

Exploring the Utility of Computer Technologies and Human Faculties in
their Spatial Capacities to Model the Archaeological Potential of Lands:
Holocene Archaeology in Northeast Graham Island,
Haida Gwaii, British Columbia, Canada

by

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Abstract

Search strategies have been a central activity within archaeology, varying with the types of questions being addressed, technological tools available, and theoretical proclivity of the investigator. This thesis will test the utility of LiDAR remote sensing and GIS spatial technologies against a phenomenological field methodology. Modeled lands include select areas within Northeast Graham Island, Haida Gwaii, located off the northern Pacific coast of Canada. The time scale in question includes the entire Holocene.

A history of the landscape concept is evaluated, fleshing out a decisive working term. An Interdisciplinary Multilogical Framework is devised, linking the two modeling methods with a breadth of information sources on the physical and cultural attributes of landscapes. This dialectic approach culminates in a holistic anthropological practice, and grounds for interpretive analysis of the archaeological record. The role of archaeological predictive modeling in the contemporary socio-political context of heritage management in British Columbia is discussed.

Table of Contents

Supervisory Committee.....	ii
Abstract.....	iii
Table of Contents.....	iv
List of Tables.....	vi
List of Figures.....	vii
Acknowledgements.....	x
Dedication.....	xii
1 Introduction.....	1
2 Archaeological Background.....	8
2.1 Project Contextualized Within Three Scales of Analysis.....	8
2.1.1 Northwest Coast.....	9
2.1.2 Haida Gwaii.....	14
2.1.3 Northeast Graham Island: Known Archaeology.....	21
2.2 Landscape: Theorizing the Term, Concept, and Perspective.....	32
2.3 Archaeological Holism and the Landscape Perspective.....	42
2.4 Dialectical Archaeology.....	43
3 Acquiring Information for Model Building.....	45
3.1 Multidisciplinary Information and Landscape Modeling.....	45
3.1.1 Sea Level and the Temporality of Landscape Change.....	48
3.1.2 Geological Origins and Geomorphology.....	53
3.1.2.1 Pleistocene Glacial History?.....	56
3.1.3 Palaeoenvironment and the Refugium Concept?.....	58
3.1.4 Animal Presence / Behaviour and the Refugium Concept.....	64
3.2 Ecology and Anthropology and their Influences on Landscape Archaeology.....	65
3.3 RS and GIS Applications: Concept of Technologies and History of Use in Archaeology.....	67
3.3.1 LiDAR: Concept of the Technology.....	69
3.3.2 Integrate Application to Thesis Problems.....	72
3.4 Results.....	73
4 Pre-field Model-Building: Objectifying the Landscape and its Inhabitants?.....	75
4.1 Scale in Landscape-derived Models.....	75
4.2 Building an Archaeological Potential Model.....	82
4.2.1 Hill model.....	90
4.2.1.1 Argonaut Hill.....	91
4.2.1.2 <i>Taaw</i> Hill.....	98
4.2.2 Marine Generated Feature Model.....	100
4.2.2.1 Clearwater Lake and Base of Argonaut Hill Environs.....	109
4.2.2.2 Lower Hiellen River and Base of <i>Taaw</i> Hill Environs.....	111
4.2.2.3 Summary.....	112
4.3 Problematize the Predictive Model Exercise.....	114
4.3.1 Space-time Simulation Difficulties.....	122

4.3.2	The Paradox in the Temporality of Knowing in Cross-cultural Inquiries: Indigenous and Western views of History in Archaeological Analysis.....	123
4.4	Resolving, or Reconciling with the Paradox.....	126
4.4.1	Diachronic and Isocratic Model of Haida Cultural History: A Return to the <i>Longue Durée</i> in Northwest Coast Archaeology.....	128
4.5	Summary of Discussions.....	132
5	Archaeological Testing: Experiencing the Landscape.....	134
5.1	Introduction.....	134
5.2	Field Methods: Qualifying the Quantified.....	134
5.2.1	Testing the Marine Generated Feature Model.....	135
5.2.2	Testing the Hill Model.....	136
5.3	Summary.....	148
6	Results, Observations, and Suggestions.....	156
6.1	Time, Place, and Materiality.....	157
6.1.1	Argonaut Hill Forks (GaTw-9).....	157
6.1.2	Clearwater Lake Imber Creek Confluence (GaTw-10).....	160
6.1.3	Clearwater Lake North Beach (GaTw-11).....	162
6.1.4	Hiellen River Spit NE (GaTw-12).....	163
6.1.5	Hiellen River Spit SE Gully (GaTw-13).....	164
6.1.6	Hiellen River Stone Bowl (GaTw-14).....	165
6.1.7	<i>Taaw</i> Hill SE (GaTw-15).....	170
6.1.8	<i>Taaw</i> Hill Lower Bench Southeast (GaTw 21).....	171
6.1.9	2005 <i>Taaw</i> Hill Investigations.....	172
6.1.10	Giant Barnacle (GaTw-16).....	174
6.1.11	Historic / Proto-Historic Archaeology (GaTw 17-20).....	177
6.2	Discussion: Northeast Graham Island Archaeology in Context.....	183
6.2.1	Interpreting and Assemblages.....	184
6.2.2	Interpreting Stratigraphic Results.....	187
6.2.3	Interpreting Temporal Results.....	190
6.2.4	Interpreting Spatial Results.....	191
7	Experiential Learning.....	195
7.1	LiDAR and GIS: Tools for Experiencing Landscape Simulacra.....	198
7.2	Phenomenology and Landscape Archaeology.....	201
7.3	Synthetic Methodological Praxis.....	204
8	Towards a Holistic Landscape Archaeology on the Pacific Northwest Coast.....	208
8.1	Interdisciplinary Multilogical Framework.....	208
8.2	Contextualizing Archaeology in Local Oral Knowledge.....	212
9	Situating Contemporary Government Mandated Archaeological Practice in British Columbia: with Suggestions for Future Directions.....	220
9.1	A Critical Evaluation of Recent Changes to Archaeological Overview Assessment (AOA) General Planning Tools Standards and Guidelines	220
9.2	Reflection on the State of Heritage Preservation in the Province in Consideration of the Rubric of Landscape Archaeology.....	233
9.3	Conclusions and Future Recommendations.....	236
10	References Cited.....	240

11	Appendix I: 2005 NE Graham Island Artifact Images.....	272
	Appendix II: 2007 <i>Taaw</i> Hill Artifact Images.....	279

List of Tables

2.1 Table showing information on the earliest known archaeology of the Northwest Coast..	13
2.2 Table showing data of early and mid-Holocene archaeology corresponding to Figure 2.2.....	17
2.3 Table showing archaeological loci directly within the northeast Graham Island research area (GaTw Borden Grid), and others nearby.....	24
3.1 Table showing palaeoecological time-line for vegetation succession of northeast Graham Island.....	60
4.1 Table describing attributes in Figure 4.7 used in building the predictive model.....	85
4.2 Table showing attribute type and data collection location information relevant for establishing palaeolandscape reconstructions, and people-landscape relations.....	89
4.3 Table showing geographical, elevation, slope, and aspect values for evaluate unit test locations derived for Argonaut Hill.....	94
4.4 Table showing evaluative units derived for testing the palaeo-marine spit feature south of <i>Taaw</i> Hill and to the west of Hiellen River.....	112
5.1 Table showing the location, dates, and type of archaeological inquiry associated with the research area.....	135
5.2 Table showing geographical, elevation, slope, and aspect values for evaluate unit test locations derived for Hiellen River palaeo-spit.....	138
6.1 Table showing data for all lithics collected during 2005 investigations on <i>Taaw</i> Hill...	173
6.2 Table showing data for all lithics collected during 2007 investigations.....	178

List of Figures

2.1 Map showing Pleistocene / Holocene boundary archaeological locations mentioned in text.....	11
2.2 Image showing locations of archaeological interest within Haida Gwaii.....	16
2.3 Photo mosaic draped on high resolution LiDAR-generated digital elevation model northeast Graham Island research zone.....	23
2.4 Figure showing the chronology of the landscape concept.....	42
3.1 Graph showing marine curve for north coast of the Americas.....	50
3.2 Image showing the temporality of Holocene marine regression in the form of relict marine generated landforms.....	52
3.3 Photo showing large section of recent exposure on the southern portion of east Argonaut Hill.....	56
3.4 Photo showing area midway on the exposure highlighting clay deposits that interrupt continuous aeolian deposits.....	56
3.5 Photo showing typical clasts size accumulated in mid-Argonaut Hill gulley bottom stream bed.....	58
3.6 Image showing locations where palaeoenvironmental data was collected.....	61
3.7 Double image showing cross section of LiDAR laser readings of <i>Taaw</i> Hill, bottom image being a close up of upper image. Note clear delineation of vegetation represented in white cloud cluster of laser readings and ground represented in red.....	71
3.8 LiDAR generated DEM of northeast Graham Island showing high-pixel resolution of highly visible hill features, and relict shoreline features associated with the palaeomarine high stand.....	72
4.1 Flowchart describing order of operations used in production and testing of predictive model.....	84
4.2 Three image collage showing a slope layer for interpreting level ground suitable for land use activities for the northwest section of Argonaut Hill.....	95
4.3 Photographic image showing mesa-like Argonaut Hill top.....	97
4.4 Image showing Argonaut Hill rendering during the early Holocene marine high stand.....	97
4.5 Image showing a tombolo connecting <i>Taaw</i> Hill to northern Graham Island during the middle Holocene.....	102
4.6 Image comparing area represented in Figure 4.5, expressing late Holocene erosional processes of the once tombolo feature.....	102
4.7a LiDAR image of north Naikoon Peninsula showing contemporary coastline and Holocene development of North Beach and the Hiellen River estuary.....	108
4.7b LiDAR image showing 18 m amsl palaeo-marine transgressive high stand, and the early-middle Holocene north and northeast Graham Island.....	108
4.8 Image showing aspect view of the north shore of Clearwater Lake, and south slope of Argonaut Hill.....	110
4.9 Tripartite image highlighting the arbitrary nature of buffers within archaeological modeling, using water features as a measure.....	116
5.1 Photo showing the 11 m palaeo-spit ridge formed during the mid-Holocene with marine regression, connecting <i>Taaw</i> Hill with Graham Island during the expansion of the Hiellen River estuary.....	137

5.2 Photo showing palaeo-spit edge with dry stream-cut gulley overlooking the more recent Hiellen River bench.....	139
5.3 Image showing Holocene geomorphology influencing the potential for archaeological behavioural patterns.....	140
5.4 Image showing results from archaeological prospection within the lower Hiellen River and <i>Taaw</i> Hill areas.....	142
5.5 Image showing bench at the southern and southeastern base of Argonaut Hill modeled as containing high archaeological potential.....	143
5.6 Image showing southeast section of Argonaut Hill featuring the Argonaut Hill Forks archaeological landscape, divided into three terraces.....	145
5.7 Photo showing mottled character of trench floor deposits at the Argonaut Hill Forks, south terrace.....	146
5.8 Image showing relationship of evaluative units and south terrace landform at Argonaut Hill Forks.....	147
5.9 Photo showing area on the southern end of Argonaut Hill.....	149
5.10 Photo showing location of single evaluative unit dug on south Argonaut Hill.....	150
5.11 Photo of <i>Taaw</i> Hill taken from a helicopter.....	152
5.12 Photo showing Argonaut Hill cliff-top edge that was profiled using trawling and shovel-shaving methods in order to interpret subsurface deposits of exposure rim.....	154
6.1 Photograph showing the profile of excavation unit four at Argonaut Hill Forks.....	159
6.2 Map showing archaeology associated with the confluence of Imber Creek delta and Clearwater Lake area.....	161
6.3 Map showing archaeology detected during 2007 evaluative unit testing around the <i>Taaw</i> Hill and lower Hiellen River areas.....	164
6.4-6.7 Photographic collage of the Hiellen stone bowl.....	166
6.8 Photograph showing a 40 cm by 50 cm section of the pebble-cobble beach at the confluence of the Hiellen River with North Beach for the purpose of comparing contents with the pebble artifacts associated with GaTw 14 and GaTw 15.....	169
6.9 Photograph showing bleached white pebble artifacts excavated and collected from GaTw 15.....	170
6.10 Map showing five evaluative unit locations on <i>Taaw</i> Hill resulting from 2005 investigations.....	174
6.11 Figure showing images and locations of CMTs discovered during 2007 field testing within southeast Argonaut Hill and north Clearwater Lake areas.....	177
6.12 Image showing disturbance to stratigraphy between two cultural layers.....	186
6.13 Image showing stratigraphy of Argonaut Hill Forks EU 4.....	188
6.14 Image of Argonaut Hill Forks south terrace EU 8 profile.....	190
6.15 LiDAR image with photo collage showing a sample of artifacts recovered from the <i>Taaw</i> Hill and Hiellen River palaeo-spit evaluative units.....	194
7.1 Schematic expressing socio-cultural resilience model.....	207
8.1 A schematic expressing the format of the Interdisciplinary Multilogical Framework applied within this thesis.....	209
8.2 Image showing Tow's migration route.....	214
8.3 Image showing the Pleistocene and Holocene sea level patterns of Naikoon Peninsula and the submerged land of Hecatia.....	217

8.4 Schematic expressing the flow of a social phenomenology embedded in the landscape.....	218
9.1 Image showing petroglyph in Channel Ridge housing development lands, Saltspring Island.....	231
9.2 Image showing one of several burial mounds islanded by a dynamite-altered landscape.....	232

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Dedication

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1 Introduction

Archaeological visibility in the context of long-term climatic, geomorphological, and environmental change across the late Pleistocene (18,000 - 9,000 BP¹) and Holocene (9,000 BP– present) periods remains a challenge facing archaeologists interpreting past human involvement in the landscape. As a consequence of these natural transformation processes affecting landscape morphology, the concern with detecting archaeological landscapes has always been a difficult task for archaeologists working in the Northwest Coast of North America (Fedje and Mathewes 2005; Fladmark 1975; Hall *et al.* 2002, 2004, 2005; McLaren 2008; Punke and Davis 2004, 2006). During the earliest period of information collection on the Northwest Coast stretching from the first encounters of the late eighteenth century to the early twentieth century anthropologists, ethnographers, historians, explorers, merchants, and government agents, all of which were interested in archaeological issues, relied on the knowledge of local inhabitants to direct them to important archaeological landscapes. Once a foundational level of information had been acquired on how to locate archaeological features and culturally significant areas the era of archaeological survey began. Harlan Smith (1919; 1927) was an early proponent of this pattern roughly corresponding to the ‘direct historical approach’, which he pursued throughout his documentation of numerous archaeological locales in 1919 during a visit to northeast Graham Island (other notable examples for the northern Northwest Coast are de Laguna 1934, 1956; and Drucker 1943). This tradition continued through to 1969 when George Macdonald, with then doctoral student Knut Fladmark, conducted a regional survey in Haida Gwaii including northeast Graham Island that established a

¹ Dates provided within this thesis are uncalibrated radiocarbon years before present (read as BP).

foundation of research projects and research design that lay the groundwork for future archaeological investigations and interpretations of Haida history. The practice of conducting ground-truthing surveys working with the simple navigational tools of intuition and a map and compass, and the skill of interpreting the landforms for archaeological potential using low-resolution maps and field experience remained the backbone for archaeologists until the late 1980's – early 1990's, at which point computer assisted modeling entered the equation. With the technological development that occurred throughout the last two decades, methods for assessing archaeological potential has swayed from being primarily a field-oriented endeavour increasingly towards a laboratory-oriented activity. I am interested in evaluating what has been gained, and also what has possibly been lost in the 'advancement' of methodological capabilities available to archaeologists modeling the contemporary landscape for archaeological potential associated with a long span of time. In this interest, I pursue the question of how the activity of archaeological inquiry has transformed from a reliance on local knowledge and survey towards a Western scientific exercise of simulation-based predictive modeling at odds with its origins of experiential empiricism.

The guiding questions that direct this thesis are twofold. First, and more aligned with the methodological aspect of research, is the query, "what is the utility of Light Detection and Ranging (LiDAR) remote sensing (RS) and geographical information systems (GIS) technologies in archaeology in general, and specifically, in northeast Graham Island, Haida Gwaii?" Second, equally applicable to the theoretical and methodological components of this investigation is the question, "what is a practical negotiation between the theory and practice of empirical scientific knowledge of the physical world, empirical and transcendental acts of 'being' and 'dwelling' in the land,

and the positivist exercise of predictive modeling when reading the landscape for archaeological potential?” As a means to critically address these two inquiries, I have conducted an interdisciplinary pre-field analysis of the research area using remote sensing and GIS technologies, followed by a brief, yet intensive eleven day field experience, and culminating with a post-field period of reflection, analysis of materials, and theorizing.

The aim of these inquiries is to demonstrate a) the proficiency with which forested zones can be virtually surveyed using modern spatial technologies as one of several lines of investigations in a case study local to the Northwest Coast, a region with the proverbial and perennial challenges of densely forested areas which are difficult to navigate, b) the presence / absence of modeled land use types through testing higher elevation and near-shore or once near-shore environments, c) the success of novel survey methods for decreasing spatial and temporal gaps in the archaeological record of northeast Graham Island and Haida Gwaii, and d) what can be gained through a holistic approach to the theoretical and philosophical components of landscape archaeology practice?

The overall intent of this thesis is to weave the vital threads of history (the re-enacted trends of time within a social context) into a fabric of understanding that amounts to peoples’ connectedness to place. Seeing as this thesis is primarily an archaeological exercise, seeking archaeological modes of interpretation, the consideration of “people” as well as “space” and “place” will require multiple avenues of inquiry in order to transcend the seeming temporal disconnect that separates myself from the producers of the archaeological record. This objective will not follow traditional expository structures for disseminating archaeological information. Instead, I pursue this exercise using a narrative

form that portrays the features of temporal experience, drawing from technological forms of reading, measuring, and representing the landscape, in addition to personal knowledge of the focus area and from knowledgeable others who are also well acquainted with the northeast Graham Island landscape. In this manner, I draw from the reciprocity between narrativity and temporality in taking the lived experience to be that essence which constitutes the mimesis expressed in text.

The organization of this thesis begins in Chapter One with the following thematic description each chapter will take.

Chapter Two entitled *Background* orients the project within three broad spatial scales of analysis including; Northwest Coast, Haida Gwaii, and northeast Graham Island. Providing this rough archaeological signature of each scale expresses the historic disciplinary context for which this thesis partly arose, and what it will be compared against. I review the landscape term, concept, and perspective as it ebbs and flows in use and meaning within and between disciplines in order to contextualize the perspective in which it is employed within this thesis. I then discuss the idea of holism and how this ancient intellectual concept may be applied to landscape archaeology. Lastly, I articulate how a *dialectical archaeology* can act as a model for conceptualizing the culminating forces of notions on landscape and holism in archaeology.

Chapter Three on *Model Building* draws on multidisciplinary fields of knowledge to analyze the spatio-temporal aspects of landscape change in relation to the systemic (behavioural) archaeological potential of the landscape. Genres of knowledge units utilized in this chapter draw from the physical and human sciences, including climatology, geography, biology, ecology, and anthropology. The technologies of LiDAR remote sensing and GIS will be explored, focusing on their applications in archaeological

modeling. I relate the exercise of landscape hermeneutics to these technological tools and the images they produce. Results of the modeling exercise are presented through the ‘landscape as palimpsest’² metaphor, which takes the choreography of natural and cultural formations enacted over the *longue durée* into consideration when interpreting archaeological potential.

Chapter Four entitled *Pre-field Model-Building: Objectifying the Landscape and its Inhabitants?* evaluates more critically the model-building process, highlighting the importance of ‘scale’ in landscape studies. The construction of two separate archaeological predictive models for northeast Graham Island makes this distinction clear. While I accept and work with certain attributes of the predictive model exercise, others remain concerning, and it is not without criticism and careful adoption that these technologies are incorporated into archaeological analysis. I clarify this point by first stressing the historical independence of each technique undertaken in landscape modeling: quantitative / statistical versus qualitative reasoning respectively, before integrating them in a dialectical manner. Issues of archaeological concern discussed in this chapter include how to simulate spatio-temporal phenomenon within a behavioural model of reciprocal exchange between socionatural systems. This chapter also considers the difficulties of merging these interconnected entities within a cross-cultural framework where ideas of Western science and indigenous world views do not coalesce in obvious ways. I finally discuss the possibility for reconciling this cross-cultural non-concordance, which challenges historic issues of knowledge construction using a multilogical view of interpreting the past.

² Latin from Greek *παλιν* + *ψαω*, translated as “again” + “I rub” or “I scrape”, and meaning scraped clear and reused.

Chapter Five on *Field Methods* describes the pre-field influence derived from the modeling exercise upon the activities carried out in the field as well as how the experience of being in the field either confirmed this analysis, or necessitated the modifying of these objectives. I use this dialectic for ascribing archaeological value to the landscape using two independent case studies, corresponding to two types of landforms represented within northeast Graham Island: promontories and palaeo-coastlines.

Chapter Six covering *Results* offers interpretations of each archaeological landscape discovered during the 2007 testing program. Interpretations of all artifacts and their contexts, whether strictly observed and left *in situ*, collected and deposited at *Qay'Lnagaay* Museum in Skidegate, Haida Gwaii, or collected for the purpose of laboratory analysis. This chapter concludes with a discussion of the question, “in what manner does the archaeological patterning indicated from discoveries made during 2007 field investigations relate, or not, to those previously known for Haida Gwaii?”

Chapter Seven entitled *Experiential Learning* first addresses the question established at the inception of this thesis which asks, “what is the utility of LiDAR remote sensing and GIS technologies to archaeologists modeling human behaviour in relation to targeted landscapes?” I proceed to evaluate the role of phenomenology as a theory for mediating between information generated from computers, a *virtual* world in the sense that it simulates something real, and experiences and knowledge derived from the *actual* world. I conclude by discussing the synthetic methodological value in the dialectical cross-fertilization of these approaches.

Chapter Eight entitled *Towards a Holistic Landscape Archaeology in the Northwest Coast* begins by exploring the chronotopic narrative histories reflected in both Haida oral story-based knowledge of lands, people, time, and space, and Western social

scientists' interpretations of these histories. I follow with a look at how these seemingly disparate and juxtaposed ontological perspectives on 'being-in-the-world' can reveal more salience about the archaeological record than appears at an early glance. I then present a holistic model for practicing landscape archaeology which I refer to as the Interdisciplinary Multilogical Framework that attempts to reconcile the multilevel dialectics ostensibly inherent in some of anthropology's longstanding precepts. Lastly, I present a brief example of how such a framework approaches the multiplicity of knowing and interpreting history, including those told by indigenous and scientist.

Chapter Nine entitled *Situating Contemporary Government Mandated Archaeological Practice in British Columbia: with Suggestions for Future Directions* consists of a critical reflection on the present and historic context of government-mandated archaeological practices in the province of British Columbia. The politics surrounding the use of these technologically centered processes for heritage management are highlighted.

2 Archaeological Background

2.1 Project Contextualized Within Three Scales of Analysis

Although this thesis refers to multiple scales of spatial analysis as they each best relate to the research inquiry³, they have only moderate consequence to the overall interpretive framework for relating archaeological, behavioural patterns to space. From smallest to largest, these spatial units more or less correspond to territories of the *Kuunlaanaas* clan, Masset Haida, and Haida Nation, which share to some degree certain commonalities useful (if only as an historic unit of analysis) for discussing the Northwest Coast as a physical backdrop where similar cultural trajectories occurred.

As Wandsnider (1992; 1998) points out, the critical concern with the use of regional data is how to distinguish scalar units. In one respect, the unique geography of Naikoon Plain, the island archipelago of Haida Gwaii, and the marine resource rich and abundant edge ecologies of the Northwest Coast, make it seemingly practical to separate broad spatial scales of reference into these components. However, they also reflect a contemporary spatial configuration of a land-water interface that has remained dynamic throughout the Holocene; thereby affecting archaeological patterns of past land use. In accord with this landscape perspective, the middle-level scale representing northeast Graham Island will constitute the majority focus for my thesis. The two broader scales representing Haida Gwaii and the Northwest Coast provide context and comparison for the landscape and archaeology of the focus area, and the finer-grained sub-scales

³ It should be noted that these units are always created by the researcher, they often relate to specific inquiries which are intended to represent something meaningful about people-world relations, but they are approximate and simplistic at best. Accordingly, they do not reflect actual geographically discrete units of space of importance to previous inhabitants of the landscape (see Mackie 2001 for discussion on “emic” spatial units of analysis). This is particularly the case when considering the sea level change for the area that was continually affecting the land-sea interface zone.

representing the landscape feature (hill or palaeomarine-generated feature) and evaluative unit will inform their interpretations.

2.1.1 Northwest Coast

The interregional scale aligns loosely with the northern and central sections of the Northwest Coast (NWC) ‘culture area’ defined by Kroeber (1939), who further developed an existing concept popular in comparative museology by Clark Wissler. The geographical extent of the NWC has been formally defined as extending from Yukatat Bay in southern Alaska to the California Oregon border and not extending much beyond the initial mountain ranges that run along a north-south axis and are situated inland from these points. The basis for these spatial configurations were founded upon a combination of commonalities in material culture, behaviour, biogeographic, and climatic phenomenon when compared to neighbouring areas and population characteristics throughout North America.

From an early temporal perspective, recent research along the northeast shores of the Pacific Ocean has located archaeological deposits near the Pleistocene-Holocene boundary (11,000 – 9,000 BP) from California (Erlandson and Moss 1996; Erlandson *et al.* 1999), Oregon (Hall *et al.* 2002, 2004, 2005; Punke and Davis (2004, 2006), British Columbia (Fedje and Mathews eds. 2005; McLaren 2008) and Alaska (Dixon 1999, 2001, 2002). These successful investigations emphasize an array of carefully judged search strategies based on interdisciplinary research programs involving palaeoshoreline and palaeoenvironmental reconstructions with contemporary archaeological visibility⁴ (Hall *et al.* 2002; Fedje *et al.* 2004). Such methods include using photogrammetry to derive

⁴ Archaeological visibility refers to the ability of a landscape to retain a high level of detectability of human-modifications in its form, or of derived proxy landforms of high cultural utility. This requires minimal alteration of archaeological features by natural transformation processes.

close contour intervals from aerial photographs, which are manipulated within a GIS. These images are used to predict locations of higher and lower archaeological potential, which can then be mapped at finer resolution using a high precision distance-measuring electronic theodolite (Fedje and Christensen 1999), or by producing a DEM photogrammetrically using Integrated Mapping Technologies from existing 1:20,000 aerial photographs (McLaren 2008:171).

At the nearest headlands to the north of northeast Graham Island is a cluster of early landscapes bearing archaeological deposits spread throughout the Alexander Archipelago of the Alaskan Panhandle, including 49-PET-408 (On Your Knees Cave), Chuck Lake, Hidden Falls, and Groundhog Bay (see Ackerman 1968, 1974; Ackerman *et al.* 1985; Davis 1984, 1989; Dixon 2002). In addition to the ongoing discovery of archaeological deposits relating to this time period in the Gwaii Haanas to the south, archaeological deposits dating to 9,780 BP (McLaren 2008) have recently been discovered in the Dundas Island Group to the east. The pattern garnered from this archaeological evidence is that northeast Graham Island is flanked to the north, east, and south by nearest points of lands containing Pleistocene / Holocene boundary archaeological deposits (Figure 2.1).

Further outside this grouping of ‘key locales’ are several other important archaeological loci of geographic and temporal interest; especially Namu (Carlson 1996) on the central British Columbia coast with an early date of 9,720 BP, the neighbouring location of ElTa 18 dating to 9,940 BP (Cannon 2000), Stave Lake in southwest B.C. with a date of 10,150 BP (McLaren 2007 pers. comm.), and the Old Cordilleran component at the nearby location of the Glenrose Cannery on the Fraser River delta,

southern British Columbia dating to 8,150 BP (Matson 1976; 1996; see also Heonjong and Sanders 2006, 2007).

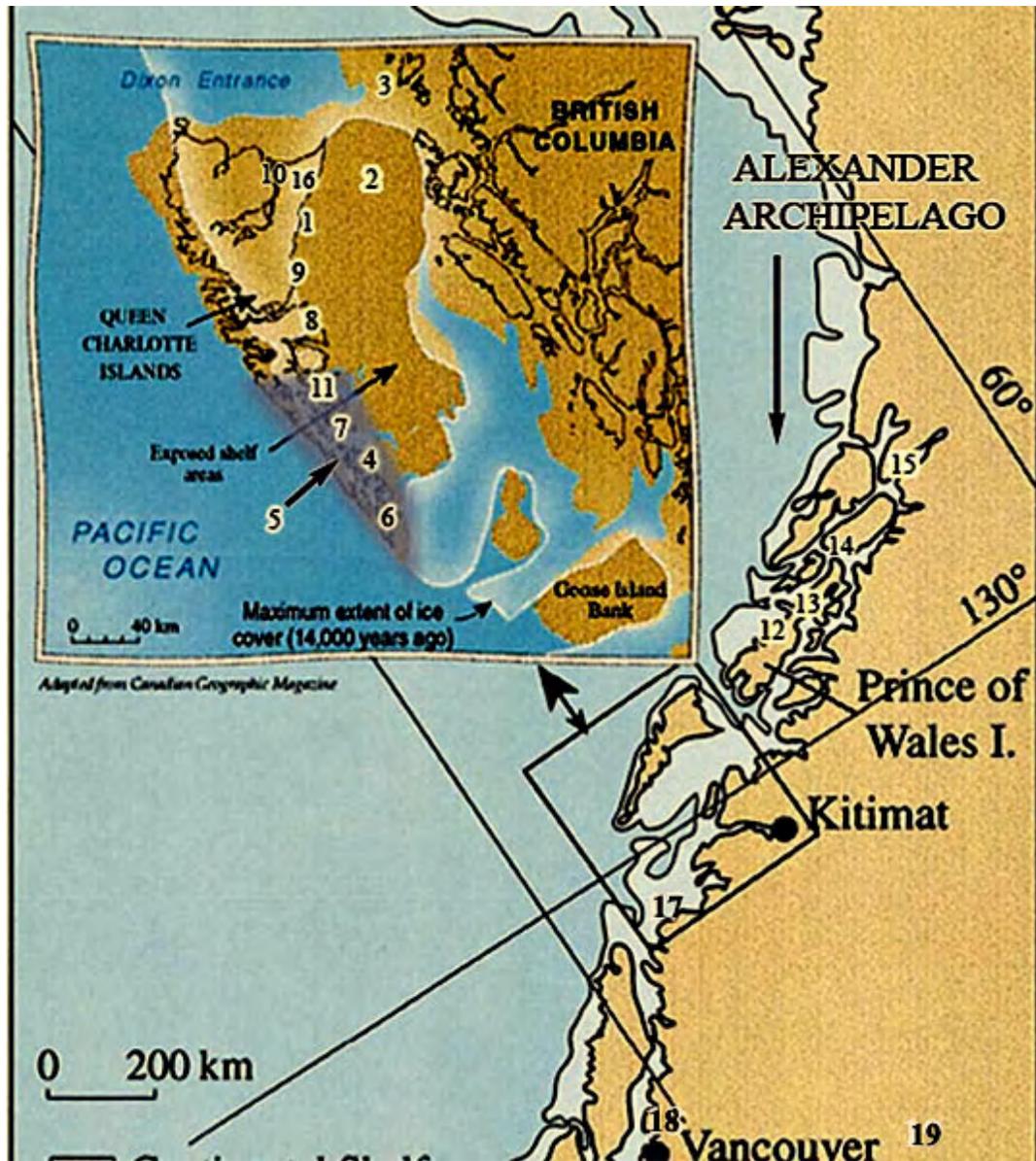


Figure 2.1 Map showing archaeological locations dating to the Pleistocene / Holocene boundary from territories between southwest British Columbia to southwest Alaska mentioned in text: (1) Cape Ball; (2) Dogfish Bank; (3) Dundas Island Group; (4) Gaadu Din; (5) Gwaii Haanas Park (shaded area in southern Haida Gwaii); (6) Kilgii Gwaay; (7) Werner Bay; (8) Kasta; (9) Lawn Point; (10) Skoglund's Landing; (11) Richardson Island; (12) Chuck Lake; (13) 48-PET-408 (On Your Knees Cave); (14) Hidden Falls; (15) Groundhog Bay; (16) Serendipity Bog; (17) Namu; (18) Glenrose; and (19) Stave Lake. (Map adopted and modified from Mandryk *et al.* 2001, adapted from Canadian Geographic Magazine).

This archaeological evidence shows that no matter one's view of the model of 'first peopling' of the Americas -- either the "ice-free corridor" versus "coastal route" for human migrations in western North America, groups had peopled the entire northern Pacific coast by the early Holocene⁵. Archaeologists considering the question of human antiquity in the Americas have produced methods for generating predictive models that will be discussed within this thesis. Much of this work is limited to data sets which rely on making correlates, drawing analogy, and using proxies for reconstructing the past.

⁵ Northeast Graham Island archaeology can be contextualized within this macro spatio-temporal question in that it is centrally situated within the geographical milieu including Northeast Asia, the submerged subcontinent of Beringia, and the landmass of both Americas. Further, northeast Graham Island possesses the unique environmental conditions which allow for peopling to practically occur. Debates about the 'first peopling' process range between a) whether people arrived prior to the Last Glacial Maximum (LGM) or with its retreat; b) the number of migrations represented within the archaeological record and contemporary DNA of indigenous populations within the Americas compared to Northeast Asia; c) what route they followed while peopling the continents; and 4) what their general adaptation with regards to mode of transportation, subsistence strategies, tool technologies, and knowledge of the environments they encountered were? For more comprehensive discussions on these debates see the following authors; Beaudoin *et al.* 1996; Bever 2006; Easton 1992; Fedje and Christensen 1999; Fedje *et al.* 2004; Fladmark 1979, 1983; Hall *et al.* 2004; Haynes 2006; Jackson and Duk-Rodkin 1996; Mandryk and Rutten 1996; Mandryk *et al.* 2001; Martin 1967; Meltzer 1995, 2003.

Region	Loci Name / Number	Age*	Locale Type / Significance**	Investigator(s) Source
Central BC Coast	Namu (EISx 1)	9,720	Marine adaptation, dates, technology	Carlson 1994,1996, 1998
North Vancouver Island	Bear Cove	8,020	Maritime adaptation	Carlson R. 1979; Carlson C. 2003
SW BC	Glenrose Cannery (DgRr 6)	8,150 +/-250	Dates and technology	Matson 1976
SW BC	Stave Lake	10,150	Dates	McLaren 2007 pers. comm.
California	Daisy Cave, Channel Islands	11,000-10,500	Maritime adaptation, dates	Erlanson 1994
Central Alaska	Broken Mammoth (XBD-131)	11,770 +/- 210	Locale type (promontory), dates, technology	Holmes 1996
Central Alaska	Swan Point (XBD-156)	11,660 +/- 60	Locale type (promontory), dates, technology	Holmes <i>et al.</i> 1996
Central Alaska	Owl Ridge (FAI-91)	11,340 +/- 150	Locale type (promontory), dates, technology	Hoffecker <i>et al.</i> 1996
Central Alaska	Mesa site, Iteriak Creek	11,660 +/- 80	Locale type (promontory), dates, technology	Kunz and Reanier 1996
Central Alaska	Reger Site	Denali tool tech. (ca. 10,500-8,000)	Locale type (promontory), technology	West 1996
SW Alaska	Chuck Lake	8,250	Maritime adaptation, dates	Ackerman <i>et al.</i> 1985
SW Alaska	Hidden Falls	9,860 +/- 75	Maritime adaptation, technology	Davis 1984
SW Alaska	49-PET-408 (On Your Knees Cave)	10,300	Maritime adaptation, dates	Dixon 2001, 2002
SW Alaska	Rice Creek	9,000	Maritime adaptation	Ackerman <i>et al.</i> 1985
SW Alaska	Groundhog Bay	10,180 +/- 130	Maritime adaptation, dates, technology	Ackerman 1968, 1974
NW BC	Dundas Island	9,780	Dates, locale type, marine adaptation	McLaren 2008

Table 2.1 Table showing archaeological location, age, type or distinguishing feature(s), and source of dissemination for evidence pertaining to the earliest known archaeology of Northwest North America, outside of Haida Gwaii.

* Earliest date in dating sequence was selected for each locale, except where ranges are provided in original publications.

** Locale significance categories are not comprehensive, nor are they ranked in terms of importance.

2.1.2 Haida Gwaii

Under more frequent circumstances considering continental landmasses, lands the size of Haida Gwaii (2,350 km²) would often be classified as *interregional*, although due to the archipelago's 'stand-alone' orientation (~ 60 – 160 km N-S axis) off the northeast Pacific coast, and its subsequent unique history of environmental and cultural phenomenon classifying it as *regional* is practical. In so doing I am not reducing the archaeology of the archipelago to a homogenous entity, as I now discuss some of the many spatio-temporal variances that occur within its physical and cultural histories.

Comprising roughly the southern half of Moresby Island is the Gwaii Haanas National Park Reserve and Haida Heritage Site where since its inception in 1987 two decades of intensive research has compiled a great quantity of archaeological information (see Fedje and Mathewes 2005). Much of this research has been concerned with tracing the early occupation of these lands, with focal locales from the Pleistocene / Holocene boundary including *Kilgii Gwaay* and *Gaadu Din* I and II caves, where human modified tools have been discovered *in situ* on the surface dating to 10,220 BP (Fedje 2008 pers. comm.) and spearpoints, flakes and a flaked tool in sediment layers containing charcoal dating to 9,450 BP (Fedje *et al.* 2005:187), 11,030 BP (Fedje 2008 pers. comm.), and between 10,500 - 10,000 BP (Fedje and Mathewes 2005:149) respectively. Also within the Gwaii Haanas Park, basal charcoal dates from Richardson Island suggest a possible late Pleistocene occupation of 9,300 BP (Fedje *et al.* 2005:209). Outside the Gwaii Haanas National Park and on the west coast of Moresby Island is K1 Cave (Figure 2.2), containing two spearpoint bases dating between 10,950 and 10,400 BP (Fedje and Mathewes 2005:149).

Naden Harbour, Lawn Point (FiTx 3), Kasta (FgTw 4), and Cohoe Creek (FjUb 10) are other locales of geographic and temporal interest for tracking the pattern of Haida culture from the early – mid Holocene on Graham Island and northeast Moresby Island in the case of Kasta (Figure 2.2). By 2000, 65 distinct archaeological locales had been recorded within Naden Harbour, Virago Sound and Davidson drainage at the south end of Naden Harbour, 54 of which were located during an extensive eight week testing period in 1999 (Stafford and Christensen 2000). The primary method for locating archaeological deposits during this investigation consisted of both observing mineral soil exposures and rigorous auger testing. In total, 15 km of shoreline and near shore locations along a series of relict prograding beach terraces were augured at 10-50 m intervals, comprising 1,200 tests.



Figure 2.2 Image showing locations of archaeological interest within Haida Gwaii: 1) Cohoe Creek, 2) Masset Inlet, 3) Naden Harbour, 4) Virago Sound, 5) *Strathdang Kwun*, 6) Richardson Island, 7) Davidson drainage, 8) EaUa 18, and 9) K1 Cave. See Table 2.2 for corresponding data on these archaeological landscapes.

Locale Name	Locale I.D.	Age	Locale Type / Importance	Investigator(s) / Source
Kasta	FgTw 4	6,010	location, culture history	Fladmark 1986
Lawn Point	FiTx 3	7,400-2,000	habitation, lithic tech., raised beach	Fladmark 1969,1970, 1986:52
Cohoe Creek	FjUb 10	6,150-4,900	midden, lithic tech., raised beach	Christensen and Stafford 2005; Fedje <i>et al.</i> 1995; Ham 1988, 1990; Southon and Fedje 2003
Naden River 1	FIUe 3	3,340-3210	midden, lithic tech., raised beach	Fedje <i>et al.</i> 1995; Southon and Fedje 2003
Naden River 2	FIUe 4	3,300-3,070	midden, lithic tech., raised beach	Christensen and Stafford 1999-225; Southon and Fedje 2003
Kilgi Gwaay	*GHNPR&HHS	9,450	maritime adaptation, organic technology	Fedje <i>et al.</i> 2005
Gaadu Din I	GHNPR&HHS	10,500-10,000	technology, subsistence, palaeoenvironment, palaeo-fauna, dates	Fedje 2006 pers. comm.
Gaadu Din II	GHNPR&HHS	11,030-9,600	technology, dates	Fedje 2007 pers. comm.
Richardson Island	GHNPR&HHS	9,290	Technology, maritime adaptation, dates	Fedje <i>et al.</i> 2005
K1 Cave	FgUc 6	10,950-10,400	preservation of organics / technology, dates	Fedje and Mathewes 2005:149
<i>Strathdang Kwun</i>	FkUb 16	6,000-3,780	midden, raised beach	Fedje <i>et al.</i> 1995

Table 2.2 Table showing data of early and mid-Holocene archaeology that corresponds to Figure 2.2; including location of archaeology, locale designation, significance of archaeology, and principle investigator / author. See Mackie and Sumpter 2005 for an extensive spatial distribution of intertidal locales throughout southern Haida Gwaii.

* GHNPR&HHS is an abbreviation for Gwaii Haanas National Park Reserve and Haida Heritage Site.

A table showing combined archaeological locale distribution for the Naden area with period of discovery, “[number of sites” and “elevation above high tide [of] terrace complex can be found in Fedje *et al.* (2005:176). Archaeological landscape diversity appeared throughout the sample, including: locales ranging in elevation from modern sea level to no more than 20 m above mean sea level (hereafter amsl – the standardized sea level datum used within this thesis), size ranges from 30 m to 4 km in length, single component and multicomponent (11) locales, locales with and without midden, with midden but lacking a cultural component, contemporary beach deposits always corresponding with raised deposits, raised deposits not always correlating to recent use of contemporary beaches, and a multitude of other variances. Three dates have been acquired from testing in the Naden area, two from shell midden deposits at FIUe 3 and FIUe 4 dating to 3,260 BP, and 3,070 BP respectively (Fedje *et al.* 1995), and one from GaUd 3 dating to 5,890 BP (Stafford and Christensen 2000:2).

Both Lawn Point and Kasta are situated along the east coast: SE on Graham Island 15 km north of Skidegate, and 10 km south of Sandspit on NE Moresby Island respectively (Figure 2.2). Lithic assemblages from Lawn Point and the Kasta reveal similar use of local river / beach pebble and cobble materials and chert blocks for stone tool manufacture, which indicate its inhabitants concentrated on unifacial and microblade technologies (Fladmark 1986:54). Sharing microblade and pebble-core industries, the deeply stratified Lawn Point locale functions as an example of antecedent technologies to the microblade – bipolar reduction and groundstone technology transition period represented in the Cohoe Creek assemblage (see Christensen and Stafford 2005; Ham 1988). Four radiocarbon samples run on charcoal recovered from Lawn Point deposits show that this locale was used over a long period of time with a single date from

component one of 2,005 BP, one date from component four of 5,750 BP, and two dates from component four of 7,050 BP and 7,400 BP (Fladmark 1986:52). Interestingly, people dwelling at this locale, or locales, would have found a common utility amongst a drastically different sequence of landscapes, with sea level fluctuation of roughly 12-15 m between these periods, and fluctuating resources based on vegetation successions and climatic variables affecting marine and terrestrial environments. Fladmark (1986:54) was able to obtain two radiocarbon dates on samples from Kasta, of 5,420 BP and 6,010 BP, within the time constraints of component four at Lawn Point. Neither locales exhibited midden deposits, and in fact, Fladmark (1986:54) mentions that “no organic materials other than charcoal were found” at all, leaving him to suggest, a) occupation was brief, b) the local subsistence adaptation was non-intertidal relying instead on fully marine and / or terrestrial resources, or c) they were seasonal use locales during unsuitable shellfish harvesting times. However, this negative evidence may also be a result of natural transformation processes, be they marine generated erosion, or taphonomic processes related to midden breakdown.

Cohoe Creek is situated at the southeastern most base of Masset Inlet, two km south of the town of Port Clements where the Yakoun River and Cohoe Creek feed into the inlet (Figure 2.2). The archaeological context at Cohoe Creek is elevated on a 15 m bench formed by a relict shoreline. At the time of its discovery, midden deposits at this locale revealed the oldest example of intertidal shellfish resource gathering on Haida Gwaii, and possibly on the Northwest Coast (Ham 1988:ii). The ten original dates run from samples collected at Cohoe Creek range between 5,200 BP and 6,980 BP (~ 1,780 years), but if the outlier is removed from either extreme the eight remaining dates tightly constrain land use between 5,980 BP to 6,350 BP (~ 370 years). Two separate dates were

obtained from a column sample collected by Ham on charcoal (4,990 BP) and shell (5,715 BP) that, according to Nelson from the SFU laboratory who ran the samples notes, is a typical variation of 600-700 years reflected between these two materials because of marine reservoir effect (Ham 1990:207).

Two subsequent archaeological investigations were made at Cohoe Creek in 1995 (Fedje *et al.* 1995) and in 1998 (Christensen and Stafford 2005) to understand further the mid-Holocene cultural patterns of the Haida from this rare early midden locale. From these investigations further dates were obtained establishing land use from the late fourth millennia BP to mid fifth millennia BP occupation. Growth band analysis of shellfish from Cohoe Creek midden deposits suggest the location was utilized seasonally between late winter / early spring months. Subsistence related activities indicated for Cohoe Creek land use relate to a variety of ecological adaptations including hunting of waterfowl, caribou, and black bear, and marine resources including sharks, seals, and porpoises (Ham 1988:ii). The trend of a gradual replacement of technological tendencies in stone-tool production at the Cohoe Creek locale, concomitant with organic artifacts, indicate a wider range of subsistence-based technological attributes were a part of the Haida's mid-Holocene repertoire than had previously been evidenced (Christensen and Stafford 2005:271-272).

Similar in geographical and physical description to Cohoe Creek, *Strathdang Kwun* (FkUb 16) is another locale of archaeological interest in the Masset Harbour area. This archaeological landscape consists of midden build-up on a relict palaeomarine shoreline presently oriented between 10-15 m above high tide several hundred meters inland from the contemporary shore. Beyond a series of eight samples collected from the faces of exposed midden within a pit disturbance feature and road cut bank ranging in age

between 6,000 and 3,780 BP (Fedje *et al.* 1995), little investigation into the extent and contents of the midden have been made.

Two major contributors to the late Holocene - protohistoric archaeological knowledge of Haida culture and history are Acheson who wrote both his masters thesis (1983) and doctoral dissertation (1991) on Haida Gwaii and specifically around the Kunghit Island group in southernmost Moresby, and Orchard whose dissertation (2007) also conducted in Gwaii Haanas focused on patterns of socioeconomic change and continuity as reflected in species and artifactual evidence gathered from midden deposits.

2.1.3 Northeast Graham Island: Known Archaeology

This primary scale is more conducive to a landscape-level analysis that includes a depth of considerations including change in landscapes over time and an intimate relation between place and interpreter of place than the previous two, which are intended to provide context. Physical boundaries created by the shores of Hecate Strait to the east, Dixon Entrance to the north, and Masset Sound to the west form a seemingly obvious geographical unit designated on maps as Naikoon Peninsula, which stands alone from the rest of Graham Island (Figure 2.2). Despite its contemporary geographical appearance, in a strict sense there are no rigid ‘naturally’-forming boundaries that define this area. Rather, it is more practical and reflective of the actual systemic landscape it has been to those who have dwelt within it over the late Pleistocene and Holocene to expand or contract its designation depending on the scale of the inquiry and time period being addressed (see Bailey and Flemming 2008 for a theoretical and practical discussion on the applicability of underwater archaeological investigations for revealing a potentially novel coastal use pattern relevant to a different geoclimatic contexts than those observed

ethnographically and garnered from the more recent Holocene archaeological record). For instance, within this chapter northeast Graham Island is discussed as an archaeological unit derived from information pertaining to locales of known archaeology in the general area that appear on a map and could be measured as more central, westerly, or southerly in their contemporary orientation on Graham Island, largely for the purpose of material and landscape comparison. More consistently however, the spatial designation of northeast Graham Island refers to lands just inland from Rose Spit, and the tip of its large peninsula, as this encompasses the literal research zone; computer modeled and physically experienced. Specifically, these lands include those northeast, east, and southeast of a line that could be drawn from North Beach, containing both *Taaw Hill*⁶ and the lower Hiellen River watershed across to East Beach, containing both Argonaut Hill⁷ and Clearwater Lake (Figure 2.3).

⁶ The name this feature is referenced by varies within the historic and ethnographic records, appearing on early nineteenth century charts as Nagdon Hill and Macroon Hill, before Dawson (1880:153) applies the name 'Tow' to the charts in 1878 (Dalzell 1973:368). According to Dalzell (1973:368) "[t]he name Tow, from a Haida word rhyming with 'cow' – although pronounced today as 'toe' – means place-of-food." 'Toe', 'Tou' and 'Tao' are other renditions used within ethnographic texts. In fact, Swanton (1905a:21) uses "Grease-Hill" as its primary name in his earliest publication, and mentions the popularity with which "Little-Mountain" is also used, although for his 1908 publication the spelling changes to 'Tow'. 'Tou' was the preferred name used by Hill-Tout (1898:10-11).

⁷ Unnamed on maps until the 1950 issue, the origins of its late naming is not confirmed (Dalzell 1973:362).

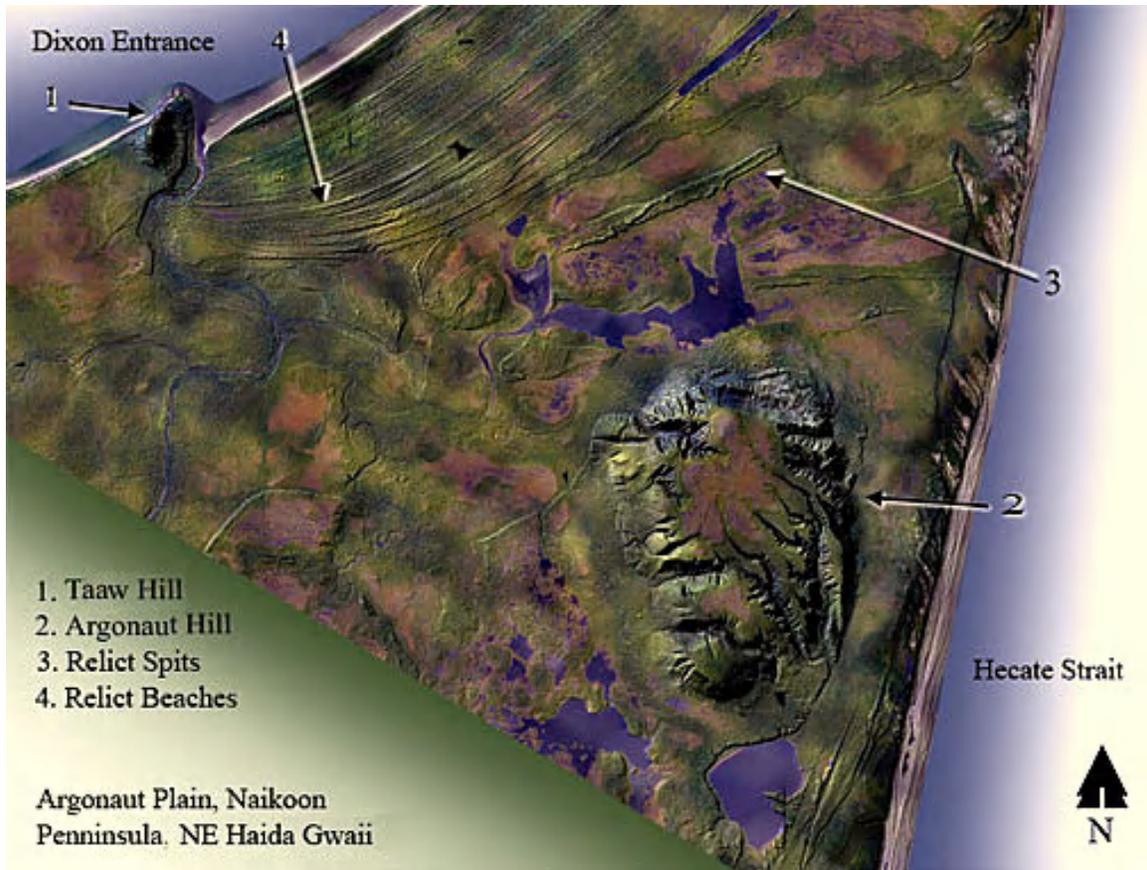


Figure 2.3 Photo mosaic draped on high resolution LiDAR-generated digital elevation model (DEM) showing research zone in northeast Graham Island. Image also includes landscape-level features of archaeological interest.

Archaeological locales of primary interest to this thesis consist of the seven which have been previously recorded within the GaTw Borden Grid (1-8 respectively, recognizing that 4 and 6 are likely redundant and may represent old *Nā-iku'n* Village), GaUa 18, Blue Jackets Creek (FIUa 4), and Skoglund's Landing (FIUa 6) which are summarized in Table 2.3. Of these locales, investigations at *Taaw* Hill, Blue Jackets Creek, and Skoglund's Landing are in their own ways more worthy of mention due to the relative nature of data collected during these three projects in comparison to the others.

Loci Name	Borden #	Age	Loci Type	Investigator(s)
Yakan Point	GaTw 1		habitation, midden	Smith 1919
Hiellen	GaTw 2		midden	Smith 1919
Unnamed	GaTw 3		cultural material	MacDonald? 1967
*Unnamed	GaTw 4		earthenworks (mound)	Smith 1919, 1927; Macdonald? 1967
Tow Hill	GaTw 5	3,280-2,050	midden, sub feature (hearth)	Smith 1919; Fladmark 1970, 1971a; Severs 1974a,b,c; Sutherland 2004
*Naikoon Village	GaTw 6		habitation, midden, dates	Fladmark 1971a
Hiellen River Site	GaTw 7		subsistence feature (fish weir)	Robinson 1973; Christensen 2000
Taaw Hill Clam Cannery	GaTw 8	Historic 1920's-30's	historic	Robinson 1973
Unnamed	GaUa 18	2,000-600	lithic tech., raised beach	Stafford <i>et al.</i> 2008
Rose Spit	GbTv 1		intertidal, lithic	Stafford 2004- 226
Blue Jackets Creek	FIUa 4	3,750 +/- 145 - 4,290 +/- 130	midden, burial, technology	Fladmark 1971a, b; Sutherland 2004
Skoglund's Landing	FIUa 6	9-8k? (questionable) 4,165 - 1,145	habitation, midden, lithic tech.	Fladmark 1969

Table 2.3 Table showing archaeological loci directly within the northeast Graham Island research area (GaTw Borden Grid), and others nearby.

* The recording of GaTw 4 and GaTw 6 may be redundant, both potentially representing the old *Nā-iku 'n* village mentioned by Swanton in 1905a.

