Testing the Waters: Intertidal Zone Archaeology at the Beaches Site (DeAk-01).

By

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Abstract

The Beaches (DeAk-01) is a multicomponent archaeological site that is situated in southwestern Bonavista Bay, Newfoundland and Labrador. The site preserves evidence of the Maritime Archaic who were the first inhabitants on the Island of Newfoundland. Earlier excavations discovered that the anthropogenic horizon which holds information of their settlement and lifeways is under a blanket of peat. However, the Maritime Archaic archaeological evidence is compromised because of erosion due to rising sea levels, and it is frequented by collectors.

This project examined the intertidal zone to re-assess the Maritime Archaic and peat horizons using three different survey techniques: core sampling, test pitting and the use of a cofferdam. Anthropogenic and peat horizons were identified, however the integrity and extent of the peat, and in-situ Maritime Archaic archaeological deposits were demonstrated to be at risk of destruction. It is recommended here that the Maritime Archaic component at the Beaches site be revisited before all cultural and geographic context is lost.

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CHAPTER ONE

The Maritime Archaic at the Beaches

1.1 Introduction

The focus of this thesis is the Maritime Archaic occupation at the Beaches site (DeAk-01), Bonavista Bay, on the Island of Newfoundland. Archaeological evidence indicates that the Maritime Archaic anthropogenic horizon at this site is one or more metres below the surface of the gravel terrace. The terrace is eroding due to rising sea levels and currents. In-situ material culture is being exposed and displaced, and as a result archaeological and geographical data is continuously lost.

The purpose of this thesis is to survey the intertidal zone at the Beaches site to determine what remains of the Maritime Archaic anthropogenic horizon that Paul Carignan originally excavated in the early 1970s, and to find the extent of the buried peat stratum that caps it (1973a, b, 1974a, b, c, 1975). To achieve this goal, it is important to understand the topography of the Beaches and the development of the gravel terrace. The specific questions that guide this research are outlined in Section 1.7. The results of this thesis show that the site has changed since the Maritime Archaic were present due to natural accretion and erosion processes.

This study demonstrates that archaeologists should consider further investigations on the gravel terrace before all cultural components and materials lose their context. It is important to continue to study the tidal flats and the site, because the stratigraphy holds critical information on the influences that environmental processes had on the settlement patterns of the Maritime Archaic and their successors at the Beaches.

1.2 Maritime Archaic Peoples

The name 'Maritime Archaic Tradition' was first defined by archaeologist James A. Tuck (1970:121) after he excavated a large burial ground at Port aux Choix which contained an abundance of material culture with skeletal remains (Tuck 1971:343-358; 1998:1). He gave two reasons for coining the name: First, evidence of this and related cultures have been found from northern New England to northern Labrador, spreading from Quebec east to Newfoundland. Second, in all areas, cultural material indicated these peoples depended on a marine subsistence (Tuck 1971:350; 1976:98). It is uncertain from where the Maritime Archaic peoples migrated (Tuck 1971:354-357), but radiocarbon dates obtained from charcoal samples collected from coastal terraces show they were in southern Labrador by 7800 BP (Fitzhugh 2006:51; McGhee and Tuck 1975:23-94; Renouf 1976:111). The Maritime Archaic were the first peoples to migrate into post-glacial southern Labrador. From evidence reported by several archaeologists, (eg. Fitzhugh 1975; McGhee and Tuck 1975; Renouf 1976; Tuck and McGhee 1975) the length of time they settled in Newfoundland and Labrador spans roughly 4800 years dating from about 8000–3200 BP.

What is known about their life-ways has been revealed from excavating burials. Grave goods included ground slate gouges, celts, axes and adzes. They made implements such as toggling harpoons of whale bone, walrus ivory combs and adornments of skate teeth and great auk beaks. This partial list of artifacts implies that the Maritime Archaic built sturdy canoes to withstand the cold, rigorous coastal waters and the Labrador Current. They were successful in their hunt for marine mammals and sea birds nesting on hard to reach and remote islands (Bourque 1994:24; Fisheries and Oceans Canada 2015; Renouf 1999:407; Sanger 1973; Tuck 1970:117-118; Tuck 1971:352; Tuck 1975; Tuck 1976).

Tuck (1982:204-205; 1998) also recognised there were two distinct Maritime Archaic cultural groups (Fitzhugh 1977, 2006; Reid 2007:6-8). Several sites in Groswater Bay on the central coast of Labrador is the area where the variation in tool kits was noticed (Fitzhugh 1977, 2006). Ground slate bayonets, celts, gouges, projectile and spearhead points, and toggling harpoons were common implements shared among both groups (Tuck 1982:204-205; Tuck 1998:2-5; Reid 2007:6-8). However, northern peoples used ground slate celts, points, and ulus (Fitzhugh 1977, 2006). They valued quartzite and Ramah Bay chert for making chipped stone tools (Hood 1981; Rast 2010; Reid 2007). Southern groups used end-scrapers instead of ulus, and leaf-shaped bifaces and blade-like flakes. The lithic materials available to the southern Archaic groups were fine to course grained cherts and rhyolites (Hood 1981; Reid 2007; Renouf and Bell 2006; Tuck 1982; Tuck 1998).

Dominic Lacroix (2015) divided southern populations on the island of Newfoundland into three additional societies: the Bridgelanders, Northlanders and Eastlanders. Lacroixs' argument is that there are too many differences in burial practices, site location preferences, technological forms and preferred lithic materials to place the Newfoundland Maritime Archaic into one monolithic culture.

For example, Bridgelanders of southern Labrador and the northwestern coast of the Northern Peninsula were in proximity to the Northlanders, whose territory extended from the northeastern half of the Northern Peninsula east to Back Harbour (Lacroix 2015:228).

The Bridgelanders and the Northlanders used red ochre in burials and ceremony. However, Bridgelanders preferred to separate their burial sites from habitation areas (Lacroix 2015:229) whereas, the Northlanders cohabited with their deceased (Lacroix 2015:114, 118). The third culture Lacroix identified were the Eastlanders. Their territory was Bonavista Bay and surrounding coastal regions. Their burial ceremonialism is unknown because no burial grounds have been found such as the Port au Choix (Bridgelander) or Curtis (Northlander) sites (Lacroix 2015:120-131, 230).

The Eastlanders preferred local rhyolites and cherts for chipped stone implements and used the expanding stem point design, whereas broad and side notched points were the favoured styles of the Bridgelanders. The Bridgelanders also preferred local grey-white chert. The Northlanders favoured Ramah chert from Labrador, as well as Newfoundland cherts for their contracting stemmed point strategy (Lacroix 2015:226). The Northlanders also used soapstone plummets, whereas the Bridgelanders and the Eastlanders did not (Lacroix 2015:226-231). Not all archaeologists agree to this tripartite system because few burials outside of Port au Choix have been excavated and differences in burial ceremonial and ritual practices are unknown (Christopher Wolff, per. comm. 2018).

1.2.1 Maritime Archaic Tradition on the Island of Newfoundland

On the island of Newfoundland, the four oldest Maritime Archaic habitation sites are multicomponent and have been radiocarbon dated to within a 600-year span. They are in three different topographic settings (see Figure 1.1 for site locations discussed in the text).

At Stock Cove (CkAl-03) the Maritime Archaic component was recently dated to around 5600 BP (Wolff and Holly 2016:240). The site is on the northeastern shore on the Isthmus of Avalon at the mouth of Bull Arm. It sits on a terrace that is 1-2 m above a cobble beach facing Trinity Bay. When the Maritime Archaic were present sea levels were 10 to 25 m lower than today (Catto et al. 2000:50). The terrace is eroding, and the beach is littered with stone artifacts from several cultural groups (McLean 2006: 40-41; Robbins 1985: 37-39; Shaw and Forbes 1990; Wolff et al 2008:157-158).

The Gould site (EeBi-02) is on the western shore of the Northern Peninsula. It was radiocarbon dated to 5500 BP (Renouf and Bell 2006:23; 2011a: 3). It is situated 600 m from the shore, but when the Maritime Archaic were at the site, it was close to the ocean (Bell and Renouf 2003: Bell et al 2005a:134; Bell et al. 2005c:178-179; Renouf and Bell 2011b:48; Smith et al. 2005:36).

South Brook Park site (DgBj-03) was located inland 35 km east of Bay of Islands on the southern tip of Deer Lake in western Newfoundland. The site was on a beach terrace 14.3 m above sea level (ASL) and radiocarbon dated to 5200 BP (Reader 1996:123; Reader 1999: 3). Sea level was close to that of today (Batterson and Catto 2001:225) and Deer Lake was much larger. The Maritime Archaic who occupied the site left an abundance of quartz and quartzite artifacts indicating they may have been an early group (Reader 1996:125-126). Later Archaic peoples on the Island used cherts and rhyolites from local quarries (Fitzhugh 2006).

The Beaches (DeAk-01) is the fourth oldest known Maritime Archaic site on the Island. It is in southwestern Bonavista Bay on the northern coast. The Maritime Archaic cultural component is 1-2 m below a gravel terrace. It dated to around 5000 BP (Carignan

1973b, 1974a, 1975). When the Maritime Archaic were at the site, the relative sea level (RSL) was more than 4 m below that of today (Shaw and Forbes 1990). Like Stock Cove, the Beaches beach and the tombolo are littered with stone artifacts.

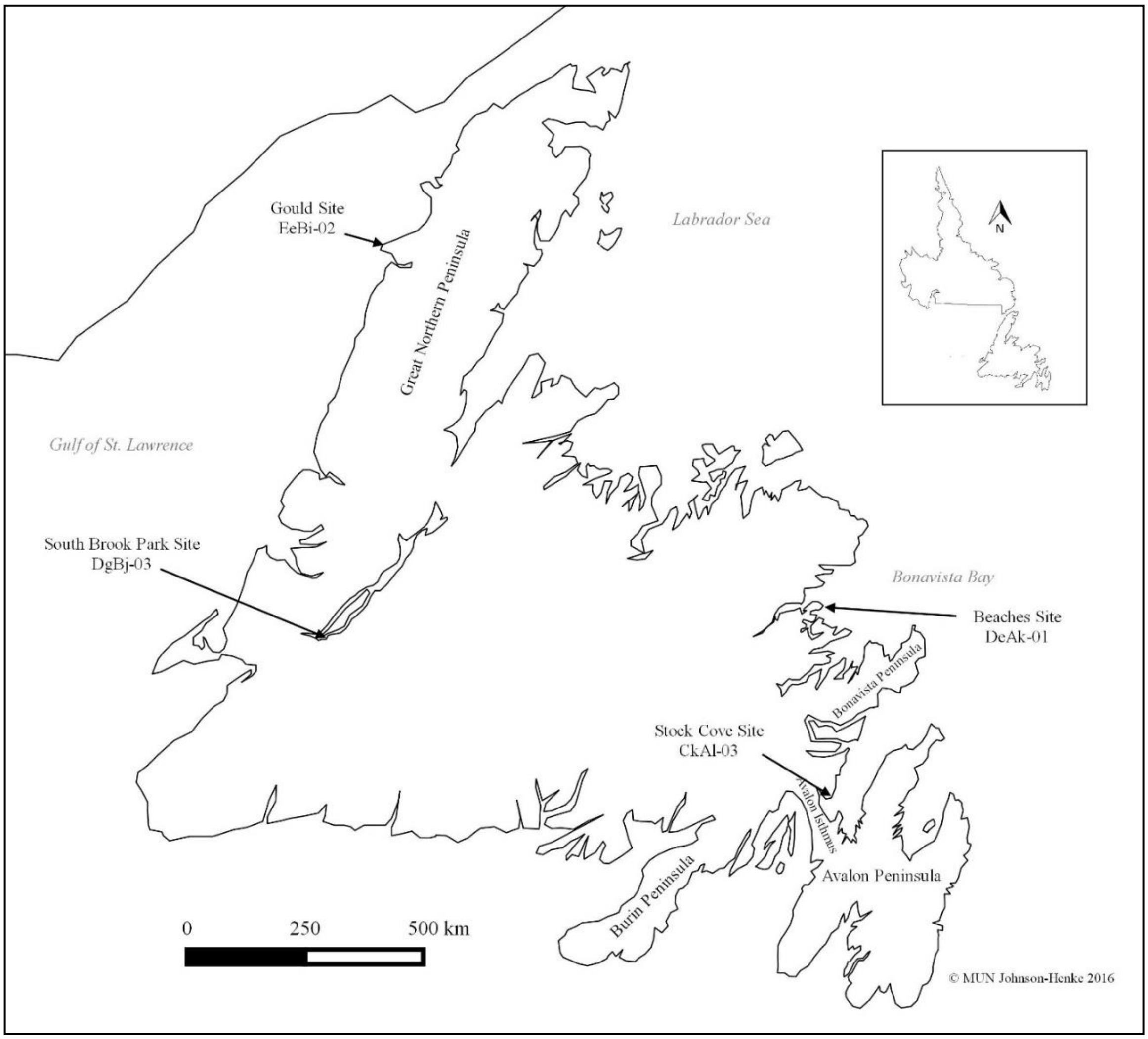


Figure 1.1. The map illustrates locations discussed in the text. South Brook Park reveals similar cultural signatures as groups from the Maritimes and Labrador (Reader 1999).

1.3 Recent Geographic History of Newfoundland

During the last glacial period the Laurentide Ice Sheet extended east as far as Newfoundland. As ocean water froze within the ice sheets, sea levels dropped up to 125 m (Bell et al. 2006:13; Clark and Mix 2002:1; Simon et al. 2016:1618) and areas of the continental shelf became dry land. The weight of the ice sheet pushed Labrador, and the Great Northern Peninsula into the earth's crust and upper mantle. The land rebounded after the ice melted, which caused shorelines to uplift as much as 140 m in some regions. The uplift is isostatic rebound, and the Northern Peninsula continues to rebound today (Bell et al. 2005a:133; Bell et al. 2006:13; Bell et al.: 2008:15; Catto et al. 2000:49-50: Liverman 1994: 222; Quinlan and Beaumont: 1981:1156-1158; Shaw et al. 2002:1870-1873; Simon et al. 2016; Westley et al. 2011:358).

Geographic circumstances were and are different for eastern parts of Newfoundland. John Shaw and Donald Forbes (1990:644) demonstrated that the Avalon Peninsula and the Burin and Bonavista peninsulas were ice free by 12,000 BP (Cumming et al. 1991:233; Liverman 1994:221; Ogden 1977:25; Shaw and Forbes 1990:656; Shaw et al. 2002:1871-72). Uplift occurred in eastern Newfoundland before it did on the Northern Peninsula, and by 5500 BP the RSL was lower than at present (Catto et al. 2000:50; Shaw and Edwardson 1994:99; Shaw and Forbes 1990:655). Currently Newfoundland is sinking from Bonavista Bay east due to continuing isostatic adjustment (Quinlan and Beaumont 1981).

1.4 Southwestern Bonavista Bay Regional Setting

Small fjords in the inner regions of southwestern Bonavista Bay are narrow and can descend to 300 m below sea level (BSL), and headlands rise steeply to 150 m ASL (Blackwood 1976:10; Brookes 1989:3; Carignan 1975:15; Cumming 1990:1; Cumming et al. 1991:222; Moreton 1864:264; Murray 1877:270; O'Brien 1987:257). Numerous islands of boreal forest dot the seascape.

The coast is dynamic and erosion along the western section of the Bay is caused by the Coriolis force (Cumming et all 1991:232; Gradstein and Srivastava 1980:262). Due to the varying speeds at different latitudes when the earth rotates, air and water are forced to deflect to the right in the northern hemisphere, and the result is the Coriolis effect. The south-southeast flow of the Labrador current deflects into Bonavista Bay and this process is a major cause of the erosion in the western region (Christopherson et al., 2006:154-156; Strahler and Strahler 2005:773).

1.5 Beaches Site (DeAk-01)

The Beaches is located west of Alexander Bay (Figure 1.2). Figure 1.3 is an aerial view of the Beaches. The section of the site that remains intact and above sea level is situated on an eroding gravel terrace (see Plate 1.1). The terrace is located between Beaches Cove to the north and a small cove to the south (in the text referred to as 'Southern Cove') north of Rocky Bay. It is at the base of a headland that is connected to Fox Bar Island by a gravel tombolo.

The terrace was measured at the high tide mark: measuring 118.5 m along the western headland,107.5 m along Beaches Cove, and it stretches 134 m on Southern Cove. The total area is 4905.6 m². A fen is at the centre of the site (Wells 1981, 1996; Wells and Pollett 1983). Alders are growing along its western perimeter, and rose bushes are encroaching toward the centre of the fen.

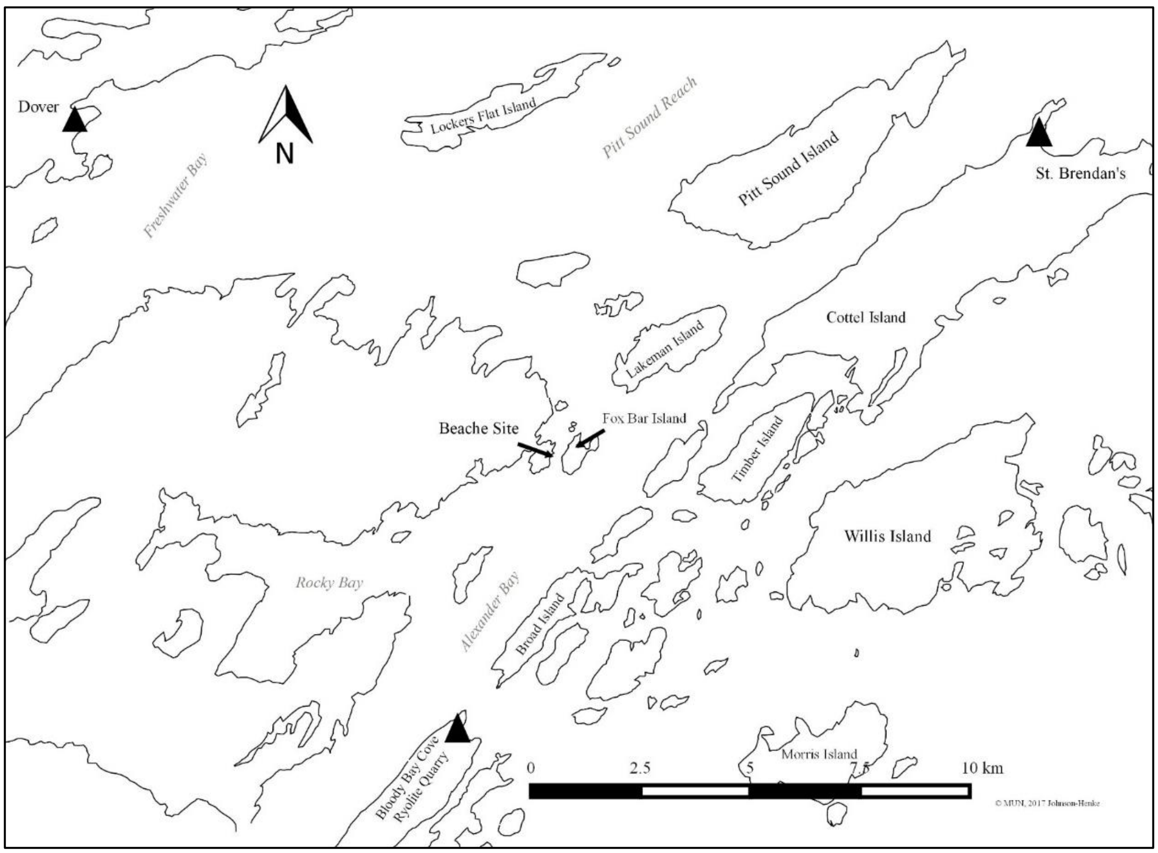


Figure 1.2. Map of southwestern Bonavista Bay and the location of the Beaches site. Bloody Bay Cove rhyolite quarry is also in Alexander Bay, and it is 9.2 km south of the site. The Dover fault is 12 km northwest in Freshwater Bay.

The western point on Fox Bar Island was also measured at the high tide mark. Measuring 54.3 m along the eastern headland, 81 m along Beaches Cove, and 69 m along Southern Cove. The total area is 1067.5 m² (see Plates 1.2 and 1.3).

The tombolo is 124 m long from the high tide mark on the points on the terrace and Fox Bar Island. The width measurement was taken at the low tide mark and it varied from 16-27 m wide. The crew crossed the tombolo to get to camp before high tide; the highest water level was approximately 70 cm. The water depth on the tombolo is estimated to be 90-100 cm during high tide (Plate 1.4).

