MOBILITY, CEREMONIALISM, AND GROUP IDENTITY IN ARCHAIC NEWFOUNDLAND

by

© Dominic Lacroix

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Abstract

This dissertation explores the world in which the first permanent inhabitants of the island of Newfoundland situated themselves. People of these First Nations lived in Newfoundland for thousands of years during the Archaic (5500–3200 uncalibrated years BP), leaving material traces in the form of objects and site locations. The three analyses presented herein use these material traces to investigate movements and contacts across the island, different expressions of burial ceremonialism, group identity, and ethnicity, and re-introduces the use of "country" to refer to land occupied by separate indigenous groups.

Least-cost paths are used to model precontact routes of travel and suggest that a number of significant places along the travel route network played an important role for Archaic islanders. It suggests that Back Harbour, and perhaps Burgeo too, were central places; that the Deer Lake-Grand Lake junction may have been of particular ceremonial importance, and that Port au Choix was intentionally positioned at a cultural boundary. The investigation of the landscape setting and burial assemblages of Newfoundland's only two known Archaic burial grounds at various scales further demonstrates important differences present between the burials at Port au Choix and Back Harbour, suggesting they were intended to fulfill slightly different roles, with Port au Choix acting as a gathering place for multiple groups, while Back Harbour appears to have been the central location of a single kin-group. The comparative analysis of stone tool assemblages from Newfoundland and its adjoining mainland regions reveals the

presence of at least three contemporary and spatially distinct technological complexes on the island. Distinct regional patterns in access to food resources, burial ceremonialism, and location along the travel route network support the presence of multiple cultural groups in Archaic Newfoundland.

This dissertation argues for the recognition of three ethnic groups sharing the island; people who inhabited separate countries, saw each other as different and maintained these differences over time despite repeated contacts and exchanges. It is time to move beyond the limiting notion of a single group of Maritime Archaic Indians occupying the island, a concept that over generalizes the complexity of the worlds present in Archaic Newfoundland.

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Chapter 1

Introduction and Overview:

Revisiting the Archaic in Newfoundland

The doctoral research presented herein focuses on the Late Archaic (ca. 5500–3200 BP; all dates are presented in conventional radiocarbon years before present ‘BP’), the earliest period of human residence in Newfoundland (for discussions of potentially earlier contexts, see Bell and Renouf 2003; Reader 1996, 1999a). Particular attention is given to concepts of mobility, ceremonialism, and group identity as informed by cultural material assemblages and site locations spanning the entire island of Newfoundland. The result is a broad overview of regional patterns present across the island, increasing our understanding of the world inhabited by Newfoundland’s first indigenous settlers.

More specifically, this research provides the first comparative analysis of Archaic material culture to incorporate artifacts from all regions of the island. Importantly, the analysis includes collections associated with numerous find locations that have rarely been considered in previous discussions of the period. These collections are, more often than not, the product of local residents with a keen eye for unusual objects and an interest in Newfoundland’s aboriginal past, who picked up and curated a variety of artifacts left behind thousands of years before by former occupants of their area. Until this project, the content of these collections had rarely been examined and related to other materials from the island, most receiving only a brief mention in survey reports (e.g., Marshall 1982; Penney 2001; Renouf and Bell 2003; Thomson 1989). Although no detailed descriptions of the content of these collections are presented herein, the artifact database completed during the analysis will be made available as of October 2015 to future researchers through the Government of Newfoundland and Labrador's Provincial Archaeology Office and The Rooms Provincial Museum. Sites whose collections include formal stone tools attributable to specific forms are presented in tables and figures throughout the following chapters and appendixes.

This important focus on material assemblages was inspired by the results of recent research performed at Memorial University by the late Professor Priscilla Renouf and some of her students that pointed to the fact that site location preferences and material traditions are not consistent across all regions of the island (Beaton 2004; Bell and Renouf 2003; Rast et al. 2004; Reid 2007; Renouf and Bell 2006). The possible presence of distinct regional patterns has important repercussions for our understanding of the Archaic in Newfoundland. Our foundational knowledge of this period relies on only a handful of excavated sites, some of which are located hundreds of kilometres apart, in vastly different environmental settings. Beyond valuable site-specific interpretations, this situation has resulted in a broad and over-generalized understanding of the lifeways adopted by these early occupants. The dominant cultural model for interpreting the Archaic population of Newfoundland, the Maritime Archaic Indians (Tuck 1971a, 1976a), assumes that the earliest people to inhabit various regions of the island shared a single mode of life, from technological traditions and resource-gathering activities to social organization, aesthetics, and ideological beliefs.

The comparative artifact analysis provides a timely test of this model, facilitating the recognition and examination of distinct regional patterns present across Newfoundland. As the following chapters will reveal, one of the most significant results to come out of this research is the recognition that a plurality of groups were sharing the island during the Archaic. This interpretation relies heavily on methods developed by culture-historians, validated by concepts from agency theory, and incorporated within a cultural landscape framework. The following sections present a broad review of our current understanding of the Archaic in Newfoundland and Labrador, provide further details on the theoretical underpinnings woven throughout the following chapters, and offer an overview of the contributions forming the core of this dissertation.

1.1 The Archaic and Newfoundland

Although the specific date range varies between regions, the Archaic period in North America is generally recognized to span the 9000–3000 BP interval. This period is typically viewed as a time of relative stability, during which groups settled down in discrete regions, began returning to the same sites, and developing a wide diversity of ideologies, arts, crafts, and technologies (Ramsden 2008). During the Archaic, closely-

Figure 1-1 The Far Northeast.

related cultural patterns are present across a vast region, known as "The Far Northeast", which extends from New England to northern Labrador (Figure 1-1; Sanger and Renouf 2006). In this region, the increasingly sedentary mode of living adopted by Archaic families is reflected in their reliance on local food and raw material resources, and the development of regional artifact styles (e.g., Fitzhugh 1978; McGhee and Tuck 1975; Pintal 1998; Renouf 1976; Robinson 2008; Robinson and Ort 2011; Tuck 1982, 1984).

1.1.1 The Maritime Archaic Tradition

Across the Far Northeast, three periods generally divide the Archaic: Early, Middle, and Late. When these boundaries are set is a matter of regional preference as these sub-periods flow into one another without any sharp discontinuities (Figure 1-2). In Newfoundland, however, the recognized Archaic presence is limited to the Late Archaic (ca. 5500–3200 BP), as evidence of an earlier presence remains elusive. The only site associated to the Early Archaic in Newfoundland is South Brook Park (DgBj-3, Figure 1-1), based on typological similarities with early lithic assemblages from Labrador and the Maritimes (Reader 1996, 1999a). All dated Newfoundland Archaic components currently fall within the Late Archaic (Table 1-1; see Appendix A for details). As a result, the research presented herein deals only with the Late Archaic.

The Late Archaic is a period during which we see a proliferation of ground stone tools, a focus on maritime resources in coastal regions, and important changes in mortuary behaviour throughout the Far Northeast. Heavy woodworking ground stone tools such as axes, adzes, and gouges, slender ground slate spearpoints and bayonets, plummets, and a variety of chipped stone points are diagnostic of this period and appear in both habitation and mortuary contexts across this vast region (Bourque 2012; Deal et al. 2006; Fitzhugh 1978; Tuck 1976b, 1991). Many of these tools indicate a subsistence

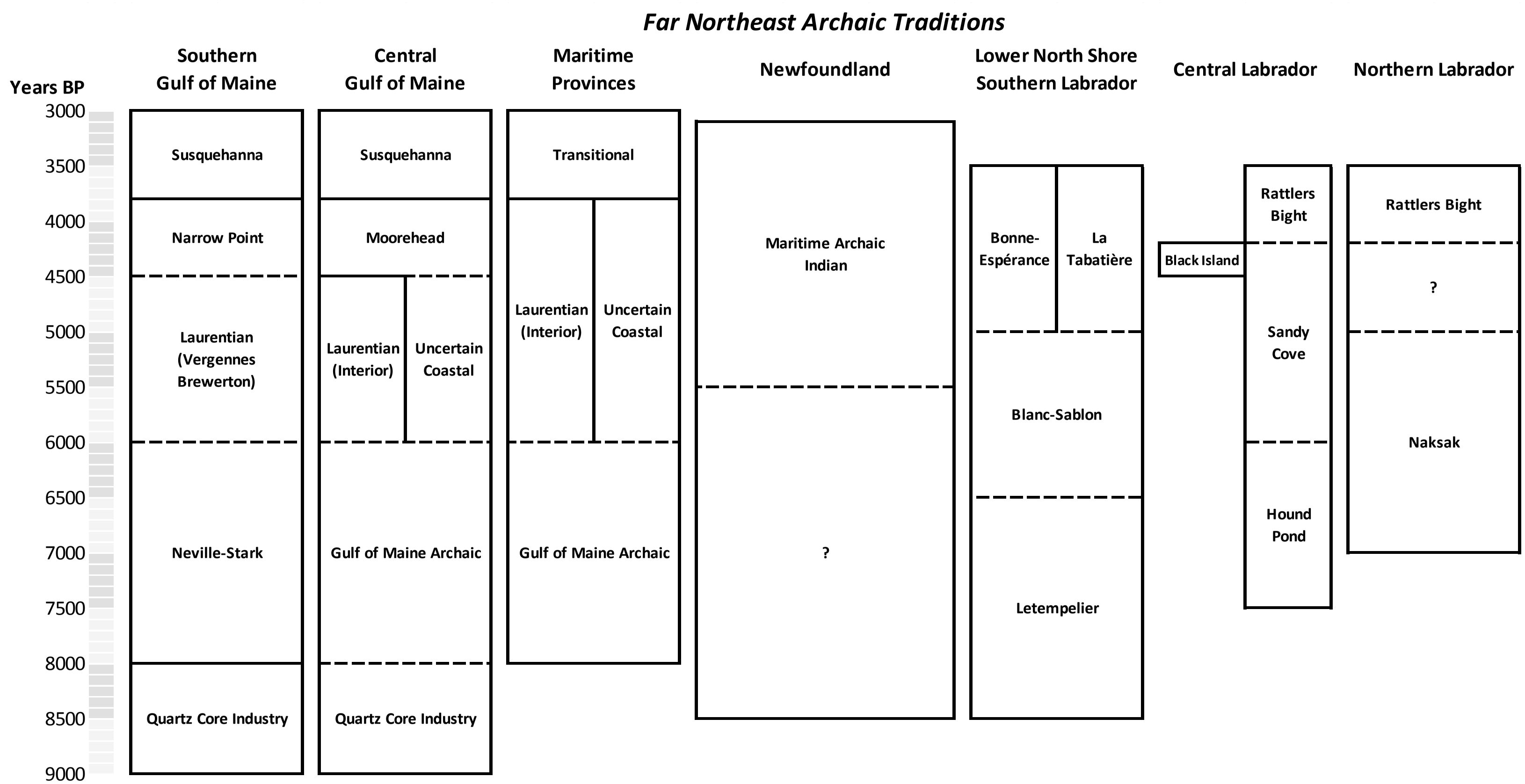

Figure 1-2 Chronological and cultural framework of the Archaic in the Far Northeast. Based on data from Deal (2013), Fitzhugh (2006), Hood (2008), Pintal (2006), Renouf and Bell (2006), Robinson (2006), and Sanger (2006).

focus on marine resources (Tuck 1975a). In coastal regions of the Gulf of Maine (Figure 1-1), this focus was placed on swordfish hunting (Bourque 2012), while further north, subsistence efforts revolved around marine mammals such as seals, walrus, and whales (Fitzhugh 2006; Pintal 2006; Spiess 1993; Tuck 1975a, 1976a). During this period, people also began to systematically deposit some of their dead in burial grounds, particularly in Maine (Byers 1979; Moorehead 1980; Robinson 2003), but also in New Brunswick (Harper 1956; Sanger 1973), Newfoundland (Temple 2007; Thibaudeau 1993; Tuck 1976a), Labrador (Fitzhugh 1980, 2006), and possibly Quebec (Pintal 2006; Pintal and Boucher 1994). These burial grounds all share in common a lavish use of red ochre and the use of a relatively standard set of stone tools as burial inclusions.

Table 1-1 Dated Archaic sites from Newfoundland.

Borden	Site Name	Radiocarbon Dates	Sources
Newfoundland			
DeAk-01	Beaches	4900±230 (SI-1384)– 3690±100 (I-6761)	Carignan (1975b)
DgBj-03	South Brook Park	5140±50 (Beta-122766)	Reader (1999a)
DhAi-05	Cape Cove-1	4540±135 (S-1859)– 3615±120 (S-1860)	Austin (1984)
DjAq-01	Curtis	3720±130 (GaK-834)– 3200±90 (GaK-1254)	Wilmeth (1978)
DlBk-01	Cow Head, Spearbank	4130±150 (DAL-326)	Reid (2007)
EeBi-02	Port au Choix-3	4290±110 (I-3788)– 3230±220 (I-4380)	Tuck (1976a)
EeBi-42	Gould	5440±50 (Beta-148518)– 3200±100 (Beta-132364)	Renouf (2011c)
EeBi-43	Old Boatyard	3980±110 (Beta-121297)[1]	Renouf (2011c)
EgBf-11	Big Droke-1	4530±60 (Beta-108559)– 3470±50 (Beta-129398)	Reader (1999b)
EgBf-15	Caines	3600±60 (Beta-108562)– 3490±80 (Beta-113405)	Reader (1999b)
EjBa-02	Big Brook-2	4090±40 (Beta-177106)– 3820±40 (Beta-171715)	Beaton (2004)

Notes:
1. Date associated with non-diagnostic flakes.

Based on these broad similarities present across a vast region, Professor James Tuck envisioned the presence of a broad cultural tradition occupying the coastal regions of the Far Northeast, uniting the "Red Paint People" of Maine and people occupying the Maritime Provinces and Newfoundland and Labrador into the *Maritime Archaic* tradition (Tuck 1971a, 1976a). Members of this cultural tradition share broad aspects of their technology, economy, and religious beliefs through a roughly standardized set of tools comprised of ground slate points, heavy woodworking tools, and an elaborate bone industry; a maritime subsistence adaptation focusing on the hunt of sea mammals and fishing; a common mortuary ceremonialism represented by large burial grounds with red ochre and standardized grave offerings; and complex magico-religious system revolving around hunting and fishing (Tuck 1971a, 1971b).

At a North American scale, the Maritime Archaic tradition plays an important role in delineating a wide territory in which general traits are widespread, traits that are in sharp contrast with neighbouring large-scale regions. It provides a much needed contrast to differentiate between the cultural expressions seen along the Atlantic coastal margin and those identified further inland in the Great Lakes, St. Lawrence Valley, and Canadian Shield regions (Ritchie and Funk 1973; Wright 1972). Although its broad definition promotes the view of a largely uniform culture across an extremely wide landscape, at a more regional scale, the Maritime Archaic tradition is formed of numerous distinct groups occupying separate coastal regions of the Far Northeast (Figure 1-2). In regions immediately adjacent to Newfoundland, people of the Maritime

Archaic tradition are divided into separate northern and southern branches based on differences in their stone tool assemblages and site location preferences.

The principal characteristics of the northern branch, the Labrador Archaic or Labrador Maritime Archaic, are a lithic assemblage dominated by chipped tapering stem projectile points and biface knives, ground slate points, knives, and ulus, steatite plummets, longhouses, the dominant use of Ramah Chert from northern Labrador, and an inferred pattern of maritime adaptation (Fitzhugh 1975a, 1978, 2006; Tuck 1982). As its name implies, the northern branch is mostly represented along coastal regions of central and northern Labrador, where Late Archaic material is grouped under the *Rattlers Bight* phase[1] (Fitzhugh 1978, 2006). Northern branch assemblages are also present along the Lower North Shore in Quebec where Late Archaic sites are grouped under the *La Tabatière* complex (Pintal 1998, 2006). La Tabatière assemblages are dominated by Ramah Chert and are principally represented by chipped contracting stemmed points and ground slate points. The sites affiliated with this complex are generally small, but numerous and relatively evenly spread, except for a small concentration in the La Tabatière-Mécatina region, where longhouses have also been identified (Fitzhugh and Gallon 2002).

In contrast to the broader definition of its northern counter part, the definition of the southern branch is limited to its stone tool assemblage. This assemblage consists of large broadly side-notched or expanding stemmed projectile points, leaf-shaped bifaces, occasional end-scrapers and other unifaces, and “linear” or “blade-like” flakes, preferentially made from a now-heavily weathered greyish Newfoundland chert (Fitzhugh 1975a; Madden 1976; McGhee and Tuck 1975; Reid 2007; Tuck 1982, 1992). Late Archaic sites associated with this southern branch are principally found in southern Labrador, somewhat concentrated along the Strait of Belle Isle. In the adjacent regions of the Lower North Shore in Quebec, these assemblages are associated with the *Bonne-Espérance* complex (Pintal 1998, 2006). These sites cluster in the Vieux-Fort and Rivière-Saint-Paul area. In Quebec, Bonne-Espérance sites are typically larger than those associated with the La Tabatière complex, but are fewer in numbers.

1.1.2 The Newfoundland Archaic

Unfortunately, the presence of lithic sub-traditions is not as well-defined in Newfoundland as in neighbouring mainland regions. Although thousands of artifacts associated with the Archaic have been recovered from 186 sites on the island (Hull 2014, personal communication), our understanding of this period remains inadequate. Current views of the Archaic in Newfoundland derive mainly from information recovered at two sites, a large burial ground located in the community of Port au Choix (Figure 1-1; Jelsma 2000, 2006; Kennedy 1981; Tuck 1976a), and the remains of a habitation and workshop occupation in Bonavista Bay (Figure 1-1; Carignan 1975b). Only a few other sites have been excavated beyond test trenches, many of which are only reported in unpublished theses and reports (e.g., Austin 1980, 1984; Beaton 2004; Carignan 1974; MacLeod 1967a, 1968; Reader 1996, 1999b; Reid 2007; Renouf 1985; Renouf and Bell 2011; Schwarz and Skanes 2010; Temple 2007), and most of what remains can only be described as small artifacts finds or local collections (Beaton 2004:42–44). As a result, interpretations of the Newfoundland Archaic have been heavily influenced by work done in Labrador and elsewhere in the Far Northeast, resulting in a tendency to view the Archaic period in broad generalizing terms (Renouf and Bell 2006:5). As a result, all archaic material from the island is currently associated with a single cultural group, the Maritime Archaic Indians.

Nevertheless, through the work of a number of graduate students from Memorial University some patterns have begun to emerge. On the west coast of the Northern Peninsula, Beaton (2004) and Reid (2007) have recognized that tool assemblages are characterised by side-notched and expanding stem projectile points, linear flakes, flake tools, blanks, and preforms. This mirrors the pattern present along the Strait of Belle Isle and further west in the Rivière-Saint-Paul area (Pintal 1998, 2006). In contrast, assemblages from the northeast coast of Newfoundland are characterized by a variety of projectile points, including both contracting and expanding stem points (e.g., Carignan 1975b; Devereux 1969; Linnamae 1967; Temple 2007; Thibaudeau 1993; Thomson 1989; Tuck 1980). In Notre Dame Bay, as in central and northern Labrador, linear flakes, flake tools, blanks, and preforms do not appear to play as significant a role as they do along the Strait of Belle Isle. Material patterns gleaned from the literature therefore suggest the presence of at least two separate technological traditions on the island during the Late Archaic, one having closer ties with central Labrador (northern branch), and the other with the Lower North Shore of the St. Lawrence (southern branch), each located in separate regions of Newfoundland.

Based on these preliminary results, the current view of a single and relatively homogeneous Late Archaic cultural tradition occupying the island is clearly in need of revision. The recognition of various branches within the Maritime Archaic tradition in Newfoundland, Labrador, and adjoining regions of the Quebec Lower North Shore raises a number of questions that presently remain unanswered. Are the people occupying different regions of the island the same as those living in Labrador and Quebec or do they represent local variants? Are differences present beyond lithic material and tool form preferences? Did the various groups share all aspects of their magico-religious beliefs and burial ceremonialism despite inhabiting dramatically different landscapes? Did families preferring to settle open rocky shores adopt the same approach to food harvesting as those preferring to settle river mouths? If people associated with the various branches did not share identical ideologies, technological traditions, and subsistence practices, could they have been separate ethnic groups? These are some of the questions this dissertation attempts to answer. The following sections further explore the concept of ethnicity and its archaeological identification, and introduce the concept of indigenous countries to refer to the particular regions proposed to be inhabited by distinct groups.

1.2 Group Identity and Ethnicity in Archaeology

Interest in group identity in archaeological research has a long history. One of the main assumptions underlying the culture-historical approach is that bounded uniform cultural entities correlate with particular peoples, ethnic groups, tribes and/or races (Jones 1997:24, 2000:446). For culture-historians, however, interest about particular peoples and their associated material culture centered on the definition of archaeological cultures, and attempted to account for their origins in terms of migration and diffusion (Trigger 2006:311). Although this approach can be successful in differentiating cultural groups, its original theoretical framework promoted the view of rather static, homogenous, and bounded archaeological cultures extending deep into the human past, in strong contrast to anthropological research, which has since demonstrated that ethnic identities are instead fluid, dynamic and contested (Jones 2000:448; Wobst 1977).

The development of agency theory, a body of social theories that discusses social structures and forces shaping human behaviour, provides a more adequate theoretical grounding for the investigation of group identity in the past. Agency theory has provided a conceptual framework that allows us to understand the social contexts at the core of the variability expressed in the archaeological record, and to better interpret this variability in terms of distinct regional traditions. Agency theory, in its most recent form (see Barrett 2012), acknowledges the complex ways in which the world is comprehended by individuals and how this impacts the way traditions are created and reinterpreted across generations.

The way human beings come to know how to behave in various situations is "experienced as a growing and embodied confidence that is inculcated [through] a cumulative history of personal experiences gained in the company, and with the approval or disapproval, of others" (Barrett 2012:155). Through the everyday routine of their lives and the cultural and spiritual beliefs they share, human beings "experience a growing comfort and feeling of confidence in knowing how to move forward in a particular place, at a particular moment, and in particular company" (Barrett 2012:156). Because skilled, comfortable, and confident practice is the result of long-term reinforced experience, this 'know-how' reasoning generally eludes objective formulation. This is what Bourdieu (1977) had recognized and depicted as the embodied competence (*hexis*) of a set of generally accepted dispositions (*habitus*). The presence of these shared practices becomes explicit, however, when people are placed in situations where they must interact with unfamiliar places or unfamiliar company, as their experience no longer provides adequate directions, and feelings of confidence and comfort begin to dissolve.

Because these feelings of confidence emerge and develop through daily routine interactions with those closest to us, shared practices amongst a group help foster a sense of belonging. This shared group identity becomes especially apparent when confronted with 'others' who may do things very differently. If the recognition of real or assumed cultural differences in customs, language, spiritual beliefs, and historical and/or physical characteristics are significant enough, this leads to the formation of ethnic identity. This subjective process of classification has been confirmed ethnographically (Jones 2000:449). Therefore, an *ethnic group* is "any group of people who set themselves apart and/or are set apart by others with whom they interact or co-exist on the basis of their perceptions of cultural differentiation and/or common descent" (Jones 1997:xiii), and *ethnicity* speaks to a consciousness of identity vis-à-vis other groups, a 'we'/'they' opposition, that involves the recognition of real or assumed cultural differences (Jones 1997:84, 2000:449).

Since the shared traits that participate in the development of ethnic identity are intricately linked to the daily activities of a group, the set of traits selected by any given group and the particular form they will take is likely to vary across space, time, and social context (Jones 1997:122). Although many characteristics that may contribute to the development of ethnic identity are rather intangible in nature (e.g., language, music, spiritual beliefs, narratives, bodily odours and postures, etc.), and some may not survive well archaeologically (e.g., items made from organic material like clothing, baskets, and utensils, or forms of bodily expression such as tattoos, scarification, hair styles, and other body modifications), archaeologists may still rely on a variety of more tangible traits that have been linked to identity formation. Fortunately, these include relatively standard cultural categories such as objects, food, and burial practices.

Although culture cannot be equated only to stone tools, culturally important artifact forms can provide an important line of evidence when investigating patterns of regional similarities and differences that are likely to have been translated in the social sphere as indicators of group identity and otherness (Heider 1967; Jones 1997; Loring 2002; Wiessner 1983). However, just as distinctive forms and styles of material culture may be actively maintained and withheld in the process of signalling ethnicity, other forms and styles may cross-cut ethnic boundaries or simply reflect other forms of identity such as gender, age, or clan groups (Jones 1997:120). Therefore, the presence of consistent patterns across multiple artifact forms provides a more robust indicator of the presence of group identity than the focus on a single form can offer.

Food is central to social life, even among modern societies where it is strongly associated with cultural identity (e.g., Chinese, French, Indian, Italian foods). It is vital to the creation and maintenance of social relations, as meals structure the day, smell and taste stimulates memory, and special meals mark periodic events in yearly cycle (e.g., Little 2009; Milner 2006). Food, especially animal food, is also directly connected to spirituality. For example, among Algonquian groups, spiritual belief systems were integrated with hunting practices, and rituals were performed to reinforce the relationship between the hunter and the animal-spirit, so that rituals and rules observed before, during and after a hunt played an important role in future encounters (e.g., Armitage 1992; Prosper et al. 2011; Tanner 1979).

The particular mode of disposal of bodies and things after their life, whether left in the open to decompose and weather away, kept as mementos, placed under a dwelling or mound, or incorporated into a formal burial ground, are culture specific choices (e.g., Kristensen and Holly 2013; McCarthy 2004). In fact, each society and each generation within these societies have constructed their own solutions to the problem of death and have enshrined them in a complex web of beliefs and customs (Parkes et al. 1997:8).

To sum up, ethnicity has a fluid and subjective nature, but is not completely arbitrary. Through daily life, practices are shared amongst the members of a group and contribute to the formation of a particular sense of belonging. Awareness of 'others' leads to the acknowledgment of real or assumed cultural differences in terms of paraphernalia, customs, language, and spiritual beliefs that form the basis of self-recognised ethnic identity. Thus, "a broad understanding of past cultural contexts derived from a variety of sources and classes of data, including things, food, and burial practices, is a necessary part of any analysis of ethnicity in archaeology" (Jones 2000:454).

1.2.1 Recognizing Ethnicity Archaeologically

It can prove difficult to identify material patterns that correlate with ethnicity, given the subjective nature of ethnic identification. In fact, any distinctive non-random distributions of particular styles and forms of material culture in different contexts may plausibly relate to the expression of ethnicity (Jones 2000:454). Therefore, it is imperative to distinguish ethnicity from mere spatial continuities and discontinuities in that it refers to the self-conscious identification of a particular group of people (Shennan 1989:14). The task then is to identify those traits that are visible archaeologically and are most likely to have had important symbolic significance to the members of a particular ethnic group, at a particular time and in a particular place, which have been involved in the self-conscious identification of the people under study.

Although it is tempting to rely only on a few diagnostic artifact types to delineate regions belonging to particular groups (e.g., Hamilton et al. 2013; LeBlanc 2008; Stothers 1996), this approach is inadequate. Reliance on only a few artifacts or material types to delineate archaeological cultures or regional variations greatly oversimplifies the complex mixture of practices involved in establishing a shared group identity. In fact, it would be rather unlikely to have a one-to-one relationship between the expressions of a particular ethnic identity and the entire range of cultural practices and social conditions associated with that particular group (Jones 1997:128, 2000:452). From a 'bird's eye view' the construction of ethnicity, at a particular time, is more likely to be manifested as multiple overlapping distributions representing various forms of cultural differences (Figure 1-3; Jones 2000:452).

An archaeological study of ethnicity is best framed within a cultural landscape framework because of the complex nature of the relationships between people, places, things, traditions and ideologies involved in creating a sense of group belonging across a broad region. A socially-grounded study of cultural landscapes provides a holistic framework that enables us to best understand how people view and interpret their world through their particular ideology, how they connect with one another across space, how they interact with their surroundings in meaningful ways through routine

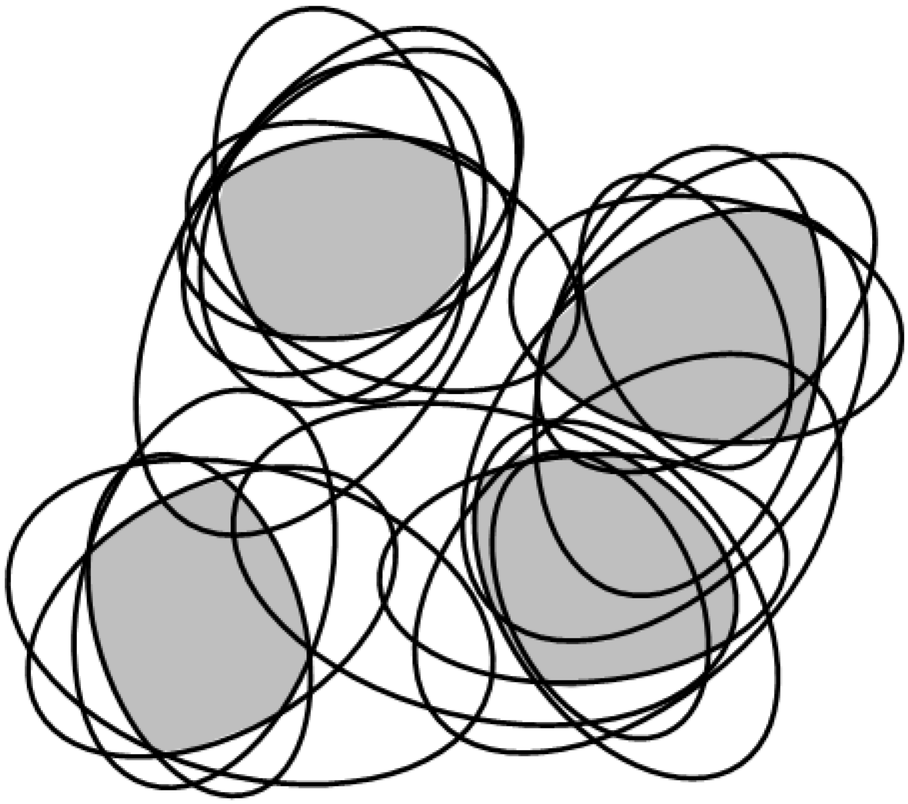

Figure 1-3 Schematic model representing multiple overlapping distributions (ovals), each representing a distinct form of cultural tradition, and the core regions (shaded areas) associated with distinct ethnic groups (after Clarke 1968:Figure 72).

daily activities, and how these traditions are re-interpreted over generations to produce archaeologically recognizable patterns (David and Thomas 2008).

From an anthropological standpoint, cultural landscapes are enmeshed with all other aspects of human life; they permeate everything, and incorporate every aspect of culture and its material expression. This includes cosmological understandings of the world, spiritual beliefs and practices, languages, social and spatial organization, economic activities, systems of property ownership, political processes, values and their manifestation in laws, history and memory, constructs of social identity, representational forms, material culture, forms of knowledge and their intergenerational transmission, embodied experience of the environment, and so forth (Strang 2008:52). Through day-to-day living within their surroundings and interaction with each other, meaning is extended among the members of a community and contributes to the creation of group identity (Barnes 1999). When the same people return to and engage with the same locations periodically and on multiple levels, they provide proof of their rights, and symbolize the permanence and continuity of kin. The landscape thus becomes the physical expression of a community and an integral part of their group identity (e.g., Cruikshank 1981; Layton 1999; Oetelaar and Oetelaar 2006; Taçon 2008; Zedeño 2008). Therefore, ethnicity can also be understood as the recognition of the different ways in which ethnic groups understand and inhabit their particular landscape.

To sum up, the research presented in this dissertation attempts to recognize ethnicity in the archaeological record of the Late Archaic in Newfoundland. To do so, it uses the standard artifact distributional analysis developed by culture-historians, which relies principally on lithic material choices and artifact forms. Regional patterns in artifact distribution are then compared to other forms of landscape patterns known to play a role in group identity formation. These include resource procurement, burial ceremonialism, and mobility. Differences present in the way these various pattern overlap at a regional scale are interpreted through a cultural landscape perspective informed by agency theory which explicitly acknowledges the role each factor plays in group identity formation. Significant regional differences across multiple categories are interpreted as representing separate ethnic groups, while regions sharing more closely related lifestyles are interpreted as local variants of a single ethnic group.

1.2.2 The Concept of "Country"

The land aspect of ethnicity has most often been formulated in terms of territory. However, the modern concepts of territory and territoriality are rooted in economic and socio-political models (e.g., Cashdan 1983; Dyson-Hudson and Smith 1978; Kelly 1983; Winterhalder and Smith 1981). A territory is generally viewed as a bounded region within which particular resources are present and to which humans have been involved in making modifications (Zedeño 1997:69, 2008:211). The resources contained within a territory may include a variety of things, such as food (animal or plant based), water, lithic or other raw materials, and "locational" resources such as fishing sites and access to trade routes (Cashdan 1983:63). Territoriality is then seen as the sum of the actions and emotions toward this bounded space, with an emphasis toward influence, control, and differential access to resources (Zedeño 2008:211). Although these concepts have allowed archaeologists to explore a variety of human-land relationships from an economic and socio-political standpoint (Zedeño 2008:211), the focus on controlled access to resources does not portray adequately the complex nature of the relationships people have with the region they inhabit. Ethnographic, ethnohistoric, and traditional oral narratives from around the world tell us that the relationship people have with their land goes beyond simplistic economic and political questions of territory and territoriality (e.g., Basso 1996; Feld and Basso 1996; Kuwanwisiwma and Ferguson 2009; Layton 1999; Nuttall 1992; Oetelaar and Oetelaar 2006; Sundstrom 1996; Welch 2009).

From a cultural landscape perspective, what we refer to as a territory represents only a subset of ways in which people relate to the land. Therefore, simplifying human-landscape relationships to territoriality is to wilfully ignore very important aspects of what a people's sense of place encompasses. If we are to move beyond the limiting nature of the concepts of territory and territoriality when investigating the bounded region that a particular group feels belongs to them, we need to adopt a different framework, one that allows for the complex relationships people have with their land. The most promising term to represent the idea of a region as the physical expression of an ethnic group is "country". At a basic level, the current use of the word country represents a political state or nation, its territory, and its people (Merriam-Webster 2003). However, common traits present in people's daily lives, such as shared symbols, language, history, blood ties, culture, music, and food, all play a role in creating national identities shared by the people of a country (Guibernau i Berdún 2007), regardless of an individual's original place of birth (Schellenberg 2004:6–7). Therefore, in its current use, the term country is already linked to a sense of belonging shared by a group of people who also share a bounded region, rules of conduct, named and storied places, some of important spiritual significance, and notions of land tenure and stewardship. Moreover, even within extremely multi-cultural settings, such as Canada, people of different ethnic backgrounds do share in at least some common heritage, customs, and beliefs.

Additionally, the application of the term country is not limited to nation-states. It is also applied to recognized regions inhabited by people sharing a common ethnic heritage such as the Basque Country in Spain, the autonomous region home to the Basque people (Trask 1997), the Dogon Country in Mali, the World Heritage site home of the Dogon people of eastern Africa (Mayor et al. 2005; van Beek and Hollyman 2001), and many other less formal regions associated with particular ethnic groups such as Sami country (Bergman et al. 2007) or various 'Amerindian' countries (e.g., Colwell-Chanthaphonh 2012; Euler 1961; Keyser 2007; Strong 1935; Turbyfill 1928). The term is also used by indigenous people to refer to their own land (e.g., Milloy 1991), especially in Australia, where various named countries represent the land and the aboriginal people traditionally associated with particular regions (Rose 1996). In the Australian archaeological literature, the use of the term country to refer to the region associated with particular Aboriginal groups is already an integral part of research narratives (e.g., Bradley 2008; Clarkson 2001; David 1995, 1996, 2011; Watchman 2004).

The meaning attached to the term "country" by Australian Aboriginal and Torres Strait Islander people is in fact even more complex than meanings attached to it by modern nation-states and their citizens. To these groups, country is also a living entity with a sacred origin, a consciousness, and a will toward life; they "talk about country in the same way that they would talk about a person: they speak to country, sing to country, visit country, worry about country, feel sorry for country, and long for country" (Rose 1996:7), and they say that "country knows, hears, smells, takes notice, takes care, is sorry or happy" (Rose 1996:7). Because of its various and complex uses linking people, emotions, and region through an intricate web of relationships, I believe the term country is best suited to represent archaeologically recognizable regions associated with past ethnic groups.

1.3 Group Identity and Archaic Countries in Newfoundland

The presence of a plurality of cultural groups in Newfoundland during the Late Archaic can be recognized from unique and regionally restricted combinations of cultural traditions, informed by concepts of group identity and ethnicity as understood through a cultural landscape framework. The research presented in the following chapters focuses on three principal themes, each focussing on specific traditions that would have been integral to the life that Newfoundland's earliest inhabitants made for themselves thousands of years ago. Results suggest that: i) highly mobile Archaic families used their knowledge of travel across Newfoundland to select and exploit specific locations as central places and boundaries; ii) important differences occur in burial ceremonialism at Newfoundland's only two excavated Archaic burial grounds; and iii) regionally distinct technological traditions existed. Each theme is presented as a stand-alone research contribution through individual chapters, although specific results stemming from each chapter are integrated into the interpretations spanning all contributions[2]. Even though all themes focus on Newfoundland, comparative material from the Far Northeast played an important role in the interpretation of the results presented throughout this doctoral dissertation.

Human mobility and long distance journeys are central to Chapter 2. The Archaic population of Newfoundland is believed to have been relatively mobile, so communication and interaction within and between regions would have been essential to the maintenance of group identity. Newfoundland has particular geographic constraints that influence the breadth of travel routes available to voyagers embarking on journeys across the island. A computer model was consequently developed to identify the location of the most important travel routes linking various locations on the island, routes that would have been available to all precontact and historic indigenous groups travelling across Newfoundland. The resulting travel route network was analyzed to determine the most and least accessible locations in Newfoundland as well as the most important corridors of travel around the island. When these results are compared to Archaic site locations, they confirm the presence of highly mobile groups, although habitual movement appears to have been restricted to constrained regions. Results also suggest that certain locations held a special status during the Archaic because of their unique position within Newfoundland's travel route network, a prime example being the location of Newfoundland's only two Archaic burial grounds.

The main focus of Chapter 3 is the significant differences apparent when the Port au Choix-3 (EeBi-2) and Curtis (DjAq-1) burial grounds are compared. The particular mode of disposal of bodies and possessions, and the ceremonial nature in which these rituals are conducted are culture specific choices. Each society and each generation within these societies constructed their own solution for the problem of death and enshrined their rituals in a complex web of beliefs and customs (Parkes et al. 1997:8). Newfoundland's two contemporaneous burial grounds do share a number of important commonalities with each other, along with other burial grounds found elsewhere in the Far Northeast during the Late Archaic, suggesting they are all expressions of a set of shared beliefs that extended beyond Newfoundland. Nevertheless, significant differences between Curtis and Port au Choix-3, including the locations chosen to establish the burial grounds and the content of their burial assemblages, suggest that they fulfilled different cultural roles at a regional scale.

Stone tools are the most visible aspect of material culture available for us to examine today and to compare across broad regions, because of the generally poor preservation of organic remains in the Far Northeast due to acidic soils. The identification of regional patterns in formal stone tool distributions forms the core of Chapter 4. Although culture cannot be equated only to stone tools, culturally important artifact forms nevertheless provide an important line of evidence in the investigation of group identity and otherness (Heider 1967; Jones 1997; Loring 2002; Wiessner 1983). To assess if the distinct technological traditions identified were the result of separate groups, they are contrasted with other forms of regional patterns, including regional site location preferences discussed by Renouf and Bell (2006) and the results are presented in Chapters 2 and 3. Consistent regional patterns cross-cutting multiple forms of cultural traditions are identified and these are interpreted as evidence for the presence of at least three distinct cultural groups sharing the island during the Archaic.

Finally, Chapter 5 summarizes the contributions made by this doctoral research to our understanding of Newfoundland's earliest period of indigenous residence. The results of these contributions force us to take a new perspective of the Archaic period, suggesting it is time to part with many concepts built into the Maritime Archaic tradition. This concluding chapter also presents a number of future avenues of research that would further bring to life the complex world in which these people lived.

1.4 Notes

1. The terms "phase" and "complex" are used here in the same sense as Pintal (1998:41) and Fitzhugh (1972:112). They provide a hierarchical way of describing culture-historical units. A "phase" is a unit for which information provides a relatively complete picture of the culture based on a large site sample including large sites and multiple related smaller sites. A "complex" is a unit for which a relatively large amount of information is known, but remains insufficient to properly define the range and variation of the assemblage.

2. This is known as the Manuscript thesis format at Memorial University of Newfoundland. For further details on the format of this dissertation, please see: http://www.mun.ca/sgs/go/guid_policies/guidelines_intro.php. Dominic Lacroix acted as principal researcher, having designed and identified the research proposal, carried on all practical aspects of the research and data analysis, and acted as sole author during the preparation of the manuscript of the stand alone contributions presented in this dissertation (Chapters 2, 3, and 4).

Chapter 2

Exploring Island Journeys and Places in Late Archaic Newfoundland: An Application of Multi-Criteria Cost Surface Analysis to Model Traditional Travel Routes

Dominic Lacroix

ABSTRACT. This contribution presents the development and analysis of a GIS-based model using least-cost paths to shed light on the little known network of traditional pedestrian and canoe routes that connected various regions of Newfoundland during its precontact period. This travel route network suggests that eastern Notre Dame Bay and Burgeo would have been particularly well suited to serve as central places, while Port au Choix appears to be located at a geographic boundary. An examination of Late Archaic site locations and artifact assemblages supports this assessment, while also confirming the importance given to interior access by the first human population to settle the island. Of particular interest is the finding that Newfoundland's only two Archaic burial grounds, Port au Choix-3 (EeBi-2) and Curtis (DjAq-1), are positioned in very different landscape settings.

2.1 Introduction

The focus of this contribution is the investigation of previously neglected aspects of precontact human mobility on and around the island of Newfoundland[1] (Figure 2-1), as informed by modelled canoe-portage routes. The focus is put on canoe travel as it is the most efficient long-distance mode of transportation available to precontact inhabitants of the island. Newfoundland has been inhabited more or less continuously over the last 5000 years. During this period, multiple groups have made Newfoundland their home, including people of Amerindian, Palaeoeskimo, and European descent (Figure 2-2). Until the arrival of European settlers, inhabitants of Newfoundland relied on hunter-gatherer-fisher lifeways, although each group adopted distinct and culturally specific approaches to subsistence on the island (Renouf 1999, 2003; Schwarz 1994). Despite its relatively large landmass (111,390 km^2), the island has a limited terrestrial fauna compared to neighbouring mainland regions, however it is surrounded by rich marine biodiversity. These resources are unevenly distributed both seasonally and spatially, requiring people to move frequently in order to access various resources (Tuck and Pastore 1985). Mobility has therefore played an important role in the interpretation of precontact subsistence practices in Newfoundland.

Despite this important role, little attention has been paid to the practicalities of travel across the island and how its particular geography may have impacted both the way people moved and the places they chose to settle. Voyagers across Newfoundland

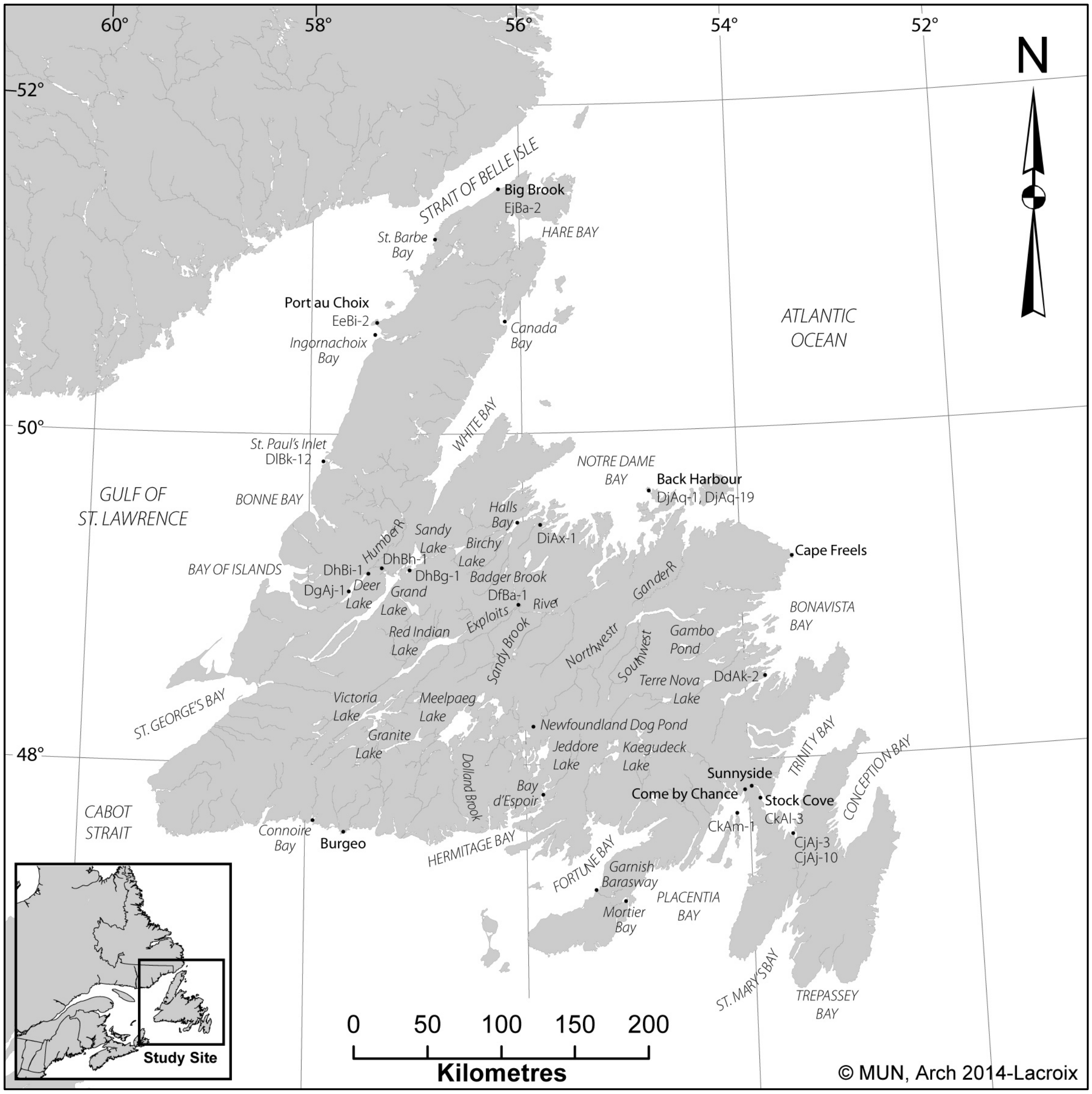

Figure 2-1 Newfoundland geography and place names used in text.

must have coped with important peninsulas dividing the coast into a series of large bays, long and steep mountain chains with limited passes, dense forests and large boggy areas, and interconnected inland lakes and river systems impacting the direction of travel. Many groups also had to cope with the presence of others, impacting the way in which certain places could be reached (Figure 2–2; Marshall 1996; Rast et al. 2004).

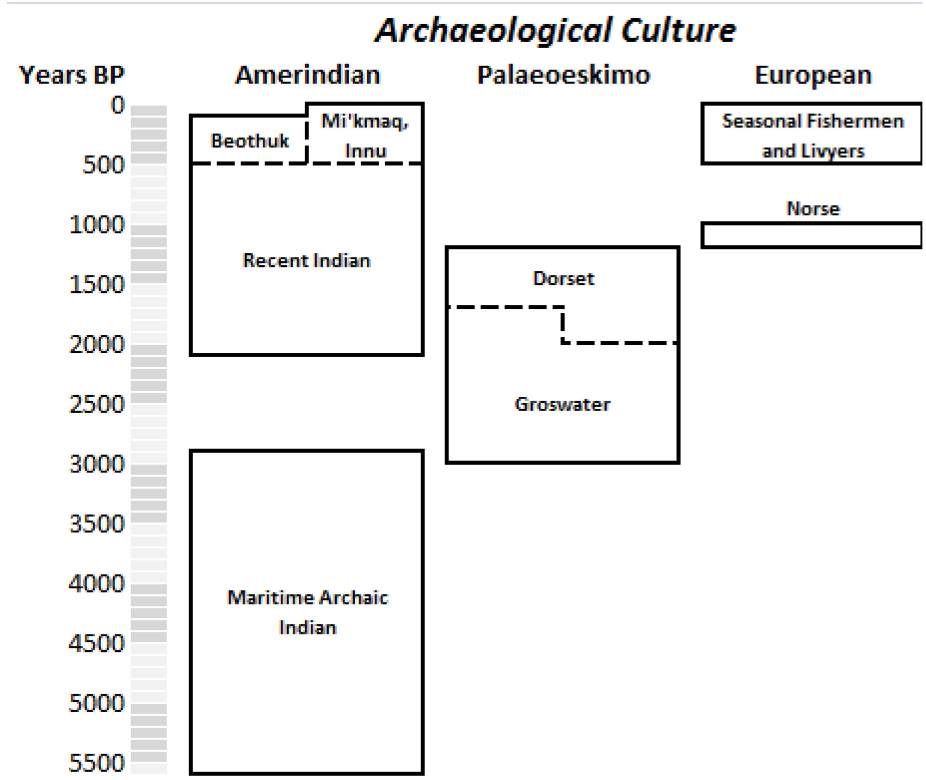

Figure 2-2 Archaeological cultures of Newfoundland over the last 5000 years. Dashed lines represent likely intermingling between groups, not direct ascendant-descendent relationships, although late Recent Indian complexes found throughout most of the island are believed to be directly ancestral to the Beothuk. Dates provided represent uncalibrated radiocarbon ages.

In addition, human movement is rarely tied solely to resources (see Holly 2003 for Newfoundland example tied to burials). From an indigenous perspective, journeys across a landscape provide the opportunity to meet and exchange with close or distant relatives, perform important ceremonies, and recount important narratives (e.g., Meyer and Thistle 1995; Oetelaar and Meyer 2006). The narratives tied to these paths speak to the relationships between individuals or groups of people, people and spirits, , people and the land, and people and resources (e.g., Basso 1996). Movement through the landscape becomes a lesson in the history of the group, playing an important role in the transmission of knowledge across generations. Journeys must be repeated periodically in order to fulfill each of these roles.

Travel routes are thus a physical representation of countless journeys made as people routinely moved from place to place (Ingold 1993). In turn, the travel route network imposes a particular pattern on the movement of people as they travel from place to place, making certain routes more travelled than others and certain regions more accessible than others, impacting their view of the world. An adequate understanding of the travel route network is therefore an important stepping stone to understanding the way people communicated and interacted with each other.

One of the major impediments to the development of a more complex view of human movement across Newfoundland has been our limited knowledge of precontact travel routes crossing the island, beyond the few recorded routes described by early explorers (e.g., Cormack 1873; Jukes 1842, 1843; Murray and Howley 1881; Speck 1922). In answer to this predicament, the research reported herein presents a model capable of independently recreating known travel routes, as well as extending our knowledge into regions where little information currently exists. The resultant modelled travel route network was quantified to identify the primary avenues of movement available to past travellers, as well as to determine the degree of accessibility of various regions of the island. The results were then applied to the Late Archaic (ca. 5500–3200 BP) to improve our understanding of mobility and social interaction during the earliest period of human presence in Newfoundland.

2.2 Filling-in Newfoundland's Terra Incognita

As mentioned above, our current knowledge of traditional interior travel routes is limited. Newfoundland is one of the oldest British colonies in the Americas, but in contrast to its mainland counterparts, this colony remained mostly sea-oriented until the end of the nineteenth century. As a result, the interior of the island remained mostly unknown to European settlers until the 1800s, outside of a few large interior lakes. Early knowledge of these lakes came from Mi'kmaq informants and expeditions searching for the Beothuk (Tompkins 1986). A more detailed knowledge of the interior finally developed through exploration expeditions assessing the development potential of various natural resources. These expeditions were led by scientist-explorers who relied heavily on Mi'kmaq guides to journey into the central regions of the island. The importance of the Mi'kmaq to our current knowledge of the interior can still be seen through the number of places still bearing their Mi'kmaq name (e.g., Meelpaeg Lake, Annieopsquotch Mountains, Kaegudeck Lake, etc.).

The reports written by these early explorers provide the first records of various interior routes of travel used by the Mi'kmaq (Cormack 1873; Jukes 1842, 1843; Murray and Howley 1881). The routes, however, cover only areas explored by the scientists and concentrate in the principal regions historically travelled by the Mi'kmaq. As a result, certain regions, such as the Northern Peninsula (Figure 2-1), have very little data. Because only limited archaeological work has been done in the interior of the island, mostly limited to the Exploits River (Figure 2-1) and large lakes located near modern settlements (Holly and Erwin 2009), site locations cannot shed much light on precontact use of the interior, especially along small and lesser known travel routes.

To improve our understanding of interior journeys, a series of criteria can be used to replicate human decisions made when choosing a travel route. A multi-criteria cost surface analysis is best implemented within a geographic information system (GIS), where the criteria can be translated into surfaces representing how costly it is to cross a particular parcel of the island. By combining these criteria into a single cost surface, it is possible to determine the most efficient or least-cost path connecting two places. A multi-criteria cost surface analysis therefore provides insight into the potential network of travel routes linking various regions of Newfoundland. Although a number of approaches to modelling travel routes exist (e.g., Bell and Lock 2000; Gaffney and Stančić 1992; Howey 2011; Madry and Rakos 1996; van Leusen 2002), this study adapts the methodology used by Howey (2007) as her approach is well-suited to model canoe and foot travel across Newfoundland. It is based on a user-defined scale of travel costs which is easily adapted to represent the level of difficulty involved in travelling across a variety of land cover types. This approach has successfully been used to study precontact movement in a variety of environments, including Michigan and British Columbia (Howey 2007, 2011; Sakaguchi et al. 2010).

The paths modelled by this technique expand our knowledge of Newfoundland's travel route network and provide a basis from which to examine the specific ways in which the geography of the island constrained human movement: Where were the principal travel corridors located? Which areas of the island were the most and least accessible for foot and canoe travel? Did certain regions act as natural central places or boundaries to human movement? Knowledge gained from these research questions can improve our understanding of mobility and social interaction in the past: How were sites positioned with respect to important travel corridors? How did regions of high and low accessibility correlate with cultural material patterns and other evidence for interaction between groups and/or regions? A final goal of this study is to provide a guide to future interior site surveys, which can target important avenues of movement and significant nodes or hubs in the modelled travel route network.

2.3 Multi-Criteria Cost Surface Analysis

The approach used for modelling travel routes across Newfoundland involved a number of steps. Relevant criteria affecting travel across Newfoundland's landscape were first identified. Adequate digital data sources representing each criterion in the GIS model were then selected. Based on the selected criteria, ranked values were used to model the relative difficulty involved in travelling through various regions of Newfoundland. Once quantified, individual criteria were combined to produce a single multi-criteria cost surface from which the cost of travelling between any two points on the island could be calculated. To identify the principal paths linking key regions, all major bays and central lakes were used as both departure and arrival points in the model. All work was performed using ArcGIS 10, an Environmental Systems Research Institute (ESRI) GIS package (ESRI 2011).

After model outputs were validated, results were used to estimate the former extent of Newfoundland's precontact route network. Information generated by the multi-criteria cost surface analysis was also used to identify routes that acted as principal links between regions and evaluate the relative accessibility of various island locations. The following sections provide a detailed description of the reasoning and methods used to generate the multi-criteria cost surface used to model foot and canoe travel across Newfoundland, run the model, and assess its results.

2.3.1 Assumptions

The present analysis relies on two important assumptions. First, the preferred mode of travel would have involved the use of watercraft, mostly likely some form of canoe that allowed navigation along the coastline and interior river systems. Water-based transportation and communication corridors, and their productive aquatic habitats, have always been strongly associated with subarctic aboriginal settlement (Hamilton 2000:45). Watercrafts permitted easy transport of large amount of equipment and supplies over long distances, and lake and river systems were the preferred and primary avenues of communication for historic nomadic people of the boreal forest (Oetelaar and Meyer 2006). When impractical, pedestrian trails and short portage routes provided access to nearby sites and movement across adjacent watersheds. In Newfoundland, offshore site locations attest to the presence of watercrafts among precontact groups, while river and lake site locations suggest travel did occur along interior waterways.

Second, the principal period of travel was during the warm season, when snow was absent and water flowed freely in rivers and lakes. The journeys modelled by this analysis involve travel over hundreds of kilometres. Among nomadic groups of the boreal forest, summer was the preferred season for long-distance journeys, while winter travel was limited to hunting trips and short residential moves (Oetelaar and Meyer 2006).

2.3.2 Criteria Selection

Four criteria were deemed essential in representing human movement across Newfoundland: slope, land cover, connected inland waterways, and coastal water. One of the most common criteria included in cost surface analyses is slope because human movement becomes increasingly difficult as slope increases. As a result, steep terrain tends to be avoided when possible. Newfoundland has a generally low topography, but relatively few flat regions, offering a mostly undulating terrain with few high peaks, with the exception of the typically steep-sided mountain ranges found along its west coast (Anguille, Long Range, Annieopsquotch; Figure 2-3a). Steep terrain also commonly borders rivers and lakes crossing mountainous and hilly regions, making access to waterways and river crossings difficult in these regions.

In addition to slope, there are three dominant natural vegetation covers in Newfoundland that would have had an important impact on movement across the

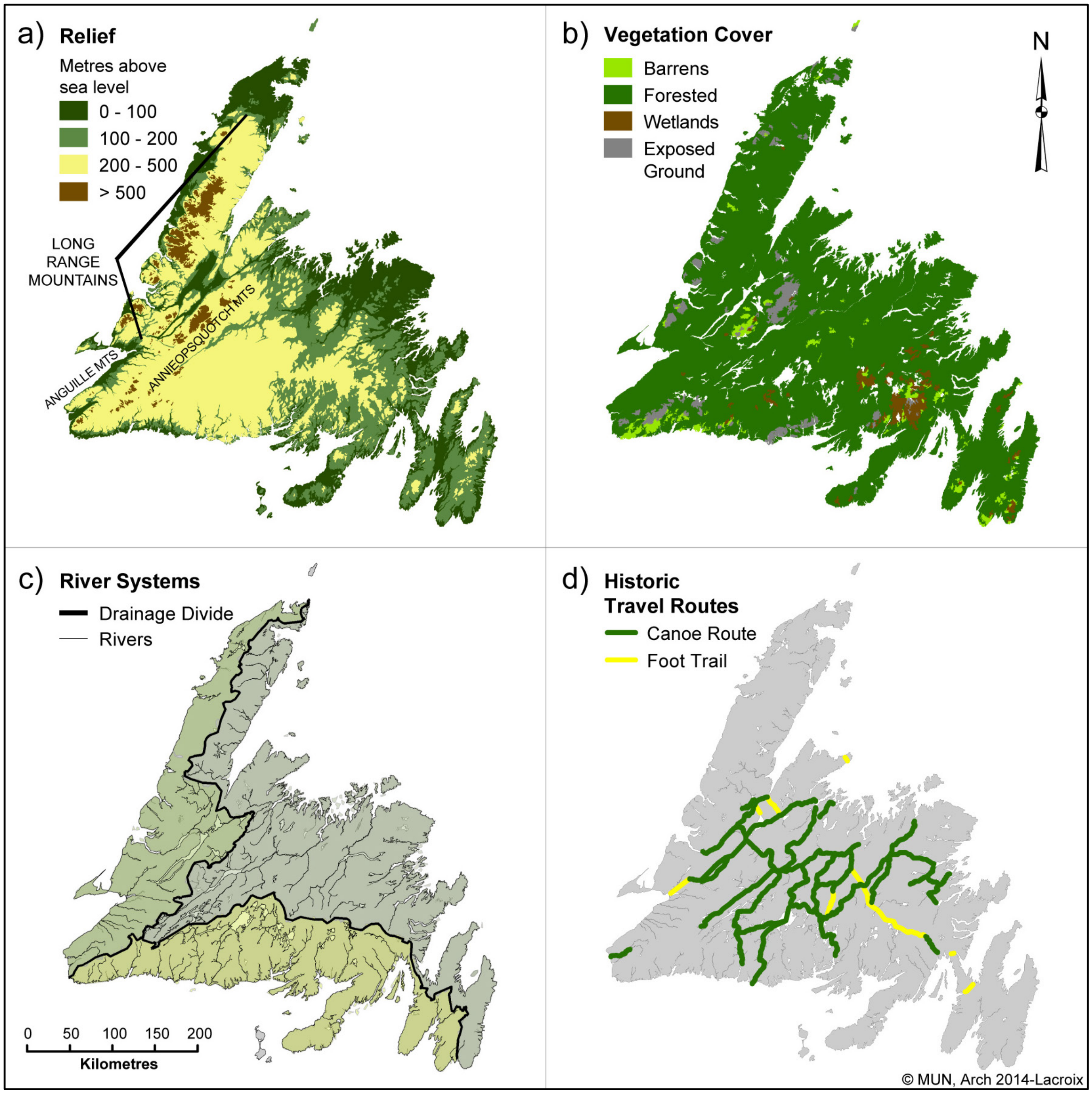

Figure 2-3 Physical setting of Newfoundland: a) generalized relief of Newfoundland (CDED data); b) simplified natural vegetation cover (LCC2000 data); c) main drainages and principal interior river systems (NHN data); and d) historically-reported interior travel routes (Cormack 1873; Jukes 1842, 1843; Murray and Howley 1881).

interior: wetlands, forests, and barrens (Figures 2-3b and 2-4; Jukes 1843; McManus and Wood 1991). Wetlands are a patchwork of bogs, swamps, and muskeg (Figure 2-4a) that

Figure 2-4 Typical geographic settings encountered in Newfoundland: a) extensive wetlands ("DSC_4116.jpg" by Scott Howse, used under CC BY-NC 2.0); b) barrens ("Barren" by Kris Griffon, used under CC BY-NC-SA 2.0); c) dense boreal forest (photo by author); and d) steep coastal cliffs ("pouch cove" by Scott Howse, used under CC BY-NC 2.0). All images cropped from originals.

present the most difficult terrain to cross, as their surface is very uneven, almost always wet, and typically unable to bear the weight of a person walking over them (Jukes 1843:20–22). In contrast, pedestrian movement along the generally featureless, windswept barrens found in many coastal regions and at higher elevations offer the easiest terrain for pedestrian travel (Jukes 1843:22–23). These barrens are dominated by shrub vegetation composed of a heath and moss cover, alternating with stunted open and patchy forests, bedrock outcrops and ponds (Figure 2-4b).

The principal vegetation cover encountered in the interior is the boreal forest (Figure 2-4c), although in exposed locations trees tended to be of small and stunted growth. As one of the early explorers described, the trees "commonly grow so closely together, that their twigs and branches interlace from top to bottom, and lying indiscriminately amongst them, there are innumerable old and rotten stumps and branches, or newly fallen trees, which, with the young shoots and brushwood, form a tangles and often impenetrable thicket" (Jukes 1843:19). Although the effort required to travel forested regions is greatly diminished by establishing a trail, these demand regular maintenance (Oetelaar and Meyer 2006). For example, Jukes' 1840 expedition to Red Indian Lake was cut short by the inability of his crew to follow a Beothuk trail associated with the Grand Falls portage, which had by then fallen out of maintenance for only 10–20 years (Jukes 1843:138–141). The cost of travel across a wooded terrain therefore remains relatively high over time due to maintenance requirements, even after a trail is established.

Other types of land cover also have an important impact on pedestrian and canoe travel. Unconsolidated sediments such as extensive sand dunes, gravel bars, and scree slopes offer some resistance to pedestrian travel, especially when carrying a significant load, and would be avoided by pedestrian travellers. Thousands of small lakes and ponds cover the interior regions of Newfoundland. Travellers moving across the interior would tend to avoid these water bodies as it is impractical to constantly “puddle jump” from one small isolated pond to the next while carrying a canoe and all its contents or build a new raft each time a lake or pond is encountered. Therefore, small isolated water bodies represent one of the most important obstacles to human movement, requiring that both pedestrian and canoe routes avoid them.

In contrast to isolated waterbodies, connected waterways act as major corridors of movement for canoe travel. Newfoundland’s interior is home to a number of large river and lake systems (Figure 2-3c). The headwaters of north- and south-flowing systems interlock in the centre of the island, where a series of large interconnected lakes, most draining to the south, are also found. Canoe travel along these connected waterways provides the most efficient way to cross large distances in Newfoundland, typically requiring only short portages to avoid main obstacles and drainage systems. Coastal waters would also have provided an important link connecting nearby coastal locations. Movement along the coast would have been relatively rapid under good conditions, but involved an increased level of difficulty when compared to travel along inland waterways because of frequent high winds and wave conditions, fog, and strong longshore currents. The ability to land safely while traveling along the coast is also more limited as steep, rocky, wave-pounded cliffs dominate the shoreline of many regions (Figure 2-4d).

The various criteria discussed above provide a guide for assigning travel costs. Low slope values are given a low cost as travelling across a low sloping landscape is preferable to crossing steep terrain. Similarly, the various land cover types discussed above are ranked from the easiest to the most difficult terrain to cross, as follows: canoe travel along connected inland waterways; canoe travel within coastal waters; foot travel across sparsely-vegetated barrens, foot travel through forested regions, foot travel on unconsolidated sediments and exposed rocks; raft travel across small isolated water bodies; and foot travel across wetlands. The following section describes the digital dataset used to represent these various criteria in the model.

2.3.3 Data Sources

All digital data used in the multi-criteria cost surface analysis was obtained from the GeoBase web-based portal, the most up-to-date, publicly available databank for Canadian digital coverage (GeoBase 2010). Two main types of data were used in the analysis: raster datasets formed of rectangular grids in which each cell holds a specific value; and vector datasets in which individual shapes such as points, lines, and polygons are associated with sets of attributes. All datasets obtained from GeoBase use geographic coordinates (latitude and longitude) and required to be projected onto a flat surface to provide a metric basis for the analysis of the various features (NAD 1983 CGS to NAD 1983 UTM Zone 21N conversion).

A combination of three principal source datasets was used to generate the model's cost surfaces. The *Canadian Digital Elevation Data* (CDED) provided digital elevations in raster form at 1:250,000 map scale, and was used to extract slope values and contour lines. The *National Hydrographic Network* (NHN) provided the vector dataset of water bodies, obstacles, and flow directions that was used to extract the connected inland waterways. The *Land Cover, Circa 2000 – Vector* (LCC2000) dataset provided polygons representing 44 land cover types that were grouped to obtain the simplified land cover classification used in the model (see below).

Two additional digital datasets were used to assess the validity of the model and interpret results for the Archaic. Mi'kmaq and historic interior travel routes were digitized from written descriptions and maps (Cormack 1873; Jukes 1842, 1843; Murray and Howley 1881), and used to validate the paths generated by the model. Archaeological site locations used to interpret the results for the Archaic were obtained as a point dataset from Newfoundland's Provincial Archaeology Office (PAO). Although the coordinates provided for individual archaeological sites vary in accuracy from a few metres to several hundreds of metres, they are sufficiently accurate for the island-scale adopted in this analysis.

2.3.4 Criterion 1: Relative Slope

Slope value in degrees was calculated from the CDED dataset following resampling to a 90-m cell raster. The effort required for moving across steep terrain does not follow a simple linear scale. Instead, it becomes increasingly more difficult to traverse steep terrain as its slope increases. To reflect more accurately the effort involved in moving across steep terrain, relative slope values were obtained using the formula proposed by

Bell and Lock (2000). Using this approach, relative slope values are obtained by dividing the tangent of the slope value of each cell by the tangent of one degree. The exponential scale provided by this approach offers a more realistic assessment of the effort involved in traversing steep terrain. Although the cost of moving up and down on an incline is not quite the same in real life, for the purpose of this analysis anisotropic (direction-dependent) costs were not considered.

2.3.5 Criterion 2: Land Cover

Land cover types were extracted from the LCC2000 dataset. Although this dataset provides land cover classes present at the turn of the millennium (ca. AD 2000; GeoBase 2009a), it is currently the best approximation of the land cover types that would have been encountered by precontact groups. Vegetation cover is mostly the result of local climatic conditions and topography, changes to which have remained minimal over the last 6000 years in Newfoundland (Macpherson 1995), especially when considering the broad land cover groupings used in this study (Table 2-1).

In the LCC2000 dataset, land cover is classified according to a harmonized legend that includes up to 44 different cover types (GeoBase 2009b), although only 33 are used for Newfoundland. These 33 land cover types were grouped into seven major land cover categories determined to be relevant to precontact movement (Table 2-1). A number of "modern" land cover types were present in the dataset and had to be incorporated into the other categories. For example, croplands and developed areas (e.g., buildings), as well as categories created as a result of the classification process (e.g., shadow, unclassified) were therefore eliminated by merging them with the most dominant land cover type surrounding them. The final set of grouped land cover polygons were then transformed into a 90-m cell raster dataset, where individual cells were attributed the value of the major land cover type having the largest area over the cell.

2.3.6 Criterion 3: Interior Waterways

Although water bodies are present in the land cover data layer (Table 2-1), major rivers and lakes forming large connected interior waterways were treated separately through the creation of a "connected interior waterways" data layer that would allow these features and small isolated water bodies to hold separate cost values. Treating these water bodies separately allowed for connected inland waterways to hold a low cost-of-travel while small isolated water bodies held a high cost-of-travel to prevent "puddle-jumping" between ponds.

Table 2-1 Descriptions of the grouped LCC2000 land cover types included in the analysis.

Grouped Land Cover	LCC2000 Code	Description
No Data	0	No data available
Modern	10, 12, 34, 121, 122	Modern development, cropland, shadows, and unclassified areas
Inland Waterway	20	Major inland river or lake
Coastal Water	20	Buffer along Newfoundland's shoreline
Isolated Water	20	Inland lakes and ponds
Exposed Ground	30, 31, 32, 33	Exposed bedrock, rubble, river sediments, beaches, etc.
Barren	40, 50, 51, 52, 100, 110	Bryoids, tundra, shrublands, and grasslands
Wetland	80, 81, 82, 83	Fens, bogs, swamps, sloughs, marshes, etc.
Forested	210, 211, 212, 213, 220, 221, 222, 223, 230, 231, 232, 233	Coniferous, broadleaf, and mixed forests

Note: LLC2000 Codes are the codes for the cover types used in the Land Cover, Circa 2000 dataset (GeoBase 2009b).

The NHN dataset from which connected waterways were extracted is still undergoing development, but already includes vector data describing hydrographic features such as lakes, reservoirs, rivers, streams, canals, islands, as well as obstacles (e.g. waterfalls, rapids, rocks in water) and constructions (e.g. dams, wharves, dikes), divided into major drainage areas for most of Canada. Although this dataset contains man-made water bodies such as reservoirs, in Newfoundland these are adequate substitutions for unmodified lakes as their inlets and outlets remain relatively unchanged, preserving the connectedness of lake and river systems. Obstacles, whether natural or man-made, were not included as part of this analysis, but could eventually be added as a further refinement that would increase the cost of travelling along river routes where long or numerous portages are required.

Large water bodies and permanent rivers were extracted from the dataset to create the “connected waterways” data layer. Large water bodies were defined as having an area larger than 1 km^2 and a perimeter greater than 60 km. These criteria removed the small lakes and ponds in Newfoundland, while preserving long, narrow water features not currently defined as rivers in the dataset. The selected features were then transformed into a 90-m cell raster using the “maximum area” option to conserve all cells touched by selected features, preserving the connected nature of the waterways.

2.3.7 Criterion 4: Coastal Water

In order to allow travel routes to follow the coast of the island, a buffer was created along the coast of Newfoundland; including smaller islands large enough to register in the land cover dataset. A distance of 20 km was selected for the buffer to incorporate the inner waters of the largest bays, the narrowest portion of the Strait of Belle Isle, and islands that were frequented by precontact inhabitants of Newfoundland. Neglecting atmospheric refraction, the 20 km buffer also corresponds to the maximum distance at which a 20-m-high feature can be seen by a person of average stature standing in a canoe (ca. 1.5 m above the surface) on a clear day, as described by the following trigonometric relation:

$$d = \sqrt{h_{obs}(2R + h_{obs})} + \sqrt{h_{obj}(2R + h_{obj})};$$

where d is the greatest distance to the object being observed, h_{obs} is the height of the observer above the ground (1.5 m), h_{obj} is the height of the object above the ground (20 m), and R is the radius of the Earth (6371 km). Given the generally steep coastal geography of the island, landscape features commonly reach a 20-m altitude near the shoreline. This ensures that coastal travel routes selected by the model remain within sight of land at all times, limiting the navigational skill assumption to the ability to visually follow the coast.

Canadian datasets only incorporate regions under Canadian authority, leaving a large hole just off Newfoundland's South Coast, where the French islands of Saint-Pierre and Miquelon are located (Figure 2-1). To best represent the coastal waters of southern Newfoundland, these islands were incorporated into the dataset. The shorelines used to generate the coastal buffer were therefore extracted from two different datasets, the *CDED* for Newfoundland and the global 30 arc-second grid dataset made available by the *General Bathymetric Chart of the Oceans (GEBCO)* for Saint-Pierre et Miquelon, both re-sampled to a 90-m cell raster dataset.

2.3.8 Least-Cost Path Analysis

The separate layers representing each criterion were combined to produce the multi-criteria cost surface. To do so, each layer was given the same 90-m cells, projection, extent, and calibrated value range. Because major lakes and rivers were present in both the land cover and inland waterways layers, these two data layers were combined using a conditional statement (ArcGIS CON function), so that, when present, inland waterway values replaced the land cover value assigned to the same cell. The addition of the coastal buffer expands this combined land cover dataset offshore.

Individual land cover categories were assigned costs distributed along a 0–100 scale (Table 2-2; Appendix B). These were adapted from Howey (2007) and respect

Table 2-2 Assigned cost values of grouped land cover.

Grouped Land Cover	Cost Value	Reasoning
Inland Waterway	5	Canoe travel occurred up major rivers and lakes
Coastal Water	10	Canoe travel occurred along shoreline
Barren	30	Easy to walk/see through
Forested	40	Vegetated but openings present
Exposed Ground	60	Avoid scrambling on loose sediments and exposed rocks
Isolated Water	65	Avoid “puddle-jumping”
Wetland	70	Impassable wetlands with canoe, wet walking

the order of travel difficulty discussed above. In order to match the scale used for surface cover costs, relative slope values were stretched to the same 0–100 scale by dividing the entire relative slope grid by the maximum value present within the grid and multiplying the results by 100 (Appendix B). The final cost surface was obtained by combining the relative slope and land cover cost surfaces using equal weights (0.5 × Surface Cover Costs + 0.5 × Relative Slope Costs) so that the total cost grid also contained values ranging from 0 to 100.

A series of 35 locations were used for the least-cost path analysis. These points represent the locations of major bays and interior lakes, and are spread somewhat evenly across the island. In order to analyse the accessibility and connectivity of various regions of the island via inland and coastal routes, each location was used, in turn, as the final destination for journeys departing from all 34 other locations. The final multi-criteria cost surface was used to calculate the accumulated cost distance required to reach a particular destination from all cells contained in the dataset. For each run, least-cost paths departing from the 34 other locations were computed on this accumulated cost-distance grid. This resulted in the creation of 1190 paths (35 destinations × 34 paths each), many overlapping either in part or completely, connecting all 35 locations across the island (Figure 2-5).

The ability of the model to reproduce the decisions leading to the selection of particular travel routes in Newfoundland needed to be assessed before results could be

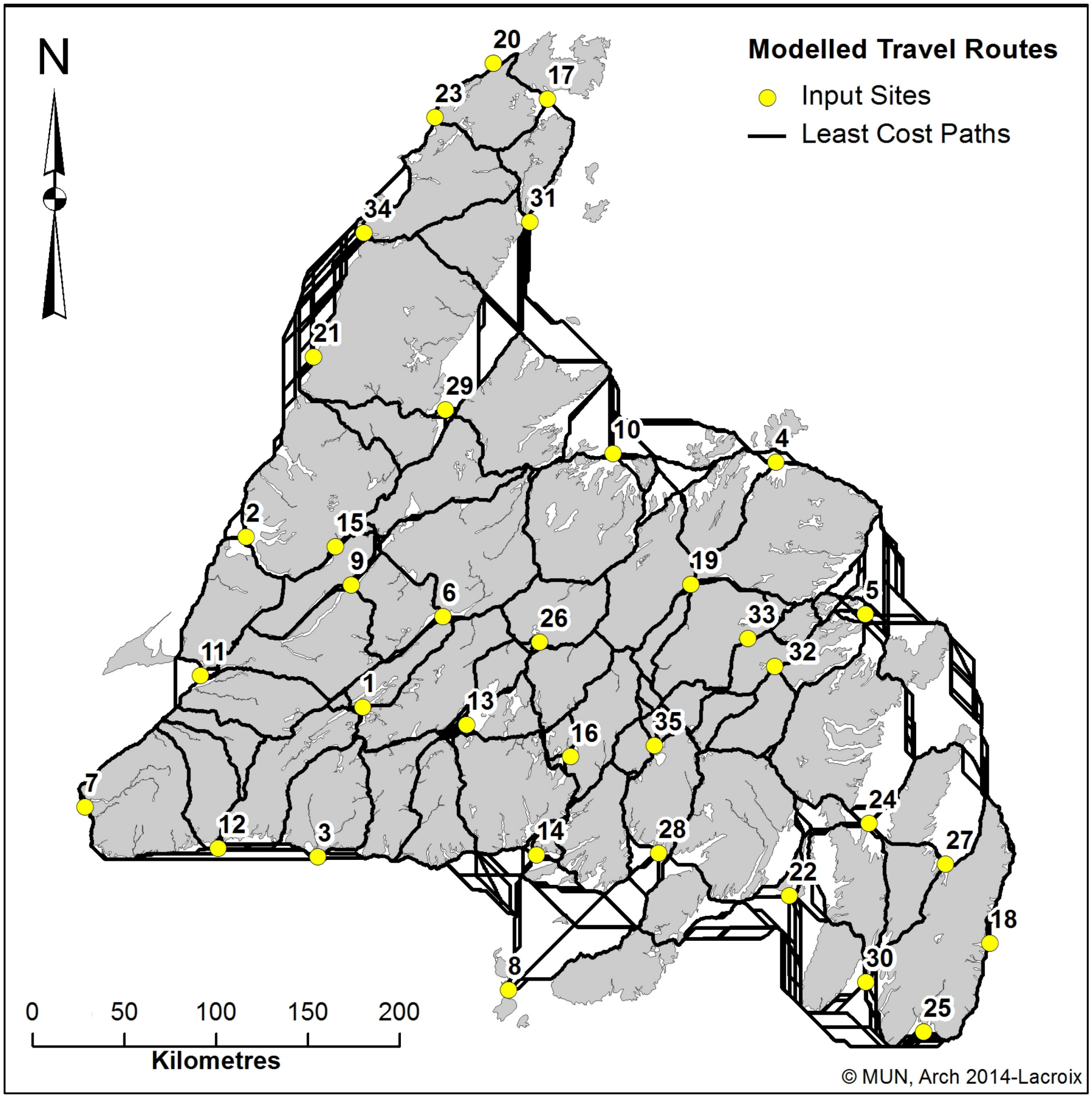

Figure 2-5 Calculated least cost paths using equally weighted relative slope and land cover cost values as defined in Table 2-2. Input site values correspond to departure and arrival site numbers presented in Table 2-4. The multiple lines visible in certain coastal regions are the result of distinct but equivalent paths selected by the model over water.

used to investigate the travel route network it generates. This assessment was performed using three methods (details below). Model runs were performed omitting certain selected criteria to assess the value of their inclusion; slight variations to the costs assigned to the criteria were used to evaluate the robustness of model results; and modelled least-cost paths were compared to known historic travel routes to verify the interpretive strength of the results.

Beyond the location of the modelled paths, model outputs provide further information associated with Newfoundland's travel route network. Two techniques were used to analyse modelled travel routes. Repeated use of particular route segments indicate their relative importance within the travel route network, and the rank differences between travel distance and travel costs of the departure and arrival locations indicate their relative accessibility via the travel route network. By combining these two measures, it becomes possible to assess the potential of various locations to act as natural boundaries to human mobility or, in contrast, favour the creation of central places and hubs of movement.

2.3.8.1 Path Interconnectivity

The least-cost path network generated by the model can be summarized through the combination of 192 route segments. Because certain route segments were repeatedly selected in the model, the higher frequency of selection indicates these corridors play an important role in connecting various regions of the island. The relative importance of different route segments in the model was obtained first by compiling the number of paths that followed particular route segments in each of the 35 sets of least cost paths (Lacroix 2015b:Appendix B). Counts obtained within separate least cost path sets for the same route segments were then summed to produce a map representing total selection counts and highlighting major travel corridors (see Figure 2-10 below).

These results, however, should not be misinterpreted as an assessment of the amount of precontact traffic that would have been present along particular routes, as they represent only the importance a particular route segment has in providing connections with other regions of the island. The amount of precontact traffic a travel route would have received is dependent on the cultural importance a particular region was given by specific groups. For example, during the early historic period, the Beothuk and the Mi'kmaq occupied different regions of the island. The Beothuk inhabited the north and the east, while the Mi'kmaq occupied the south and the west, essentially avoiding each other. The route connecting Red Indian Lake to Notre Dame Bay and Bonavista Bay via the Exploit River was the principal Beothuk corridor of movement between the coast and the interior (Marshall 1996), while Mi'kmaq travellers made principal use of routes departing from Bay d'Espoir, St. George's Bay, Halls Bay to access the interior (Cormack 1928; Jukes 1842; Marshall 1996; Speck 1922).

2.3.8.2 Location Accessibility

In order to assess the accessibility of various locations in the model, the total cost and length of each path were calculated (see Table 2-3 for Ingornachoix Bay example). This process was repeated for each set of paths leading to all 35 destinations (Lacroix 2015b:Appendix B). In each case, the values obtained were converted to a distance rank and a cost rank for each of the 34 departure sites. The cost rank was then subtracted from the distance rank for each site (Table 2-3 and Figure 2-6 for examples). A positive rank difference indicates travel to the destination is easier than the distance from the departure location implies, while a negative difference indicates that travel to the destination is more difficult than the distance from the departure point implies.

Table 2-3 Differences between distance and cost ranks for least cost-paths reaching Port au Choix (Ingornachoix Bay).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Parsons Pond	78769	1	393977	2	-1
St. Barbe Bay	96768	2	360707	1	1
Canada Bay	125937	3	865287	5	-2
Strait of Belle Isle	147230	4	541569	3	1
White Bay	165176	5	1034465	7	-2
Hare Bay	186286	6	713880	4	2
Bay of Islands	194994	7	924348	6	1
Gambo Pond	202605	8	2410372	24	-16
Notre Dame Bay	224591	9	1332642	10	-1
Deer Lake	269133	10	1151185	8	2
Grand Lake	282289	11	1260915	9	2
St. George's Bay	295787	12	1337198	11	1
Hamilton Sound	302240	13	1700816	13	0
Gander Lake	322031	14	1920614	16	-2
Red Indian Lake	328072	15	1599162	12	3
Codroy Rivers	386897	16	1709282	14	2
Near Pistol Lake	403135	17	2013620	17	0
La Poile Bay	408720	18	2102324	19	-1
Victoria Lake	411908	19	1842676	15	4
Kaegudeck Lake	429892	20	2597751	26	-6
Bonavista Bay	438417	21	2270000	21	0
Jeddore Lake	479867	22	2347368	22	0
Terra Nova Lake	496485	23	2402778	23	0
Meelpaeg Lake	501910	24	2101697	18	6
Fortune Bay	511471	25	2930736	28	-3
Burgeo	530315	26	2265176	20	6
Trinity Bay	580708	27	2965179	29	-2
Hermitage Bay	603587	28	2515169	25	3
Conception Bay	612416	29	3042196	30	-1
Placentia Bay	642327	30	3166367	31	-1
Saint-Pierre et Miquelon	652220	31	2792184	27	4
Cape Broyle Harbour	656372	32	3291848	32	0
St. Mary's Bay	711063	33	3588350	33	0
Biscay Bay	738431	34	3647701	34	0

Note: A positive rank difference indicates travel to Port au Choix is easier than distance suggests, while a negative difference indicates that travel to Port au Choix is harder than distance implies.

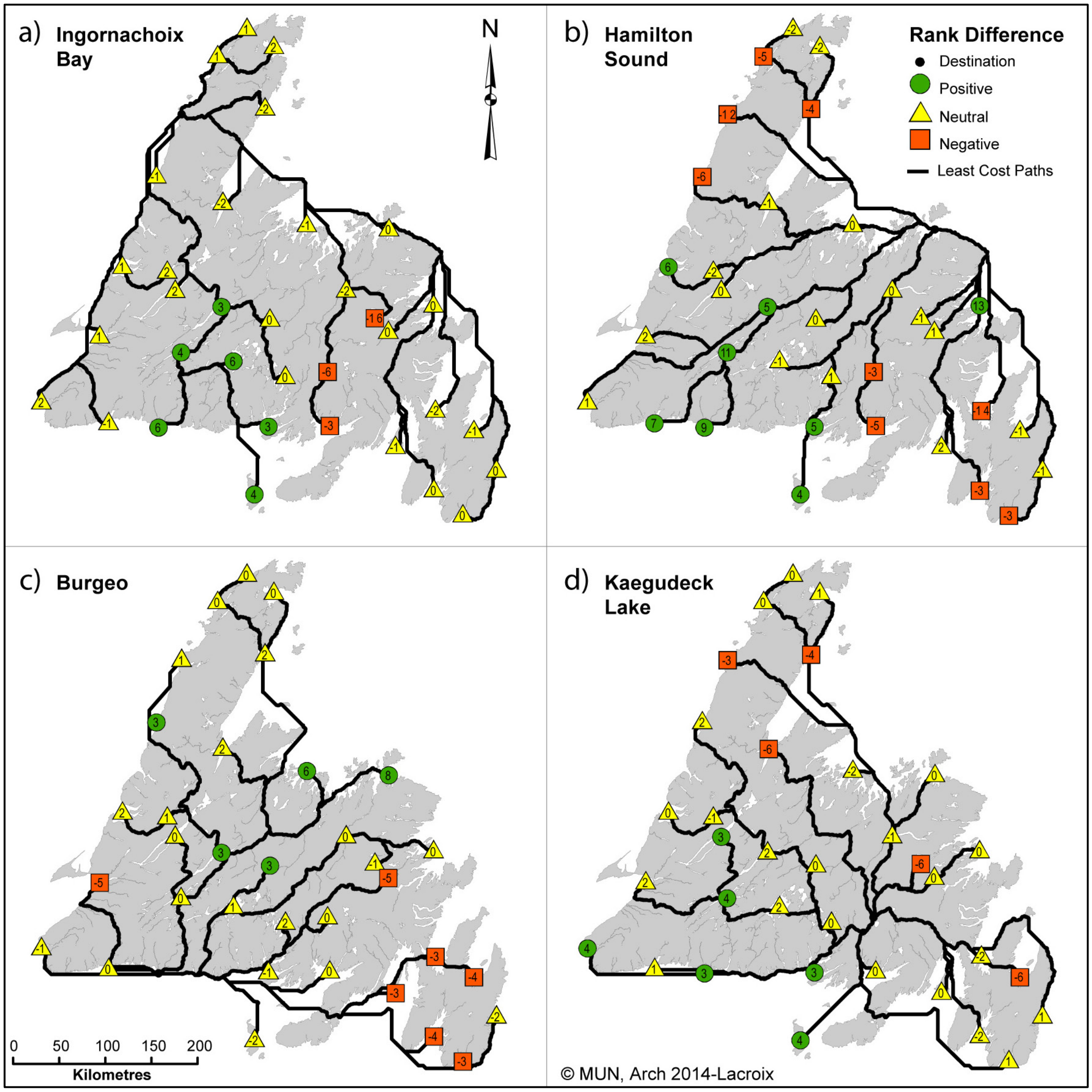

Figure 2-6 Modelled travel routes and rank differences for least-cost paths reaching various destinations: a) Ingornachoix Bay; (b) Hamilton Sound; (c) Burgeo; (d) Kaegudeck Lake. Negative values indicate locations harder to reach than distance implies, and positive values indicate locations easier to reach than distance implies.

The set of rank differences obtained for each destination were assembled into a matrix. Rank differences obtained for each departure location over the 35 sets of paths were summed to assess which locations were the most and least accessible (see

Table 2-4 below). A high positive value indicates that a location is highly accessible, while a highly negative value indicates that a location is not easily accessible.

2.4 Modelling Results

The following sections present a discussion of the model results. The validity of the least-cost paths generated was successfully assessed through repeated analyses using different inputs to the model and comparison with known historic travel routes. The validated travel route network is used to identify major route segments, isolated regions, the most and least accessible places to foot and canoe travel on the island, and locations with a high likelihood to act as central places or social boundaries.

2.4.1 Model Validation

Modelled least-cost paths are only suggestive of possible routes of travel based on the criteria built into the model as outputs are dependent on the merit of the criteria and logic selected to create the model. Three separate methods were used to validate different aspects of the model before results could be analysed. First, the value of using a combination of slope and surface cover was evaluated. Second, the sensitivity of modelled routes to input changes were tested through repeated model runs using modified surface cover cost values. Third, modelled paths were compared to historic travel routes to assess their ability to replicate known route choices.