Returning to Haida Gwaii in 1969 after assisting George Macdonald on his archaeological survey of the Queen Charlotte Islands for the National Museum of Man in 1967 (MacDonald and Inglis 1981), Knut Fladmark (1971a:16) located three locales of prehistoric significance including *Taaw* Hill, conducting surface collections and test

excavating each. In 1974 Fladmark undertook further survey work in the region, but concentrated his research efforts in excavating Skoglund's Landing (see Fladmark 1975). Following Fladmark's recommendation for "intensive archaeological investigation" (1971a:15) of a locale described as "likely including representative samples from nearly the total age-range of human occupation of the Charlottes" (1971a:16), Patricia Severs (1974d) pursued more involved archaeological investigations of *Taaw* Hill as part of her dissertation research (completed in 2008), including test excavations. Upon request by the Masset Band Council for excavations to cease, Severs' 1974 field season was aborted. What resulted from the three 'Localities' (A, B, and C) proposed for excavation by Severs was, "only very little excavation at Localities A and C, one test unit on the terrace below Locality B, and the lack of completion of the units at Locality B (Trench A)" left her with the personal and professional sentiment that "the cultural sample from Tow Hill can not be considered adequate" (1974d:7). Interestingly, Severs (1974d:11) follows up noting that "[s]ome six hundred and forty-five artifacts including diagnostic flakes were excavated at Tow Hill in 1974", and Fladmark *et al.* (1990b:230) writes more recently states, "[e]xcavations at Blue Jackets Creek and Tow Hill represent the only *extensive* prehistoric site excavations on the islands" (emphasis added).

In her 1974 provincial permit report, Localities A and B are documented as having "the same approximate elevation" of 6-9 m (1974d:5), although the contour map accompanying the report shows Locality A at 2-3 m and Locality B at 10-11 m above contemporary high tide. Comparing information documented on her map to the sea level

data for northern Haida Gwaii provided by Fedje *et al.* (2005:23)⁸ Locality A would have been used some time after 2,000 BP and likely not much more recently than 1,000 BP. However, based on the same sea level data, which places the marine maximum at 10-11 m amsl for northern Haida Gwaii, relative dating of Locality B is made impractical. The two radiocarbon samples taken from Locality B date to 3,280 +/- 210 and 2,050 +/- 115 BP respectively (Severs 1974d), but keep in mind this unit was not excavated to sterile deposits. According to Severs' map, Locality C was placed on a higher terrace at an elevation of 18 m (Severs 1974d:5), and therefore also has the potential to represent an open time frame. Judging by Severs' comment that, "[m]ost of the statements on results and discussion... pertain to Locality B", although Locality B was not excavated to sterile nor was its cultural contents ever fully reported on, and the statement that "[d]ata available for Localities A and C is too limited for comment" (1974d:10), I believe further archaeological investigations are warranted at these locales, if for nothing more than clarification and reinterpretation. Samples suitable for dating were entirely lacking from Localities A and C (Severs 1974d; 1975).

Taaw Hill was visited in 2005 for the first time in over 30 years by a team of archaeologists from UVIC and Parks Canada whose brief work has not previously been written up, but a description of which is included in this thesis (Chapter Six).

Located between Old and New Masset, GaUa 18 (Figure 2.2) is a recent project undertaken between 2005-08 that has revealed archaeological deposits from two separate raised beach terraces, with fifteen dates ranging between 2,000 BP and 600 BP (Stafford *et al.* 2008; Jim Stafford pers. comm. 2008).

⁸ The sea level curve for northern Haida Gwaii was based on few data points (Fedje 2008 pers. comm.). Working from LiDAR generated imagery and ground truthing this area with a GPS indicates the early – middle Holocene marine high stand was closer to 18 m amsl for northeast Graham Island.

Blue Jackets Creek is situated at an elevation of 11.6 m above the present day high tide (Severs 1972:2; compare with “10-12 m above mean high tide” Sutherland 2004:226) on the east shore of Masset Inlet 2.4 km south from the village of New Masset, and is by far the most temporally constrained archaeological landscape in northeast Graham Island dating to the middle Holocene period. Twelve radiocarbon samples collected from the complex stratigraphy of wave-washed sandy loam range between 5,260 BP and 2,270 BP with eight constrained between the roughly 900 year period of 4,675 BP and 3,750 BP (Sutherland 2004:229). However, both Fladmark (1971a:13; 1971a:3) and Severs (1974:22) date the terminal human component of the occupation to 4,290 +/- 130 BP. Any interpretation of this archaeological landscape beyond its well dated character was left ambiguous, leaving Breffitt (1993:149) to suggest from the “location of the site” and the “narrow range of artifacts in the assemblage” expressed through evidence of “intensive core reduction with little emphasis on tool production” that Blue Jackets Creek was a “specific function site... utilized by the residents of the probable village”. Sutherland (2004:225-239), argued for a continuous occupation of the locale over approximately a two millennia period from roughly 4,000 – 2,000 BP. Sutherland (2004) comments that the significant tool assemblage (2,504 artifacts), evidence of burials (23 with 25 individuals interred), and faunal remains further indicate a period of cultural stability, with possibly a slight shift towards increased marine resource extraction and social interaction towards the terminus of the occupation. Due to the multiple historic episodes of disturbance to this archaeological landscape, any interpretation of its ancient cultural pattern must be considered partial.

Thought to be disturbed by the early Holocene sea level maximum transgression, the 8 m deep stratified gravel beach deposits at Skoglund’s Landing located < 10 km

south of the contemporary Haida village of New Masset on the eastern shore of Masset Inlet has not been accurately dated. However, Fladmark *et al.* (1990:231) indicates that the excavated material assemblage from the locale shows technological correlates to stone-tool manufacturing that suggest human occupations were established in the region 9,000 – 8,000 BP. It is important to note however that the radiocarbon dates run on samples from this locale range between 4,200 and 1,000 BP. The greatest value that the archaeology of Skoglund’s Landing offers to this thesis is its large lithic assemblage of 1,080 artifacts which can act as a basis for discussion on ecological and socio-technological behavioural adaptations in the region. For instance, through an MA-based research project analyzing the entire lithic assemblage from Skoglund’s Landing, Breffitt (1993:149) places it “fully within the cultural inventory and temporal range of the Graham Tradition”, an amorphous temporal classification of Haida culture sequence suggested by Fladmark (compare 1982:103; 1989:219; 1990:231) to range approximately between 4,500 BP and the historic era⁹. Sutherland (2004) has recently challenged this broad temporal classification of the Graham Tradition, suggesting it should express a sharp distinction between the 5,000-2,000 BP and post 2,000 BP cultural sequences. Akin to all the archaeological locales from the 2007 inventory dating contemporaneously with Skoglund’s Landing, shell midden deposits are entirely lacking, a trait believed to be characteristic of archaeological deposits from this time frame (Breffitt 1993:148-149). In concluding on the lithic technologies recovered from Skoglund’s Landing, Breffitt (1993:149) suggests, similarly to his interpretation of the Blue Jackets Creek locale that, this “assemblage probably represents a specific function location, or site, involving only

⁹ The predecessor tradition within the Haida archaeological sequence is referred to as the Moresby Tradition, named after the southern of the two largest islands that comprise the archipelago, and intended to cover the era roughly between 8,900 and 5,000 BP.

one of many activities undertaken by Graham Tradition people and does not represent a discrete technological unit”.

With the exception of GaTw 7, which has had a considerable number of distinct visits for the purpose of recording information on its overall potential or condition, (Dawson 1880; Chittenden 1884; Newcombe (Neary and Tanner 1992); Swanton 1905a; Smith 1919; Robinson and St. Pierre 1973; Robinson 1973; MacDonald 1983; Roberts *et al.* 1986; Wilson 1992; Zacharias 1996; Christensen 2000), the reason for such minimal attention paid to the other archaeological locales in the GaTw Borden Grid is that their reporting has either been marginal or ambiguous as to offer much insight. However, articulating briefly what is known of these archaeological locales for the purpose of appreciating the landscape as a whole will be performed, as well as to provide context to areas of recognized archaeological potential that will be expanded upon in subsequent chapters.

Limited test excavations were applied by Harlan Smith with the Canadian Museum of Civilization in 1919 at GaTw 1, or “Old Yagan”, with no subsequent analysis of recovered artifacts or cultural interpretations of locale importance beyond a temporal estimate of the locale which he gave to be a minimum of “several centuries”.

GaTw 2 or “Hiellen” is a small midden locale that has had archaeologists collect artifacts from its contents on two separate occasions. Both collection visits were made for the Canadian Museum of Civilization, and were carried out by Harlan Smith in 1919 and George Macdonald in 1967. Likely a land use locale fronting the sea shore earlier in the Holocene, its contemporary context is inland approximately one kilometre south following the Hiellen River from where the bridge at the base of *Taaw* Hill crosses the river.

Descriptions for GaTw 3 are entirely lacking, with the record form only providing geographical coordinates and mention of “cultural materials” under “site typology”.

Although no author’s name is provided for the document, it can be suggested that, due to its coterminous occurrence with Macdonald’s 1967 known non-permit reconnaissance in the area, he was its author.

GaTw 4 and GaTw 6 are discussed together as much confusion has arisen from the seemingly redundant information on location and feature description provided by researchers visiting the area. First noted by Chittenden (1884) while on a hurried survey of the East Beach near-shore lands south from Rose Spit, in 1919 Smith (1927:109) was the first to formally document the possible house features by way of close measurement and surface drawings. Although Swanton (1905a:85) doesn’t mention observing any landforms or features associated with the locale of *Nā-iku’n*, he does mention information that corresponds to other descriptions of its orientation on the spit when he states, “the spot which was pointed out to me as the site of the ancient town is between one and two hundred feet back from the sea to the east [from North Beach], which it formerly fronted”. This archaeological locale was not registered until an un-authored site form provided its whereabouts in 1967, leading Foster of the British Columbia Archaeology Branch in 1998 to suggest it was “[p]robably a form submitted by Macdonald”. Fladmark likely reregistered it in 1971 after his 1970 observation when he filed GaTw 6 with the Archaeology Branch, designating it Naikoon Village after Swanton’s ethnographic recording of *Nā-iku’n*. A more recent visit to this area was made by Stafford (2004:8-9) for the purpose of conducting an Archaeological Impact Assessment (AIA) prior to the upgrade of an automated weather station in the vicinity. Most recently, Eldridge (pers. com. 2009) notes having observed a number of archaeological locales in the area

representing an assortment of use types including, residential and non residential structure rims, burials, and a lone splitting adze. Although some degree of variation exists in observations made throughout this 130 year period, it makes practical sense that these are the result of the highly dynamic landscape that Rose Spit is, and has always been.

GaTw7, or the “Hiellen River Site” or “Hiellen (*Li’elan*¹⁰) village” was recorded by Robinson during an AIA in 1973, and constitutes a recording of small pockets of shell midden and a fish weir near to the rivers mouth. This observation corresponds to a plan map from 1888 showing detail of Hiellen IR No. 11 also indicating a weir across the creek. Also recorded by Robinson in 1973 was GaTw 8 or the “Hiellen Clam Cannery Site” which was located between the base of *Taaw* Hill and the Hiellen River, and operated for several seasons between 1923 and 1930 (see Dalzell 1973:368).

Christensen’s (2000) non-permit report prepared for Economic Development and Heritage Resources and The Old Massett Village Council at this locale notes that despite the early historical modifications caused to the archaeological landscape associated with the construction and use of the area by the Clam Cannery, and the subsequent looting of heritage artifacts by the public, slight surficial evidence remains for possible house and midden berm features, as do subsurface archaeological deposits containing both organic and inorganic cultural artifacts.

The overview of archaeological evidence for Holocene human occupation in northeast Graham Island shows how previous search methods relied on material evidence of landform modifications, largely in the form of midden, thereby limiting the activity type and age range of land use patterns in the area. These search methods also suggests

¹⁰ All Haida words are shown in Masset dialect, as defined in the orthography of the original publication cited by linguist / ethnographer Swanton (1905a; 1908).

archaeological knowledge acquisition has been slow to develop, characterized better as happening in “spits and spurts”. In fact, what preceded 2007 investigation of lands in northeast Graham Island was a repetition of visits made to locales referenced in the earliest ethnohistoric and ethnographic records in order to record and expand on known archaeological landscapes (see Sanders 2009a for a more expanded discussion). In light of this history of archaeological inquiry, I proposed the use of novel technological tools to provide a basis for innovative methodological search strategies as a beneficial way to explore what archaeology might exist beyond what has already been learned.

2.2 Landscape: theorizing the term, concept, and perspective

Analyzing the ways in which the word landscape has been defined, co-opted, and redefined between disciplines is useful for understanding its use history. Furthermore, articulating from what perspective the concept will be referenced within this thesis at the outset helps to guide the reader. Most specifically, the landscape concept is important to unpack because of the implications its definition has on the theme of assessing the archaeological potential of lands central to this thesis investigation. The definition of landscape articulated in this section, that is, a palimpsest phenomenon comprised of co-dependent living, dwelling beings and systems is amended along with the word archaeology into the concept of ‘landscape archaeology’ that will for this thesis replace the traditional notion of ‘site’ used within the discipline (see Carman 1999).

The term “landscape” has been increasingly been used in the thinking and language of social scientists and physical scientists alike for the past two decades, and anthropologists are well positioned to comment on its utility in expressing the integral interrelationships between people and the physical world. The atmosphere of this

discourse is centered most notably on two criticisms, consisting of a methodological and theoretical concern respectively. From a methodological perspective, concern arises with the ways in which the landscape term and concept has been used, to represent the physical and implicitly non-human world, which reflects dissatisfaction with the semiotics of the term's use and meaning over time. From the numerous examples which describe the types of landscape archaeology approaches practiced throughout the discipline, I believe Wilkinson's (2003) is useful for being particularly inclusive.

Wilkinson (2003:4) organizes landscape approaches according to three broad research paradigms: 1) cultural historical (or landscape history) approaches popular in Europe; 2) processual approaches ("archaeological survey, off-site and quantitative studies, catchment analysis, settlement archaeology, and various ecosystem approaches"); and 3) post-processual ("phenomenological, ideational, and symbolic / religious landscape") approaches. To mediate these concerns as best as possible within the layout of this thesis, I will briefly trace 'a' use-history of the landscape concept from its genesis in Dutch and Flemish Renaissance painting to its contemporary place within the anthropological discipline. The purpose of this exercise is to create the context within which to draw a practical working understanding of this inherently polysemous term to employ throughout this thesis.

The origins of the word "landscape" in English came from the Dutch term *Landschap*, which can be sourced to sixteenth century painters who depicted landscape as a two-dimensional, pictured representation of 'something out there'. In these artists' objective to achieve correspondence between the pictorial ideal and the world itself, people transformed the landscape in their renderings to suit their aesthetic desires of 'nature' – as something natural, and not a part of human culture. Pictorial representations

of landscapes from this era are thought to externalize and disembodify the living environment (see Gibson 1977 and Ingold 1993 for an example that both rely on the set of paintings by Bruegel named *The Harvesters*). Landscape, then, in the European and American tradition became a matter of constructing and reconstructing rational visual perceptions of ‘realistic’, but not ‘real’ worlds. For example, Schama (1995:6-7) provides a potent reflection to this effect on the issue of perception and landscape imagery with his comments, “[f]or we are accustomed to separate nature and human perception into two realms, they are, in fact, indivisible. Before it can ever be repose for the senses, landscape is the work of the mind. Its scenery is built up as much from strata of memory as from layers of rock”. In part, Schama’s emphasis that conventional notions of landscapes are merely constructions of the mind is a commentary on the larger project of thinking about a more synergistic relationship between the Cartesian dualism of nature as distinct from culture – separate phenomena that are confined to distinct spheres. I believe that Schama’s “strata of memory” are constituted by ‘being-in-the-world’, thereby causing systemic archaeological landscapes to inform their own structures, as they are mediated through the processes of individual and group land-use, cognition, and perception.

Following a prolonged period of objective treatment towards the landscape by Western society, anthropologists, geographers and other social scientists from the 1980’s onward began to critically examine the concepts of space and place in landscape representations, and its effect on the interpretation of human culture across time (Bender 1993; Casey 1996; Cosgrove 1984; Feld and Basso 1996; Hirsch and O’Hanlon 1995; Lawrence and Low 1990; Lawrence-Zùñiga and Low 2003; Tilley 1994; and Thomas 1993a, 1993b, 1996). This changing *Zeitgeist* in the discipline can be noted by Hirsch and O’Hanlon’s (1995:1) comment that, until recently, the concept of “landscape has received

little overt anthropological treatment”. In these expositions there appears a common call for change in landscape representation from being people’s imaginings of what a landscape ‘should be’, towards an empirical judgment of its constitution, which until recently has largely neglected people and their imprint.

Concepts of *space*, *place* and *landscape* promoted by anthropologists correspond with the trajectory shared within social science disciplines that has begun to discuss the physical world in relation to the ‘lived-life’ experiences of people inhabiting these reciprocal domains. For instance, theories in cultural geography, architecture, ecopsychology, phenomenological philosophy, landscape architecture, developmental biology, and still other disciplines share to some degree what Feld and Basso (1996:6) refer to as a distancing from the “western landscape concept”, where “places are fixed and immutable elsewhere’s”. In contrast to past ideals on notions of static landscapes, the intellectual trajectory within these disciplines has trended towards a worldly perspective where people socialize their physical surroundings generating an animated and synergistic existence with their own personal and culturally collective spheres. This dynamic is expressed by Ingold (2000:173) through the perspective of an ‘agent-in-their-environment’, or as Tilley (1994:12) states, “it is about the relationship between Being and Being-in-the-world”. Besides each echoing Heidegger (especially 1962) and Merleau-Ponty (especially 1962), these examples emphasize making meaningful connections between the physical and social realms. Whereas the *Landschap* was once the physical representation and rendering of space and place, anthropologists amongst other social scientists now speak of a “dwelled in” landscape involving the primacy of the pre-existing, ordered world in which all beings dwell, and the processes of meaning and significance – by and of the land – that local inhabitants come to be engaged in through

this dwelling. This dialectic of socionatural systems challenges Sauer's (1963:343) simplified conceptualizing of a "cultural landscape", as it is constructed from the "natural landscape"¹¹. I contend in this articulation of "landscape" that along with Berkes (1999:6), 'land' and 'knowledge of land' is "more than the physical landscape; it includes the living environment". In sum, the contemporary discourse on culturally-dynamic landscapes has built analytical bridges across the disjuncture between the human and non-human realms once taken to be dichotomous entities.

An important distinction regarding applying a social component to the physical world has been to eliminate the bias in prevailing Western thought that privileges form over process. In so doing, the onlooker, whatever their theoretical persuasion, can study a 'performance-based' landscape, one that holds histories of processes rather than a composition of object / features for which histories are absent. Echoing the dialectical thought that populated nineteenth century Western philosophy first espoused by Hegel, Inglis (1977:489) defines landscape as, "a living process; it makes men (*sic*); it is made by them". To expand the idea of an animated landscape holding clues to culturally-constituted behaviours, I look to Ingold's (1993:158) notion of a 'taskscape', or "a pattern of activities 'collapsed' into an array of features" (Ingold 1993:162). Taskscapes describe the cumulative activities relating to a group's engagement with the landscape,

¹¹ I propose that the dynamism shared between people and the composition of the biotic and abiotic world is more complex, and more organic than imagined by the American geographer Sauer (1963:343) who wrote, "[t]he cultural landscape is fashioned from a natural landscape by a culture group. Culture is the agent, the natural area is the medium, the cultural landscape is the result". I envisage a less hierarchical and more representative formation of the dynamism which suggests a symbiotic relationship between "agent / medium" "culture / natural area", so that people are concomitantly the mediums by which the nonhuman world is structured and restructured. This is neither a cultural or environmental determinism, but a synergy involving the reciprocal exchange of energies between each. Anderson (2007) likens this dynamism to the two wings of a bird, stating, "the bird cannot fly without both working together, but neither one is the bird itself".

where temporality and history are merged together in experience. Combined, everyday ritualized behaviours impart a physical signature of people's habitual actions enacted in their social lives into the landscape. This "muscular consciousness" as Ingold (1993:167) refers to the act of 'being-in-the-world', ultimately impresses the landscape with visible signs - taskscapes. From physical clues such as pathways, habitation features, canoe skids, clam gardens, horticultural terracing, fishing weirs and middens, it appears that in the reciprocal act of building and dwelling, "the landscape is always in the nature of 'work in progress'" (1993:162). In fact, according to Ingold (1993), taskscapes constitute acts of embodiment that personify a tangible, human component in the landscape¹². Merleau-Ponty's (1962:24) reflection that the landscape is "not so much the *object* as the *homeland* of our thoughts" is useful for interpreting taskscapes in the palaeolandscape¹³ when modeling land-use behaviour, perception, and cognition patterns of Holocene inhabitants of northeast Haida Gwaii during an endured period of landscape change – necessitating intensive and extensive acts of 'landscape learning'¹⁴.

¹² Ingold's perspective on the landscape concept expresses a cosmological representation influenced through experiences with an ontology held by the Sammi of Lapland, Northern European reindeer herders (see Ingold 1976). Ingold's (1993:152) organizing model is referred to as the "dwelling perspective"; explained as a view which contends, "the landscape is constituted as an enduring record of – and testimony to – the lives and works of past generations who have dwelt within it, and in so doing, have left there something of themselves".

¹³ The palaeolandscape refers to the attributes of the landscape that can be read in relation to either cultural or natural formation processes that modified their forms over time, using both scientific and indigenous technologies, skills and knowledge. These may include glacial activities, sea level histories, references to mnemonic landmarks embedded in toponyms, oral histories *et cetera*.

¹⁴ Bourdieu's (1977) notion of *habitus* – an abstract behavioural domain of structured dispositions suggests people live a large part of their lives in a state not wholly guided by rules or norms for which they strive. I argue this unconscious structuring of the individual and their actions are routinely interrupted by episodes of cognitive and bodily realizations when confronted with any stimuli prompting thought-out-actions. Conscious worlds are not restricted to human actions, but also relate to the realm of what Varela *et al.* (1991:27-28) refer to as "*mindful, open-ended reflection*" played out while in the state of mindfulness / awareness. Examples of these processes will occur through a reference to a persons 'social fields' (Wobst 1974, 1976; Lesser 1961), which, for example, may consist of anything from challenges forcing thought-out-actions posed by drastic changes in climatic or environmental systems, or being asked to access memory in recounting an experience, family or clan narrative *et cetera* – often relating to culturally

The concept of taskscapes characterizes the difference between being an observer *of* a landscape and being a participant *in* a landscape. The difference being, what one sees as a first time observer versus what one sees and knows from recurring participation is embedded in the intimate experiencing of the landscape where nuances of its humanness are acquired and become knowledge. The humanness of landscape occurs any time people dwell in a landscape, experiencing the reciprocal exchange of being modified and modifying the other. Following Plato's (380 BC) famous quote, "necessity is the mother of invention", I suggest people affect change upon the landscape which alters the ecological balance, while the environment in response poses challenges for human adaptations involving modifications to the landscapes with which they dwell. This process occurs relative to the manner that each context of people-landscape relations is constituted and reconstituted over time in a recursive manner¹⁵ – hence the importance in

transmitted knowledge units. The result is that 'landscapes of action' are indivisible from 'landscapes of consciousness', which means a process oriented 'landscape-as-text' metaphor is capable of extracting temporally significant meanings from 'taskscapes' that remain in the palaeolandscape.

As a concept, 'landscape learning' (see Golledge 2003) is a collective enterprise of a group becoming intimate with their surroundings. Knowledge acquisition, information transmission and previous experiences with proxy landscapes are integral to a group's survival in a newly colonized area, or within a dynamic landscape where transformation is punctuated. 'Landscape learning' can deal with numerous questions relating to people-landscape relations. For instance, key amongst these may be; what did colonizing or resident populations know about their landscape? How did they learn it? What is the temporality of the learning process? How did they retain and transmit this knowledge?

¹⁵ As a way to extend the "dwelling perspective" from a strictly cultural operating system into a joint biological connection I make use of the movement in evolutionary biology concerned with reshaping the dominant notional processes of the organisms' role in natural selection. In articulating the evolutionary merit in the "niche construction perspective", Day *et al.* (2003) explain that "organisms regularly modify both biotic and abiotic sources of natural selection in their environments, thereby generating forms of feedback in evolution that are rarely considered in evolutionary analysis". On a parallel track, ecologists studying ecosystem dynamics describe niche construction under the rubrics of ecosystem engineering, suggesting that organisms' involvement in the ecosystem "partly controls the flow of energy and matter through ecosystems and may play vital roles in ecosystem stability and resilience" (Day *et al.* 2003). The "niche construction perspective" which emphasizes the reciprocal aspect of the building process within the ecological context organisms inherit (also read as select) can be a fruitful body of knowledge adapted to social science interests of the human "agent in their environment" and "dwelling perspective" concepts.

This shift warns against viewing environments exclusively as self-regulating and equilibrium-seeking systems to which individuals or cultures adapt or adapted. Rather, it promotes thought of the biotic and abiotic entities of lived-in landscapes as historically-contingent outcomes of human niche-building through time. For instance, among these dynamics are the symbiotic relations with other species of

basing archaeological analysis involving multidisciplinary components on local patterns of data and local knowledge.

While consensus was emerging with the work of social and cultural theorists (and to some degree with physical scientists) by the 1990's as to what the landscape concept signified, what ensued over time with the way landscapes were being depicted in a practical sense of representing land was not so much a shift in perception away from the subject / object dichotomy, but rather a shift in technological methods of representation towards the same end. For example, pictorial landscapes created during the sixteenth–twentieth centuries are not maps, but as objectified representations of resources, they are closely tied to cartographic maps, as devices for separating space into commodity units (Cosgrove 1984). Although modern cartography and map-making using GIS both reinforce the two-dimensional aspect of landscape in Cartesian terms – e.g. non-subjective geometric depictions of space (see McGlade 2003), the matter of perception remains the same – people were distinct, onlookers, the omniscient ‘eye in the sky’. In the words of Chris Gosden (1999:153), “[l]andscape was not lived, but looked at, being seen as something external to people; nature versus their culture”. For Canadians familiar with their nations’ own artistic heritage this depiction of externalizing the landscape from peoples involvement¹⁶ may sound reminiscent of landscape renderings produced by the

plants and animals – what can be considered as one of the most important factors of landscape evolution throughout the Holocene (see Delcourt and Delcourt 2004).

¹⁶ Relating directly to the anthropological criticisms waged towards the Western tradition of dehumanizing the landscape through pictorial forms of representation, Foucault’s (1994:178-185) discussion of ‘utopias’ and ‘heterotopias’ is useful for distinguishing between imagined and experienced places within landscape paintings and lived-in environments, where the former are “society perfected... and fundamentally and essentially unreal” - simulacra, while the latter are “real places, actual places, places that are designed into the very institution of society”. Taking a lead from Merleau-Ponty by emphasizing the experiential component of landscape interpretations, Casey (1996) claims that “to be in place is to know” (read conscious) therefore, “place is no secondary grid overlaid on the presumed primacy of space... place is the most fundamental form of embodied experience – the site of powerful fusion of self, space, and time”. Both

Group of Seven, which were intended to personify the ‘real Canadian wilderness’ to the public, but were in fact feeding their imaginations with products of nation building.

According to this strange and estranged sense of attachment, for example, Inuit, Newfoundlanders, and Haida maritimers, as Canadians, were all intended to relate to the landlocked landscape of the Rocky Mountains – unseen and never experienced.

Relationships that define the ‘cultural landscape’ can be described diversely as neither entirely natural-functional nor cultural-symbolic. How people *do* interact with their landscape is directed by perception, which can be defined as a reflection of an apprehended world within perspectival space according to personal experience and sociocultural organizing apparatuses. Being in the landscape constitute behaviourally meaningful activities that rely on mnemonic landscape entities such as prominent landforms, sacred places, resource locales, and other culturally constituted places for cognitive indicators. The phenomenon of human *perception* and *cognition* are guided by knowledge and experience involving the landscape, and thus *land-use* is the third and mediating factor shaping ways people engage the landscape.

Having transcended nearly half a millennium following the use-life of the landscape term, and moved between diverse bodies of reasoning in this literature review, I have traced a pattern in the application and meaning of the landscape concept from an origin, through diffusion of multidisciplinary exploration, to a contemporary context where a strong antithesis has been formulated (Figure 2.4). This antithesis problematizes

Foucault and Casey rest their emphasis on perception and phenomenological acts of conscious realization, or how “being-in-the-world” is the factor distinguishing between notions of what is ‘real’ versus what is ‘imagined’, and what constitutes space and place respectively. In this manner, neither the pictorial representation nor the computer-generated image as simulacra are replacements for the real world, rather, they are either distant realities or near approximations and useful proxies at best.

past conceptions of landscape with the material representations of landscape having been distanced, and objectified entities reinforcing ‘truth-claims’, free from context or ‘open-minded’ interpretation. In synthesizing this anthropological critique and those from related disciplines with which anthropologists often engage in cross-intellectual fertilization I have articulated the perspective of landscape I retain within this thesis. In summation, landscapes are not subject to simple binary oppositions between nature and culture, it is a place of dwelling (see Heidegger 1971 Ch. IV), and a palimpsest for the temporality of sociocultural and natural phenomena that constitute and are constituted by its interconnected components. Having covered the era where notions of landscape were born void of human presence, constructs of our referential apparatuses involving memories and imaginations, to a place where human taskscapes function as embodying processes of landscape, I transition into a fuller discussion on the temporal and sociocultural aspect of the landscape equation as it contributes to archaeological holism.

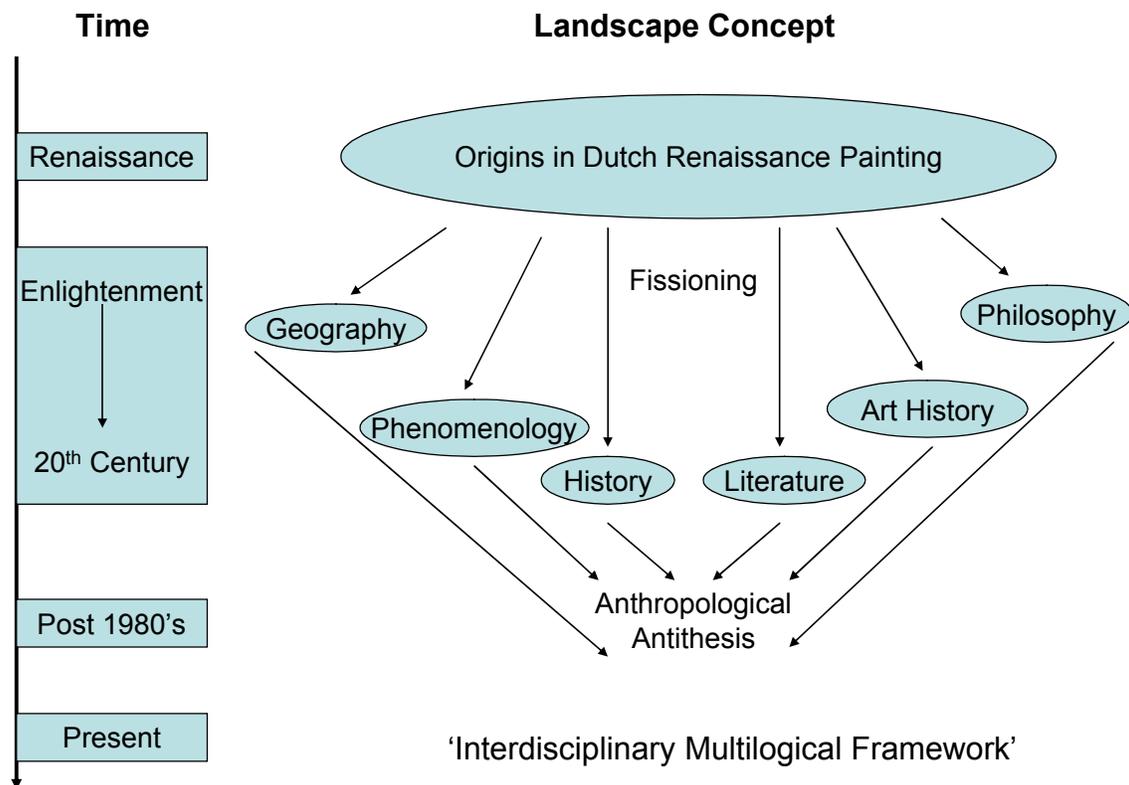


Figure 2.4 Figure showing the trajectory of the landscape concept over the *longue durée*, from its origins, period of fissioning through multidisciplinary use histories, anthropological antithesis, and interdisciplinary synthesis. The novel aspect of the Interdisciplinary Multilogical Framework in the use history of the landscape concept is its holistic ability to marry strengths from diverse disciplines and sociopolitical voices into a synthetic theoretical model and framework for methodological practice.

2.3 Archaeological Holism and the Landscape Perspective

I contend that landscape perspectives in archaeology benefit from a borrowing of ideas developed in history, geography, ecology and elsewhere; but ultimately, archaeological prospection derived from behaviour-based models considering cultural factors will need to be built to interpret the systemic character of archaeology at the landscape level. Further, incorporating indigenous (local) knowledge of heritage into archaeological inquiries is another integral component of such a dynamic project.

Rossignol (1992:4) comes close to formulating a holistic landscape archaeology that parallels the type this thesis follows when she defines a landscape approach as “the archaeological investigation of past land use by means of a landscape perspective, combined with conscious incorporation of regional geomorphology, actualistic studies (taphonomy, formation processes, ethnoarchaeology), and marked by ongoing re-evaluation and innovation of concepts, methods, and theory.” In accord with these reflexive and recursive views, archaeological holism is an integrative exercise in configuring a wide variety of ideas, approaches, and data for the purpose of testing hypotheses about people’s relationships to the larger cosmos through a multidimensional context, making landscape studies a foundation for its synthetic dialectic.

2.4 *Dialectical Archaeology*¹⁷

The tradition in anthropological theory of creating and maintaining poles from which to argue is in part the impetus for the recent florescence in landscape archaeology that has led to an attempt at a new synthesis for dealing with a diverse array of physical

¹⁷ *Dialectical archaeology* draws from holistic studies of landscapes as embodied places that reflect interacting forces of both environment and culture. This approach forms a new dialectical synthesis from ostensibly incommensurable juxtapositions dealt with in the ‘natural’ and ‘social sciences’. The synthetic character of this dialectic is the product of intercession between competing patterns and ideas generated from distinct disciplinary, epistemological, and ontological foundations. Included in this method is the possibility of merging between all cultural constructions of time; past, present and future. The work of *dialectical archaeology* draws most poignantly on the merits of interdisciplinarity (see Klein 1990), and is not to be mistaken with the program of *Dialectical Anthropology*, although it too ascribes to the philosophical potential in Marxism as “the dialectical method for discovering the self-reinforcing and/or contradictory connections among all significant aspects of sociocultural life... in particular times and places” (Diamond 1975/76:3).

Another closely corresponding use of the dialectical method within the anthropological discipline has come from Marquardt (1992) who proposes a “dialectical anthropological archaeology”, which is closely tied to the Marxist notions of ‘agency’, ‘contradiction’, ‘structure’, and ‘power’. In part, due to the resolution of the archaeological record under investigation corresponding to 2007 research, the design of *dialectical archaeology* is focussed on the integration between people and the matrix of ecological systems; inclusive of all world views. In this manner, the *dialectical archaeology* I propose is well aligned with the notion of *heshook-ish Tsawalk* used by Atleo (2004) to describe the oneness between all material and immaterial entities (see Chapter Eight for fuller discussion of concept use).

and cultural considerations. For instance, the questions formulated by Sahlins (1976) who asks whether humans create or define their environments according to a cultural logic, or by Lenski (1995) who asks if environments determine human behaviours, are two cases of presenting an argument from a polar position that orients its subject within a binary relationship. ‘Lumping’ and ‘splitting’ units of analysis such as archaeologists invariably do with *artifacts, levels, horizons, features, sites, regions, zones* and so forth into ‘wholes’ or ‘parts’ is as antiquated a dilemma as the Aristotelian philosophical conflict between reductionism and holism. Within a *dialectical archaeology* the interstitial medium between these antithetical approaches can be achieved, making real-world connections between the varying levels of organization which constitute interactional inquiries (people–landscape) within interdisciplinary frameworks.

Expressing the landscape archaeology perspective in relation to the structuralist argument in anthropology, Tilley (1994:23) writes, “[p]eople and environment are constitutive components of the *same* world, which it is unhelpful to think of in terms of a binary nature / culture distinction.” Likewise, theory and methods are often treated as two independent mechanisms for approaching archaeological inquiries. This tension between modes of investigating cultural and non-cultural phenomenon is a remnant of the Cartesian tradition of splitting archaeological units of analysis into opposing languages, a practice challenged within the *dialectical archaeology* undertaken by this thesis.

Chapter Three begins this journey by discussing the multidisciplinary data set that is coalesced for assessing the archaeological potential of northeast Graham Island.

3 Acquiring Information for Model Building

As part of the process of working towards a dialectical archaeological practice, initial stages of data gathering focussing on the physical environment are required to assist with contextualizing the human component in the landscape. Good palaeoenvironmental proxies, such as are available for northeast Graham Island, do not place people in the region before the archaeological evidence shows they were present, they do suggest, however, that modeling the most prominent and enduring features in the region for both landscape visibility and archaeological potential could be a productive ‘first step’ in drawing attention to areas that have retained a signature of high utility to local inhabitants. Chapter Three looks to flesh out the long term trends in the physical landscape that inform the holistic modeling process, plaited into a unified theory in section 3.2.

3.1 Multidisciplinary Information and Landscape Modeling

Understanding the physical processes that affected palaeolandscape change within northeast Graham Island and its surrounding environs, including the submerged landforms of ‘Hecatia’¹⁸, and the temporality of these phenomena is important on several accounts. Reconstructing the temporality of major system changes can establish a spectrum of probability that can suggest human presence in this landscape from highly probable to impossible. Once the spatial limits of possible land use have been established, finer-grained multidisciplinary data can help refine the modeling strategy. For example, climatological data on shoreline fluctuation and resulting geographical orientation of the near-shore environments act as useful proxies for predicting more specific behaviours of

¹⁸ ‘Hecatia’ is a term devised by Fladmark (1979) which describes the submerged portion of the Argonaut Plain that once extended northeast to southeast from Graham Island towards the continental mainland.

people on the stable landform. Although my analysis in this section of large-scale climatic, geological, and ecological systems spans a wider range of time than the immediate archaeological evidence covers, my intent is to provide broad spatial and temporal context for subsequent research to consider the potential for people-landscape interactions in NE Haida Gwaii over the *longue durée*¹⁹.

When articulating the “what is a model” question at the outset of their book, Kohler and van der Leeuw (2007:3-4) state, “[i]t is an imaginary system, represented in language, mathematics, computer code, or some other symbolic medium, that has useful similarities to aspects of a target system in the real world.” While this description of what entails a “model” is generally accepted, it strikes me as odd that these authors who have been primary contributors to the development of archaeological modeling formation fail to emphasize the salient point that the *archaeological model* is not intent upon matching “similarities to aspects of a target system in the real world” as it exists today, or whenever data was collected, so much as it is for reconstructing a dynamic temporal system, and socio-landscape palimpsest, from an imagined world that may have existed in the past. The difference between these two approaches to archaeological modeling is the former is content to accept temporally static and automated computer generated simulacra as the landscape, while the latter reads the simulacra as a single component within a dialogical storied landscape composed by experience-based perceptions. Writing in the same year as the above authors, Bailey (2007:214) notes, “there is as yet little clear guidance as to how far the outcomes of such simulations can be influenced by or

¹⁹ Marc Bloch (1953) and Lucien Febvre (1973) of the French *Annales* School of Historic Thought pioneered the theory throughout the first half of the twentieth century, while the tradition was carried on by Fernand Braudel (1980) in the second half of the century. While having a moderate level of influence throughout the social sciences in general (Flyvbjerg 1998; Putnam 1993), the concept of the *longue durée* has been applied minimally to archaeology (Bintliff ed. 1991; Knapp ed. 1992; Redman 2005), and only a single article (Ames 1991) on Northwest Coast archaeology has adopted its theoretical and methodological conceptions.

evaluated against the empirical record of large-scale palimpsests”.

The above point is captured by these authors as they further describe their use of the “model”, stating, “[i]t is often highly simplified, omitting details that are thought to be noncritical to the aspects of the target system being explored. It might be viewed as an abstraction, a simplification, an idealization, or a conceptual devise” (Kohler and van der Leeuw 2007:4). Whereas it was once viewed that,

computers could not help us [archaeologists] much in cases in which the dynamics are really complex... many archaeologists began to suspect that the “systems” that archaeologists deal with are too complex to yield to these techniques... we now (since 1995) seem to have access to sufficiently powerful computers and to sufficiently sophisticated software to have another go at it. (Kohler and van der Leeuw 2007:4-5)

Interestingly, Kohler and van der Leeuw (2007:4-5) further mention that, “more importantly, we have at our disposal a theoretical approach that differs in many ways from the relatively simplistic systems models of the 1970’s.” Their weighted reliance on a theoretical approach, the same as that applied later in this thesis of “ecodynamics” (McGlade 1995) and “non-linear dynamics” to long-term cultural change (McGlade and van der Leeuw 1997), suggests the power of computers has not been the critical factor requiring development, rather, in part, it is our own conceptualizing of such dynamics at times which have been slow to develop.

In considering the reliance on computers versus empirical observations and theorizing in the contemporary construction of the archaeological predictive model, I suggest it is only as accurate and powerful as the spatial, temporal, and character data that go into it, in addition to the multidisciplinary knowledge base held by the model user. Constructing and interpreting the predictive model as a monologue is thus deleterious to understanding the recursive character of people-landscape interactions over time.

3.1.1 Sea Level and the Temporality of Landscape Change

The palaeogeography of near-shore environments in the northeast Pacific Ocean has experienced periods of flux throughout the terminal Pleistocene and Holocene epochs. From the height of the Wisconsin glaciation (ca. 15,500 BP in Blaise *et al.* 1990) until the early Holocene (ca. 8,900 BP), change was punctuated. The post glacial maximum melting of sea-ice and the subsequent opening, or expansion, of the sea passage between Haida Gwaii and the continental mainland began to widen as the tripartite process of lowered eustatic sea levels, isostatic rebound, and tectonics occurred. These effects showed extreme regional variation (McLaren 2008; Riddihough 1982), depending upon distance from the release of the Wisconsin ice-sheet. Eustatic loading of the continental mainland first caused the Haida Gwaii archipelago to lift in relation to the forebulging of the continental crust below its surface from 13,250 to 10,250 BP (Hetherington and Reid 2003; Hetherington *et al.* 2004). By 11,750 isostatic rebound occurring on the continental mainland contributed to the forebulge collapse effecting Haida Gwaii – concomitant with the trend of rising eustatic sea levels. The result was that a coastal plain, much like that observed today on a micro-scale in Argonaut Plain in northeast Graham Island, increased in size extending east across the Hecate Strait, either joining with the mainland (Hetherington *et al.* 2003), as observed in recent bathymetric imagery, or leaving a short gap where a deep water trench exists near to the continental mainland. With rapid global temperature increases during the terminal Pleistocene, the melting of glaciers released high volumes of water into the oceans causing a rapid sea level transgression, flooding all but a relict portion of the ancient low-lying Argonaut Plain, which remains part of contemporary Haida Gwaii geography.

During this period, sea level in northern Haida Gwaii (Figure 3.1) transgressed from approximately 150 m below modern mean sea level to 11 m above modern (Fedje *et al.* 2005:25), rapidly transforming landscapes, shrinking the landmass, and isolating floral and faunal regimes. Subsequent to the early Holocene marine high stand, sea level remained relatively constant during a 4,000 year period of eustatic and tectonic equilibrium. This period of comparative stability was interrupted by marine sea level regression that occurred gradually over the next 5,000 years, as a result of unbalanced eustatic rise and tectonic uplift (Fedje *et al.* 2005:25).

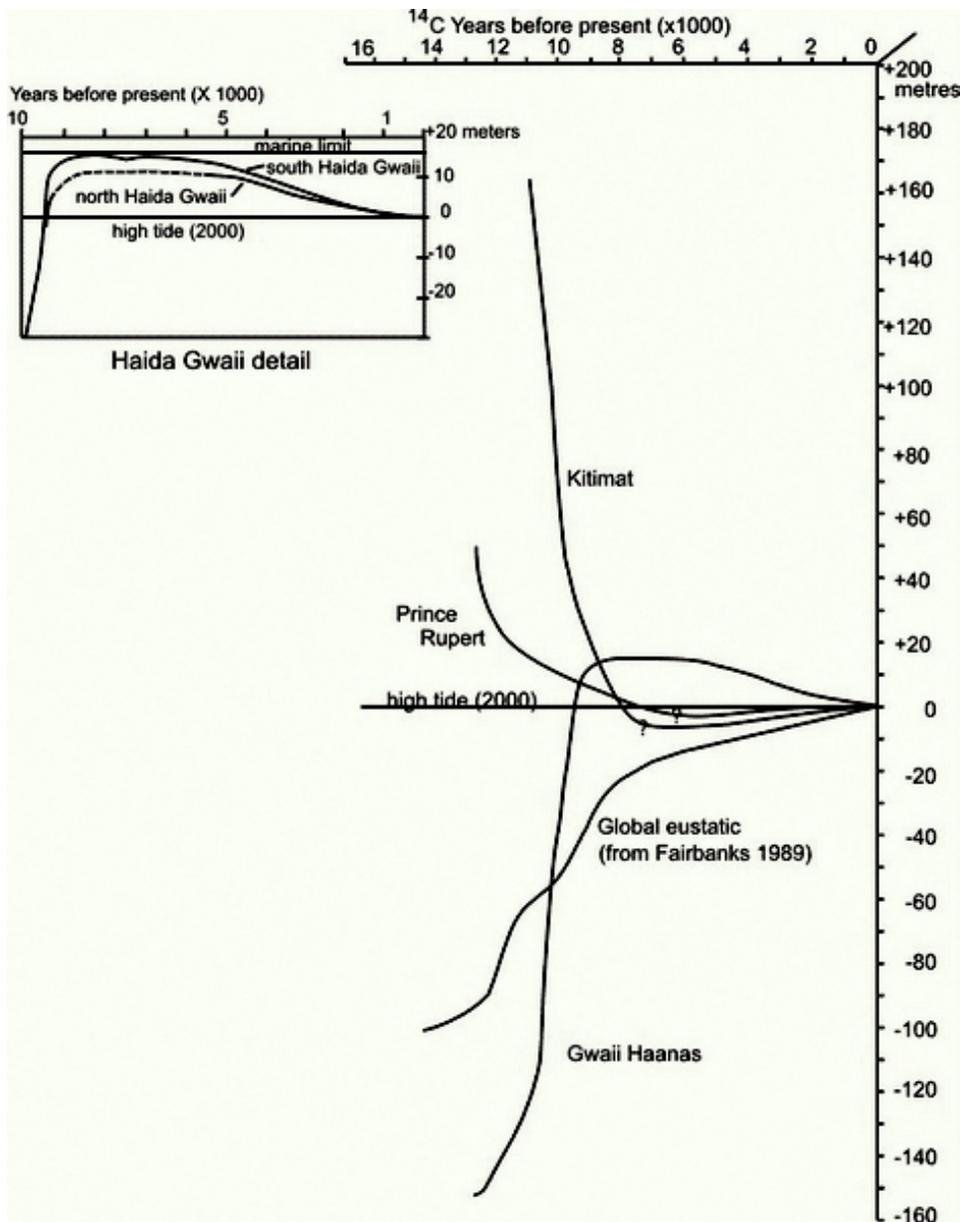


Figure 3.1 Terminal Pleistocene and Holocene marine curve comparing regional (Haida Gwaii) and interregional (northern Northwest Coast of America) trends (source in Fedje and Mathewes 2005:23). Palaeoenvironmental data for northern Haida Gwaii are absent for the years between 9,000 – 7,000 BP and 6,000 – 4,000 BP (Fedje 2008 pers. comm.).

By today’s standards, the north and east coasts of northeast Graham Island is considered “one of Canada’s most dynamic coastlines” (Walker and Barrie 2006; also see Anderson and Walker 2006; Walker and Barrie 2006; Walker *et al.* 2007; Wolfe *et al.* 2008). For instance, Walker and Barrie (2006) document East Beach movement due to

the loss of land at an annual retreat of 1–3 m and tens of meters in extreme years during the contemporary period, suggesting marine-oriented use locations in the past would experience change at a generational rate. This gradual regression of sea levels throughout the mid-late Holocene left a physical signature in the macro-level landscape morphology of relict (remnant formation) prograding shorelines from sea level activities running parallel to North Beach, and reflecting modern shoreline configuration fronting Argonaut Hill to the north between *Taaw* Hill and Rose Spit on an SW-NE axis (Figure 3.2).

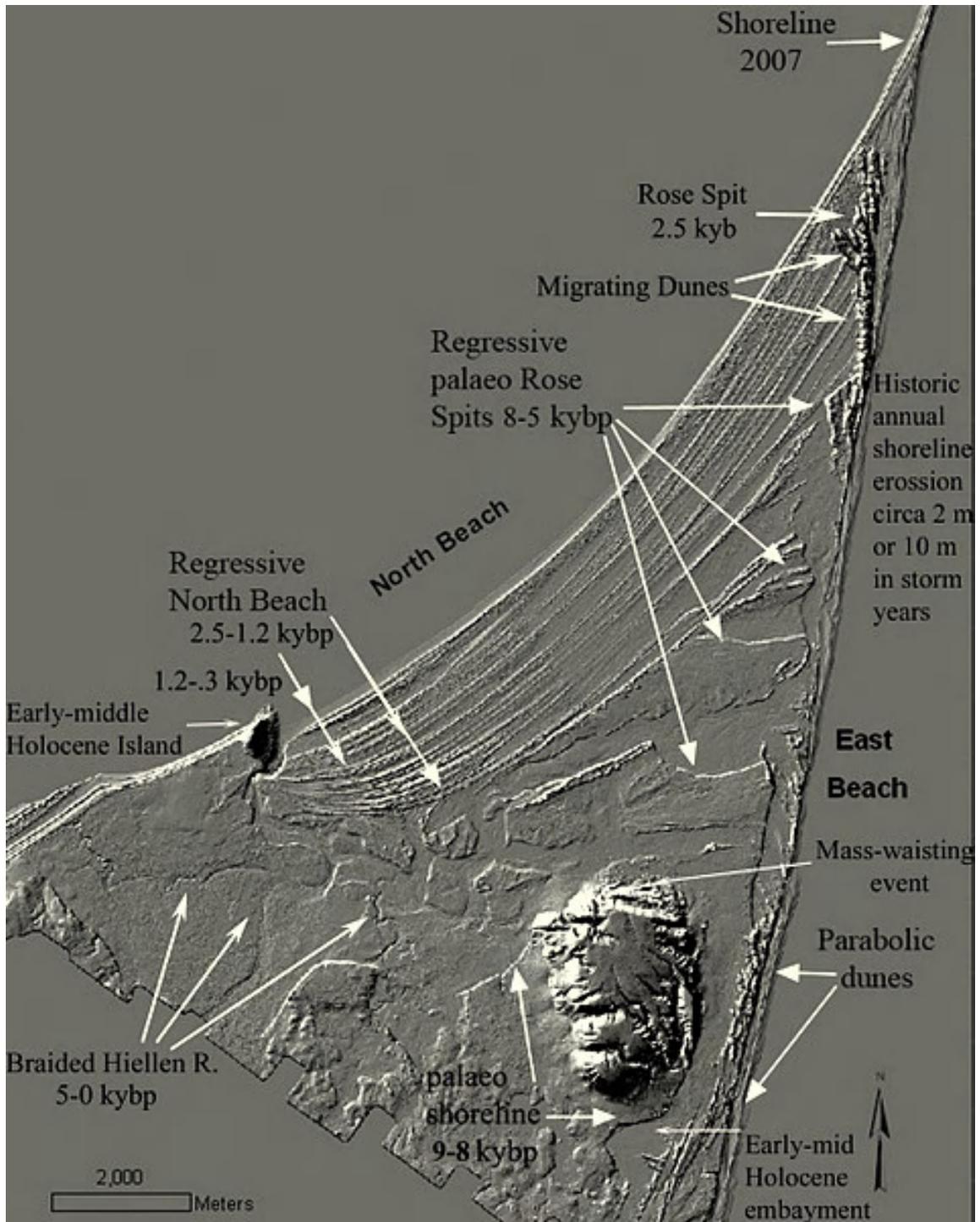


Figure 3.2 Image showing the temporality of Holocene marine regression in the form of relict marine generated landforms.

3.1.2 Geological Origins and Geomorphology

The entire Naikoon Peninsula contains a unique, low-lying geography compared with the steep topographic relief of the mountain-dominant island archipelago of Haida Gwaii to its immediate west, and southwards encompassing the Queen Charlotte Ranges of the Insular Mountain Belt physiographic region, and nearly the entire Pacific coastal zone extending from Alaska to Tierra Del Fuego in southern Chile and Argentina.

Although reduced from its late Pleistocene extent, what remains of the Coastal Trough physiographic region beyond the submerged Hecate Depression is a specialized geological zone comprising either unconsolidated Quaternary sediments of glaciofluvial origins, or thick tabular deposits of well sorted sands (Clague 1989; Clague *et al.* 1982). This transition in sediments from till to a thick sand unit occurs somewhere north of Cape Ball on the northeast coast of Graham Island (Clague 1989:72). Above these deposits on the near-shore environs are a series of ancient relict prograding shorelines running parallel to North Beach. This area is more frequently disturbed near the East Beach side of the peninsula, due to the localized phenomenon of large slowly migrating (several meters on the decadal scale) parabolic dunes and the smaller quickly migrating (several meters on an annual scale) foredunes (Walker and Barrie 2006). The area situated south of the stranded relict beach features running parallel to North Beach, which effectively constitutes the Hiellen River watershed, contains an assortment of marine generated features that were also formed by mid-late Holocene regressive marine activity. Other than evidence for reconstitution of this landscape via the forces of a meandering Hiellen River creating a network of braided stream channels clearly visible using LiDAR generated imagery, direct evidence of the Holocene marine record remains relatively intact. Constituting a landscape of greater stability than the contemporary near-shore

environment, features within this more protected zone of the Hiellen River watershed retain greater potential archaeological visibility. Prior geological research in northeast Graham Island conducted by Clague (1989:71) suggests deposits in these locations contain fossiliferous shallow marine and estuarine mud and sand, beach gravels and aeolian sand.

A navigational landmark in the northeast Graham Island landscape, visible by land or from the sea, *Taaw* Hill stands 108.8 m amsl, constituting an erosional Tertiary basalt feature that next to Argonaut Hill is the second highest point of land for a great distance in any direction. Local outcroppings from *Taaw* Hill are comprised mainly of olivine basalts and sandstones (Sutherland Brown 1968; Sutherland-Brown and Yorath 1989). These outcroppings were also documented by early geologists and ethnographers (Dawson 1880; in Swanton 1905:393), the former who originally described the sea-cliff as “an eminence remarkable in this low country... composed of columnar volcanic rocks of tertiary age.”

