

EkTb-9, Triquet Island, Núláwitǵv Tribal Area, British Columbia, Canada:
A Persistent Place of Human Occupation and Investment in Haílzaqv Territory

by

Alisha Gauvreau

Bachelor of Arts (Honours), Laurentian University, 2009
Cultural Resource Management Certificate, Simon Fraser University, 2011
Master of Resource Management, Simon Fraser University, 2016

A Dissertation Submitted in Partial Fulfillment of the
Requirements for the Degree of

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University of Victoria

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Supervisory Committee

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Dr. Quentin Mackie, Co-Supervisor
Department of Anthropology

Dr. Duncan McLaren, Co-Supervisor
Department of Anthropology

Dr. Genevieve Hill, Additional Member
Royal British Columbia Museum

Abstract

Archaeological site EkTb-9, Triquet Island, is situated within the Núláwítǵv Tribal area of Haíłzaqv (Heiltsuk) Nation territory along the outer central coast of British Columbia (BC), Canada. Emerging from the Hakai Ancient Landscapes Archaeology Project, this dissertation explores the 14,000-year record of repeat human occupation and investment at the site. EkTb-9's early post-glacial record is an integral component of the historical ecology of the region as a similar relative sea level has been maintained since the late Pleistocene, supporting access to and repeat occupation of these same areas over millennia. Through collaboration with Haíłzaqv Nation, oral narratives and language (Haíłzaqvǵa) are combined with archaeological interpretations and Haíłzaqv temporal phases are identified for past occupations of the site. This approach considers the intersections of Indigenous knowledge and Western science and the social and political embeddedness of archaeological practice. Collectively, the studies undertaken for this dissertation offer a unique opportunity to explore the theoretical and political importance of observed continuity at a single place of repeated human occupation and investment on the outer NWC of BC; a storied landscape of enduring cultural, economic, ecological, and political significance for Haíłzaqv Nation.

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List of Acronyms and Abbreviations

AD	Anno domini
ARP	Anvil-rested percussion
ASP	Anvil supported percussion
AT	Auger test
BC	British Columbia
Cal BP	Calibrated years before present
cm	Centimeter
CMT	Culturally modified tree
°C	Degrees Celsius
Central Coast	Central coast of BC, Canada
CCA	Central Coast Archaeology
dbd	Depth below datum
dfs	Depth below surface
DFO	Fisheries and Ocean Canada
ESP	Environmentalists' Sub-soil Probe
EU	Excavation unit
HCA	<i>Heritage Conservation Act</i>
HALAP	Hakai Ancient Landscapes Archaeology Project
HCEC	Haílzaqv Cultural Education Center
hht	Higher high tide
HHWLT	Higher High Water Large Tide
HIRMD	Haílzaqv Integrated Management Department
HTC	Haílzaqv Tribal Council
km	Kilometer
KYA	One Thousand Years Ago
LiDAR	Light detection and ranging
m	Meter

mg	Milligram
mm	Millimetre
NISP	Number of identifiable specimens
NWC	Northwest Coast of BC, Canada
PARL	Provincial Archaeological Resource Library
UCIAMS	University of California Irvine Accelerated Mass Spectrometry
VC	Vibracore
XRF	X-Ray Fluorescence

Community Engaged Research and Ethics Statement

This dissertation complies with the following:

- The Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans.
- The conditions of the Haílzaqv Band Research Registration Agreement (2016-2024) administered by the Haílzaqv Tribal Council c/o Haílzaqv Cultural Education Center.
- The terms and conditions of the University of Victoria's Human Research Ethics - Community Engaged Research Project Registration Protocol (Approval Number: 19-0104-01; 2016-2024).
- The terms and conditions of *Heritage Conservation Act* Permit 2011-0171, issued to Dr. Duncan McLaren by the BC Archaeology Branch, Ministry of Forests, Canada.

This work has also been conducted in alignment with the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP; United Nations 2008), the Truth and Reconciliation Commission of Canada: *Calls to Action* (TRCC 2012), the *BC Declaration Act* (Province of British Columbia 2023a), and the following principles adapted from the Canadian Archaeological Association (2023):

- Acknowledge Indigenous peoples have the right to maintain, control, protect, and develop their archaeological heritage.
- Engage with and make every reasonable effort to obtain free, prior, and informed consent from an Indigenous Nation prior to, during, and after conducting archaeological investigations within its territory.
- Create opportunity and invite Indigenous community members to participate in archaeological investigations planned in their territory and make every reasonable effort to hire and train Indigenous people to conduct not only archaeological fieldwork, but also

laboratory analyses, interpretation of archaeological data, presenting, and report writing in alignment with the Nation's protocols and the community member's personal interests.

- Mobilize the results of archaeological work through engagement with Indigenous communities within whose territories the work is undertaken.

This dissertation was conducted from the onset (ca. 2015) through direct collaboration with Haíłzaqv Nation, the Hakai Institute, the University of Victoria, and the Royal BC Museum (RBCM). Our collaborative work operates under the authority of the Haíłzaqv Tribal Council (HTC) and Yimás Council (hereditary chiefs), with input and direction from the Haíłzaqv Integrated Resource Management Department (HIRMD), and the Haíłzaqv Language Program. As described elsewhere in this dissertation (Chapter 1, 3, 4, and 5), this near decade-long collaboration enabled the ethical consideration and integration of Haíłzaqv!a (Haíłzaqv language) and other aspects of Haíłzaqv history and knowledge into this dissertation. As described further in Chapter 3, the collaboration with Haíłzaqv Nation represents a positive step towards acknowledging the legal and ethical need to consult, co-create, and re-envision how western science and Indigenous knowledge can be combined to improve our understanding of the past (Salomon et al. 2018).

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¹ A single “generation” is generally understood to be about 20 to 30 years (14,000 / 25 = 560).

² See Stafford et al. 2009, McLaren 2013, 2014, 2015, 2016a, 2016b, 2018.

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To put some faces to those named above, I have included several photo layups at the end of this section.³ I am so grateful to the photographers for capturing these important moments and memories over the last decade. So many people contributed in some way to this PhD journey, and while I have endeavoured to capture and acknowledge this incredible network of people, I also wish to thank all of those who may not be directly named above.

In closing, I extend my gratitude to you, the reader, for your interest in this research. May this work deepen our appreciation for the vibrant past of the Pacific Northwest, while fostering cultural sensitivity and honoring Indigenous rights, land ownership and sovereignty.

³ These layups also demonstrate the nature of the landscape and seascape of Triquet Island, highlight various field and laboratory methods undertaken for this research and the broader HALAP, and reveal examples of the field crews' collective interactivity with site EkTb-9 (Ingold 1993, 2017; Hicks 2016; Thomas 2001).



Panorama, looking south at EKTb-9 Triquet Island from kayaks in 2017;

L-R: Angela Dyck

Photo Credit: Alisha Gauvreau



Panorama, looking west-northwest at the intertidal excavation unit at EKTb-9 in 2017;

L-R: Duncan McLaren, Daryl Fedje (in the excavation unit/ caisson), Angela Dyck, Jim Stafford, Seonaid Duffield, Chris Hebda, Joanne McSporrán, Maxwell Johnson Jr., Quentin Mackie;

Photo Credit: Alisha Gauvreau



Vibracoring near the EU trench in 2017;
L-R: Seonaid Duffield, Alisha Gauvreau,
Maxwell Johnson Jr., Daryl Fedje ;
Photo Credit: Joanne McSporran



Excavating Stratum VI in the EU trench in 2015;
L-R: John Maxwell, Alisha Gauvreau;
Photo Credit: Grant Callegari



Auger testing along northeastern peninsula in 2017;
L-R: Duncan McLaren, Daryl Fedje ;
Photo Credit: Alisha Gauvreau



Collecting a column sample from the north wall of the
EU trench in 2016;
L-R: Alisha Gauvreau, Duncan McLaren, John Maxwell,
Angela Dyck, Seonaid Duffield;
Photo Credit: Joanne McSporran



Carefully lowering buckets of sediment to the beach for wet-screening in 2015;
L-R: Tomonori Kanno
Photo Credit: Rika Shinkai



Bucket line at wet-screening station in 2015;
L-R: Jenny Cohen, John Maxwell, Callum Abbott,
Tomonori Kanno, Naoto Yamamoto, Rika Shinkai
Photo Credit: Dale Croes



Water pump system set in a canoe to operate wet-screens at variable tides in 2015;
L-R: Callum Abbott
Photo Credit: Dale Croes



Wet-screening in the intertidal in 2015;
L-R: Callum Abbott, Tomonori Kanno, John Maxwell,
Naoto Yamamoto, Jenny Cohen, Rika Shinkai
Photo Credit: Dale Croes



Wet-screening on the northern beach in 2016;
L-R: Andrea Walkus;
Photo Credit: Joanne McSporrán



Wet-screening on the northern beach in 2016;
L-R: Angela Dyck, Seonaid Duffield, Duncan McLaren;
Photo Credit: Joanne McSporrán



Packaging peat bundles in 2015;
L-R: Joanne McSporrán;
Photo Credit: Rika Shinkai



Photographing the bark wrapped stick in 2015;
L-R: Josh Vickers;
Photo Credit: Dale Croes



At the EU trench in 2015;
L-R: Jenny Cohen, Alisha Gauvreau, Andrea Walkus;
Photo Credit: Dale Croes



At the EU trench in 2016;
L-R: Alisha Gauvreau, Angela Dyck, John Maxwell,
Andrea Walkus;
Photo Credit: Joanne McSporrán



Wet-screening while sporting fancy moustaches in 2015;
L-R: Alex Lausanne, Jenny Cohen;
Photo Credit: Rika Shinkai



Heading to the Hakai Institute from Triquet Island in 2015;
L-R: Johnny Johnson;
Photo Credit: Rika Shinkai



Setting up the drone in 2015;
L-R: Grant Callegari;
Photo Credit: Rika Shinkai



Operating the drone from the beach in 2015;
L-R: Grant Callegari;
Photo Credit: Rika Shinkai



Kitchen shift in 2015;
L-R: Andrea Walkus;
Photo Credit: Rika Shinkai



Fire pit on the northern beach in 2015;
L-R: D, Josh Vickers, Rika Shinkai;
Photo Credit: Dale Croes



Field crew (minus Joanne McSporran) in 2015;
 L-R: Dale Croes, Andrea Walkus, Josh Vickers, Alisha Gauvreau, John Maxwell, Callum Abbott, Jenny Cohen, Daryl Fedje, Rika Shinkai, Tomonori Kanno, Naoto Yamamoto, Duncan McLaren;
 Photo Credit: Joanne McSporran



Hakai vessel with Hakai Geospatial team and Brian Menounous (UNBC) collecting drone imagery and LiDAR data at Triquet Island in 2017;
 Photo Credit: Keith Holmes



Auger testing at the southern area of the site in 2015;
 L-R: Callum Abbott
 Photo Credit: Dale Croes



EkTb-9 intertidal excavation in 2017;
 L-R: Jim Stafford, Daryl Fedje
 Photo Credit: Joanne McSporran



EU trench in 2015; humic removed east of trench for egress in 2015;
 L-R: Rika Shinkai, Naoto Yamamoto, Alisha Gauvreau, Tomonori Kanno;
 Photo Credit: Dale Croes



EkTb-9 intertidal excavation in 2017;
 L-R: Maxwell Johnson Jr., Chris Hebda, Daryl Fedje, Jim Stafford (in the unit), Angela Dyck, and site visitors
 Photo Credit: Joanne McSporran



After hours on the beach in 2015;
L-R: Duncan McLaren;
Photo Credit: Dale Croes



After hours on the beach in 2015;
L-R: Johnny Johnson, Josh Vickers, Jenny Cohen;
Photo Credit: Rika Shinkai



Campsite on Triquet Island in 2015;
L-R: Dale Croes, Tomonori Kanno, Rika Shinkai;
Photo Credit: Naoto Yamamoto



Fish trap EkTb-3 on Triquet Island in 2019;
L-R: Larissa Dixon;
Photo Credit: Larissa Dixon



Ferrying fieldgear to shore in 2016;
L-R: Duncan McLaren, John Maxwell;
Photo Credit: Joanne McSporran



Diligent notation at the trench 2016;
L-R: Angela Dyck, Seonaid Duffield;
Photo Credit: Joanne McSporran



After hours on the beach in 2016;
L-R: Jim Stafford, Johnny Johnson, Duncan McLaren,
Daryl Fedje; *Group shot*: Seonaid Duffield, Maxwell
Johnson Jr., Angela Dyck, Alisha Gauvreau, John Maxwell,
Jim Stafford, Duncan McLaren, Daryl Fedje;
Photo Credit: Joanne McSporran



Backfilling the trench in 2016;
L-R: John Maxwell, Daryl Fedje, Seonaid Duffield,
Jim Stafford, Duncan McLaren, Maxwell Johnson Jr.,
Angela Dyck;
Photo Credit: Joanne McSporran



Trench dweller
Photo Credit:
Joanne McSporran



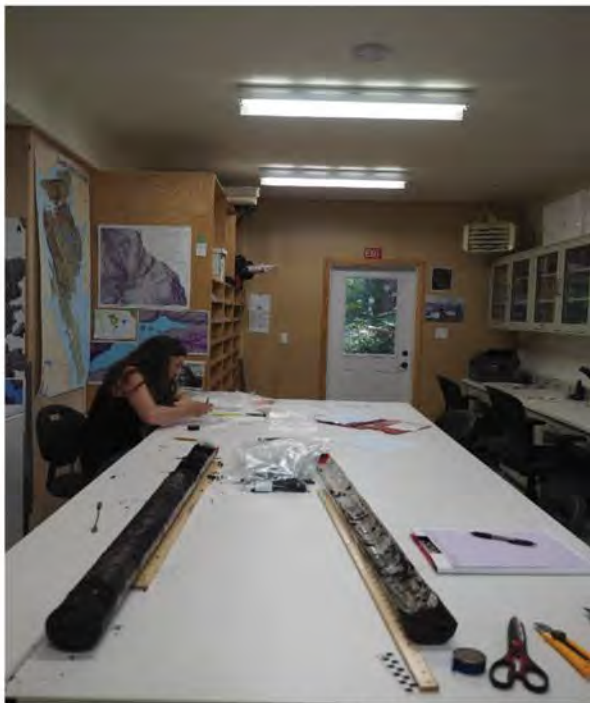
Setting up the vibracore at EkTb-9 in 2017;
L-R: Seonaid Duffield, John Maxwell, Maxwell Johnson Jr.;
Photo Credit: Alisha Gauvreau



Conducting a vibracore test in 2017;
L-R: John Maxwell, Maxwell Johnson Jr.;
Photo Credit: Alisha Gauvreau



Retrieving a vibracore sample in 2017;
L-R: Seonaid Duffield, John Maxwell, Maxwell Johnson Jr.;
Photo Credit: Alisha Gauvreau



Processing a vibracore at Hakai's Archaeology Lab
at the Quadra Island Ecological Observatory in 2018;
L-R: Seonaid Duffield
Photo Credit: Alisha Gauvreau



Peninsula Pursuits Series at the University of Victoria Continuing Studies Department in 2017; L-R: Alisha Gauvreau, Larissa Dixon
Photo Credit: Alisha Gauvreau



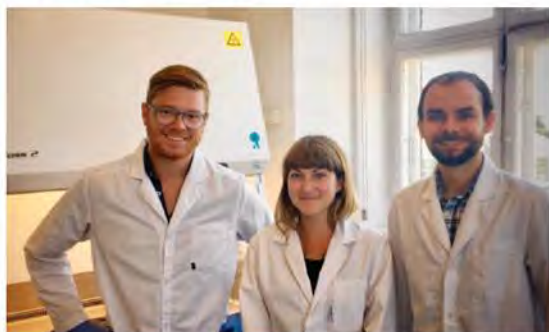
Canadian Archaeological Association Conference in Ottawa, Ontario, in 2017; L-R: Joanne McSparran, Daryl Fedje, Alisha Gauvreau, Seonaid Duffield, Alex Lausanne, Cecilia Porter
Photo Credit: Alisha Gauvreau



Processing peat bundles at Hakai's Archaeology Lab at the Quadra Island Ecological Observatory in 2016; L-R: Angela Dyck, Alisha Gauvreau
Photo Credit: Alisha Gauvreau



Research Institute for Humanities and Nature in Kyoto, Japan, in 2016 ; L-R: Alisha Gauvreau, Junko Habu, Naoto Yamamoto,
Photo Credit: Alisha Gauvreau



Center for Geogenetic Research, Copenhagen, Denmark, 2018; L-R: Mikkel Winther Pedersen, Alisha Gauvreau, Chris Hebda;
Photo Credit: Alisha Gauvreau



Aerial view of Bella Bella, Campbell Island, in 2014;
Photo Credit: Alisha Gauvreau



Looking northwest at BBQ salmon on the beach in Bella Bella, Campbell Island, in 2014;
Photo Credit: Alisha Gauvreau



Presenting at HIRMD in Bella Bella, in 2017;
L-R: Alisha Gauvreau
Photo Credit: Alisha Gauvreau



Heiltsuk Cultural Education Center in 2017;
Photo Credit: Alisha Gauvreau



View south en route to Triquet Island in 2016;
Photo Credit: Alisha Gauvreau



The goose, aka my ride to the Hakai Institute in 2015;
L-R: Hakai Staff, Pacific Coastal Airlines Staff, Josh Vickers,
Jonny Johnson;
Photo Credit: Alisha Gauvreau

Dedication

To past, present, and future generations of Indigenous Peoples of the Pacific Northwest.

Chapter 1 Introduction

“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.”

Ingold (1993:152).

Introduction

Emerging from the Hakai Ancient Landscapes Archaeology Project (HALAP), this dissertation explores the 14,000-year record of human/landscape/seascape interactivity expressed at archaeological site EkTb-9, Triquet Island, located on the Northwest Coast (NWC) of British Columbia (BC), Canada.⁴ As the site is in the Núláwít̓xv Tribal Area of Haíłzaqv (Heiltsuk) Nation territory, this dissertation also explores intersections of Indigenous knowledge and Western science and aspects of the social and political embeddedness of archaeological practice. In the following sections of this introduction, you will find an overview of the theoretical framework that informs this dissertation, along with a description of the study area and some of the current implications of archaeological inquiry. Additionally, I identify existing gaps in knowledge on the NWC, present my research questions in table format, and provide a detailed outline of the structure and content of this dissertation.

Theoretical Framework

The theoretical framework that I employ for my dissertation is grounded in the research program of historical ecology (Armstrong 2017; Armstrong et al. 2017; Balée 2006; Szabó 2015; Thompson 2013), influenced by Ingold’s (1993, 2017) concept of the temporality of the landscape

⁴ Dr. Duncan McLaren is the Primary Investigator of the HALAP, with archaeological work conducted per the terms and requirements of *Heritage Conservation Act* Permit 2011-0171. For more information about the initial recording of the site (Stafford et al. 2009), and its selection for investigation as part of the HALAP, see Chapter 3 Background.

and Bartlett et al.'s (2012) concept of two-eyed seeing. The research program of historical ecology is well suited for the investigation of archaeological sites with long-term records of human occupation and investment because it centers on the study of human/landscape/seascape interactivity; that is, how people shape, and are simultaneously shaped by, the environments they inhabit over extended periods of time (decades, centuries, millennia) (Balée 2006; Crumley 1987, 1994, 2007; Ingold 1993:165, 2017). Within this interactivity, humans are keystone species and primary drivers of landscape formation and environmental change (Thompson 2013:2). This recognition of ancestral agency is a welcome departure from earlier theories (e.g., cultural ecology) that largely perceived humans to be “reactors to, rather than causes of the environmental change, stability, degradation and increased biodiversity” observed at archaeological sites (Thompson 2013:4). Historical ecology reflects Ingold's (1993:165, 2017) idea that the landscape is more than a backdrop or stage for human activities; it is interactivity manifest, “populated by beings who are themselves agents, and who reciprocally ‘act back’ in the process of their own dwelling.”^{5,6}

As there is “no single unified methodology or theory” associated with the research program of historical ecology (Armstrong 2017; Armstrong et al. 2017:27; Rick and Lockwood 2013; Santana-Cordero et al. 2024; Szabó 2015), this dissertation applies both novel and well-established methods of archaeological and anthropological inquiry.^{7,8} This includes the theoretical and community-centered approach of two-eyed seeing (Atalay 2006, 2008, 2012;

⁵ Ingold (1993) framed this interactivity around the concept of *the taskscape*. The “taskscape” is not mentioned in this dissertation (beyond this footnote) as Ingold later argued that he “had introduced taskscape in short only to show why we do not need it. Landscape will do, so long as we bring it back to life and cease to regard it as stage and scenery for the enactment of human affairs” (Ingold 2017:22).