2.4.1.1 Confirmation of Multi-criteria Requirement

To assess the relative importance of combining relative slope and surface cover cost values, the model was run twice more using each cost surface separately. Paths modelled using surface cover alone occasionally followed very steep terrain, especially for paths crossing the Long Range Mountains (Figure 2-7a). Paths modelled using relative slope costs alone also produced problematic travel routes (Figure 2-7b). Numerous cases of inadvertent puddle-jumping, where paths repeatedly jump from one small pond to the next, were present. This is a result of the low cost attributed to flat expanses of water. Low relief wetlands were also frequently selected, resulting in routes that in reality would be extremely difficult to follow. This preferential selection of low relief areas also led to cases in which paths repeatedly left the meandering course of major rivers in favour of shorter, more direct overland "shortcuts" across nearby ponds and wetlands. These various issues demonstrate that it is necessary to employ multiple criteria that include both slope and surface covers in order to obtain realistic results when modelling canoe and pedestrian travel routes in Newfoundland.

2.4.1.2 Model Sensitivity Assessment

To assess the sensitivity of the least-cost paths to slight model input variations, multiple runs were carried out in which surface cover cost values were incrementally varied, while preserving the order of travel difficulty. Results show that for travel over water, cost values associated with inland waterways can be increased fourfold (4×) and coastal

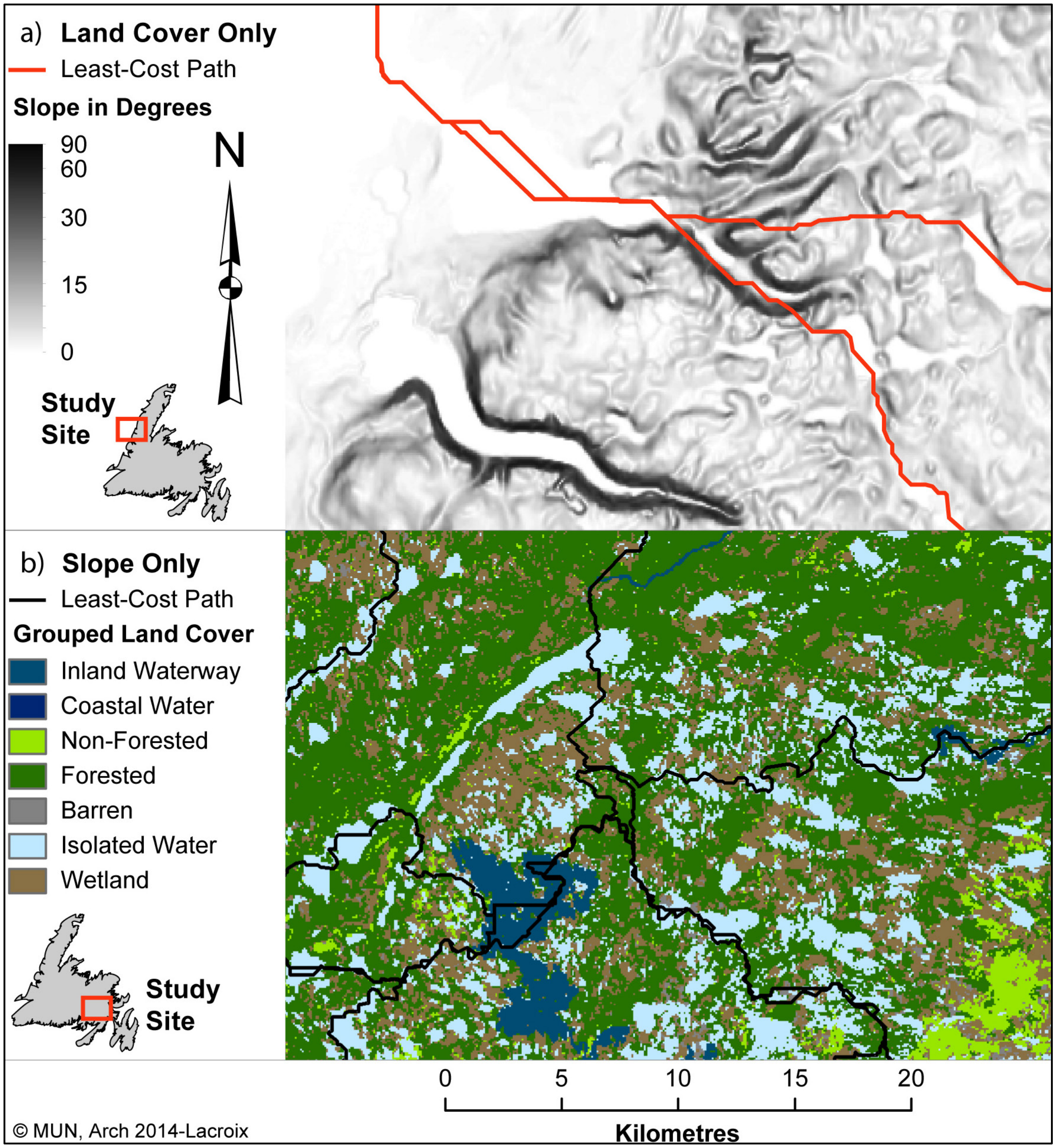

Figure 2-7 Example of modelled least-cost paths using relative slope and surface cover separately: a) path modelled using surface cover alone crossing steep terrain (please note non-linear colour scale); b) path modelled using relative slope alone, puddle-jumping and crossing difficult terrain.

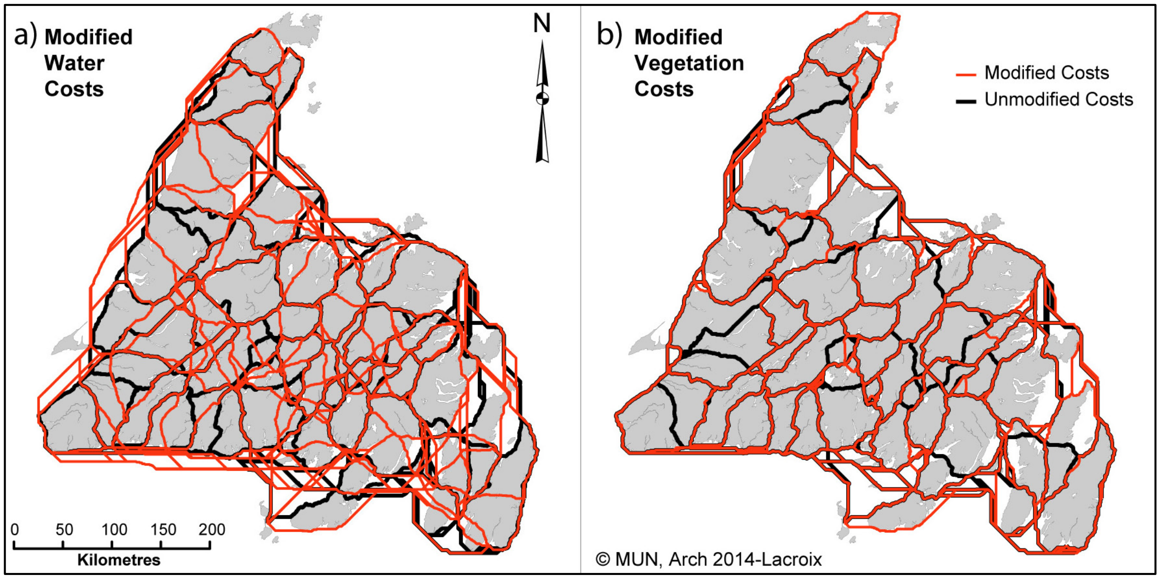

Figure 2-8 Effect of changes to model parameters over a subset of least cost paths, results with modified cost values in red and original values in black (Table 2-2): a) inland waterways and coastal waters set to 20, other costs left unchanged; b) non-forested, forested, barren, isolated water, and wetland set to 50, 60, 70, 80, and 90 respectively, water costs left unchanged.

waters twofold (2×) before the principal travel routes are strongly affected (Figure 2-8a). Changes occur mostly on more opportunistic routes that are rarely readopted, receiving low selection counts whether using the original or modified values. Similar effects were noted when modifying cost values for grouped land cover categories, making it necessary to double the cost difference between coastal waters and non-forested barrens before significant changes occurred (Figure 2-8b).

2.4.1.3 Historic Route Correlation

The Least-cost paths were compared to known historic travel routes to evaluate the effectiveness of the model at reproducing known travel corridors. It is important to note that the criteria and cost values selected in the model are intended to replicate canoe-portage routes used for travel during summertime. Winter travel changes a number of parameters that lead to a different network of trails. For example, frozen ponds and wetlands would no longer present significant obstacles to foot travel, resulting in increased use of foot trails and slightly more direct routes.

The routes selected for comparison are therefore primarily composed of Mi'kmaq canoe routes and trails used during the warm season, as recorded by early scientist-explorers during the nineteenth century (Figure 2-3:d; Cormack 1824, 1873; Jukes 1842, 1843; Murray and Howley 1881). Qualitative comparisons between modelled paths and historic routes indicate a relatively high degree of correlation where traditional routes are known to have been present (Figure 2-9). For example, historic routes following all three major rivers, the Exploits, Humber, and Gander, are all properly reproduced by the model. Travel along the interconnected interior lakes found along the southern half of the island is also adequately reproduced. Because the model is partial to canoe travel, foot trails are not reproduced as efficiently, although a number of important routes correlate well with model results. For example, the portage crossing the isthmus of Avalon and the Mi'kmaq mail route moving from Placentia Bay towards the north coast are reproduced by the model.

Discrepancies do exist, however, but they are generally small and are due to the use of smaller water bodies at the intersection of drainages, which did not meet the connected waterways criteria and consequently were given a high cost value in the analysis. For example, Newfoundland Dog Pond and its outlet were used to ascend

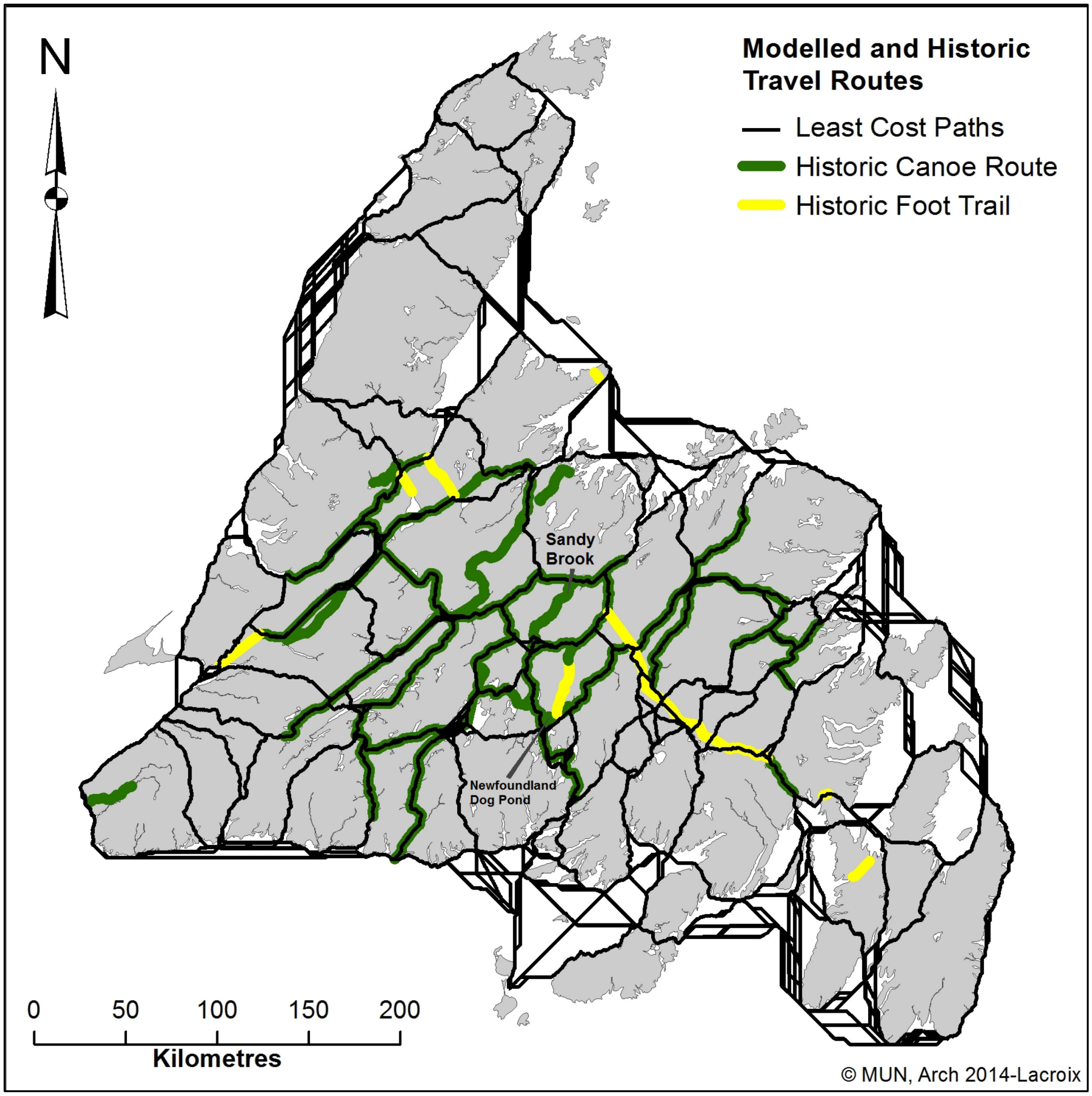

Figure 2-9 Sample of historic travel routes, digitized from written accounts (Cormack 1824, 1873; Jukes 1842, 1843; Murray and Howley 1881), and compared to modelled paths.

toward and connect with the Northwest Gander River (Figure 2-9; Murray and Howley 1881:216), but are absent in the modelled connected waterways layer. Similarly, Sandy Brook was one of the Exploits River tributaries used by the Mi'kmaq to reach this system from central Newfoundland (Figure 2-9; Jukes 1843:44). Nevertheless, the large degree of overlap supports the model's ability to reproduce known interior travel routes and provide reliable approximations of the route choices made by historic Mi'kmaq and early scientific expeditions. Similarly, modelled coastal paths are representative of the routes taken by modern adventurers circumnavigating the island (e.g., (Campbell 2004; Howgate 2006; Paul 2001), and can be assumed to adequately represent precontact coastal travel routes.

In summary, the combination of relative slope values and surface cover categories given travel costs as defined in Table 2-2 provide a relatively accurate and robust set of travel routes at an island-scale. The use of a multi-criteria cost surface, which considers both topography and surface conditions, increases the realism of modelled paths. The results can robustly be reproduced using a range of assigned cost values and modelled least-cost paths correlate well with known historic travel routes. Based on these results, modelled paths are believed to adequately reflect precontact travel routes, including those found in areas where historic information is sparse or unavailable, with confidence levels increasing with repeated occurrences of route segment selection by the model.

2.4.2 Precontact Travel Route Network

Selection counts are a good indicator of the importance modelled routes play in linking various regions of the island. High values indicate important travel corridors linking multiple regions, while low selection counts indicate opportunistic routes offering few connections to other regions. The corridors selected most frequently by the model are found along the Northeast Coast, the South Coast, and in the interior, between Red

Indian Lake and Meelpaeg Lake (Figure 2-10). Of these regions, the sector located between Bonavista Bay and Canada Bay has the highest selection counts in the model, as following the shoreline provides a quick and efficient way for travelling long distances along this coastline. Selection counts are also high between Fortune Bay and Hare Bay along the South Coast. The western end of this corridor also provides easy entrance into the interior of the island via Dolland Brook and Bay d'Espoir, while at its eastern end, Placentia Bay offers a variety of options to skirt or cross over the Avalon Peninsula.

In the interior, Burnt Pond, and, to a lesser extent, Granite Lake are two small lakes located between the larger Victoria Lake and Meelpaeg Lake that act as important connection hubs linking numerous travels routes converging on the two larger lakes. Another important connection hub is Junction Brook which links the Humber River and the West Coast to Grand Lake and all other regions of the island via short portages. The upper reaches of the Exploits River also have high selection counts. This river system empties along the north coast of the island in the Bay of Exploits, but has headwaters located only 50 km from the South Coast. It therefore provides one of the best travel routes for crossing the island, especially between the southwest and northeast coasts. In the model, the most important corridor along this route is found between Victoria Lake and Badger Brook. Using a variety of inlets and short portages, this corridor provides access to White Bay and various portions of Notre Dame Bay in the north, to multiple bays along the South Coast, and access to the central West Coast.

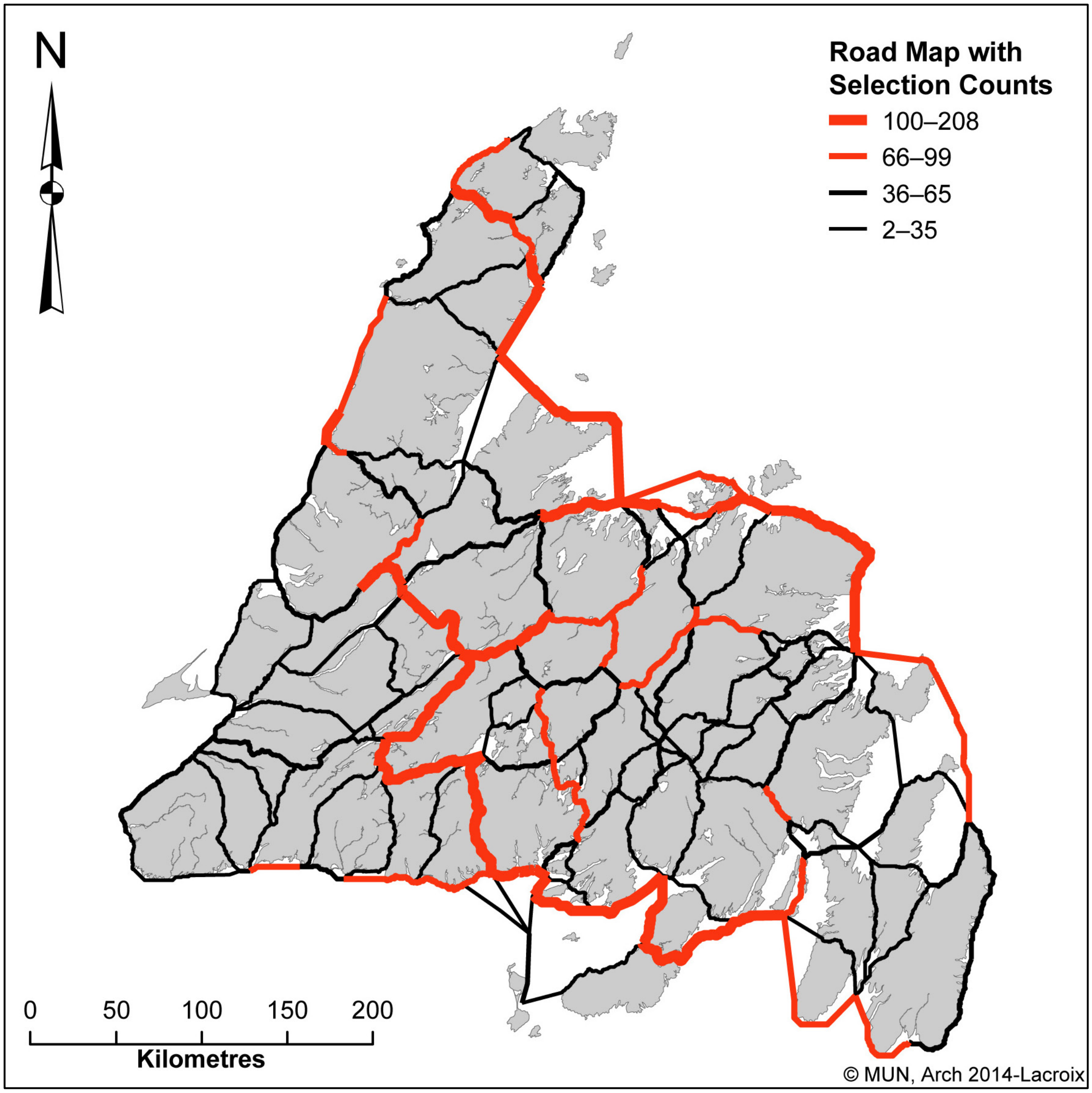

Figure 2-10 Road map to canoe and foot travel across Newfoundland classified by selection counts in the model.

Elsewhere on the island, two peninsula crossings appear to have held major importance. The first crosses the Burin Peninsula midway along its length, connecting Placentia Bay to Fortune Bay via Mortier Bay and the Garnish Barasway. The second crosses the upper portion of the Northern Peninsula, connecting St. Barbe Bay and

Canada Bay via a route that closely follows the path of the modern Highway 432 along most of its length. Although of lesser importance in the model, the various routes crossing the Avalon Peninsula are interesting. The two paths leaving St. Mary's Bay roughly follow the course of Routes 80 and 81 between St. Mary's Bay and Trinity Bay, and Route 90 between St. Mary's Bay and Conception Bay. Similarly, the path crossing the narrowest bridge of land separating Placentia Bay and Trinity Bay closely follow the modern road connecting Come by Chance in Placentia Bay to Sunnyside in Trinity Bay. Notably, this narrowest neck of land was not the preferred crossing location between Placentia Bay and Trinity Bay in the model. The main path joining these two bays is located slightly further south, connecting La Manche Bay in Placentia Bay to Rantem Cove in Trinity Bay, and was repeatedly selected over the neck by a factor of three.

Route segments with low selection counts dominate in a number of regions, suggesting these would typically be avoided for long distance journeys and visited only from nearby locations. Among these regions are those covered by mountain ranges such as the Long Range Mountains forming the spine of the Northern Peninsula, the Anguille Mountains backing the southwest coast, and the hills running parallel to the East Coast, making travel across each of these regions difficult.

Regions where significant breaks in selection counts are present are also interesting. Although present at the corners of the island, where routes are divided along two prominent directions, three notable breaks in selection counts occur along more central regions of the coastline. The first is located between Ingornachoix Bay and

St. Barbe Bay, where paths located above Ingornachoix Bay preferentially cross the Northern Peninsula at St. Barbe Bay, while paths found below Ingornachoix Bay preferentially cross the Long Range Mountains further south. Another significant break in selection counts is present between St. George's Bay and the Bay of Islands, as most paths heading inland use routes starting in these two bays, leaving only coastal traffic between them. A final break in selection counts is present between Burgeo and Connoire Bay along the South Coast. Similarly to previous cases, most incoming paths to the east and west of Burgeo head inland before reaching the archipelago.

2.4.3 Interconnectivity and Accessibility

Among the locations selected for the model, Victoria Lake is the most accessible (Table 2-4). As seen in the previous section, Victoria Lake is extremely well connected to multiple routes of travel across Newfoundland. It lies within 60 km of the South Coast, which can be accessed using multiple rivers. It is also directly connected to Red Indian Lake and Meelpaeg Lake, providing important routes to eastern and northern regions of the island. Relatively short portages connect this lake to tributaries of St. George's Bay, to Grand Lake and the large Humber River system, and thus most of the West Coast.

The Bay of Islands is also an extremely accessible place, located along the West Coast and connected to the remainder of the island via the Humber River and short portages to travel routes leading to all corners of the island. Despite being at the centre

Table 2-4 Rank differences between all departure and arrival locations.

	Departure	Arrival Site*																																		Rank
Site Name	Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	Sum
Victoria Lake	1	0	3	0	11	7	1	-1	1	-2	10	1	1	2	2	1	4	5	0	4	4	-2	2	4	3	2	1	0	5	4	2	5	1	4	4	4	93
Bay of Islands	2	1	0	2	6	5	0	0	1	3	8	0	-5	5	3	0	1	1	5	8	1	0	2	1	4	1	5	5	5	1	2	-1	6	5	1	0	82
Burgeo	3	1	4	0	9	0	3	0	0	-1	7	-2	0	0	1	2	2	3	1	7	2	0	1	2	0	1	6	-2	4	5	1	3	-1	2	6	3	70
Hamilton Sound	4	3	1	8	0	1	1	5	5	2	0	3	6	2	8	0	2	0	0	1	-2	0	1	-2	1	1	4	3	1	2	1	1	4	2	0	0	65
Bonavista Bay	5	4	1	0	13	0	3	4	1	2	2	2	1	-2	0	1	-1	2	0	1	1	0	3	1	0	2	-3	2	4	3	1	2	1	0	0	0	51
Red Indian Lake	6	0	0	3	5	6	0	0	7	-1	6	0	0	2	3	0	-3	0	4	2	0	0	1	0	-4	1	1	5	3	1	1	1	-2	2	3	2	49
Codroy Rivers	7	-3	2	-1	1	0	2	0	1	2	3	0	0	5	1	0	4	0	0	4	4	2	0	4	0	0	2	-4	1	3	0	0	-4	2	2	4	37
Saint-Pierre-et-Miquelon	8	0	3	-2	4	-1	5	-1	0	0	-2	0	1	-1	0	3	1	0	2	4	0	0	4	0	2	2	6	1	2	-6	4	0	-1	-5	4	4	33
Grand Lake	9	-3	2	0	0	0	0	1	2	0	0	0	-1	0	1	0	3	1	1	5	2	1	0	2	1	0	0	2	0	1	0	1	3	0	2	3	30
Notre Dame Bay	10	4	1	6	0	2	3	2	0	1	0	1	4	-1	3	-1	0	-1	1	-1	-1	0	-1	-1	1	-1	0	1	-2	1	-1	1	8	-1	-1	-2	25
St. George's Bay	11	-2	-1	-5	2	3	-4	1	1	0	6	0	-3	0	3	1	2	2	1	4	1	1	0	1	1	0	-1	3	1	0	0	2	-4	2	1	2	21
La Poile Bay	12	0	-3	0	7	1	0	-1	-1	-1	4	-1	0	3	1	0	6	2	-2	5	-1	-1	-1	-1	0	-1	4	-4	1	4	-1	2	-4	3	-1	1	20
Meelpaeg Lake	13	0	4	1	-1	-1	3	1	0	1	2	2	1	0	1	3	-1	-1	1	0	-1	1	1	-1	0	0	-1	-1	5	-2	1	-1	-4	-2	6	2	19
Hermitage Bay	14	2	1	-1	5	-1	3	-1	0	0	2	0	1	0	0	3	1	0	0	0	0	-1	2	0	-1	-2	0	-3	1	1	1	0	-2	0	3	3	17
Deer Lake	15	-1	0	1	-2	-2	-1	0	3	0	-2	0	1	5	5	0	-2	0	-1	4	2	1	0	2	-1	1	-2	0	2	-1	0	1	1	1	2	-1	16
Jeddore Lake	16	4	-3	2	1	1	-4	2	0	1	2	1	3	0	0	-4	0	0	-1	5	1	0	0	1	0	0	0	-1	-1	0	0	0	-2	2	0	0	10
Hare Bay	17	0	-2	0	-2	-1	1	1	-1	0	-1	2	2	0	0	-4	1	0	0	-1	0	2	1	-1	0	1	3	1	-1	1	1	0	2	-2	2	1	6
Cape Broyle Harbour	18	0	0	-2	-1	1	0	-1	-4	0	0	-1	0	0	-2	0	0	0	0	0	0	0	0	0	2	0	0	2	-1	0	1	0	5	2	0	1	2
Gander Lake	19	3	1	0	0	-1	2	4	2	0	0	2	1	0	2	2	0	-2	0	0	-3	1	-3	-3	-2	-4	-1	1	-1	-3	-3	-1	1	0	-2	-1	-8
Strait of Belle Isle	20	1	-3	0	-3	0	0	0	0	-1	-4	0	-2	0	0	1	0	-2	1	-2	0	1	0	0	1	0	0	0	-1	1	0	1	1	-3	1	0	-12
Parsons Pond	21	0	-1	3	-6	-3	-2	0	1	1	-6	1	-4	4	0	3	0	1	-2	1	0	0	2	0	-2	2	-2	-3	4	-3	2	-2	-2	0	-1	2	-12
Placentia Bay	22	1	0	-3	2	1	2	-3	0	-1	0	0	-1	2	-3	0	0	0	0	-6	0	1	0	0	1	0	0	-3	-2	0	0	0	-2	2	-1	0	-13
St. Barbe Bay	23	0	-1	0	-5	-1	0	-1	0	1	-3	-2	0	-2	-1	1	0	2	-1	-3	0	1	0	0	0	0	1	0	-1	0	0	0	1	-2	1	0	-15
Trinity Bay	24	-1	0	-3	-14	0	-4	0	0	1	-3	0	1	1	-1	0	0	-1	0	-2	0	-1	0	0	0	0	-1	0	3	0	-1	-1	5	4	-2	-2	-22
Biscay Bay	25	0	0	-3	-3	-1	0	-2	1	-1	0	0	-2	-1	-7	0	-1	0	0	-4	0	0	1	0	-4	0	1	0	-4	0	0	0	-2	4	0	1	-27
Near Pistol Lake	26	-1	-1	3	0	-4	-1	-1	0	-3	0	-2	1	-2	-1	-3	0	0	-2	0	0	0	-2	0	0	-1	0	2	0	-2	-2	0	-6	-2	0	0	-30
Conception Bay	27	-1	0	-4	-1	1	0	-2	-4	2	-1	1	-2	-3	-6	0	-2	0	1	-3	0	0	-4	0	-1	0	-1	0	-4	0	0	0	5	3	-1	-6	-33
Fortune Bay	28	-1	1	0	-5	0	4	-1	0	1	-4	1	1	0	0	1	-3	-4	-2	-2	-2	0	0	-2	2	0	0	-2	0	-2	0	-4	-2	-7	-3	0	-35
White Bay	29	-2	-1	2	-1	-1	-4	1	-1	0	-1	1	1	-5	-2	-1	-4	0	0	-4	0	-2	0	0	1	1	-3	1	-3	0	0	1	2	-4	-2	-6	-36
St. Mary's Bay	30	-1	0	-4	-3	0	0	-3	-2	-2	0	0	0	0	-4	0	-2	0	-1	-7	0	0	0	0	0	0	0	-1	-4	0	0	0	-3	2	0	-2	-37
Canada Bay	31	1	-1	2	-4	-3	-1	-2	-1	-2	-2	-3	3	-3	0	-2	2	0	-2	-5	-1	-5	-2	0	-1	-2	0	-1	-2	2	-2	0	0	-5	-2	-4	-48
Terra Nova Lake	32	-4	0	-5	1	0	-5	-6	-3	1	4	-4	-4	-8	-5	0	-8	3	1	0	4	-1	-4	4	2	-3	-11	2	-3	3	-4	3	0	0	0	0	-50
Gambo Pond	33	1	-3	-1	-1	0	-1	6	-10	-1	-7	0	1	-3	-1	-3	-1	-5	1	-1	-5	1	1	-5	0	2	-4	2	-8	-4	1	-5	-1	0	-16	-6	-76
Ingornachoix Bay	34	-1	-1	1	-12	-7	-2	-1	1	-1	-10	-2	-5	4	1	1	-1	0	-4	-9	1	0	-3	1	-4	-4	-3	-4	-4	-3	-3	-3	-2	-8	0	-3	-90
Kaegudeck Lake	35	-5	-3	0	-3	-2	-4	-1	0	-2	-10	-1	-1	-4	-2	-5	0	-6	-2	-5	-7	0	-2	-7	-2	1	-1	-4	0	-7	-2	-6	-2	-1	-6	0	-102

* Departure and arrival site numbers are equivalent, so that any given location corresponds to a single value (see Figure 2-5 for map location)

of a break in selection counts, Burgeo is another one of the most accessible locations in the model. Its position along the South Coast makes it easy to reach large interior lakes that lead, via the Humber, Exploits, and Gander Rivers to all northern regions of the island. Along the East Coast, Bonavista Bay and Hamilton Sound are another two very well-connected locations, especially to the interior and the South Coast via the Exploits and Gander rivers. From these two locations, southern regions of the West Coast are also easily reached through short portages via the Exploits and Humber drainages.

Three of the four least accessible locations are small lakes located along the eastern portion of the island (Terra Nova Lake, Gambo Pond, and Kaegudeck Lake; Figure 2-5, Sites 32, 33, 35). The inlet and outlet streams attached to these lakes are quite short and do not connect to larger river systems. Although accessible from the coast, they are very difficult to reach from the interior as multiple ridges have to be crossed. The second least accessible location is Ingornachoix Bay. To reach this bay, paths must either cross the Long Range Mountains and/or follow long coastal routes.

2.4.4 Location Centrality and Peripherality

From a social network perspective, certain locations are more central to communication than others. There are three principal forms of centrality that define a communication network (Freeman 1978). The first is based on the degree to which a particular location is in direct contact with other places. People occupying locations directly linked to multiple other places act as focal points in the communication *activity* of a region. A second view of centrality is based on the frequency with which a particular location falls between other places. In this case, locations along route segments having high selection counts act as important relays and people occupying those places can exert significant *control* over network communication. The third view of centrality is based on accessibility. People located in places with high accessibility values can communicate with more *efficiency* with all other places in the network.

Places where multiple paths converge fall along route segments with high selection counts, and are highly accessible are more centrally located in the travel route network. From a perspective purely limited to relief and land cover, these are natural candidates for central places. Locations where these traits converge include Notre Dame Bay and large interior lakes. Poorly connected places with low accessibility values and located along route segments with low selection counts likely remained peripheral to human mobility. These are likely to have provided natural buffers or boundaries between regions. One such peripheral area is the southeastern reaches of central Newfoundland, where Kaegudeck Lake is located (Figure 2-5, Site 35). Regions devoid of least-cost paths are further areas likely to have provided buffers as they are not connected to the travel route network, making them highly inaccessible. Examples include large portions of the Northern Peninsula, and the northeastern corner of the island (Figure 2-10).

The peripheral or central nature of particular places, as predicted by the model, is solely dependent on geography. They do not inform us of the particular use people made of these places. In fact, these regions may not have held the role promoted by their network location as a result of overriding cultural factors that may have driven people into or out of particular areas. Any culturally-specific insights to be gained from model results must therefore be based on the archaeological record associated with each major precontact occupations of the Island (Figure 2-2). Port au Choix is a good illustration of this point. It is located immediately north of Ingornachoix Bay (Figure 2-1). In the model, this location has a low degree of connection to nearby places and is not easily accessible from other Newfoundland locations. Although journeys leading to most destinations in Newfoundland essentially avoid Port au Choix, it is located along the only direct route connecting western Newfoundland to southern Labrador (Figure 2-10). According to concepts of network centrality, Port au Choix is unlikely to have been an important place unless travel along the west coast of the island was more culturally significant than the model suggests or some other factor attracted people to this location.

Archaeologically, we know this location was important to both the Archaic and Palaeoeskimo population of the island. The site of Phillip’s Garden (EeBi-1) is one of the largest Palaeskimo habitation sites ever recorded and acted as an important central place. Palaeoesquimoes were attracted to Port au Choix for the predictable seasonal return of a large concentration of migrating harp seals during a few weeks in the spring, the mass harvesting and processing of which kept residents busy for months at this single location (Erwin 2011; Renouf 2011b; Ryan 2011). The presence of an important resource concentration was more important to the Palaeoeskimo inhabitant of Port au Choix than its location along the travel route network.

The Archaic population of the island did not appear to have made use of this resource, but came to Port au Choix for brief visits to bury their friends and relatives. The site of Port au Choix-3 (EeBi-2) is one of the largest Late Archaic burial grounds known to date (Tuck 1976a). This burial ground is interpreted, not as a central place, but as a signpost, one that overlooked every traveller moving north and south along this stretch of the West Coast; a place visited repeatedly, but occupied only briefly by small mortuary task groups (Renouf and Bell 2011). In this case, the importance of the site lies in its location, one through which travellers must pass while journeying between other places. This suggests that, for the Archaic population of the island, movement along the West Coast may have been more culturally important than geography alone predicts and that the particular placement of Port au Choix-3 may reflect a form of cultural control over coastal movement.

2.5 Applying Model Results to Archaic Newfoundland: A Case Study

The knowledge gained from the modelling and analysis of Newfoundland's travel route network can help us expand our understanding of mobility and social interaction in Newfoundland's past. Although the focus of the next few sections is the Archaic (ca. 5500–3200 BP)[2], the earliest period of human presence in Newfoundland, model results can easily be applied to patterns associated with later groups. In this case study, Archaic site locations are first examined in relation to primary avenues of travel, and a number of interesting Archaic locations are examined in terms of their location with respect to the travel route network.

2.5.1 Archaic Newfoundland

The earliest occupants were a population of Amerindian descent, affiliated with what has been termed the *Maritime Archaic* tradition, emphasizing the coastal aspect of the economy of these people. Although the role played by interior resources in their economy is not yet understood, an interior facet to the Archaic seasonal round has long been hypothesized for Newfoundland, based mostly on the peak seasonal availability of various resources (e.g., Austin 1980; Beaton 2004; Carignan 1975b; Tuck 1976a). The current interpretive model assumes that Newfoundland Archaic families were involved in a form of seasonal round, occupying coastal locations during the warm season, a time when maritime resources are highly available, and the interior during the cold season to focus on caribou hunting.

Archaic islanders spent roughly 3000 calendar years on the island, the longest of any cultural group (Figure 2-2). During this time, they would have developed a very intricate relationship with the island, including its interior regions. Although the particular narratives tied to the island have been lost, a better understanding of mobility can provide an enriched interpretation of the Archaic. Site locations across the island support the view that a form of mobility going beyond mere access to interior resources was present during the Archaic. The frequent association between coastal sites with rivers reaching into the interior and a remarkably high number of interior sites, despite their under-representation in our current sample, has led Renouf and Bell (2006) to suggest that the use of the interior for movement between coasts played an important role in Archaic lifeways. A better understanding of movement within regions and across the island can shed light on the way in which Newfoundland's particular geography played a role in shaping the world inhabited by its Archaic population.

2.5.2 Site Locations and Interior Routes of Travel

A list of 186 archaeological sites likely affiliated to the Archaic was obtained from the PAO database and later reduced to 113 sites based on the presence of diagnostic Archaic artifacts in their collection. Artifacts considered diagnostic were limited to chipped projectile points, plummets, ground slate points and bayonets, and ground stone gouges, adzes, and axes. Because a number of sites are in very close proximity to each other, the list was further condensed to 82 separate localities (Lacroix 2015c).

The large majority of localities (83 percent) are positioned along modelled travel routes, including not only interior sites, but also numerous island locations (Figure 2-11). For example, five island localities are positioned directly along the route leading from Notre Dame Bay to Halls Bay, where three separate routes lead into the interior. Although only three localities are positioned directly at the mouth of an inland river route, when sites found along the shores of the bay in which these rivers empty are included, the number increases to 20 localities (25 percent). This confirms the

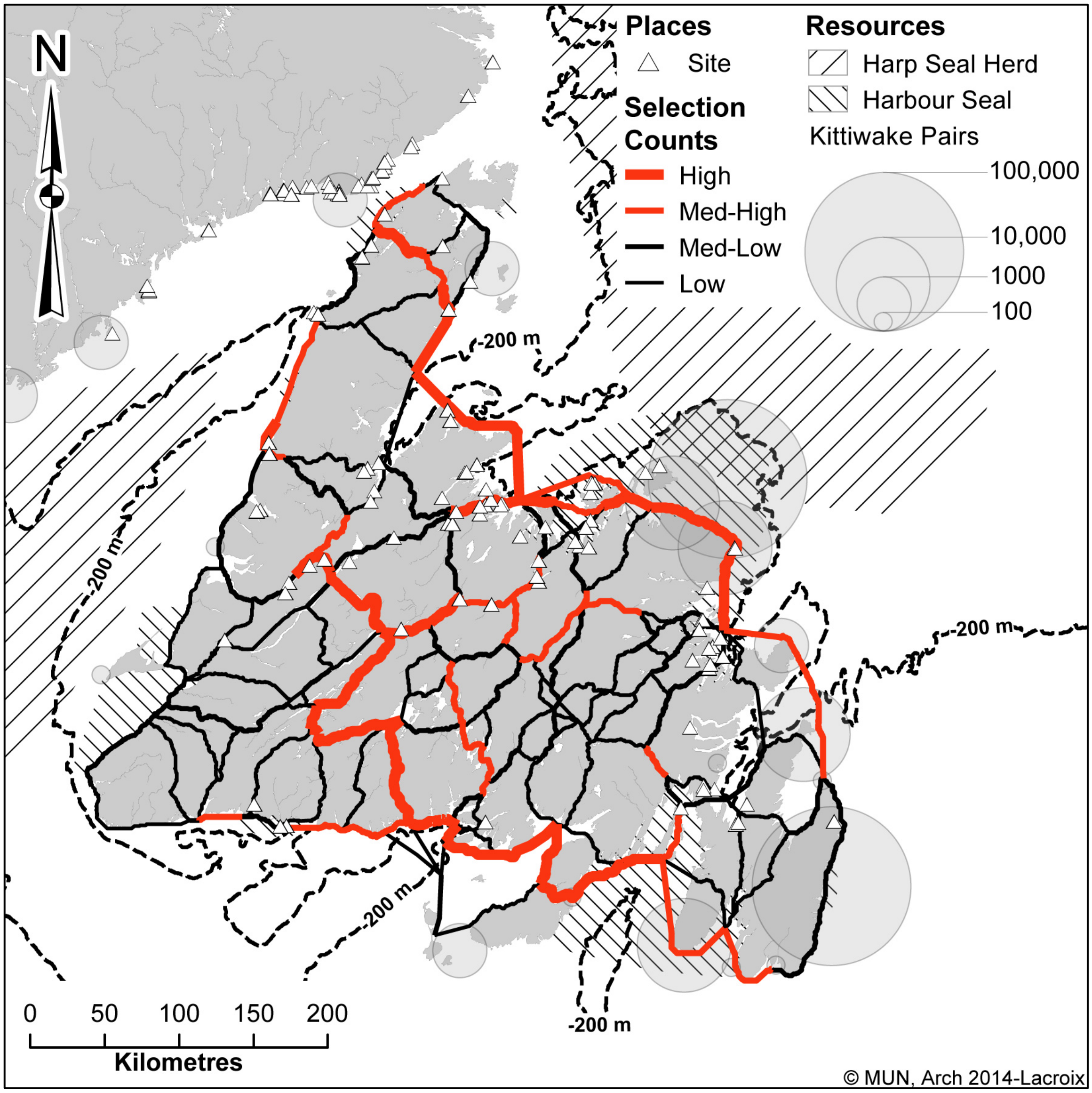

Figure 2-11 Spatial distributions of Archaic sites, major coastal resource concentrations, water with high marine productivity (>200 m depth), and their relationship to modelled travel routes.

suggestion made by Renouf and Bell (2006) that a large number of coastal sites are located near a route providing access to the interior. Furthermore, the 13 interior localities (16 percent) present in the site sample are all positioned along modelled interior routes of travel. Therefore, despite the limited amount of interior surveys, there is strong evidence from site locations alone that the interior was important to the Archaic inhabitants of the island (Renouf and Bell 2006:14).

The ability to combine site locations with modelled travel routes provides an enriched context from which to interpret archaeological sites. A number of sites are found at important junctions in the travel route network. For example, the sites located at the mouth of St. Paul's Inlet (DlBk-12) and, to a lesser extent, Big Brook in Unfortunate Cove (EjBa-2), not only provided direct access to nearby deposits of Newfoundland chert (Beaton 2004; Lavers 2010) but were also well-positioned to access inland routes crossing the Northern Peninsula.

Other examples include the sites found in southeastern Trinity Bay (CjAj-3 and CjAj-10), which are located at one endpoint of a trail crossing the Avalon Peninsula, ideally located as a departure or arrival point for this short trip. The site located at the mouth of Badger Brook (DfBa-1) is also positioned at the end point of an important route linking western Notre Dame Bay, via Hall's Bay, to the Exploits River system. Similarly, the site found at the northern end of Long Island (CkAm-1), one of the principal islands in Placentia Bay, is located at a junction point where routes heading inland from Placentia Bay and those crossing the Isthmus of Avalon converge together. These various locations, and others like them, would have provided strategic places where travellers could rest and wait for other travelling parties, before moving on.

2.5.3 Boundaries and Central Places

The modelled travel route network brings new and interesting perspectives to the interpretation of four notable Archaic locations around the island: Port au Choix, Back Harbour, Burgeo, and the Humber Junction. As briefly discussed above, the Port au Choix burial ground acted as a landmark positioned along a travel route connecting the West Coast of Newfoundland to Southern Labrador, perhaps as a way to exert some control over coastal movement; additional evidence suggests it marked a cultural boundary. In contrast, the location of Back Harbour and its burial ground suggest they fulfilled a different role, one of a central place. This central role appears to be mirrored, to a lesser extent, in Burgeo on the South Coast. The Humber Junction also appears to have been an important place, marked by the deposition of special items, perhaps as a result of its location at an important hub in Newfoundland's travel route network.

2.5.3.1 Port au Choix

As noted above, the presence of an Archaic burial ground at Port au Choix suggests the travel route following the west coast of the Northern Peninsula was more culturally significant than the model predicts. The burial ground is interpreted as a signpost because of its highly visible and recognizable location. It is positioned on a sandy spit, overlooking a narrow channel between a large island and the mainland along this coastal route. The burials were placed along a prominent beach terrace and many were marked either by rocks, boulders, or whale bones (Tuck 1976a). The new perspective provided by the travel route network may further explain why this particular locality was selected for the burial ground.

Archaeologically, an important change in artifact assemblages occurs at Port au Choix. In Labrador, and adjacent regions of Quebec, Archaic assemblages are divided into two principal branches, a northern and a southern (Fitzhugh 2006; Pintal 2006; Tuck 1982). In Newfoundland, Port au Choix marks the southernmost location where assemblages associated with the southern branch Bonne-Espérance complex are found (Beaton 2004; Lacroix 2015c; Pintal 1998, 2006; Reid 2007).

The location of Port au Choix also corresponds with a number of dramatic changes in the local environment that have important implications for subsistence practices. Over 100 plant species reach their northern limit in the vicinity of Port au Choix (Damman 1983). A change in coastal morphology also occurs at Port au Choix. During the Archaic, the burial ground was located on the southernmost island of an archipelago extending northward into the Strait of Belle Isle. South of Port au Choix, the coastline is straight, unprotected, and, during the Archaic, would have been punctuated by seven deep narrow bays leading to the foot of the Long Range Mountains (Bell and Renouf 2011; Shaw et al. 2002). Sheltered locations north of Port au Choix were within easy reach of the Strait of Belle Isle, an important corridor funnelling the migration of numerous marine species, including harp seals and the great auk (Fuller 1999; McGhee and Tuck 1975; Nalcor Energy 2012). No significant annual marine resource concentrations are present along the coast south of Port au Choix where mid-reach locations along deep bays would have provided the best shelter and access to local interior and coastal resources.

Given the very different landscapes and living opportunities available to people inhabiting areas north and south of Port au Choix, the change in artifact assemblage occurring at Port au Choix suggests the presence of a cultural boundary. If so, the burial ground acted not only as a signpost along a culturally important travel route, but also as a boundary marker. Archaic burial grounds acting as cultural boundary markers are known elsewhere in the Far Northeast where they are also located along important travel routes. Throughout the Moorehead burial tradition in the Gulf of Maine (ca. 5200–3700 BP), many burial grounds are located midway along long river systems reaching far into the interior, where they are believed to represent the boundary between separate interior and coastal populations (Robinson 2001, 2003, 2006). Therefore, Port au Choix-3 possibly represents a local interpretation of the same ideology, adapted to its particular regional context. As an important "in between" place along a culturally significant travel route, the burial ground and its highly recognizable location would have provided a strong visual statement to travellers entering this narrow channel that they were now crossing a cultural boundary.

2.5.3.2 Back Harbour

Reference to the travel route network also expands our understanding of the Archaic site cluster present in the modern community of Back Harbour, located on North Twillingate Island in northeastern Newfoundland. During this period, Back Harbour was one of the most important inhabited places within Notre Dame Bay and, most likely, the entire island. Back Harbour is pockmarked by no less than 15 Archaic sites, all in close proximity (Temple 2007; Wells and Renouf 2008b); the highest Archaic site concentration anywhere on the island. In fact, Back Harbour can be considered as one gigantic archaeological site, one from which 40 percent of all diagnostic Archaic material from Newfoundland has been recovered (Lacroix 2015c:Table 4-2). This site cluster is of further importance as it is home to the only other known Archaic burial ground on the island (Temple 2007; Tuck 1978a). Back Harbour clearly played a central role in the lives of people inhabiting northeastern Newfoundland during the Archaic.

One of the possible reasons people came to Back Harbour was its privileged access to resources. Renouf and Bell (2006) noted that the eastern reaches of Notre Dame Bay are ideally located to access a variety of major offshore resource concentrations including a large winter harp seal breeding herd, a year-round presence of harbour seals, and the summer presence of significant sea bird colonies on nearby islands (Figure 2-11). As a result, people inhabiting Back Harbour had year round access to a plentiful supply of food.

The central role of Back Harbour is further supported by the travel route network. Notre Dame Bay is well connected to numerous locations via multiple interior and coastal routes placing Back Harbour at a focal point of activity along the travel route network (Figure 2-10). One of the coastal routes with the highest selection count in the model passes just off Back Harbour, providing this locality with a central role in the relay of information along this coastal route. It is also located in close proximity to one of Newfoundland's most accessible locations on the island (Hamilton Sound; Table 2-4, Figure 2-6b). The high accessibility value of eastern Notre Dame Bay is partly a result of the important coastal route, but also because of the ease of cross-island travel it provides via the Gander, Exploits and Humber river systems. This made Back Harbour an efficient location from which to start or end long-distance journeys.

It appears that Back Harbour became one of the most important central places in Archaic Newfoundland as a result of its strategic location. This locality allowed its inhabitants privileged access to significant resource concentrations that could support large groups of people, a central role in the communication network of the region, and easy access to most other places on the island. Newfoundland's two Archaic burial grounds are therefore located in two very different regional settings. While both are located along important routes of travel, Back Harbour is at the heart of a central place with a significant human presence but Port au Choix is not. These differences suggest the two burial grounds fulfilled different roles, the former providing a direct link between ancestors and an important habitation locale, the later acting as a significant landmark and boundary marker (Lacroix 2015d).

2.5.3.3 Burgeo

There are currently very few Archaic sites along the south coast of Newfoundland as a result of thousands of years of continuous sea-level rise that submerged most low-lying coastal sites dating to this period (Bell and Renouf 2003; Rast et al. 2004; Renouf and

Bell 2006). Despite sea level change acting against both site preservation and detection, Burgeo has a small Archaic site cluster (Figure 2-11). It is estimated that the rate of submergence in this region has been, on average, 15 cm/century over the last 5000 years, placing the Archaic sites (CjBj-3, CjBj-13, CjBk-6) at least 7–10 metres above their contemporaneous coastline (Rast et al. 2004). Based on underwater finds by local divers, we know that there are submerged Archaic sites at Burgeo (Rast 1999; Rast et al. 2004). This suggests Burgeo was an important Archaic locality.

An abundant food supply is available in this region and would have been attractive to Archaic groups. This location is favoured with access to a major salmon river (Grandys Brook). Deep water comes very close to shore creating a zone of high marine productivity that attracts a resident population of harbour seals, a small but predictable number of migratory harp seals during the winter, and birds (Figure 2-11). Caribou and fur-bearers are also found along the coast.

The travel route network also supports the suggestion that Burgeo was an important Archaic place. As a locality along a relatively straight coast, Burgeo does not have a high degree of connection to other places surrounding it, but it sits on the only route connecting southern coastal locations together. Like at Port au Choix and Back Harbour, this “in betweeness” provides a strategic location that offers a certain level of control over regional communication. In addition, very steep hills meet the sea between Burgeo and Hermitage Bay, decreasing the number of available landing locations, thus making Burgeo’s accessible shorelines a natural stopping point for journeys travelling along the south coast of the island. It is also one of the most accessible locations (Table 2-4), which means it is ideally suited to act as an efficient departure and arrival point for journeys to most other places on the island. This level of connectivity to most of the island would no doubt have made Burgeo one of the principal places to reach after arriving from Cape Breton via the Cabot Strait. Model results therefore suggest Burgeo would have acted as an important place along the western portion of the south coast of the island. This would likely have been exploited by the Archaic population of the island, especially when you take into account that it was complimented by the natural attractions of this locality.

2.5.3.4 Humber Junction

The travel route network may also help shed some light on a region where some of the most unusual Archaic artifacts in Newfoundland have been found. This region, the Humber Junction, is the area where Grand Lake and the southern Humber drainage connect with the main branch before emptying into Deer Lake. The collections associated with multiple find spots from this region are unlike any other on the island and show links to a number of distant regions both within and outside of Newfoundland.

There is a very intriguing assemblage associated with the Rumbolt site (DhBg-1). Today this site is on the shores of Sandy Lake, a man-made reservoir, but during the Archaic this site would have been located at the edge of a small pond linked to Grand Lake, just east of the head of Junction Brook, the river linking Grand Lake to the Humber River. The assemblage consists of a cache of 12 pristine and almost perfectly rectangular celts with a unique hexagonal cross-section, made in three standard sizes from a banded grey limestone (Figure 2-12). These include 11 gouge-adze combinations, more than a third of the total number of double-ended celts from Newfoundland. The only other Newfoundland specimen related to these celts was found in a burial context at Port au Choix, but it is not as finely made, having a rectangular cross-section and showing signs of use (Figure 2-13:e). The Rumbolt celts were also found in association with an unusual ground slate point made of the same material as the celts (Figure 2-13:a). A second, almost identical specimen was found within a few hundred metres of the cache (Figure 2-13:b; Sterling Rumbolt, personal communication). These two points have a broad blade with a hexagonal cross-section, similar to specimens from burial contexts at Port au Choix (e.g., Tuck 1976a:Plate 16), but their stem differs, consisting of a double-notched neck and a rounded base. Outside Newfoundland, the only other specimen sporting the same features comes from the Mersey River system in Nova Scotia (Figure 2-13:c; Queen's County Museum Accession No. DEX-160), linking the Sandy Lake specimens to the Maritimes.

A very unusual 70 cm-long greenstone rod was found at the opposite end of Junction Brook, where it empties into Deer Lake (DhBh-1). This specimen resembles a paddle, with a blunt adze-like bit at one end of the long cylindrical shaft and a bulbous protuberance at the other (Figure 2-14:a). This find appears to be unique in the Far Northeast, although it recalls, in shape, much smaller ground stone rods recovered from

Figure 2-12 Double-ended ground stone celts from the Rumbolt Cache (DhBg-1).

Figure 2-13 Rumbolt Cache (DgBh-1) artifacts (a, d, f), and their closest match elsewhere: b) few hundred metres away, on opposite side of sandy spit; c) Mersey River drainage in Nova Scotia (Queen’s Country Museum, DEX-160); e) Port au Choix burial ground.

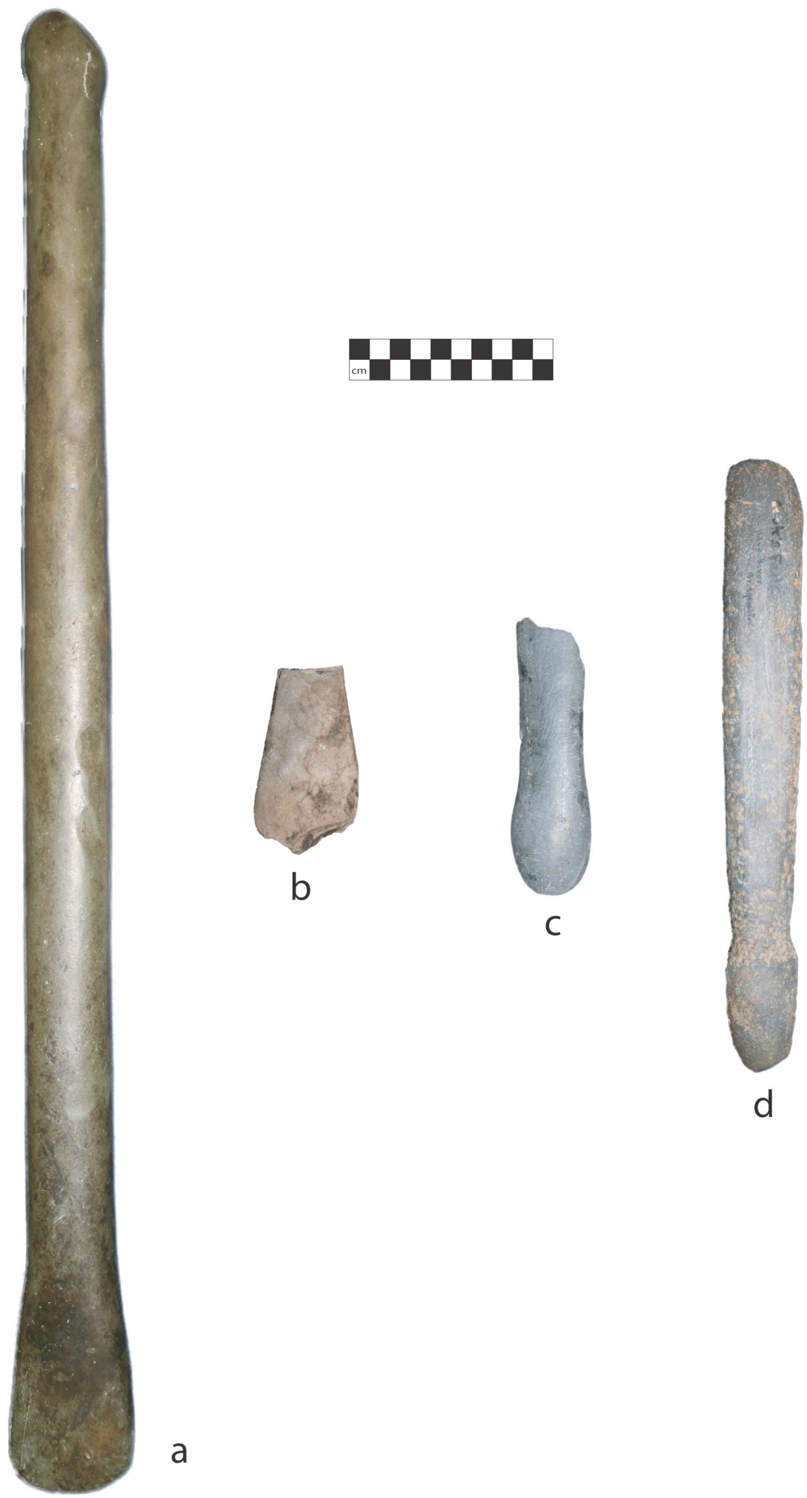

Figure 2-14 Unusual artifact from Junction Brook and comparative material: a) green staff-like rod from DhBh-1; b) broken adze-like paddle from CkAl-3; c) and d), Nova Scotia Rods from Lunenburg County (Nova Scotia Museum, BeDd-1:7 and 80.10.9).

Lunenburg County in Nova Scotia (e.g., Nova Scotia Museum Catalogue Nos. BeDd-1:7 and 80.10.9; Figure 2-14:c, d). In Newfoundland, its closest match is the broken and battered bit-end portion of a possibly similar but slightly smaller implement made of limestone and recovered from Stock Cove (CkAl-3; Figure 2-14:b). The unusual staff-like rod provides a weak link between the Humber Junction and the Maritimes, and possibly southeastern Newfoundland as well.

A double-ended axe with an unusual pentagonal cross-section was also recovered from the mouth of Junction Brook (DhBh-1, Figure 2-15:a, b). Specimens with this type of cross-section are relatively rare in Newfoundland, with this specimen being the only double-ended example. The two closest matches are partial specimens, one is from Back Harbour (DjAq-19; Figure 2-15:d), but the other is unfortunately unprovenienced (Figure 2-15:e). Another two specimens from Bonavista Bay (DdAk-2) and Trinity Bay (CjAj-3) present the distinctive ridge and bit facet associated with the other specimens, but lack the pentagonal cross-section and are either waterworn or unfinished. Outside Newfoundland, several highly-polished examples of celts with pentagonal cross-sections were recovered in burial context at Rattlers Bight in Labrador (Figure 2-15:c), linking the Deer Lake specimen to eastern Newfoundland and northern regions.

A final set of unusual finds come from the shores of Deer Lake. In Newfoundland and elsewhere in the Far Northeast, as heavy woodworking tools are rarely made of red stone. Although this colour choice was relatively common for ground slate points and

Figure 2-15 Double-ended celt with pentagonal cross-section from Junction Brook (a, b) and comparative material (c, d, e): a) side view; b) top view; c) Rattlers Bight burial ground; d) Back Harbour intertidal zone; e) unknown provenience.

bayonets in Newfoundland, only two red celts are present in collections from the island and both are from the Deer Lake area. The first is a small trapezoid axe (DhBi-1; Figure 2-16:c), a form relatively common in Newfoundland. The other is a gouge-adze combination with an unusually narrow gouge bit followed by a deep and narrow channel (DgBj-1; Figure 2-16:a). A grey specimen almost identical in shape and form is the only other known example of this type in Newfoundland and comes from the inner reaches of Notre Dame Bay (DiAx-1; Figure 2-16:b), linking the Deer Lake specimen to northeastern Newfoundland.

Most of the unusual artifacts associated with the Humber Junction are well-finished, sometimes highly polished, with little signs of usewear, and in one instance placed *en cache*, suggesting they were ritually deposited. If so, this region appears to have held a special importance for the Archaic inhabitants of Newfoundland. The links to various regions of Newfoundland, the Maritimes, and Labrador displayed by this unusual collection suggest people tied to a variety of other places either lived in or passed through this region. The level of distant contact exhibited by the Humber Junction collections is supported by its particular location within the travel route network of the island. This region is directly connected to inland routes leading in all directions, making it an important hub in the communication network of the island. It is strategically located along one of the most important inland travel corridors, linking the Humber drainage to the Exploits system. It also provides access to the easiest pass crossing the

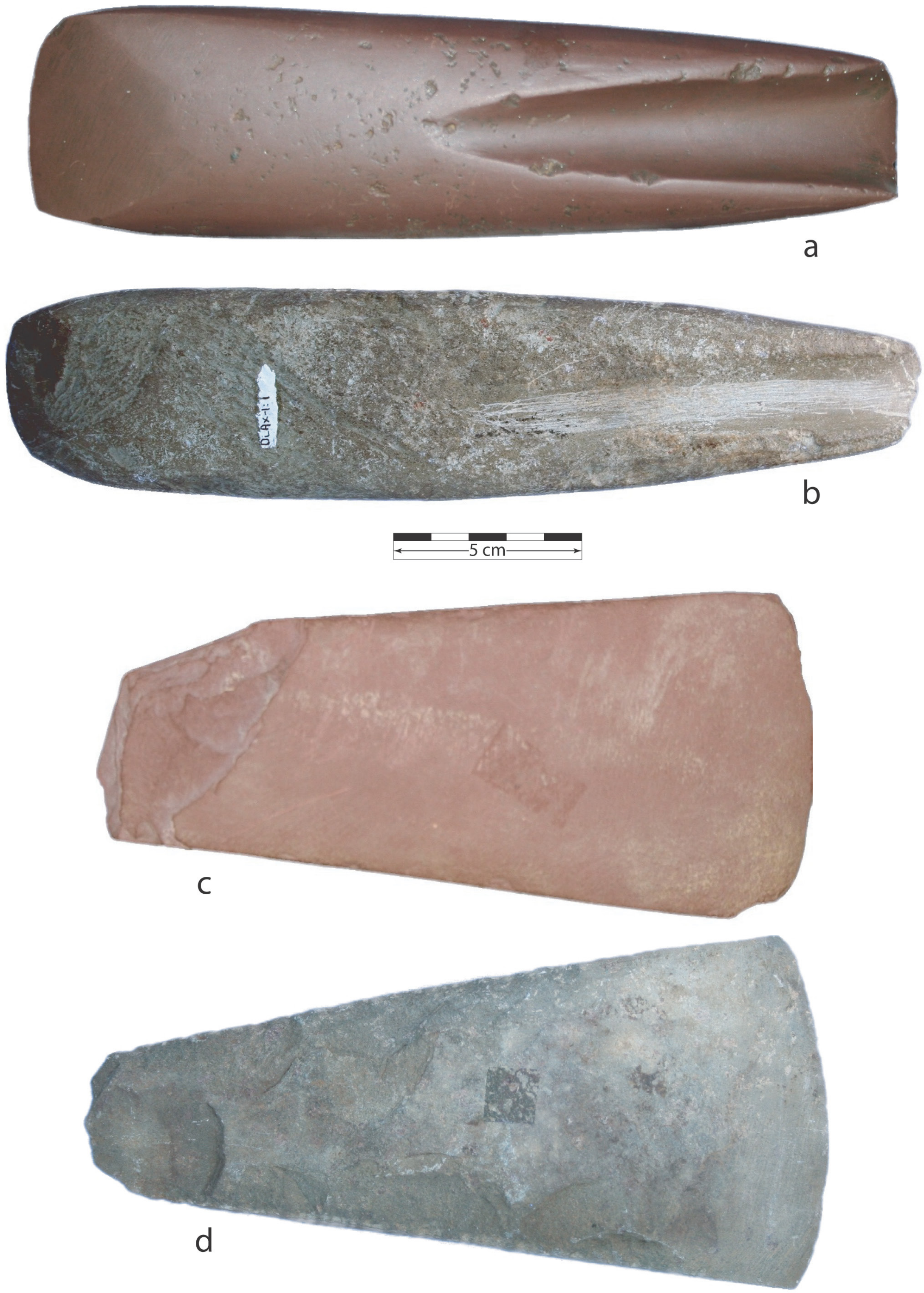

Figure 2-16 Unusual red slate woodworking tools from Deer Lake (a, c) and comparative material (b, d): a) red gouge-adze combination from DgBj-1; b) similar gouge-adze combination from DiAx-1; c) red trapezoidal axe from DhBi-1; d) similar trapezoidal axe from EeBi-2.

Long Range Mountains. Finally, important waterways connect this locality to most other regions of the island, making it relatively easy to travel to other island locations. According to model results, the Humber Junction is a good location to connect with people travelling from distant locations, a role that appears to have been adopted by the Archaic population of Newfoundland.

2.6 Conclusions

The traditional view of mobility in Newfoundland is over-simplistic, especially for the Archaic. The model described herein was developed to explore more complex notions of mobility by defining the nature of Newfoundland's travel route network. The model uses a combination of slope and land cover types to generate travel routes using a multi-criteria cost surface analysis approach. The model produced realistic paths of movements, likely representing precontact travel routes. The resultant network closely reproduces known historic travel routes used by the Mi'kmaq, and extends the list of routes to areas where information was not previously available.

The communication network was also quantified to highlight the primary travel corridors and areas that would have seen very little traffic, as well as providing a relative ranking of the accessibility of various locations around the island. Using this information, conditions favouring location centrality and periphery were reviewed. These results provide new food for thought for rethinking the role these travel routes played within the particular world of each precontact group that has inhabited the island. These results can also serve as a basis to guide future interior surveys towards locations likely to have received intensive human traffic over the last 6000 years.

Contrasting these results with our current knowledge of the Archaic confirmed that sites are generally located along important travel routes, including regions immediately adjacent to river mouths or bays which act as nodes and end points in the travel route network. The Port au Choix burial ground appears to have acted as a boundary marker judiciously positioned along a culturally important travel route connecting the west coast of Newfoundland to southern Labrador. In contrast, Back Harbour was positioned at the nexus of its region, strategically positioned not only to access some of the most important resource concentrations on the island, but also to provide easy access to most other regions. The results of the analysis suggest two other places worth investigating in further detail. In the Humber Junction and Burgeo areas, archaeological evidence and site location converge to suggest these were important places to Archaic people journeying across Newfoundland.

Newfoundland Archaic mobility went far beyond seasonal access to resources in peak availability. The travel route network formed the spine of a complex communication system that not only helped people exchange with each other, sometimes across large distances, but also brought them together. These routes, and the journeys associated to them, would have been an integral aspect of the history of the people of Archaic Newfoundland.

2.7 Acknowledgements

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2.8 Notes

1. The Province of Newfoundland and Labrador is composed of the island of Newfoundland and a mainland portion known as Labrador. In this paper, “Newfoundland” refers only to the island of Newfoundland.

2. Dates are provided in uncalibrated radiocarbon years before present (BP, 1950), unless otherwise stated.

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Chapter 3

Revisiting Port au Choix:

Archaic Burial Ceremonialism in Newfoundland

Dominic Lacroix

ABSTRACT. Newfoundland has two known Late Archaic burial grounds, Curtis and Port au Choix-3, that share broad similarities with each other and with other ceremonial sites from the same period. However, a comparative evaluation of their landscape settings and burial assemblages highlighted significant differences between the two. Curtis is a typical expression of the Late Labrador Archaic burial tradition, present along the Lower North Shore in Quebec and the Atlantic coast of Labrador. Ceremonial sites of this tradition are located within or in close proximity to important contemporary habitation locales and, although exotic goods are present, burial deposits are representative of local tool forms. In contrast, Port au Choix-3 was positioned far from intensive loci of habitation and its deposits contain diverse tool forms linking its assemblage to multiple regions. It is suggested that these two burial grounds fulfilled different roles, with Curtis acting as an ancestral link between an important central place and a local kin-group, while Port au Choix-3 acted as a cultural boundary marker.

3.1 Introduction

The interpretation of the Late Archaic (ca. 5500–3200 BP)[1] in Newfoundland and neighbouring regions, especially along the Lower North Shore, the Strait of Belle Isle, and Atlantic Labrador has relied heavily on information from the Port au Choix-3 burial ground (EeBi-2, referred as PAC-3 hereafter). A second, less-well documented, Archaic burial ground is present in Newfoundland (Curtis, DjAq-1). A multiscale comparative investigation between these sites and other burial locations outside Newfoundland suggests PAC-3 is atypical and played a different role in the Archaic world of the region.

During the Late Archaic, a communication and exchange network linked regions spanning from northern Labrador in Canada to Maine in New England, a region referred to as the Far Northeast (Figure 3-1). Although burial traditions present in the Far Northeast during this period share some remarkable overarching similarities, each relied on a very particular set of landscape and material patterns. The Curtis burial ground has direct doppelgangers north of the St. Lawrence within the Late Labrador Archaic burial tradition (Fitzhugh 2006; Tuck 1978a). In contrast, a number of significant patterns present at PAC-3 stand at odds to this burial tradition, suggesting the burial ceremonialism present at this site had a different purpose. These results suggest we must rethink our interpretation of PAC-3 to accommodate this different role. We must also critically re-evaluate former interpretations of life in Newfoundland and Labrador made with a heavy reliance on information from PAC-3.

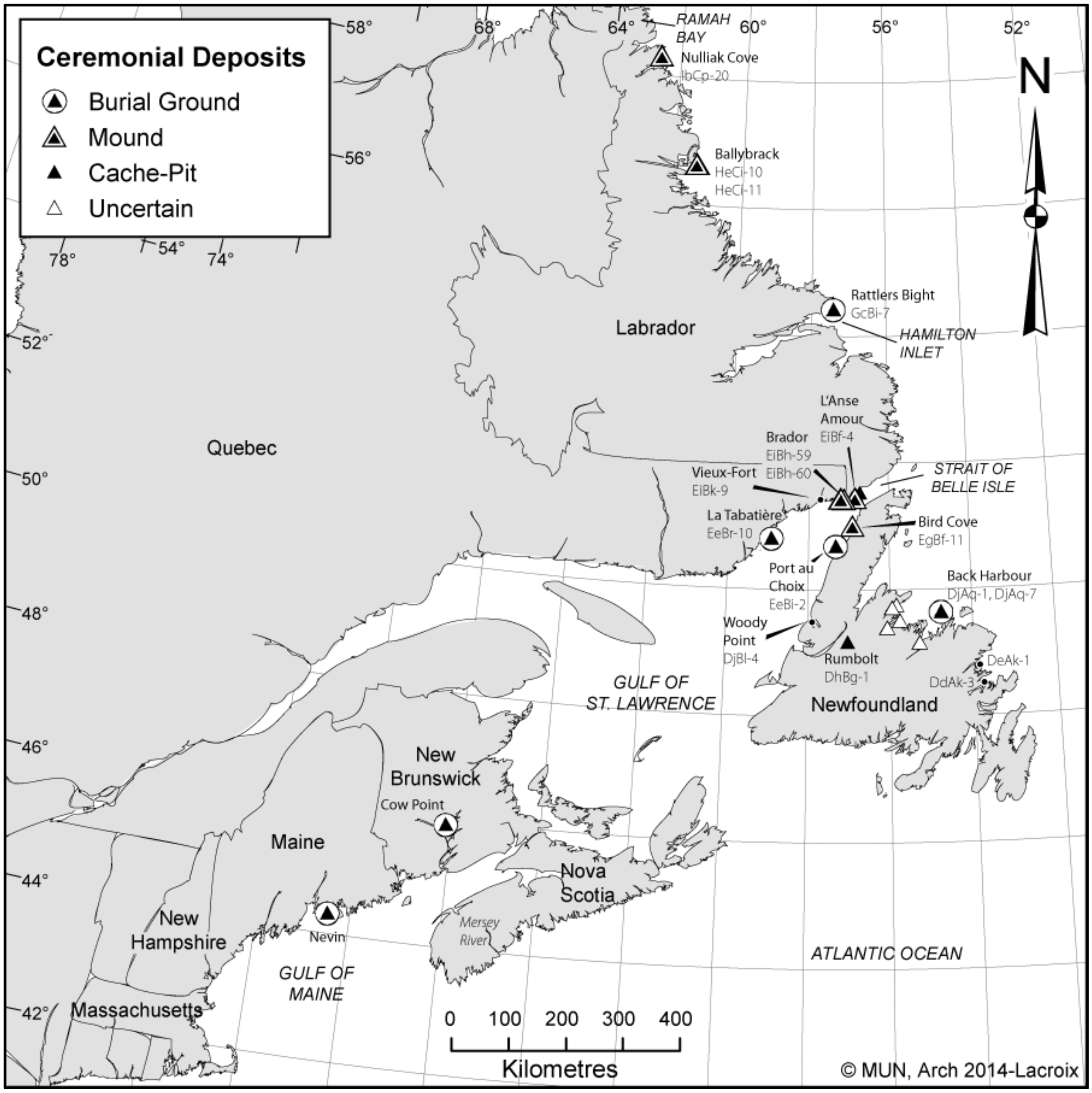


Figure 3-1 Late Archaic burial deposits in Newfoundland and southern Labrador.

3.2 Late Archaic Burial Ceremonialism

Burial ceremonialism is used here to refer to the ritual deposition of things, as opposed to caches, in that they were not meant to be recovered at a later time. As a form of ceremonialism, burials could be performed individually, along with other members of a group, or as part of a large aggregation uniting multiple communities (Walthall 1999). In this context, burial ceremonies can commemorate important singular events that may or may not include the death of a loved one or leader, or represent an iteration of a recurring ritual needing to be performed periodically. Burial ceremonialism, like other forms of ceremonies, has the power to rekindle memories, and rejuvenate ties between people and the spirit world (Chesson 2001). The act of burying something and/or someone is enshrined in a complex web of culture-specific beliefs and customs, performed in the present as a reinterpretation of long standing traditions sometimes dating back millennia (e.g., Fahlander and Oestigaard 2008; Rakita et al. 2005).

Various forms of burial ceremonialism were present in the Far Northeast during the Late Archaic (e.g., isolated pits, stone mounds, burial grounds; Table 3-1). The most remarkable among these are burial grounds, as they offer concentrated examples of this form of ceremonialism. Late Archaic burial grounds are sometimes composed of hundreds of burial pits, frequently covered in ochre and a recurring set of inclusions comprised of a variety of ground stone objects such as gouges and adzes, slate points, plummets and other forms of stone pendants. Less frequently included are chipped stone bifaces, both local and exotic. These burial grounds have commonly been called “great boneless cemeteries” due to the very consistent lack of skeletal remains within the burial pits (e.g., Fitzhugh 1975b; Robinson 1996b; Tuck 1978a, 1991). Missing remains are generally seen as being a result of a lack of preservation due to high soil

Table 3-1 Subarctic coastal Archaic sites associated with burial deposits.

Borden	Site Name	Context	Burial Deposits	Radiocarbon Date Range BP*	Sources
Early Archaic (ca. 8000–6500 BP)					
EiBh-60	Brador Tumulus-2	Mound	1		Lévesque (1976); Pintal (1998, 2006)
EiBf-04	L'Anse Amour	Mound	1	7530±140 (I-8099)– 7255±115 (SI-2306)	McGhee and Tuck (1975); Tuck (1978a)
EjBe-16	Arrowhead Mine	Cache-pit	1	7255±85 (SI-1799)	McGhee and Tuck (1975)
EjBf-08	Barney	Cache-pit	1		McGhee and Tuck (1975)
HeCi-10	Ballybrack-9	Mound	1		Fitzhugh (1978, 2006)
HeCi-11	Ballybrack-10	Mound	1	7065±70 (Beta-3558)	Fitzhugh (1978, 2006)
Middle Archaic (ca. 6500–5000 BP)					
EiBg-77	Rivière de l'Est	Mounds	2		Pintal (1998, 2006)
Late Archaic (ca. 5000–3200 BP)					
EeBi-02	Port au Choix-3	Burial Ground	122	4290±110 (I-3788)– 3230±220 (I-4380)	Jelsma (2000); Kennedy (1981); Tuck (1976a)
EgBf-11	Big Droke-1	Mound?	1	4530±60 (Beta-108559)– 3470±50 (Beta-129398)	Reader (1998, 1999b)
DkAx-02	Nipper's Harbour	Uncertain	?		Thomson (1986, 1989)
DkAx-08	Smith Harbour Burial	Uncertain	1		Site record form; Site collection
DiBa-03	South Brook-1	Uncertain	1		Site record form; Site collection
DjAw-06	Miles Cove-1	Uncertain	?		Marshall (1982)
DhAt-03	Winter House Cove-1	Uncertain	1		Schwarz (1992)
DjAq-01	Curtis	Burial Ground	15	3720±130 (GaK-834)– 3200±90 (GaK-1254)	Thibaudeau (1993)
DjAq-07	MacLeod-2	Uncertain	?		MacLeod (1969); Temple (2007, 2008); Site catalogue
DhBg-01	Rumbolt	Cache-pit	1		Site record form; Site collection
EeBr-10	La Tabatière-10	Uncertain	?		Pintal (1998, 2006); Pintal and Boucher (1994)
EiBh-59	Brador Tumulus-1	Mound	1		Lévesque (1976); Pintal (1998, 2006)
EiBf-02	Forteau Point	Cache-pits	3	5035+65 (SI-2311) from Cache 1	McGhee and Tuck (1975); Tuck (1978a)
EiBf-04	L'Anse Amour	Uncertain	2		Harp (1964a); McGhee and Tuck (1975)
GcBi-7	Rattlers Bight-1	Burial Ground	9	4000±65 (SI-2515)– 3370±50 (SI-2518)	Fitzhugh (1978, 2006)
IbCp-20	Nulliak Cove-1	Mounds	4	3565±75 (SI-4821) from Mound 1	Fitzhugh (1981, 1984, 2006); Rankin (2008)

* Range of accepted radiocarbon dates associated with the burial events.

acidity, although it is possible that a significant proportion of the burials may never have held any skeletal remains (Wright 2006). In the Far Northeast, only two sites affiliated with Late Archaic burial practices have produced well-preserved human remains: PAC-3 in Newfoundland and Nevin in Maine (Figure 3-1; Byers 1979; Tuck 1976a).

Despite the limited number of burials at Nevin and in certain loci at PAC-3, both male and females, ranging from infants to old adults, are represented at each site. Furthermore, based on burial pit totals, placement in a burial ground is unlikely to have been the principal mode of disposal of the dead (Bourque 2012; Wright 2006). The apparent lack of preferential selection and possible opportunistic choice of the deceased, suggest that it was the performance of the burial ceremony itself that held more importance, not the person being interned. Accordingly, beyond a brief overview of what has been noted previously, the remainder of this paper distances itself from the discussion of the deceased buried in Newfoundland. Instead the focus is placed on the regional context within which the burials occurred as evidence demonstrating how seemingly similar forms of burial ceremonialism can tell very different stories.

3.3 Newfoundland Archaic Burials Grounds

A little over a dozen Late Archaic ceremonial burial deposits are known or suspected from various locations around Newfoundland and its adjoining mainland regions (Figure 3-1; Table 3-1). Among these, only two are currently recognized as burial grounds, in sharp contrast to the 34 present in the Gulf of Maine (Robinson 2003). The two Newfoundland burial grounds, PAC-3 and Curtis, are located some 220 km distance from each other, as the crow flies, on opposite coasts of the island (Figure 3-1). Both were professionally excavated in the 1960s, but Curtis was poorly documented and results were never published. As a result, most of the information currently available regarding burial ceremonialism on the island comes from PAC-3. The following sections provide a summary of what is currently known from these two burial grounds.

3.3.1 Port au Choix-3

The first and best known, PAC-3 (EeBi-2), is located in the modern community of Port au Choix along the western shore of the Northern Peninsula in Newfoundland (Figure 3-2). Although connected to the mainland today, the burial ground was located on a large island at the time of its use, separated from the mainland by a narrow channel through which travellers following the coast would have passed, overlooking the burial ground (Renouf and Bell 2011). This burial ground is Newfoundland and Labrador's largest, with 122 known burials including two dogs. Remains were placed in the ground either alone or in groups, the largest of which is a mass grave containing at least 15 individuals (Jelsma 2000; Kennedy 1981; Tuck 1976a). The burials are unevenly spread across at least seven spatially and temporally separate burial loci, some dating to different periods, indicating a progression in burial ceremonialism with a florescence around 3800 BP. During this period, the oldest and largest of the loci, Locus II, was established and remained in use for multiple centuries. It contains the remains of 93 individuals

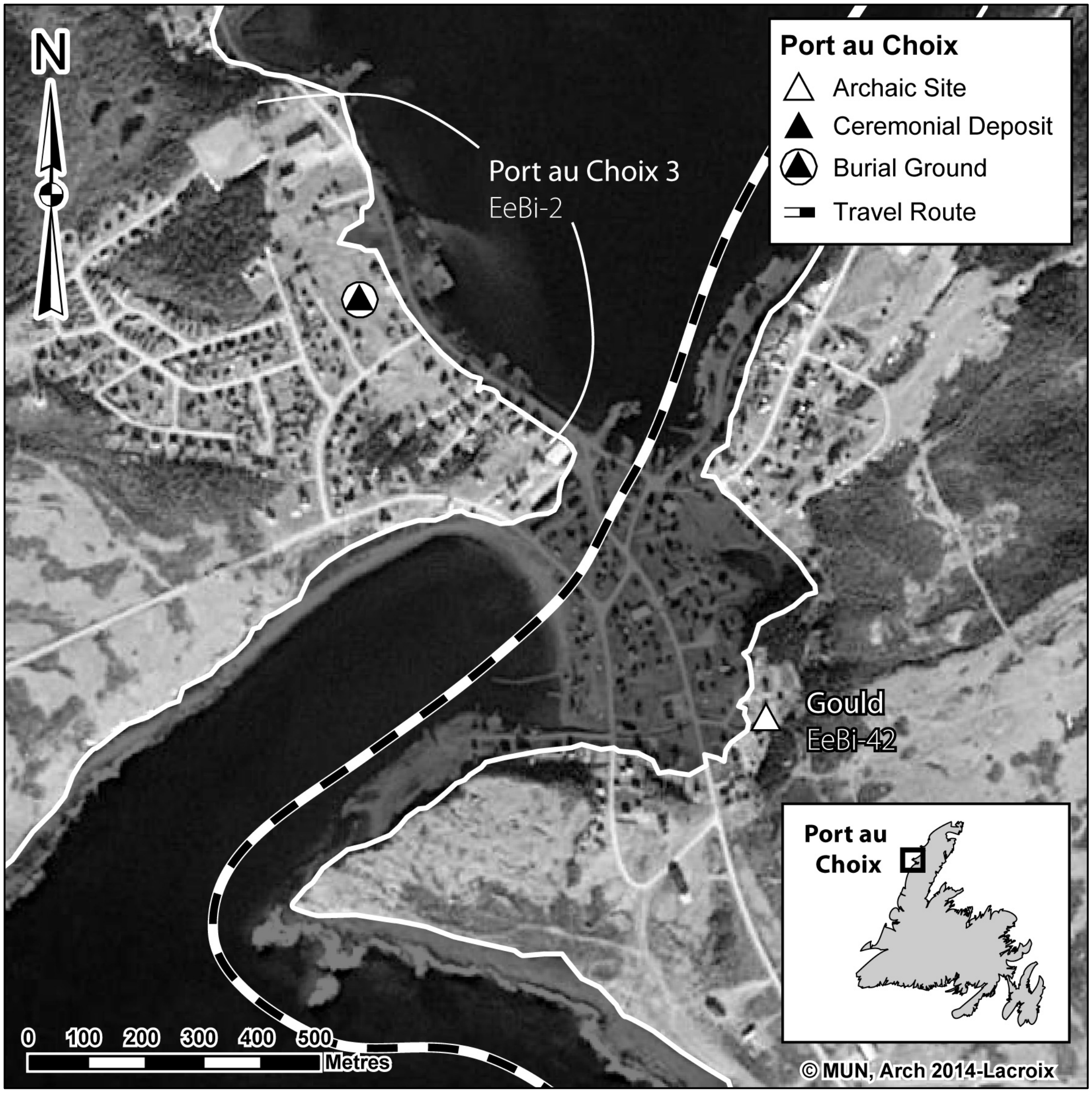


Figure 3-2 Port au Choix-3 (EeBi-2) with reconstructed coastlines at 5000 BP, showing the extent of the burial ground based on local reports and its associated field camp (EeBi-42; Renouf and Bell 2011).

deposited in 52 graves placed in three spatially separate, but contemporaneous clusters. This peak period of use was followed by less intensive use of the burial ground and the placement of an increasingly less elaborate set of ground stone items within the graves (Tuck 1976a).

Most burials had some form of stone covering. In fact, some boulders still protruded from the ground in 1968, when the principal excavation took place, proving very useful in identifying the location of the graves (Tuck 1976a:6, 12). These boulders likely played a similar role during the Archaic as well, where they would have provided visible markers for identifying the location of previous burials. Grave inclusions vary greatly in style and quality, even within individual burials, and number from few to several hundred (Tuck 1976a). These differences have led previous researchers to suggest that men received slightly preferential treatment over women, perhaps because of their perceived higher status. It has also been suggested that women came from a larger population than the men, and that the three burial clusters from Locus II represent groups with different acquired status (Jelsma 2000, 2006; Kennedy 1981; Tuck 1976a).

At a local scale, the original expectation that a large aggregation site would be associated with this burial ground has never materialized. Although nearby resources could have supported large groups during certain periods of the year, the visitors of this site do not appear to have bothered. Despite the extensive size of PAC-3 and over 40 years of archaeological surveys in the community of Port au Choix, the only habitation site associated with the burial ground is a relatively small and only briefly occupied field camp (Gould, EeBi-42) located across the channel on the mainland. The separation provided by the water channel is significant in that it prevents direct access to the burial ground from its associated campsite, providing a physical barrier between camping and ceremonial spaces, between the living and the dead. At Port au Choix, the majority of artifacts are associated with the burial ground (Table 3-2). The associated campsite and a few other findspots account for less than 10 percent of all Archaic artifacts recovered from this community. The low density of artifacts (350 m^2 excavated, 0.2 artifacts/m^2) indicates that small task groups, who occasioned little in the way of domestic debris, performed the ceremonial and mortuary activities at PAC-3 instead of the large social gatherings originally assumed (Renouf and Bell 2011).

At a regional scale, PAC-3 is located in a relatively isolated region the west coast of the Northern Peninsula. Beyond the field camp and a few isolated find locations, the

Table 3-2 Artifact counts and percentages from Port au Choix and Back Harbour.

	Woodworking Tools[1]		Ground Points		Chipped Points		Plummets		All Artifacts	
Location	N	NF%	N	NF%	N	NF%	N	NF%	N	NF%
Port au Choix										
Burial Ground	96	13	65	26	6	5	5	8	172	14
Other Sites	*5*	*1*	*2*	*1*	*6*	*5*	*0*	*0*	*13*	*1*
Back Harbour										
Burial Ground[2]	89	12	44	18	14	11	10	16	157	13
Other Sites	*227*	*30*	*45*	*18*	*14*	*11*	*31*	*51*	*317*	*27*
Localities with Burial Grounds	417	55	156	63	40	32	46	75	659	55
All Newfoundland Localities (NF)	756	-	249	-	125	-	61	-	1191	-

Notes: Reported counts include all diagnostic artifacts recovered, including named types, unclassified specimens, and fragments. Not all burial ground artifacts are directly associated with burials. Artifact counts for other Newfoundland localities are adapted from Lacroix (2015b:Table C-2).
1. Woodworking tools include ground stone gouges, adzes, axes, chisels, preforms, and fragments.
2. Back Harbour burial ground counts include artifacts from DjAq-1 and DjAq-7.

closest habitation sites are located some 50 km to the north (EgBf-11) and 90 km to the south (DlBk-1). This region has been well-surveyed and sites dating to later periods are relatively evenly distributed along this stretch of coast. Admittedly this situation may be a result of local sea-level history making Archaic sites more difficult to find. However, the Late Archaic shoreline is estimated to have been only 4–5 m above its current level on the Northern Peninsula with effects diminishing southwards, placing Late Archaic coastal sites well within modern community limits, where surveys tend to focus (Bell and Renouf 2003; Renouf and Bell 2006). Interestingly, more Archaic sites are known north of Port au Choix where sea-level changes have had the most impact which suggests the current low archaeological site density may actually reflect a sparse Archaic presence along this stretch of the coast. The lack of a large habitation site associated with PAC-3 and its location within a sparsely inhabited region connecting Archaic sites located north and south of the burials led to the suggestion that PAC-3 acted as a signpost along an important route of travel (Lacroix 2015a; Renouf and Bell 2011).