Despite the considerable research conducted by geologists and physical geographers within the northeast Graham Island zone, little is known about the physiography of Argonaut Hill. In fact this feature has been neglected from the literature, outside of a single reference to it on a map generated by Sutherland-Brown (1968), and some brief interpretation of its geological composition and history by Quickfall in his MSc thesis (1987). This is curious, considering its prominence on the landscape as the highest point of land in northeast Graham Island, at 136 m amsl. No greater focus has been made on this feature by social scientists, as 2007 investigations on Argonaut Hill was the first time any archaeologist had visited this feature.

The joint research team comprising Masset Haida, Parks Canada, and UVIC Anthropology Department members spent eight days investigating areas on and around Argonaut Hill, during which several novel observations were made. For instance, at one location where a recent failure occurred an exposure revealed nearly the entire vertical composition of the hill (Figure 3.3). What was observed upon the initial visit seemed to confirm that the hill is comprised exclusively of a variety of sands (Josenhans pers. comm. 2007; Walker *et al.* 2007). All sands were entirely clean, lacking any break in geological origins. Nor were any organic inclusions detected, suggesting they were deposited in a single, continuous event. However, upon a subsequent visit, a closer analysis following the varve-like layers from the hilltop surface downwards, a lens of clay deposits measuring >30 cm thickness could be followed horizontally across the exposure at 52 m amsl. During this visit, we did not detect any organics within the sand or clay deposits, but we did collect two 6 cm deep by 8 cm diameter circular clay units for the purpose of palaeomagnetic dating (Figure 4.4), which, as of this writing, has not yet been analyzed. The importance of such analysis would be to place the formation of this hill within a known glacial event. Doing so would have a series of significant repercussions related to the much debated North Pacific coast refugium hypothesis, and the related interest that model provokes for archaeological modeling of the early peopling of Haida Gwaii and the Americas. Specifically, whether a) the northeast Pacific Coast, and subsequently the Americas was peopled prior to, during, or after the last glacial maximum (LGM), and b) the coastal, marine migration versus the continental, terrestrial migration was responsible for the peopling processes.



Figure 3.3 Photo on left shows upper portion of recent exposure on the southern portion of east Argonaut Hill at 93 m amsl.

Figure 3.4 Close up image of area midway on the exposure and midway in the hills' formation that reveals its entire composition consists of sand, with a single detectable interruption of clays at 52 m amsl. Note the sampling of undisturbed clay sediments for the purpose of palaeomagnetic analysis which may provide evidence of the age of this prominent feature in the northeast Graham Island landscape.

3.1.2.1 Pleistocene Glacial History

The idea some form of glacial refugium or refugia existed in the low-lying plain of northeast Graham Island has been agreed on by most scientists studying the palaeoenvironmental context in these environs (see Bryan 1941; Clague 1981, 1989; Fladmark 1979, 1983; Foster 1989; Heusser 1960, 1989; Heusser *et al.* 1985, *et al.* 1993; Lacourse and Mathewes 2005; Lacourse *et al.* 2003, 2005; Lindsey 1989; Sutherland Brown 1968; Warner 1984; Warner *et al.* 1982). Multiple lines of interdisciplinary evidence suggest this region of the northeast Pacific is unique for not being exposed to

the magnitude of ice-coverage experienced elsewhere on the continental mainland, and was likely part of a chain of refugia that stretched along a N-S axis from southern Alaska to the Olympic Peninsula in northern Washington (Heusser 1960, 1989).

Oriented at the interface between oscillating continental and local piedmont glaciations during the late Pleistocene, Argonaut Plain was only lightly affected by ice during the last glacial maximum (18,000 – 16,000 BP) – if at all (see Sutherland-Brown 1968:31-33). This glacial history contrasts markedly to the more heavily glaciated mountainous regions of Haida Gwaii that were denuded of all pre-Holocene sediment deposits. Argonaut Plain constitutes the subaerial remnant of a once greater coastal plain that may have been part of a series of late Pleistocene refugia before largely being drowned during the Holocene. What remains post sea level regression, and is one central focal point of Northeast Graham Island investigations, is the transition point between areas retaining Pleistocene archaeological potential and a temporally restricted archaeological record. Argonaut Hill may reflect this transition point, assuming the western portion of the hill represents a glacial-proximate delta feature. Evidence supporting this scenario was observed in a larger proportion of glacially-deposited geological erratics in the form of cobbles and gravels on the western and northwestern sections of the hill where the piedmont glacial activity would have dominated, with a winnowing out of these larger clasts replaced by gravels and small pebbles observed in deeply-cut stream beds (Figure 3.5) as we surveyed east across the hill, with clean sands dominant in the eastern slopes. The roughly 2% west-east trend in slope of the hill feature also corroborates this interpretation, although it does not appear the sharp termination of the eastern side of the hill can not be explained by early Holocene marine transgression alone. Gradual weathering or a combination of sea-level induced erosion involving mass-

wasting events and weathering may account for its morphology. The fact that a consistent horizontal varve-like layering exists in the large exposure on the east side of the hill, with a thick clay layer interruption mid-sequence, suggests that the hill was not pushed into place by an advancing piedmont glacier from the west. Rather, it suggests formation through a rhythmic pattern, such as would occur by a more gradual depositional process created through a seasonal opening and closing of a partially hollowed-out glacier.



Figure 3.5 Photo showing typical clast size in mid-Argonaut Hill gulley bottom stream bed.

3.1.3 Palaeoenvironment and the Refugium Concept?

Dating of palaeoecological sediments containing both terrestrial and aquatic biota from offshore environs near Cape Ball, 42 km south of the Hiellen River delta on East Beach, lends credence to the refugia hypothesis (see Table 3.1). Dates from the late phase of a peat deposition containing *in situ* tree stumps and *Picea sitchensis* (sitka spruce)

cones provide proxy evidence for a habitable environment for humans dating to 12,400 BP (Warner *et al.* 1982). More plant evidence is garnered from pollen analysis of a Hecate Strait seabed core sediment sample taken from Dogfish Bank, 50 km east-southeast from Hiellen River delta. This core contained a pollen assemblage dominated by genera in the families *Cyperaceae* (sedges) and *Poaceae* (true grasses), suggesting exposure between 14,330 and 12,860 BP with an ice-free herb tundra environment dating between 13,790 and 13,190 BP (Lacourse *et al.* 2005). The successions of vegetation regimes during the last glacial maximum, terminal Pleistocene, and early Holocene for northeast Graham Island, including the subaerially exposed ‘Hecatia’ palaeo-landmass has its closest modern analogue in the “modern coastal meadows and tundra on the Shumagin Islands (Heusser 1983a, 1983b) and Aleutian Islands (Heusser 1990) in southwestern Alaska” (Lacourse *et al.* 2005:51).

14 C years BP	Dominant Plant Species	Ecology	Locale	Source
16,000-15,000	<i>Poaceae, Cyperaceae, Rumex, Equisetum, Juncus</i>	sparse tundra	Cape Ball	Warner 1984; Warner <i>et al.</i> 1982; Mathewes 1985; Mathewes <i>et al.</i> 1985
13,000	<i>Salix reticulata, Ploemium, Polygonum viviparum</i>	dwarf shrub tundra	Dogfish Bank Cape Ball	Barrie <i>et al.</i> 1993; Mathewes and Clague 1982
12,000	<i>Empertum nigrum, Pinus contorta</i>	open woodland	Cape Ball	Mathewes and Clague 1982
11,300	<i>Picea</i>	transitional	Cape Ball	Mathewes and Clague 1982
11,200-9,400	<i>Pinus contorta, Picea sitchensis, Tsuga mertensiana, Alnus</i>	closed forests	Cape Ball, Serendipity Bog, Boulton L.	Warner 1984
10,700	<i>Tsuga heterophylla</i>	closed forests	Cape Ball	Warner 1984
9,400-5,500	<i>Picea sitchensis, Tsuga mertensiana,</i>	closed forests	Serendipity Bog, Boulton L.	Warner 1984
9,400-8,500	<i>Malus fusca, Alnus, Salix</i>	open herbaceous meadow	Serendipity Bog	Harrison and Warner 1986
5,500-3,000	<i>Cupressaceae*, Pinus contorta, Aster</i>	forest-bog complexes	Serendipity Bog, Boulton L.	Quickfall 1987
3,000-present	<i>Tsuga mertensiana, Cupressaceae*</i>	modern forests	Haida Gwaii	Lacourse and Mathewes 2005:56

Table 3.1 Table showing palaeoecological time-line for vegetation succession of northeast Graham Island. This information was derived from palynology readings of sediment cores taken from an eroding sea cliff at Cape Ball central east coast of Graham Island, Dogfish Bank mid-Hecate Strait, and from two wetland systems located in northeast Graham Island (Figure 3.6). The plant species provided in each time period are ordered in terms of abundance.

* “[R]elative contributions of western red cedar (*Thuja plicata*) and yellow-cedar (*Chamaecyparis nootkatensis*) are unknown due to indistinguishable pollen morphologies” (Lacourse and Mathewes 2005:56).



Figure 3.6 Image showing locations where palaeoenvironmental data were collected.

Warner *et al.* (1982:677) have concluded that, despite the influence of ice during the Wisconsin glaciation, by 16,000 – 15,000 BP northeast Graham Island was ice-free, and furthermore, evidence of macrofossils from Cape Ball indicates there was a well-established flora regime *in situ* at 16,000 BP. Relying on more recent AMS radiocarbon dating techniques and palaeoecological analysis from submerged sediments from the continental shelf sea floor lying below the Hecate Strait, Lacourse *et al.* (2005:36) state,

“portions of the shelf were subaerially exposed and ice-free between at least 14,330 and 12,866 ¹⁴C years BP” (also see Barrie *et al.* 1993). Recent work on the marine / lacustrine signature of diatoms from lakebed cores collected by Duncan McLaren (2008) from the Dundas Island Group, 70 km to the east / northeast of the Hiellen River delta suggests a viable environment for people prior to 12,300 BP. Early palynology studies from this region provide evidence that by this time there grew a spruce / alder forest that emerged from two prior periods of non-forest dominant vegetation regimes. This pattern shows a slight temporal lag from territories to the west with ones to the east in concordance with the modeled glacial activities influencing biotic regimes being dominant closer to the continental mainland where glacial loading was most intense.

A local proxy Pleistocene-Holocene transition palaeoenvironmental indicator comes from Serendipity Bog. Collected from the Hiellen River headwaters (54°01.6'N; 131°45.67'W), evidence provided by Harrison and Warner (1986:116) from this single core sample (measuring 3.26 m below bog / lake bed surface) suggests a “flourishing fresh-water sponge population [existed] between about 9,400 and 8,500 years B.P., composed of *S. lacustris* and a member of the genus *Anheteromeyenia*”. During this 900 year period, pollen and plant microfossil evidence indicates that the early Holocene Argonaut Plain wetland environment was likely surrounded by sand and gravel shores, supporting an open herbaceous meadow consisting of Pacific crab apple (*Malus fusca*), alder (*Alnus* spp.), and willow (*Salix* spp.). Shallow freshwater environments (2.0 m – 0.6 m) rich in organic nutrients dominated the emergent habitats around Serendipity Bog, supporting fens and wet meadows (Harrison and Warner 1986:117-118).

These geographically and temporally disparate data are useful for modeling general spatiotemporal patterns of palaeoenvironmental conditions, and although data

from Serendipity Bog can be considered local, coring multiple locations for greater spatiotemporal control of conditions from freshwater environments within the Hiellen delta, at the base of Argonaut Hill, and from the bogs contained atop Argonaut Hill, will provide ultimate palaeoenvironmental precision. One such lake at the base of Argonaut Hill spotted during a helicopter reconnaissance in 2007 prior to landing at base camp was attempted, but coring was not successful at locating peat within three meters of sediments, suggesting the lake was a result of recent infilling from a hill slide where the peat layer had either been deeply covered or else it has not yet developed.

Lumme Lake is captured directly to the west and behind the raised beach features to the north of Argonaut Hill in and amongst the bars and spits also formed during regressive Holocene shorelines, and Clearwater Lake is captured inland to the south of Argonaut Hill by migrating dunes along East Beach. Both lakes hold the potential for important palaeoenvironmental information regarding the history of vegetation regime succession, and freshwater versus marine environmental information including flooding of the terrestrial landscape by storm surges and tsunamis, or more permanent marine inundation. Possible evidence of such phenomena may be captured within Severs' (1974:5) description of "cultural deposits containing marine shellfish found at a considerable distance upstream from the mouth of the [Hiellen] river would seem to imply that some sort of marine embayment existed in the past". I suggest future coring of freshwater bottom sediments will be an important stage for analyzing the local palaeoclimatic and palaeoenvironmental conditions of the immediate region. Doing so will help account for the variability in such natural systems affecting the amorphous refugia hypothesis, and isolating such conditions will assist with the formation of archaeological behavioural models within the research zone.

3.1.4 Animal Presence / Behaviour and the Refugium Concept

Evidence for viable faunal regimes on Haida Gwaii develops over the periods 14,540 – 9,700 BP to include brown bear, black bear, caribou, deer, dog, river otter, mouse and shrew. Harbour seals, sea lions, sea otter, twenty-four taxa of bird, fourteen fish taxa (compare 17 fish taxa from Richardson Island faunal samples in Steffen 2006) and a variety of intertidal shellfish can be added between 10,000 – 9,000 BP (Wigen 2005). For example, palaeontological evidence of bear hibernation dates between 14,400 – 10,000 BP and archaeological evidence exists for human subsistence activities relating to bear hunting during the period of 10,000 - 10,600 BP (Fedje 2008 pers. comm.). Submarine cores from the shifting near-shore environments of contemporary East Beach and ancient Argonaut Plain shows evidence for a viable intertidal environment suitable to a human diet in ‘Hecatia’ from 13,220 BP in the form of edible marine-based colonizing species including; *Macoma nasuta* (bent-nosed clams), *Clupea harengus pallasii* (Pacific Herring), and *Gymnocanthus* (sculpin) (Hetherington *et al.* 2003:1760). Further evidence establishing a potential human niche in the form of a marine diet derives from cave archaeology in Haida Gwaii where Sockeye salmon (*Oncorhynchus nerka*) have been dated as early as 10,500 BP (Fedje 2008 pers. comm.).

Building upon earlier research concerning biotic endemism on Haida Gwaii (see Cowan 1989; Foster 1965; Kavanaugh 1989; Schofield 1989), Tom Reimchen and Ashley Byun’s (2005) evaluation of endemic species in Haida Gwaii suggests that mtDNA lineages of black bear, brown bear, dwarf Dawson caribou, marten, saw-whet owls, short-tailed weasels, *Nebria* ground beetles and stickleback fish cumulatively suggest a refugia was present on or near northeast Graham Island as part of a pan-northeast Pacific coast phenomena, stretching from northern Vancouver Island in the

south to Argonaut Plain on northeast Haida Gwaii. Reimchen and Byun's (2005) study of the three-spined stickleback focusing on Argonaut Plain provides evidence that this landform is a remnant of the larger submerged plain stretching across the Hecate Strait and was the epicentre of these palaeobiological refugia.

The implications this evidence holds for modeling human presence as early as the Pleistocene-Holocene boundary are obvious – a large refugium, or even a patchwork of smaller refugia with well developed flora and fauna systems would have encouraged people to settle during a glacial era. Whether the presence of people in the area preceded the LGM or could access this refugium before piedmont and continental glaciers blocked it off from other ecologically viable refugium is an imperative of this issue (see Dixon 2001; Fedje *et al.* 2004).

3.2 Ecology and Anthropology and Their Influences on Landscape Archaeology

In my attempt to model past behaviours of people through a simulation of biotic and abiotic landscape elements within time and space, the intention is not to reduce these relationships to a geographically or ecologically determined functionalism. Rather, I have pointed to examples of archaeological evidence along the way that have shaped, and continue to influence, the Haida landscape, and in so doing suggest the ancestral Haida knew the landscape intimately. In this manner, I believe key elements of emically-experienced landscapes are emically-identified ecological resources, and thereby emic categories in a very important sense reflect both the type and extent of interaction people had with resources. Knowing something about the Haida use of the landscape is therefore paramount.

In order to counter notions that human behaviours are either responses to

environmental conditions or fully constitutive of environments, I advance the notion of *landscape equality*, which takes the position that people have engaged landscapes over time with honour, reverence, and respect, and in so doing, interact with it on equitable terms. The repercussions of this perspective are significant when modeling human behaviour throughout the Holocene era in northeast Graham Island. For instance, if neither the environmental nor human domains fully determine the other's behaviours and characteristics, if there is no environmental substrate for the performance of culture to be acted out on without forming an anthropogenic landscape, then any model interested in distinguishing the archaeological landscape from the contemporary landscape must take both systems to be elemental in the development of the other.

Ingold (1994) historicizes the relationship between people and animals using the concept of the “mutualistic environment”, challenging the perspective that plants and animals have ‘come under human domestication’, noting instead how each participate in an intricate choreography of “autonomy and dependency”. Under this framework, people and landscape entities *coexist* simultaneously in two realms, self-adapting and influencing adaptation within a vibrant niche-organism interplay. Reconsidering the static meaning of the niche concept used by traditionalists in evolutionary sciences, Ingold (1992; 2004a; 2004b; 2007b) proposes a reordering of the human-environment dynamic, where the physical environment is no longer considered to consist of entities *for* living organisms to inhabit, but constitutes the environment *of* these organisms.

The *landscape equality* concept is intended to counter the dominant paradigm inherent in viewing a synchronic time-space interaction between human modifier and modified world (see Yen's 1989 “The Domestication of the Environment”), by exploring people's perception and experiences with the temporal depth (history) of space. By

balancing interpretations of space with the human experience and the cultural lens from which experiences are made meaningful, the disembodied visualism that tends to simplify vision through compartmentalization is given a depth making worthy the exercise of modeling for people's behavioural relationships with landscapes. The only way to appreciably overcome what Frieman and Gillings (2007:5) refer to as the "hegemony of the eye" is to tether the lives and heritage of the entire ecological and cultural matrix using our entire sensorium.

3.3 RS and GIS Applications: Concept of Technologies and History of Use in Archaeology

A common impetus in the design of archaeological modeling originates in the concern for time and cost-efficient survey methods (Schiffer *et al.* 1978). Remote sensing technologies have been adopted for use in archaeology, in part, as a time-saving device, allowing for the remote detection of archaeological indicators (culturally modified features or proxy landscape entities) in the landscape via wide scale visual survey, as opposed to the traditional methods of pedestrian ground truthing.

Remote sensing offers myriad ways of collecting and interpreting data about physical phenomenon, in a similar way as the human visual apparatus is capable of arranging differential absorption and reflection of electromagnetic wavelengths, only in a limited capacity (measured in frequencies Hz). Aerial photography has been popularly employed by archaeologists largely for such purposes as deriving measurements of large-scale anthropogenic features and relationships, and less successfully for basing interrelationships between landscape entities and anthropogenic features – referred to as photogrammetry.

Most recently, technologies representing the landscape using photographic

sensors mounted on aircraft have allowed for multispectral information to be collected and analyzed in what is referred to as the “satellite image”²⁰. Whereas the former method for representing the landscape produces a depiction of something real when visually perceived, the latter records information across a broader spectrum, including non-visible wavelengths. Both however are fixed mediums in terms of capturing a synchronous moment in the perpetual choreography and reciprocal exchange between biotic and abiotic landscape entities, thereby limiting the utility of these images for interpreting the dialectical landscape as processes captured in human experience.

With sophisticated GIS software, remote sensing datasets can be represented as one key factor providing a spatial backdrop within a versatile, multi-component image for deriving interpretations of landscape morphology. The combination of remote sensing and other spatial and compositional datasets within a GIS produces a palimpsest of thematic layers, each revealing a distinct quality of the landscape. In this format, distinct landscape attributes such as water bodies, roads, elevation, slope, geological composition, vegetation cover and others can be isolated, highlighted, hidden, covered over, coloured, measured, quantified, turned on / off, hillshaded, and thereby objectified. Similarly, map-making with GIS allows the user to create abstract, culturally derived variables such as lines of longitude, latitude, archaeological locales, test / excavation locations, survey routes, geographical coordinates, areas of greater or less archaeological potential, and other such navigational aids, visualization tools for understanding the archaeological record, and discipline-specific symbols.

²⁰ The resolution of the image created from photographic and digital techniques is dependent on a tripartite combination of technology type, equipment quality, and nearness to object, making the researchers consideration of scale an important factor when and how to employ each.

3.3.1 LiDAR: Concept of the Technology

I have used high resolution LiDAR (Light Detecting and Ranging) data collected from northeast Graham Island as base spatial data well suited for detecting a wide spectrum of macro and microtopographic nuances within a landscape approach (see Challis 2006). LiDAR is a relatively recent method for measuring topography that can be used to create maps of elevation, known as digital elevation models (DEM). The LiDAR data are acquired using an instrument that emits swaths of high frequency laser pulses (ca. 50,000 pulses / sec.) directed towards the earth from an aircraft-mounted device, returning 2,000 – 5,000 positive height measurements per second (Conolly and Lake 2006:72).

For Haida Gwaii, LiDAR data were collected using a discrete return Mark II LiDAR system mounted on a fixed wing (Navajo) aircraft, for which the nominal platform altitude during flight mission was 1,300 meters above high tide (maht). Post collection processing computes the point coordinates from the independent data parameters including; scanner position, orientation, scanner angular deflection, and the laser pulse time to assure precision. All LiDAR points are then georeferenced using the Universal Transverse Mercator (UTM) map projection (Zone 9 N) and the NAD83 horizontal datum corrected to mean sea level²¹ using the Canada 2000 geoid model. The laser's elapsed time back to the instrument creates a 3-D image (Figure 3.7) from a high density of vertical distance readings. Not all laser pulses strike the ground, particularly in densely vegetated areas, and as a result, these data are filtered to digitally remove the forest canopy, and some of the less-dense lower vegetation, creating a simulation closely

²¹ Above mean sea level will be the standardized sea level datum referred to throughout this thesis.

resembling a 'bare-earth' model of the terrestrial landscape (Figure 3.8), with a theoretical horizontal resolution of about one meter and a vertical accuracy of +/- 15 cm (see DeLoach and Leonard 2000; Brock *et al.* 2002). At this latter stage, the LiDAR data distinguish between vegetation and ground readings using vegetation removal algorithms in TerraSolid's TerraScan LiDAR processing software. In a triangulated irregular network (TIN) format, interpolation between known neighbouring elevation points that did penetrate the forest canopy to read the ground surface was performed during the post-processing stage in order to build a DEM.

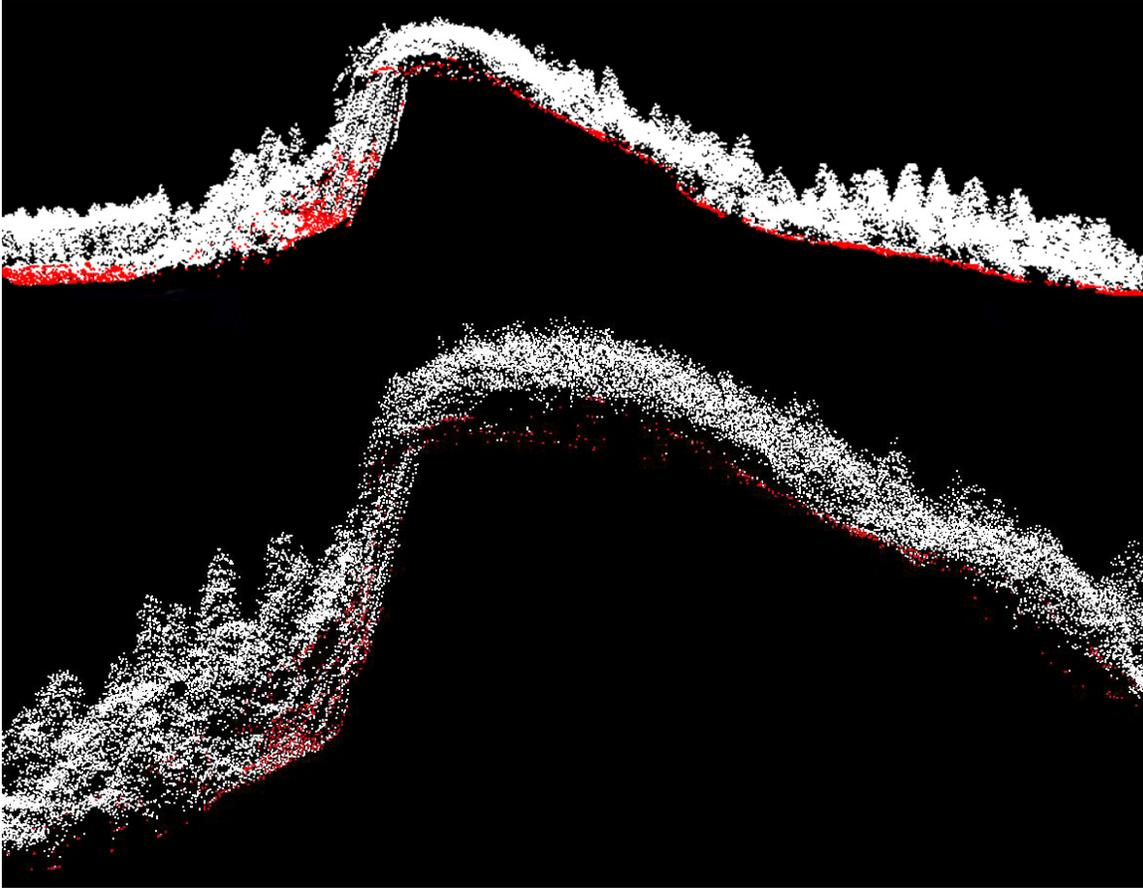


Figure 3.7 Double image showing cross section of LiDAR laser readings of *Taaw Hill*, bottom image being a close up of upper image. Note clear delineation of vegetation represented in white cloud cluster of laser readings and ground represented in red.

The LiDAR laser swath applied to northeast Graham Island penetrated the vegetal matter at an average point density of one point every 1.65 meters of pixel cells throughout the rasterized DEM. Raster data are the preferred method of representing continuously varying phenomena, such as elevation, as the continuous cell-based structure is analogous to a continuously varying surface (Conolly and Lake 2006:30).

I have treated the continuous-tone grey-scale and color-ramped LiDAR generated imagery at this stage as a tool for revealing subtle patterns impossible to observe using traditional contouring methods, and for ‘reading’ the “bare earth” beneath the trees. Interpretation of the archaeological potential of specific landforms and clusters of

landforms in the northeast Graham Island landscape began with viewing these LiDAR generated imagery.

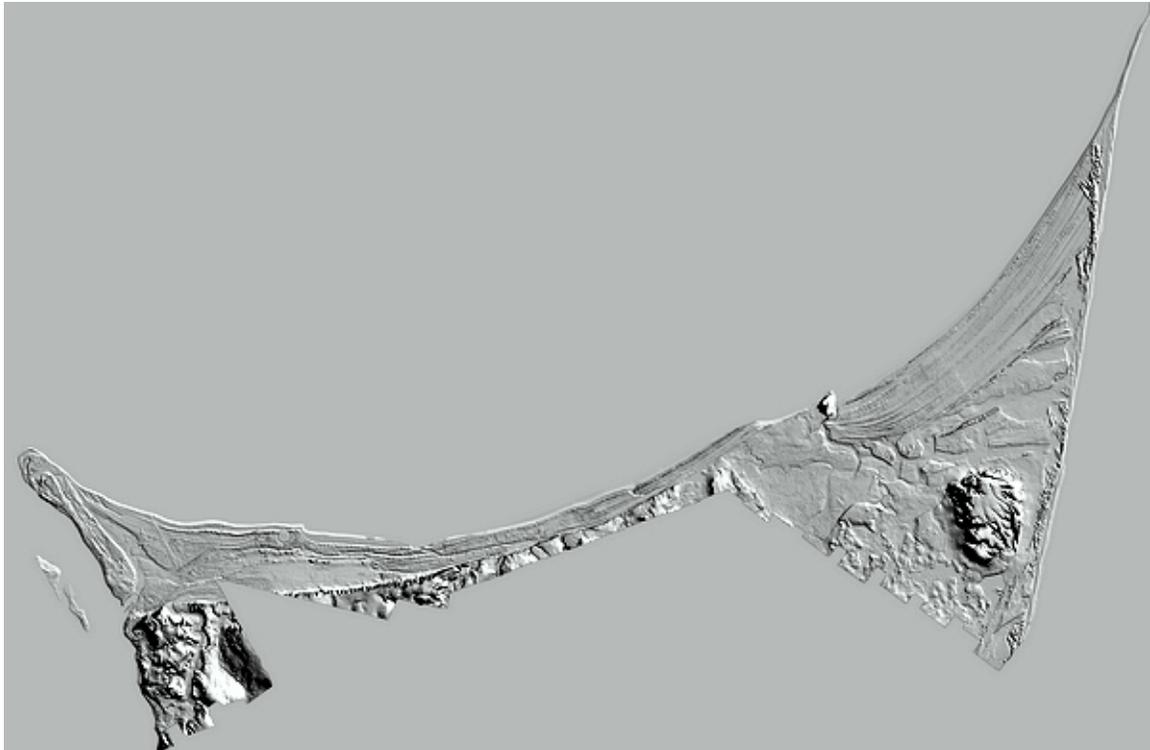


Figure 3.8 LiDAR generated DEM of northeast Graham Island showing high-pixel resolution of highly visible hill features, and relict shoreline features associated with the palaeomarine high stand. A hill shade was applied using ENVI at a sun azimuth angle of 45° to enhance and highlight the subtle geomorphic features. Image represents the stage with which the DEM was acquired from UVIC Geography Department.

3.3.2 Integrate Application to Thesis Problems

At the foundation of an archaeological potential model, and what makes a model worth creating, is whether the remote sensing data is capable of representing the landscape at a resolution where particular research questions relating to human behaviour within a palaeolandscape can be addressed. Compared with my mental image of Northeast Graham Island Late Pleistocene and Holocene landscapes, which itself was informed through an interdisciplinary set of proxy data, the LiDAR generated imagery

for northeast Graham Island appeared to fulfill this requirement. The next level of concern is to integrate multidisciplinary data that could inform interpretations of the landscape composition change. For this study, such data provide some regional strength in terms of identifying the more prominent natural features but lacked fine-grained spatial and temporal resolution for northeast Graham Island (scalar accuracy of palaeoenvironmental data will be discussed further in Chapters Four and Seven).

3.4 Results

Once the multidisciplinary information on the late Pleistocene and Holocene landscape for the northeast Pacific generally, and more specifically, for northeast Graham Island, had been amassed, there was the potential for deriving a multiplicity of histories incorporating knowledge from Haida oral histories, archaeology, ethnography and ethnohistory. Together, these knowledge units were visualized in the northeast Graham Island landscape palimpsest, with specific attributes of the landscape reflecting some physical phenomenon judged to be culturally significant. This latter exercise was primarily a recursive process whereby I would direct the GIS to compute an expected outcome relationship based on information acquired of certain landscape entities from multidisciplinary research. I then determined if the image that appeared on the screen matched my mental model of the way things ‘should’ appear according to these knowledge units, often finding they did not, and having to modify the process until concordance between my cognitive models was recreated within the GIS generated image²². Referred to as “candidate explanations” by Kohler and van der Leeuw (2007),

²² This process is largely a result of becoming familiar with the myriad forms of representing the landscape and deriving landscape variables using GIS software. The experience of having a limited choice of unfamiliar perspectives for viewing the landscape, and operating within an inductive framework highlights the inherent subjectivity of computer-based modeling using spatial data and GIS.

these cognitive models seek largely qualitative rather than quantitative understanding of the world in relation to experiences held and the data presented, opposed to letting the data blindly order the world. Chapters Four and Five will discuss in detail the processes which have only been introduced here.

Taken within the context of this project, knowing I was working from a simulacrum (a copy without an original), I was prepared in advance to immediately take into consideration the real world as I was experiencing it *vis-à-vis* field testing, modifying the model accordingly. To the credit of the LiDAR data resolution and selected model variables, only minor alterations were required for the immediate testing phase.

4 Pre-field Model-Building: Objectifying the Landscape and its Inhabitants?

4.1 Scale in Landscape-derived Models

As discussed in Chapter Two, the archaeology of Graham Island is deficient in relation to the developed archaeological programs carried out over the past two decades in the southern regions of the Haida Gwaii archipelago, stemming from two decades of ongoing research activities within the Gwaii Haanas National Park Reserve. Judging by the inconsistent archaeological history of research activities in northeast Graham Island to date, it thus remains premature for any confident expression of what archaeological models should look like for the area. This is particularly the case with respect to early Holocene archaeology requiring sophisticated research methodologies to locate early archaeological landscapes within the contemporary landscape no longer reflecting an obvious near-shore use area. I have approached this setting by drawing from the interdisciplinary *landscape as palimpsest* and *landscape equality* models articulated in Chapter Three.

Judging by the topological attributes which represent each type of landscape being modeled in northeast Graham Island (hill versus marine generated), it is pertinent to critically analyze how varying landscapes ‘constrain’ and ‘enable’ the behaviours (be they social, ecological, symbolic, *et cetera*) that occur therein, and in what ways? The first step towards operationalizing such an analysis is to do away with the ‘site’ concept that estranges people from the majority of the landscape, while focusing the analytical gaze on an arbitrary measurable ‘unit’ of analysis; the test, evaluative, or excavation unit, or on a series of such discrete units often 20-50 cm², 1 m², or 2 m² in scope, and

commonly no more in vertical dimension than in horizontal (see Bailey 2007:199 and Stahl 1993:250 on the theme of the arbitrary character of archaeological classifications of cultural phenomenon). Widening ones perspectival gaze and analytical scope is more reflective of the sum behavioural patterns under inquiry that occurred throughout a comprehensive cultural landscape rather than behaviour specific studies (house construction, fish processing, lithic knapping, rock art, *et cetera*) that have more restricted spatial and material interests.

As pointed out by Dunnell (1992:22), the ‘site’ concept is “deleterious to archaeology, not to mention embodied experience. Its use is warranted neither as a unit of observation nor as a unit of analysis”. This is particularly the case when it comes to non-monumental or even non-feature based archaeology dealing largely with transportable material culture such as stone and organic tools and subsequent tool manufacturing debitage. The ‘site’-based perspective is further away still when considering aspects of culture embedded in the six human sense modalities that leave no physical impression in the landscape, but exist in cognitive and embodied acts of living, dwelling people. These senses include the well accepted five (smell, touch, sight, taste, and hearing), and the additional one of proprioception: that sense which describes the unconscious perception of movement and spatial orientation arising from stimuli within the body itself.

One of the numerous concerns with the traditional use of the ‘site’ concept in archaeology has been its tendency to target land use patterns based upon the greatest concentrations of inorganic materials from locations of known ethnographic use. This exercise produces a perception of past people-landscape relations as occurring in a Cartesian model of ‘have been / have not been’ present dichotomies, whereby discrete activity places (sites) are separated from non-anthropogenic spaces in a landscape void of

movement. Rossignol (1992:9) adds to the list of potential problems associated with an “overdependence on the site concept...” stating “neglect of dispersed ‘off-site’ materials are important for investigating land use at the regional scale.” The intent of the archaeological modeling and testing program established for northeast Graham Island is not to define the landscape as a patchwork of ‘sites’ in the sense as being discrete units in time and space, but rather to treat them as non-bounded *landscapes* within the time-space continuum that reflect a) what *is* known archaeologically, and b) provide the basis for an interpretation of how “what *is* known” could be embedded within an embodied landscape in the past.

According to Giddens (1984:118), “[l]ocales refer to the use of space to provide the settings of interaction” which is in turn essential to “specifying its contextuality.” He further states, “[i]t is usually possible to designate locales in terms of their physical properties, either as features of the material world or, more commonly, as combinations of those features and human artifacts. But it is an error to suppose that locales can be described in those terms alone.” In essence, it is known people have always spent greater amounts of time in some places than others, and archaeologists modeling the potential of lands for past human use have a myriad way to interpret this relationship. I propose that the work of landscape archaeology is to take what Hägerstrand (1975) calls “stations” – those places where culture and time appear arrested and curtailed, to be woven into a more expansive representation of temporal and spatial aspects of social life. Such a model transcends the ‘looking-glass’ window of material culture and involves both the imagined worlds of complex ecologies in the past and the experiences of people in the ‘historic’ and present eras, including those of indigenous cultures and archaeologists alike. Bailey’s (2007) theorizing around the “durational present”, which holds time “past, present, and

future to be essentially arbitrary – and, of course, open to varying definition according to the time perspective of the observer”, shares the perspective I advance of a transcendental time-observer dynamic where the cultural landscape palimpsest partially informs recurring experiences people have with landscapes.

Identifying research scale units presents difficulties akin to the issues of ‘site’ definition in archaeology (see Carman 1999; Dunnell 1992; Ebert 1992; Dunnell and Dancey 1983), which I have replaced with the more fluid concept of the *archaeological landscape*. Supporting this movement is Kanter (2005:1185) who points out that “[g]eographic features such as drainages or mountain ranges seem to provide obvious boundaries, but they also assume that people in the past would have had similar criteria for defining their landscapes”, or that these boundaries have remained constant in the life-world of previous generations inhabiting the landscape. The degree of arbitrariness with which archaeologists determine scale through boundaries has already been highlighted in Chapter Two with respect to establishing the three broad geographic scales that contextualize this thesis investigation. Further support exists for this position by clarifying that even bodies of water (especially shorelines) do not accurately represent area use boundaries, particularly by a highly marine adapted culture inhabiting areas undergoing dynamic sea level fluctuation, such as the Haida on Haida Gwaii. For instance, ways in which many contemporary societies look to the oceans as mysterious places that the fledgling scientific disciplines of marine biology and oceanography are just beginning to scratch its ‘opaque’ surface, is quite contrasted by the familiarity with which our species was once in step with the planet’s seas. This point is evidenced by the fact that nearly every niche on this planet has been inhabited by people, and that reaching these places often required an intimate knowledge of the sea. Suffice it to say that on a

nuanced level, scales are not intended to be bounded, rather, they must suit the systemic relationship held between people and the landscape in question, which through a symbiotic relationship played out in a dynamic landscape across long spans of time has always been in a process of retransformation. In behaviouralist terms, those that gave rise to cultural relativism in anthropology, what appears to be a boundary to some is a frontier to others.

The notion of ‘boundaries’ and ‘boundedness’ can be understood by drawing from Ingold’s (2007) most recent work, which is a historicized reflection on the meaning of the line, where he describes quite aptly a context that parallels Haida-colonial relations in the northeast Pacific, including practices of prior archaeological descriptions:

It is also along paths, too, that people grow into a knowledge of the world around them, and describe the world in the stories they tell. Colonialism, then, is not the imposition of linearity upon a non-linear world, but the imposition of one kind of line upon another. It proceeds first by converting the paths along which life is lived into boundaries in which it is contained, and then by joining up these now enclosed communities, each confined to one spot, into vertically integrated assemblies. Living *along* is one thing; joining *up* is quite another. (2-3)

Approaching archaeological inquiries at a landscape scale overcomes some of the myopia of site-based investigations, while making increasingly apparent the gaps in our knowledge of the complex dynamics of people-material systems (Heilen 2005:17). As a way to take caution from these “gaps in our knowledge”, I have substituted the division-based method of interpreting the archaeological record using the ‘site’ concept with the additive method of landscape archaeology. Although both concepts are concerned with being the primary unit of analysis, only the latter offers a framework for dealing with the complexity of the people-landscape aggregate. Modeled after LaMotta and Schiffer (2001), I take landscape archaeology to operate on a *systemic scale*, where synchronic and diachronic variation in the organization of one or more behavioural systems can be

studied. For northeast Graham Island research, the *in situ* artifact as archaeological record and the recorded document represents synchronic moments in time, while toponyms and oral knowledge, and geological, climatic, environmental, and biological data inform interpretations of human behaviour at a diachronic level. Combined, these data generate a continuum of time where moments of human decision-making are reflected in a mosaic of natural and cultural systems unfolding over the *longue durée*.

With the issue of scale being resolved by taking a systemic approach to landscape archaeology, I discuss the theoretical work of Whittlesey (1997) and Zedeño (1997; see also 2000a and 2000b) on modeling cultural landscapes, as a means for focusing the northeast Graham Island model building process towards the type of landscape features that may help guide present and future research. I discuss these authors' contributions according to four dimensions of cultural landscapes, including 1) the formal dimension; 2) the relational dimension; 3) the historical dimension; and 4) the cognitive dimension.

Archaeologically, the *formal dimension* is comprised of cultural landscapes that consist of imprints associated with a group's intentional designation of landscape features. Examples of the formal dimension expressed in the Northwest Coast landscape is garnered within settlement features including architectural material remains; cleared and level ground that once represented a longhouse floor; semi-subterranean pithouse depressions; midden buildup; terraced garden plots; defensive trench embankments, and so on. Judging by the lack of historic reference to (or archaeological knowledge of) these types of features modeled within northeast Graham Island, the formal dimension will not constitute a significant portion of the model building process involved in this study.

The *relational dimension* is detectable in landscape transformations resulting from people-landscape relations in a behavioural sense. The relational dimension is thus

most suitable to this study in that the LiDAR remote sensing dataset available for northeast Graham Island can be analyzed within a GIS which can account for the spatial relationships between the many landscape elements (topography, geology, water features, vegetation cover, *et cetera*), their positive attributes (protection from inclement weather, solar aspect, viewsheds, nearness to water, *et cetera*) and the sociocultural (behavioural) factors of people who modified or sought utility in its form.

The *historical dimension* of cultural landscapes accounts for the palimpsest effect of the sum total transformations caused by human activities in the landscapes recorded during historic times. To describe this dimension Zedeño (1997:70) uses the example that archaeologists gather “documentary information on aboriginal land use and territory formation” as a way that information on past people-landscape relations can be “explicitly applied to the archaeological record”. I use historical dimensions of direct ethnographic correlation to flesh-out knowledge of past land-use retained and transmitted by the Haida as archaeological analogues.

Traditionally conceived as the least tangible and furthest from the material culture record is the *cognitive dimension*, which encapsulates how features within the cultural landscape are emically perceived and interpreted. Whittlesey (1997) contends that cognitive dimensions can be approached with great sensitivity using the conceptual organization of local beliefs and worldviews that exists within the historical dimension of a contemporary culture’s knowledge and knowledge that has been documented by ancestral group members. This articulation of a cognitive dimension varies in kind from the type of cognitive reasoning expressed in Chapter Three which accounts for personal experience, and constitutes the thrust of the framework I develop in Chapter Seven using a phenomenological perspective.

The immediate purpose of separating expressions of people-landscape relations into four dimensions is to generate a simplified analytical framework for interpreting the material evidence and the archaeological potential of the landscape for past use.

Ultimately, the challenge is to reconfigure the ‘parts’ into a ‘whole’, so that each dimension interdigitates with the others, thereby revealing a broader behaviour-based reflection of past inhabitants of northeast Graham Island.

4.2 Building an Archaeological Potential Model

In this process, the acquisition of spatial data and information on past landscapes for GIS integration consists of a remote sensing LiDAR generated DEM, standardized BC Terrain Resource Information Management (TRIM) data files provided through the Base Mapping & Geomatic Services Branch of the British Columbia Government, sea level curve for Hecate Strait and Dixon Entrance (Fedje 1993; Josenhans *et al.* 1995; 1997), known archaeological reconnaissance’s and test excavations made in the region, and landscapes of Haida significance recorded in the ethnohistoric and ethnographic literature. The DEM acts as a base layer for the entire modeled area of northeast Graham Island. Primary attributes and other secondary attributes²³ (Figure 4.1) are applied to each model with considerations of their land use potential to people (e.g., hills versus wave-cut spits, beach ridges and terraces). Once LiDAR data have been processed and interpolated, GIS technologies are required for representing data, and deriving qualitative and quantitative variables associated with human occupation and land use. ESRI ArcGIS 9.1

²³ Primary and secondary attributes refer to variables used to create the predictive model that are premised on differently acquired data sources (see Conolly and Lake 2006:Ch 5). For example, primary data is comprised of information or measurements gathered from field observations, ground truthing, archaeological prospection and raw LiDAR remote sensing data. Secondary data refers to information (primary data) that has already gone through processing or interpretation (e.g., once interpolated into a DEM, remote sensing data transforms from primary to secondary data).

and Spatial Analyst software were used for representing and manipulating spatial data during the pre-fieldwork stage of research.

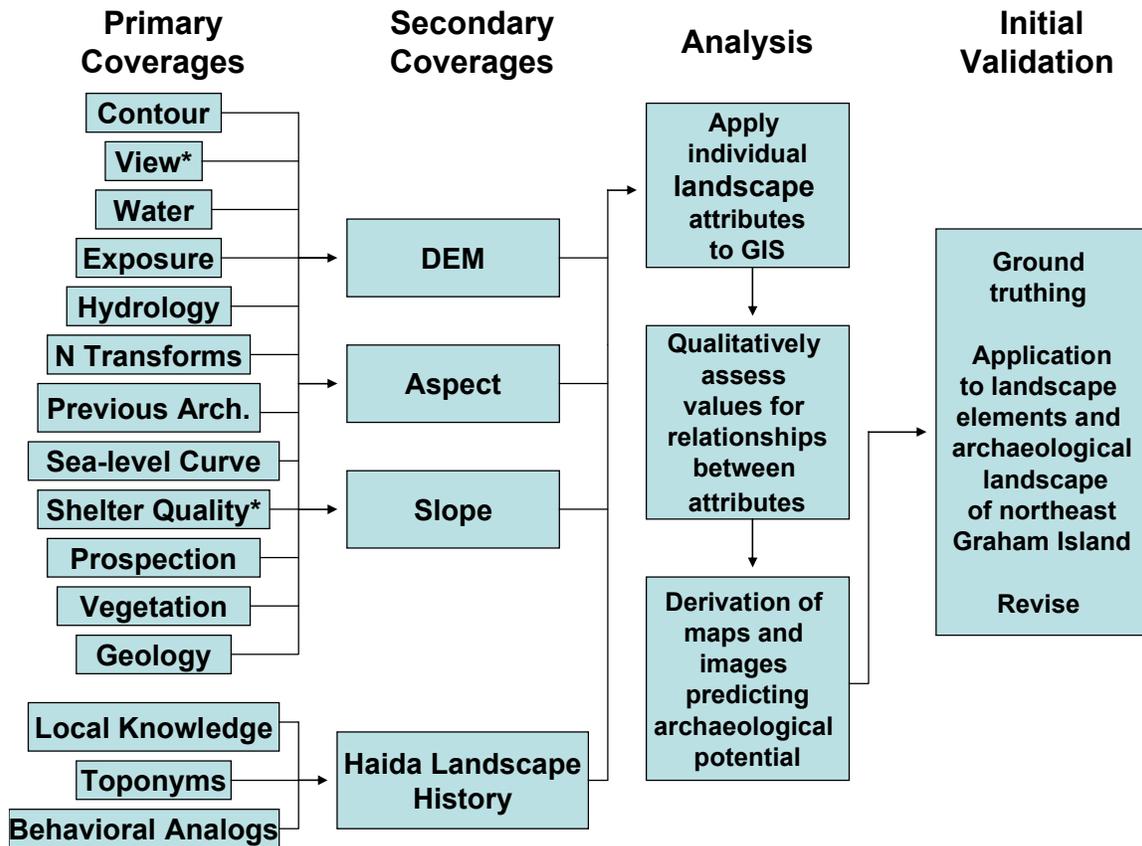


Figure 4.1 Flowchart describing order of operations used in production and testing of archaeological predictive model. See Table 4.1 below for descriptions of each attribute labelled in the primary and secondary coverages.

* Depending on the method applied, computer-assisted quantitative versus qualitative analysis, these two attributes of “view” and “shelter quality” may also be considered a secondary coverage.

Attribute	Description
Contour	An isoline: an imaginary line passing through, or joining a set of locations that share the same specified elevation.
View	Viewscape: ability to sight surroundings from a particular vantage point.
Water	Including seas for navigational purposes and freshwater bogs, marshes, lakes, and rivers for drinking and resource extraction.
Surveys	Areas traversed by foot in search of archaeological material, features, and landscapes.
Exposure	Area of exposed sediments where soil characteristics can be assessed, revealing information on geological and cultural histories of landform.
Hydrology	The movement of water over the earth's surfaces - a measure of drainage quality in relation to habitability.
Natural Transforms	The effects of natural formation processes on the survivorship of the archaeological record.
Previous Archaeology	Combined archaeological investigations involving subsurface testing.
Sea Level Curve	Pattern of sea level change over the terminal Pleistocene and Holocene epochs.
Shelter Quality	The ability of a landscape to provide protection from the worst of inclement weather conditions.
Prospection	2007 testing program.
Vegetation	BC TRIM data expresses dominant vegetative regimes useful for modeling human activities associated with these species and environments.
Geology	Geological composition of landforms informs a) the temporality of landscape, b) suitability for human use, and type of use, and c) the testability of soils.
Local Knowledge	Knowledge of people-landscape relationships over the <i>longue durée</i> held by the Haida.
Toponyms	Place names: mnemonic devices relating people to the animated landscape shared by contemporary community members and present populations with ancestral populations.
Behavioural Analogues	Behavioural practices held by contemporary communities or those documented in the ethnohistoric or ethnographic records that lend credence to the archaeological record, including materials and landscapes.
DEM	A Digital Elevation Model is a digital map that provides a model of the elevation of the earth's surface in a given area where elevation data has been collected.
Aspect	The azimuth of the maximum rate of change of elevation (slope) in the downward direction. More generally, a position sloping in a particular direction of downward slope, relevant to the orientation of the sun.
Slope	The upward or downward inclination of a land surface – gradient.

Table 4.1 Table describing attributes in Figure 4.1 used in building the predictive model.

This exercise in predictive modeling intends to test whether it is possible to distinguish landforms of higher and lesser archaeological significance through a landscape hermeneutics based on Holocene palaeo-climatic and palaeo-environmental proxies that remain etched into the northeast Graham Island landscape palimpsest. Physical variables of the landscape employed in this process include elevation, slope, aspect, viewsapes, and other normative archaeological landscape characteristics. The quantification of fresh water access and nearness to ocean for marine resource harvesting and transportation will be discussed under the following subheading, but suffice it to say that access to water has been and will always remain a necessary consideration when modeling human presence anywhere in the world, at any time²⁴. An abundance of fresh water sources exist in northeast Graham Island and have done so throughout the late Pleistocene and Holocene periods, making the necessary consideration the nuanced relationship between the continually shifting sea, near-shore lands, and fresh water across time.

The first of four primary categories of examination informing the model-building process is elevation, the basic unit of analysis which influenced the separation of the northeast Graham Island landscape into two topographically distinct modeling zones. Minimum elevations based on sea level data can be useful guides for reading the temporality of landscape configuration.

²⁴ The longstanding assumption that fresh water must be present in order for archaeological potential to exist should not negate the fact that in some instances, people find inspired ways to dwell in a landscape without a permanent water source. For instance, several islands lacking a fresh water source with an archaeological record, including GcTr5, GdTq1, GcTr8, and GdTq4, exist in the nearby island archipelago of the Dundas Island Group, northeast Pacific (McLaren 2008 pers. comm.). Such “exceptions to the rules” suggest that archaeological modeling is often a generalizing exercise, producing interpretations of generalized behaviours, at best.

Slope and aspect are two practical factors that have been adopted by archaeologists modeling the landscape using ethnographic analogy that shows patterns of land use in relation to areas of level ground that are south facing. The observation of preference towards level ground has been reiterated through the fact that when people do not possess the adequate ground surface to build residential and social structures or to grow crops they modify the land in order to do so. The solar energy provided by the sun only reaches a low zenith angle in the midday sky and only for a brief time during the late Fall to early Spring months in the northern hemisphere at roughly $54^{\circ} 00''$. Therefore, modeling a southern exposure is a valid step in the modeling process, and is in accord with the general ethnographic and archaeological patterns for the Northwest Coast.

No computer-generated view-shed analysis was conducted for either model, but such innate archaeological features as promontories and lookouts were considered. In part, ArcScene in ArcGIS fulfills this function by allowing the viewer a three dimensional perspective of the 'bare earth' by using the *navigation* or *fly* tools to increase or decrease altitude and to adjust the angle with which the land is being viewed at. Using these functions to orient oneself atop a cliff, promontory, elevated ridge or any potential lookout feature provides a simulation of view afforded from these features. The assumption that trees were not obscuring the view or that the quality of view was maintained by selective tree removal / harvesting is built into this consideration.

Contemporary vegetation coverage data was applied using BC TRIM data. As explained in Chapter Two, Late Pleistocene and Holocene vegetation succession patterns acquired through palynological evidence from sub-marine sediment cores taken at Cape Ball and Dogfish Bank (see Barrie *et al.* 1993; Lacourse and Mathewes 2005), from lacustrine cores acquired from Serendipity Bog (Harrison and Warner 1986) and

throughout the Dundas Island Group (McLaren 2007 pers. comm.; 2008) can be projected into the northeast Graham Island landscape as proxy data. The collection location of palaeoenvironmental and other data is important for modeling past landscapes across a long period of time affecting dynamic systems change (Table 4.2).

Attribute	Attribute Type	Collection Location	Source
DEM	Secondary	NE Graham Island (aerially sensed)	UVIC funded grants; generated by the UVIC Geography Department
Hydrology	Secondary	GIS Derived	BC TRIM
Aspect	Secondary	GIS Derived	Calculated
Shelter Quality	Secondary	GIS Derived	Qualified
Slope	Secondary	GIS Derived	Calculated
Sea Level Curve	Primary	Gwaii Haanas, Hecate Strait	Fedje 1993, Hetherington <i>et al.</i> 2003, Josenhans <i>et al.</i> 1995, 1997
Soils	Primary	NE Graham Island	Anderson and Walker 2006, Clague 1981, 1989; Clague <i>et al.</i> 1982; Sutherland-Brown 1968; http://ess.nrcan.gc.ca/esic/geoscan_e.php
Behavioural Analogy	Primary	Haida Gwaii	Ethnographic/historic records
Cultural Knowledge (toponyms)	Primary	NE Graham Island	Haida elders and ethnography: Swanton 1905a, b; 1908
Known Archaeology	Primary	NE Graham Island	Fladmark 1969; Severs 1974d, 1975; Smith 1919; Christensen, Fedje, Q. Mackie, Stafford pers. comm.
Natural Transformations	Primary	NE Graham Island	Historic records, GIS analysis; Dalzell 1973
Cultural Transformations	Primary	NE Graham Island	Historic records, GIS analysis; Dalzell 1973
Geological Reconstructions	Primary	NE Graham Island	Clague 1981, 1989; Clague <i>et al.</i> 1982; Sutherland-Brown 1968, 1989; Walker and Barrie 2006, Anderson and Walker 2006; Wolfe <i>et al.</i> 2008
Palaeo-ecological Knowledge	Primary	Cape Ball, Dogfish Bank, Dundas Isl., Serendipity Bog	Barrie <i>et al.</i> 1993, 2005; Heusser 1960, 1989; Heusser <i>et al.</i> 1985; Lacourse <i>et al.</i> 2003, 2005; Mathewes and Clague 1982, 1985; Harrison and Warner 1986

Table 4.2 Table showing attribute type and data collection location information relevant for establishing palaeolandscape reconstructions, and people-landscape relations.