⁶ In this vein, the archaeological work undertaken at EkTb-9 also represents a form of dwelling and interactivity with the landscape and seascape of Triquet Island (Hicks 2016; Ingold 1993, 2017). Although detailed explorations of this more recent dwelling are beyond the scope of this dissertation, the photos included in the Acknowledgments section provide some depictions of the field crew's interactivity with Triquet Island. I encourage all archaeologists to contemplate the varied ways in which their archaeological fieldwork represents a “more recent form of dwelling on an ancient site” (Ingold 1993:152, 2017; Hicks 2016; Thomas 2001:181).

⁷ Methods are described in more detail later in this introduction and elsewhere in this dissertation. Archaeological and anthropological methods include those adapted from related disciplines (e.g., geography, geology, ecology, biology, botany, Indigenous studies, and conservation science).

⁸ A recent study reviewed 544 historical ecology papers and found consistent trends in the variables and categories described (Santana-Cordero et al. 2024). This dissertation reflects the interdisciplinary, community-engaged, millennia-scale, knowledge mobilization and management-focused objectives of historical ecology (Armstrong 2017; Santana-Cordero et al. 2024).

Bartlett et al. 2023; McGuire 2008).⁹ The collaboration with Haítzaqv Nation made it possible to use this approach, which means to see "from one eye with the strengths of Indigenous ways of knowing, and to see from the other eye with the strengths of Western ways of knowing, and to use both of these eyes together, for the benefit of all" (Barlett et al. 2012:335).

These concepts are applied to support explanations and interpretations of the storied landscape/seascape of EkTb-9 and the broader Núláwítǵv Tribal Area. Overall, the theoretical framework and approach employed in this dissertation aims to bridge gaps between the social and natural sciences to produce data that has cultural and environmental value for Indigenous and non-Indigenous communities and governments, including regional conservation and stewardship initiatives (Armstrong and Veteto 2015; Armstrong 2017; Armstrong et al. 2017: 27; Balée 1998, 2006; Crumley 1987, 2007; McKechnie 2013; Rick and Lockwood 2013; Szabó 2015; Szabó and Hedl 2011; Thompson 2013).

Study Area

Situated along the outer NWC of BC (Figure 1-1), site EkTb-9 and the Núláwítǵv Tribal Area within the broader Haítzaqv Territory, are storied landscapes in an area of the world where few early-post glacial sites are presently known (Braje et al. 2020; Boas 1932; Erlandson et al. 2007; Erlandson and Braje 2011; Mackie et al. 2018; Maxwell et al. 1997; McLaren et al. 2015, 2019a, 2019b; Olson 1955). The outer NWC is proposed to have permitted early human expansion from Asia into the Americas as ice began to retreat, with evidence of non-glacial conditions on the NWC of BC as early as ca. 18,000 – 16,000 years ago (Al-Suwaidi et al. 2006; Blaise et al. 1990; Darvill et al. 2018; Erlandson et al. 2007; Fladmark 1975, 1979, 1983; Hebda 2019; Li et al. 2023; Letham 2024; Lesnek et al. 2020; Madsen et al. 2022; McLaren et al.

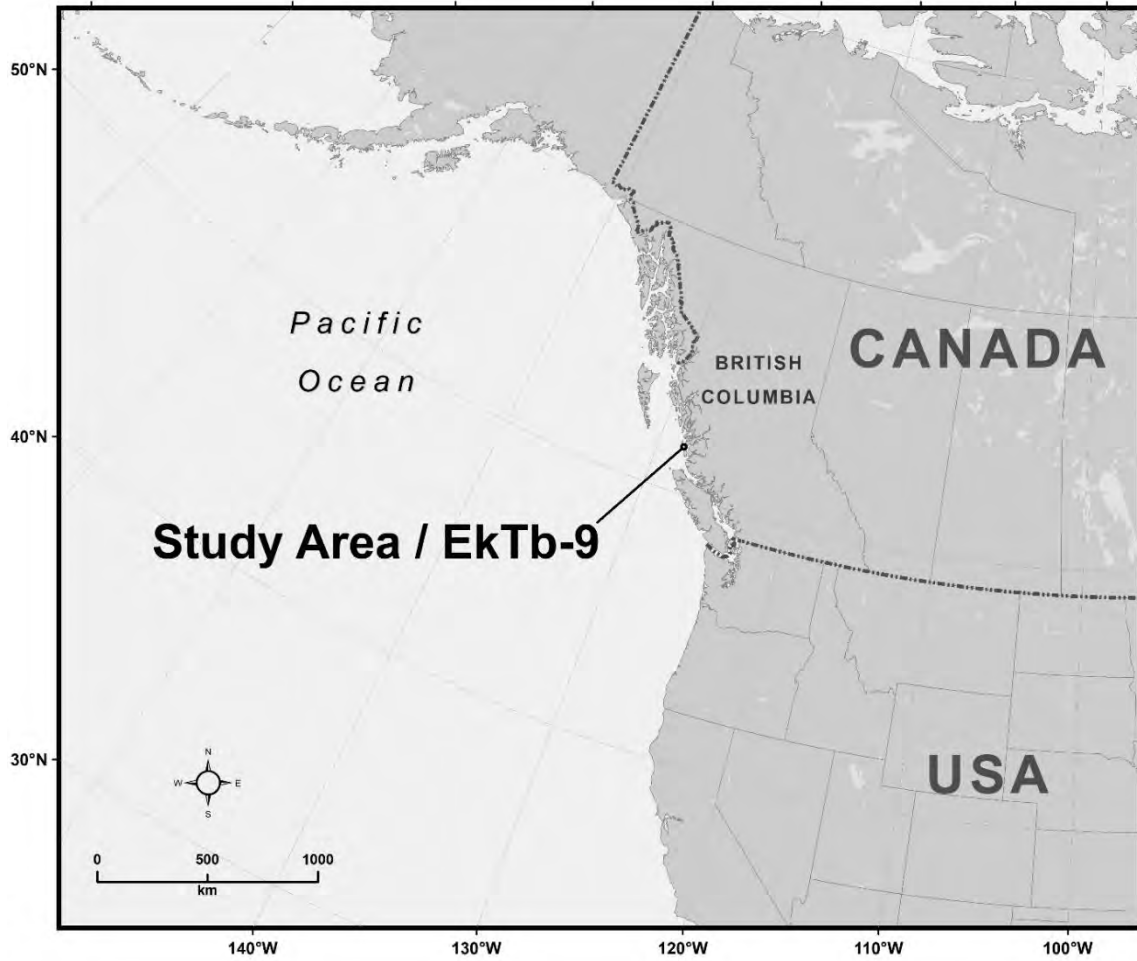
⁹ The concept and application of “two-eyed seeing” is described in more detail later in this introduction.

2019a; Misarti et al. 2012; Nichols 2023; Oviatt et al. 2022; Potter et al. 2017; Shaw 2020). Human presence is documented on the NWC by ca. 14,000 – 13,000 years ago however, only a handful of outer coastal sites are known to be more than 12,000 years old (Davis et al. 2019, 2022; Dillehay et al. 2015; Halligan et al. 2016; McLaren et al. 2018, 2023; Vogelaar 2017; Waters et al. 2011, 2018; Willams et al. 2018). While available linguistic, archaeological, genetic, and geological evidence suggests that Pleistocene seafarers harnessed the oceans varied resources as they expanded out along the Pacific Rim, many gaps remain within the late Pleistocene archaeological record of the NWC (Al-Suwaidi et al. 2006; Barrie and Conway 2002; Bennett et al. 2021; Blaise et al. 1990; Braje et al. 2020; Darvill et al. 2018; Erlandson and Braje 2011; Fladmark 1975,1979,1983; Hebda et al. 2022; Li et al. 2023; Letham 2024; Lesnek et al. 2020; Mackie et al. 2018; Madsen et al. 2022; McLaren et al. 2019a, 2023; Misarti et al. 2012; Nichols 2023; O’Connell 2010; Oviatt et al. 2022; Pigati et al. 2023; Shaw 2020). Results produced through the HALAP, including those described in this dissertation, serve to fill some of these lingering lacunae (Mackie et al. 2018; McLaren 2008; McLaren et al. 2014, 2015, 2018, 2019a).

Over the last three decades, the application of minimally invasive coring methods and new data technologies have improved archaeological prospection and interpretations of the dynamic early-post glacial environment of the NWC (Hebda et al. 2022; Letham et al. 2020, 2022; Mackie et al. 2018:43; McLaren et al. 2019a, 2023). The HALAP’s application of such methods for its regional based study of the NWC succeeded in producing chronologies for a few outer coastal island sites that demonstrate early-post glacial records of occupation, some of which are long lasting, spanning the entire Holocene (Dyck et al. 2020; Mackie et al. 2018; McLaren 2013; McLaren et al. 2015, 2018, 2019a, 2019b). These sites present unique

opportunities for archaeological investigations along the coast as they are situated in areas where a relative sea level has been relatively stable since the late Pleistocene (Mackie et al. 2018; McLaren 2008; McLaren et al. 2014, 2015, 2019a). Overall, the results of the HALAP demonstrate a broad regional scale of repeated residency and endowment in the storied landscape of the Núláwitxv Tribal Area over a long duration of time (Dyck et al. 2020; Letham et al. 2020; McLaren 2013:1; McLaren et al. 2015, 2018, 2019a, 2019b).

Figure 1-1 EkTb-9, Study Area, on the Central Coast of British Columbia, Canada.
Figure prepared by K Holmes (Hakai Institute).



Archaeology as Socially and Politically Embedded Practice

Archaeological investigations of storied landscapes that are replete with the products and processes of ancestral labour have practical and political implications in the present (Armstrong 2017; Armstrong et al. 2017; Atalay 2006, 2008, 2012; Balée 2006; Balée and Erickson 2006; Castañeda 1996; Cruickshank 1991, 1994, 1998, 2001, 2002; HTC 2018, 2023; Kidder 2013; Marsden 1998a, 1998b, 2002; Martindale 2000, 2006; Mason 2000; McGuire 2008; McLaren et al. 2015; Pennings 2013; Thompson 2013; Wadsworth et al. 2023; White 2006; Wilson and Harris 2005). While the discipline of archaeology does not “directly seek to engage in the key political struggles of the modern world”, archaeological investigations conducted within unceded Indigenous territories in Canada can carry profound political effects for Indigenous communities today (Atalay 2006, 2008, 2012; Kidder 2013; McGuire 2008:14; Wadsworth et al. 2023). As per Castañeda (1996:24):

“Some of these effects stem directly from the ideological assumptions that undergird the research paradigm and interpretive models, whereas others derive from secondary manipulations by persons other than the researcher. Once the archaeologist produces an interpretation of the past, that knowledge has a political life of its own.”¹⁰

In the age of social media and rapid information exchange it can be challenging to predict if one’s work may be perceived by the media as trivial or tantalizing, and it is largely impossible to control for potential secondary manipulations of one’s data (Wadsworth et al. 2023). This means that even with ongoing reciprocal community engagement and best efforts to communicate accurate information to the public, secondary manipulations of data will still occur and can often result in facts being glossed over or lost to the ether. As per Schablitsky (2020:1):

“Sharing archaeological findings can be dangerous since a single interview can create a barrage of problems that did not previously exist. When a site is just discovered and

¹⁰ See the Conclusion Section for a description of how some of the results of this dissertation took on “a life of their own” following the presentation of a poster reporting EkTb-9’s revised chronology at the Society of American Archaeology conference in Vancouver, BC, in 2017.

exciting finds have not yet been publicly shared, reporters and even documentary producers can exhibit a voracious appetite for the “new” and “spectacular” [...] Many archaeologists have experienced being misquoted and, perhaps worse, the significance of their discoveries overshadowed, often in favor of sensationalism. Although this unintentional or intentional misrepresentation of research can leave a site and the scholar relatively unscathed, occasionally there may be a significant impact to the project.”¹¹

The ripple effects of such impacts are also more likely to be acutely felt by those communities engaged in the work, which further supports the validity and necessity for the early application of two-eyed seeing (Atalay 2006, 2008, 2012; Bartlett et al. 2023; McGuire 2008). This process of weaving Indigenous knowledge with scientific investigations, interpretations, and curricula, can be ethically applied by outside researchers through direct collaboration and engagement with recognized holders (and owners) of Indigenous knowledge and histories (Bartlett et al. 2012; Nicholas 2022). Collaboration and engagement towards this end can corroborate the accuracy and appropriateness of the community information that is being integrated into the study, thereby mitigating potential for over-simplification, unlawful appropriation, and perpetuation of the generally extractive and problematic colonial foundations of archaeology (Gaudreau 2015; Nicholas 2022; Wadsworth et al. 2023). Coauthoring scientific publications, newsletters and other accessible media to mobilize the results of community engaged research is an invaluable way to create a permanent factual record of the work; one reflecting both Western scientific and community-specific principles and values.¹²

¹¹ In some instances, the scholars do not remain unscathed, including but not limited to, experiencing harassment, death threats, and threats of intentional destruction of Indigenous cultural/burial spaces and other sensitive sites (Wadsworth et al. 2023). See Wadsworth et al. 2023 for insightful, though disheartening, discussion of the effects of North American archaeology’s surge in popularity and higher visibility for both scientific and fringe narratives.

¹² See Appendix C and Appendix E for examples of media produced in collaboration with the HIRMD working group and the Hakai Institute to support the mobilization and accessibility of the results of this dissertation research.

While “two-eyed” seeing is a practical and ethical theoretical approach to collaborative research, no universal frameworks exist for combining Indigenous oral narratives and knowledge with archaeological inquiries, as each Indigenous community is unique, possessing Nation-specific laws, protocols, histories, and preferences for engagement (Budhwa 2002:108; Gaudreau 2015; Martindale 2006; Nicholas 2022). Cognizant of these realities and in alignment with the framework of the *Declaration Act*, this dissertation was conducted from the onset (ca. 2015) through engagement with community and governmental organizations of the Haíłzaqv Nation.¹³ The collaborative work undertaken for this dissertation operates under the authority of the elected Haíłzaqv Tribal Council (HTC) and the hereditary Yímás Council, with input and direction from the Haíłzaqv Integrated Resource Management Department (HIRMD), the Haíłzaqv Cultural Education Center, the Haíłzaqv Language Program, and Qíxítasu Yímázalas Elroy White (Central Coast Archaeology (CCA)). This dissertation also reflects the collaborative efforts among a network of individuals at the Hakai Institute, the Tula Foundation, the University of Victoria, the Royal British Columbia Museum (RBCM), and numerous other national and international institutions, communities, and organizations.¹⁴ This collaboration is aligned with the research program of historical ecology, and represents a positive step towards acknowledging the legal and ethical need to consult, co-create, and re-envision how Western science and Indigenous knowledge can be combined to enrich our collective understanding of the past, and to promote the protection of cultural and environmental values in the present (Armstrong 2017; Armstrong et al. 2017; Atalay 2006, 2008, 2012; Balée 2006; Balée and Erickson 2006; CAA 2023;

¹³ The *Declaration on the Rights of Indigenous Peoples Act* (the *Declaration Act*) establishes the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) as the Province of British Columbia’s framework for reconciliation, as called for by the Truth and Reconciliation Commission of Canada’s (TRCC) *Calls to Action* (Province of British Columbia 2023; TRCC 2012; United Nations 2008). When this dissertation research first began, it was primarily guided by the principles of UNDRIP and other ethical best practices and requirements for community collaboration, as the *Declaration Act* was assented to November 28, 2019, approximately four years after this dissertation was initiated, and eight years after the HALAP began work at the site. For more information regarding the ethical, statutory, and regulatory considerations that have guided the research, see the Community Engaged Research and Ethics Statement section in the front matter of this dissertation.

¹⁴ See the Acknowledgements section for more details.

Province of British Columbia 2023; Salomon et al. 2018; UNDRIP 2008; Santana-Cordero et al. 2024; Thompson 2013; TRCC 2012). Collaborations such as these have many strengths, however, they are equally prone to an ebb and flow in degree of tensity. Suffice to say this dissertation is as much an exercise of collective growth and reconciliation as it is one of archaeological inquiry.

Research Questions and Dissertation Structure

This dissertation is structured around four core chapters (publications) that are theoretically bound by the unifying threads of *temporality* (Ingold 1993, 2017) and *two-eyed seeing* (Bartlett et al. 2012). Each chapter is encased by its own thematically specific context and conclusions, and each build upon the results of those that precede it. Given the approach taken for this dissertation, little more will be said here regarding the paleoenvironmental, archaeological, cultural, and socio-political contexts that informed the list of questions developed for this research (Table 1-1).¹⁵ Methods applied for this dissertation are similarly not described here beyond the details provided above. Detailed descriptions of this important information are instead woven directly into the four core chapters and appendices of this dissertation.^{16,17}

Recognizing the social and political embeddedness of this dissertation, I have sought to address questions of interest to the Hałtzaqv community in addition to those asked for the sake of satisfying archaeological curiosities. The five sets of research questions listed in Table 1-1 are

¹⁵ That is, the “sandwich thesis” approach wherein the introduction and conclusion constitute the “bread” and the chapters in between represent the more “nutrient-dense fillings.”

¹⁶ This approach attempts to reduce redundancy to the extent possible within this dissertation in the hope that it will be more easily digestible.

¹⁷ Appendix A lists the EkTb-9 faunal, lithic, and perishable artifact logs and the vibracore sample logs (Supplemental Data) that you can find on the UVic’s Research and Learning Repository (UVicSpace). Appendix B provides more context regarding the methods applied for this dissertation and the artifact repository. Appendix C is the Hałtzaqv newsletter (Chapter 3 summary). Appendix D lists examples of Hałtzaqv online resources. Appendix E lists select media coverage, podcasts, and the website designed by the Hakai Institute. Appendix F is a glossary of technical terms. Finally, Appendix G is a Hałtzaqvla (Hałtzaqv Language) glossary.

addressed in one or more of the interconnected chapters prepared for this dissertation, however, they are not explicitly mentioned in any of them.¹⁸

Table 1-1 Research Questions and Chapter Cross-References.

#	Research Questions	Chapters
1	<p>How have archaeology and Indigenous oral narratives been imbricated on the NWC?</p> <ul style="list-style-type: none"> • What ethical and epistemological considerations are necessary when combining these two ways of knowing the past? • What implications does this information have for the discipline of archaeology and Indigenous communities today? 	Chapter 2 Chapter 3
2	<p>What can archaeological science and Haítzaqv oral history tell us about the record of human occupation at Triquet Island and the antiquity of ancestral lifeways on the NWC?</p> <ul style="list-style-type: none"> • What does the earliest evidence from EkTb-9 reveal about access requirements and habitability of NWC landscapes during and after the early-post glacial period? 	Chapter 3 Chapter 4
3	<p>As Triquet Island has always been an island, what additional proxies might support the inferred use of boats at the island from the late Pleistocene to the present day?¹⁹</p> <ul style="list-style-type: none"> • What implications does seafaring have for the peopling of North America? • What role does seafaring play for Haítzaqv people today? 	Chapter 3 Chapter 4 Chapter 5
4	<p>What does the investigation of archaeological site EkTb-9 reveal about the interactivity of people / plant relationships on the NWC?</p>	Chapter 3 Chapter 4 Chapter 5
5	<p>What do the combined results of the work at EkTb-9 contribute to evolving theories of change, continuity, and complexity on the NWC through time?</p>	Chapter 3 Chapter 4 Chapter 5

To address the first research question, Chapter 2 explores how archaeologists working on the NWC of North America have imbricated two ‘forms of knowing’ – Indigenous oral records and archaeological chronologies – to achieve a more complete understanding of history.²⁰ This

¹⁸ The five questions presented in this dissertation differ from the initial three that I had identified for this research in my dissertation proposal, but only insofar as to be disaggregation’s of the former. Over the course of this dissertation, new data and insights were gleaned during each subsequent field season, and the socio-political context continued to evolve in tandem. This iterative process informed the overall organization of information and the final structure of the dissertation as it appears here.