3.3.2 Curtis

The second burial ground, Curtis (DjAq-1), is located in the modern community of Back Harbour on North Twillingate Island in northeastern Newfoundland (Figure 3-3). In contrast to PAC-3, the extent of this burial ground is difficult to ascertain because only limited information exists regarding the original archaeological work conducted in Back Harbour (Temple 2007). The excavations were limited to only a small area located on the

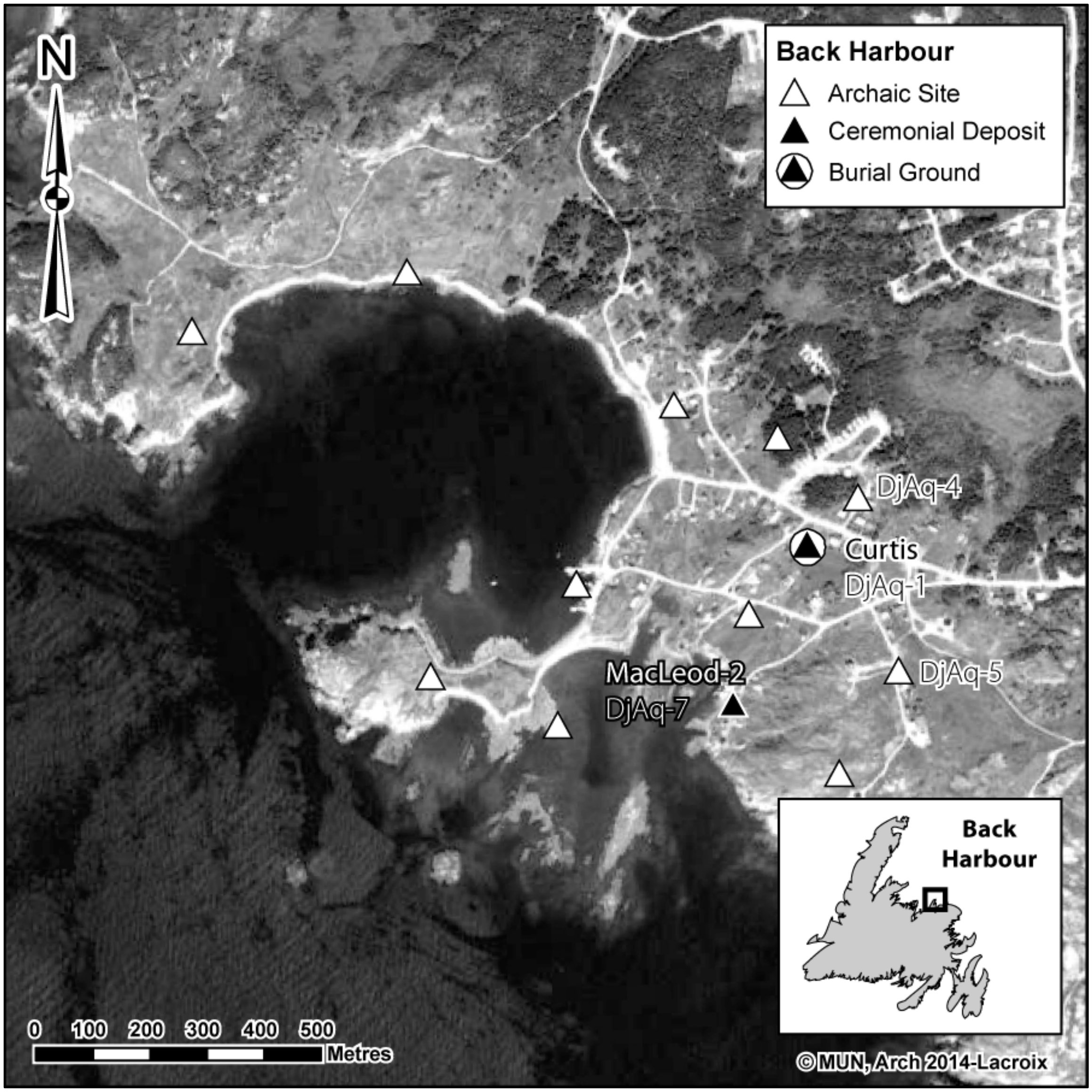


Figure 3-3 Curtis (DjAq-1), showing the significant site concentration surrounding it, including MacLeod 2 (DjAq-7), a probable second burial cluster.

private property from which the first finds were reported, and it appears that only a small portion of the landform on which the burial ground is located was tested. The immediate area surrounding the burial ground was also left untouched during a recent survey of the community (Wells and Renouf 2008a). A second nearby burial locus (DjAq-

7) was identified during the original work and recently reinvestigated (Temple 2007, 2008). Although this second burial locus has suffered a lot of damage due to modern construction activities, its presence some 300 m from the main burial ground indicates that Archaic burial activities in Back Harbour may have been much more significant than current data implies.

Curtis contains at least 15 burials consisting of ochre patches comparable in size to those of PAC-3. Stone tools were present, but organic remains were not preserved at this site. Elevated levels of calcium and phosphorus within the burial pits suggests they originally held skeletal remains that later decomposed in place (MacLeod 1967c:18; Thibaudeau 1993:7). At the time of excavation, the original investigator felt that a number of ground slate points showed evidence of ritual killing (Thibaudeau 1993:13). Similar to the findings at PAC-3, some of the burials were covered with small boulders (Tuck 1978a). Based on radiocarbon dates from burial inclusions, the use of this burial ground was generally contemporaneous with PAC-3, although the establishment of PAC-3 predates Curtis by 500 years based on current data (Table 3-1).

At a local scale, Curtis sits at the centre of an important site cluster where at least 13 sites are located within a few hundred metres of each other, the largest local concentration currently recorded on the island (Figure 3-2). Almost 40 percent of all Archaic diagnostic tools recorded in Newfoundland come from these various sites (Table 3-2). No physical barrier exists between habitation and ceremonial spaces. A large habitation site is located less than a hundred metres behind the burials (DjAq-4; Temple

2007) and the largest Archaic ground stone tool workshop in Newfoundland is also nearby (DjAq-5). Although burials devoid of any artifacts are present at PAC-3 and Curtis, Back Harbour burials were generally more richly furnished with stone tools than their Port au Choix counterparts as similar counts are achieved by much fewer burials at Back Harbour (Table 3-2). The exceptional site and artifact densities indicate this location was an important place, frequently visited, and likely occupied for extended periods by a relatively large group of people. This is in sharp contrast to PAC-3 which is associated with a short-term field camp visited by small task groups. A significant distinction therefore exists in the placement of the two burial grounds at a local scale and the degree of occupation that occurred in proximity to the burials.

At a regional scale, Curtis is also part of the greatest concentration of sites on the island. Over 30 percent of all Newfoundland Archaic sites are located in Notre Dame Bay (Renouf and Bell 2006). This region was especially attractive because of its strategic location in proximity to food resource concentrations, including seabird breeding colonies, resident populations of harbour seals, and winter breeding herds of harp seals. This situation also contrasts with PAC-3 which lies at a significant distance removed from its current nearest neighbours. Important distinctions in local and regional site location exist between PAC-3 and Curtis, with PAC-3 interpreted as a signpost along a sparsely inhabited travel route, while Curtis is associated with a focal point within an important habitation zone (Lacroix 2015a). The following sections demonstrate that important differences are also present in the burial assemblages of these two burial grounds.

3.4 Newfoundland Archaic Burial Goods

Although descriptions of the burial inclusions from PAC-3 have been published and used to investigate status concepts, they have not been compared to artifacts found at habitation sites elsewhere on the island since the 1970s. The same is also true for Curtis. With more than 40 years of archaeological work in Newfoundland since the excavation of the two burial grounds, broad patterns are becoming evident. The following sections describe the findings that resulted from the direct inspection of material from PAC-3 and the examination of casts and photographs of the material from Curtis, as the originals curated at the Canadian Museum of History were not available for study. The majority of the PAC-3 collection is located at The Rooms Provincial Museum, although a number of artifacts are on permanent display at Parks Canada facilities across the Province. Casts of the Curtis artifacts are located at the Twillingate Museum, in the community of the same name in northeastern Newfoundland.

The stone tools from the burial assemblages can be compared to the collections associated with occupation assemblages where artifacts of the same forms are present. A total of 29 Late Archaic localities on the island, 14 localities from the Quebec Lower North Shore and 9 localities from southern Labrador where used as comparison base (Figure 3-4; Table 3-3). Localities correspond either to isolated sites or distinct clusters of sites where individual sites are located within a few hundred metres of each other. Multiple collections associated with a locality are treated as a single entity representing

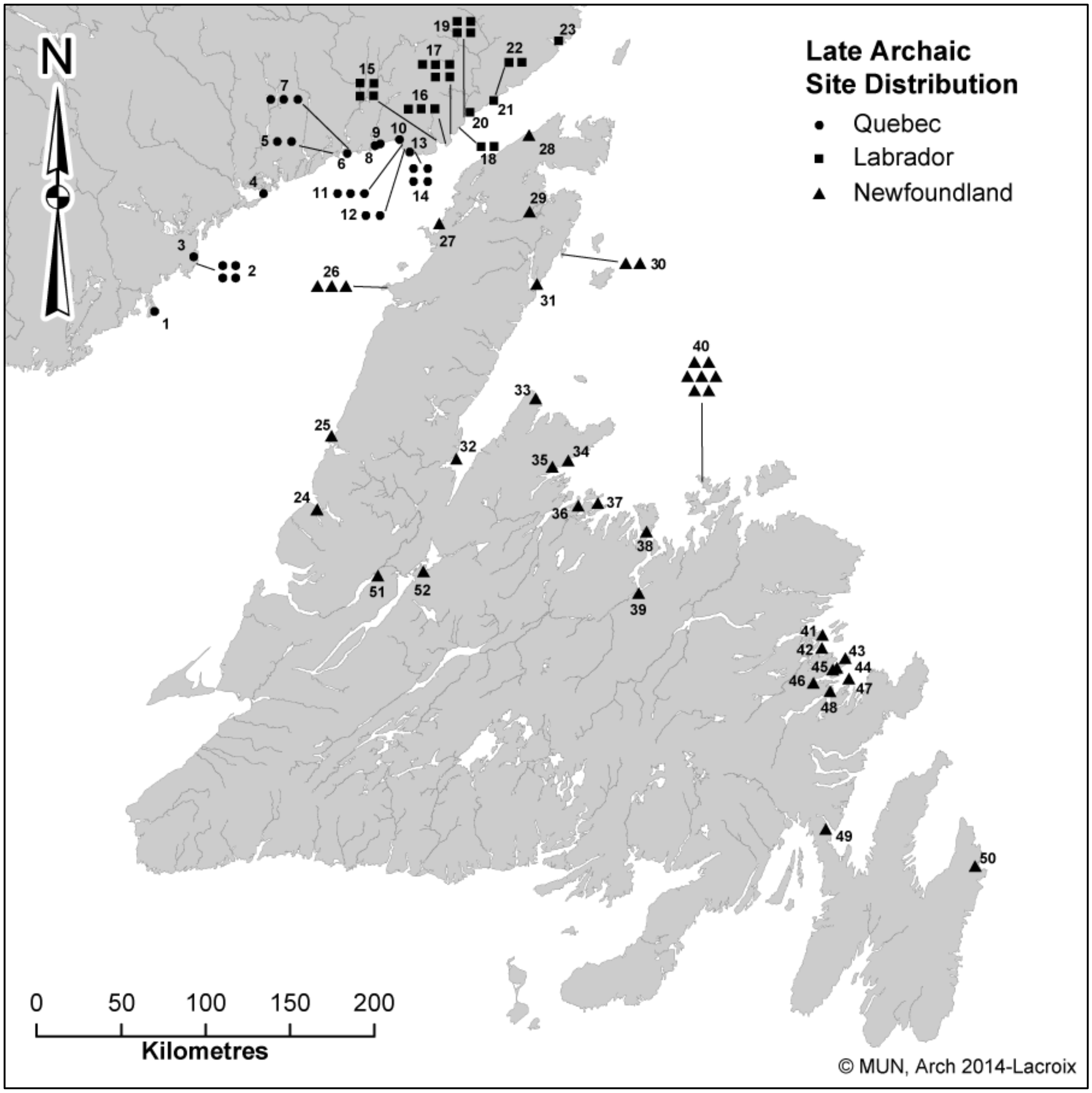


Figure 3-4 Late Archaic localities with assemblages with material comparable to Port au Choix-3 and Curtis burial assemblages. Numbers correspond to localities listed in Table 3-3.

the intensity of discard over multiple events. The investigation of these collections was part of a larger project attempting to identify regional patterns in material culture across the island, the broad results of which are reported elsewhere (Lacroix 2015c).

Table 3-3 Artifact counts by forms for sites with assemblages comparable to PAC-3 and Curtis.

		Ground Slate Points[2]				Chipped Points[3]				Plummets[4]	Distance[5] [km]	
Loc#[1]	Borden	BK	BX	MX	PW	RB	GY	BV	CG	TG	PAC-3	Curtis
Quebec Lower North Shore												
1	EdBt-03	0	0	0	0	1	0	0	0	0	138	338
2	EeBr-01, EeBr-07, EeBr-09, EeBr-10	8	0	0	0	4	0	0	0	0	114	325
3	EfBr-04	1	0	0	0	0	0	0	0	0	116	328
4	EhBo-15	0	0	0	0	0	2	0	0	0	92	309
5	EiBk-09, EiBk-18	0	1	0	0	0	12	0	0	0	86	291
6	EiBk-05	0	0	0	0	2	0	0	0	0	84	285
7	EiBk-11, EiBk-12, EiBk-13	0	0	0	1 B	0	0	0	0	0	86	287
8	EiBi-17	0	0	0	0	1	0	0	0	0	85	277
9	EiBi-05	0	0	0	0	0	0	0	0	0	86	276
10	EiBh-47	0	0	0	0	1	0	0	0	0	89	270
11	EiBh-41, EiBh-59, EiBh-132	1	0	0	0	1	0	0	0	0	86	266
12	EiBh-27, EiBh-86	0	0	0	0	1	0	0	0	0	82	263
13	EiBh-44	0	0	0	0	1	0	0	0	0	82	260
14	EiBg-30, EiBg-43, EiBg-49, EiBg-58	0	0	0	0	3	2	0	0	0	83	259
Southern Labrador												
15	EiBf-02, EiBf-05, EiBf-06, EiBf-18	2	1	0	1 B	8	11	0	0	0	91	254
16	EiBf-04, EiBf-14, EiBf-25	24	2	1	2 B	19	14	0	0	0	93	250
17	EjBf-05, EjBf-10, EjBe-55, EjBe-58, EjBe-64	1	0	0	0	2	2	0	0	2	99	253
18	EjBe-19, EjBe-71	0	0	0	0	0	2	0	0	0	105	253
19	EjBe-06, EjBe-08, EjBe-12, EjBe-24	0	0	0	0	0	7	0	0	0	110	256
20	EjBe-32	0	0	0	0	4	1	0	0	1	114	258
21	EkBc-47	0	0	0	0	1	0	0	0	1	128	257
22	EkBc-39, EkBc-41	0	0	0	0	0	1	0	0	0	131	259
23	FaAx-02	0	0	0	0	0	1	0	0	0	178	274
Western Northern Peninsula												
24	DjBl-04	3	0	0	6 A	0	0	0	0	0	139	227
25	DlBk-01	0	0	0	0	0	0	0	0	1	93	220
26	EeBi-02, EeBi-03, EeBi-42	7	12	5	35 A, B	1	5	0	0	4	0	218
27	EgBf-15	0	0	0	0	1	1	0	0	0	48	217
28	EjBa-02	0	0	1	0	0	1	0	0	0	124	229

(continued)

Table 3-3 (continued)

		Ground Slate Points[2]					Chipped Points[3]				Plummets[4]	Distance[5] [km]	
Loc#[1]	Borden	BK	BX	MX	PW		RB	GY	BV	CG	TG	PAC-3	Curtis
Eastern Northern Peninsula/White Bay													
29	EgBa-01	1	0	0	0		0	0	0	0	0	96	189
30	EfAx-01, EfAx-07	1	0	0	2	B	2	0	0	0	1	105	159
31	EeBa	0	0	1	0		0	0	0	0	0	89	152
32	DkBe-01	1	0	0	0		0	0	0	0	0	109	145
33	EaBa-10	1	0	0	0		2	0	0	0	1	109	109
Notre Dame Bay													
34	DkAx-02	0	0	0	1	A	0	0	0	0	1	148	79
35	DkAx-08	0	0	0	6	A	0	0	0	0	2	146	86
36	DjAw-07	1	0	0	0		0	0	0	0	0	172	73
37	DjAv-04	2	0	2	0		0	0	0	0	1	178	62
38	DiAt-05	0	0	1	0		1	0	0	0	0	210	43
39	DgAt-01	1	0	0	0		0	0	0	0	0	234	75
40	DjAq-01, DjAq-02, DjAq-04, DjAq-05, DjAq-07, DjAq-20, DjAq-30	34	0	1	13	A, C	10	0	2	1	16	218	0
Bonavista Bay													
41	DeAk-01	1	1	0	0		5	0	4	0	0	331	118
42	DeAl-01	0	0	0	0		0	0	1	1	0	334	122
43	DeAj-01	1	0	1	0		1	0	0	0	0	349	135
44	DdAk-02	1	0	0	0		0	0	0	0	0	348	137
45	DdAk-15	1	0	0	0		0	0	0	0	0	347	136
46	DdAl-03	0	0	0	0		0	0	0	1	0	344	137
47	DdAj-04	1	0	0	0		0	0	1	0	0	358	146
48	DdAk-03	0	1	0	0		0	0	0	0	0	356	147
Southern Newfoundland													
49	CkAl-03	1	0	0	0		0	0	0	0	0	413	219
50	CjAe-50	1	0	0	0		0	0	0	0	0	488	280
Central Newfoundland													
51	DhBi-01	0	0	0	0		0	0	0	1	0	170	198
52	DhBg-01	0	2	0	0		0	0	0	0	0	169	172
	Totals	96	20	13	67		72	62	8	4	31		

Notes: Reported counts include only artifacts that could be assigned to specific forms.
1 Numbers correspond to localities presented in Figure 3-4.
2 Ground slate point forms: Back Harbour (BK), broad hexagonal (BX), mixed (MX), and pie-wedge (PW). Labels A, B, and C indicate the presence of pie-wedge Group A, B, and C specimens.
3 Chipped points forms: Rattlers Bight (RB), Graveyard (GY), and Bonavista (BV).
4 Plummet form: top-grooved (TG).
5 Distances are based on UTM zone 21 coordinates.

These sites are associated with two distinct but generally related Late Archaic cultural traditions. They both belong to the Maritime Archaic cultural continuum that linked people inhabiting the coastal regions of the Far Northeast, spanning from northern Labrador to central Maine. The two groups are distinguished principally through differences in their stone tool assemblages and spatially overlap across a rather broad region that includes most of the Lower North Shore in Quebec, the Strait of Belle Isle, and many regions of Newfoundland (Lacroix 2015c). The northern branch of the Maritime Archaic, also Labrador Archaic, is the most widely distributed and the only group present in northern Labrador. Late Labrador Archaic sites are grouped under the Rattlers Bight phase in Labrador and the La Tabatière complex in Quebec. Sites associated with the southern branch of the Maritime Archaic cluster in the Strait of Belle Isle, where they are grouped under the Bonne-Espérance complex, and eastern Newfoundland, where they fall under the Bonavista complex. A small presence in Hamilton Inlet also exists and is grouped under the Black Island complex.

3.4.1 Heavy Woodworking Tools

Heavy woodworking tools include ground stone axes, adzes, and axes. These tools dominate both burial assemblages and appear in similar numbers at PAC-3 and Curtis (Table 3-2). Although woodworking tools are briefly discussed below, they were not formally classified during the analysis, thus no artifact counts are available for this class of ground stone tools at habitation sites. Despite the current lack of typology beyond their broad divisions into gouges, adzes, and axes, the overall variability in form within each of these categories is higher at PAC-3 (Tuck 1976a:Plates 14, 33–35, 38; cf. Thibaudeau 1993:Plates 1–11). This variability may be a reflection of the longer use-life of PAC-3. Forms present in the later Loci I (n = 11, Plate 14) and IV (n = 2, Plate 50), are also present in the earlier Locus II (Plates 33–35). Samples from these later Loci are small, but possibly indicate a reduction in variability over time. The bulk of the material is from Locus II (n = 58; 25 PAC-3 specimens are unprovenienced). Unfortunately, not enough burials are currently dated within this locus to resolve the presence of temporal variability. This issue will only be solved by dating additional Locus II burials.

One of the types present at both PAC-3 and Curtis, trianguloid thin-polled gouges, illustrate the link existing between Newfoundland, Labrador, and the Gulf of Maine (Figure 3-5). These specimens are similar in shape to adzes and gouges from Moorehead burial assemblages in the Gulf of Maine (Smith 1948, Types 4, 5, and 8). Bourque (2012:68–70) suggests that a small subset of the Maine specimens are likely imports from the north based on similarities in raw material, form, and quality with specimens from Back Harbour and Rattlers Bight. At PAC-3, 5 out of 20 gouges are trianguloid thin-polled specimens, occurring in pairs in two Locus II burials (Harp Burial-3: Harp and Hughes 1968:Plate 9:b, c; Burial-C45: Tuck 1976a:Plate 34:3, 4). The fifth specimen is unprovenienced. They are slightly more numerous at Curtis, where 7 of 18 specimens are trianguloid thin-polled gouges, split across five burials with pairs occurring in two

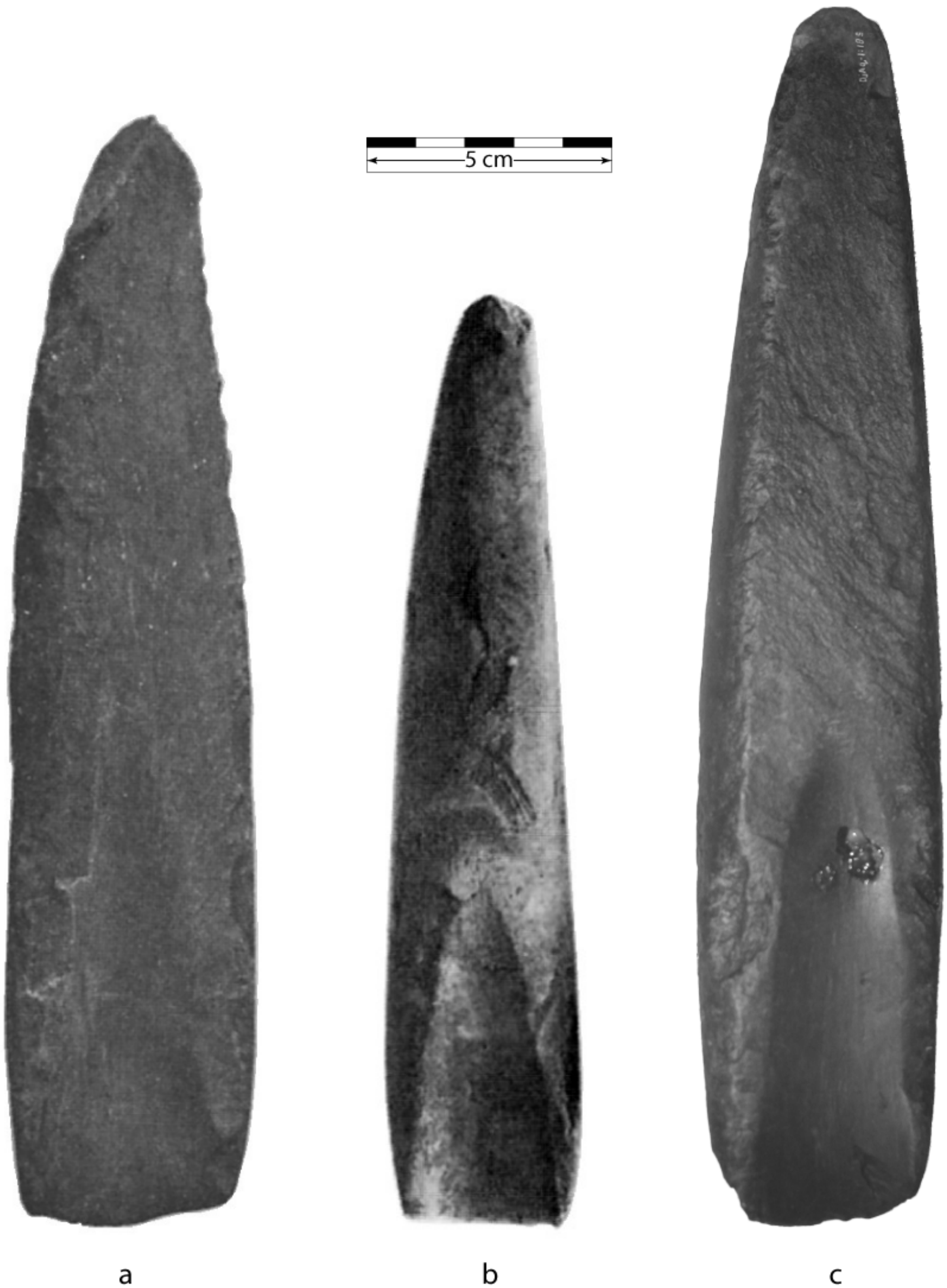


Figure 3-5 Thin polled gouges present in burial contexts. Artifacts shown are from EeBi-2 (a, b) and DjAq-1 (c).

burials (Burial-1: #5; Burial-2: #18; Burial-3: #56, #148; Burial-6: #329; Burial-14: #440, #441; Thibaudeau 1993:Plates 1–3). The more frequent occurrence of trianguloid thin-polled gouges in Curtis burials may indicate that the people of Back Harbour were more closely involved in the exchange network connecting Labrador and Maine than the task groups using PAC-3. Similar conclusions are borne by other artifact forms.

3.4.2 Ground Slate Points and Bayonets

The second largest category of artifacts consists of a variety of ground slate points and bayonets. They are present in at least 24 burials at PAC-3, occurring in four principal forms, and in at least 10 burials at Back Harbour, occurring in only three principal forms (Figure 3-6; Table 3-4). The Back Harbour form (BK) is a generally long-bladed spearpoint, although short versions also exist, with a flattened diamond to biconvex cross-section and a long narrow stem (Figure 3-6:a, b). The broad hexagonal form (BX) is a broad bladed spearpoint with a flattened hexagonal cross-section and a wide stem (Figure 3-6:d). A third spearpoint form has mixed characteristics (MX), borrowing traits from both the Back Harbour and broad hexagonal forms. Their long narrow blades have three ground facets on one face, are convex on the other, and are hafted using a long thin stem (Figure 3-6:c). The final form, the pie-wedge bayonet (PW), includes three variants with thick asymmetric diamond or pie-wedge cross-sections (Figure 3-6:e–g).

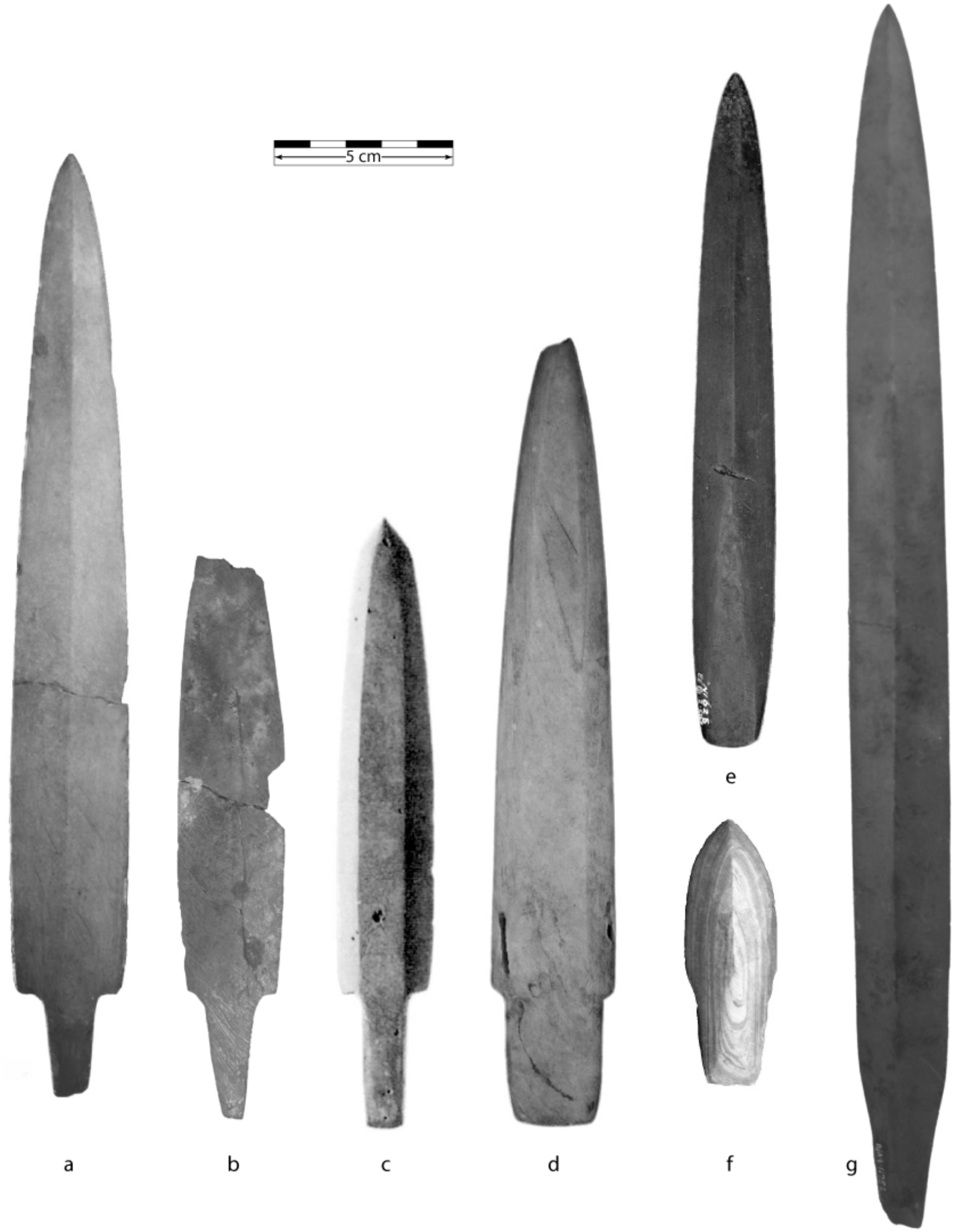


Figure 3-6 Ground slate point forms present in burial contexts: (a, b) Back Harbour (BK); (c) mixed (MX); (d) broad-hexagonal (BX); and (e–g) pie-wedge bayonets (PW). Pie-wedge bayonets are present in three varieties: (e) Group A; (f) Group B; and (g) Group C. Artifacts shown are from DjAq-1 (a, g) and EeBi-2 (b, c, d, e, f).

Table 3-4 PAC-3 and Curtis ground slate point frequencies by form and burials.

Burial Locus	Burial	BK	BX	MX	PW-A	PW-B	PW-C	NC	Total
Back Harbour		*27*	*0*	*1*	*0*	*0*	*6*	*10*	*44*
DjAq-01	Burial-1	1	0	0	0	0	0	0	1
	Burial-2	1	0	0	0	0	0	1	2
	Burial-3	14	0	0	0	0	0	0	14
	Burial-4	1	0	0	0	0	3	1	5
	Burial-5	1	0	0	0	0	0	0	1
	Burial-6A	0	0	0	0	0	1	0	1
	Burial-7	1	0	0	0	0	0	2	3
	Burial-11	1	0	0	0	0	0	0	1
	Burial-13	5	0	1	0	0	1	3	10
	Trench A-1	1	0	0	0	0	0	0	1
	Trench A-3	1	0	0	0	0	1	2	4
DjAq-07	NA	0	0	0	0	0	0	1	1
Port au Choix-3		*7*	*12*	*5*	*30*	*5*	*0*	*8*	*65*
Locus II	Burial-A1	0	0	0	1	0	0	0	1
	Burial-A7	1	0	0	0	0	0	0	1
	Burial-A12	0	0	0	1	0	0	0	1
	Burial-A13	0	0	0	1	0	0	1	2
	Burial-B15	2	0	0	0	0	0	0	2
	Burial-B17	0	0	1	0	0	0	0	1
	Burial-B22A	0	0	0	1	0	0	0	1
	Burial-B25	0	0	0	1	0	0	0	1
	Burial-B26	1	4	2	3	0	0	0	10
	Burial-B30C	0	0	0	1	0	0	0	1
	Burial-B31	0	0	0	1	0	0	0	1
	Burial-C32	0	0	1	1	0	0	0	2
	Burial-B33	0	0	0	2	2	0	0	4
	Burial-C34	0	3	0	0	0	0	0	3
	Burial-C35A	0	0	0	7	1	0	0	8
	Burial-C36	0	3	0	0	0	0	1	4
	Burial-C37	0	1	1	0	0	0	1	3
	Burial-C39	0	0	0	0	1	0	0	1
	Burial-C44A	0	0	0	1	0	0	0	1
	Burial-C44B	0	0	0	2	0	0	1	3
	Burial-C45	0	0	0	1	0	0	1	2
	Burial-C47B	0	1	0	0	0	0	0	1
	Burial-C50A	0	0	0	2	1	0	0	3
	Harp Burial-3	0	0	0	0	0	0	1	1
	NA	1	0	0	2	0	0	0	3
Locus I	NA	1	0	0	0	0	0	1	2
Unknown	NA	1	0	0	2	0	0	1	4
	Totals	34	12	6	30	5	6	18	111

Notes: Letters preceding the grave number for PAC-3 indicate grave cluster. Letters appearing after the grave number specify single individual within graves with multiple burials. Ground slate point forms: Back Harbour (BK), broad hexagonal (BX), mixed (MX), pie-wedge (PW), and not classified (NC).

These four principal forms co-occur together at PAC-3 in Burial-B26 (1 BK, 4 BX, 2 MX, 3 PW). Multiple forms also occur in a few other PAC-3 burials (Burial-C32: 1 MX, 1 PW; Burial-37: 1 BK, 1 MX) and Curtis burials (Burial-4: 1 BK, 3 PW; Burial-13: 5 BK, 1 MX, 1 PW) suggesting the four principal forms were in contemporaneous use at the time these burials took place (Tuck 1976a:29). All four forms appear in both early and late burial contexts at PAC-3 (Table 3-5), suggesting each remained in use throughout the use of Locus II. A notable shift does occurs between PAC-3 and Curtis, as pie-wedge and broad hexagonal forms dominate at PAC-3 Locus II, but are replaced in prominence by the Back Harbour form at PAC-3 Locus I and Curtis. This potentially indicates a change in cultural preference occurred between the establishments of the two burial grounds, but may simply relate to contemporaneous regional preferences. This issue will only be clarified through a systematic radiocarbon dating program of burial and occupation contexts throughout Newfoundland.

3.4.2.1 Back Harbour Form

The most common form found outside burial contexts in Newfoundland and adjacent regions of Quebec and Labrador is the narrow-stemmed Back Harbour point form (Figure 3-6:a; Table 3-3). Outside Newfoundland, narrow-stem ground slate points occur in Rattlers Bight phase assemblages in Labrador (Fitzhugh 1978), and are also present in related La Tabatière complex assemblages in Quebec (Pintal 1998), but have not been reported south of the Gulf of St. Lawrence. However, the narrow contracting stem

Table 3-5 Chronological relationships between PAC-3 burials and ground slate points.

Burial Locus	Burial[1]	Ground Points[2]	Superposition[3]	Depth[4]	Radiocarbon Age BP[5]
Locus II-A	Burial-A1	1 PW	-	-	4220±50 (GrA-6478)
	Burial-A6		> A7	< 40 cm	
	Burial-A7	1 BK	-	< 40 cm	
	Burial-A10		-	40–90 cm	4130±50 (GrA-6666)
	Burial-A11		> A1	< 40 cm	
	Burial-A12	1 PW	> A13 > A14	40–90 cm	4160±50 (GrA-6479)
	Burial-A13	1 PW	> A14	-	
	Burial-A14		-	40–90 cm	
Locus II-B	Burial-B5	2 BK	-	40–90 cm	
	Burial-B17	1 MX	-	40–90 cm	
	Burial-B18		-	< 40 cm	4000±50 (GrA-6525)
	Burial-B19		> B24	40–90 cm	
	Burial-B22A	1 PW	> B22D	< 40 cm	
	Burial-B22D		-	< 40 cm	
	Burial-B25	1 PW	-	40–90 cm	4150±50 (GrA-6526)
	Burial-B26	1 BK, 4 BX, 2MX, 3PW	-	40–90 cm	
	Burial-B30C	1 PW	> (B30A, B30B)	40–90 cm	4130±50 (GrA-6501)
	Burial-B31	1 PW	-	< 40 cm	
	Burial-B33	4 PW	-	< 40 cm	
Locus II-C	Burial-C32	1 MX, 1PW	> C36	40–90 cm	
	Burial-C34	3 BX	> C32 > C36	40–90 cm	
	Burial-C35A	8 PW	-	40–90 cm	4110±50 (GrA-6527)
	Burial-C36	3 BX	-	> 90 cm	4150±50 (GrA-6495)
	Burial-C37	1 BX, 1 MX	-	40–90 cm	
	Burial-C38		> C37	< 40 cm	
	Burial-C39	1 PW	-	< 40 cm	
	Burial-C44A	1 PW	> C44B	> 90 cm	
	Burial-C44B	2 PW	-	-	
	Burial-C45	1 PW	-	40–90 cm	
	Burial-C47B	1 BX	-	-	
	Burial-C50A	3 PW	-	> 90 cm	3930±130 (I-4678)
Locus I	Burial-1	1 BK	-	-	3410±100 (I-4677)

Notes:

1 Letters preceding the grave number for PAC-3 indicate grave cluster. Letters appearing after the grave number specify single individual within graves with multiple burials.

2 Ground slate point forms: Back Harbour (BK), broad hexagonal (BX), mixed (MX), and pie-wedge (PW).

3 Tuck (1976a) was able to discern temporal relationships between a number of burial events. A more complete set of relationships is presented in Lacroix (2015b:Table A-2).

4 Jelsma (2000) found a significant statistical relationship between the depth of earlier (< 40 cm) and later (> 40 cm) burials across all Locus II clusters, although cluster C burials tend to be generally deeper. Exceptions do occur as indicated by Burial-C50A, a deep deposit with a late date.

5 Only radiocarbon dates obtained on human bones are considered herein because of unresolved incomparability issues with dates obtained from other sample sources (charcoal, wood).
Sources: GrA# (Jelsma 2000) and I# (Tuck 1976a).

treatment of the Back Harbour form replicates a common stem treatment used in narrow hexagonal bayonets from the Gulf of Maine, providing a weak link between the dominant ground slate point forms of these regions (e.g., Bourque 2012:Figure 32; Sanger 1973:Plates 6–7).

Beyond being the principal form present at Curtis (n = 27/44; Table 3-4), the Back Harbour spearpoint is also present in its largest concentration from occupation contexts at this locality (n = 8; Locality 40), if the exceptional find of 20 cache specimens at L'Anse Amour (EiBf-4; Locality 16) in southern Labrador is not included (Harp 1964a). With the exception of Woody Point (Locality 24), all other narrow-stem specimens found at occupation sites in Newfoundland are located east of the Northern Peninsula (n = 22/25; Table 3-3). This wide but well-connected region is easily accessible from Back Harbour (Lacroix 2015a), and includes three Notre Dame Bay localities where Back Harbour points are present within 75 km of Curtis (Localities 36, 37, 39). This clustering in northeastern Newfoundland suggests that narrow-stem points were local to this region (Lacroix 2015c).

In contrast, the Back Harbour form is present in lower numbers at PAC-3 (n = 7/65, including 2 miniatures; Table 3-4). The nearest localities where similar specimens have been found are approximately 90 km or more from PAC-3 (Table 3-3). These localities are on the opposite side of either the Strait of Belle Isle (Localities 2–3, 11, 15–17) or the Long Range Mountains which forms the spine of the Northern Peninsula (Localities 29, 30, 36, 37, 39, 40, 41, 43–45, 47, 49, 50). The nearest site along the west coast of

Newfoundland is located 140 km away from PAC-3 (DjBl-4; Locality 24). The lack of narrow-stem ground slate points in the vicinity of Port au Choix suggests this form may not have been local to the area (Lacroix 2015c).

3.4.2.2 Pie-Wedge Form

Pie-wedge bayonets can be divided into three variants based on material, form, and hafting treatment. Group A are generally slender specimens with long blades, smooth edges, and a relatively flat base with a thinned triangular facet on the upper surface of the haft element (Figure 3-6:e). These bayonets are made interchangeably from black, grey, green, or red slate. Group A bayonets are the dominant variant present at PAC-3 (n = 30/35; Table 3-4). Although relatively rare, they are also the principal bayonet variant encountered outside Port au Choix (Table 3-3), where they are limited to localities found south of PAC-3 and do not occur north of the Strait of Belle Isle (Localities 24, 34, 35, 40). These include specimens from a presumed burial deposit at DkAx-8 (Table 3-1) and a single specimen from a workshop context in Back Harbour (DjAq-5).

Group B pie-wedge bayonets are generally shorter with slight shoulders forming a rudimentary stems, sometimes have edge serrations along the lower blade/stem elements, and are preferentially made of banded grey slate (Figure 3-6:f). They are only found north of PAC-3, occurring both in Newfoundland and in adjacent regions of Quebec and Labrador (Localities 7, 11, 15, 16, 30). As a group, these bayonets are reminiscent in both form and material to Cow Point Group B specimens, a Late

Moorehead burial ground in interior New Brunswick (Figure 3-7; Sanger 1973:Plate 8). This remarkable link indicates that relatively direct ties were present between people occupying the Strait of Belle Isle and people who used the interior Cow Point burial ground. Outside Newfoundland and its adjacent mainland regions, pie-wedge specimens related to Groups A and B cluster in the Great Lakes and St. Lawrence valley regions (Bourque 2012:78).

Group C pie-wedge bayonets are a unique variant present within the Curtis burial assemblage. The hafting treatment of these bayonets differ from Group A and B bayonets as both extremities taper to a point, making Group C bayonets more akin to weaving sticks in form (Figure 3-6:g; Thibaudeau 1993:Plates 12, 15, 16). At Curtis, only six specimens are present across four burials (Table 3-4). Specimens potentially exist at a few occupation sites but are too fragmentary to assign to this variant with any certainty (e.g., DjAq-5; DeAk-1, Carignan 1975b:Plate 7:d–e). Bone specimens almost identical in form to Group C slate bayonets have been recovered from both Locus I and II at PAC-3 (Tuck 1976a, Locus I: Plate 13:5, Locus II BurialC-44A: Plate 22:4), suggesting this form co-existed with Group A and B bayonets. Outside Newfoundland, similar specimens are present in at least two other burial contexts, at Cow Point and Portland Point in New Brunswick (Sanger 1973:Plate 6:c; Tuck 1991:Figure 2.3).

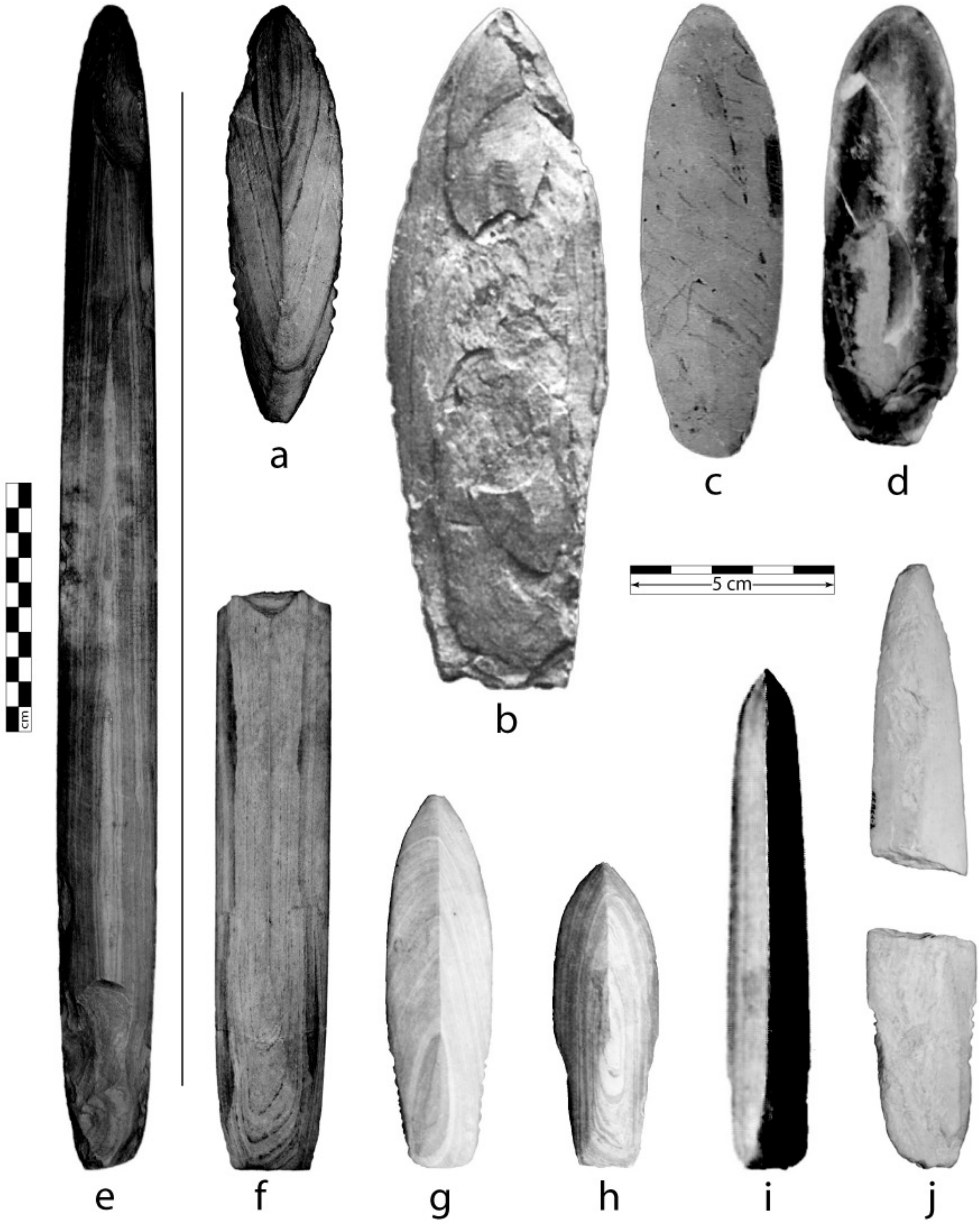


Figure 3-7 Group B banded slate pie-wedge bayonets from: EiBk-13 (a), EiBf-2 (b), EiBf-4 (c, d), EeBi-2 (e–i), and EfAx-1 (j). Note that bayonet (e) is displayed at a smaller scale than other artifacts.

3.4.2.3 Broad Hexagonal Form

The broad hexagonal form is second in importance at PAC-3, but occurs in only a few burials (Figure 3-6:c; n = 11 from 4 burials). This form is absent at Curtis (Table 3-4), and extremely rare in occupation contexts in Newfoundland, southern Labrador, and adjacent regions of Quebec (Table 3-3). A single specimen is associated with the oldest component of the Gould site and predates the establishment of the burial ground (EeBi-42, Locality 26; Reid 2007). North of PAC-3, a similar specimen comes from Vieux-Fort along the eastern Lower North Shore in Quebec (EiBk-9, Locality 5). These two specimens are of a different variant from those of PAC-3, sporting stems with eared bases (Figure 3-8:b–c). The association of this distinct variant with a component predating the establishment of the burial ground suggests they may represent an earlier form, later replaced by the PAC-3 variant, and ultimately abandoned before the establishment of Curtis. Broad hexagonal specimens with similar stem treatments are known from a number of sites along the St. Lawrence River, in New Brunswick, western Nova Scotia, and two coastal locations in the Gulf of Maine where they are interpreted as either imports or local copies (Figure 3-8:a; Bourque 2012:78–80; Turnbull 1988).

Another broad hexagonal variant is present in Newfoundland. Two specimens come from an interior location south of PAC-3 (DhBg-1, Locality 52). In this case, the stem element is rounded and notched (Figure 3-8:e–f). One of the two complete specimens was part of a burial deposit (Table 3-1) that also included 1 adze and 11

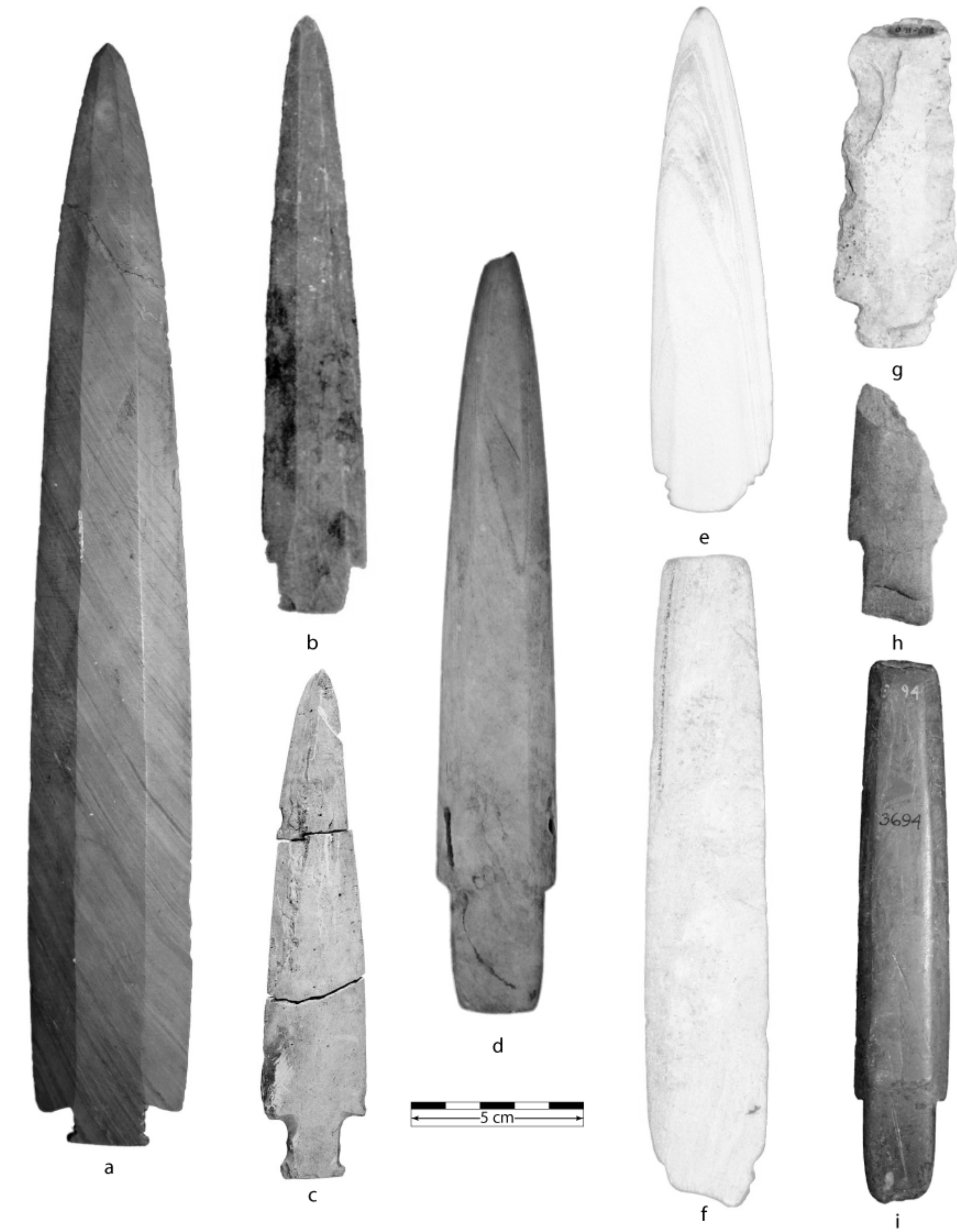


Figure 3-8 Hexagonal spearpoints related to PAC-3 specimens. Artifacts shown are from: (a) Lunenburg County, NS (Nova Scotia Museum, Accession No. 00.10.11); (b) EiBk-9; (c) EeBi-42; (d) EeBi-2; (e, f) DhBg-1; (g) Queens County, NS (Queen's County Museum, Accession No. DEX-160); (h) DeAk-1; and (i) narrow hexagonal form, Hants County, NS (Nova Scotia Museum, Accession No. 11.3).

gouges-adzes in three standard sizes[2] (Lacroix 2015a:Figure 2-12). The second complete, but water-rolled, specimen is a stray find from a nearby location (Sterling Rumbolt 2012, personal communication). These two specimens have an almost identical counterpart from an interior site along the Mersey River in southwestern Nova Scotia (Figure 3-8:g), providing yet another link between some of the material encountered at Port au Choix and the Maritime Provinces.

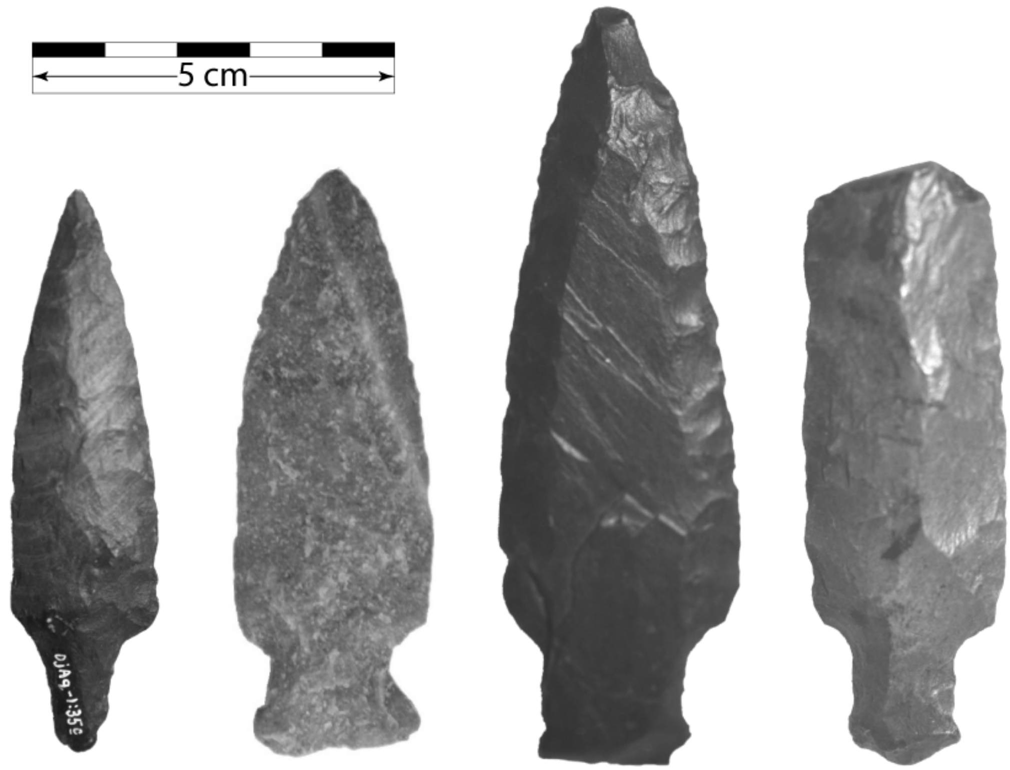
Only one Newfoundland broad hexagonal specimen exhibits the same stem treatment as those of PAC-3. It is a small proximal fragment found over 300 km away at the Beaches site in Bonavista Bay (DeAk-1, Locality 41; Figure 3-8:h). Outside Newfoundland, this stem form is not as unusual, commonly appearing on narrow hexagonal specimens from Nova Scotia and the Gulf of Maine (e.g., Figure 3-8:i; Bourque 2012:Figure 32; Sanger 1973:Plate 6). Across the Far Northeast, hexagonal slate points occur across a broad range of sizes. The long and narrow hexagonal bayonets from the Gulf of Maine that reach extreme lengths (ca. 38 cm) are at one extreme, the wider and shorter PAC-3 broad hexagonal specimens at the other, with Nova Scotia specimens somewhat intermediate between the two extremes (Stephen Powell 2013, personal communication).

3.4.2.4 Mixed Form

The mixed form spearpoint occurs in very low numbers at both PAC-3 (n = 5) and Curtis (PAC-3: n = 5, Curtis: n = 1; Table 3-4). Because of current chronological issues, it is difficult to ascertain whether mixed trait slate points represent a transitional form between an older hexagonal form and a younger Back Harbour form or a distinct contemporary form. The limited evidence currently available appears to support the transitional status of the mixed form as they occur in deeper burials at Locus II (Table 3-5). The presence of a single specimen at Curtis suggests the transition was mostly complete by the time Burial-13 was performed at Curtis. A direct link between the mixed trait and Back Harbour forms is further indicated by their broadly corresponding spatial distributions (Table 3-3). Although more restricted in range than the Back Harbour form, mixed trait points from occupation contexts are present along the coastlines of southern Labrador, the eastern Northern Peninsula, Notre Dame Bay, and Bonavista Bay (Localities 16, 28, 31, 37, 38, 43). The particular combination of a narrow tapering stem with a narrow faceted blade seen in mixed trait points provides a stronger link to narrow hexagonal specimens from the Gulf of Maine than that proposed for the Back Harbour form alone. This raises the possibility that mixed trait points are not only transitional between the Back Harbour form and the broad hexagonal variant seen at Port au Choix, but also the narrow hexagonal forms of the Gulf of Maine.

3.4.3 Chipped Tools

The chipped stone tool assemblages also show some interesting differences between the two burial grounds. They occur in low numbers at both sites, with only six specimens directly associated with burials at Curtis and only one recovered *in situ* from a burial at PAC-3 (Table 3-6). Outside Newfoundland, chipped bifaces, including projectile points,



a b c d

Figure 3-9 Chipped point forms present in burial contexts: (a) Rattlers Bight (RB); (b) Graveyard (GY); and (c) Bonavista (BV); and (d) Cannings Cove (CG). Artifacts shown are from DjAq-1 (a, c, d) and EeBi-2 (b).

Table 3-6 PAC-3 and Curtis chipped point frequencies by form.

Burial Locus	Burial	RB	GY	BV	CG	NC	Total
Back Harbour		*6*	*0*	*2*	*1*	*5*	*14*
DjAq-01	Burial-1	0	0	0	0	1	1
	Burial-3	1	0	0	0	0	1
	Burial-4	0	0	2	1	0	3
	Burial-13	0	0	0	0	3	3
	Burial-14	2	0	0	0	0	2
DjAq-07	Test Trench-5	0	0	0	0	1	1
	NA	3	0	0	0	0	3
Port au Choix-3		*1*	*1*	*0*	*0*	*4*	*6*
Locus II	Burial-C35A	0	1	0	0	0	1
	NA	0	0	0	0	1	1
Unknown	NA	1	0	0	0	3	4
	Totals	7	1	2	1	9	20

Notes: Letters preceding the grave number for PAC-3 indicate grave cluster. Letters appearing after the grave number specify single individual within graves with multiple burials. Chipped point forms: Rattlers Bight (RB), Graveyard (GY), Bonavista (BV), Cannings Cove (CG), and not classified (NC).

are commonly present in burials, their relative frequency generally increasing as the tree line approaches and the occurrence of heavy woodworking tools diminishes (Fitzhugh 2006; Robinson 2001:Table 4). Given the large number of heavy woodworking tools present, the low relative frequency of chipped points in Newfoundland burial contexts is unsurprising. Despite these low numbers, however, four different types of chipped points are represented (Figure 3-9). At each site, the chipped points are representative of the forms present in the surrounding area.

At Curtis, at least six points are reminiscent of the tapering stem Rattlers Bight (RB) form prominent in Labrador and diagnostic of a Late Archaic phase of the same name (Figure 3-9:a). Outside Newfoundland, they are typically made from Ramah chert (Fitzhugh 1975a, 2006), but the Curtis specimens are made from Newfoundland stones, predominantly dark chert and rhyolite with only a single specimen made of Ramah chert. Another five specimens are located within 50 km of Curtis, including multiple Back Harbour occupation contexts (Localities 38, 40). More examples are found a little further afield on either side of Back Harbour, in Bonavista Bay and along the eastern shorelines of the Northern Peninsula leading to the Strait of Belle Isle (Localities 30, 33, 41, 43). These regions are well-connected with Back Harbour via an important coastal travel corridor (Lacroix 2015a). At PAC-3, a single Ramah specimen was recovered in the general vicinity of the burial ground by Elmer Harp. Like Curtis, the closest non-mortuary specimen is located less than 50 km from PAC-3 (Locality 27), and numerous specimens occur within a 100 km radius of the burial ground, mostly in southern Labrador and Quebec (Localities 6, 10–17; Table 3-3).

The three remaining chipped points associated with Curtis come from a single deposit (Buria-4, Table 3-6). Two are associated with the expanding stem Bonavista form (Figure 3-9:c–d). Points of this form are made of local rhyolite or dark chert, and, outside Curtis, have only been found in Bonavista Bay (Localities 41, 42, 47; Table 3-3). The third specimen is classified with the Canning Cove form, a slightly more gracile version of the Bonavista form characterized by a thick and straight stem ending with a small expansion of the base. The few non-mortuary specimens known all come from Bonavista Bay and a single interior location (Localities 42, 46, 51). The only chipped artifact, outside of flakes, directly associated with a burial at PAC-3 is a single quartzite point with broad side notches of the Graveyard form (Figure 3-9:b). Multiple localities found within a 100 km radius of PAC-3 also bear similar points (Localities 4, 5, 14–16), with important concentrations in the Vieux-Fort region in Quebec, and the Strait of Belle Isle in Labrador (Table 3-3).

While the low numbers of local chipped points found in burial context are representative of broad trends present at the scale of the Far Northeast, the representation of Ramah chert within those same contexts does not. Ramah chert is frequently present as a burial inclusion in the Far Northeast. During the Late Archaic, debitage, preforms and finished tools are relatively common in burial contexts north of the Strait of Belle Isle, while only finished tools are present south of the Gulf of St.

Lawrence (Loring 2002:170–171). Since PAC-3 is extremely close to the Strait of Belle Isle, the expectation would be for Ramah chert to be relatively well represented there, and less so at Curtis, located farther south. Intriguingly, however, the opposite occurs. Ramah chert is nearly completely absent from PAC-3, where the only finished tool made of this material is a shattered point recovered in the general vicinity of the site. In contrast, Ramah chert is well represented at Curtis, from debitage to finished tools (MacLeod 1967b; Thibaudeau 1993). The larger presence of Ramah chert at Curtis suggests that closer ties existed between the people of central and northern Labrador and those performing burial ceremonies at Back Harbour than their counterparts from Port au Choix.

3.4.4 Plummets

Plummets are grooved or perforated stones generally interpreted as pendants or fishing weights of some sort (e.g., line, net), and have frequently been associated with burial assemblages in the Far Northeast, especially within the Gulf of Maine (Robinson 2001:275–278). The top-grooved plummets found in Newfoundland and Labrador are different from those typically found in the Gulf of Maine and the Maritimes, and are characterized by the grooves used to form the attachment point (Figure 3-10). A first groove separates the attachment point from the body, while a second groove typically runs across the top of the attachment point, creating a bifurcate knob. This form is thus far unique to Newfoundland and Labrador. In Labrador, they are consistently associated with Rattlers Bight artifact assemblages (Fitzhugh 1978, 1985).

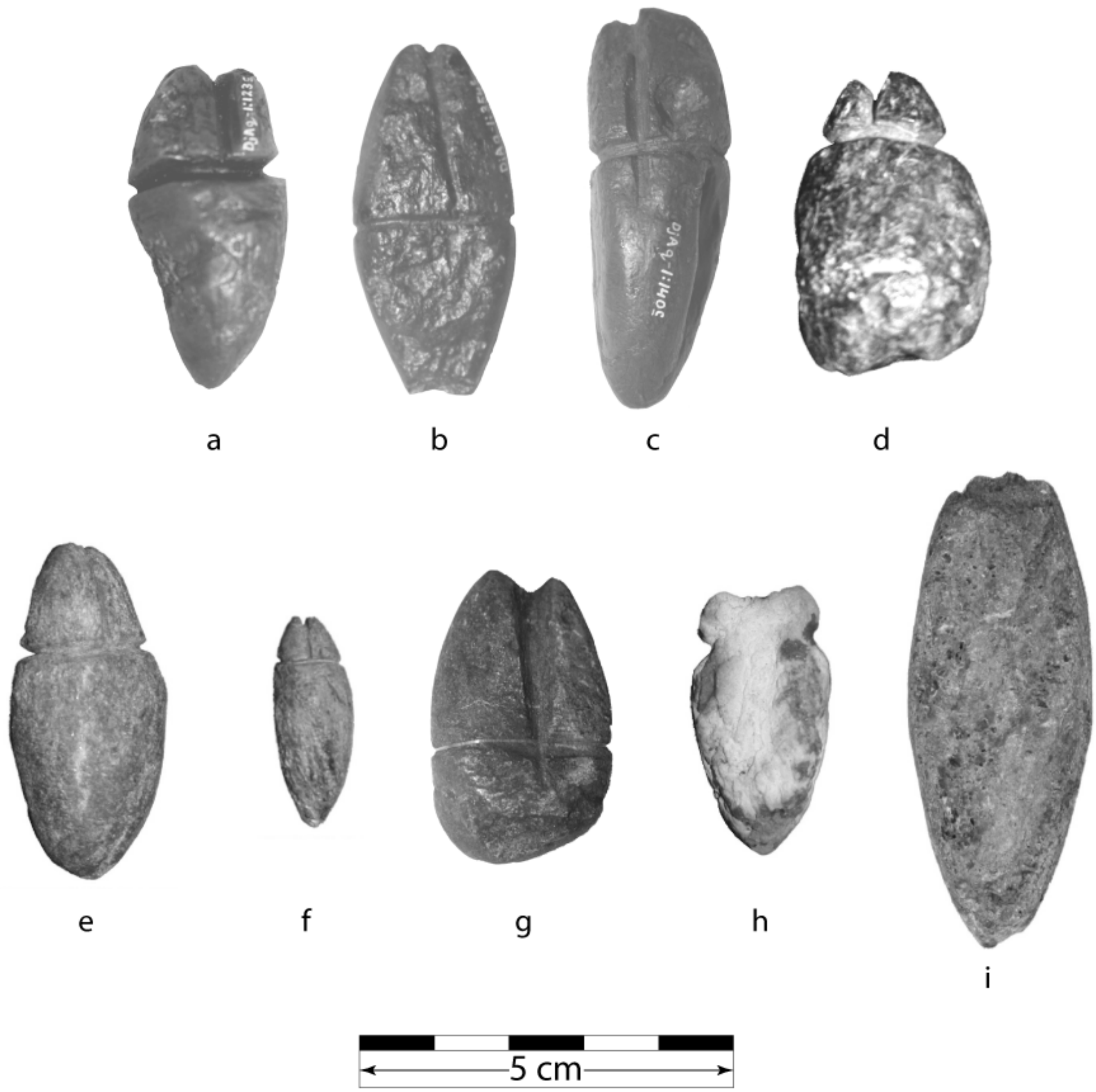


Figure 3-10 Top-grooved plummets from burial contexts. Artifacts shown are from DjAq-1 (a–c), DjAq-7 (d), and EeBi-2 (e–i). Specimen shown in (i) is either a preform or a top-grooved plummet with a broken top.

Plummets are twice as frequent in burial context at Back Harbour as they are at PAC-3, but specimens directly associated with burials occur in roughly the same numbers at both sites (Table 3-7). At PAC-3, they occur in later burials (Burial-A11, Burial-C38, Burial C50; Table 3-5), suggesting the adoption of plummets into local ideology likely occurred while the burial ground was already in use. This provides a possible explanation for their presence in larger numbers at Back Harbour. Outside burial contexts, they are absent in Quebec, only a few specimens are present in southern Labrador, and in Newfoundland, they occur only on the Northern Peninsula, and Notre Dame Bay (Table 3-3). Their largest concentration occurs at Back Harbour where 10 non-mortuary specimens have been recovered (Locality 40). The intensive presence of top-grooved plummets at Back Harbour in both burial and occupation contexts suggest their ideological role may have been especially important at this particular location.

Table 3-7 PAC-3 and Curtis plummet frequencies by form.

Burial Locus		Burial	TG	NC	Total
Back Harbour			*6*	*4*	*10*
	DjAq-01	Burial-4	1	0	1
		Burial-6A	2	1	3
		Burial-7	1	0	1
		NA	1	0	1
	DjAq-07	Test Trench-5	0	1	1
		NA	1	2	3
Port au Choix-3			*4*	*1*	*5*
	Locus II	Burial-A11	1	0	1
		Burial-C37	0	1	1
		Burial-C38	1	0	1
		Burial-C45	1	0	1
		Burial-C50A	1	0	1
		Totals	10	5	15

Notes: Letters preceding the grave number for PAC-3 indicate grave cluster. Letters appearing after the grave number specify single individual within graves with multiple burials. Plummet forms: top-grooved (TG) and not classified (NC).

3.4.5 Discussion

In summary, interesting differences are evident between the Port au Choix and Back Harbour burial assemblages. Both burial assemblages have links to material from local occupation contexts but also display distinct inter-regional connections to regions located further afield that include Labrador, the Maritimes, the St. Lawrence corridor, and the Gulf of Maine. This indicates that the interaction sphere in which the mourners of PAC-3 and Curtis operated were different, suggesting the distinct landscape settings of the two burial grounds may be connected to inter-regional patterns of interaction.

At Curtis, the important presence of plummets, the Back Harbour point form, Rattlers Bight-like chipped points, and Ramah chert artifacts and debitage suggest a strong link existed between the people of Back Harbour and the broader Labrador Archaic population, the northern branch of the Maritime Archaic Indians. The more important presence of a dominant Gulf of Maine celt form, the thin-polled trianguloid gouge, as well as the use of a local form of plummets in burial contexts at Back Harbour suggest a more intense link with the people of the Moorehead burial tradition in the Gulf of Maine than what is present at Port au Choix. Similarly, the dominant Back Harbour ground slate point form and the Group C pie-wedge bayonets also appear to be linked to the narrow hexagonal points from the Gulf of Maine. From a material perspective, Back Harbour appear as a middle point in the exchange network that link the northern regions of Labrador to the coastal population of the Gulf of Maine.

Although similar links are present at PAC-3 as well, other artifact classes indicate contact and exchange with additional regions. In Newfoundland, Labrador, and the Quebec Lower North Shore, ground slate pie-wedge bayonets Group B occur only in a relatively restraint region encompassing the Strait of Belle Isle and immediately adjoining regions in Quebec and Newfoundland. The sole chipped point associated with a burial at PAC-3, a Graveyard form, is associated with the same region and is more clearly linked with the southern branch of the Maritime Archaic Indians. In addition to linking PAC-3 with Newfoundland regions located south of the burial ground, the dominance of Group A pie-wedge bayonets and broad hexagonal spearpoints suggest links with the Maritime provinces, the St. Lawrence, and the Great Lakes, regions that are not represented in the Back Harbour burial assemblage.

The differences in cultural ties suggested by the assemblages of Newfoundland's two Archaic burial grounds may either relate to temporal changes, as people began using Curtis some 500 years after PAC-3 was established, or contemporaneous regional differences. If temporal, the differences suggest that communication and exchanges between Labrador, northern Newfoundland and the Gulf of Maine intensified towards the end of the Archaic, at the detriment of previous relationships with populations occupying the St. Lawrence corridor and coastal and interior regions of the Maritime peninsula. If valid, this trend presents an interesting counter case to Cow Point, as the changes move in the opposite direction of those observed at this Late Moorehead burial ground, where coastal plummets and narrow hexagonal bayonets are replaced by perforated abrasive stones and interior pie-wedge bayonets (Robinson 2006; Sanger 1973). If differences instead relate to contemporaneous regionality, it suggests we are dealing with two distinct cultural groups, one with stronger ties to the Maritimes and St. Lawrence populations, the other with Labrador Archaic groups and to a lesser extent, coastal groups of the Gulf of Maine. Whether temporal, regional, or both, the distinctions suggest that different types of cultural ties linked the people using Curtis and PAC-3 to the interaction sphere of the Northeast.

3.5 Late Maritime Archaic Burial Traditions of the Far Northeast

During the Late Archaic, two clearly distinct burial traditions were present in coastal regions of the Far Northeast. One centered on the Gulf of Maine, culminating in the Moorehead burial tradition during the Late Archaic (Robinson 1996a, 2001, 2008), and the other, the Labrador Archaic burial tradition, was located in Atlantic coastal regions of subarctic Canada. Although broadly related, as seen through their common use of red ochre-lined burial pits and similar choices made in terms of burial furnishings, these two principal traditions followed mostly independent paths tracing back to the Early Archaic (ca. 9000–8000 BP). While Curtis is an example of the Labrador Archaic burial tradition, PAC-3 is not, exhibiting a unique mixture of traits borrowed from the two principal traditions.

3.5.1 Labrador Archaic Burial Tradition

The Labrador Archaic, also Labrador Maritime Archaic, is the label most often assigned to a relatively unified and long-lived continuum of cultural traditions used by groups inhabiting Labrador and adjacent regions of Quebec throughout the Archaic (ca. 8500–3500 BP; Fitzhugh 2006; Pintal 1998). As a result of the appearance of a generally related but culturally distinct set of people during the Late Archaic (5000–3200 BP), the late expression of the Labrador Archaic also takes on the label of northern branch of the Maritime Archaic, the southern branch representing the new group occupying the Strait of Belle Isle and its adjoining regions. Although a single term is applied to a wide geographic region and temporal span, regional differences are present through all periods (e.g., Fitzhugh and Gallon 2002; Pintal 1998). The label *Labrador Archaic burial tradition* used below refers only to those aspects of burial ideology and ceremonialism that remain present across coastal regions of Labrador, Newfoundland, and the Quebec Lower North Shore throughout the Archaic.

Within this subarctic coastal region, the earliest evidence of burial ceremonialism is found along the northern shoreline of the Gulf of St. Lawrence and in Labrador in the form of stone mounds or pavements built over a single burial cist or pit (Table 3-1). This burial tradition can be traced to ca. 7500 BP (McGhee and Tuck 1975; Tuck 1978a), and continues to be expressed sporadically throughout the Archaic (Fitzhugh 2006; Pintal 2006). Mounds typically occur in groups or in associations with other forms of burial deposits commonly dating to later periods. For example, L'Anse Amour (EiBf-4;

Figure 3-1), host to an Early Archaic mound (ca. 7500 BP), was reused during the Late Archaic as a location where simpler ochre-lined burial pits were placed (Table 3-1). Remarkably, locations where repeated burials occur are always associated with significant habitation components dating to the period of reuse. Based on radiocarbon dates and typological similarities, three sites with known or assumed repeated burial deposits date to the same period as the two burial grounds found in Newfoundland: Nulliak Cove-1, Rattlers Bight-1, and La Tabatière-10 (Figure 3-1).

Nulliak Cove-1 (IbCp-20) is positioned at the centre of one of the principal Labrador Archaic core regions during the Late Archaic (Fitzhugh 2006; Hood 2008). Sites in this region are located only a short distance away from Ramah Bay, providing easy access to Ramah chert, the lithic material that came to be used almost exclusively in the crafting of formal chipped stone tools during the Late Archaic in Labrador. Although many sites in this region are interpreted as potential base camps for Ramah chert procurement expeditions (Fitzhugh 1978, 2006; Tuck 1975b), Nulliak Cove held a special status. This site is one of the largest Archaic sites ever identified in Labrador, and is home to at least 27 segmented longhouses and four burial mounds, marking the unique importance this place held for Labrador Archaic families. The burial mounds and the largest structures, some reaching in excess of 70 m in length, date to the Rattlers Bight phase (Hutchings 2011; Rankin 2008), a period during which this region was separated from the remainder of the Labrador Archaic world by an extensive Pre-Dorset Palaeoeskimo core area, a group that arrived ca. 4000 BP from the north and appropriated portions of the former Labrador Archaic world (Fitzhugh 2006; Hood 2008). The unique density of longhouses, the length they attain, the gradual move towards a corporate use of caches, and the burials present at Nulliak Cove all point to the importance these structures played in bringing discrete family units into larger social groupings at this site and signalling their presence to the new Palaeoeskimo population (Hood 2008; Hutchings 2011; Rankin 2008:125).

The four burial mounds are therefore an integral aspect of the ceremonialism displayed at Nulliak Cove. The return to a form of burial that had not been used for thousands of years especially speaks of a need to affirm ancestral ties with this place and produce tangible markers of this connection on the landscape. All four are located in relative proximity to longhouses, although far enough to remain separate from day-to-day activity areas, further reinforcing the link between the living and their ancestors (Fitzhugh 1985:Figure 2). Although the use of mounds at Nulliak Cove differ from contemporaneous Archaic burials in subarctic coastal regions of Quebec, Newfoundland, and Labrador, the burial assemblages from the two excavated mounds and their location within an important regional hub indicate they are local interpretations of a shared underlying ideology. No identifiable human remains were recovered from the excavated burials, but birch bark and bone fragments were present suggesting skeletal remains may have been removed and transported elsewhere (Fitzhugh 1981, 1984, 2006). Although the burial assemblages associated with the two excavated mounds were unequally distributed, Rattlers Bight chipped stone points and bifaces were common in both and of a style consistent with forms found at the site and in non-burial contexts elsewhere in Labrador. Of note is evidence of artifacts having been ritually destroyed or “killed” and the absence of heavy woodworking tools, which would have been of little use this far north (Fitzhugh 2006:57–58).

Rattlers Bight-1 (GcBi-7) is located in Hamilton Inlet, at the centre of the largest Archaic core region in Labrador (Fitzhugh 2006; Hood 2008). It is also located in close proximity to eight more Archaic sites occupying the same landform, and is one of the largest sites in this region as well as the type site for the Rattlers Bight phase. Similarly to Nulliak Cove, it is interpreted as a summer aggregation site, contains the remains of a longhouse identifiable through a series of linear features, and is home to at least nine burial deposits (Fitzhugh 1978, 1980, 2006).

The burials occurred in two clusters located near, but separate from the edge of the longhouse and its activity areas, indicating an important link was present between the centre of daily activity and the burials (Fitzhugh 2006:Figure 2). Although not as visually prominent as the Nulliak Cove mounds, most burials were covered by stone slabs or filled with boulders providing cues to the location of the burials for occupants of and visitors to the site, and represent another form of re-interpretation of the ancestral form of mound burials. Organic remains in the form of birch bark, and faunal elements from various species were present within most burials. Probable human skeletal elements were present in only a single burial (Feature E2) and included two bundles of poorly preserved long bones and a mandible (Fitzhugh 2006:59). Burial items were unevenly distributed, but included chipped points and bifaces predominantly made of Ramah chert, finished heavy woodworking ground stone tools and ground points similar to those from Curtis, and top-grooved plummets, including a few preforms. As seen at Nulliak Cove, many tools appear to have been ritually killed (Fitzhugh 2006:60).

A third possible burial ground associated with Rattlers Bight and Nulliak Cove is located in the community of La Tabatière (EeBr-10), along the western portion of the Lower North Shore in Quebec. This site is located at the centre of a third Labrador Archaic core region, and among the largest concentration of Archaic sites within this region (Lacroix 2015c; Pintal 1998, 2006). Although its status as a burial ground remains unconfirmed, this site is included here because the nature and quantity of material uncovered, unfortunately solely as a result of construction activities, strongly suggests it had a burial component (Pintal 1998, 2006; Pintal and Boucher 1994). For similar reasons, no longhouse features are known from La Tabatière, although these features are present at a number of sites in the vicinity (Fitzhugh and Gallon 2002; Fitzhugh and Sharp 2003). Artifacts from this site closely resemble well-finished examples recovered from the Rattlers Bight burial ground and many are still covered with red ochre. The assemblage includes chipped Ramah chert points of the Rattlers Bight form, a local variation on the Back Harbour ground slate point form, and heavy woodworking tools, including blanks and preforms (Pintal and Boucher 1994:Photo 47–61).

To sum up, north of Newfoundland, locations with multiple burials remain infrequent, but always occur along the coast, within important habitation sites acting as the principal focus of occupation within a region. These sites clearly played an important role in bringing people together as attested by the high density of occupation and the presence of longhouses, so that burial ceremonialism was only one aspect confirming the special nature of these places. Although some exotic items are almost always present, burial assemblages are usually representative of occupation assemblages from the neighbouring region. Overall, the importance of heavy woodworking tools diminishes nearer the treeline, while the relative importance of Ramah chert decreases away from its source. These characteristics are all present at the Curtis burial ground, indicating it is another and perhaps the best example of the Late Archaic expression of the Labrador Archaic burial tradition. Evidence from the burial assemblage supports this assessment, as strong material links tie Curtis to standard Labrador Archaic occupation assemblages.

In contrast, PAC-3 is somewhat at odds with this pattern. Material evidence from its burial assemblage suggests a different set of regional links. Furthermore, the burial ground is located in complete isolation from major habitation sites. In light of the habitation locations preferred by the Labrador Archaic burial tradition defined above, PAC-3's unusual location is a dramatic difference suggesting it stands apart from other burial grounds in its wider region. In their recent analysis of the local landscape surrounding PAC-3, Renouf and Bell (2011) suggested that PAC-3 acted as an important landmark positioned along the coastal travel route running along the Northern Peninsula. This interpretation is consistent with Robinson's (2001, 2003, 2006) analysis of related Late Archaic burial grounds associated with the Moorehead burial tradition found in the Gulf of Maine.

3.5.2 Moorehead Burial Tradition

The Moorehead burial tradition appears with the Late Archaic in the Gulf of Maine (ca. 5200 BP) and continues until it is interrupted by the arrival of the Susquehanna tradition (ca 3700 BP). Between these dates, 34 Moorehead burial grounds are further divided into Early, Middle, and Late groups, with a florescence during the Middle period with 21 sites reaching up to 60–200 burials each. They occur in Maine and New Brunswick but strongly cluster on the Kennebec and Penobscot rivers in central Maine. Like the Labrador Archaic burial tradition, Moorehead burial grounds all share a number of characteristics. They are all located along interior river systems at anadromous fishing locations. None are located on maritime islands or points of land without immediate access to fresh water, despite occupation sites occurring in such locations. A few burial grounds are known to have significant evidence of habitation directly adjacent to the burial component (Bourque 1971:Appendix 5; Robinson 2001:227). This site location preference is interpreted to mean that burial grounds were situated at seasonal aggregation sites, away from areas occupied during most of the year (Robinson 2003).

Moorehead burial grounds are found in both near interior and deep interior locations (less and more than 20 km above the head of tide respectively). Both types are present across all periods, but near interior locations dominate the Middle and Late periods. The majority of Moorehead burial grounds are therefore located along short coastal river systems, and these are interpreted as the burial and aggregation locations associated with local kin-groups (Robinson 2003). In contrast, deep interior locations are positioned roughly midway along long river systems, near major access points to interior travel routes. These burial grounds are typically at highly recognizable locations on the landscape, often associated with waterfalls, and are interpreted as signposts marking the boundary between distinct interior and coastal populations (Robinson 2003). The Late period Cow Point burial ground in New Brunswick is one example of a boundary marker.

PAC-3 is consistent with a number of characteristics associated with boundary Moorehead burial grounds. Like its Gulf of Maine counterparts, it is located at a highly recognizable location on the landscape along an important route of travel. Port au Choix is not a central place, is located quite a distance away from extensive habitation sites, and Bonne-Espérance assemblages reach their southern limit at PAC-3 (Lacroix 2015c; Reid 2007). These commonalities with boundary Moorehead burial grounds suggest that Port au Choix may have been more than just a landmark along a travel route, also acting as a boundary marker between regions inhabited by different communities. Some artifact forms present within the PAC-3 burial assemblage further support the presence of a change in cultural rules occurring around Port au Choix. For example, Group B pie-wedge bayonets are linked to regions north of Port au Choix, while Group A bayonets are connected to more southern regions of the island. The co-occurrence of these two styles in three burials suggests people linked to separate regions were present at the site at the same time (Table 3-4). Evidence from skeletal remains from PAC-3 suggests that women came from a wider population pool than men, supporting the presence of ties to a variety of regions (Jelsma 2000; Kennedy 1981). It is difficult, however, to discern from the burial assemblage whether people from different groups used the burial ground together or whether it was used by a single group with members having different ties to a variety of neighbouring regions. Nevertheless, the location choice and the burial assemblage variability exhibited at PAC-3 are consistent with a local re-interpretation of the ideology that was involved in the establishment of boundary burial grounds in the Gulf of Maine.

In contrast to Moorehead boundary sites, however, the occupation site associated with PAC-3 clearly indicates this location was not the focus of large-scale social gatherings, but a simple short-stay field camp used by small mortuary task groups performing burial rituals (Renouf and Bell 2011). Other differences clearly set PAC-3 apart from Moorehead burials. For example, PAC-3 is located on an island along the coast, not the interior. The use of the miniature mounds placed over most of the burials at PAC-3 is also notably absent in Moorehead burial contexts. Their presence at PAC-3 may have played a purely functional role, such as stabilizing the burial deposits in an active beach or indicating the location of previous burials, but they are consistent with the use of boulders in mounds and burial pits by the Labrador Archaic burial tradition and likely represent a local expression of similar beliefs (Tuck 1978a).

In summary, the local landscape setting and burial assemblage present at Curtis place this burial ground squarely within the Labrador Archaic burial tradition, along Nulliak Cove-1, Rattlers Bight-1, and La Tabatière-10. These sites are located within important habitation clusters at both local and regional scales and their burial assemblages reflect this connection. Despite PAC-3 being located within a few hundred kilometres from a number of burial grounds associated with the Labrador Archaic burial tradition, a number of important differences suggest that this site is the product of a distinct set of ceremonial rules. Its location along an important route of travel, away from important habitation sites, and at the southern boundary of the Bonne-Espérance complex recalls boundary Moorehead burial grounds and suggests that PAC-3 acted as a boundary marker rather than a central place. Materials from the burial assemblage have ties with regions located on either side of the Bonne-Espérance boundary, supporting the view that PAC-3 played a more important role in intergroup relationships than other nearby burial grounds.

3.6 Burial Practices and Group Identity

Hunter-gatherer-fisher movement across the landscape produces strong connection to places, including burial grounds, to which they regularly return. These burial sites are regularly placed on prominent landforms along important paths of movement, becoming persistent places over their use-life, acting as important landmarks to people travelling the region, either physically or through narratives, and playing a significant role in the periodic renewal of relationships between people, people and spirits, and people and land (e.g., Littleton and Allen 2007; Walthall 1999). The particular nature of the relationships in which burial grounds acted as mediators are dependent on the ways in which these persistent places were enmeshed in the lives of the people involved in the burial ceremonies.

Because we learn about our world through stories and embodied practices (Ingold 2000), the narratives associated with the burial grounds and the performance of burial ceremonies would have been integral to the knowledge of the world held by the people involved with these persistent places, and would have made up part of a shared group identity. These narratives would have provided the template for the proper way of performing burial ceremonies and acceptable forms of burial offerings, the rationale for performing the rites, how to find the site, and the role various people had to take on during the ceremonies. Although the details of such stories may forever remain elusive, Newfoundland's burial grounds do offer important clues regarding the relationships people who participated in their creation held with the places they deemed proper to ceremonially bury their relatives. Whereas Curtis offers a narrative comparable to that of Nulliak Cove-1, Rattlers Bight-1, and La Tabatière-10, PAC-3 reveals a very different story.

At Curtis, people chose to live in the company of their ancestors, performing burial ceremonies in the core of their region, at a site where high artifact densities speak of planed aggregations and numerous returns, strengthening the bonds between place and inhabitants. The close proximity between living sites and the burials would have forced people to routinely walk past and set their gaze upon the burials when going about their day-to-day activities (Figure 3-3). Yet, the burial area was a powerful and respected zone of the settlement, as no evidence of other activities overlays or intermixes with the burial deposits, despite this close proximity. Although it has been suggested that, at Nulliak Cove at least, the need to reaffirm the ancestral link to the place in tangible ways was linked to the arrival of a new ethnic group, the Pre-Dorset Palaeoeskimo (Hood 2008), this explanation does not explain why, at the same period, burial ceremonialism also amplified in regions far from the immediate contact zone. It seems more plausible that, at a time of increased climate variability and changing social conditions (Fitzhugh 2006; Hood 2008), this required ancestral presence was an integral aspect of a new form of ongoing negotiation local populations had with fluctuating marine resource in an attempt to secure more predictable returns in their region as well as their own sense of place. The unusual choice of mounds at Nulliak Cove, then, is simply a local modification to a more general pattern in response to the need for clear visual statements of this link to a foreign group. At Back Harbour and its northern counterparts, it is the interplay between community, individuals, ancestors, land, sea, and other creatures that attracted people back over many generations and conferred these central places a special ceremonial status. Like other burial grounds of the Labrador Archaic burial tradition, Curtis provided a way for a local population, perhaps a single kin-group, to reaffirm their identity as a group and mitigate their relationships with this culturally significant place, theirs ancestors, and unpredictable marine resources.