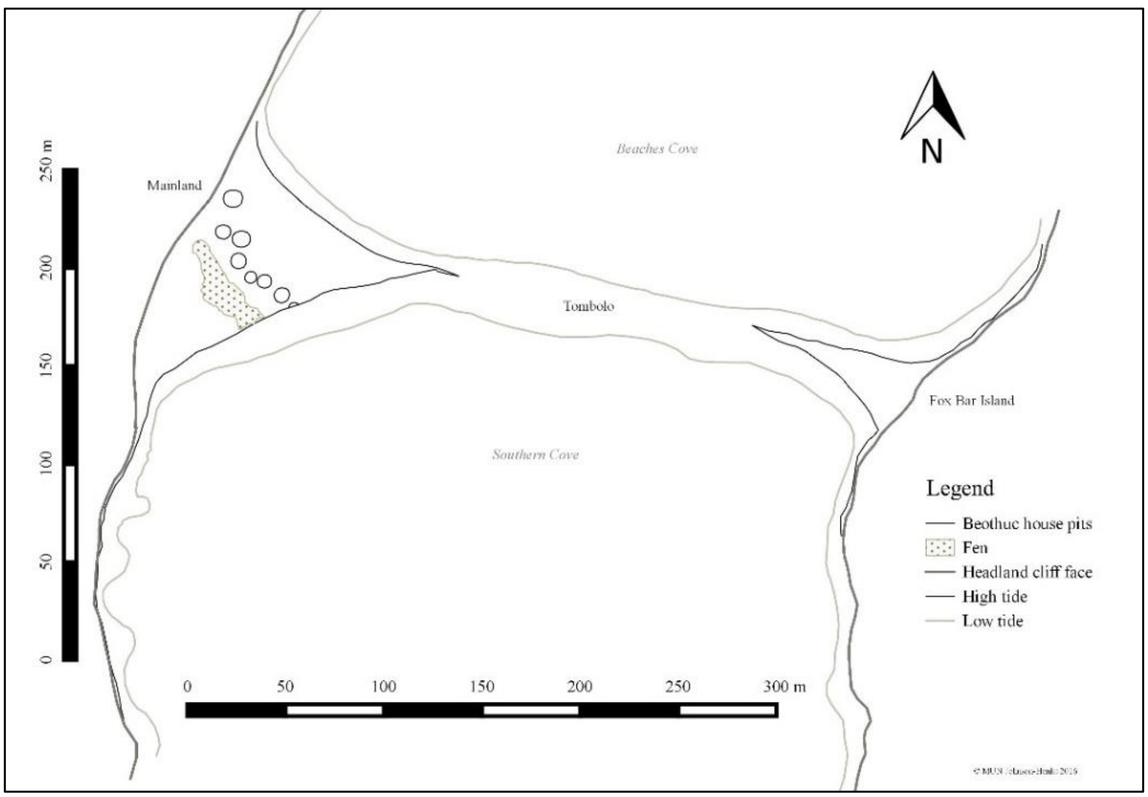


Figure 1.3. The tombolo that connects Newfoundland to Fox Bar Island is narrower than when T. G. B. Lloyd described it in 1876 (222).

Plate 1.1. View facing west. Behind the breakwater erosion continues. No test pits were excavated in this location.

Plate 1.2. Northwest view toward Beaches. Terrace where Beothuk house pits are situated. The breakwater (white wall) is not preventing erosion. Tide is going out.

Plate 1.3. View is northeast toward Fox Bar Island. The point on Fox Bar Island is at centre of the photo. Tide is going out.

For approximately 4-8 m the tombolo gently slopes toward Beaches Cove; then, there is a 10-12 m drop to the bottom of the Cove. This was observed by Salvage Port Authority representative Winston Squire and experienced fisherman Andy Brown (pers. com., 2015).

The south side of the tombolo gently slopes for 100 m or more into Southern Cove. Marine species include blue mussel (*Mytilus edulis*), surf clam (*Spisula olidissima*), razor clam (*Ensis directus*) and juvenile crab (*Chionoecetes opilio*). The nearshore of Southern Cove likely serves as a nursery for species such as crab (*Chionoecetes opilio*): eel (*Anguilla rostrate*) and star fish [(*Asterias vulgaris*) (Memorial University Ocean Sciences; 2015; Rao et al. 2009:117-118)]. Three aquatic floral species: bladder whack (*Fucus vesiculosus*), sea lettuce (*Ulva lactuca*), and eel grass (*Zostera marina L.*) were exposed at low tide (Fisheries and Oceans Canada 2015; Guiry 2016, see Plates 1.5-1.8).

Plate 1.4. Western view from Fox Bar Island. In Southern Cove swimmers jumped from motor boats near boulders in the foreshore. The water depth at low tide approximately 100 m from the top of the tombolo is estimated to be 1.25 – 1.5 m. Tide is beginning to rise in the Bay.

Plate 1.5. South view of intertidal zone in the Southern Cove, about centre of the tombolo at low tide.

Plate 1.6. Southwest view of Rocky Bay. A rocky outcrop sits at the entrance to Southern Cove. Bladder whack drapes over the rocks. Photo was taken at low tide.

Plate 1.7. Eelgrass and North Atlantic Sea Star (*Asterias vulgaris)*. This photo was taken in the location where most of the artifacts were found in the intertidal zone. Low tide.

Plate 1.8. Eelgrass and bladder whack in the location Core 3 (C3) was taken. The tide is beginning to come into the Bay. Southwest view into Southern Cove.

1.6 Previous Archaeological Research

Anthropologist T.B.G. Lloyd surveyed the Beaches in the early 1870s. He (1876b:222) described it as the 'Old Camping Grounds'. When he visited the site, the tombolo was a maximum of 110 m wide and 2 m ASL. There were 13 Beothuk house pits on the western side of the tombola and three adjacent to Fox Bar Island. A small tickle flowed between Beaches Cove and Southern Cove.

Helen Devereux was the first professional archaeologist to study the Beaches. She was commissioned by the National Museum of Canada and the Department of Provincial Affairs of Newfoundland in the mid 1960s. Her interest was mainly in the four Beothuk house pits (1966a, 1966b, 1969) she found, but the house pits near Fox Bar Island had disappeared. Devereux speculated the 1929 Grand Banks tsunami eroded them. However, Alan Ruffman (2006) explained that the tsunami refracted around the Avalon Peninsula.

When the wave hit the Bonavista Peninsula the effect was minor in Bonavista and Port Union. The site would not have experienced disturbance from the wave (Clague et al. 2003; Fine et al. 2004; Steven Ward, per. com. 2017).

Devereux exposed the stratigraphy on the southwestern section of the terrace and dug a test trench 1.52 m wide and 6.1 m long. She uncovered a horizon of red-brown peat averaging 20.5 cm thick. Under the peat lay a black anthropogenic horizon. Artifacts that were retrieved include a harpoon point, bifacial ulu and ground stone axes, an adze and chisel. Devereux (1966a, 1966b, 1969) found a deposit of charcoal in one of the house pits and it radiocarbon dated to cal. 1950 ±100 BP (GaK-1481), (Wilmeth 1978:157). Figure 1.4 is a map indicating locations of previous excavations.

Paul Carignan began a salvage project under contract with the Archaeological Survey of Canada (1973b, 1974a). He chose the area that included the fen, because that was where he believed the most information could be collected. He discovered three cultural strata in the substrate and noted a complex stratigraphy of the southeastern portion of the terrace (Carignan 1975:28). Radiocarbon dates from charcoal samples demonstrated that the site was at least 3000 years older than Devereux's sample produced. The results of Carignan's (1975:38-39; Wilmeth 1979:156-157) radiocarbon dates are: 3740 ±100 BP (I-6761), 3890 ±100 BP (I-7509) and 4950 ±230 BP (SI-1384); which indicated the Beaches was the oldest multicomponent site discovered on Newfoundland up to 1973 (Plate 1.9 and Plate 1.10).

In 1989 archaeologist Laurie McLean (1990a, 1990b) with Burnside Heritage Foundation Inc., conducted a systematic survey of the Beaches. He found four additional Beothuk house pits and dug 24 test pits on the gravel terrace and four on Fox Bar Island.

The test pits on Fox Bar Island were on a ridge facing west approximately 2 m ASL where Maritime Archaic macroblades (i.e., prismatic blades) were found.

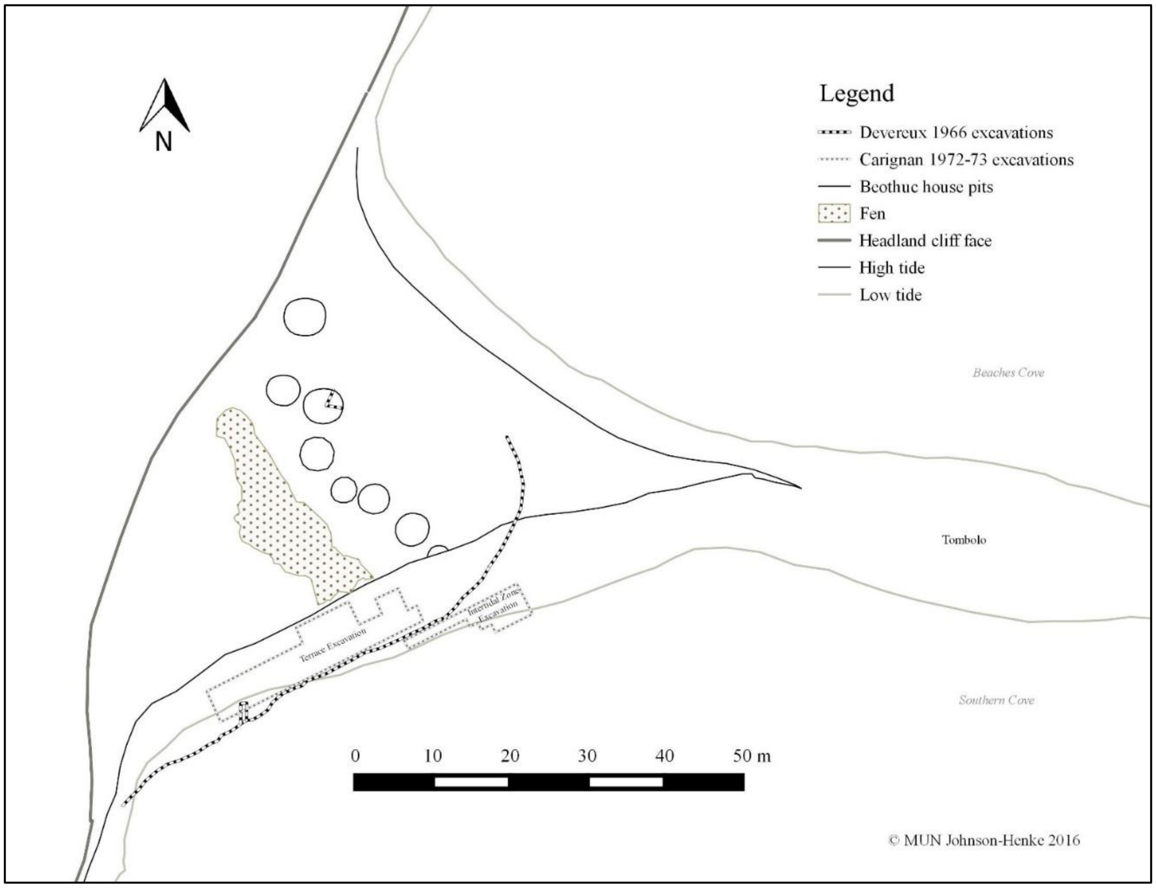


Figure 1.4. The map shows the approximate locations of Carignan's and Devereux's excavations at the Beaches. The house pits (circles) are located east of the fen.

After examining the lithic tools, McLean concluded that there were at least six cultural groups that utilised the Beaches terrace. Archaeological remains of Maritime Archaic, Arctic Small Tool Tradition (ASTt) including Groswater and Dorset, Beaches, Little Passage and Beothuk (respectively) peoples have been excavated (McLean 1990b:5). In 1995 Deal and McLean (1996:5) excavated part of House Pit 1 and found there was no floor. Because of the lack of cultural evidence, deemed it a natural feature.

Plate 1.9. Southwest view. Stakes mark part of Carignan's excavation in the intertidal zone. The boulder in the centre was a geo-reference to produce maps. Photo courtesy of Dr. Raymond LaBlanc, 1973.

Plate 1.10. The view is southwest. The finger points to the reference boulder in 2014. It is completely under water at high tide. The breakwater sits where the gravel terrace did in the early 1970s. Photo courtesy of Ariel Pollard-Belsheim, 2014.

The gravel terrace and the intertidal zone have experienced topographic changes as demonstrated by several archaeologists and the results of this research. This thesis is a continuing contribution to the evidence of some of those changes that will be presented and discussed in Chapter Three.

1.7 Research Objectives

The field work of previous researchers has presented information on geographical changes the Beaches has experienced. However, little is known about the alterations to the landscape. Three questions initiated the current research:

Question One: Are there still in-situ Maritime Archaic deposits in the intertidal zone at the Beaches site?

Devereux (1966b) recorded that the southwestern extent of a buried peat stratum capped an archaic anthropogenic horizon that Carignan (1974a, 1975) later identified. Carignan traced Maritime Archaic archaeological deposits, and a peat horizon into the tidal flats of Southern Cove. He found that the peat thinned descending toward the low tide line. The artifacts Carignan (1975:28, 33) excavated in the intertidal zone were exclusive to the Maritime Archaic tool kit.

Currents, tidal cycles, ice, and storm surges are a few ways that artifacts can be exposed. Researchers have observed that with every low tide new inventories of artifacts were exposed. Artifacts found during the 2015 field season were tracked by the crew using the total station and geo-references. Most implements and debitage were collected from the intertidal zone of: Southern Cove, some were on the north beach adjacent to Beaches Cove, on the tombolo and in 1.5 m of water off the west coast of Fox Bar Island approximately

150 m south from the top of the tombolo (Figure 1.5).

Residents of local communities have visited the site for decades and have amassed private collections. In 1973, Raymond LaBlanc (pers. com., 2014), witnessed a boat driver surface collect in the intertidal zone along the southwestern bank, while Carignan's crew excavated the terrace. McLean also found up to 30 shallow pits from looting when he first surveyed the site in 1989 (Deal and Mclean 1996:4).

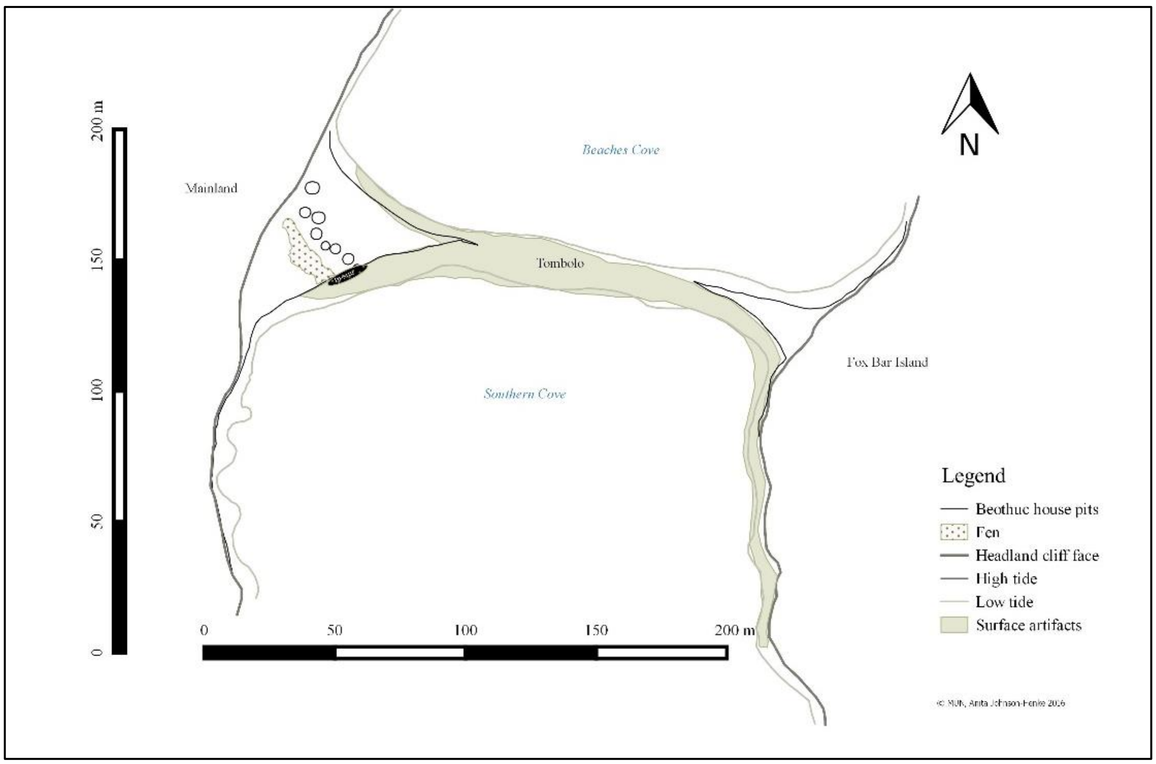


Figure 1.5. Map showing the large area in the intertidal zone where artifacts were collected by the field crew. Out of the 294 artifacts collected, 32% were found in-situ.

Eric Facey collected artifacts from the Beaches for several years in Southern Cove (Campbell 2016). Devereux (1966a; 1966b) and Carignan (1973-74 catalogue sheets) found many stone implements in the same area. Although this thesis does not focus on material culture the number and variety of artifacts, and the amount of debitage retrieved from the intertidal zone demonstrates the wealth of information that is continuously moved out of context and valuable data that is being destroyed or pillaged.

Question Two: What can the stratigraphy tell us about the landscape when the Maritime Archaic occupied the Beaches?

Devereaux's (1966b, 1969) and Carignan's (1975:31) stratigraphic profiles showed episodes of deposition and inundation. The Beaches' geomorphology can partially be reconstructed by analysing the sediments, and peat horizons from core samples and from sections of the strata that were exposed during 2015 season. Pedogenesis is a method of classifying stratigraphic columns to determine soil development (Holliday 2004:41-77). This allows the substrate to be divided into pedostratigraphic units. Pedostratigraphic units are divisions in soil strata separated by disconformities such as deposits and inundations, or anthropogenic alterations that interrupt the normal sequence of soil production (Elias 2007:2847-2856; Holliday 2004:74-77). Pedostratigraphic units give a clear illustration of soil formation and this assists in recognising palaeo-topographies. By scrutinising Devereaux's and Carignan's detailed field notes and reports; in addition, to observations during field work in 2015 and radiocarbon dates from peat samples, enables researchers to recreate a partial image of the topography when the Maritime Archaic were present.

Question Three: What recovery methods are most effective excavating in the intertidal zone at the Beaches?

Archaeologists have developed and borrowed several methods for working on coastal sites that are situated in the intertidal zone, and they must work around tidal range and schedules (Bell 2013:472). They excavate at low tide and when incoming high tidal water begins to hamper visibility and work, they stop excavating. On the Northwest Coast auger and core sampling have been used for survey and accompany excavation (Cannon 2000; Fedje et al. 2009, Mackie et al. 2011).

Researchers employed and experimented with three methods of survey and excavation for this project. They included: shovel and trowel, experiments with a cofferdam and dewatering system, and core samples were extracted with a percussion core sampler. Cofferdams have aided archaeologists at submerged sites, and they have extended the work day in intertidal excavations. Two core samples were taken due to the high-water table in the test pits, and two were extracted in lieu of digging test pits. The methods were then evaluated for efficiency.

1.8 Summary of Results

Much of the southwestern bank has eroded since the mid 1970s, but buried peat covers a Maritime Archaic cultural component. The peat extended approximately 5 m from the southern bank into the intertidal zone of Southern Cove. The four cores were instrumental in producing an illustration of the intertidal zone, the southern section of the gravel terrace, and the palaeo-topography of the site. The data indicated there was no terrace when the Maritime Archaic first used the Beaches site. The terrace was built by the sediment deposits that cap the Maritime Archaic archaeological evidence.

The most efficient methods for excavating in the tidal flats was a combination of digging test pits and extracting core samples. The cofferdam did not work well for water control because the material it is made of is too rigid for the substrate. However, there are designs of cofferdams that will work well in littoral zones around Newfoundland. More experimentation is needed.

CHAPTER TWO

Theory and Method

2.1 Theory: Introduction

Through millennia peoples used and inhabited palaeo-coastlines because of the abundant marine resources (Bailey 2004a:3; Bailey 2004b:39-40). Archaeological evidence of their past life-ways is under sediments and water, due to rising global sea levels (Bang-Andersen 1996:429-431; Bell et al. 2008:14; Bernick 2013:74; Erlandson 2001:288; Erlandson 2012:138; Ford 2011:764, 765; Lacroix et al. 2014:17; Tuck, 1991:32; Voris 2000:1155). In Newfoundland and Labrador Dr. Trevor Bell of Memorial University (MUN) is principal researcher for Coastal Archaeological Resources Risk Assessment (CARRA: 2014). He identified several sites in Newfoundland that are at risk of erosion. Sites such as Cape Onion East (EjAv-8) and Port au Choix (EeBi-2) located on the Northern Peninsula, and the Beaches (DeAk-1) and Cape Freels 3 (DhAi-3) in Bonavista Bay (Carignan 1973a) are a few locations where site integrity is in jeopardy.

2.1.1 Theoretical Framework

The theoretical approach to this thesis was based on Robert Van de Noort's *Archaeological Theory of the Sea* (2011:21-43). It was the foundation for his studies around the North Sea and grounded on geographic principles. A basic rule of geography is that there is no single environment (Golledge 1996:475). The physical and biotic environments controlled social, cultural, political and economic environments affected daily activities, beliefs and values (Ford 2011:772).

Coastal archaeology (Ford 2011:772; Golledge 1996:475; Van de Noort 2011, 2013:727/28) is based on archaeological and geographical theory and assumes that coastal peoples in the past adapted to environmental changes. People had a complex relationship with the natural environment, therefore environmental influences must be discussed in context with the culture-nature relationship (Van de Noort 2011:21-49; 2013:727/28). For example, evidence of Maritime Archaic peoples acclimating to environmental changes was found in northern Labrador. Single family pit houses evolved into multi-family longhouses to accommodate settlement changes (Erlandson 2001; Erlandson and Fitzpatrick 2006; Tuck 1991; Wolff 2008).

At the Beaches site (Carignan 1975:26-31) two depositional events have been identified. The first deposit covered an exclusively Maritime Archaic anthropogenic horizon. The more recent deposit capped a multicomponent anthropogenic horizon with 4500 years of archaeological evidence (Devereux 1966b:288, Carignan 1974a, 1975, McLean 1999:33). The natural deposits between anthropogenic deposits indicated settlement patterns were affected at the Beaches.

Humans capitalised on resources the environment offered. This is evident in the variety and number of grave goods the Maritime Archaic produced from avian, marine, and terrestrial faunal remains. Ancient peoples manipulated materials from the environment to accommodate cultural and social identity (Erlandson and Fitzpatrick 2006; Ford 2011:772; Wolff 2008), therefore social identity and practices were prescribed by the environment (Ford 2011; Golledge 1996). Non-human agents such as flora, fauna or inanimate objects in nature incorporated peoples into a network of natural environments. For example, grave goods from the Port au Choix and the L'Anse Amour burials illustrated a complex relationship with marine mammals and red ocher. Lacroix reported regional differences on Newfoundland regarding stone tool styles (2015). Stone lithic materials sourced from several quarries, indicated the Maritime Archaic peoples adapted well to local environments (e.g., Sanger and Renouf 2006).