¹⁹ McLaren et al. 2014, 2015, 2019a. Discussed further in Chapters 2 and 3.

²⁰ Chapter 2 is a manuscript that was published on January 12, 2016, in Hunter Gatherer Research (Gauvreau and McLaren 2016). I am the principal author on this manuscript, which was co-written with Dr. Duncan McLaren.

approach is very much aligned with the concept of two-eyed seeing (Bartlett 2012), and through a focused review of literature the chapter explores the benefits of undertaking a more polyphonic approach to archaeology on the NWC. Aligned with the research program of historical ecology (Armstrong 2017; Armstrong et al. 2017; Balée 2006; Santana-Cordero et al. 2024; Thompson, 2013), this chapter examines where and how these approaches have added significant contributions to science, history, jurisprudence and other socio-political pursuits.

Chapter 3 largely focuses on the paleogeographic and geomorphic setting of EkTb-9, and presents the detailed results of sea level reconstruction, geo-spatial mapping, and diatom, pollen, macrobotanical, sediment and lithic analyses. Preliminary results of zooarchaeological and perishable artifact analyses are also discussed. Chapter 3 applies knowledge gained from Chapter 2 to address Questions 1, 2 and 5, and provides preliminary data to address Questions 3 and 4.²¹ Pursuant to Bartlett et al.'s (2012) two-eyed seeing approach, archaeological interpretations of the site are combined with Haíłzaqv oral history, and discussions are organized by Haíłzaqv temporal phases identified for the Núláwítǵv Tribal Area in collaboration with members of Haíłzaqv Nation.

Chapter 4 builds on the results of Chapters 2 and 3 through the application of the concepts underpinning my theoretical framework (Armstrong 2017; Armstrong et al. 2017; Balée 2006; Bartlett et al. 2012; Crumley 1987, 1994, 2007; Ingold 1993, 2017; Thompson 2013) to address Questions 3 and 5. Chapter 4 is a case study of the zooarchaeological and other proxies from site EkTb-9 that support the inferred use of boats in Haíłzaqv territory over the last ca.

²¹ Chapter 3 is a multi-authored manuscript that was published on April 28, 2023, in the *Journal of Archaeological Science: Reports* (Gauvreau et al. 2023). I am the principal author and analyst on the manuscript, which was co-written with Daryl Fedje, Angela Dyck, Christopher Hebda, Dr. Duncan McLaren, Dr. Quentin Mackie, Keith Holmes, Qíxítasú Yímázas Elroy White, Dúqváisla William Housty, and Čvúi Rory Housty.

14,000 years.²² This case study explores the evolving narrative of early maritime technologies, mobility, subsistence, settlement, and investment on the NWC. It also examines the antiquity of seafaring within Haítzaqv territory and the continued importance of the Tribal Canoe Journeys and other marine based activities for coastal Indigenous people today.

Chapter 5 similarly builds on Chapters 2 and 3, and addresses Questions 3, 4 and 5.

Chapter 5 presents unpublished results of the analysis of wood artifacts and vegetal remains from EkTb-9.^{23,24} I explore the interactivity of wetlands, social practice, and knowledge transmission on the NWC from the mid-Holocene to the present day in the context of known Indigenous uses for identified plant species.

Collectively, the studies undertaken for this dissertation offer a unique opportunity to explore the theoretical and political importance of observed continuity at a single place of repeated human occupation and investment on the outer NWC of BC; a storied landscape of enduring cultural, economic, ecological, and political significance for Haítzaqv Nation.

²² Chapter 4 is a manuscript that has not yet been submitted for publication; I am the sole author and analysts on the manuscript. This manuscript will be submitted to the *Journal of Maritime Archaeology*. Early drafts were heavily revised through review by Dr. Quentin Mackie and Dr. Duncan McLaren. The HIRMD working members, Qíxítasu Yímázalas Elroy White and Dúqváísła William Housty, also reviewed the paper and provided comments and edits.

²³ The results of the analysis of perishable artifacts and macrobotanicals collected during the 2012 field season were published in a chapter (McLaren et al. 2019b) prepared for Bernick's (2019) book "Waterlogged"; Dr. Duncan McLaren is the lead author of the chapter, and I am one of the coauthors.

²⁴ Chapter 5 is a manuscript that has not yet been submitted for publication; I am the sole author and analysts on the manuscript. This manuscript has been submitted to the *Society of Ethnobiology: Research Communications*. Early drafts required minimal revisions following review by Dr. Quentin Mackie, Dr. Duncan McLaren, and HIRMD working members Qíxítasu Yímázalas Elroy White and Dúqváísła William Housty.

Chapter 2 Stratigraphy and Storytelling: Imbricating Indigenous Oral Narratives and Archaeology on the NWC of North America²⁵

Introduction

The term imbrication refers to patterns created by two or more objects that overlap one another, as in roof shingles or tiles. Similarly, in examples of Salishan basketry, design elements are imbricated into the structure by interweaving a pattern using a material of contrasting colour (Bernick 2003). Other Indigenous groups on the NWC use similar, but differently named, techniques of adding decorative elements to basketry, including the use of overlay and dying. The product of these manufacturing techniques is a finished object that incorporates the structural design of the basket and combines it with an interwoven decoration. Here we consider the imbrication of Indigenous oral narratives with archaeology on the NWC of North America. Both are diachronic forms that relate stories about past events. In combining the two, a more detailed and decorated understanding of the past can be constructed. This approach can provide a means of understanding the results of certain archaeological investigations from a more emic perspective. Archaeology can be imbricated with Indigenous oral narratives, adding chronology, spatial information, and physical evidence of historical events.

Overall, the goal of this paper is to review some of the ways in which archaeology and oral narratives have been intertwined on the NWC of North America. We draw our examples from the growing body of academic and grey literature born from this trend. While it may not always be appropriate to combine oral narratives with archaeology, we find that many of the studies that have attempted to do this with community involvement have enhanced the results of

²⁵ This chapter is a manuscript that was published on January 12, 2016, in Hunter Gatherer Research (Gauvreau and McLaren 2016). I am the principal author on this manuscript, which was co-written with Dr. Duncan McLaren.

cross-disciplinary studies that are of particular importance for historical, social and political reasons.

Indigenous Oral Narratives

For millennia, Indigenous communities on the NWC of North America have transmitted their complex and dynamic oral narratives across generations; forming a foundation of culture, identity, rights, and privileges (Hulan and Eigenbrod 2008; Martindale 2006; Thom 2003; Wilson and Harris 2005). Involving a focused exchange between orator and listener, oral historical traditions are simultaneously educational, entertaining, socially situated, contextually contingent, ritualized, and in some cases, highly politicized (Cruikshank 1998, 2002; Martindale 2006; Thom 2003; Wilson and Harris 2005). Certain types of stories were regulated via strict transmission protocols (Marsden 2001, 2002; Wilson and Harris 2005), and indeed, their exchange occurred in the context of power, and differential power, meaning they were subjected to social “vetting.” As a result, oral narratives have evolved over time, and they are imbued with multiple levels of contextually specific meaning (McMillan and Hutchinson 2002; Thom 2003). Oral narratives therefore cannot be viewed as a “product” in the same way that we consider artifacts or other “things” (Cruikshank 1994:405). Indigenous communities continue to develop, transmit, and verify their respective oral narratives today through ceremonies (Cruikshank 1998; Marsden 2001, 2002; Wilson and Harris 2005), traditional use studies, and language programs.

Researchers and the public have long used the terms “oral traditions”, “oral narratives”, and “oral histories” interchangeably. In this paper we make an explicit distinction among the terms, and we operationalize them as follows: Oral traditions are a “social process” referring to the inter- and intra-generational transmission of oral narratives and oral histories (Cruikshank 1994). Oral narratives or stories are a form of Indigenous property – they comprise knowledge of

observations and experiences that have been transmitted across generations – they are encyclopedic compendiums of ecological, social, political, medicinal, and other information (Bahr 1998; Wilson and Harris 2005). Oral narratives therefore provide historical accounts of events on the landscape, many extending into deep time (Hall 2003; McLaren et al. 2015; Wiley 2008).

We further subdivide “oral narratives” into (1) clan stories, which are owned accounts of lineage-specific histories, and (2) creation stories, which are shared accounts of population-specific histories (e.g., Raven cycles) (Marsden 1998a; McLaren 2008). Following Cruikshank (1994) and Mason (2000), we use the specialized term “oral history” to refer to recent “firsthand experiences” or “eyewitness” accounts documented during an interview with a witness that has later been transcribed.

Ethnography

Ethnographic research conducted within the NWC cultural area is unique in some respects. During the late 19th and early 20th Centuries, ethnographers compiled a massive and detailed collection of Indigenous oral narratives. Some of the ethnographers involved in this effort include Franz Boas (1888, 1898a, 1898b, 1910, 1912, 1916, 1917, 1935, 1981), Henry Tate (Maud 1982, 1989), George Hunt (Boas and Hunt 1905, 1906), Ella Clark (1953), Charles Hill-Tout (1978), Edward Sapir (1912, 1924), John Swanton (1905, 1908), Stith Thompson (1977), and Claude Levi-Strauss (1967). The list is in no way exhaustive, but it is demonstrative of the abundance of documented narratives available for consultation. In addition, it is important to note that the amount of ethnographic work conducted with the diverse Indigenous populations along the NWC significantly varied from Nation to Nation. The primary goal of this early ethnographic research was to gain a better understanding of the diverse cultural groups living in

the region – their respective histories, and their inter-connections “in their own words” (Thom 2003:3), however, much of it was collected and reported through a “colonial gaze” (Geniusz 2022).

Archaeology and Oral Narratives

Some scholars, mostly working outside of the NWC Cultural Area, have scrutinized the content of Indigenous oral narratives, and dismissed them as mere “myth” or “legend”; ultimately classifying the accounts as problematic sources of information lacking in scientific rigor (Henige 2009; Mason 2000, 2006; McGee 2008; Vansina 1985; Whiteley 2002). In so doing, they perpetuated the antiquated theoretical hang-ups surrounding the “scientific illegitimacy” of this body of knowledge well into the twentieth century (Gaudreau 2015; Wilson and Harris 2005). In many cases, however, the original ethnographers were quite clear about the legitimacy of oral narratives as testimonies of the past:

“...it must be pointed out that while the Indians had no written records and had to rely on oral transmission of the clan and family histories, the traditions of all the groups from Vancouver Island northward are so specific and consistent and insofar as they can be checked, so correct – that there is little doubt that for the most part they are historically accurate.”

Drucker (1955: 115).

Recognizing the validity of Drucker’s perspective, some of the earlier approaches to NWC archaeology involved actively weaving information from oral narratives into archaeological investigations and assemblage interpretations by the mid-1900s (De Laguna 1960; Drucker 1939; MacDonald 1969; Strong 1934). This trend gained increasing momentum following the groundbreaking *Delgamuukw v. BC* (1997) court case, wherein oral narratives were legally recognized as valid historical records for consideration in land claims cases and other legal disputes (Budwha 2002). Over the last two decades, many NWC archaeologists have formed a

concerted effort to continue exploring the ethics and methodologies for combining Indigenous oral narratives with their archaeological investigations (Atalay 2008; Cruikshank 2005; Echo-Hawk 2000; Finnegan 2003; Gaudreau 2015; Martindale 2006; Martindale and Marsden 2003; McMillan and Hutchinson 1997, 2002). No “universal framework” or methodology exists for combining Indigenous oral narratives with archaeological data because they are epistemologically and ontologically different ways of knowing – they originate from variable cultural traditions, and the formation processes for both types of data significantly vary (Budhwa 2002:108; Martindale 2006).

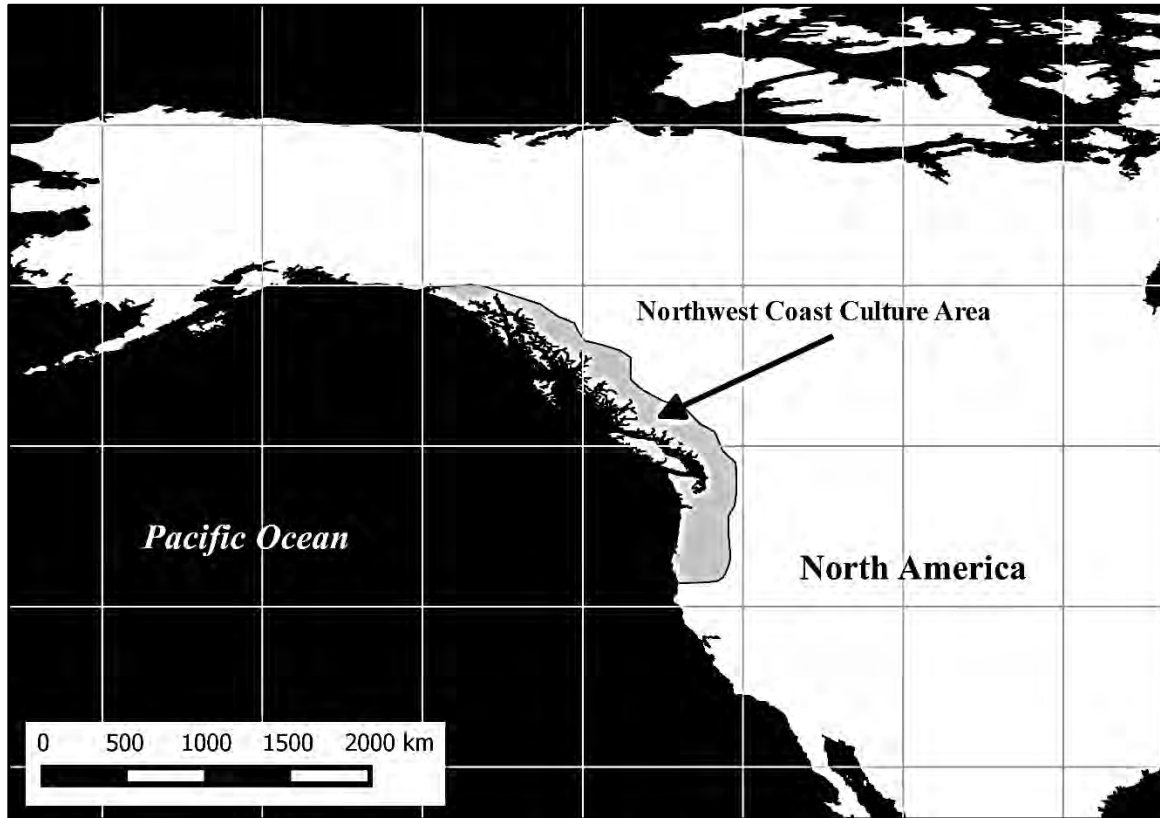
Recognizing that there is no “catch-all” framework for this, our goal is to identify the emerging themes and trends in this field of inquiry. To achieve this goal, we compile a comprehensive review of cross-disciplinary research conducted on the NWC of North America ranging from Alaska down to the northern regions of California (Figure 2-1), and we identify the contributions that Indigenous narratives and archaeological research/chronologies can offer our collective understanding of the past. We apply the metaphor of imbrication to structure our review and discussion of these cross-disciplinary studies. We are not arguing that imbrication be considered as a universal strategy. Instead, our approach follows the same vein as Jackley’s (2012) metaphor of “weaving”, Bernick’s (2003) metaphor of “stitching”, and Bartlett et al.’s (2012) “two-eyed seeing” as a means of conceptualizing the ways in which these diachronic sources of information can be combined. Lastly, we address the ethical and theoretical issues that have been raised over time and the ways in which community-engaged research may help overcome some of these issues.

Combining Indigenous oral narratives with archaeological methodology is surrounded by socio-political complexity, and the main arguments against this approach have centered on issues

of validation, over-simplification and appropriation (Martindale 2006; Gaudreau 2015). As a result, several archaeologists have struggled to recognize oral narratives as valid (Wylie 1995) and have not acknowledged the myriad ways in which Indigenous ontologies and ways of knowing can provide new insight and paradigms for the interpretation of archaeological assemblages and sites (Gaudreau 2015). In this paper we acknowledge these issues exist and are very necessary for us to continue to explore as a discipline, however, it is also important to highlight those instances in which this approach has been applied in a fruitful manner.

We advocate here that archaeology should not serve to “validate” oral histories, but rather, be seen as a complimentary suite of tools that communities and researchers can partner with oral narratives to enhance our collective understanding of the past. Indigenous ontologies and ways of knowing bring novel interpretations and understandings of the material remains recovered from archaeological investigations. Of course, archaeology and oral history do not always “match-up” – memory is fallible, just as archaeological sites erode over time – but the purpose of this paper is to focus on those instances in which these types of data converge to reciprocally support, and flesh-out, regional and site-specific histories.

Figure 2-1 Map of the NWC culture area in North America.

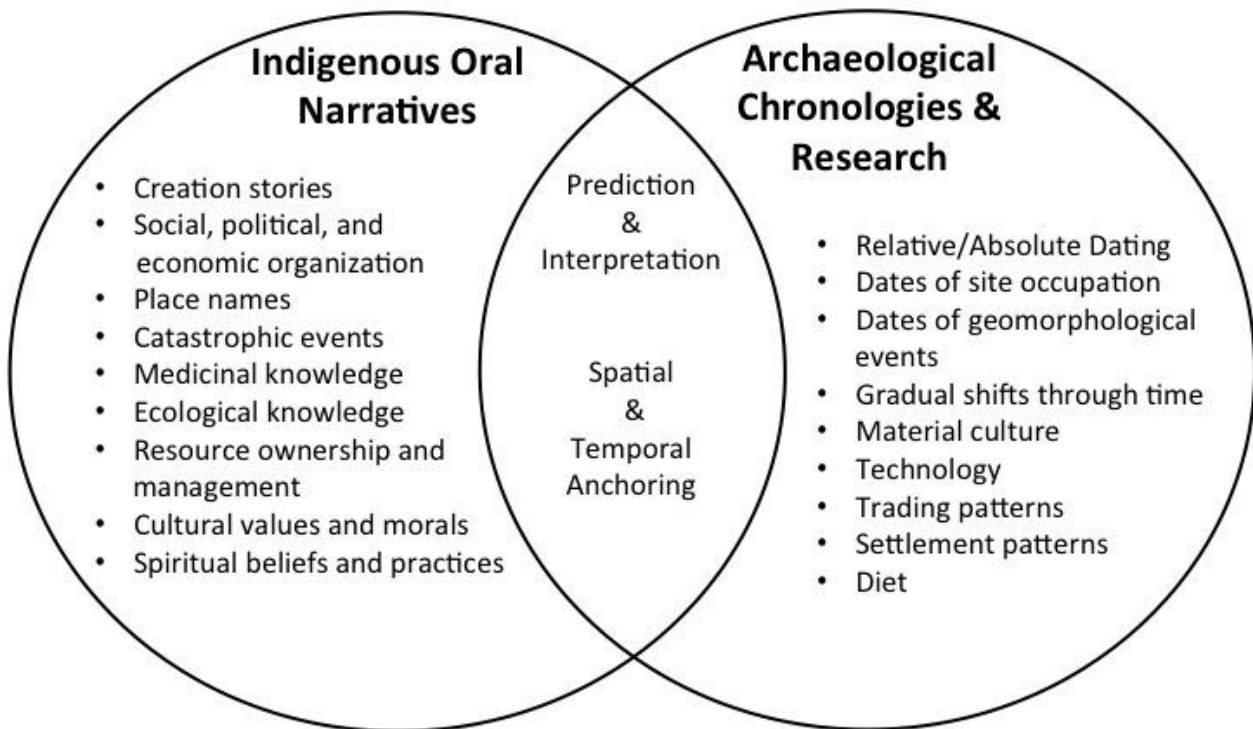


Types of Imbrication

Both Indigenous oral narratives and archaeological chronologies represent incomplete sources of information (Marsden 1998b; McKechnie 2015; Wilson and Harris 2005). By imbricating these diachronic systems of knowing the past, archaeologists have formulated more robust, emic, and accurate interpretations of the historical record (Martindale and Nicholas 2014; McKechnie 2015; Gaudreau 2015; Wiley 2008). Thus, much like the shingles on a roof, Indigenous oral histories and archaeological research have edges that overlap (Figure 2-2). Oral narratives often relate large-scale events that occurred in the past, whereas archaeology is often more concerned with everyday life as interpreted through artifacts and features. For example, aspects of archaeology, such as lithic debitage analysis, may not figure prominently in

oral narratives. Likewise, a story relating the accomplishments of a hero-animal figure may not have archaeological residues. While information contained within oral narratives will not always perfectly align with the archaeological and geological records, they are often complementary (Gaudreau 2015; Rosaldo 1980).

