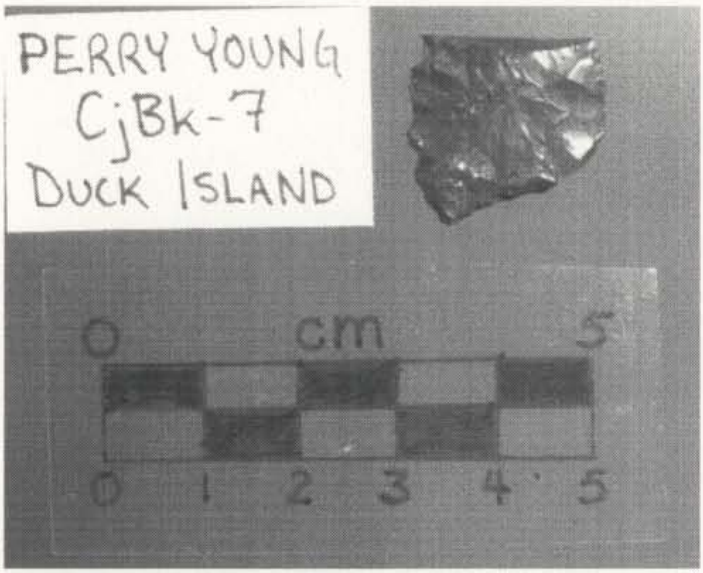

Plate 74 CjBk-7 Duck Island: biface

Plate 75 CjBk-8 Father Hughes point: view north

Plate 76 CjBk-8 Father Hughes Point: cabin & overturned tree, view southwest

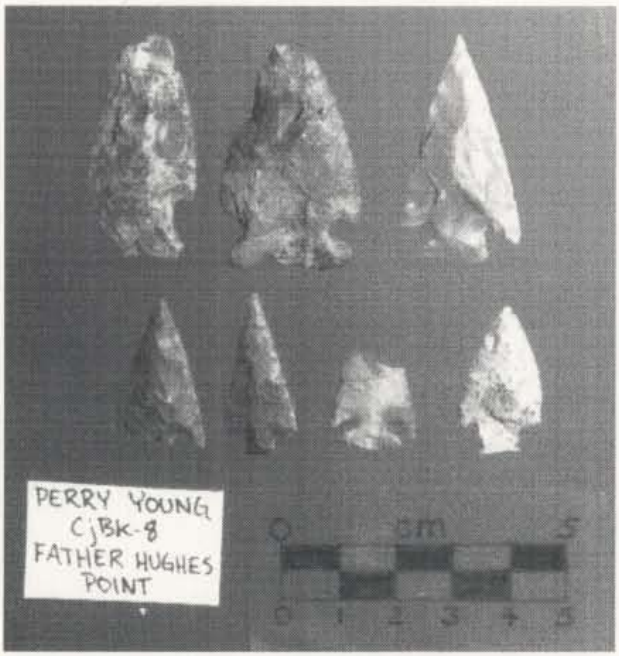

Plate 77 CjBk-8 Father Hughes Point: projectile points

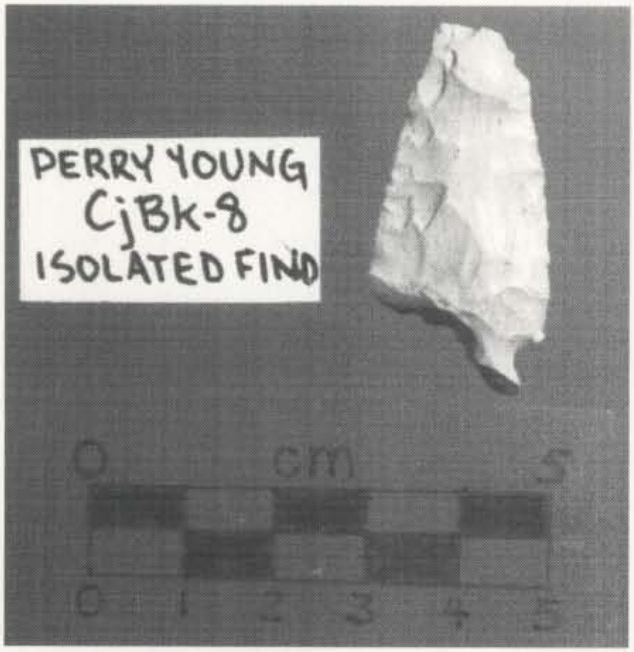