This relationship varied through time and space and from site to site (Ford 2011:772). Maritime Archaic southern and northern peoples used different tools (Fitzhugh 2006:52; Reid 2007:6-8; Tuck 1982:204-205; Tuck 1991; Tuck 1998; Wolff 2008: iv). Resources in various locations, topographies, and experiences in certain spaces brought new dimensions into the relationship (Speck 1977:72-74; Thornton 2008:22-35; Wenzel 2000:134/35).

Their knowledge of aquatic, marine, avian and terrestrial species (Bourque 1994; Jelsma 2000; Tuck 1975) was testament to their relationship with the environment, and socio-political organisation. Van de Noort (2011; 2013:727, 728) deems that the diverse and abundant faunal remains, to be indicators that nature was as an intricate part of everyday life (Thornton 1977). The data collected from the Beaches site, and many other sites throughout Newfoundland and Labrador demonstrate that Maritime Archaic populations were affected by geographic processes and they acclimated.

2.2 Methodology: Introduction

Intertidal zone archaeology has not been practiced in Newfoundland and Labrador therefore projects from the Northwest Coast, the British Iles, and the Caribbean were used to reference this project. Survey and excavation were scheduled around the tidal cycles for Dover and Wellington so that researchers had as much time as possible to work during the low tide cycle. Tidal cycles were monitored for 14 months (Canada's Fisheries and Oceans, 2014/15).

In Bonavista Bay there are two daily tidal cycles; the second cycle has a range of as much as 4 cm higher than the first. There is also a biweekly range that varies. A spring tide occurs on a full moon (Christopherson et al. 2006:522) and has a range of up 1.3 m. A neap tide occurs on a new moon and has a range of 70 to 90 cm (Fisheries and Oceans Canada 2015). Extra centimeters allow for a longer period to work low in the intertidal zone. The best time for working in the tidal flats was in late July and early August because of the cycles and warmer weather. The full moon at the end of July and the beginning of August 2015 produced a tidal range of 1.3 m which occurred for two consecutive days; and one day before and after, the tidal range was 1.2 m.

2.2.1 Field Methods

A Nikon Novo 3 m total station from the Department of Archaeology at MUN was used to attain accurate survey and mapping information. Geographic features that were surveyed included high and low tide, elevation, locations of test pits and core samples, fen, and artifacts in-situ and on the surface. Georeference points were surveyed and included the wharf, and a large boulder south and adjacent to Carignan's excavation in the tidal flats (LeBlanc, pers. com., 2014). This survey aided in producing maps and plotting overlays from the Devereux, Carignan, and McLean maps, reports and publications. Site datum was established in 2014 by CARRA members Ariel Pollard-Belshiem and Marc Storey when they surveyed the site. The site datum was located on the south side of the terrace: at Northing 5409930.053, Easting 292939.020, and elevation is 0.648 m ASL (see Plate 2.1).

The substrate of the intertidal zone and the gravel terrace are a mix of gravel and sand of various granule sizes, with cobbles and boulders in the matrix. Don Henke and I took a reconnaissance trip to the Beaches to assess locations in the intertidal zone to determine what diameter of core sampler would most easily penetrate the substrate, and to assist Dr. Steven Bruneau in his design of a portable cofferdam. Two sizes of polyvinyl chloride (PVC) pipe were tested. They were 2.54 and 5.08 cm in diameter and 40 cm long. The PVC pipe that is 5.08 cm was easier to push into the surface (Plate 2.2).

It was surmised that a Watermark™ Universal Core Head Kit sediment sampler was the most effective and least expensive tool for this project. The kit included a bronze slide hammer (7.26 kg) and bronze gravity weight (5.44 kg). Polycarbonate core sleeves 68 mm in diameter (inside measure), and 60 and 120 cm lengths were used to collect the cores.

Dr. Stephen Bruneau, Director of Industrial Outreach for the Faculty of Engineering and Applied Science at MUN, planned and arranged the modifications for the cofferdam. Two fibreglass tanks were donated by Laboratory Services at the Ocean Sciences Centre at Logy Bay. One tank was 1.98^2 m and 0.61 m high. The bottom was removed leaving as much height as possible to use as a cofferdam. The other tank was 1.22 m in diameter

Plate 2.1. Setting up the total station on datum. View is southeast.

Plate 2.2. PVC pipe segments used to test the Beaches site intertidal zone substrate.

and 1.52 m tall (see Plate 2.3). It was cut down to 95 cm in height. It housed the generator that powered a submersible pump for dewatering and seepage control inside the cofferdam. Back dirt from Test Pit 1 (TP1) was used to fill sandbags to seal the contact point between the cofferdam and the substrate. The cofferdam was set up in two locations low in the intertidal zone in Southern Cove.

Plate 2.3. The fibreglass tanks outside of the Engineering and Applied Science building.

2.2.2 Approach to Excavation

Fourteen test pits were excavated by shovel and trowel, four core samples were extracted, and the field crew experimented with the portable cofferdam (Figure 2.1). Test pits were dug at different locations in the intertidal zone on the southwest beach parallel to Devereux's and Carignan's excavations. Seepage from the fen in TP1 and TP9 prevented archaeologists from observing the strata, therefore core samples were taken. Two other cores were extracted instead of digging test pits. Core 1 (C1) was taken from the fen to use

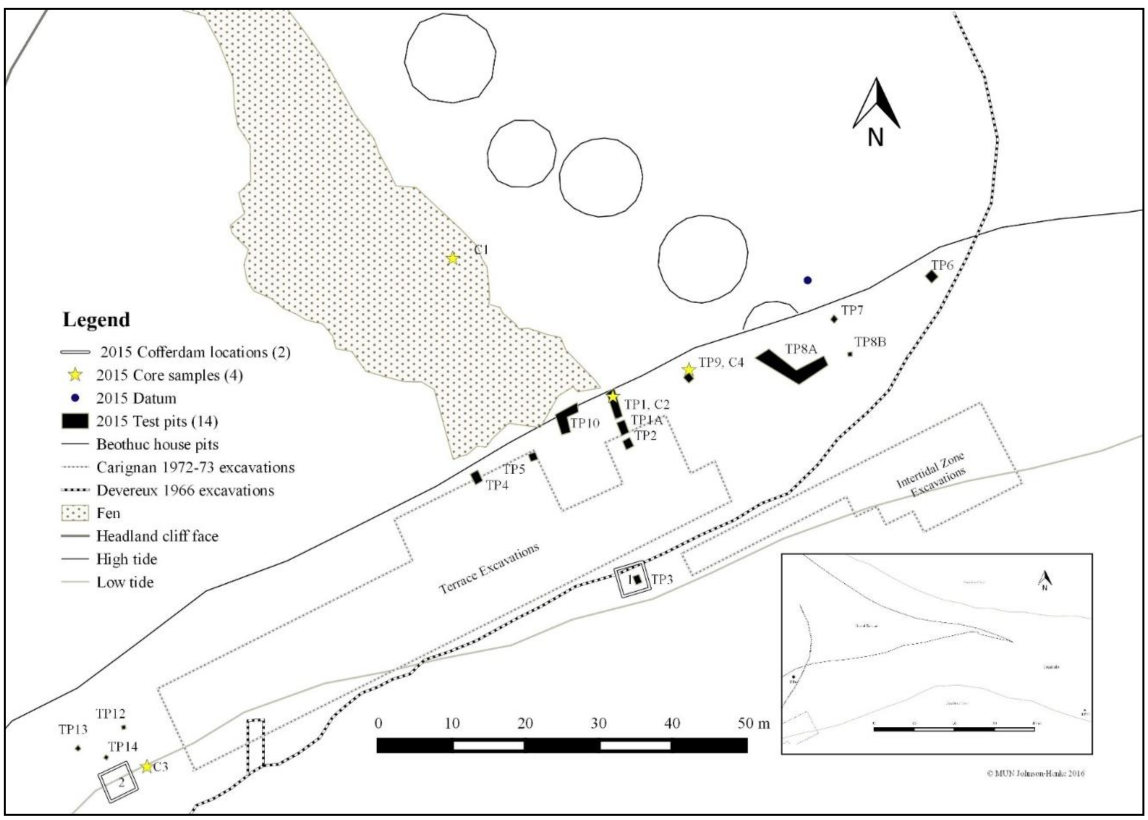


Figure 2.1. The map indicates locations of 2015 excavations in relation to previous excavations on the terrace and in the tidal flats. Four Beothuk house pits are visible.

as a base line for test pits, other cores and information from previous excavations. Core 3 (C3) was taken at the lowest elevation in the tidal flats. All cores were stored in a cool damp location until transported to the conservation laboratory at MUN where they were refrigerated until examined.

2.2.3 Laboratory Methods

The cores were analysed, strata were identified, and physical properties were categorised including grain size and class of structure, colour, sphericity and angularity. Size and class of structure were estimated using *The Wentworth Scale*. Sphericity and angularity were evaluated using *Powers 1953 Scale* (Horiba Scientific 2013). Sediment colour was determined with the *Munsell Soil Color Charts* (1975), descriptions in field notes and photos, and the Jancowski-Walsh and Rees palaeoethnobotanical report (2015). The *Canadian System of Soil Classification* (University of Saskatchewan 2015) was employed to classify the soil strata, with guidance from publications by Vance T. Holliday (2004), E. Doyle Wells (1981) and E. Doyle Wells and F. C. Pollett (1983).

The basal 1-2 cm of the peat stratum from each core and the upper 1-2 cm of Core 2 (C2) were dried for 24 hours at 150° in a Fisher Isotemp 500 series drying oven. The peat was sent to Lalonde Laboratory, at the University of Ottawa for accelerator mass spectrometer (AMS) radiocarbon dating. The peat was analysed with a 3MV AMS and the results were calibrated per Bronk and Ramse 2009 OxCal (Dr. Liam Kieser, pers.com. 2015).

Bulk peat samples taken from Test Pit 1 and 10 (TP1 and TP10) and a bulk sediment sample from TP1 were analysed for palaeo-ethnobotanical and other organic remains. Undergraduate students Andrea Jancowski-Walsh and Daniel Rees conducted the analysis under the supervision of Dr. Michael Deal. The samples were dried, then dry sieved and analysed macroscopically and microscopically (Jancowski-Walsh and Rees 2015). A flotation technique was used to examine part of the bulk sample from TP1. Their laboratory report determined sediment colour with the *Munsell Soil Color Charts* (1975), and they employed the *Wentworth Soil Micromorphology Guidelines* to classify size and structure of sediment grains.

All artifacts recovered in 2015 were identified and catalogued per William Andrefsky's (2005) *Lithics Macroscopic Approaches to Analysis*, and T. Loy and G. R. Powell's 1977 *Archaeological Data Recording Guide*. Artifacts previously retrieved from the Beaches, and collections from the Bonavista Bay region were used for comparison. Several archaeological reports and artifacts at The Rooms Provincial Museum of Newfoundland and Labrador were also used for comparison. Artifacts collected out of context, from the intertidal zone represent 69% of the total.

At the request of the Newfoundland and Labrador Archaeological Society, prehistoric lithic artifacts from the Eric Facey private collection were also catalogued. An adze (DeAk-01:9714) was the only artifact from his collection that was attributed to the Maritime Archaic tool kit. All the Facey collection was surface collected. Catalogue sheets for the stone artifacts are reproduced in Appendix C.

CHAPTER THREE

For Peats' Sake: Stratigraphic Profiles of Core Samples and Test Pits

3.1 Introduction

Peatlands provided floral species in the diet of ancient cultures (Moerman 2004; Scott and Black 2008). There are several types of peatlands, however bogs and fens are the most common on Newfoundland. Water source and nutrients are the foremost difference between them. Surface and subsurface water flow through fens from fresh water sources, and water in bogs is supplied mainly through precipitation. They are influenced by geomorphology, substrate, water chemistry and flora: therefore, fens and bogs evolve to adapt to changes in the local environment. For example, with increased moisture a fen can evolve into a bog, and it is common for different peatlands to occur together in a location (Canadian Wetland Classification System 1997; Gorman 1957; Vitt 2006; Wells 1981; Wells and Poilette 1983).

Fens are less acidic than bogs and fens that are nutrient rich can support many species. Flora species in fens include grasses, sedges, herbs and shrubs (Canadian Wetland Classification System 1997; Gorman 1957; Vitt 2006; Wells 1981; Wells and Poilette 1983). Deal and McLean (1996) implemented a palaeo-ethnobotanical analysis of the Beaches in 1995 and observed several species from the *Gramineae* (grass) family (1996:40-41) as well as herbs and shrubs. Andrea Jancowski-Walsh and Daniel Rees (2015:7) examined buried peat from TP1 and TP10 which confirmed species of grass, herbs and shrubs. Their pH test resulted in level 5 and is within the pH range for fens (Northeastern

Area State and Private Forestry 2016). The fen is the lowest elevation on the terrace. When sediments were deposited on or near it, the fen truncated or lengthened depending on which direction the deposit originated.

This chapter presents the results of the data collected. The stratigraphic profiles are described for all test pits and cores that are mapped in Figure 2.1. They are presented in the order which they were excavated. Core 2 (from TP1) and Core 4 (C4) from TP9 are described with the test pits from which they were extracted. Test Pit 2 (TP2) was excavated before Test Pit 1A (TP1A) but it is presented after it.

In the stratigraphic drawings of cores and test pits, three attributes are recorded and illustrated. On the left side of the drawing the pedostratigraphic units and alpha Canadian Soil Classification codes are noted (definitions of the codes are found in Appendix A). On the right side is the description of each stratum. The matrix of most strata from test pits and cores were the same regarding pebble size, of medium (8-16 mm) to course (16-32 mm) sub-angular and poorly rounded gravel. In the text these are referred to as beach gravel. Other strata with varying sizes of sediments are defined. In-situ artifacts are presented and discussed in Chapter Five.

3.2 Description of Excavations and Strata

Test Pit 1. The location was chosen because it was parallel to the (1974b, 1975) area Carignan recorded the complex stratigraphy of the terrace. The unit was 50-60 cm wide and 1.5 m long. It ran from the high tide mark to the northern limit of the breakwater. The test pit was excavated to 0.964 m BSL (see Figure 3.1, Plates 3.1 and 3.2).

The top organic horizon (stratum 1, LFH) was 10 cm thick and the top of Pedostratigraphic Unit VI, because it was topmost in the sequence of soil production. Near the bottom of stratum 1 a microblade fragment (DeAk-01: 9470) and 6 flakes were found (stratum 2, Apb, Pedostratigraphic Unit V). Stratum 3 (Ae) was a lens of very fine poorly rounded gravel within coarse brown-grey sand. It was 1-2 cm deep.

Stratum 4 (Aeg) varied in thickness from 0-8 cm. It was a matrix of beige-grey clay with medium and coarse sand. Within the clay and sands, poorly sorted fine to course, sub-angular and poorly rounded gravel. This horizon was thicker on the western side of the Unit where it measured 10 cm and narrowed to a point approximately 3 cm from the eastern wall. Six small flakes and a microblade fragment (DeAk-01: 9692) were found near the boundary (stratum 5, Apb) with the buried peat below. Stratum 6 (Ofb) was a 1-2.5 cm wide and 8 cm long pocket of dark brown humus in the shape of an eye, was enveloped in stratum 3, caused by a protruding root. Three flakes and a tip-flute spall (DeAk-01: 9480) were excavated (stratum 7, Apb). Due to bioturbation stratum 5, 6, and 7 were included in Pedostratigraphic Unit V.

Stratum 8 (Bfg) was a thin horizon of dark blue-grey silty sand. The sediment analysed by Jancowski-Walsh and Rees (2015:6) indicated the pH level was 4 and the *Munsell Soil Colour Chart* corresponds to 10YR: 7/2 (dull yellow orange). Beneath, stratum 9 consisted of five flakes (Apb, Unit IV) that were found near the boundary with stratum 10.

Stratum 10 (Bhg) was dark humic grey clay and sand with fine rounded gravel lay over an in-situ feature (Figure 3.1 and Plate 3.1). The cobble and stone hearth (stratum 11, Apb*)* varied from 25-30 cm. Greasy humic soil was between the cobbles and stones. A sample of charcoal (DeAk-01: 9723) was taken from between a top stone and one below, however it was not radiocarbon dated. The hearth was the top of Pedostratigraphic Unit III. A few flakes were found and included in stratum 11.

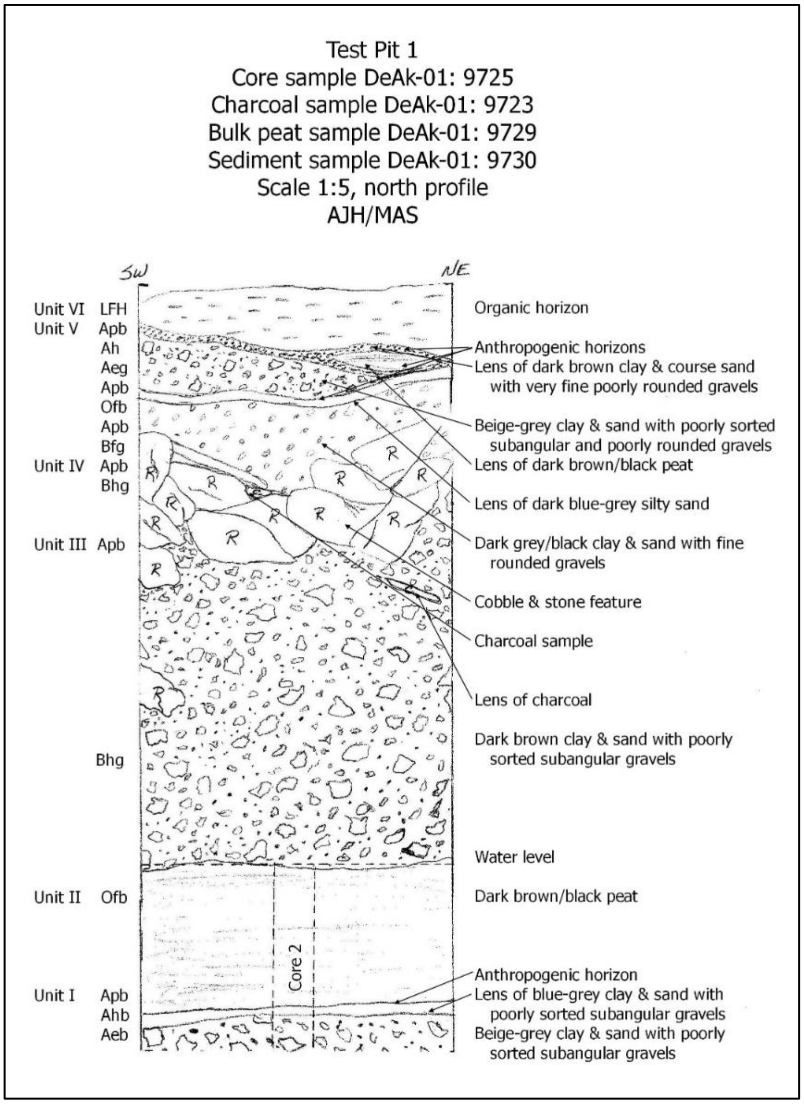


Figure 3.1. The drawing indicates the locations from which samples were extracted. There are six pedostratigraphic units in TP1.

Plate 3.1. TP1, north view, facing the terrace.

Plate 3.2. TP1, south view, facing Southern Cove.

Under the feature was a 51 cm stratum of saturated dark brown humic coarse sand with beach gravel. It (stratum 12, Bhg) was very compact and difficult to excavate. Approximately 8 cm from the top a lens of charcoal 15 cm long (stratum 12b, Oh) was found in the NE corner of the test pit. Four centimetres below another lens: 10 cm long that ran north-south on the eastern side of the test pit. A third lens of charcoal, 20 cm long (stratum 12c, Oh) was traced from the bottom of the stone feature running northwest-southeast (see Plate 3.1). These may represent twigs or small branches from a forest fire.

Core 2 (DeAk-01: 9725). Core 2 was extracted from the top of stratum 13 (Ofb). This peat horizon was 23-26 cm (Unit II). Two samples were radiocarbon dated. The sample from the top 1-2 cm dated to cal. 3560-3382 BP (UOC-1185), and the basal 1-2 cm radiocarbon dated to cal. 3964-3705 BP (UOC-1184). The bulk sample analysis (Jancowski-Walsh and Rees 2015:5-7) indicated the flora on the site was established since the peat developed (Deal and McLean 1996:34-35; Devereux 1969). Besides evidence of common cinquefoil (*Potentilla simplex* Mihx.), there were two species of grasses (*Gramineae*) and three species from the *Rosaceae* family. Six species were not identified to family.

Artifacts (stratum 14, Apb, Pedostratigraphic Unit I) beneath the peat included 31 flakes, a retouched flake (DeAk-01: 9680), multi-faceted scraper (DeAk-01: 9681), a notched flake (DeAk-01: 9683) and a core (DeAk-01: 9684). Stratum 15 (Ahb) was 1-2 cm of dark blue-gray clay and coarse sand with fine-coarse sub-angular gravel. Below, stratum 16 (Aeb) was beige-grey clay and coarse sand, and the same size gravel as in the stratum above (Plate 3.3). Stratum 16 was excavated 2-3 cm.

Test Pit 1 had the most complex stratigraphy of the survey. Six pedostratigraphic units were observed. Four of six units had an anthropogenic top horizon and the other two had peat. Pedostratigraphic Unit I gave indication a deposit redirected the peatland over part of a habitation or work area of the site. The peat accumulated before another deposit capped it in this location. Later, a hearth was built on the gravel interrupting soil production. Units I-IV were evident, but bioturbation has disturbed the sequence in V-VI. Alterations to the landscape were not as dramatic as those that occurred before the hearth was built. The number of anthropogenic strata in Units V-VI indicated the site experienced geographic phenomena. People stayed, but likely relocated to a different area.