Figure 2-2 The imbrication of Indigenous oral narratives and archaeology.



Some of the major contributions of Indigenous oral narratives and histories are listed in the left circle of Figure 2-2. Indigenous oral histories – some documenting events that are likely to be millennia old (McLaren et al. 2015) – carry invaluable information for their respective cultural groups and can also serve to organize the proprietors “perceptions about the world”

(Cruikshank 1991:141). Some narratives contain information about social, political, and economic organization as well as lineage and clan histories (Angelbeck and McLay 2011; Martindale 2006; Martindale and Marsden 2003; Swadesh 1948; Vasina 1985). While others describe traditional medicinal and ecological knowledge (Cruikshank 1998; Houde 2007; Jones and Russell 2012) and spiritual practices (Wilson and Harris 2005). Oral narratives also document traditions of Indigenous resource ownership and management strategies (Lepofsky and Caldwell 2013; Gauvreau 2015; Gauvreau et al. 2017) and serve as records of catastrophic geomorphological events (Bornhold et al. 2007; Budhwa 2002; McMillan and Hutchinson 2002).

Some of the major contributions made by archaeological research and chronologies are listed in the right circle of Figure 2-2. Over the last century, archeologists have developed specialized methods and techniques for studying and reconstructing the cultural past of peoples on the NWC through the analysis of their material remains (Carlson 1970). Some of these techniques are borrowed from other disciplines such as geology, geography, botany, history, and ecology. Archaeological methods of investigation, such as systematic surveying, subsurface testing, geophysical testing, and the establishment of chronological dates – whether through relative or chronometric methods – enable site occupation histories, settlement patterns, trading patterns, diet, technological developments, and other material culture remains to be anchored in space and time.

The area where the two circles overlap in Figure 2-2 reveals some of the complimentary roles that Indigenous oral narratives and archaeological research can perform. Oral narratives can play a predictive and interpretive role in archaeological investigations, and, reciprocally, archaeology can spatially and temporally anchor events and other information contained in oral

narratives. These roles are all interrelated, but we consider them below under separate headings for the sake of clarity.

Prediction and Interpretation

Oral narratives can play a predictive role for archaeologists as they can draw on the information contained therein to develop hypotheses, and they can also rely on them as guides for locating sites related to important place names and events (DeLaguna 1960; Fedje et al. 2005; Marsden 1998b; White 2006). Q̄íx̄itasu Yím̄ázas Elroy White (2006) thesis involved linking oral history to ethnographic narratives about the Haílzaqv selective fishery system and recording the physical remains of fish traps and their surrounding environment (White 2011). This was an “internalist” archaeology approach (Yellowhorn 2002, 2006, 2012), or what Q̄íx̄itasu Yím̄ázas Elroy White now terms a M̄núxvit approach (uniting; becoming one).²⁶ He used the information contained in the narratives provided by twelve oral historians to locate the fish trap sites and developed hypotheses about their use and function (White 2011). Q̄íx̄itasu Yím̄ázas Elroy White (2006) successfully applied archaeological methods to help his community better understand their recent and ancient history. The results of Q̄íx̄itasu Yím̄ázas Elroy White’s (2006) research included novel information about the methods of fish-trap operation, and the construction of fish-traps of various shapes and sizes to target specific marine species in Haílzaqv Nation territory.

Archaeologists have also drawn from origin narratives that discuss socio-political relationships between communities to hypothesize about the effects that inter-group conflict and

²⁶ Q̄íx̄itasu Yím̄ázas Elroy White has applied the “internalist” approach for much of his career, however, he has recently expanded this concept within his archaeological practice to follow the language, protocols and cultural knowledge of his (Haílzaqv) Nation. Q̄íx̄itasu Yím̄ázas Elroy now employs the M̄núxvit approach. M̄núxvit is a Haílzaqv word that means “uniting or becoming one.” For additional context see: <https://coastalfirstnations.ca/hai%C9%ABzaqv-archeologist-practices-m%CC%93%E1%B9%87uxvit-approach-to-ancestral-work/>.

political alliances have on settlement patterns (Angelbeck and McKlay 2011; Marsden 2001, 2002; Martindale 1999, 2003; Martindale and Marsden 2003). For example, McDonald and Inglis (1981) seminal research involving ethno-historic and ethnographic material (oral narratives and photographs) from the NWC gave equal voice to the knowledge provided by the local Indigenous Nations and that of the archaeologists (Marsden 1998b). By linking the photographs with some of the local group origin narratives of the region, McDonald and Inglis (1981:60) were able to predict the location of features (house platforms) and interpret the village plans at the Kitselas Fortress in Prince Rupert, BC. Combining these data enabled them to hypothesize about “variability” within and among communities and to address ideas of village structure, and their associated cultural material assemblages.

Local group origin narratives were (and remain) an integral part of the land and resource title systems practiced by the Indigenous peoples of the NWC (Boas 1940; Drucker 1939, 1944; McIlwraith 1992). These stories often related how the original ancestor of the local group came to earth. Original ancestor figures were important in bestowing certain prerogatives to their descendants. Importantly, the rights to relate these stories were hereditary and for this reason they were protected, through bloodshed if necessary. The original ancestor narrative would be related at ceremonial potlatches in association with displays of crests and dances associated with the story. Through this means, the narratives were publicly vetted and the hereditary prerogatives were reified.

Hereditary prerogatives associated with origin narratives include title to land and resources (Boas 1940; Drucker 1939, Trospen 2009). In this manner, land ownership was hereditary and, in some respects, inalienable. Overall, the effects of this system centered on the importance of oral narratives for control and access to resources. This would have tended to keep

local groups in proximity to the areas where they had hereditary title to property and to invest in and manage that property appropriately (Trosper 2009). If this pattern played out over several generations, this system of title may have acted as a major cultural factor that would have implications for archaeological interpretation. Taking this into account, McLaren et al. (2015) have considered the role of original ancestor narratives as cultural factors leading to the long-term occupation of sites on the central coast of BC. The system of hereditary narratives may have also spurred the rise of social inequalities, as a dichotomy would have eventually appeared between people who held hereditary links to the original ancestor stories of a certain place and those who did not. Similarly, it would potentially account for the tendency for some narratives to be reshaped over time by those vying for access to territory and resources. The archaeological evidence for social stratification on the NWC may have roots in this narrative-based system of social organization.

In a similar vein to McLaren et al. (2015) analysis and interpretations, Letham et al. (2015) analysis of Tsimshian oral narratives highlighted the importance of geographically peripheral regions within Tsimshian territory, and the social and political factors that affected human occupation and resource use on the Dundas Islands. Some of the Tsimshian narratives that Letham et al. (2015) analyzed discussed the influx of non-Tsimshian groups from the north to the Dundas Islands, and they used this information to interpret and explain the occurrence of different village “layouts” observed during their surveys of outer coastal sites. Similar population movements documented in Tsimshian narratives have been investigated in Prince Rupert Harbour (Archer 1991; MacDonald 1969, Martindale and Marsden 2003). In several studies, place names that were repeatedly mentioned in different oral narratives appeared to be of greater cultural and historic significance and this was an important consideration when the researchers

were establishing the relationship between different settlement sites (Letham et al. 2015; Martindale and Marsden 2003).

Temporal Anchoring

Archaeological methods can be used to help temporally anchor events that are recorded in oral narratives. Due to regular referencing in oral histories and narratives, earthquakes, tsunamis, and floods were observed phenomena, but the timing of these events was never specified beyond general sequential referencing (Bornhold et al. 2007; McMillan and Hutchinson 1997; McLaren 2003). In pursuing large scale geomorphic changes and social upheavals related in oral narratives, archaeologists have sought to provide historic ages using chronometric (e.g., AMS dating) and relative dating techniques (Marsden 1998b; Martindale 2006; McKechnie 2015; McLaren 2003).

The temporal duration of a particular historical event may become incorporated into oral histories and narratives in different ways (McLaren 2008). Short-term environmental change, for example, caused by a tsunami, would be highly perceptible to the local population and because of this impact, more likely to become an event documented in an oral narrative. In contrast, sea level change as the result of eustatic or isostatic factors may occur on a barely visible scale to the local population. However, evidence of this type of sea level change may be more evident to the local populations in local geological records. For example, shellfish found in exposed raised beach deposits can be indicative of times when sea level was higher and are regularly revealed through creek bank erosion or large tree throws. Such lasting evidence may provide an alternative means through which events are remembered and make their way into lasting oral narratives.

Relative Dating Methods

Some oral narratives have a type of inherent temporal structuring using what are referred to as ‘sequencing references’ (McLaren 2003). The orator may use specific devices in a narrative to relate when a particular event occurred in history (Ludwin et al. 2005; Marsden 1998; Martindale 2006; McKechnie 2015). For example, a story may be anchored in the past in relative terms by the usage of phrases such as “this story occurred before the flood.” Another story, seemingly unrelated, may be set in the time after the flood. In this manner, major environmental events can provide sequencing references for the stories. Using relative dating methods common in archaeology, one can order a series of oral narratives into a coherent sequence using these temporal references. For example, McLaren (2003) reviewed a body of Coast Salish narratives from the Fraser Valley and was able to order them temporally using relative dating techniques. A total of eleven major epochs were used by the Coast Salish narrators of these stories: 1) The Beginning, 2) The First Humans, 3) Before the Transformation, 4) The Age of Transformation, 5) World Transformed, 6) The Great Flood, 7) After the Flood, 8) The Great Snow, 9) After the Snow, 10) The Great Sickness, and 11) The Arrival of Europeans.

Significantly, the application of archaeological methods to a diverse set of oral narratives provided an opportunity to understand these events in relation to a chronological series of epochs. Furthermore, the same general sequence of narrative events was employed by different orators from different communities, suggesting a shared understanding of this temporal sequence of events to which different narratives could be attached. Following suit, McKechnie’s (2015) research combined narrative sequential ordering with chronometric dating to better understand the ages of occupation of small and large settlement sites documented in Nuu-chah-nulth oral histories. By combining the two, McKechnie (2015) temporally anchored oral historical

knowledge of growth, expansion and shifting residence patterns of multiple village sites within the Nuu-chah-nulth territory over the last 2,500 calendar years.

Chronometric Dating Methods

In some cases, archaeological and geological methods can be used to gain chronometric dates for episodes related in oral narratives. Extensive research has been conducted to spatially and temporally anchor orally documented geo-morphologic events on the NWC (Budwha 2002). These studies demonstrate that large-scale events (war, disease, catastrophes) are more likely to show up in both oral narratives and the archaeological record (Angelbeck and McLay 2011; McLaren 2003, 2008; Martindale 2006). The major geological events documented in oral narratives on the NWC involve glacial periods (Cruikshank 1991, 1994, 1998, 2001, 2002; McLaren et al. 2015), earthquakes (Clague and Bobrowsky 1999; Ludwin et al. 2005; McMillan and Hutchinson 1997, 2002), tsunamis and floods (Clague 1995; Marsden 1998b; McLaren 2008; Wilson and Harris 2005), and volcanic eruptions (Edinburgh 2015).

Unsurprisingly, earthquakes feature prominently in the oral narratives of cultural groups located along the Cascadia Subduction zone. Ludwin et al. (2005) explored over 40 oral narratives about earthquakes from communities along the primary-boundary fault of the Cascadia Subduction Zone and they used radiocarbon and tree-ring dating to temporally anchor the geomorphological events. As seismic activity can lead to powerful wave action, many narratives that recount earthquake events also discuss tsunamis and flooding.

Geological investigations undertaken by Clague (1995) and Clague and Bobrowsky (1999) explored oral historical evidence of earthquakes and tsunamis on Western Vancouver Island and identified areas of imbrication with the geological record to date the events. Similarly, Bornhold et al. (2007) established a “village-specific” timing for a landslide-generated tsunami

at Kwalate Village. In the case of the Kwalate Village tsunami, interviewed members of the Kwakwaka'wakw population knew the approximate timing and location of the event, but they were uncertain of its precise calendar date. Through archaeological survey, subsurface testing, and AMS dating, the researchers were able to establish that the event occurred in the mid-sixteenth century (Bornhold et al. 2007).

Spatial Anchoring

Much work has been done to imbricate oral traditions with archaeological investigations to better understand site locations and settlement patterns on the NWC of North America. Archaeologists have explored this on the mainland coast of BC (Archer 2006; Reimer 2003), among the outer coastal islands of the central and North Pacific coast of BC (Fedje et al. 2005; Letham et al. 2015; McLaren et al. 2015; White 2006), the west coast of Vancouver Island, BC (McKechnie 2015), the Sunshine Coast, BC (Jackley 2012; Johnson 2010), and Alaska (Crowell and Howell 2013; De Laguna 1960, 1972; Downs 2006). Studies that focused specifically on identifying the impacts of orally recorded geological events on coastal settlement patterns include Budwha (2002), Hall (2003), Marsden (2000, 2003), McMillan and Hutchinson (1997, 2002), and Harris (1997).

Jackley's (2012) community-based archaeological research with Tla'amin First Nation is an excellent example of successful imbrication on the sunshine coast, BC. Jackley (2012) wove converging lines of evidence (interview data, Tla'amin oral narratives, archaeological survey data, and radio-carbon dates) together to develop a detailed timeline that captured the settlement history of the Northern Coast Salish Klehkwahnohm village site. Each line of evidence provided unique insight into different periods of time, enabling Jackley (2012: iii) to trace Tla'amin First Nation "continued use of and connection to the landscape" for over two millennia.

Similarly, in Reimer's (2003) study of alpine archeology and the oral traditions of the Squamish First Nation, he combined his survey data with information contained in local stories to establish settlement patterns in the mountainous areas near Squamish, BC. Reimer's (2003) research was fundamental to the recognition that mountainous areas are part of the cultural landscape. Reimer (2003:59) documented numerous sites and compiled other reports that identified sites in different mountainous regions that were previously thought to be "peripheral" or "too remote" to be inhabited by members of the Squamish Nation and those members from other neighboring Indigenous groups.

Fedje et al.'s (2011) research on southern Haida Gwaii used the information contained within an oral narrative to name a regional archaeological complex. The Kinggi Complex is an archaeological period that spans ca. 12,700 to 9,700 years ago on the Haida Gwaii archipelago (Fedje et al. 2011). The name for this complex is borrowed directly from Haida oral literature that relates a series of episodes that involved the ancestor Kinggi. One of these episodes includes a period of rising of sea level. As this is a feature of the archaeological narrative from this period as well, the researchers decided to name the archaeological complex after the character in the oral narrative (Fedje and Christensen 1999). Other cultural history periods in Haida Gwaii include the Graham and Moresby Traditions, named after the islands on which they were initially identified (Fradmark et al. 1990: 231). These islands were named after figures that participated in British imperialist expansionism into the region and have nothing to do with Haida oral traditions (Akrigg and Akrigg 1986).

Discussion

A prominent critique surrounding the imbrication of Indigenous oral narratives with archaeological research is that it involves a process of "cherry-picking tidbits" of data contained

in the stories and exploiting this data for scientific pursuits (Gaudreau 2015). Gaudreau (2015), and others (Edinburgh 2015; Martindale 2006) have therefore argued that if we are to incorporate elements of Indigenous oral narratives and histories into our archaeological interpretations and analyses that we must look at the intricate layers of these complex stories as closely as we look at the intricate layers of stratigraphy.

Community-based research (Castleden 2010) and the two-eyed seeing (Bartlett et al. 2012) approach, both involving close collaboration between Indigenous community members and external researchers, have been proposed as arrangements through which the overlapping edges of oral narratives and archaeological data can be ethically and appropriately explored (Brady et al. 2003; Gaudreau 2015; Martindale and Nicholas 2014). Neither an easy, nor straightforward process, community-based archaeological research requires ongoing negotiations, clear lines of open communication, solid ethic agreements (e.g., memorandum of understanding), and mutually agreed upon out-puts (Bartlett et al. 2012; Castleden 2010; Nicholas and Markey 2014). Community-based archaeological research represents a developing trend towards indigenizing archaeology on the NWC of North America and an attempt to achieve multi-vocality in coastal research (Atalay 2008; Damm 2006; Gaudreau 2015; McKechnie 2015; Nicholas 2008, 2022).

Pursuant to the results of the *Delgamuukw v. BC* (1997) court case, it may also be detrimental to dismiss archaeological inquiry as a valid means of investigating the direct history of the past. Indigenous Nations on the NWC have a vested interest in the results of archaeological research and how they relate to their oral traditions. Across most of coastal BC, this is partially due to a lack of treaties or other formal agreement concerning land title in the region. The landmark Supreme Court of Canada case *Tsilhqot'in Nation v. BC* (2014) found that

Aboriginal title to land could be assessed based on a combination of archaeological, historical, and oral evidence provided by Indigenous Elders, and the judges awarded the Tsilhqot'in Nation a declaration of Aboriginal title over the area at issue based on these three distinct though complimentary types of information.

By working with Indigenous knowledge holders and the owners of certain oral narratives, we can collectively bring more “emic” perspectives and interpretations to the field of archaeology (Bartlett et al. 2012; White 2006; Yellowhorn 2002, 2006, 2012). By consulting transcribed accounts of Indigenous oral narratives, we can improve our collective understanding of the past by overcoming some of the limitations imposed by only considering environmental pressures. Through these imbrications, researchers can gain a better understanding of how knowledge was created and in which contexts it has evolved (Budhwa 2002; Cruikshank 1998). These represent important steps for mobilizing data for direct application relevant to Indigenous resource management, stewardship and enhancement initiatives (Brady et al. 2003; Wilson and Harris 2005).

There are many more avenues for this research to occur. Moving forward, we propose that new archaeological methods of investigation be incorporated into imbricated research. For example, the application of cosmogenic Chlorine-36 dating may be appropriate for establishing when glacial ice last crossed the Stikine River and left erratics. This event is a prominent feature in some Tlingit, Tsimshian and Tahltan migration stories (Marsden 2001). Most of the literature reviewed in this paper comes from published sources. However, much of the archaeology undertaken in the region is done under the auspices of cultural resource management (CRM). Most of the information and data generated through CRM is unpublished grey literature, presented in reports for CRM clients, Indigenous communities, as well as federal and provincial

regulators. In BC, there is an online library (Provincial Archaeological Resource Library; PARL) of this ‘grey literature’ that can be searched using key words. The following list details our “key word searches” conducted in 2016 and the number of reports that mention these words:

- “Oral history” or “oral histories” = 845 reports
- “Oral tradition(s)” = 468 reports
- “Oral narrative” = 25 reports
- “Myth”, “myths” or “mythology” = 674 reports

Combined, these search terms are used in a total of 2,012 reports representing approximately 29% of the total reports in the PARL system (n=6,762) in 2016. Not all these sources are from the NWC, as BC also includes portions of the Interior Plateau and Subarctic culture areas. While we did not undertake a comprehensive review of all these documents, we draw upon a few here as examples of how oral narratives have been entwined with CRM in the study area.

One of the most common ways in which oral narratives are referred to in the grey literature is through referencing them in the background research section (Allester 2013:14; McLay 2002: 6-7; Stafford 2012: 8). In essence, if there are oral histories and/or narratives concerning an area, the presence and purpose of archaeological sites can be cross-referenced with this information. If no archaeological sites are known in an area, oral narratives can raise the likelihood that archaeological sites may be present (Nord et al. 2009: 58) and specify possible archaeological site types (Eldridge and Seip 2002: 4).