Plate 78 CjBk-8 Father Hughes Point: biface

Plate 79 CjBk-9 Doctors Harbour: view west

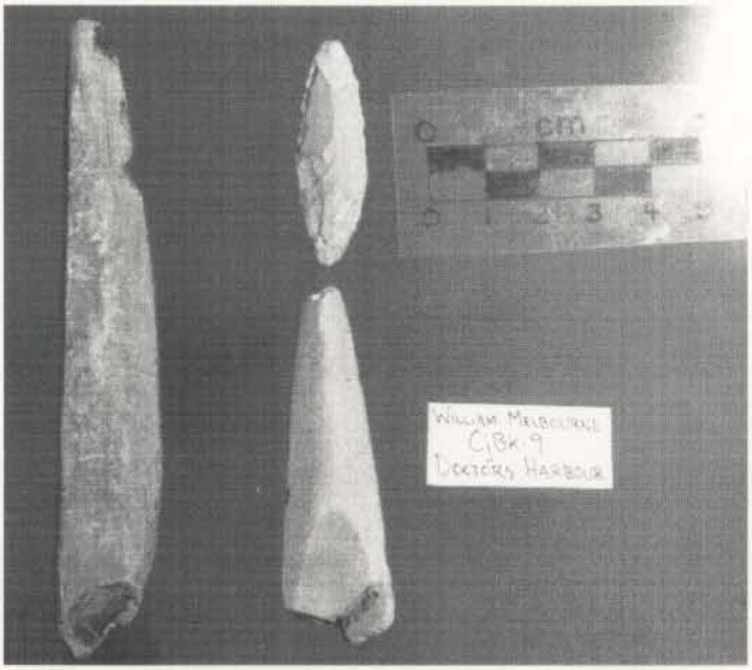

Plate 80 CjBk-9 Doctors Harbour: ground slate

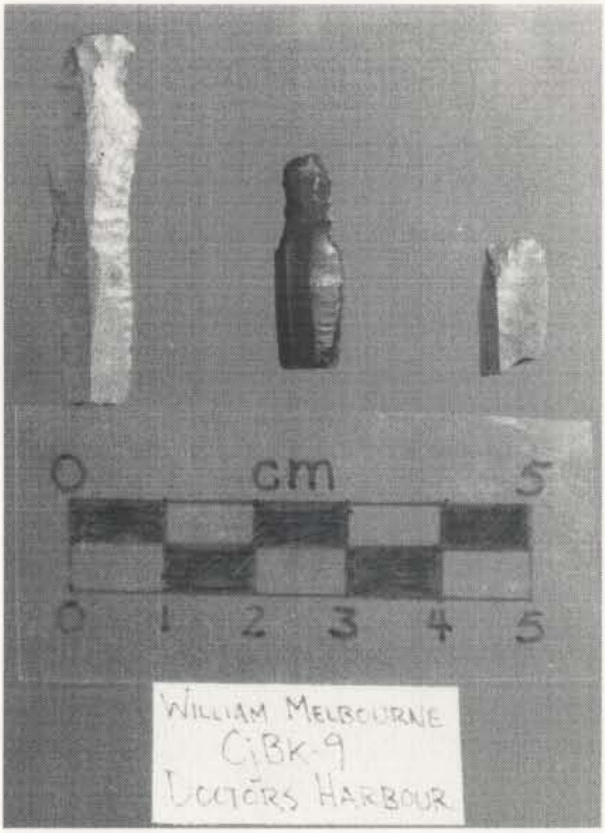

Plate 81 CjBk-9 Doctors Harbour: microblades

Plate 82 CjBk-9 Doctors Harbour: scrapers