In contrast to the close relationship displayed at Curtis, there is a voluntary distance put between the living and the dead at PAC-3. Although ancestors oversee the movement of their descendants from a prominent place at Port au Choix (Renouf and Bell 2011), people only come in close physical contact with their ancestors in small groups and for brief periods during journeys or periodic rituals. As noted above, multiple lines of evidence suggest PAC-3 was positioned at a significant boundary in the Late Archaic landscape of the Far Northeast. As a result, it is suggested that PAC-3 played a more important role in the affirmation, or renewal, of relationships between groups across this boundary rather than interceding between a single group and its territory. Differential patterns in nitrogen and carbon stable isotopes have hinted at the presence of at least two separate diet groups buried in separate clusters within Locus II. Although, these were not deemed to correspond to distinct cultural groups in the original analysis (Jelsma 2000, 2006), the current data is insufficient to dismiss the possibility (Wright 2006:444–448). Yet, the isolated nature of the burial ground and its material connections to diverse regions make it difficult to ascertain whether PAC-3 was used by one or multiple groups, or which of the known cultural groups may have been the principal users of PAC-3. The limited chronology present at PAC-3 also makes it difficult to evaluate whether these associations changed over time. Incorporating the analysis of strontium isotopes may help differentiate individuals that were born and raised in separate regions (Bentley 2006), and may also point further research toward specific regions in search of the homelands of PAC-3's occupants.

In summary, the differences in burial ceremonialism observed between PAC-3 and Curtis are the expressions of distinct practices. Although these two burial grounds may seem very similar at first glance, their location and the content of their burials tell a more complex story. Curtis is at the centre of its region, part of the largest site on the island, and filled with artifacts commonly found at nearby habitation sites. PAC-3 is located at a border between regions, far from important habitation sites, and filled with artifacts linked to diverse regions. These significant differences indicate that distinct ceremonial rules were at work, likely a result of the divergent roles fulfilled by these two burial grounds: Curtis promoting local identity formation while PAC-3 sustained intergroup relationships.

3.7 Conclusions

Although remarkable, burial grounds were not the principal mode of disposal of the dead during the Archaic in the Far Northeast. Whatever method people inhabiting these regions used to dispose of their dead did not leave significant traces in the archaeological record. Therefore, the patterns seen within Newfoundland's burial grounds cannot be taken as representative of the dominant mortuary practices present at that time. Instead, burial grounds offer a window into the world views shared by the people of various regions as they came together to perform important ceremonies.

An analysis of the regional context in which Newfoundland's burial grounds were established and used permits us to confidently place the Curtis burial ground within a widely shared burial tradition spanning the subarctic coastal regions of Atlantic Canada, the Labrador Archaic burial tradition. At PAC-3, however, results have raised more questions than they have provided answers. This site borrows a mixture of traits from both the Labrador Archaic and Moorehead burial traditions, while deviating from each in significant and fascinating ways. PAC-3 appears to sit at a cultural boundary between groups inhabiting regions to the north and south of Port au Choix. As a result, the possibility that multiple groups may be represented at Port au Choix should be re-examined. Finally, in light of the extreme unusual nature of the patterns seen at Port au Choix, any interpretations relying on this site to explain patterns seen elsewhere in Newfoundland, Labrador, and Quebec must be made with renewed caution.

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3.9 Notes

1. All dates in the text and tables are provided in conventional radiocarbon years BP (before present, 1950).

2. The 12 pristine woodworking tools found deposited together at the Rumbolt (DhBg-1) site are quite intriguing and most unusual when contrasted to coastal assemblages from Newfoundland (Lacroix 2015a:Figure 2-12). All 12 implements are almost perfectly rectangular and have a unique hexagonal cross-section. They are present in three standard sizes and all are made from the same banded, grey limestone that has weathered to a pale tan colour. The assemblage includes 11 gouge-adze combinations, more than a third of the total number of double-ended celts from Newfoundland. Their closest match is a single specimen from Burial 44A at Port au Choix-3 (EeBi-2). This gouge-adze combination matches the general proportions of the Rumbolt long form and material, although not as weathered. Despite the striking similarities, some differences are present. The Port au Choix specimen is generally not as finely made, having a rectangular cross-section (the dorsal edges have not been faceted), and clear signs of use, suggesting this represent a working version of the specimens from Rumbolt.

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Chapter 4

Relatives a World Apart:

Regionalism and Group Identity in Archaic Newfoundland

Dominic Lacroix

ABSTRACT. Until now, knowledge of the Archaic in Newfoundland has principally relied on information from only a handful of sites, located hundreds of kilometres apart, resulting in a patchy and over-generalized understanding of the period. This paper presents the results of an analysis of formal stone tool assemblages from 82 localities spread around the island of Newfoundland. They demonstrate the presence of clear regional differences within Newfoundland. When these technological traditions are contrasted with other forms of regional patterns such as site location preferences, access to food resources, burial ceremonialism, and a modelled travel route network, three distinct regions with different cultural patterns emerge. This regionalism is interpreted as the presence of at least three ethnic groups in Newfoundland during the Late Archaic, each settled in its own "country" and with its own unique set of traditions. Results challenge the long-held view of a single, homogeneous group of people present across all regions of the island, known as the Maritime Archaic Indians.

4.1 Introduction

Our current view of the Late Archaic (ca. 5500–3200 BP)[1] in Newfoundland is over-generalized and based on a small number of key sites, one of which, the Port au Choix burial ground (EeBi-2), is not representative (Lacroix 2015d). In this paper, our sparse source of information is augmented by examining a large sample (n = 1191) of Archaic stone tools associated with over one hundred sites from Newfoundland. The results of this analysis suggest that multiple groups cohabited on the island over multiple generations, mirroring patterns present in Labrador and adjoining regions of Quebec. The distinctive distribution of certain forms of artifacts also indicates that each group remained in somewhat separate regions of the island. This hypothesis is further supported by preferential site clustering in different environmental settings, and the use of different forms of burial ceremonialism and patterns of regional interaction.

As places, crafts, food, and ideological beliefs are strongly associated with group identity (Díaz-Andreu et al. 2005; Jones 1997; Nagel 1994), the recognition of significant differences in the lifeways of people from different regions of Newfoundland provides the basis for the identification of culturally distinct groups. The somewhat separate region inhabited by each group is referred to as their country, the English word preferred by Australian Aborigines to denote the complex nature of the relationships people have with the region they inhabit (e.g., Bradley 2008; Rose 1996), since the term territory commonly used in western narratives is rooted in limiting notions of resource access, control, and exploitation (Zedeño 2008). The maintenance of separate technological, economic, and burial traditions despite centuries of cohabitation and interaction speaks to the presence of ethnicity on the island during the Late Archaic. The identification of separate ethnic groups in Newfoundland undermines the previous explanatory model revolving around a single group of people, the *Maritime Archaic Indians* (MAI), spanning the entire island. The following sections provide a brief overview of the current understanding of the Archaic in Newfoundland in order to better understand the results within Newfoundland's wider region.

4.2 Newfoundland and the Maritime Archaic Tradition

The earliest and longest cultural period in Newfoundland and Labrador is the Archaic (ca. 8000–3200 BP). Human presence during this period has been interpreted with the help of a concept named the Maritime Archaic tradition, first proposed by Jim Tuck in the 1970s based on his excavations at the Port au Choix burial ground and broad similarities present in contemporaneous assemblages recovered throughout the Far Northeast(Figure 4-1; Tuck 1971a:350). This tradition recognizes that broad similarities such as the use of red ochre in burials, a focus on maritime hunting, and the widespread use of ground stone tools were shared across a vast region spanning from the Gulf of Maine to northern Labrador. In Newfoundland and Labrador, the Maritime Archaic Indians were envisioned as the local representatives of this tradition. Over time, research has recognized the presence of two distinct MAI branches encompassing at least four generally contemporaneous cultural groups in Labrador and adjacent regions of Quebec (e.g., Fitzhugh 2006; Pintal 2006; Sanger 2006; Tuck 1992). These four MAI groups can all be found along the Quebec Lower North Shore and southern Labrador, an area smaller than the island of Newfoundland. Despite the multiplicity of cultural groups present across the Strait of Belle Isle, Newfoundland Archaic site classification still lacks the further refinements present in neighbouring mainland regions.

This classification has helped maintain and still promotes the idea that a single, widespread, and relatively homogeneous group of people occupied the island during the Archaic. Although thousands of artifacts have been recovered from more than a hundred Archaic sites in Newfoundland, our current perception of this period derives mainly from the information gathered by two large and well-reported excavations: a large burial ground with remarkable organic preservation in the community of Port au Choix in western Newfoundland (EeBi-2; Tuck 1976a), and a habitation and workshop site from Bonavista Bay in eastern Newfoundland (DeAk-1; Carignan 1975b). Only a few other sites have been excavated beyond test trenches, many of which are only reported in unpublished theses and reports (e.g., Austin 1980, 1984; Beaton 2004; Carignan 1974; MacLeod 1967a, 1968; Reader 1996, 1999b; Reid 2007; Renouf 1985; Renouf and Bell 2011; Schwarz and Skanes 2010; Temple 2007).

The bulk of the Archaic material recovered in Newfoundland has therefore remained underutilized, forcing investigators to draw their interpretations from a meagre and sparsely populated dataset, limiting interpretations to broad generalizing terms that further propagate visions of a single island culture (Renouf and Bell 2006:5). If we are to move forward with our understanding of the Newfoundland Archaic, collections accumulated outside excavated sites must be integrated to our interpretations, providing a broad foundation from which the basic assumptions underlying the single group vision can be appropriately evaluated.

Because the majority of Newfoundland Archaic sites are located on the northern half of the island (Figure 4-2) and that only 18–60 km separate the island from the mainland across the Strait of Belle Isle, cultural patterns observed just north of Newfoundland are especially relevant to our understanding of the ways in which early islanders interacted with their closest neighbours. In Quebec and Labrador, the Maritime Archaic includes two major, distinct, and contemporaneous Archaic cultural sequences (Fitzhugh 1978, 2006; McGhee and Tuck 1975; Pintal 1998, 2006; Reid 2007; Tuck 1982). Although both groups probably share ancestry with people present throughout the region during the Early Archaic, and have overlapping geographic distributions, the principal cultural developments of each sequence occurred in separate areas. One centre of cultural development was in central and northern Labrador (Fitzhugh 1978, 2006), while the other was located further south, along the Strait of Belle Isle and the Quebec Lower North Shore (McGhee and Tuck 1975; Pintal 1998). The specific moment when these groups became distinct is difficult to assess, but by the Late Archaic (5500–3200 BP) they can easily be differentiated. These two distinct cultural units are often termed the northern and southern branches of the Maritime Archaic in reference to their geographic centre of development and principal site clusters.

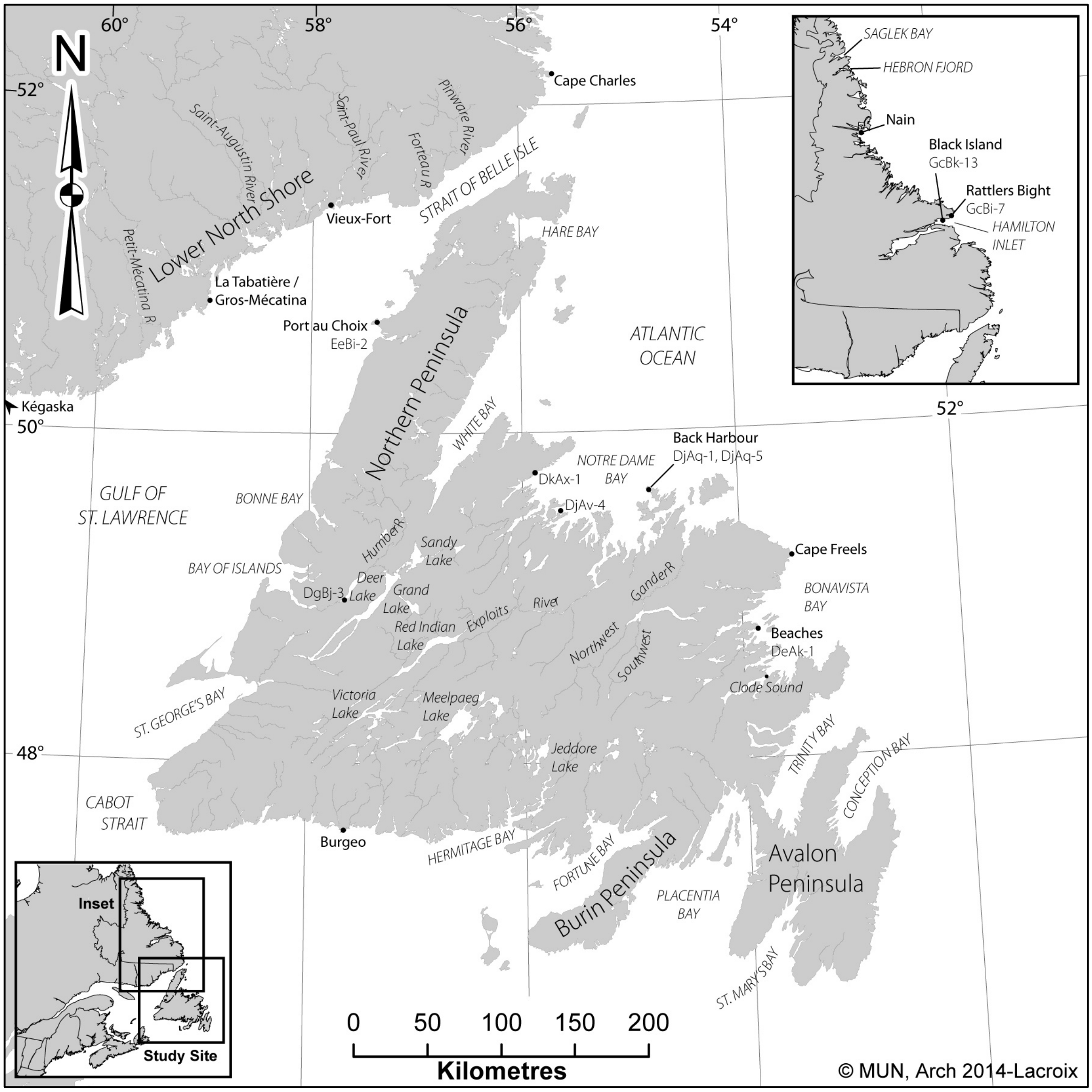

Figure 4-1 Newfoundland and adjoining regions of Quebec and Labrador with place names mentioned in the text.

The northern branch, also named the *Labrador Archaic* or *Labrador Maritime Archaic*, dominates the early archaeological record of Labrador. The terminal expression of the Labrador Archaic temporal continuum is of the most relevance to this study as most Newfoundland components are contemporaneous with these assemblages (see below). In Labrador, this terminal expression is termed the *Rattlers Bight* phase (4200–3500 BP; Fitzhugh 2006). On the Lower North Shore in Quebec, these sites are grouped under the *La Tabatière* complex (5000–3500 BP; Pintal 2006). The distinction made between the terms phase and complex conveys the extent of our understanding of the cultural units based on excavated sites (Fitzhugh 1972:112; Pintal 1998:41). The term *phase* denotes a group of sites for which a relatively complete picture of the culture involved is available as a result of excavation at a large site and numerous related smaller sites. The term *complex* is used for groupings of sites for which a large amount of information is available but remains incomplete because data from a large excavated site is still missing or insufficient samples are available to define the range and variation of the assemblage with a degree of confidence. Therefore a more complete picture of the Late Labrador Archaic is currently available in Labrador than Quebec.

Despite their large geographic range, Late Labrador Archaic assemblages share the following traits: chipped tapering stem projectile points in a number of forms and biface knives, ground celt, gouges, and small slate points, perforated and/or grooved steatite plummets, longhouses, and the dominant use of Ramah chert for formal stone tools (Fitzhugh 1975a, 1978, 2006). In Labrador, sites of the Rattlers Bight phase cluster within two principal core regions, in the Hebron-Saglek area and along the central coast south of Nain, although material associated with this cultural unit is also present in the Straight of Belle Isle (Fitzhugh 2006). In Quebec, sites associated with the La Tabatière complex predominantly cluster in the La Tabatière-Mécatina area although they appear sporadically throughout the Lower North Shore (Pintal 1998, 2006). Sites with chipped stemmed points, ground slate points, and plummets are present in Newfoundland on the Northern Peninsula, and within large bays such as Bonne Bay, Notre Dame Bay, and Bonavista Bay (e.g., Carignan 1975a, 1975b; Reid 2007; Schwarz and Skanes 2010; Temple 2007). These items, however, often appear within assemblages where traits associated with the southern branch are also present (Renouf and Bell 2006:6).

In contrast to their northern counterparts, sites associated with the southern branch only appear during the Late Archaic, do not extend into northern Labrador, and instead cluster along the Strait of Belle Isle where they overlap geographically with Labrador Archaic sites. In Quebec, sites associated with the southern branch are grouped under the *Bonne-Espérance* complex (5000–3500 BP; Pintal 1998, 2006), a cultural unit that also encompasses sites present in adjoining regions of southern Labrador and Newfoundland (Pintal 2006; Reid 2007). Although they are present throughout the Lower North Shore and the Strait of Belle Isle, Bonne-Espérance complex sites principally cluster in the Vieux-Fort and Rivière-Saint-Paul area in Quebec (Pintal 2006). Newfoundland chert dominates these assemblages, and common artifacts include broad side-notched points, large bifaces, large linear flakes, while celts and gouges are less common. A closely related southern branch complex appears for a brief interval in Hamilton Inlet and is grouped under the *Black Island* complex (4500–4200 BP; Fitzhugh 1975a). The presence of broad side-notched and expanding stem points, leaf-shaped bifaces, and flake scrapers made of southern Labrador rhyolitic chert, and the absence of ground stone tools identifies this complex as intrusive to the local Labrador Archaic sequence. Sites dominated with a rhyolite assemblage including expanding stem points are also known from a number of locations in Newfoundland, including White Bay and Bonavista Bay (e.g., Carignan 1974, 1975b; Devereux 1969; Linnamae 1967).

Despite the relatively large time span (1000–2000 years) covered by the Late Archaic phase and complexes, artifact assemblages appear to remain relatively consistent in form throughout this period. Even if small changes were present, the limited chronology currently available in this region is not sufficient to enable the identification of further temporal patterns within these various culture-historical units. A similar situation is also present in Newfoundland. Although more than a hundred Archaic sites are known on the island, only ten have produced radiocarbon dated material. All accepted dates fall within the Late Archaic with most dates clustering in the later half of the period (4500–3200 BP; Table 4-1). Radiocarbon dates come from both burial and occupation contexts from regions spanning most of the island and, with the exception of the Port au Choix burial ground (Lacroix 2015d), all contain typical artifact assemblages for their region. Based on stylistic similarities between Newfoundland Archaic assemblages and artifacts found both south and north of island, only a single Newfoundland assemblage, excavated from an undated component in a raised palaeobeach terrace, is likely to predate the Late Archaic (DgBj-3; Reader 1996, 1999a). All other examined material is consistent with a Late Archaic attribution.

Table 4-1 Archaic sites with Radiocarbon Dates.

Loc[1]	Borden	Site Name	Radiocarbon Age BP	Source	Notes
Quebec Lower North Shore					
2	EeBr-01	La Tabatière	3910±90 (Beta-67796)	Pintal (1998)	Dates La Tabatière complex
5	EiBk-09	Poste Vieux-Fort	3450±60 (Beta-52488)	Pintal (1998)	Dates Bonne-Espérance complex
8	EiBj-23	Baie au Saumon	4740±120 (Beta-67254)	Pintal (1998)	Dates Bonne-Espérance complex
10	EiBi-17	Presqu'île des Belles Amours	4470±450 (Beta-19634)–4010±130 (Beta-11691)	Pintal (1998)	Dates La Tabatière complex
11	EiBi-05	Pointe Rocheuse	4930±1200 (UQ-733)–3500±300 (UQ-732)	Pintal (1998)	Dates La Tabatière complex
14	EiBh-86	Anse des Dunes	3840±90 (Beta-39883)	Pintal (1998)	Dates La Tabatière complex
16	EiBg-43	Rive-Ouest-de-la-Blanc-Sablon	2870±90 (Beta-23005)–2690±60 (Beta-23008)	Pintal (1998)	
Southern Labrador					
17	EiBf-02	Forteau Point	5561±60 (P-691)–5035±65 (SI-2311)	Tuck (1978a)	
17	EiBf-06	Graveyard	4450±85 (SI-2307)–4285±85 (SI-2308)	Wilmeth (1978)	Dates Bonne-Espérance complex
18	EiBf-04	L'Anse Amour	4105±95 (I-7544), Area 5	McGhee and Tuck (1975)	
-	GcBi-07	Rattlers Bight-1	4525±155 (SI-929)–3370±50 (SI-2518)	Fitzhugh (1975a)	Dates Rattlers Bight phase
-	GcBk-13	Black Island-2	4890±90 (SI-1787)–3125±55 (SI-1275) Nearby beach emerged ca. 4200 BP.	Fitzhugh (1975a)	Dates Black Island complex
Newfoundland					
27	DlBk-01	Cow Head, Spearbank	4130±150 (DAL-326)	Reid (2007)	
28	EeBi-02	Port au Choix-3	4290±110 (I-3788)–3230±220 (I-4380)	Tuck (1976a)	
28	EeBi-42	Gould	5440±50 (Beta-148518)–3200±100 (Beta-132364)	Renouf (2011)	
29	EgBf-15	Caines	3600±60 (Beta-108562)–3490±80 (Beta-113405)	Reader (1999b)	
30	EjBa-02	Big Brook-2	4090±40 (Beta-177106)–3820±40 (Beta-171715)	Beaton (2004)	
43	DjAq-01	Curtis	3720±130 (GAK-834)–3200±90 (GAK-1254)	Wilmeth (1978)	
44	DhAi-05	Cape Cove-1	4540±135 (S-1859)–3615±120 (S-1860)	Austin (1984)	
45	DeAk-01	Beaches	4900±230 (SI-1384)–3690±100 (I-6761)	Carignan (1975b)	

1 Numbers correspond to localities presented in Figure 4-2 and Table 4-2.

The lack of early sites in Newfoundland is a result of the historic processes that created the current site sample. Most sites have been recorded as a result of modern development activities and this development has principally occurred along the coast. Because of the complex sea-level history of Newfoundland, occupation contexts pre-dating the Late Archaic are likely to be located either some distance inland of the current coast, offshore, or in the intertidal zone (Bell and Renouf 2003). Early sites, if preserved, are to be found away from modern communities, in areas that have received little archaeological attention. Site locations, limited radiocarbon dates, and stylistic similarities within Newfoundland and with better dated assemblages from Quebec and Labrador support the attribution of the material used in this study to the Late Archaic.

The following sections present the results of the visual inventory of a large sample of material recovered from known Archaic sites on the island and clarifies the relationship between assemblages found in various regions of Newfoundland. Because we do not have enough chronology to identify temporal patterns in the Late Archaic of Newfoundland and its neighbouring regions, it is assumed that all material examined during this study date to the Late Archaic and that any spatial patterns identified represent contemporary regional differences in technological traditions rather than changing traits within a single culture.

4.3 Journey into Newfoundland's Archaic Material Culture

As of 2014, there are 186 sites with a probable Archaic component in Newfoundland present in the site database maintained by the Provincial Archaeology Office (PAO) of the Government of Newfoundland and Labrador. Based on stylistic similarities and a limited number of radiocarbon dates, all Newfoundland sites are presumed to date to the Late Archaic, with the exception of the older component from South Brook Park (DgBj-3) that has produced material consistent with an Early Archaic occupation (Reader 1996, 1999a).

For the purpose of this analysis, only those sites that could securely be identified as having an Archaic component on the basis of diagnostic artifacts such as chipped projectile points, ground slate points, ground stone woodworking tools, and plummets were included. This identification was based on information obtained from the PAO site database, site record forms (SRF), catalogue sheets, unpublished site reports, photographs, and artifact collections held at number of facilities in and outside Newfoundland. A total of 113 Newfoundland sites were confirmed to have an Archaic component and the inventory resulted in the compilation of information associated with 1191 artifacts (Lacroix 2015b:Table C-2; summarized in Table 4-3 below). These were photographed and qualitative notes on the general morphology of each specimen were taken (e.g., longitudinal, lateral and cross-sections, blade and stem form, etc.), allowing artifacts from different collections to be compared[2].

The spatial distribution analysis reported herein does not include heavy woodworking tools as this tool category still lacks an adequate typological classification. Once sites where only heavy woodworking tools are present are removed, 44 Newfoundland Archaic sites remain for analysis. Because some of these sites are located in very close proximity to each other, sometimes sharing a single landform, they were lumped together and considered as single, large, repeatedly occupied sites, further reducing the sample to 33 Newfoundland localities (Table 4-2). It must be noted that this sample is not uniformly distributed across the island (Figure 4-2). This situation is the result of a number of factors, including sea-level change and sampling biases (Renouf and Bell 2006). Therefore, patterns identified through this analysis can confidently be applied only to regions where sites are currently located.

Newfoundland is separated from the Lower North Shore in Quebec and southern Labrador by only 18 km at its narrowest point along the Strait of Belle Isle, making these regions a critical component of our understanding of Newfoundland's precontact history. As a result, the study area selected goes beyond Newfoundland and includes the coastal regions found between Kégashka in Quebec and Cape Charles in southern Labrador (Figure 4-1). A similar set of criteria for site selection in Newfoundland was applied in the selection and evaluation of Late Archaic sites from Labrador and Quebec, and a total of 25 localities from these two regions were selected to complement the analysis (Figure 4-2, Table 4-2). Despite the fact that many artifact collections were

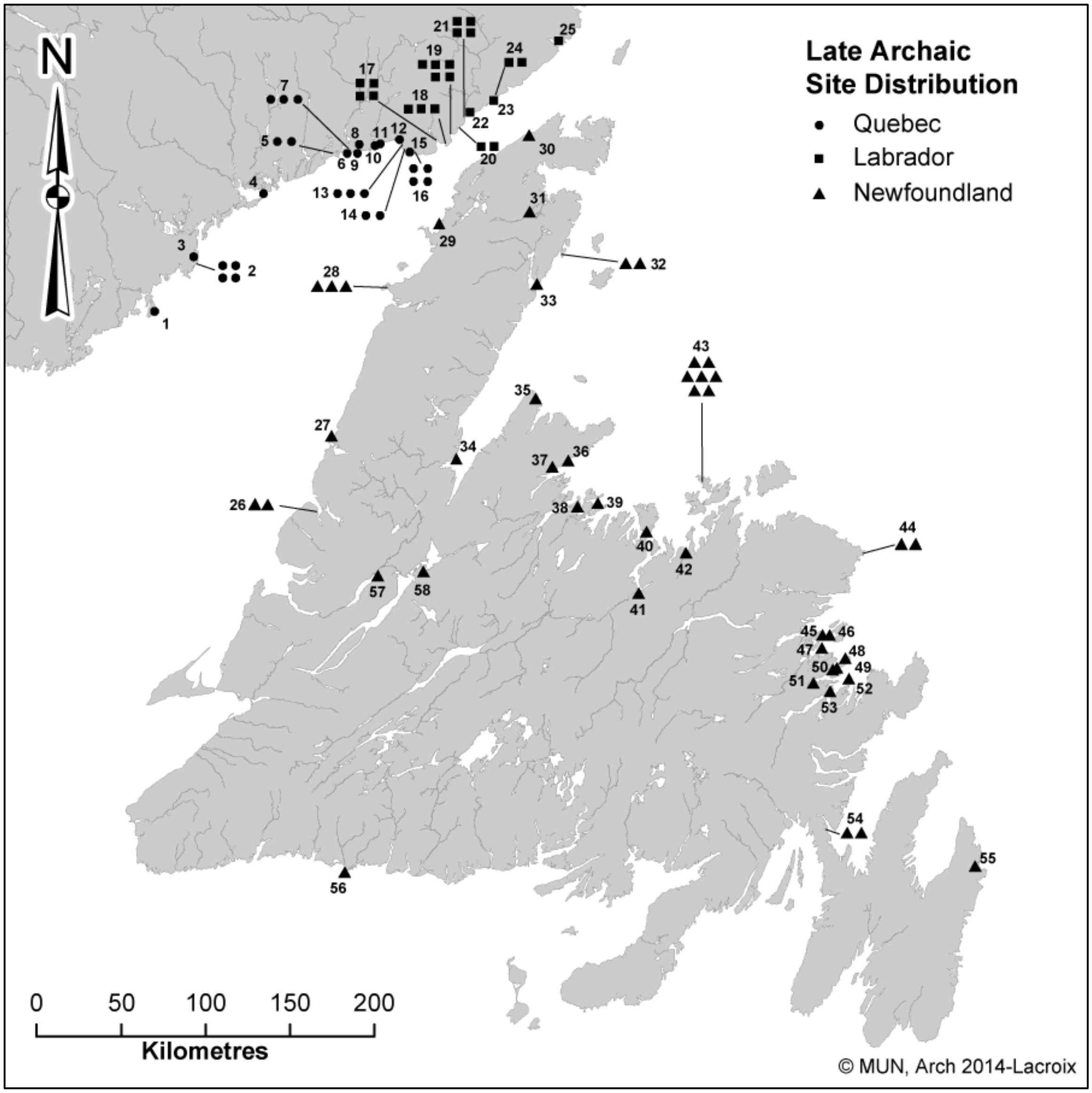

Figure 4-2 Late Archaic site distribution for Newfoundland, southern Labrador, and the Lower North Shore in Quebec. Numbers correspond to localities presented in Table 4-2.

directly inspected, the analysis of the material from Quebec and Labrador relies heavily on information available in site reports and regional syntheses (e.g., McGhee and Tuck 1975; Pintal 1998). Site location information was obtained from the PAO for southern

Table 4-2 Newfoundland, Labrador, and Quebec Archaic sites included in the analysis.

Locality[1]	Borden	Source	Collection[2]
Quebec Lower North Shore			
1	EdBt-03	Site collection	10
2	EeBr-01, EeBr-07, EeBr-09, EeBr-10	Site collection; Fitzhugh and Gallon (2002); Pintal (1998); Pintal and Boucher (1994)	10
3	EfBr-04	Site collection	10
4	EhBo-15	Fitzhugh et al. (2004)	13
5	EiBk-09, EiBk-18	Site collection; Martijn (1971, 1974); Pintal (1998); Site catalogue	10, 13
6	EiBk-05	Site collection	10
7	EiBk-11, EiBk-12, EiBk-13	Site collection; Martijn (1974); Pintal (1998)	10, 13
8	EiBj-23	Pintal (1998)	10
9	EiBj-05	Martijn (1971)	13
10	EiBi-17	Site collection; Pintal (1998)	10
11	EiBi-05	Site collection; Pintal (1998)	10
12	EiBh-47	Site collection; Fitzhugh (2001)	10
13	EiBh-41, EiBh-59, EiBh-132	Site collection; Fitzhugh (2001); Lévesque (1976); Pintal (1998)	10, 13
14	EiBh-27, EiBh-86	Site collection; Pintal (1998)	10, 13
15	EiBh-44	Site collection	11
16	EiBg-30, EiBg-43, EiBg-49, EiBg-58	Site collection; Lévesque (1976); Pintal (1998); Pintal and Groison (1987)	10, 11, 13
Southern Labrador			
17	EiBf-02, EiBf-05, EiBf-06, EiBf-18	Site collection; Auger and Stopp (1987); Balson (2001); Harp (1964a); Madden (1976); McGhee and Tuck (1975)	1, 12
18	EiBf-04, EiBf-14, EiBf-25	Site collection; Auger and Stopp (1987); Balson (1999, 2001); Harp (1964a); Lévesque (1976); McGhee and Tuck (1975)	1, 12
19	EjBf-05, EjBf-10, EjBe-55, EjBe-58, EjBe-64	Balson (1999, 2001)	12
20	EjBe-19, EjBe-71	Site collection; Harp (1964a); McGhee and Tuck (1975)	1
21	EjBe-06, EjBe-08, EjBe-12, EjBe-24	Harp (1964a); Madden (1976); McGhee and Tuck (1975)	1
22	EjBe-32	McGhee and Tuck (1975)	1
23	EkBc-47	Tuck (1981)	1
24	EkBc-39, EkBc-41	Tuck (1992)	2
25	FaAx-02	Auger and Stopp (1987)	1

(continued)

Table 4-2 (continued)

Locality[1]	Borden	Source	Collection[2]
Western Northern Peninsula			
26	DjBl-04, DjBl-07	Site collection; Harp (1964a, 1964b); Schwarz and Skanes (2010); Site catalogue	1, 3
27	DlBk-01	Site collection; Reid (2007); Site catalogue	1
28	EeBi-02, EeBi-03, EeBi-42	Site collection; Harp (1964a, 1964b); Harp and Hughes (1968); Reid (2007); Renouf and Bell (2000, 2011); Tuck (1976a); Wintemberg (1940); Site catalogue	1, 2, 4A, 4B, 4C
29	EgBf-15	Site collection; Reader (1998, 1999b), Reid (2007)	1
30	EjBa-02	Site collection; Beaton (2004); Reid (2007)	2
Eastern Northern Peninsula/White Bay			
31	EgBa-01	Site collection; Carignan (1975a)	1
32	EfAx-01, EfAx-07	Site collection; Carignan (1975a); Drouin (2005); Lloyd (1876); Pope (2010)	1, 8, 12, 13
33	EeBa	Wintemberg (1940)	13
34	DkBe-01	Site collection; Linnamae (1975); Site catalogue	1, 3
35	EaBa-10	Site collection; Erwin (1998); Thomson (1986, 1989)	1, 7, 12
Notre Dame Bay			
36	DkAx-02	Site collection; Thomson (1989); Site record form	1
37	DkAx-08	Site collection; Erwin (2000)	1, 12
38	DjAw-07	Site collection; Marshall (1982)	1, 12
39	DjAv-04	Site collection	1
40	DiAt-05	Site collection	1
41	DgAt-01	Site collection	1
42	DhAr-01	Site collection; Pastore (1982)	1
43	DjAq-01, DjAq-02, DjAq-04, DjAq-05, DjAq-07, DjAq-20, DjAq-30	Site collection[‡]; Lloyd (1876); Temple (2007); Thibaudeau (1993); Westley (2008); Site catalogue	1, 3, 6[‡], 12, 13
Bonavista Bay			
44	DhAi-05, DhAi-07	Site collection; Austin (1980, 1984)	1
45	DeAk-01	Site collection; Carignan (1975b); Site catalogue	1, 3, 5, 13
46	DeAk-03	Site collection; Carignan (1973, 1974, 1975b)	1
47	DeAl-01	Site collection; Carignan (1974, 1975b); MacLean (1989, 2004)	1
48	DeAj-01	Site collection; Carignan (1974); McLean (2004)	1, 5
49	DdAk-02	Site collection; Carignan (1975a)	1

(continued)

Table 4-2 (continued)

Locality[1]	Borden	Source	Collection[2]
50	DdAk-15	Site collection; McLean (2004)	5
51	DdAl-03	Site collection	1
52	DdAj-04	Site collection; Tuck (1980)	1
53	DdAk-03	Site collection; Curtis (2008); Sawicki (1980); Tuck (1980)	4A
Southern Newfoundland			
54	CkAl-03, CkAl-10	Site collection; Holly et al. (2011); Robbins (1985)	1
55	CjAe-50	Howley (1915)	13
56	CjBk-06	Rast (1997, 1998, 1999)	12
Central Newfoundland[3]			
57	DhBi-01	Site collection; Harp (1964a, 1964b)	1, 9
58	DhBg-01	Site collection; Hull (2011)	9

Notes:

1 Numbers correspond to localities presented in Figure 4-2.

2 Collection locations:

- 1 The Rooms, Provincial Archives, Art Gallery and Museum, St. John's, NL
- 2 Memorial University, Department of Archaeology, St. John's, NL
- 3 Canadian Museum of History, Gatineau, QC
- 4A Parks Canada, Atlantic Collections and Conservation Facility, Dartmouth, NS
- 4B Parks Canada, Port au Choix National Historic Site Visitor Interpretation Centre, Port au Choix, NL
- 4C Parks Canada, Lobster Cove Head Lighthouse, Rocky Harbour, NL
- 5 Burnside Heritage Foundation Museum, Burnside, NL
- 6 Twillingate Museum, Twillingate, NL
- 7 Dorset Soapstone Quarry Visitor Centre, Fleur de Lys, NL
- 8 French Shore Historical Society Interpretation Centre, Conche, NL
- 9 Deer Lake Public Library, Deer Lake, NL
- 10 Laboratoire et réserve en archéologie du Québec, Quebec, QC
- 11 Musée régional de la Côte-Nord, Sept-Îles, QC
- 12 Private collections, various locations
- 13 Unknown

3 Sites located more than 30 km from the nearest coastline.

‡ Includes DjAq-1 museum reproduction casts on display at the Twillingate Museum

Labrador and from the site database maintained by the Direction de l'archéologie et des institutions muséales, Ministère de la Culture et des Communications du Québec for the Lower North Shore.

4.4 My Things, Your Things: Regional Patterns in Material Culture

Although the majority of the specimens examined cannot currently be attributed to specific forms beyond their general class (e.g., wood working tools, chipped and ground points, plummets), artifact counts are informative as to the relative importance of discard activities that took place at each locality. Overall, the single most important Archaic locality in Newfoundland is Back Harbour, where nearly 40 percent of all formal Archaic stone tools have been recovered (Table 4-3), indicating intensive activities took place there. Although a burial ground (DjAq-1) is associated with this locality, only a quarter of the local collection comes from burial deposits. The largest collection from this locality is from a workshop/habitation site (DjAq-5) located a few hundred metres from the burial ground, accounting for 18 percent of the artifact count on the island. Remarkably, the bulk of the material from this site is the result of finds associated with yearly road grading activities (Wells and Renouf 2008a).

Outside Back Harbour, other relatively large collections (> 13 formal stone tools) are generally from sites where excavations have taken place, with some notable exceptions. For example, DkAx-2 and DjAv-4 (Localities 36, 39; Table 4-3) are sites that

Table 4-3 Artifact counts for the 15 largest diagnostic artifact collections in Newfoundland.

Locality[1]	Sites	Gouges/ Celts[2]	Ground Points	Chipped Points	Plummets	Totals	Nfld%
Western Northern Peninsula		*147*	*87*	*28*	*6*	*268*	*23%*
26	DjBl-04, DjBl-07	24	12	2	0	38	3%
28	EeBi-02, EeBi-03, EeBi-36, EeBi-42	101	67	12	5	185	16%
29	EgBf-11, EgBf-15, EgBf-19, EgBf-24	13	6	10	0	29	2%
	Other localities	9	2	4	1	16	1%
Eastern Northern Peninsula/ White Bay		*41*	*11*	*10*	*5*	*67*	*6%*
32	EfAx-01, EfAx-07	10	4	3	1	18	2%
34	DkBe-01	12	2	0	0	14	1%
35	EaBa-10	13	2	1	3	19	2%
	Other localities	6	3	6	1	16	1%
Notre Dame Bay		*439*	*117*	*34*	*47*	*637*	*53%*
36	DkAx-02	32	5	2	2	41	3%
38	DjAw-06, DjAw-07	10	4	1	0	15	1%
39	DjAv-04	23	6	0	1	30	3%
43	DjAq-01, DjAq-02, DjAq-03, DjAq-04, DjAq-05, DjAq-06, DjAq-07, DjAq-19, DjAq-20, DjAq-21, DjAq-24, DjAq-25, DjAq-30, DjAq-32	315	89	28	41	473	40%
	Other localities	59	13	3	3	78	6%
Bonavista Bay		*77*	*20*	*40*	*1*	*138*	*12%*
44	DhAi-01, DhAi-04, DhAi-05, DhAi-06, DhAi-07	13	0	6	0	19	2%
45	DeAk-01	27	11	15	0	53	4%
46	DdAk-03, DdAk-04	14	4	5	0	23	2%
	Other localities	23	5	14	1	43	4%
Trinity Bay		*15*	*9*	*2*	*1*	*27*	*2%*
54	CkAl-03, CkAl-10	7	7	1	1	16	1%
	Other localities	8	2	1	0	11	1%
Southern Newfoundland		*7*	*3*	*5*	*0*	*15*	*1%*
Central Newfoundland[3]		*30*	*2*	*6*	*1*	*39*	*3%*
58	DhBg-01	12	2	0	0	14	1%
	Other localities	18	0	6	1	25	2%
	Totals	756	249	125	61	1191	100%

Notes: Counts include preforms and fragments. Adapted from Lacroix(2015b:Table C-2).
1 Numbers correspond to localities presented in Figure 4-2.
2 Celts include adzes, axes, and fragments not identifiable to a particular type.
3 Sites located more than 30 km from the nearest coastline.

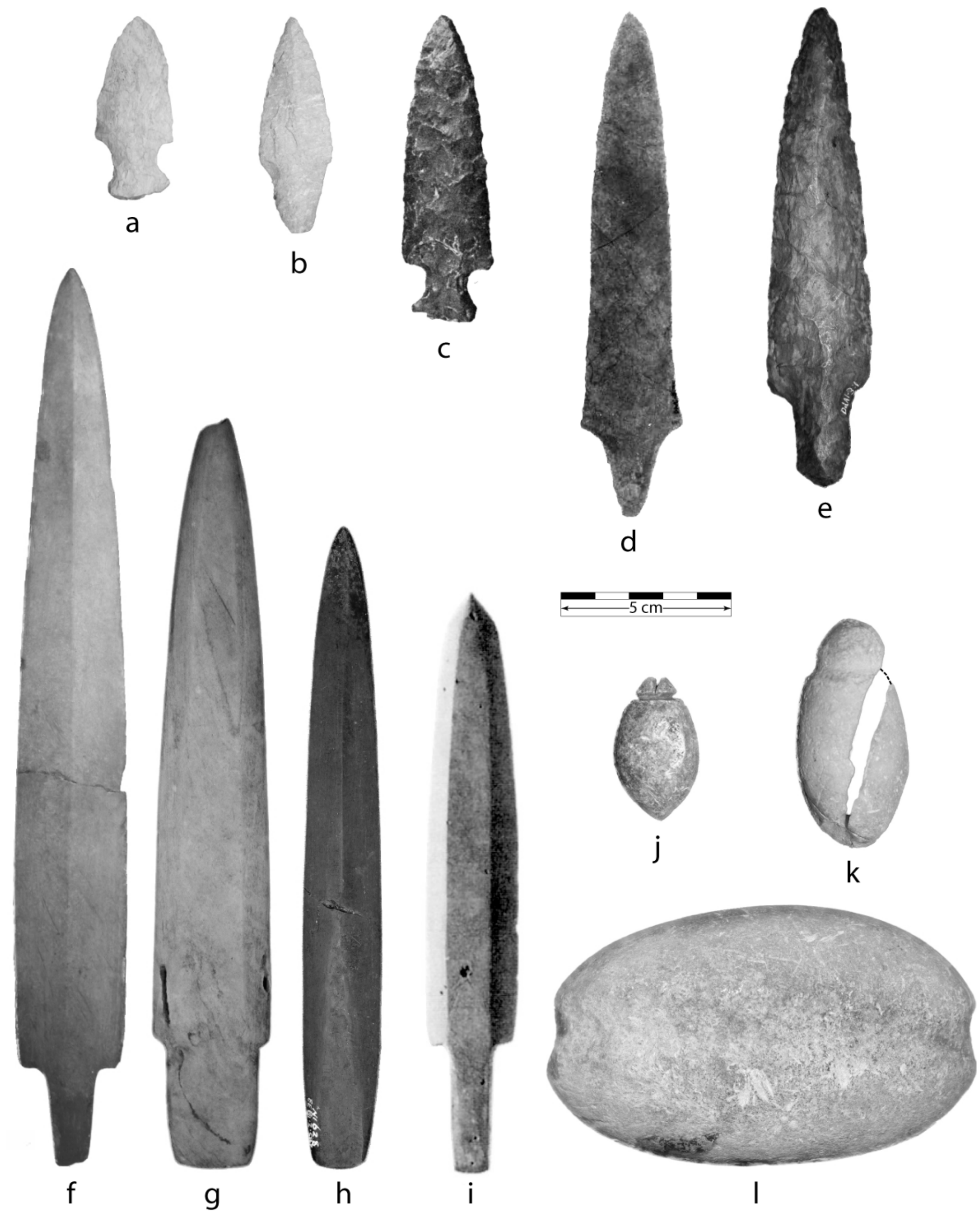

Figure 4-3 Principal Newfoundland Archaic artifact forms: a) broad side-notch chipped point, Graveyard form (EiBf-2); b) contracting stem chipped point, Rattlers Bight form (DiAt-5); c) expanding stem chipped point, Bonavista form (DeAk-1); d) flaring shoulder chipped point, Cape Cove form (DhAi-5); e) straight stem chipped point, Cannings Cove form (DdAl-3); f) narrow stem slate spearpoint, Back Harbour form (DjAq-1); g) broad hexagonal slate spearpoint (EeBi-2); h) pie-wedge slate bayonet (EeBi-2); i) mixed form slate spearpoint (EeBi-2); j) top-grooved plummet (DjAv-4); k) pecked knob plummet (DeAk-3); l) longitudinally grooved cobble or netsinker (DjAv-20).

have never been professionally excavated and where finds are the result of local construction and gardening activities, indicating these are likely to have been significant habitation locales. As the following sections will demonstrate, notable patterns are present among artifacts that could confidently be assigned to specific chipped point, ground point, and plummet forms (Figure 4-3). Specimens that can be confidently assigned to one of these forms account for approximately 25 percent of the total artifact count, but are present at over 50 percent of the localities.

4.4.1 Chipped Stone Points

In contrast to Late Archaic sites from Labrador, Quebec, and later time periods, Newfoundland Archaic points occur much less frequently, suggesting other technologies may have been privileged over chipped stones for projectile points (Table 4-4). The Late Archaic population of Newfoundland possibly relied more extensively on bone, antler and wood artifacts than neighbouring groups, a circumstance akin to that proposed for the Gulf of Maine Archaic in New England (Robinson 1992). Although no specific projectile point typology currently exists for Newfoundland, there are at least five principal point forms present (Figure 4-3:a–e).

The dominant form is akin to the Rattlers Bight projectile point form (RB), well known in Labrador where these points occur in a wide range of sizes and are characterised by sharp shoulders leading to a contracting stem finishing in a flat or rounded base (Figure 4–3:b; Fitzhugh 2006:55). Newfoundland sites where similar points

Table 4-4. Chipped stone point frequencies by localities.

Locality[1]	Borden	RB	GY	BV	CP	CG	NC	**Total**	Source[2]
Quebec Lower North Shore		*15*	*16*	*0*	*0*	*0*	*0*	***31***	
1	EdBt-03	1	0	0	0	0	0	**1**	1
2	EeBr-01, EeBr-07, EeBr-09, EeBr-10	4	0	0	0	0	0	**4**	1, 2, 3
4	EhBo-15	0	2	0	0	0	0	**2**	2, 3
5	EiBk-09, EiBk-18	0	12	0	0	0	0	**12**	1, 2, 3, 4
6	EiBk-05	2	0	0	0	0	0	**2**	1
8	EiBj-23	0	+	0	0	0	0	**0**	3
9	EiBj-05	0	+	0	0	0	0	**0**	3
10	EiBi-17	1	0	0	0	0	0	**1**	1, 3
11	EiBi-05	+	0	0	0	0	0	**0**	1, 3
12	EiBh-47	1	0	0	0	0	0	**1**	1, 3
13	EiBh-41, EiBh-59, EiBh-132	1	0	0	0	0	0	**1**	1, 3
14	EiBh-27, EiBh-86	1	0	0	0	0	0	**1**	1, 3
15	EiBh-44	1	0	0	0	0	0	**1**	1
16	EiBg-30, EiBg-43, EiBg-49, EiBg-58	3	2	0	0	0	0	**5**	1, 2, 3
Southern Labrador		*34*	*39*	*0*	*0*	*0*	*0*	***73***	
17	EiBf-02, EiBf-05, EiBf-06, EiBf-18	8	11	0	0	0	0	**19**	1, 2, 3
18	EiBf-04, EiBf-14, EiBf-25	19	14	0	0	0	0	**33**	1, 2, 3
19	EjBf-05, EjBf-10, EjBe-55, EjBe-58, EjBe-64	2	2	0	0	0	0	**4**	2, 3
20	EjBe-19, EjBe-71	0	2	0	0	0	0	**2**	1, 2, 3
21	EjBe-06, EjBe-08, EjBe-12, EjBe-24	0	7	0	0	0	0	**7**	2, 3
22	EjBe-32	4	1	0	0	0	0	**5**	2, 3
23	EkBc-47	1	0	0	0	0	0	**1**	3
24	EkBc-39, EkBc-41	0	1	0	0	0	0	**1**	3
25	FaAx-02	0	1	0	0	0	0	**1**	3
Western Northern Peninsula		*2*	*7*	*0*	*1*	*0*	*14*	***24***	
26	DjBl-04, DjBl-07	0	0	0	1	0	1	**2**	1, 2, 3, 4
27	DlBk-01	0	0	0	0	0	2	**2**	1, 2, 3, 4
28	EeBi-02, EeBi-03, EeBi-42	1	5	0	0	0	6	**12**	1, 2, 3, 4
29	EgBf-15	1	1	0	0	0	4	**6**	1, 2, 3
30	EjBa-02	0	1	0	0	0	1	**2**	1, 2, 3
Eastern Northern Peninsula/White Bay		*4*	*0*	*0*	*0*	*0*	*1*	***5***	
32	EfAx-01, EfAx-07	2	0	0	0	0	1	**3**	1, 2, 3
34	DkBe-01	0	0	+	0	0	0	**0**	1, 2, 3, 4
35	EaBa-10	2	0	0	0	0	0	**2**	1, 2, 3

(continued)

Table 4-4 (continued)

Locality[1]	Borden	RB	GY	BV	CP	CG	NC	**Total**	Source[2]
Notre Dame Bay		*11*	*0*	*2*	*1*	*1*	*19*	***34***	
36	DkAx-02	0	0	0	0	0	2	**2**	1, 3, 4, 5
38	DjAw-07	0	0	0	0	0	1	**1**	1, 3
40	DiAt-05	1	0	0	0	0	0	**1**	1
41	DgAt-01	0	0	0	0	0	1	**1**	1
42	DhAr-01	0	0	0	1	0	0	**1**	1, 3
43	DjAq-01, DjAq-02, DjAq-04, DjAq-05, DjAq-07, DjAq-20, DjAq-30	10	0	2	0	1	15	**28**	1[‡], 2, 3, 4
Bonavista Bay		*6*	*0*	*6*	*3*	*2*	*21*	***38***	
44	DhAi-05, DhAi-07	0	0	+	1	0	3	**4**	1, 2, 3
45	DeAk-01	5	0	4	1	0	5	**15**	1, 2, 3, 4
46	DeAk-03	0	0	+	0	0	4	**4**	1, 2, 3
47	DeAl-01	0	0	1	0	1	3	**5**	1, 2, 3
48	DeAj-01	1	0	0	0	0	0	**1**	1, 2, 3
49	DdAk-02	0	0	0	1	0	0	**1**	1, 2, 3
51	DdAl-03	0	0	0	0	1	0	**1**	1
52	DdAj-04	0	0	1	0	0	1	**2**	1, 2, 3
53	DdAk-03	0	0	0	0	0	5	**5**	1, 2, 3
Southern Newfoundland		*0*	*0*	*0*	*1*	*0*	*1*	***2***	
54	CkAl-03, CkAl-10	0	0	0	0	0	1	**1**	1, 2, 3
56	CjBk-06	0	0	0	1	0	0	**1**	2, 3
Central Newfoundland		*0*	*0*	*0*	*0*	*1*	*0*	***1***	
57	DhBi-01	0	0	0	0	1	0	**1**	1, 2, 3
		72	62	8	6	4	56	**208**	

Notes: Reported counts include only artifacts that could be assigned to specific forms. The not classified (NC) category includes fragments and preforms. The chipped points forms included in the analysis are Rattlers Bight (RB), Graveyard (GY), Bonavista (BV), Cape Cove (CP), and Cannings Cove (CG).

1 Numbers correspond to localities presented in Figure 4-2.

2 Sources of information include: 1-original artifact, 2-photograph, 3-written analysis, 4-catalogue entry, and 5-site record form.

\+ No chipped points are present but site assemblages are consistent with host complex.

‡ Includes DjAq-1 museum reproduction casts on display at the Twillingate Museum.

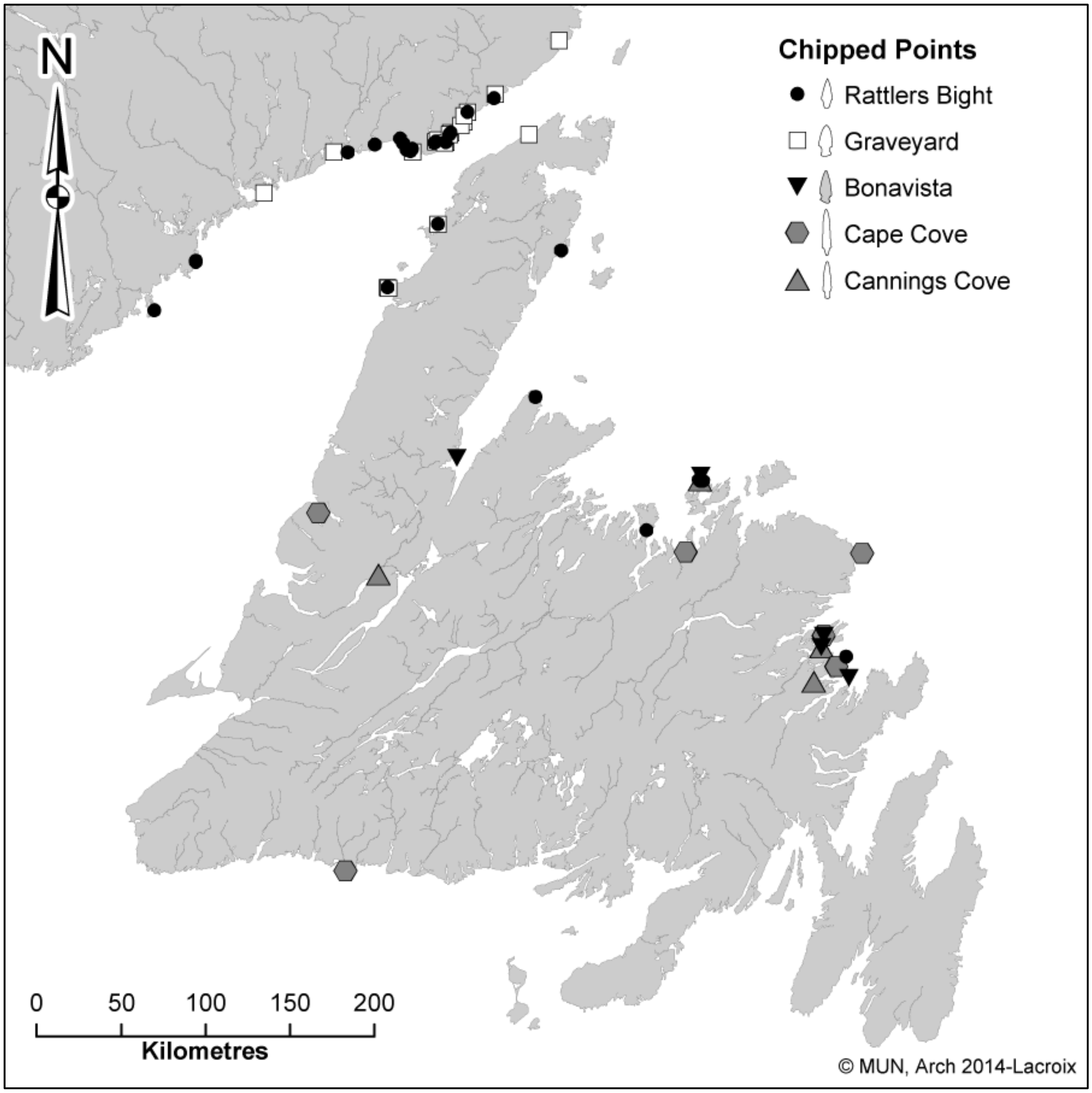

Figure 4-4 Chipped point distributions. See Table 4-4 for detailed locality list.

have been recovered are almost exclusively located along the northern coastline, including the Northern Peninsula, with their most concentrated presence in Back Harbour (Figure 4-4; Table 4-4). Like similar specimens found on the Lower North Shore (Pintal 1998, 2006), Newfoundland specimens are not exclusively made of Ramah chert but also use a variety of local material.

A second important form in southern Labrador and the Quebec Lower North Shore are points of the Graveyard form (GY). These stemmed specimens have broad side notches and are typically made of grey-white Newfoundland chert (Figure 4–3:a; McGhee and Tuck 1975:57). In Newfoundland, this form is only present at a few sites, and all are located along the west coast of the Northern Peninsula, from Port au Choix to the Strait of Belle Isle (Figure 4-4; Table 4-4).

The third Newfoundland form has an expanding stem that is closely related to the Graveyard form as well as points from the Black Island-2 assemblage in central Labrador (Figure 4–3:c; Fitzhugh 1975a; Fitzhugh 1978), but are preferentially made from eastern Newfoundland Bloody Bay rhyolite. These points are grouped under the Bonavista form (BV), are present in the Curtis burial assemblage, and occur at a few sites in Bonavista Bay and White Bay (Figure 4-4; Table 4-4). In Newfoundland, the related Graveyard and Bonavista points generally co-occur with blade-like linear flakes in site assemblages (Carignan 1974, 1975b; Devereux 1969; Linnamae 1975; Reid 2007; Tuck 1980), a pairing also present across the Strait of Belle Isle (McGhee and Tuck 1975; Pintal 1998, 2006).

In contrast to the previous three projectile point forms, the last two are not related to assemblages found north of Newfoundland. Both are made from a variety of materials, notably locally sourced fine-grained lithics, such as chert and rhyolite. The first is the Cape Cove form (CP). These points have a long, straight to slightly convex blade with a thick biconvex cross-section, sharp and slightly flaring shoulders, and a long contracting stem (Figure 4-3:d). The other, the Cannings Cove form (CG), has a relatively large amount of variability across its few representatives, which may include specimens from more than a single form. Cannings Cove points all share a number of traits, however, including an elongated, triangular to slightly convex blade with a thick bi-convex cross-section, sharp to slightly rounded shoulders, and a thick parallel stem with a slightly expanding, un-thinned, and generally oblique base (Figure 4-3:e). Given the thickness of the stem and the base form, these points were likely fitted into a socket, in contrast to other point forms from the study area. Find locations for these two point forms are currently limited to regions south of the Northern Peninsula, including central and southern Newfoundland (Figure 4-4; Table 4-4). Interestingly, these last two forms have their closest match among Middle and Late Archaic point styles from New England and the Maritimes (see Bourque 1995:Plate 5.1, 2001:Illustration 2-12; Coe 1964:Figures 34, 116).

4.4.2 Ground Stone Tools

There are three principal forms of ground stone tools in Newfoundland's Archaic assemblages: woodworking tools such as gouges, adzes and axes, slate points and bayonets, and plummets. As presented below, some of these forms have variants clustering in specific regions of the island, most notably narrow-stemmed ground slate points and top-grooved plummets. No significant patterns in the distribution of celts were clearly apparent during the analysis. Nevertheless, these tools do seem to have a number of standardized forms that may relate to functional, temporal, or spatial patterns, or a combination thereof. An in-depth analysis of these patterns, however, was beyond the scope of this project and will require further research. One significant result of the analysis was the recognition that the Humber Junction (i.e. Deer Lake-Grand Lake-Sandy Lake area) has the most unusual assemblages of heavy woodworking tools on the island (Lacroix 2015a). This region surrounds an important junction point in Newfoundland's inland travel route network, and these intriguing collections may hint at a previously unacknowledged form of interior ceremonialism.

4.4.2.1 Ground Slate Points and Bayonets

Four principal forms of ground slate points or bayonets are present in Newfoundland and its adjacent mainland regions (Figure 4-3:f–i). All four forms are present in burial deposits, but only one is common in occupation contexts (Lacroix 2015d). Interestingly, ground slate points and bayonets occur more frequently in Newfoundland Archaic assemblages than chipped points do.

The most common form found in Newfoundland, Labrador and Quebec is the Back Harbour form (BK). Back Harbour slate spearpoints have a leaf-shaped blade with a flattened diamond to bi-convex cross-section and a long narrow stem (Figure 4-3:f). Narrow-stemmed points are found at all types of sites, from generalized large and small encampments to specialized workshop and burial grounds. These points are present in most regions of the island, except the south coast (Figure 4-5; Table 4-5). The majority of Newfoundland's non-mortuary specimens (14/25 or 68 percent) are found between the northeastern tip of the Northern Peninsula and Back Harbour. Remarkably, nearly

Table 4-5. Ground slate point frequencies by locality.

Locality[1]	Borden	BK	BX	MX	PW	NC	**Total**	Source[2]
Quebec Lower North Shore		*10*	*1*	*0*	*1*	*0*	***12***	
2	EeBr-01, EeBr-07, EeBr-09, EeBr-10	8	0	0	0	0	**8**	1, 2, 3
3	EfBr-04	1	0	0	0	0	**1**	1
5	EiBk-09, EiBk-18	0	1	0	0	0	**1**	1, 2, 3, 4
7	EiBk-11, EiBk-12, EiBk-13	0	0	0	1	0	**1**	1, 2, 3
13	EiBh-41, EiBh-59, EiBh-132	1	0	0	0	0	**1**	1, 3
Southern Labrador		*27*	*3*	*1*	*3*	*0*	***34***	
17	EiBf-02, EiBf-05, EiBf-06, EiBf-18	2	1	0	1	0	**4**	1, 2, 3
18	EiBf-04, EiBf-14, EiBf-25	24	2	1	2	0	**29**	1, 2, 3
19	EjBf-05, EjBf-10, EjBe-55, EjBe-58, EjBe-64	1	0	0	0	0	**1**	2, 3
Western Northern Peninsula		*10*	*12*	*6*	*41*	*13*	***82***	
26	DjBl-04, DjBl-07	3	0	0	6	3	**12**	1, 2, 3, 4
27	DlBk-01	0	0	0	0	1	**1**	1, 2, 3, 4
28	EeBi-02, EeBi-03, EeBi-42	7	12	5	35	8	**67**	1, 2, 3, 4
29	EgBf-15	0	0	0	0	1	**1**	1, 2, 3
30	EjBa-02	0	0	1	0	0	**1**	1, 2, 3
Eastern Northern Peninsula/White Bay		*4*	*0*	*1*	*2*	*3*	***10***	
31	EgBa-01	1	0	0	0	0	**1**	1, 2, 3
32	EfAx-01, EfAx-07	1	0	0	2	1	**4**	1, 2, 3
33	EeBa	0	0	1	0	0	**1**	2, 3
34	DkBe-01	1	0	0	0	1	**2**	1, 2, 3, 4
35	EaBa-10	1	0	0	0	1	**2**	1, 2, 3
Notre Dame Bay		*38*	*0*	*4*	*20*	*51*	***113***	
36	DkAx-02	0	0	0	1	4	**5**	1, 3, 4, 5
37	DkAx-08	0	0	0	6	2	**8**	1, 3
38	DjAw-07	1	0	0	0	1	**2**	1, 3
39	DjAv-04	2	0	2	0	2	**6**	1
40	DiAt-05	0	0	1	0	1	**2**	1
41	DgAt-01	1	0	0	0	1	**2**	1
43	DjAq-01, DjAq-02, DjAq-04, DjAq-05, DjAq-07, DjAq-20, DjAq-30	34	0	1	13	40	**88**	1[‡], 2, 3, 4
Bonavista Bay		*5*	*2*	*1*	*0*	*12*	***20***	
45	DeAk-01	1	1	0	0	9	**11**	1, 2, 3, 4
48	DeAj-01	1	0	1	0	0	**2**	1, 2, 3
49	DdAk-02	1	0	0	0	0	**1**	1, 2, 3
50	DdAk-15	1	0	0	0	0	**1**	1, 3
52	DdAj-04	1	0	0	0	0	**1**	1, 2, 3
53	DdAk-03	0	1	0	0	3	**4**	1, 2, 3

(continued)

Table 4-5 (continued)

Locality[1]	Borden	BK	BX	MX	PW	NC	**Total**	Source[2]
Southern Newfoundland		*2*	*0*	*0*	*0*	*6*	***8***	
54	CkAl-03, CkAl-10	1	0	0	0	6	**7**	1, 2, 3
55	CjAe-50	1	0	0	0	0	**1**	2, 3
Central Newfoundland		*0*	*2*	*0*	*0*	*0*	***2***	
58	DhBg-01	0	2	0	0	0	**2**	1, 2, 3
		96	20	13	67	85	**281**	

Notes: Reported counts include only artifacts that could be assigned to specific forms. The not classified (NC) category includes fragments and preforms. The ground slate point forms included the analysis are Back Harbour (BK), broad hexagonal (BX), mixed (MX), and pie-wedge (PW).
1 Numbers correspond to localities presented in Figure 4-2.
2 Sources of information include: 1-original artifact, 2-photograph, 3-written analysis, 4-catalogue entry, and 5-site record form.
‡ Includes DjAq-1 museum reproduction casts on display at the Twillingate Museum.

a third of all specimens from Newfoundland are red, a colour choice rarely made off the island. Also notable are three specimens from Curtis (DjAq-1, Locality 45) that have an unusual notch or waist near the junction between the blade and stem, a feature reproduced in a number of narrow hexagonal bayonets from the Moorehead burial tradition in Maine and New Brunswick (e.g., Sanger 1973:Table 7, Plate 7:g).

A related spearpoint form identified during the analysis remains unique to Newfoundland and Labrador for the moment. It blends traits from both the narrow-stem and the broad hexagonal point forms. Spearpoints of this mixed form (MX) have a thin stem and a blade cross-section with one convex face and three facets on the opposite side (Figure 4-3:i). Although they may represent a candidate demonstrating a transition from one form to the other, a few specimens co-occur with the other forms in burial assemblages at Port au Choix-3 (Lacroix 2015d). All other specimens are from occupation sites. Their spatial distribution nearly coincides with the narrow-stem form.

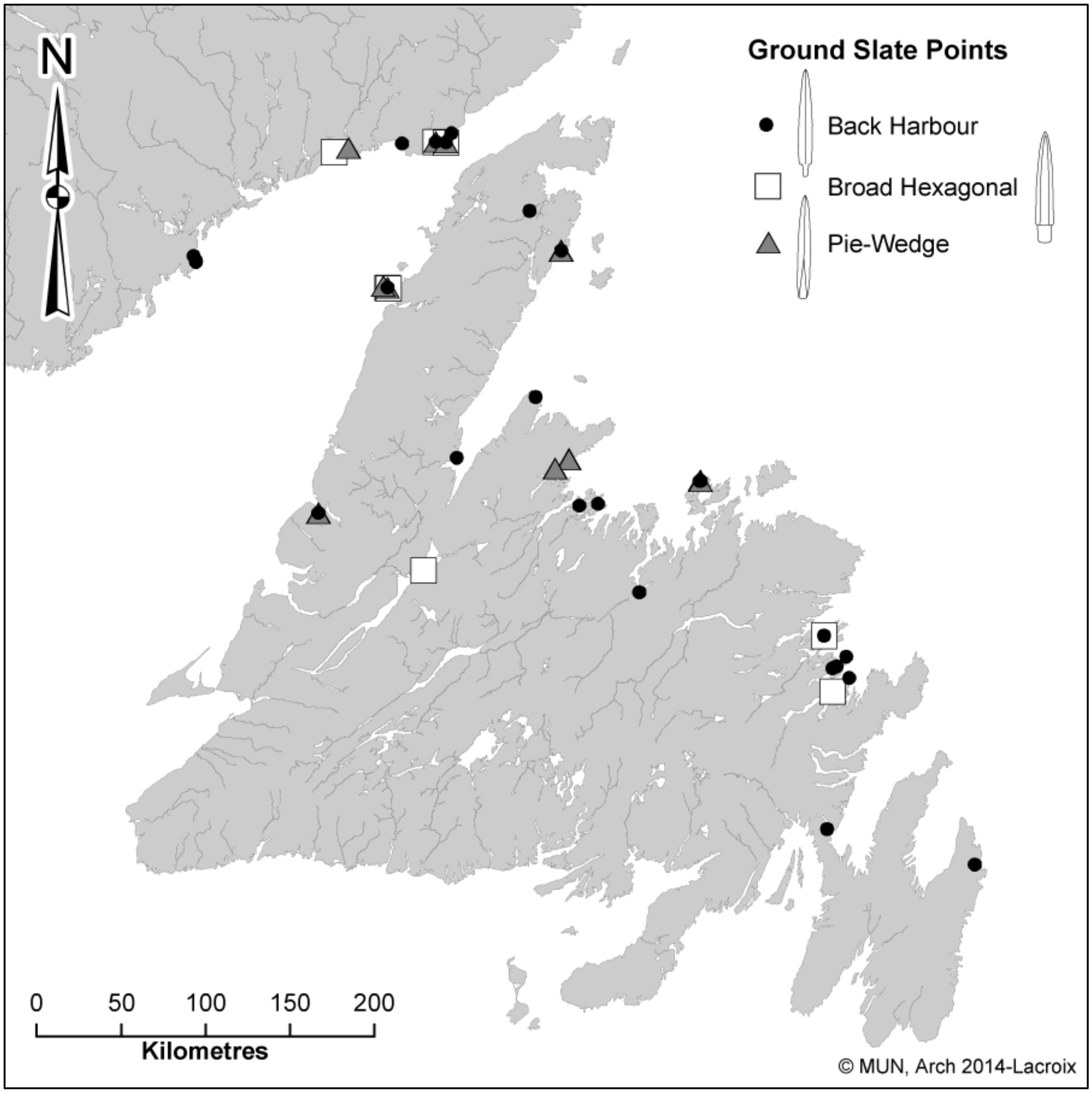

Figure 4-5 Ground slate point distributions. See Table 4-5 for detailed locality list.

In contrast, broad hexagonal spearpoints (BX) and pie-wedge bayonets (PW) are both quite rare outside burial deposits (Figure 4-3:g–h). These two forms dominate the burial assemblage at Port au Choix, but are otherwise infrequent in Newfoundland (Figure 4-5; Table 4-5). Both forms are linked to the St. Lawrence corridor and the Maritime provinces (Lacroix 2015d), and are easily differentiated from Back Harbour spearpoints. Broad hexagonal spearpoints have a wide stem and a broad blade with a hexagonal cross-section, while pie-wedge bayonets have long narrow blades with an asymmetric diamond to pie-wedge cross-section.

4.4.2.2 Plummets and Netsinkers

Plummets and netsinkers are grooved or perforated stones generally interpreted as a fishing weight of some sort (e.g., line, net). In Newfoundland, plummets and netsinkers appear in three forms (Figure 4-3:j–l), but top-grooved plummets (TG) dominate the assemblage. This form is characterized by the grooves used to form the attachment point. A first groove separates the attachment point from the body, while a second groove typically runs across the top of the attachment point, creating a bifurcate knob. In Labrador, they are associated with the Rattlers Bight phase of the Labrador Archaic (Fitzhugh 1978, 1985). In Newfoundland, their greatest concentration occurs along the northeastern coast of the island, particularly in Notre Dame Bay (Figure 4-6; Table 4-6). They are notably absent from Bonavista Bay and the Lower North Shore. No plummet of this particular form has been reported south of the Gulf of St. Lawrence. The other two forms, the pecked knob (PK) and longitudinally grooved cobble (LG), are quite rare but are also limited to the northeastern portion of the island (Figure 4-6; Table 4-6).

Table 4-6 Plummet frequencies by localities.

Locality[1]	Borden	TG	PK	LG	NC	**Total**	Source[2]
Southern Labrador		*4*	*0*	*0*	*0*	***4***	
19	EjBf-05, EjBf-10, EjBe-55, EjBe-58, EjBe-64	2	0	0	0	***2***	2, 3
22	EjBe-32	1	0	0	0	***1***	2, 3
23	EkBc-47	1	0	0	0	***1***	3
Western Northern Peninsula		*5*	*0*	*0*	*0*	***5***	
27	DlBk-01	1	0	0	0	***1***	1, 2, 3, 4
28	EeBi-02, EeBi-03, EeBi-42	4	0	0	0	***4***	1, 2, 3, 4
Eastern Northern Peninsula/White Bay		*2*	*2*	*0*	*0*	***4***	
32	EfAx-01, EfAx-07	1	0	0	0	***1***	1, 2, 3
35	EaBa-10	1	2	0	0	***3***	1, 2, 3
Notre Dame Bay		*20*	*1*	*10*	*0*	***31***	
36	DkAx-02	1	0	0	0	***1***	1, 3, 4, 5
37	DkAx-08	2	0	0	0	***2***	1, 3
39	DjAv-04	1	0	0	0	***1***	1
41	DgAt-01	0	0	1	0	***1***	1
43	DjAq-01, DjAq-02, DjAq-04, DjAq-05, DjAq-07, DjAq-20, DjAq-30	16	1	9	0	***26***	1‡, 2, 3, 4
Bonavista Bay		*0*	*1*	*0*	*0*	***1***	
46	DeAk-03	0	1	0	0	***1***	1, 2, 3
Southern Newfoundland		*0*	*0*	*1*	*0*	***1***	
54	CkAl-03, CkAl-10	0	0	1	0	***1***	1, 2, 3
		31	4	11	0	**46**	

Notes: Reported counts include only artifacts that could be assigned to specific forms. The not classified (NC) category includes fragments and preforms. The plummet forms included in the analysis are top-grooved (TG), pecked-knob (PK), and longitudinally-grooved cobble (LG).

1 Numbers correspond to localities presented in Figure 4-2.

2 Sources of information include: 1-original artifact, 2-photograph, 3-written analysis, 4-catalogue entry, and 5-site record form.

‡ Includes DjAq-1 museum reproduction casts on display at the Twillingate Museum.

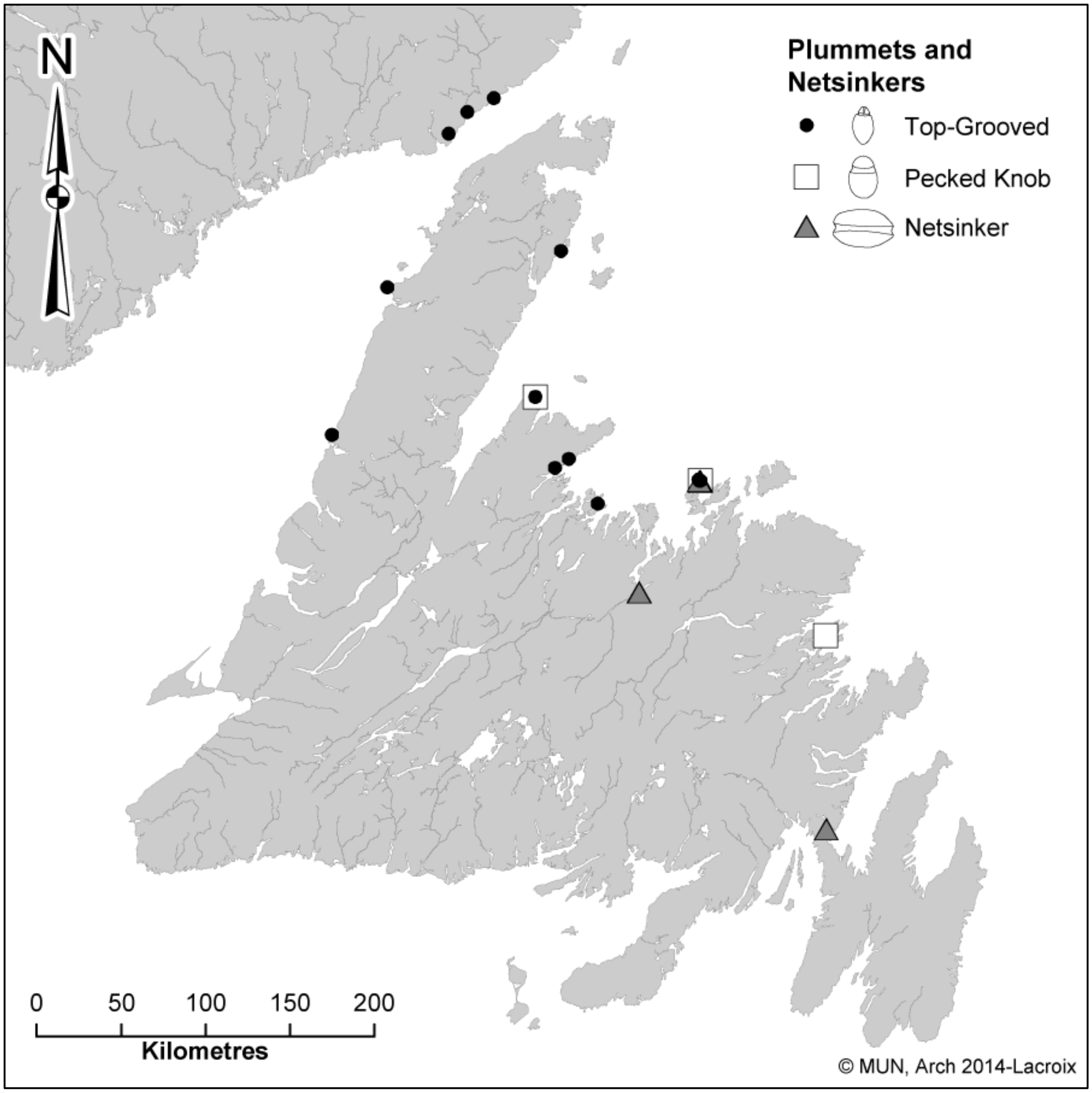

Figure 4-6 Plummet and netsinker distributions.

4.4.3 Discussion

The technological patterns described above establish that both northern and southern-style assemblages are present in Newfoundland. Following the nomenclature style used by Pintal (1998:41) and Fitzhugh (1972:112), Newfoundland sites with Labrador Archaic material are grouped under a new techno-cultural complex named *Back Harbour* (ca. 3700–3200 BP). These include contracting stem points, narrow-stemmed ground slate points, and top-grooved plummets. Based on similarities with the Rattlers Bight phase in Labrador and the La Tabatière complex in Quebec, this complex represents a third regional variant of the Labrador Archaic tradition. For example, in central Labrador, Ramah chert is the most dominant material used for stemmed points, and ground slate points, plummets and longhouses are all relatively common (Fitzhugh 1978, 2006). In Newfoundland, plummets are relatively abundant, stemmed points typically use local lithics as Ramah chert is used sparingly, ground slate points with a very narrow stem are common, but evidence for longhouses are still lacking. On the Lower North Shore, sites associated with the La Tabatière complex have more Ramah chert, lack plummets, and use ground slate points with a slightly wider stem (Pintal 1998, 2006; Pintal and Boucher 1994). Longhouses have been identified in this region (Fitzhugh and Sharp 2003).

Within the region spanning the Strait of Belle Isle, numerous assemblages are essentially identical to those associated with the Bonne-Espérance complex in southern Labrador and the Lower North Shore in Quebec (Pintal 1998, 2006; Reid 2007), with Newfoundland dates extending the lower limit of this complex by a few hundred years (ca 5000–3200 BP). Similarly, numerous assemblages from Bonavista Bay are also closely linked to the southern branch. In this region, assemblages dominated by local rhyolite including with expanding stem chipped points and linear flakes are grouped under a new heading, the *Bonavista* complex (ca. 4900–3600 BP).

These technological complexes form clear regional distributions (Figure 4-7). The distributions demonstrate that artifacts associated with the Labrador Archaic (e.g., Rattlers Bight, La Tabatière, and Back Harbour assemblages) are present almost everywhere where sites are present in Newfoundland, overlapping with Bonne-Espérance and Bonavista assemblages only in certain regions. The various ways in which artifact distributions merge together highlight the presence of four relatively well-defined regions where particular patterns are spatially circumscribed. These regions occur in two different forms. The first includes two separate regions where only Labrador Archaic assemblages are present. One is located in the La Tabatière-Mécatina region in Quebec, while the other is located along the northeast coast of Newfoundland. Artifacts associated with these assemblages include Back Harbour slate spearpoints, Rattlers Bight-like contracting stem chipped points, and top-grooved plummets. The other two regions instead represent the principal area where southern-style assemblages cluster, while overlapping with northern Labrador Archaic assemblages. Southern assemblages include stemmed chipped points with broad side-notches or expanding stems and the presence of a blade-like flake industry. One of these regions

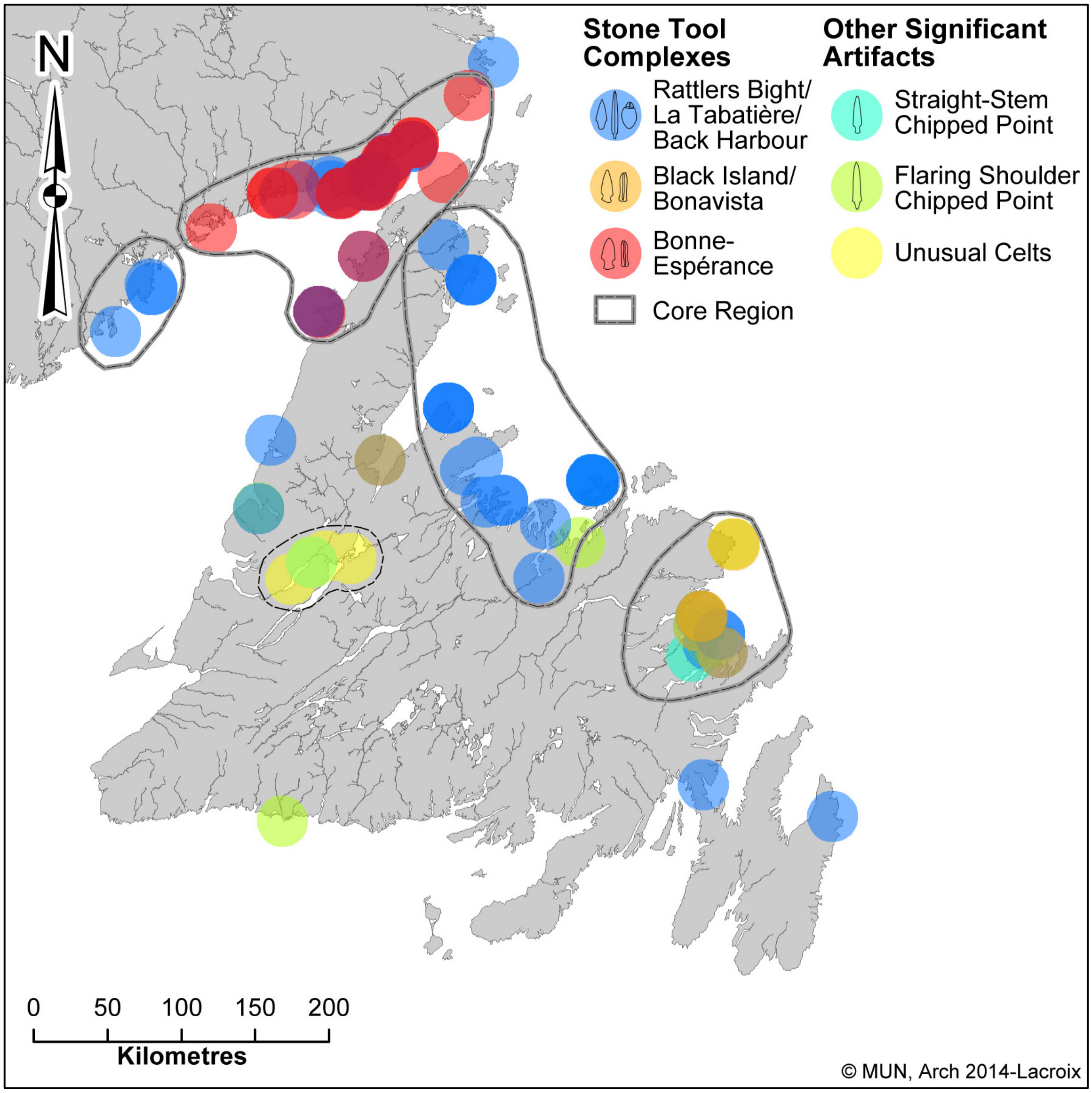

Figure 4-7 Combined technological patterns across Newfoundland highlighting regions where specific complexes concentrate. Dark tones indicate the presence of multiple sites or artifact classes belonging to a particular complex. The closely-related *Rattlers Bight* phase, and *La Tabatière* and *Back Harbour* complexes include contracting-stem chipped points, narrow-stem ground slate points, and top-grooved plummets, the similar *Black Island* and *Bonavista* complexes are represented by rhyolite, expanding-stem chipped points and linear flakes, while the *Bonne-Espérance* complex includes white-grey chert, broad-side notch chipped points and linear flakes.

centres along the Strait of Belle Isle and includes portions of Newfoundland, Labrador and Quebec, while the second is concentrated within Bonavista Bay in Newfoundland.

Although artifacts associated with the northern and southern branches occasionally co-occur at the same sites, they are typically from distinct areas, features, or components, allowing the possibility that items belonging to distinct assemblage types were deposited at separate times and/or by different people. The prevailing Labrador Archaic presence in Newfoundland in terms of sites and artifact numbers suggests their makers were the dominant group inhabiting the island. The presence of southern branch clusters overlapping with the broad Labrador Archaic area suggests people belonging the various branches were not in direct competition and may have adopted complementary lifeways, an approach known to have been used by later precontact Newfoundland cultures (Renouf 1999, 2003; Schwarz 1994).

4.5 My Place, Your Place: Cultural Landscapes and Regional Lifeways

Beyond differences in technological traditions, other aspects of the lifeways adopted by hunter-gatherer-fishers during the Late Archaic differ across Newfoundland. Site location preferences, access to significant food resource concentrations, burial practices, and site placement in relation to important travel routes are among other forms of human-landscape relationships that have patterned distributions in Newfoundland.

4.5.1 Land Use and Food Resources

A previous examination of Archaic site location on Newfoundland revealed that the regions where the two most important site clusters occur, Notre Dame and Bonavista bays, are ideally positioned to take advantage of very important annual resource concentrations fuelled by the high productivity of their marine food chain (Figure 4–8; Renouf and Bell 2006). Sites located within these two bays have access to a significant resident population of harbour seals, migrating whales and large seabird colonies in the summer, and the Front harp seal breeding herd throughout the winter.

Despite similarities in resource availability and the presence of large habitable islands within each bay, differences are present in locations preferred by people inhabiting these two regions. In Renouf and Bell's (2006) analysis, a third of the sites located within Notre Dame Bay are located on islands and at the mouth of deep bays and arms, while only about a fifth of the sites within Bonavista Bay are in similar outer coast locations[3]. These differences in site location suggest the subsistence focus may have been different within each bay. The more important presence of offshore oriented sites in Notre Dame Bay supports the view that open-water marine mammal hunting was an important aspect of the lifestyle of Labrador Archaic groups (Fitzhugh 1978, 2006; Fitzhugh and Sharp 2003; Pintal 1998). In contrast, the higher proportion of nearshore, and near-interior locations displayed in Bonavista Bay suggest people from this region may have made a more significant use of coastal routes leading inland to

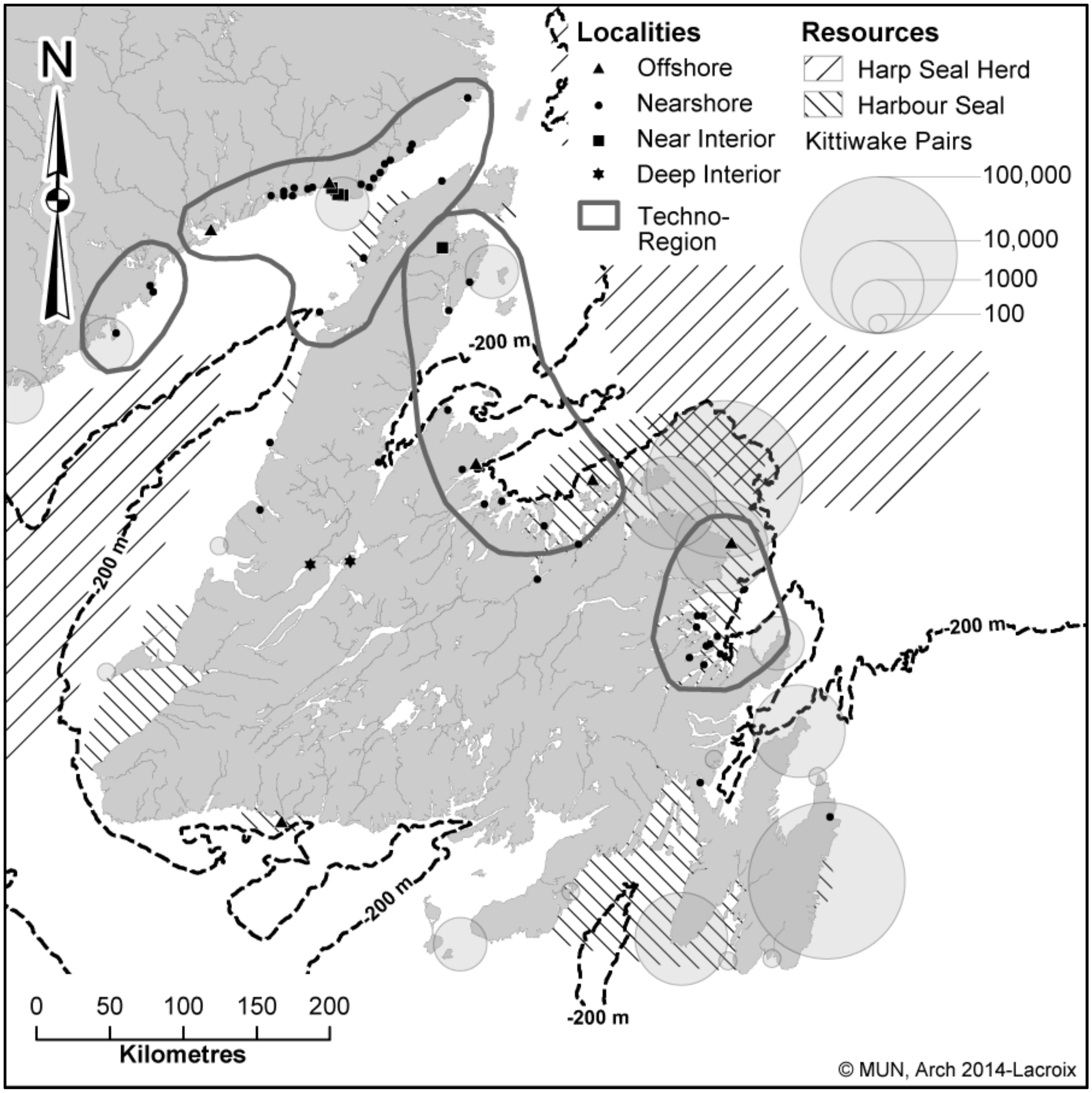

Figure 4-8 Archaic site distribution in Newfoundland, including core technological regions, the distribution of major resources, and the location of the 200 m bathymetric contour representing zones of high-marine productivity.

access timber stands, salmon and trout rivers, and relied more heavily on animals preferring sheltered locations (Renouf and Bell 2006).