Plate 3.3. Analysing C2 in the laboratory. The peat is smooth and pungent in all the cores.

Core 1 (DeAk-01: 9724). Core 1 was taken from the fen, 2 m from its eastern boundary and midway between the northern boundary and high tide. It was excavated to 0.715 m BSL (see Plates 3.4 and 3.5), and it was taken for a baseline measure for locations where peat was excavated, and radiocarbon dated. It is uncertain how far the core sleeve penetrated the lowest stratum in all cores; therefore, the depth of the basal section of the core may not represent the actual depth of the stratum in the substrate (Plate 3.6 and Figure 3.2).

The organic horizon (LFH, Pedostratigraphic Unit II) was 10-12 cm. There were some small angular pebbles in the matrix. Near the boundary with stratum 2 (Ahg) humic soil was in a matrix of poorly sorted fine and very fine gravel with coarse sand. Stratum 2 was blue-grey clay and coarse sand with beach gravel, that varied from 8-11 cm deep.

Stratum 3 (Bhg) varied 3-10 cm. The matrix was dark blue-grey silty sand and humic soil,

Plate 3.4. Extracting C1 from the fen. North view, toward the Beothuk house pits.

Plate 3.5. C1 out of the substrate. Just 30 cm from where the core was extracted there was a small pool of stagnant water. View is north toward the house pits.

with fine poorly rounded and rounded gravel. The boundary between the 3rd and 4th strata was distinct. Gravel in stratum 3 was coarser than in stratum 4 (Bfg1). The matrix of stratum 4 was reddish brown and varied 3-11 cm. The boundary between stratum 4 and 5 was also distinct because the colour changed to (Bfg2) beige-grey and there was less humic content in stratum 5. Beach gravel was in the matrix and this horizon varied 12-18 cm. A few cobbles were in the matrix near the boundary with stratum 7 and humic content became more concentrated toward the peat. Stratum 6 (Bt) was a lens of white-grey clay (Plate 3.7) a few millimetres into stratum 7 (Ofb).

The brown-black peat was 23-26 cm deep and plant fibres were visible and abundant 14 cm into this horizon. The basal section radiocarbon dated to cal. 4422 – 4155 BP (UOC-1183, Pedostratigraphic Unit I). Two pedostratigraphic units were observed in C1. Buried peat in Unit 1 indicates a deposit covered at least part of the fen, and a later deposit caused the peatland to move back to a previous location or a portion of an earlier position.

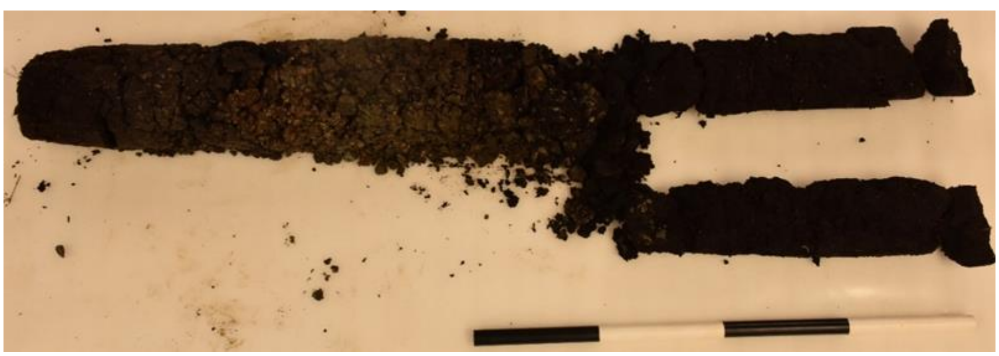


Plate 3.6. C1 taken from the sleeve and the peat stratum has been split in two.

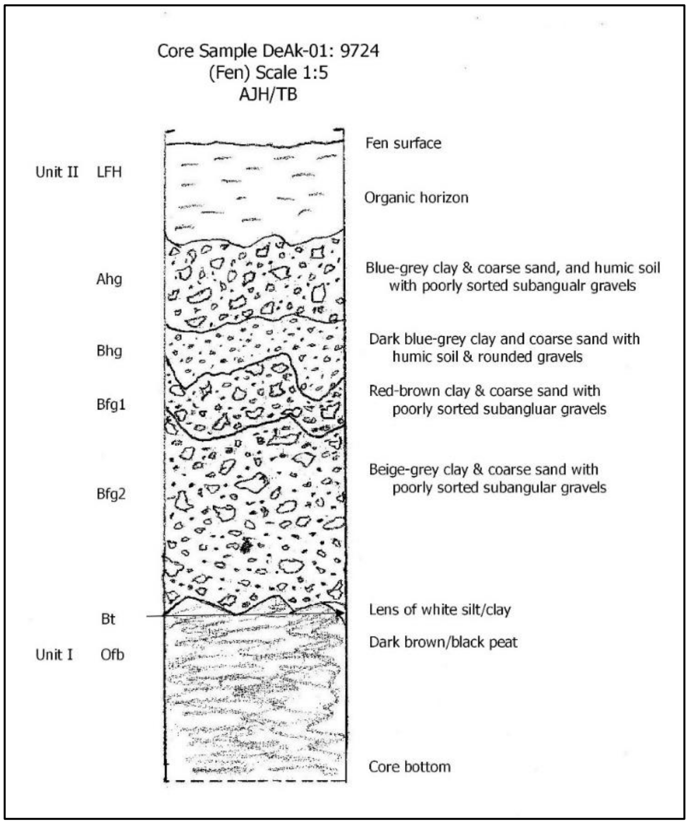


Figure 3.2. Drawing shows the pedostratigraphic units.

Plate 3.7. The white silt/clay of stratum 6, in C1.

Core 3 (C3, DeAk-01: 9726). The bottom of C3 was 3.86 m BSL. It was taken 18 m east of the headland to find a western boundary of peat. It was 29 cm and had four strata. Intertidal plants were growing on the surface of blue-grey medium and coarse sand that was 0.5-2 cm (O/W, Pedostratigraphic Unit II). Stratum 2 was pale blue-brown sand and humic soil with fine, poorly rounded and rounded gravel (Aeg). It was 6-13 cm (see Figure 3.3, and Plate 3.8 and 3.9). The horizon below (stratum 3, Bhg) was dark brown clay and sand, with humic soil and beach gravel that covered a 13-18 cm thick peat horizon (stratum 4, Ofb). The peat was red-brown with plant fibres and several cobbles. It radiocarbon dated to cal. 6176-5749 BP (UOC-1186, Pedostratigraphic Unit I).

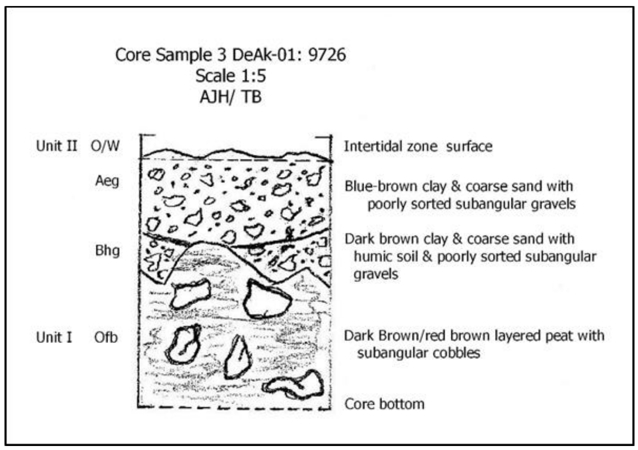


Figure 3.3. Profile of C3.

This core had two pedostratigraphic units and yielded a third buried peat horizon. It gave insight into topography that possibly dates to the earliest Maritime Archaic inhabitants at the Beaches. The buried peat near the headland suggests that a peatland or section of it was previously in this location.

Test Pit 1A. Test Pit 1A was located on the south side of the breakwater adjacent to TP1 and it was excavated to 0.8 m BSL. The surface was littered with waterworn sub-angular and poorly rounded cobbles and boulders (W, Pedostratigraphic Unit III). This horizon was an average of 5 cm deep (Figure 3.4 and Plate 3.10).

Plate 3.8. C3 was taken from the lowest point in Southern Cove.

Plate 3.9. C3 out of the sleeve. The peat was pasty and pungent.

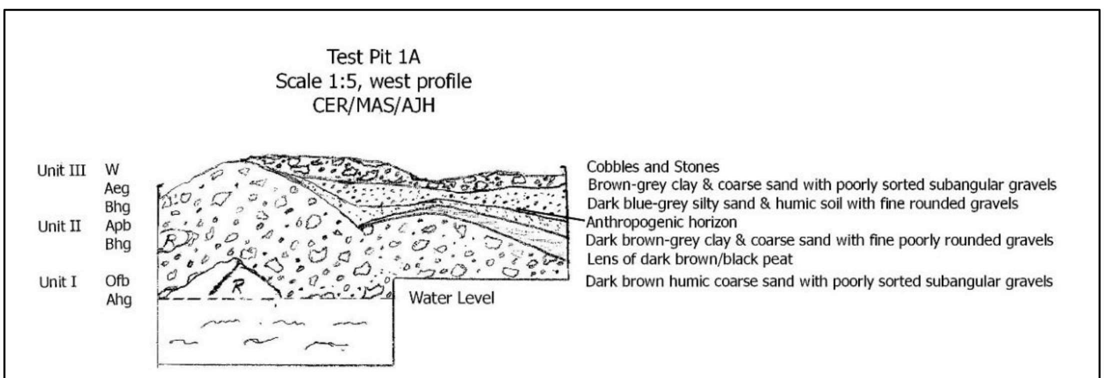


Figure 3.4. TP1A western profile. The southern perimeter of a peat stratum was found in this test pit.

Stratum 2 (Aeg) was a mixture of brown-grey clay with medium and coarse sand, and poorly sorted fine to coarse sub-angular and poorly rounded gravel. It varied from 3-4 cm. Beneath was dark blue-grey silty sand and humic soil 2-8 cm (stratum 3, Bhg). There was fine poorly rounded and rounded gravel in the matrix. Artifacts were found in a thin anthropogenic horizon (stratum 4, Apb, Pedostratigraphic Unit II) at the bottom of stratum 3. A unifacial blade that was broken in half (DeAk-01: 9672/9674) and nine flakes were excavated.

Stratum 5 (Bhg) was a 1-2 cm lens of very fine poorly rounded gravel in a matrix of coarse dark brown-grey sand and humic soil. Stratum 6 (Ofb, Pedostratigraphic Unit I) was dark brown-black peat that was 4 cm thick on the north side and terminated 30 cm from the southern edge. Under the peat stratum 7 (Ahb) was excavated 1-2 cm. It was dark brown humic clay and coarse sand with beach gravel.

Plate 3.10. TP1A located on the south side of the breakwater from TP1. The view is west toward the headland.

Three pedostratigraphic units were observed in TP1A. Three strata in Units I and II were the same as the Apb (hearth), Bhg, and Ofb (the peat that covers the Maritime Archaic evidence) strata in TP1. Test Pit 1A strata are not a continuation of the same two units in TP1. The Maritime Archaic anthropogenic horizon in TP1 was below the peat, and in TP1A it was above peat. There was 30-35 cm between the test pits. The profile of the TP1A indicates that a deposit from the direction of Beaches Cove covered the anthropogenic horizon. A southern peat boundary was found in this test pit.

Test Pit 2 (TP2). A core sample could not be taken from this area because of too many cobbles. This test pit was 75-80 cm deep and no peat was found. Beneath sub-angular and poorly rounded cobbles and stones (stratum 1, O/W) was a horizon of dark blue-grey clay, and medium and coarse sand with beach gravel (stratum 2, Aeg). It was 20 cm deep on the north side of the unit and 15 cm on the south. Stratum 3 (Bhg) varied from 30 cm, on the north to 50 cm on the south. It was dark brown humic and coarse sand with beach gravel. Stratum 4 (Bfg) was excavated approximately 10 cm into a horizon of blue-grey clay and coarse sand with beach gravel. The humic content from TP1A may have leached into this stratum, or perhaps it is the remnant from a buried peat stratum above, or both. No disconformities or artifacts were observed (see Plate 3.11).

Test Pit 3 (TP3). This test pit was located where Carignan worked in the intertidal zone in the 1970s. The bottom of the test pit was approximately 1.6 m BSL and there was one pedostratigraphic unit with two strata. On the surface (O/W, stratum 1) bladder whack was growing in blue grey sand and clay with beach gravel, cobbles and stones (stratum 2, Aeg, see Plate 3.12).

Plate 3.11. TP2 is 1 m south of breakwater. View is northwest.

Plate 3.12. TP3 was located SE of the boulder that marks the location of the 1973 intertidal zone grid. View is to the north.

Test Pit 4 (TP4). Test Pit 4 was located on the southwestern edge of the fen. No peat was found, which may be due to the proximity of the most northerly extent of Carignan's terrace grid. This test pit was excavated to 0.822 m BSL. There were a few cobbles on the surface (Plate 3.13). Stratum 1 (O/W) was brown-grey clay, and medium and coarse sand with beach gravel. It was 13 cm deep on the north side of the unit and 7 cm on the south. Beneath was dark brown humic and coarse sandy matrix with beach gravel (stratum 2, Ahg), that was excavated to 45 cm on the north side of TP4 and 40 cm on the south.

Test Pit 5 (TP5). The search for peat continued with TP5. It was located on the periphery and at the centre of the fen, about 3 m northeast of TP4. It was excavated to 0.785 m BSL. One pedostratigraphic unit was observed (Plate 3.14). A core (DeAk-01: 9685) of

Bloody Bay Cove rhyolite was collected from the surface. Stratum 1 (O/W) was brown-grey clay, and medium and coarse sand with poorly sorted fine to coarse sub-angular and poorly rounded gravel. This horizon was 7 cm on the north side, and 4 cm on the south. Beneath (stratum 2, Aeg) was white clay-silt with fine and medium sub-angular and poorly rounded gravel. Stratum 2 was 6 cm deep on the north side, and 4 cm on the south. Stratum 3 was visible only on the west side of TP5 and it was about 10 cm. It was a matrix of brown sand and beach gravel. Stratum 4 was excavated 22 cm and it was dark brown humic (Bhg) sand, with beach gravel.

Plate 3.13. TP4 is situated south of an uprooted tree on the edge of the fen. The view is north.

Plate 3.14. TP5 had three strata on three sides and four strata on the west side. Northwest view.

Test Pit 6 (TP6). Test pit 6 was dug east of TP1 to find the eastern peat boundary. The strata observed revealed one pedostratigraphic unit (Plate 3.15). It was excavated to

1.03 m BSL. Stratum 1 (O/W) was about 10 cm. The matrix was brown-grey course sand, and poorly sorted very fine to course sub-angular and poorly rounded gravel. Stratum 2 (Ahg) was 15 cm of dark brown humic coarse sand with beach gravel. And beneath, was a 10 cm deep stratum (stratum 3, Aeg) of fine to coarse gravel in a matrix of coarse, brown-grey sand. Stratum 4 (Bhg) was dark brown humic clay and coarse sand, with beach gravel and excavated 5 cm.

Plate 3.15. TP6 located adjacent to the most easterly breakwater.
No peat horizon was found in this test pit. The view is northwest.

Test Pit 7 (TP7). The basal stratum of TP7 was excavated to 0.884 m BSL and one pedostratigraphic unit was observed (Plate 3.16). Stratum 1 (O/W) varied from 3-8 cm. It was brown-grey clay, and medium and coarse sand with poorly sorted fine to coarse sub-angular and poorly rounded gravel. Stratum 2 (Ahg) was a horizon of dark brown humic, and coarse sandy matrix with beach gravel that varied from 10-20 cm, and stratum 3 (Aeg) was blue-grey clay and coarse sand with beach gravel. It was excavated about 10 cm.

Plate 3.16. Test Pit 7. The view is north-northwest.

Test Pit 8A (TP8A) and Test Pit 8B (TP8B). Test Pit 8A was the largest test pit but it was only excavated to the first buried peat horizon (0.76 m BSL). Four strata were observed above the peat which were identical to those in TP8B but varied in thickness. Only TP8B was drawn to scale (see Figure 3.5, Plates 3.17, 3.18). This test pit was dug close to TP8A to study the stratigraphy under the peat. It was excavated to 1.15 m BSL and seven strata were observed. Under sub-angular and poorly sorted cobbles and stones (W, Pedostratigraphic Unit III), stratum 2 was a 5 cm thick horizon of brown-grey clay, and medium and coarse sand with poorly sorted fine-coarse sub-angular, and poorly rounded gravel (Aeg). Stratum 3 was red-brown coarse sand (Bfg) and clay with beach gravel, and dark brown peat (stratum 4, Ofb) with visible roots or stems. The peat on the west side of TP8B was 4 cm thick and narrowed to a point on the east (Pedostratigraphic Unit II).

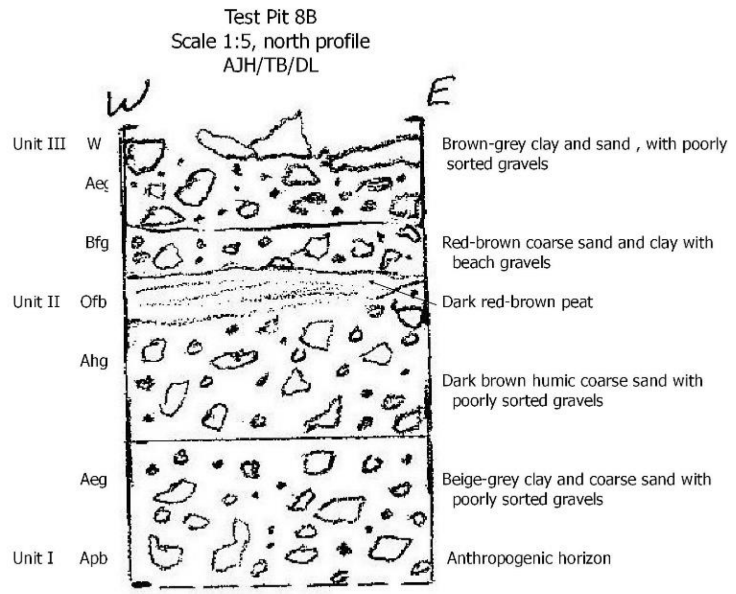


Figure 3.5. The drawing illustrates the north profile of TP8B. The buried peat terminates on the eastern side of the test pit.

Stratum 5 was dark brown humic soil with beach gravel (Ahb) that was 13 cm. And stratum 6 (Aeb) was a 15 cm horizon of beige-grey clay, and medium and coarse sand with poorly sorted fine-coarse sub-angular and poorly rounded gravel. A flake of Bloody Bay Cove rhyolite was found in the basal section (stratum 7, Apb). Although only one flake was excavated, it was not discounted (Pedostratigraphic Unit I). Three pedostratigraphic units were observed in TP8B. The buried peat at the top of Unit II formed a bowl with the edge on the east side.

Test Pit 9. This test pit was 5.5 m north east of TP1 and excavated to 0.964 m BSL. Twenty centimeters into the substrate, the water table became too high to observe the strata therefore, Core 4 (C4, see Plate 3.19 and Plate 3.20) was extracted. Under sub-angular and poorly rounded cobbles and stones (W, Pedostratigraphic Unit III), there was a 5 cm horizon of brown-grey clay and medium-coarse sand, with poorly sorted fine-coarse gravel (stratum 2, Aeg). Stratum 3 was red-brown coarse sand and clay with beach gravel (Bfg1) that varied from 2-5 cm. Beach gravel continued into stratum 4, but the matrix was dark brown clay and sand (Bfg2). Stratum 4 was 10 cm.

Plate 3.17. TP8A in the foreground, TP8B is to the right side, east of a pile of beach gravel. View is northward.

Plate 3.18. TP8B. Cobbles were in most locations in the intertidal zone. View is west.

Core 4 (C4, DeAk-01: 9727). Core 4 was extracted from the top of stratum 5 (Ofb), a dark brown peat horizon that varied from 14-20 cm (Pedostratigraphic Unit II). A celt (DeAk-01: 9668), retouched flaked (DeAk-01: 9669) and hammer stone (DeAk-01: 9670) (stratum 6, Apb, Pedostratigraphic Unit I) were found beneath the peat. A sample from the basal section of peat radiocarbon dated to cal. 4569-4250 BP (UOC-1187). Stratum 7 was a lens of dark blue-grey clay and beach gravel (Ahb). Beige-grey clay and sand with beach gravel (stratum 8, Aeb) was at the bottom of C4, and it was 4-11 cm (Figure 3.6). Three pedostratigraphic units were observed in TP9.

Plate 3.19. Mark Storey extracting C4. Southwest view.

Plate 3.20. C4 in the lab at MUN, Queens College. The total length of the core was 36 cm.

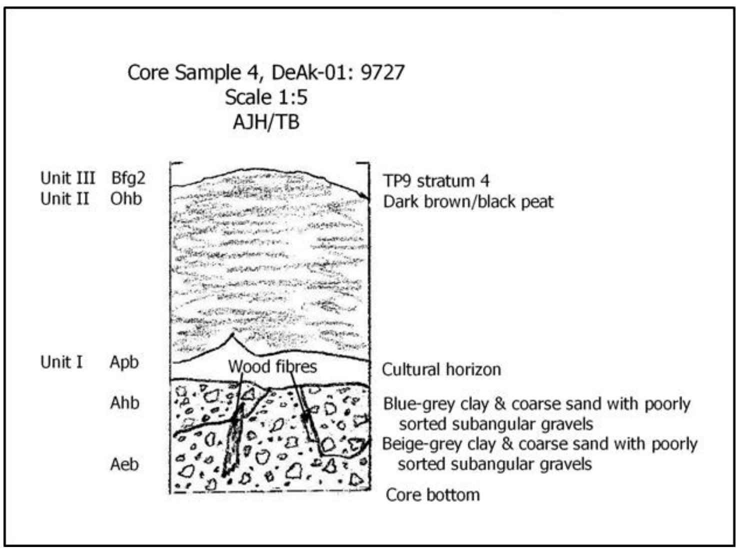


Figure 3.6. C4 peat dated 600 years earlier than in TP1.