In some cases, this is more formalized, and locations and land use activities specifically mentioned in oral narratives are incorporated into archaeological predictive models (Fisher et al. 1998). Oral narratives concerning a specific place have also been used to rate the relative significance of a site (Eldridge and Seip 2002:16; Mathews 2003:17). In all cases, oral narratives

provide a local context for archaeology that is guided by the needs of development and land alteration. In other instances, places related in oral histories/narratives and map-based traditional land use studies provide a guide for archaeological inventory (Gray et al. 2015).

The temporal context of oral narratives is sometimes considered in CRM reports, although not to the same degree as the spatial context. For example, the regional ‘Culture History’ synthesis given in Marshall’s (2004:8) report on an impact assessment of the proposed Hazelton landfill site, includes the following statement: “A rich body of oral tradition has been preserved and passed down through ‘time immemorial,’ which claims that the Tsimshian have lived throughout different locations within their territories since the beginning of time.” Marshall (2004: 24) goes on to point out that the oral narratives of the local region are more fully documented than the archaeology and for this reason much of the archaeological work has been influenced by the oral narratives.

The practice of imbricating oral narratives and archaeological research is by no means a new phenomenon, especially when it comes to the research being conducted on the NWC of North America. From academic publications to CRM reports, to court cases involving issues of land title, communities and researchers are clearly drawing from both oral narratives/histories and archaeology to provide a more comprehensive picture of the past.

Conclusion

This paper has explored the benefits of undertaking a more polyphonic approach to archaeology on the NWC of North America— the imbrication of two diachronic forms of knowing the past: Indigenous oral history and archaeology. The review presented here suggests that this is an active and fruitful subfield in the archaeology of the region. The extensive body of literature that has been compiled by recording oral narratives and histories has been used to help

guide archaeological predictions and hypotheses about the past. Archaeological and geological methods can help to situate oral historical events in time and in some cases provide calendar dates for when events occurred. Archaeological methods can also help to situate oral traditions in spatial terms, through survey, mapping and sampling techniques. Overall, the imbrication of archaeology and Indigenous oral narratives has resulted in a much more robust understanding of the regional history. However, the approach remains optional for those practicing CRM in BC, as the provincial archaeological impact assessment guidelines and associated *Heritage Conservation Act*, 1996, presently make no mention of, nor require consideration of, Indigenous oral history when determining a sites significance or interpretation of its cultural materials and features.^{27,28}

²⁷ https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/archaeology/forms-publications/archaeological_impact_assessment_guidelines.pdf

²⁸ https://www.bclaws.gov.bc.ca/civix/document/id/complete/statreg/96187_01

Chapter 3 Geo-archaeology and Haíłzaqv Orał History: Long-term Human Investment and Resource Use at EkTb-9, Triquet Island, Núláwítxv Tribal Area, Central Coast, BC, Canada²⁹

Introduction

The early post glacial record of human occupation on the outer Pacific coast of BC, Canada represents an integral component of the evolving narrative for the peopling of the New World and the proposed coastal corridor hypothesized to have permitted human expansion southward from Asia into the Americas along the western margin of the Cordilleran Ice Sheet (Erlandson et al. 2007; McLaren et al. 2019a; Potter et al. 2017; Fladmark 1975,1979,1983). While debates surrounding the occupation of the Americas prior to the Last Glacial Maximum continue (Bennett et al. 2021), robust archaeological, linguistic, and genetic evidence indicate it is more likely that the peopling of the Americas occurred as ice began to retreat (Li et al. 2023; Madsen et al. 2022; Nichols 2023). The coastal corridor is supported by evidence of non-glacial conditions on the NWC of BC as early as ca. 18,000 – 16, 000 years ago (Al-Suwaidi et al. 2006; Blaise et al. 1990; Darvill et al. 2018; Hebda 2019; Lesnek et al. 2020; Misarti et al. 2012; Oviatt et al. 2022; Shaw 2020); and documented human presence on the landscape by ca. 14,000 – 13,000 years ago, as well as archaeological and other palaeoenvironmental evidence from elsewhere in the Americas (Davis et al. 2019, 2022; Dillehay et al. 2015; Halligan et al. 2016; Waters et al. 2011, 2018; Willams et al. 2018). Our understanding of this crucial period remains however limited as many near-coastal archaeological sites were submerged or high-stranded following changes in sea level during the Last Glacial Maximum (Mackie et al. 2011; McLaren 2008; McLaren et al. 2014, 2015, 2018). Archaeological sites on Triquet Island and a few other

²⁹ This chapter is a multi-authored manuscript that was published on April 28, 2023, in the *Journal of Archaeological Science: Reports* (Gauvreau et al. 2023). I am the principal author and analyst on the manuscript, which was co-written with Daryl Fedje, Angela Dyck, Christopher Hebda, Dr. Duncan McLaren, Dr. Quentin Mackie, Keith Holmes, Qíxítasú Yímázasal Elroy White, Dúqváisla William Housty, and Ğvúi Rory Housty.

outer-coastal islands along the north and Central Coast of BC are rare exceptions as a similar relative sea level has been maintained since the late Pleistocene (Mackie et al. 2018; McLaren et al. 2015).³⁰

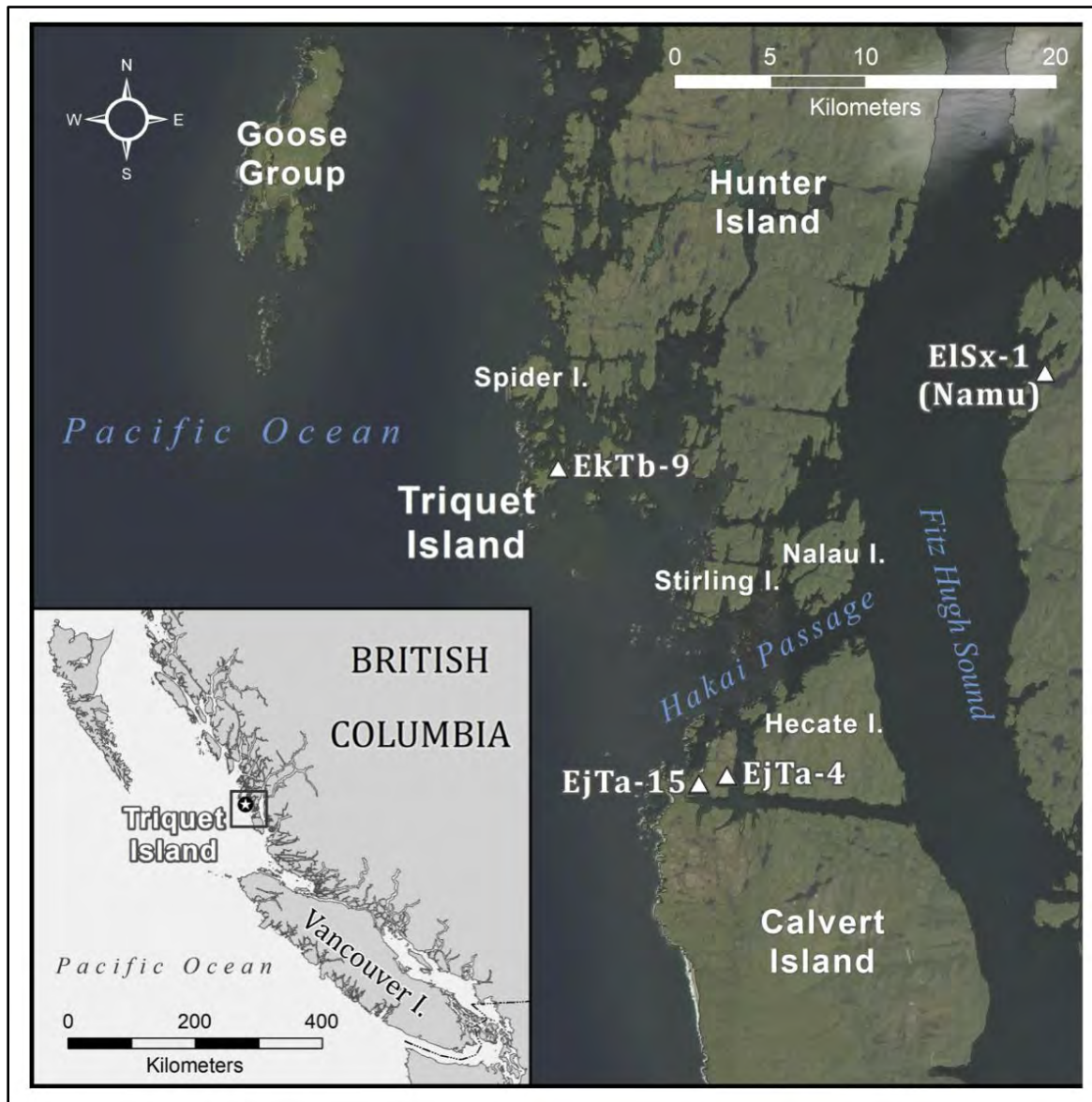
Triquet Island is situated approximately 25 km west of the Pacific mainland coast of BC within Haítzaqv Nation territory; it is a small island (144 ha in size) in a larger archipelago north of Hakai Passage, located at the entrance to Kildidt Sound within the Hakai Lúxvbálís Conservancy (Figure 3-1). Today, the island is in the Coastal Western Hemlock biogeoclimatic zone, Very Wet Hypermaritime subzone, Central Variant (CWHvh2) (Banner et al. 1993; Pojar et al. 1991).³¹ Triquet Island’s hypermaritime environment is characterized by high levels of precipitation (fog, drizzle, rain) during mild wet winters and generally cool summers, subtle variation in slope, excess soil water, and a maximum elevation of 49 m above modern sea level (Banner et al. 2005). Average yearly precipitation on Triquet Island ranges between approximately 120-500 mm a month; the highest levels of precipitation generally occur from October through February. Average temperatures fluctuate between approximately -12°C and 9°C from October to March and between approximately -1°C and 20°C from April to September. Throughout the year, average windspeeds vary between 2 km/hr and 40 km/h.

³⁰ Hereafter referred to as the Central Coast.

³¹ The Coastal Western Hemlock Zone, Very Wet Hypermaritime subzone, Central Variant includes all coastal islands and a mainland fringe along the central and north coast of BC from Smith Inlet in the south to the Alaska border in the north (Banner et al. 1993).

Figure 3-1 Study area map showing location of EkTb-9 on Triquet Island and other nearby archaeological sites (EISx-1, EjTa-15, EjTa-4) on the Central Coast.

Archaeological sites EkTb-9, EISx-1, EjTa-4, and EjTa-15 exhibit similar patterns of long-term human occupation and investment beginning during the early post-glacial period /early Holocene era. The inset shows the location of Triquet Island along the coast of BC, Canada. Prepared by K Holmes (Hakai Institute).



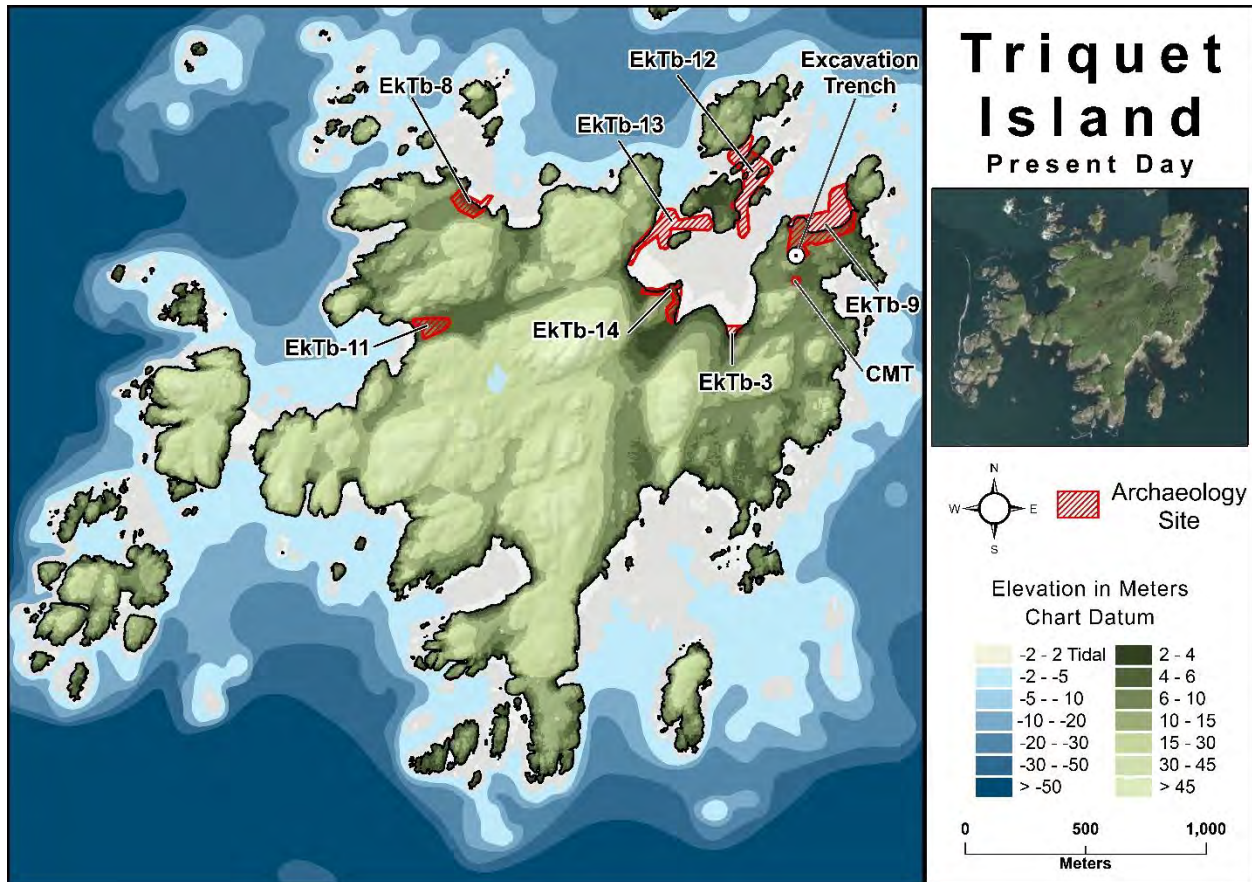
Despite the small size of the island, seven archeological sites (EkTb-3, 8, 9 and 11-14) have been recorded there (Figure 3-2). The sites are primarily distributed across the northern and protected coastal extent of the island. Inventoried features include intertidal fish traps and petroforms (circular stone alignments), extensive intertidal surface lithic scatters, culturally modified trees, shell-midden and shell-less midden accumulations, and a house platform. Estuarian root gardens (Deur 2002; Turner and Deur 2005; Turner et al. 2013), well established berry patches, and a Hałtzaqv registered trapline and trapper's cabin are also known on Triquet Island (Stafford et al. 2009; McLaren 2018).^{32,33} While most of the outer coastal islands around Hakai Passage and Kildidit Sound are rocky and steep sided, Triquet Island has gently sloped and protected beaches. With its desirable topographical features and outer coastal positioning allowing unimpaired visibility of the Pacific Ocean and adjacent inner waterways, the island is a logical choice for repeated human occupation and investment in place (Letham et al. 2020).

³² Estuarian root gardens identified in coastal BC are cultivated landscapes that have been managed and maintained by coastal Indigenous Nations across generations (Turner and Deur 2005; Turner et al. 2013). Estuarian root gardens often comprise a mix of springbank clover (*Trifolium wormskioldii*), Pacific silverweed (*Potentilla egedii*), northern riceroot lily (*Fritillaria camschatcensis*) and Nootka lupine (*Lupinus nootkatensis*) (Turner et al. 2013). These root gardens are typically situated on "estuarine salt marshes and gravel beds where the mouths of rivers and streams meet saltwater" (Turner et al. 2013:116).

³³ Hałtzaqv traplines were integral sources of income during the fur trade and the rights to the traplines have been passed down across generations (Maxwell et al. 1997; Stafford et al. 2009).

Figure 3-2 Mid-Range map of the archaeological sites (EkTb-3, -8, -9, -11, -12, -13, -14) and the excavation trench location on Triquet Island.

Modern day sea level at Triquet Island; elevation in meters from chart datum. Image derived from data obtained through drone imagery and LiDAR. EkTb-9 archeological site boundary shown in red with small polygon showing location of a culturally modified tree (CMT) associated with the site. Prepared by K Holmes (Hakai Institute).



EkTb-9, comprising both intertidal and terrestrial deposits, is the largest archaeological site currently recorded on Triquet Island (Figure 3-2). The site is centrally located along a protected northeastern bay, facilitating access to resources in the surrounding productive intertidal and estuarine areas, coastal forests, deep-sea and near shore marine environments, and sea-mammal rookeries. An extensive tidal flat on the lee side provides an excellent place for landing watercraft and harvesting intertidal resources. EkTb-9 is a multi-component site

containing a rich assemblage of stratified natural and cultural deposits bearing stone tools, hearth features, fauna, preserved organics, perishable wooden artifacts, and fire-broken rock.³⁴

This chapter focuses on the terrestrial component of our fieldwork (above the intertidal zone), presenting the main stratigraphic and archaeological results with a discussion of site formation processes. The results of radiometric dating coupled with the analysis of sediments and biological proxies demonstrate landscape change since the late Pleistocene.³⁵ Geospatial modelling enables reconstructed visualisations of these processes. We provide detailed results of the lithic analyses and preliminary summaries of the faunal and waterlogged artifact assemblages recovered. EkTb-9 offers a unique opportunity to learn more about site formation processes, terraforming, and the theoretical and political importance of observed continuity at a single place of repeated human occupation and investment. This study contributes to discussions surrounding the hypothesized coastal dispersal route for the peopling of the Americas. This study also represents a novel collaboration with descendent community members from Haïlzaqv Nation to bridge Indigenous knowledge with archaeological methods of investigation.

Background

EkTb-9 was first recorded during a one-day archaeological impact assessment; part of a larger study of select recreation sites within the Hakai Lúxvbálís and Outer Coastal Islands Conservancies (Stafford et al. 2009). The site was selected for further investigation during the Hakai Ancient Landscapes Archaeology Project (HALAP) due to its outer coastal position and promising stratigraphy (McLaren 2013, 2014).³⁶ The primary goal of the HALAP was to

³⁴ Human remains were also identified within the excavation trench at the site; these remains were subsequently reinterred as per the Haïlzaqv Human Remains Policy and were therefore not subject to laboratory analyses.

³⁵ For consistency, we report all radiocarbon dates herein as “Cal BP” (calendar years before present; AD [anno domini] 1950). Calibration details are described in the Chapter 3 Methods – Radiometric Dating section.

³⁶ The HALAP was conducted under the terms and conditions of *Heritage Conservation Act* Permit 2011-0171.

investigate the early post-glacial environmental and human history within the Hakai Passage region of the Central Coast. In 2011 the HALAP team conducted a preliminary core and auger testing program at EkTb-9 to sample and date cultural deposits (McLaren 2013). Land-based excavation at the site began in 2012, continued in the spring of 2015 and 2016, and culminated with a minimally invasive Vibracore sampling program in 2017 (Gauvreau and Dyck 2018; McLaren 2013, 2014, 2016a, 2016b, 2018). Intertidal excavations at the site began in 2016 and concluded in 2017 (Dyck et al. 2020).