Similar differences in site location are present along the Strait of Belle Isle. Nearly half the sites where artifacts associated with the Bonne-Espérance complex are present are located at the mouth of important salmon rivers (Table 4-4; Localities 5, 17, 19, 22, 24, 25, 30). In contrast, sites affiliated with the La Tabatière complex are found in a wider variety of settings. This difference suggests that fishing and access to the interior may have played a more important role in the selection of suitable campsites for Bonne-Espérance people (Pintal 1998, 2006).

4.5.2 Burial Ceremonialism

Differences in burial ceremonialism are also present in Newfoundland. Although archaeologists have properly investigated only a few burial deposits, Newfoundland's two excavated burial grounds (DjAq-1 Curtis, EeBi-2 Port au Choix-3) provide important information regarding regional forms of burial ceremonialism (Figure 4-9). The local landscape setting in which the burial grounds were established and the content of their burials suggest they played different roles within their regions (Lacroix 2015d).

Curtis is part of the widely shared Labrador Archaic burial tradition also associated with the Rattlers Bight phase and the La Tabatière complex. Burials from this tradition are part of the largest and most densely occupied sites of their immediate geographic region, placed in close proximity to living areas, and furnished with artifacts commonly found at habitation sites elsewhere in their region. In contrast, Port au Choix-3 is far removed from any densely occupied site, is only associated with a briefly occupied field camp requiring crossing a body of water to access, has a burial assemblage consisting primarily of non-local tool forms, and is positioned at the southern boundary of Bonne-Espérance complex assemblages.

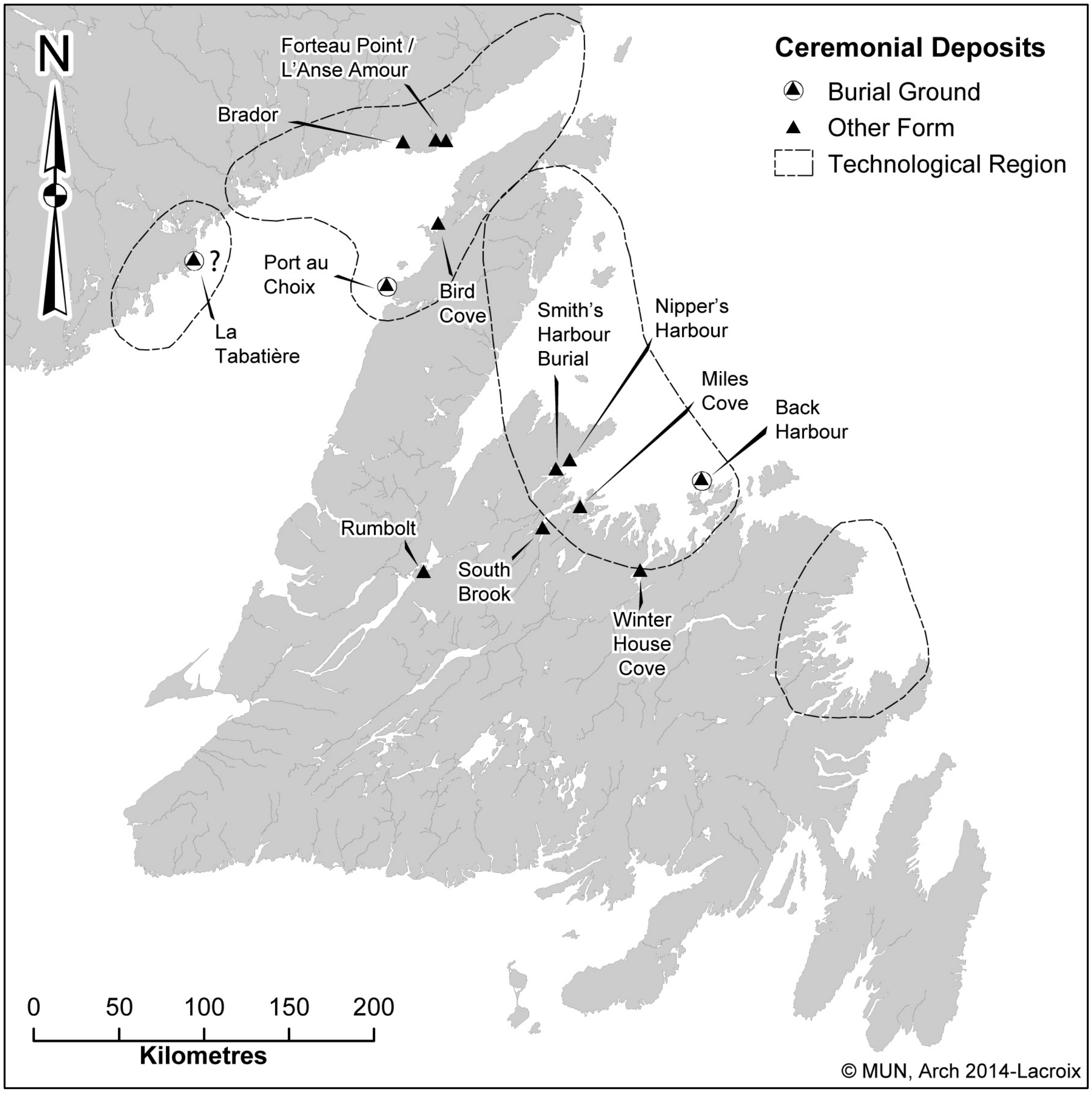

Figure 4-9 Archaic ceremonial deposit distribution in Newfoundland in relation to core technological regions.

Despite being in use at the same time, Newfoundland's two burial grounds appear to have played different roles, Curtis as community center and PAC-3 as boundary marker (Lacroix 2015d). Based on its location and content, the Curtis burial ground can be confidently associated with people of the Back Harbour complex, but no such assignation is currently possible for the Port au Choix burial ground. Nevertheless, the presence of regional differences in the way these burial grounds were used suggests that not all people shared the same ceremonial customs. The current absence of burial deposits of any form in Bonavista Bay further supports this idea. Burial deposits of various forms are present within all other technological regions, and their lack in Bonavista Bay is especially notable as it is home to the second most important site concentration on the island (Figure 4-9). The absence of ceremonial deposits in Bonavista Bay and the important overlap between the northern and southern branches along the Strait of Belle Isle raises the possibility that the burial deposits currently known may be principally associated with people of the northern branch, the Labrador Archaic, while people affiliated with the southern branch did not make use of such ceremonialism. At the very least, regional differences are currently present, even if they cannot be directly associated with specific technological complexes.

4.5.3 Regional Interaction

Newfoundland's travel route network provides a way of examining social interaction between neighbouring regions through a comparison of shared material patterns and the characteristics of the travel corridors connecting these regions. Interesting patterns are revealed when the three principal regions identified through differences in technological patterns are contrasted with Newfoundland's travel route network (Figure 4-10). The inland limits of the technological regions frequently correlate with

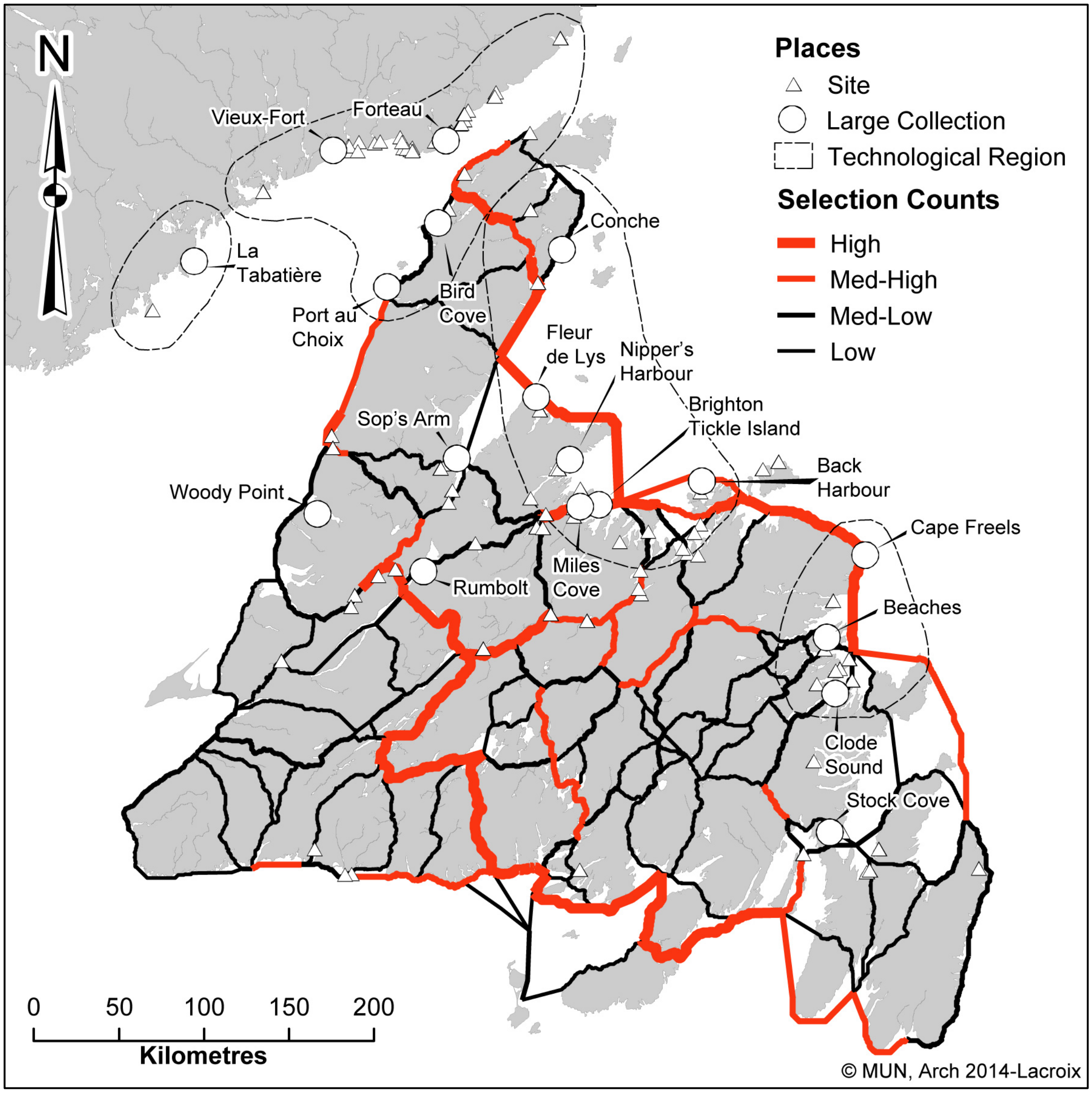

Figure 4-10 Archaic site distribution in Newfoundland, including core technological regions, and their relationship to modelled travel route intensity.

diminutions in selection counts, indicating the presence of natural obstacles making canoe and foot travel more difficult beyond the core regions. The natural geography of Newfoundland therefore appears to help circumscribe each technological region without preventing contact between regions.

Port au Choix is one of the least accessible places to reach from Newfoundland localities, but is easily accessible from the Strait of Belle Isle (Lacroix 2015a). From the Bonne-Espérance region, however, journeys to most Newfoundland locations avoid the Long Range Mountains by crossing the Northern Peninsula north of Port au Choix (Lacroix 2015b:Figure B-22). Only voyages up and down the west coast pass through this locality. Despite the presence of good quality chert sources south of Port au Choix (Hartery 2001; Lavers 2010; Nagle 1985), the suspected sources of the Newfoundland grey chert used by the Bonne-Espérance complex are all located north of the burial ground (Beaton 2004; Reader 1999b; Reid 2007). The southern limit of Bonne-Espérance assemblages also occurs at Port au Choix, suggesting the presence of a cultural boundary at this location. The particular nature of Port au Choix within Newfoundland's travel network therefore appears to have been adopted as a cultural boundary by Archaic groups inhabiting this region.

In northeastern Newfoundland, the southern limits of Back Harbour assemblages also roughly coincide with the region where routes heading inland reduce in intensity, suggesting the island's geography played a role in defining the extent of this region as well. The high selection counts found along the outer coast supports the high-level of homogeneity identified across assemblages from this region, indicating people made use of the high level of connectivity present in northern Newfoundland to maintain close contacts among relatives.

The important travel corridor connecting the northeast coast of Newfoundland also extends into Bonavista Bay where Back Harbour assemblages overlap with the Bonavista complex. The different character of the latter assemblage and its circumscription within Bonavista Bay suggest that another cultural boundary existed between these two regions. Again, the inland limits of the Bonavista core region with a natural reduction in selection counts indicating increased efforts was required to travel beyond this region.

As noted above, artifact assemblages from Bonavista Bay are closely related to those of the Bonne-Espérance complex, a remarkable link given the distance separating these assemblages and the lack of direct travel routes between these two regions. This long-distance link, likely maintained via journeys passing through Notre Dame Bay, the geographic overlap between southern and northern branch assemblages, sometimes at the same sites, and the presence of mixed material within a few burials suggest that interaction between regions was not uncommon and that boundaries had a certain degree of permeability.

4.5.4 Discussion

In Newfoundland, a number of regional patterns converge to suggest more than the presence of separate technological traditions during the Late Archaic. Culture cannot be equated only to stone tools; craftsmanship is learned and developed with the help of mentors and repeated practice and is therefore enmeshed with notions of social systems and group identity (Ingold 2000). Similarly, site locations are material reflections of repeated decisions, reasoning that is learned, transferred, and reproduced over multiple generations and becomes an integral aspect of a group's ideology (e.g., Cruikshank 1981; Layton 1999; Oetelaar and Oetelaar 2006; Taçon 2008; Zedeño 2008). In turn, these choices impact the way resources are routinely accessed. Among other things, differential access to different foodstuff is enmeshed with the formation of identity as food is central to social and ritual life (e.g., Amoss 1987; Borré 1991; Little 2009; Milloy 1991). Burial ceremonialism, whether it is used as a form of disposal of the dead or not, is one of the most potent reflections of ideological beliefs and group identity (e.g., Bonsu and DeBerry-Spence 2008; Course 2007; Kristensen and Holly 2013; Laviolette 2003; McCarthy 2004; Parker Pearson 2000; Poirier and Bellantoni 1997).

Recurrent differences hinted above regarding crafts, camp placement, food procurement habits, and burial practices used by people of various regions of Newfoundland are likely the results of distinct lifeways. If routine daily activities performed by people inhabiting Bonavista Bay, Notre Dame Bay, and the region north of Port au Choix did take place within different cultural contexts, these differences indicate that at least three distinct groups cohabited in Newfoundland during the Late Archaic. Each would have experienced and understood its world in its own particular way, transmitting different knowledge, skills, memories, narratives, and world views to following generations.

Newfoundland's Archaic population appears to have maintained relatively well-defined countries. The regions associated with the Bonne-Espérance and Bonavista complexes are relatively well-constrained and large portions of Newfoundland's north coast appear to have been somewhat exclusive to the makers of the Back Harbour complex. Material patterns and the presence of important travel routes connecting the various regions suggest that interaction between these communities were not uncommon. As a result, differences between each group are unlikely to have gone unnoticed. Accepting the definition of ethnicity as a consciousness of identity vis-à-vis other groups, a 'we'/'they' opposition that involves the recognition of real or assumed cultural differences (Jones 1997:84, 2000:449), the maintenance of important cultural distinctions despite recurring interaction indicates that Late Archaic groups developed and maintained separate ethnic identities. The following sections elaborate on the particular lifeways adopted by people inhabiting the multiple countries of Archaic Newfoundland.

4.6 My Country, Your Country: Regionalism and Ethnicity

Based on the regional differences presented above, a traveller journeying across Newfoundland during the Late Archaic would have encountered a series of countries inhabited by people who maintained separate cultural traditions although they remained generally related. While some of these traditions were more unique, others were shared with close and distant neighbours, linking the inhabitants of each country to other groups present in the Far Northeast at the time. The following sections summarize the little we know about the multiple countries of Archaic Newfoundland.

4.6.1 The Northland

Northlanders are the most visible, widespread, and best-recorded group inhabiting Newfoundland during the Late Archaic. Their country centered on the offshore regions of what is today Notre Dame Bay and follows the eastern shore of the Northern Peninsula to the Strait of Belle Isle. Important Northland localities included Conche, Nippers Harbour, Miles Cove, Brighton Tickle Island, and Back Harbour (Figure 4-10; Table 4-3, Localities 32, 36, 38, 40, 43), all of which are likely to have acted as the focal point of their immediate region. These sites are all located on islands or protruding peninsulas providing easy access to open, unprotected water. The intensity of the occupation present at Back Harbour and the massive size of its collection suggest this locality may have acted as a sort of capital to the Northland country. Like most groups inhabiting the Far Northeast during the Archaic, some of the most easily recognisable things made by these people included heavy woodworking tools in a number of forms, including some extremely well made and finely polished examples. Northlanders were the makers of the Back Harbour complex assemblages, including the narrow-stemmed Back Harbour ground stone points and finely-chipped, contracting stem points similar to the Rattlers Bight form of Labrador. These chipped points are sometimes made from Ramah chert, a distant material imported from northern Labrador, but are also crafted from a variety of Newfoundland chert and rhyolite. Top-grooved plummets, generally made of soapstone, are also common finds throughout this country.

Northlanders are closely related with groups inhabiting mainland regions found north of Newfoundland, including the Labrador Archaic groups of the Quebec Lower North Shore and Labrador, partaking in a form of burial ceremonialism in which significant burial deposits were placed centrally within their country, generally in designated areas of its most significant habitation locale (Lacroix 2015d). Unlike their close mainland cousins, however, Northlanders do not appear to have made use of longhouses. These have been suggested to represent kin-based groupings sharing residence (Fitzhugh 2006; Hood 2008; Rankin 2008), and their absence in Newfoundland perhaps signals that a slightly different form of social organization may have been present in the Northland country.

The seasonal aggregation of harp seals in early winter clearly was an important aspect of the life of these people. The presence of a concentration of netsinkers in Back Harbour, including a find from the intertidal area, suggests Northlanders used nets to capture marine animals and perhaps hint at a pre-contact form of the historic winter landsmen harp seal hunt (Renouf and Bell 2006; Sanger 1977). Other important resource-gathering practices likely included the harvest of harbour seal and kittiwake on offshore islands. Whale hunting may also have been attempted, making use of the numerous ground slate points, akin to the Alutiiq people of Alaska who used remarkably similar lance tips for this purpose (Crowell 1994; Crowell and Lakoten 2001). Given the regional importance of seasonal resource concentrations, the Curtis burial ground located within the most central place of the Northland country likely played an important role in propitiation rituals related to these various offshore resource-gathering activities, in addition to its importance in community building activities.

4.6.2 The Bridgeland

This country, straddling the Strait of Belle, is a good example of the fuzzy nature of cultural boundaries as this particular region was shared by at least two separate groups, especially along its northern periphery. Although small transient camp sites affiliated with the Rattlers Bight phase and the La Tabatière complex are common in this region, they rarely co-occur in archaeological deposits with those attached to the Bonne-Espérance complex, the dominant presence at large river mouth sites in this region and its resident population. Despite the overlap in the physical territories of different groups present in this region, separate identities were nevertheless maintained providing a strong case for the presence of ethnicity. The term "Bridgeland" is thus doubly relevant as it refers to both the physiographic region linking Newfoundland, Labrador, and Quebec via the Strait of Belle Isle, and a cultural region where separate groups intermingled.

Nevertheless, the term "Bridgelanders" is used here to represent the makers of tools associated with the Bonne-Espérance complex as this form of assemblage is not found outside the Bridgeland region until farther west along the Middle North Shore (Pintal 1998, 2006). Important places are located at the mouth of major Atlantic salmon rivers including the Vieux-Fort, Saint-Paul, and Forteau rivers (Figure 4-10; Table 4-2, Localities 5, 7, 17). Based on site location preferences, annual salmon runs appear to have played a more important role in the lives of these people than it did for Labrador Archaic groups (i.e. Rattlers Bight phase, La Tabatière complex, and Northlanders). In contrast to sites located on the north side of the Strait of Belle Isle, Newfoundland locations instead appear to focus on or near important sources of the grey-white chert preferred by craftspeople of this country, which were brought back across the strait in the form of large bifaces (Pintal 1998; Reid 2007).

Items favoured by Bridgelanders include chipped points of the Graveyard form, knives and drills using the same broad side-notched hafting, and a blade-core industry from which scrapers were occasionally made (Pintal 1998). Ground slate points and plummets are uncommon in their assemblages, but pie-wedge bayonets in Group B, and perhaps broad hexagonal spearpoints as well, appear to be associated with these people (Lacroix 2015d). Given that the Port au Choix burial ground is interpreted as a boundary marker and is positioned at the southern limit of the Bridgeland country (Figure 4-9), Bridgelanders are likely to have been one of the groups involved in at least some aspects of its ceremonialism[4]. If so, the Bridgelanders, like others in the Gulf of Maine, chose to perform important burial ceremonies at the periphery of their country. Overall, these people appear more closely related to groups inhabiting the Maritimes and the St. Lawrence valley than their direct neighbours in the La Tabatière-Mécatina, Notre Dame Bay, and Hamilton Inlet regions.

4.6.3 The Eastland

This country is perhaps the most weakly defined of the three principal regions identified in Newfoundland, but nevertheless offers a marked contrast to the patterns seen in the neighbouring Notre Dame Bay. The Eastland core region is centered on Bonavista Bay, where artifact assemblages are all closely related to each other, although the region also likely encompassed a large portion of central and southern Newfoundland, as suggested by the presence of a remarkably similar assemblage in White Bay (Carignan 1975b; Devereux 1969; Linnamae 1975), and the distributions of chipped points unique to this and the southern regions of Newfoundland (Figure 4-4). The recurring overlap across a number of tool forms principally associated with Northlanders (Figure 4-7) is likely the result of significant interaction between the two groups supported by the important coastal route connecting these two regions (Figure 4-10). Important places in this country included Cape Freels, Beaches, and Clode Sound (Figure 4-10; Table 4-3, Localities 44, 45, 51). As exemplified by the locations of these important places, the geographic settings chosen by Eastlanders to establish their camps is varied, giving local communities access to seasonal offshore harp seal concentrations and large salmon rivers at the head of the bays. Despite the concentration of Archaic sites present in Bonavista Bay, evidence that Eastlanders made use of burial ceremonialism remains to be discovered, suggesting aspects of this group's ideology differed from that of their neighbours.

The tool assemblage used by Eastlanders is closely related to tool forms from the Bridgeland, but the preferred lithic material used in tool making, a local rhyolite to the Eastland region, is very different. The chipped assemblages from this region, grouped under the Bonavista complex, also closely resemble the material from the Black Island complex in central Labrador. Two chipped point forms dominate in this region. Based on dated contexts from sites at Cape Freels and Beaches, the flaring-shoulder Cape Cove form appears to be the earliest and most broadly distributed (Figure 4-4), later replaced by Bonavista points with broad ovate side-notches (Austin 1980; Carignan 1975b). A third form present in this region, the Cannings Cove point, is likely a variant of the Bonavista form (Lacroix 2015d). Like their counterpart from the Strait of Belle Isle, and in contrast to their direct neighbours from Notre Dame Bay, plummets are essentially absent from this region, the only known specimen being of a different form than the more typical top-grooved plummets found in Newfoundland (Figure 4-6). Interestingly, the artifact assemblage, the broad approach to the inhabitation of the landscape, and the overall distribution of these people closely resembles patterns known from Recent Indian contexts on the island (Holly 2002, 2005). If a direct link between the Archaic and Recent Indian populations of Newfoundland is ever established, it will most likely be through this particular group.

4.6.4 An Interior Ceremonial Place?

Although not a cultural core area or country, a fourth Newfoundland region is worth of mention. This region is set apart on the basis of a series of unusual finds that have been made from the Deer Lake-Grand Lake area, mostly in the form of atypical and especially well-finished heavy woodworking tools (Figure 4-7; Table 4-2, Localities 75–78). Based on the connectivity of local waterways, it is likely that this region served as a travel hub where groups met and crossed into each other's countries. The remarkable nature of the finds suggests this area had a special importance for people living and travelling across Newfoundland. Many of the unusual tools appear to be in perfect condition, demonstrating close correlations with artifacts found elsewhere on the island, and in at least one instance, were clearly deposited together on cache (Lacroix 2015a). This raises the possibility that this series of peculiar items were purposefully left behind, at various times, by people having ties elsewhere on the island to mark important events through the ceremonial deposition of specially made artifacts. The lack of context associated with most of these finds prevents further interpretations but does indicate that this region would provide a good starting point for future interior investigations.

4.7 Conclusions

Until now, our understanding of Late Archaic assemblages from Newfoundland remained rather sketchy given the sometimes confusing mixture of point forms and raw material preferences present both on the island and on the north side of the Strait of Belle Isle (Renouf and Bell 2006:6). Moreover, large portions of the island remain poorly defined given the limited amount of data available from most of the interior, and the southern and southwestern coastlines. The preliminary analysis of a large number of collections from excavated and non-excavated contexts has led to the identification of three cultural core regions in Newfoundland, regions where consistent combinations of material patterns occur: the Northland, Bridgeland, and Eastland.

In Notre Dame Bay and along the eastern shores of the Northern Peninsula, Northland assemblages are grouped under the Back Harbour complex (ca. 3700–3200 BP), a local variant of the northern Archaic branch, also known as the Labrador Archaic. In the Bridgeland region, Bonne-Espérance complex (ca 5000–3200 BP) assemblages, the principal southern Archaic variant, extend onto the Northern Peninsula in Newfoundland, north of Port au Choix. In Bonavista Bay, Eastland assemblages associated with the Bonavista complex (ca. 4900–3600 BP) represent a second variant of the southern Archaic branch in Newfoundland, offering a mixture of traits seen in both the Black Island complex in Hamilton Inlet and the Bonne-Espérance complex in the Bridgeland region.

Differences between these regions are not limited to technological traditions. Site location preferences differ in these three areas, with large sites located at the mouth of major salmon rivers in Bridgeland, in outer coastal locations in Northland, and varied locations in Eastland. Ceremonial burial traditions also differ with the presence of the Labrador Archaic burial tradition in Northland, its absence in Bridgeland where a variety of other forms of burial deposits exist, and the current lack of burial deposits of any form in Eastland. These regional differences in cultural traditions are reinforced by Newfoundland's geography, which provides natural barriers to human movement between these regions. The presence of non-local items within each region indicates they were not isolated and that efforts were made to keep in contact with friends and relatives inhabiting distant lands.

The coexistence of these cultural differences for over a millennium indicates that they do not represent a chronological change within a single culture, pointing instead to the presence of generally related, but culturally distinct groups sharing the island. In light of these results, it is proposed that the identified regions represent neighbouring indigenous countries within Newfoundland, and that the maintenance of separate traditions, despite evidence of recurring contact, signals ethnicity played a role in forging group identity. Furthermore, the recognition of distinct Late Newfoundland Archaic cultural groups indicates that our current lumping of sites under the single label of Maritime Archaic Indians does disservice to our understanding of this period of the island's precontact history.

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4.9 Notes

1. Unless otherwise stated, all dates provided in the text are given in uncalibrated radiocarbon years before present (1950).

2. Electronic copies of all photographs, notes, and database entries were deposited in October 2015 with both the Provincial Archaeology Office (PAO) and The Rooms Provincial Museum and copies can be obtained, with permission, from these two institutions for research purposes.

3. In their analysis, Renouf and Bell (2006) included sites where only woodworking tools were present, resulting in a larger site sample than the one used to assess technological patterns in this study and presented in Figure 4-8. Also in contrast to the present study, their analysis only covers the island of Newfoundland.

4. The possibility that some people buried at Port au Choix-3 originated from the Bridgeland country could be investigated through the use of strontium isotopes. Most rocks contain small amounts of strontium and humans absorb this element through the water they drink, and the plants and animals they eat (Bentley 2006). Given the complex geology of Newfoundland and Labrador (Bostock et al. 1983), it should be possible to identify people that lived on watersheds draining the southeast regions of the Quebec-Labrador Peninsula from people who lived on the island.

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Chapter 5

Summary and Conclusion:

A New Outlook on the Newfoundland Archaic

Over the course of many decades of travelling and living around Canada and abroad, my accent or appearance has often led to people asking “where are you from?” This simple question, a reflection of my personal development, inspired the research efforts that led to this doctoral dissertation. The penultimate result has been the identification of a plurality of groups that would have called different parts of Newfoundland their home. The identification of differences across a variety of customs including technology, site location preferences, and ideological beliefs related to death has been central to the recognition of distinct groups. This undermines the cultural model that has been used to interpret the Archaic period in Newfoundland, the Maritime Archaic Indians. This concept has fostered an overly simplistic view of the Newfoundland Archaic, smoothing over significant regional differences to focus on a limited number of traits shared across the entire island. Through this doctoral research, the complex nature of the Archaic occupation of the island has begun to be revealed.

The doctoral research revolves around four principal themes: mobility, ceremonialism, technology, and group identity. In Chapter 2, the analysis of Newfoundland’s travel network suggested Port au Choix and Back Harbour were located in very different settings when their regional landscapes were taken into account. In Chapter 3, this exploration of the differences in landscape setting was deepened, and supplemented through an analysis of the content of known burial assemblages from these two significant places. An important result was the recognition that the two burial grounds fulfilled different cultural roles. In Chapter 4, technological patterns were examined in further detail to reveal the presence of at least three separate technological traditions on the island. When these technological traditions were contrasted with regional differences in burial ceremonialism, site location preferences, resource accessibility, and travel routes, different patterns were consistently found to be present in these three regions. These regions were interpreted as indigenous countries inhabited by separate ethnic groups.

The ultimate source of these distinctions lies in the presence of separate beliefs and routine activities adopted by the people inhabiting different regions of the island. Whether these were occasional propitiation and mortuary ceremonies, or daily activities such as hunting, trapping, fishing, gathering, food preparation, lithic resource procurement, or crafting and maintaining essential objects, they all played a part in providing distinct experiences through which the people of each region interacted with and understood the particular world they lived in. The places where these activities occurred, the locations where people lived, the resources available to them, how different people learned their craft, how this knowledge was transmitted to the next generation, and “others” they were in contact with also played important roles in shaping the world inhabited by Newfoundland's Archaic groups. The following sections present a summary of the research contributions made in the previous chapters. They also discuss the implication that the recognition of a multiplicity of Archaic groups has for the Maritime Archaic Indian concept in Newfoundland. Finally, a number of potentially productive avenues of research that would further enhance our understanding of the Newfoundland Archaic are proposed.

5.1 Summary of Research Contributions

Throughout Chapters 2–4, the four principal themes of mobility, burial ceremonialism, technological traditions, and group identity in Archaic Newfoundland were explored in some detail. These topics had all remained relatively unexplored at an island-wide scale prior to this doctoral research. The following sections provide a summary of the research contributions made throughout this doctoral dissertation, broken down by theme, which helped broaden our understanding of Newfoundland's earliest period of human occupation.

5.1.1 Mobility

The interior of Newfoundland has remained relatively unexplored archaeologically, a *terra incognita* beyond a few principal river systems (Holly and Erwin 2009). Although some precontact and early historic travel routes are known, the bulk of the information that has appeared in writing is limited in scope as a result of survey areas selected by early scientist-explorers and the principal regions known to their Mi'kmaq guides (e.g., Cormack 1873; Jukes 1842, 1843; Murray and Howley 1881; Speck 1922). Chapter 2 provided the first attempt to fill in the blanks present in the historic literature and visualize how different regions of the island are connected to each other, as well as determine the most and least accessible places on the island. The development of the research model was based on a series of criteria impacting pedestrian and canoe travel in Newfoundland and was created with the intention to principally examine canoe travel across the island during the warm season when people of the boreal forest preferred to undertake long distance travel.

The parameters selected were successful in reproducing historic canoe routes while revealing a number of previously unidentified travel routes. Routes with the most potential of having been used during precontact time are those with high selection counts, meaning that in the model the same route was selected numerous times to link a variety of places. Along the coast, areas of high selection counts include most of the northeast coast, and the region found between Placentia Bay and Hare Bay along the South Coast. Interior regions with high selection counts include rivers and short portages linking Meelpaeg Lake, Victoria Lake, Red Indian Lake, Grand Lake, and Deer Lake. The principal route linking the east and west coasts of the Northern Peninsula is found between Canada Bay and St. Barbe Bay. Dolland Brook on the South Coast and the upper regions of the Exploits River are also important traffic corridors. Some of the least accessible places for people travelling across the island include Kaegudeck Lake in southeastern Newfoundland, and Ingornachoix Bay on the Northern Peninsula, while the most easily accessible locations include Victoria Lake and the Bay of Islands.

These results are not culturally-specific as the model relied solely on environmental constraints to select efficient travel routes. This geographically constrained travel route network, however, provides a new layer of information from which to evaluate site locations and material patterns from all precontact periods in Newfoundland. Using this approach, Archaic site and travel route locations were contrasted with each other, confirming the importance that access to the interior had for the Archaic population of the island. Moreover, Archaic sites in the vicinity of Port au Choix, Back Harbour, Burgeo, and the Humber Junction (i.e. Deer Lake-Grand Lake area) appear to have been positioned at strategic locations along the travel route network, promoting their role as either a central place or a regional boundary. Particularly significant was the determination that the Port au Choix burial ground was placed at a regional boundary while its contemporaneous counterpart in Back Harbour, the Curtis burial ground, was at the nexus of its region.

5.1.2 Ceremonialism

The landscape and material patterns present at each site were further investigated in Chapter 3, based on the knowledge that Port au Choix-3 and Curtis, the only two burial grounds currently known on the island of Newfoundland, were positioned in very different regional settings. Taking into account the number of known burial deposits and the time span during which the burial grounds were in use, it appears most likely that burial grounds were not the principal form of disposal of the dead in Archaic Newfoundland. Burial grounds offer a doorway into various aspects of the ideology governing Late Archaic burial ceremonialism in Newfoundland, even when taking into account their lack of representativeness as to the make up of the total population of the region.

Through an examination of various patterns present in Labrador and the Lower North Shore in Quebec, a burial tradition widely shared across this region was defined as the Labrador Archaic burial tradition. Within this tradition, burial deposits were located at central places within their region and associated with a major habitation site. In addition, tool forms dominating burial assemblages are representative of local forms found in habitation contexts. Because these burials are placed at culturally significant locations on the landscape, they appear to play an important role in reinforcing the ancestral ties local kin-groups have with these important places. In Newfoundland, the Curtis burial ground is representative of this northern burial tradition. It is positioned at the centre of its region, within one of the most important Archaic locations on the island, and the tools found within its burial deposits are type-artifacts for sites spread throughout Newfoundland's North Coast.

In contrast, Port au Choix-3 is far removed from important habitation clusters, is only associated with an intermittently and briefly occupied field camp, and its burial assemblage is not representative of habitation contexts from the region. Instead, its particular location along a significant travel route and at a local cultural boundary mirrors, in a coastal setting, the placement of interior Moorehead burial grounds. The burial grounds are typically positioned mid-way along important interior waterways and at a presumed interior-coastal boundary. This suggests the highly visible setting chosen for Port au Choix-3 acted as a visual landmark indicating the presence of a cultural boundary. Despite this reference to southern burial location preferences, the use of stone markers placed above the graves was not a practice observed in the Gulf of Maine. The low-frequency occurrence of artifacts only found among assemblages located north and east of the Gulf of St. Lawrence, links Port au Choix-3 to groups inhabiting Newfoundland, Labrador, and/or the Lower North Shore. The impression left by this admixture of northern and southern patterns is that Port au Choix-3 was created and used to mark a cultural boundary and reinforce important links existing between neighbouring regions.

Port au Choix-3 is therefore *not* representative of the most visible form of burial ceremonialism present elsewhere in Newfoundland, Labrador, and the Lower North Shore. Results also raise the possibility that multiple groups shared this important burial ground. These findings have important repercussions, as Port au Choix-3 is the most widely known Archaic site from Newfoundland and currently lies at the base of much of our understanding of this period in Newfoundland. Interpretations relying on data from Port au Choix-3 as principal supporting evidence must therefore be made with extreme care, as our understanding of the relationship between PAC-3 and other sites from its wider region remains minimal.

5.1.3 Technology

Chapter 4 presented the results of the first extensive Archaic artifact inventory of the island, pushing the analysis of material patterns in Newfoundland beyond burial contexts. The analysis of formal stone tool distributions was successful in delineating important regional patterns, bringing attention to long undervalued collections. These include three principal regions of Newfoundland where distinct technological traditions are present.

Along the northern Atlantic shorelines of the island, *Back Harbour* complex assemblages typically include narrow-stemmed ground slate points, top-grooved plummets, and contracting stem points with strong links to contemporaneous material of the *Rattlers Bight* phase in Labrador and the *La Tabatière* complex in Quebec. Along eastern coastal regions, *Bonavista* complex assemblages are dominated by local rhyolite, an almost complete lack of plummets, the use of linear or blade-like flakes, and points with an expanding stem. These show strong stylistic similarities to the intrusive *Black Island* complex in Hamilton Inlet in Labrador. These assemblages also have strong links to material associated with the *Bonne-Espérance* complex that clusters on both sides of the Strait of Belle Isle as far south as Port au Choix along the West Coast of Newfoundland, even when taking into account clear distinctions in lithic material preferences. In the latter complex ground slate points and plummets are extremely rare or absent, and chipped assemblages are dominated by grey-white Newfoundland chert, including roughly chipped points with broad side-notches and linear or blade-like flakes.

The inventory also demonstrated a number of interesting trends in the Archaic tool assemblage. In contrast to later cultural groups, ground stone tools dominate Archaic collections and chipped stone points represent only 10 percent of the formal artifact count (Table C-2). If you regard Port au Choix-3 as indicative of common objects missing elsewhere due to poor preservation, ground tools made of stone, bone, and antler, appear to have been at the base of the formal Archaic tool kit in Newfoundland. The artifact collection from the modern community of Back Harbour (DjAq area) in northeastern Newfoundland accounts for 40 percent of the formal artifact count on the island, suggesting this place was an extremely important and dynamic centre of activity during the Archaic. Other central places of smaller scale are suggested by the extent of private artifact collections from Nippers Harbour (DkAx-2) and Brighton Tickle Island (DjAv-4). The results also clearly show that very little data currently exist for large regions of the island, some of which are likely to have played a significant role in the movement of people, things, and ideas across Newfoundland.

5.1.4 Group Identity

The arguments presented in the preceeding chapters principally rely on stone tools and site locations to identify regional lifestyle differences because of the general lack of preservation of organic remains from Archaic contexts in Newfoundland, and a high percentage of find spot locations in the site sample. Although site locations were mainly used as dots on a map to interpret large-scale patterns, these locales were at one time living places where people established themselves, made homes, and dwelled for a given amount of time before moving on to their next destination. These homes required the presence of a hearth to prepare meals, keep warm or ward off mosquitoes. Stays, even if only of a few days duration, would have seen people sleeping on site, harvesting and preparing food, playing with their children, working at personal craft projects, obtaining fresh supplies of raw material, repairing and maintaining implements necessary for daily life, all of this perhaps while waiting for the fog to lift or the heavy rain to abate before moving on again. It is this habitual movement on the landscape, where certain choices were repeated over and over or certain places visited again and again that is the source of the site samples we have today.

A large portion of the research presented in the previous chapters has also relied on stone tools to discern patterns across the island. Each thing crafted, used, and eventually discarded is linked to stories and events that would have been central to a number of life experiences. For example, the grey-white chert so essential to people occupying the Strait of Belle Isle was procured from a number of locales along the western shores of the Northern Peninsula. Large quantities of this material made its way across the Strait of Belle Isle and into the Lower North Shore of Quebec in the form of large bifaces that were then reworked and made into other tools (Pintal 1998). While working the stone, a knapper would recall memories of the distant lands where the stone was first obtained, people the journey was made with, and perhaps something entertaining that happened over the course of the journey or the miserable weather that delayed the crossing of the strait. The reworking of a biface into a Graveyard point may have been an opportunity to present a new skill to a child and anticipate an upcoming hunting trip with relatives while invoking animal spirits for its success. At each step of the stone's journey, people shared experiences through stories and physical presence. It is through these shared experiences that group identity is forged and maintained. Routine activities recurring over generations, whether linked to stone, burial ceremonialism, or food procurement, were integral to the formation of the material patterns observed in the previous chapters.

The results presented in Chapter 4 have shown that people adopted distinct lifestyles in different regions of the island, even when direct routes of communication linking neighbouring regions and access to similar resources were available. This demonstrates that ethnicity was at play in Archaic Newfoundland, with groups forging their own group identity and maintaining this separate identity in the face of recurring contact with other groups sharing the island. In hindsight this result is not so surprising, since a plurality of contemporaneous groups occupying Newfoundland has long been the norm. Indigenous people today share the island with people whose ancestry spans all regions of the world. During the early historic period, the Beothuk, the Mi'kmaq, and the Innu shared the shores of Newfoundland with Basque, French, and English fishermen. Moving further back in time, Early Recent Indian and Dorset Palaeoeskimo groups developed advantageous ways of co-habiting (Renouf 2003). On material grounds, it has been suggested that multiple Middle Dorset groups occupied different regions of the island (LeBlanc 2000, 2008). Radiocarbon dates suggest Groswater and

Dorset Palaeoeskimo are likely to have shared the island for a time as well (Renouf 2011a).

Informed by this historic perspective, the presence of multiple groups during the Archaic constitutes yet another example of cohabitation. Through mobility within and across regions, and kin-connections with other groups, people would have been able to access a variety of resources through the vast exchange network present across the Far Northeast at this time. This knowledge of others is likely to have been at the core of the success of Archaic presence in Newfoundland which lasted for over 3000 years.

5.2 Moving Beyond the Maritime Archaic Indian Label

Throughout the previous chapters, the use of the term Maritime Archaic was kept to a minimum, for a variety of reasons. The recognition that a plurality of Archaic groups was present in Newfoundland forces a new outlook on the period. The prevailing model for understanding the earliest period of human settlement on the island is unfortunately constrained by the over-generalized use of the Maritime Archaic Indian concept. In Newfoundland, the definition of this cultural group is based on knowledge from a very limited number of contexts (e.g., Austin 1984; Carignan 1975b; Reader 1996, 1999b; Renouf and Bell 2001; Tuck 1976a, 1978b), and is premised on the assumption that broadly similar artifact assemblages found across the island were used to exploit a relatively homogenous maritime environment. Despite knowledge of important regional distinctions in maritime productivity in Newfoundland (Renouf and Bell 2006), and the recognition of at least two separate branches of this cultural tradition in Labrador and the Lower North Shore (Pintal 1998; Reid 2007; Tuck 1982), the prevailing view of a single homogenous population of Maritime Archaic Indians inhabiting Newfoundland has remained relatively unchallenged until now.

A number of distinct cultural complexes can now be identified within Newfoundland and its adjoining mainland regions, each occupying its own indigenous country, undermining the view of a homogenous population (Figure 5-1). The term "complex" is used here in the same sense as Pintal (1998:41) and Fitzhugh (1972:112), in which groups of sites are recognized as sharing a relatively large amount of traits, but for which comprehensive information is still lacking. In eastern Newfoundland, rhyolite assemblages including expanding-stem points and blade-like flakes principally clustering within the Eastland country are subsumed under the *Bonavista* complex (ca. 4900–3600 BP). Assemblages associated with the Northland country, characterized by narrow-stemmed ground slate points, top-grooved plummets, and contracting-stem points made of a variety of local material are placed under the *Back Harbour* complex (ca. 3700–3200 BP). This complex is closely related to the *La Tabatière* complex (ca. 5000–3500 BP) clustering on the western Lower North Shore, but also present in the Strait of Belle Isle (Fitzhugh and Gallon 2002; Pintal 1998, 2006). North of Port au Choix, within the Bridgeland country, assemblages dominated by grey-white Newfoundland chert linear flakes and points with broad side-notches belong to the *Bonne-Espérance*

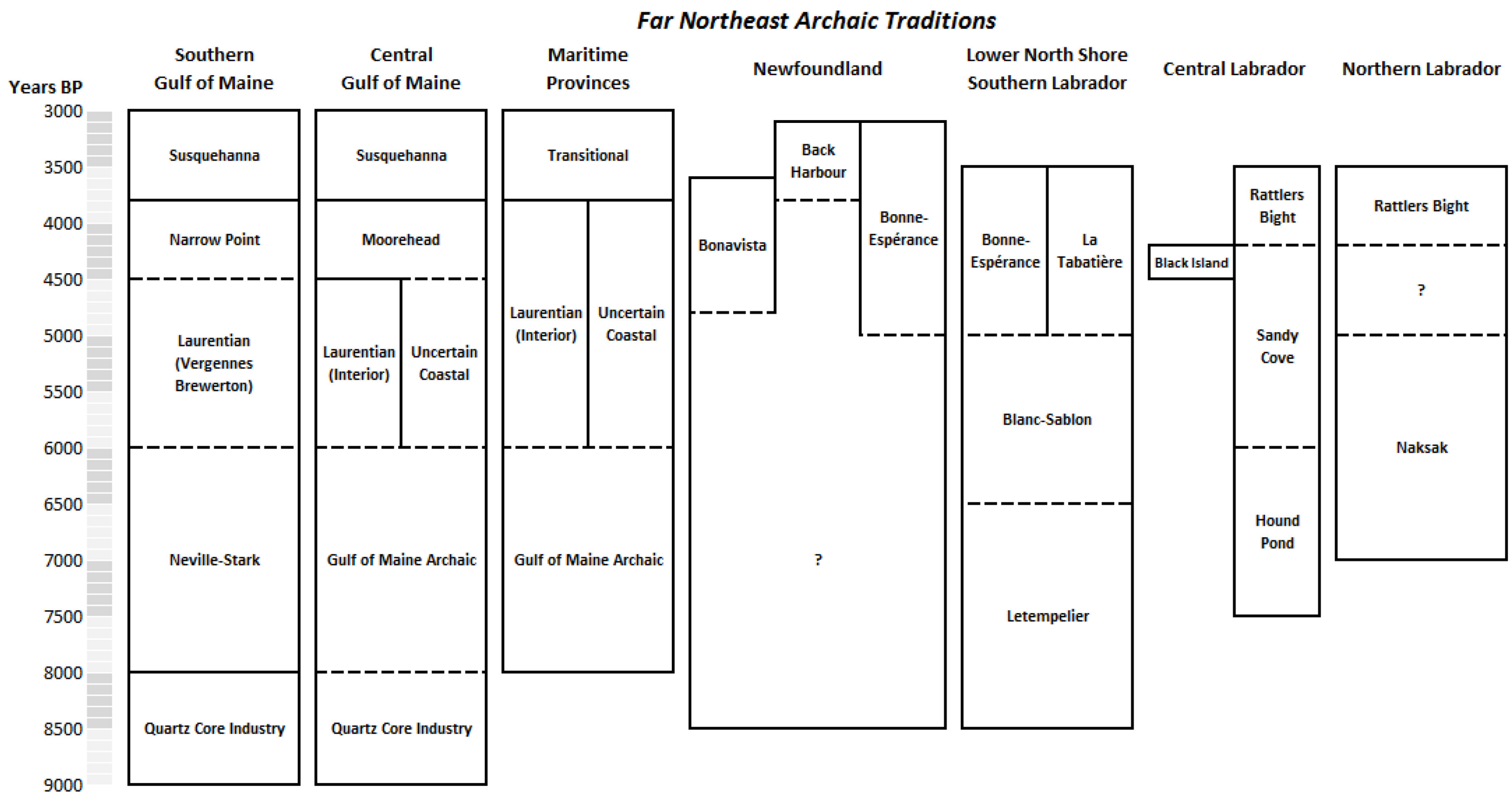

Figure 5-1 Revised chronological and cultural framework of the Archaic in the Far Northeast. Based on data from Deal (2013), Fitzhugh (2006), Hood (2008), Pintal (2006), Renouf and Bell (2006), Robinson (2006), and Sanger (2006).

complex (ca. 5000–3200 BP; Pintal 1998, 2006). As comparative research progresses, further regional variants, currently subsumed under the *Rattlers Bight* phase, will likely be identified in central and northern Labrador as well.

Beyond the presence of distinct cultural complexes previously grouped together under the Maritime Archaic Indian concept in Newfoundland, the use of the word "maritime" to name these people has had unintended consequences in focusing interpretive lenses towards the sea at the expense of land. The importance of the Newfoundland interior is supported by the research presented herein; indicating that land and land-based resources were integral to the lifeways of early islanders. At a site-scale, the locations chosen by Newfoundland Archaic groups to establish their camps also support the importance land had in their world view as they preferred sheltered settings where land had a dominant visual presence. Despite the important role maritime resources had in their life, people preferred to establish their camp in locations in sheltered locations where the view of water is not only framed but also backed by near and distant landforms, preventing expansive views of open water (Figure 5–2; Lacroix 2011; Rast et al. 2004; Renouf and Bell 2006).

As seen in Chapter 4, there are at least three times more woodworking tools than there are ground slate points and bayonets in Newfoundland, further supporting the importance land, forests, and wood had in the lives of early islanders. In

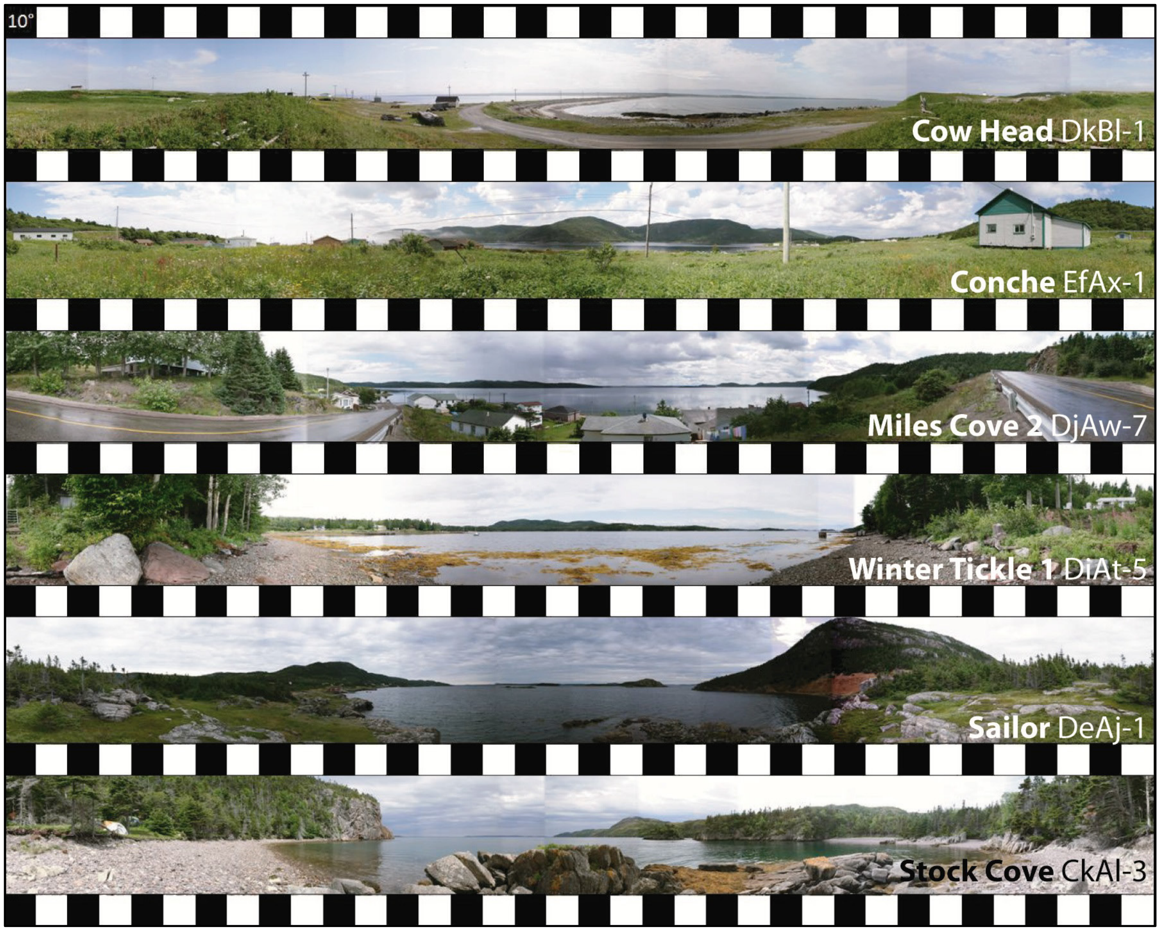

Figure 5-2 Flattened circular (360°) panoramas from typical Archaic site locations, showing preference for locations visually encircled by near and distant landforms blocking the view of open water.

Newfoundland, ground stone axes, adzes, and gouges have rarely been discussed beyond their possible use for crafting wooden things such as containers or dugout canoes. Across the Atlantic, however, similar implements are beginning to be understood as active players in Neolithic land clearances to make way for agricultural land (Ramsden 2008). Heavy woodworking tools are likely to have played an active role in Archaic food procurement traditions in the Americas as well. Ground stone woodworking tools can be traced back to the earliest stages of the Archaic in the

American Northeast (ca. 9000 BP), a time during which postglacial landscapes changed dramatically, as forests of various types replaced open landscapes (McWeeney and Kellogg 2001). Procuring food in a wooded environment requires a different approach than that used on an open landscape. As forests became established, woodworking tools would have been instrumental in creating clearings, felling trees that could then be burned, creating open settings favourable to important faunal and floral species, such as a variety of berries and forage for hare and caribou (Ramsden 2008; Spiess 1993).

Evidence of voluntary land clearing by Archaic populations and maintenance of these conditions for extended periods is present in Newfoundland at the Gould (EeBi-42) site, the short-stay field camp associated with the Port au Choix burial ground. At this site, a cut, partially burned spruce log dating to the period of peak use of the burial ground was found in close proximity to three worn ground stone gouges, and charred seeds from edible berries were recovered from soil samples (Renouf and Bell 2011). Despite brief intermittent stays at this location, the landscape surrounding the site was cleared and repeatedly rejuvenated through the use of fire throughout most of the Archaic (Renouf et al. 2009). Maintained clearings would have provided visitors with ready access to grasses, shoots, and berries, and an increased likelihood of encountering animals depending on these resources. This raises the intriguing possibility that woodworking tools did play an important role in food and raw material procurement traditions during the Archaic in Newfoundland, requiring a turn of the investigative gaze back towards the land to gain more appreciation of this important aspect of early human life on the island.

Given the presence of a multiplicity of ethnic groups in Newfoundland and the important role land played in their day-to-day activities, the use of the Maritime Archaic Indian concept should be abandoned in Newfoundland to refer to its local people. Although the terms “Maritime Archaic” are useful to recognize the presence of broad generalities shared by various people belonging to coastal groups found across the Far Northeast, they have very little to offer to the understanding of the regional lifeways adopted by individual communities, even at a scale as broad as the island of Newfoundland. The term “Archaic” used alone is sufficient to refer to the period. If the need arises to differentiate between patterns present throughout Newfoundland to those of another region, the terms “Newfoundland Archaic” should offer enough specificity. When discussing the people belonging to separate countries, the use of country names suggested in Chapter 4 would provide clear reference to specific groups (Northland, Eastland, and Bridgeland). The use of named technological complexes would also provide a similar level of differentiation between groups (Back Harbour, Bonavista, and Bonne-Espérance complexes), although they do not provide an explicit recognition of the complex nature each group had with their homeland.

5.3 Future Research Leads

The results presented throughout this dissertation have paved the way toward a number of future avenues of research. Some of the most promising are briefly elaborated upon in the next few sections.

One of the principal findings from the analysis of Newfoundland's travel route network was the identification of a number of important travel corridors, as well as locations along this network that are likely to have acted as central places. These places are ideal locations to focus archaeological surveys. Promising locations include Victoria, Granite, and Meelpaeg Lakes, especially junctions between these lakes and significant rivers, as well as island locations that were used historically (e.g., Cormack 1873; Jukes 1842). Surveys in these regions will contribute to filling in the *terra incognita* that still remains in central Newfoundland.

Another location worth further investigation is Burgeo. A number of sites from all precontact time periods are already known from this area, but a special research strategy must be taken to assess the archaeological potential of this region during the Archaic. Because of a significant rise in sea level in this region since the Archaic, our current knowledge of Archaic site locations in the Burgeo area is limited to sites that would not have been directly on the coast at the time of their occupation (Rast 1999; Rast et al. 2004). The reconstruction of Burgeo's submerged landscapes will be a necessary first step in the assessment of its archaeological potential for Archaic research (e.g., Westley et al. 2011).

In addition to guiding future surveys, there are a number of ways in which our understanding of the travel network can be refined. For example, simple changes to model parameters could simulate travel in winter. The current scale of analysis required a simplified elevation model in order to keep the computation time of least-cost paths reasonable (20–30 minutes per destination). To that effect, the model used a 90-m cell size to investigate travel routes at an island-scale. This cell-size is too coarse, however, for determining the actual route pedestrian trails are likely to have followed on the ground, as important features at a human-scale are smoothed out. For analyses focusing on smaller regions, a cell size of 10 m or less would be more appropriate for estimating the position of foot trails linking nearby waterways or avoiding obstacles found along these waterways, including falls and dangerous rapids. For this purpose, obstacles could also be included as a supplementary criterion and given high cost values. Finally, using the map biography approach (e.g., Tobias 2000) to document knowledge held by fishing guides and First Nation groups still using the interior in various seasons would also greatly contribute to our knowledge of traditional interior travel routes.

Another important result of this doctoral research was the demonstration that the Port au Choix burial ground is somewhat of an anomaly within the region. A number of analyses have looked directly at the individuals that were buried there using a variety of techniques such as metric and non-metric osteological traits, DNA, and carbon and nitrogen stable isotopes (Jelsma 2000; Kennedy 1981; Tuck 1976a). These studies have provided interesting results, suggesting a generally higher status for men, women that came from a larger population and married into the area, and the presence of different diets. Despite these studies, current data remains insufficient to determine if Port au Choix was the result of the ceremonial practices of a single group or multiple groups sharing this boundary marker. A possible avenue of research that would help clarify this issue would be the analysis of strontium isotopes. These isotopes provide a chemical signature of the local geology of the places where people lived as strontium is absorbed through the water and plant foods they consume (e.g., Bentley 2006). Because of the different geology of the regions surrounding Port au Choix, especially between Newfoundland and Labrador (Bostock et al. 1983), the chemical signature provided by strontium isotopes would provide clues as to the principal region inhabited by individuals buried at Port au Choix-3, and whether they migrated between childhood and death.

Chemical sourcing analyses performed on stone tools would also be an interesting avenue of research. Techniques such as laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS) would further enhance our knowledge of the variability present within assemblages, and the level of mobility involved in procuring raw lithic material, linking results back to studies of travel routes and group interactions (e.g., Lavers 2010; Speakman and Neff 2005). Residue and usewear analyses on stone tools, especially the more porous ground stone tools, would also provide a better understanding of the activities in which these tools were used (e.g., Evershed 2008; Odell 2004).

The identification of distinct technological traditions has relied mostly on chipped stone tools, ground stone points, and plummets; the most dominant form of formal Archaic stone tools in Newfoundland, however, are woodworking tools such as adzes, axes, and gouges. As briefly mentioned in Chapter 4, some standard forms of woodworking tools seem to be present, but a more in-depth analysis of morphological traits is required to confirm this hypothesis. The development of a classification for gouges and celts would add to our knowledge of regional patterns and provide a basis for comparison with the ground stone traditions elsewhere in the Far Northeast. Finally, to determine if the environmental management seen at Port au Choix was part of a wider tradition using woodworking tools and fire to create and maintain clearings, more local-scale palaeoenvironmental analyses are required. The impact of human presence on local vegetation at these sites can be assessed using a combination of sediment records from ponds located in proximity to archaeological sites and further afield (e.g., Renouf et al. 2009).

5.4 Conclusion

This doctoral dissertation has presented a variety of analyses relying principally on stone tool distributions and site locations to explore cultural practices linked to mobility, burial ceremonialism, stone tool traditions, and resource access in Newfoundland during the Archaic. The first modeling of the intricate travel route network crisscrossing the interior of Newfoundland was created, which led to the recognition that the burial grounds from Port au Choix and Back Harbour were placed in very different settings. A more in-depth comparison between the Port au Choix-3 and Curtis burial grounds identified the former as somewhat of an oddity for the region. The first comprehensive analysis of Archaic artifact distributions in Newfoundland also identified distinct regional stone tool traditions. Differences in technological traditions, ideology linked to burial ceremonialism, resource-dependent food procurement habits, and use of traditional travel routes were interpreted as the presence of a plurality of ethnic groups co-habiting on the island, but maintaining separate countries. The results suggest it is time to part with the over-generalized concept of the Maritime Archaic Indians in Newfoundland, focussing instead on regional complexes and the ways in which these complexes interacted with each other and with more distant groups inhabiting other regions of the Far Northeast.

Benefits of this doctoral research are not limited to the results presented herein, but will also promote further research along various avenues of inquiries. Results will guide future surveys towards important regions along the modelled travel route network, and serve as the basis from which to further expand our understanding of traditional interior travel routes. Further research is likely to shed light as to the identity of the people buried at Port au Choix, and provide improved understandings of lithic material procurement and stone tool use during the Archaic. Finally, as new information is gathered from regions for which little data is currently available, more ethnic groups may yet be identified, placing Newfoundland's Archaic population at the centre of a very dynamic interaction sphere.

Appendix A

Archaic Radiocarbon Dates in Newfoundland

This appendix provides a list of all Newfoundland radiocarbon dates spanning the Archaic, a period ranging between 8000–3200 BP in Newfoundland and Labrador. They are presented alphabetically by Borden number in Table A-1, providing the measured radiocarbon age before present and detailed contextual information for each entry.

Some dates presented in Table A-1 were excluded from the research reported in this dissertation. These dates are either anomalous for their context, or the dated material was not associated with features or diagnostic artifacts (Beta-134151, Beta-148519, GaK-1266, GSC-1403, S-1954, TO-8519, TO-8520, TO-8581, Qu-365, Y-2609). Dates obtained from human remains at Port au Choix-3 (EeBi-2) also require special consideration (GrA-6478, GrA-6479, GrA-6495, GrA-6496, GrA-6501, GrA-6525, GrA-6526, GrA-6527, GrA-6666, I-4677, I-4678). These are not directly comparable to dates obtained from other organic material because of the marine reservoir effect, a result of consuming marine resources rich in "old" carbon that causes measured ages to appear older than they are by as much as 300–400 years (Jelsma 2000:33). In such cases, it is very difficult to ascertain the precise reservoir difference and apply an appropriate correction to the measured radiocarbon age. Dates obtained from human bones were not directly compared to those obtained from other sources during the analysis.

Furthermore, since all dates obtained from human remains, corrected or not, fall within the range already defined from other organic material, they do not influence research results reported in this dissertation.

All accepted dates fall within the Late Archaic (5500–3200 BP), predominantly in the post-4500 BP range (Figure A-1). This period is contemporaneous with all important Late Archaic cultural units currently defined for the Quebec Lower North Shore and Labrador: the *Rattlers Bight* phase (4200–3500 BP; Labrador), and the *La Tabatière* and *Bonne-Espérance* complexes (5000–3500 BP; Quebec). These dates are the basis for the chronological ranges given for the new Newfoundland complexes identified in Chapter 4. The Beaches (DeAk-1) and Cape Cove-1 (DhAi-5) sites provide dates for the *Bonavista* complex (ca. 4900–3600 BP), and Curtis (DjAq-1) dates the end of the *Back Harbour* complex (ca. 3700–3200 BP). Date ranges obtained for the Bonne-Espérance complex in Quebec are supported by Newfoundland material through dates obtained from the Gould (EeBi-42), Big Droke-1 (EgBf-11), Caines (EgBf-15), and Big Brook-2 (EjBa-2) sites, extending the terminal date by a few hundred years to 3200 BP (ca. 5500–3200 BP).

A.1 Newfoundland Sites

Table A-1 Measured Newfoundland Archaic radiocarbon dates.

Borden	Site Name	Lab Code	Reported Age	Sample Material	Context	Note	Source
DeAk-01	Beaches	I-6761	3690 ± 100	Charcoal	Culture Layer 2, Feature 2		Carignan (1975b)
DeAk-01	Beaches	I-7509	3840 ± 100	Charcoal	Culture Layer 2, Feature 3		Carignan (1975b)
DeAk-01	Beaches	SI-1384	4900 ± 230	Charcoal	Culture Layer 2, Feature 1		Carignan (1975b)
DhAi-05	Cape Cove-1	S-1860	3615 ± 120	Charcoal	Feature 1, Layer 2		Austin (1984)
DhAi-05	Cape Cove-1	S-1859	4540 ± 135	Charcoal	Feature 1, Layer 5		Austin (1984)
DjAq-01	Curtis	GAK-1254	3200 ± 90	Charcoal	Trench A3, Stratum 4A		Wilmeth (1978)
DjAq-01	Curtis	GSC-758	3560 ± 140	Charcoal	Trench A3, SW face of Trench A		Wilmeth (1978)
DjAq-01	Curtis	GSC-834	3720 ± 130	Charcoal	Trench A3, Stratum 4A		Wilmeth (1978)
DjAq-01	Curtis	GAK-1266	6920 160	Charcoal	Trench A, NW corner, 115 cm depth	1	Wilmeth (1978)
DgBj-03	South Brook Park	Beta-122766	5140 ± 50	Charcoal	Unit N0W5, 54 cm BS, with Lithics		Reader (1999a)
DlBk-01	Cow Head	DAL-326	4130 ± 150	Charcoal	Upper Terrace, Feature 45		Reid (2007)
DlBk-01	Cow Head	S-1954	6285 ± 570	Charcoal	Upper Terrace, Feature 40	2	Hartery (2001)
EeBi-02	Port au Choix-3	I-4380	3230 ± 220	Carbonized birch (?) bark	Locus 4, Burial 2		Tuck (1976a)
EeBi-02	Port au Choix-3	Y-2608	3370 ± 80	Charcoal	Locus 2, Burial 22		Tuck (1976a)
EeBi-02	Port au Choix-3	I-4677	3410 ± 100	Human bone	Locus 1, Construction		Tuck (1976a)
EeBi-02	Port au Choix-3	I-4682	3690 ± 90	Charcoal	Locus 2, Burial 22		Tuck (1976a)
EeBi-02	Port au Choix-3	AA-33919	3777 ± 44	Beaver incisor	Locus 2, Burial 35B		Robinson (2006)
EeBi-02	Port au Choix-3	AA-29482	3825 ± 60	Caribou bone	Locus 2, Burial 35B		Robinson (2006)
EeBi-02	Port au Choix-3	AA-33920	3826 ± 38	Caribou bone	Locus 2, Burial 35B		Robinson (2006)
EeBi-02	Port au Choix-3	I-4678	3930 ± 130	Human bone	Locus 2, Burial 50	3	Tuck (1976a)
EeBi-02	Port au Choix-3	GrA-6525	4000 ± 50	Human bone	Locus 2, Burial B18A	3	Jelsma (2000)
EeBi-02	Port au Choix-3	GrA-6496	4000 ± 50	Human bone	Locus 2, Burial C40A	3	Jelsma (2000)
EeBi-02	Port au Choix-3	GrA-6527	4110 ± 50	Human bone	Locus 2, Burial C35A	3	Jelsma (2000)
EeBi-02	Port au Choix-3	GrA-6666	4130 ± 50	Human bone	Locus 2, Burial A10	3	Jelsma (2000)
EeBi-02	Port au Choix-3	GrA-6501	4130 ± 50	Human bone	Locus 2, Burial B30C	3	Jelsma (2000)
EeBi-02	Port au Choix-3	GrA-6526	4150 ± 50	Human bone	Locus 2, Burial B25	3	Jelsma (2000)
EeBi-02	Port au Choix-3	GrA-6495	4150 ± 50	Human bone	Locus 2, Burial C36A	3	Jelsma (2000)
EeBi-02	Port au Choix-3	GrA-6479	4160 ± 50	Human bone	Locus 2, Burial A12	3	Jelsma (2000)
EeBi-02	Port au Choix-3	GrA-6478	4220 ± 50	Human bone	Locus 2, Burial A1B	3	Jelsma (2000)
EeBi-02	Port au Choix-3	I-3788	4290 ± 110	Charcoal	Locus 2, Burial 22		Tuck (1976a)
EeBi-02	Port au Choix-3	GSC-1403	4690 ± 130	Long clam shells	Sand, 6.1 m Beach Terrace	4	Tuck (1976a)
EeBi-02	Port au Choix-3	Y-2609	5120 ± 120	Wood inside bog iron	Locus 2, Burial 42	5	Tuck (1976a)
EeBi-42	Gould	Beta-132364	3200 ± 100	Charcoal	Area 99-1, Level 6, beneath Feature 46		Renouf (2011c)

(continued)

Table A-1 (continued)

Borden	Site Name	Lab Code	Reported Age	Sample Material	Context	Note	Source
EeBi-42	Gould	Beta-108099	3260 ± 50	Charcoal	Area 98-1, Level 4, Feature 1		Renouf (2011c)
EeBi-42	Gould	Beta-134153	3420 ± 60	Charcoal	Area 3, Level 6, Feature 264		Renouf (2011c)
EeBi-42	Gould	Beta-120795	3450 ± 50	Wood	Area 98-1, Level 4, Feature 11a		Renouf (2011c)
EeBi-42	Gould	Beta-134148	3450 ± 70	Charcoal	Area 99-1, Levels 5/6, Feature 46		Renouf (2011c)
EeBi-42	Gould	Beta-107795	3720 ± 50	Charcoal	Area 99-6, Level 4, beneath hearth		Renouf (2011c)
EeBi-42	Gould	Beta-121295	3850 ± 100	Charcoal	Area 98-1, Level 5, Feature 24		Renouf (2011c)
EeBi-42	Gould	TO-8520	4010 ± 160	Leaf and bark	Main site area, 70 cm depth	6	Renouf (2011c)
EeBi-42	Gould	Beta-146081	4060 ± 80	Charcoal	Area 1, TT00-16, Level 3X, Feature 515		Renouf (2011c)
EeBi-42	Gould	TO-8519	4140 ± 80	Bark fragments	Main site area, 85–86 cm depth	6	Renouf (2011c)
EeBi-42	Gould	TO-8581	4670 ± 120	Stem fragments	Area 4, 122–123 cm depth	6	Renouf (2011c)
EeBi-42	Gould	Beta-148519	5440 ± 40	Charcoal	Area 99-2E, Level 4	6	Renouf (2011c)
EeBi-42	Gould	Beta-134151	5440 ± 50	Charcoal	Area 99-2B, Level 5	6	Renouf (2011c)
EeBi-42	Gould	Beta-148518	5440 ± 50	Charcoal	Area 99-2E, Feature 502		Renouf (2011c)
EeBi-43	Old Boatyard	Beta-121297	3980 ± 110	Charcoal	Associated with flakes		Renouf (2011c)
EgBf-11	Big Droke-1	Beta-129398	3470 ± 50	Charcoal	Feature 8		Reader (1999b)
EgBf-11	Big Droke-1	Beta-108560	3500 ± 60	Charcoal	Associated with artifacts		Reader (1999b)
EgBf-11	Big Droke-1	Beta-113158	3560 ± 50	Charcoal	Feature 19		Reader (1999b)
EgBf-11	Big Droke-1	Beta-129399	3600 ± 50	Charcoal	Feature 6		Reader (1999b)
EgBf-11	Big Droke-1	Beta-129400	3820 ± 50	Charcoal	Feature 15		Reader (1999b)
EgBf-11	Big Droke-1	Beta-113159	3920 ± 50	Charcoal	Feature 1, south perimeter		Reader (1999b)
EgBf-11	Big Droke-1	Beta-108561	4230 ± 60	Charcoal	Feature 3		Reader (1999b)
EgBf-11	Big Droke-1	Beta-108559	4530 ± 60	Charcoal	Associated with artifacts		Reader (1999b)
EgBf-15	Caines	Beta-113405	3490 ± 80	Charcoal	Feature 1		Reader (1999b)
EgBf-15	Caines	Beta-108562	3600 ± 60	Charcoal	Feature 2		Reader (1999b)
EjAv-01	L'Anse aux Meadows	Qu-365	5080 ± 110	Charcoal	Stone concentration east of House D	7	Wallace (2003)
EjBa-02	Big Brook-2	Beta-171715	3820 ± 40	Charcoal	Feature 7		Beaton (2004)
EjBa-02	Big Brook-2	Beta-177106	4090 ± 40	Charcoal	Feature 14		Beaton (2004)

Notes: When available, normalized measurements ($\delta^{13}C$ correction) are presented, otherwise reported ages represent conventional measurements.
1. Anomalous date, possibly from small sample size; not in direct association with artifacts.
2. Anomalous date obtained from a Palaeoeskimo feature.
3. Requires marine reservoir correction, reducing measured age by 300–400 years (Jelsma 2000:33).
4. Dates emergence of raised beach terrace, not burials; date from shell requires a marine reservoir correction.
5. Dates wood preserved inside bog iron nodule; predates burials by unknown amount.
6. Dates stratigraphy, not features or artifacts.
7. Anomalous date recovered from disturbed context.

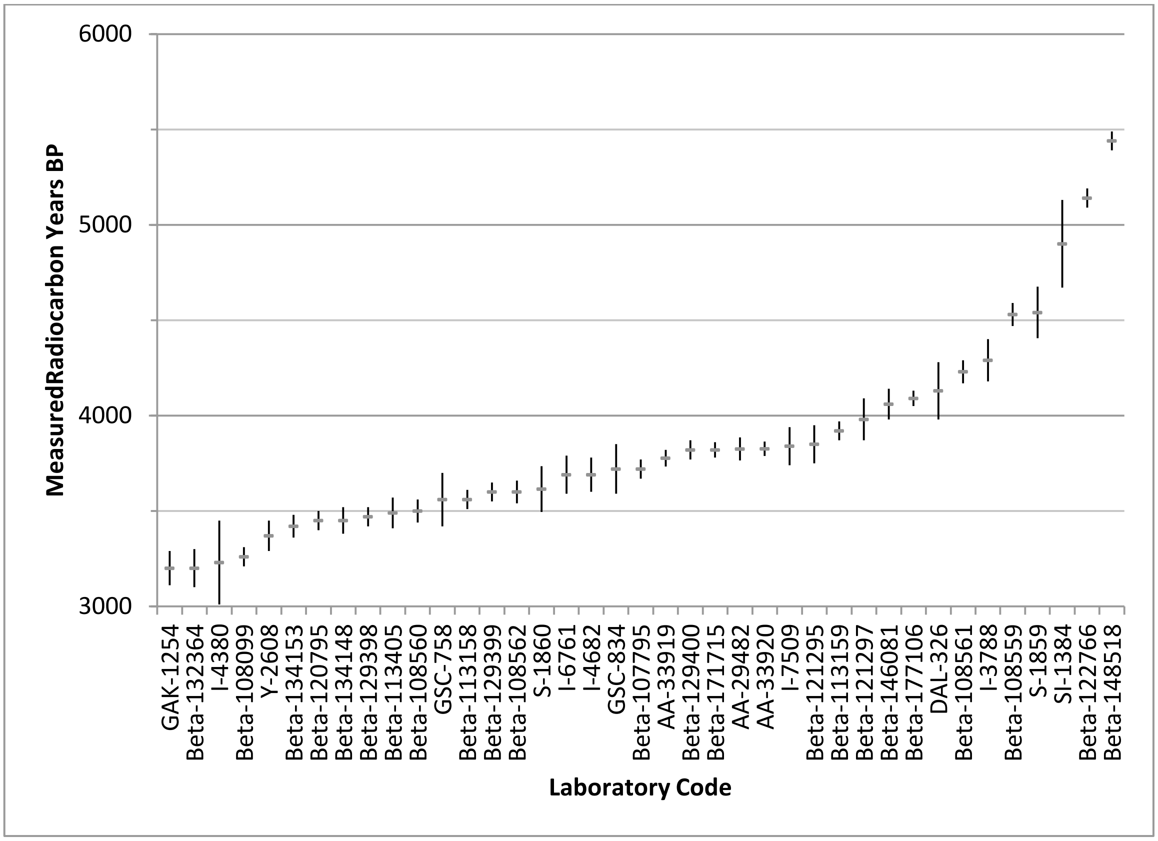

Figure A-1 Temporal distribution of measured Newfoundland Archaic radiocarbon dates.

A.2 Port au Choix-3, Locus II Burials

Table A-2 Assigned cost values of grouped land cover.

Locus	Burial[1]	Ground Points[2]	Superposition[3]	Depth[4]	Radiocarbon Age BP[5]
Locus II-A	Burial-A1A		-	-	
	Burial-A1B	1 PW	> (A1A, A1C)	-	4220±50 (GrA-6478)
	Burial-A1C		-	-	
	Burial-A2A		> A9	< 40 cm	
	Burial-A2B		> A9	< 40 cm	
	Burial-A3			40–90 cm	
	Burial-A4			-	
	Burial-A6		> A7	< 40 cm	
	Burial-A7	1 BK	-	< 40 cm	
	Burial-A8		> A9	40–90 cm	
	Burial-A9			40–90 cm	
	Burial-A10			40–90 cm	4130±50 (GrA-6666)
	Burial-A11		> A1B > (A1A, A1C) > A8 > A9	< 40 cm	
	Burial-A12	1 PW	> A13 > (A14A, A14B)	40–90 cm	4160±50 (GrA-6479)
	Burial-A13	1 PW	> (A14A, A14B)	-	
	Burial-A14A		-	40–90 cm	
	Burial-A14B		-	-	
	Burial-A21			-	
Locus II-B	Burial-B5	2 BK	-	40–90 cm	
	Burial-B15			40–90 cm	
	Burial-B16A		> B16D > B24	40–90 cm	
	Burial-B16C		> B16D > B24	40–90 cm	
	Burial-B16D		> B24	-	
	Burial-B17	1 MX	-	40–90 cm	
	Burial-B18A		> B18D > B18C	< 40 cm	4000±50 (GrA-6525)
	Burial-B18B		> B18A > B18D > B18C	< 40 cm	
	Burial-B18C		-	< 40 cm	
	Burial-B18D		> B18C	< 40 cm	
	Burial-B19		> B24	40–90 cm	
	Burial-B20			< 40 cm	
	Burial-B22A	1 PW	> B22D	< 40 cm	
	Burial-B22B		> B22D	< 40 cm	
	Burial-B22C		> B22D	< 40 cm	
	Burial-B22D		-	< 40 cm	
	Burial-B23		> B29 > B30C > (B30A, B30B)	> 90 cm	
	Burial-B24			40–90 cm	

(continued)

Table A-2 (continued)

Locus	Burial[1]	Ground Points[2]	Superposition[3]	Depth[4]	Radiocarbon Age BP[5]
Locus II-B	Burial-B25	1 PW	-	40–90 cm	4150±50 (GrA-6526)
	Burial-B26	1 BK, 4 BX, 2MX, 3PW	-	40–90 cm	
	Burial-B27A			40–90 cm	
	Burial-B27B		> B27A	< 40 cm	
	Burial-B28A			40–90 cm	
	Burial-B28B			40–90 cm	
	Burial-B29		-	40–90 cm	
	Burial-B30A		-	-	
	Burial-B30B		-	-	
	Burial-B30C	1 PW	> (B30A, B30B)	40–90 cm	4130±50 (GrA-6501)
	Burial-B31	1 PW	-	< 40 cm	
	Burial-B33	4 PW	-	< 40 cm	
Locus II-C	Burial-C32	1 MX, 1PW	> C36A > C36B	40–90 cm	
	Burial-C34	3 BX	> C32 > C36A > C36B	40–90 cm	
	Burial-C35A	8 PW	-	40–90 cm	4110±50 (GrA-6527)
	Burial-C35B			< 40 cm	
	Burial-C36A	3 BX	> C36B	> 90 cm	4150±50 (GrA-6495)
	Burial-C36B		-	> 90 cm	
	Burial-C37A1	1 BX, 1 MX	-	40–90 cm	
	Burial-C37A2		-	40–90 cm	
	Burial-C37B1		> (C37A1, C37A2)	40–90 cm	
	Burial-C37B2		> (C37A1, C37A2)	40–90 cm	
	Burial-C37C1		> (C37A1, C37A2)	40–90 cm	
	Burial-C37C2		> (C37A1, C37A2)	40–90 cm	
	Burial-C37C3		> (C37A1, C37A2)	40–90 cm	
	Burial-C37D		> (C37A1, C37A2)	40–90 cm	
	Burial-C37E		> (C37A1, C37A2)	40–90 cm	
	Burial-C37F		> (C37A1, C37A2)	40–90 cm	
	Burial-C37G		> (C37A1, C37A2)	40–90 cm	
	Burial-C37H		> (C37A1, C37A2)	40–90 cm	
	Burial-C37I		> (C37A1, C37A2)	40–90 cm	
	Burial-C37J		> (C37A1, C37A2)	40–90 cm	
	Burial-C37K		> (C37A1, C37A2)	40–90 cm	
	Burial-C38A		> (C37B–C37K) > C37A	< 40 cm	
	Burial-C38B		> (C37B–C37K) > C37A	< 40 cm	
	Burial-C39	1 PW	-	< 40 cm	
	Burial-C40A		-	< 40 cm	4000±50 (GrA-6496)
	Burial-C40B			< 40 cm	
	Burial-C41		> (C37B–C37K) > C37A	40–90 cm	

(continued)

Table A-2 (continued)

Locus	Burial[1]	Ground Points[2]	Superposition[3]	Depth[4]	Radiocarbon Age BP[5]
Locus II-C	Burial-C42			40–90 cm	
	Burial-C43			< 40 cm	
	Burial-C44A	1 PW	> C44B	> 90 cm	
	Burial-C44B	2 PW	-	-	
	Burial-C45	1 PW	-	40–90 cm	
	Burial-C46A		> C50	40–90 cm	
	Burial-C46B		> C50	40–90 cm	
	Burial-C46C		> C50	40–90 cm	
	Burial-C46D			40–90 cm	
	Burial-C47A		> C47B	> 90 cm	
	Burial-C47B	1 BX	-	-	
	Burial-C48			< 40 cm	
	Burial-C49A		> (C37B–C37K) > C37A	40–90 cm	
	Burial-C49B		> (C37B–C37K) > C37A	40–90 cm	
	Burial-C50A	3 PW	-	> 90 cm	3930±130 (I-4678)
	Burial-C50B			> 90 cm	
	Burial-C50C			> 90 cm	
	Burial-C51			40–90 cm	
	Burial-C52			40–90 cm	
	Burial-C53			-	
Locus I	Burial-1	1 BK	-		3410±100 (I-4677)

Notes:

1 Letters preceding the grave number for PAC-3 indicate grave cluster. Letters appearing after the grave number specify single individual within graves with multiple burials.
2 Ground slate point forms: Back Harbour (BK), broad hexagonal (BX), mixed (MX), and pie-wedge (PW).
3 Tuck (1976a) was able to discern temporal relationships between a number of burial events.
4 Jelsma (2000) found a significant statistical relationship between the depth of earlier (< 40 cm) and later (> 40 cm) burials across all Locus II clusters, although cluster C burials tend to be generally deeper. Exceptions do occur as indicated by Burial-C50A, a deep deposit with a late date.
5 Only radiocarbon dates obtained on human bones are considered herein because of unresolved incomparability issues with dates obtained from other sample sources (charcoal, wood).
Sources: GrA# (Jelsma 2000) and I# (Tuck 1976a).

Appendix B

Least Cost Path Analysis Supplementary Data

This section provides supplementary information in the form of figures and tables relating to data layers used and modelling results obtained during the multi-criteria cost surface analysis presented in Chapter 2.

The first two maps present the two principal data layers that were combined to create the final multi-criteria cost surface used in the model. Figure B-1 presents the combined surface cover cost layer that includes the coastal water buffer, inland waterways, and other land cover categories. These categories and the cost associated with each were presented in Table 2-2, but are reproduced in Table B-1 below for clarity. Figure B-2 presents the relative slope cost surface layer used in the model.

In contrast, Figures B-3 to B-37 and Tables B-3 to B-37 present individual modelling results obtained for each destination, including the length, cost, rank, and rank difference of the least-cost paths linking specific departure and destination locations.

B.1 Model Inputs

B.1.1 Surface Cover Cost Surface

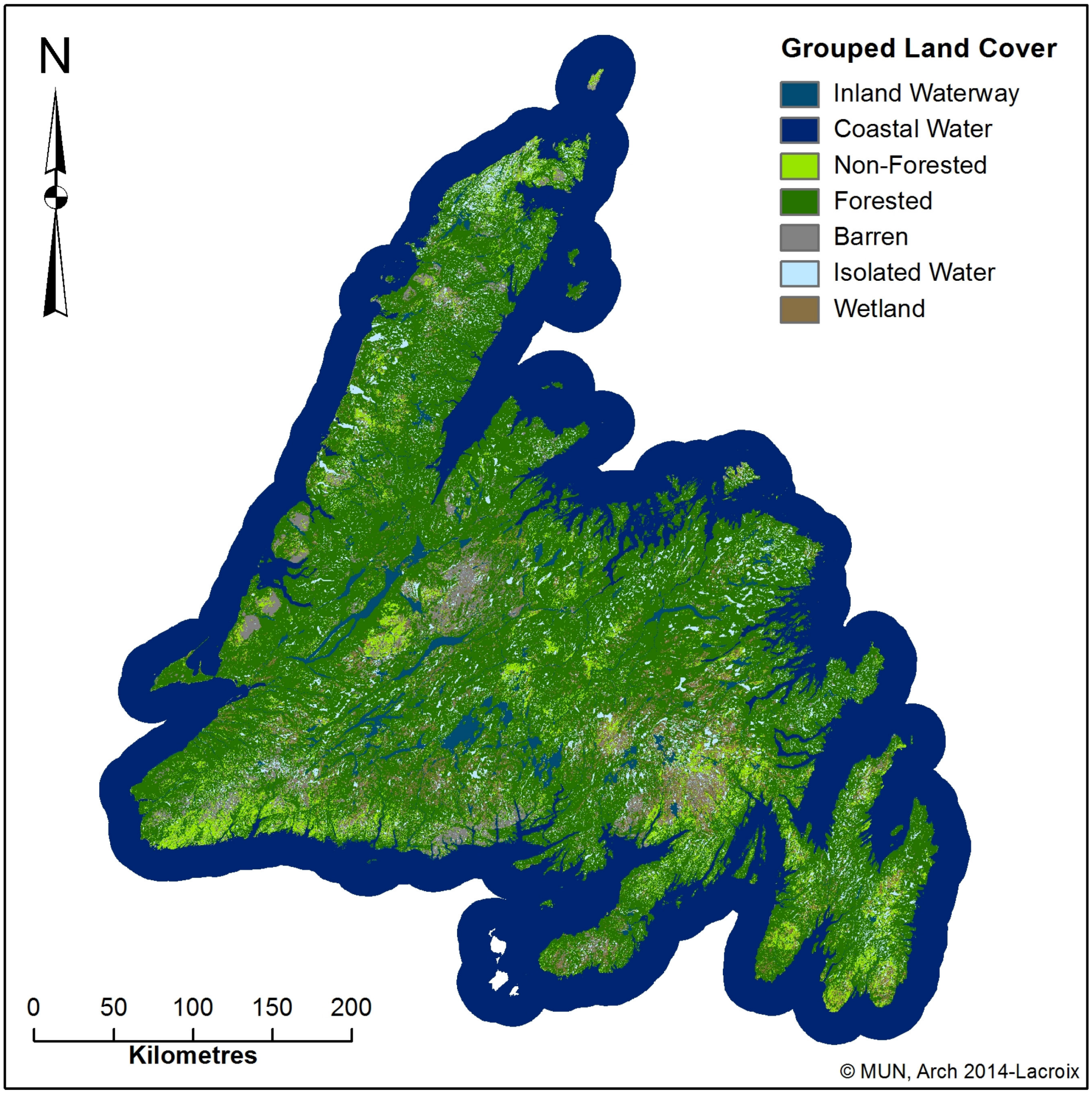

Figure B-1 Surface cover input layer including both water and land categories.

Table B-1 Assigned cost values of grouped land cover.