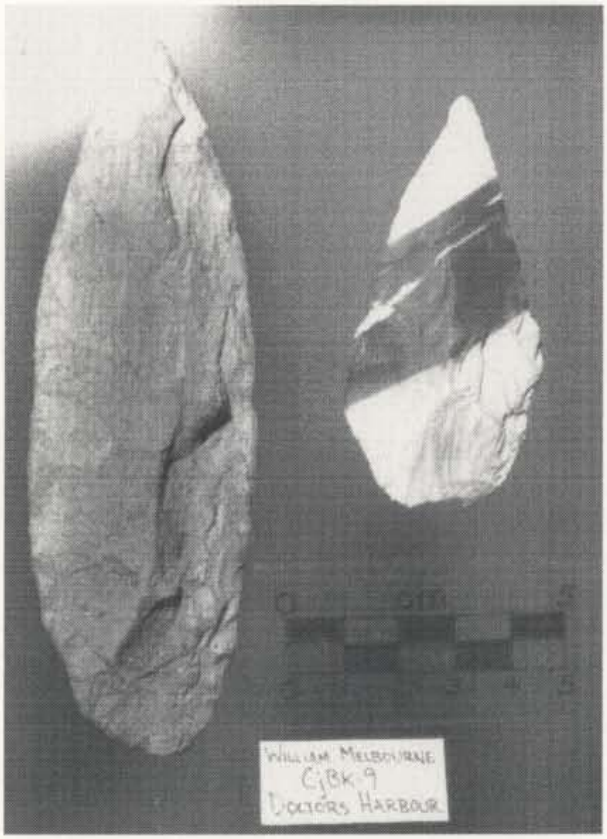

Plate 83 CjBk-9 Doctors Harbour: large bifaces

Plate 84 CjBk-10 Hunters Rest: view northwest

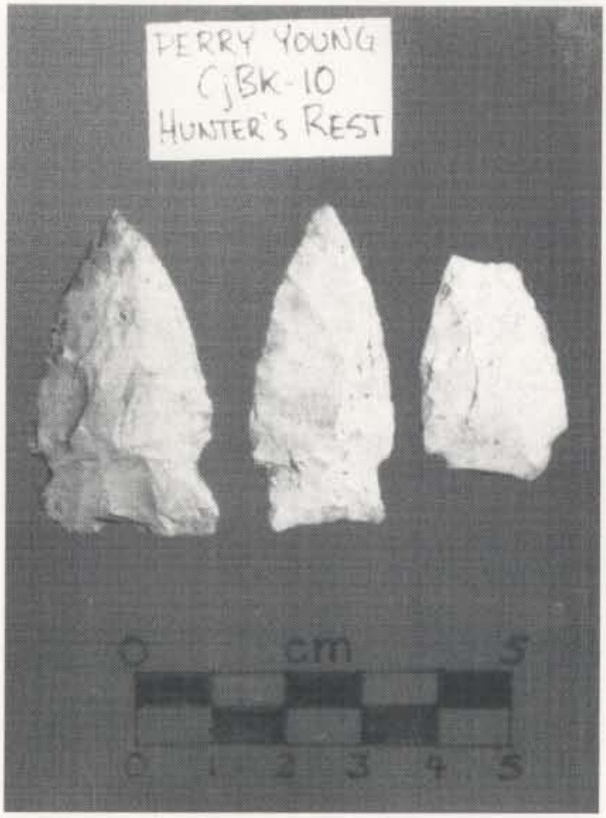

Plate 85 CjBk-10 Hunters Rest: projectile points

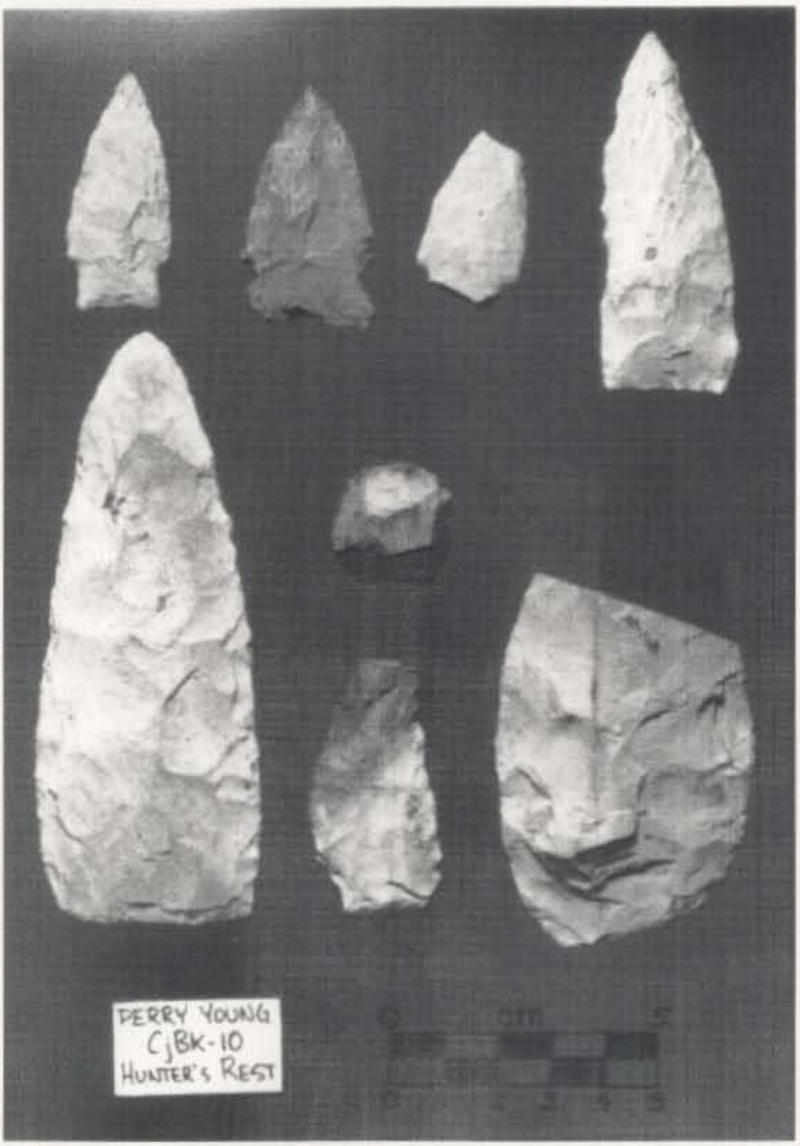

Plate 86 CjBk-10 Hunters Rest: artifacts