Regional setting

Among outer coastal islands situated along the NWC of North America there are hundreds of recorded archaeological sites that pre-date ca.7,000 years ago located within 300 m of the current shoreline, and a handful that pre-date ca.12,000 years ago (Fedje et al. 2021; Gustas and Supernant 2019; Lausanne et al. 2019; Vogelaar 2017). Early post-glacial occupation sites such as Far West Point (GcTr-6) (Martindale et al. 2009; McLaren 2008), Kilgii Gwaay (1325T) (Cohen 2014; Fedje et al. 2001, 2005; Mackie et al. 2011; Mathews et al. 2019; Wigen 2002, 2005), and Richardson Island (1127T) (Fedje et al. 2005; Magne 2004; Smith 2004; Steffen 2006; Story 2008; Waber 2011), indicate site inhabitants practiced maritime-based subsistence with a focus on near-shore and bottom fish species such as pelagic herring, rockfish and greenling, whereas karst cave sites K1(FgUc-6), Gaadu Din 1 (1693T), and Gaadu Din 2 (1906T) on southern Haida Gwaii demonstrate early postglacial presence of black and brown bear, ungulates, domesticated dog, and salmon, with an archaeological record up to ca. 13,100 – 12,600 years ago (Fedje et al. 2021).

Early post-glacial sites EjTa-4 and EjTa-15 on Calvert Island (Wuiga; approximately 18 km southeast of EkTb-9) demonstrate long-term records of human occupation (Figure 3-1)

(McLaren et al. 2015, 2018). Archaeological sites GcTr-6, EjTa-15, and EjTa-4 indicate a pattern of population and site expansion that point to persistent outer coastal settlement during the early post-glacial period and early Holocene (Martindale et al. 2009; McLaren 2008; McLaren et al. 2015, 2018). Like EkTb-9, accessing these other island sites over the last ~14,000 years would have required the use of watercraft (Figure 3-1).³⁷ A nearby mainland coastal site of regional significance within Haílzaqv Territory is Namu (ElSx-1) (Figure 3-1). Archaeological investigations at Namu also demonstrate a long-term record of repeated human occupation, beginning ca. 11,500 years ago (Cannon 1991, 1996; Carlson 1996; Luebbers 1972; McLaren et al. 2015; Rahemtulla 2006). Due to the extensive field and laboratory investigations conducted at Namu, the settlement and subsistence history of this mainland site has served as the primary comparative record for all other sites on the Central Coast.

Past archaeological research on the Central Coast has demonstrated long-term cultural continuity in the absence of sustained political conflict, environmental upheavals, group migrations, and cultural replacement (McLaren et al. 2013). Few village sites were permanently abandoned, implying that people were choosing to stay in places where they had millennia-old settlements rather than finding alternative locations. The option to remain and repeatedly reoccupy settlements over millennia was possible, in part, because of the stable relative sea level in the region (McLaren et al. 2015). Results from the HALAP have demonstrated that mainland coastal and outer coastal adaptation systems were locally specific, exhibiting variation in resource procurement strategies (Duffield 2017; McLaren 2013; McLaren et al. 2015, 2019b). These varied systems coalesced through established trade routes and kinship ties and were perpetuated for millennia through culturally specific prerogatives and long-term connections to

³⁷ See Chapter 3 Background - History of Glaciation and Sea Level Change section for additional context.

place, creating a legacy of persistent places of repeated human occupation and investment (Grier and Schwadron 2017; Grier et al. 2017; Letham et al. 2020; McLaren et al. 2015).³⁸

Terraforming and Intentional Investment in Place

Early outer coastal island inhabitants engaged in the material process of terraforming, a practice involving the alteration and construction of components of the landscape through repeated human occupation and investment over millennia (Grier and Schwadron 2017). Although large shell accumulations (shell middens) have long been regarded as refuse heaps revealing the subsistence, seasonality, and resource exploitation practices of the site's inhabitants, increasing attention has been given to the relationship between these types of terraformed landscapes and human social memory and identity (Gamble 2017; Grier et al. 2017; Randall and Sassman 2018).

At outer coastal sites GcTr-6, EjTa-15, and EjTa-4 (Letham et al. 2020; Martindale et al. 2009; McLaren 2008; McLaren et al. 2015; McLaren et al. 2018) and other large shell midden sites on the NWC (Grier et al. 2017; Mackie 2003) where patterns of population and site expansion are revealed, terraforming has occurred through labor-intensive movement of available materials such as shell, rock, fire altered rock, and sediments. Terraforming was undertaken at diverse spatial and temporal scales at these sites, and they all eventually became more suitable for human habitation and resource harvesting over time (Grier and Schwadron 2017; Trant et al. 2016). Large-scale resource production features connected with the inhabitants' management systems, such as clam gardens (Caldwell et al. 2012; Holmes et al. 2022; Jackley 2014; Jackley et al. 2016; Lepofsky et al. 2015), fish traps and weirs (Caldwell et al. 2012; Moss 2012; White 2006), and plant gardens (Hoffmann et al. 2016; Turner and Deur 2005) are often

³⁸ Culturally specific prerogatives are exclusive rights and privileges held and inherited by a person, class, or village (McLaren et al. 2015).

associated with the labor-intensive feats of terraforming. These landscape modifications are deemed to be of monumental scale in relation to their impact on social practice, as the implications of terraforming extend beyond simply making a landscape more habitable (Gamble 2017; Grier et al. 2017; Randall and Sassman 2018). Places that become persistently occupied and invested in are generally understood to have been incorporated into cultural spheres, informed by the ecology of the area as well as the traditions, behaviours, and worldview of the inhabitants (Randall and Sassman 2018). Conceptually, terraforming is not simply the creation of new livable surfaces, but rather, the production of “new topologies” manifest through the rearrangement of histories and relations to the land guided by a vision for the future (Randall and Sassman 2018:11). While many acts of terraforming on the NWC were intentional, the modification of the landscape was nevertheless gradual, and may have been somewhat “unintentional” at the onset. In this paper we explore how the natural and cultural deposits at EkTb-9 and the oral histories of Haílzaqv Nation indicate that the site is a persistent place that has been subject to terraforming through continued investment and intentional landscape modification.

History of glaciation and sea level change

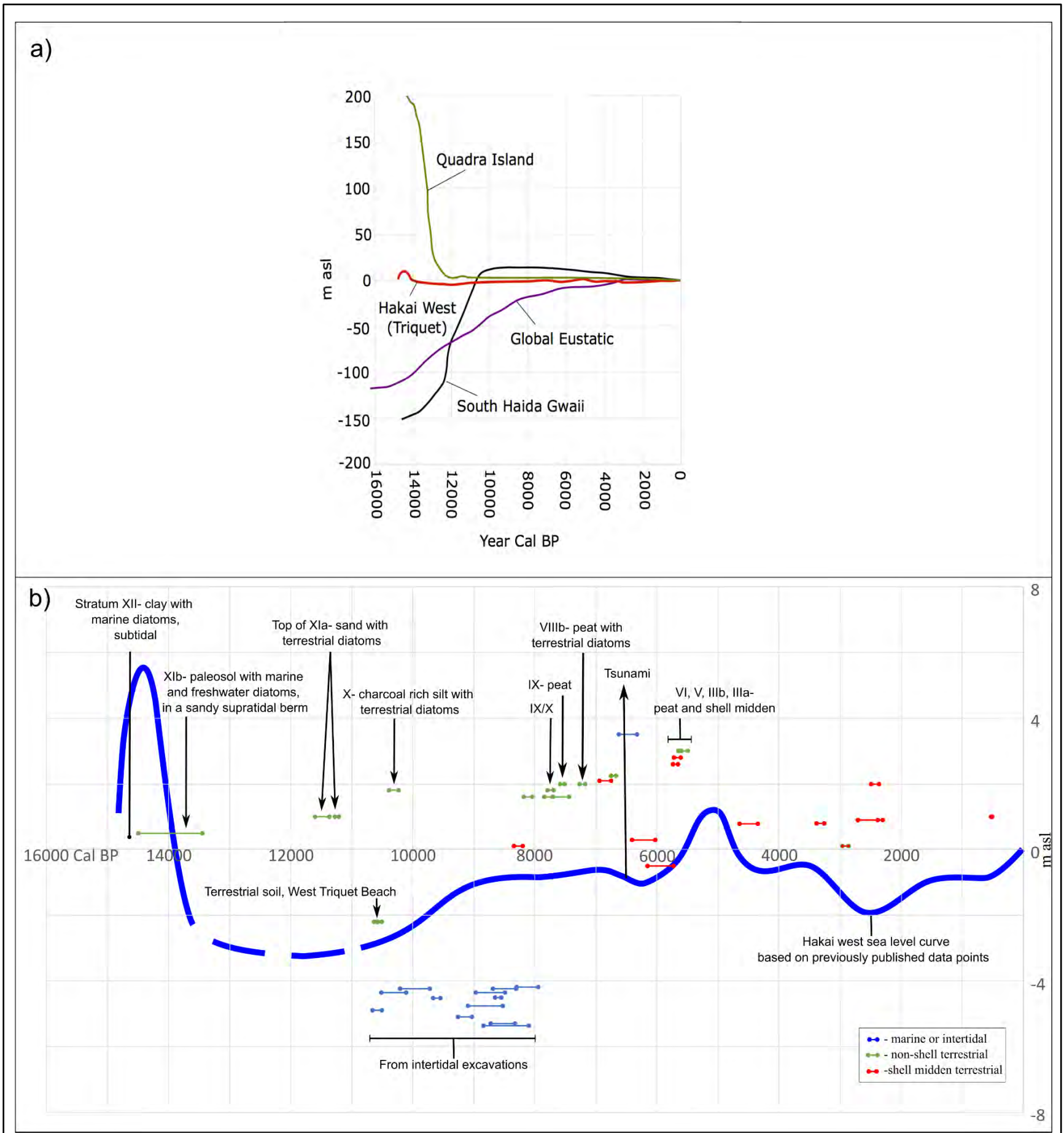
Ice from the late Wisconsin glacial maximum (locally known as the Fraser glaciation) had retreated from the outer islands of the Central Coast, including Triquet Island, by ca. 18,000 years ago (Darvill et al. 2018; Shaw et al. 2020). By ca. 13,800 years ago, ice had retreated well into the fjords of the mainland to the east (Darvill et al. 2018; Shaw et al. 2020). The local and global diminishment of ice during this time had significant effects on the regional sea level history. Sea levels around Triquet Island prior to ca. 15,000 years ago are not well constrained (Figure 3-3). At ca. 15,000 years ago, relative sea level was below 1.5 m above higher high tide

(hht). At ca. 14,500 years ago, coincident with a local ice advance, sea level was 6 m above modern levels (McLaren et al. 2014). This rise may have resulted from increased isostatic depression of the earth's crust or the effects of a global meltwater pulse event (Abdul et al. 2016). By ca. 14,000 years ago sea level had fallen to a position near modern and was slightly lower than modern for the next three millennia (McLaren et al. 2014). After ca. 10,500 years ago, relative sea level began to rise and has remained within 1 to 2 m of modern until the present day. Radiometric dates on samples collected from a paleosol identified below beach sand (2.2 m below hht) on the west side of Triquet Island provide localized evidence of a lowstand with ages of ca. 10,600 Cal BP (UCIAMS 102764, 102763) (Walker and McLaren 2013).

The relative stability of the local sea level in the vicinity of the Central Coast continued until late Holocene times. This phenomenon is referred to as a “sea level hinge”; that is, a fortuitous offsetting of isostatic, eustatic, and tectonic forces resulting in general stability in the local sea level (McLaren et al. 2014, 2015). This consistent sea level has contributed to the abundance of archaeological sites that have records of repeated long-term use, as the same protected beaches would have been accessible along the shoreline for over 15,000 years. The stable relative early post-glacial sea level history of the Hakai Passage region contrasts with inner coastal fjord shorelines that were, concomitantly, up to 200 m above modern sea level, and with outer coastal shorelines of Haida Gwaii to the west which had late glacial sea levels as low as 150 m below modern shorelines (Mackie et al. 2018; Shugar et al. 2014) (Figure 3-3).

Figure 3-3 Sea level Curve for the study area within the Hakai West region.

Selection of regional sea level curves including Quadra Island (Fedje et al. 2018), Hakai West (including Triquet Island) (McLaren et al. 2014) and southern Haida Gwaii (Fedje et al. 2005). The global eustatic sea level curve is approximated from Barbados sea level research (Peltier and Fairbanks 2006). (b) Detailed view of the Hakai West Sea level curve published in 2014 (McLaren et al. 2014) which includes Triquet Island and the broader outer Central Coast region. Radiocarbon/elevation data points from Triquet Island (Dyck et al. 2020; McLaren 2014; McLaren et al. 2014; and this paper) plotted on either side of the curve with details concerning stratigraphic associations of the data points noted where appropriate. Prepared by D McLaren.



Palaeoenvironmental setting

Following the retreat of Cordilleran ice from the outer coast ca. 18,000 years ago coast (Shaw et al. 2020; Barrie and Conway 2002; Clague 2000; Clague et al. 2004), the region experienced dynamic climatic fluctuations including the temperate Bølling–Allerød interstadial (ca. 14,700 – 12,900 years ago) and the cooler Younger Dryas (ca. 12,900 – 11,700 years ago) (Lacourse and Mathewes 2005; Mathewes 1993), both of which affected the growth and spread of post-glacial vegetation along the coast.

Pollen studies provide a ca. 14,500-year-old vegetation history from the Hakai region, revealing a succession of plant species from open conditions during the late Pleistocene, to the climax coastal rainforests and bog ecosystems in the region today (Eamer 2015; Lucas 2013). Older post-glacial plant communities have been documented from at least ca. 17,500 years ago on northern Vancouver Island (Hebda 2019; Hebda et al. 2022), and from ca. 18,000 (Blaise et al. 1990) to ca. 14,500 years ago (Mathewes and Clague 2017; Lacourse et al. 2003, 2012; Lucas 2013) in comparably situated coastal contexts on the Haida Gwaii archipelago. These data suggest the outer coast environment from ca. 18,000 – 16,000 years ago was cool and dry with tundra-like herb and shrub dominated vegetation communities, followed by a transitional period between ca. 16,000 – 14,500 years ago when a mosaic of tundra-like environments and early arboreal communities existed across the outer coast.

By ca. 14,500 years ago the record from Calvert Island (Wúíga), located approximately 15 km southeast of Triquet Island, indicates that the herb and shrub tundra had been succeeded by a shore pine (*Pinus contorta*) dominated parkland (Eamer 2015). By ca. 13,500 years ago the canopy became more closed with the addition of Sitka spruce (*Picea sitchensis*), western hemlock (*Tsuga heterophylla*), and some alder (*Alnus* sp.). Soon after ca. 13,000 years ago, a

slight expansion of mountain hemlock (*Tsuga mertensiana*) is noted, possibly the result of the onset of the Younger Dryas cooling event (Mathewes 1993). By the early Holocene, climatic conditions ameliorated with forests dominated by alder and mixed conifers. Sphagnum bogs expanded in flatter, more poorly drained areas of the outer coast. Cedar (Cupressaceae) pollen — likely belonging to western redcedar (*Thuja plicata*) — appears in the record on Calvert Island (Wúíga) between ca. 8,300 – 7,500 years ago (Eamer 2015). On Triquet Island, pollen analyzed from archaeological sediments reveal that cedar appears between ca. 6,700 – 5,700 years ago at lesser relative amounts than on Calvert Island (Wúíga) (Lucas 2013). This later signal could be the result of hypermaritime moisture-laden conditions which slowed evapotranspiration and may have limited the initial growth of cedar as it spread to smaller outer islands (Banner et al. 2005; Hebda et al. 1997).

Surficial geology

The surficial geology of EkTb-9 comprises a mix of undivided rock complexes consisting of Mesozoic and Late Jurassic to Early Cretaceous granodioritic intrusive rock. Quaternary deposits include glacial till and colluvial deposits consisting of blocks and rubble with sand and silt derived from the crystalline bedrock, medium-grade metamorphic substrate, and cemented sandstone (Bellafontaine et al. 2019; Fulton 1995). Sandy duric (McKeague and Sprout 1975) sediment with cobble to boulder-size clasts overlies this bedrock and likely represents a combination of deglacial and early post-glacial beach deposits. These deposits are overlain by Ferro-Humic Podzols (Pennock et al. 2015; Sanborn et al. 2011) with clastic sediment to gravel size material, organic soil, peat accumulations, woody debris, and stratified anthropogenic sediment (D Horizons) (Naeth et al. 2012; Valentine 2019).

Community collaboration

This project was conducted from the onset through direct collaboration with Haíłzaqv Nation, the Hakai Institute, the University of Victoria, and the Royal BC Museum (RBCM). Our collaborative work operates under the authority of the Haíłzaqv Tribal Council (HTC) and Yímás Council (hereditary chiefs), with input and direction from the Haíłzaqv Integrated Resource Management Department (HIRMD), and the Haíłzaqv Language Program. This collaboration is fundamental to the democratization of the discipline of archaeology and represents a positive step towards acknowledging the legal and ethical need to consult, co-create, and re-envision how western science and Indigenous knowledge can be combined to improve social-ecological systems today and enrich our understanding of the past (Salmon et al. 2018). Through our collaboration, we combine Haíłzaqv oral historical and linguistic data with our archaeological results (and vice-versa) to enhance our mutual understanding and interpretations of the site (Chapter 2; Gauvreau and McLaren 2016). Our approach acknowledges that oral history and archaeological chronologies are diachronic systems of knowing the past and that not all aspect of oral history can be tested using empirical methods (Chapter 2; Gauvreau and McLaren 2016). We have collaborated closely with HIRMD to explore the overlapping edges of Haíłzaqv oral histories and the archaeological record for the Núláwítǵv tribal area (Hakai Passage/South Hunter Island area) where the EkTb-9 site is located. Available oral historical information shared with us by HIRMD is not specific enough to allow direct spatial anchoring to the EkTb-9 site, however, it highlights Haíłzaqv Nation's enduring rights and title in the area, and the cultural significance of archaeological sites in the immediate region.

Haíłzaqv Nation oral historical records

Haíłzaqv Nation members descend from marine-based people who acquired their primary subsistence from the Pacific Ocean and coastal river systems (White 2006). Haíłzaqv Nation recognize five ancestral local groups (tribes) that held and continue to hold rights and title to the lands and waters of their territory. The five local groups include the Qvúqvaýáitxv (People of the calm water), the Wúyalitxv (People of the outside), the Wúíłitxv (People of the inlet; inside water People), the Xíxís (down river People), and the Ýisdáitxv (People of Ýisdá – where mountains meet the sea) (HTC 2018). The names of the Haíłzaqv local groups demonstrate the significance of coastal freshwater and marine environments to Haíłzaqv people and how they continue to shape Haíłzaqv cultural identity today (HTC 2018). Prior to European contact, the Haíłzaqv Nation also recognized the Núláwítxv tribal group; a local sub-group who later amalgamated with the Wúyalitxv sub-group when relocating to the village of Qíc (Old Bella Bella) and then to the present-day site of Wáglisł (Bella Bella) (Boas 1932; Olson 1955). In Haíłzaqvł, the language of Haíłzaqv people, Núláwítxv means “People of the oldest place in the world.”

Haíłzaqv Nation have núymas laýaxsšv gałglis nálayaxv (story about the beginning of time when the world was created), or origin stories, that are held by the different local groups. These creation stories are tied specifically to the regions that each local group inhabited and differ between groups (HTC 2018; McLaren et al. 2015; White 2006). Núymas laýaxsšv gałglis nálayaxv and other ancestral origin stories tying local groups to place are how Yímás (Hereditary Chiefs) and their families affirm their rights, privileges, cultural practices, and connections to their specific regions of the broader Haíłzaqv territory (HTC 2018; White 2006). One núymas laýaxsšv gałglis nálayaxv shared with anthropologist Livingston Farrand in 1897 by a member

of the Killer Whale clan (who originates from the Núláwítǵv tribal area; now Wúyalitǵv) (Boas 1932; Farrand 1916; Olson 1955) parallels the available archaeological and palaeoenvironmental data for the region:

“In the beginning there was nothing but water and ice, and a narrow strip of shoreline”.