Grouped Land Cover	Cost Value	Reasoning
Inland Waterway	5	Canoe travel occurred up major rivers and lakes
Coastal Water	10	Canoe travel occurred along shoreline
Non-Forested	30	Easy to walk/see through
Forested	40	Vegetated but openings present
Exposed Ground	60	Avoid scrambling on sand and rocks
Isolated Water	65	Avoid "puddle-jumping"
Wetland	70	Impassable wetlands with canoe, wet walking

B.1.2 Relative Slope Cost Surface

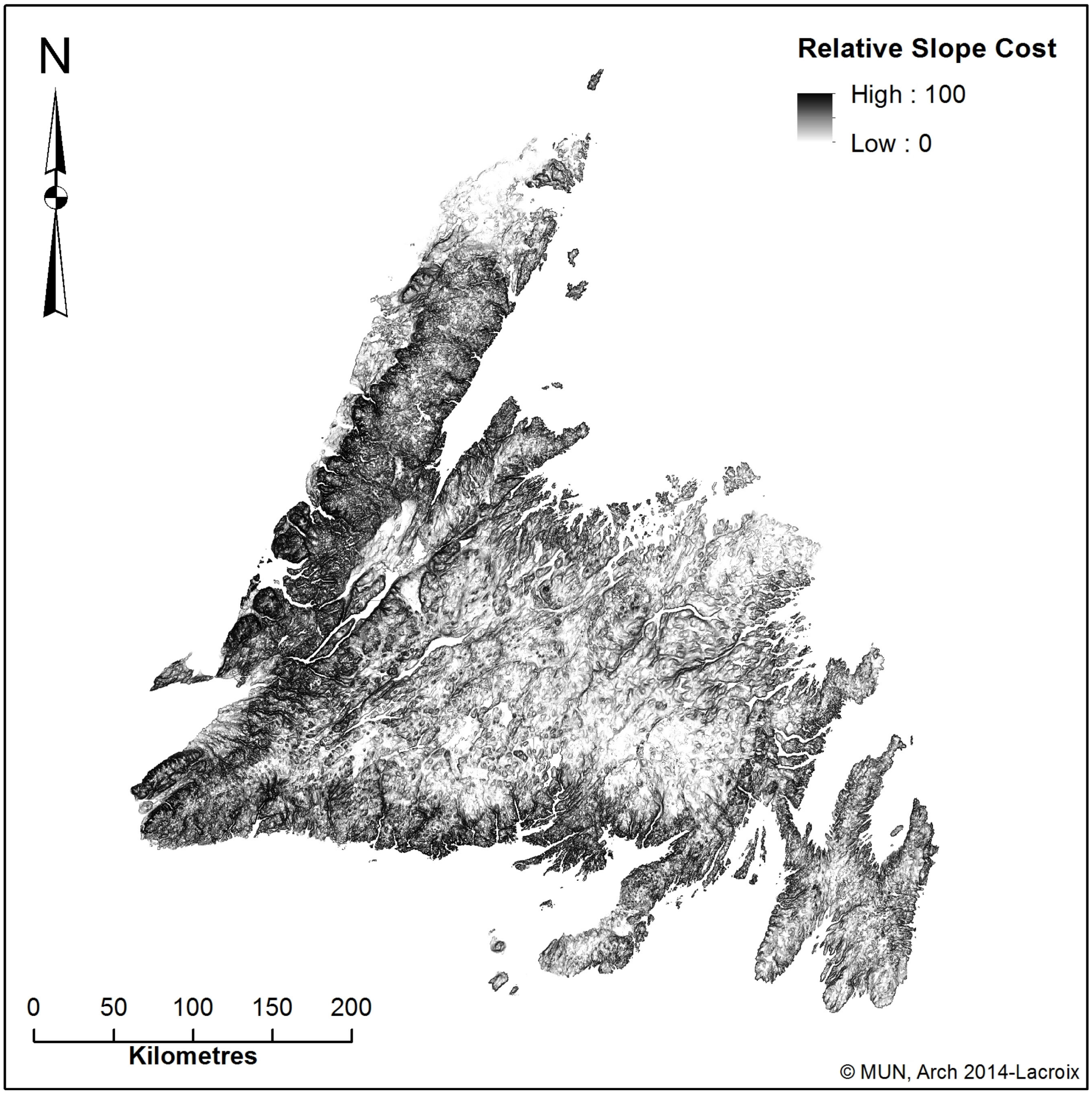

Figure B-2 Relative slope cost input layer.

B.2 Model Results

The following figures and tables present the specific sets of least-cost paths obtained for each individual destination site. The order of presentation respects the numbering system used in Figure 2-5 and Table 2-4, which present sites from the most to least accessible, and is reproduced in Table B-2 below.

Table B-2 List of results by input sites with associated figures and tables.

Site Number	Site Name	Figure	Table
1	Victoria Lake	Figure B-3	Table B-3
2	Bay of Islands	Figure B-4	Table B-4
3	Burgeo	Figure B-5	Table B-5
4	Hamilton Sound	Figure B-6	Table B-6
5	Bonavista Bay	Figure B-7	Table B-7
6	Red Indian Lake	Figure B-8	Table B-8
7	Codroy Rivers	Figure B-9	Table B-9
8	Saint-Pierre et Miquelon	Figure B-10	Table B-10
9	Grand Lake	Figure B-11	Table B-11
10	Notre Dame Bay	Figure B-12	Table B-12
11	St. George's Bay	Figure B-13	Table B-13
12	La Poile Bay	Figure B-14	Table B-14
13	Meelpaeg Lake	Figure B-15	Table B-15
14	Hermitage Bay	Figure B-16	Table B-16
15	Deer Lake	Figure B-17	Table B-17
16	Jeddore Lake	Figure B-18	Table B-18
17	Hare Bay	Figure B-19	Table B-19
18	Cape Broyle Harbour	Figure B-20	Table B-20
19	Gander Lake	Figure B-21	Table B-21
20	Strait of Belle Isle	Figure B-22	Table B-22
21	Parsons Pond	Figure B-23	Table B-23
22	Placentia Bay	Figure B-24	Table B-24
23	St. Barbe Bay	Figure B-25	Table B-25
24	Trinity Bay	Figure B-26	Table B-26
25	Biscay Bay	Figure B-27	Table B-27
26	Near Pistol Lake	Figure B-28	Table B-28
27	Conception Bay	Figure B-29	Table B-29
28	Fortune Bay	Figure B-30	Table B-30
29	White Bay	Figure B-31	Table B-31
30	St. Mary's Bay	Figure B-32	Table B-32
31	Canada Bay	Figure B-33	Table B-33
32	Terra Nova Lake	Figure B-34	Table B-34
33	Gambo River	Figure B-35	Table B-35
34	Ingornachoix Bay	Figure B-36	Table B-36
35	Kaegudeck Lake	Figure B-37	Table B-37

B.2.1 Site 1: Victoria Lake

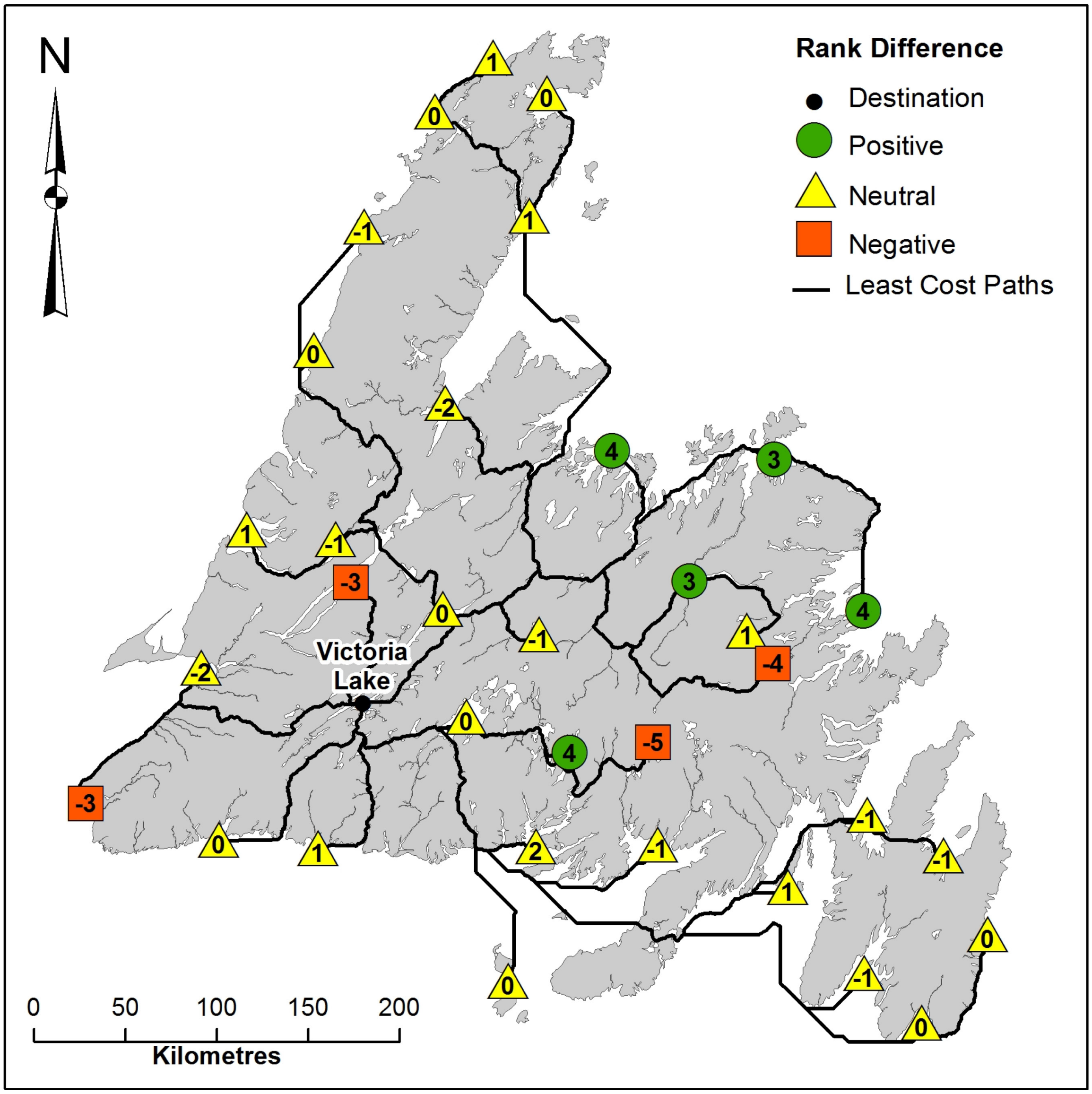

Figure B-3 Modelled travel routes and rank differences for least-cost paths reaching Victoria Lake (see Table B-3 for details).

Table B-3 Differences between distance and cost ranks for least-cost paths reaching Victoria Lake (see Figure B-3 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Red Indian Lake	85108	1	246905	1	0
Meelpaeg Lake	91977	2	262072	2	0
Grand Lake	103995	3	601473	6	-3
Burgeo	120295	4	425554	3	1
La Poile Bay	138304	5	587613	5	0
Near Pistol Lake	149636	6	636456	7	-1
St. George's Bay	153766	7	755122	9	-2
Jeddore Lake	166607	8	577341	4	4
Deer Lake	190098	9	761639	10	-1
Hermitage Bay	193666	10	675535	8	2
Codroy Rivers	216832	11	994728	14	-3
Saint-Pierre et Miquelon	242287	12	952520	12	0
Kaegudeck Lake	261708	13	1120195	18	-5
Bay of Islands	262283	14	986112	13	1
Notre Dame Bay	270030	15	869514	11	4
Fortune Bay	275110	16	1092758	17	-1
White Bay	287440	17	1193157	19	-2
Gander Lake	296054	18	1049670	15	3
Hamilton Sound	320025	19	1058861	16	3
Parsons Pond	332589	20	1448681	20	0
Terra Nova Lake	362654	21	1697866	25	-4
Placentia Bay	367060	22	1517807	21	1
Gambo River	381537	23	1555792	22	1
Canada Bay	383393	24	1591440	23	1
Ingornachoix Bay	410279	25	1842653	26	-1
Trinity Bay	435847	26	1865752	27	-1
St. Mary's Bay	442540	27	1937371	28	-1
Bonavista Bay	456125	28	1628045	24	4
Hare Bay	468904	29	1953647	29	0
Biscay Bay	477992	30	2114363	30	0
St. Barbe Bay	478656	31	2134001	31	0
Conception Bay	490789	32	2370081	33	-1
Strait of Belle Isle	528705	33	2312174	32	1
Cape Broyle Harbour	555144	34	2457071	34	0

Note: A positive rank difference indicates travel to Victoria Lake is easier than distance suggests, while a negative difference indicates that travel to Victoria Lake is harder than distance implies.

B.2.2 Site 2: Bay of Islands

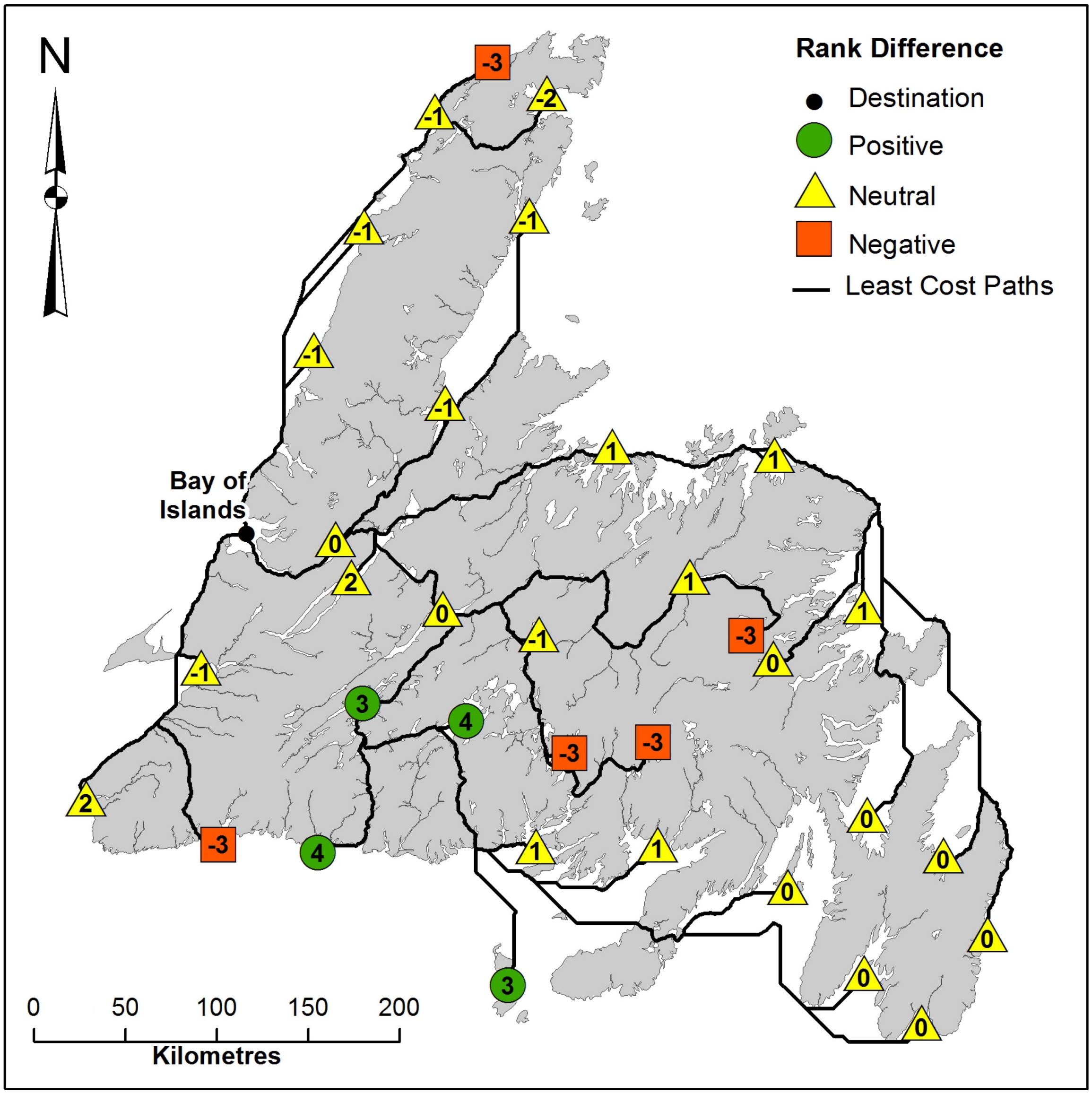

Figure B-4 Modelled travel routes and rank differences for least-cost paths reaching Bay of Islands (see Table B-4 for details).

Table B-4 Differences between distance and cost ranks for least-cost paths reaching Bay of Islands (see Figure B-4 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Deer Lake	73176	1	226837	1	0
St. George's Bay	109148	2	452731	3	-1
Parsons Pond	115909	3	530375	4	-1
Grand Lake	132571	4	404359	2	2
Red Indian Lake	178354	5	742606	5	0
White Bay	185038	6	860806	7	-1
Ingornachoix Bay	193371	7	924341	8	-1
Codroy Rivers	200258	8	824817	6	2
La Poile Bay	222081	9	1217857	12	-3
Near Pistol Lake	253407	10	1157062	11	-1
Notre Dame Bay	259342	11	1008678	10	1
Victoria Lake	262190	12	986114	9	3
St. Barbe Bay	279308	13	1282693	14	-1
Canada Bay	307820	14	1391243	15	-1
Strait of Belle Isle	329778	15	1463552	18	-3
Jeddore Lake	330156	16	1490811	19	-3
Meelpaeg Lake	352192	17	1245134	13	4
Hamilton Sound	361244	18	1441225	17	1
Hare Bay	368826	19	1635876	21	-2
Burgeo	380597	20	1408610	16	4
Gander Lake	399808	21	1570278	20	1
Kaegudeck Lake	425256	22	2033674	25	-3
Hermitage Bay	453886	23	1658600	22	1
Gambo River	485065	24	2076401	27	-3
Bonavista Bay	497365	25	2010409	24	1
Saint-Pierre et Miquelon	502502	26	1935585	23	3
Fortune Bay	535357	27	2075822	26	1
Terra Nova Lake	555489	28	2143178	28	0
Placentia Bay	627226	29	2500889	29	0
Trinity Bay	639718	30	2705588	30	0
Conception Bay	671453	31	2782582	31	0
St. Mary's Bay	702738	32	2920493	32	0
Cape Broyle Harbour	715388	33	3032235	33	0
Biscay Bay	738163	34	3097498	34	0

Note: A positive rank difference indicates travel to Bay of Islands is easier than distance suggests, while a negative difference indicates that travel to Bay of Islands is harder than distance implies.

B.2.3 Site 3: Burgeo

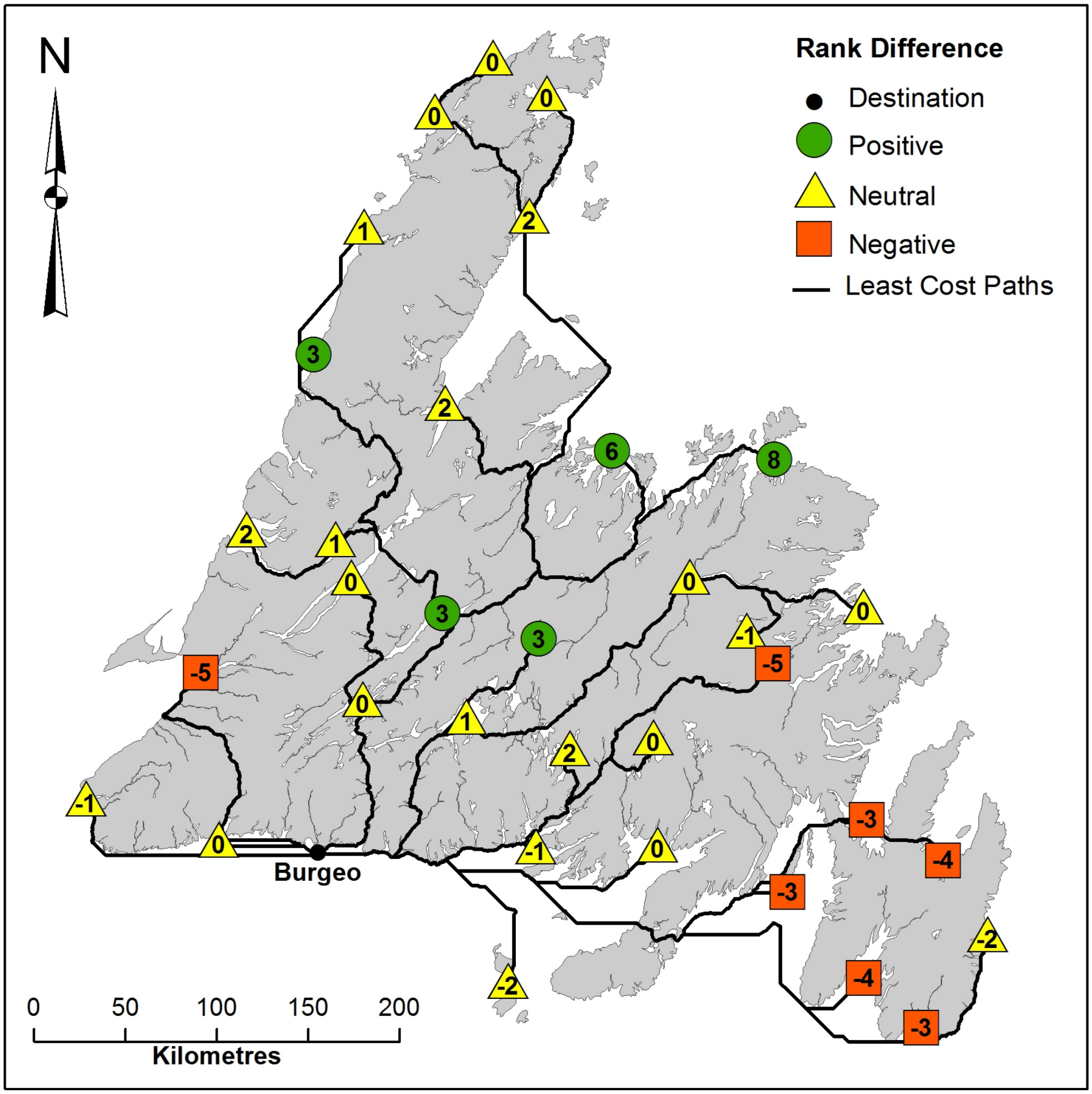

Figure B-5 Modelled travel routes and rank differences for least-cost paths reaching Burgeo (see Table B-5 for details).

Table B-5 Differences between distance and cost ranks for least-cost paths reaching Burgeo (see Figure B-5 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
La Poile Bay	56425	1	279566	1	0
Victoria Lake	120320	2	425552	2	0
Hermitage Bay	137835	3	520448	4	-1
Meelpaeg Lake	147738	4	488573	3	1
Codroy Rivers	151767	5	723597	6	-1
Saint-Pierre et Miquelon	171825	6	743733	8	-2
St. George's Bay	194067	7	1069763	12	-5
Red Indian Lake	203582	8	669399	5	3
Jeddore Lake	205023	9	738935	7	2
Fortune Bay	212771	10	925674	10	0
Grand Lake	219926	11	1022271	11	0
Near Pistol Lake	220189	12	922693	9	3
Kaegudeck Lake	245097	13	1074763	13	0
Placentia Bay	304695	14	1350723	17	-3
Deer Lake	308596	15	1184140	14	1
Gander Lake	326758	16	1294186	16	0
Terra Nova Lake	342585	17	1708433	22	-5
Trinity Bay	373481	18	1698668	21	-3
St. Mary's Bay	380174	19	1770286	23	-4
Bay of Islands	380781	20	1408622	18	2
Notre Dame Bay	388474	21	1292008	15	6
White Bay	405879	22	1615655	20	2
Gambo River	412032	23	1800308	24	-1
Biscay Bay	415626	24	1947278	27	-3
Conception Bay	428423	25	2202997	29	-4
Bonavista Bay	436945	26	1903810	26	0
Hamilton Sound	438486	27	1481356	19	8
Parsons Pond	451087	28	1871186	25	3
Cape Broyle Harbour	492778	29	2289977	31	-2
Canada Bay	501832	30	2013935	28	2
Ingornachoix Bay	528777	31	2265175	30	1
Hare Bay	587402	32	2376157	32	0
St. Barbe Bay	597096	33	2556499	33	0
Strait of Belle Isle	647145	34	2734672	34	0

Note: A positive rank difference indicates travel to Burgeo is easier than distance suggests, while a negative difference indicates that travel to Burgeo is harder than distance implies.

B.2.4 Site 4: Hamilton Sound

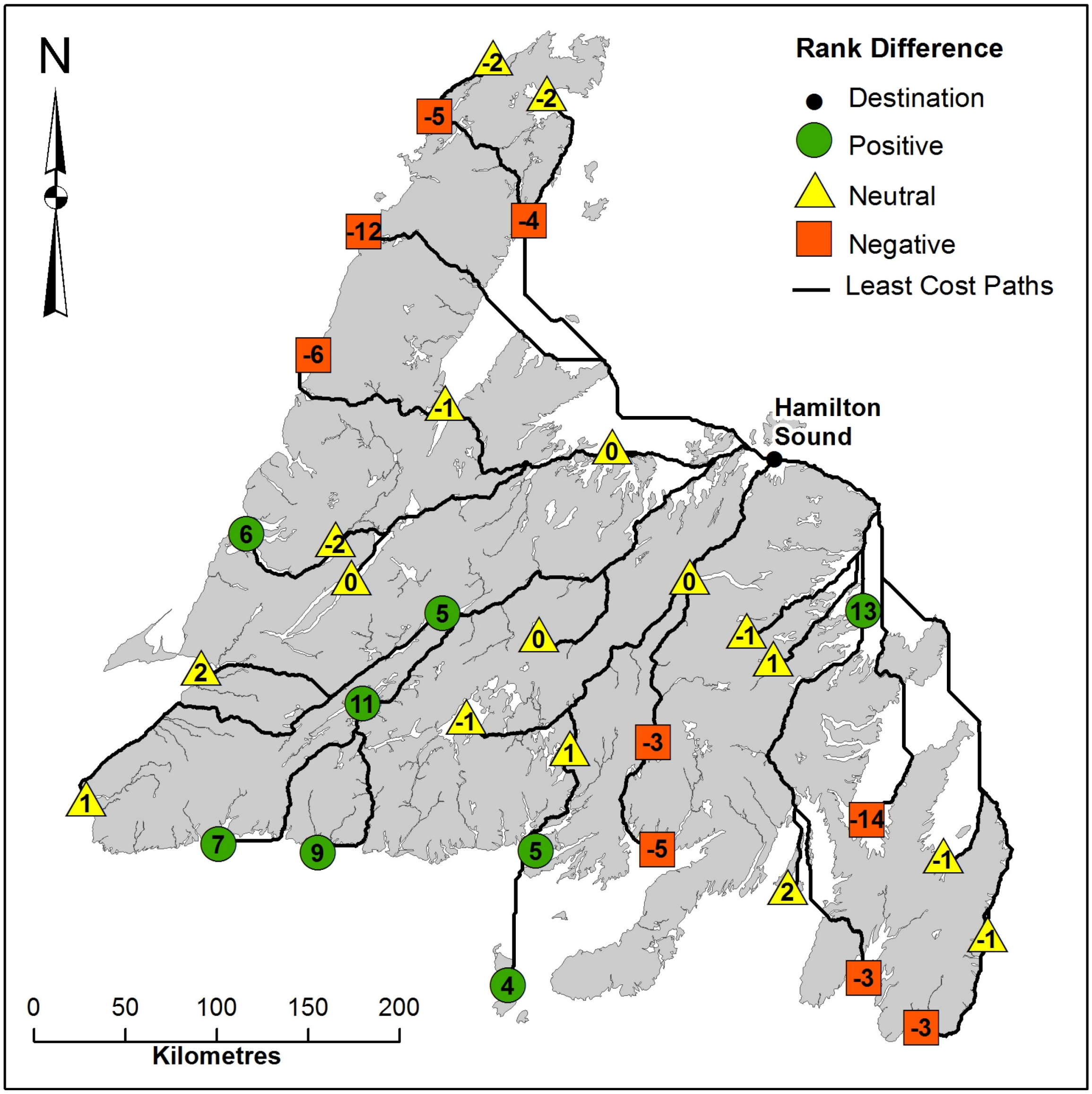

Figure B-6 Modelled travel routes and rank differences for least-cost paths reaching Hamilton Sound (see Table B-6 for details).

Table B-6 Differences between distance and cost ranks for least-cost paths reaching Hamilton Sound (see Figure B-6 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Gander Lake	96105	1	312281	1	0
Notre Dame Bay	102413	2	439588	2	0
Trinity Bay	111497	3	1271234	17	-14
Gambo River	189942	4	734039	5	-1
Terra Nova Lake	192948	5	708850	4	1
Kaegudeck Lake	203966	6	989417	9	-3
Near Pistol Lake	213002	7	882985	7	0
Canada Bay	230276	8	1112929	12	-4
Jeddore Lake	236716	9	902057	8	1
White Bay	237913	10	1092583	11	-1
Red Indian Lake	247075	11	840261	6	5
Meelpaeg Lake	276553	12	1120069	13	-1
Fortune Bay	285546	13	1322390	18	-5
Deer Lake	289358	14	1216762	16	-2
Grand Lake	290352	15	1191855	15	0
Bonavista Bay	300459	16	576086	3	13
Ingornachoix Bay	301611	17	1700820	29	-12
Conception Bay	308875	18	1348231	19	-1
Hermitage Bay	314612	19	1179741	14	5
Hare Bay	315786	20	1475135	22	-2
Victoria Lake	320609	21	1058866	10	11
St. Barbe Bay	325538	22	1655489	27	-5
Placentia Bay	338770	23	1472429	21	2
Cape Broyle Harbour	352831	24	1597862	25	-1
Parsons Pond	360481	25	1856495	31	-6
Bay of Islands	361544	26	1441244	20	6
Strait of Belle Isle	375595	27	1833650	30	-3
Saint-Pierre et Miquelon	394091	28	1560394	24	4
St. Mary's Bay	407511	29	1894398	32	-3
St. George's Bay	407840	30	1656106	28	2
Biscay Bay	434890	31	1953691	34	-3
Burgeo	439046	32	1481363	23	9
La Poile Bay	457018	33	1643426	26	7
Codroy Rivers	524157	34	1916941	33	1

Note: A positive rank difference indicates travel to Hamilton Sound is easier than distance suggests, while a negative difference indicates that travel to Hamilton Sound is harder than distance implies.

B.2.5 Site 5: Bonavista Bay

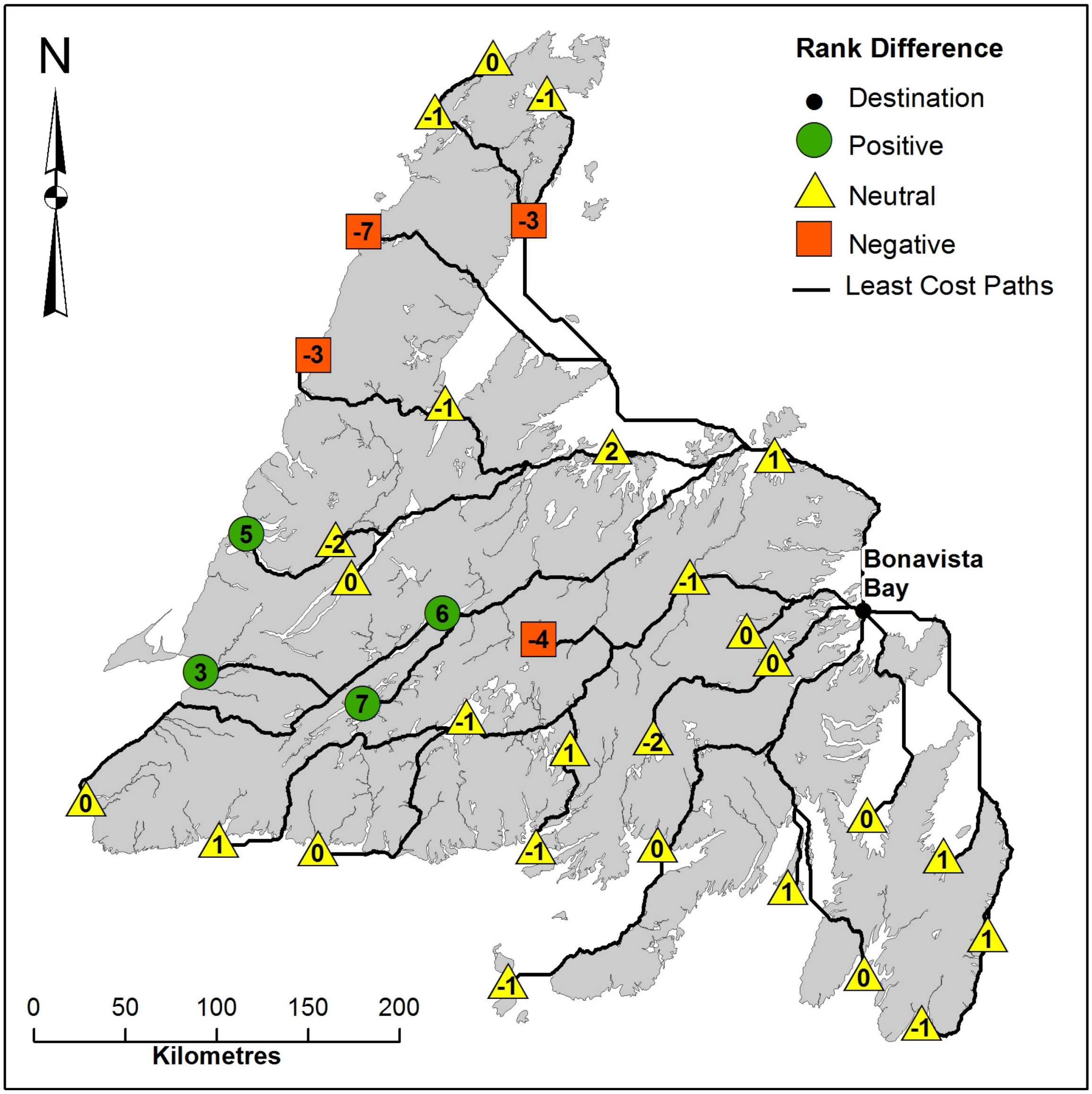

Figure B-7 Modelled travel routes and rank differences for least-cost paths reaching Bonavista Bay (see Table B-7 for details).

Table B-7 Differences between distance and cost ranks for least-cost paths reaching Bonavista Bay (see Figure B-7 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Terra Nova Lake	72353	1	233793	1	0
Gambo River	83209	2	302697	2	0
Gander Lake	111163	3	609617	4	-1
Hamilton Sound	134705	4	576087	3	1
Trinity Bay	150679	5	712203	5	0
Kaegudeck Lake	183973	6	966840	8	-2
Conception Bay	199662	7	872451	6	1
Placentia Bay	203895	8	896515	7	1
Near Pistol Lake	227493	9	1276322	13	-4
Fortune Bay	228301	10	1045276	10	0
Notre Dame Bay	238543	11	1008773	9	2
Cape Broyle Harbour	243581	12	1122086	11	1
Jeddore Lake	252568	13	1201505	12	1
St. Mary's Bay	272636	14	1318483	14	0
Meelpaeg Lake	292379	15	1419517	16	-1
Biscay Bay	325677	16	1477915	17	-1
Hermitage Bay	330503	17	1479194	18	-1
Saint-Pierre et Miquelon	360486	18	1562587	19	-1
Canada Bay	366435	19	1682112	22	-3
White Bay	374043	20	1661770	21	-1
Red Indian Lake	383131	21	1409447	15	6
Deer Lake	425456	22	1785955	24	-2
Grand Lake	426450	23	1761048	23	0
Ingornachoix Bay	437770	24	2270008	31	-7
Burgeo	438347	25	1903810	25	0
Hare Bay	451946	26	2044318	27	-1
Victoria Lake	456665	27	1628055	20	7
St. Barbe Bay	461697	28	2224674	29	-1
La Poile Bay	484481	29	2168505	28	1
Parsons Pond	496612	30	2425700	33	-3
Bay of Islands	497642	31	2010437	26	5
Strait of Belle Isle	511746	32	2402847	32	0
St. George's Bay	543869	33	2225314	30	3
Codroy Rivers	660186	34	2486160	34	0

Note: A positive rank difference indicates travel to Bonavista Bay is easier than distance suggests, while a negative difference indicates that travel to Bonavista Bay is harder than distance implies.

B.2.6 Site 6: Red Indian Lake

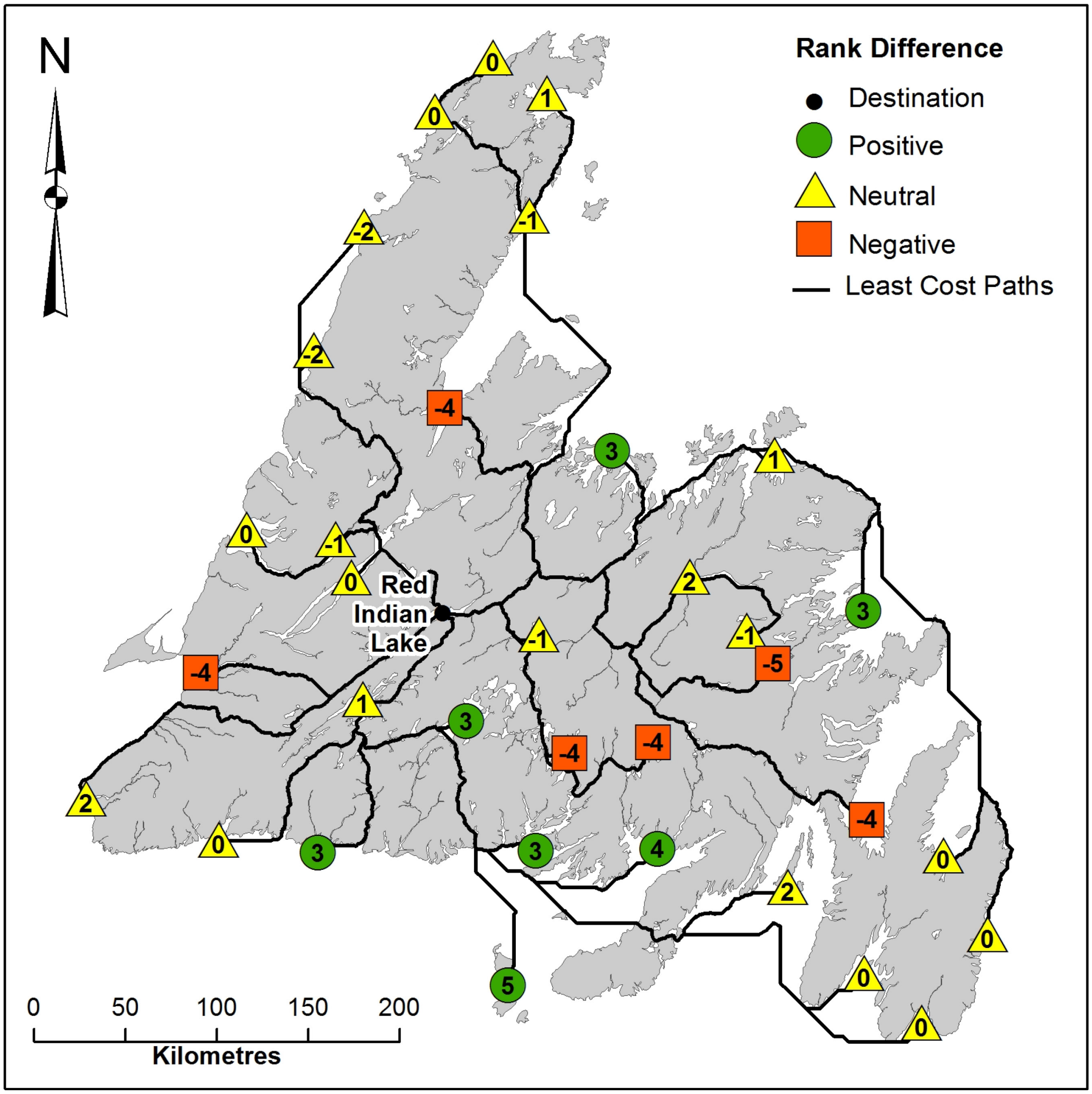

Figure B-8 Modelled travel routes and rank differences for least-cost paths reaching Red Indian Lake (see Table B-8 for details).

Table B-8 Differences between distance and cost ranks for least-cost paths reaching Red Indian Lake (see Figure B-8 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Near Pistol Lake	76393	1	417851	2	-1
Victoria Lake	85153	2	246905	1	1
Grand Lake	92301	3	455456	3	0
Deer Lake	106364	4	518131	5	-1
Jeddore Lake	153138	5	751594	9	-4
St. George's Bay	161299	6	817151	10	-4
Meelpaeg Lake	175114	7	505918	4	3
Bay of Islands	178541	8	742604	8	0
Notre Dame Bay	196772	9	650911	6	3
Burgeo	203518	10	669400	7	3
White Bay	214183	11	974551	15	-4
La Poile Bay	221527	12	831459	12	0
Gander Lake	222774	13	831065	11	2
Hamilton Sound	246767	14	840258	13	1
Kaegudeck Lake	248207	15	1294452	19	-4
Parsons Pond	248855	16	1205174	18	-2
Hermitage Bay	276764	17	919381	14	3
Codroy Rivers	277616	18	1077986	16	2
Terra Nova Lake	289365	19	1479262	24	-5
Gambo River	308031	20	1337180	21	-1
Canada Bay	310136	21	1372834	22	-1
Saint-Pierre et Miquelon	325343	22	1196367	17	5
Ingornachoix Bay	326546	23	1599145	25	-2
Fortune Bay	358234	24	1336605	20	4
Trinity Bay	378209	25	2079973	29	-4
Bonavista Bay	382893	26	1409442	23	3
Hare Bay	395646	27	1735041	26	1
St. Barbe Bay	405398	28	1915395	28	0
Placentia Bay	450103	29	1761654	27	2
Strait of Belle Isle	455455	30	2093555	30	0
St. Mary's Bay	525616	31	2181226	31	0
Conception Bay	556923	32	2181588	32	0
Biscay Bay	561041	33	2358224	33	0
Cape Broyle Harbour	600858	34	2431234	34	0

Note: A positive rank difference indicates travel to Red Indian Lake is easier than distance suggests, while a negative difference indicates that travel to Red Indian Lake is harder than distance implies.

B.2.7 Site 7: Codroy Rivers

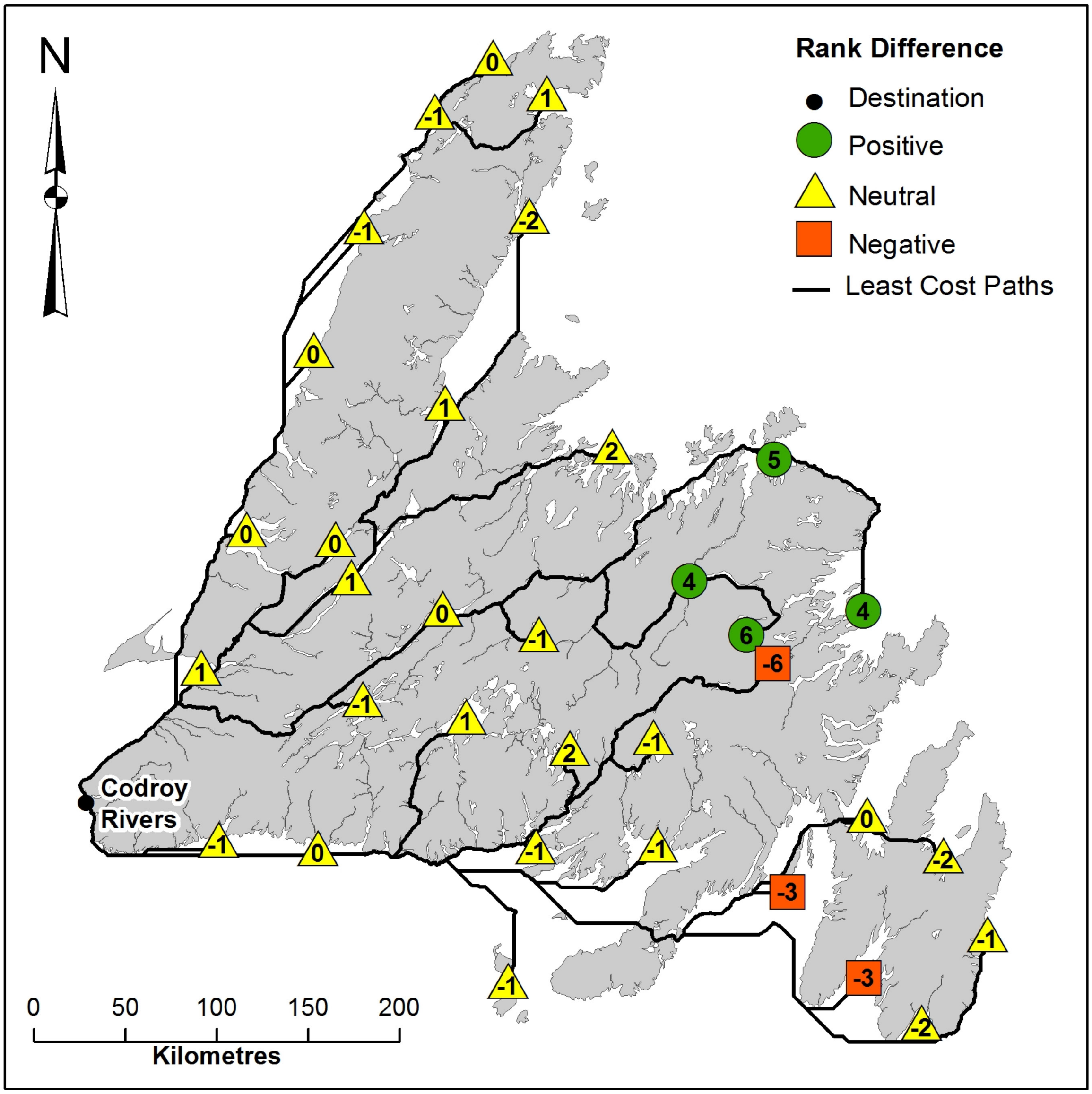

Figure B-9 Modelled travel routes and rank differences for least-cost paths reaching the Codroy Rivers (see Table B-9 for details).

Table B-9 Differences between distance and cost ranks for least-cost paths reaching the Codroy Rivers (see Figure B-9 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
La Poile Bay	99274	1	461810	2	-1
St. George's Bay	108594	2	403528	1	1
Burgeo	151800	3	723599	3	0
Bay of Islands	199931	4	824817	4	0
Victoria Lake	216544	5	994729	6	-1
Grand Lake	226614	6	899166	5	1
Deer Lake	233172	7	1013276	7	0
Red Indian Lake	276691	8	1077987	8	0
Hermitage Bay	289647	9	1242262	10	-1
Meelpaeg Lake	299592	10	1210395	9	1
Parsons Pond	307506	11	1315306	11	0
Saint-Pierre et Miquelon	323494	12	1465538	13	-1
Near Pistol Lake	352302	13	1494536	14	-1
Jeddore Lake	356836	14	1460758	12	2
Fortune Bay	364583	15	1647485	16	-1
White Bay	365598	16	1610653	15	1
Ingornachoix Bay	384994	17	1709278	18	-1
Kaegudeck Lake	396909	18	1796588	19	-1
Notre Dame Bay	412992	19	1654121	17	2
Placentia Bay	456507	20	2072534	23	-3
St. Barbe Bay	470931	21	2067631	22	-1
Canada Bay	488374	22	2141096	24	-2
Terra Nova Lake	494398	23	2430253	29	-6
Gander Lake	498708	24	1907753	20	4
Strait of Belle Isle	521389	25	2248500	25	0
Hamilton Sound	522657	26	1916943	21	5
Trinity Bay	525294	27	2420486	27	0
St. Mary's Bay	531987	28	2492130	31	-3
Hare Bay	560449	29	2420817	28	1
Biscay Bay	567439	30	2669135	32	-2
Conception Bay	580236	31	2924822	33	-2
Gambo River	583966	32	2413878	26	6
Cape Broyle Harbour	644591	33	3011837	34	-1
Bonavista Bay	658769	34	2486144	30	4

Note: A positive rank difference indicates travel to the Codroy Rivers is easier than distance suggests, while a negative difference indicates that travel to the Codroy Rivers is harder than distance implies.

B.2.8 Site 8: Saint-Pierre et Miquelon

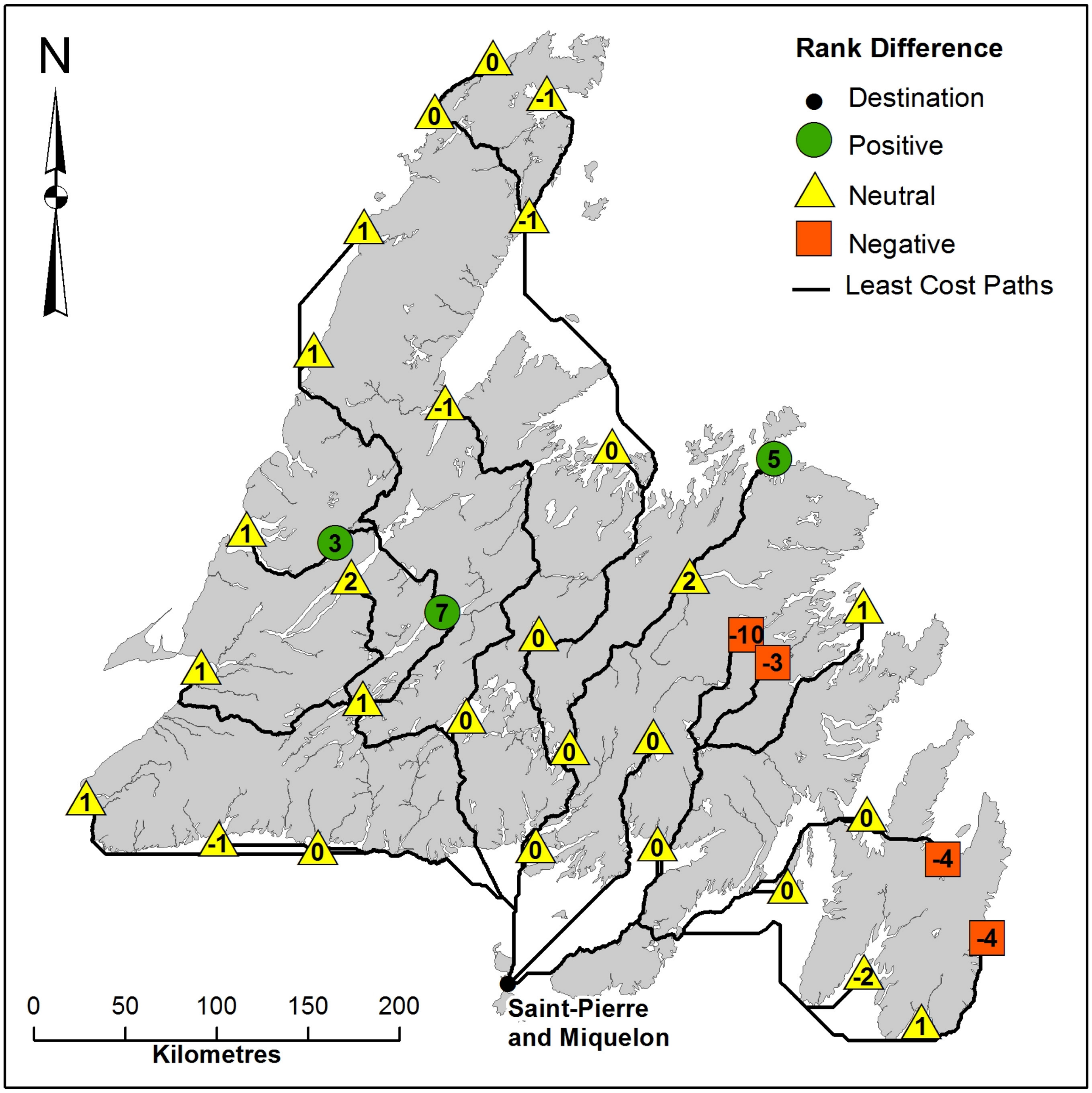

Figure B-10 Modelled travel routes and rank differences for least-cost paths reaching Saint-Pierre et Miquelon (see Table B-10 for details).

Table B-10 Differences between distance and cost ranks for least-cost paths reaching Saint-Pierre et Miquelon (see Figure B-10 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Hermitage Bay	79784	1	394061	1	0
Fortune Bay	137773	2	547561	2	0
Jeddore Lake	156879	3	658336	3	0
Meelpaeg Lake	169615	4	740651	4	0
Burgeo	172196	5	743733	5	0
Kaegudeck Lake	178898	6	782335	6	0
Placentia Bay	196743	7	839386	7	0
La Poile Bay	230041	8	1017996	9	-1
Victoria Lake	241873	9	952526	8	1
Near Pistol Lake	242490	10	1077487	10	0
Trinity Bay	265530	11	1187331	11	0
St. Mary's Bay	272199	12	1258949	14	-2
Terra Nova Lake	280608	13	1443357	16	-3
Gambo River	294623	14	1714529	24	-10
Gander Lake	297987	15	1250225	13	2
Biscay Bay	307650	16	1435942	15	1
Conception Bay	320472	17	1691651	21	-4
Codroy Rivers	323962	18	1465545	17	1
Red Indian Lake	325104	19	1196377	12	7
Grand Lake	341484	20	1549246	18	2
Bonavista Bay	360288	21	1562597	20	1
Cape Broyle Harbour	384803	22	1778631	26	-4
St. George's Bay	391168	23	1702276	22	1
Hamilton Sound	393211	24	1560397	19	5
Notre Dame Bay	400998	25	1747263	25	0
Deer Lake	430094	26	1711126	23	3
White Bay	433802	27	2128088	28	-1
Bay of Islands	502279	28	1935608	27	1
Canada Bay	557881	29	2487756	30	-1
Parsons Pond	572585	30	2398192	29	1
Hare Bay	643392	31	2849981	32	-1
Ingornachoix Bay	650275	32	2792202	31	1
St. Barbe Bay	653144	33	3030321	33	0
Strait of Belle Isle	703193	34	3208494	34	0

Note: A positive rank difference indicates travel to Saint-Pierre et Miquelon is easier than distance suggests, while a negative difference indicates that travel to Saint-Pierre et Miquelon is harder than distance implies.

B.2.9 Site 9: Grand Lake

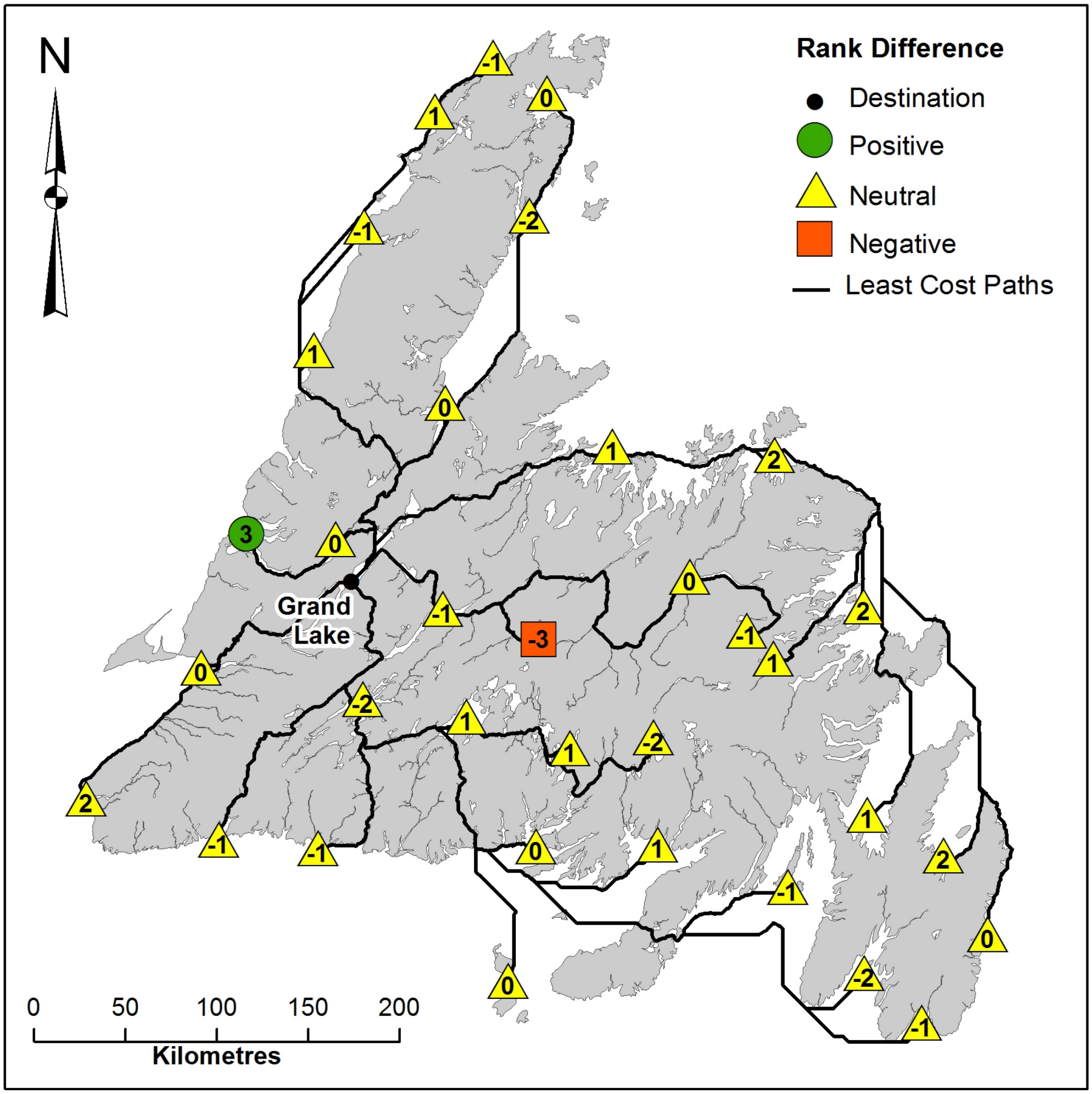

Figure B-11 Modelled travel routes and rank differences for least-cost paths reaching Grand Lake (see Table B-11 for details).

Table B-11 Differences between distance and cost ranks for least-cost paths reaching Grand Lake (see Figure B-11 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Deer Lake	60474	1	179885	1	0
Red Indian Lake	92019	2	455458	3	-1
Victoria Lake	104069	3	601473	5	-2
St. George's Bay	118664	4	508836	4	0
Bay of Islands	132659	5	404360	2	3
White Bay	140729	6	715824	6	0
Near Pistol Lake	167082	7	869914	10	-3
Notre Dame Bay	188311	8	759292	7	1
Meelpaeg Lake	191386	9	858788	8	1
Parsons Pond	202959	10	866927	9	1
Burgeo	219790	11	1022270	12	-1
La Poile Bay	225114	12	1173853	13	-1
Codroy Rivers	227385	13	899167	11	2
Canada Bay	263532	14	1246260	16	-2
Jeddore Lake	266017	15	1174062	14	1
Ingornachoix Bay	280725	16	1260898	17	-1
Hamilton Sound	290214	17	1191839	15	2
Hermitage Bay	293080	18	1272252	18	0
Gander Lake	313498	19	1283131	19	0
Saint-Pierre et Miquelon	341696	20	1549237	20	0
Hare Bay	349093	21	1607917	21	0
Kaegudeck Lake	361117	22	1716926	24	-2
St. Barbe Bay	366719	23	1619251	22	1
Fortune Bay	374550	24	1689475	23	1
Gambo River	398755	25	1789254	26	-1
Strait of Belle Isle	417189	26	1800110	27	-1
Bonavista Bay	426334	27	1761022	25	2
Placentia Bay	466419	28	2114524	29	-1
Terra Nova Lake	484459	29	1893791	28	1
St. Mary's Bay	541931	30	2534127	32	-2
Trinity Bay	568704	31	2456193	30	1
Biscay Bay	577357	32	2711133	33	-1
Conception Bay	600392	33	2533175	31	2
Cape Broyle Harbour	644327	34	2782827	34	0

Note: A positive rank difference indicates travel to Grand Lake is easier than distance suggests, while a negative difference indicates that travel to Grand Lake is harder than distance implies.

B.2.10 Site 10: Notre Dame Bay

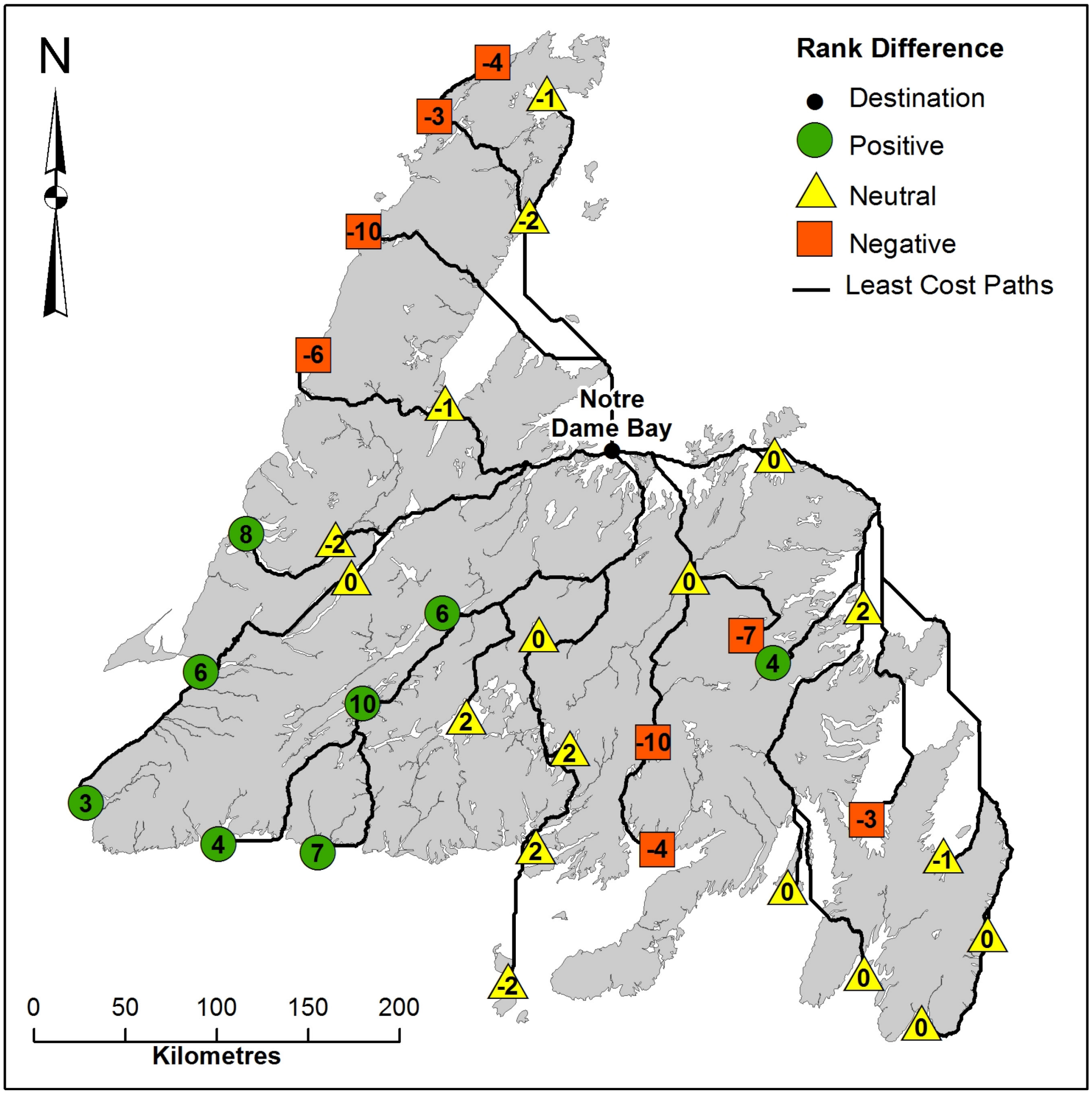

Figure B-12 Modelled travel routes and rank differences for least-cost paths reaching Notre Dame Bay (see Table B-12 for details).

Table B-12 Differences between distance and cost ranks for least-cost paths reaching Notre Dame Bay (see Figure B-12 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Hamilton Sound	102270	1	439589	1	0
Gander Lake	110679	2	641889	2	0
White Bay	136007	3	660034	4	-1
Canada Bay	152916	4	744762	6	-2
Near Pistol Lake	162857	5	693635	5	0
Deer Lake	187421	6	784203	8	-2
Grand Lake	188419	7	759289	7	0
Gambo River	189702	8	1131642	15	-7
Red Indian Lake	196923	9	650912	3	6
Kaegudeck Lake	218540	10	1319027	20	-10
Ingornachoix Bay	224389	11	1332647	21	-10
Hare Bay	238426	12	1106968	13	-1
Bonavista Bay	238432	13	1008774	11	2
Meelpaeg Lake	247683	14	1065741	12	2
St. Barbe Bay	248178	15	1287322	18	-3
Jeddore Lake	250269	16	1115834	14	2
Parsons Pond	258575	17	1423942	23	-6
Bay of Islands	259606	18	1008676	10	8
Victoria Lake	270391	19	869516	9	10
Terra Nova Lake	296500	20	1141539	16	4
Strait of Belle Isle	298235	21	1465483	25	-4
Fortune Bay	300119	22	1652002	26	-4
St. George's Bay	305386	23	1263781	17	6
Hermitage Bay	321765	24	1366623	22	2
Trinity Bay	380701	25	1703926	28	-3
Burgeo	388827	26	1292012	19	7
Saint-Pierre et Miquelon	401244	27	1747277	29	-2
La Poile Bay	406799	28	1454070	24	4
Conception Bay	412464	29	1780919	30	-1
Codroy Rivers	414107	30	1654112	27	3
Placentia Bay	442358	31	1905125	31	0
Cape Broyle Harbour	456419	32	2030550	32	0
St. Mary's Bay	511094	33	2327095	33	0
Biscay Bay	538479	34	2386398	34	0

Note: A positive rank difference indicates travel to Notre Dame Bay is easier than distance suggests, while a negative difference indicates that travel to Notre Dame Bay is harder than distance implies.

B.2.11 Site 11: St. George's Bay

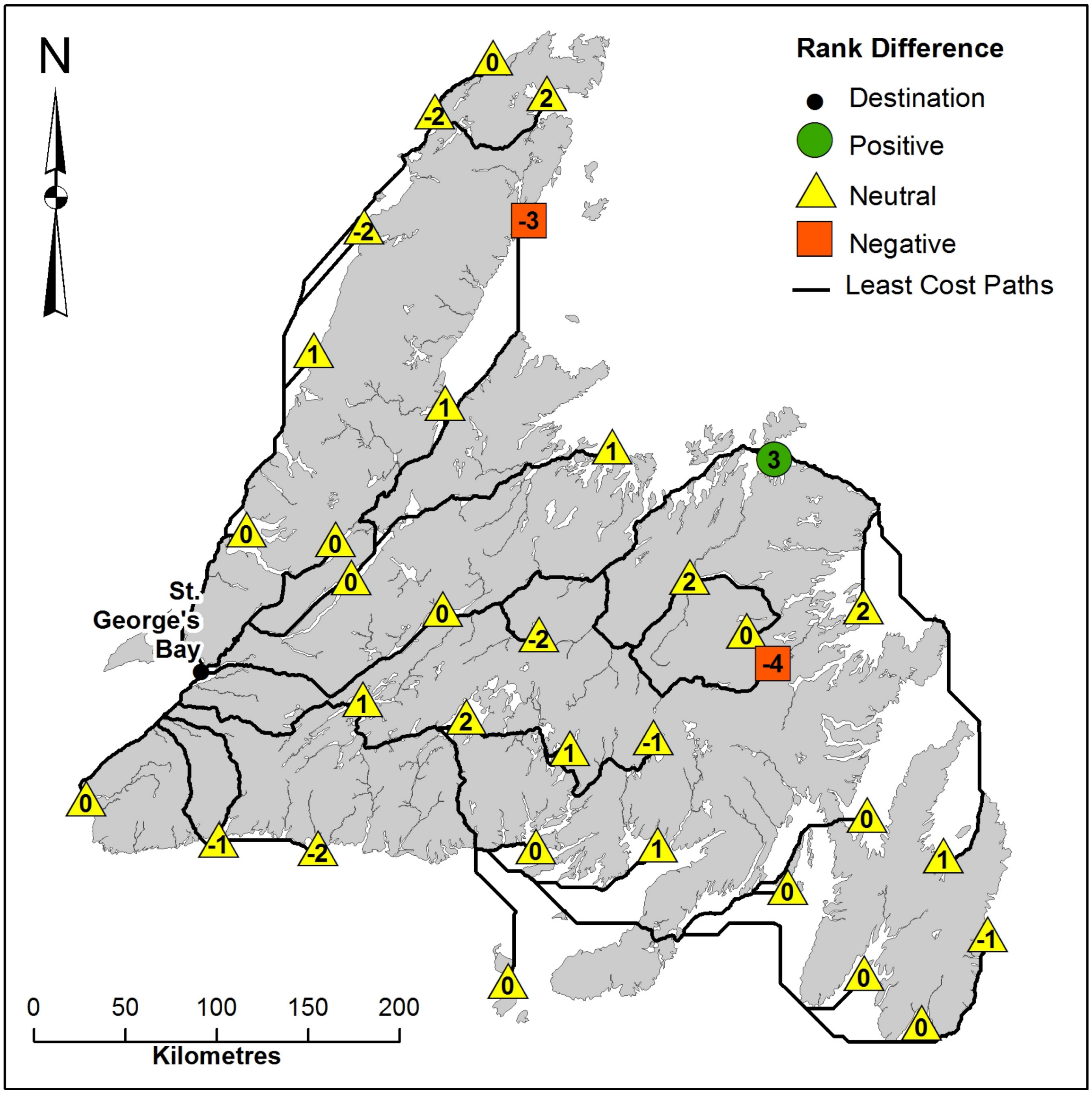

Figure B-13 Modelled travel routes and rank differences for least-cost paths reaching St. George's Bay (see Table B-13 for details).

Table B-13 Differences between distance and cost ranks for least-cost paths reaching St. George's Bay (see Figure B-13 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Codroy Rivers	108852	1	403528	1	0
Bay of Islands	108904	2	452731	2	0
Grand Lake	118170	3	508832	3	0
Deer Lake	124727	4	622943	4	0
La Poile Bay	130675	5	796567	6	-1
Victoria Lake	153765	6	755122	5	1
Red Indian Lake	160630	7	817147	7	0
Burgeo	194241	8	1069761	10	-2
Parsons Pond	216478	9	943221	8	1
Near Pistol Lake	236241	10	1233696	12	-2
Meelpaeg Lake	241059	11	1011819	9	2
White Bay	257153	12	1220314	11	1
Ingornachoix Bay	293905	13	1337193	15	-2
Notre Dame Bay	304568	14	1263780	13	1
Jeddore Lake	315690	15	1327094	14	1
Hermitage Bay	342753	16	1425284	16	0
St. Barbe Bay	379842	17	1695546	19	-2
Canada Bay	379935	18	1750753	21	-3
Gander Lake	382661	19	1646912	17	2
Saint-Pierre et Miquelon	391369	20	1702268	20	0
Hamilton Sound	406597	21	1656102	18	3
Kaegudeck Lake	410790	22	1869957	23	-1
Fortune Bay	424223	23	1842506	22	1
Strait of Belle Isle	430313	24	1876405	24	0
Terra Nova Lake	449282	25	2295106	29	-4
Gambo River	467918	26	2153037	26	0
Hare Bay	469360	27	2048729	25	2
Placentia Bay	516126	28	2267557	28	0
Bonavista Bay	542749	29	2225286	27	2
Trinity Bay	584948	30	2615513	30	0
St. Mary's Bay	591922	31	2687164	31	0
Biscay Bay	627374	32	2864169	32	0
Cape Broyle Harbour	704526	33	3206871	34	-1
Conception Bay	716734	34	2997477	33	1

Note: A positive rank difference indicates travel to St. George's Bay is easier than distance suggests, while a negative difference indicates that travel to St. George's Bay is harder than distance implies.

B.2.12 Site 12: La Poile Bay

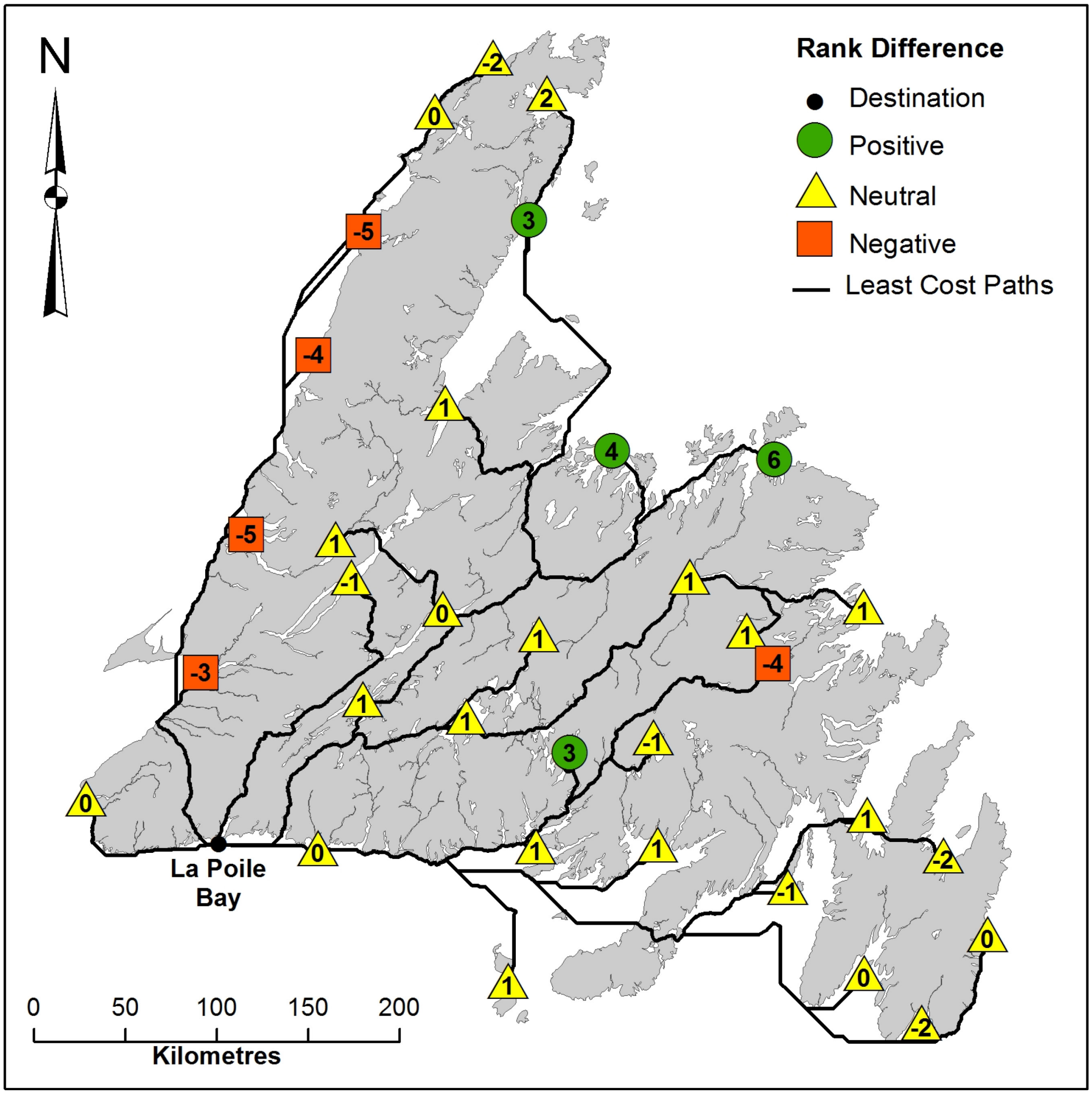

Figure B-14 Modelled travel routes and rank differences for least-cost paths reaching La Poile Bay (see Table B-14 for details).

Table B-14 Differences between distance and cost ranks for least-cost paths reaching La Poile Bay (see Figure B-14 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Burgeo	56445	1	279566	1	0
Codroy Rivers	99207	2	461810	2	0
St. George's Bay	130765	3	796568	6	-3
Victoria Lake	137936	4	587612	3	1
Meelpaeg Lake	193381	5	752406	4	1
Hermitage Bay	195627	6	794709	5	1
Red Indian Lake	221199	7	831459	7	0
Bay of Islands	222117	8	1217859	13	-5
Grand Lake	224967	9	1173856	10	-1
Saint-Pierre et Miquelon	229474	10	1017987	9	1
Jeddore Lake	262815	11	1013196	8	3
Near Pistol Lake	264075	12	1184984	11	1
Fortune Bay	270563	13	1199934	12	1
Kaegudeck Lake	302889	14	1349030	15	-1
Deer Lake	326040	15	1346205	14	1
Parsons Pond	329691	16	1708347	20	-4
Placentia Bay	362487	17	1624983	18	-1
Gander Lake	372847	18	1558883	17	1
Terra Nova Lake	400377	19	1982694	23	-4
Notre Dame Bay	406091	20	1454069	16	4
Ingornachoix Bay	407138	21	2102319	26	-5
White Bay	423495	22	1777716	21	1
Trinity Bay	431273	23	1972927	22	1
St. Mary's Bay	437966	24	2044546	24	0
Hamilton Sound	456102	25	1643416	19	6
Gambo River	458121	26	2065006	25	1
Biscay Bay	473418	27	2221549	29	-2
Bonavista Bay	483034	28	2168515	27	1
Conception Bay	486215	29	2477255	31	-2
St. Barbe Bay	493146	30	2460705	30	0
Canada Bay	519445	31	2175996	28	3
Strait of Belle Isle	543608	32	2641576	34	-2
Cape Broyle Harbour	550570	33	2564251	33	0
Hare Bay	604952	34	2538222	32	2

Note: A positive rank difference indicates travel to La Poile Bay is easier than distance suggests, while a negative difference indicates that travel to La Poile Bay is harder than distance implies.

B.2.13 Site 13: Meelpaeg Lake

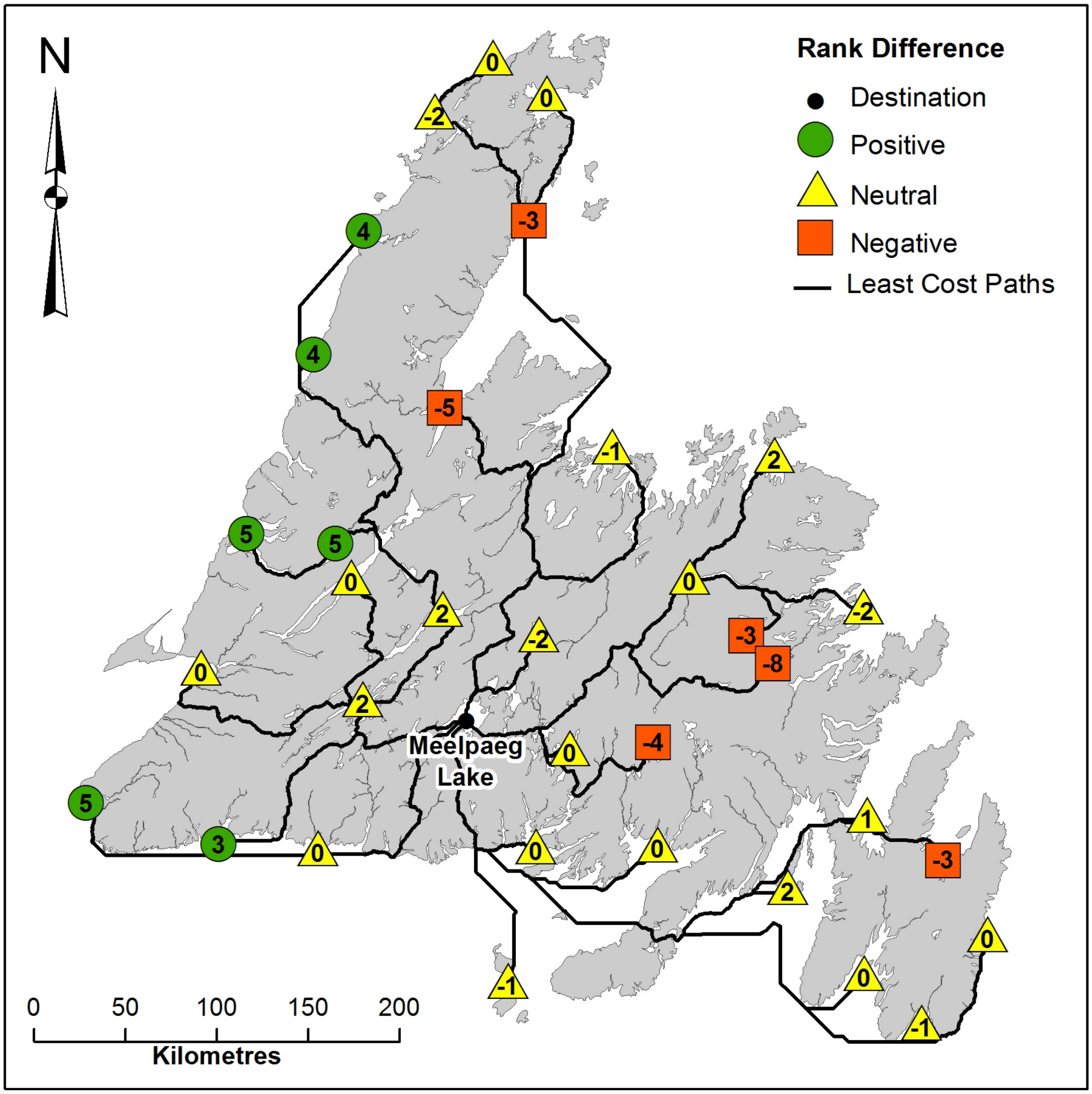

Figure B-15 Modelled travel routes and rank differences for least-cost paths reaching Meelpaeg Lake (see Table B-15 for details).

Table B-15 Differences between distance and cost ranks for least-cost paths reaching Meelpaeg Lake (see Figure B-15 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Near Pistol Lake	76112	1	442465	3	-2
Jeddore Lake	76186	2	318695	2	0
Victoria Lake	92031	3	262072	1	2
Hermitage Bay	121507	4	463661	4	0
Burgeo	147921	5	488573	5	0
Saint-Pierre et Miquelon	170123	6	740652	7	-1
Kaegudeck Lake	171286	7	861548	11	-4
Red Indian Lake	175236	8	505919	6	2
Gander Lake	180973	9	809898	9	0
Grand Lake	191642	10	858791	10	0
La Poile Bay	193663	11	752407	8	3
Fortune Bay	202977	12	880888	12	0
St. George's Bay	241326	13	1011821	13	0
Notre Dame Bay	247453	14	1065737	15	-1
Terra Nova Lake	247587	15	1458094	23	-8
White Bay	264949	16	1389382	21	-5
Gambo River	266247	17	1316013	20	-3
Hamilton Sound	276300	18	1120068	16	2
Deer Lake	280249	19	1020653	14	5
Bonavista Bay	291161	20	1419514	22	-2
Placentia Bay	294901	21	1305939	19	2
Codroy Rivers	299687	22	1210386	17	5
Bay of Islands	352434	23	1245129	18	5
Canada Bay	360902	24	1787663	27	-3
Trinity Bay	363688	25	1653884	24	1
St. Mary's Bay	370397	26	1725502	26	0
Biscay Bay	405849	27	1902495	28	-1
Conception Bay	418630	28	2158211	31	-3
Parsons Pond	422740	29	1707703	25	4
Hare Bay	446412	30	2149879	30	0
St. Barbe Bay	456164	31	2330225	33	-2
Cape Broyle Harbour	483001	32	2245189	32	0
Ingornachoix Bay	500453	33	2101675	29	4
Strait of Belle Isle	506213	34	2508398	34	0

Note: A positive rank difference indicates travel to Meelpaeg Lake is easier than distance suggests, while a negative difference indicates that travel to Meelpaeg Lake is harder than distance implies.

B.2.14 Site 14: Hermitage Bay

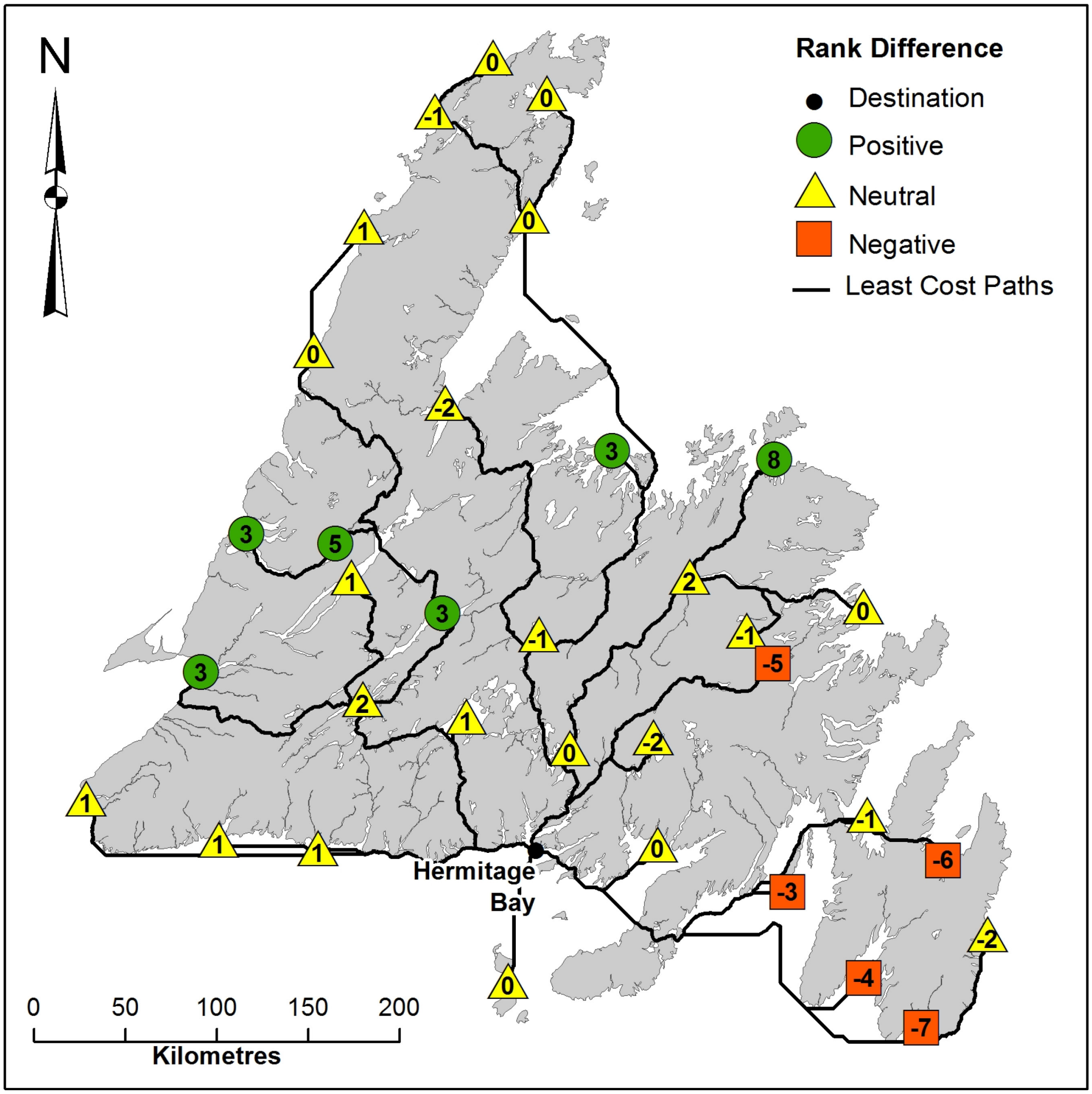

Figure B-16 Modelled travel routes and rank differences for least-cost paths reaching Hermitage Bay (see Table B-16 for details).

Table B-16 Differences between distance and cost ranks for least-cost paths reaching Hermitage Bay (see Figure B-16 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Jeddore Lake	77512	1	277682	1	0
Saint-Pierre et Miquelon	80124	2	394060	2	0
Fortune Bay	90276	3	460877	3	0
Kaegudeck Lake	117520	4	613509	6	-2
Meelpaeg Lake	121335	5	463659	4	1
Burgeo	137737	6	520447	5	1
Near Pistol Lake	163239	7	696833	8	-1
Placentia Bay	182116	8	886616	11	-3
Victoria Lake	193662	9	675534	7	2
La Poile Bay	195582	10	794711	9	1
Terra Nova Lake	215008	11	1247176	16	-5
Gander Lake	218645	12	869568	10	2
Trinity Bay	250903	13	1234561	14	-1
St. Mary's Bay	257569	14	1306179	18	-4
Red Indian Lake	276866	15	919381	12	3
Codroy Rivers	289503	16	1242259	15	1
Biscay Bay	293021	17	1483171	24	-7
Grand Lake	293272	18	1272254	17	1
Gambo River	303919	19	1375683	20	-1
Conception Bay	305845	20	1738880	26	-6
Hamilton Sound	313971	21	1179737	13	8
Notre Dame Bay	321636	22	1366612	19	3
Bonavista Bay	328832	23	1479185	23	0
St. George's Bay	342957	24	1425283	21	3
White Bay	366905	25	1770196	27	-2
Cape Broyle Harbour	370173	26	1825861	28	-2
Deer Lake	381879	27	1434127	22	5
Bay of Islands	454065	28	1658609	25	3
Canada Bay	478519	29	2107070	29	0
Parsons Pond	524366	30	2121175	30	0
Hare Bay	564077	31	2469296	31	0
St. Barbe Bay	573706	32	2649638	33	-1
Ingornachoix Bay	602020	33	2515184	32	1
Strait of Belle Isle	623755	34	2827811	34	0

Note: A positive rank difference indicates travel to Hermitage Bay is easier than distance suggests, while a negative difference indicates that travel to Hermitage Bay is harder than distance implies.