Additional primary attributes of unprocessed data informing landscape interpretations included; local knowledge and behavioural analogues garnered from the ethnographic and ethnohistoric literature, known archaeological landscapes, multidisciplinary information on the physical and biological entities in the landscape, large-scale morphological disturbances, previous survey and test locations, protection from inclement weather measured in shelter quality (i.e., prevailing winter winds and other climatic variables), lookouts for safety / defence and hunting purposes. These and still other factors specific to location type helped define the model building process, rather than the entire modeled zone.

Negative attributes are few, beyond the inverse of many of the positive attributes. For instance, hydrology was a theme considered for the hill model and marine generated model as both a negative (saturated soils) and positive (well drained soils) attribute informing where settlements and use locations were either restricted or more likely to be located. In general, north facing lands with steep or undulating terrain that are a great distance to lookouts, fresh water and the ocean with poorly drained soils would not attract people in the same way as having all those favourable attributes available.

4.2.1 Hill Model

Holocene sea level history discussed in Chapter Three indicate that areas within both *Taaw* Hill and Argonaut Hill offer high landscape visibility that is temporally unconstrained, based on the fact these landforms remained above the early Holocene marine high stand during the periods of transgression and regression. This sea level evidence allows for the possibility of an early archaeological presence in these locations,

but whether the attribute of high *landscape visibility* translates to high *archaeological visibility* is in doubt, as discussed in Chapter Six on *Results*.

In part, Argonaut Hill and *Taaw* Hill were modeled as containing high potential zones based upon survivorship as stable landforms showing long-term landscape visibility above the distinctly visible palaeomarine high stand of 15-18 m above contemporary mean sea level measured using LiDAR data in a GIS. In respect to the idea of “survivorship”, it is important to note the perennial problem archaeologists contend with which stems from working with fractions (a sample) of the world once reflected in the past, whether it be a fraction of the landscape, biotic entities, pollen, oral narratives, material culture – *ad infinitum*. In principle, most hill features should have a higher rate of archaeological preservation due to a lesser degree of natural transformation processes associated with the dynamic terminal Pleistocene to mid-Holocene climatic and environmental variables affecting their structures.

4.2.1.1 Argonaut Hill

Positioned 2.25 km to the southeast of *Taaw* Hill, Argonaut Hill is an archaeologically unexplored area of northeast Graham Island. Indications that this feature was largely unexplored even by local homesteaders during the historic era is provided by Dalzell (1973:362) whose place name collection of Haida Gwaii describes Argonaut Hill as, “a conspicuous mesa-shaped hill, 535 feet high and wooded to its summit”, a description clearly lacking mention of its unique extensive internal hill top, bog-covered ecosystem. Despite the paucity of prior knowledge associated with this feature, LiDAR imagery indicates it offers a set of strategic vantage points which may have been utilized, amongst other activities, for monitoring the location and movement of game on the low-

lying Argonaut Plain below. As potential game hunting lookouts, constructive analogues can be made between the geomorphology of both *Taaw* Hill and Argonaut Hill with the known game hunting lookout locations of Broken Mammoth, Swan Hill, Owl Ridge, Reger Site, and the Mesa Site (Bever 2001; West ed. 1996), associated with the Nenana (ca. 12,000 to 10,500 BP) and Denali (ca. 10,500 to 8,000 BP) complexes distributed throughout central and western Alaska.

All the locales comprising these complexes are either open-air camps or lookouts rising above a lowland plain, similar to *Taaw* Hill and Argonaut Hill in relation to Argonaut Plain. From these vantage points, migration and feeding behaviours of large mammals and herd animals could be observed from long distances, making access to game efficient and relatively predictable. Modeling the landscape according to these eco-functional parameters is similar to the *prospect-refuge-hazard* theory proposed by Appelton (1975) which uses this triadic of principles for differentiating landscape elements into symbolic attributes. Although behavioural analogues associated with promontory features (prospect) in the archaeological literature predominantly reflect activities relating to staging of the hunt, I do not contend they are necessarily representative of all the activities conducted at these locales. Rather, it is more likely that promontories offer multiple functional and aesthetic qualities, although evidence relating to functional activities may often reflect the most detectable.

The attribute of elevation had a direct impact on where testing locations were selected for Argonaut Hill. Although the ten test locations derived through the predictive model clustered within less than ten meters elevation between 125 m and 133 m amsl (Table 4.3), these were not solely elevation based decisions that determined to test the highest points of land. Rather, they were the result of qualitative analysis based on

favourable hydrology, level slope, and clear sightlines down away from the hill onto the plain below. Since little geological data exists for Argonaut Hill, the measure of hydrology was determined based on reading the TRIM data in a GIS for wetland extent atop the hill feature and inferring that lands with higher elevation outside these wetland systems would have suitable hydrology for past land use and archaeological prospection.

Although this model did not formally weight the variables factoring into where testing occurred, aspect was neither a push or pull factor for Argonaut Hill considering the types of activities being modeled in association with promontory use, and the fact that the hill top is relatively level across its entire extent. Even so, with all else (elevation, slope, and nearness to cliff / hill edge) being equal, a favourable aspect was factored into the test locations with eight of twelve (66.6%) constrained within the idealized southwest to southeast range of 135° to 225° with two others only several degrees outside these arbitrary ideals at 124° and 228° respectively making ten of twelve, or 83.3% of the samples oriented in a suitable location for maximizing warmth and light.

Geographic Coordinates (UTM Zone 9N)	Elevation	Slope*	Aspect
322114 / 5992957	130 m	0%	135°
322000 / 5992887	128 m	7.1%	124°
321843 / 5992830	133 m	5.1%	177°
321601 / 5992461	132 m	0%	228°
321812 / 5992470	131 m	0%	225°
321651 / 5992027	125 m	0%	114°
321788 / 5991564	125 m	0%	342°
321960 / 5991200	126 m	0%	222°
321897 / 5991141	127 m	63%	61°
321965 / 5990628	127 m	0%	164°
322253 / 5990447	95 m	0%	158°
321946 / 5990492	111 m	0%	180°

Table 4.3 Table showing geographical, elevation, slope, and aspect values for evaluative unit test locations analytically derived for Argonaut Hill.

* What reads as 0% in the slope column includes everything that was sub 0.499% slope. Aspect given to 0% readings are derived from general trends (often very slight) in the land surrounding test locales.

Level slope was determined by creating a slope layer (Figure 4.2) in GIS within the *3D Analyst Tools / Raster Surface / Slope* applications which provide a landscape matrix representing designated grid size of any resolution selected of slope units. Images shown in this figure highlight that studying the broader landscape for general trends of slope is useful for narrowing the focus to specific areas, where behaviour-specific locales of interest can be determined, and tested. Decreasing the cell size, or raster resolution, while moving through this process, makes specific reading of sub-2 m² cell values possible when selecting precise locations for evaluative testing of subsurface deposits. As problems arise from such a narrow spatial perspective of the contemporary ground surface when modeling the palaeo-landform potential, what is actually sought in this exercise is an area of level ground exceeding a given measurement, often 20 m² or more.

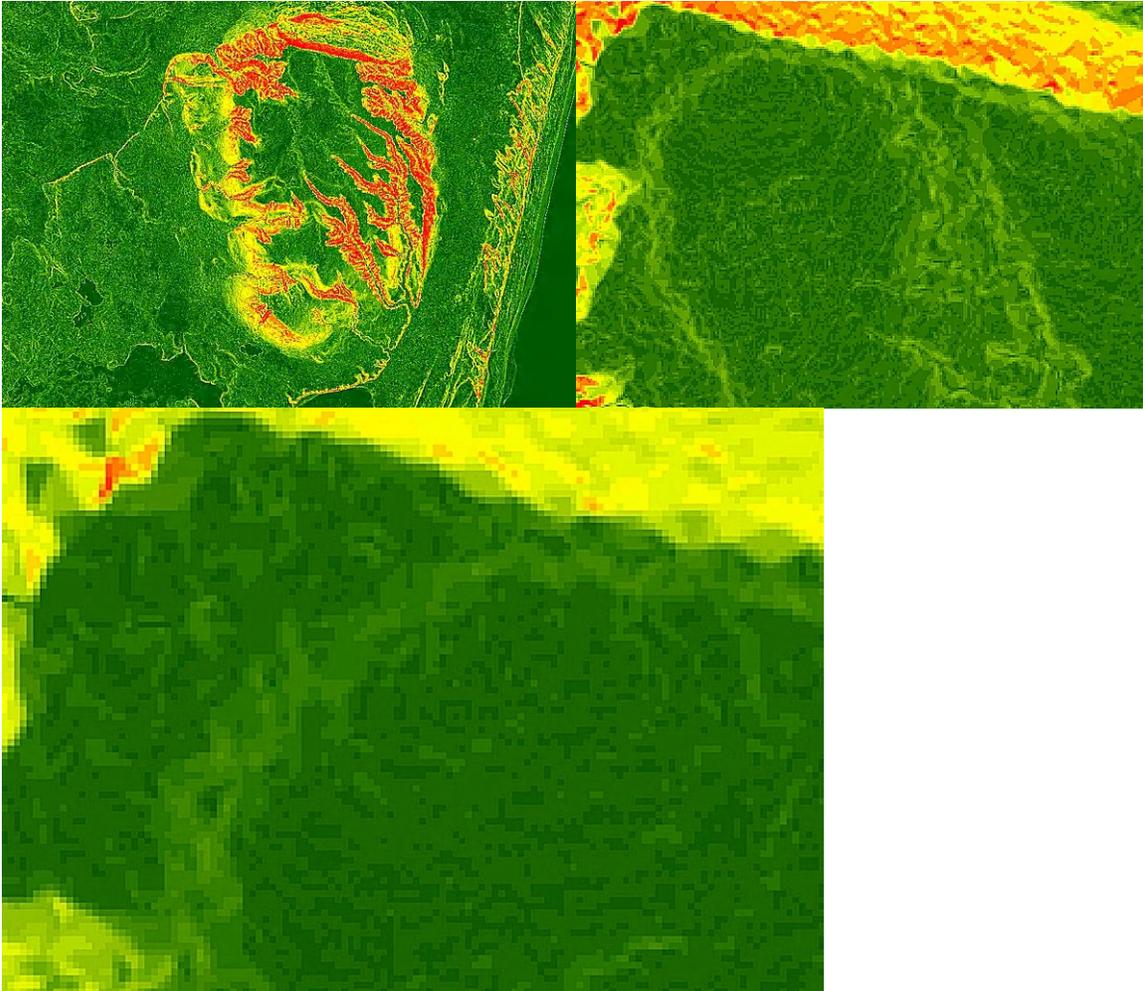


Figure 4.2 Three image collage showing a slope layer for interpreting level ground suitable for land use activities for the northwest section of Argonaut Hill. In sequence, the first image top left shows Argonaut Hill in its entirety, the second image to its right shows the northwest corner of the hill, and the third image the extreme outer northwest edge portion of the second. The important relationship when working with the slope view is to increase the raster resolution when decreasing the scale of the landscape, thereby decreasing the cell size. For instance, image one provides a macro scale perspective of the landscape and its resolution is the least of the three with only nine *Classes* dividing up the 90° slope. In the medium scale shown in the second image the *Class* count has been increased to 18, and the micro landscape scale depicted in the third image has the maximum of 32 *Classes* applied. Changing of *Classes* also changes the value of the colours represented in the images, although what remains consistent is that green represents the least amount of slope (and idealized level ground for archaeological prospection), followed by yellow, then orange, with red depicting the areas of greatest slope.

Increasing the resolution of the cell value provides a more accurate morphology of that value, which can contain a significant range of values if encompassing a large area,

seeing that each cell is actually reading an average of individual point readings determined by an algorithm referred to as *Nearest Neighbour*²⁵.

Due to its large oval size with an approximate width of 2.5 km along its E-W axis and length of 3.5 km along its N-S axis, Argonaut Hill was modeled for human land use for purposes beyond being a lookout feature, as it constitutes a landscape containing direct positive attributes relating to subsistence activities. For instance, provincial government issued vegetation cover data shows the central portion of Argonaut Hill as a wetland ecosystem, which along with being a productive place for hunting and gathering a plethora of plant and animal species for subsistence and medicinal purposes, it would have been a place specifically well suited for ungulates and avifauna. In fact, mirroring Wigen's (2005) recording of "twenty-four taxa of birds" in the Pleistocene-Holocene faunal record, Blackman's (1990:244) ethnological work local to the Masset area points out that "some 25 species of birds...contributed to the diet of the people of northern Graham Island". In order to maximize the multiple ecosystems and landscape attributes available to past dwellers of the hill feature the thin valence of wooded zones separating the steep hill edges from the open, inner hilltop bog environment was modeled as offering important sight lines for both hill and plain environments (compare digital photograph and LiDAR-generated GIS image of Argonaut Hill wetland system Figures 4.3 and 4.4). Specifically, due to the slight eastward sloping (~ 30 m elevation differentiation across 1.5 km = 2% grade) character of the upper Argonaut Hill surface, the higher western portion of the hill was modeled as holding higher potential for containing lookouts than the lower eastern section.

²⁵ Nearest neighbour analysis is a method used for determining "whether a set of *points* in space tends towards a regular, random, or clustered spatial pattern" (Conolly and Lake 2006:303).



Figure 4.3 Image showing mesa-like Argonaut Hill top, expressing inner bog environment, bog drainage system, with thin outer wooded zone before hill drops off. Photograph looking north towards Rose Spit and Rose Point seen in the distance.

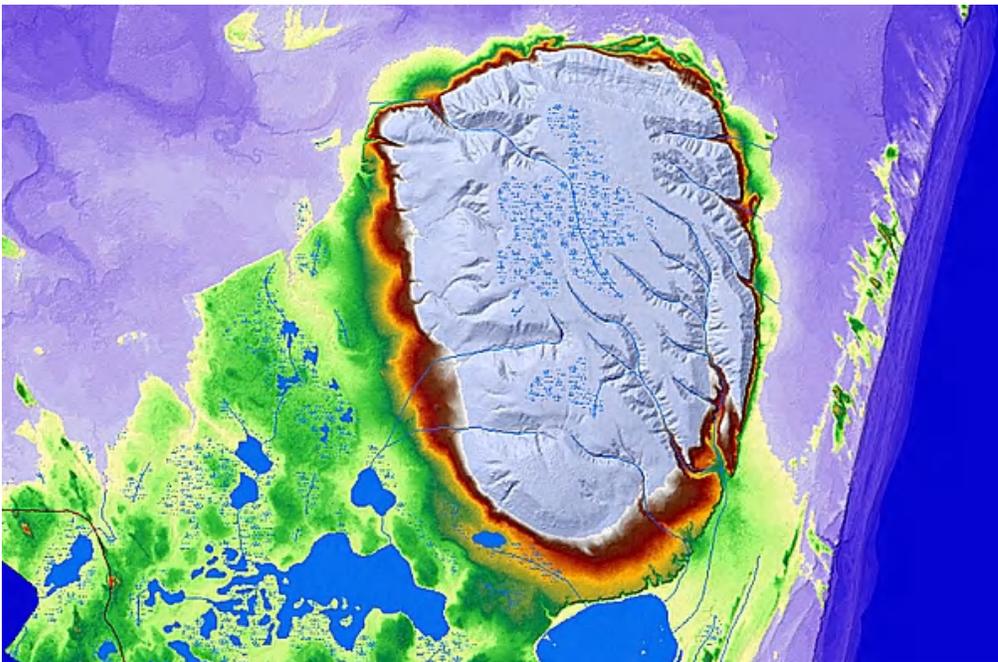


Figure 4.4 Image showing Argonaut Hill rendering during the early Holocene marine high stand (8,900 BP), as the northeastern most peninsula of Graham Island. Purple signifies marine flooded areas during the early-mid Holocene.

An additional reason Argonaut Hill signifies a landscape of high archaeological potential is it has a local place name in Haida, referred to as *Kliki Damen* (Dalzell 1973:362)²⁶. Knowing that this prominent landmark is part of the Haida's cognitive mapping of the northeast Graham Island landscape lends credence to the interpretation that the feature retains a degree of cultural and practical significance that may still reflect a Holocene signature of human presence.

4.2.1.2 *Taaw Hill*

Although plenty of time was spent during the pre-field period analyzing images of *Taaw Hill*, and considering how its presence influenced people's behaviours in the area, no locations were selected for subsurface testing during the modeling phase. This decision was partly based on the factor of having limited time in the field, and wanting to concentrate on previously unexplored areas. Late during the second and final day of testing on the palaeomarine spit extending south from *Taaw Hill* and west of the Hiellen River, myself and another team member independently decided to place an evaluate unit on *Taaw Hill*. Seeing as no model had been generated for guiding archaeological testing on this feature, both our decisions for unit placement relied on intuition, a factor of archaeological investigations often neglected in discussions on methodology and results. The utility in the inherent faculty of intuition will be expanded on in Chapter Seven, as it pertains to informing aspects of the phenomenological approach I suggest is primary to understanding attributes of the archaeological landscape at a systemic scale.

²⁶ The name *Kliki Damen* is also attached to the creek west of Yagan Point, known locally as White Creek. What connection, if any, these two features have is unknown. One thought is that these two features may have been accessed over land and therefore share a common name. This scenario makes sense in both respects that a) this route would be preferable to the detour required via beach or ocean involving *Nai'kun Point* or its turbulent waters, and b) by the fact that a historic overland "wagon trail / road" transects this same route (see Dalzell map 1973:357).

When thinking in terms of behaviour based landscapes, *Taaw* Hill must be considered distinct from Argonaut Hill in that it was disconnected from Graham Island by several kilometres of ocean during an approximately four thousand year period at the time of the marine high stand (8,900 – 5,000 BP), forming an island. The landforms around *Taaw* Hill largely reflect the mid-late Holocene story of geomorphological events which connect *Taaw* Hill and Graham Island, once marine regression increased. However, the relict marine generated spit and spit ridge on the east side of the tombolo bridging these two land masses modeled for high archaeological potential may also be concomitantly associated with the early-mid Holocene spit formation caused by the Hiellen estuary expansion via transporting fluvial materials from the upper Hiellen River and depositing them up against the south side of *Taaw* Hill as they entered the waters of Dixon's Entrance. In effect, while the early-middle Holocene relative marine standstill was occurring, lands were building near the delta of the Hiellen due to ongoing alluvial processes. As an island oriented directly in front of the Hiellen River delta, *Taaw* Hill would have caused the settling of fine sediments otherwise carried off by river forces and ocean currents into deeper waters (see Walker *et al.* 2007:187-191 for a series of maps expressing the temporality of this landform alteration, as it also applies to the building of Northeast Graham Island during Holocene marine regression). The result of this dynamic exchange between a drastic reworking of the landscape and the matrix of people's ongoing decision making processes suggest behavioural activities related to their land use patterns throughout the feature's history would have been made in synergy with these forces. For instance, activities may have transitioned from marine beach and intertidal harvesting of shellfish and other marine resources eventually reflecting an increase of inland, forest-based activities. It is likely that *Taaw* Hill was used throughout this period

as both a navigational marker and a lookout, for which the precise purpose would have varied in relation to its changing surroundings.

4.2.2 Marine Generated Feature Model

The landscape visibility of marine generated features holds a finite history relating to the Holocene, making the archaeological visibility temporally constrained. The most distinctive evidence that remains embedded in the landscape palimpsest from this period are the wave-cut beach ridges that resulted from the marine transgression maximum, and the subsequent less pronounced regressive spits and beach strandlines. Together, these imprints of Holocene marine trends act as temporal indicators, highlighting where the often culturally-significant near-shore environments exist across time.

Using 1:20 k topographic maps and map data, TRIM data, satellite, or orthographic imagery to interpret such landscape nuances as Holocene marine activities does not provide the necessary resolution, or image of ground surface in the latter instances of remote sensed imagery. However, viewing the same landscape with LiDAR data in a GIS clearly reveals the ‘bare-earth’ and its steep break in slope that today remains largely intact from these dramatic palaeoclimatic events. Imagery produced from these same technological tools for recording and representing spatial data suggests that a period of ocean inundation occurred in northeast Graham Island (Figure 3.2), beyond the series of parallel prograding beach terraces produced by mid-late Holocene marine regression (post 5,000 BP). Oriented roughly 30° east from due north, these prograding relict wave-cut beach features penetrate the coast at North Beach ~ 2 km deep before giving way to another ~ 2 km span of prograding spits, dating from the middle and late

Holocene periods respectively. Recent research on the geomorphology of northern Naikoon Peninsula by Walker *et al.* (2007:47) suggests “[T]ow Hill did not join the mainland until ~3,000 to 5,000 years ago when fluvial sediments from an expanding Hiellen River estuary combined with westward littoral sediment transport to form a tombolo land bridge.” (Figure 4.5). An additional image (Figure 4.6) is provided below for comparison of the same area which highlights the relationship the GIS user has with matching mental images that seem to best reflect data.

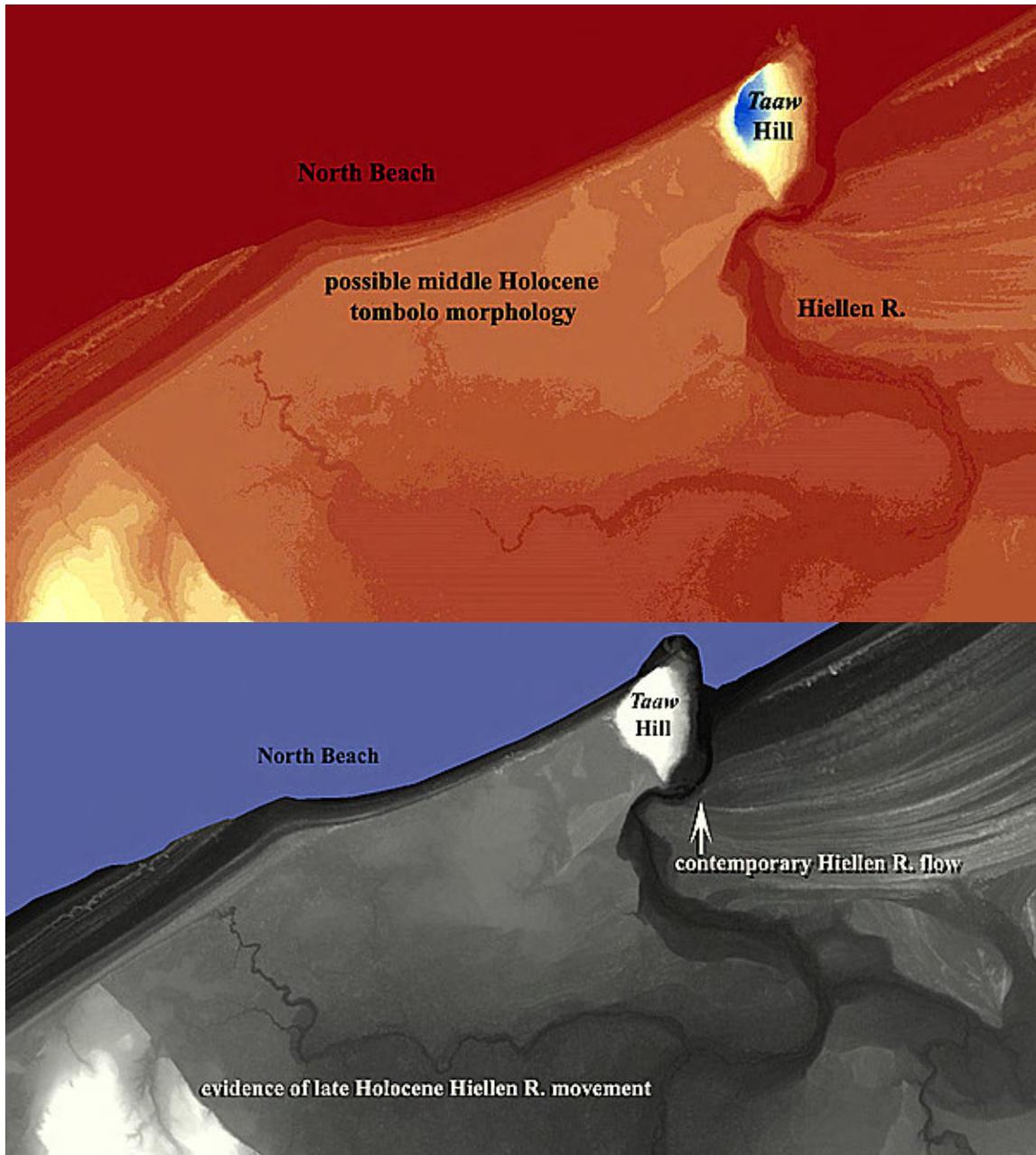


Figure 4.5 Image showing a ‘land corridor’ connecting *Taaw Hill* to northern Graham Island captured in the bottom left of the image to the southwest during the middle Holocene. The color ramp in this image was made within *Layer Properties / Symbology / Show / Classified* option using a *Classification of Natural Breaks* where 32 manually *Classified Classes* were ascribed elevation values which represent 2.5 m intervals up until 30 m with elevations exceeding 30 m separated by 5 m intervals. The separation of lands previously inundated with the ancient Pleistocene landforms are represented by the transition to the consistent yellow shading indicating abrupt topographic relief, and specify lands above 20 m amsl.

Figure 4.6 Using *stretched view* with two *standard deviations* this image more accurately represents the contemporary ‘bare-earth’ morphology to the west of *Taaw Hill*, where the middle Holocene tombolo has been gradually eroded by the forces of a meandering *Hiellen River*.

With such a fine-grained temporal resolution known for the northeast Graham Island landscape it would be a productive exercise to attempt to follow a cultural sequence of the Holocene inhabitants of the region by testing a series of prograding relict beach ridges and spits based on location and elevation for archaeological potential. However, with the time allotted for field testing for this project, I decided to focus testing largely on the prominent ridges formed by marine maximum representing the highest landscape visibility with the greatest temporal survivorship of archaeological potential stretching back to the pre-Holocene area.

GIS software offers multiple visual aids that assist in accentuating certain terrain features. For example, it is possible to simulate the rising and falling of the sea level using tools in ArcMap under *Layer Properties / Symbolology / Show: Classified or Stretched*. If working using the *Classified* method for drawing raster groupings into *Classes*, the choices range from *Manual / Equal Interval / Defined Interval / Quantile / Standard Deviations* or as I prefer for visualizing northeast Graham Island - *Natural Breaks*. The latter method is preferred because it takes the existing topography represented in the data set and creates a mathematical relationship between elevation and the color ramp applied, more accurately simulating actual breaks in slope than if an arbitrary system of separation was applied, such as *Equal Interval*. Working using the *Stretched* method that draws the raster by stretching elevation values along a color ramp offers several *Types* including *None / Custom / Histogram Equalize / Minimum-Maximum / Histogram Specification* or as I prefer *Standard Deviations*, which can be divided up into a number of deviations ranging from one which creates a completely homogenous

landscape to any number of deviations which enhances the heterogeneous appearance of elevated features in the landscape.

There are a few key variables that direct decision making during the process of representing the landscape in a color scheme intended to highlight certain landscape features. Topography plays a crucial role in limiting options for viewing landscape where an extreme variation occurs. For instance, the *Stretched* view emphasizes the subtle topographic nuances such as the ancient braided stream beds of the meandering Hiellen River depicted in the low-lying Argonaut Plain, while the *Classified* view provides better resolution for terrain with steep topographic relief, such as with *Taaw* Hill and Argonaut Hill. When the two types of landscape features are being represented together in an image or map it is often preferable to use the hillshading option, which offers a smoother view of the same landscape while still emphasizing the three dimensional aspect of the land.

Hillshading is another tool used in GIS that accentuates steep breaks in slope by applying a simulated 'natural' shading of the slope by applying a variable sun azimuth that is found in the *ArcToolbox* under *Spatial Analyst Tools / Surface / Hillshade*. The hillshading view can be manipulated in a number of ways including angles and directions not found in the real world (and certainly not in this geographic setting, although applying shading reflecting time of day and seasonality could be informative when considering the solar aspect of a specific locale of interest), resulting in unique forms of representing the same landscape. Accessing a unique style for viewing the hillshade image beyond those explained for the non-hillshade images, also found within *Layer Properties / Symbology / Show* is a third option in addition to *Classified* and *Stretched* named *Unique Values* that allows the image designer to draw a raster assigning a color to each value, or simply ramping the color scheme throughout a greater number than is

possible in the other two options. With 254 values assigned to the northeast Graham Island LiDAR generated image, this method allows for the smoothest and most representative viewing of the landscape.

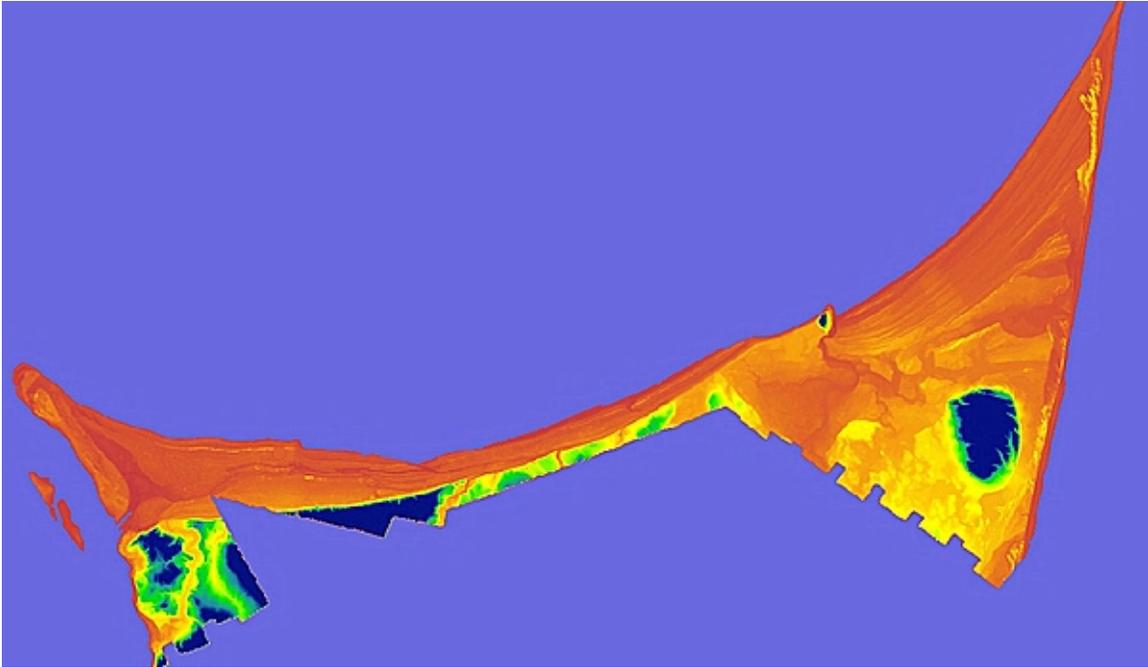
The foremost attribute considered in the marine model was the primary attribute of marine transgression maximum beach ridges and subsequent regressive beach features resulting from fluctuating Holocene marine activities. This palaeoenvironmental proxy of human land use includes relict beach and foredune ridges, spits, elevated deltas, wave-cut ridges, riverine and lacustrine erosional features, terraces, aeolian (windblown) bars, berms and scarps. The relict shoreline and marine generated features that remain throughout the Haida Gwaii archipelago between the marine high stand and contemporary high tide are most evident in the northeast section of Argonaut Plain. Partly, this high visibility for the temporality of the landscape is due to it being a high energy shoreline that helped form these features in the first place (see Walker and Barrie 2006), and further, because its low topographic relief is only minimally affected by colluvial processes altering their morphology. Elevation, orientation and time are inherently connected and their relationship is useful for reading the temporality of the landscape on Argonaut Plain. When viewing the landscape within a GIS relating these three factors is easily achieved using the *Identify* icon which brings up an *Identify Results* drop box that displays results of elevation points based on which cell on the screen is clicked. In preparing for the image to be saved and exported to a permanent file where it can be used for field survey, and where it is no longer interactive within the GIS, it is necessary to apply close contour line intervals (1-2 m) to the images so that knowledge relating to peoples activity choices around particular spatio-temporal features can be contextualized within map elevation.

Related to elevation in an important way, hydrology is an obvious variable restricting or encouraging land use throughout the low-lying Argonaut Plain. The contemporary terrain of Argonaut Plain can be likened to the northeastern portion of British Columbia, where a recent history of large scale industrial projects has encouraged the production of several archaeological predictive models (Eldridge and Anaya-Hernandez 2005; Walde 1992). The minimally differentiated landscape of this region, hosting extensive tracts of muskeg has been modeled in a manner that is heavily reliant on terrain as a means to infer hydrologic conditions suitable for human use. For example, drawing from Saxburg *et al.* 1998 and Shortt *et al.* 1998, Eldridge and Anaya-Hernandez (2005:15) note that “the major contributor to archaeological potential in the northeast is terrain... Knolls, rises, low ridges, terrace edges, and similar locations were A (*sic*) tendency for many sites to be located on small knolls and ridges was also found in similar areas in northeastern Alberta”, or more to the point, “[m]any sites are located on small raised landforms”. As is the case with being able to distinguish between modern drainage versus palaeo-drainage proxies in the northeast British Columbian / Canadian sub-arctic landscape when predicting the pre late Holocene archaeological potential of lands, so too is Holocene sea level data intimately tied to contextualizing the contemporary landscape visibility in northeast Graham Island.

A further consideration when projecting contemporary landscape morphology into the past in northeast Graham Island is the unique environmental condition of aeolian sand dunes characterizing the 300 m landward environment of the near-shore foredunes (Anderson and Walker 2006:17) that both a) cause a novel pattern in the archaeological record of short-term land use throughout the Holocene due to shifting surface landforms, and b) cover the archaeological record with landscape formations that do not represent

their earlier morphology. These factors make modeling archaeological potential of marine generated features increasingly challenging, obscuring the original landforms which inform archaeological potential modeling and obscuring actual archaeological evidence.

Based on a combination of qualitative and quantitative values (including practical aspects of accessing interest zones) relating to culturally significant landscape entities, three testing zones were derived for the Argonaut Hill area and two in association with the Hiellen River / *Taaw* Hill area, each reflecting greater archaeological potential than surrounding lands. Each of these locales around Argonaut Hill are associated with the prominent marine-cut ridge that resulted from early Holocene sea level maximum, which can be traced across the base of over 180° of the Argonaut Hill including its northwest, south, and southeast sections (see Figure 4.4). In fact, this same prominent feature is part of a palaeomarine ridge that extends the entire northern Naikoon Peninsula for which LiDAR data exists (Figures 4.7 a and 4.7 b). Compared to areas that have been washed by mid-late Holocene marine regression, level benches above the palaeomarine high stand constitute true remnants of the coastal plain that stretched between Haida Gwaii and the continental mainland during the Pleistocene-Holocene Boundary, thereby constituting a landscape of long term visibility. From the numerous locations that appeared suitable for land use (moderate-high archaeological potential) within this non-linear palaeo-coastline, several stood out as particularly well situated.



4.7 a LiDAR image of north Naikoon Peninsula showing contemporary coastline and Holocene development of North Beach and the Hiellen River estuary.

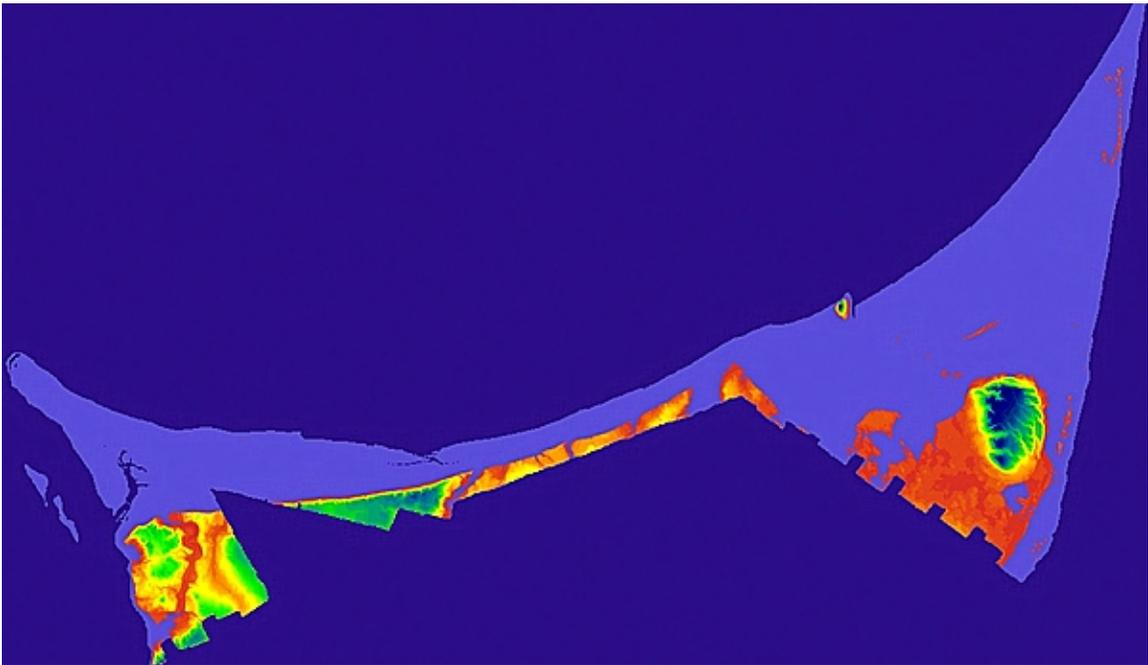


Figure 4.7 b LiDAR image showing 18 m amsl palaeo-marine transgressive high stand, and the early-middle Holocene north and northeast Graham Island. Note location of *Taaw* Hill as an isolated island.

4.2.2.1 Clearwater Lake and Base of Argonaut Hill Environs

Referred to as the Argonaut Hill Forks for its strategic orientation at the primary source of fresh water flowing from Argonaut Hill, this locale also offers safety and protection from inclement marine and climatic conditions in the form of a river delta abutting a steep backdrop. During the early-mid Holocene this delta would have allowed safe harbourage for canoes from an otherwise relatively linear coastline with steep topographic relief characterizing the East Beach coastline near Argonaut Hill. This latter factor alludes to two other positive attributes of level ground surface and hydrology, which were absent along much of lands at the base of Argonaut Hill due to weathering processes but resulted at this locale through the geological accumulation of alluvium, that are subsequently cut away by flowing water. The result of these combined phenomena was a series of three equal level benches spread out on either side of the two river channels and one at their confluence suitable for a range of human activities.

The level 29-30 m amsl bench that exists at the north end of Clearwater Lake was another location derived as holding high landscape visibility with long-term archaeological potential. The other positive attributes of this locale is that it offers unobstructed year round south, east and west facing aspect (Figure 4.8), tremendous protection from inclement southwest to southeasterly late Fall to early Spring winds and weather systems, and westerly to northwesterly summer winds and weather systems (Walker *et al.* 2007:18) depending on portion of the locale under use, and immediate access to year-round fresh water. The use of this location would have experienced a transition from primarily a marine-based use locale between the marine transgression high stand 8,900 BP and the middle Holocene (c. 5,000 BP), at which point this large

embayment would have closed in, forming Clearwater Lake. Geomorphological evidence of aeolian movement supported with optically stimulated luminescence (OSL) dating collected by Walker *et al.* (2007:48) suggests this process occurred through the forces of a small northerly migrating barrier spit complex, formed by longshore drift of sediments along the seaward margin of east Beach, with a terrestrial radiocarbon date of 6,500 BP on buried organics as evidence for its early-middle Holocene formation.

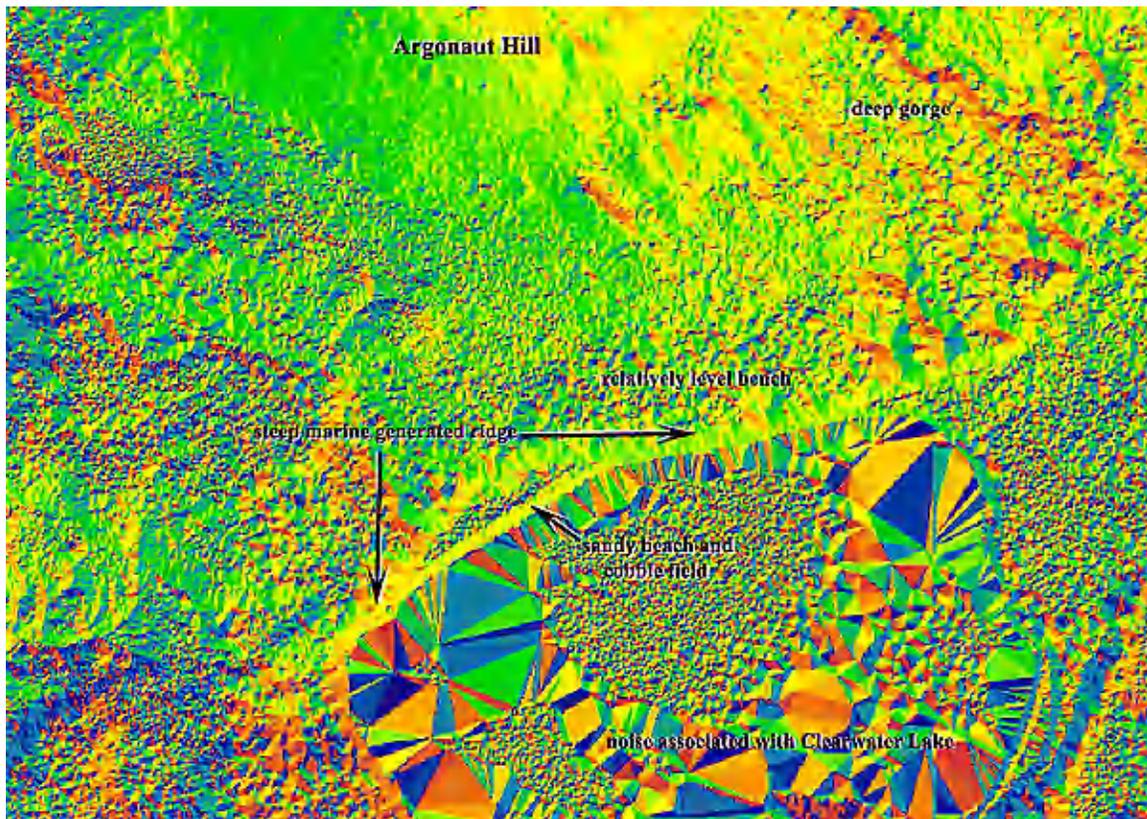


Figure 4.8 Image showing aspect view of the north shore of Clearwater Lake, and south slope of Argonaut Hill. The color ramp consists of a spectrum of reds / oranges / yellows / greens / blues which are divided up into 10 *Classes* starting at 0°, roughly representing 36° each. This final display image was represented in *Stretched* view. Note the high level of solar exposure indicated in the matrix of orange, yellow, and green cells that cover the palaeo-marine wave-cut ridge and level terrace along the north bank of Clearwater Lake, ranging broadly between 75° to 245° and more consistently between 112° to 211°. Clearwater Lake is represented by ‘noise’ features showing large and small pyramids for areas that are in fact homogenous in their aspect. This image relates as an example to the discussion on fractals covered in section 4.3.

The last locale of pre-field interest was the river and marine maximum ocean confluence and lands along both banks of a river channel that clearly remains embedded in the landscape palimpsest to the west of the north end of Argonaut Hill (seen flowing north in Figure 4.4 to the west of the central portion of Argonaut Hill). The research team was unable to access this region during 2007 summer field testing, due to time constraints.

4.2.2.2 Lower Hiellen River and Base of *Taaw* Hill Environs

A palaeo-marine spit feature formed during the early-mid Holocene marine transgression / regression sequence was investigated in part to learn something about behaviour-based activities associated with this feature type as this was the sole spit feature being modeled. A few interesting factors drew my attention to this feature. Firstly, when modeling the archaeological potential of this feature the relationship between elevation and time must be considered under a non-linear dynamic taking into consideration ongoing natural landform alterations in the form involving the building of lands at the outflow of the Hiellen River previously discussed. In this respect, this area is unique in that it was undergoing an additive process simultaneously as marine levels were regressing, revealing largely in tact palaeolandforms. Secondly, based on this knowledge, the spit has the potential to have been building a bridge between *Taaw* Hill and the Graham Island prior to the middle-late Holocene dates given by Walker *et al.* (2007). No longer a giant pile of sand turning up marine resources that was only accessible by boat, once the Hiellen River estuary expanded past the spit feature to its contemporary location parallel with the northern most extent of *Taaw* Hill, this well forested, and well drained feature sitting high above the river and protected from

inclement weather by *Taaw* Hill to its north would have transitioned into a “place to be” rather than a “place to visit”. In this manner of landform transition and flexible human utility, the palaeo-marine spit south of *Taaw* Hill was modeled as high potential for Holocene archaeology, deserving thorough subsurface prospection, focussed along its more pronounced southeastern edge (Table 4.4.).

Geographic Coordinates (UTM N9)	Elevation (amsl)	Slope	Aspect
316957 / 5995033	16.1 m	0.79%	218°
316872 / 5994919	17.2 m	1.20%	169°
316859 / 5994899	17.4 m	0.73%	128°
316817 / 5994789	15.3 m	0.43%	182°
316730 / 5994791	15.6 m	0.49%	280°
316667 / 5994743	15.7 m	0.70%	99°
316550 / 5994607	15.9 m	0.27%	273°
316483 / 5994665	17.4 m	0.61%	108°
316512 / 5994520	17.2 m	0.81%	239°
316462 / 5994469	15.8 m	0.61%	282°

Table 4.4 Table showing evaluative units analytically derived for testing the palaeo-marine spit feature south of *Taaw* Hill and to the west of Hiellen River that were derived from a multivariate qualitative and quantitative rationale.

4.2.2.3 Summary

These two types of landforms can be compared broadly. Marine generated features represent temporally finite landscape visibility with archaeological potential relative to derivation based on multiple factors unique to the local context. Hill features offer the potential for long term landscape visibility with theoretically high archaeological potential in certain locales based on a different set of variables. An exception for the marine model exists with the high stand ridge bench locations that were not inundated with marine transgression and therefore also retain pre-Holocene archaeological potential.

Generally speaking, the marine generated relict beach features reflect lower landscape visibility than more stable land surfaces, although, the archaeological potential may still remain relatively high in comparison to interest zones on hill features due to the scale of cultural deposits developed in association with behavioural patterns being modeled for each. For instance, modifications made to the landscape in the form of anthropogenic soil accumulation and material culture that remains in the archaeological record in association with activities carried out at lookout sites is assumed to be considerably less than at permanent (year round) or semi-permanent (seasonal) use locales in association with marine environments.

In brief, prospection targets for both hill and marine generated features were derived by a) acquiring thorough background information on the history of natural formation processes affecting the contemporary landscape and those that comprised the environmental context of past inhabitants, b) drawing on a wide range of ethnographic and experiential behavioural principles, c) applying the previous information to the LiDAR DEM, d) manipulating the LiDAR images for qualitatively analyzing the primary and secondary coverages corresponding to Figure 4.1 in a GIS, e) identifying features and areas within features that match the behavioural activity type being modeled, f) analyzing these areas in multiple views corresponding to coverages (slope, elevation, aspect) of related activity type, and g) selecting the highest potential coordinates to guide field investigations.

4.3 Problematize the Predictive Model Exercise

According to Mandelbrot,

[m]any important spatial patterns of Nature are either irregular or fragmented to such an extreme degree that ... classical geometry ... is hardly of any help in describing their form. ... I hope to show that it is possible in many cases to remedy this absence of geometric representation by using a family of shapes I propose to call fractals -- or fractal sets. [Fractals being, a] complex geometric pattern exhibiting self-similarity in that small details of its structure viewed at any scale repeat elements of the overall pattern. (1977)

Fractals, Mandelbrot (1977) claims, “arise in connection with nonlinear and chaotic systems”, which suggests the network of living and nonliving systems that coalesce to comprise the landscape are a potentially useful example for discussing such a model. Mandelbrot’s model strikes me as well aligned with relationships the viewer of computer-generated images has with large scale patterns of landscapes rendered therein, and in this manner, is a useful commentary relating to aspects of archaeological modeling representing remote sensing data within GIS applications (see Figure 4.8). Not all elements and systems of composed elements in the landscape however represent “fragmented” patterns of “self-similarity” equally, and in fact, distinguishing different patterns within the landscape is an imperative of modeling landscapes for archaeological potential. For instance, particularly depending on visualization format, at an initial glance some landscapes may appear to conform to patterns of “self-similarity”, as is the case with a mosaic of LiDAR laser reading data given cell values in a DEM. This phenomenon is also true of GIS renderings of landscapes that highlight only certain physical attributes. However, the more familiar these landscapes become when experienced on the ground, and the more knowledge gained of their internal complexity, fractal patterning increasingly disappear and become unique in their own dynamics of

interconnecting relationships between each landscape attribute. Images of northeast Graham Island rendered to display slope (Figure 4.2), aspect (Figure 4.8) or some other attribute generated through mathematical geometric design are clearly what is described by Mandelbrot with the fractal character of spatial patterns. Importantly, the structure of Mandelbrot's model attempting to quantify the world's physical phenomena represents an experiential disconnect that people have with the material world resulting by the culturally constituted "hegemony of the eye" (Freiman and Gillings 2007:5) that prioritizes the visual sense over the matrix of senses comprising the sensorium.

Specifically, is this process of reducing the landscape into a patchwork of coloured cell-based units representing fixed quantitative values what is experienced when taking in the landscape as a phenomenological course of Being? The answer is surely that it is not, which begs the question, "is working within a quantifiable world visualized and interpreted hermeneutically through a mosaic of fractal geometries the most useful alternative to the real world prior to field experience?" My sense (and experience) is that being-in-the-world is about being in a constant state of rediscovery, a sense that the synchronic character of digital photography, satellite imagery, and imagery generated from remote sensed data are unable to capture and portray. Despite this position, I also feel as long as the fractal simulacra being viewed are kept in perspective, there remains a useful aspect to this exercise. Namely, that these representations of the landscape are not the world of phenomenological experience, nor are they the same storied worlds of the Haida. In light of this understanding, I can appreciate the utility of objectifying the landscape for correlation to other narratives as part of a holistic study of its past, as long as it does not become *the* story of the past.

Quantifiable studies of landscape, such as archaeological predictive modeling, often use the designation of a buffer to signify a certain attribute, quality, value, or potential for archaeology within a landscape, which can be an entirely arbitrary designation. The 100 m buffer applied in the example provided in Figure 4.9 was chosen because it matches the British Columbia Archaeology Branch (BCAB) mandate for distinguishing between 'site' boundaries. By applying an equally arbitrary 200 m buffer in the third image it is observed that a drastically new look is ascribed to the landscape, as would a 50 m buffer, and so on. Were this an exercise in buffering the narrowly-focused archaeological landscape units of 'sites' and pathways, the result between the two separate expressions of archaeological potential (has archaeological material / has no archaeological material) would indicate the unsatisfactory methods of some quantitative analysis when it comes to modeling the far more complex ecodynamics of people-landscape relations. Implications stemming from this type of simplification of the landscape and a cultures' behavioural relationships to these landscapes, will present serious practical repercussions.

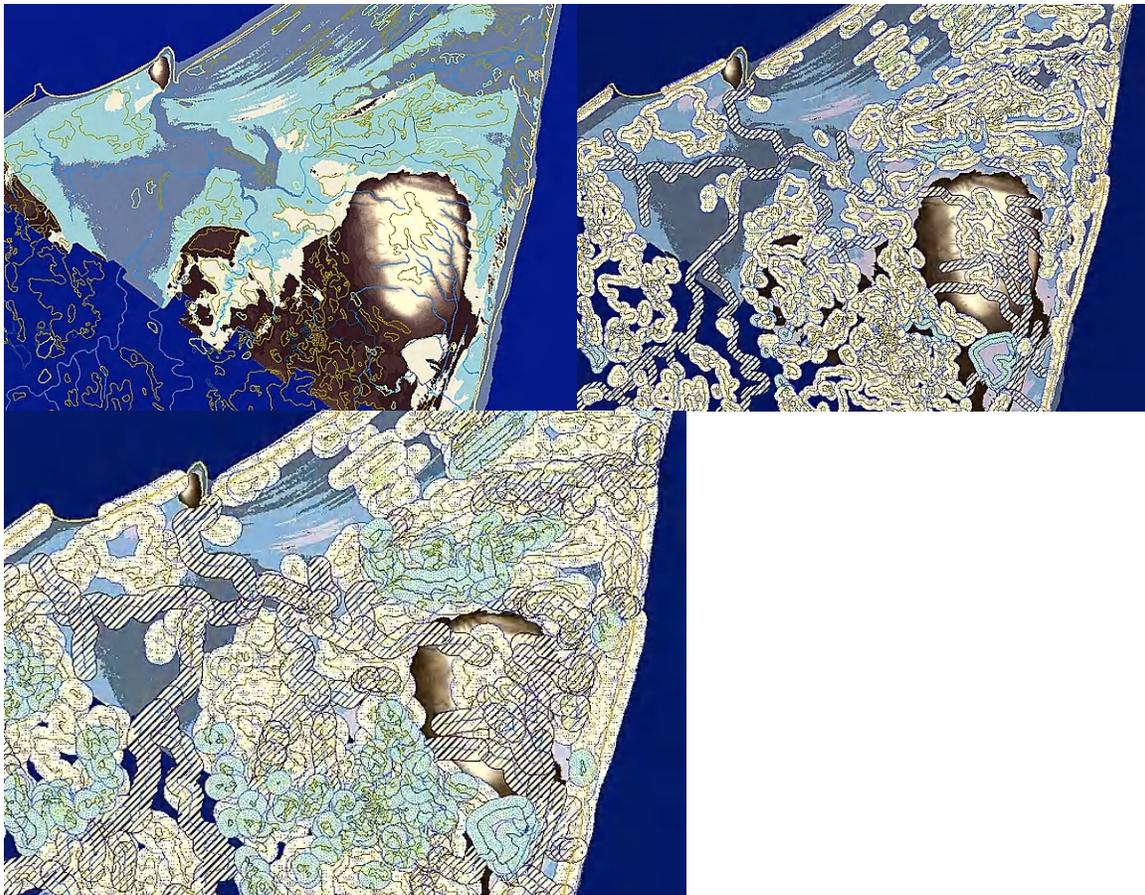


Figure 4.9 This series of images expresses the relationship between the variety of fresh and salt water sources for part of northeast Graham Island including the lower Hiellen River watershed and *Taaw* Hill, and Argonaut Hill. The layered color scheme in the image is viewed as classified at 5 m intervals. The BC TRIM data that is overlaid on all images represents rivers in light blue, lakes in dark blue, marshes in light brown, and swamps in light green. Image two in the upper right shows a 100 m buffer for all four variables, while the third image shown in the bottom left reflects the same four variables each with a 200 m buffer. The buffer symbol for lakes is smooth light blue, diagonal stranded blue and white lines for rivers, and white backdrop with blue vegetation for swamps and marshes. These images are intended to reflect two observations, firstly, that assigning a different buffer designation creates a drastically new analytical context which to consider spatial relationships between people and resources, and secondly, that a palpable water source is never very far no matter where one is situated in northeast Graham Island. Together, these two points question the validity of working with a strict spatial system of buffers.