Test Pit 10. Test Pit 10 was 2 m west of TP1 and it was excavated to 0.875 m BSL. The location was chosen because no peat was found in TP4 or TP5. There were three pedostratigraphic units, although the surface may have been back dirt from previous work. Under scattered cobbles and boulders (W, Pedostratigraphic Unit III) stratum 2 varied from 15 cm to 22 cm (north to south) where it met the breakwater beam. It was beige-grey clay and medium-coarse sand with beach gravel (Aeg, see Figure 3.7 and Plates 3.21 and 3.22). Beneath was dark brown-black peat (Ofb, Pedostratigraphic Unit II) that varied 20-30 cm.

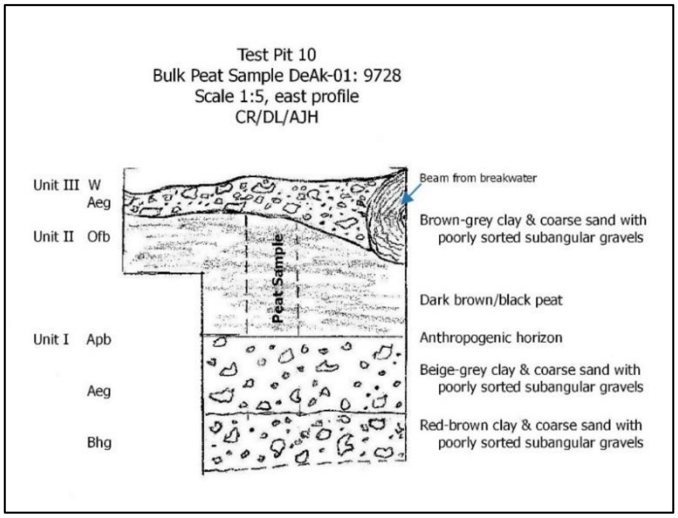


Figure 3.7. Illustration of the eastern profile of TP10. No radiocarbon date was obtained.

Plate 3.21. TP10 adjacent to the breakwater. The view is toward the west.

Bulk peat sample DeAk-01: 9728 was examined by Jancowski-Walsh and Rees. They found five floral species that differed from TP1. Raspberry (*Rubus strigosus* Michx.), elderberry (*Sambucus canadensis* L.) and pin cherry (*Prunis pensylvanica* L.) seed were found, as well as an unidentified *Gramineae* species (2015:7). Artifacts found under the peat (Apb) included a biface preform (DeAk-01: 9658), a retouched flake (DeAk-01: 9562) and several small flakes (Pedostratigraphic Unit III). Stratum 5 (Aeb) was a 19-20 cm horizon of beige-grey clay and coarse sand with beach gravel. And stratum 6 was red-brown clay and coarse sand with beach gravel (stratum 6, Bhg) 12-14 cm.

Although a radiocarbon date was not obtained, the bifacial preform from beneath it resembles a Maritime Archaic preform that Carignan found at the Beaches (discussed in

Chapter Five). The data demonstrated that in this section of the site Pedostratigraphic Unit 1 was inundated by a deposit that caused the peatland to shift in a northerly direction.

Plate 3.22. The section of TP10 where the bulk peat sample was taken. The view is northeast toward Fox Bar Island.

Test Pit 11 (TP11). This test pit was excavated on the tombola to survey the area for buried peat and evidence of Maritime Archaic. It was excavated to approximately 1.4 m BSL. One pedostratigraphic unit was observed (see Plate 3.23). A patch of sea lettuce (*Ulva lactuca.* stratum 1, O/W) covered brown-grey clay and medium and coarse sand, with poorly sorted fine to coarse sub-angular and poorly rounded gravel (stratum 2, Ahg). Stratum 2 was 2-5 cm and stratum 3 (Aeg) was blue-grey clay and coarse sand with beach gravel and a few cobbles and dug 30 cm.

Test Pit 12, 13, 14 (TP12, TP13, TP14). These test pits were approximately 3.8 m BSL. Each was excavated 35 cm, and two strata with one pedostratigraphic unit were observed. The surface was 1-2 cm deep (stratum 1, O), where bladder whack and eelgrass grew over blue-grey medium and coarse sand, with poorly rounded gravel cobbles and stones (Aeg). Two test pits yielded Atlantic surf clam (*Spisula solidissima*) shells 20 cm below the surface. Stratum 2 was excavated 33-35 cm (Plates 3.24-3.26).

Plate 3.23. Digging TP11 on the tombolo. Behind Christina, a blue mussel nursery. The view is southeast.

Plate 3.24. Sandbags mark location of TP12. TP12. The view is north.

Plate 3.25. Open TP13 shows brown humic mud on the surface around dark blue-grey gravel which may indicate a peat stratum in the proximity.

Plate 3.26. Digging TP14. A mud and gravel encrusted surf clam shell sits on the left side of the test pit. North view toward the terrace.

3.3 Objective One Discussion: In-situ Maritime Archaic material culture and buried peat in the intertidal zone

In-situ Maritime Archaic archaeological deposits were excavated from TP1, TP1A, and TP9. Artifacts were also found in TP5, TP8B, and TP10 however cultural affiliation was uncertain. The southern boundary of a buried peat stratum was found in TP1A. The peat may continue south from TP9, TP8A, and TP8B because most of the surface artifacts were collected between TP12 and TP6, and high and low tide which gave indication little peat remains.

The eastern boundary was found in TP8B. The peat formed a point on the eastern edge of the test pit. The drawback is that the northern and western limits were not found. The buried peat in the fen gave no indication of a northern limit. Three explanations for not finding the north and west boundaries include: 1) There is a carpet of peat that lays beneath the terrace and it continues north from TP1, TP9, and TP10; 2) The test pits west of TP10 were not excavated deep enough; 3) Excavators dug through Carignan's backfill.

Because the east boundary was in TP8B buried peat could be expected in TP7. Test Pit 7 was excavated 15-30 cm higher than the surrounding test pits. This suggests that TP7 may have a stratum of buried peat and, or archaeological deposits (Plate 3.17). But the situation may be different for TP6.

Test Pit 6 was 5 m north of TP8B and excavated to 1.03 m BSL. When a deposit truncated the peatland, it may not have moved it as far east as TP6. But the prospect of Maritime Archaic deposits in this area remains due to the ancient topography. Without further investigations a northern peat boundary cannot be ascertained, and this is also true for the western boundary.

The west border may have been interrupted by Carignan's excavations because of the lack of peat in TP4 and TP5. But, both Devereux (1966) and Carignan (1974, 1975) reported that sediments capping the buried peat, become thicker west and northward, and the peat was deeper in the substrate. Test Pit 4 was excavated to 0.822 m BSL and TP5 excavated to 0.785 m BSL. The depth of TP4 and TP5 are the most likely reason for the lack of peat. On the other hand, test pits 12, 13 and 14, as well as C3, were 3.86 m BSL. The surface strata of each were within a few centimeters, so it is probable that the peat continues north under the terrace from where the fresh water source flows. Boundaries were not defined for this buried peat stratum.

Although two buried peat boundaries were not mapped, the radiocarbon dates indicated the peat that covered the exclusive Maritime Archaic anthropogenic stratum was a chronosequence. The chronosequence was created by the continuous formation of peat assisted by numerous deposits, but separated by time (Holliday 2004:162, Stevens and Walker: 1970:339).

3.4 Objective Two: Introduction

The Beaches has changed because geographic processes have influenced the position of the peatland, and likely settlement patterns of the cultural groups that inhabited the site. In the mid-70s Carignan attested to and witnessed storm surge activity when he was at the Beaches.

> “…wave-deposited gravel is found in two other instances in the stratigraphic column of this particular area. It was found immediately above Cultural Layer 1 along a 15 foot section. In fact, this was deposited before the peat layer developed over the entire Layer 1. In this same area along the bank a fairly recent deposit of gravel had been lain over the uppermost humus/peat layer. This is a fairly recent development during the past few years and the process was, in fact, on-going during the two summers spent at the site.” (Carignan 1975:30).

In 1971 the Island was hit by tropical storm Arlene in July, and then hurricane Beth in mid-August. Hurricane Alice hit Newfoundland in July of 1973, and Gilda in October the same year. Hurricanes and tropical storms cause storm surges that deposit sediments on coastal regions (Christopherson et al. 2006:240-246; National Oceanic and Atmospheric Administration 2008; Woodroffe 2003:301-303).

3.4.1 Objective Two Discussion: The Landscape when the Maritime Archaic were present at the Beaches Site (DeAk-01)

When the Maritime Archaic occupied the Beaches, there was no gravel terrace as there is today. At least three geographic influences were responsible for the evolution of the Beaches site: 1) The tombolo was created by ocean currents, waves, foreshore and nearshore topography; 2) The gravel terrace was built as sea levels rose, with the assistance of storm surges, and ice may have been a factor; 3) And the relative sea level was lower 5000 BP. These physical processes are also responsible for eroding the site.

Tombolos connect islands to mainland coasts. When waves converge on an island they slow down and bend around the island (Christopherson et al. 2006:531; Woodroffe

2003:302). The refraction (bending) of waves causes them to collect sediments from the island, mainland beaches, the floor of the bay or a combination of all three. The sediments are deposited and accumulate on underwater terraces. The tombolo at the Beaches may have developed soon after glaciers melted on Newfoundland and the RSL was more than 2 m above todays level (Shaw and Forbes 1990:644). David Liverman (1994:220) determined that southwestern Bonavista Bay was underwater 12,500 BP. When isostatic rebound caused ice-free areas to elevate, the tombolo also rebounded.

Shaw et al (2002:1868, 1875) demonstrated that around 6000 BP the relative sea level was 10-20 m lower than today. The data collected from C3 revealed the fen was located close to the headland cliff 6200 BP, or perhaps earlier. The peat sample confirmed that peat was developing for some time before sea levels rose to 15 m BSL. The foreshore in Southern Cove was available for occupation when the Maritime Archaic first arrived at the site.

The buried peat horizons indicated peat production was interrupted at least three times, but the radiocarbon dates revealed a chronosequence. Therefore, the peat observed in the 2015 test pits may not be the same horizon(s) as those that Carignan described. For example, the radiocarbon date from C3 suggests that the original position of the peatland was near the headland, yet in the location of TP3, Carignan found Maritime Archaic deposits capped by a peat horizon. This illustrated that the peatland shifted. The radiocarbon dates retrieved in 2015, as well as those from Carignan's research are plotted in Figure 3.8.

Because the peatland was near the headland the site experienced a landslide (s) which repositioned it east, into Southern Cove. The southwestern section of the terrace between the fen and the headland is higher than eastern sections which may account for this (these) incident (s). Carignan (1973a:5; 1974b:28; 1975:28) reported that adjacent to TP6 and west toward TP9, the farther he excavated toward the headland, the thicker the gravel stratum became, and the buried peat gradually got deeper.

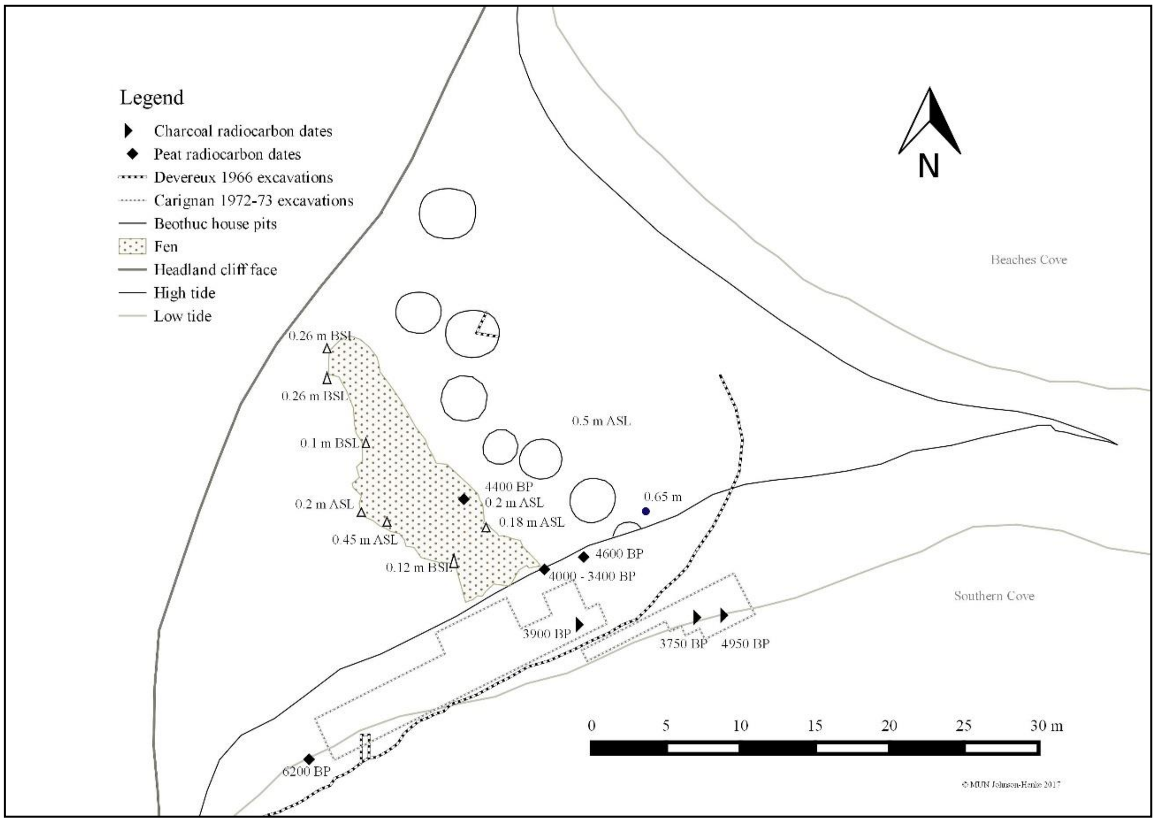


Figure 3.8. Locations where samples have been taken for radiocarbon dates that relate to Maritime Archaic presence. Elevations around the gravel terrace are also mapped to illustrate that the fen is the lowest section.

The 2015 survey confirmed a section on the western boundary was 0.46 m ASL, and across the fen the eastern perimeter was 0.18 m BSL. The northwest end of the fen that is closest to the cliff face was 0.26 m BSL. A debris boundary from a land/rock slide may be close to C1. Deposits from storm surges thin landward from the shore (Kortekaas and Dawson 2007:209; Lario et al. 2010:301-302; Morton et al. 2007:201); therefore, a landslide at the Beaches would thin toward the shore. Prior to the landslide peoples may have settled adjacent to the peatland.

When sea levels rose to a height that allowed sediments to be deposited on the Maritime Archaic occupation areas gravel buried material culture, and redirected the fen causing peat to develop in other locations. Much evidence of earlier episodes has eroded, or it is beneath the terrace and the point on Fox Bar Island. The terrace was built by landslides, rising sea levels and storm surges (Christopherson et al. 2006:520/21, 531).

There is a 1600-year gap between the radiocarbon dates of C3 and C4. The peat in TP9 (C4) began to develop around 4600 BP. The data and Carignan's report indicated a deposit from Beaches Cove was probable cause for burying the oldest archaeological evidence he found. It also repositioned the fen back toward the headland. This could also explain the single multicomponent anthropogenic horizon on the terrace (Carignan1974b:29). The Maritime Archaic continued to inhabit the site in other locations that experienced less environmental effects. The peoples who followed settled in the same section (s) on the terrace.

Core 1 was taken to use for a baseline to compare with peat found in other parts of the site, expecting it to reveal the fen was in the same location since it developed. The top LFH horizon would be very thick and no gravel, or few would be in the matrix. Peatlands can expand or reduce, depending upon the volume of ground water flowing through it (Vitt 2006:20-21, Zoltai and Vitt 1995:134), in addition to sediment deposits shifting its position the chronosequence was created.

The peat in the fen was approximately 55 cm below the surface, in TP10 it was 22 cm, and in TP1 it was 1 m. Anthropogenic deposits could be under the peat in the fen, because the bottom of C1 is 0.715 BSL, the dept of the peat stratum is unknown, and the chronosequence continues beneath the fen from TP1. The situation could be the same around TP10. Because the peat was so close to the surface, there may be another buried peat horizon deeper in the substrate (Devereux 1966). Another peat horizon gives the prospect of another anthropogenic horizon.

The Jancowski-Walsh and Rees analysis indicated the presence of raspberry, elderberry and grasses. Evidence presented by Deal and Mclean (1996:34-35) and Devereux (1969) showed the same species in other locations. The different species may have established in other areas of the site or perhaps the peatland evolved.

The buried peat in TP1 began to develop around 4000 BP, and production was interrupted about 400 years before ASTt groups arrived at the site. This deposit occurred too early to correspond with two of Carignan's radiocarbon dates. It either came from Southern Cove or a landslide occurred, due to the western profile of TP1A and TP2. The profile of TP1A illustrated a bowl of peat with the outer ridge toward Southern Cove. Test Pit 2, stratum 2 was 20 cm thicker on the south side of the unit. Either the deposit has eroded or there is evidence in the substrate of the terrace.

CHAPTER FOUR

Equipment Analysis: Using a Cofferdam and Core Sampler for Excavating the Intertidal Zone at the Beaches

4.1 Introduction

Archaeologists have used several methods and instruments to study topographies of sites and their stratigraphy. On Newfoundland, Pricilla Renouf and Trevor Bell of Memorial University used geotechnical methods to survey and research in the mid1990s (Bell et al. 2005:193-194). They were the first to use ground penetrating radar (GPR) and magnetometry to survey and map. They identified and mapped beach sediment, bedrock and peat at the Gould site [(EeBi-02).

South Brook Park (DgBj-01) has succumb to development (Stephen Hull, pers. com. 2017: Temple et al. 2007) however Stock Cove was surveyed with GPR. Christopher Wolff of University of Albany, and Thomas Urban of Cornell University mapped the eroding terrace (2012:160-172; 2014:126). A feature that was 1.7-1.9 m below the terrace was detected using GPR and magnetic survey mapped several features in the substrate. Excavation of the feature revealed a compact floor of Maritime Archaic origin (Wolff and Holly 2016:240).

At the Beaches an intertidal zone approach was used for survey and excavation. By surveying with a total station, taking core samples and digging test pits, allowed for a partial reconstruction of the site. This chapter introduces the equipment that was used to collect data and evaluates performance. Suggestions are offered regarding models of cofferdams and core samplers appropriate for working at the Beaches site.

4.2 Cofferdams: Introduction to Methods and Models

Portable cofferdams were initially experimented with in the early 19th century (Stevenson 1848:217). Several designs and materials were employed. Rows of posts driven into the substrate adjacent to each other; and talus debris heaped on sand in tidal flats; or cast-iron cylinders 2.44 m in diameter with heavy canvas to hold back water were some designs. Thomas Stevenson wrote of his experience using wooden planks held together within steel frames and uprights (Stevenson 1848:218-220). The uprights were periodically driven further into the sand and clay. Whatever the design, the construction was relevant to water body, location, tidal range, and duration of the excavation (Doran 2013:486/87; Stevenson 1848).

For example, in the York River near Yorktown, Virginia a cofferdam was constructed to excavate 27 m BSL. The enclosure was 29.5 m by 13.6 m and in 1982 cost $412,000.00 USD. The duration of the excavation was five years (Broadwater 1992:39-42). In the late 1990s a low tech, low budget sandbag system was used at the Los Buchillones site in Cuba (Graham et al. 2000; Peros 2000; Peros et al 2006: Doran 2013:486). It worked well in this location because the tidal range is between 0.73 and 0.75 m (Tide-Forecast 2017). Archaeologists excavated an area 400-500 m² and 0.5-1 m deep in a lagoon with sandbag walls, and pumps for dewatering. They worked for two field seasons. The cost was not found but a sandbag dam is minimal especially if sand is available on or near the site.

A contemporary example is from the Salt Springs site in Florida. It was made using a wooden frame and waterproof tarps. The water pressure held the tarps in place, both at the top and bottom. It was 91 m long and handled a depth of 2.5 m. There were issues with water breaching the tarp during storms and fast rising tides (Michael Russo, pers. com. 2017). It was flexible, portable and easy to expand, but installation was expensive (Doran 2013:486; Sassaman 2011:4/5). In 2009 it was $50,000 USD and excavation lasted seven years.

At the Beaches two tanks were donated by Laboratory Services at the Ocean Sciences Centre, Logy Bay and modified by Industrial Outreach, Faculty of Engineering and Applied Science at MUN. The submersible water pump was donated, and the generator was borrowed from Dr. Bell. All the equipment was light weight. The empty sand bags were $43.91 CND, the water hose $15.97 and operating costs (gas and oil) were $4.96. It took two and one-half hours of labour for three individuals [3 (individuals) X $25/hour X 3 (hours) = $225.00]. The total cost for experimenting with this cofferdam was = $289.94 CND.

4.2.1 Beaches Cofferdam: Assessment

The 1.22 m round tank that held the generator worked well in water. The height of the side made it easy to lift the generator in and out. One individual could easily move it by rolling it to location. It was lightweight, easy to push upright and move into position (see Plate 4.1). One individual could climb in and out, to start and stop the generator and it did not leak.

The cofferdam rolled and maneuvered easily into location. The first experiment was set up in an area with cobbles. Sandbags were placed inside the cofferdam but did not seal the bottom edge where it was in contact with the substrate. It was an unsuccessful attempt (see Plates 4.2 and 4.3).