B.2.15 Site 15: Deer Lake

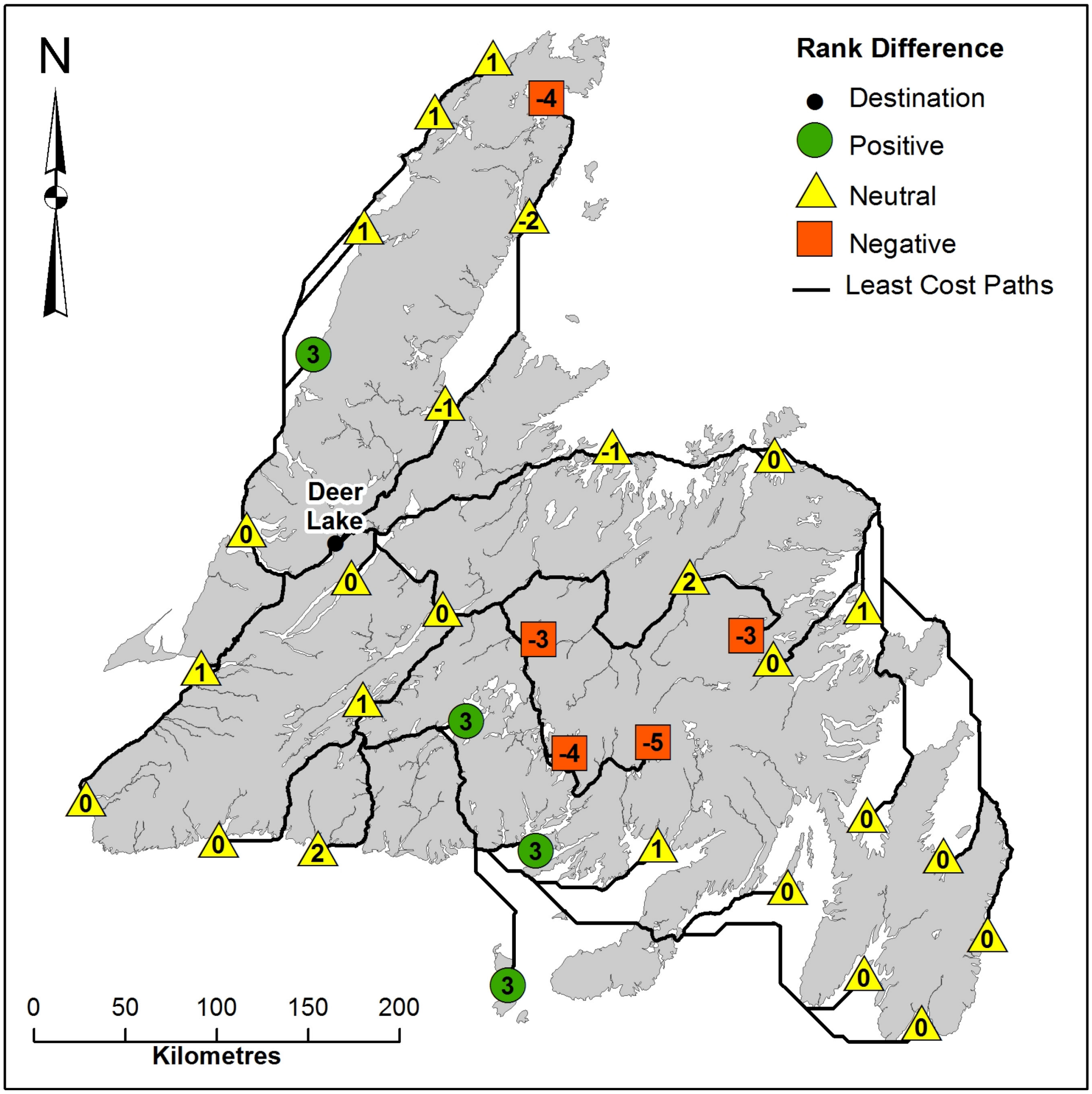

Figure B-17 Modelled travel routes and rank differences for least-cost paths reaching Deer Lake (see Table B-17 for details).

Table B-17 Differences between distance and cost ranks for least-cost paths reaching Deer Lake (see Figure B-17 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Grand Lake	60431	1	179885	1	0
Bay of Islands	73355	2	226836	2	0
Red Indian Lake	106213	3	518130	3	0
White Bay	111969	4	633970	5	-1
St. George's Bay	125140	5	622942	4	1
Near Pistol Lake	181266	6	932586	9	-3
Notre Dame Bay	187201	7	784206	8	-1
Victoria Lake	190049	8	761638	7	1
Parsons Pond	190370	9	757200	6	3
Codroy Rivers	233861	10	1013274	10	0
Canada Bay	234776	11	1164406	13	-2
Jeddore Lake	258015	12	1266332	16	-4
Ingornachoix Bay	267738	13	1151171	12	1
Meelpaeg Lake	280045	14	1020652	11	3
Hamilton Sound	289104	15	1216752	15	0
Burgeo	308450	16	1184134	14	2
Hare Bay	320336	17	1526063	21	-4
La Poile Bay	326458	18	1346192	18	0
Gander Lake	327667	19	1345804	17	2
Kaegudeck Lake	353116	20	1809195	25	-5
St. Barbe Bay	353694	21	1509524	20	1
Hermitage Bay	381739	22	1434117	19	3
Strait of Belle Isle	404164	23	1690383	22	1
Gambo River	412925	24	1851926	27	-3
Bonavista Bay	425224	25	1785936	24	1
Saint-Pierre et Miquelon	430355	26	1711101	23	3
Fortune Bay	463210	27	1851339	26	1
Terra Nova Lake	483349	28	1918705	28	0
Placentia Bay	555079	29	2276391	29	0
Trinity Bay	567597	30	2481111	30	0
Conception Bay	599281	31	2558090	31	0
St. Mary's Bay	630886	32	2695997	32	0
Cape Broyle Harbour	643216	33	2807742	33	0
Biscay Bay	666311	34	2873002	34	0

Note: A positive rank difference indicates travel to Deer Lake is easier than distance suggests, while a negative difference indicates that travel to Deer Lake is harder than distance implies.

B.2.16 Site 16: Jeddore Lake

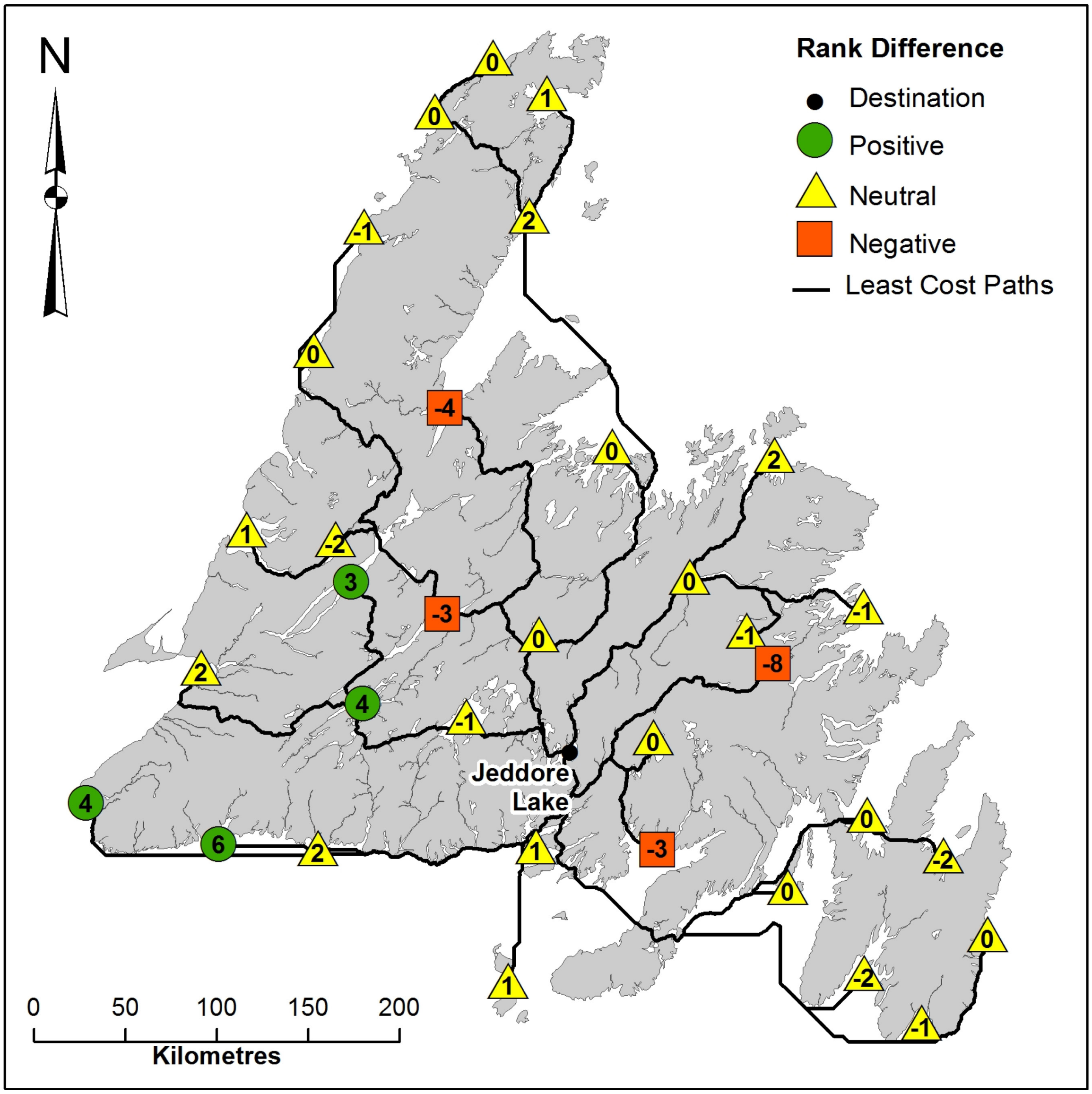

Figure B-18 Modelled travel routes and rank differences for least-cost paths reaching Jeddore Lake (see Table B-18 for details).

Table B-18 Differences between distance and cost ranks for least-cost paths reaching Jeddore Lake (see Figure B-18 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Meelpaeg Lake	76341	1	318695	2	-1
Hermitage Bay	77929	2	277683	1	1
Near Pistol Lake	91855	3	446050	3	0
Kaegudeck Lake	101639	4	569753	4	0
Fortune Bay	132752	5	674683	8	-3
Gander Lake	141032	6	591884	6	0
Red Indian Lake	153298	7	751594	10	-3
Saint-Pierre et Miquelon	157385	8	658337	7	1
Victoria Lake	166781	9	577341	5	4
Terra Nova Lake	199058	10	1203419	18	-8
Burgeo	205471	11	738937	9	2
Gambo River	226306	12	1098000	13	-1
Hamilton Sound	236358	13	902055	11	2
Placentia Bay	242806	14	1101482	14	0
Notre Dame Bay	250252	15	1115829	15	0
Bonavista Bay	251220	16	1201499	17	-1
Deer Lake	258311	17	1266336	19	-2
La Poile Bay	263316	18	1013200	12	6
Grand Lake	266392	19	1174061	16	3
White Bay	295537	20	1519411	24	-4
Trinity Bay	311593	21	1449427	21	0
St. George's Bay	316077	22	1327090	20	2
St. Mary's Bay	318285	23	1521045	25	-2
Bay of Islands	330496	24	1490818	23	1
Biscay Bay	353737	25	1698038	26	-1
Codroy Rivers	357237	26	1460749	22	4
Conception Bay	366535	27	1953747	29	-2
Parsons Pond	400802	28	1953382	28	0
Canada Bay	407136	29	1856287	27	2
Cape Broyle Harbour	430889	30	2040727	30	0
Ingornachoix Bay	478497	31	2347375	32	-1
Hare Bay	492646	32	2218506	31	1
St. Barbe Bay	502398	33	2398850	33	0
Strait of Belle Isle	552447	34	2577023	34	0

Note: A positive rank difference indicates travel to Jeddore Lake is easier than distance suggests, while a negative difference indicates that travel to Jeddore Lake is harder than distance implies.

B.2.17 Site 17: Hare Bay

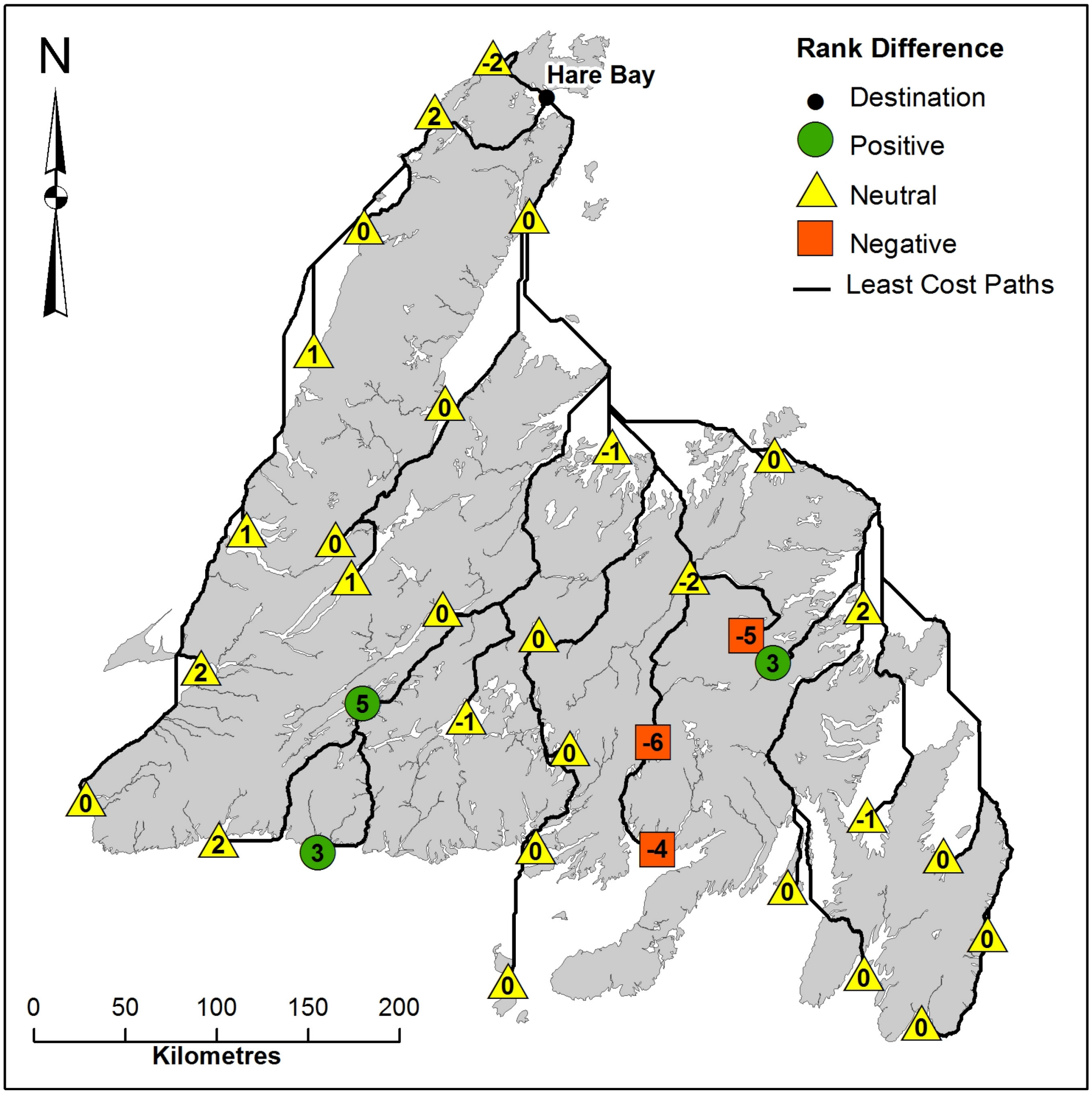

Figure B-19 Modelled travel routes and rank differences for least-cost paths reaching Hare Bay (see Table B-19 for details).

Table B-19 Differences between distance and cost ranks for least-cost paths reaching Hare Bay (see Figure B-19 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Strait of Belle Isle	57657	1	391942	3	-2
Canada Bay	85637	2	363952	2	0
St. Barbe Bay	91315	3	362630	1	2
Ingornachoix Bay	186596	4	713881	4	0
White Bay	212010	5	918463	5	0
Notre Dame Bay	238682	6	1106959	7	-1
Parsons Pond	254767	7	1105499	6	1
Hamilton Sound	316332	8	1475133	8	0
Deer Lake	320963	9	1526076	9	0
Gander Lake	336164	10	1694931	12	-2
Grand Lake	349586	11	1607933	10	1
Bay of Islands	368922	12	1635868	11	1
Red Indian Lake	396730	13	1735047	13	0
Near Pistol Lake	405793	14	1796298	14	0
Gambo River	415187	15	2184690	20	-5
Kaegudeck Lake	444047	16	2372067	22	-6
Meelpaeg Lake	447490	17	2149876	18	-1
Bonavista Bay	452509	18	2044317	16	2
St. George's Bay	469750	19	2048718	17	2
Victoria Lake	470197	20	1953655	15	5
Jeddore Lake	493240	21	2218501	21	0
Terra Nova Lake	510577	22	2177087	19	3
Fortune Bay	525626	23	2705052	27	-4
Codroy Rivers	560853	24	2420816	24	0
Hermitage Bay	564736	25	2469296	25	0
Burgeo	588634	26	2376154	23	3
Trinity Bay	594811	27	2739497	28	-1
La Poile Bay	606606	28	2538222	26	2
Conception Bay	626541	29	2816495	29	0
Saint-Pierre et Miquelon	644215	30	2849958	30	0
Placentia Bay	656419	31	2940683	31	0
Cape Broyle Harbour	670497	32	3066147	32	0
St. Mary's Bay	725155	33	3362666	33	0
Biscay Bay	752556	34	3422001	34	0

Note: A positive rank difference indicates travel to Hare Bay is easier than distance suggests, while a negative difference indicates that travel to Hare Bay is harder than distance implies.

B.2.18 Site 18: Cape Broyle Harbour

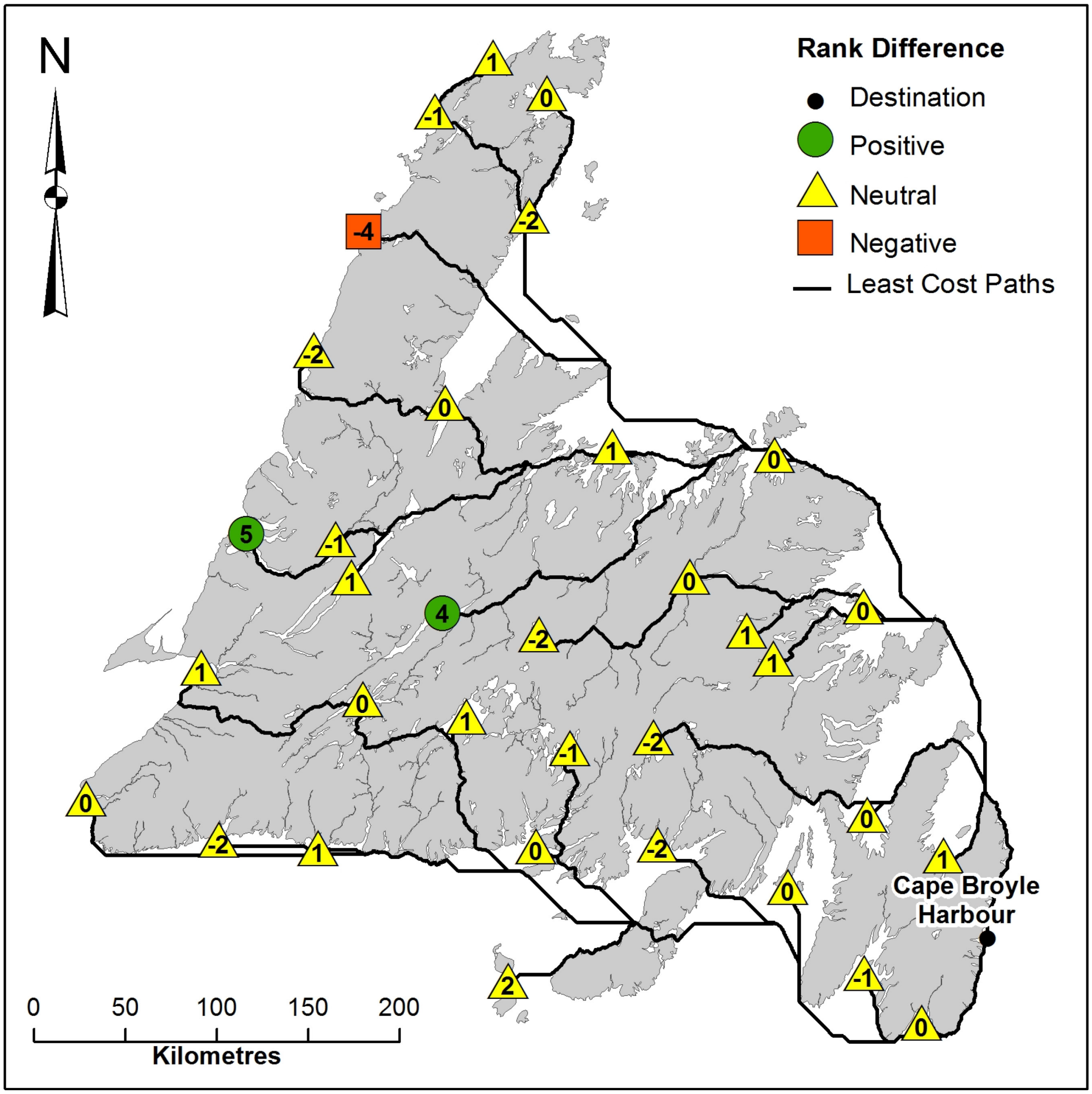

Figure B-20 Modelled travel routes and rank differences for least-cost paths reaching Cape Broyle Harbour (see Table B-20 for details).

Table B-20 Differences between distance and cost ranks for least-cost paths reaching Cape Broyle Harbour (see Figure B-20 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Biscay Bay	80702	1	358519	1	0
St. Mary's Bay	138822	2	653016	3	-1
Conception Bay	144547	3	547241	2	1
Trinity Bay	207445	4	917250	4	0
Placentia Bay	218849	5	1052193	5	0
Bonavista Bay	242673	6	1122083	6	0
Fortune Bay	292859	7	1568698	9	-2
Terra Nova Lake	314956	8	1345563	7	1
Gambo River	327373	9	1415997	8	1
Hamilton Sound	351514	10	1597863	10	0
Gander Lake	355327	11	1722927	11	0
Kaegudeck Lake	364543	12	1840779	14	-2
Hermitage Bay	370310	13	1825856	13	0
Saint-Pierre et Miquelon	385091	14	1778633	12	2
Jeddore Lake	430686	15	2040728	16	-1
Notre Dame Bay	455377	16	2030549	15	1
Near Pistol Lake	471685	17	2389639	19	-2
Meelpaeg Lake	483033	18	2245187	17	1
Burgeo	492976	19	2289972	18	1
La Poile Bay	550821	20	2564241	22	-2
Victoria Lake	555359	21	2457068	21	0
Canada Bay	583422	22	2703942	24	-2
White Bay	590882	23	2683560	23	0
Red Indian Lake	599949	24	2431225	20	4
Deer Lake	642291	25	2807738	26	-1
Grand Lake	643284	26	2782830	25	1
Codroy Rivers	644742	27	3011801	27	0
Ingornachoix Bay	654757	28	3291835	32	-4
Hare Bay	668932	29	3066167	29	0
St. Barbe Bay	678684	30	3246507	31	-1
St. George's Bay	704603	31	3206822	30	1
Parsons Pond	713450	32	3447488	34	-2
Bay of Islands	714476	33	3032222	28	5
Strait of Belle Isle	728733	34	3424680	33	1

Note: A positive rank difference indicates travel to Cape Broyle Harbour is easier than distance suggests, while a negative difference indicates that travel to Cape Broyle Harbour is harder than distance implies.

B.2.19 Site 19: Gander Lake

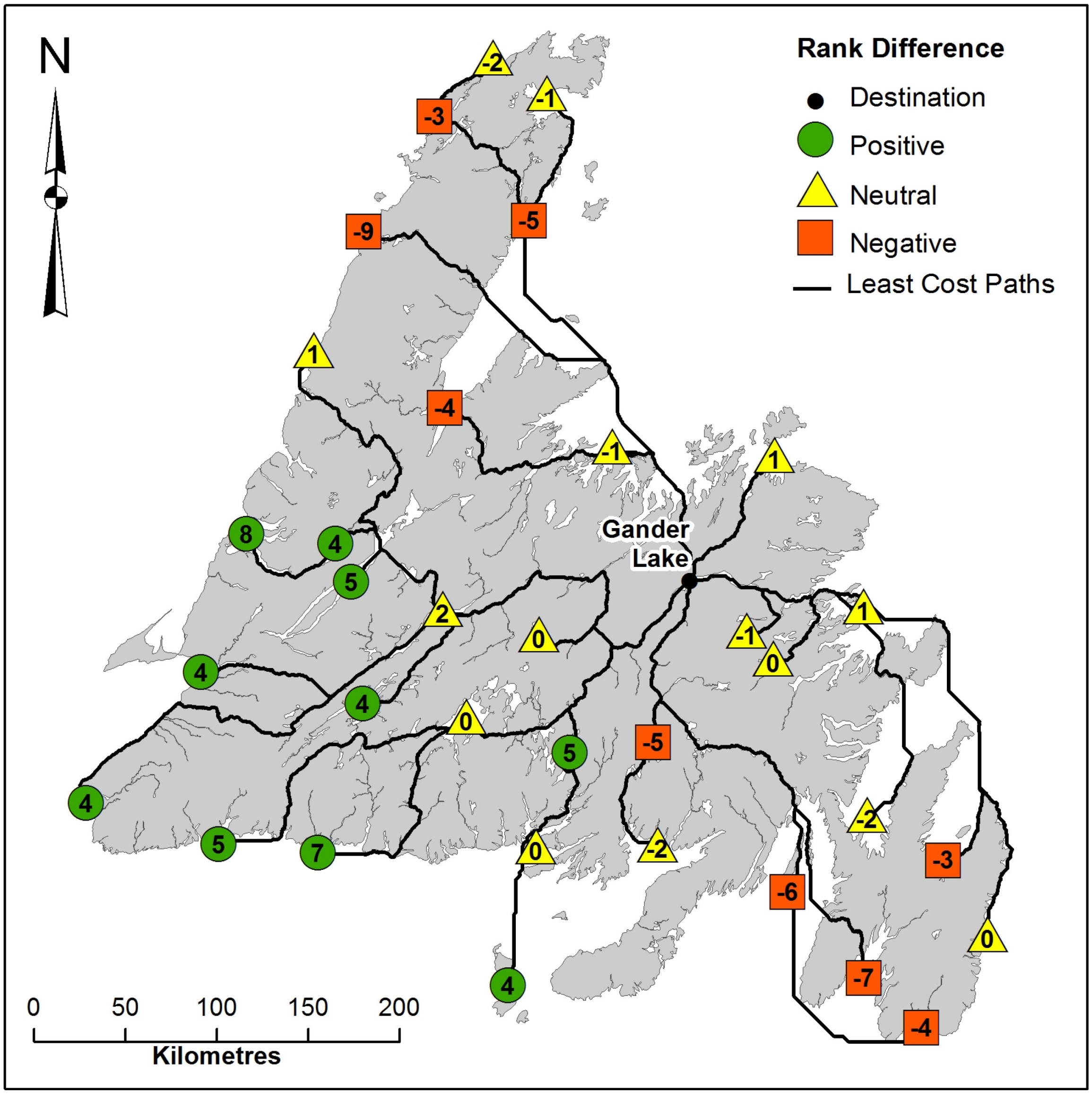

Figure B-21 Modelled travel routes and rank differences for least-cost paths reaching Gander Lake (see Table B-21 for details).

Table B-21 Differences between distance and cost ranks for least-cost paths reaching Gander Lake (see Figure B-21 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Gambo River	85876	1	506118	2	-1
Hamilton Sound	95878	2	312282	1	1
Kaegudeck Lake	108167	3	677525	8	-5
Notre Dame Bay	110687	4	641891	5	-1
Bonavista Bay	110812	5	609617	4	1
Near Pistol Lake	116362	6	666706	6	0
Terra Nova Lake	133526	7	669541	7	0
Jeddore Lake	141436	8	591885	3	5
Meelpaeg Lake	181284	9	809897	9	0
Fortune Bay	189746	10	1010492	12	-2
Hermitage Bay	219332	11	869565	11	0
Red Indian Lake	222986	12	831065	10	2
White Bay	246112	13	1294889	17	-4
Canada Bay	250098	14	1332723	19	-5
Placentia Bay	250385	15	1384096	21	-6
Trinity Bay	257867	16	1309007	18	-2
Victoria Lake	296520	17	1049670	13	4
Saint-Pierre et Miquelon	298811	18	1250219	14	4
Conception Bay	311917	19	1473285	22	-3
Grand Lake	313952	20	1283140	15	5
St. Mary's Bay	319093	21	1806064	28	-7
Ingornachoix Bay	321434	22	1920614	31	-9
Burgeo	327251	23	1294184	16	7
Deer Lake	328015	24	1345811	20	4
Hare Bay	335609	25	1694930	26	-1
St. Barbe Bay	345361	26	1875284	29	-3
Cape Broyle Harbour	355852	27	1722916	27	0
La Poile Bay	373364	28	1558878	23	5
St. George's Bay	383725	29	1646910	25	4
Biscay Bay	388934	30	2074041	34	-4
Strait of Belle Isle	395418	31	2053445	33	-2
Bay of Islands	400200	32	1570292	24	8
Parsons Pond	470460	33	2032857	32	1
Codroy Rivers	500042	34	1907744	30	4

Note: A positive rank difference indicates travel to Gander Lake is easier than distance suggests, while a negative difference indicates that travel to Gander Lake is harder than distance implies.

B.2.20 Site 20: Strait of Belle Isle

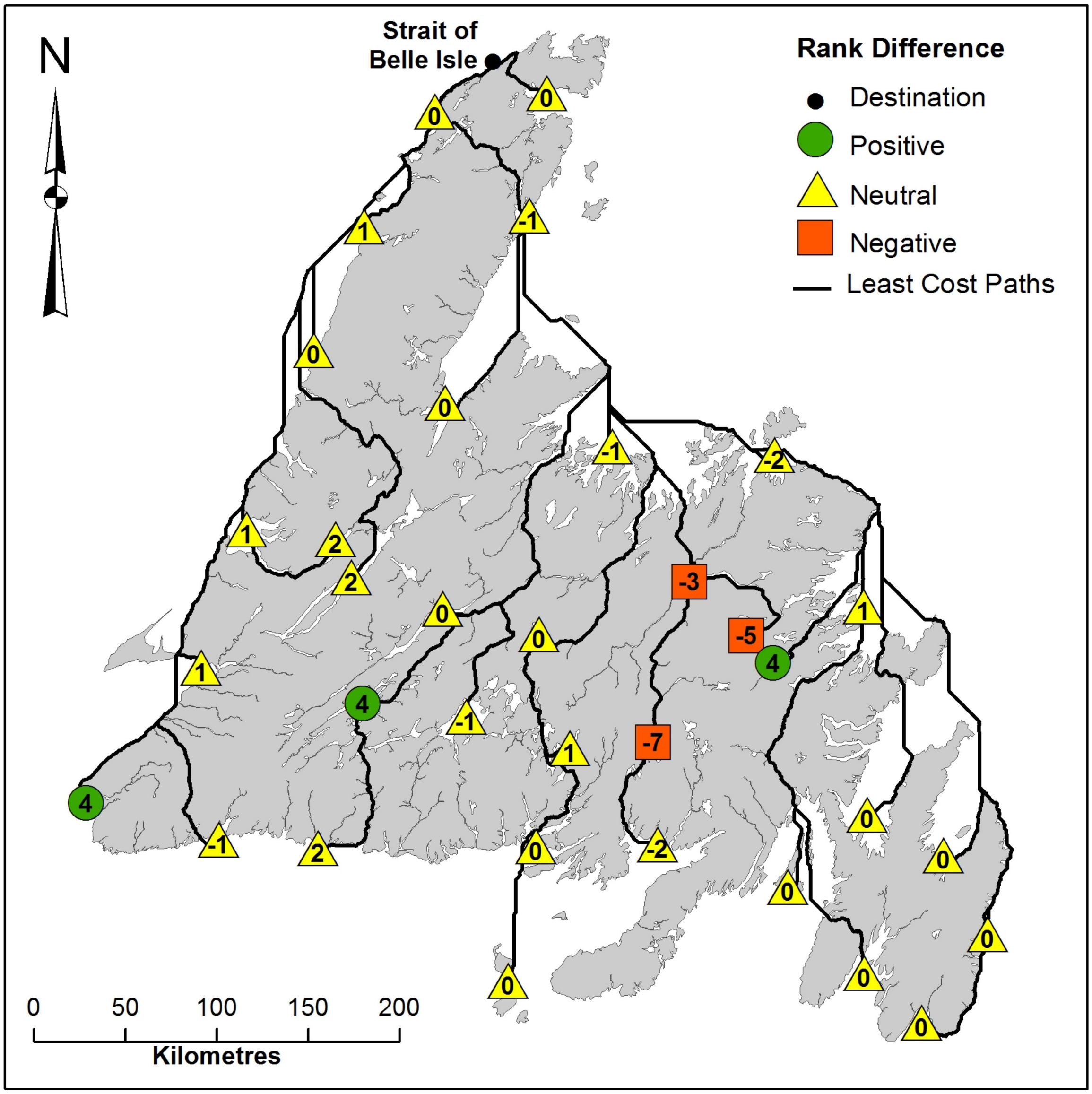

Figure B-22 Modelled travel routes and rank differences for least-cost paths reaching the Strait of Belle Isle (see Table B-22 for details).

Table B-22 Differences between distance and cost ranks for least-cost paths reaching the Strait of Belle Isle (see Figure B-22 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
St. Barbe Bay	50543	1	180861	1	0
Hare Bay	57695	2	391943	2	0
Canada Bay	147220	3	730180	4	-1
Ingornachoix Bay	147525	4	541567	3	1
Parsons Pond	215696	5	933191	5	0
White Bay	271679	6	1276407	6	0
Notre Dame Bay	298619	7	1465469	8	-1
Bay of Islands	329899	8	1463560	7	1
Hamilton Sound	376269	9	1833643	11	-2
Gander Lake	396101	10	2053441	13	-3
Deer Lake	404038	11	1690395	9	2
Grand Lake	418083	12	1800133	10	2
St. George's Bay	430691	13	1876410	12	1
Red Indian Lake	456667	14	2093557	14	0
Near Pistol Lake	465730	15	2154810	15	0
Gambo River	475124	16	2543198	21	-5
Kaegudeck Lake	503962	17	2730581	24	-7
Meelpaeg Lake	507427	18	2508390	19	-1
Bonavista Bay	512446	19	2402835	18	1
Codroy Rivers	521801	20	2248502	16	4
Victoria Lake	530108	21	2312167	17	4
La Poile Bay	543625	22	2641543	23	-1
Jeddore Lake	553149	23	2577011	22	1
Terra Nova Lake	570514	24	2535613	20	4
Fortune Bay	585541	25	3063566	27	-2
Hermitage Bay	624645	26	2827806	26	0
Burgeo	648532	27	2734669	25	2
Trinity Bay	654742	28	3098014	28	0
Conception Bay	686478	29	3175036	29	0
Saint-Pierre et Miquelon	704124	30	3208468	30	0
Placentia Bay	716356	31	3299202	31	0
Cape Broyle Harbour	730434	32	3424688	32	0
St. Mary's Bay	785092	33	3721185	33	0
Biscay Bay	812493	34	3780541	34	0

Note: A positive rank difference indicates travel to the Strait of Belle Isle is easier than distance suggests, while a negative difference indicates that travel to the Strait of Belle Isle is harder than distance implies.

B.2.21 Site 21: Parsons Pond

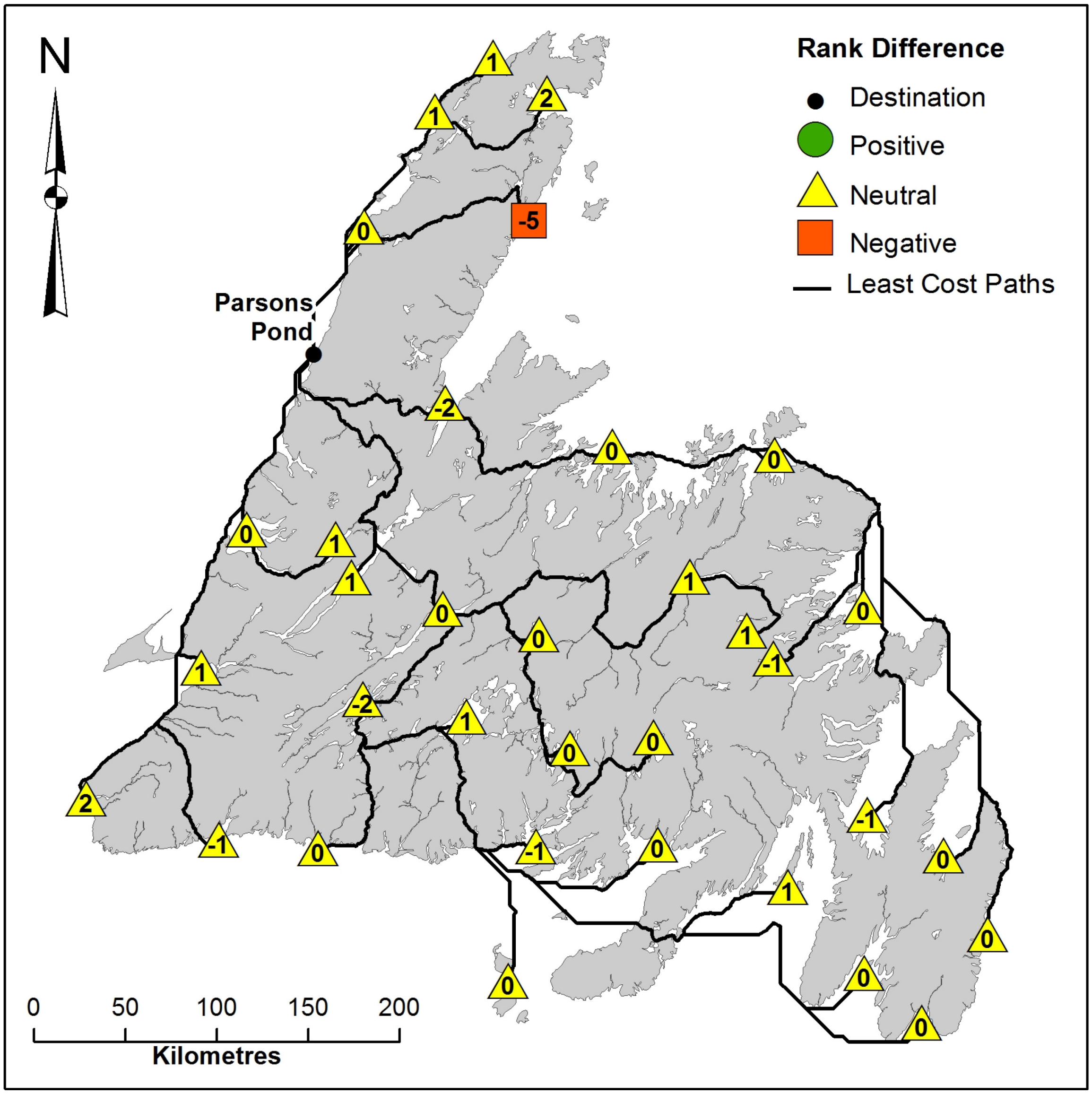

Figure B-23 Modelled travel routes and rank differences for least-cost paths reaching Parsons Pond (see Table B-23 for details).

Table B-23 Differences between distance and cost ranks for least-cost paths reaching Parsons Pond (see Figure B-23 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Ingornachoix Bay	74988	1	393978	1	0
Bay of Islands	116665	2	530373	2	0
White Bay	125125	3	776099	5	-2
St. Barbe Bay	164365	4	752330	3	1
Deer Lake	190803	5	757202	4	1
Canada Bay	199061	6	1234611	11	-5
Grand Lake	203445	7	866927	6	1
Strait of Belle Isle	214827	8	933191	7	1
St. George's Bay	217434	9	943225	8	1
Red Indian Lake	249228	10	1205177	10	0
Hare Bay	253883	11	1105503	9	2
Victoria Lake	256324	12	1448691	14	-2
Notre Dame Bay	258825	13	1423944	13	0
Codroy Rivers	308544	14	1315310	12	2
Near Pistol Lake	324280	15	1619635	15	0
La Poile Bay	330367	16	1708352	17	-1
Meelpaeg Lake	346326	17	1707712	16	1
Hamilton Sound	360728	18	1856490	18	0
Burgeo	374731	19	1871188	19	0
Jeddore Lake	401029	20	1953384	20	0
Hermitage Bay	448028	21	2121181	22	-1
Gander Lake	470681	22	2032852	21	1
Saint-Pierre et Miquelon	496620	23	2398173	23	0
Bonavista Bay	496849	24	2425685	24	0
Kaegudeck Lake	499280	25	2496244	25	0
Fortune Bay	529465	26	2538435	26	0
Terra Nova Lake	554973	27	2558463	28	-1
Gambo River	555939	28	2538976	27	1
Trinity Bay	607495	29	3120863	30	-1
Placentia Bay	621334	30	2963501	29	1
Conception Bay	670937	31	3197886	31	0
St. Mary's Bay	696846	32	3383105	32	0
Cape Broyle Harbour	714872	33	3447538	33	0
Biscay Bay	732272	34	3560110	34	0

Note: A positive rank difference indicates travel to Parsons Pond is easier than distance suggests, while a negative difference indicates that travel to Parsons Pond is harder than distance implies.

B.2.22 Site 22: Placentia Bay

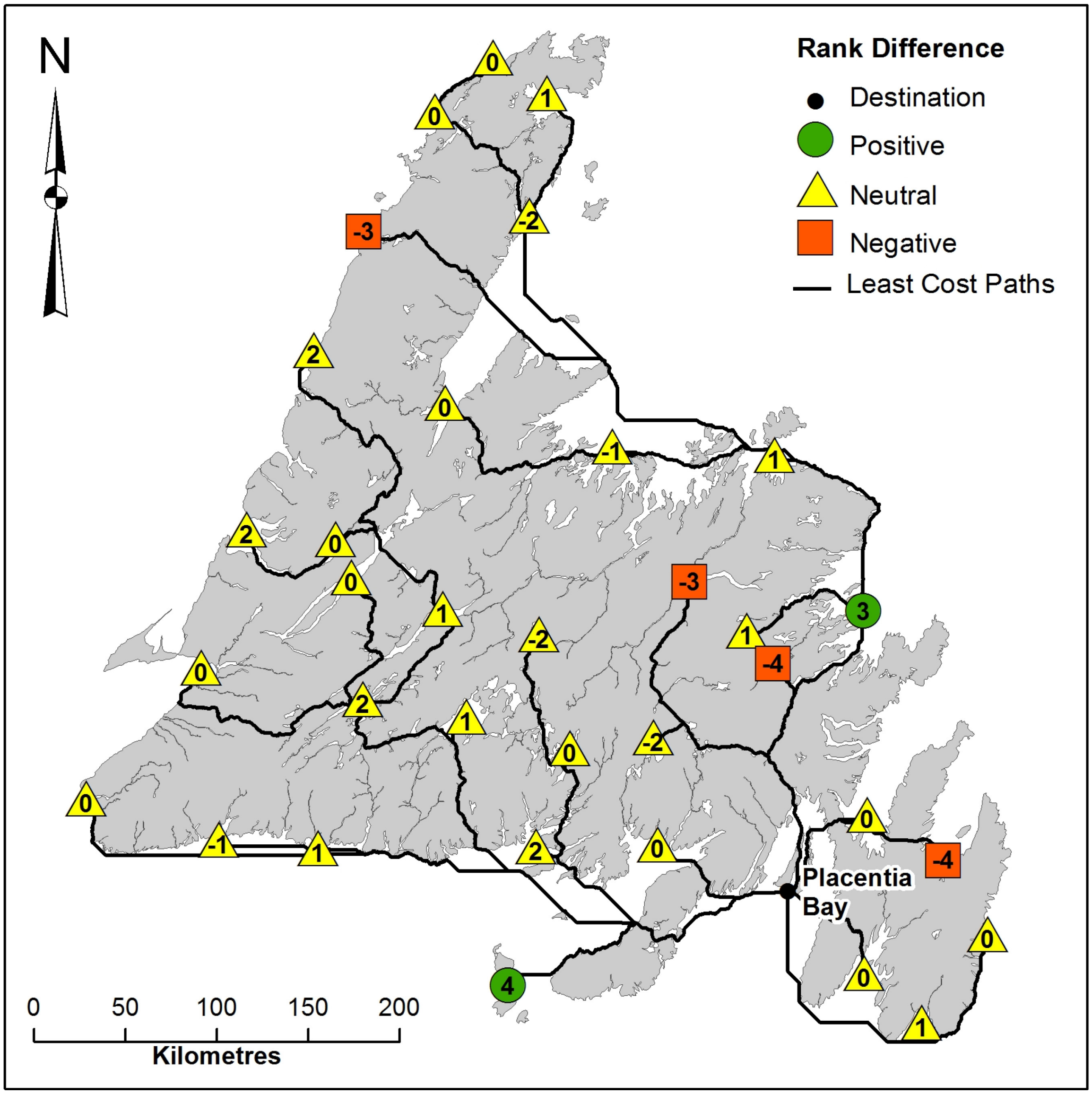

Figure B-24 Modelled travel routes and rank differences for least-cost paths reaching Placentia Bay (see Table B-24 for details).

Table B-24 Differences between distance and cost ranks for least-cost paths reaching Placentia Bay (see Figure B-24 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Trinity Bay	74440	1	413417	1	0
St. Mary's Bay	80642	2	476750	2	0
Fortune Bay	90210	3	595180	3	0
Conception Bay	129382	4	917739	8	-4
Biscay Bay	141928	5	709505	4	1
Terra Nova Lake	154801	6	935087	10	-4
Kaegudeck Lake	171345	7	921634	9	-2
Hermitage Bay	182093	8	886612	6	2
Saint-Pierre et Miquelon	196887	9	839387	5	4
Bonavista Bay	203679	10	896516	7	3
Cape Broyle Harbour	219036	11	1052195	11	0
Jeddore Lake	242474	12	1101482	12	0
Gander Lake	250223	13	1384096	16	-3
Gambo River	285035	14	1186354	13	1
Meelpaeg Lake	294813	15	1305939	14	1
Burgeo	304730	16	1350726	15	1
Near Pistol Lake	328061	17	1520638	19	-2
Hamilton Sound	338438	18	1472430	17	1
La Poile Bay	362575	19	1624988	20	-1
Victoria Lake	367140	20	1517819	18	2
Notre Dame Bay	442262	21	1905117	22	-1
Red Indian Lake	450370	22	1761670	21	1
Codroy Rivers	456496	23	2072538	23	0
Grand Lake	466750	24	2114540	24	0
St. George's Bay	516435	25	2267572	25	0
Deer Lake	555360	26	2276419	26	0
Canada Bay	570182	27	2578507	29	-2
White Bay	577691	28	2558122	28	0
Bay of Islands	627546	29	2500904	27	2
Ingornachoix Bay	641543	30	3166401	33	-3
Hare Bay	655693	31	2940731	30	1
St. Barbe Bay	665444	32	3121072	32	0
Parsons Pond	697803	33	2963487	31	2
Strait of Belle Isle	715494	34	3299245	34	0

Note: A positive rank difference indicates travel to Placentia Bay is easier than distance suggests, while a negative difference indicates that travel to Placentia Bay is harder than distance implies.

B.2.23 Site 23: St. Barbe Bay

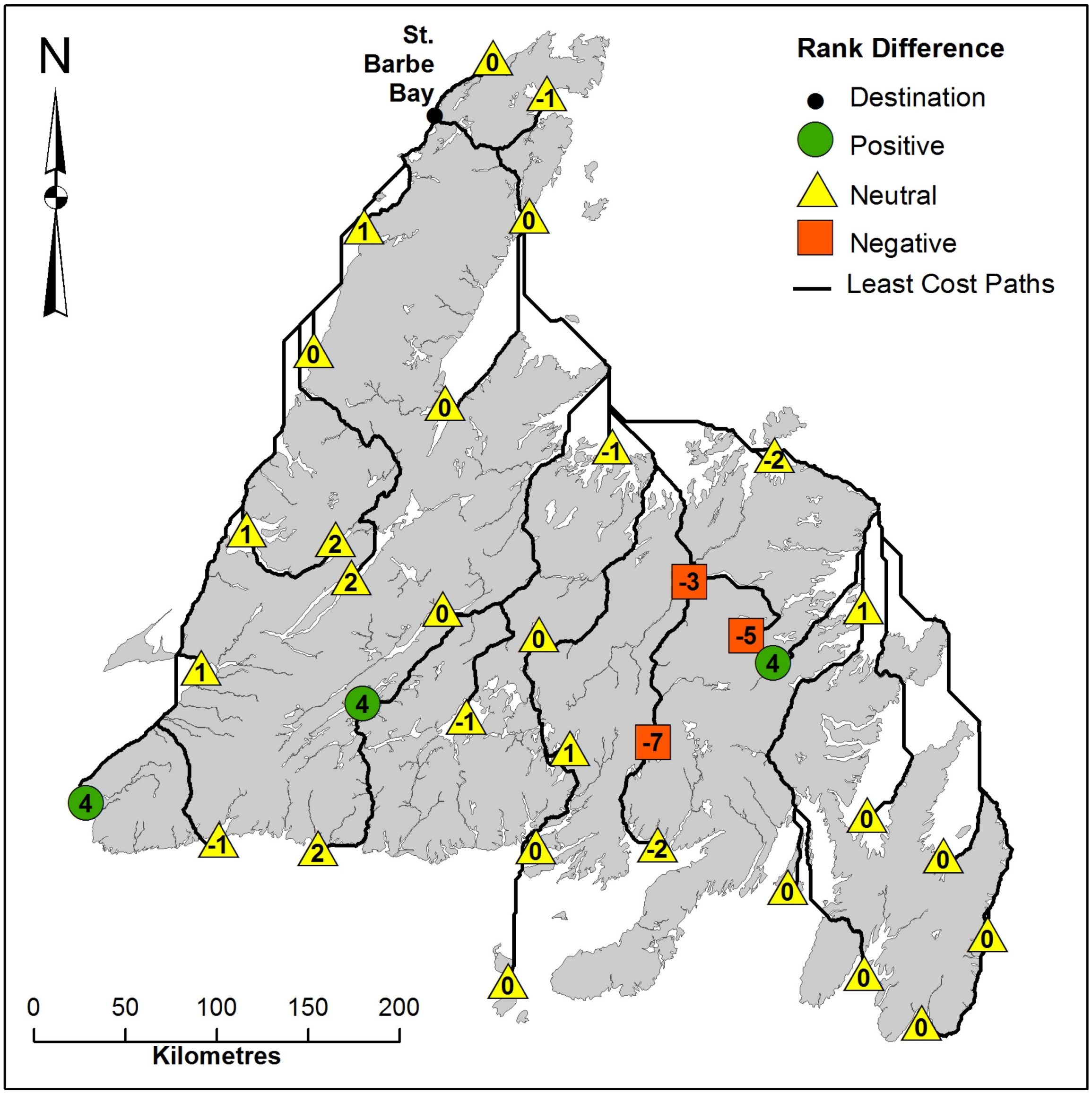

Figure B-25 Modelled travel routes and rank differences for least-cost paths reaching St. Barbe Bay (see Table B-25 for details).

Table B-25 Differences between distance and cost ranks for least-cost paths reaching St. Barbe Bay (see Figure B-25 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Strait of Belle Isle	50462	1	180861	1	0
Hare Bay	91266	2	362630	3	-1
Ingornachoix Bay	96964	3	360707	2	1
Canada Bay	97140	4	552017	4	0
Parsons Pond	165127	5	752331	5	0
White Bay	221598	6	1098243	6	0
Notre Dame Bay	248539	7	1287307	8	-1
Bay of Islands	281858	8	1282699	7	1
Hamilton Sound	326189	9	1655481	11	-2
Gander Lake	346020	10	1875279	13	-3
Deer Lake	355996	11	1509535	9	2
Grand Lake	368542	12	1619273	10	2
St. George's Bay	382650	13	1695550	12	1
Red Indian Lake	406587	14	1915395	14	0
Near Pistol Lake	415650	15	1976646	15	0
Gambo River	425044	16	2365037	21	-5
Kaegudeck Lake	453881	17	2552416	24	-7
Meelpaeg Lake	457346	18	2330224	19	-1
Bonavista Bay	462365	19	2224665	18	1
Codroy Rivers	473760	20	2067634	16	4
Victoria Lake	480054	21	2134003	17	4
La Poile Bay	495583	22	2460681	23	-1
Jeddore Lake	503097	23	2398848	22	1
Terra Nova Lake	520433	24	2357439	20	4
Fortune Bay	535461	25	2885401	27	-2
Hermitage Bay	574593	26	2649643	26	0
Burgeo	598478	27	2556505	25	2
Trinity Bay	604668	28	2919845	28	0
Conception Bay	636380	29	2996856	29	0
Saint-Pierre et Miquelon	654072	30	3030305	30	0
Placentia Bay	666276	31	3121032	31	0
Cape Broyle Harbour	680335	32	3246508	32	0
St. Mary's Bay	735011	33	3543015	33	0
Biscay Bay	762394	34	3602362	34	0

Note: A positive rank difference indicates travel to St. Barbe Bay is easier than distance suggests, while a negative difference indicates that travel to St. Barbe Bay is harder than distance implies.

B.2.24 Site 24: Trinity Bay

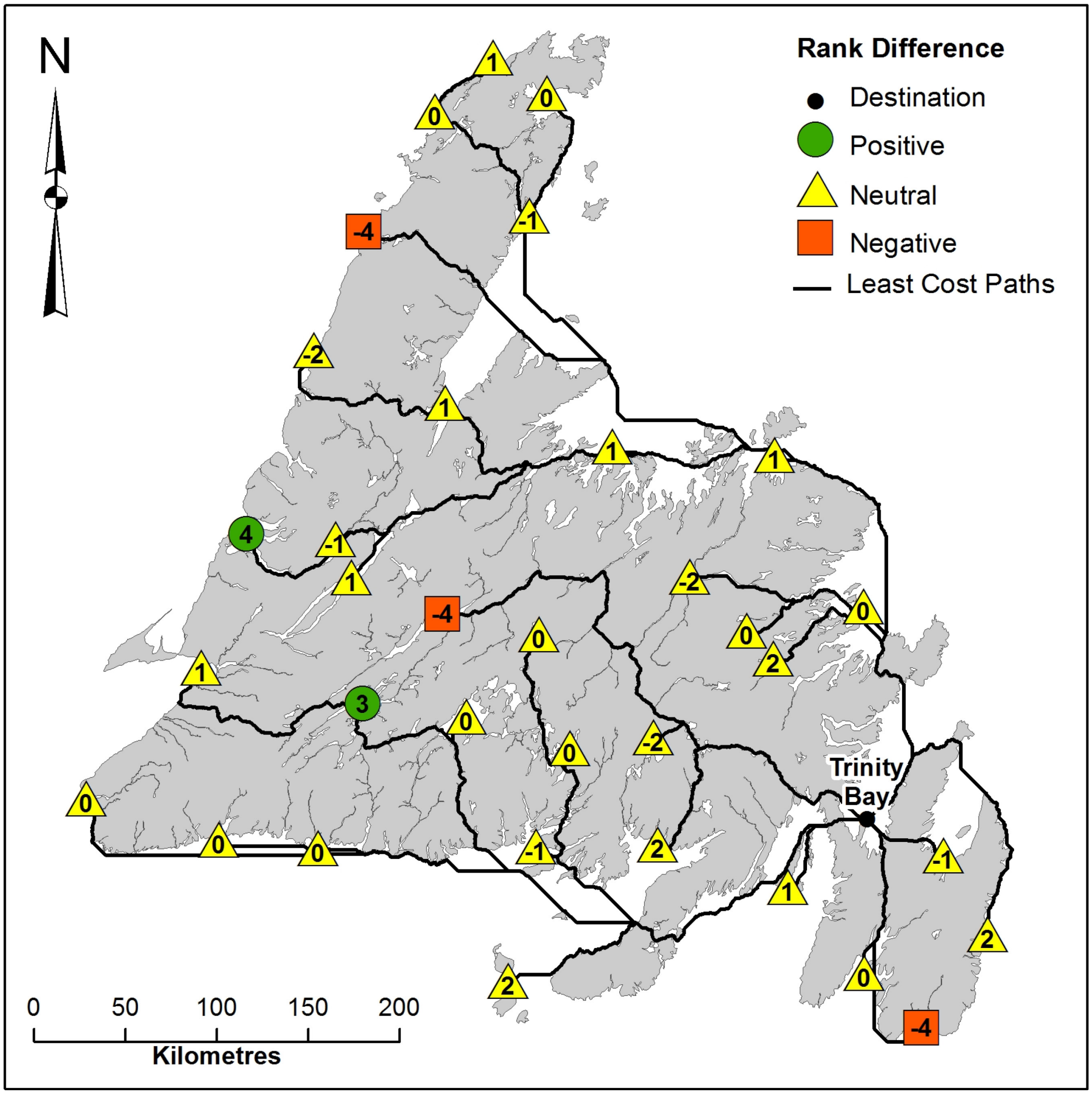

Figure B-26 Modelled travel routes and rank differences for least-cost paths reaching Trinity Bay (see Table B-26 for details).

Table B-26 Differences between distance and cost ranks for least-cost paths reaching Trinity Bay (see Figure B-26 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Conception Bay	54589	1	509705	2	-1
Placentia Bay	74558	2	413417	1	1
St. Mary's Bay	100737	3	686217	3	0
Bonavista Bay	150292	4	712202	4	0
Biscay Bay	158212	5	973427	9	-4
Kaegudeck Lake	163139	6	956252	8	-2
Fortune Bay	201657	7	885444	5	2
Cape Broyle Harbour	207716	8	917251	6	2
Terra Nova Lake	218078	9	925219	7	2
Gambo River	229902	10	1002089	10	0
Hermitage Bay	250828	11	1234555	12	-1
Gander Lake	257829	12	1309016	14	-2
Saint-Pierre et Miquelon	265610	13	1187332	11	2
Hamilton Sound	276814	14	1271235	13	1
Jeddore Lake	311209	15	1449427	15	0
Meelpaeg Lake	363552	16	1653884	16	0
Burgeo	373495	17	1698671	17	0
Red Indian Lake	377809	18	2079969	22	-4
Notre Dame Bay	380638	19	1703922	18	1
Near Pistol Lake	396796	20	1868583	20	0
La Poile Bay	431340	21	1972933	21	0
Victoria Lake	435878	22	1865763	19	3
Canada Bay	508558	23	2377276	24	-1
White Bay	516143	24	2356923	23	1
Codroy Rivers	525261	25	2420499	25	0
Deer Lake	567551	26	2481104	27	-1
Grand Lake	568545	27	2456196	26	1
Ingornachoix Bay	579893	28	2965193	32	-4
St. George's Bay	585122	29	2615519	28	1
Hare Bay	594069	30	2739500	30	0
St. Barbe Bay	603820	31	2919841	31	0
Parsons Pond	638711	32	3120851	34	-2
Bay of Islands	639737	33	2705588	29	4
Strait of Belle Isle	653869	34	3098014	33	1

Note: A positive rank difference indicates travel to Trinity Bay is easier than distance suggests, while a negative difference indicates that travel to Trinity Bay is harder than distance implies.

B.2.25 Site 25: Biscay Bay

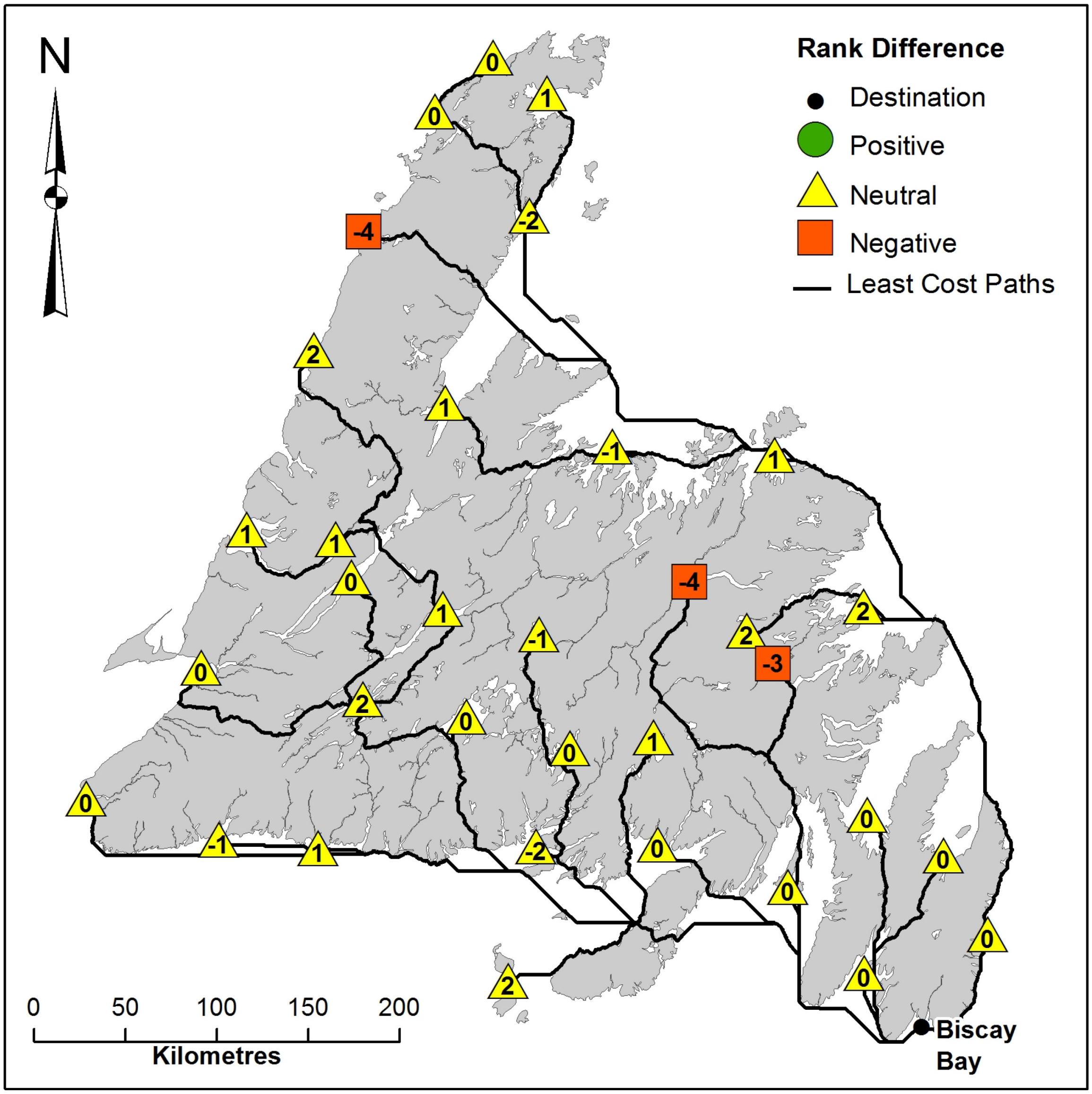

Figure B-27 Modelled travel routes and rank differences for least-cost paths reaching Biscay Bay (see Table B-27 for details).

Table B-27 Differences between distance and cost ranks for least-cost paths reaching Biscay Bay (see Figure B-27 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
St. Mary's Bay	61632	1	310325	1	0
Cape Broyle Harbour	80618	2	358519	2	0
Placentia Bay	141631	3	709506	3	0
Conception Bay	144593	4	887731	4	0
Trinity Bay	157668	5	973431	5	0
Fortune Bay	215665	6	1226010	6	0
Hermitage Bay	293146	7	1483169	9	-2
Terra Nova Lake	293157	8	1625038	11	-3
Saint-Pierre et Miquelon	307928	9	1435946	7	2
Bonavista Bay	324594	10	1477914	8	2
Kaegudeck Lake	338206	11	1549845	10	1
Jeddore Lake	353527	12	1698041	12	0
Gander Lake	388436	13	2074053	17	-4
Meelpaeg Lake	405870	14	1902498	14	0
Gambo River	409288	15	1771828	13	2
Burgeo	415813	16	1947285	15	1
Hamilton Sound	433408	17	1953694	16	1
Near Pistol Lake	439114	18	2117197	19	-1
La Poile Bay	473682	19	2221548	20	-1
Victoria Lake	478197	20	2114378	18	2
Notre Dame Bay	537233	21	2386391	22	-1
Red Indian Lake	561401	22	2358232	21	1
Codroy Rivers	567579	23	2669113	23	0
Grand Lake	577807	24	2711101	24	0
St. George's Bay	627492	25	2864133	25	0
Canada Bay	665153	26	3059788	28	-2
Deer Lake	666414	27	2872981	26	1
White Bay	672662	28	3039402	27	1
Ingornachoix Bay	736488	29	3647680	33	-4
Bay of Islands	738599	30	3097465	29	1
Hare Bay	750663	31	3422012	30	1
St. Barbe Bay	760415	32	3602353	32	0
Parsons Pond	808856	33	3560049	31	2
Strait of Belle Isle	810464	34	3780526	34	0

Note: A positive rank difference indicates travel to Biscay Bay is easier than distance suggests, while a negative difference indicates that travel to Biscay Bay is harder than distance implies.

B.2.26 Site 26: Pistol Lake

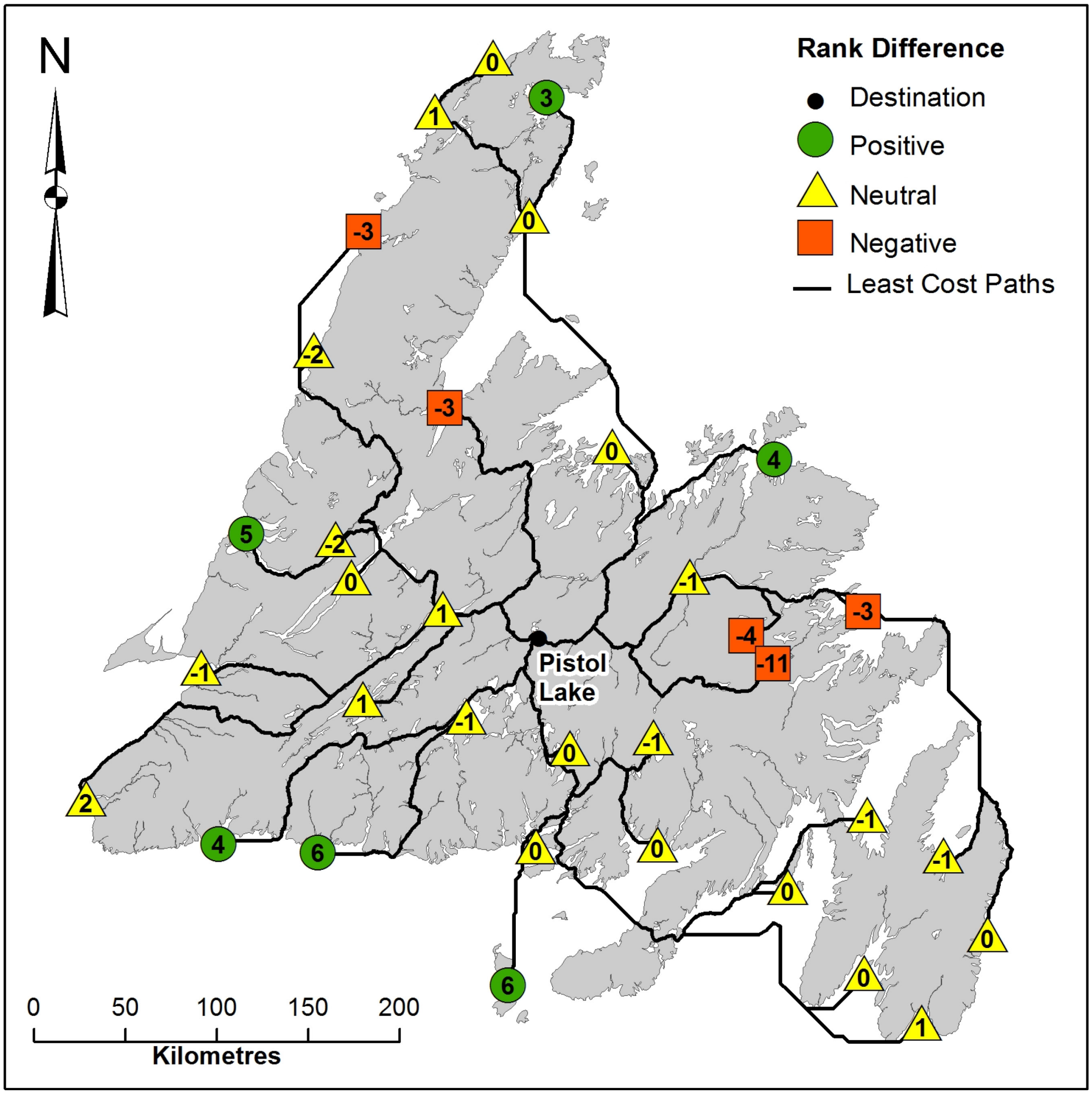

Figure B-28 Modelled travel routes and rank differences for least-cost paths reaching Pistol Lake (see Table B-28 for details).

Table B-28 Differences between distance and cost ranks for least-cost paths reaching Pistol Lake (see Figure B-28 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Meelpaeg Lake	76166	1	442465	2	-1
Red Indian Lake	76480	2	417851	1	1
Jeddore Lake	91664	3	446050	3	0
Gander Lake	116294	4	666705	5	-1
Victoria Lake	150014	5	636456	4	1
Notre Dame Bay	162785	6	693633	6	0
Hermitage Bay	163155	7	696831	7	0
Grand Lake	167447	8	869911	8	0
Deer Lake	181509	9	932586	11	-2
Terra Nova Lake	182886	10	1314899	21	-11
Kaegudeck Lake	186837	11	988902	12	-1
Gambo River	201567	12	1172821	16	-4
Hamilton Sound	212888	13	882979	9	4
Fortune Bay	217949	14	1093832	14	0
White Bay	218634	15	1185665	18	-3
Burgeo	220515	16	922693	10	6
Bonavista Bay	226481	17	1276321	20	-3
St. George's Bay	237219	18	1233696	19	-1
Saint-Pierre et Miquelon	242634	19	1077485	13	6
Bay of Islands	253695	20	1157058	15	5
La Poile Bay	264602	21	1184982	17	4
Canada Bay	319669	22	1434091	22	0
Parsons Pond	324001	23	1619630	25	-2
Placentia Bay	328027	24	1520626	24	0
Codroy Rivers	353536	25	1494529	23	2
Trinity Bay	396848	26	1868571	27	-1
Ingornachoix Bay	401691	27	2013602	30	-3
St. Mary's Bay	403528	28	1940190	28	0
Hare Bay	405179	29	1796298	26	3
St. Barbe Bay	414931	30	1976652	29	1
Conception Bay	427615	31	2139990	32	-1
Biscay Bay	438953	32	2117182	31	1
Strait of Belle Isle	464988	33	2154815	33	0
Cape Broyle Harbour	471550	34	2389632	34	0

Note: A positive rank difference indicates travel to Conception Bay is easier than distance suggests, while a negative difference indicates that travel to Conception Bay is harder than distance implies.

B.2.27 Site 27: Conception Bay

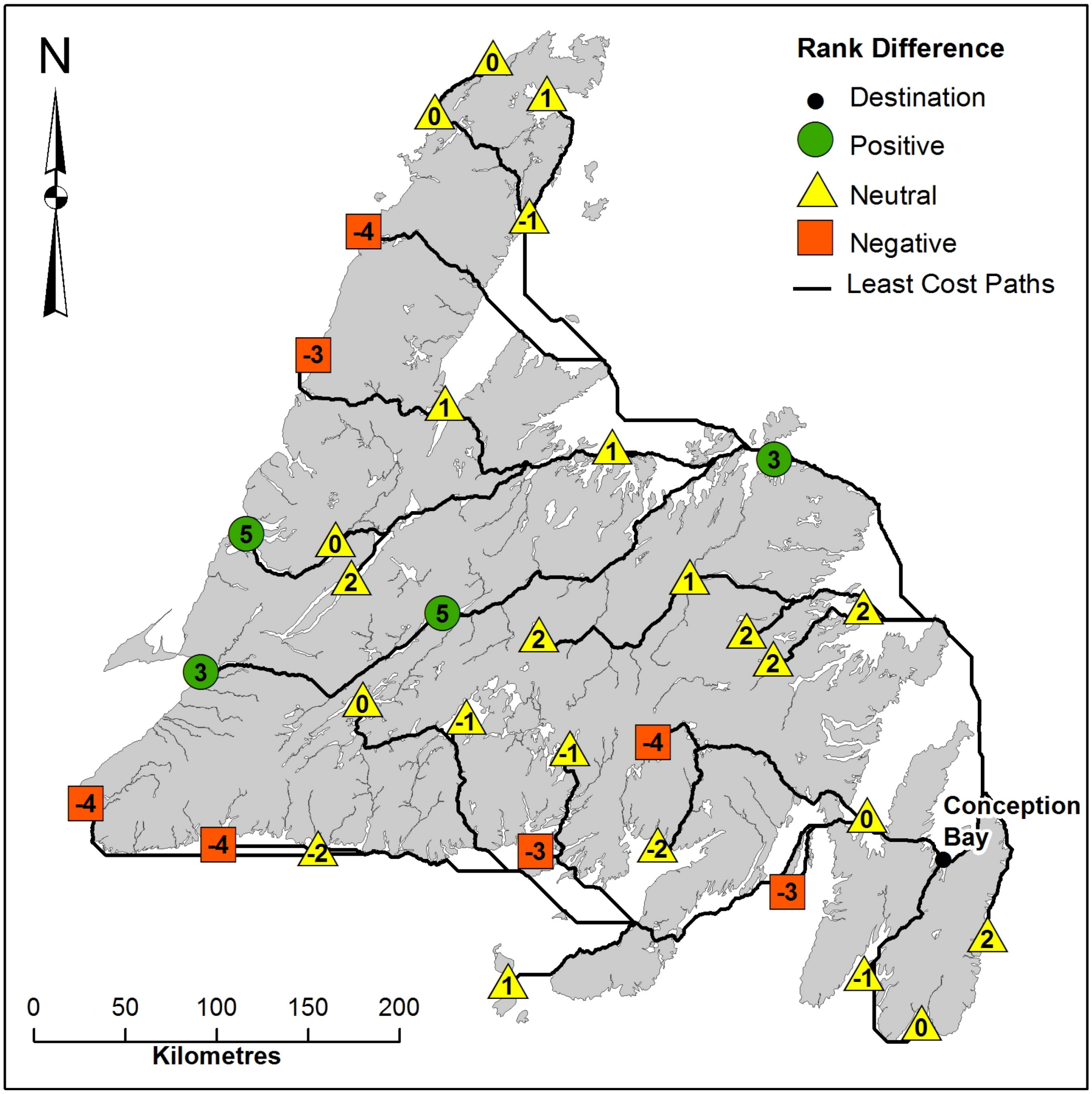

Figure B-29 Modelled travel routes and rank differences for least-cost paths reaching Conception Bay (see Table B-29 for details).

Table B-29 Differences between distance and cost ranks for least-cost paths reaching Conception Bay (see Figure B-29 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Trinity Bay	54445	1	509705	1	0
St. Mary's Bay	87550	2	600517	3	-1
Placentia Bay	129501	3	917738	6	-3
Cape Broyle Harbour	144786	4	547242	2	2
Biscay Bay	145104	5	887727	5	0
Bonavista Bay	199422	6	872447	4	2
Kaegudeck Lake	217350	7	1464025	11	-4
Fortune Bay	256051	8	1393212	10	-2
Terra Nova Lake	271695	9	1095926	7	2
Gambo River	284123	10	1166361	8	2
Hermitage Bay	305746	11	1738876	14	-3
Hamilton Sound	308237	12	1348227	9	3
Gander Lake	312077	13	1473291	12	1
Saint-Pierre et Miquelon	320527	14	1691652	13	1
Jeddore Lake	366122	15	1953747	16	-1
Notre Dame Bay	412098	16	1780913	15	1
Meelpaeg Lake	418469	17	2158206	18	-1
Burgeo	428412	18	2202991	20	-2
Near Pistol Lake	428435	19	2140002	17	2
La Poile Bay	486257	20	2477259	24	-4
Victoria Lake	490733	21	2370087	21	0
Canada Bay	539981	22	2454279	23	-1
White Bay	547603	23	2433916	22	1
Red Indian Lake	556704	24	2181587	19	5
Codroy Rivers	580178	25	2924820	29	-4
Deer Lake	599012	26	2558095	26	0
Grand Lake	600005	27	2533187	25	2
Ingornachoix Bay	611316	28	3042197	32	-4
Hare Bay	625491	29	2816503	28	1
St. Barbe Bay	635243	30	2996844	30	0
Parsons Pond	670171	31	3197844	34	-3
Bay of Islands	671197	32	2782579	27	5
Strait of Belle Isle	685292	33	3175017	33	0
St. George's Bay	717451	34	2997457	31	3

Note: A positive rank difference indicates travel to Conception Bay is easier than distance suggests, while a negative difference indicates that travel to Conception Bay is harder than distance implies.

B.2.28 Site 28: Fortune Bay

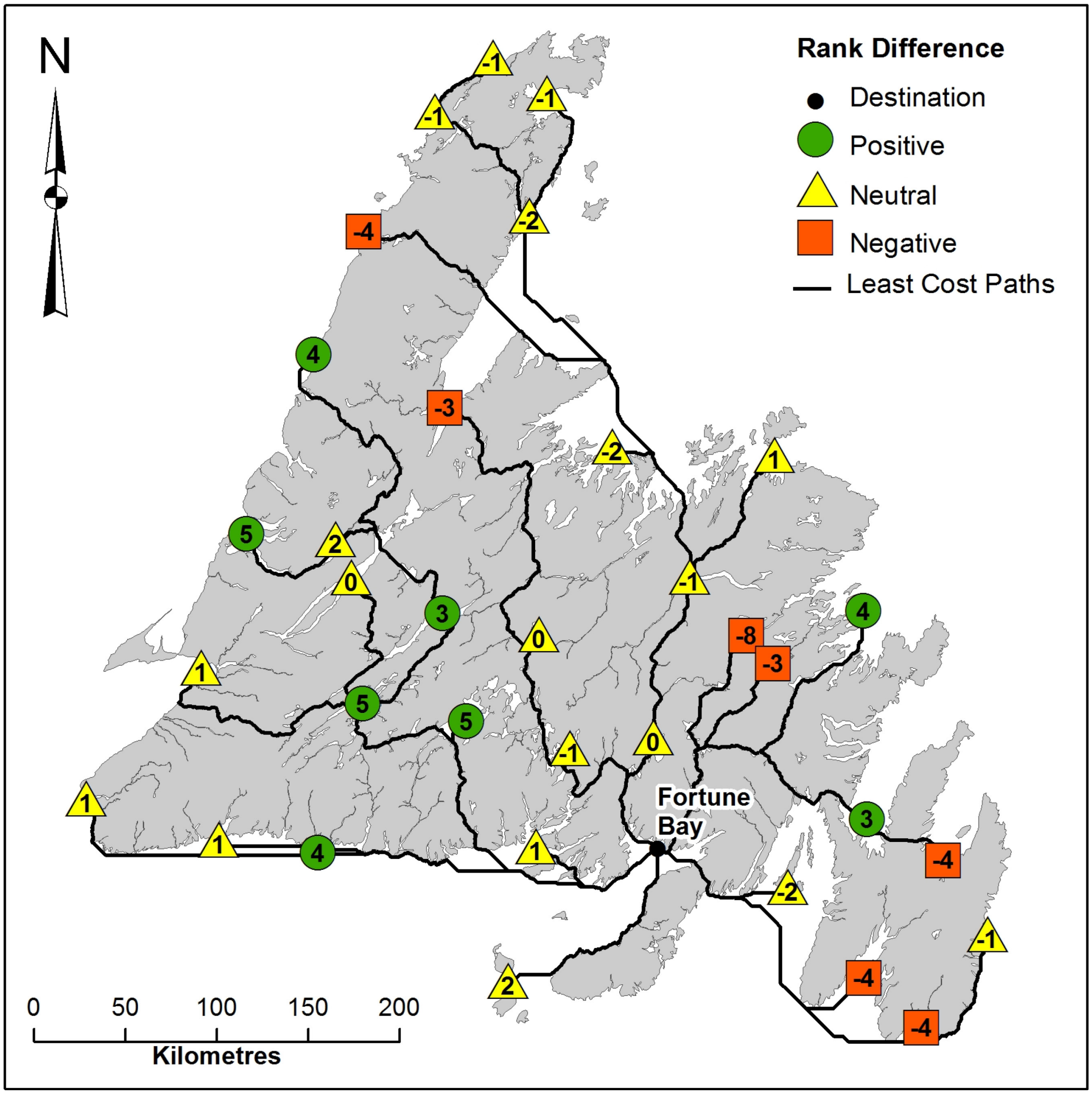

Figure B-30 Modelled travel routes and rank differences for least-cost paths reaching Fortune Bay (see Table B-30 for details).

Table B-30 Differences between distance and cost ranks for least-cost paths reaching Fortune Bay (see Figure B-30 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Kaegudeck Lake	81711	1	333529	1	0
Placentia Bay	90289	2	595181	4	-2
Hermitage Bay	90297	3	460876	2	1
Jeddore Lake	132442	4	674683	5	-1
Saint-Pierre et Miquelon	137890	5	547560	3	2
Terra Nova Lake	148764	6	926041	9	-3
Gambo River	162778	7	1197212	15	-8
St. Mary's Bay	180666	8	1049014	12	-4
Gander Lake	189553	9	1010496	10	-1
Trinity Bay	201774	10	885441	7	3
Meelpaeg Lake	202952	11	880891	6	5
Burgeo	212895	12	925676	8	4
Biscay Bay	216118	13	1226006	17	-4
Near Pistol Lake	218131	14	1093834	14	0
Bonavista Bay	228418	15	1045275	11	4
Conception Bay	256186	16	1393205	20	-4
La Poile Bay	270740	17	1199939	16	1
Victoria Lake	275279	18	1092768	13	5
Hamilton Sound	285298	19	1322385	18	1
Cape Broyle Harbour	293270	20	1568696	21	-1
Notre Dame Bay	300027	21	1651995	23	-2
Red Indian Lake	358509	22	1336619	19	3
Codroy Rivers	364661	23	1647488	22	1
Grand Lake	374890	24	1689489	24	0
White Bay	421797	25	2167202	28	-3
St. George's Bay	424574	26	1842519	25	1
Canada Bay	439476	27	2342836	29	-2
Deer Lake	463500	28	1851369	26	2
Ingornachoix Bay	510811	29	2930756	33	-4
Hare Bay	524986	30	2705061	31	-1
St. Barbe Bay	534738	31	2885401	32	-1
Bay of Islands	535685	32	2075850	27	5
Strait of Belle Isle	584787	33	3063574	34	-1
Parsons Pond	605944	34	2538436	30	4

Note: A positive rank difference indicates travel to Fortune Bay is easier than distance suggests, while a negative difference indicates that travel to Fortune Bay is harder than distance implies.

B.2.29 Site 29: White Bay

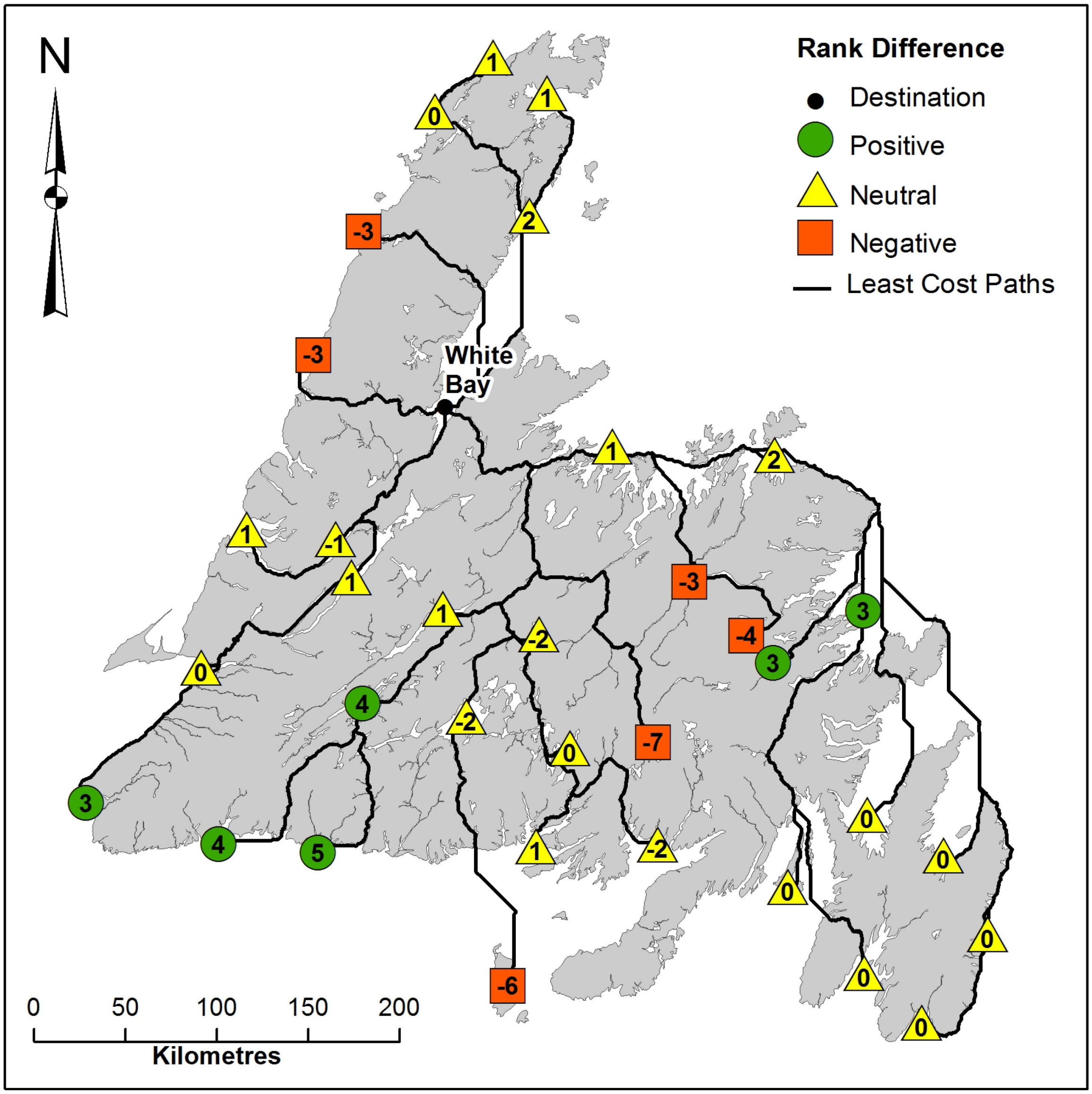

Figure B-31 Modelled travel routes and rank differences for least-cost paths reaching White Bay (see Table B-31 for details).

Table B-31 Differences between distance and cost ranks for least-cost paths reaching White Bay (see Figure B-31 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Deer Lake	112201	1	633968	2	-1
Parsons Pond	124754	2	776097	5	-3
Canada Bay	125903	3	556805	1	2
Notre Dame Bay	135930	4	660035	3	1
Grand Lake	140855	5	715821	4	1
Ingornachoix Bay	164965	6	1034467	9	-3
Bay of Islands	185310	7	860803	6	1
Hare Bay	211463	8	918462	7	1
Red Indian Lake	214351	9	974551	8	1
Near Pistol Lake	218850	10	1185665	12	-2
St. Barbe Bay	220871	11	1098244	11	0
Hamilton Sound	237817	12	1092581	10	2
Gander Lake	246279	13	1294884	16	-3
St. George's Bay	257822	14	1220313	14	0
Meelpaeg Lake	265189	15	1389381	17	-2
Strait of Belle Isle	270929	16	1276404	15	1
Victoria Lake	287819	17	1193156	13	4
Jeddore Lake	295576	18	1519413	18	0
Kaegudeck Lake	318933	19	1932426	26	-7
Gambo River	325309	20	1784640	24	-4
Saint-Pierre et Miquelon	351546	21	2128081	27	-6
Codroy Rivers	366543	22	1610645	19	3
Hermitage Bay	367132	23	1770203	22	1
Bonavista Bay	374022	24	1661764	21	3
Burgeo	406255	25	1615653	20	5
Fortune Bay	421844	26	2167208	28	-2
La Poile Bay	424228	27	1777716	23	4
Terra Nova Lake	432090	28	1794533	25	3
Trinity Bay	516302	29	2356933	29	0
Conception Bay	548054	30	2433913	30	0
Placentia Bay	577933	31	2558129	31	0
Cape Broyle Harbour	592010	32	2683565	32	0
St. Mary's Bay	646668	33	2980112	33	0
Biscay Bay	674069	34	3039418	34	0

Note: A positive rank difference indicates travel to White Bay is easier than distance suggests, while a negative difference indicates that travel to White Bay is harder than distance implies.