This excerpt is spatially anchored to the Hakai Passage/South Hunter Island area that the Killer Whale clan inhabited (Farrand 1916; McLaren et al. 2015). Following glacial-retreat and subsiding sea levels during the early post-glacial period, the Núláwítǵv tribal area would have revealed newly exposed shorelines, tombolos and steeply sided rocky outcrops, as well as narrow strips of shoreline and increasingly productive tidal flats (McLaren et al. 2015). In 1968, Haíłzaqv historian Qáqutíláyu (Hoffman Harris) reaffirmed this origin story excerpt during an interview conducted by the Haíłzaqv Cultural Education Center (HCEC). During our excavations at EkTb-9, archaeologist Qíǵitasu Yímázalas Elroy White (Central Coast Archaeology) and Haíłzaqv field technician Guvi’ba Josh Vickers generously shared Haíłzaqv histories and songs of the outer islands (Núláwítǵv/ Wúyalitǵv) with us when we gathered around the campfire, the screening stations, and the excavation unit. Haíłzaqv people, generation after generation, have repeatedly transmitted the environmental history of the Hakai Passage region, and continue to be active managers of their terrestrial and marine landscapes. Haíłzaqv creation stories are regionally specific histories belonging to local groups and sub-groups. These histories are continuously reaffirmed through oral sharing (and written transcription) by Haíłzaqv knowledge keepers during potlatches and other ceremonies, as well as more casually, such as around the dinner table, or more formally for legal cases and academic research (HTC 2018; White 2006).

The Núláwítǵv tribal area encompasses a sizable portion of the outer Central Coast, capturing sites such as EjTa-4, EjTa-15, as well as EkTb-9, and many other sites in the general

area. The place name Núlú, meaning ‘the eldest,’ is mentioned in several oral narratives (Boas 1932; Olson 1955) and is believed to be associated with an important village site, EITb-1, within the Núláwítǵv Tribal Area (Kildit Sound) (Hobbler 1988). However, Núlú was never plotted on a map by Haítzaqv knowledge keepers, and it has been suggested that Núlú may have been the name for the geographic area used by the Núláwítǵv, rather than a specific village site (Olson 1955; Pomeroy 1980). The cultural identities of several Haítzaqv community members continues to be derived from this ancestral location (HTC 2018; Stafford et al. 2009). The following translated origin story from Núlú, told by Ai’wageł (alternate spelling: Káwázít)/ Ellen Anderson (née Douglas), a Núláwítǵv descendant, was transcribed by Anthropologist Franz Boas in *Bella Bella Tales* (Boas 1932):

“In Núlú lived a Killer Whale with a human face. Yágis, who had also the name Haítmlisa, came down from the sky and arrived in Núlú. He said to the Killer Whale, “Who is older in this world, you or I?” The Killer Whale replied, “When we came into life there were no place names. We were the first ones to come into this world.” Then Yágis said, “You must be the first of men, and therefore this place shall be called Núlú.” Then the Killer Whales became men. They were the ancestors of the No’loidexu (Núláwítǵv). They always had plenty of food at Wúíga (Calvert Island) and at the Wúígaxstú River. And they also had plenty of food which they obtained at the Sea Otter Rocks, Sisiumt or wawís.”

This origin story from Núlú re-affirms the name of the Núláwítǵv Tribal Area and explains the origins of the ancestors of the Núláwítǵv. An interesting connection to Calvert Island (Wúíga) is highlighted in Ai’wageł’s narrative, hinting at the longstanding connection among outer coastal islands for subsistence purposes. Intertidal archaeological investigations conducted at EjTa-4 on Calvert Island (Wúíga) uncovered ca. 13,000 year old human footprints impressed in clay-rich soils, providing an additional line of evidence supporting the early post-glacial occupation of Núláwítǵv tribal area (McLaren et al. 2018).

Methods

This section provides a description of field, laboratory, radiometric dating, and geospatial modelling methods applied during our research program.

Field Methods

Preliminary subsurface testing at EkTb-9 was conducted with core and auger devices. Six tests were conducted in 2011 using a JMC Environmentalist's Sub-Soil Probe (ESP; 2 cm diameter) to refine site boundaries and obtain samples suitable for radiometric dating (McLaren 2013) (Figure 3-4). Two of these ESP tests were selected for dating: ESP-2011-E and ESP-2011-F (McLaren 2013) (Figure 3-4). Three shovel tests (50 x 50 cm) and 13 Dutch auger tests (7 cm diameter) were also conducted between 2011-- 2017 at various locations across the site to further refine our understanding of terrestrial site stratigraphy and boundaries (Figure 3-4). Only one sample from an auger test (AT-2017-DJJ1) was selected for dating (Figure 3-4).

The excavation trench at EkTb-9 was established at the southern extent of the site where auger testing revealed peaty deposits below relatively thin shell midden accumulations. The excavation trench is located approximately 70 m inland from the shore of the protected northeastern bay at the "front" of the site where intertidal components have been identified (Dyck et al. 2020; Gauvreau and Dyck 2018) (Figure 3-4 and Figure 3-5). This peripheral location was chosen for the excavation unit with the aim of attaining the oldest cultural deposits and due to the presence of peat deposits with potential to contain preserved wooden artifacts and macrobotanical remains. The trench is composed of three contiguous 1 x 1 m units (EU2012, EU2015, EU2016). The units were excavated in 5 cm levels within the identified stratigraphic layers. All material recovered from the excavation trench was screened using 3 mm mesh. Due to the presence of

human remains identified in the early Holocene deposits at the site, the excavation trench was not reopened or expanded in 2017.³⁹

Four Vibracore tests (VC-2017-1 through VC-2017-4) were conducted in 2017 with a Wink Vibracore ‘H’ Series model to sample the deepest shell-midden layers while causing the least amount of impact to terrestrial cultural deposits (Figure 3-4).⁴⁰ Three of these Vibracore tests were oriented east to west in a transect across the northern extent of the site and the fourth test was conducted at the southwestern extent of the site. Each Vibracore test began with a shovel test and/or Dutch auger test to remove the organic overburden (culturally sterile organic LFH horizon down to the Ah horizon soil). The LFH/Ah ranged from 20 to 100 cm depth below the forest soil surface. Once the interface with the mineral soil (B horizon) or cultural strata was uncovered, the Vibracore drill bit was positioned at the base of the shovel/auger test to commence drilling. The Vibracore tests measured 7.5 cm in diameter (Duffield 2017; Duffield et al. 2022).⁴¹

³⁹ Stratum IX; subsequently reinterred as per Hailzaqv Human Remains Policy.

⁴⁰ We conducted the Vibracore tests in previously cleared areas to minimize disturbance to the forest understory.

⁴¹ The tests measure the width of the drill rods; see Duffield MA thesis for a detailed description of the mechanisms involved in Vibracore testing with a Wink Vibracore ‘H’ model (Duffield 2017).

Figure 3-4 Map of EkTb-9 showing locations of select subsurface tests and the excavation trench with callouts for relevant median radiometric dates (Cal BP) obtained.

Subsurface tests comprise: Auger Tests (AT), JMC Environmentalist's Sub-Soil Probe (ESP) Tests, Vibracore Tests (VC), Excavation Units (EU) and the Excavation Trench (comprised of EU2012, EU2015, and EU2016); positive subsurface tests conducted in the intertidal area are also shown (Dyck et al. 2020). Symbols used to denote the location of the subsurface tests are not to scale. Median radiocarbon ages shown where relevant. Prepared by A Dyck.

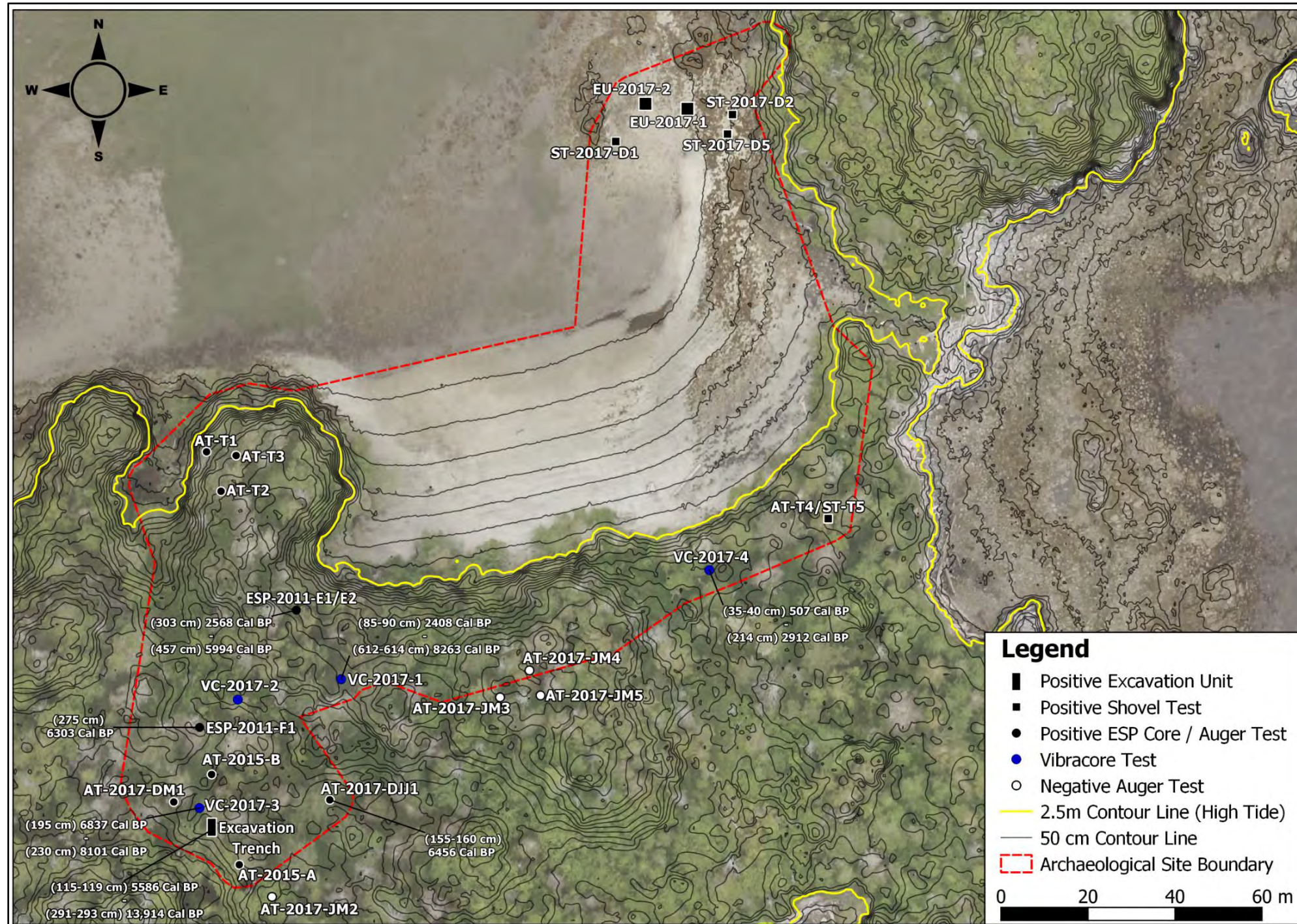
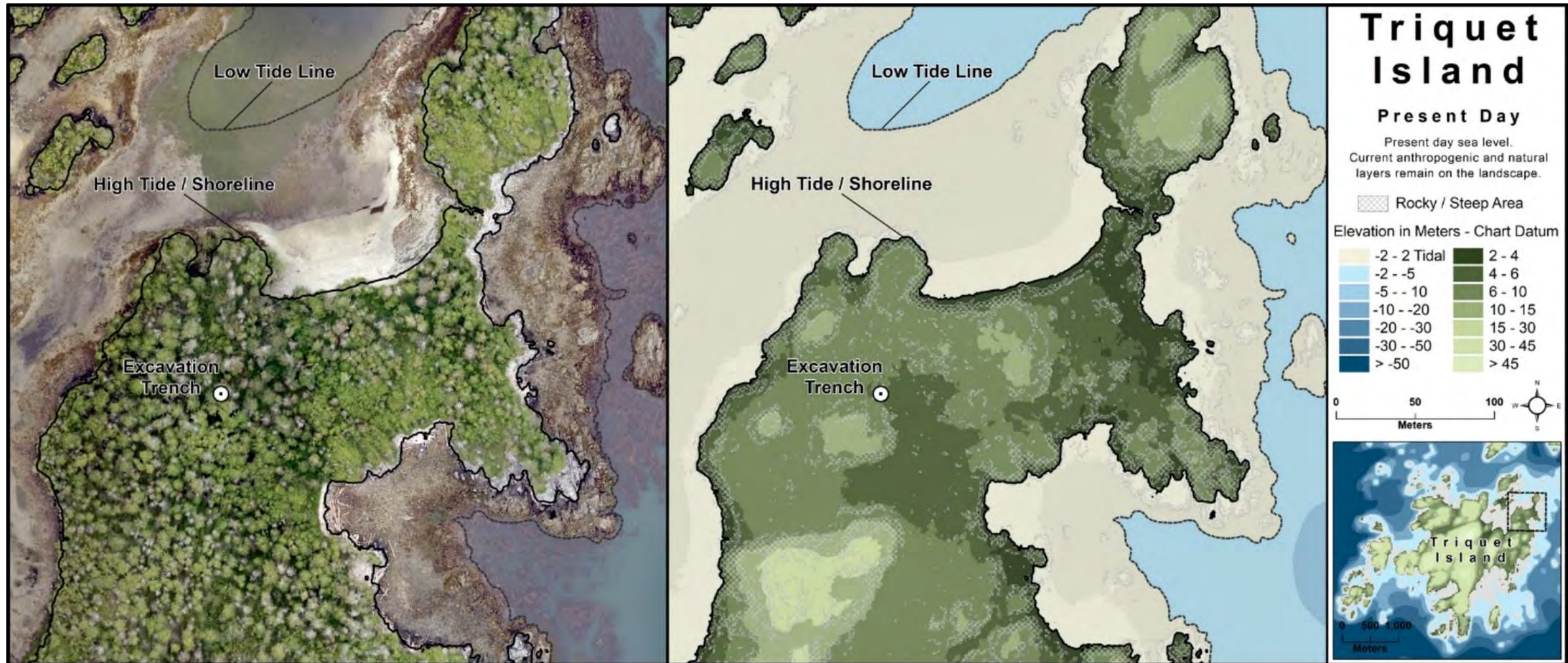


Figure 3-5 Present day sea level at the northeastern extent of Triquet Island, encompassing the EkTb-9 site area and location of the excavation trench.

Elevation in meters from chart datum. Current anthropogenic (shell-midden) and natural layers remain on the landscape. Image derived from data obtained through drone imagery and LiDAR. Prepared by K Holmes (Hakai Institute).



Laboratory Methods

Description of laboratory procedures in this chapter are limited to radiocarbon analyses and geospatial modelling. Methods employed for lithic, faunal, sediment, pollen, macrofloral, perishable artifact, and silicious microfossil analyses are described in Appendix B.

Radiometric Dating

The Keck Carbon Cycle AMS Facility at the University of California Irvine (UCIAMS) processed 28 radiocarbon samples for this research program between 2012 and 2019. The A.E. Lalonde AMS Laboratory at the Canadian Centre for AMS and Environmental Radionuclide Research at the University of Ottawa (UOC) processed a single sample in 2019. The 29 radiocarbon samples (17 charcoal, 8 wood and plant material, 4 marine shell) were calibrated using Calib Rev8 (Stuiver and Reimer 1993). The charcoal, wood and plant samples were calibrated with the IntCal20.14C dataset (Reimer et al. 2020) and the marine shell samples were calibrated with the Marine20.14C dataset (Heaton et al. 2020). Marine shell samples were assigned an 84.0 ± 132.0 Delta R correction (Schmuck et al. 2021).⁴² All dates are reported with a two-sigma error range. Uncalibrated ages are included in Tables 3-1 and 3-2.

⁴² Marine shell samples are only included in Table 3-2.

Table 3-1 Radiocarbon dates obtained from the excavation trench (EU2012, EU2015, EU2016), EkTb-9.

<i>Laboratory ID#</i>	Test Designation	Stratum and Field depth (~ cm below surface)	14CBP	±	Older Cal BP range	Younger Cal BP Range	Median Probability	Material for dating	Sample elevation above or below high-high tide (m)
<i>UCIAMS 163731</i>	EU2015	Stratum IIIa; 115-- 119	4840	20	5599	5483	5586	Charcoal	3
<i>UCIAMS 179730</i>	EU2016	Stratum IIIb; 130-- 131	4865	15	5647	5583	5593	Charcoal	3
<i>UCIAMS 117999</i>	EU2012	Stratum V; 155-- 160	4930	20	5714	5595	5637	Charcoal	2.8
<i>UCIAMS 118002</i>	EU2012	Stratum VI; 180-- 185	4965	15	5732	5604	5681	<i>Sambucus racemosea</i> seeds	2.6
<i>UCIAMS 118003</i>	EU2012	Basal Stratum VII; 215-- 220	5885	20	6777	6658	6705	<i>Tsuga heterophylla</i> needle	2.25
<i>UCIAMS 118000</i>	EU2012	Stratum VIIIb; 220	6300	20	7264	7165	7208	<i>Taxus brevifolia</i> wood atlatl artifact	2.04
<i>UCIAMS 118004</i>	EU2012	Stratum IX; 230-- 235	6840	20	7713	7612	7670	<i>Sambucus racemosea</i> seeds	1.8
<i>UCIAMS 184918</i>	EU2016	Stratum IX/X; 254-- 259	6915	15	7788	7682	7732	<i>Unidentified seeds</i>	1.8
<i>UCIAMS 112263</i>	EU2012	Stratum X; 255-- 260	9140	25	10402	10232	10275	Charcoal	1.8
<i>UCIAMS 163730</i>	EU2015	Stratum XIa; 268-- 270	9845	25	11311	11201	11242	Charcoal	1
<i>UCIAMS 118001</i>	EU2012	Stratum XIa; 270-- 275	9960	25	11606	11262	11357	Charcoal	1
<i>UCIAMS 179732</i>	EU2016	Stratum XIb; 291-- 293	12010	180	14802	13478	13914	Disperse Charcoal	0.5

Dates have been calibrated with a 2-sigma error. Dates have been organized by stratum and depth. Calibration data set: IntCal20.14C (Reimer et al. 2020). Prepared by A Gauvreau.

Geospatial Modelling

This research program was enhanced through high-density digital elevation modelling and spatial mapping of past shorelines and landscape transformation through time. Data were obtained through drone imagery and LiDAR (Light Detection and Ranging).^{43,44} Drone and LiDAR based digital elevation models were merged and converted to chart datum. The elevation models are based on field sampling data listed above using Esri ArcGIS software. Geospatial modelling provides a visualization of geomorphic features of the site and adjacent areas. Radiometric dates obtained for discrete stratigraphic layers coupled with the regional sea level curve enabled us to reconstruct landscape evolution through time.

Results

The results of our multi-proxy research program are described below. Radiometric dating results are followed by a discussion of surficial geology, site stratigraphy (sedimentology) and formation processes uncovered at the site. Summaries of the siliceous microfossil, pollen, macrobotanical, faunal, perishable wood, and lithic assemblages are also provided. Common names, scientific names (Latin), and Hailzaqv terminology are provided for identified floral and faunal specimens.

Dating

Twenty-nine accelerator mass spectrometric (AMS) dates were obtained for the terrestrial component of the EkTb-9 site (Tables 3-1 and 3-2). These include dates on charcoal (n=17), sclerotia (n=1), shell fragments (n=4), seeds (n=5), a western hemlock (*T. heterophylla*) needle (n=1), and a carved western yew (*Taxus brevifolia*) wood artifact (n=1). A date of 14,802 –

⁴³ Drone and digital elevation models: Keith Holmes, Hakai Institute

⁴⁴ LiDAR: Dr. Brian Menounos, University of Northern BC; Hakai Institute

13,478 Cal BP ($12,010 \pm 180$ 14CBP; UCIAMS 179732) was obtained from dispersed charcoal collected from a deeply buried paleosol (Stratum XIb) associated with a cluster of quartzite lithics (cores and flakes) found resting on a boulder (Table 3-1). This date provides an approximate age for the earliest occupation of the site. An attempt was made to duplicate this date through external assessment of sub-sampled sediments collected above, below, and within the paleosol (Stratum XIb) by the Paleosciences Archaeobotanical Services Team. Only uncharred unidentifiable material was recovered from the sub-sampled deposits, none of which were substantial enough for accurate dating (Puseman and Briles 2019). Further efforts to identify charcoal within existing sediment samples has not yielded enough identifiable material for accurate radiocarbon dating (1 mg).