The second location was sandy on the surface with a few cobbles; however, a few centimetres into the substrate cobbles had to be removed. The crew could not get it to work (Plate 4.4). The sides were too short to be an effective barrier for any length of time. The substrate was too rocky, and sand filled sandbags would have worked better for seepage control. The sand bags were placed inside the cofferdam, but placement would not have made a difference. And the bottom panel was not trimmed so that it could be easily pushed into the substrate (see Plate 4.5).

Plate 4.1. The small tank being rolled into place. View is northeast.

Plate 4.2. Ready to place generator into the tank. The view is southwest.

Plate 4.3. Bailing water. The space between the bottom of the cofferdam and a boulder allowed eels to swim to the interior of the dam. The view is southeast.

Plate 4.4. Left foreground TP13 and TP14 were marked with sandbags. Left of the dam a wooden stake marks C3. The view is toward the south.

Plate 4.5. The bottom of the cofferdam.

4.2.2 Alternative Cofferdam Models Appropriate for The Beaches

A cofferdam design that may work at the Beaches is a water bladder that sits on the surface in the intertidal zone called *Aqua Barriers*. Water is pumped out of the excavation area into the bladder. It covers uneven terrain and sandbags are not required. A small aqua barrier system consists of three barriers 2.44 m wide and 10 m long. It can enclose a work area of 10 m^2 square and accommodates two individuals. Four individuals are required to move and install the barrier. A four-inch diameter pump is needed to fill and empty the bladders. A small system was $150,000 CND (Vic Pontecorvo, pers. com., 2017) and a comprehensive manual is supplied.

The model used at Salt Springs (discussed above) is a good alternative because of the convenience of constructing a custom length and it can easily be adjusted. It is also lightweight. The cost can be less than what Sassaman paid depending on what materials or equipment can be borrowed, donated or repurposed. Despite the cofferdam not working, the price it took to be informed was $290 CND. Intertidal archaeologists can continue to work on developing a system that will work in littoral areas of Newfoundland.

4.3 Coring the Substrate: Introduction

There are advantages to coring archaeological sites. Benefits include saving time, labour and money, as well as site integrity (Stein 1986:505). Coring provides archaeologists with data that allow for the reconstruction of chronologies and landscape. In the early 20th century A. R. Crook cored the Cahokia Mound (1914, 1922) to confirm that it was not anthropogenic. And in the 1930s J. A Ford and F. B. Kniffen used core samples

(Stein 1986:506) to examine sediments of archaeological sites. They measured depth and established chronologies of sites they cored.

By extracting four cores, Andrea L. Balbo, Per Persson and Stephen Roberts (2010) discovered changes in settlement patterns on the River Ren, Norway, that was initiated by climatic conditions during the early Holocene. And at the Hinkley Point site in Bristol Channel, UK, Seren Griffiths and colleagues (2015) extracted three core samples that contained buried peat. The samples enabled them to reconstruct the landscape of the submerged site. These few examples illustrate how core samples can be used to study the anthropogenic and geographic histories of sites.

4.3.1 Watermark™ Universal Core Head Kit: Assessment

A standard Watermark™ Universal Core Head Kit has two clear polycarbonate core barrels that are 68 mm in diameter (inside measurement) and come in 60 or 120 cm lengths. As well, two rubber boot couplers and 12.7 cm nut driver, T-handle and lifting eye assembly (for lowering on a line or cable) and a carrying case. Optional equipment purchased for extra cost included bronze gravity weights, percussion hammer assembly (90 cm long threaded rod 17.78 cm diameter), hammer lifting eye and a lifting eye for the sliding rod. Polycarbonate core barrels with sharpened ends and poly end caps, and a core extruding tool were also obtained. The total cost was $4425.96 CND (see Plate 4.6).

The Watermark™ Universal corer allowed for the collection of data in locations where it was difficult to view the stratigraphy due to the high-water table. It was also beneficial in locations where researchers set up the cofferdam. However, the substrate was

Plate 4.6. Christina demonstrates the sleeve incorrectly attached to the core head. If a sleeve is not straight, the head is hammered into the side of the sleeve and not the substrate. The finger in the foreground points to the reference boulder. View is southwest.

compact with cobbles and boulders in the matrix which hindered all methods of excavation.

The longest core was from the fen. The slide hammer assembly allowed the sleeve to penetrate the substrate easily because there were no cobbles and boulders. Nonetheless, extracting the core sleeve from the substrate was problematic. A ditch was dug around the sleeve to extract the core. This method was applied to all cores.

Dents in core sleeves was another issue. A sleeve was bent when it hit a cobble while extracting C3 and the sleeve had to be cut to remove the sample. All the core sleeves were cut lengthwise to remove the samples, due to damage. When coring C4, the bottom of the sleeve hit Maritime Archaic artifacts larger than its circumference. It was lifted to remove the artifacts, then replaced in the same location. The result was an air and water pocket in the sleeve. This can occur with any core sampler and data will be lost.

Finally, the manufacturer's instructions were not explicit. This may be due to the assumption that only experienced operators would purchase the product (see Appendix B). The Watermark™ Universal corer was intended for fine sediments, but there are core samplers that will work more efficiently and with detailed operating manuals.

4.3.2 Alternative Corers Appropriate for the Beaches

The Eijkelkamp™ system uses a percussion hammer gouge (Canti and Meddens 1998:98; Eijkelkamp 2006). The gouge (core shaft) is metal and PVC core sleeves are available. A gas or electric powered hammer is attached to the gouge, then it is drilled into the substrate. According to the manufacturer, it works well in gravel and soils with cobbles and stones. The gouges and sleeves are available in 50, 100 and 200 cm lengths, and diameters suitable for the Beaches substrate are 75 and 100 mm.

Once the gouge is at the chosen depth the motor is removed and a mechanical rod puller (jack) jacks out the core. One benefit is, the metal gouges have an open side and allows the stratigraphy to be studied immediately after extraction. Two individuals can easily transport, and core sample a variety of substrates (Eijkelkamp 2006). A comprehensive operations manual is available on line. The equipment necessary for the Beaches site would be approximately $7500.00 CND (Rob Dyck, pers. com., 2017).

A Vibracore™ system (Wink 2008-2016) is also used to core gravel and cobble riddled substrates. A drill head powered by a generator causes acoustic vibration and transfers it to a core barrel. The vibration pushes the core barrel into the substrate. A core sample can be taken in 10 seconds and it is efficient in diverse applications.

A standard kit includes: 16.78 kg drill head, 27.67 kg Honda driven power plant, 12.25 kg flex drive cable, gin pole hoisting and pull-down system, drill rods and a core bit. Core diameters that are available: 44.45 mm, 60.5 mm, and 76.2 cm and 1.52 m long. Wink (2016) claim the system is portable and easily transported by two people to remote sites by watercraft or all-terrain vehicle (Rob Dyck, pers. com., 2017). The cost was $20,000 to $30,000 CND. The Wink model is for projects with big budgets. Three to five people are needed to set it up and at the Beaches site it is more advantageous to have a small crew.

After investigating various models of core sampling units for the Beaches, the budget was the decisive factor. The Eijkelkamp is the most economical up front and has the potential to save on labour and the costs involved with extra crew members, and transportation issues. Core diameters of 75 mm and barrels longer than 100+ cm would work well for coring the Beaches intertidal zone.

CHAPTER FIVE

Material Culture in the Intertidal Zone

> "…*no two archaeologists will ever form the same interpretations of archaeological phenomena. Instead, each archaeologist's interpretation simply makes a target for other archaeologists to re-evaluate and perhaps reject*." (E.B. Banning 2002: 8).

5.1 Introduction

This chapter discusses in-situ diagnostic artifacts. Some of the pieces and classes recovered from the surface are also discussed and compared with those retrieved by Carignan, Devereux and Facey. McLean's data were unavailable when the statistics for this thesis were collected from the Rooms Provincial Museum and Archives. The artifacts are grouped and not presented in the order of the test pits from where they were excavated (see Table 5.1).

Of 293 artifacts collected during 2015 field season 36.5% are diagnostics. Diagnostics breakdown into: 26% bifacial preforms, 19% cores, 14 % scrapers, 12% retouched flakes, 8% blades, 7% blade-like flakes, and other categories are 14%. Sixteen (15%) diagnostic artifacts were excavated which is 5% of all lithics retrieved. The total artifacts found in-situ was 90 (30%), including 74 flakes. Archaeological deposits and debitage were excavated from TP1, TP1A, TP8B, TP9, and TP10.

The most abundant lithic material was Bloody Bay Cove rhyolite (BBC) and 89% of the total. Another 6% of the artifacts have characteristics of BBC rhyolite, such as light and, or dark veining but due to heavy patination the material could not be positively verified. Other lithic materials include: quartzite (1.50%), black rhyolite (0.75), brown chert (0.75%), blue chert (0.35%), red rhyolite (35%), granite (0.35%) and Trinity Bay chert (0.35%).

Table 5.1. The table contains artifacts retrieved from 2015 field season and the Facey collection. The Facey scraper (*) has use wear like an abrader.

OBJECT	In Situ		Out of Context		Facey Collection	
	Quantity	Material	Quantity	Material	Quantity	Material
Adze					1	Rhyolite
Axe					1	Chert, Trinity Bay
Blade:	1	BBC Rhyolite				
Bifacial Utilised			1	BBC Rhyolite		
Burin:					1	Chert, Trinity Bay
Spall			1	BBC Rhyolite		
Celt	1	Slate				
Core:	2	BBC Rhyolite	15	14-BBC Rhyolite/2-Rhyolite		
Bifacial			1	BBC Rhyolite		
Exhausted			1	BBC Rhyolite		
Utilised			1	BBC Rhyolite		
Endblade: Bifacial			2	1-BBC Rhyolite/1-Chert	2	BBC Rhyolite
Unifacial			1	Rhyolite		
Flakes: Blade-like	2	BBC Rhyolite	5	BBC Rhyolite		
Retouched	3	BBC Rhyolite	10	BBC Rhyolite		
Utilised	1		3	BBC Rhyolite		
Hammer Stone	1	Granite				
Lancelote			1	BBC Rhyolite		
Macroblade			3	2-BBC Rhyolite/1-Rhyolite		
Microblade	2	1-BBC Rhyolite/1-Quartz	1	BBC Rhyolite		
Ovate Tool			1	1-BBC Rhyolite/1-Rhyolite		
Preform: Bifacial	1	BBC Rhyolite	27	24-BBC Ryolite/3-Rhyolite	3	BBC Rhyolite
Scraper: Endscraper			8	BBC Rhyolite		
Multiple edges, bifacial			3	2-BBC Rhyolite/1-Chert, Trinity Bay		
Multiple edges, unifacial			1	BBC Rhyolite	1*	BBC Rhyolite
Side, bifacial			2	BBC Rhyolite		
Side, unifacial	1	BBC Rhyolite		2-BBC Rhyolite/1-Rhyolite		
Spall:		BBC Rhyolite	1	Rhyolite		
Tip-Flute	1			BBC Rhyolite		
Ulu: Preform			2	Rhyolite		
Total	**16**		**91**		**9**	

5.2 Artifacts

In TP1 two microblade fragments were excavated. A proximal end (DeAk-01: 9470) made from BBC rhyolite was found near the top of TP1, and it is 13 mm long, 14.18 mm wide and 3.93 mm thick (Figure 5.1). A medial fragment made of quartzite, was found just above the hearth. It is 13.64 mm long, 8.23 mm wide and 4.07 mm thick (DeAk-01:

9692, Plates 5.1 and 5.2). A large microblade fragment made from BBC rhyolite was surface collected near TP1 and it (DeAk-01: 9481) is 26.21 mm long, 15.55 mm wide and 5.69 mm thick.

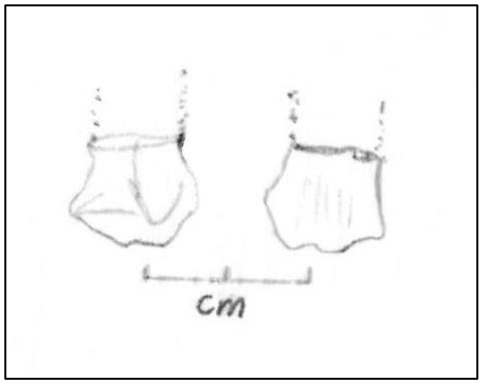


Figure 5.1. Microblade proximal fragment, DeAk-01: 3470 from TP1.

Plate 5.1. Quartzite microblade fragment DeAk-01: 9692, dorsal side.

Plate 5.2. Ventral side of medial fragment.

A tip-flute spall (DeAk-01:9480) also from TP1 is 32.9 mm long X 12.42 mm wide and 3.84 mm thick (Plates 5.3 and 5.4). A large heavily patinated spall was found on the surface.

It is 45.04 mm long, 26.76 mm wide and 15.24 mm thick (DeAk-01: 9577). This spall is heavily waterworn and patinated (Plates 5.5 and 5.6). A burin spall (DeAk-01: 9573) of BBC rhyolite was also found on the surface. It is 94.87 mm long, 23.64 mm wide and 12.78 mm thick (Plates 5.7 and 5.8).

Plate 5.3. Dorsal side of tip-flute spall.

Plate 5.4. Ventral. side.

Plates 5.5. Dorsal sides of spall from the surface.

Plate 5.6. Ventral side.

Plate 5.7. Burin spall. Dorsal side view.

Plate 5.8. Ventral side view.

Two blade fragments were found in-situ. The other two fragments are two halves of a Maritime Archaic blade as shown in Plate 5.9. The left half of the blade is 46.41 mm long, 20.26 mm wide, and 5.45 thick (DeAk-01: 9672); and the right is 46.48 mm long, 20.14 mm wide, and 5.37 mm thick (DeAk-01: 9674). They were in TP1A.

Plate 5.9. This implement is indicative of Maritime Archaic design (Tim Rast, pers. com., 2017).

Two test pits each yielded a blade-like flake. DeAk-01: 9698 was excavated in TP1A. It is 27.38 mm long, 16.35 wide and 4.36 mm thick, and the smaller blade-like flake (DeAk-01: 9699) came from TP10. It is 23.62 mm long, 13.02 mm wide and 2.85 mm thick. Both are made from BBC rhyolite, and were excavated from stratum four in each test pit.

A bifacial preform (DeAk-01: 9658, Plate 5.10) was found in TP10. It is 85.86 mm long, 41.74 mm wide and 18.35 mm thick. It is smaller than the Maritime Archaic stemmed point that Carignan found (1975:171, 219) at the Beaches. Both tools are asymmetric, have a rounded edge chipped on one side and on the other there is bulge above a visible stem (Figure 5.2). It was the only one found in-situ of 28 bifacial preforms collected.

Plate 5.10. DeAk-01: 9658 from TP10.

Figure 5.2. Stemmed bi-face Carignan excavated (1975).

In context with DeAk-01: 9658 was a retouched flake (DeAk-01: 9562), which is 55.56 mm long, 39.8 mm wide. It has a notch (see Plate 5.11). There are two blade-like flakes that also have notches. One is 27.5 mm long, 15.6 mm wide and 4.36 mm thick (DeAk-01: 9683) and it was inTP1. The other (DeAk-01: 9521) is 77.43 mm long, 45 mm wide and 14.73 mm thick (Plates 5.12 and 5.13) and was collected from the surface.


Plate 5.11. DeAk-01: 9562


Plate 5.12. DeAk-01: 9683


Plate 5.13. DeAk-01: 9522

Twenty retouched flakes were retrieved, and three were in-situ. The one from TP9 is 75.2 mm long, 64. 6 mm wide and 10.7 mm thick. A granite hammer stone and an unfinished celt of grey slate were also in TP9. The celt is 140.76 mm long, 39.91 mm wide and 19.15 mm thick. The artifacts were found beneath buried peat that radiocarbon dated to 4600 BP (see Plates 5.14, 5.15, 5.16, 5.17 and Figure 5.3).


Plate 5.14. Feldspar or quartz specks are visible.


Plate 5.15. Ventral side of the retouched flake.


Plate 5.16. Hammer stone from TP9.

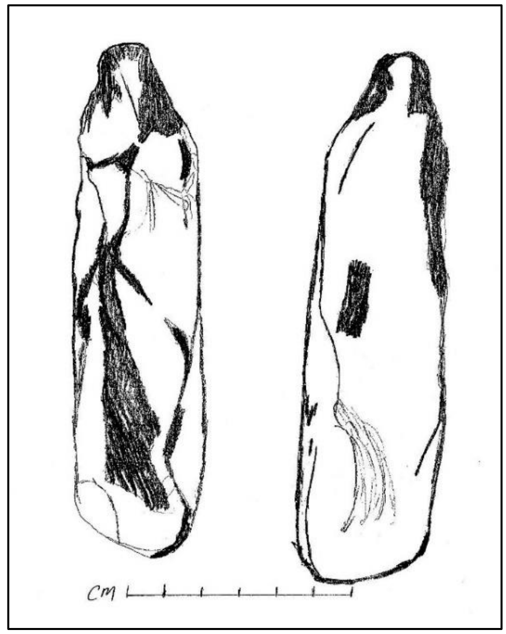


Plate 5.17. Patination on DeAk-01: 9668.

Figure 5.3. Celt that was excavated from TP9 (DeAl-01: 9668).

Table 5.2 shows the distribution of diagnostic stone artifacts from 2015, and in-situ artifacts that Carignan and Devereux excavated belonging to the same classes as the 2015 survey or the Facey collection. Over time, Mr. Facey collected nine stone artifacts from the intertidal zone in Southern Cove (John Campbell 2016). The catalogue sheets for the artifacts are in Appendix C. The Facey collection shares two artifact classes with Devereux and Carignan excavations: adzes and burins, but none were retrieved during field season.

In the stratigraphy along Southern Cove Devereux (1966b) found a ground stone adze made of black slate and polished smooth and Carignan (1975) excavated a ground stone adze. Facey collected an adze (DeAk-01: 9714) and a scraper (DeAk-01: 9717) made of rhyolite (Plate 5.18 and Plate 5.19). The scraper is unusual because there is little use wear on the end and none on the sides, but there is the full length of the flat, smooth and heavily patinated dorsal side (Plates 5.20 and 5.21). It is 73.13 mm long, 38.56 mm wide and 13.33 mm thick. It is 20 mm longer, and 6 mm thicker than the largest end-scraper

Table 5.2. Table shows the distribution of diagnostic lithics based on artifacts from the intertidal zone at the Beaches. Not all are in the Maritime Archaic toolkit.

OBJECT	2015 In-situ	2015 Surface	Carignan In-situ	Devereux In-Situ	Facey Surface
Adze			1	6	1
Axe				11	1
Blade:	1				
Bifacial utilised		1			
Bifacial			135	2	
Burin:			2		1
Spall		1			
Celt	1		9		
Core:	2	15	1	33	
Bifacial		1			
Exhausted		1			
Utilised		1			
Endblade: Bifacial		2	128		1
Tip-fluted, Bifacial					1
Unifacial		1			
Flakes: Blade-like	2	5	2		
Retouched	3	10		84	
Utilised	1	3		103	
Graver			1		
Hammer Stone	1		3		
Lancelote		1	22		
Macroblade		3	7		
Microblade	2	1	44		
Ovate Tool		1	2		
Preform: Bifacial	1	27			3
Scraper: End		8	21		
Multiple edges, Bifacial		3			
Multiple edges, Unifacial		1			1*
Side, Bifacial		2			
Side, Unifacial	1				
Unspecified				51	
Spall:					
Tip-Flute	1	1			
Stemmed Point			11		
Ulu: Bifacial			10	1	
Preform		2	7		
TOTAL	**16**	**91**	**406**	**291**	**9**

Plate 5.18. Adze from Facey collection.

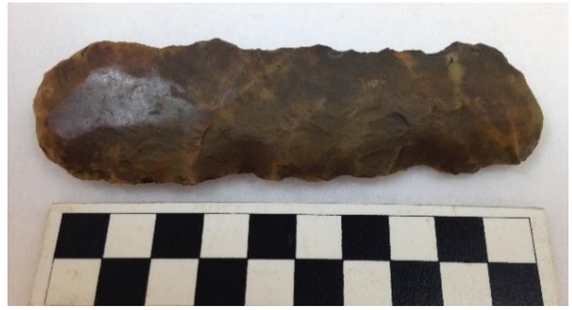


Plate 5.19. In both plates, polishing is visible.

Plate 5.20. Dorsal side of DeAk-01: 9717.

Plate 5.21. Ventral side.

found during the field season. Facey also has a biface fragment (DeAk-01: 9716) that is the shape of a gouge (Figure 5.4, Plate 5.22). It is 71.92 mm long, 46.01 mm wide and 14.62 mm thick at one end. There is a shallow groove in the ventral side that resembles Maritime Archaic ground stone gouges, but it is rhyolite.

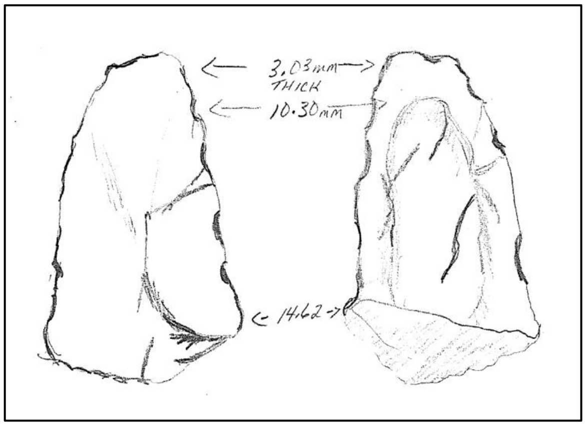


Figure 5.4. DeAk-01: 9716, gouge?

Plate 5.22. Ventral side of the tool.