Plate 87 CjBk-11 Cowlest Barasway: view south

Plate 88 CkBl-5 Northwest Arm 1: view north

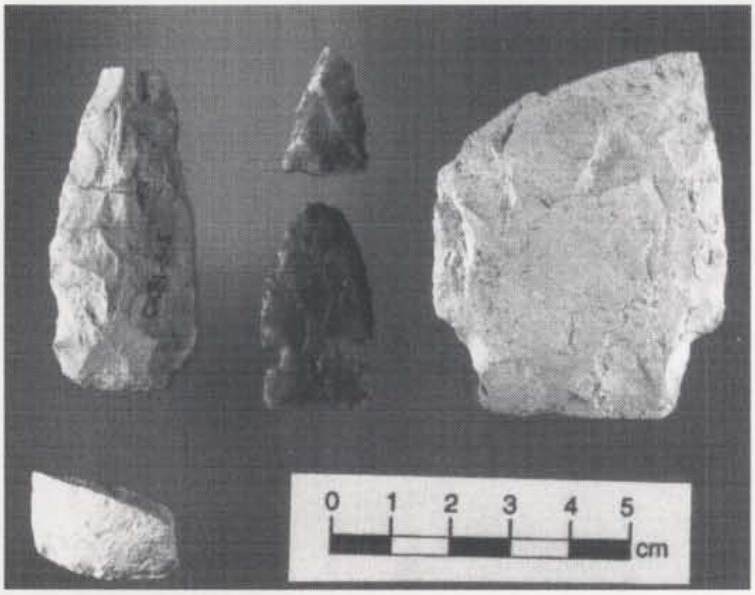

Plate 89 CkBl-5 Northwest Arm 1: artifacts

Plate 90 CkBl-6 Rocky Barasway Cairn: view south

INVESTIGATING PALAEO-ESKIMO AND INDIAN SETTLEMENT PATTERNS ALONG A SUBMERGING COAST AT BURGEO, NEWFOUNDLAND

TIMOTHY L. RAST