For instance, present regulations of ‘site’ designation in British Columbia, along with the resulting protective measures of archaeological heritage under the Heritage Conservation Act, tend to reduce the scale and scope of people’s activities in the past, and thereby reducing the importance of the landscape for indigenous people in the

present to static locales, i.e., 'sites'. This is observed in yet another example of poorly monitored development of a massive housing complex in the town of Colwood, southern Vancouver Island, where the unique archaeological phenomenon of a 2,850 BP semi-subterranean pithouse was, according to Moneo writing for *The Globe and Mail* newspaper, disturbed when "a trench for the water line was mistakenly dug in a space considered out of bounds for development" based on the fact that "[e]arlier excavations indicated the area was archaeologically sensitive" (March 22, 2008:S4). The area set aside to 'protect' this archaeological feature measures "roughly seven meters by six meters" (Moneo March 22, 2008:S4), though such a fine area for defining a "site" in no way represents the archaeological landscape associated with activities carried out within this feature.

What would happen if these bounded landscape units of human activity were connected by a network of 'least cost' pathways? Would there be a drastically different appearance to the archaeological landscape? Further, what if these strictly eco-functional units of 'sites' and pathways were modeled as *archaeological landscapes* connected by *corridors* of movement that modified their course over time in relation to, a) physical landscape alterations, b) changing dynamics within sociocultural networks, and c) socio-ideological / symbolic variables (see Snead 2000; Snead and Preucel 1999; Taçon 1999)? The answer to these rhetorical questions is that any form of archaeological analysis (including potential modeling, and field-based research) operating within a site-based paradigm is limiting the field of human behaviours from which to help reconstruct past lifeways. Further, neglecting those 'spaces' between common archaeologically recognized 'places' impedes the epistemological foundation of the discipline,

perpetuating the operationalization of a circular treatment of how we know what we know.

I promote such a reconsideration of traditional GIS models, which Gaffney (in Gaffney and van Leusen, 1995:373-374) suggests, “all too frequently represents human activity as a series of isolated points (sites / settlements)”, allowing for a more representative set of behavioural attributes related to the landscape, involving a network of people’s movement, their land use and cultural importance of the landscape.

How informative, or non-informative the visual representation provided by Figure 4.9 is for envisioning behavioural patterns of people in relation to water-related activities in the past, may be decided with the subsequent concerns with such an approach. For instance, a secondary criticism added to that of arbitrarily quantifying the archaeological potential of lands based on ‘blanket’ regulations, is that this exercise relies on contemporary data and therefore is only approximate regarding Holocene ecological conditions in northeast Graham Island. This point stresses challenges facing archaeologists modeling palaeo-environments using contemporary visual and spatial data, and their reliance on thorough local palaeo-climatic and environmental data. In some cases, clues to past environmental conditions may be interpreted from these LiDAR generated images, while, at other times, it may require either a) making observations and taking palaeo-environmental samples from the source, or, b) working within general spatio-temporal trends acquired from neighbouring areas. What *is* known about access to water for northeast Graham Island during the Holocene is that the relationship of Argonaut Hill and *Taaw* Hill would have varied in their orientation to Hecate Strait and Dixon Entrance, thereby affecting the way people engaged the landscape through changing navigational patterns. Peoples’ reliance on fresh potable water for drinking and

resource extraction would have altered only in form rather than kind, as sections of the expanding low-lying Argonaut Plain would have remained a wetland ecosystem throughout the Holocene, and increasingly so as peat deposits accumulated over time. I do not believe the quantification of water features through designating buffered boundaries of practical distance to source for human utility in the area is required to arrive at this conclusion.

In an independent, but parallel case, thinking about the deleterious effects of separating people, their language, and knowledge from the landscape in the representation of land in maps, Tilley (1994) contends that “in a fundamental way names create landscapes. An unnamed place on a map is quite literally a blank space.” In a sense, Tilley is correct that the information represented on the map has a tendency to become recognized as the accepted history of that place, while the information left off the map is either forgotten, or becomes regarded as a subjugated place, relegated to a second-class history (see McGlade’s 2003 chapter “The Map is not the Territory”). The indigenous-colonial history in the Northwest Coast, as elsewhere around the world, speaks to this rewriting of history, for which the map and named places along with other information about the places displayed on the map act to perpetuate. Engaging the theme of power as it applies to representation of lands and its ability to subjugate a peoples’ historic connection to lands is a pertinent concern for archaeologists building predictive models intended to interpret the archaeological ‘value’ of lands. This discussion will be expanded in Chapter Nine in the form of a brief query into the implementation of archaeological predictive models within British Columbia government mandated archaeology, with a view to the future.

Maps, as ‘summary representations’ of an increasing virtually experienced world are entirely subjective, and essentially interpretive devices based on their limited ability to present information, and this is particularly accurate of the paper, or hard copy map which is a product of an individual's intent upon expressing a pre-established set of spatial relationships. For example, the “unnamed place on a map” can represent many-a-things to different people, based upon their own experiences in and knowledge of that “blank space” – signifying the error in the concept that a landscape can be a *tabula rasa*, or *terra incognita*.

These criticisms that correspond to the capacity to represent and cover numerous values of landscapes based upon a multiplicity of experiences has been improved to some degree with the introduction of remote sensing and GIS technologies, in that they are capable of retaining a tremendous degree of data, most of which is only made visible upon request. However, the work of qualifying archaeological potential in the landscape of northeast Graham Island lead me to the question, to what degree are people and landscapes reducible to data, which Gaffney and van Leusen (1995) point out become geographically anchored information as a prerequisite for being applied to a GIS for modeling purposes? In part, the limiting factor of any GIS to represent the human component in the landscape is that people, and societies, are dynamic; they migrate, procreate, die, build things and modify others, fixing them into a two dimensional screen, sheet of paper, or number that corresponds to a cell on that monitor or grain in that sheet of paper is to some degree inadequate. Similarly, non-human animals and landscapes are dynamic systems that require a full-dimensional, diachronic framework for their investigation.

4.3.1 Space-time Simulation Difficulties

The above criticism of the predictive modeling exercise focuses on its limitations to represent landscapes in anything other than a two-dimensional time-slice, that is, a paradoxical antithesis to the essence of archaeology. If space-time correlation is an essential dimension of archaeological inquiry, and the strengths of GIS representation are not in this domain, then what are the suggestions as to the ideal incorporation of GIS to archaeological applications?

I suggest two brief points for redeeming the utility of GIS within archaeological analysis, where both time and space merge. Firstly, a GIS is only as robust as the data that goes into it, thereby making the argument for access to a broad-reaching multidisciplinary dataset which draws discrete spatial, temporal, and compositional data together. Secondly, following the hermeneutic approach to reading the landscape for its historic attributes in relation to changing spatial arrangements, as with the empty / not-so-useful GIS versus data-heavy / robust GIS relationship, there is likewise a necessity for a deep knowledge-base and skill-set required by the GIS user -- predictive modeller -- analyst. The high resolution LiDAR remote sensing data imagery available for northeast Graham Island is paramount in making both processes practical.

Prior to 2007 investigations, the archaeological record for Graham Island dated reliably to 7,400 BP (Fladmark 1986:52) and northeast Graham Island reliably to 4,920 BP (Fladmark 1971a:3), with significant temporal data gaps in this history. Furthermore, the spatial representation of Graham Island archaeology is sparse, primarily focused on developed near-shore areas within Naden Harbour, Masset Inlet and Masset Sound, Queen Charlotte City, Skidegate and *Taaw* Hill. The modeling and testing exercise set

out in this thesis attempts to address these spatio-temporal issues using a landscape archaeology approach concerned with a diversity of geographic locales within a sample area with the potential to relate to a range of periods. Working from a multidisciplinary data set, informing the temporality of the landscape palimpsest that is partly visible in the phenomenon represented in LiDAR imagery, and ultimately validating these simulacra through field observations and testing methods, relationships between time and space will begin to take on dimension.

4.3.2 The Paradox in the Temporality of Knowing in Cross-cultural Inquiries: Indigenous and Western Views of History in Archaeological Analysis

*Time present and time past
Are both perhaps present in time future
And time future contained in time past*

(T.S. Eliot, Four Quartets)

The intent of most archaeological predictive models, particularly the cultural resource management (CRM) type model is to recreate the known cultural ‘resource’ (defined as materialist) data for deriving the likely presence of still unknown heritage ‘resources’. The danger with this scenario is that its investigative formula neglects other types of knowledge, presupposing that what is known within a specific paradigm will be all that can be known. The outcome of possessing such an attitude, content upon working within “the repetitious confirmation of otherwise obvious relations” (Gaffney and van Leusen 1995:369) is to operate within a theoretically and methodologically sterile environment where knowledge is not openly acquired, but reified. The alternative is what I highlight in this section, that is, grounds for a cross-cultural view of being-in-the-world over the *longue durée*.

Forming one of the earliest anthropological perspectives for deriving knowledge of indigenous histories in the Americas was Bandelier, whose method of inquiry was unique amongst late 19th century scholars for its ability to interpret the past in relation to the contemporary ethnographic record – to work, in his words, “backwards in time from the known to the unknown” (1884). This methodology of “upstreaming” as Fenton (1952:333) would later refer to it, developed into the “Direct Historical Approach” made popular by North American archaeologists whose project was to essentially write history backwards, starting with the ethnographic present, tracing it back through the protohistoric period, and ultimately into the prehistoric era. Although this method has its drawbacks²⁷, especially in contexts where cultural change was punctuated, there are instances where such a method is well suited to the historic trajectory of a culture group. A suitable case in point resulted from the relative population and cultural insularity of the ancestral Haida dwelling on an island archipelago roughly 100 km out to sea in the northeast Pacific for most of the last ten thousand years.

Whereas the work of early anthropologists such as Bandelier had their ‘stories’ of a culture’s past rooted partially in a oral knowledge possessed by that group, what followed with the scientific turn preached by processualists devoted to the “New Archaeology” was a distancing from this connectedness. According to this “paradigm shift” (Kuhn 1962), knowledge of the past was about a long series of positivist assumptions that could be questioned largely along materialist and statistical terms. A

²⁷ Another factor hindering the use of this method is that it operates best when there is a continuous archaeological record to work back through. Unfortunately, a known *in situ* culturally continuous archaeological record of First Nations within the Northwest Coast is an uncommon phenomenon, as it remains for Haida Gwaii (Fedje *et al.* 2005). This approach has been attempted by authors taking the archaeology of the Northwest Coast as a whole (see Ames and Mashner 1999; Matson and Coupland 1995).

certain paradox appears with this turn to scientism as a way to render the past intelligible, the paradox being the relationship of seeking knowledge of the past using voiceless objects excavated from the ground, while neglecting dialogue regarding oral knowledge and narratives relating stories of landscape histories that rests with contemporary populations. Similarly, experience based interpretations of the archaeological landscape and its material correlates are neglected by researchers operating within this paradigm.

An alternative view to thinking about the past is held by indigenous cultures throughout the world, suggesting that knowledge relating to their histories is transmitted down through generations, in oral traditions. Knowledge of these histories is stewarded by the ‘collective memory’ (see Halbwachs 1980, 1992) of the community, and in the context of the Haida, have come to be particularly distributed, being owned by specific clans, lineages, houses, families, and individuals. Knowledge in this tradition is not so synchronic as to fit into a dated sequence likened to the scientific model of paradigm shifts, punctuated equilibrium in evolutionary time, or points of historic discovery; rather, it flows across time, attached to peoples’ names, collective stories, and named places. In this manner, the same history known through scientific methods and experimentation is known through trans-generational oral teachings, confirming, in the words of Ricoeur (1984:84), “the very Kantian thesis that time cannot be directly observed, that it is properly invisible”, a perpetual *aporia* of the phenomenology of time constituted by culturally-derived ontological perspectives of ‘being-in-the-world’.

I believe these different expressions of knowing and relating to history directly corresponds to each group’s recursive experience with local landscape phenomena and processes of meaning making aroused by these experiences. As Ridington (1996:1) points

out in a parallel theme to the paradox I highlight about the temporality of archaeological knowledge acquisition;

[d]uring the past five-hundred years, a substantial literature representing Native American spirituality has come into being as outsiders and Native Americans themselves sought to explain, objectify and analyze what participants have known through direct experience.

As developed in Chapters Eight and Nine, I contend that in part, any cross-cultural reconciliation in the ways histories are being articulated will first require a dialogue about experience. Before I get there however, I will foreshadow this discussion by relating the infrequently challenged assumptions influencing the pre-field model building process, with the experiential and interpretive components of archaeological investigation. The purpose of doing so is to retain the narrative flow of this thesis.

4.4 Resolving, or Reconciling with the Paradox

An example of the historic chasm between ways of perceiving and ‘being-in-the-world’, specifically relating to the theme of culturally constituted forms of landscape representation can be analyzed from Golledge’s (2003) commentary on the spatio-cognitive geographies expressed by cultures using cartographic versus cognitive mapping (mental model of an individual’s metaphorical spatial environment). Earlier anthropological considerations of these sociocultural phenomena juxtaposing ‘cognized’ models with “operational” models articulate that “[c]ognized models are descriptions of the knowledge and beliefs concerning their environment entertained by a people”, while “[o]perational models are descriptions of approximately the same domains prepared in accordance with the assumptions and methods proposed by some scientific theory – ecology, systems theory, structural theory” (Rappaport 1978:84). According to Golledge (2003:32), evaluated against professional cartographic maps,

[m]ost cognitive maps are incomplete, are often distorted because of incomplete information, and require mental rotation, alignment, and matching as well as scale transformation when being used in travel planning or in actual wayfinding.

Each of these points is also true of navigation using cartographic maps.

Comparing these two epistemological methods for representing landscape for the purpose of wayfinding (navigation) within a Western paradigm creates an unnecessary hierarchy to the equation. An alternative is to appreciate the multiplicity of map-making and navigational practices that correspond to the socially-inculcated experience of the landscape – be it with reference to a ‘common-to-all’, fixed, and alienated version of space and place, or in reference to a network of mnemonic landscape features. For the sake of brevity on what could be a lengthy exposition on this subject, I will summarize Heilen’s (2005:138) discussion on this theme, which states; “[e]mic classification of landscape features, or *social knowledge*, may certainly differ from etic classifications, but this distance does not necessitate that emic classifications have no objective referents.” Framed in cultural relativistic terms aligned with the notion I have previously proposed in Chapter Three of *landscape equality*, and for which I return in Chapter Eight when proposing my Interdisciplinary Multilogical Framework, Heilen captures the essence of a perspective it will take to practice an ethical archaeology where order of knowledge and units of time are not bound to a Western paradigm of linear time. Rather, it will consider the phenomenological understanding of peoples relationships with “time geographies” (see Hägerstrand 1973, 1975) along an equal plane, if different notional perception of the temporality of history in a given landscape.

The established tradition of predictive modeling is by its present constitution largely an exercise of reiterating known patterns in the archaeological record. The danger of reinforcing what is already known each time a predictive model is created, or an

Archaeological Overview Assessment (AOA), or (AIA) is conducted, is to admit the near demise of the discipline as a static intellectual exercise for which archaeologists assume they know whatever there is to know, or they already know how to achieve what it is they want to know. Seeing as what is known by Western scientists often varies from knowledge held by other groups on the same history, I contend a more cross-culturally intelligible narrative of history would be one taking into account a multiplicity of versions and possibilities. This transformation will entail a series of modifications to existing theoretical and methodological precepts held by archaeologists and legal action on the part of governmental policy makers; a matter I propose in Chapters Eight and Nine will require truly interdisciplinary knowledge sets and cross-cultural dialogue.

4.4.1 Diachronic and Isocratic model of Haida Cultural History: A Return to the *Longue Durée* in Northwest Coast Archaeology

I attempt some practical reconciliation between these two independent cultural traditions of knowledge-building and history-making by working with a forward-thinking theory of history in relation to its time and place of origin. Historians associated with the French *Annales* School formulated a theoretical model dealing with a *histoire totale* in an effort to capture the whole of human activity in a given society (Foster and Ranum 1975:vii) most compatible with the dialogical, spatio-temporal framework put forth in this thesis. As originally conceived, and throughout a three-quarter century of existence, the *Annales* approach to historiography has sought to integrate humanistic theories as a way to “command the sources” of a never-ending written document pertaining to any given theme. Working from alternative sources of information as a way to eschew traditional forms of historiography produced in Europe, these scholars promoted a more pluralistic form of cross-cultural interpretation within historical writings. It is in this

capacity of far-reaching source gathering and interdisciplinary interconnected learning that the *Annales* approach to understanding the past becomes a more ethical (representative of multiple histories, including that of the victors *and* the vanquished) endeavour than its disciplinary predecessor(s).

The incorporation of *Annales* thought within archaeological analysis is a fitting influence which can be utilized to establish long term historical structures referred to as *la longue durée*²⁸, over the synchronic event, and series of events. In a study on the theme of perceived notions of time Ricoeur (1984:85) states, “the principle incidence of this notion of a temporal hierarchy: historiography, in its battle against the history of events... leaves only a single choice: either chronology or achronic systemic relations”.

Illustrations provided in Chapter Eight will show how long term historical structures of indigenous knowledge systems are instructive for interpreting people’s involvement in a key object of archaeological focus - the palaeolandscape. As for now, I simply want to make the point that the long term approach to interpreting cultural relatedness to lands is an important inquiry to follow.

In concentrating on the primacy of continuity between place and people over the *longue durée*, I agree with Gosden (1994:122) that any discussion of the social implications of behaviour and time needs to begin with the premise that a temporal depth exists within all human action. For instance, every form of human-landscape interaction

²⁸ The “long-run” for historians of the *Annales* School took this to encase the scale of several hundred years, whereas I have adopted it to mesh with archaeological measures of time and therefore extend its admittedly amorphous configuration to several millennia. A comparable archaeological model promoting such flexible considerations of time-oriented structures between the event and process is referred to as “time perspectivism” (see Bailey 1981:103, 1987:7, 2007:200-202).

must be initialized with some sets of pre-existing strategies and ways of knowing, or organizing and creating meaning, of the world.

Furthermore, social meaning resides over the *longue durée* not solely within individuals or in relations between individuals, but through a synergistic relationship between people and the landscape within which they dwell. This position is also shared by Ingold (2000:172) who notes that people occupy simultaneously a world with two domains, including, “a social domain of interpersonal relations and an ecological domain of inter-organismic relations”. While people are the agents responsible for the enactment of socially constituted and constituting ritualized actions that connect past, present, and future knowledge practices, other living forms and the animate landscape constitute the embodiment, and necessary referents of these knowledge units²⁹. Importantly then, culturally significant knowledge units do not exist without a landscape with which to reference or analogize. As the adage goes, “the whole is greater than the sum of its parts.”

For an illustration, *Skaay*, *Ghandl*, *Haayas* and other Haida oral historians refer to the origins of everything social and cultural; including knowledge, experience, spirituality and life as it exists in relation to the sentient world, in all its various forms (see Bringham 1999, 2000, 2001). It is valuable to read and listen to these histories for their insight into the discursive practices and structures informing an ontological understanding of a Haida way of dwelling within the landscape (Sanders 2008a, 2008b, 2007a, 2007b). Comparable documentation of local Pacific Northwest Coast narrative histories in the form of ethnohistory and ethnography has shown them to have a

²⁹ A ‘knowledge unit’ is a category of information that has been socialized into a group’s discursive practice, and its transmission can be traced intergenerationally through oral transmission, experiential learning through an active engagement in the world, or through academic institutional training.

considerable time depth (Harris 2002; MacMillan and Huchinson 2002; Miller 1998). Studying Haida narratives from an interdisciplinary perspective (as undertaken for northeast Graham Island in Chapter Eight), can reveal evidence of people-landscape relations dating to constrained temporal periods associated with natural phenomena, which archaeologists grounded in the Western scientific tradition are comfortable referencing.

Nevertheless, the conception of the *longue durée* is culturally relative, explained by archaeologists using linear dating methods that refer to time in the units of tens within a window of tens of thousands (e.g., 14,600 +/- 80 BP), and by historians using the written document, while an indigenous perspective often envisions time in a cyclical, recurring, manner, often revolving around the changing seasons, and the temporality of managing food resources, maintaining social relations, negotiating political status, and balancing spirituality. Despite these generalized differences in the cultural orientation of time, there is potential for complementation of these ontological views of historicizing the past, rather than a contradictory conflating of truths. For instance, following a similar philosophical perspective as the temporalized landscape palimpsest model promoted within this thesis is the notion of specialized time and temporailized space among neighbouring Tlingit articulated by Thornton (2008:22) that suggests, “[a]lthough different cultures may conceptualize time in different ways, time is everywhere inseparable from place because it is through temporally situated interactions with specific locales that cultural and individual conceptions of place are formed”.

What the *Annales* referred to as ‘*mentalité*’ (mentalities), was used to suggest that peoples’ thoughts could be as much as part of the *longue durée* as climatic, environmental or geomorphological phenomenon. In this sense the *Annales* emphasized

not only the event (and political actions of the elite), but the enduring structures. These structures constitute the core of society which gets passed from generation to generation in the isocratic flow of culture; the latter concept being that phenomenon which guides a sense of constancy in Being, and knowing the landscape where groups dwell, amongst the continual state of change and socio-ecological adaptation. Change in this context is gradual, as knowledge and practice pertaining to sociocultural identity is not recreated within a generational timeframe; and thus, there has never been a social *tabula rasa*.

4.5 Summary of Discussions

I suggest that when modeling landscapes for archaeological potential it is necessary to view them as comprised of numerous integrative systems that share some common properties which allow them to be taken as a collective whole, as well as independent systems within larger systems. Landscape scale, has thus been an important factor in representing certain variables for analyzing archaeological potential. The philosophical position of integrating micro systems into larger more dynamic systems has been achieved in the practical exercise of drawing from multidisciplinary knowledge sources that inform both levels of landscape interaction.

The modeling of two distinct landform types was intended to test, in part, whether these two separate sets of behavioural attributes relating to hill and marine generated features reflect distinct behavioural attributes indicative of localized spatio-temporal signatures respectively. These may be generalized as “lookouts” and “other”, where the former may include behaviours related to navigation, hunting, or defensiveness, and the latter may include marine resource harvesting, the gamut of occupation related activities, and still others.

I discussed the qualitative processes of deriving archaeological potential from corresponding knowledge of palaeoclimatic, palaeoenvironmental and geomorphological phenomenon to the visual representation of the northeast Graham Island landscape in GIS. This qualitative interpreting of landscape potential invoked behavioural archaeological analogues associated with landscapes containing similarly formed relict shoreline features within the Gwaii Haanas National Park Reserve, with which I am familiar. I also discussed the various methods for viewing the physical landscape attributes of slope, aspect, and contoured elevation quantitatively, and how they inform the qualitative process of assessing the landscape. The role of ethnographic and archaeological analogy contributed in significant ways to the model variables chosen in establishing predictive locations of past land use in northeast Graham Island.

Adopting the concept of the *longue durée* helps articulate the rhythm for which archaeological analysis is best suited, according to the isocratic (relative constancy within an environment of change) flow of culture. This interpretation matches that promoted by Ricouer (1984:104) who states, “by means of the slowness, the weightiness, the silence of long-lasting time, history reaches an intelligibility that belongs only to the long time-span, a coherence that belongs only to durable equilibrium, in short, a kind of stability within change.”

5 Archaeological Testing: Experiencing the Landscape

5.1 Introduction

In Chapter Four I discussed how remote sensing and GIS technologies act as mental precursors shaping the archaeologist's perspective of lands prior to being in the field. While these innovative tools assist in the predictive modeling exercise, LiDAR and GIS technologies need to be employed with caution. Indeed, this process of utilizing computerized spatial technologies for representing land, increasingly employed in archaeology, impacts and affects the construction of indigenous histories by prioritizing a Western value system, potentially running contrary to the ways of being in and perceiving the world experienced by earlier inhabitants. I argue here that employing a strong focus on field methods founded upon empirical observations is one way to balance the effects of archaeological modeling using a series of computer-generated simulacra. Chapter Five explores the dialectics of working with an archaeological testing program based upon interpretations of the land using contemporary spatial tools while experiencing the land in a phenomenological manner.

5.2 Field Methods: Qualifying the Quantified

All archaeological work conducted during 2007 field investigations is covered under the Heritage Inspection Permit 2007-205 assigned by the British Columbia Archaeology Branch, by Park Use Permit SK0710582 for research conducted within Naikoon Provincial Park, and with proposal acceptance by the Council of Haida Nation (CHN). Field duration consisted of ten days in northeast Graham Island, divided into three days in the *Taaw* Hill and Hiellen River areas and six and a half days in Argonaut Hill and Clearwater Lake areas. The investigation time spent in each of these research

locales (calculated using a six member field team) works out to two and three quarter days in the former and five days in the latter, equalling a total of seven and three quarter days of actual ground truthing and subsurface prospection (Figure 5.1).

Field testing was concerned with two primary objectives, the first being the verification of locales predicted as holding high archaeological potential using LiDAR and GIS, and the second being the in-field modification of this model based upon empirical observations gained during field investigations. Combined, these pursuits allowed for a broad-scale consideration of the northeast Graham Island region during the modeling phase, in addition to the validation of specific locales believed to contain high archaeological potential based upon derivation of multiple landscape attributes. The result was a consideration of locales traditionally considered “off-site” equally with landscapes derived as “on site”, in an effort towards representation of a quantitatively and qualitatively defined archaeological landscape representing flexible patterns of past land use.

Location	Date	# of People	Time (days)	Activity	# of Test Units	# of + Tests	# of + Tree Throws	# of Loci Found from Survey	# of New Loci of Antiquity
Hiellen R.	18-Jul	4	0.25	reconnaissance	0	0		0	0
Hiellen R.	19-Jul	6	1	test arch. deposits	3	2	2	2	3
Hiellen R.	20-Jul	6	0.75	test arch. deposits	7	3	0	0	1
Taaw Hill	20-Jul	4	0.25	test arch. deposits	3.5	0.5	0	0	1
Taaw Hill	21-Jul	2	0.5	test arch. deposits	0.5	0.5	0	0	0
Argonaut Hill	21-Jul	4	0.25	reconnaissance	0	0	0	0	0
Argonaut Hill	22-Jul	4	0.5	test arch. deposits	3	0	0	0	0
Clearwater L.	23-Jul	5.5	1	test arch. deposits	8	0	0	2	2
Argonaut Hill	24-Jul	6	1	test arch. deposits	9	0	0	0	0
Forks	25-Jul	5	1	test arch. deposits	6	4	1	0	1
Argonaut Hill	26-Jul	4	0.75	test arch. deposits	12	0	0	0	0
Argonaut Hill	26-Jul	2	1	reconnaissance	0	0	0	0	0
Clearwater L.	27-Jul	6	0.5	test arch. deposits	3	0	0	0	0
Forks	27-Jul	6	0.5	test arch. deposits	14	4	0	0	0
Average		4.6							
Totals	10		9.25		69	14	3	4	8

Table 5.1 Table showing the location, dates, and type of archaeological inquiry associated with the research area. The table also expresses the relationship between people-hours and the archaeological testing results.

5.2.1 Testing the Marine Generated Feature Model

Field testing began with the more accessible lower Hiellen River / *Taaw* Hill areas, which could be accessed by vehicle along Tow Hill Rd. that runs the length of northern Naikoon Peninsula starting from the town of Masset and ending at *Taaw* Hill and the Hiellen River. Initiating research in this area was strategic in that it allowed the team to become familiar with the marine generated features being identified and to refine the associated testing methods prior to flying to the base camp on Argonaut Hill where we would be isolated and unable to add to our field gear. The original objective of investigations in this area was to determine whether the modeled zone along what was identified using LiDAR-generated imagery as a palaeo-spit ridge running southwest and attached to the southern base of *Taaw* Hill does in fact contain archaeological remains associated with the set of attributes modeled. A brief survey along the west bank of the Hiellen River the first evening in the area was successful at identifying this significant feature (Figure 5.1). The following day was spent shovel testing along the southwest ridge edge of this palaeo-spit, with some further survey of its inner and northwestern portions.



Figure 5.1 Photo showing the 11 m palaeo-spit ridge formed during the mid-Holocene with marine regression that once acted as a tombolo connecting *Taaw* Hill with Graham Island during the expansion of the Hiellen River estuary. This ridge edge was modeled as the highest potential landscape of the spit.

This exercise began by following the coordinates provided from the pre-field modeling of the feature establishing the optimal locales of a quantified landscape derived from elevation in meters amsl, aspect, and slope (Table 5.2). It also includes a set of qualified attributes related to other eco-functional and behavioural characteristics derived from comparable archaeological patterns and the ethnographic record (the latter attributes are discussed in sections 4.2.1.1, 4.2.1.2 and 4.2.2.3 for the hill model, and in sections 4.2.2.1 – 4.2.2.3 for the marine generated feature model.) It was observed that the first two of the modeled locales were aligned with the physical landscape observed in person,

and so one of the locales featuring a dry stream channel that bisected the spit ridge was selected as a strategic location for the initial evaluative unit (Figure 5.2).

Geographic Coordinates (UTM 9N)	Elevation	Slope	Aspect	Location on Feature
316957 / 5995033	16.1 m	0.79%	218°	sw ridge edge
316872 / 5994919	17.2 m	1.20%	169°	inner-spit sand dune
316859 / 5994899	17.4 m	0.73%	128°	inner-spit sand dune
316817 / 5994789	15.3 m	0.43%	182°	sw ridge edge
316730 / 5994791	15.6 m	0.49%	280°	level inner-spit area
316667 / 5994743	15.7 m	0.70%	99°	sw ridge edge
316550 / 5994607	15.9 m	0.27%	273°	southern section
316483 / 5994665	17.4 m	0.61%	108°	inner-spit sand dune
316512 / 5994520	17.2 m	0.81%	239°	inner-spit sand dune
316462 / 5994469	15.8 m	0.61%	282°	southern section

Table 5.2 Table showing geographical, elevation, slope, and aspect values of optimal modeled test locations derived for Hiellen River palaeo-spit.

One side of this dry stream channel was shaved using a shovel in order to determine the geological composition of soils comprising the spit. Organic deposits covering sterile sands at this locale were roughly 25 cm dbs, meaning the contemporary elevation and surface of the spit interpreted using LiDAR remote sensing is slightly higher than it would have appeared during the middle Holocene. Auguring was also employed to help understand the composition of deposits below the 70 cm mark accessible using trowelling methods in a tight 40 cm² unit. Auguring helped to determine that below the brown iron-stained sand layer trowelled between 30 cm – 70 cm dbs that transitions to an olive grey sand from 70 cm -90 cm dbs; deposits measuring 90 cm -110 cm dbs are dark and heavily oxidized; sands becoming light grey between 110 cm – 160 cm dbs; shifting slightly to dark grey with larger granules of rounded sands from 160 cm – 210 cm dbs (charcoal appears in this layer); transitioning into a darker grey sand with an increasing concentration of pebbles between 210 cm – 220 cm dbs ultimately terminating in a dark

brown homogenous layer of large pebbles. In sum, none of the layers indicated cultural significance.



Figure 5.2 Photo showing palaeo-spit edge with dry stream-cut gully overlooking the more recent Hiellen River bench and the waterway in background. Note the first shovel test location placement on the very outer edge of the spit ridge to the far right centre of the image and the shovel-shaven right face of the old stream gully where profiling took place.

Subsequent testing along the palaeo-spit ridge largely corresponded with these geological observations, although locations slightly inward from the exposed ridge edge appeared to accumulate a thicker layer of organic deposits measuring roughly 50 cm. Importantly, this observation of a lower elevation of the palaeo-spit feature during the mid-Holocene, corresponding to its formation and early vegetation development affects the timing of its earliest exposure from marine regression, thereby helping to constrain its earliest possible use by people. However, a notable divergence from this relatively

homogenous trend towards representing the spit feature as a smooth surface either during the middle Holocene or at present was observed with the sub-surface testing of deposits in the middle of the spit platform where a series of undulations in the ground surface measuring between 1-1.5 m proved to be isolated sand dunes with only a thin lens of organic soil covering them (Figure 5.3).

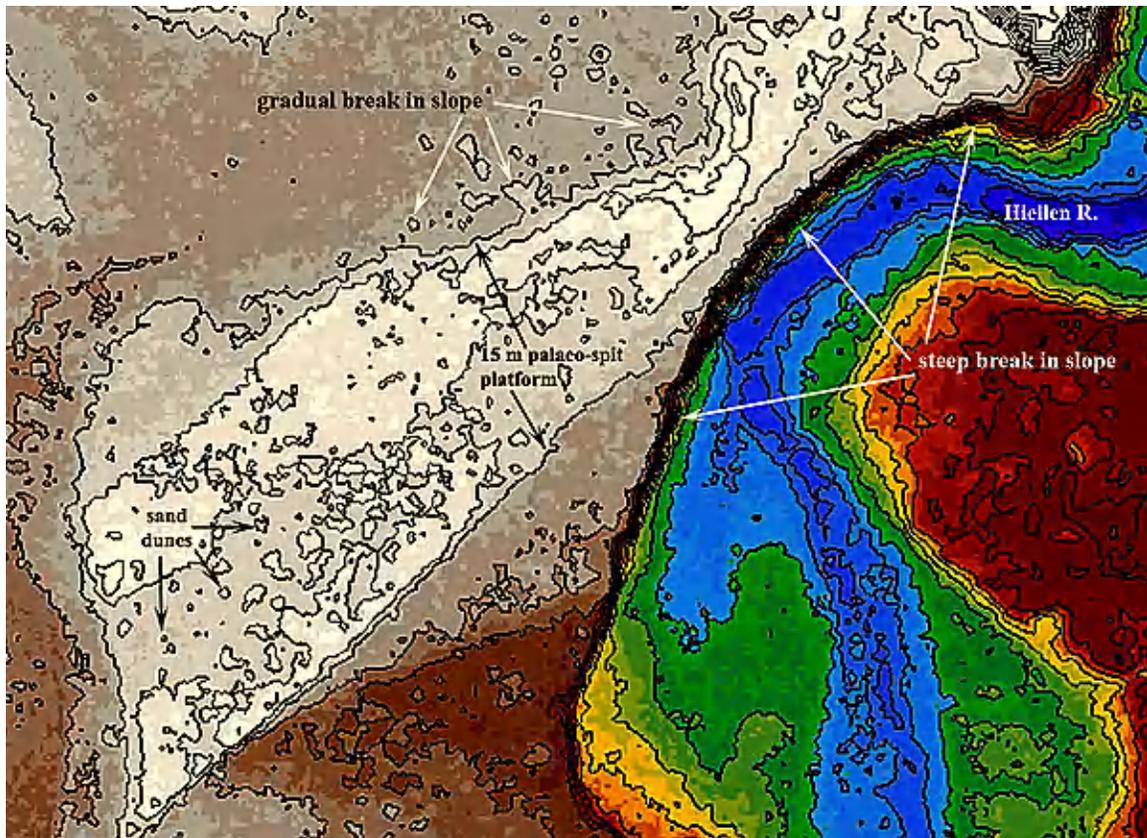


Figure 5.3 Image showing the relationship between the pronounced southeast facing palaeo-spit face formed during a period of marine standstill and constant impacting of the feature relating to middle Holocene wave action, and the gradual shaping of the northwest facing portion of the feature resulting from the same period of marine regression in a less exposed zone, protected by *Taaw* Hill. The gradual but continual expansion of the Hiellen River and estuary contributed to the geomorphological expression of the steep-sided southeast ridge containing high archaeological potential. Wind-blown aeolian deposits atop the palaeo-spit platform express an earlier signature of near-shore migrating dunes that have been sealed by an organic layer resulting from vegetation and forest generation beginning during the mid-Holocene and continuing until present.

These test locations roughly corresponded to the location modeled for determining the potential of the mid section of the palaeo-spit using LiDAR imagery and GIS. With these

observations the decision was made to neglect the locales that were selected for testing at the far southwest end of the spit. This is not to say that archaeological deposits do not exist away from the palaeo-spit edges, as our survey through the inner portion of the feature was successful at locating several archaeological artifacts in such contexts.

Investigations along the northwest portion of the palaeo-spit confirmed what was deduced through viewing these lands using computer generated imagery. Specifically, this portion of the feature was formed through gradual natural formation processes relating to marine regression, and did not experience the same repeated wave or riverine action that caused the severely pronounced nine to twelve meter bank to form on the southeast side (Figure 5.1). As a result of this observation and confirmation of previous modeling, no testing was applied to this portion of the feature, as no set of landscape attributes distinguished one place from any other.

While surveying the palaeo-spit ridge at the end of the first day, we discovered an unusual archaeological artifact in a tree throw situated precisely on the southeastern ridge edge formally modeled as having high archaeological potential. Interestingly, this locale directly overlapped with a modeled location to test for archaeological remains based upon quantification of landscape values in relation to the eco-functional qualities. The remaining time spent testing this ridge feature concentrated efforts on confirming the archaeological character, including extent of use and nature of activities associated with what was once a linear coastal feature that was part of a small island transitioning into a river terrace connected to the main island during the mid-late Holocene. This investigation was carried out particularly as it applied to the ridge edge running northeast towards *Taaw* Hill from the mid-spit region where archaeological materials were

discovered. Testing continued as far as the southeast portion of *Taaw* Hill on a twelve meter terrace (Figure 5.4).

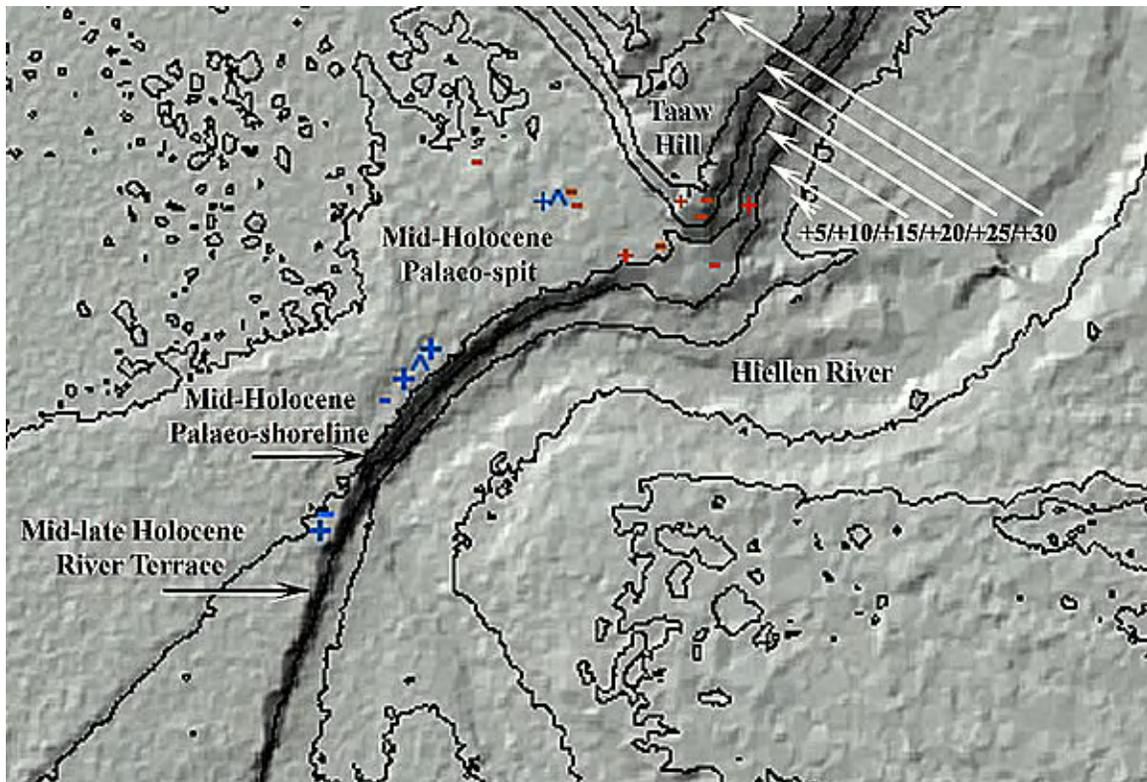


Figure 5.4 Image showing results from archaeological prospection within the lower Hiellen River and *Taaw* Hill areas. Symbols in blue represent investigations carried out on July 19th, and symbols in red represent investigations carried out on July 20th and 21st. The positive (+) symbol denotes positive evaluate units where archaeology was discovered; the negative (-) symbol denotes evaluate units with no archaeology; and the caret (^) symbol denotes a positive tree throw where archaeology exists within the root system.

A second stage of marine generated feature testing and surface survey took place at the south and southeast base of Argonaut Hill, north shore of Clearwater Lake, and surrounding environs (Figure 5.5). The primary signifier denoting archaeological potential within this zone is the wave-cut ridge feature caused by the early Holocene marine transgression high stand, the period of marine standstill, and subsequent coterminous storm surge events. The 29-30 m amsl bank that levelled out at the southern base of Argonaut Hill and stretched across the north end of Clearwater Lake, elevated

roughly 11 m above the lake was an area modeled as holding high landscape visibility with high archaeological potential. The original survey down from base camp atop Argonaut Hill consisted of a few members walking the ridge bank checking tree throws for artifacts or signs of anthropogenic soils along the ridge edges, and a few members traversing the lake shore below.

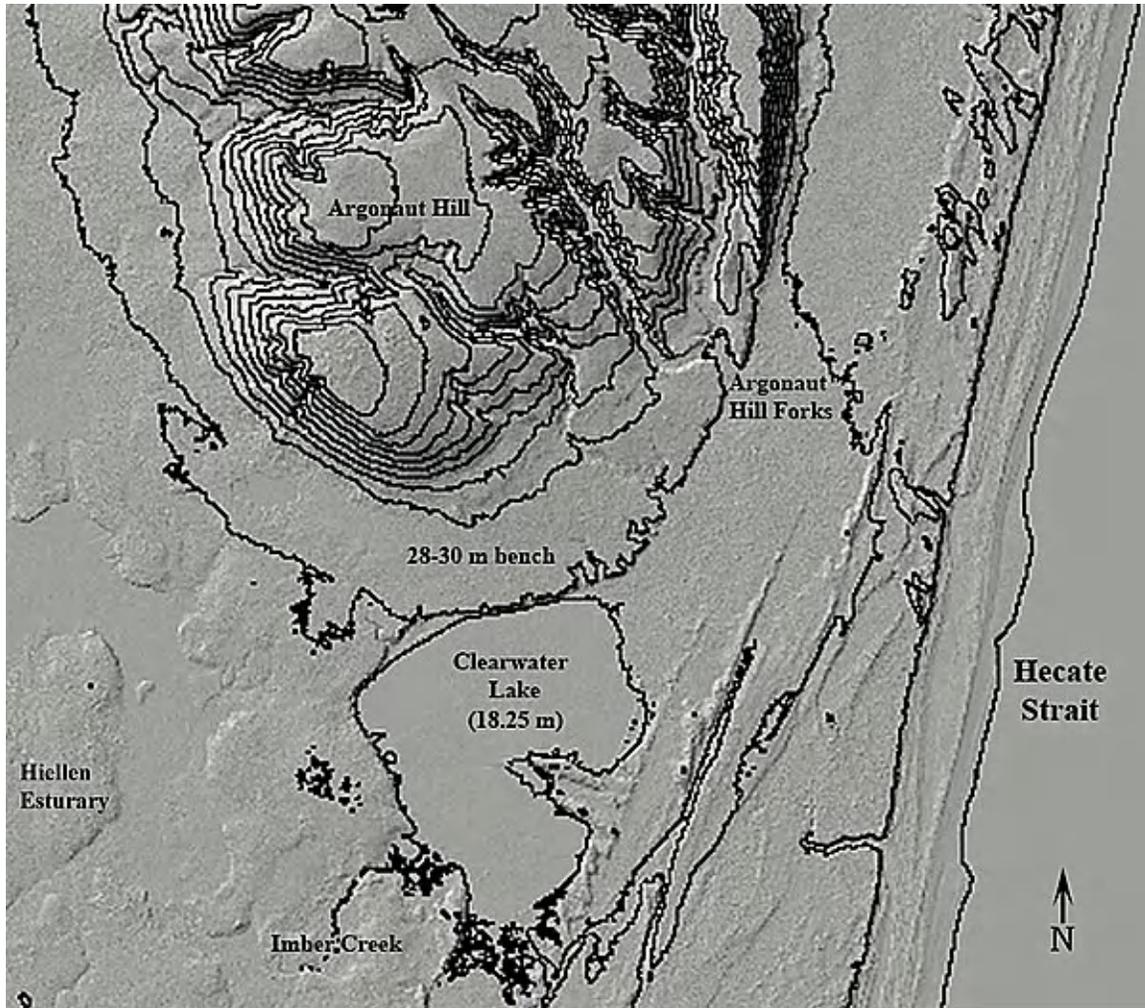


Figure 5.5 Image showing level bench at the southern and southeastern base of Argonaut Hill modeled as containing high archaeological potential. Image also shows named areas of importance for archaeological survey and prospection in the region, and their elevation. Contour line indicates five meter intervals, with the initial contour line being five meters.

In the afternoon four team members remained at the north end of Clearwater Lake testing the bank ridge edges in pairs. Eight evaluative units were dug during this time,

none of which contained archaeological deposits. During this time, a third team of two surveyed the northern half of the western shore and associated bank of Clearwater Lake until the point where it converged with the confluence of Imber Creek, a small stream that fed the lake from the chain of lakes and wetlands that flow east feeding Hecate Strait from the upper Hiellen estuary rather than those that flow into the Hiellen River ultimately feeding Dixon's Entrance (Figure 5.5).

Two days later another trip was made down from the Argonaut Hill camp, this time to investigate an area at the southern end of the east side of the base of the hill which is referred to as "The Forks". The southern terrace area constituting the majority of level ground at the "The Forks" was modeled as containing high archaeological potential as an undifferentiated landscape unit, without constituting any predetermined 'dig spots'. Test locations selected in this landscape were based on intuiting where to dig when considering the multitude of behavioural variables associated with dwelling in the landscape, and on determining the practical placement of test units based upon the contemporary surface expression of a living landscape.

"The Forks" delta is comprised of three 'elevated' land surfaces that would have remained above the early Holocene marine transgression, which are referred to as the southern, central, and northern terraces (Figure 5.6). The southern terrace is the largest and most level, and subsequently was the landform that drew the most attention when analyzing the LiDAR data in a GIS, and upon field visitation. The central terrace was tested on the second visit to the locale over the course of a partial day by two crew members, and the northern terrace is narrow and has a slightly sloped character to it and is thus less likely to offer archaeological potential. Nonetheless, testing at all three locales

was conducted, with the majority focus concentrated on the southern terrace. The second half of this day (our final day of archaeological prospection in northeast Graham Island) was spent covering these zones, expanding the scope of evaluative unit testing and conducting minor excavations in the southern terrace region so as to understand something about a) the spatial extent of artifact-bearing deposits throughout the archaeological landscape, and b) the expression of land-use reflected in artifact type and patterning.

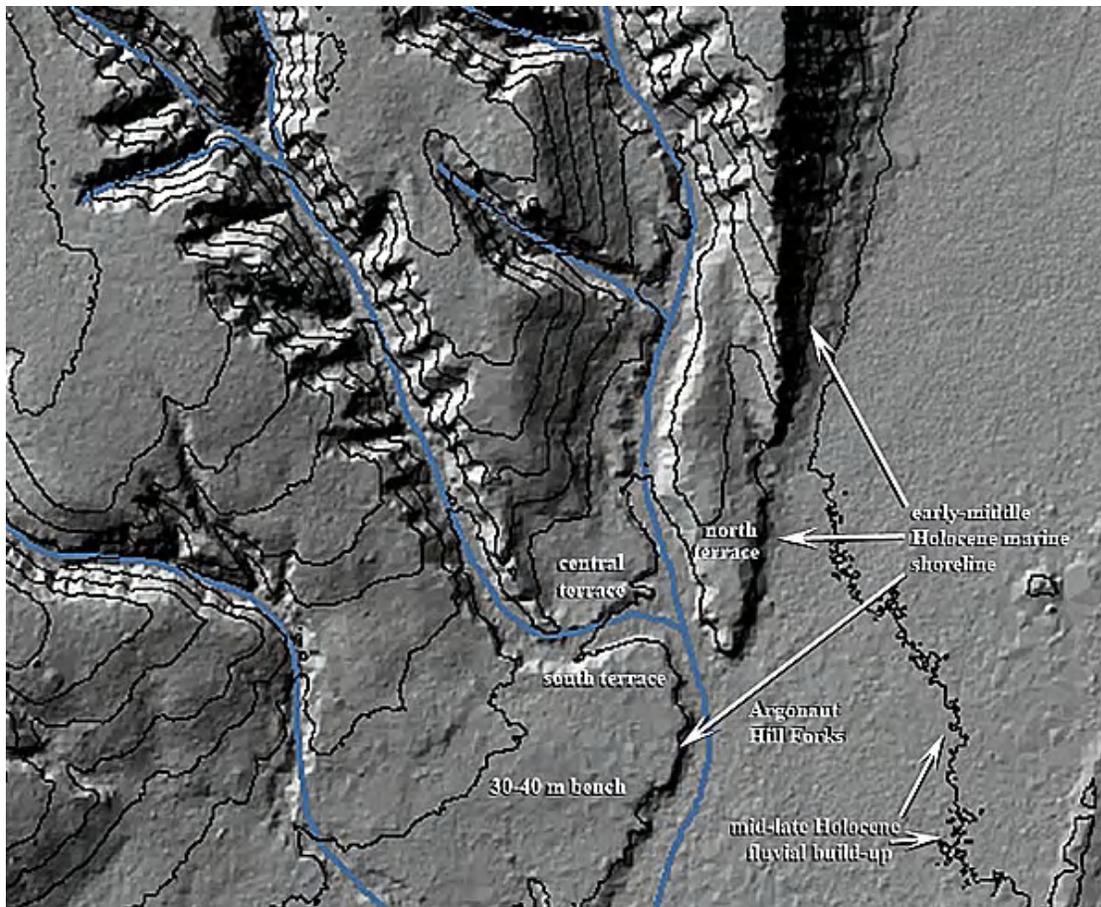


Figure 5.6 Image showing southeast section of Argonaut Hill featuring the Argonaut Hill Forks archaeological landscape, divided into three terraces. Image also shows elevation of terraces in relation to ten meter contour lines. Contours indicate an approximate 20 m amsl palaeo-marine transgression maximum, likely created during storm surges, as it would have been an extremely exposed portion of the early Holocene coastline. The higher elevation land at the mouth of the Argonaut Hill Forks is a result of fluvial sediments brought from the inner portion of the hill via the deeply eroded gorges and deposited on an expanding palaeo-shoreline created during Holocene marine regression, and therefore does not reflect early-middle Holocene river levels.

All subsurface testing of deposits was conducted using trowelling methods except shovel shaving of high iron content deposits in a 40 cm² test unit expanded on the final afternoon at “The Forks” to a 50 cm by 163 cm trench-like unit that contained a mottled cement layer varying horizontally and ranging between 55 cm and 80 cm dbfs (Figure 5.7).



Figure 5.7 Photo showing mottled character of trench floor deposits at the Argonaut Hill Forks, south terrace. Photo shows even level of the trench expressing mixing of light and dark coloured medium-coarse grained sandy soils, cemented iron-stained sandy soils, with rich charcoal-rich, artifact-bearing anthropogenic deposits.

Both quarter inch and eighth inch mesh size screens were used throughout the subsurface testing program. While little screening was required for the evaluative testing of 40 cm² units carried out under my methodological framework, a single exception to this pattern was the trench-like unit excavated at the southern terrace of 'The Forks'. As a representative sample, fifty percent of soils excavated at units four, eight and nine (see Figure 5.8) were wet screened in a nearby creek in order to determine whether any micro-debitage were missed in previously employed excavation and dry screening techniques.

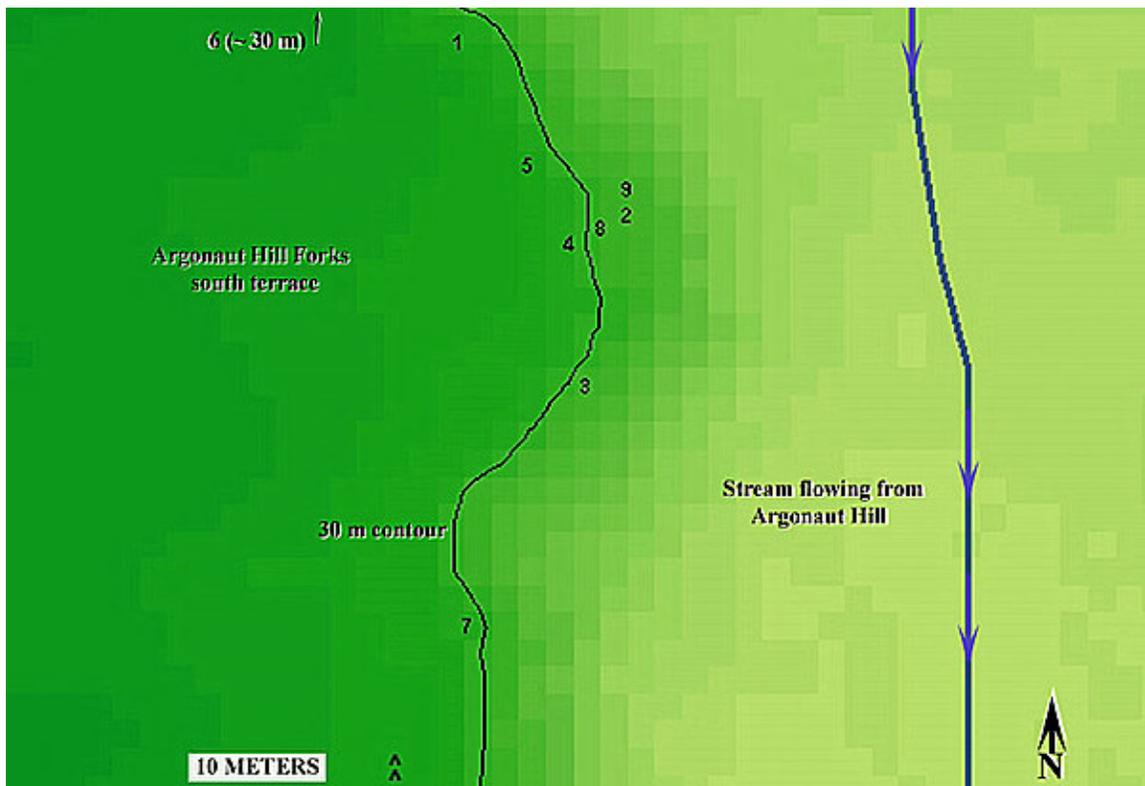


Figure 5.8 Image showing relationship of evaluative units and south terrace landform at Argonaut Hill Forks. Unit four was expanded into an excavation trench in the afternoon on the final field day. The double caret symbol next to the scale marker indicated the tree throw containing archaeological material. This image also shows the close distribution of unit placement in relation to the 30 m contour line, confirming the readings given by our handheld GPS devices in the field which recorded all unit heights as ranging between 29-31 m amsl, after applying appropriate tidal conversions for the area in relation to m above high tide (a.h.t.). The altimeters in the GPS devices were zeroed to high tide by walking out to East Beach and setting them to the high tide strand line.