Twenty-eight bifacial preforms were found in the intertidal zone and three are in the Facey collection. This class of artifact was the most abundant found in the tidal flats. Maritime Archaic ulus have also been retrieved from the Beaches site. A large ulu preform (DeAk-01: 9466) 139 mm long, 97 mm wide and 21 mm thick (see Plate 5.23 and 5.24), and a smaller one (DeAk-01: 9605) 81.5 mm long, 48.5 wide and 18 mm thick (see Plates 5.25 and 5.26) were surface collected. They are about the same size as two chipped slate preforms excavated from the Fowler site in southern Labrador (McGee and Tuck 1975). The ulus are 180 mm long and 70 mm wide, and the small one is 116.5 mm long and 51.5 mm wide (thickness unknown).

Devereux (1966a, 1969) excavated a retouched bifacial ulu from her test trench. It is 82.55 mm long, 25.4 mm wide and 12.7 mm thick and a bifacial ulu from the south profile of the terrace that is 73.15 mm long. She surface collected two unifacial ulus, but only recorded their lengths: 54.36 mm and 50.86 mm. Carignan excavated 17 ulus (1973a:11-12, 14; 1973b:14, 19, 20) from Maritime Archaic anthropogenic strata. Five unifacial and eight bifacial ulus were excavated from the terrace; and two unifacial and two bifacial ulus were found in-situ in the intertidal zone. Carignan does not mention dimensions (illustrated in Figure 5.5 and 5.6).

Plate 5.23. Dorsal side DeAk-01:9466.

Plate 5.24. Ventral side.

Plate 5.25. Dorsal side DeAk-01:9605.

Plate 5.26. Ventral side.

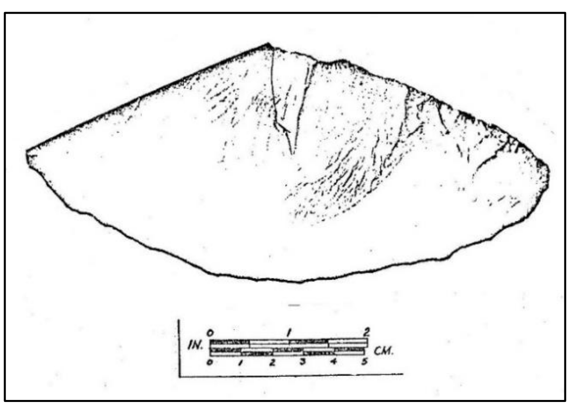


Figure 5.5. This drawing is from Carignan's Salvage Report in 1973 (modified from Carignan, 1973b).

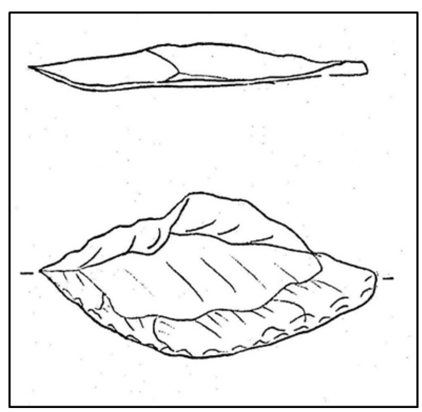


Figure 5.6. This ulu is from the terrace. No scale drawings in his preliminary report (modified from Carignan 1973a).

5.3 Summary and Conclusion

The highest percentage of chipped stone tools and debitage collected from the Beaches site is made of BBC rhyolite. Bifacial preforms were the most abundant tool class excavated or found on the surface and retouched flakes second. A comparison of the various collections indicated several Maritime Archaic ulus were excavated from archaeological deposits. Ulus raise questions regarding social and political connections to groups in northern Labrador. Or perhaps there are connections with similar archaic groups from the Maritimes or New England? Or both?

The test pits had few artifacts in comparison to the number of surface artifacts that have been displaced and distributed in Southern Cove. A core was found several meters from the tombolo and adjacent to Fox Bar Island. There are more artifacts in that area, and in Beaches Cove where they are much more difficult to retrieve.

CHAPTER SIX

Summary and Conclusion

The research in this thesis has determined the answers to three questions: 1) Are there remaining in-situ Maritime Archaic archaeological deposits in the intertidal zone; 2) What was the topography like when the Maritime Archaic were present; 3) What excavation methods are most effective working in the intertidal zone at the Beaches site? To answer the first two questions, it was necessary to use a geoarchaeological approach. First, notes and reports from previous excavations were perused for details regarding the site to: understand the stratigraphy in the sections that researchers worked; look for explicit details about individual strata and the topography; find descriptions of geographic references to be used for mapping.

Surveying the intertidal zone by digging test pits in locations where buried peat was expected, aided in locating in-situ Maritime Archaic archaeological deposits. It was unexpected to find that the second buried peat horizon that Devereux and Carignan excavated was a chronosequence; therefore, the buried peat strata in the test pits may not be the same strata that Devereux and Carignan excavated. For that matter, Devereux and Carignan may not have exposed the same horizons. Regardless, it is important to track so that archaeologists can locate cultural deposits that are at risk of being lost to erosion or looting.

The east and south peat boundaries were established in Southern Cove. In TP1A the southern boundary was found close to a breakwater. And in TP8B the peat boundary formed a point on the east side of the test pit, demonstrating that the peat deepened westward. The northern boundary is under the gravel terrace as shown in C1 and TP1 strata, and the western boundary is close to TP4 and TP5 or, it continues under the terrace.

An ancient peat stratum was discovered low in the intertidal zone 18 m east of the headland. Research should continue in that area for at least two reasons. First, to find the perimeter of this peat horizon, extract core samples that include the complete peat stratum, and radiocarbon date those samples. Core samples can establish radiocarbon dates and boundaries of the peat as well as another chronosequence. Second, buried archaeological deposits may be under the peat or sediments along its boundary that date to 6200 BP or earlier.

We cannot discount Maritime Archaic deposits in the substrate along the tombolo because TP11 was unfruitful. Information remains that postdates or is contemporary to the Maritime Archaic component. And there is information that predates their occupation that can help to determine their arrival and settlement at the site.

The Beaches has experienced several topographic changes that affected settlement patterns. To obtain more data further archaeological survey in the intertidal zone and the foreshore in Southern Cove is needed. Intertidal zone archaeology has not previously been practiced in Newfoundland, therefore experimentation in survey and excavation methods is required to find the appropriate tools. The cofferdam did not work, but the experiment was worth the cost to know more about the substrate in Southern Cove. A water bladder may be the most efficient, but water barriers used for flood control may be less expensive, the most effective, and easiest to set-up and take-down.

Coring assisted archaeologists in areas where the water table was too high to observe the stratigraphic column at the time of excavation. Obtaining core samples is an efficient method of collecting data to reconstruct past topographies. There were problems with the Watermark™ Universal corer, but the Eijkelkamp™ system would work better at the Beaches. It costs more but is robust and cores can easily be removed from the substrate.

Material culture was not the focus of this study, however inventories collected from the Beaches site demonstrated its strategic location. The recovery of several ulus lead to questions regarding which Maritime Archaic group (s) used the site. For example, did they have cultural and, or ceremonial connections to Northern Maritime Archaic groups, or the Maritimes?

The results of this analysis show that the Beaches has changed considerably since the Maritime Archaic were present. The geographic processes that created it continue to remodel the site. There are rich archaeological deposits beneath the terrace, the point on Fox Bar Island and in Southern Cove. These areas will continue to inform researchers of the anthropogenic and geographic history of the Beaches site.

Appendix A

Canadian Soil Classification Codes

These codes were taken directly from the Canadian Soil Classification Codes as published on the website at http://www.soilsofcanada.ca/glossary.php. Developed by: Department of Soil Science University of Saskatchewan, 51 Campus Drive, Saskatoon SK S7N 5A8.

Ae:
An A horizon characterized by the eluviation of clay, Fe, Al, or organic matter alone or in combination. When dry, it is usually lighter colored (higher in color value by one or more units) than an underlying B horizon

Ah: An A horizon enriched with organic matter, that is darker (has a color value at least one unit lower than the original parent material) and/or has 0.5% more organic C than IC. It contains ≤ 17% organic C by weight. Some Ah horizons satisfy the criterion for "f" but are not designated this suffix.

Ahb: A buried A horizon enriched with organic matter that is darker (has a color value at least one unit lower than the original parent material) and/or has 0.5% more organic C than IC. Burial may occur by mass wasting of soil downslope, intermittent flooding or deposition of air-borne material.

NOTE: “b” at the end of a classification denotes a buried horizon in the context of this thesis.

Ap: An A horizon that has been disturbed by human activity such as mixing of the upper soil by ploughing in agricultural landscapes. Some Ap horizons satisfy the criterion for "f" but are never designated this suffix.

Apb: A buried ‘A’ horizon that has been disturbed by human activity.

Bf: A B horizon commonly found in podzolic soils that has: 1) a moist crushed color of black, a hue of 7.5YR or redder, or a hue of 10YR near the horizon boundary becoming yellower with depth. 2) amorphous material with brown to black coatings on grains or aggregates and a silty feel when rubbed wet. 3) ≥ 0.6% pyrophosphate-extractable Al+Fe in textures finer than sand and ≥ 0.4% in sands. Organic C ranges between 0.5 and 5%. 4) ≥ 10 cm in depth (depth satisfies the podzolic B criteria).

Bh: A B horizon enriched with organic matter. It contains > 1% organic C and < 0.3% pyrophosphate-extractable Fe. Generally, the color value and chroma are ≤ 3 when moist. This horizon is considered a podzolic B horizon if it is ≥ 10 cm in depth.

Bhf: A B horizon commonly found in podzolic soils that has: 1) a moist crushed color of black, a hue of 7.5YR or redder, or a hue of 10YR near the horizon boundary becoming yellower with depth. 2) accumulation of amorphous material showing brown to black coatings on grains or microaggregates, and a silty feeling when rubbed wet. 3) ≥ 0.6% pyrophosphate-extractable Al+Fe in textures finer than sand and ≥ 0.4% in sands. Organic C is > 5%. 4) ≥ 10 cm in depth (depth satisfies podzolic B criteria).

F: This organic horizon is characterized by an accumulation of partly decomposed organic matter. Some of the original structures are difficult to recognize. The material may be partly comminuted (pulverized) by soil fauna as in modern (a non-matted forest humus), or it may be a partly decomposed mat permeated by fungal hyphae as in more.

H: This organic horizon is characterized by an accumulation of decomposed organic matter in which the original structures are indiscernible. This horizon differs from the F by having greater humification due chiefly to the action of organisms. It is frequently intermixed with mineral grains, especially near the junction with mineral horizons.

O: An organic horizon containing > 17% organic C (approximately ≥ 30% organic matter) by weight. It is developed mainly from mosses, rushes and woody materials, and is divided into 3 subhorizons (Of, Om and Oh) based on the material present and the stage of decomposition.

Of: An organic horizon consisting largely of fibric materials that are readily identifiable as botanical materials. Fibric material is not well decomposed having a von Post scale of decomposition ranging from class 1 to 4. It has a rubbed fiber volume of > 40%. There are three kinds of fibric horizons: 1) Fennic horizons are derived from rushes, reeds, and sedges. 2) Silvic horizons are derived from wood, moss with < 75% volume being sphagnum. 3) Sphagnic horizons are derived from sphagnum mosses.

Omp: An organic horizon that is disturbed by human activities such as cultivation, logging, and habitation. It contains mesic material that is partly altered both physically and biochemically. It is at a stage of decomposition intermediate between fibric and humic materials (von Post scale of decomposition ranging from class 5 to 6).

g: A horizon that always experiences eluviation.

Podzolic B horizon: This horizon is defined by morphological and chemical properties. Morphologically it has: 1) a 10 cm thickness. 2) a moist crushed color of black, or a hue of 7.5YR or redder or 10YR near the upper boundary becoming yellower with depth. 3) accumulation of amorphous material indicated by brown to black coatings on grains or microaggregates. There is a silty feel when wet, unless it is cemented. Chemically it can have either: 1) very low Fe (< 0.3% pyrophosphate-extractable Fe), and > 1% organic C. 2) very appreciable levels of Fe as well as Al (≥ 0.3% pyrophosphate-extractable Fe, ≥ 0.6% pyrophosphate-extractable Fe+Al in textures finer than sand, ≥ 0.4% in sand), and > 0.5% organic C.

W: A W horizon is a layer of water which may occur in Gleysolic, Organic, or Cryosolic soils. Hydric layers in Organic soils are a kind of W layer, as is segregated ice formation in Cryosolic soils.

APPENDIX B

Watermark™ Universal Core Head Kit Instructions

From the box of parts, the following three pages were enclosed, but no formal instructions. On the webpage of the Forestry Suppliers, below is a direct quote, that supplements the documents enclosed with the sampler.

> To obtain a sample, attach a polycarbonate core barrel to the core head and push or lower the sampler into the sediment. If sampling in compact deposits, use the optional slide hammer. To adjust sampler weight, use the bronze gravity weights (sold separately) for even easier penetration. Next, haul the sampler to the surface and insert a core extruding plug inside the barrel before the barrel breaks the surface. Loosen the rubber coupler sleeve and remove the barrel from the core head. With the core extruding plug in place, you can attach the barrel directly to the optional incremental core extruding apparatus (sold separately) which allows samples to be incrementally pushed from the bottom up if desired. In shallow water (less than 6 m), the sampler is manually-driven using the "T" handle and the optional aluminum extension rods. In deeper water, the corer is gravity/slide hammer-driven. Use separate lines for sampler deployment and slide hammer operation. Select the optional extensions for even deeper sampling. Universal core head kit contains polyethylene and stainless-steel corer head, "T" handle, one clear polycarbonate core barrel (68 mm x 71 mm x 120 cm), two polycarbonate end caps, one core extruding plug, 15 m calibrated line with line reel, hexnut driver, carrying case, and directions.
>
> (http://www.forestry-suppliers.com)

UNIVERSAL CORER
CORING TIPS AND DIRECTION FOR USE

How it Works... The Universal Corer was designed to collect long undisturbed cores of the mud water interface. The corer head drives clear polycarbonate core barrels (2 5/8" ID x 2 ¾" OD) to a maximum sediment depth of 2.4 meters. The custom (CNC) check valve was specially designed to allow water and mud to free flush through the core head/barrel with minimal sample disturbance. After the core barrel is pushed into the sediments (see methods below), the sampler is hoisted upwards, the check valve seats, and a partial vacuum is created to hold the sample inside the core barrel. Since the assembly does not require core catchers, it is necessary to "Plug or Cap" the end of the Core Barrel before it is lifted into the air. Otherwise, you may lose all or part of a sample. With the Extruding Plug in place, double seal the ends of the barrel with Poly End Caps. The Core Extruding Plugs can be used with or without "O" rings depending on the nature of the investigation and sediment type. The core barrel is now ready for transport and prepared for the extruding process with (optional) Core Extruding Apparatus.

Attaching the Barrel...The core barrel is easily attached and removed from the core head by loosening/tightening the Rubber Boot Assembly. Use the Hex Driver to tighten and loosen the LOWER band clamps only. YES" is written on the lower clamps as a reminder ... OK to loosen or tighten. "NO" is written on the upper clamps as a reminder ... "Do not touch". Fully slide core barrel into core head approximately 10 cm and secure lower hose clamps very tightly. If you don't secure the band clamps you will fail to collect a sample (lack of vacuum seal) and risk losing the Core Barrel entirely.

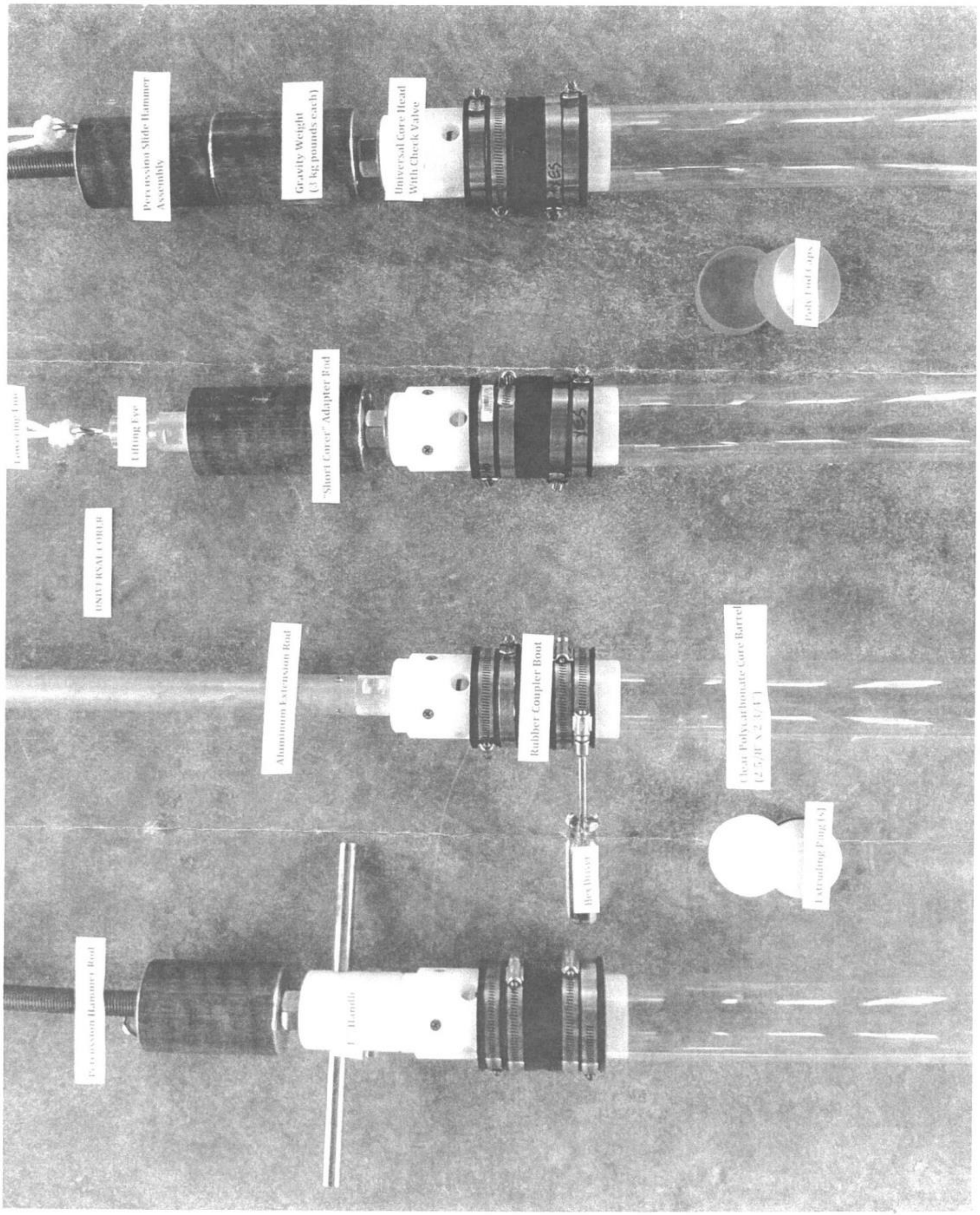
Methods for Deployment... The Universal Core Head is easy to use and can be deployed in many ways. A stable work platform is required for any coring operation. Ice cover is the best working option, but many are successful on a well-anchored raft or pontoon. Before deploying the sampler, be sure to tie off the end of the lowering line to the platform to prevent inadvertent loss of sampler. Below, please find some common deployment techniques.

1. "T"-HANDLE: The corer can be deployed in shallow water or as a diver with the "T"-Handle. Secure the "T" Handle to the core head securely. An optional Percussion Slide Hammer Assembly can be mounted atop the handle and aid in driving (retrieving) the corer into sediments.
2. EXTENSION RODS: Aluminum Holobar Extension Rods are available (1.2 and 2.4 meter lengths) to deploy the sampler in shallow water to a maximum depth of 20 meters. Securely tighten the stainless steel couplers between before deployment. This method allows good "communication" between the operator and the core head. It allows one to measure how far the corer has been pushed vs. how much mud has been collected. This is an important measurement in determining any "core shortening" that may be occurring.

The "T" Handle and (optional) Percussion Slide Hammer Assembly can be mounted atop the extension rods and aid in driving (and retrieving) the corer.

3. GRAVITY WEIGHTS: The sampler can be deployed in deep water with Gravity Weights. The number of Gravity Weights needed depends on the target depth and the type of sediments encountered. A maximum of four (4) weights can be added to the core head. For collecting short cores of mud water interface, use the "Short Corer Adapter Rod" to allow easy/ergonomic use of a single Gravity Weight. The use of more than one Gravity weight will require the use of the Percussion Slide Hammer Assembly. Tie the sampler to strong non-stretch wire or rope (with minimum test strength X 500 pounds) to the Lifting Eye. Determine the depth of water and slowly lower the end of the core barrel to mud water interface. Do not allow the corer to freefall through the water column since it will not penetrate properly and your sampling effort will probably fail. Allow the sampler to gently enter the sediments until the lowering line slightly "slacks". Gently pull upwards on core head with care not to "shock" the Lowering Line and quickly reel in the sampler. Seal the end of the barrel with a Core Extruding Plug or Poly End Cap before lifting into air.
4. PERCUSSION SLIDE HAMMER ASSEMBLY: The 90 cm long Slide Hammer Rod allows one to add both Gravity and Slide Hammer Weights when attempting to collect long a core in deep water. The Lifting Eye should be fully secured at the core head and the line/wire before deployment. The assembly can hold a maximum four (4) Gravity weight and the Percussion Hammer for a maximum weight of approximately 60 pounds. Tie the sampler to strong non-stretch wire or rope (with minimum test strength X 500 pounds) to the Lifting Eye. Determine the depth of water and slowly lower the end of the core barrel to mud water interface. Do not allow the corer to freefall through the water column since it will not penetrate properly and your sampling effort will probably fail. Allow the sampler to gently enter the sediments until the lowering line slightly "slacks". On a separate line attached to percussion hammer lifting eye, gently pull upward on the percussion hammer. Allow the hammer to drop and measure your deployment progress on your Lowering Line. The Corer should be stabilized by the Lowering Line, but allowed to slack when slide hammer strikes the core head. It is very effective (and minimizes sample disturbance) to hammer in short 15 to 20 cm long strokes. Gently pull upwards on core head with care not to "shock" the Lowering Line and quickly reel in the sampler. Seal the end of the barrel with a Core Extruding Plug or Poly End Cap before lifting into air. This method requires some time and effort to master, but produces good quality samples in deep waters.