B.2.30 Site 30: St. Mary's Bay

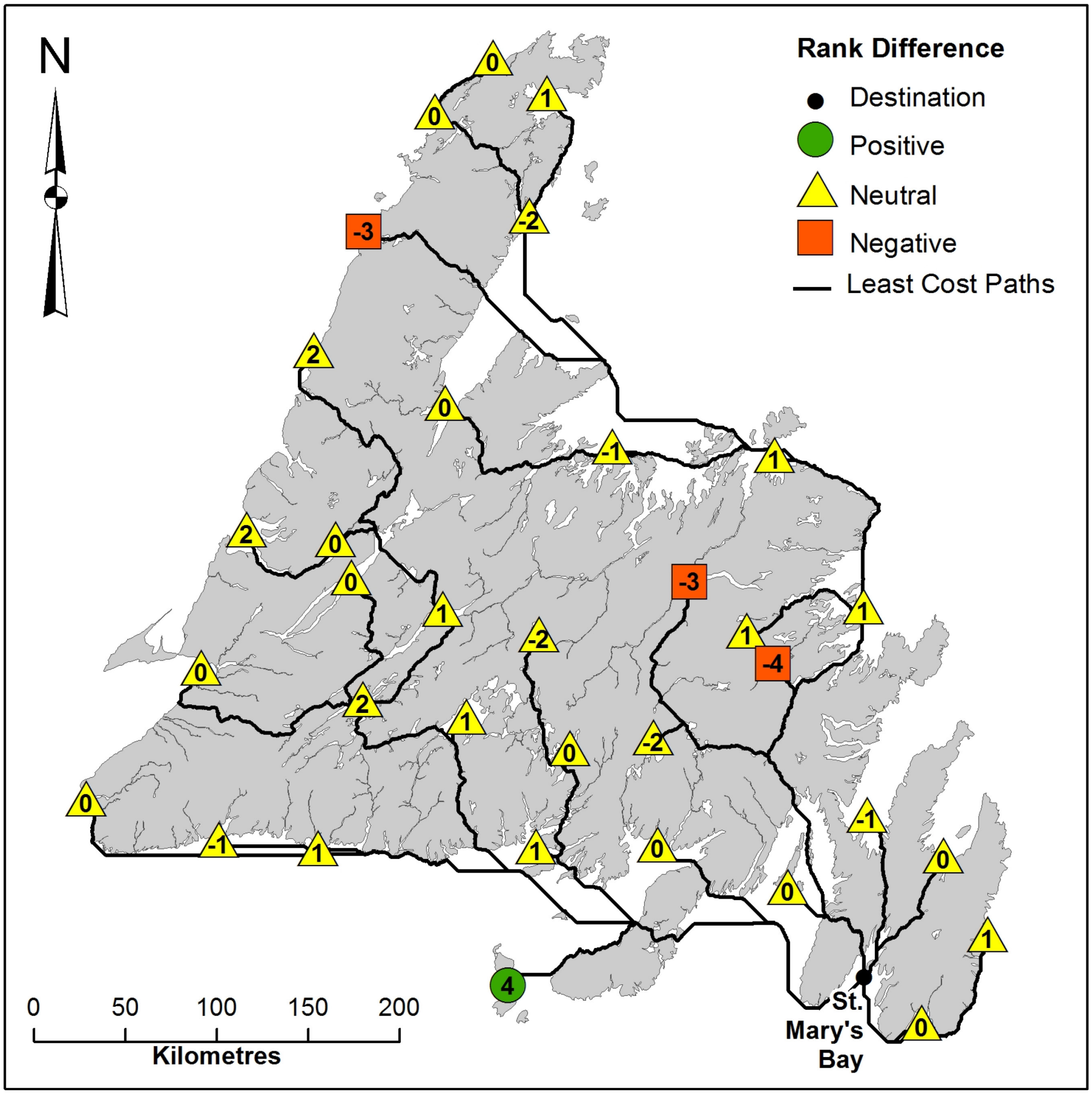

Figure B-32 Modelled travel routes and rank differences for least-cost paths reaching St. Mary's Bay (see Table B-32 for details).

Table B-32 Differences between distance and cost ranks for least-cost paths reaching St. Mary's Bay (see Figure B-32 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Biscay Bay	62055	1	310325	1	0
Placentia Bay	80607	2	476751	2	0
Conception Bay	87211	3	600518	3	0
Trinity Bay	100308	4	686218	5	-1
Cape Broyle Harbour	139207	5	653016	4	1
Fortune Bay	180460	6	1049022	6	0
Terra Nova Lake	223129	7	1357059	11	-4
Kaegudeck Lake	239600	8	1343609	10	-2
Hermitage Bay	257910	9	1306179	8	1
Bonavista Bay	272006	10	1318493	9	1
Saint-Pierre et Miquelon	272691	11	1258955	7	4
Jeddore Lake	318291	12	1521051	12	0
Gander Lake	318477	13	1806068	16	-3
Gambo River	353363	14	1608331	13	1
Meelpaeg Lake	370634	15	1725508	14	1
Burgeo	380576	16	1770295	15	1
Near Pistol Lake	403878	17	1940207	19	-2
Hamilton Sound	406765	18	1894407	17	1
La Poile Bay	438421	19	2044558	20	-1
Victoria Lake	442960	20	1937387	18	2
Notre Dame Bay	510590	21	2327100	22	-1
Red Indian Lake	526191	22	2181240	21	1
Codroy Rivers	532342	23	2492123	23	0
Grand Lake	542571	24	2534109	24	0
St. George's Bay	592255	25	2687145	25	0
Deer Lake	631204	26	2695988	26	0
Canada Bay	638510	27	3000499	29	-2
White Bay	646019	28	2980111	28	0
Bay of Islands	703389	29	2920473	27	2
Ingornachoix Bay	709845	30	3588392	33	-3
Hare Bay	724020	31	3362724	30	1
St. Barbe Bay	733772	32	3543064	32	0
Parsons Pond	773646	33	3383056	31	2
Strait of Belle Isle	783821	34	3721237	34	0

Note: A positive rank difference indicates travel to St. Mary's Bay is easier than distance suggests, while a negative difference indicates that travel to St. Mary's Bay is harder than distance implies.

B.2.31 Site 31: Canada Bay

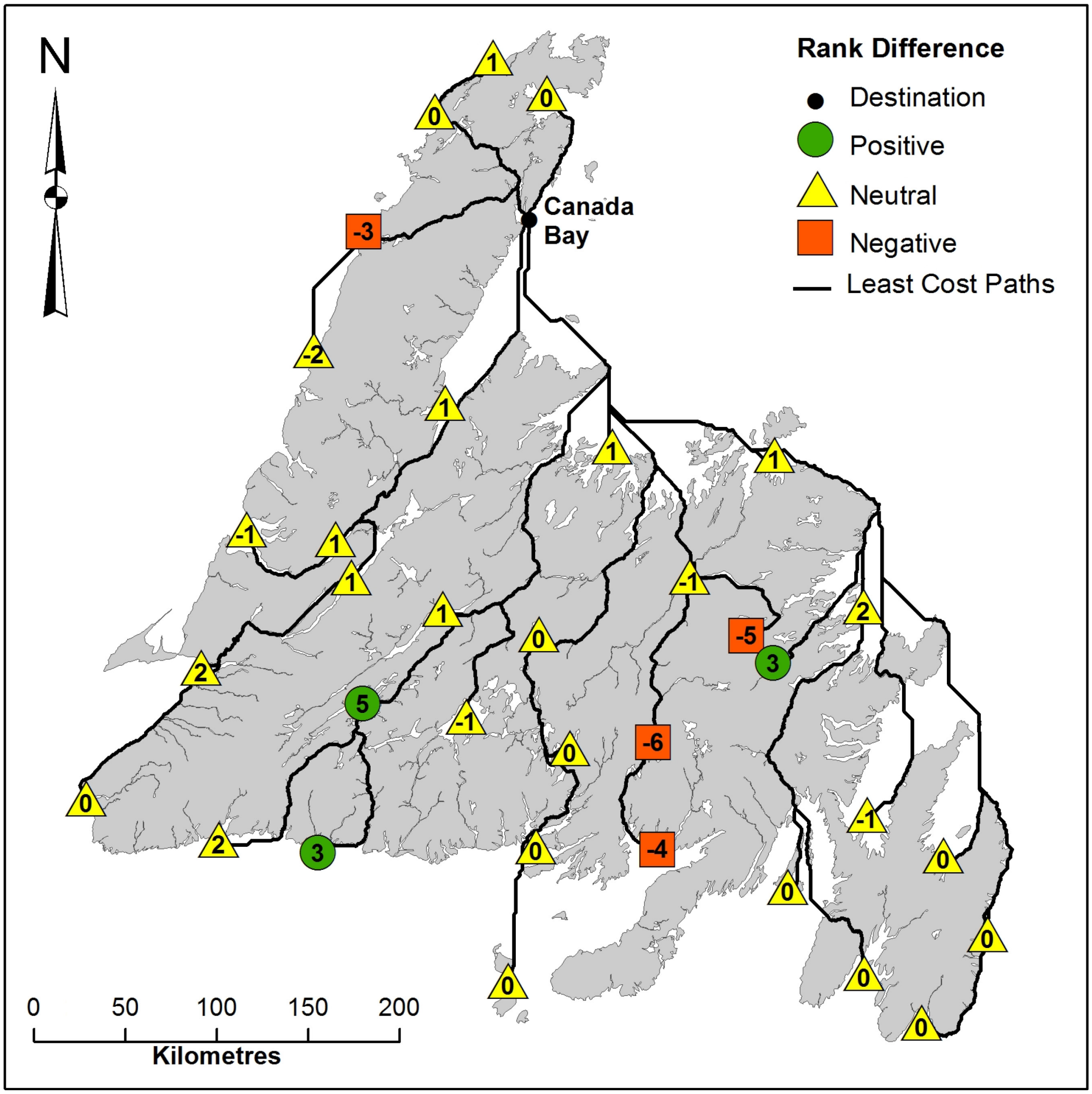

Figure B-33 Modelled travel routes and rank differences for least-cost paths reaching Canada Bay (see Table B-33 for details).

Table B-33 Differences between distance and cost ranks for least-cost paths reaching Canada Bay (see Figure B-33 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Hare Bay	85434	1	363953	1	0
St. Barbe Bay	96680	2	552016	2	0
Ingornachoix Bay	125771	3	865287	6	-3
White Bay	126273	4	556806	3	1
Strait of Belle Isle	146729	5	730179	4	1
Notre Dame Bay	153021	6	744761	5	1
Parsons Pond	199583	7	1234605	9	-2
Hamilton Sound	230670	8	1112935	7	1
Deer Lake	235199	9	1164414	8	1
Gander Lake	250550	10	1332733	11	-1
Grand Lake	263853	11	1246271	10	1
Bay of Islands	308307	12	1391257	13	-1
Red Indian Lake	311068	13	1372847	12	1
Near Pistol Lake	320132	14	1434101	14	0
Gambo River	329573	15	1822488	20	-5
Kaegudeck Lake	358433	16	2009867	22	-6
Meelpaeg Lake	361828	17	1787677	18	-1
Bonavista Bay	366847	18	1682119	16	2
St. George's Bay	380820	19	1750785	17	2
Victoria Lake	384536	20	1591455	15	5
Jeddore Lake	407571	21	1856303	21	0
Terra Nova Lake	424915	22	1814888	19	3
Fortune Bay	440013	23	2342852	27	-4
Hermitage Bay	479067	24	2107093	24	0
Codroy Rivers	489541	25	2141120	25	0
Burgeo	502972	26	2013952	23	3
Trinity Bay	509123	27	2377288	28	-1
La Poile Bay	520966	28	2176015	26	2
Conception Bay	540881	29	2454267	29	0
Saint-Pierre et Miquelon	558546	30	2487755	30	0
Placentia Bay	570758	31	2578484	31	0
Cape Broyle Harbour	584837	32	2703920	32	0
St. Mary's Bay	639493	33	3000467	33	0
Biscay Bay	666896	34	3059773	34	0

Note: A positive rank difference indicates travel to Canada Bay is easier than distance suggests, while a negative difference indicates that travel to Canada Bay is harder than distance implies.

B.2.32 Site 32: Terra Nova Lake

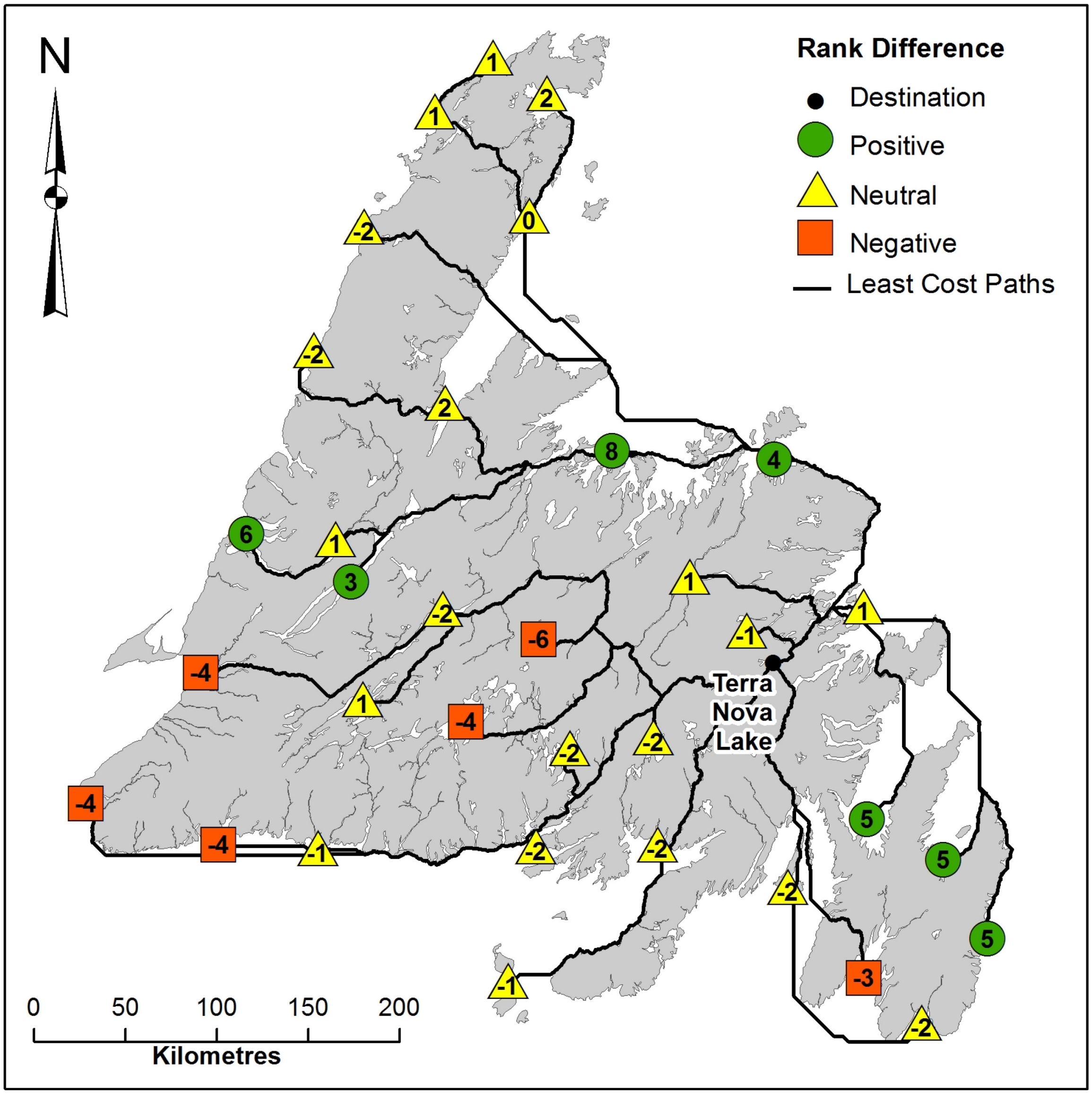

Figure B-34 Modelled travel routes and rank differences for least-cost paths reaching Terra Nova Lake (see Table B-34 for details).

Table B-34 Differences between distance and cost ranks for least-cost paths reaching Terra Nova Lake (see Figure B-34 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Gambo River	53166	1	286328	2	-1
Bonavista Bay	72349	2	233793	1	1
Kaegudeck Lake	111976	3	733953	5	-2
Gander Lake	133812	4	669540	3	1
Fortune Bay	148685	5	926041	7	-2
Placentia Bay	154936	6	935084	8	-2
Near Pistol Lake	182914	7	1314897	13	-6
Hamilton Sound	192764	8	708851	4	4
Jeddore Lake	199034	9	1203420	11	-2
Hermitage Bay	215463	10	1247176	12	-2
Trinity Bay	218683	11	925219	6	5
St. Mary's Bay	223644	12	1357053	15	-3
Meelpaeg Lake	247752	13	1458092	17	-4
Conception Bay	271989	14	1095923	9	5
Saint-Pierre et Miquelon	280871	15	1443354	16	-1
Red Indian Lake	289479	16	1479256	18	-2
Biscay Bay	293448	17	1625029	19	-2
Notre Dame Bay	296588	18	1141537	10	8
Cape Broyle Harbour	315924	19	1345558	14	5
Burgeo	342939	20	1708435	21	-1
Victoria Lake	363013	21	1697864	20	1
La Poile Bay	400784	22	1982697	26	-4
Canada Bay	424508	23	1814876	23	0
White Bay	432089	24	1794534	22	2
St. George's Bay	450226	25	2295125	29	-4
Deer Lake	483502	26	1918719	25	1
Grand Lake	484495	27	1893812	24	3
Codroy Rivers	494705	28	2430263	32	-4
Ingornachoix Bay	495843	29	2402772	31	-2
Hare Bay	510019	30	2177093	28	2
St. Barbe Bay	519770	31	2357438	30	1
Parsons Pond	554657	32	2558464	34	-2
Bay of Islands	555671	33	2143203	27	6
Strait of Belle Isle	569819	34	2535611	33	1

Note: A positive rank difference indicates travel to Terra Nova Lake is easier than distance suggests, while a negative difference indicates that travel to Terra Nova Lake is harder than distance implies.

B.2.33 Site 33: Gambo River

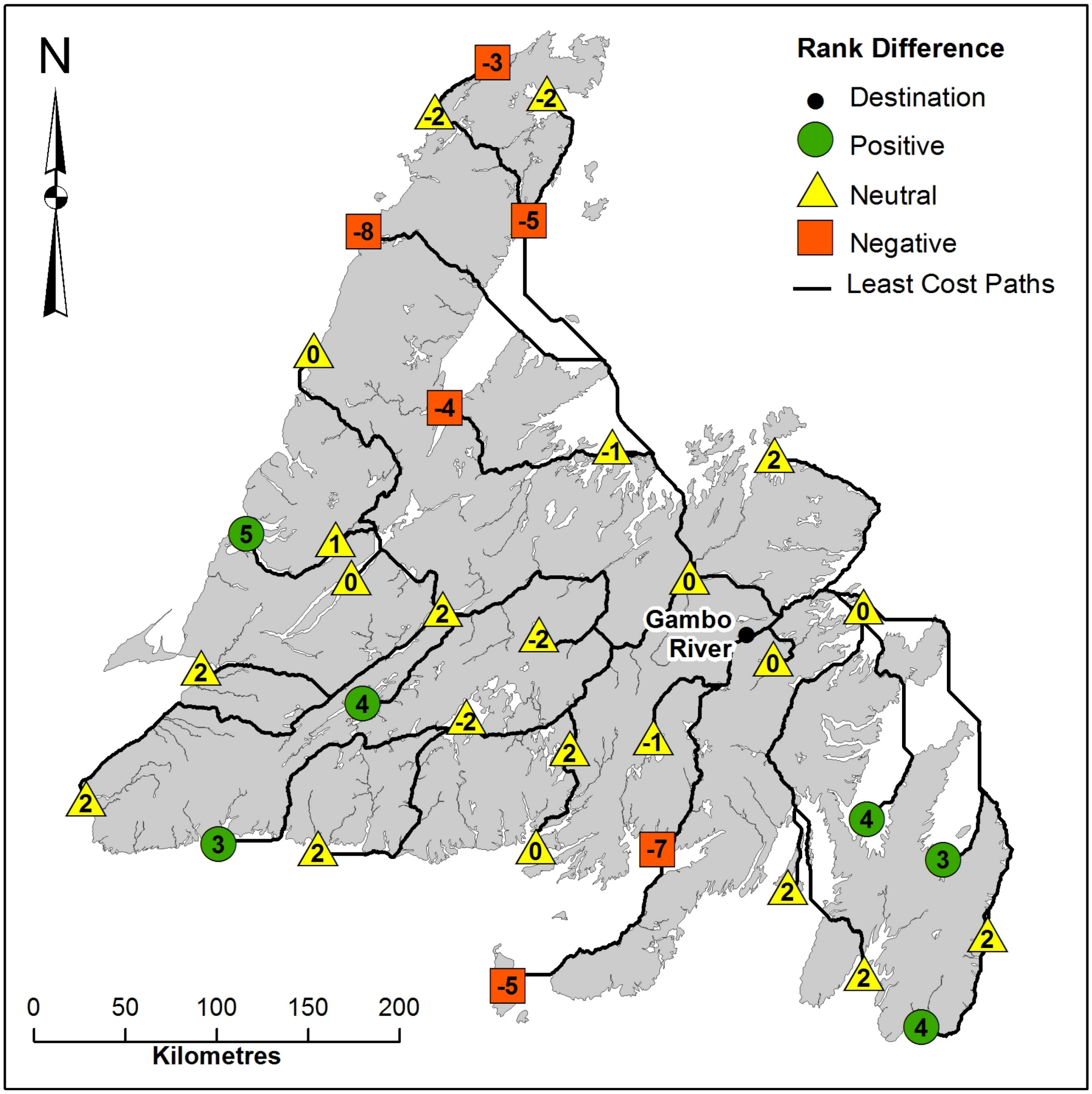

Figure B-35 Modelled travel routes and rank differences for least-cost paths reaching Gambo River (see Table B-35 for details).

Table B-35 Differences between distance and cost ranks for least-cost paths reaching Gambo River (see Figure B-35 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Terra Nova Lake	53101	1	286328	1	0
Bonavista Bay	83068	2	302697	2	0
Gander Lake	86100	3	506117	3	0
Kaegudeck Lake	111712	4	957329	5	-1
Fortune Bay	162508	5	1197210	12	-7
Hamilton Sound	189317	6	734039	4	2
Notre Dame Bay	190136	7	1131640	8	-1
Near Pistol Lake	202374	8	1172822	10	-2
Jeddore Lake	227449	9	1098004	7	2
Trinity Bay	230114	10	1002091	6	4
Meelpaeg Lake	267261	11	1316017	13	-2
Conception Bay	284173	12	1166367	9	3
Placentia Bay	284980	13	1186357	11	2
Saint-Pierre et Miquelon	294693	14	1714522	19	-5
Hermitage Bay	305384	15	1375693	15	0
Red Indian Lake	308999	16	1337184	14	2
White Bay	325561	17	1784637	21	-4
Cape Broyle Harbour	328256	18	1416000	16	2
Canada Bay	329377	19	1822472	24	-5
St. Mary's Bay	353721	20	1608325	18	2
Victoria Lake	382533	21	1555792	17	4
Grand Lake	399936	22	1789263	22	0
Ingornachoix Bay	400713	23	2410369	31	-8
Biscay Bay	410188	24	1771828	20	4
Burgeo	413228	25	1800310	23	2
Deer Lake	413999	26	1851934	25	1
Hare Bay	414888	27	2184690	29	-2
St. Barbe Bay	424640	28	2365034	30	-2
La Poile Bay	459340	29	2065005	26	3
St. George's Bay	469737	30	2153051	28	2
Strait of Belle Isle	474689	31	2543207	34	-3
Bay of Islands	486185	32	2076415	27	5
Parsons Pond	556444	33	2539000	33	0
Codroy Rivers	586054	34	2413897	32	2

Note: A positive rank difference indicates travel to Gambo River is easier than distance suggests, while a negative difference indicates that travel to Gambo River is harder than distance implies.

B.2.34 Site 34: Ingornachoix Bay

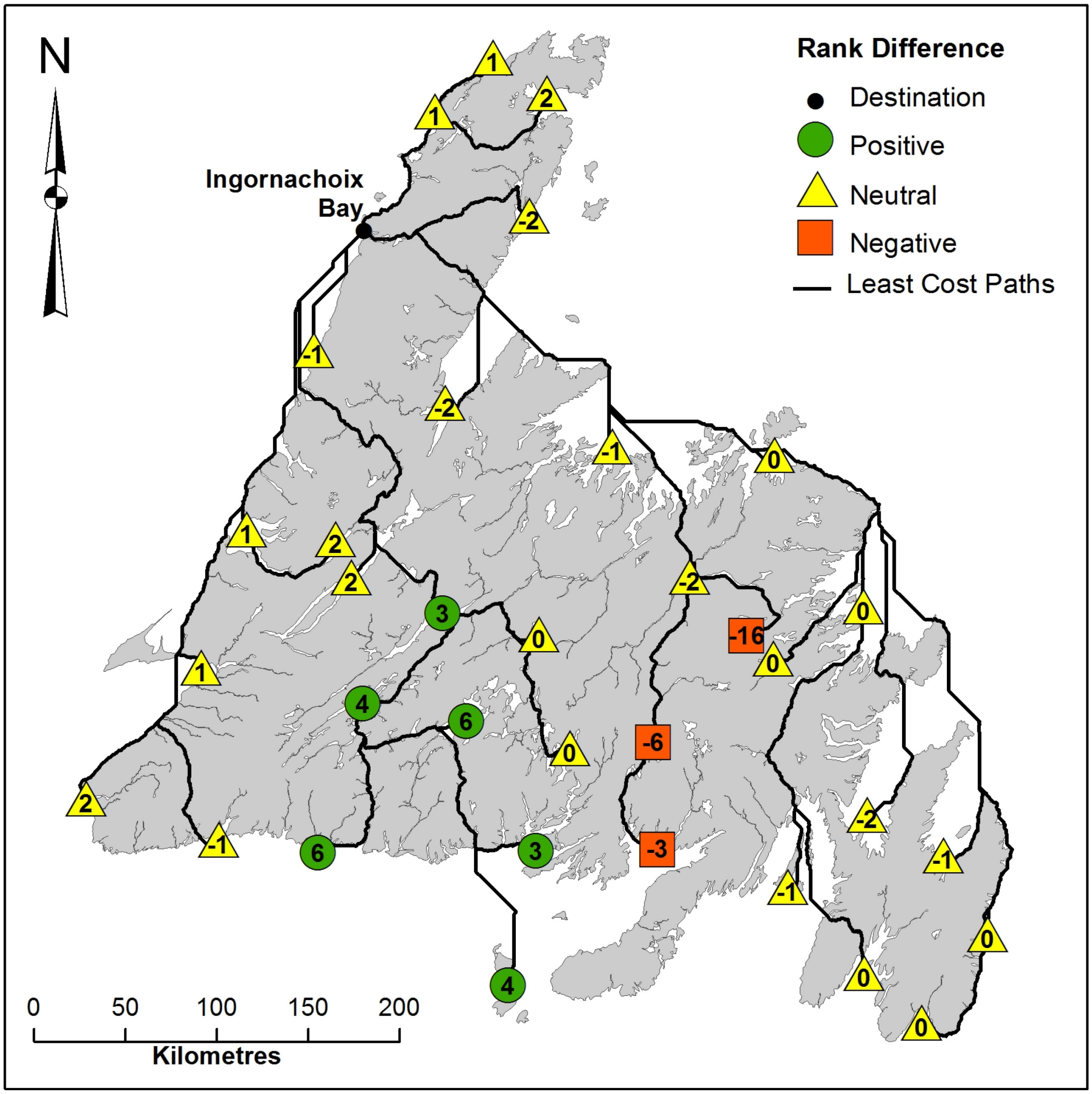

Figure B-36 Modelled travel routes and rank differences for least-cost paths reaching Ingornachoix Bay (see Table B-36 for details).

Table B-36 Differences between distance and cost ranks for least-cost paths reaching Ingornachoix Bay (see Figure B-36 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Parsons Pond	78769	1	393977	2	-1
St. Barbe Bay	96768	2	360707	1	1
Canada Bay	125937	3	865287	5	-2
Strait of Belle Isle	147230	4	541569	3	1
White Bay	165176	5	1034465	7	-2
Hare Bay	186286	6	713880	4	2
Bay of Islands	194994	7	924348	6	1
Gambo Pond	202605	8	2410372	24	-16
Notre Dame Bay	224591	9	1332642	10	-1
Deer Lake	269133	10	1151185	8	2
Grand Lake	282289	11	1260915	9	2
St. George's Bay	295787	12	1337198	11	1
Hamilton Sound	302240	13	1700816	13	0
Gander Lake	322031	14	1920614	16	-2
Red Indian Lake	328072	15	1599162	12	3
Codroy Rivers	386897	16	1709282	14	2
Near Pistol Lake	403135	17	2013620	17	0
La Poile Bay	408720	18	2102324	19	-1
Victoria Lake	411908	19	1842676	15	4
Kaegudeck Lake	429892	20	2597751	26	-6
Bonavista Bay	438417	21	2270000	21	0
Jeddore Lake	479867	22	2347368	22	0
Terra Nova Lake	496485	23	2402778	23	0
Meelpaeg Lake	501910	24	2101697	18	6
Fortune Bay	511471	25	2930736	28	-3
Burgeo	530315	26	2265176	20	6
Trinity Bay	580708	27	2965179	29	-2
Hermitage Bay	603587	28	2515169	25	3
Conception Bay	612416	29	3042196	30	-1
Placentia Bay	642327	30	3166367	31	-1
Saint-Pierre et Miquelon	652220	31	2792184	27	4
Cape Broyle Harbour	656372	32	3291848	32	0
St. Mary's Bay	711063	33	3588350	33	0
Biscay Bay	738431	34	3647701	34	0

Note: A positive rank difference indicates travel to Ingornachoix Bay is easier than distance suggests, while a negative difference indicates that travel to Ingornachoix Bay is harder than distance implies.

B.2.35 Site 35: Kaegudeck Lake

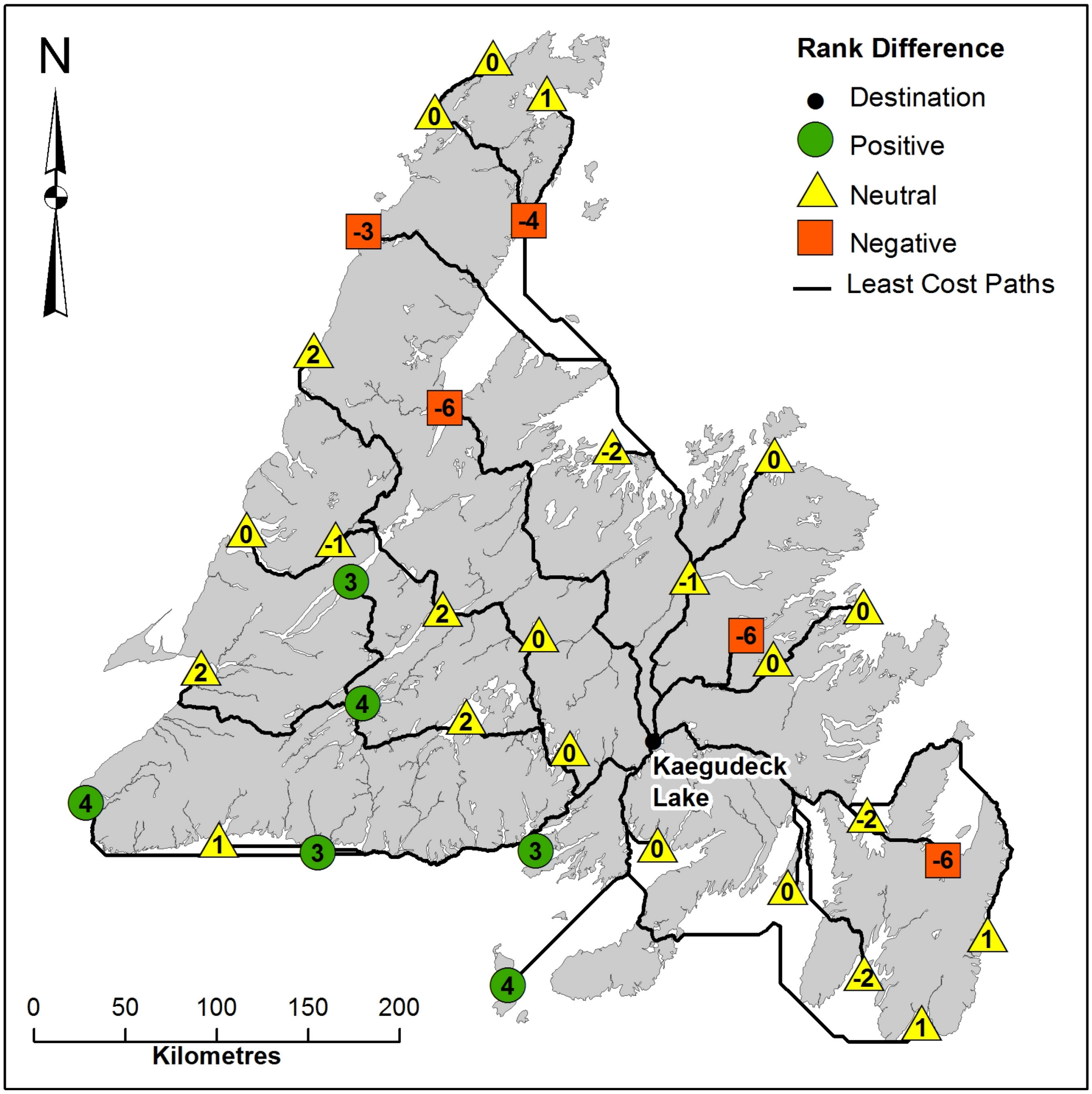

Figure B-37 Modelled travel routes and rank differences for least-cost paths reaching Kaegudeck Lake (see Table B-37 for details).

Table B-37 Differences between distance and cost ranks for least-cost paths reaching Kaegudeck Lake (see Figure B-37 for map).

Departure Location	Least-Cost Path Length [m]	Distance Rank	Least-Cost Path Cost	Cost Rank	Rank Difference
Fortune Bay	81860	1	333529	1	0
Jeddore Lake	101423	2	569753	2	0
Gander Lake	108049	3	677526	4	-1
Gambo River	111723	4	957329	10	-6
Terra Nova Lake	111906	5	733953	5	0
Hermitage Bay	117848	6	613509	3	3
Trinity Bay	163232	7	956249	9	-2
Placentia Bay	171523	8	921632	8	0
Meelpaeg Lake	171634	9	861548	7	2
Saint-Pierre et Miquelon	178850	10	782329	6	4
Bonavista Bay	183659	11	966838	11	0
Near Pistol Lake	187111	12	988904	12	0
Hamilton Sound	203794	13	989417	13	0
Conception Bay	217644	14	1464014	20	-6
Notre Dame Bay	218522	15	1319024	17	-2
St. Mary's Bay	240264	16	1343601	18	-2
Burgeo	245324	17	1074762	14	3
Red Indian Lake	248562	18	1294449	16	2
Victoria Lake	262074	19	1120195	15	4
La Poile Bay	303169	20	1349025	19	1
White Bay	318861	21	1932431	27	-6
Biscay Bay	338051	22	1549835	21	1
Deer Lake	353552	23	1809199	24	-1
Canada Bay	357971	24	2009857	28	-4
Grand Lake	361685	25	1716917	22	3
Cape Broyle Harbour	364916	26	1840763	25	1
Codroy Rivers	397090	27	1796574	23	4
St. George's Bay	411370	28	1869947	26	2
Bay of Islands	425737	29	2033680	29	0
Ingornachoix Bay	429307	30	2597753	33	-3
Hare Bay	443511	31	2372078	30	1
St. Barbe Bay	453234	32	2552420	32	0
Parsons Pond	495997	33	2496265	31	2
Strait of Belle Isle	503283	34	2730593	34	0

Note: A positive rank difference indicates travel to Kaegudeck Lake is easier than distance suggests, while a negative difference indicates that travel to Kaegudeck Lake is harder than distance implies.

Appendix C

Artifact Distribution Analysis Supplementary Data

This appendix provides additional information pertaining to the artifact distribution analysis. It includes a complete list of the sites inventoried during the analysis (Table C-1). This list is more extensive than that presented in Chapter 4 as it includes sites where axes, adzes or gouges are the only diagnostic Archaic tools present. Overall, the inventory of diagnostic Late Archaic stone tools included assemblages associated with 63 sites (24 localities) from the Quebec Lower North Shore, 22 sites (9 localities) from southern Labrador, and 113 sites (81 localities) from Newfoundland. This section also provides summarized counts by principal artifact categories (celts/gouges, ground points, chipped points, and plummets) for all 113 Newfoundland sites inventoried (Table C-2). A set of detailed tables presents the raw data used to create the artifact distributions presented in Chapter 4. The information is divided across 10 tables, each representing a specific artifact form or a set of similar types. Sites with chipped stone points are listed in Tables C-3–C-6, ground stone points in Tables C-7–C-10, and plummets in Tables C-11 and C-12.

Data entries follow the order of presentation established in Chapter 4, moving eastward along the Quebec Lower North Shore and the Strait of Belle Isle in southern Labrador, and clockwise along the Newfoundland coastline, starting on the west coast at foot of the Northern Peninsula. In Tables C-1 and C-2, locality numbers correspond to those presented in Figure C-1. In Tables C-3–C-12, numbers associated with each entry correspond to the numbers assigned to localities in Chapter 4 (Table 4-2 and Figure 4-2). When relevant, entries provide counts for specific artifact forms found at a site. These counts are based on visual inspections of site assemblages, as well as photographs or descriptions available in reports. Individual entries for each artifact, including those not integrated in the distribution analysis, can be found in the photo and artifact databases deposited with the Provincial Archaeology Office and The Rooms Provincial museum as of October 2015. Research copies may be obtained from these institutions. Finally, entries include, when available, known radiocarbon age ranges to provide estimates of the period during which particular artifact forms were in use.

C.1 Sites and Localities

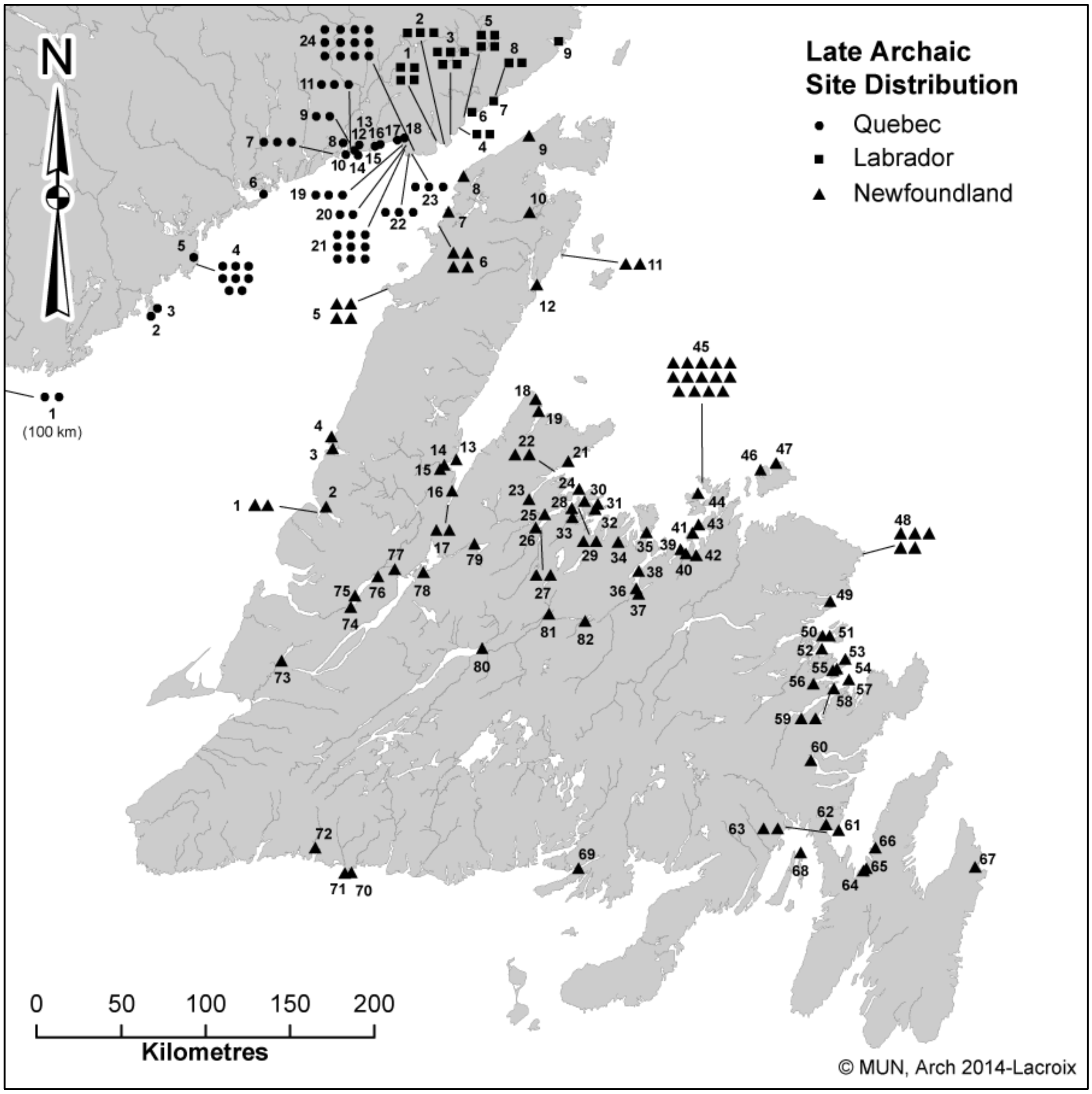

Figure C-1 Complete Late Archaic site distribution for Newfoundland, southern Labrador, and the Lower North Shore in Quebec. Numbers correspond to localities listed in Table C-1. Note Newfoundland locality number 20 is missing as associated find lacks local provenience.

Table C-1 Complete list of Archaic sites and localities included in the analysis.

Site	Locality	Borden	Site Name	Source	Collection[†]
Quebec Lower North Shore					
1	1	EbCi-02	Rivière Kégashka	Site collection	10
2	|	EbCi-05	Havre Kégashka	Site collection	10
3	2	EdBt-01	Petit Mécatina-1	Site collection	10
4	3	EdBt-03	Petit Mécatina-3	Site collection	10
5	4	EeBr-01	La Tabatière	Site collection; Pintal (1998)	10
6	|	EeBr-04	La Tabatière	Site collection	10
7	|	EeBr-05	La Tabatière	Site collection	10
8	|	EeBr-07	La Tabatière	Site collection; Pintal (1998)	10
9	|	EeBr-08	La Tabatière	Site collection	10
10	|	EeBr-09	La Tabatière	Site collection; Pintal (1998)	10
11	|	EeBr-10	La Tabatière	Site collection; Fitzhugh and Gallon (2002); Pintal (1998); Pintal and Boucher (1994)	10
12	|	EeBr-11	La Tabatière	Site collection	10
13	5	EfBr-04	Carrière de l'aéroport de La Tabatière	Site collection	10
14	6	EhBo-15	Île Bayfield	Fitzhugh et al. (2004)	13
15	7	EiBk-09	Poste Vieux-Fort	Martijn (1971); Pintal (1998); Site catalogue	10, 13
16	|	EiBk-18	Church Hall	Site collection; Martijn (1974)	10
17	|	EiBl-01	Vieux Fort	Site collection	10
18	8	EiBk-47	Rivière Saint-Paul	Site collection	10
19	9	EiBk-34	Rivière Saint-Paul	Site collection	10
20	|	EiBk-36	Baie des Esquimaux	Site collection	10
21	10	EiBk-05	Plant	Site collection	10
22	11	EiBk-11	Lac Salé	Martijn (1974)	13
23	|	EiBk-12	Billy Hammers Cove	Site collection; Pintal (1998)	10
24	|	EiBk-13	Portage Cove	Site collection; Pintal (1998)	10
25	12	EiBk-10	Lac Salé	Site collection	10
26	13	EiBj-23	Baie au Saumon	Pintal (1998)	10
27	14	EiBj-05	Salmon Bay Village	Martijn (1971)	13

(continued)

Table C-1 (continued)

Site	Locality	Borden	Site Name	Source	Collection[†]
28	15	EiBi-17	Presqu'île des Belles Amours	Site collection; Pintal (1998)	10
29	16	EiBi-05	Pointe Rocheuse	Site collection; Pintal (1998)	10
30	17	EiBh-47	Baie de Brador	Site collection; Fitzhugh (2001)	10
31	18	EjBh-01	Lac Carré	Site collection	10
32	19	EiBh-41	Brador	Fitzhugh (2001)	13
33	|	EiBh-59	Tumulus de Brador-I	Lévesque (1976); Pintal (1998)	13
34	|	EiBh-132	Blanc-Sablon (route blanche)	Site collection	10
35	20	EiBh-74	Petit lac à Bouleaux	Site collection	10
36	|	EiBh-128	Blanc-Sablon (route blanche)	Site collection	10
37	21	EiBh-27	Anse à la Barque	Site collection; Pintal (1998)	10
38	|	EiBh-02	Lourdes-de-Blanc-Sablon	Site catalogue	10, 12
39	|	EiBh-13	Anse des Dunes	Site collection; Site catalogue	11
40	|	EiBh-15	Anse des Dunes	Site collection	11
41	|	EiBh-18	Lac à la Truite	Site collection	11
42	|	EiBh-20	Anse des Dunes	Lévesque (1976)	13
43	|	EiBh-85	Anse aux Dunes	Site collection	10
44	|	EiBh-86	Anse des Dunes	Pintal (1998)	13
45	|	EiBh-121	Blanc Sablon	Site collection	10
46	22	EiBh-05	Anse des Cailloux	Site catalogue	11
48	|	EiBh-109	Anse Lazy	Site collection	10
49	|	EiBh-123	Blanc Sablon	Site collection	10
47	23	EiBh-44	Blanc-Sablon	Site collection	11
50	|	EiBg-05	Rive-Ouest-de-la-Blanc-Sablon	Site collection; Site catalogue	10, 11
51	|	EiBg-07	Rive-Ouest-de-la-Blanc-Sablon	Site collection; Site catalogue	10, 11
52	24	EiBg-30	Rivière de Blanc-Sablon	Site collection; Lévesque (1976)	11
53	|	EiBg-31	Rivière de Blanc-Sablon	Site collection	11
54	|	EiBg-32	Rivière de Blanc-Sablon	Site collection	11
55	|	EiBg-33	Rivière de Blanc-Sablon	Site collection	11
56	|	EiBg-34	Rivière de Blanc-Sablon	Site collection	11
57	|	EiBg-35	Rivière de Blanc-Sablon	Site collection	11
58	|	EiBg-38	Rivière de Blanc-Sablon	Site collection; Site catalogue	11

(continued)

Table C-1 (continued)

Site	Locality	Borden	Site Name	Source	Collection[†]
59	|	EiBg-43	Rive-Ouest-de-la-Blanc-Sablon	Pintal (1998); Pintal and Groison (1987)	13
60	|	EiBg-49	Rive-Ouest-de-la-Blanc-Sablon	Pintal (1998); Pintal and Groison (1987)	13
61	|	EiBg-55	Ruisseau de l'Est	Site collection	10
62	|	EiBg-58	Ruisseau de l'Est	Site collection	10
63	|	EiBg-59	Ruisseau de l'Est	Site collection; Site catalogue	3, 10
Southern Labrador					
1	1	EiBf-02	Forteau Point	Site collection; Auger and Stopp (1987); Harp (1964a); McGhee and Tuck (1975)	1
2	|	EiBf-05	English Point	Harp (1964a); McGhee and Tuck (1975)	1
3	|	EiBf-06	Graveyard	Site collection; McGhee and Tuck (1975)	1
4	|	EiBf-18	Forteau Bay-8	Balson (2001)	12
--	|	EiBf	Forteau Brook Area	Madden (1976)	1
5	2	EiBf-04	L'Anse Amour	Site collection; Balson (2001); Harp (1964a); Lévesque (1976); McGhee and Tuck (1975)	1, 12
6	|	EiBf-14	Dynamite	Auger and Stopp (1987)	1
--	|	EiBf-25	L'Anse Amour / Point Amour General Collection	Balson (1999)	12
7	3	EjBf-05	New Church	Balson (1999, 2001)	12
8	|	EjBf-10	Old Anglican Church	Balson (1999)	12
9	|	EjBe-58	Royle Normore's Garden	Balson (1999)	12
10	|	EjBe-64	Normore's Hennery	Balson (1999)	12
11	|	EjBe-55	Brook Road-1	Balson (2001)	12
12	4	EjBe-19	Iceberg	Harp (1964a); McGhee and Tuck (1975)	1
13	|	EjBe-71	Capstan Island General Collection	Site collection	1
14	5	EjBe-06	West St. Modeste-2	Harp (1964a); McGhee and Tuck (1975)	1
15	|	EjBe-08	Pinware West-1	Harp (1964a)	1
16	|	EjBe-12	Pinware West-5	Harp (1964a); McGhee and Tuck (1975)	1

(continued)

Table C-1 (continued)

Site	Locality	Borden	Site Name	Source	Collection[†]
17	|	EjBe-24	Black Rock Brook	Madden (1976)	1
--	|	EjBe	Pinware Area	Madden (1976)	1
18	6	EjBe-32	Easter Settlement	McGhee and Tuck (1975)	1
19	7	EkBc-47	MAI in Western Arm	Tuck (1981)	1
20	8	EkBc-39	Tracy Road-1	Tuck (1992)	2
21	|	EkBc-41	Tracy Road-3	Tuck (1992)	2
22	9	FaAx-02	Pitts Harbour-2	Auger and Stopp (1987)	1
23	*10*	*GcBi-07*	*Rattlers Bight-1*	*Site collection; Fitzhugh (1972, 1975a, 1978)*	*1*
24	*11*	*GcBk-13*	*Black Island-2*	*Site collection; Fitzhugh (1975a)*	*1*
Western Northern Peninsula					
1	1	DjBl-04	Woody Point-2	Site collection; Schwarz and Skanes (2010); Site catalogue	1
2	|	DjBl-07	Woody Point-1	Harp (1964a, 1964b)	1, 3
3	2	DjBl-02	Norris Point-1	Site collection; Bishop (1973)	1, 12
4	3	DlBk-01	Cow Head, Spearbank	Site collection; Reid (2007); Site catalogue	1
5	4	DlBk-12	St. Paul's Bay-4	Site record form	12
6	5	EeBi-02	Port au Choix-3	Site collection; Harp (1964a, 1964b); Harp and Hughes (1968); Tuck (1976a); Wintemberg (1940); Site catalogue	1, 4A, 4B, 4C
7	|	EeBi-03	Port au Choix-9	Site collection; Harp (1964a)	1
8	|	EeBi-36	Spence	Site collection	1
9	|	EeBi-42	Gould	Site collection; Reid (2007); Renouf and Bell (2000, 2011)	1, 2
10	6	EgBf-11	Big Droke-1	Site collection; Reader (1998, 1999b); Reid (2007)	1
11	|	EgBf-15	Caines	Site collection; Reader (1998, 1999b), Reid (2007)	1
12	|	EgBf-19	Big Droke-2	Reader (1998)	1

(continued)

Table C-1 (continued)

Site	Locality	Borden	Site Name	Source	Collection[†]
13	|	EgBf-24	Gary Pittman	Site collection; Hartery and Rast (2001); Site catalogue	1
14	7	EgBf-26	Pond Cove Rock Quarry	Site collection; Bell and Renouf (2003)	1
15	8	EhBe-09	Health Care Centre, Flower's Cove	Site record form	12
16	9	EjBa-02	Big Brook-2	Site collection; Beaton (2004); Reid (2007)	2
Eastern Northern Peninsula/White Bay					
17	10	EgBa-01	Main Brook	Site collection; Carignan (1975a)	1
18	11	EfAx-01	Conche	Site collection; Carignan (1975a); Drouin (2005); Lloyd (1876); Pope (2010)	1, 12, 13
19	|	EfAx-07	Taylor's Point	Site collection; Carignan (1975a); Lloyd (1876); Pope (2010)	8, 13
20	12	EeBa-15	Morgan Fillier	Renouf and Lavers (2013)	12
--	|	EeBa	Englee Area	Wintemberg (1940)	13
21	13	DkBe-01	Pittman	Site collection; Linnamae (1975); Site catalogue	1, 3
22	14	DkBf-03	Budden Garden	Site record form	12
23	15	DkBf-04	Pollards Point-2	Site record form	12
24	16	DjBe-01	Brown's Cove	Site collection; Harp (1964a, 1964b)	1
25	17	DjBf-01	Gold Cove-1	Site collection; Harp (1964a, 1964b)	1
26	|	DjBf-02	Gold Cove-2	Harp (1964a, 1964b)	2
27	18	EaBa-10	Shelley Garden	Site collection; Erwin (1998); Thomson (1986, 1989)	1, 7, 12
Notre Dame Bay					
28	19	EaBa-14	Cow Cove-1	Site collection	1
29	20	DlAx-01	Stone Tool	Site collection	1
30	21	DkAx-02	Nipper's Harbour-1	Site collection; Thomson (1989); Site record form	1
31	22	DkAx-08	Smith's Harbour Burial	Site collection; Erwin (2000)	1, 12
32	|	DkAx-09	Shiner Land	Site collection	1

(continued)

Table C-1 (continued)

Site	Locality	Borden	Site Name	Source	Collection†
33	23	DjBb-01	King's Point-2	Penney (1988)	12
34	24	DjAw-19	Oxford	Site record form	12
35	25	DjBa-01	Springdale	Site collection; Site record form	1
36	26	DiBa-01	West Bottom	Site collection	1
37	27	DiBa-03	South Brook-1	Site record form	12
38	|	DiBa-04	South Brook-2	Site record form	12
39	28	DjAx-02	Port Anson-2	Site collection; Site record form	1
40	29	DjAw-06	Miles Cove-1	Site collection; Marshall (1982)	1, 12
41	|	DjAw-07	Miles Cove-2	Site collection; Marshall (1982)	1, 12
42	30	DjAw-10	Paddocks Cove-1	Site collection	1
43	31	DjAv-04	Brighton Tickle Island	Site collection	1
44	32	DjAv-10	Captain Wilfred Bartlett's	Site record form	12
45	33	DiAx-01	Crescent Lake-1	Site collection	1
46	34	DiAu-03	Woodward's Cabin	Site catalogue	3
47	35	DiAt-05	Winter Tickle-1	Site collection	1
48	36	DgAt-08	Peterview-2	Site collection	1
49	37	DgAt-01	Rattling Brook	Site collection	1
50	38	DhAt-03	Winter House Cove-1	Site record form	12
51	39	DhAr-02	Thornley	Site collection	1
52	40	DhAr-01	Campbellton	Site collection; Pastore (1982)	1
53	41	DiAr-05	Newstead-2	Site collection	1
54	42	DhAr-04	Loon Bay-1	Site record form	12
55	43	DiAq-01	Inspector Island	Site collection; Site catalogue	1
56	44	DjAq-01	Curtis	Site collection‡; Thibaudeau (1993)	3, 6 (casts)
57	|	DjAq-02	Anstey	Site collection; Site catalogue	1, 3
58	|	DjAq-03	Dock Road-1	Site collection	1
59	|	DjAq-04	Peyton's Lane	Temple (2007); Site Catalogue	1, 3
60	|	DjAq-05	Back Harbour-3	Site collection; Temple (2007); Site catalogue	1, 3
61	|	DjAq-06	MacLeod-1	Site collection; Site catalogue	1, 3, 6

(continued)

Table C-1 (continued)

Site	Locality	Borden	Site Name	Source	Collection†
62	|	DjAq-07	MacLeod-2	Site collection; Site catalogue	1, 3
63	|	DjAq-17	Tizzard's Harbour Stone Axe	Site record form	12
64	|	DjAq-19	Batrix Island Intertidal North	Site collection	1
65	|	DjAq-20	Batrix Island Intertidal South	Site collection; Westley (2008)	1, 6, 12
66	|	DjAq-21	Peyton's Woods	Site collection	1
67	|	DjAq-24	Back Harbour-5	Site collection	1
68	|	DjAq-25	Back Harbour-6	Site collection	1
69	|	DjAq-30	Ball Field	Site collection	1
70	|	DjAq-32	Center Property, Back Harbour	Site collection	12
--	|	DjAq	Twillingate Area	Lloyd (1876)	13
71	45	DkAn-02	Esso	Holly (1997)	12
72	46	DkAm-01	Baxter Newman's Garden	Holly (1997)	12
Bonavista Bay					
73	47	DhAi-01	Cape Freels-1	Site collection; Carignan (1973)	1
74	|	DhAi-04	Cape Freels-4	Site collection	1
75	|	DhAi-05	Cape Cove-1	Site collection; Austin (1980, 1984)	1
76	|	DhAi-06	Cape Cove-2	Austin (1980)	1
77	|	DhAi-07	Cape Cove-3	Austin (1980)	1
78	48	DgAk-10	Three Coves	Site collection	1
79	49	DeAk-01	Beaches	Site collection; Carignan (1975b); Site catalogue	1, 3, 5, 13
80	50	DeAk-03	Fox Bar	Site collection; Carignan (1973, 1974, 1975b)	1
81	51	DeAl-01	Bloody Bay Cove-1	Site collection; Carignan (1974, 1975b); MacLean (1989, 2004)	1
82	52	DeAj-01	Sailor	Site collection; Carignan (1974); McLean (2004)	1, 5
83	53	DdAk-02	Sandy Cove-1	Site collection; Carignan (1975a)	1
84	54	DdAk-15	Little Sandy Cove-2	Site collection; McLean (2004)	5
85	55	DdAl-03	Cannings Cove	Site collection	1

(continued)

Table C-1 (continued)

Site	Locality	Borden	Site Name	Source	Collection[†]
86	56	DdAj-04	Long Island	Site collection; Tuck (1980)	1
87	57	DdAk-19	Chandler Reach-4	Site collection	4A
88	58	DdAk-03	Clode Sound-1	Site collection; Curtis (2008); Sawicki (1980); Tuck (1980)	4A
89	|	DdAk-04	Clode Sound-2	Site collection; Curtis (2008); Sawicki (1980); Tuck (1980)	4A
Southern Newfoundland					
90	59	DbAl-03	Cooper Axe	Site collection	1
91	60	CkAk-01	Bull Island Lagoon	Site collection	1
92	61	CkAl-04	Sampson's Head Cove	Site collection	1
93	62	CkAl-03	Stock Cove	Site collection; Robbins (1985)	1
94	|	CkAl-10	Stock Cove West	Holly et al. (2011)	1
95	63	CjAj-02	Dildo Island	Site collection; LeBlanc (1996); Marshall (1990)	1
96	64	CjAj-03	Anderson's Cove	Site collection; Site record form	1
97	65	CkAi-01	Hefford Gouge	Site record form	12
98	66	CjAe-50	Waterford River Ground Point	Howley (1915)	13
99	67	CkAm-01	New Grove	Site catalogue	1, 3
100	68	CjAw-01	Eagle Point	Site collection	1
101	69	CjBj-13	Morgan Island-3	Rast (1997, 1998, 1999)	12
102	70	CjBk-06	Upper Burgeo-2	Rast (1997, 1998, 1999)	12
103	71	CkBl-01	Parsons Cabin	Site collection	1
Central Newfoundland					
104	72	DeBn-01	George's Lake-1	Penney (2001)	12
105	73	DgBj-03	South Brook Park	Site collection	1
106	74	DgBj-01	Deer Lake-2	Site collection	9
107	75	DhBi-01	Deer Lake-1	Site collection; Harp (1964a, 1964b)	1, 9
108	76	DhBh-01	Junction Brook	Site collection; Carignan (1975a); Hull (2011)	9
109	77	DhBg-01	Rumbolt	Site collection; Hull (2011)	9
110	78	DiBd-02	Birchy Lake-6	Site collection	1
111	79	DfAw-01	North Angle	LeBlanc (1973)	1, 3

(continued)

Table C-1 (continued)

Site	Locality	Borden	Site Name	Source	Collection†
112	80	DfBa-01	Pope's Point	Site collection; Locke (1974)	1, 3
113	81	DeBd-01	Indian Point	Locke (1975); Site catalogue	3, 13

Notes:

* Sources of information include: 1-original artifact, 2-photograph, 3-written analysis, 4-catalogue entry, and 5-site record form.

† Collection Locations:

1 The Rooms, Provincial Archives, Art Gallery and Museum, St. John's, NL
2 Memorial University, Department of Archaeology, St. John's, NL
3 Canadian Museum of History, Gatineau, QC
4A Parks Canada, Atlantic Collections and Conservation Facility, Dartmouth, NS
4B Parks Canada, Port au Choix National Historic Site Visitor Interpretation Centre, Port au Choix, NL
4C Parks Canada, Lobster Cove Head Lighthouse, Rocky Harbour, NL
5 Burnside Heritage Foundation Museum, Burnside, NL
6 Twillingate Museum, Twillingate, NL
7 Dorset Soapstone Quarry Visitor Centre, Fleur de Lys, NL
8 French Shore Historical Society Interpretation Centre, Conche, NL
9 Deer Lake Public Library, Deer Lake, NL
10 Laboratoire et réserve en archéologie du Québec, Quebec, QC
11 Musée régional de la Côte-Nord, Sept-Îles, QC
12 Private collections, various locations
13 Unknown

‡ Includes DjAq-1 museum reproduction casts on display at the Twillingate Museum.

Table C-2 Summary of diagnostic artifact counts for Newfoundland Archaic localities.

Locality	Sites	Gouges/ Celts[1]	Ground Points	Chipped Points	Plummets	Totals
Western Northern Peninsula		*147*	*87*	*28*	*6*	*268*
1	DjBl-04, DjBl-07	24	12	2	0	38
2	DjBl-02	2	0	0	0	2
3	DlBk-12	1	0	0	0	1
4	DlBk-01	2	1	2	1	6
5	EeBi-02, EeBi-03, EeBi-36, EeBi-42	101	67	12	5	185
6	EgBf-11, EgBf-15, EgBf-19, EgBf-24	13	6	10	0	29
7	EgBf-26	2	0	0	0	2
8	EhBe-09	1	0	0	0	1
9	EjBa-02	1	1	2	0	4
Eastern Northern Peninsula/White Bay		*41*	*10*	*11*	*5*	*67*
10	EgBa-01	0	1	0	0	1
11	EfAx-01, EfAx-07	10	4	3	1	18
12	EeBa-15	1	0	1	0	2
13	DkBe-01	12	2	0	0	14
14	DkBf-03	2	0	0	1	3
15	DkBf-04	1	0	0	0	1
16	DjBe-01	1	0	2	0	3
17	DjBf-01, DjBf-02	1	1	4	0	6
18	EaBa-10	13	2	1	3	19
Notre Dame Bay		*439*	*117*	*34*	*47*	*637*
19	EaBa-14	3	0	0	0	3
20	DlAx-01 (unknown location)	1	0	0	0	1
21	DkAx-02	32	5	2	2	41
22	DkAx-08, DkAx-09	3	8	0	2	13
23	DjBb-01	1	0	0	0	1
24	DjAw-19	1	0	0	0	1
25	DjBa-01	2	0	0	0	2
26	DiBa-01	1	0	0	0	1
27	DiBa-03, DiBa-04	5	0	0	0	5
28	DjAx-02	1	0	0	0	1
29	DjAw-06, DjAw-07	10	4	1	0	15
30	DjAw-10	1	0	0	0	1
31	DjAv-04	23	6	0	1	30
32	DjAv-10	2	0	0	0	2
33	DiAx-01	1	0	0	0	1
34	DiAu-03	3	0	0	0	3

(continued)

Table C-2 (continued)

Locality	Sites	Gouges/ Celts[1]	Ground Points	Chipped Points	Plummets	Totals
35	DiAt-05	5	2	1	0	8
36	DgAt-08	1	0	0	0	1
37	DgAt-01	9	2	1	1	13
38	DhAt-03	8	0	0	0	8
39	DhAr-02	1	0	0	0	1
40	DhAr-01	1	0	1	0	2
41	DiAr-05	2	0	0	0	2
42	DhAr-04	1	0	0	0	1
43	DiAq-01	3	1	0	0	4
44	DjAq-17	1	0	0	0	1
45	DjAq-01, DjAq-02, DjAq-03, DjAq-04, DjAq-05, DjAq-06, DjAq-07, DjAq-19, DjAq-20, DjAq-21, DjAq-24, DjAq-25, DjAq-30, DjAq-32	316	89	28	41	474
46	DkAn-02	1	0	0	0	1
47	DkAm-01	1	0	0	0	1
Bonavista Bay		*77*	*20*	*40*	*1*	*138*
48	DhAi-01, DhAi-04, DhAi-05, DhAi-06, DhAi-07	13	0	6	0	19
49	DgAk-10	1	0	0	0	1
50	DeAk-01	27	11	15	0	53
51	DeAk-03	4	0	4	1	9
52	DeAl-01	3	0	5	0	8
53	DeAj-01	8	2	1	0	11
54	DdAk-02	6	1	1	0	8
55	DdAk-15	0	1	0	0	1
56	DdAl-03	0	0	1	0	1
57	DdAj-04	0	1	2	0	3
58	DdAk-19	1	0	0	0	1
59	DdAk-03, DdAk-04	14	4	5	0	23
Trinity Bay		*15*	*9*	*2*	*1*	*27*
60	DbAl-03	1	0	0	0	1
61	CkAk-01	1	0	0	0	1
62	CkAl-04	2	0	0	0	2
63	CkAl-03, CkAl-10	7	7	1	1	16
64	CjAj-02	1	2	1	0	4
65	CjAj-03	2	0	0	0	2
66	CkAi-01	1	0	0	0	1

(continued)

Table C-2 (continued)

Locality	Sites	Gouges/ Celts[1]	Ground Points	Chipped Points	Plummets	Totals
Southern Newfoundland[2]		*7*	*3*	*5*	*0*	*15*
67	CjAe-50	0	1	0	0	1
68	CkAm-01	2	2	1	0	5
69	CjAw-01	2	0	0	0	2
70	CjBj-13	2	0	3	0	5
71	CjBk-06	0	0	1	0	1
72	CkBl-01	1	0	0	0	1
Central Newfoundland[3]		*30*	*2*	*6*	*1*	*39*
73	DeBn-01	2	0	0	0	2
74	DgBj-03	1	0	0	1	2
75	DgBj-01	1	0	0	0	1
76	DhBi-01	1	0	1	0	2
77	DhBh-01	2	0	0	0	2
78	DhBg-01	12	2	0	0	14
79	DiBd-02	1	0	0	0	1
80	DeBd-01	6	0	3	0	9
81	DfBa-01	3	0	2	0	5
82	DfAw-01	1	0	0	0	1
	Totals	756	249	125	61	1191

Notes: Counts are only rough approximations offering a broad assessment of the diagnostic material present across the island as they had to be compiled from a variety of sources, some providing very few details.

1 The term “celt” is used here to refer to adzes, axes, preforms, and fragments not attributable to a specific type.

2 Southern Newfoundland is a broad category that includes sites located on the South Coast, Burin Peninsula, Placentia Bay, and Avalon Peninsula.

3 Central Newfoundland includes sites located 30 km or more from the coast.

C.2 Chipped Stone Tools

Table C-3 Sites with *Rattlers Bight/La Tabatière/Back Harbour* complexes assemblage.

No.[†]	Borden	Site Name	Points	Radiocarbon Date	Source
Quebec Lower North Shore					
1	EdBt-03	Petit Mécatina-3	1		Site collection
2	EeBr-01	La Tabatière	+	3910±90 (Beta-67796)	Pintal (1998)
2	EeBr-07	La Tabatière	1		Pintal (1998)
2	EeBr-09	La Tabatière	+		Pintal (1998)
2	EeBr-10	La Tabatière	3		Fitzhugh and Gallon (2002); Pintal (1998)
6	EiBk-05	Plant	2		Site collection
10	EiBi-17	Presqu'île des Belles Amours	1	4470±450 (Beta-19634)–4010±130 (Beta-11691)	Pintal (1998)
11	EiBi-05	Pointe Rocheuse	+	4930±1200 (UQ-733)–3500±300 (UQ-732)	Pintal (1998)
12	EiBh-47	Baie de Brador	1		Fitzhugh (2001)
13	EiBh-59	Tumulus de Brador I	+		Pintal (1998)
13	EiBh-132	Blanc-Sablon (route blanche)	1		Site collection
14	EiBh-27	Anse à la Barque	+		Pintal (1998)
14	EiBh-86	Anse des Dunes	1	3840±90 (Beta-39883)	Pintal (1998)
15	EiBh-44	Blanc-Sablon	1		Site collection
16	EiBg-30	Rivière de Blanc-Sablon	2		Lévesque (1976); Site collection
16	EiBg-58	Ruisseau de l'Est	1		Site collection
Southern Labrador					
17	EiBf-02	Forteau Point	5	5561±60 (P-691)–5035±65 (SI-2311)*	Harp (1964a); McGhee and Tuck (1975)
17	EiBf-18	Forteau Bay-8	3		Balson (2001)
18	EiBf-04	L'Anse Amour	19	4105±95 (I-7544), Area 5	Balson (2001); Harp (1964a)
19	EjBf-10	Old Anglican Church	1		Balson (1999)
19	EjBe-64	Normore's Hennery	1		Balson (1999)
22	EjBe-32	Easter Settlement	4		McGhee and Tuck (1975)
23	EkBc-47	MAI in Western Arm	1		Tuck (1981)
--	*GcBi-07*[‡]	*Rattlers Bight-1*	*65*	*4525±155 (SI-929)–3370±50 (SI-2518)*	*Site collection; Fitzhugh (1972, 1975a, 1978)*

(continued)

Table C-3 (continued)

No.†	Borden	Site Name	Points	Radiocarbon Date	Source
Newfoundland					
28	EeBi-02	Port au Choix-3	1	4290±110 (I-3788)–3230±220 (I-4380)	Site collection
29	EgBf-15	Caines	1	3600±60 (Beta-108562)–3490±80 (Beta-113405)	Reader (1999b)
32	EfAx-01	Conche	2		Pope (2007)
35	EaBa-10	Shelley Garden	2		Thomson (1986); Site collection
40	DiAt-05	Winter Tickle-1	1		Site collection
43	DjAq-01	Curtis	3	3720±130 (GaK-834)–3200±90 (GaK-1254)	Thibaudeau (1993)
43	DjAq-02	Anstey	2		Site collection
43	DjAq-04	Peyton's Lane	1		Temple (2007)
43	DjAq-07	MacLeod-2	3		Site collection
43	DjAq-30	Ball Field	1		Site collection
45	DeAk-01	Beaches	5††	4900±230 (SI-1384)–3690±100 (I-6761); Cultural Layer 2	Carignan (1975b)
48	DeAj-01	Sailor	1		McLean (2004)

Notes: See Figure 4-4 for spatial distribution.

† Numbers correspond to locality numbers presented in Figure 4-2.

+ No chipped points are present but locality assemblage is consistent with La Tabatière complex or Rattlers Bight phase.

‡ Rattlers Bight-1 material included for comparison only.

†† At least two of these specimens may be associated with the Recent Indian Cow Head complex.

* Dated material from EeBf-02 is not directly associated with the points, but older features (see Appendix A for details).

Table C-4 Sites with *Bonne-Espérance* complex assemblage.

No.[†]	Borden	Site Name	Points	Radiocarbon Date	Source
Quebec Lower North Shore					
4	EhBo-15	Île Bayfield	2		Fitzhugh et al. (2004)
5	EiBk-09	Poste Vieux-Fort	12	3450±60 (Beta-52488)	Pintal (1998)
5	EiBk-18	Church Hall	+		Martijn (1974)
7	EiBk-11	Lac Salé	+		Martijn (1974)
7	EiBk-12	Billy Hammers Cove	+		Pintal (1998)
7	EiBk-13	Portage Cove	+		Pintal (1998)
8	EiBj-23	Baie au Saumon	+	4740±120 (Beta-67254)	Pintal (1998)
9	EiBj-05	Salmon Bay village	+		Martijn (1971)
16	EiBg-43	Rive-Ouest-de-la-Blanc-Sablon	2	2870±90 (Beta-23005)–2690±60 (Beta-23008)	Pintal (1998) Pintal and Groison (1987)
16	EiBg-49	Rive-Ouest-de-la-Blanc-Sablon	+		Pintal (1998); Pintal and Groison (1987)
Southern Labrador					
17	EiBf-02	Forteau Point	4	5561±60 (P-691)–5035±65 (SI-2311)*	McGhee and Tuck (1975); Auger and Stopp (1987)
17	EiBf-05	English Point	+		Harp (1964a); McGhee and Tuck (1975)
17	EiBf-06	Graveyard	6	4450±85 (SI-2307)–4285±85 (SI-2308)	McGhee and Tuck (1975); Site collection
17	EiBf	Forteau Brook Area	1		Madden (1976)
18	EiBf-04	L'Anse Amour	11	4105±95 (I-7544), Area 5	Balson (2001); McGhee and Tuck (1975); Site collection
18	EiBf-14	Dynamite	+		Auger and Stopp (1987)
18	EiBf-25	L'Anse Amour General Collection	3		Balson (1999)
19	EjBf-10	Old Anglican Church	1		Balson (1999)
19	EjBe-58	Royle Normore's Garden	1		Balson (1999)
20	EjBe-19	Iceberg	+		Harp (1964a); McGhee and Tuck (1975)
20	EjBe-71	Capstan Island General Collection	2		Site collection
21	EjBe-06	West St. Modeste-2	1		Harp (1964a); McGhee and Tuck (1975)
21	EjBe-08	Pinware West-1	+		Harp (1964a)
21	EjBe-12	Pinware West-5	+		Harp (1964a); McGhee and Tuck (1975)
21	EjBe-24	Black Rock Brook	5		Madden (1976)
21	EjBe	Pinware Area	1		Madden (1976)
22	EjBe-32	Easter Settlement	1		McGhee and Tuck (1975)
24	EkBc-39	Tracy Road-1	+		Tuck (1992)

(continued)

Table C-4 (continued)

No.[†]	Borden	Site Name	Points	Radiocarbon Date	Source
24	EkBc-41	Tracy Road-3	1		Tuck (1992)
25	FaAx-02	Pitts Harbour	1		Auger and Stopp (1987)
Newfoundland					
28	EeBi-02	Port au Choix-3	1	3825±60 (AA-29482)–3777±44 (AA-33919); Burial 35	Tuck (1976a)
28	EeBi-42	Gould	4	4060±80 (Beta-146081)–3200±100 (Beta-132364); Younger Component	Reid (2007); Renouf and Bell (2011)
29	EgBf-15	Caines	1	3600±60 (Beta-108562); Feature 2	Reader (1999b); Reid (2007)
30	EjBa-02	Big Brook-2	1	4090±40 (Beta-177106)–3820±40 (Beta-171715)	Beaton (2004)

Notes: See Figure 4-4 for spatial distribution.

† Numbers correspond to locality numbers presented in Figure 4-2.

\+ No chipped points are present but locality assemblage is consistent with Bonne-Espérance complex.

* Dated material from EeBf-02 is not associated with the points, but older features (see Appendix A for details).

Table C-5 Sites with *Black Island/Bonavista* complexes assemblage.

No.†	Borden	Site Name	Points	Radiocarbon Date	Source
Labrador					
--	*GcBk-13‡*	*Black Island-2*	*11*	*4890±90 (SI-1787)–3125±55 (SI-1275); nearby beach emerged ca. 4200 BP*	*Site collection; Fitzhugh (1975a)*
Newfoundland					
34	DkBe-01	Pittman	+		Linnamae (1975); Devereux (1969)
43	DjAq-01	Curtis	2	3720±130 (GaK-834)–3200±90 (GaK-1254)	Thibaudeau (1993)
44	DhAi-05	Cape Cove-1	+	4540±135 (S-1859)–3615±120 (S-1860)	Austin (1980)
44	DhAi-07	Cape Cove-3	+		Austin (1980)
45	DeAk-01	Beaches	4	4900±230 (SI-1384)–3690±100 (I-6761); Cultural Layer 2	Carignan (1975b)
46	DeAk-03	Fox Bar	+		Carignan (1974)
47	DeAl-01	Bloody Bay Cove	1		Carignan (1974, 1975b)
52	DdAj-04	Long Island	1		Tuck (1980)

Notes: See Figure 4-4 for spatial distribution.

† Numbers correspond to locality numbers presented in Figure 4-2.

‡ Black Island-2 material included for comparison only.

\+ No chipped points are present but locality assemblage is consistent with Bonavista complex.

Table C-6 Newfoundland sites with chipped point forms not currently associated with a complex.

No.†	Borden	Site Name	Points	Radiocarbon Date	Source
Flaring Shoulder (Cape Cove form)					
26	DjBl-07	Woody Point-1	1		Harp (1964a)
42	DhAr-01	Campbellton	1		Site collection
44	DhAi-05	Cape Cove-1	1	4540±135 (S-1859); Feature 1, Layer 5	Austin (1980)
45	DeAk-01	Beaches	1	4900±230 (SI-1384)–3690±100 (I-6761)	Carignan (1975b)
49	DdAk-02	Sandy Cove-1	1		Carignan (1975a)
56	CjBk-06	Upper Burgeo	1		Rast (1998)
Straight Stem (Cannings Cove form)					
43	DjAq-01	Curtis	1	3720±130 (GaK-834)–3200±90 (GaK-1254)	Thibaudeau (1993)
47	DeAl-01	Bloody Bay Cove-1	1		Carignan (1974)
51	DdAl-03	Cannings Cove	1		Site collection
57	DhBi-01	Deer Lake	1		Harp (1964a)

Notes: See Figure 4-4 for spatial distributions.

† Numbers correspond to locality numbers presented in Figure 4-2.

C.3 Ground Stone Tools

Table C-7 Sites with narrow stem ground slate points (*Back Harbour* form).

No.[†]	Borden	Site Name	Points	Notes	Source
Quebec Lower North Shore					
2	EeBr-09	La Tabatière	1		Pintal (1998)
2	EeBr-10	La Tabatière	7	Wider stem than typical; possibly twice as many specimens found (Pintal 1998:115)	Pintal and Boucher (1994)
3	EfBr-04	Carrière de l'aéroport de La Tabatière	1	Wider stem than typical	Site collection
13	EiBh-41	Brador	1	Wider stem than typical, part of burial cache deposit	Fitzhugh (2001)
--	QLNS	Other non-specified locations	2	Tip and body fragments	Pintal (1998)
Southern Labrador					
17	EiBf-02	Forteau Point	2		Harp (1964a)
18	EiBf-04	L'Anse Amour	24	Includes a long-bladed specimen; 20 found in cache	Harp (1964a); Lévesque (1976)
19	EjBe-55	Brook Road-1	1		Balson (2001)
--	*GcBi-07*[‡]	*Rattlers Bight-1*	*9*	*Includes 1 long-bladed, 3 miniatures, and 2 red specimens*	*Site collection*
Newfoundland					
26	DjBl-04	Woody Point-2	3	Red, includes 2 distal fragments	Schwarz and Skanes (2010)
28	EeBi-02	Port au Choix-3	7	Includes 2 red specimens and 2 miniatures, from 4 burials and stray finds	Tuck (1976a)
31	EgBa-01	Main Brook	1		Carignan (1975a)
32	EfAx-01	Conche	1	Red, 2 non-refitting fragments	Site collection
34	DkBe-01	Pittman	1		Linnamae (1975)
35	EaBa-10	Shelley Garden	1		Site collection
38	DjAw-07	Miles Cove-2	1		Site collection
39	DjAv-04	Brighton Tickle Island	2	Includes 1 red tip fragment	Site collection
41	DgAt-01	Rattling Brook	1		Site collection
43	DjAq-01	Curtis	27	Most long-bladed, includes 2 red and 4 notched stem specimens, from 8 burials and stray finds	Thibaudeau (1993)
43	DjAq-05	Back Harbour-3	5	Includes 2 red specimens; catalogue records mention at least 28 ground point fragments	Temple (2007); Site catalogue

(continued)

Table C-7 (continued)

No.[†]	Borden	Site Name	Points	Notes	Source
43	DjAq-20	Batrix Island Intertidal South	1	Red, water-rolled	Site collection
43	DjAq	Twillingate Area	1		Lloyd (1876)
45	DeAk-01	Beaches	1		Site collection
48	DeAj-01	Sailor	1	Red	Site collection
49	DdAk-02	Sandy Cove-1	1	Red	Carignan (1975a)
50	DdAk-15	Little Sandy Cove-2	1	Red	Site collection
52	DdAj-04	Long Island	1	Red, tip only	Tuck (1980)
54	CkAl-03	Stock Cove	1	Red, unusual multi-faceted stem	Site collection
55	CjAe-50	Waterford River Ground Point	1		Howley (1915)

Notes: See Figure 4-5 for spatial distribution.

† Numbers correspond to locality numbers presented in Figure 4-2.

‡ Rattlers Bight-1 material included for comparison only.

Table C-8 Sites with broad hexagonal ground slate points.

No.[†]	Borden	Site Name	Points	Notes	Source
Quebec Lower North Shore					
5	EiBk-09	Poste Vieux-Fort	1	Tapering stem with margin notches and expanding base[1]	Martijn (1971)
Southern Labrador					
17	EiBf-02	Forteau Point	1	Badly eroded, cross-section uncertain, square-stemmed, similar to EiBf-04 specimen	McGhee and Tuck (1975)
18	EiBf-04	L'Anse Amour	2	Includes 1 flattened diamond, long-bladed, and 1 flattened diamond, short bladed, expanding stem similar to EeBi-42 specimen	Balson (2001); Harp (1964a)
Newfoundland					
28	EeBi-02	Port au Choix-3	11	Includes 4 banded slate specimens, from 4 burials	Tuck (1976a)
28	EeBi-42	Gould	1	Flattened diamond, expanding base; predates burial ground	Reid (2007)
45	DeAk-01	Beaches	1		Carignan (1975b)
53	DdAk-03	Clode Sound-1	1	Weakly defined tapering stem	Sawicki (1980)
58	DhBg-01	Rumbolt	2	Peculiar sub-form with rounded base and double notches at the neck; includes 1 specimen from cache and second nearby find	Site collection

Notes: See Figure 4-5 for spatial distribution.

† Numbers correspond to locality numbers presented in Figure 4-2.

Table C-9 Sites with transitional ground slate point forms not included in analysis.

No.†	Borden	Site Name	Points	Notes	Source
Southern Labrador					
18	EiBf-04	L'Anse Amour	1	hexagonal, thin stem, blade with serrated edges, banded slate	Harp (1964a)
Newfoundland					
28	EeBi-02	Port au Choix-3	5	3 facets/convex, thin stem, from 4 burials	Tuck (1976a)
30	EjBa-02	Big Brook-2	1	3 facets/convex, thin broken stem, unusually small specimen	Beaton (2004)
33	EeBa	Englee Area	1	3 facets/unknown, thin stem	Wintemberg (1940)
39	DjAv-04	Brighton Tickle Island	2	1 hexagonal with thin stem; 1 hexagonal mid-section	Site collection
40	DiAt-05	Winter Tickle	1	3 facets/convex, mid-section	Site collection
43	DjAq-01	Curtis	1	3 facets/convex, thin stem, from 1 burial	Thibaudeau (1993)
48	DeAj-01	Sailor	1	3 facets/convex, broken notched stem	Site collection

† Numbers correspond to locality numbers presented in Figure 4-2.

Table C-10 Sites with pie-wedge bayonets

No.[†]	Borden	Site Name	Points	Notes	Source
Quebec Lower North Shore					
7	EiBk-13	Portage Cove	1	Banded grey slate	Pintal (1998)
Southern Labrador					
17	EiBf-02	Forteau Point	1	Banded grey slate	Harp (1964a)
18	EiBf-04	L'Anse Amour	2	Stubby specimens	Balson (2001); McGhee and Tuck (1975)
Newfoundland					
26	DjBl-04	Woody Point-2	6		Schwarz and Skanes (2010)
28	EeBi-02	Port au Choix-3	34	Includes 20 complete; 11 red, 5 banded grey, and 1 black; from 16 burials and other find spots	Tuck (1976a)
28	EeBi-03	Port au Choix-9	1	Red, complete	Harp (1964a)
32	EfAx-01	Conche	2	Fragments, possibly part of single specimen	Carignan (1975a)
36	DkAx-02	Nipper's Harbour	1	Red	Thomson (1989)
37	DkAx-08	Smith's Harbour Burial	6	Includes 2 complete	Site collection
43	DjAq-01	Curtis	6	All complete specimens, from Burials 4, 6, 13, and Trench A-3	Thibaudeau (1993)
43	DjAq-04	Peyton's Lane	1	Red with lengthwise groove along centre of blade	Temple (2007)
43	DjAq-05	Back Harbour-3	6	Includes 1 complete miniature	Site collection; Temple (2007)

Notes: See Figure 4-5 for spatial distribution.

† Numbers correspond to locality numbers presented in Figure 4-2.

Table C-11 Sites with top-grooved plummets.

No.[†]	Borden	Site Name	Plummets	Notes	Source
Southern Labrador					
19	EjBf-05	New Church	2		Balson (1999, 2001)
22	EjBe-32	Easter Settlement	1	Heat shattered	McGhee and Tuck (1975)
23	EkBc-47	MAI in Western Arm	1		Tuck (1981)
--	*GcBi-07*[‡]	*Rattlers Bight-1*	*19*	*All from general site, 3 also perforated*	*Site collection*
Newfoundland					
27	DlBk-01	Cow Head, Spearbank	1		Reid (2007)
28	EeBi-02	Port au Choix-3	4		Tuck (1976a)
32	EfAx-07	Taylor's Point	1	Previously assigned to EfAx-01	Carignan (1975a); Pope (2010)
35	EaBa-10	Shelley Garden	1		Site collection
36	DkAx-02	Nipper's Harbour-1	1		Site collection
37	DkAx-08	Smith's Harbour Burial	2		Site collection
39	DjAv-04	Brighton Tickle Island	1		Site collection
43	DjAq-01	Curtis	4		Thibaudeau (1993)
43	DjAq-02	Anstey	2		Site collection
43	DjAq-05	Back Harbour-3	5	Includes 2 with grooved neck only	Temple (2007); Site collection
43	DjAq-07	MacLeod-2	1		Site collection
43	DjAq-20	Batrix Island Intertidal South	3	Includes 1 with grooved neck only	Site collection
43	DjAq	Twillingate Area	1	Has pointed protuberance recalling a dorsal fin.	Lloyd (1876)

Notes: See Figure 4-6 for spatial distribution.

† Numbers correspond to locality numbers presented in Figure 4-2.

‡ Rattlers Bight-1 material included for comparison only.

Table C-12 Sites with other plummets forms or netsinkers.

No.[†]	Borden	Site Name	Plummets	Notes	Source
Pecked Knob Form					
35	EaBa-10	Shelley Garden	2	Only neck is pecked	Site collection; Thomson (1986)
43	DjAq-05	Back Harbour-3	1		Temple (2007)
46	DeAk-03	Fox Bar	1		Carignan (1975b)
--	*GcBi-07*[‡]	*Rattlers Bight-1*	*3*	*2 from general site, 1 from Burial B*	*Site collection*
Longitudinally Grooved Cobble (Netsinker)					
41	DgAt-01	Rattling Brook	1		Site collection
43	DjAq-05	Back Harbour-3	8		Site collection
43	DjAq-20	Batrix Island Intertidal South	1		Westley (2008)
54	CkAl-10	Stock Cove West	1		Holly et al. (2011)
Preforms, Perforated, or Undetermined					
28	EeBi-02	Port au Choix-3	1	Preform (?)	Tuck (1976a)
±34	DkBf-03	Budden Garden	1	Undetermined form	Site record form
36	DkAx-02	Nipper's Harbour-1	1	Undetermined form	Thomson (1989)
43	DjAq-01	Curtis	1	Preform	Thibaudeau (1993)
43	DjAq-02	Anstey	1	Undetermined form	Site catalogue
43	DjAq-04	Peyton's Lane	2	Undetermined form	Site catalogue
43	DjAq-05	Back Harbour-3	8	3 preforms, 5 undetermined form	Site collection; Site catalogue
43	DjAq-07	MacLeod-2	3	1 preform, 2 undetermined form	Site collection; Site catalogue
--	*GcBi-07*[‡]	*Rattlers Bight-1*	*4*	*1 perforated only; 3 preforms, including 1 from Burial B*	*Site collection*

Notes: See Figure 4-6 for spatial distributions.

† Numbers correspond to locality numbers presented in Figure 4-2.

‡ Rattlers Bight-1 material included for comparison only.

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