Such testing of soils was thought to potentially help to indicate certain behavioural attributes of locale use associated with technology manufacture, including, but not restricted to stone tool reshaping using pressure flaking.

5.2.2 Testing the Hill Model

While the marine generated feature model relied heavily on detecting palaeo-beach features, and associated near-shore terrace ridges for modeling archaeological potential, the hill model is primarily interested in exploring potential lookout locales. The series of western hilltop edges emanating from a core of inner bog systems atop Argonaut Hill were the areas selected for field prospection. Four primary areas were targeted for prospection, which were investigated with greater or lesser rigor, sometimes the rigor being exerted on accessing them.

The initial area tested on Argonaut Hill was on the extreme west and central edge of the hill near camp. Only two evaluative units were dug and multiple tree throws were investigated. The soils contained in one of the tree throws consisted of a charcoal layer with what appeared to be a worked bifacial stone stool, with a small piece of agate (< 1 cm²) observed next to it. The possible implement seemed weather worn and was left *in situ* and was determined to be ultimately inconclusive. In the late morning the team set out to explore the very southern and southeastern section of the mesa-like hilltop in what was becoming a stormy day with high winds and torrential rains. To make matters worse, this whole southern section of Argonaut Hill had been devastated by blow-down several decades ago which completely stripped the zone of mature trees. The contemporary environment consisted of a dense regenerating coniferous forest growing up from a scattered matchbox of mature blow-down (Figure 5.9), making travel exhausting.



Figure 5.9 Photo showing area of past blow-down indicated by cluster of dead standing trees on the southern, nearest end of Argonaut Hill and signs of the young regenerating forest growing up throughout the hilltop clearing and below across the entire hillside. This image also highlights the slight slope of the mesa-like hilltop that runs from west to east, or inland to coast. The small lake at the bottom of this past slide is the locale mentioned in Chapter Three where we attempted to extract peat containing palaeoenvironmental data, which was absent. Even on a cloudy day, outlines of mountains on the Alaskan Panhandle are visible from northeast Graham Island.

These conditions forced four of the team members to head back to camp, while two of us pushed on, feeling it were important to test, or at least visit each location selected during pre-field modeling. While we successfully surveyed the south and southwest edge of Argonaut Hill, only one evaluative unit was dug, amongst investigating the soils contained in half a dozen giant root balls at the base of tree throws and the newly exposed sediments that once existed underneath. The single evaluative test took advantage of one large tree throw almost precisely in the location where the model had derived highest potential (Figure 5.10). No glimpses of archaeological remains were detected from this unit measuring 80 cm dbh: the first 40 cm of which consisted of a thick root mat layer, followed by a thin lens of leached alluvial materials capping 10-15 cm of surface gravels

and small cobble remains of lag from glacial deposits which overlay what appeared to be a varve-like layering of sorted sands ranging in coarseness.



Figure 5.10 Photo showing location of single evaluative unit dug on south Argonaut Hill in relation to tree throw, indicated by root and soil wall in back of image. Also note evidence of the levelled forest to the right of the image with only a few dead standing trees remaining that were de-limbed during a great storm, most apparent in the central foreground of Figure 6.9 (image taken by Daryl Fedje).

Although weather conditions that day precluded us from observing Clearwater Lake to the south, we determined that the vantage from the edge of Argonaut Hill did afford a tremendous observatory viewpoint. Such a lookout would have included not only a view of the productive wetland environment supporting large populations of herd animals in the wetland amongst numerous other resources, and the freshwater lake environment of the mid-late Holocene in the form of Clearwater Lake, but also of the marine shores of Hecate Strait throughout the entire Holocene, including the early-mid Holocene marine embayment that is now Clearwater Lake.

The full crew of six people spent the next field day testing two locales situated on the central, western portion of Argonaut Hill. While all four locales modeled for archaeological prospection in the zone were visited during the day's survey, two were tested and two were not, as the latter turned out to be non-distinguishable when observed directly. For example, upon locating one modeled locale, it was observed that the high point derived by the model selected an area away from the hilltop edge by roughly 40 m. Although it was near a steep break in slope, the break was merely the origin of a gully that originates at the bog. During no period throughout the Holocene could a strategic view be accessed from this locale, and therefore it is in an unfavourable position for a lookout. Furthermore, with the locale being situated so close to the bog, and although not visibly appearing like a bog, subsurface forest deposits revealed they were still an integral part of the bog system; indicating deposits were not suitable for excavation or screening. This observation indicates the temporal variable of modeling bog versus non-bog areas on Argonaut Hill over the course of the Holocene.

One of the modeled test locations was chosen as an area to expand testing with five other evaluative units being undertaken, while the other area of prospection was selected using 'in-field modeling', often called 'intuition'. Both areas selected for testing were determined based on what appeared to be the most suitable location for a lookout in 2007, and for which it was hoped would also corresponded to the area offering greatest landscape visibility over the course of the Holocene era. The location that field observations confirmed were suitable for such interests had a clear sightline across the Hiellen River water catchment and low-lying plain towards *Taaw* Hill (Figure 5.11) - another anchor point in the northeast Graham Island landscape.



Figure 5.11 Photo of *Taaw* Hill taken from a helicopter at roughly the same angle northwest as would appear from promontories afforded on Argonaut Hill test locales, only roughly half the distance in between.

During our final day of prospection on Argonaut Hill we covered two untested areas. The outer edges of Argonaut Hill surrounding camp had only been surveyed the first morning on the hill in a very brief and unsystematic manner, and the far northwest corner of Argonaut Hill had not been surveyed at all. Two groups of two remained around camp while three locales were targeted based on further survey of the outer hilltop edge conducting six evaluative units in locale one, four units in locale two, and two units in locale three. Two other team members made the long walk to the far northwest corner of the hill, in what was another day of inclement weather.

Prospection at locales 1-3 around camp was all negative, with excavation and note taking efforts concentrating primarily on descriptions of deposits. On average, units were dug to relatively shallow depths ranging from 37 cm – 69 cm dbs, with a mean depth of

55 cm dbs. The general trend in deposits observed in this section of Argonaut Hill comprised a humic layer ranging between 0 cm and 15-20 cm dbs, followed by either a clean light grey-brown clay or clays mixed with ash and silts measuring 22-29 cm dbs, covering a transition into a consolidated coarse grained sand layer with the occasional rounded pebble / gravels (described as “almost impenetrable with shovel”) between roughly 30 cm – until termination of units, periodically interrupted by a clean sand layer often stained orange / red / brown through oxidization.

Three locales in the far northwest section of Argonaut Hill had been defined as holding higher potential than surrounding areas in the model, each of which was located during survey to the area. It was not necessary to place any evaluate units at these locales as there were significant exposures at each where we used shovels and trawls to shave the first meter of deposits providing a far more significant cross section of subsurface deposits than gained with the 40 cm² evaluative unit method for profiling (Figure 5.12).



Figure 5.12 Photo showing cliff edge that was profiled using trowelling and shovel-shaving methods in order to interpret subsurface deposits of exposure rim. Note rough fractions of clasts size variability eroding from upper layer of Argonaut Hill deposits laying scattered on slumping sands.

Tree throws with large root systems containing soils were often, as in this case, located in strategic places on the landscape in the near vicinity to modeled areas and acted as a better-case replacement to evaluative units. Although I have described in detail the provenience of each test location and important tree throws containing archaeological evidence or tree throws which were tested in replacement of evaluate units in locales derived by the computer-based model, hundreds of tree throws and exposures of all sizes and contexts were investigated in the processes of surveying target hill and marine generated features throughout northeast Graham Island.

Of theoretical interest to this thesis, it is important to recognize that the only conclusive archaeological remains discovered from prospection on hill environments in

northeast Graham Island came from *Taaw* Hill, where unlike all the formal efforts in modeling Argonaut Hill, the intuitive placement of a unit on a 24 m bench at the southeastern most point of the hill revealed a cultural layer bearing a stone-rimmed hearth with stone tool artifacts. This occurrence is interesting for its ability to highlight the proven fact that people's capacity to model the world in which they experience can be a sophisticated, and conventionally followed, but also a conventionally unrecognized method for deriving test locations, within the contemporary modeling paradigm in archaeology.

5.3 Summary

Chapter Five has provided “thick description” of field methods employed to validate a pre-field, computer-based model of archaeological potential using LiDAR remote sensing and GIS spatial technologies for rendering a virtual landscape, in concert with a phenomenological approach to modeling the archaeological potential of the physical landscape based on embodied sense perception. These raw data support discussions on experiential methods in archaeological analysis, and how they relate to interpretations of the archaeological record, highlighted in Chapter Seven. Chapter Six discusses the “Results” of these dialectical methods in modeling using both simulacra of the landscape and acts of being in the landscape in order to make sense of the success of the marine generated model and the apparent lack of success in the hill model.

6 Results, Observations, and Suggestions

Of the seven previously recorded archaeological locales in the GaTw Borden quadrant of northeast Graham Island, five were discovered by following leads provided by late eighteenth to early twentieth century explorers (Ingraham 1971; Mackenzie 1891), fur traders (Work 1945; see Gough 1992), government surveyors (Chittenden 1884; Dawson 1880a, b), and ethnographers (Swan 1876; Swanton 1905a; 1905b; 1908). In contrast to these methods for locating archaeological remains, areas investigated in this study were modeled using either computer-generated or intuitive methods based on a multidisciplinary understanding of the landscape. Of the two broader zones where investigations occurred, the *Taaw* Hill / Hiellen River areas have been the focus of virtually all previous visits by non-Haida interested in the local history, while the Argonaut Hill / Clearwater Lake areas remained unreferenced and unexplored by those same visitors.

The results of field data collected during less than eight days of combined fieldwork in the summer of 2007 reflect an exceptionally successful research design and implementation for gathering new archaeological data from northeast Graham Island; measured in terms of both recording of Haida heritage landscapes and knowledge gained of the most probable behavioural patterns reflected from ‘negative’, minimal material results. Chapter Six documents the material contributions discovered in the local archaeological record during this time, in addition to making some observations on their spatial and temporal context within the broader landscape. Some suggestions on the significance of correlations between the material, spatial, and temporal components of these archaeological investigations is provided.

6.1 Time, Place, and Materiality

The discovery of nine archaeological landscapes of antiquity and four of historic or protohistoric use comprise the novel archaeological contribution garnered during the 2007 field investigations. These data provide the temporal, spatial, and material information with which to reinterpret past land use in northeast Graham Island.

6.1.1 Argonaut Hill Forks (GaTw-9)

Evaluative unit testing of the three terraces at the Forks showed the southern terrace alone to contain conclusive evidence for archaeological remains. From nine evaluative units measuring roughly 40 cm², and one expanded to 50 cm by 163 cm, 28 stone tool artifacts were recovered (Table 6.2 and Appendix II).

Four test units were excavated on the central terrace, two of which contained organic layers with high amounts of charcoal mid-stratigraphic sequence. Separated by 37 m, organic, charcoal-bearing deposits at these evaluative units measured 29-36 cm dbs and 38-43 cm dbs respectively. Interestingly, although no artifacts were discovered in these test units, the level of deposits bearing large amounts of charcoal roughly corresponds to layers containing artifacts at the south terrace. This proxy evidence suggests possible use of the central terrace by past inhabitants of this archaeological landscape. Further testing of this terrace is recommended for future exploration.

Two evaluative units were excavated on the north terrace, with no evidence of archaeological remains being detected.

The Forks archaeological landscape is an example that problematizes the conventional use of the 'site' concept by challenging its singularity. Evidence from the Forks illustrates how contemporary places on the landscape, corresponding to the

horizontal dimension of human social activity (see Hägerstrand's "chrono-geography", 1973) and perception (see Tuan 1974, 1975, 1977) over the last few hundred years, co-occur with multiple systemic landscape units in the vertical dimensions over the *longue durée* of millennia. For example, in addition to the two distinct cultural levels expressed in the stratigraphy (roughly 34-40 cm db and 48-52 cm db) throughout southern terrace deposits (Figure 6.1), evidence of historic or protohistoric land use was discovered at the locale on our original survey to the area, noting a series of CMTs directly in the modeled locale, prior to evaluative unit testing³⁰. The four radiocarbon dates of 7,140 +/- 20, 6,345 +/- 20, 6,340 +/- 15 and the possible outlier of 3,925 +/- 15 BP constraining archaeological land use at this locale, along with the observation of CMTs, suggests people have been recognizing the ecological value and cultural importance of this landscape throughout at least a 7,000 year history.

³⁰ A key indicator of archaeological potential exists in forests in the form of CMTs, therefore, paradoxically; the ability of LiDAR to strip vegetation from the earth limits its application to modeling terrestrial forms of land use, neglecting the importance of vegetation-based resources.

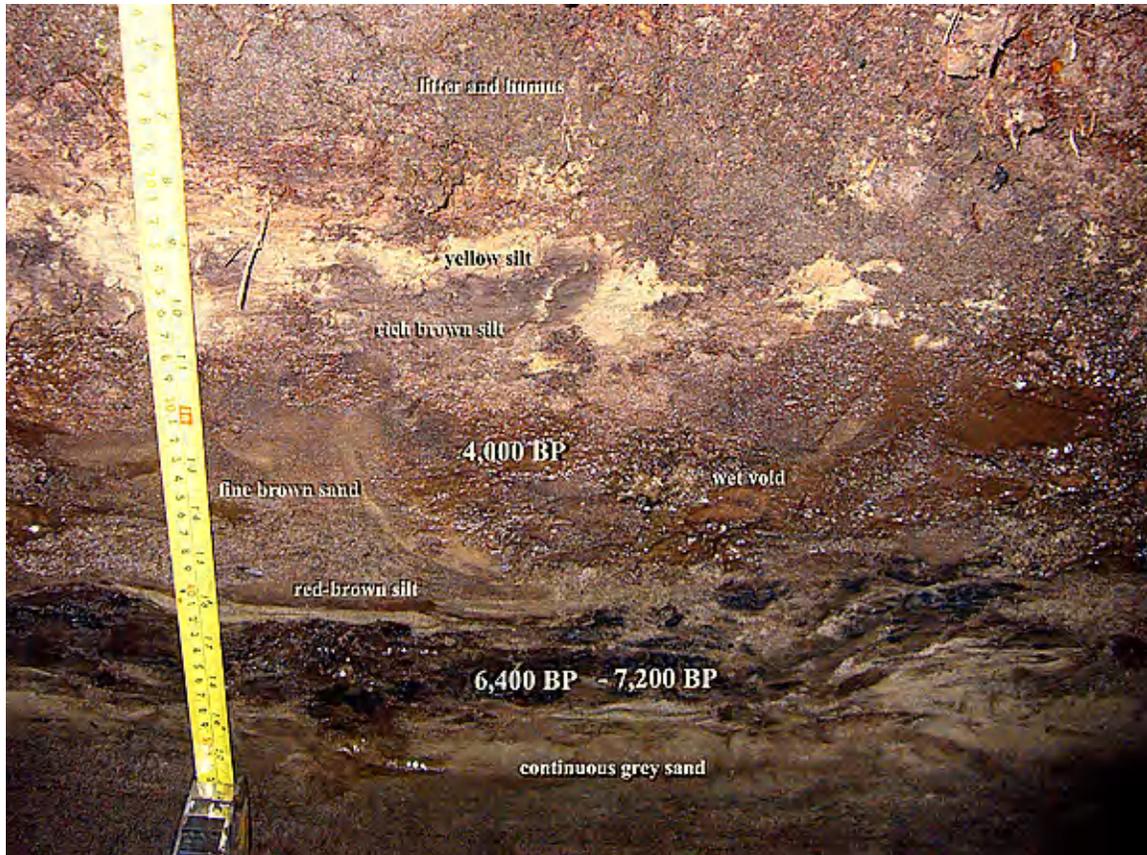


Figure 6.1 Photograph showing the profile of evaluative unit-turn-excavation unit four at Argonaut Hill Forks, including identified stratigraphic layers and dated cultural layers.

GaTw 9 offers an example of how emically recognized places of broad-based advantageous landscapes may overlap with earlier archaeological landscapes, as a result of accident or design. The most credible interpretation I can provide for the reoccurring phenomenon of archaeological levels at this locale is that places with enduring qualities providing year round access to fresh water, marine and terrestrial resources, protection from inclement weather, extensive areas with level terrain, well drained alluvial sediments, clear site lines, safe harbourage for canoes, *et cetera* offer a greater capacity to attract recurring use than landscapes lacking a similar suite of favourable attributes. However, to what extent such recurring use of the landscape over the *longue durée* reflects intergenerational connections remain unknown. Such a proposition would require

more rigorous sub-surface testing for comparative geomorphological and stratigraphic analysis, supported with a greater number of radiocarbon dates, and further support possibly accessed through conducting a series of elder interviews at such locales.

6.1.2 Clearwater Lake - Imber Creek Confluence (GaTw-10)

The archaeological significance of areas around the confluence of Imber Creek with Clearwater Lake is largely unknown. Time allowed for only a brief survey to be conducted, with a single sub-surface evaluative unit excavated. The area was interpreted during the pre-field modeling stage as a place worthy of ground truthing (visited and analyzed in person), although it was not formally modeled using multiple variables of the physical landscape in a GIS. The selection of evaluative unit placement was therefore based on its empirical context gained from field observations. Areas typically regarded as high potential near to the creek's edge were all low-lying, and no palaeomarine landforms were visible, as this protected area had left a more subtle Holocene marine generated record offering no substantial differentiation within today's landscape. This combination of phenomenon made selection of the test location relatively uninformed. Ultimately, an evaluative unit was dug a few meters back from the north bank of the creek at the present location where its constriction terminates and the creek opens into a miniature delta – an early-mid Holocene estuary - hosting a small wetland prior to feeding Clearwater Lake (Figure 6.2).

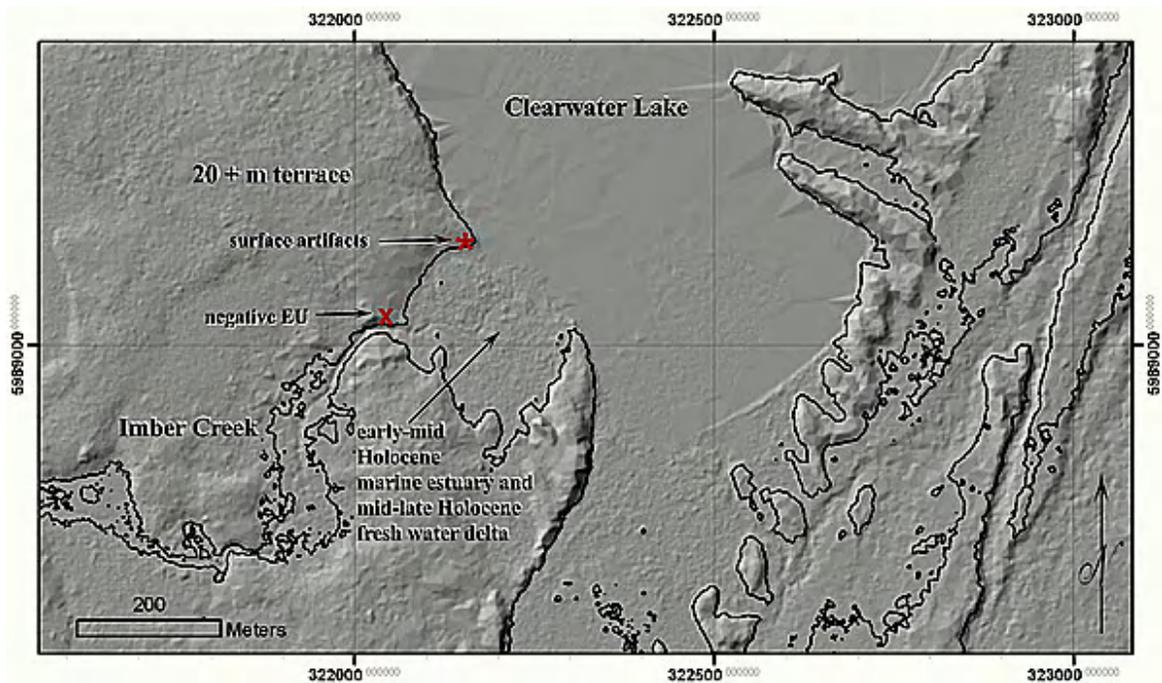


Figure 6.2 Map showing evaluative unit placement along the north bank of Imber Creek and the location of two surface artifacts discovered at the confluence of Imber Creek delta and Clearwater Lake. Map shows 20 m contour line.

No archaeological remains were detected inland along Imber Creek and away from Clearwater Lake, including observed subsurface deposits, although evidence of past use of this landscape was detected when surveying the nearby (170 m) north bank of the wetland and intersection with Clearwater Lake (Figure 6.2). Two unifacial cobble choppers were identified at this locale lying on the contemporary surface of the Clearwater Lake beach, closed off from marine formation processes when it was an embayment during the early and middle Holocene (Walker *et al.* 2007:48, 202). Due to the dynamic character of Holocene environments affecting landform morphology in the area, it is possible these stone tools and their contexts relate to any number of time periods. This situation does little to help interpret them as a) being *in situ* and of relatively recent age, b) related to a stable lake beach environment and exposed for millennia, c) related to a dynamic lake beach environment recently exposed from

subsurface deposits formed during beach washouts, or d) a dynamic marine beach environment that disturbed its original archaeological context followed by stable mid-late Holocene lake beach conditions.

6.1.3 Clearwater Lake North Beach (GaTw-11)

Archaeological evidence was first detected in this landscape during a survey of a previously modeled ridge edge elevated above Clearwater Lake's north shore. However, surface finds were scattered below across a 267 m by approximately 2-5 m cobble and pebble field overlying sands as part of a more extensive pure sand beach. The initial interpretation was that these raw materials and lithics likely eroded from the upper ridge deposits 10 m above the beach to the north. A series of evaluative units were dug on the near-ridge edge portion of the terrace overlooking Clearwater Lake, with no archaeological remains detected. I have since questioned whether the raw materials were either a result of a) natural erosional processes that were subsequently selected from the beach and left after manufacture and possibly utilization, or b) whether the 18.5-20 m beach section containing cobble and pebble materials represents a localized post glacial depositional phenomenon where tool manufacture and possible tool use occurred. Judging by the water worn character shown on these artifacts, the latter scenario of marine high stand survival from the Pleistocene-Holocene transitional period is a possibility.

From the brief survey of this pebble and cobble field twelve artifacts were observed and photographed (see Table 6.2 and Appendix II), with eleven having been left after recording. Considering the rarity of larger clasts within the aeolian environment of northeast Graham Island, the local abundance of a variety of medium-high quality raw

pebble and cobble materials would have drawn past populations to this place. Evidence provided from the sample stone tool assemblage suggests people used this resource locale to test the quality of raw materials, some tool manufacturing occurred (mostly choppers - seven), and considering the frequency of complete tools remaining, tool utilization and processing of resources also occurred.

6.1.4 Hiellen River Spit NE (GaTw-12)

The discovery of archaeological remains at this locale was part of the continuation of testing a linear palaeo-spit ridge in order to determine the extent, intensity, timing, duration, and activity types performed along the feature. Two stone tool artifacts were discovered in this evaluative unit; one spall tool with possible evidence of retouch (material degraded) and a hammerstone. The hammerstone was recovered from light grey sand deposits measuring 25 cm dbfs to its base, and the 'spall' tool just below at 28 cm dbfs from deposits transitioning to dark grey sand. The stratigraphy between 36 cm and 40 cm dbfs consisted of a compact mottled brown and black layer with high inclusions of charcoal. Two medium pieces (> 5 cm and < 10 cm) of fire altered rock were excavated from deposits measuring 39 cm dbfs. These deposits correspond to those from evaluative unit seven (Figure 6.3), located 65 m to the east along the ridge edge, which contained no artifactual evidence but indicated long term and possible intensive land use through a moderate level of fire altered rock with white flecks (possible shell or calcined bone) distributed throughout the matrix from 20-30 cm dbfs, transitioning to a high density of fire altered rock and charcoal in deposits measuring 30-50 cm dbfs.

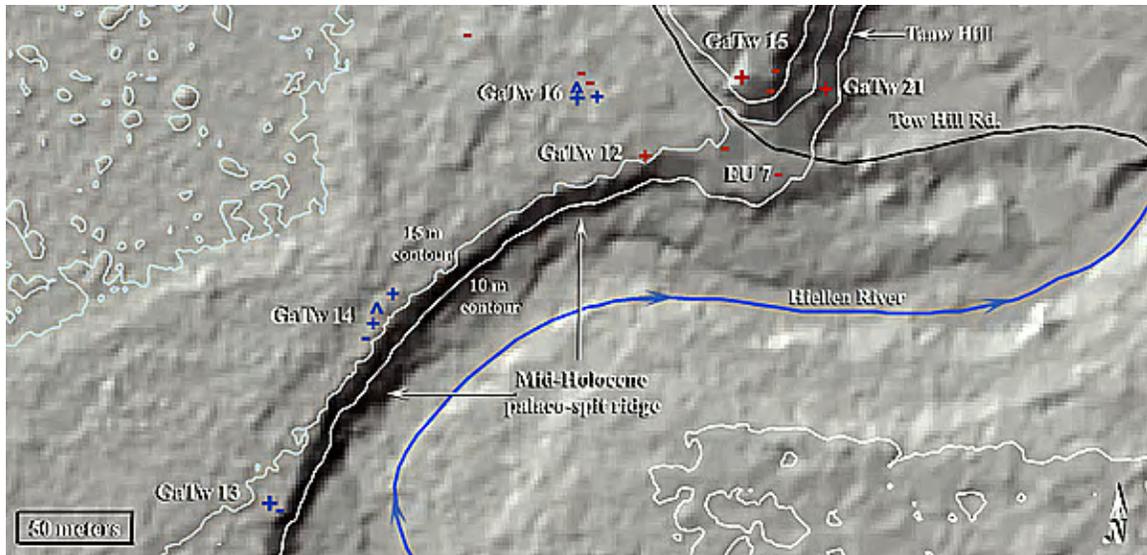


Figure 6.3 Map showing Borden numbers indicating archaeology detected during 2007 evaluative unit testing around the *Taaw Hill* and lower *Hiellen River* areas. Blue symbols represent evaluative units ('+' tests and '-' tests) and tree throws ('^') tested on July 19th, and red symbols represent July 20th tests. White contour lines indicate 10 m intervals and the light blue line indicates 15 m.

A dark black greasy layer exists at the bottom of these anthropogenic layers.

Multiple coastal archaeologists have recently noted this ubiquitous phenomenon occurring at the bottom of midden deposits, with Stein's (1992) Northwest Coast example being one of the most comprehensive. One interpretation of these deposits based on observations throughout northeast Graham Island is that they signify acid dissolved or groundwater saturation of shell midden that no longer exist. The white flecks indicated between the 20 – 30 cm layer may represent the most recent, non-eroded remnant shell from such midden, and possibly bone.

6.1.5 Hiellen River Spit SE Gully (GaTw-13)

Two evaluative units were placed at the Hiellen River Spit SE Gully. This first unit was excavated to sterile deposits consisting of a clean, rounded gravel pavement at 62 cm db, and contained no archaeological remains after trowel work was no longer possible. This unit was then augered to a terminal depth of 220 cm. The stratigraphy

trawled through in the first 60 cm consisted of aggrading alluvial deposits showing multiple wash events of gravels and pebbles with alluvial sands indicating high iron content. Auguring revealed over two meters of alluvial sand deposits transitioning from lighter grey to darker grey sands becoming rounded around the two meter depth. The rare occurrence of charcoal was sampled from 200 cm dbs at the point where sands were waning and pebbles begin to dominate deposits, the latter causing auguring to cease.

The second unit was placed five meters back from the spit ridge edge where the first unit was placed. It was trowelled to 61 cm dbs where it too terminated with a gravel pavement-like layer. A thin and non-continuous lens of charcoal-rich organics revealed a single unifacial chopping tool at 41 cm dbs. This was the furthest south and west evaluative testing occurred along the palaeo-spit ridge, extending 295 linear m from the furthest point northeast along the ridge where it joins with the southern extent of *Taaw* Hill.

6.1.6 Hiellen River Stone Bowl (GaTw-14)

A unique pecked stone bowl of a considerable weight and size (Figures 7.4-7.7) was discovered in a root ball of a mature hemlock tree uplifted by a competing spruce tree. A closely measured approximate depth for this artifact was 70 cm dbs to the centre of the bowl. The weathering on the bowl and surrounding roots and soil associated with the immediate context containing the bowl indicates it had been exposed to the elements causing chemical weathering for a long enough period for significant mosses to accumulate on and around the artifact. These severe taphonomic processes seemed to affect the integrity of the bowl, which shows evidence of minor exfoliation on its outside and bottom sections.



Figures 6.4-6.7 Photographic collage of the Hiellen stone bowl starts in the top left with an image of the spruce tree that uprooted the fallen hemlock tree (foreground) containing the artifact within its root system shown in the top right image. The two lower images show close-ups of the stone bowl from horizontal and partially vertical perspectives. Note evidence of the exfoliated portions of the bowl following the crack caused by pressure applied by the once live root system encasing it. Note also the well worked flat rim and bottom of the bowl. During close inspection of the bowl during initial curation at the *Qay'Lnagaay* Museum in Skidegate, Haida Gwaii a shallow etched line design running the perimeter of the bowl approximately 2.5 cm below its rim was observed.

The base of the bowl was sitting on fine olive green sandy silt with the top of the rim entering organics. An adjacent evaluative unit located four meters away showed the same olive green / grey sandy silt layer in its stratigraphy beginning at 57 cm dbs, supporting the accuracy with which the stone bowl's depth was originally measured. Two large river cobble manuports were found in similar contexts as the bowl within the root system, one of which was collected and the other left *in situ*. The function and symbolism of this artifact weighing over 2.5 kg is unknown.

A unifacial cobble chopper was the fourth artifact recovered from the locale and the only one with a secure, intact subsurface provenience, measuring 38 cm dbs to its base. In light of the fact the bowl was found in stratigraphic position contained within a soil matrix, and the cross unit referencing of stratigraphy suggests the bowl was between 40 cm and 45 cm below the organic layer in sterile deposits, I propose the bowl was a) buried at the time of entering the archaeological record, or b) later suppressed due to natural formation processes.

If it was neither buried intentionally, nor suppressed by the root system with which the bowl was contained, carrying the bowl into deeper deposits than those that accumulated through soil genesis on top of it, a third option becomes possible. Considering the bowl and associated manuports were excavated from deeper deposits than the cobble chopper recovered from the nearby evaluative unit, they may be older and associated with a distinct event / process. Given the bowl's minimum age of 3,930 BP +/- 15, securely dated through association with the neighbouring dated cobble chopper as the oldest known stone bowl on the Northwest Coast, the latter scenario would be interesting. Unfortunately, no obvious cultural layer was present in either context, a piece of evidence

that would help to distinguish between distinct layering of strata versus a disturbed, natural transformation, or intentional burial phenomenon.

Consistently shaped, medium sized bleached white beach or river pebbles co-occurred in two significant archaeological contexts, leading to the suggestion they belong to a distinct artifact class. Significantly, at both the marine generated landform of GaTw 14 and the hill promontory landform of GaTw 15 (separated by seven meters elevation) these artifacts were collected from *in situ* stratigraphic contexts below and above the early Holocene marine maximum high stand in distinct cultural levels. This curiosity led me to photograph (Figure 6.8) the nearby Hiellen River – North Beach confluence pebble and cobble bed in order to study and compare its contents with what was observed in the evaluative units (Figure 6.9). This simple empirical test of sampling the most logical source of pebbles accessible to people utilizing the Hiellen River palaeo-spit, and *Taaw* Hill landscapes proves that the pebble shape, size and colour common to the cultural layers within these archaeological contexts are present but not the most consistent pebble type to the Hiellen River and North Beach environments. Further, geologically, their homogeneity in the archaeological and palaeoenvironmental context of the sandy fluvial Hiellen River spit makes little sense. This suggests pebble size, shape and colour were purposefully selected during collection.

The fact that they are all bleached white suggests they were heated and likely boiled, and possibly used as cooking stones. Ethnographic evidence on boiling stone use varies between and within the technological repertoire of Pacific Northwest Coast cultures. For example, boiling stones are used in the production of acorn meal by tribes from northern California (Heizer 1978:637; Strike 1994:127), by the *Kwakwaka'wakw*

for drying eulachon (Boas 1895:320), the production of canoes, use in cooking involving bentwood box technology and others. Interestingly, out of the 12 collected from GaTw 15, six show signs of intentional grinding for edge preparation during stone tool manufacture or damage from knocking them against another hard surface. Although not a great distance, the secondary usage of these pebbles after they were used for cooking makes practical sense when considering all stone materials were gathered from the river and carried to the spit terrace.



Figure 6.8 Photograph showing a 40 cm by 50 cm section of the pebble-cobble beach at the confluence of the Hiellen River with North Beach for the purpose of comparing contents with the colour and morphological characteristics of pebble artifacts associated with GaTw 14 and GaTw 15 landscapes.



Figure 6.9 Photograph showing bleached white pebble artifacts excavated and collected from GaTw 15. Note the infrequency of excavated pebble color, size and shape in the natural beach assortment shown in Figure 6.8. Also note the grinding / abrading evidence indicated on the outer edge of many of the smaller artifacts.

6.1.7 *Taaw* Hill SE (GaTw-15)

Of three evaluative units placed on the first level terrace (23 m amsl) above the Hiellen River palaeo-spit at the southern ‘toe’ of *Taaw* Hill, only one contained cultural remains. This 40 cm by 30 cm evaluative unit excavated down onto a corner of a hearth-like feature indicated by four large cobble manuports in deposits measuring 70 cm – 80 cm dbs, arranged into a semi-circle containing large chunks of charcoal. In a hurried excavation due to the prearranged helicopter flight to transport the team to Argonaut Hill, two bifacially-worked flakes (Appendix II: GaTw 15:3-4) were recovered amongst the charcoal and hearth-rimed cobbles and dated to 2,130 BP +/- 15.

It should be noted that no fire altered rock were observed amongst the deposits containing possible hearth stones and charcoal. This observation contradicts Fladmark's (1990:231) description of deposits associated with hearth features at Lawn Point (7,400-2,005 BP) and Kasta (6,010-5,420 BP) that were "entirely lacking fire-cracked rocks (ubiquitous in most later sites)."³¹ It may be that what we are interpreting as hearths are in fact not hearths, but rather collections of large cobbles used for purposes other than containing the heat and spread of fire?

Working from the ethnographic information provided by Swanton (1905a) that the people of the Hiellen village were engaged in acts of warfare during the protohistoric and historic periods, I propose that promontory locales such as GaTw 15 can be equally considered a lookout for defensive purposes, as it could for hunting game, or any other purpose.

6.1.8 *Taaw* Hill Lower Bench Southeast (GaTw 21)

A single evaluative unit was placed on the lowest bench of *Taaw* Hill measuring 12.5 m amsl. Excavated to 70 cm dbs, two pieces of fire altered rock and a hammerstone were recorded in a black sandy-silt matrix with pebbles and charcoal present in between the organic mineral layer at 0-20 cm and the greasy dark grey sandy silt layer at 50-70 cm. No material was collected from this locale.

³¹ An exception however exists in his work, where he mentions, "[t]he only definite cultural features observed at Lawn Point were a single stone ringed hearth in Component 1..." (Fladmark 1986:51), dating to 2,005 BP, and roughly co-terminus with GaTw 15 cultural deposits.

6.1.9 2005 *Taaw* Hill Investigations

Drawing on known archaeological potential a team of archaeologists³² made a five day visit to *Taaw* Hill in August 2005 to further test the area. Their field notes show that a minimum of fifteen 50 cm² evaluative units were excavated and at least one was further expanded into a larger excavation measuring 1 m by 50 cm (Figure 6.10). Two new archaeological locales were discovered and further archaeological evidence was recorded at the previously known “Locality C” excavated by Severs (1974b). The presence of modified and seemingly unmodified cobbles in deposits on *Taaw* Hill between 94 m and 129 m amsl were interpreted as cultural phenomenon and are the dominant artifact type discovered (Table 6.1 and Appendix I). Two manuports (objects transported and deposited by people) excavated from shallow sandy-silt deposits measuring 15-20 cm dbs at an elevation of 94 m amsl were radiocarbon dated to 1,330 BP +/- 20 in 2007. At 129 m amsl a cobble chopper with multiple flake scars was pulled out of the unit wall from the surface of a black sand layer at a depth of 45 cm dbs. The team also revisited GaTw 5 and excavated a minimum of three evaluative units, one of which contained a hearth and multiple cobble choppers (Appendix I: GaTw 5:1-2)³³.

³² The team included Allan Davidson, Daryl Fedje, Quentin Mackie, Duncan McLaren, Martina Steffen, and Ian Sumpter.

³³ Field notes indicate that the elevation and reference point to Severs’ Locality C was derived by GPS, which used the beach “log line” for a zeroing device. Although notes state, “3 times = same reading”, the UTM coordinates provided correspond on the LiDAR-generated data as 26 m amsl, and thereby a significant minimum horizontal distance away from Locality C recorded as 19 m elevation.

Location	Borden #	Name	EU #	Artifact #	Artifact Type	Material	DBS (cm)	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)	Date Found	Comments
Taaw Hill	n/a	DQS	5	1	manuport	granitic	15-20	142	104	55	1386	Aug/23/05	
Taaw Hill	n/a	DQS	5	2	manuport	weathered	15-20	136	100	58	1294	Aug/23/05	
Taaw Hill	GaTw 5	Locality C	3	1	unifacial chopper	weathered	60	128	94	49	795	Aug/25/05	
Taaw Hill	GaTw 5	Locality C	3	2	boiling / hammer stone	weathered	65	47	35	21	53.3	Aug/25/05	possible evidence of edge preparation wear
Taaw Hill	n/a	TD1	1	1	retouched flake / possible scraper plane	weathered	45	105	72	32	272.6	Aug/23/05	
Taaw Hill	n/a	TD1	1	2	unifacial chopper	weathered	45	121	74	39	465	Aug/23/05	possibly retouched
Taaw Hill	n/a	?	T2	1	abrader	sandstone	?	44	37	15	44	Aug/23/05	worn
Taaw Hill	n/a	?	T3	?	?		?	30	27	21	37.1	Aug/23/05	

Table 6.1 Table showing artifact attribute list for materials excavated and collected during 2005 investigations on *Taaw Hill*.

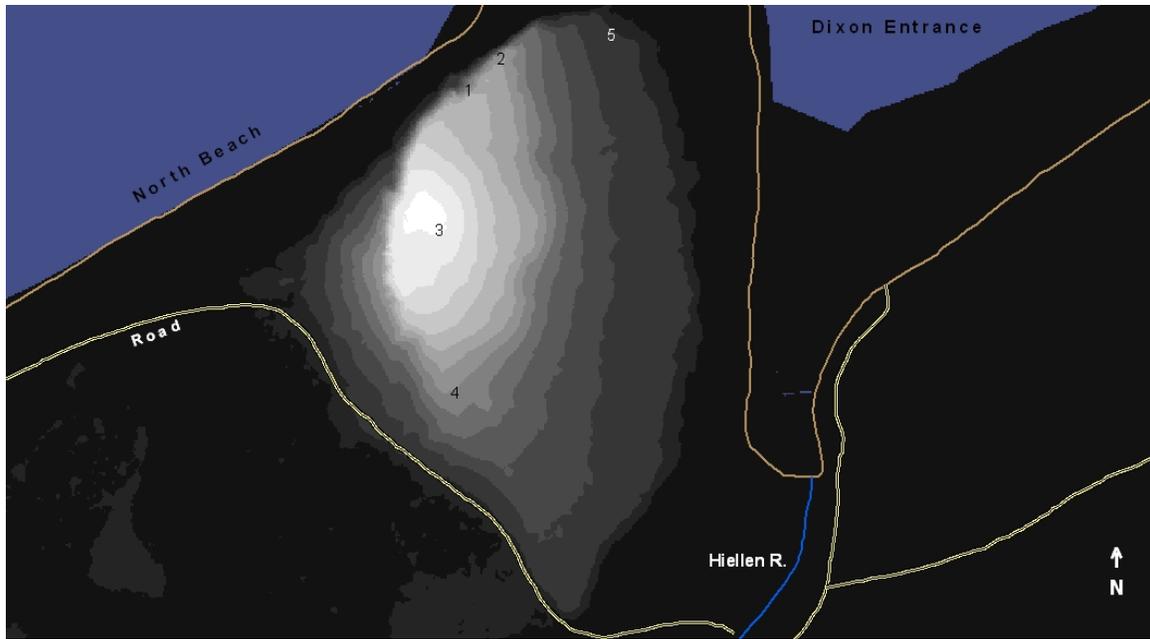


Figure 6.10 Map showing five evaluative unit locations scattered along north edge, hill top, and mid-shoulder of south side of *Taaw* Hill conducted during 2005 visit.

6.1.10 Giant Barnacle (GaTw-16)

Named for the larger-than-normal giant barnacle (*Balanus nubilus*, see Table 6.2 and Appendix II: GaTw 16:3) discovered eroding from the root system of a large tree throw central to the palaeospit south of *Taaw* Hill, this locale also contained three large cobble artifacts. One artifact was excavated from shallow deposits 20 cm db to the centre of the artifact where the root mat and humus layer had been pulled up with the root system. The importance of this artifact (Appendix II: GaTw 16:2) showing multiple grooved lines aligned roughly 90 degrees to one another across the flatter surface of the cobble is unknown, although over one hundred analogous artifacts were excavated by Gessler (1974, 1975, 1988) from *Kiusta* in northwest Graham Island, a half dozen by Fladmark from the Tillel area centrally located on the east coast of Graham Island³⁴, and

³⁴ I observed these artifacts while depositing the stone bowl at the *Qay'Lnagaay* Museum Skidegate, Graham Island.

most pertinent to the study area, “three grooved hammerstones” in the possession of local land owner Herbert Bradley whose property overlapped with GaTw 4 were observed by Smith (1919). One large cobble showing evidence of human use and one cobble chopper were also exposed in the root system.

The living range of this barnacle species extends from southern Alaska to northern California, where it is the largest of all barnacle species on this stretch of the Pacific coast (Kozloff 1973:252), and probably the largest in the world (Snively 1978:121; Richetts *et. al.* 1985:401). Considering that this barnacle species’ niche ranges from subtidal to intertidal waters and requires either solid rock or wood to attach itself to, the aeolian environment of GaTw 16 was not its living environment. The nearby basalt outcropping of *Taaw* Hill is one likely scenario for its place of origins. Another scenario may have it within the Hiellen delta as a passenger on a waterlogged decomposing tree in a relationship of *obligate commensalism*. In either case it follows that the barnacle collected from GaTw 16 ended up in its present locale from non-natural formation processes. Further to this point, considering the elevation where the barnacle was discovered measures 16 m amsl, corresponding to an early-mid Holocene beach environment, it is unlikely the shell would have survived in such a context to the state that it is today. In addition to the absence of any medium for which the barnacle may have once been attached, and the fact it was found within an archaeological context with neighbouring artifacts, I interpret this object as being culturally transported, and an archaeological artifact.

An interesting ethnographic analogue for the methods of harvesting and transporting edible barnacles from the intertidal zone to the village is offered by Boas

(1921:499-508) who in reference to George Hunt's ethnographic field work notes that the barnacle collection begins by canoe from the village as the tide begins to ebb, followed by navigation to a known destination of barnacle abundance. There, the barnacle patch is surveyed using canoe while still below water. Once located, driftwood is collected from the beach for heating the barnacle stones for which they are attached. The barnacle patch is once again located and anchor is dropped where it will "run dry at half tide", at which point loose stones that are both bare and contain barnacles are collected. A fire is prepared using the driftwood to raise the "heating stones" to a high enough temperature for cooking the "barnacle stones" by placing them on top. A bucket filled with salt water is poured over the pile of stones once sufficiently heated creating an intense steam which is contained underneath old mats that are piled above. Removing the mats in approximately half an hour's time the barnacle stones are removed from the embers for drying and cooling. The barnacle stones are washed, removing all sands and then the barnacles are removed from their stone hosts and placed in a basket for transport back to the village as the tide flows. Additionally, local Haida informed Blackman (1979:49) during her ethnographic fieldwork in the Masset area that "[g]iant barnacle was not eaten but used by shaman to cure illness."

The top of the barnacle shows evidence of reshaping for easier extraction of meat (confirmed by Wigen 2008 pers. comm.), and for possible subsequent use as a liquid-containing vessel. Archaeological evidence of intensive fire use was detected within a nearby evaluative unit (EU 7) placed between GaTw 12 and GaTw 15 showing buildup of charcoal-rich soils containing abundant fire altered rock. Boiling stones were discovered in the surrounding archaeological landscape at GaTw 14 and GaTw 15.

6.1.11 Historic / Proto-Historic Archaeology (GaTw 17-20)

While traversing the landscape of northeast Graham Island during field testing, I came across four culturally modified tree (CMT) types (Figure 6.11), each reflective of a specific behavioural activity. While none of these trees were dated using coring or alternative methods, each is related to an era of activities important to Haida heritage.

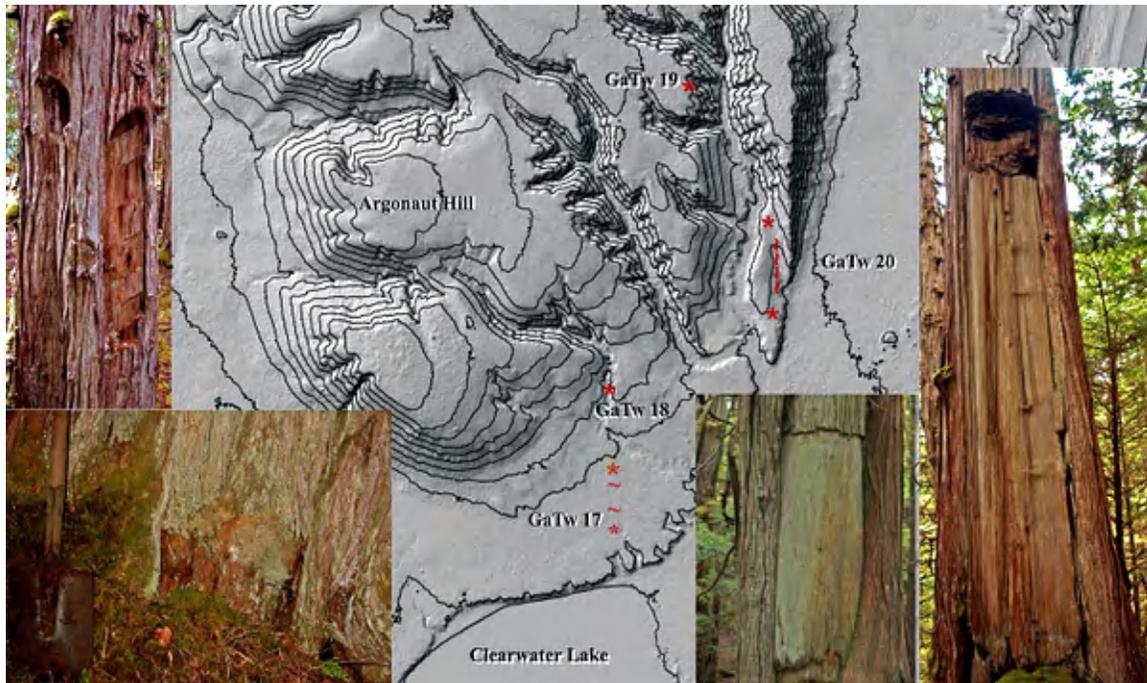


Figure 6.11 Figure showing images and locations of a sample of CMTs discovered during 2007 field testing within southeast Argonaut Hill and northern Clearwater Lake areas. CMT types include, blazes top left (GaTw 17); a “canoe test” tree bottom left (GaTw 18); plank removal far right (GaTw 19); and cedar stripped near right (GaTw 20). All CMTs are Western red cedar.

Location	Borden #	Name	EU #	Artifact #	Artifact Type	Material*	DBS (cm)	Length (mm)	Width (mm)	Thickness (mm)	Weight (g)	Date Found	Comments
Arg. Hill / CWL	GaTw 9	AH Forks	1	GaTw 9:1	primary flake	argillaceous shale (weathered)	40	48	23	10	8.1	July 25,2007	broken (2 pieces)
Arg. Hill / CWL	GaTw 9	AH Forks	1	GaTw 9:25	tested	?	80	77	50	31	143	July 25,2007	broken (2 pieces); questionable
Arg. Hill / CWL	GaTw 9	AH Forks	1	GaTw 9:26	hammer stone	volcanic tuff nodule	46	119	90	49	664	July 25,2007	bleached (possibly boiled)
Arg. Hill / CWL	GaTw 9	AH Forks	2	GaTw 9:27	core	grey/ green chert / rhyolite	34	48	40	36	62.8	July 25,2007	possibly heat treated
Arg. Hill / CWL	GaTw 9	AH Forks	2	GaTw 9:2	spall (cutting tool)	sandstone	40	92	49	15	76	July 25,2007	heavily degraded (retouch)
Arg. Hill / CWL	GaTw 9	AH Forks	2	GaTw 9:4	primary flake (proximal)	white agate /chalcedony	40	10	8	6	2	July 25,2007	
Arg. Hill / CWL	GaTw 9	AH Forks	2	GaTw 9:28	unifacial chopper	weathered	38	121	96	51	794	July 25,2007	
Arg. Hill / CWL	GaTw 9	AH Forks	3	GaTw 9:5	unifacial chopper/ hammer stone	weathered	40	97	77	33	308	July 25,2007	
Arg. Hill / CWL	GaTw 9	AH Forks	4	GaTw 9:6	shatter	volcanic tuff	41	30	16	6	2.1	July 27,2007	
Arg. Hill / CWL	GaTw 9	AH Forks	4	GaTw 9:7		weathered	45	11	9	2	0.2	July 27,2007	degraded
Arg. Hill / CWL	GaTw 9	AH Forks	4	GaTw 9:8	shatter	volcanic tuff	48	41	35	17	23	July 27,2007	similar material and morphology to AH Forks EU 1
Arg. Hill / CWL	GaTw 9	AH Forks	4	GaTw	primary flake	argillaceous	50	16	15	5	0.9	July 27,2007	wet screened

				9:9		shale								from back-dirt
Arg. Hill / CWL	GaTw 9	AH Forks	4	GaTw 9:10	shatter	argillaceous shale	50	21	13	7	1.6	July 27,2007		
Arg. Hill / CWL	GaTw 9	AH Forks	4	GaTw 9:11	primary flake	weathered	52	31	25	8	4.9	July 27,2007		
Arg. Hill / CWL	GaTw 9	AH Forks	4	GaTw 9:12	bifacial chopper	weathered	?	106	106	38	293	July 27,2007	heavily degraded exterior (partly damaged during excavation)	
Arg. Hill / CWL	GaTw 9	AH Forks	4	GaTw 9:29	primary flake	sedimentary ?	50	39	34	10	15	July 25,2007	broken (2 pieces); cobble cortex	
Arg. Hill / CWL	GaTw 9	AH Forks	4	GaTw 9:30	secondary flake (proximal)	petrified wood	45	35	11	9	3.2	July 27,2007	fractured; cortex	
Arg. Hill / CWL	GaTw 9	AH Forks	4	GaTw 9:31	?	volcanic tuff	39	53	42	16	23.7	July 27,2007	weathered; damaged; 3 pieces	
Arg. Hill / CWL	GaTw 9	AH Forks	8	GaTw 9:13	unifacial chopper	?	38	85	62	47	332	July 27,2007		
Arg. Hill / CWL	GaTw 9	AH Forks	8	GaTw 9:14		argillaceous shale	38	32	20	7	2.9	July 27,2007		
Arg. Hill / CWL	GaTw 9	AH Forks	8	GaTw 9:15	fracture	argillaceous shale	39	60	35	15	33	July 27,2007		
Arg. Hill / CWL	GaTw 9	AH Forks	8	GaTw 9:16	?	?	40	27	9	5	0.9	July 27,2007	weather worn	
Arg. Hill / CWL	GaTw 9	AH Forks	8	GaTw 9:17	shatter	brown petrified wood	46	29	15	8	1.1	July 27,2007		
Arg. Hill / CWL	GaTw 9	AH Forks	8	GaTw 9:18	primary flake (proximal)	argillaceous shale	49	21	13	3	0.6	July 27,2007		

Arg. Hill / CWL	GaTw 9	AH Forks	8	GaTw 9:19	primary flake ?	andesite / basalt	50	34	32	8	7.3	July 27,2007	
Arg. Hill / CWL	GaTw 9	AH Forks	8	GaTw 9:20	shatter	volcanic tuff	50	21	14	7	1.5	July 27,2007	
Arg. Hill / CWL	GaTw 9	AH Forks	8	GaTw 9:21		andesite	60- 66	46	45	11	15.6	July 27,2007	poor provenience due to artifact found in natural hole in stratigraphy
Arg. Hill / CWL	GaTw 9	AH Forks	8	GaTw 9:32	primary flake	sedimentary (weathered)	50	62	61	22	63	July 27,2007	weathered; cobble cortex
Arg. Hill / CWL	GaTw 9	AH Forks	9	GaTw 9:22	grinding stone	weathered	34	86	71	41	303	July 27,2007	heavily degraded; patterned grinding marks; irregular chips
Arg. Hill / CWL	GaTw 9	AH Forks	9	GaTw 9:23	spall	weathered	35	72	57	14	60	July 27,2007	
Arg. Hill / CWL	GaTw 9	AH Forks	tree throw	GaTw 9:24	unifacial chopper	weathered	n/a	102	99	53	477	July 25,2007	
Arg. Hill / CWL	GaTw 11	CWL North Beach	surface	GaTw 11:1	cutting tool	argillaceous shale	0	57	27	7	13.9	July 23,2007	retouch; water warn
Taaw Hill / Hiellen R.	GaTw 12	Hiellen R. NE	6	GaTw 12:1	hammer stone/ chopper	volcanic tuff	25	81	64	31	200	July 20,2007	grinding and red pigment application; heated
Taaw Hill / Hiellen R.	GaTw 12	Hiellen R. NE	6	GaTw 12:2	spall w/ retouch	weathered	28	124	88	23	306	July 20,2007	damaged; 3 pieces +
Taaw Hill / Hiellen R.	GaTw 13	Hiellen R. SE Gulley	2	GaTw 13:1	chopper	weathered	29	148	107	86	1234	July 19,2007	

Taaw Hill / Hiellen R.	GaTw 14	Hiellen R. Stone Bowl	tree throw	GaTw 14:1	hammer stone	weathered	~70	190	139	68	2200 +	July 20,2007	grinding
Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:1	hammer stone/ hearth stone	weathered	78	155	104	64	1554	July 21,2007	
Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:2	hammer stone/ hearth stone	weathered	80	139	82	57	812	July 21,2007	grinding; contains cemented soils
Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:3	flake (distal)	varvite / argillaceous shale	70	25	29	7	3.6	July 21,2007	rough cortex: patinated
Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:4	spoke shave / graver	siliceous argillite	77	37	27	8	6.7	July 21,2007	(finishing flake w/ unifacial retouch); patinated
Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:5	boiling stone	granitic	52-75	60	49	24	102	July 21, 2007	evidence of light burning; use wear
Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:6	boiling stone	tuff	52 - 75	57	49	24	80	July 21, 2007	evidence of light burning; use wear
Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:7	boiling stone	tuff	52 - 75	58	53	24	106	July 21, 2007	
Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:8	boiling stone	tuff	52 - 75	54	39	21	57	July 21,2007	
Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:9	boiling stone	granitic	52 - 75	45	37	21	44	July 21, 2007	light use wear
Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:10	boiling stone	tuff	52 - 75	39	32	17	22	July 21,2007	

Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:11	boiling stone	?	52 - 75	45	32	24	41	July 21, 2007	
Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:12	boiling stone	tuff	52 - 75	41	33	20	36	July 21, 2007	
Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:13	boiling stone	?	52 - 75	42	36	20	44	July 21, 2007	
Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:14	boiling stone	tuff	52 - 75	42	37	25	39	July 21, 2007	heavy use wear
Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:15	boiling stone	?	52 - 75	45	35	16	36	July 21, 2007	
Taaw Hill / Hiellen R.	GaTw 15	Taaw Hill SE	1	GaTw 15:16	boiling stone	tuff	52 - 75	30	27	23	20	July 21, 2007	heavy use wear
Taaw Hill / Hiellen R.	GaTw 16	Giant Barnacle	tree throw	GaTw 16:1	hammer stone / weight	granitic	0	145	121	69	1713	July 20, 2007	
Taaw Hill / Hiellen R.	GaTw 16	Giant Barnacle	1	GaTw 16:2	?	sandstone	20 +	158	102	62	1462	July 20, 2007	grinding; intersecting lines; 20 cm dbs from under tree throw
Taaw Hill / Hiellen R.	GaTw 16	Giant Barnacle	tree throw	GaTw 16:3	drinking vessel	shell	0	125	101	78	246	July 20, 2007	possible evidence of opening shell top

Table 6.2 Table showing data for all artifacts collected during 2007 investigations. “Arg Hill” refers to Argonaut Hill, and “CWL” refers to Clearwater Lake.