AQUATIC RESEARCH INSTRUMENTS -P.O. Box 98 -Hope, ID 83836 USA
PH 800.320.9482 aquaticresearch.com


Percussion Slide Hammer Assembly
Gravity Weight
Universal Core Head With Check Valve
Poly End Caps
Lifting Eye
"Short Corer" Adapter Rod
UNIVERSAL CORER
Aluminum Extension Rod
Rubber Coupler Boot
Clear Polycarbonate Core Barrel
Hex Driver
Extruding Plug(s)
Percussion Hammer Rod
Handle

APPENDIX C

Eric Facey Private Collection: Catalogue Sheets

ARCHAEOLOGICAL SPECIMENS RECORD - NEWFOUNDLAND & LABRADOR

Permit Number ERIC FACEY COLLECTION

Borden Number DeAk-01 Catalogue Number 9714

Site Name REACHES Previous Number

Culture Cultural Phase/Complex

Object ADZE Material RHYOLITE

Complete ☑ Incomplete ☐ Portion

Quantity 1 Colour BROWN/DARK GREY Manufacturing Technique CHIPPED

Associated Date Dating Technique

Description USEWARE ON DISTAL SURFACE OF DORSAL & VENTRAL SIDES. STRIATIONS ARE ALSO VISIBLE. EXHIBITS POLISHING 25-45mm FROM PROXIMAL END OF VENTRAL SIDE. NO POLISHING IS VISIBLE ON DORSAL.

Length 112.62 mm Width 31.31 mm Height mm Thickness 14.83 mm

Outside Diameter mm Inside Diameter mm Bore Diameter /64 in

Weight g Condition Description HEAVILY PATINATED

Collector/Excavator FACEY, ERIC Collection Date UNKNOWN

Collection Method SURFACE FIND Associated Features

Stratum Event Lot

Grid Co-ordinates Collection Unit INTERTIDAL ZONE

North/South Measure m East/West Measure m

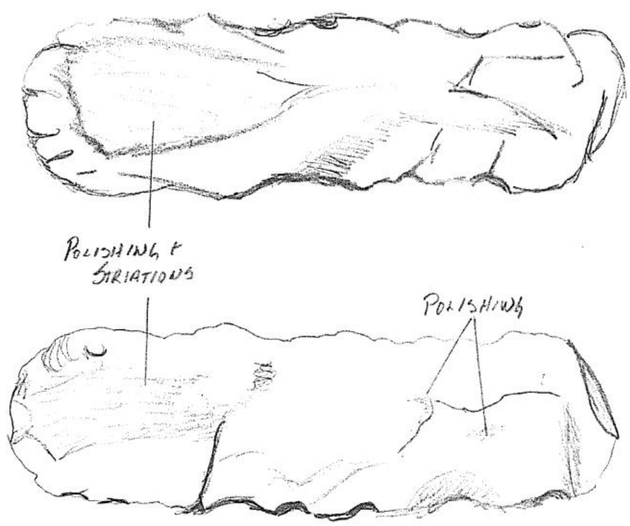
Depth Below Datum ______ m Depth Below Surface ______ m

Cataloguer JOHNSON-HENKE Catalogue Date 03/17/2016

Cataloguer Remarks IN CARIGNAN'S 1975 MERCURY SERIES PUBL.
IS A SIMILAR OBJECT (215 b), WHICH HE REFERS TO AS AN
'ENDBLADE SCRAPER' -> DAVIS & EDMONDS SHOW A PHOTO (369)
OF AN ALMOST IDENTICAL ADZE (MAI)

Image Reference ______

Sketch of item cited in **Object** field



ARCHAEOLOGICAL SPECIMENS RECORD - NEWFOUNDLAND & LABRADOR

Permit Number ERIC FACEY COLLECTION

Borden Number DEAK-01 Catalogue Number 9715

Site Name BEACHES Previous Number

Culture UNKNOWN Cultural Phase/Complex

Object PREFORM - BIFACE Material RYHOLITE, BBC

Complete ☐ Incomplete ☑ Portion TIP MISSING

Quantity 1 Colour DARK BLUE-GREY Manufacturing Technique CHIPPED

Associated Date Dating Technique

Description

Length 104.67 mm Width 38.22 mm Height mm Thickness 17.21 mm

Outside Diameter mm Inside Diameter mm Bore Diameter /64 in

Weight g Condition Description

Collector/Excavator FACEY, ERIC Collection Date UNKNOWN

Collection Method SURFACE FIND Associated Features

Stratum Event Lot

Grid Co-ordinates Collection Unit INTERTIDAL ZONE

North/South Measure m East/West Measure m

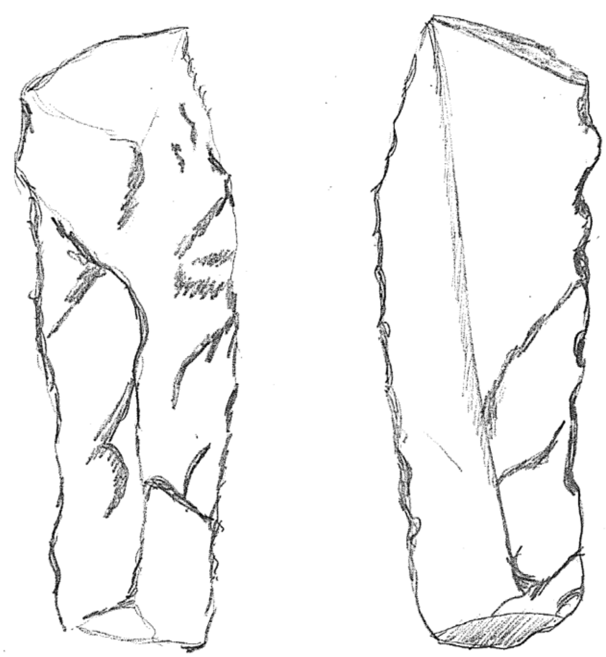
Depth Below Datum________ m Depth Below Surface________ m

Cataloguer JOHNSON. HENKE Catalogue Date 03/17/2016

Cataloguer Remarks________

Image Reference________

Sketch of item cited in **Object** field



ARCHAEOLOGICAL SPECIMENS RECORD - NEWFOUNDLAND & LABRADOR

Permit Number ERIC FACEY COLLECTION

Borden Number DeAk-01 Catalogue Number 9716

Site Name BEACHES Previous Number ____

Culture UNKNOWN Cultural Phase/Complex ____

Object BIFACE FRAGMENT Material RHYOLITE, BBC

Complete ☐ Incomplete ☑ Portion DISTAL

Quantity 1 Colour BROWN/DARK GREY Manufacturing Technique CHIPPED

Associated Date ____ Dating Technique ____

Description GROOVE ON VENTRAL SURFACE: APPEARS TO BE A GOUGE. FROM THE DISTAL EDGE OF THE GROOVE, THE TIP DECREASES IN THICKNESS FROM 10.30 -> 3.03 MM. AT THE END OF THE IMPLEMENT.

FELDSPAR/QUARTZ SPECKS IN MATRIX. VEINS, GREY/BROWN MARBLING

Length 71.92 mm Width 46.01 mm Height ____ mm Thickness 14.62 mm

Outside Diameter ____ mm Inside Diameter ____ mm Bore Diameter ____ /64 in.

Weight ____ g Condition Description PATINATED, WATERWORN

Collector/Excavator FACEY Collection Date UNKNOWN

Collection Method SURFACE FIND Associated Features ____

Stratum ____ Event ____ Lot ____

Grid Co-ordinates ____ Collection Unit INTERTIDAL ZONE

North/South Measure ____ m East/West Measure ____ m

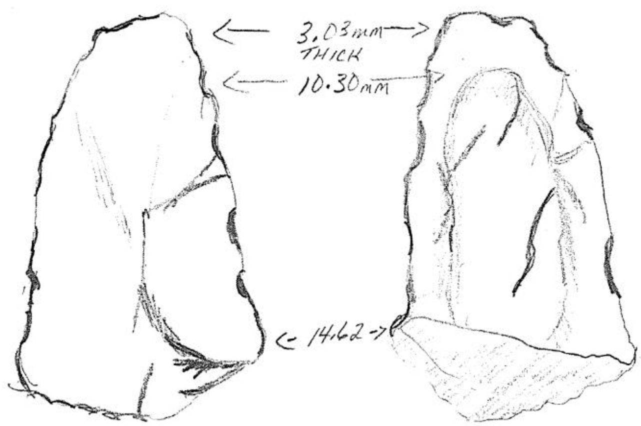
Depth Below Datum_______________m Depth Below Surface_______________m

Cataloguer JOHNSON-HENKE Catalogue Date 03/17/2016

Cataloguer Remarks

Image Reference

Sketch of item cited in **Object** field



ARCHAEOLOGICAL SPECIMENS RECORD - NEWFOUNDLAND & LABRADOR

Permit Number ERIC FACEY COLLECTION

Borden Number DEAK-01 Catalogue Number 9717

Site Name BEACHES Previous Number

Culture UNKNOWN Cultural Phase/Complex

Object SCRAPER Material RHYOLITE, BBC

Complete ☑ Incomplete ☐ Portion LEFT SIDE OF TIP (DORSAL)

Quantity 1 Colour DARK GREY BLUE & PURPLE. Manufacturing Technique CHIPPED

Associated Date Dating Technique

Description MULTIFACETED TOOL: PARALLEL SIDES (LENGTHWISE) HAVE STEEP ANGLES FOR SCRAPING. DORSAL SURFACE IS FLAT AND IS MUCH SMOOTHER THAN THE REST OF THE IMPLEMENT.

VEIN & DARK/LIGHT MARKING

Length 73.13 mm Width 38.56 mm Height mm Thickness 13.33 mm

Outside Diameter mm Inside Diameter mm Bore Diameter /64 in

Weight g Condition Description HEAVILY PATINATED ON DORSAL SURFACE, WATER-WORN

Collector/Excavator FACEY, ERIC Collection Date UNKNOWN

Collection Method SURFACE FIND Associated Features

Stratum Event Lot

Grid Co-ordinates Collection Unit INTERTIDAL ZONE

North/South Measure m East/West Measure m

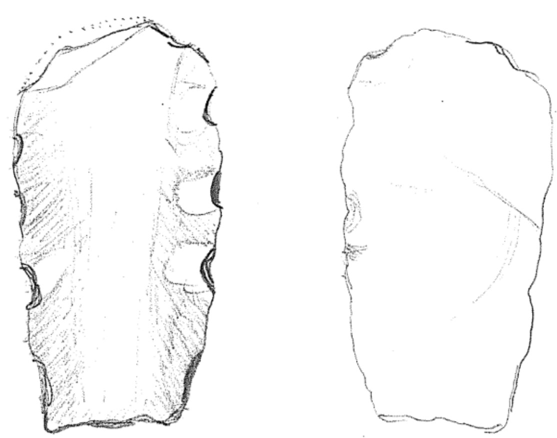
Depth Below Datum________________m Depth Below Surface________________m

Cataloguer JOHNSON- HENKE Catalogue Date 03/17/2016

Cataloguer Remarks________________

Image Reference________________

Sketch of item cited in **Object** field



ARCHAEOLOGICAL SPECIMENS RECORD - NEWFOUNDLAND & LABRADOR

Permit Number ERIC FACEY COLLECTION

Borden Number DEAK-01 Catalogue Number 9718

Site Name BEACHES Previous Number

Culture UNKNOWN Cultural Phase/Complex

Object BIFACE PREFORM Material RHYOLITE, BBC

Complete ☐ Incomplete ☑ Portion MEDIAL FRAGMENT

Quantity 1 Colour BLUE GREY Manufacturing Technique CHIPPED

Associated Date Dating Technique

Description

Length 56.10 mm Width 49.02 mm Height mm Thickness 21.78 mm

Outside Diameter mm Inside Diameter mm Bore Diameter /64 in

Weight g Condition Description WATERWORN

Collector/Excavator FACEY, ERIC Collection Date UNKNOWN

Collection Method SURFACE FIND Associated Features

Stratum Event Lot

Grid Co-ordinates Collection Unit INTERTIDAL ZONE

North/South Measure m East/West Measure m

Depth Below Datum__________m Depth Below Surface__________m

Cataloguer JOHNSON-HENKE Catalogue Date 03/17/2016

Cataloguer Remarks

Image Reference

Sketch of item cited in **Object** field

ARCHAEOLOGICAL SPECIMENS RECORD - NEWFOUNDLAND & LABRADOR

Permit Number ERIC FACEY COLLECTION

Borden Number DeAk-01 Catalogue Number 9719

Site Name BEACHES Previous Number

Culture UNKNOWN Cultural Phase/Complex

Object BURIN Material CHERT, TRINITY BAY

Complete ☐ Incomplete ☑ Portion DISTAL

Quantity 1 Colour GREEN Manufacturing Technique CHIPPED

Associated Date Dating Technique

Description

Length 63.14 mm Width 59.29 mm Height mm Thickness 26.08 mm

Outside Diameter mm Inside Diameter mm Bore Diameter /64 in

Weight g Condition Description

Collector/Excavator FACEY, ERIC Collection Date UNKNOWN

Collection Method SURFACE FIND Associated Features

Stratum Event Lot

Grid Co-ordinates Collection Unit INTERTIDAL ZONE

North/South Measure m East/West Measure m

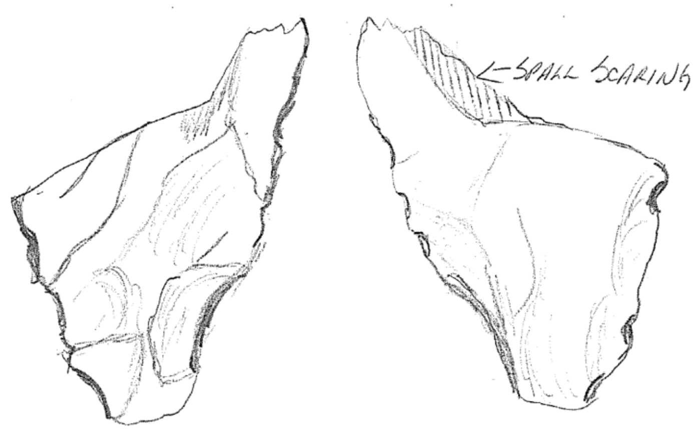
Depth Below Datum________________m Depth Below Surface________________m

Cataloguer JOHNSON-HENKE Catalogue Date 03/17/2016

Cataloguer Remarks HERITAGE NEWFOUNDLAND/LABRADOR WEBSITE GIVES THE TIME PERIOD OF THIS IMPLEMENT, ACCORDING TO STENTON (1998: 37-39) THE SCARING AS INDICATED IN THE DRAWING, STIPULATES THE REMOVAL OF SPALLS. (POSSIBLY ASTt)

Image Reference________________

Sketch of item cited in Object field



ARCHAEOLOGICAL SPECIMENS RECORD - NEWFOUNDLAND & LABRADOR

Permit Number ERIC FACEY COLLECTION

Borden Number DEAK-01 Catalogue Number 9720

Site Name BEACHES Previous Number

Culture UNKNOWN Cultural Phase/Complex

Object AXE/ADZE HEAD Material CHERT, TRINITY BAY

Complete ☒ Incomplete ☐ Portion

Quantity 1 Colour BROWN GREEN Manufacturing Technique CHIPPED

Associated Date Dating Technique

Description EXHIBITS USEWARE & STRIATIONS (INDICATED ON BACK PAGE)

Length 95.98 mm Width 65.10 mm Height mm Thickness 19.92 mm

Outside Diameter mm Inside Diameter mm Bore Diameter /64 in

Weight g Condition Description PATINATED AND WATERWORN

Collector/Excavator FACEY, ERIC Collection Date UNKNOWN

Collection Method SURFACE FIND Associated Features

Stratum Event Lot

Grid Co-ordinates Collection Unit INTERTIDAL ZONE

North/South Measure m East/West Measure m

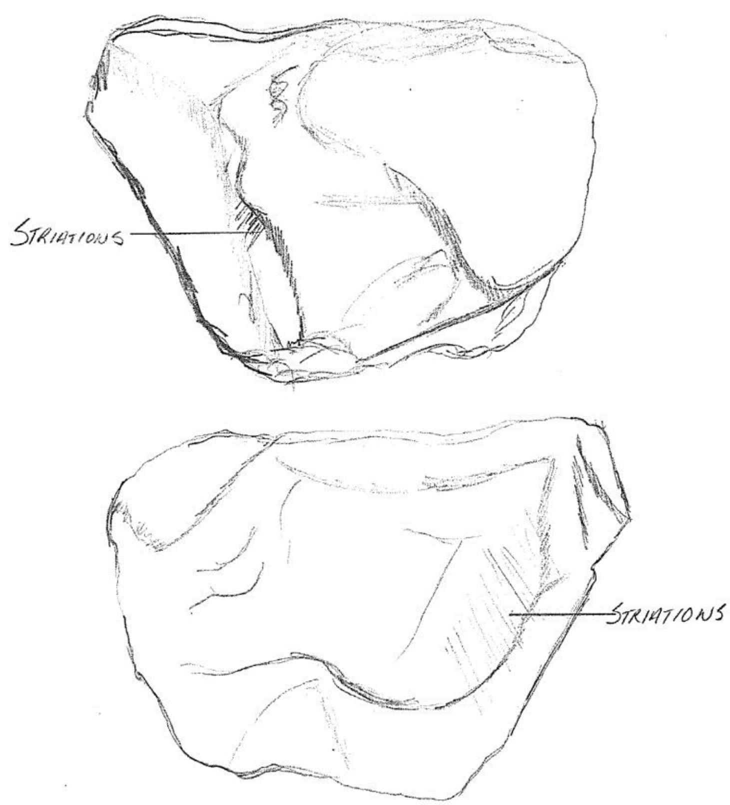
Depth Below Datum________________m Depth Below Surface________________m

Cataloguer JOHNSON-HENKE Catalogue Date 03/17/2016

Cataloguer Remarks________________

Image Reference________________

Sketch of item cited in **Object** field



ARCHAEOLOGICAL SPECIMENS RECORD - NEWFOUNDLAND & LABRADOR

Permit Number ERIC FACEY COLLECTION

Borden Number DEAK-01 Catalogue Number 9721

Site Name REACHES Previous Number

Culture UNKNOWNN Cultural Phase/Complex

Object END BLADE Material RHYOLITE, BBC.

Complete ☑ Incomplete ☐ Portion

Quantity 1 Colour DARK GREY BLUE Manufacturing Technique CHIPPED

Associated Date Dating Technique

Description DARK/LIGHT GREY MARBLING IN MATERIAL, PURPLE VEINS.

Length 45.86 mm Width 20.67 mm Height mm Thickness 8.09 mm

Outside Diameter mm Inside Diameter mm Bore Diameter /64 in

Weight g Condition Description WATERWORN.

Collector/Excavator FACEY, ERIC Collection Date UNKNOWN

Collection Method SURFACE FIND Associated Features

Stratum Event Lot

Grid Co-ordinates Collection Unit INTERTIDAL ZONE

North/South Measure m East/West Measure m

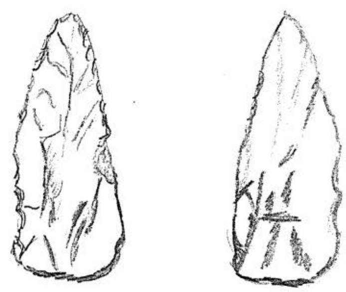
Depth Below Datum ______ m Depth Below Surface ______ m

Cataloguer JOHNSON-HENKE Catalogue Date 03/17/2016

Cataloguer Remarks CULTURE IS CLASSIFIED 'BEOTHUK' BECAUSE THE SHAPE (NOT SIZE) IS VERY SIMILAR TO ONE FOUND BY CARIGNAN (MERCURY SERIES, 1975: 201, pt) INSITU, CULTURAL LAYER 1

Image Reference

Sketch of item cited in **Object** field



ARCHAEOLOGICAL SPECIMENS RECORD - NEWFOUNDLAND & LABRADOR

Permit Number ERIC FACEY COLLECTION

Borden Number DeAk-01 Catalogue Number 9722

Site Name BEACHES Previous Number

Culture ASTt Cultural Phase/Complex MIDDLE DORSET

Object TIPFLUTED END BLADE Material CHERT, TRINITY BAY

Complete ☒ Incomplete ☐ Portion MISSING LEFT PROXIMAL CORNER (D)

Quantity 1 Colour WHITE/BEIGE Manufacturing Technique CHIPPED

Associated Date Dating Technique

Description

Length 52.27 mm Width 17.92 mm Height mm Thickness 7.42 mm

Outside Diameter mm Inside Diameter mm Bore Diameter /64 in

Weight g Condition Description PATINATED, WATERWORN

Collector/Excavator FACEY, ERIC Collection Date UNKNOWN

Collection Method SURFACE FINDS Associated Features

Stratum Event Lot

Grid Co-ordinates Collection Unit INTERTIDAL ZONE

North/South Measure m East/West Measure m

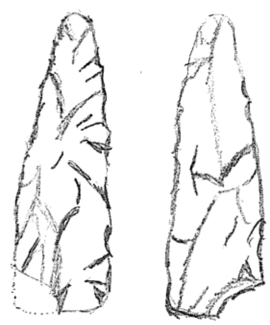
Depth Below Datum ______ m Depth Below Surface ______ m

Cataloguer JOHNSON-HENKE Catalogue Date 03/17/2016

Cataloguer Remarks CARIGNAN ALSO FOUND SIMILAR ARTIFACT MADE FROM BBC RHYOLITE (MERCURY SERIES 1975:221q; JOHN CAMPBELL)

Image Reference ______

Sketch of item cited in **Object** field



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