* Material identification was assisted by Nicole Smith.

6.2 Discussion: Northeast Graham Island Archaeology in Context

Having just provided the locale-by-locale results from 2007 field investigations, I now discuss some of the trends observed between locales with respect to the artifactual record, stratigraphic observations, radiocarbon indicators, and spatial patterning. Landscape studies are interested in relationships between the dynamic character of landforms and behaviours of living systems within these landforms, including those of people. While materialist studies of stone, bone, and shell have been the *modus operandi* for which tangible and proxy evidence are devised to support the cultural historical sequence of Haida Gwaii (Fladmark 1972, 1990), I employ artifacts as clues (one category of many) to the nature of activities carried out in the landscape within an encompassing context of setting and experience. By opening ones' senses to the life-world they experience during field investigations, experiential evidence becomes the 'material' of archaeological interpretation. Trigger (1989:30) extends this method to incorporate the subjective thought-world of the archaeologist, stating, "ideas are viewed as processes that occur in the human brain and can be studied from a materialist perspective... [arguing that] imperceptible entities are appropriate areas of study."

Artifacts in near spatial proximity may have, and frequently do have, a degree of unrelated histories that preclude a simple equation between spatial proximity and human behavioural relevance. For instance, their composition and association may be strictly modern and archaeological. To what degree materials, time, and space must differ before a discrete archaeological category (i.e., "Culture" or "Tradition") is constructed should be argued. Such categories denoting continuity and change created by archaeologists only approximate historic processes and events. Accordingly, the basis for establishing an discrete

archaeological “Culture” or “Tradition” can mean the correspondence between a single technological skill or knowledge set amongst a repertoire of hundreds, and some of these “Traditions” have been named, as in the case of “Graham Tradition” and “Moresby Tradition”, after individuals who never visited the Islands. As Mackie and Acheson (2005:276) note, “the characterization of the Graham Tradition... comes almost entirely from Blue Jacket’s Creek data”; which shows why “a persistent complication exists in trying to understand the full scope of the Graham Tradition across the archipelago and through time”. Instead of tying in archaeological data from 2007 investigations to this knotty framework built from a neo-evolutionary cultural viewpoint that explains cultural development principally via environmental parameters and trait-based categories built from a narrow image of archaeological material culture, I discuss them here within their local contexts and in relation to previous northeast Graham Island archaeology. This practice of *description* and *interpretation*, rather than an attempt at *explanation*, suits the modicum of samples of archaeological materials and radiocarbon dates recovered from 2007 evaluative unit testing (Table 6.2– Appendix II).

6.2.1 Interpreting Artifacts and Assemblages

Table 6.2 shows a unimodal artifact assemblage shared between the roughly 7,200 year archaeological record in northeast Graham Island, with few exceptions dominated by pebble and cobble tools derived from the same raw materials and sources. Comparing the overall assemblage, not including boiling stones, the primary tool types are cobble choppers numbering 6 (17%), and hammerstones numbering 6 (17%) collectively representing one third of the assemblage.

The Forks assemblage indicates further reduction of cobble and pebble tools through evidence of reduction flakes and waste debitage with rounded cobble and pebble cortex. Evidence of stone tool technologies associated with quarried nodules exists but is restricted to exotic materials in the form of one opaque light green / grey exterior and dark green interior chert / rhyolite core³⁵ and one agate / translucent ginger chalcedony flake. Together with two artifacts comprised of petrified wood, these four artifacts found in the same unit are unique materials from the rest of the assemblage. Intra-locale comparisons suggest the Forks shows a variable tool-kit reflecting a general activity area; such as a camp or village (more exploration is necessary to establish this concretely). Two proximate lines of corroborating evidence supporting the interpretation the Forks was a semi-permanent habitation locale appears in the depth (~ 12-14 cm db) of anthropogenic soils excavated through, and from the profile of test unit one which shows a post-like disturbance in the anthropogenic, artifact-bearing layer (Figure 6.12).

³⁵ This material appears visually identical to artifacts from Richardson Island archaeological landscape, centrally located on the east side of the Gwaii Haanas National Park Reserve, 150 km due south (Smith 2008 pers. comm.).

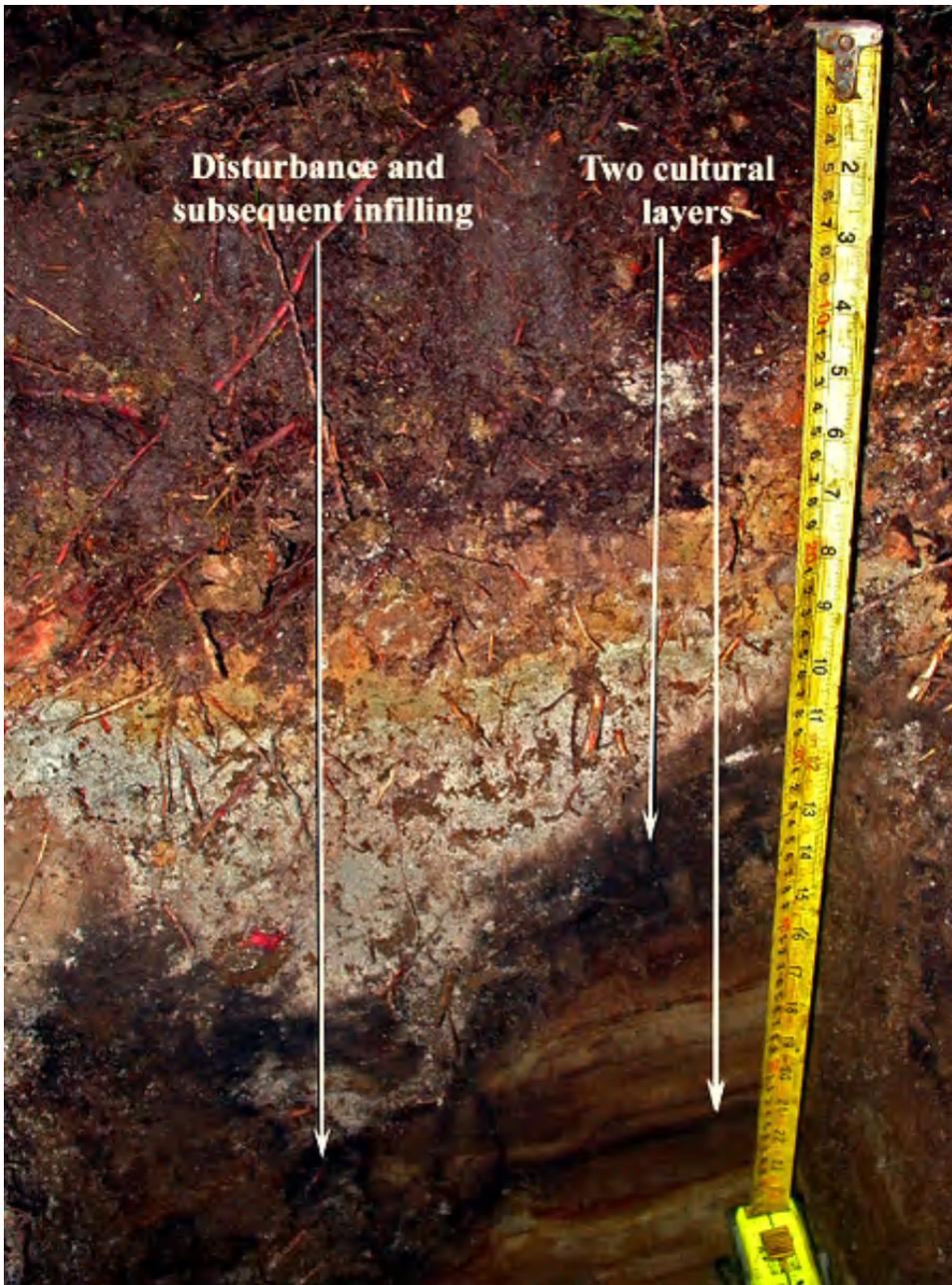


Figure 6.12 Image showing disturbance to stratigraphy between two cultural layers. Further evidence of disturbance is indicated in the unusual character of mixing in sand layer showing a high concentration of organic inclusions within fine white sand layer.

The cobble and non fluvial chopper (six unifacial and one bifacial) artifact type dominates at the Clearwater Lake - North Beach locale, comprising over 50% of the sample assemblage recorded. Three flakes (one retouched) and two cores indicate the potential for a more diverse assemblage than this sample reveals.

Besides the two retouched flakes from GaTw 15 and the pecked stone bowl from GaTw 14, choppers, hammerstones, and boiling stones comprise the entire assemblages from 2005 and 2007 testing and excavation in the *Taaw* Hill – Hiellen River areas.

With so few diagnostic artifacts recovered, only a general interpretation of land use patterns including presence and basic activities is appropriate at this stage. The exception is with the stone bowl, which, considering the labour involved in its creation, and its intrinsic symbolic value, may be inferred with confidence as a place of semi-permanent occupation, intensive resource harvesting locale, or special use locale on the palaeo-spit landscape.

Ground and pecked stone tools are conventionally associated with artifact assemblages from the late Holocene, as seen at Blue Jackets Creek (Severs 1972:7; 1974:192). Archaeological remains at Skoglund's Landing provides a local example reflecting the mid-Holocene pattern of groundstone scarcity where, even when an assemblage does contain such technologies, only nine of 1,080 artifacts, or less than one percent are ground (see Breffitt 1993:109-113 for further discussions on groundstone materials from Skoglund's Landing). For this reason, the stone bowl artifact discovered on the Hiellen River palaeo-spit is an exceptional indication that people were settled in, and deeply connected with this landscape by at least 4,000 BP – adept with chipped, pecked, and ground forms of tool manufacturing technologies, and employing sophisticated cooking technologies using boiling stones consistent with the ethnographic era.

6.2.2 Interpreting Stratigraphic Results

Considering the low intensity testing resulting from 2007 prospection, and the fact that these tests rely on such a limited spatial scope in the form of a patchwork of evaluative units

each measuring 40 cm², interpretations of landscape histories will rely on local context where observations were made.

At the Forks, fine white sands were ubiquitously overlaying both cultural layers and beneath a significant duff layer (Figure 6.13) indicating a depositing of sands post 4,000 BP from one of: a) down-slope movement from general erosion or more severe failures in Argonaut Hill immediately backing the locale, b) a swash from a tsunami-like event, or c) aeolian deposits.



Figure 6.13 Image showing approximately 20 cm layer of fine white sands in EU 4 from the central terrace overlaying most recent four thousand year old cultural layer.

At first glance, the clean nature of the fine white sand layer seems to suggest the down-slope building of deposits on the terraces is not the cause, as an array of inclusions

would be expected in such a formation process. The relatively homogenous composition of Argonaut Hill deposits observed at one of the massive failures located 795 m to the north of the south terrace indicates that a layering of clean deposits would be a possible expression from such an event. What makes this scenario unlikely is that the terraces at the Forks, and particularly the southern terrace where the majority of stratigraphy was observed, are level. This suggests a stable feature over geological time and formed by earlier marine terracing or glacio-fluvial forces rather than down-slope accumulation of deposits.

The 30 + m elevation of the three terraces at the base of Argonaut Hill is roughly 20-25 m higher than mid-Holocene sea levels, making the locale roughly 780 m away from the marine shoreline during the mid-Holocene. Although unlikely, the marine generated swash option should not be disregarded at this stage.

The most plausible cause of this stratigraphic phenomenon follows that the aeolian deposits observed today stretching north-south along East Beach and east-west across North Beach have comprised the geology of this landscape long before people came to be, and that due to the ease with which sands are moved by natural elements such as wind and water, this landscape has been dynamic. As Walker *et al.* (2007:48) observes, “[m]ost of the shorelines, on both the North and East coasts during this period were dune capped, indicating high aeolian activity”, the temporality of which remains elusive.

To lend credence to the caveat that extreme variability exists within stratigraphic patterns across the Argonaut Hill / Clearwater Lake landscape I provide an image of EU 8 stratigraphy (Figure 6.14) at the southern terrace located only 190 m away from EU 4 (Figure 6.13) at the central terrace for comparative purposes. In sum, while the precise formation processes responsible for shaping the geomorphological context of this landscape remain

questionable, geological evidence in the form of stratigraphic sequences confirms that people dwelling in the area were confronted with a combination of subtle and drastic, continuous and punctuated forces affecting change and cultural response (adaptation).

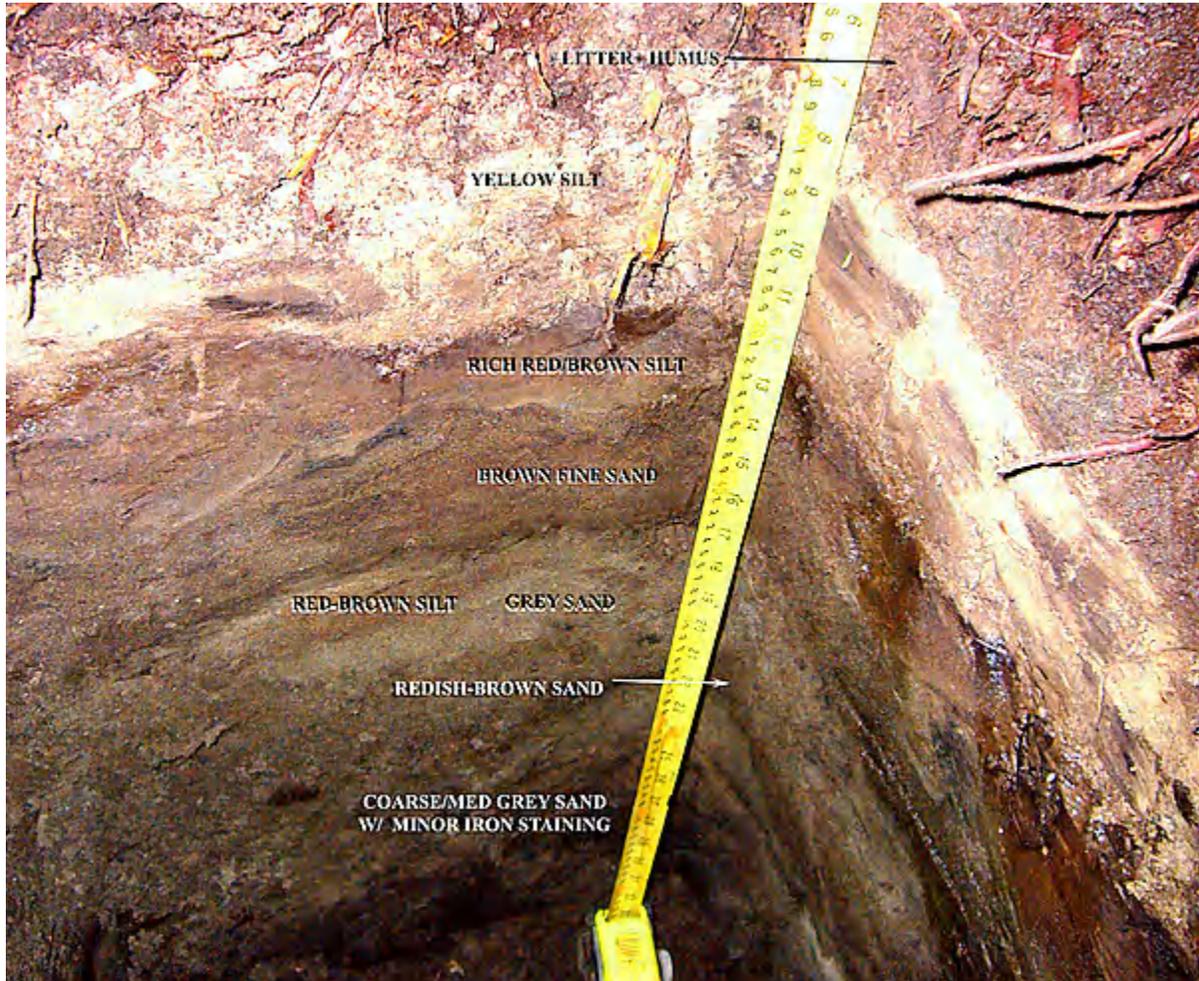


Figure 6.14 Image of south terrace EU 8 profile showing a unique soil depositional history from other nearby EU's.

6.2.3 Interpreting Temporal Results

People were utilizing the Forks locale at least as early as 7,200 BP, possibly most intensively between the 7,200 – 6,300 BP span of nine hundred years, and intermittently

since then including the protohistoric / historic era³⁶. A single radiocarbon date taken from the Hiellen palaeo-spit indicates people occupied the feature from at least 4,000 BP, and as evidenced in accumulations of anthropogenic soils, intensively for some time during and after this period. The two radiocarbon dates assayed from *Taaw* Hill samples relate to land use within the last 2,200 BP.

6.2.4 Interpreting Spatial Results

If hill features were primarily used as locations to survey the lowland environment for resources, monitor the presence of non-local peoples, and navigational activities from cliff top edges, as proposed in Chapter Four, the issue of rapidly eroding promontory locations observed during 2007 field work on Argonaut Hill suggests this feature holds poor archaeological visibility and potential. Coupled with the fact the signature of these behavioural activities leaves a light archaeological ‘footprint’, in comparison to cases where a more significant record of human modification to lands occurs, there is little surprise that a paucity of ancient archaeological remains was discovered on Argonaut Hill. Four more recent archaeological locales however were discovered during hill survey; one of which was located on the eastern hill top edge (GaTw 19), another cluster on a hogback connecting the eastern hilltop edge and the base of the hill (GaTw 20), one on the southern base of the hill in a gully bottom (GaTw 18), and another cluster stretched across the southern base of the hill towards the north end of Clearwater Lake (GaTw 17) (see Figure 6.11).

³⁶ As seen from Figures 5.7, 6.1, and 6.12 the stratigraphy characteristic of the Forks archaeological landscape indicates a series of natural and cultural processes affecting the “living floor”. This mixing of soils is responsible for the series of date reversals received on radiocarbon samples assayed. On two separate occasions AMS dates returned from the laboratory indicating lower deposits were younger than those above them. Taken from the same excavation unit number four at the Forks, by two excavators working roughly 1.25 m apart, samples from 52 cm dbs and 52 cm dbs read 3,925 +/- 15 BP and 6,340 +/- 15 BP respectively, while samples from 38 cm dbs and 39 cm dbs read 6,345 +/- 20 BP and 7,140 +/- 20 BP respectively.

Other than the protohistoric archaeological evidence of a large plank removal on the eastern edge of Argonaut Hill top, the only archaeological evidence of any antiquity derived from testing of hill features is from *Taaw* Hill, where intensive testing during 2005 and less intensive and extensive testing during 2007 both located archaeological remains. I believe the difference in archaeological visibility between these two examples relates directly to the ability to predict the archaeological potential of unstable and enduring landforms respectively; the former reflective of the geological composition of Argonaut Hill and the latter reflective of the geological composition of *Taaw* Hill. This factor affecting modeling decisions is particularly the case when treating the finite hill top edges as landscape features offering higher archaeological potential than more homogenous areas.

Testing of marine generated features was a success with nine newly recorded archaeological landscapes stemming from five field days of associated investigations in 2007. The combination of computer-assisted modeling and intuitive field-testing was a productive combination of methods allowing for such success. These archaeological discoveries are unique in the area based on the fact they were not drawing from existing knowledge of where to look for archaeological remains. This approach has revealed novel information on Haida Holocene heritage. Chittenden (1884:36), who documented regional protohistoric settlement patterns in 1884, commenting specifically on known habitation locales, suggests information may not always flow this way:

... at the mouth of the Hiellen, where there was formerly a considerable village. A still larger one is said to have stood at the base of Rose Spit point, called by the Indians Necoan, and another between this point and Cape Ball, on the east coast of Graham Island, the remains of which may still be seen.

While the former two locales have rich historic, ethnographic and archaeological documentation confirming their existence, the latter may be represented, in part, for the first time by 2007 archaeological discoveries.

Considering no more than 130 m separates any positive test revealing archaeological remains along the 330 m high potential feature of the Hiellen River palaeospit, determined strictly by the degree of testing, it seems logical to consider the five archaeological ‘sites’ recorded with the British Columbia Archaeology Branch and other areas of archaeological interest as a continuous *archaeological landscape*. As implied in section 6.2.2 on “Interpreting Stratigraphic Results”, nothing exists amid the tested areas to suggest these lands were not utilized by the same activities indicated by the archaeological materials already discovered (see Figure 6.15 for a sample of recovered archaeological materials from the *Taaw* Hill and Hiellen area). Should the work of archaeology, that takes a sample of evidence showing past land use, continue to separate the cultural use of lands into disparate analytical and historical units, as opposed to viewing them as a related historic trajectory? Chapter Seven highlights how these different ways of interpreting histories within spatial, temporal and material contexts results from unique cultural ways of being-in-the-world, which hold organic political agendas.

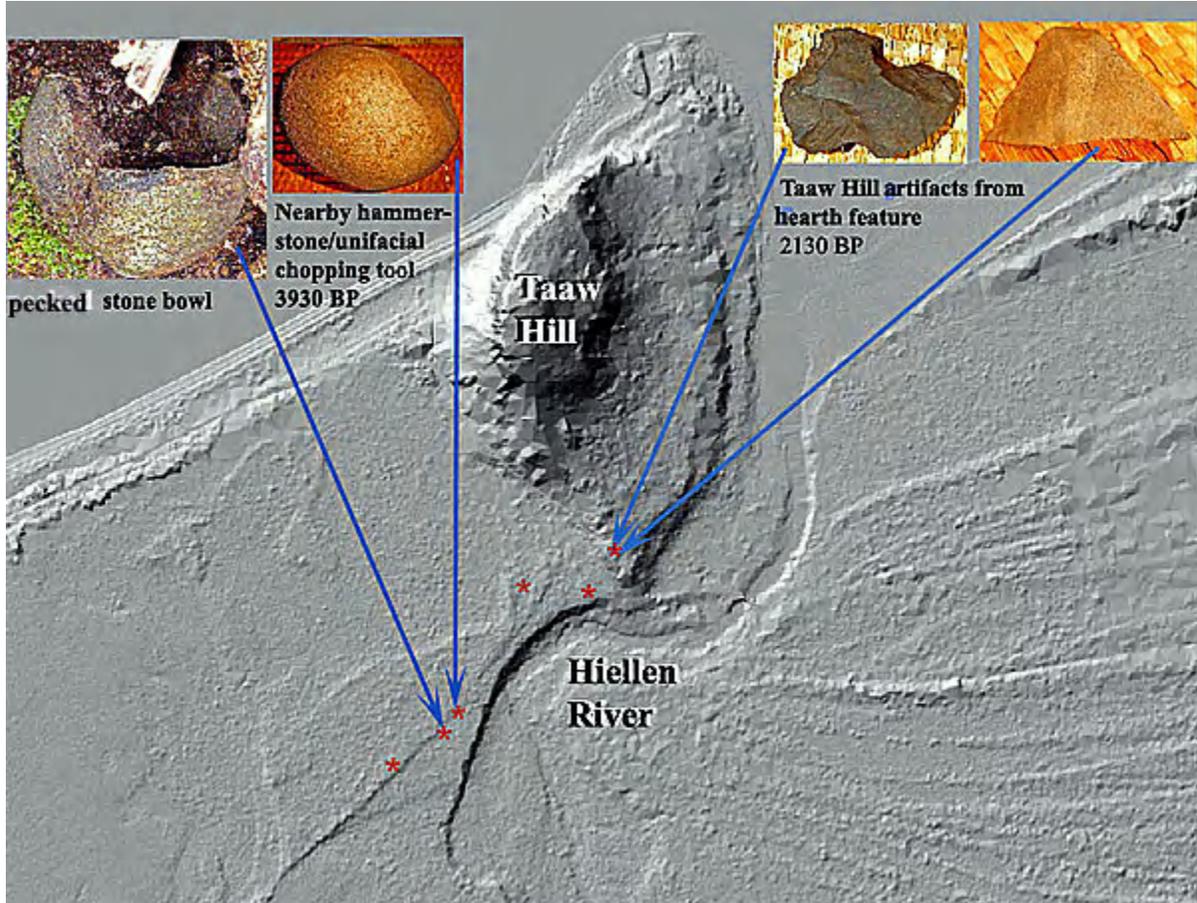


Figure 6.15 LiDAR image with photo collage showing a sample of artifacts recovered from the *Taaw Hill* and *Hiellen River* palaeospit evaluative units.

7 Experiential Learning

... useful skills and useful tools are not in themselves wrong. But it's being tricked or dazzled by them that throws us off. Then we think we're less real than our tools.
(Snyder 1980:87)

Chapter Seven draws attention to a novel turn in the historic trajectory between the shared performance of phenomenological experience of landscapes and the advent of modern cartography. This turn reveals unique ways that orient an individual's sense perception and their community's shared sense of being-in-the-world. The changing inter-relationship and synergy experienced between people, local ecology, and technology is discussed. Finally, a methodological synthesis is offered, integrating recent innovations in spatial technology and lived experience.

Finding meaning through experiences with the world originated with myriad senses including wonder, doubt, and fear about interactions people had with surrounding phenomena. These accumulated events and processes entered into the memory of society (akin to Durkheim's (1893) "conscience collective") in the form of a history that connected people to place through experiential being. Amassed, a complex of culturally relative narratives are formed, situating a society in relation to themes of life, death, and renewal as part of recurring systems involving seasonal cycles and cultural ritual, environmental management planning, history (time) and geography (place). This inquiry comprises an essential ontological foundation that situates social identity. Signifiers of the past encapsulated in mnemonic devices within the landscape, experienced through landscape visitation and narrative form act as elemental components bridging contemporary populations with ancestral lands and ancestors. Though traditional use studies are in the BC context a common means of documenting the storied, lived in landscape, they are also an

irreconcilable method for achieving profound local understandings of landscape based on their inherently Western ontological design and restrictive outcomes (see Thom 2008).

People sharing a common cultural personality have positioned their expression of being intimately within the life-world³⁷ they know and define. Embodied experience in this life-world is the substance from which emic cultural narratives originate. The reason essential philosophical questions of what being human means in relation to the physical and sentient world of other living beings have been shared cross-culturally throughout much of history is because humanity has the same basic tool set from which to perceive phenomenon as bipedal, binocular dwellers of the world. Giddens (1984:111) has reflected this notion in his “biographical project” that takes the human body with all of its modalities as an engaged entity in the life-world as a means to understanding its humanness. As part of the multi-layered, phenomenological landscape people inhabit, the body provides the essential medium by which to experience the physical landscape. Cultural geographer Yi-Fu Tuan (1977:34) believes this experiential sharing of the world relates to the fact that “man [*sic*] is the measure of all things... if we look for fundamental principles of spatial organization, we find them in two facts: the posture and structure of the human body, and the relations (whether near or distant) between human beings”. Although this latter “fact” should simply read “beings” and include the entire matrix of entities comprising the landscape palimpsest, Tuan focuses our attention to one important aspect of the phenomenological manifesto by situating the importance of the perceiving being in the body, which inhabits the world. Archaeologist Christopher Tilley (1994:11-14) argues that the archaeological significance of past landscapes are unattainable using abstract two-dimensional representations of space. Rather,

³⁷ The phenomenological discourse describes the *life-world* as the sum total of the physical world perceived when in the state of awareness of consciousness as incarnate in a body and inhering in the world (Langer 1989).

human experience and understanding of the world are mediated through the body. Tilley (1994:27-33) takes this position to mean that bodily movement through the landscape is important to the degree it allows people who share experiences of place to generate narratives that structure social understanding. Other researchers working within the British School of landscape studies offer comparable interpretations of the relationship between people's senses and the landscape. For Geurts (2005:169), there are no discrete modalities that operate independent from the matrix of senses (sensorium) that deliver information based on experiences as "affairs of the whole body". The body has been described likewise by Rodaway (1994:181) as the central means for our orientation while experiencing the landscape, our measure of the landscape, our vehicle for navigating the landscape and a familiar system for interpreting and understanding the sensory information we experience. This position is also shared by Varela, Thompson, and Rosch (1991), who believe the human body is the essential 'technology' from which we perceive and order the world. They state, "[t]he body is the location point of the senses; we look at the world from the vantage point of the body, and we perceive the objects of our senses to be related spatially to our body" (65). These authors expand their vision of the mechanics of experience by proposing that human mindfulness is the means by which embodied everyday experience helps resituate the mind from abstract theories and preoccupations into the essential mode of being.

The second component of this symbiotic relationship comprising embodied perception and experiential learning involving cognition is referred to by Jackendoff (1987:20) as the "phenomenological mind". The active involvement in the world as a conscious being (through mindfulness / awareness practice) serves the archaeologist familiar

with the multilayered landscape history upon entering the field as a methodology for interpreting its archaeological potential.

According to the cognitive biologist Maturana (1988), expressions of these experiences are realized in cognition, and shared through the social use of language and other bodily actions to communicate on a conscious level. Bateson (1972), anthropologist and early proponent of a cybernetic theory of human communication, also argued for “conscious purpose” in human action and interaction, a point which supports the idea that experiences with landscape dwelling creates shared social minds. Turner (especially 1969, 1974, 1986) and Geertz (especially 1974) are considered ‘symbolic’ anthropologists whose interests are in the interplay between lived experiences and culturally inculcated narratives so as to understand the dialectic between tradition / ritual behaviour and presence for which meaning arises within self and community alike. The inquiry of the mind-body / self-community dialectic has been expanded by Maturana (1987). He suggests we all have embodied minds. From this view, unique experiences as observers exist only for the individual, and a degree of consensual understanding is made by way of interactions with other beings, enabling one to hold the observer (experiential) position.

With this framework of social being in mind, I reflect upon the ultimate utility of LiDAR remote sensing technologies for modeling archaeological potential within the landscape.

7.1 LiDAR and GIS: Tools for Experiencing Landscape Simulacra

The contributions LiDAR remote sensing and GIS technologies offer for representing land within an archaeological predictive modelling context, attempting to infer human behaviour by distinguishing between varying land forms, offer both positive and negative

attributes. For example, high resolution LiDAR imagery proved useful for detecting relict palaeo-landforms associated with marine transgression and regression in step with Fladmark's (1990a:184) observation that "[u]ntil archaeological research is focused on those now hidden palaeo-shoreline positions, Northwest Coast prehistoric cultural sequences will remain artificially foreshortened". However, as proposed in Chapter Five, contrary to archaeological predictive modeling that designates high potential status to every raised landform offering good hydrology in an otherwise low-lying environment susceptible to ground saturation (Eldridge *et al.* 2005:14-15; Saxburg *et al.* 1998; Shortt *et al.* 1998), 2007 field discoveries show that dune features within the palaeo-marine spit south of *Taaw* Hill and elsewhere in Naikoon Peninsula revealing similar morphology are in fact migrating sand dunes³⁸. The result of these field observations is the indication of poor archaeological visibility, and low corresponding archaeological potential in certain areas being modeled. Experiencing the northeast Graham Island landscape through survey and evaluative unit testing proved that borrowing rationales from other predictive models for determining landform potential can be problematic, and thus, understanding local processes which created the modeled landforms is necessary.

Another observation made during field investigations was how often, despite the ability for a GIS to distinguish micro-topographical nuances in the aspect or slope views using high resolution LiDAR data, the variability of these on the large terraces, marine generated features, and to a lesser degree hilltop edges being modeled, were negligible when compared to experiencing nuances of these landscape features in person. Accordingly, while LiDAR generated imagery is useful for highlighting such prominent signifiers of high

³⁸ The animated aspect of these dune features is lent credence to by Swanton (1908:769) who notes, "supernatural beings all lived under sand-hills", one of which is named *Ula'man*.

potential archaeological landscapes associated with relict shorelines now stranded at varying distances inland at multiple scales, the final selection of prospection locations requires decision making drawing from a physical engagement with the landscape. This latter relationship emphasizes a perception of the landscape representative as a whole, a matrix of relational ecologies, rather than a patchwork of binary simulacra, i.e., a finite descriptive tool set of computer-generated pixels revealed through an arbitrary colour scheme arranged in an arbitrary shape, size and illumination, codifying the landscape. For instance, features obscuring indicators of palaeolandscapes such as migratory wind-blown sand ridges, nursing trees, tree throws and like features created from ongoing natural formation processes are not archaeological signifiers, and thus, must be delineated from the higher potential, cultural landscape through field survey.

Drawing on a local example from Naden Harbour, paralleling Masset Sound to the west, we see the impetus for an intensive ground surveying project (Christensen and Stafford 2000) arising from concern for heritage protection in relation to existing archaeological modeling and its role in focusing forestry and related ‘developmental’ practices. This investigation drew upon a previous pen and paper potential model (Wilson 1996), and traditional use study (Gold 1996), which was later built upon using ongoing spatial and cultural data collection by Young *et al.* (1999) and Young (2000). With LiDAR data now available for Naden Harbour, and with archaeological investigations using this technology underway (Allan Davidson, pers. comm. July 2008), we see recursive archaeological modeling finding its way into NWC archaeological practice.

These two methodological concerns with predictive modeling in Northeast Graham Island emphasizing the combined use of contemporary spatial technologies with experiential

methods, reinforced with the local example from Naden Harbour, reminded me of Korzybski's (1931) dictum, "the map is not the territory." As highlighted by Bateson (1979:110), Korzybski's assertion is that "the effect is not the cause", but is reliant on the assumption of "[s]ome regularity in the relation between effect and cause." I now turn to this theme in discussing the role of phenomenology in landscape archaeology.

7.2 Phenomenology and Landscape Archaeology

The theme of *navigation* is instrumental to the phenomenological perspective of being-in-the-world, and is embodied in the act of surveying and validating (modifying) an archaeological predictive model. Navigation using 'sense perception' and 'imagining' both rely on an image of the world from which to orient places, phenomena, and one's own activities within space and time. The image may be cognitive and derived from intentional acts of being-in-the-world, or it may be a computer-generated simulacra derived from remote sensing technologies.

Despite the culturally-relative narratives created by artisans and cartographers that reference culturally-meaningful beings and settings, these different stimuli for phenomenal experience result in a synchronic rendering of the world of landscapes, housepoles, animal beings, origin stories, or archaeological features. As Arnheim (1969:140) remarks in his book *Visual Thinking*, "[s]ince images can be made at any level of abstraction, it is worth asking how well different degrees of abstractness suit the [function under analysis]", and in this case, the function being perceptions of the archaeological landscape. In addressing this issue, he argues, "mere replicas may be useful as raw material for cognition but are produced by cognitive acts of the lowest order and do not, by themselves, guide understanding". Schama (1995) takes a similar perspective in his book, *Landscape and Memory*, revealing through

examples of landscape representations and social memory that people can be detached from an image, but not from place. Though these objects vary in medium and meaning, they share a degree of fixity which limits the viewer's perception of the object. This is particularly apparent with the Western tradition of cartography which separates the object world from the perceiving subject's experiential world, thereby reducing the three dimensional world into a two dimensional simulation depicted in imagery on a map. The development of the science of map making has led to the creation of GIS, which continues to restrict the viewer's ability to navigate the phenomenal landscape (read as page, or screen) in any actual sense; and is limited to adding more overlays with higher resolution data sets, and using the *zoom in* and *zoom out* or *pan* icons to navigate horizontally and vertically³⁹.

Accordingly, "the observer generates a description of the domain of reality through his or her interactions (including interactions with instruments and through instruments)" (Maturana 1978:60) as they 'navigate' their relative object world.

One concern amongst many which can be raised against this rigidity in visual perception when relying on computer-generated technologies for landscape modeling is that it is a simulacra of perception, abstracting the way all beings navigate, perceive, and order their world. For instance, no being perceives the world via the "birds eye view", where the gaze is fixed precisely below their position in the world, as with traditional cartographic and GIS maps using remote sensing spatial technologies. Rather, people dwell in a relational landscape where conscious experiential being amount to insight. Frieman and Gillings' (2007) article "Seeing is perceiving?" provides a convincing argument for the limiting

³⁹ The unique capabilities of ArcScene to navigate a three dimensional landscape from a variety of angles by simulating the flight of a bird or airplane (if your computer has the ability to perform this task), rectifies some of the problems facing GIS users wanting to depict a landscape in a more experiential manner. Although it retains, and possibly enhances the omniscient aspect of the viewing of land from the inherently non-human sky realm, it does offer the key factor of movement.

character of a unimodal interpretive framework of the past built upon the “viewing of space... which invariably takes place from a single fixed point” (8). The point that human action (movement) is perceptually guided is captured by Merleau-Ponty (1963:13) who states, “all the movements of the organism are always conditioned by external influences... [and thus] *behaviour is the first cause of all the stimulations*”. Further to this point is the concept that one’s participation in the landscape is part of a larger heritage of people-landscape ecodynamics encapsulated in Davis’ (2001) notion of the “ethnosphere”. Davis defines the ethnosphere as being;

the sum total of all the thoughts, dreams, ideals, myths, intuitions, and inspirations brought into being by the imagination since the dawn of consciousness. The ethnosphere is humanity’s great legacy. It’s a symbol of all that we’ve achieved and the promise of all that we *can* achieve as the wildly curious and adaptive species we are”. (Davis 2004:1)

In partnership with the prefield modeling phase of archaeological investigations, navigating the world through a phenomenological praxis is integral, doing otherwise is the work of simulation.

A second concern with the virtual experiences acquired through the use of spatial technologies opposed to pure inductive phenomenology during navigation occurs with the various modes of *perception* embodied in each form of being. *Movement*, Spurling (1977:38) contends, “displays in striking fashion how our body inhabits space (and time)”, a realization which reconstitutes the pre-objective world through “pure transitions”, of objects defined in relation to their behaviour experienced as they appear in the subject’s visual field.

Perceptions of the phenomenal world gained through perpetual movement are thus anchored in a drastically different manner of *moving figure – background reference*, than perceptions obtained with two-dimensional computer-generated simulacra. The type of archaeological landscape modeling I hope to inspire will employ movement as a means to experience the

physical landscape “constants that impose the same limitations on physical movement today as they did in the past... so that we and the people of the past share carnal bodies” (Tilley 2004b:201).

According to Gell (1992:224), acts of being-in-the-world are set in a fluid temporal context comprised of “[r]etentions and pretensions... the basic Husserlian category of ‘intensions’, by which is meant... all retentions linking *noesis* (processes of cognition) and *noema* (that which is cognized).” Reinstating human intentionality into the time-space continuum present in the landscape palimpsest establishes deep cultural roots, making a heritage of sense perception⁴⁰ accessible to archaeologists dwelling in the landscape (see Tilley 2004a:2-19, 2004b:201-202).

Navigating northeast Graham Island, while being mindful of the many factors ordering the course of survey and traverses within the landscape palimpsest, helped to model the palaeolandscape for its archaeological potential. In this manner, phenomenological field methods encompass the role of the archaeological modellers’ cognition that the GIS are unable to fulfill.

7.3 Synthetic Methodological Praxis

The dialectical process of modeling lands using high resolution LiDAR-generated imagery in a GIS, and ground truthing these models for validation is the greatest benefit for archaeologists interested in minimizing the limited capacity for each method to operate as reliable ‘stand alone’ interpretive devices. According to Heidegger’s’ phenomenological philosophy, especially as espoused in *Being and Time* (1927), phenomena are not the

⁴⁰ The concept of a “heritage of sense perception” relates to the ability for individuals and communities socioculturally or temporally disparate to perceive their life-worlds in similar ways. These common experiences may draw from living with endured practices, intergenerational building of local knowledge’s, dwelling within a land of similar constraints, or possessing an awareness of how making certain decisions result in certain outcomes which share a commonality across time.

foundation or ground of Being, and neither are appearances. An appearance is “that which shows itself in something else,” while a phenomenon is “that which shows itself in itself.” The ‘appearance’ in this sense is comprised of virtual experiences with the landscape acquired through interpreting landscape imagery during the pre-field modeling stage of research, and is thus simulacrum. ‘Phenomena’ are essential materials confirming actual experiences with the world, and are gained during field investigation.

Heidegger’s point is well suited to the formulation of landscape archaeology, which finds utility in experiences with both realms of pre-field ‘appearances’ of the landscape produced by computer-generated imagery, and actual ‘phenomena’ observed in the field, as long as the former do not drive the latter. Accordingly, any GIS attempting to model lands for archaeological potential should be considered as a ‘living document’, a framework, designed with the flexibility to incorporate new data; dialogical and diachronic, not monological and synchronic. Often, this process occurs while in the field, as sense perception makes adjustments to the simulacra that may direct navigation (maps), and the simulacra that informs archaeological prospection (predictive models). A symbiotic melding of the two approaches is where modern landscape archaeology lies – at the interstices between human-programmed, computer-generated logic, and the sense derived through lived experiences and perceived relationships fashioning each. In *The Structure of Behaviour* Merleau-Ponty (1963) describes this dialectic as including not only a sensible, actually perceived lived experience with matter, but also a ‘virtual space’ by stating that “physiology cannot be conceptualized without psychology”.

In Chapter Two's discussion on 'theorizing landscape', I described a history of Cartesian notions of space towards a more expansive vision of the phenomenal world using the notion of lived-in landscapes. Langer (1989:80) notes;

... space has been considered to be objective or subjective – either part of the 'real' world 'out there', or a principle of unification 'in' the subject of experience. Merleau-Ponty's phenomenological descriptions, however, have revealed that subject to be incarnate subjectivity; rather than a transcendental ego, the subject of experience is the phenomenal body inseparably bound up with the world. It is obvious, therefore, that the traditional notion of space will need to be rethought, and that the unity of experience no longer can be considered to lie 'out there' or 'in here' but must, rather, originate in that dynamic relationship between body-subject and world *through* which 'objects' and 'subjects' come into being for us.

Phenomenologists contend that space is only relevant insofar as it is perceived and experienced. The promotion of phenomenological methods in landscape archaeology emphasizing empirical observations derives from the assertion that archaeologists need to develop better understandings of how archaeological patterns relate to systemic behaviours of prior landscape occupants. Intuiting the archaeological potential of landscapes based upon a lasting account of field experiences, by analogizing their attributes from one example to the next, and with reference to the multicomponents incorporated in the Interdisciplinary Multilogical Framework model, are several threads in the rich fabric which comprise the phenomenological approach. Thus, phenomenological field methods invoke a kind of "middle range theory" (Binford 1977; Merton 1968) to help explain the relationship between patterns of archaeological landscapes and systemic experiences of place (Figure 7.1).

Socio-cultural Resilience over the *Longue Durée*

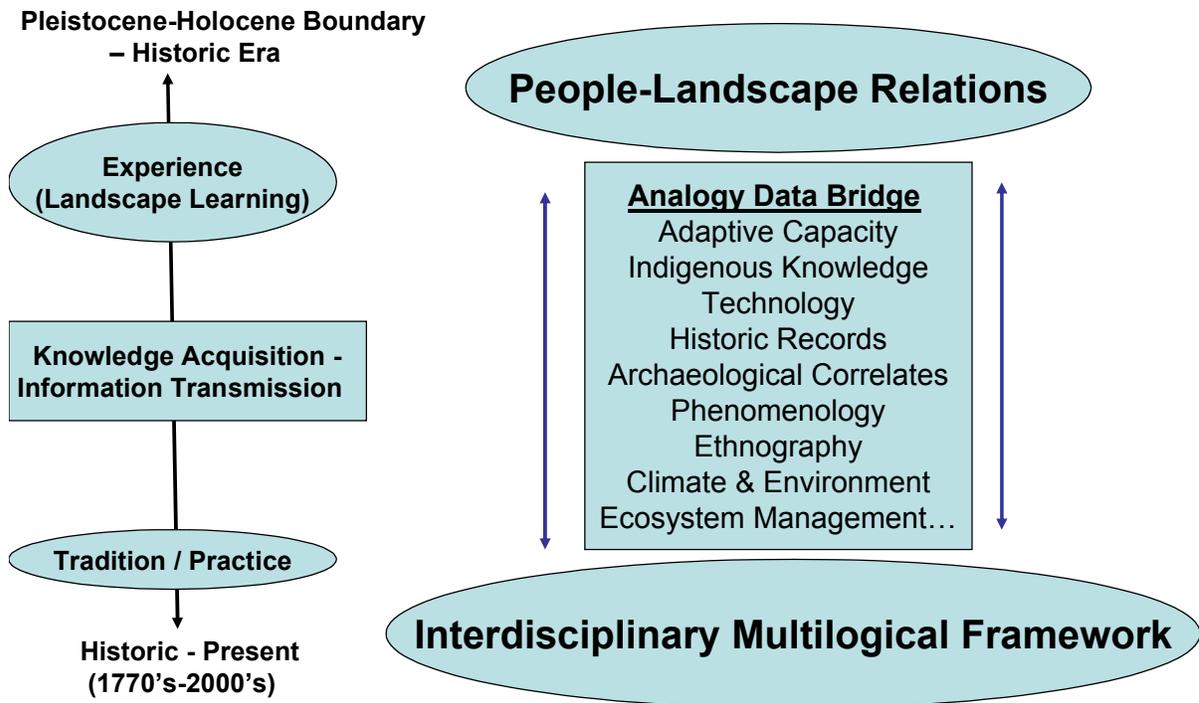


Figure 7.1 Schematic showing a sample of the types of analogies landscape archaeologists draw from when collecting data for modeling the archaeological potential of lands.

Phenomenological being as a methodological praxis for archaeological field research situates the archaeologist in the object of analysis – where personal experiences in the landscape coalesce with a field of possible behaviours followed out on a similar palaeolandscape in an activity of transcending space-time. Integration of the perceiving subject into the object world enables experiencing of the dialectic between physical geography and human thought, where experienced and socialized places constitute an intelligible landscape. Such a phenomenological perspective is the novel component I offer as part of a synthetic archaeological praxis also employing computer-generated spatial technologies, informing a more holistic archaeology.

8 Towards a Holistic Landscape Archaeology on the Pacific Northwest Coast

Monologue is finalized and deaf to the other's response, does not expect it and does not acknowledge in it any decisive force. Monologue manages without the other, and therefore to some degree materializes all reality... Life by its very nature is dialogic. To live means to participate in dialogue.
(Bakhtin 1984:292-293)

8.1 Interdisciplinary Multilogical Framework

Landscape archaeology attempts to make meaning from an unlimited number of potential contexts and configurations of people-landscape interactions. The collection of a diversity of disciplinary information, ideas, theories, and personal knowledge to accord with such a range of behaviour is thus essential. It is in this spirit of interdisciplinary and intersubjective synthesis that I propose a fluid framework (Figure 8.1) for interpreting the archaeological potential of landscapes. The intent of this framework is to work towards resolution of the multiplicity of narratives that describe peoples' connectedness to place; be they derived through an organic process of dwelling in the landscape or through virtual experiences of landscape simulacra.

Interdisciplinary Multilogical Framework

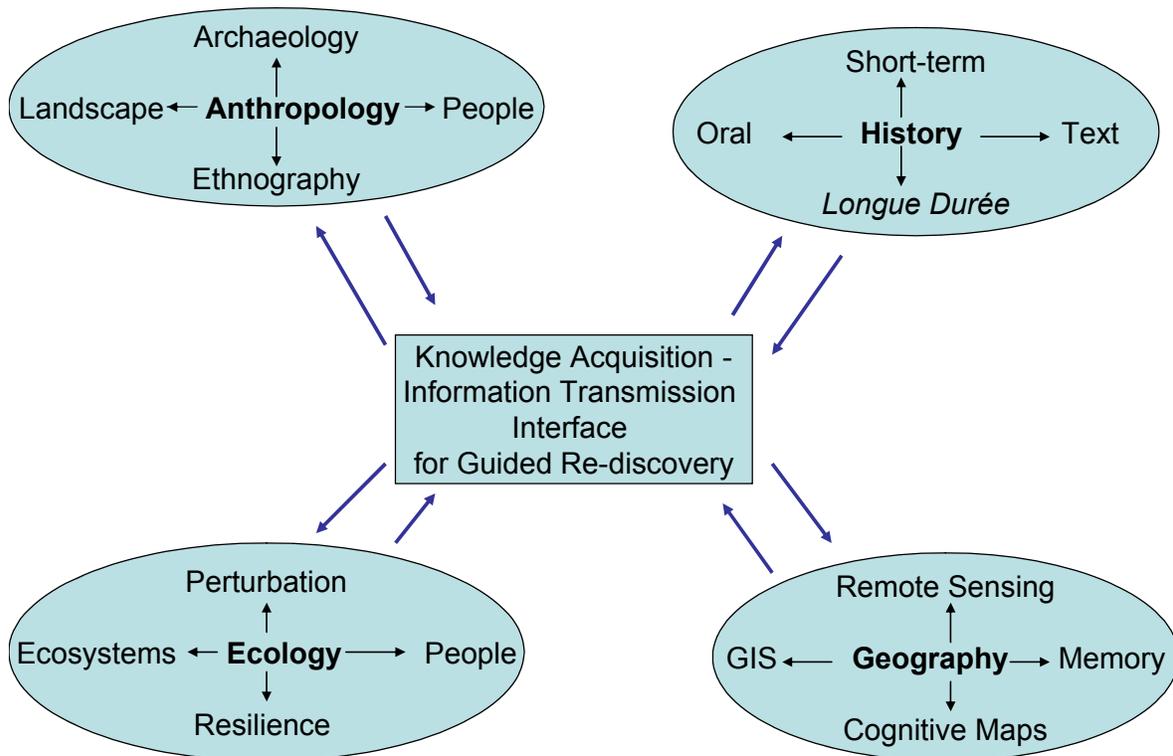


Figure 8.1 A schematic showing a non-linear, theoretical framework used for modeling the management of culturally meaningful knowledge of people-landscape ecodynamics over the *longue durée*. This model holds that the intergenerational transmission of knowledge is a diachronic practice where information and experience coalesce to account for knowledge. Accordingly, the acquisition of knowledge is a process of guided re-discovery, a socially mediated time-honoured ritual that culminates with the experiential involvement with previously referenced phenomena. Archaeologists incorporating such knowledge systems into their existing interdisciplinary framework are involved in a holistic interpretive process.

Intersubjective cross-cultural anthropological investigations help open up the researcher’s “doors of perception” (Huxley 1954) through exposure to the local narratives describing the myriad of interconnections linking people with the cultural landscape⁴¹.

⁴¹ The dialectic of cultural narratives and memories of experiences are constituted through a collective sense of being-in-the-world, thereby having meanings of cultural landscapes mediated through the adaptive management of individual and group perception. Anthropologist, Buddhist and Beat poet, Gary Snyder’s influence on the “ethnopoetics writing movement (see Alcheringa issue one Statement of Intent; see also Rothenberg 185; Tedlock 1983 on the theme) highlights the integral nature of focussing human thought in a systemic ecological relationship with all life forms. This belief is articulated in his concept “architecture of consciousness”, which relates the deep cognitive and bodily correspondences between

Through this process, the object of the researcher's gaze is expanded from the isolated human subject to a more holistic and contextualized place of meaning - the cultures' 'life and thought worlds'⁴².

The Interdisciplinary Multilogical Framework is not fixed in terms of what information from what disciplines apply; rather, I expect the framework to be fluid and flexible in its application to a diversity of inquiries. I have included four disciplines in this case which relate to bodies of thought and knowledge units accessed within this thesis.

From geography I employ the most current remote sensing technologies (LiDAR) for representing land. Maps have often been the archaeologist's primary means of interpretation and representation of relationships between people, place, and time. Although mapping and other spatial technologies are applied within this thesis I have taken caution in borrowing from this tradition, and in this respect have taken seriously the concern of McGlade (1995; 2003) who states, "[w]e need new maps if we are to arrive at a more sophisticated understanding of the complex social-natural interactions that lie at the heart of social systems" (2003:119). These "new maps" are most effectively employed when they are capable of representing a palimpsest landscape generated from a holistic real-world data set. These maps however will always require an interpretive framework drawing from field observations that balance the ongoing interplay between inscription, erasure and further inscription, referenced to both cognitive analogical and material phenomenon.

the "external and internal landscape... [and moves through] the structure of the whole mind... unconscious and conscious, and on through sense perception and immediate emotion into the reaches of abstract, scientific theorizing and pure mathematics (1980:5). Snyder's work in these regards speak to the central theme of cultural landscapes as places where relationships between people and landscape phenomenon have nurtured the other, shaping and reshaping their forms over time.

⁴² Similar to the concept of the life-world articulated in Chapter Seven, I make the *thought-world* to mean all that is socially meaningful to a culture which lies outside the physical world or that which is embodied within the physical world and exists within thought.

Ecological models developed largely as non-human ecosystem approaches can be modified and co-opted by landscape archaeologists in order to consider the sociocultural component within the systemic landscape. Resilience theory⁴³, later developed into the more humanistic Resilience Alliance (see Walker *et al.* 2004; 2006) is a pertinent example that applies to the long meditation of indigenous cultural knowledge set in local landscapes. The notion of sociocultural resilience takes the process of ‘landscape learning’ and knowledge transmission as central cultural apparatuses enabling *in situ* socio-ecological sustainability (see Sanders 2007a, 2007b, 2009b on the sociocultural resilience model).

Historians associated with the French *Annales* School formulated a theoretical model dealing with a *histoire totale* in an effort to capture the whole of human activity in a given socio-ecological landscape (Foster and Ranum 1975:vii), a view most compatible with the Interdisciplinary Multilogical Framework model put forth in this chapter. As originally conceived, and throughout a three-quarter century of existence, the *Annales* approach to historiography has sought to integrate humanistic theories as a way to “command the sources” of a never-ending written document pertaining to any given theme. Working from alternative sources of information as a way to eschew traditional forms of historiography produced in Europe, these scholars promoted a more pluralistic form of cross-cultural interpretation within historical writings. It is in this capacity of far-reaching source gathering and interdisciplinary interconnected learning that the *Annales* approach to understanding the past becomes a more historically representative and inclusive endeavour. The incorporation of *Annales* thought within archaeological analysis is a fitting influence which can be further utilized to establish long term historical structures referred to as the *longue durée*, over the

⁴³ For more on the origins of the resilience concept see C.S. Hollings 1973.

synchronic event captured in the archaeological record of anthropogenic soils, features, artifacts and other material culture (see Ames 1991). Certain illustrations provided throughout this thesis such as the detecting of GaTw 15 on *Taaw* Hill and GaTw 10 near the outflow of Imber Creek into Clearwater Lake show how using intuition partly informed by historically documented ethnographic analogy were successful at locating a 7,200 year record of archaeological remains. This method is instructive for interpreting previous inhabitants' involvement in a key object of archaeological focus - the palaeolandscape.

From the anthropology of landscapes, I develop a landscape archaeology⁴⁴ that builds a more holistic approach to interpreting people-landscape interactions over the *longue durée*.

8.2 Contextualizing Archaeology in Local Oral Knowledge

The Western tradition of intellectual thought captured in text originated to a large degree with the hidden monologue-based philosophy of Plato⁴⁵. A unique historic trajectory occurred with cultures relying on oral, aural, and visual forms of ritual to transmit knowledge. Such cultures have been engaged in a dialogue, generated through intergenerational shared experiences of place. Bakhtin's notion of the "chronotope" (directly

⁴⁴ Landscape archaeology emphasizes ways of reading past relationships between people and the landscape, from the landscape. This specialized field in archaeology has been under continual evolution since its inception. It has always employed a multidisciplinary tool set, and it is now common to have some form of remote sensing and GIS technology informing spatial interpretations and representations within its research design.

⁴⁵ This position is supported by Murray's (1991) exegesis using modern literary theory to evaluate the history of the dialogue in Native American representations undertaken across many social science disciplines. He states, "[l]ong-established use of the dialogue form as a device for the propounding of an argument, stretching back to Plato, has, of course, always involved an agenda set in advance, in which the participants played clearly defined roles, leading to the emergence of the correct view. The truth is never in doubt, and the other positions are put up only as straw men, but the well established conventions of the form make it irrelevant for us to object that, for instance, the actual identities and characters of the figures in dialogue are subordinated to the development of the argument, or to criticize the suppression or misrepresentation of the true nature and views of one of the participants."

translated as ‘time’, ‘space’), provides a useful framework for interpreting the cross-cultural values of narratives. According to Bakhtin (1981:84) all cultural narratives reference,

spatial and temporal indicators [that when complete] are fused into one carefully thought-out, concrete whole. Time, as it were, thickens, takes on flesh, becomes artistically visible; likewise, space becomes charged and responsive to the movements of time, plot and history.

What transpires within a culture rich in narratives of oral tradition is a dialogue between mutually interacting myths, and the existing knowledge held by performers (participants) and audience (observers) alike. The result of this relationship between narrative form and cognitive procedure is a culture that can situate meaning in place and relate its history in the landscape. From this I conclude that, when available, toponyms and other oral knowledge relating to landscapes of cultural significance including origin stories, places where climatic and environmental phenomena occurred, ancient village locales, and ancestral use of local territories should be incorporated into any archaeological predictive model.

For my investigations into the landscape history of northeast Graham Island, Haida Gwaii, this meant finding ways to flesh-out the ‘language of landscape.’ One source I explored to situate these utterings of deeper local knowledge and wisdom, was Haida mythology. In Haida mythology, narratives featuring dialogues between the Haida, spirit beings, animals and other landscape entities are located in specific places. To learn more about these inanimate entities as understood through Western ontology, I turned to the more ‘scientific’ narratives of glacial advances and retreats, geomorphology, sea-level histories, vegetation successions, faunal records, and pollen analysis recorded by natural scientists. From this data, I traced the temporality of landscape change over the terminal Pleistocene and Holocene epochs which the Haida dwelling in these areas would have experienced;

landscapes they made sense of, and derived meaning from, through oral history and local narratives.

One example of the robust understanding acquired through the combined use of contemporary computer-generated spatial technologies of LiDAR remote sensing and GIS, along with the use of oral history can be garnered through relating the ethno-linguistic work of Swanton's 1900 recording of Haida elder *Haayas'* story to the northeast Graham Island landscape. Using a hermeneutic methodology assists in this process (Figure 8.2).

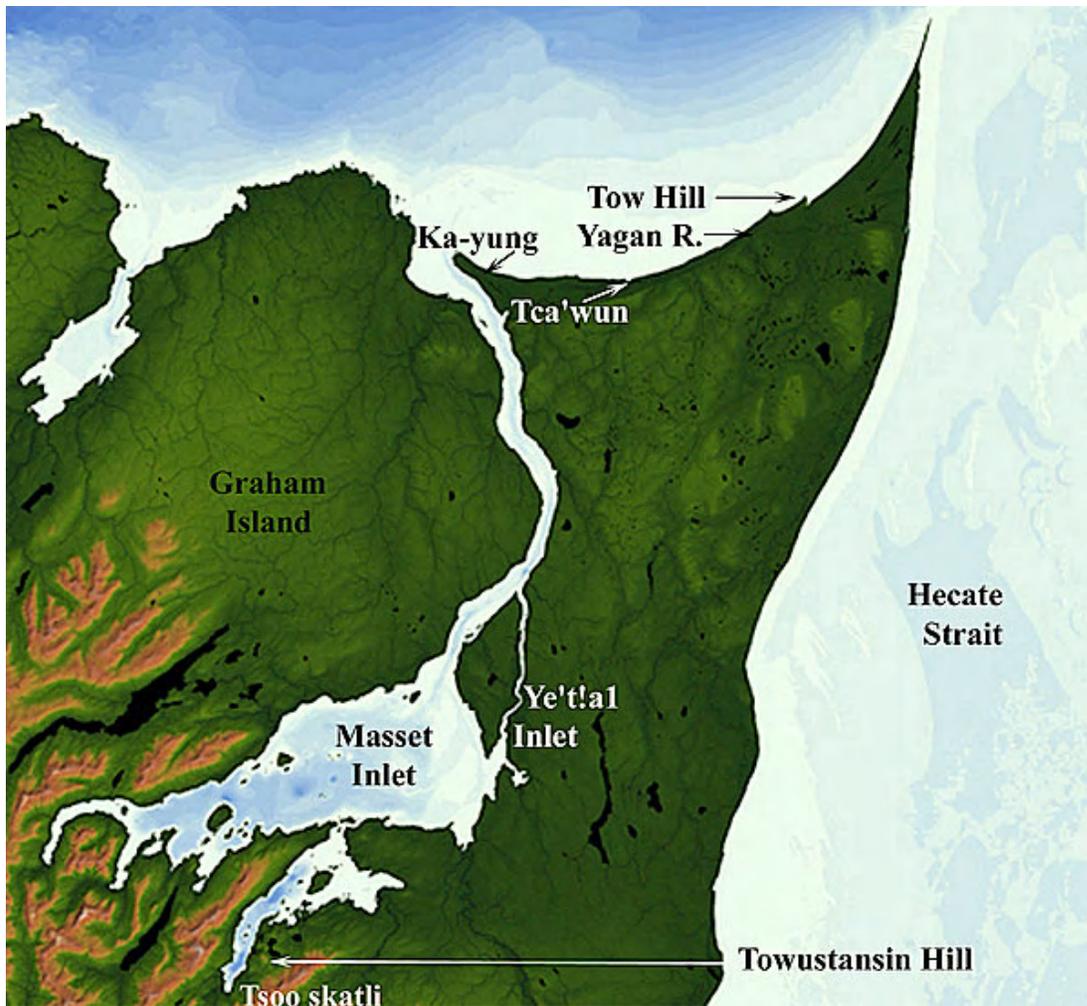


Figure 8.2 Image showing areas of Tow's origin down in the bed of *Tsoo skatli*, his migration through Masset Inlet, Masset sound and along North Beach and final resting place at the contemporary confluence of the Hiellen River with Dixon's Entrance. Appearing on contemporary maps as 'Towustansin', Swanton (1905a:21) refers to the brother of 'Tao' (his 1905 spelling) as 'Tao dō'na-i'.

Tow and his elder brother lived in *Tsoo skatli*. And their mother gave them young dog-fish. Then she did not give any young dog-fish to Tow. Both were named Tow. And when he saw he was given no dog-fish, he went away in anger. Now he started off. And he went down through *Ye't!al*-Inlet. And he went down in the bed of this inlet. And when he came to Kayung, Raven ran out of the house, talking angrily to him. Then he stood upon a stone. And he broke the stone by jumping up and down. That stone is called "Stone-Broken-by-the-Foot," because Raven broke it with his feet. Then he (Tow) went on. And he was going to stay at *Tca'wun* Point. Then he looked at himself there. And he was not good there. Then he went away again. And he was going to stay at *YagAn* River.' And he also disliked that. And he again started off. Then he sat near Hi-ellen (*Li'elAii*) River. And he said, "I am all right here. Here I will stay." Some of his stones fell at *Tca'wun*. Some also fell at *YagAn*. (Swanton 1908:393-394)

This story of a traveling hill articulates a set of observations made about the distinct character of certain phenomenon within the ever-changing life-world of the Haida during an endured period of environmental change. Specifically, this commentary lends credence to the ordering of how these few permanent landmarks constituting tertiary basalt came to be on an otherwise continually shifting landscape of a low-lying plain comprising aeolian deposits experiencing ongoing marine transgression and regression. The latter force of changing sea levels likely had profound effects on the way permanent landmarks appeared to generations of Haida referencing these spatially meaningful cultural signifiers. The narrative of a migrating hill is suggestive of another way to perceive this relationship between interacting phenomena; and here we can look to the vertical (computer generated 'birds eye') versus horizontal (human experiential) perspectives offered by the geographer Tuan (1977) as critical influences on what story derives from different landscape experiences.

According to Jakob von Uexküll, each being perceives its own *Umwelt* (thought of as subjective spatio-temporal worlds), to be the objective *Umgebung* (which *would* be objective reality, were such a reality to exist), but this is merely perceptual bias. In considering the multiplicity of ontological views with which 'worlds' are constituted, archaeologists working

within the Interdisciplinary Multilogical Framework recognize that though all experience depends on taking up a position in the world, perceptions gained through a mapped simulacra and perceptions gained through landscape dwelling generate two views of the same world that can be reconciled (Sanders 2008c). When compared with Figure 8.2 and its associated narrative, Figure 8.3 provides one such example where the perceiver's position in / of the landscape, be it from a horizontal versus vertical view shapes their experience, which in turn generates a relative sense of order and meaning in / of it. In short, the relationship between the scientific modeling of changing sea levels and the local narrative of a migrating hill is merely a different way of telling the same story. Haida Gwaii, and specifically the landscape of northeast Graham Island was undergoing constant change throughout the terminal Pleistocene and Holocene eras, just as the hill's (Tow's) movement reflects important changes in the mythological landscape.

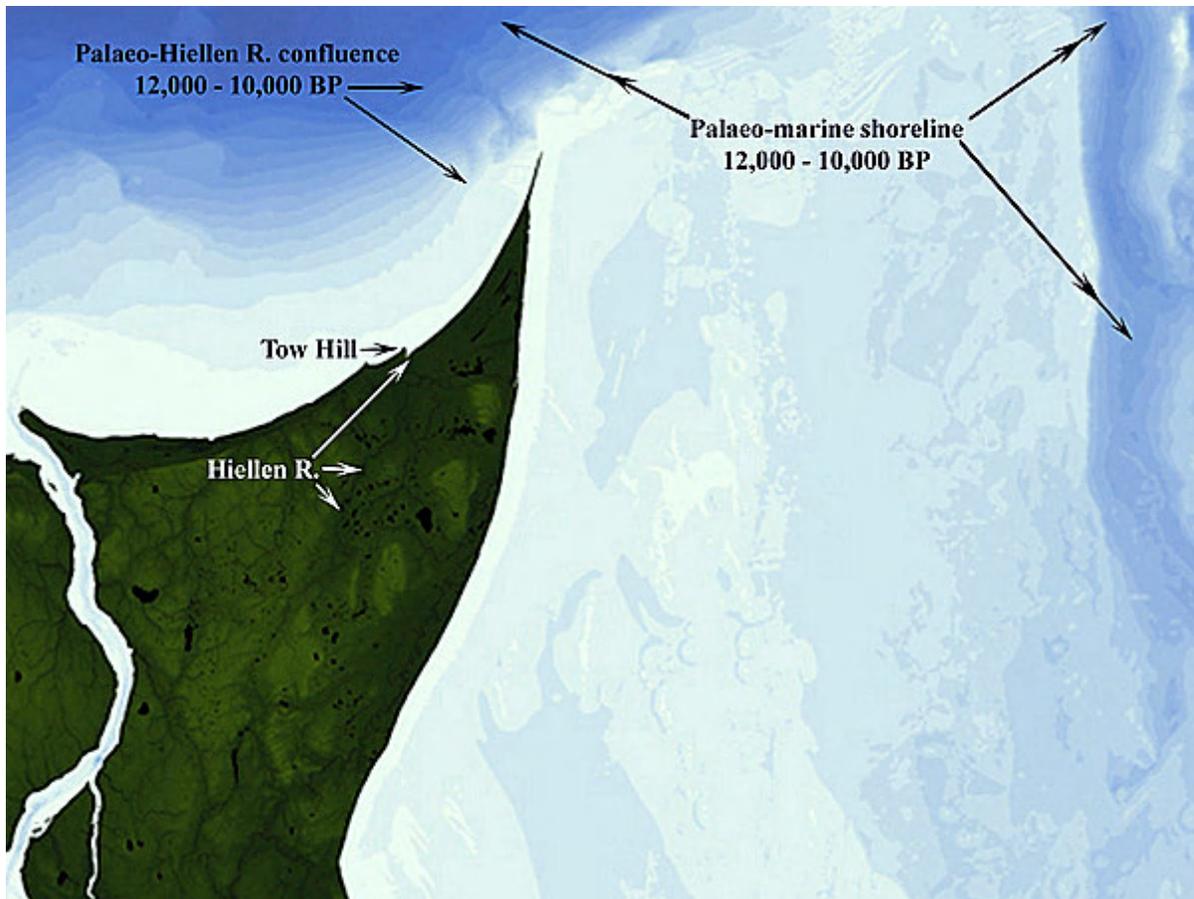


Figure 8.3 Image showing Naikoon Peninsula and the submerged land of Hecatia in whites and lighter blues. Pleistocene-Holocene transition palaeoshorelines formed during early marine transgression and the ancient confluence of the Hiellen River are indicated using arrows.

Although the events of mythic time are rooted deep in the past, this history is ongoing and recurring in the sense that Haida continually make reference to their existence and being in relation to these events and their settings. Thus *Old Women of the Tides* is not merely a remote mythological figure, but rather a continual phenomenal presence in the ebb and flow of daily sea tides (Thornton 2008:21). The combined spatial and temporal references to a culture's past are what I refer to as a *narrative landscape*⁴⁶. The *narrative landscape* is a

⁴⁶ Differences expressed between groups vary through a combination of ecological factors and ways that perception of their life-world is structured in relation to their organic cultural matrix. Language, (loosely defined as a system of shared symbols that communicate intelligible meanings) is the key medium common to group members where these narrative histories are transmitted and enter into forms of ritual – becoming traditions with endured practice. Anthropologists interested in the meaning imbued in these narratives can take here Ricoeur's (1965) advice that it is not the 'said' we are after as interpreters of

concept that describes the relativistic cosmology held by a group and translated through narration and reference to commonly recognized places in the landscape. It is through this capacity of time-honoured connection to place and knowledge systems that meanings transcend the palaeolandscape to the contemporary landscape – ancestors to present populations (Figure 8.4).

The Social Phenomenology of Landscape

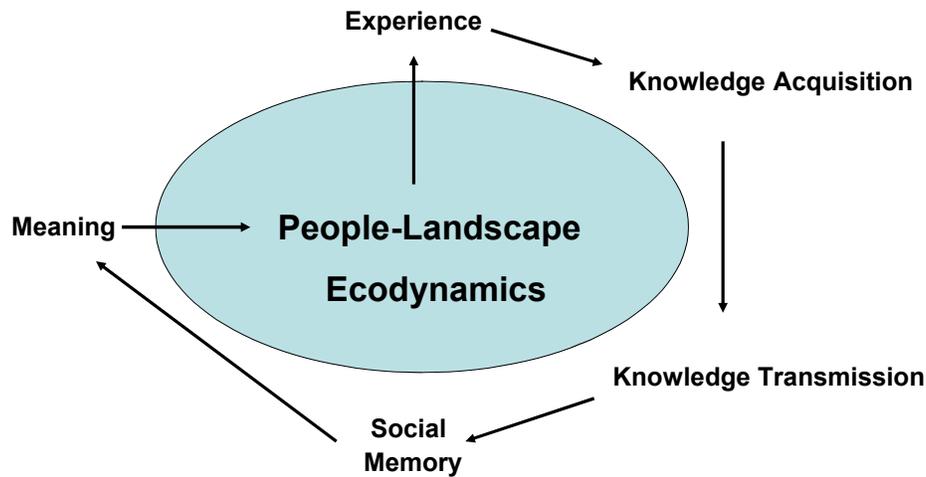


Figure 8.4 Schematic showing the relationship between an experiential phenomenology and the process of coming-into-knowing enacted within a social landscape through systems of knowledge flow, and the recursive character of meaning making within a social context. Derived independently through ‘open-ended conscious reflection’ of personal experiences with lands, information gathering, inter-personal relaying of experiences and ideas, and subjective reasoning attempting meaning construction, this schematic also parallels Maturana’s (1978:60) point that “knowledge implies interactions”. This schematic describes the hermeneutic methodology used in interpreting the story of Tow Hill migrating in relation to what is known of sea level change through the Western scientific paradigm (see Figures 8.2 and 8.3).

social action, rather it is the ‘saying’ of the said that truly informs us. Likewise, we will not learn here of the difference between epistemological or ontological views by solely interpreting what was ‘seen’, rather, we must look to make sense of the ‘seeing’ experience when relating physical features in the landscape to cultural meaning. Phenomenological being as a field method is thus an imperative procedure in divulging a sense of the local *narrative landscape*.

Poet, linguist and prose author, Robert Bringhurst chose to title the prologue to his book of translated Haida myths, *A Story as Sharp as a Knife* (1999), “Reading What Cannot be Written”. This interesting selection of words speaks to the fact that what is narrated in oral form has a multi-verse world of meaning attached to it, a world that can not be duplicated once translated and inscribed in print. However, similar to the ways the world is read for its myriad signs of seasonal change, how animal behaviours are read by hunters, plants read by foragers and farmers, peoples bodily movements read during socialization, art read for its beauty and aesthetic, or spatial imagery read comparatively to ones mental map, with an Interdisciplinary Multilogical Framework supporting the reading of such texts a larger portion of the once immense reservoir of knowledge surrounding the stories can be accessed and contextualized in the contemporary landscape.

This brief depiction of the way the Interdisciplinary Multilogical Framework model helps provide context to indigenous oral form is only intended to provide one example of how the best effort at representation derives from a dialogical process, and product of cross-cultural understanding. I conclude this thesis with a critique of the historic and contemporary context within which the discourse and practice pertaining to professional archaeology in British Columbia has been composed and established; in the hope that some form of resolution involving all arbiters of cultural heritage can contribute and be in accord.

9 Situating Contemporary Government Mandated Archaeological Practice in British Columbia: Suggestions for Future Directions

Inspiration for this chapter derives from personal and philosophical discontent with the contemporary practice of heritage management in the province, as predictive modeling such as it out-regulated Archaeological Overview Assessments (AOA) to the often politicized climate of land and resource development in BC. I consider how the British Columbia Archaeology Branch (BCAB) regulations of predictive modeling AOA exercises prompt binary decision making of ‘has / has not archaeology’ by archaeologists relying on statistical probabilities and ‘objective’ science at the peril of more holistic, multidimensional approaches to modeling and ground truthing lands, involving extant knowledge management systems held by First Nations. This critique and proposed vision for future heritage policy draws on notions discussed in the Interdisciplinary Multilogical Framework outlined in Chapter Eight which articulate a framework for a holistic archaeological practice for interpreting the past.

9.1 A Critique of Recent Changes to “Archaeological Overview Assessment” Standards and Guidelines

In 2008, the BCAB drafted a revision to the AOA guidelines established in the 1990’s. The “AOA Assessment as General Planning Tools Standards and Guidelines” document outlines a more quantifiable methodological approach to modeling archaeological potential of lands slated for development. The clear motivation for modifying this document is stated on page one, and reads as follows: “[t]he changing nature of the client group and use of the AOA studies requires a change in the AOA products” (2008:1). The “client group”, and driver behind these changes are “development or resource-extraction proponents” (2008:1).

One central aspect of these changes to AOA deliverables attempts to judge a model's success based on the categories of *effectiveness* and *efficiency*; with the former measured by its ability to “capture a substantial number of known archaeological sites” within its designated area, and the latter “defined by the amount of land the model requires to capture these known sites” (2008:2). In order for a model to be effective and “accepted by the Province”, it must “capture at least 70% of known archaeological site locations within areas of [modeled] archaeological potential” (2008:5). Pertaining to model efficiency, the AOA provisions further state:

[t]wo models will be accepted by the Province, high efficiency models that capture 70% or more of the known archaeological sites in 10% of the land base or less and, moderate efficiency models that capture 70% or more of known archaeological sites in 10% to 15% of the land base. (2008:5)

Model efficiency will be measured using Kvamme's (1988) gain statistic calculated as **%area / %known sites** (a score of 1 expressing highest efficiency and 0 expressing most inefficient) “to estimate how far the model deviates from a random distribution of a model's level of improvement over chance” (2008:5). Model efficiency is thus determined through a “single measure of model performance” (2008:5) for comparison with other models.

I foresee three primary problems with how these regulations structure archaeological practice. The first concern is with the ability of these strictly quantitative parameters to capture a representative sample of an archaeological signature reflecting the myriad behaviours related to landscape dwelling. In particular, I question the quality this type of measure allows when it comes to comparisons in like or kind of the complexities inherent in the physical world, and related cultural activities and practices enacted across time and space, and *in situ* cultural developments being modeled for archaeological potential.

The second concern arises from the limited capacity these modeling techniques show for expressing the discipline's ability to expand knowledge, considering they are fundamentally based on quantifying notions of effectiveness and efficiency, relying singularly on what is already known. The implication of such a modeling formula is complete redundancy between the model's objective (to capture known archaeological 'sites') and its outcome (a model showing a polygon of high archaeological potential around areas of known archaeological significance). What this formula negates is the possibility of a model capturing areas of unrecorded archaeological significance.

This latter criticism can be appreciated by the fact a paucity of 'site' types and number of certain 'site' types remains unrecorded with the BCAB, compared to ethnographically documented social practices of indigenous peoples. This point is shared by Mohs (1987, 1994) in his Masters thesis focused on the centrality of sacred places in the practice of indigenous spirituality. The overall intent of Mohs' investigation is to "familiarize the archaeological community with a little known or understood category of sites that figure prominently in the culture and history of the *Sto:lo*" (1987:iii). Paralleling the argument presented in this chapter on the concern for responsible heritage preservation practices, the quarter century old critique by Mohs on issues pertaining to "[c]urrent resource management legislation... [and its] effectiveness in affording protection to these sites and in addressing native heritage concerns" (1987:iii) express the recurring character and dismay of some professionals with which archaeological practice is being mandated in the province (see also Grier and Shaver 2008). For instance, although the more familiar sacred places are potentially recognized as protected under section 4(4)(a) of the Heritage Conservation Act, effective conservation and management is not in place, especially those embodied within the

material world and seemingly non-cultural physical landscape through culturally meaningful knowledge, narrative, and practice. Likewise, many ancient archaeological landscapes corresponding to palaeoshoreline configurations now existing well inland (as undertaken through this thesis research), or beneath the sea (Fedje and Josenhans 2000, Eldridge 2009 pcrs. comm.), have experienced minimal investigation. In large measure, the documented and provincially registered archaeological record within British Columbia reflects settlement and subsistence activities of the late Holocene era, thereby delimiting indigenous claims on what has been the most comprehensively articulated geopolitical and temporal cultural heritage, and missing areas of greater temporal importance that may just appear as recorded late-Holocene landscapes.

Another investigation on indigenous aspects of sacred landscapes is offered by Miller (1998). Although the theme of sacredness is not strictly one I wish to discuss, Miller's paper provides a useful reflection on how indigenous cosmological views in general play out in a Western legal system. In particular, Miller's paper highlights how the legal institution is founded upon acceptance of tangible material evidence of objective scientific experimentation and the objective reporting of scientific 'results' by scientists over what the judge ruling on the case under question referred to as "passionate... testimony grounded upon observation" (1998:87). In this sense, the discourse on the sacred presented by indigenous peoples is emblematic of a larger constellation of cultural constructions whose significance does not readily transfer between people holding different ontological orientations. For background on this case, the precise concern brought before the courts focused on the preservation of a sacred landscape comprising a large megalithic feature referred to as Nookachamps rock, which was one sacred feature within a network of physical

entities prominent in extant oral narratives recounted by local indigenous cultures of western Washington. In the final stages of this case, and in the ultimate decision made by the judge between preservation of this heritage for countless generations of indigenous communities versus lasting destruction for the economic gain by a single family, the spiritual landscape of the Nookachamps Valley, and its connection to a larger nexus of historically significant mythological landscapes was reduced to a materialist analysis focused on the validity of a single petroglyph.

Drawing upon the work of Mohs (1987, 1994) and Miller (1998) provides examples of the inadequacy in the present legal systems on both sides of the international border concerning heritage protection. I discuss throughout this thesis how differing ways of being-in-the-world result in unique interpretations on history, and that such constructions, recursively, mutually influence the social, political, economic, and ideological frameworks which ultimately provide shape and coherence within any given society. Predictive models built with a profound awareness of this can do much more to further heritage protection.

These *in situ* cultural institutions are only working at present for the dominant culture group, while subjugating others. At a foundational level, through both legal and direct action⁴⁷, change in the present power differentiation over heritage protection needs to occur.

⁴⁷ A pertinent instance where these forms of action have been implemented with success can be evidenced in the following quote extracted from a follow up letter by Morales (2004) notifying the BCAB of their multiple concerns with Dewhirst's re-application for a heritage inspection permit for the purpose of conducting an AIA:

The Hul'qumi'num Treaty Group has passed a successful resolution at the recent BC First Nation Summit that the protection of our First Nations' archaeological heritage and ancestral cultural property be asserted as a s.35 aboriginal right in British Columbia. In this instance, we argue there is a legal duty on the part of the Crown (Ministry of Sustainable Resource Management), and Third Parties (Channel Ridge Properties Ltd., ArchaeoResearch Ltd., and Arcas Consulting Archaeologists Ltd.) to *fully consult and accommodate* our aboriginal interests to avoid potential infringement upon our aboriginal rights. We state these meaningful interests involve consulting and accommodating: a) choice of archaeological consultant and the design of the permit b) a meaningful participation in field research; c) a decision-making role in heritage site management.

Only through these means will the efforts of those who challenge the dominant model coalesce into a most coherent alternative; one offering a) a vision for a more unified body of archaeological practitioners, b) a bridge between this tool set and others used for interpreting the past, and c) empowerment to the people whose heritage is at stake.

The methods and scale of the modeling conducted in Northeast Graham Island during 2007 makes comparison to those methods established by the BCAB incommensurable. However, the logic supporting the measure of effectiveness and efficiency of the latter can be critiqued in relation to data provided by the former. Had I applied the BCAB model to areas of Hiellen River and *Taaw* Hill, this model would have been judged as most effective and efficient had it only captured small areas around the known locales on both banks of the Hiellen River delta, to the detriment of not having located the archaeological landscape in the palaeo-spit to the south of *Taaw* Hill. The question remains what happens when a model is conducted for areas where previous archaeology is unknown? This would have been the situation had I applied the BCAB modeling method to areas within Clearwater Lake and Argonaut Hill. Would my model have received a gain statistic score of 0 based upon this fact, only to reach “accepted” levels if I were to expand the investigation area to include previously known ‘sites’ further north near Rose Point, thereby “capturing 70% or more of known archaeological sites in 10% to 15% of the land base” (2008:5)? Under these conditions, it would have required a movement north of the entire focus area in order to satisfy this blind constraint. In both cases, the arbitrary measurements of effectiveness and efficiency created by the BCAB modelling framework functions to focus the modeller’s gaze on heritage that is already known, and deters the expansion of novel archaeological re-discovery.

In light of the apparent success of the beach generated model and apparent lack of success with the hill model in material returns, I propose a reconsideration of what constitutes a successful model in relation to ideas of quantifying effectiveness and efficiency. What is absent from these measures of effectiveness and efficiency is their ability to reflect the ultimate utility in the myriad learning experiences gathered from ground-truthing a variety of areas, and how only through a recursive process of model validation and reanalysis is novel learning of the past going to occur. To quote Swanton, who in a correspondence with a discouraged Smith (1919) part way through his field research in Northeast Graham Island encourages, “you must certainly make a thoro [*sic*] examination of the islands, for negative evidence on this point (Rose Point), tho [*sic*] not pleasant to the investigator, may be of almost as much scientific value as positive evidence”. Working from a flexible field methodology employing contemporary spatial technologies, subsurface testing, observations of natural transformation processes, and experiential knowledge of lands, I was able to revise both models in order to better reflect the spatial and temporal potential of human activities in each area. Modeling marine generated features using this methodology proved successful at correlating personal cognitive preconceptions of land use based on ethnographically analogous landforms, with contemporary landforms recognized to have remained stable over the course of known time periods. Information drawn from an interdisciplinary knowledge set imparted onto imagery derived from remote sensing data and personal experience were equally beneficial to this modeling process. The same methods used for modeling hill features revealed personal experience in the landscape offered an integral level of analysis that imagery created using spatial technologies was unable to provide. Lacking the level of information available for the formation of marine generated features assisting with modeling

these features, modeling Argonaut Hill benefited most from phenomenological sense perception which offered information on the temporality of natural formation processes absent from LiDAR generated simulacrum. In short, while the marine generated model was successful in revealing land use patterns over a long span of time, the aberrant hill model was successful at determining how recurring erosional processes limit the antiquity of the archaeological record. In the latter case, broader patterns of past land use are inferred based on historic or protohistoric evidence of archaeology situated on contemporary hill top edges, and more antiquated archaeology associated with promontories, as documented in GaTw 19 and GaTw 15 (see Chapter Six). Both stories are necessary to fully appreciate the intricate dynamic played out between people and the physical world across time.

The latter method is at complete odds with the restrictive modeling objectives set out by the BCAB in their AOA Standards and Guidelines revisions, which state:

linked to these concepts of effectiveness and efficiency, is a requirement to produce a map layer that has no gradation in potential or relative ranking. This map layer will indicate either where archaeological expertise needs to be employed or that no further archaeological work is required. (2008:2)

Applied as a “stand alone” stipulation for modeling archaeological potential of lands, this clause reduces the behavioural patterns of people in the past to a chimera scenario, where people are transported without trace between major activity locales. Concurrently, the above clause ignores the relevance of movement in the development of material and sociocultural and technological innovation. For instance, this can be appreciated in the continual sociocultural florescence of freshwater, marine and terrestrial interaction networks enhancing access to trade and exchange in material resources, affines, social practices and technologies. Accordingly, what then do archaeologists make of imported materials, oral stories referencing intimate knowledge of distant events, places, and people, trade, communication,

and resource harvesting trails, what is the purpose of the canoe and the altered beach landform created for the ‘canoe run’, how have people dealt with environmental phenomenon that have altered their place of habitation to the extent that requires movement, and how did we come to inhabit nearly the entire earth? What this clause succeeds in advancing is an impression of a stagnant culture whose history is captured in the ethnographic present, including contemporary environmental conditions.

The real power in the stipulation becomes manifest through the key phrase “linked to these concepts of effectiveness and efficiency”. Through this linkage, and the quantified measure of model value determined using Kvamme’s gain statistic, areas suggested for archaeological investigations are considerably reduced. The net result of such a framework is the further impediment of archaeological knowledge acquisition and subsequent protection of indigenous and pre-1846 non-indigenous heritage within the province.

Another issue concerning the BCAB AOA guidelines’ isolation of certain cultural activities from the continuum of social practice is evidenced in the Modeling Results section of the Project Deliverables that creates a separate CMT Site Type Layer from the Combined Site Type Layer excepting CMTs (2008:6-7). Such fragmentation of archaeological behavioural signifiers threatens disjuncture between typically interconnected activities that may for example include: bark, pitch and plank removal, cambium and medicine collection, tree girdling, and canoe testing, with activities relating to settlement, hunting, fishing and gathering, and ritual / ceremonial life. The usefulness of CMTs as signifiers of a more complete archaeological (including historical) record is given additional credence by the archaeological landscape of Argonaut Hill Forks (GaTw 9).

Having first modeled this area as high archaeological potential using LiDAR remote sensing data in a GIS, upon ground truthing the locale, I came across a series of bark-stripped CMTs. Intuitively placed evaluative units in the immediate vicinity discovered archaeological remains indicating a suite of behavioural activities dating between 7,200 and 4,000 BP. In summation, when considered alone, CMTs hold less predictive power than when applied within a more systemic archaeological model of past land use.

The third problem I experience with the present structure of the AOA guidelines is the hasty atmosphere it creates for archaeological investigations, including established lines of communication shared between interest groups involved in heritage issues. A clear example of the low quality of work associated with a similar temporally-constrained framework is found in a report provided by the third party archaeologist hired by the courts in the same *Nookachamps Valley et al. v. Skagit County, et al* case previously referenced in this chapter, who was “allowed only three weeks between the Order of Motions calling for a cultural resources survey and the date for filing the report, and by limiting the contract to within the range of \$3,500 (Miller 1998:87)”. Total time spent in the landscape under question amounted to “one site visit, in a rain storm” (Miller 1998:87). The sum of this report states evidence of human occupation was absent, yet the author neglected to comment on the significant restraints placed upon his ability to recover such evidence.

The latter part of my previous critique relates to how the present power structure established around heritage protection creates a power imbalance encouraging unproductive forms of communication between heritage interest groups. As an example, the letter that Morales, Chief Negotiator for the *Hul’qumi’num* Treaty Group (HTG) forwarded to Channel Ridge Properties Ltd. (CRP) expressing the desire that an AIA be conducted of areas on

Saltspring Island, southwest British Columbia showing rare archaeological heritage in the form of inland midden, a petroglyph, and multiple burials (Figures 9.1 and 9.2) were initially ignored, demonstrating disregard for the authority the HTG held over heritage management issues in their traditional territory (correspondence on file, HTG, Ladysmith). This attitude is further reflected by the fact that an archaeologist was eventually hired, but only to conduct an AOA, and only after receiving redundant notification from the BCAB that they were legally obliged to do so. In fact, this measure was prompted by involvement of the RCMP by way of a follow up letter sent by Morales, once it was brought to his attention by local residents that destruction of lands retaining heritage had been initiated in the form of logging and road building by CRP without applying for a site alteration permit. The limited scope of pre-field modeling and in-field ground truthing, lack of subsurface investigations, consideration of a broad suite of land use practices performed in such geographical and environmental contexts, and temporal analysis of these environmental contexts, reflects the low quality of the AOA produced by Park and Dewhirst (2004). These unfortunate proceedings represent a clear example where deleterious relations between the client group, archaeologists, and First Nations require restructuring. For instance, the present structure of a colonial government's authority over First Nation's heritage, overlapping with land developer's investment interests, and interests in heritage preservation by First Nations, archaeologists, and concerned public citizens, mediated by an archaeologist hired by the investment group resulted in the destruction of known heritage, near-destruction of previously undiscovered heritage, and the absolute destruction of the context with which it was situated. A broader implementation of a government to government Memorandum of Understanding (MOU), drafted in 2007 by the HTG in collaboration with Minister of Tourism, Sport and the Arts is a

positive movement towards balancing the flow of information over heritage management; providing a time frame and framework for documenting indigenous values and information to inform bureaucratic management decisions.



Figure 9.1 Image showing *sxu'xil'* (petroglyph) located by pocket of inland midden on housing development property, Saltspring Island. The *hul'q'umi'num'* name given to rock art, *sxu'xil'*, its nominative form derived from *xuxulul's* (meaning writing) is said by local elder Arvid Charlie (Luschiim) that this proper name means “written, story that’s written, that rock’s got something (written on it)” (Arnett 2009 pers. comm.). Further evidence of connection between Coast Salish language and the animated landscape is given by Bierwert (1999:73), who writes:

In Halkomelem, Xals is named for his inscriptions upon the landscape. The root word xal refers to inscription in the widest sense. Xals indicates “his mark,” the trace of his presence, his record. The Halkomelem word designates not only graphic inscriptions and visual designs of the oral cultures but all kinds of graphics of the historic cultures, including photographs and writing. The landmarks that the Transformer created are the work of Xals then, marks made in this world, marks we can understand were created in the same sense as these other graphic inscriptions. Carlson (2001:156) also notes “the *Halq'eméylem* verb “to write” is derived from the very name of the legendary Transformers, *Xexá:ls.*” This point is also reiterated by a local elder from Kuper Island, Florence James who notes that *Xeel's* made the petroglyphs by physically inscribing them with his own fingers.



Figure 9.2 Image shows one of several burial mounds left undisturbed on a small ‘island’ of original land amongst dozens of acres of blasted bedrock. Separated by only a few hundred metres, the burials and petroglyph features have been stripped of any of their original context, and in this process, altering the sacred nature of these places.

Beyond the need to spend adequate time in the field, experiencing stages and remnants of natural formation processes as they unfold and affect the archaeological context under inquiry at the scale appropriate for addressing research questions, adequate time and legal measures must also be established for allowing healthy lines of communication to inform research inquiries. Ensuring the latter point is met requires political action on the part of provincial and federal governments towards balancing the power of heritage preservation from the contemporary model ensuring that First Nations have equal voice in heritage management issues within their traditional territories. Under this more equitable framework

for heritage management, I foresee a trend towards increased cooperation between archaeologists and First Nations, the result of which will provide a sharing of unique knowledge and skill sets, technologies, and resources that will benefit the quality of research into heritage related issues for all. Preparations for incorporating such collaborative (ethnographic) work into this thesis were organized prior to field research, and all requirements for accountability were satisfied from the perspective of the university. In our 2007 research, multiple avenues were attempted for incorporating Haida community member's knowledge into the modeling framework, with time, monetary issues, existing political obstacles, and related communication challenges being limiting factors when it came to implementation within sectors of the Haida community. I still believe, and knew throughout this research, that a stronger local voice, insight, and aesthetic would have greatly benefited composition of this thesis.

9.2 Reflection on the State of Heritage Preservation in the Province in Consideration of the Rubric of Landscape Archaeology

The above discussion highlights aspects of the role the BCAB expects of professional archaeologists within the province. Intended only as a brief critique, the framework can be further illuminated by considering the 'big picture' surrounding how the various interest groups invested in the province's resources that overlap with archaeological landscapes become entrenched within their own discourse, operate within their own political influence, and thereby each articulate a separate perspective on notions of heritage and management. It remains my hope that some of these restraints can be dissolved with revisions to the BCAB guidelines and standards, and more direct cooperation from and collaboration with First Nations. Critical to this movement is to incorporate the insights provided within this thesis by way of the Interdisciplinary Multilogical Framework model, and the primacy of experiential

knowledge derived from fieldwork and intuitive methods as a system for informing any and all approached of simulacra use within archaeological resource management.

While insightful for exposing underlying power dynamics influencing interpretive opinion, this broader endeavour provides a useful context reflecting the similar dynamic held between distinct archaeological bodies that often have associated disparate research agendas, clients, and literary traditions. In both cases this insularity creates disjuncture in cross-cultural, cross-disciplinary, and interdisciplinary understanding of heritage related issues. Only through efforts to engage in judgment-free, action-oriented dialogue, where power vested in groups holding heritage interests is equally disseminated, will reconciliation on issues pertaining to indigenous heritage protection in the province enter into practice. Bridging these ontological and intellectual chasms by weaving these monologues into a multilogical narrative, and grounds for cross-cultural practice is what a holistic landscape archaeology strives to achieve.

Paralleling this critique pertaining to limitations posed by the fragmented quantitative methods promoted by the BCAB is the notion of *heshook-ish tsawalk* (meaning “everything is one”) as Atleo (2005) puts forth in his book *Tsawalk*. Atleo’s thesis is an antithesis to the evolutionary narrative of existence relying upon inherently reductive principles of discerning characteristics of entities using methods altering their fundamental state when removed from the context of their natural environment, into the laboratory. The tradition of problematizing positivist science transcends culture boundaries, as evidenced by the notion of *heshook-ish tsawalk* that speaks to synergistic studies in ecology, and the notions of experience expressed within indigenous ways of being and the Western concept of phenomenology alike. These ‘alternate’ ways of viewing the dialectic relationship between human cultures and their

physical world, that has impressed in it the time honoured but malleable cultural landscape, is encapsulated by what Brumbraugh and Lawrence (1963) have termed the “experiential continuum”. These authors’ perspective parallel those argued in this thesis, which proposes archaeologist and previous inhabitants of the landscape under investigation share a common lexicon of meaning derived from an interconnected world of beings and phenomena that is often attached to place and transcends time.

Directed by the government mandated practices established by the BCAB, the history of Cultural Resource⁴⁸ Management (CRM) in British Columbia reflects a paucity of consideration towards the significance of landscapes (intertidal, riverine, lacustral, dunal, promontory *et cetera*) as cultural heritage systems, the way in which archaeological use locales interconnect and reveal the former use of the physical environment also as a cultural landscape. Untold systems of knowledge and information on patterns of land use have disappeared from view in this manner, culminating in the objectification of cultural heritage as a patchwork of ‘sites’ or objects or myth fragments. An alternative perspective holds that “place” shares a certain fluidity with “space”, and is generated through a culturally inculcated system of meanings held by indigenous peoples’ that challenge those designed for the benefit of Western legal policy on land claims, implemented by policy makers informed by a materialist ontology. Under this structure, the signature of indigenous peoples land use,

⁴⁸ The phrase cultural resource management can be interpreted to imply drastically different meanings. From a Western materialist perspective the word *resource* connotes the object world, and thereby is often reduced to being synonymous with the tangible methods of survey, excavation of artifacts and documentation of the archaeological ‘site’. What this use-definition neglects unfortunately is the intangible aspects of culture expressed in the broader matrix of ‘things that can be used’ by people in a cultural landscape. These may include those non-material human social institutions that help make up the environment in our head -- our social institutions, our beliefs, our accustomed practices, and our perceptions of what makes the environment culturally familiar (see King 2008).

rights, ownership, and management and stewardship strategies are restricted to dots on a map that reflect more about historic land use (development) patterns by contemporary society.

The boundaries and extent of the archaeological landscapes described for northeast Graham Island are merely relics of limited archaeological investigations reflecting the ability of an adaptable archaeological practice employing the Interdisciplinary Multilogical Framework to detect patterns of past land use. Accordingly, archaeologists must continue to work towards practicing their discipline free from ontological prejudices restricting the integral developmental nature of human experience-based learning, and in so doing, remain circumspect when forming interpretations on the tripartite rendering of time, space, and sociocultural phenomenon.

Heritage is about more than objects, ‘sites’ or other relicts – “heritage” must also be about cultural processes and practices of management, sustainability, stewardship, conservation / preservation and commemoration. Heritage does not simply include relicts from the material world, but is also comprised of the intangibles carried in the minds (memory and narratives) of living human cultures. In this sense, heritage does not exist without the traditions and practices associated with and embedded within contemporary communities, thereby heritage remains contingent upon the matrix of knowledge’s they possess.

9.3 Conclusions and Future Recommendations

This thesis set out to model areas within Northeast Graham Island using novel spatial technologies and traditional methods of pedestrian survey, with the intent to address the strengths of each. The utility of LiDAR remote sensing technologies have been found to be a useful tool for a) spatial analysis of remote areas difficult to access, b) modeling ground

surface in areas with thick vegetation cover such as forested zones, c) assessing spatial attributes for extensive areas that would otherwise be too costly in terms of time and resources to cover entirely by pedestrian survey, and d) making large-scale connections between palaeoclimatic events and other natural transformation processes responsible for landform modifications. When used in concert with an Interdisciplinary Multilogical Framework for interpreting the palimpsest landscape over the Holocene, the fine resolution of this data set functions as a useful tool (base layer). What this holistic framework offers to the high resolution capabilities of LiDAR data-generated imagery is dimension, both in terms of time and space. As a stand-alone tool, LiDAR technology is visually impressive, but it is a simulacrum of the world, and only one component amongst many available to assist archaeologists with their inquiries of complex interconnections between socionatural systems. Testing these simulacra against the physical world requires the authentic faculties archaeologists possess, but have increasingly neglected to recognize and hone with the onset of the computer era. These include the incredible ability of the human mind and body to store information, sense, compare mental and object worlds, analyze relations, intuit, and in all this, model the world around them. To invoke the words of Ingold (1993:152), “[t]o perceive the landscape is therefore to carry out an act of remembrance”, and within this “remembrance” lays the ability to perceive strata of human activities from a landscape “pregnant with the past” (153).

While the field testing portion of investigations was able to confirm the impressive accuracy of the LiDAR readings of ground, and its ability to distinguish certain macro features pertinent for building an archaeological predictive model, there are smaller scales, and questions of cultural behavioural expressions where this technology does not offer a

replacement to the rigorous field methodology that the discipline of archaeology was founded upon. For example, working from the most rudimentary maps, some background knowledge of geomorphological processes and field observations, Smith (1919) conducting the first archaeological survey of Northeast Graham Island notes a very similar line of reasoning for modeling this area to all subsequent archaeological investigations:

In doing this work, it was desirable not only to search for archaeological sites on the present sea shore but to make a reconnaissance back from the shore to discover if there were inland places that might have been sea-side sites, suitable for habitation during the human period. Finding that the entire area was made up of dunes, muskegs, swamps and lakes, all approximately parallel with the present shores, and noting the rapid growth of shore line, spits and dunes at present, it seemed possible, without definite information as to the age of these, that any of the land might be sea-shore within the human period. Consequently, search was made in the backcountry for the oldest shell-heaps or other remains, and shell-heaps were found a mile and a half inland.

One significant distinction however between the model followed by Smith and that employed in this thesis investigation is reflected in Smith's (1919) emphasis in his field notes on the "shell-heap" (midden) as a primary, and almost exclusive archaeological indicator. A combination of deduction and induction were used to discern cultural value to land within the 2007 model.

Ultimately, a holistic approach to modeling lands using the strengths of both LiDAR for enabling close analysis of the Holocene landscape palimpsest prior to field research, along with the practice of phenomenological field methods informed by a multidisciplinary data set was the sophisticated combination responsible for the detection of a new, and rich set of cultural landscapes in Northeast Graham Island during 2007 investigations.

Although not attempted within this thesis, I envision being able to use LiDAR generated imagery successfully to detect a variety of culturally modified landforms. Certainly this will be possible with more monumental type architectural features encountered in the

archaeological record throughout the world, as I am sure has occurred, but as well throughout the Northwest Coast with interior style pithouse depressions, midden-rimmed coastal plank house vestiges, and it remains unknown whether it will be useful for detecting burial mounds, clam gardens or other features of this scale (Sanders 2007c)? Still in its relative infancy as a technology utilized by archaeologists, I expect as this expensive data becomes increasingly available, that further innovative applications will be devised. I sense these will not justify trending away from the re-discovery that lies within our phenomenological faculties, and their stifled capacities, all of which are critical to employ in furthering the objective of preserving this archaeological heritage for future generations.

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Appendix I: Artifact Images for 2005 Investigations



DQS 5-1



DQS 5-2



Locality C 3-1



Locality C 3-2



TD1 1-1



TD1 1-2



T21



T3

Appendix II: Artifact Images for 2007 Investigations



GaTw 9:1-2



GaTw 9:2 - Image showing area of retouch.



GaTw 9:4



GaTw 9:5



GaTw 9:6



GaTw 9:7



GaTw 9:8



GaTw 9:9



GaTw 9:10



GaTw 9:11



GaTw 12



GaTw 9:13



GaTw 9-14



GaTw 9:15



GaTw 16



GaTw 9:17



GaTw 18

4 | 5 | 6 | 7 | 8 |



GaTw 9:19



GaTw 9:20



GaTw 9:21



GaTw 9:22



GaTw 9:23



GaTw 9:24



GaTw 9:25



GaTw 9:26



GaTw 9:27

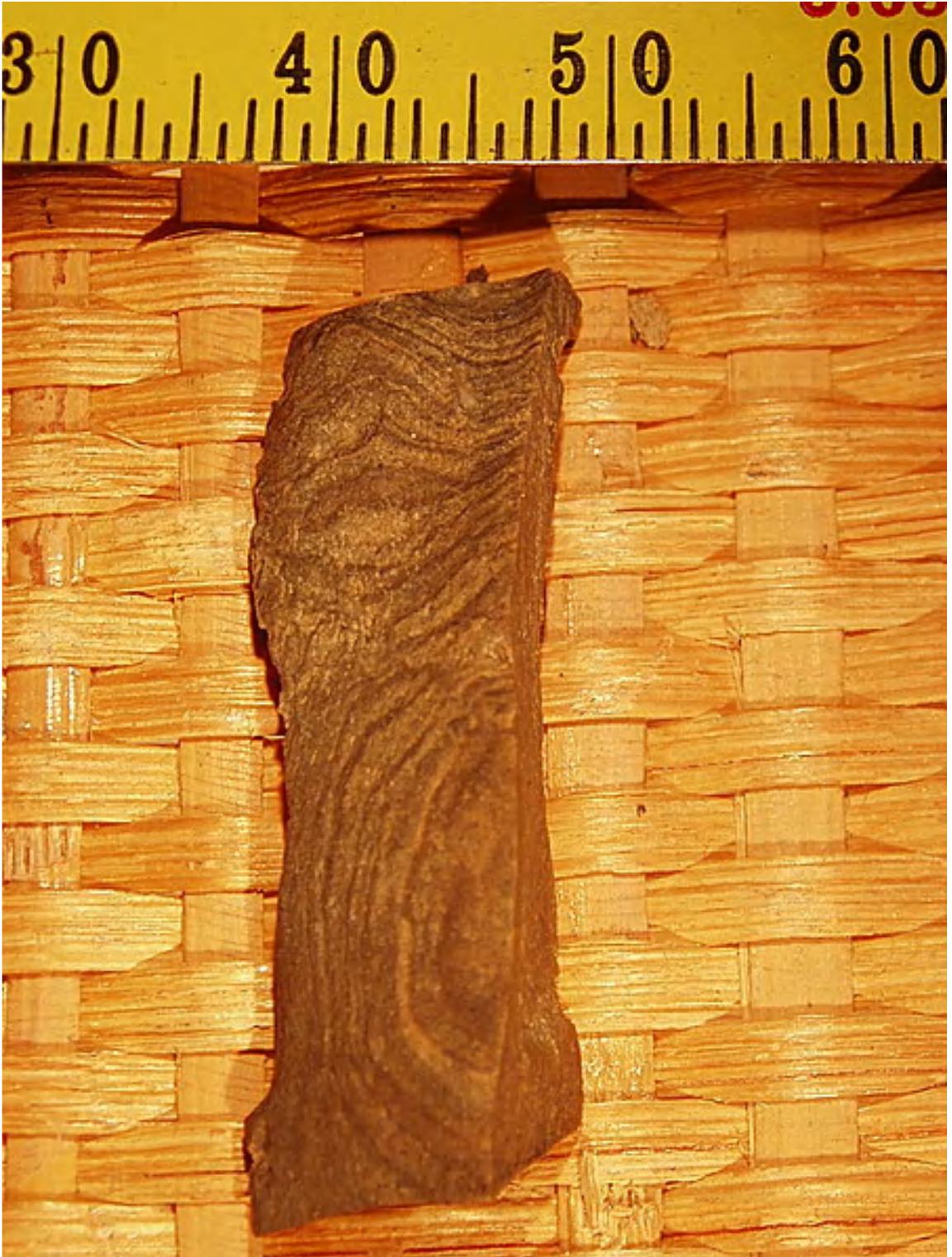
20 1 2 3 4 5 6 7 8 9 30



GaTw 9:28



GaTw 9:29



GaTw 9:30



GaTw 9:31



GaTw 9:32

2 3 4 5 6 7



GaTw 11:1



GaTw 11:1



Clearwater L. N. Beach (GaTw 11) surface survey artifact 1 (flake – water worn)



Clearwater L. N. Beach (GaTw 11) surface survey artifact 2 (unifacial chopper - water worn)



Clearwater L. N. Beach (GaTw 11) surface survey artifact 3 (unifacial chopper – water worn)



Clearwater L. N. Beach (GaTw 11) surface survey artifact 4 (bifacial chopper)



Clearwater L. N. Beach (GaTw 11) surface survey artifact 5 (unifacial chopper)



Clearwater L. N. Beach (GaTw 11) surface survey artifact 6 (unifacial chopper)



Clearwater L. N. Beach (GaTw 11) surface survey artifact 7 (unifacial chopper – water worn)



Clearwater L. N. Beach (GaTw 11) surface survey artifact 8 (unifacial chopper – water worn)



Clearwater L. N. Beach (GaTw 11) surface survey artifact 9 (core – water worn)



Clearwater L. N. Beach (GaTw 11) surface survey artifact 10 (flake – water worn)



Clearwater L. N. Beach (GaTw 11) surface survey artifact 11 (core)



GaTw 12:1



GaTw 12:1 - Images show both hammer-stone and unifacial chopper qualities.



GaTw 12:2



GaTw 13:1



GaTw 14:1



GaTw 14 – non recorded artifact from EU 2 (unifacial chopper)



GaTw 14 – non-recorded artifact with *Qay'llnagaay* Museum repository.



GaTw 15:1



GaTw 15:2



GaTw 15:3

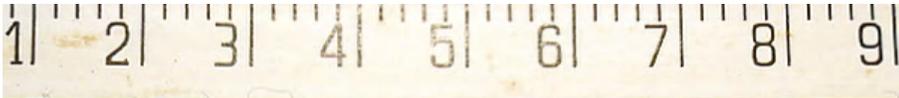
4 | 5 | 6 | 7 |



GaTw 15:4



GaTw 15:4



GaTw 14:5



GaTw 6-11



GaTw 15:12-15



GaTw 16



GaTw 16:1



GaTw 16:2



GaTw 16:3