The next record of occupation at EkTb-9 is associated with an age of 11,606 – 11,262 Cal BP ($9,960 \pm 25$ 14CBP; UCIAMS 118001; charcoal), which was obtained from the top of Stratum XIa (Table 3-1). The latest radiometric date obtained from the site is 519 – 494 Cal BP (450 ± 15 14CBP; UCIAMS 210955; charcoal) between 45-50 cm below the modern soil surface (Table 3-2). All twenty-nine dates occur sequentially; no reversals were found within the samples collected from the terrestrial component of the site. This radiocarbon chronology indicates that the site was repeatedly occupied between ca. 11,606 and 494 Cal BP and suggests a ca. 14,802 – 13,478 Cal BP component (Table 3-1). Bark-stripped western redcedar culturally modified trees (CMTs) at EkTb-9 provide direct evidence of more recent occupation and resource use over the last 300 years.

Site Stratigraphy

For this analysis, the stratigraphy of the site is primarily derived from the excavation trench where thirteen strata were identified. Individual strata were recorded in the field based on their lithological and pedological characteristics (Stein 1992, 2008). Complex stratigraphy identified in the Vibracore and ESP tests are collapsed into primary stratigraphic units consistent with (and/or post-dating) those found in the trench. Stratigraphy is variable across EkTb-9 due to the uneven nature of the parent substrate on the island and a combination of natural and cultural site formation processes. Tests undertaken across the site (Figure 3-4 and Figure 3-6) provide information on the accumulation of cultural layers during the Holocene.

Shell midden deposits at the site are extensive and preserved shell accumulation began as early as ca. 8,000 years ago (Figure 3-4 and Figure 3-6; Table 3-2). In the north-central area of the site, the basal shell midden deposits in VC-2017-1 have an associated radiometric date of 8,335 – 8,191 Cal BP (7,445±20 14CBP; UCIAMS 210954; charcoal) (Figure 3-4 and Figure 3-6). The upper deposits of this sample have an associated radiometric date of 2,489 – 2,354 Cal BP (2,405±15 14CBP; UCIAMS 210952; charcoal) (Figure 3-6; Table 3-2). A date of 2,705 – 2,366 Cal BP (2,460 ±25 14CBP; UCIAMS 151820; charcoal) was obtained from basal shell midden deposits in ESP-2011-E1 (conducted at the northwestern extent of the site) (Figure 3-4; Table 3-2). Results from dating VC-2014-4 indicate that the formation of the shell midden deposits at the northeastern extent of the site did not commence until ca. 2,961 – 2,854 Cal BP (2,810±20 14CBP; UCIAMS 210956; charcoal) and terminated ca. 519 – 494 Cal BP (450±15 14CBP; UCIAMS 210955; charcoal), indicating that the eastern extent of the site was a horizontal expansion of the earlier (western) area of occupation (Figure 3-4 and Figure 3-6; Table 3-2). Shell midden deposits (Strata IV/ V) are considerably thinner in the excavation trench

(averaging 40 cm in thickness) at the southern end of the site (Figure 3-4 and Figure 3-7), when compared to the deeper shell midden deposits at the northern side of the site, which have a maximum measured vertical span of 5.29 m (Figure 3-4 and Figure 3-6). At the northern edge, shell and other material were used (Strata IV/ V) to fill in low lying areas, including between exposed bedrock and rocky promontories, thereby expanding the site footprint (Figure 3-4 and Figure 3-6). At the southern extent, charcoal-rich greasy black organic shell-less (carbonate-free) midden deposits are present in the excavation trench and VC-2017-3, indicated through presence of abundant periostracum in Stratum X (Figure 3-4, Figure 3-6 and Figure 3-7). A date of 8,177 – 8,035 Cal BP ($7,320 \pm 20$ 14CBP; UCIAMS 206015) was obtained from upper Stratum X in VC-2017-3 (Figure 3-6; Table 3-2). Within the excavation trench, a date of 11,606 – 11,262 Cal BP ($9,960 \pm 25$ 14CBP; UCIAMS 118001) was obtained from the interface of Strata XI/X and a date of 7,788 – 7,682 Cal BP ($6,915 \pm 15$ 14CBP; UCIAMS 184918) was obtained from the interface of Strata X/IX (Table 3-1; Figure 3-7). The stratigraphy of the excavation trench is described in detail below.

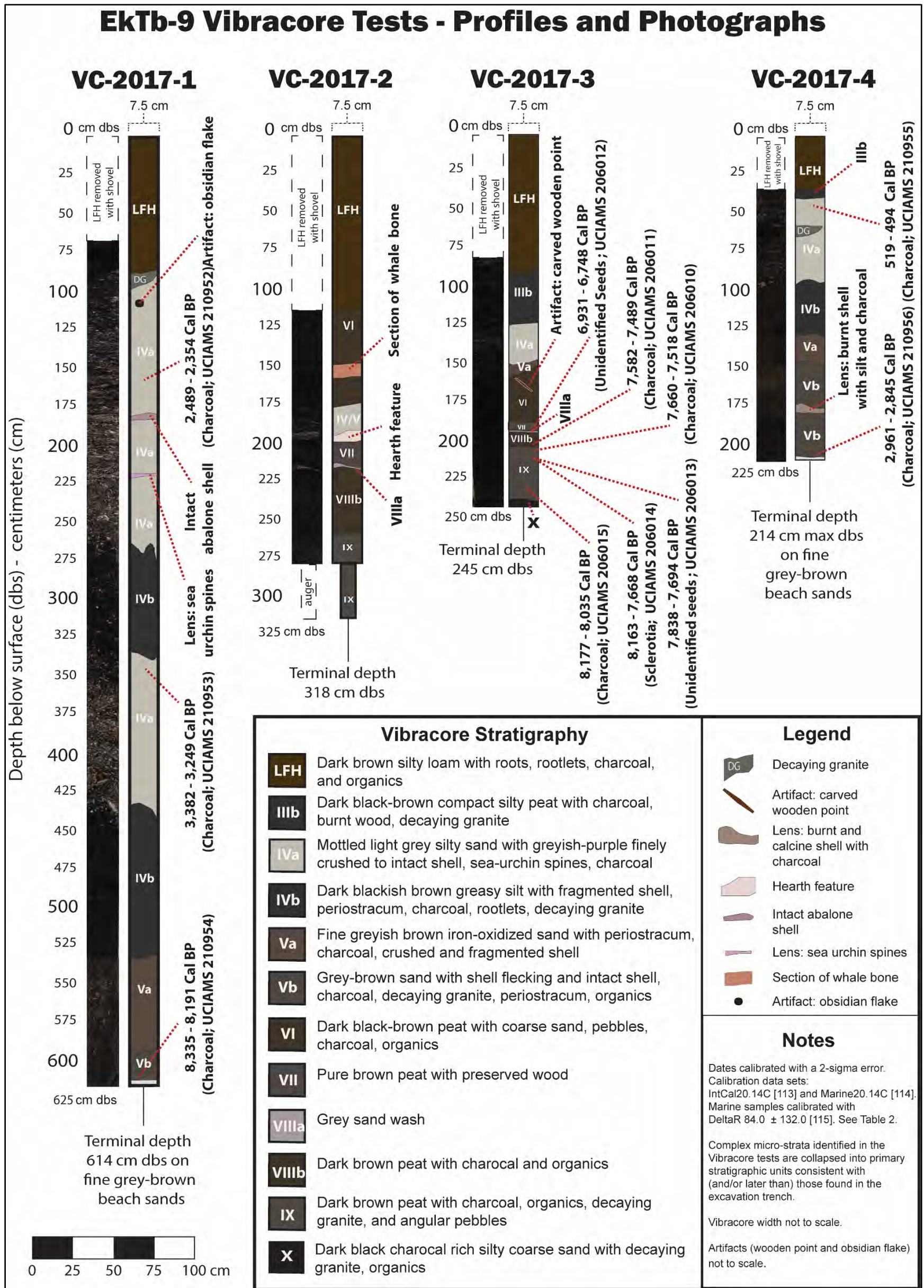
Table 3-2 Radiocarbon dates obtained from Auger, ESP, and Vibracore tests conducted between 2011 and 2017 at Ektb-9.

Laboratory ID#	Test Designation	Stratum and Field depth (~ cm below surface)	14CBP	±	Older Cal BP range	Younger Cal BP Range	Median Probability	Material for dating	Sample elevation above or below high-high tide (m)
UOC-8927	AT-2017-DJJ1	Stratum VIIIa; 155-160	5674	48	6620	6314	6456	Charcoal	3.5
UCIAMS 151820	ESP-2011-E1	Basal Shell Midden; 303	2460	25	2705	2366	2568	Charcoal	0.9
UCIAMS 151837	ESP-2011-E1	Basal Shell Midden; 303	3075	25	2946	2238	2587	Shell fragment	0.9
UCIAMS 102751	ESP-2011-E2	Shell Midden; 334	4775	20	5129	4355	4729	Clam shell fragments	0.8
UCIAMS 102750	ESP-2011-E2	Basal Shell Midden; 457	5865	20	6291	5658	5994	Mussel shell fragments	-0.5
UCIAMS 102752	ESP-2011-F1	Basal Shell Midden; 275	6155	20	6629	5976	6303	Clam, mussel, and barnacle fragments	0.3
UCIAMS 210952	VC-2017-1	Upper Shell Midden; 160-165	2405	15	2489	2354	2408	Charcoal	2
UCIAMS 210953	VC-2017-1	Central Shell Midden; 350	3110	20	3382	3249	3337	Charcoal	0.8
UCIAMS 210954	VC-2017-1	Basal Shell Midden; 610-612	7445	20	8335	8191	8263	Charcoal	0.1
UCIAMS 206012	VC-2017-3	Stratum VIIIa; 195-196	6000	35	6931	6748	6837	Unidentified Seeds, .083mgC	2.25
UCIAMS 206011	VC-2017-3	Stratum VIIIb; 200	6670	20	7582	7489	7533	Charcoal	2
UCIAMS 206010	VC-2017-3	Upper Stratum IX; 205	6730	20	7660	7518	7593	Charcoal	1.6
UCIAMS 206013	VC-2017-3	Upper Stratum IX; 210	6950	20	7838	7694	7771	Unidentified Seeds	1.6
UCIAMS 206014	VC-2017-3	Upper Stratum IX; 210	7060	110	8163	7668	7876	0.25mgC Sclerotia	1.6
UCIAMS 206015	VC-2017-3	Upper Stratum X; 230	7320	20	8177	8035	8101	Charcoal	1.6
UCIAMS 210955	VC-2017-4	Upper Shell Midden; 45-50	450	15	519	494	507	Charcoal	1
UCIAMS 210956	VC-2017-4	Basal Shell Midden; 211	2810	20	2961	2854	2912	Charcoal	0.1

Dates have been calibrated with a 2-sigma error. Dates have been organized by stratum and depth. Calibration data sets: IntCal20.14C (Reimer et al. 2020) and Marine20.14C (Heaton et al. 2020). Marine samples calibrated with DeltaR 84.0 ± 132.0 (Schmuck et al. 2021). Prepared by A Gauvreau.

Figure 3-6 Stratigraphic profiles and photographs of the four Vibracore tests (VC-2017-1, VC-2017-2, VC-2017-3, VC-2017-4) conducted at EkTb-9.

Vibracore tests conducted across the central extent of the site. Radiometric dates (Cal BP; 2-sigma error; see Table 3-2) obtained from discrete strata within each core are listed along the vertical axis. Complex strata collapsed into primary stratigraphic units consistent with those found in the excavation trench (see Figure 3-7). Prepared by A Gauvreau. References cited in the Notes: [113] Reimer et al. 2020, [114] Heaton et al. 2020, and [115] Schmuck et al. 2021.



Excavation Trench: Stratigraphy, Sedimentology, and Formation Processes

Strata identified in the excavation trench are designated “Stratum XII” through “LFH horizon” (Figure 3-7). Horizon labels and soil classifications assigned to each stratum are derived from the Canadian System of Soil Classification (Soil Classification Working Group 1998) and other published resources (Pennock et al. 2015; Naeth et al. 2012; Valentin 2012). Site strata are described from bottom to top.

Stratum XII (the deepest deposit encountered in the trench) is composed of water rounded light-beige-grey compact gravelly sand and clasts up to cobble size (Table 3-3). In the upper part (upper 20 cm) these sediments are cobble-rich and highly cemented (duric [Fulton 1995]). Gravel clasts were largely granitic with rare pieces of other mineral origin, exhibiting moderate to heavy rounding. Sand and silt clasts were also rounded but largely limited to quartz and feldspar.

The water rounded character of the mineral component and the presence of marine microfossils, including diatoms and very abundant fragmentary sponge spicules (Table 3-3), suggests this is marine sediment (C Horizon). Cultural material and organic remains are absent. Stratum XII extends to at least 395 cm depth based upon auger testing. The marine microfossils indicate sea level was higher than today when this stratum was deposited (Figure 3-3 and Figure 3-10; Table 3-3). We have not been able to obtain a sample large enough for radiocarbon dating within this layer. Due to its stratigraphic location, we assume that the formation of Stratum XII dates to the late Pleistocene, sometime around ca. 14,500 years ago when relative sea level was higher than today (McLaren et al. 2014). Triquet Island’s landscape would have had low topographic relief during this time, with gravel beaches, slightly raised berms, and exposed rocky outcrops (Figure 3-8).

Figure 3-7 Stratigraphic profile of the west wall of the excavation trench comprised of EU2012, EU2015, and EU2016; excavation trench located at the southwestern extent of the site.

Trench measured 3 m in length, oriented north-south, and we attained approximately 3 m depth below surface. Radiometric dates (Cal BP; 2-sigma error; see Table 3-1) obtained from discrete strata within each excavation unit (EU) are listed along the vertical axis. Prepared by A Gauvreau.

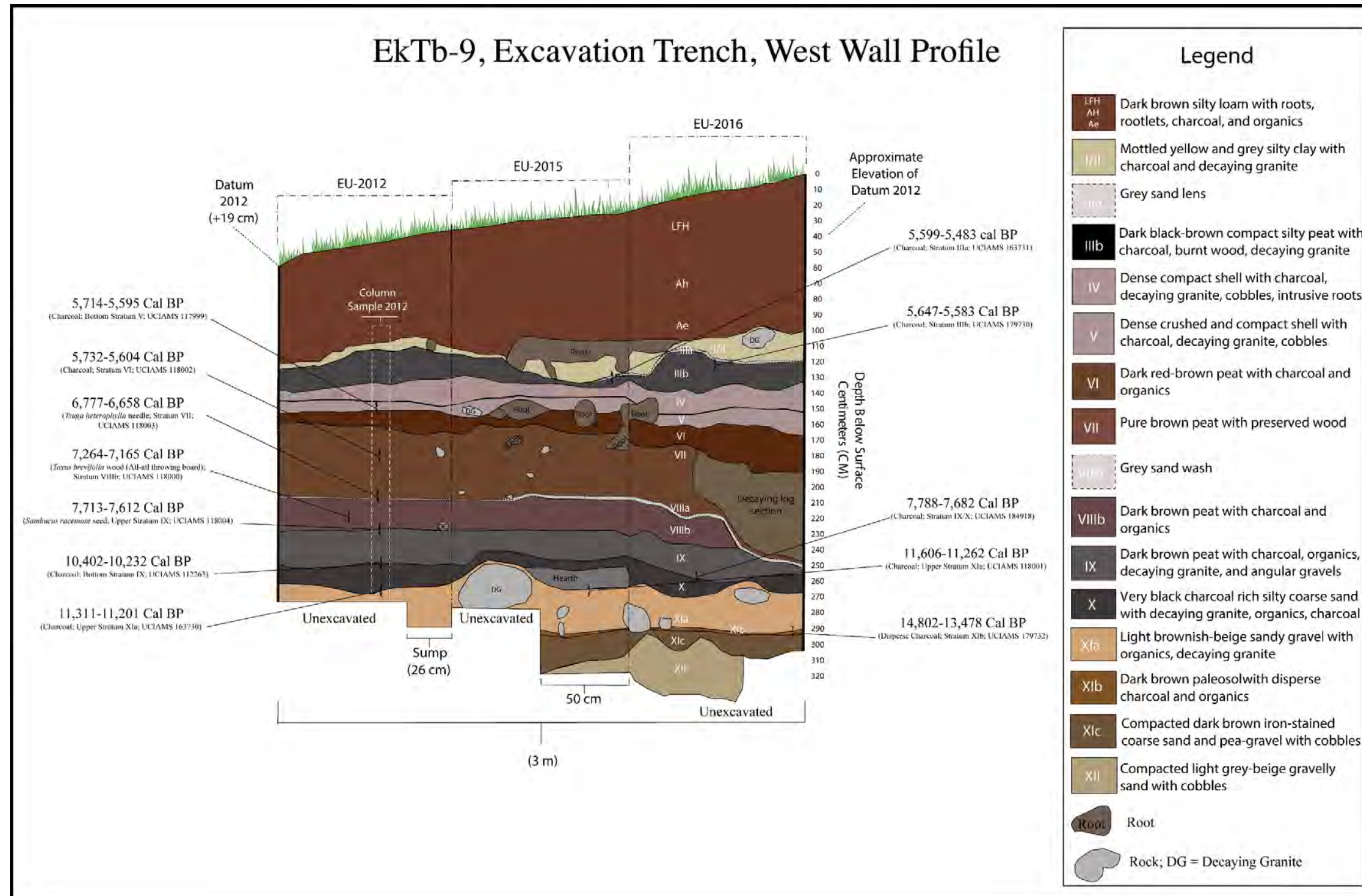


Table 3-3 Sediment components from basal Strata X through XII (263-317 cm dbs).

Mineral and organic component percentages are estimates from 10x binocular evaluation. Sand fraction from Stratum XII (307-317 cm dbd) is approximately >90% quartz, whereas the sand fraction from overlying Strata XIc through X is approximately 50% quartz. Prepared by D Fedje.

Stratum	14 CBP	Depth below surface (cm)	% Gravel fraction	% Mineral fraction exotic	% Mineral fraction rounded	Mica clasts	% Organic fraction	Fish bone	Small mammal bone	Marine plants	Terrestrial plants	Charcoal
X	10,275	263-265	-	-	<5	present	>95	-	-	absent	common	abundant
XIa	11,242	265-270	10-15	<1	<5	abundant	5-10	-	-	absent	present	present
XIa	11,357	279-284	15-20	<1	<5	abundant	5-10	-	-	absent	absent	absent
XIb	13,914	288-291	15-20	2-5	>75	abundant	40-50	-	-	common	present	almost nil
XIb	13,914	289-290	15-20	2-5	>75	abundant	40-50	-	-	common	present	almost nil
XIc	N/A	291-293	15-20	5-10	>75	abundant	5-10	-	-	present	absent	absent
XIc	N/A	294-297	30-40	5-10	>75	abundant	5-10	-	-	present	absent	absent
XII	N/A	307-312	50-60	5-10	-	rare	<1	1	-	absent	absent	absent
XII	N/A	312-317	50-60	5-10	-	rare	<1	1	2	present?	present?	almost nil

Figure 3-8 Reconstructed Sea Level at Triquet Island during the Early Post-Glacial Period (ca. 14,000 Cal BP).

Reconstruction of shoreline ca. 14,000 years ago with sea level at modern levels and the LFH/Ae and Strata I-X stripped away from the landscape. Elevation in meters from Higher High Water Large Tide (HHWL). Data obtained through drone imagery, LiDAR, and radiometric dates from discrete strata coupled with the regional sea level curve. Prepared by K Holmes (Hakai Institute).



Stratum XI overlies Stratum XII and it is a Dom horizon comprised of sandy gravel and varying proportions of organics, including plant macrofossils (Table 3-3). The sandy gravel was composed of both heavily rounded clasts, likely marine sediment, and angular degraded granite. The latter included gravel clasts and sand, deposited by slope-wash from weathered granite bedrock. The sand was comprised of quartz, feldspar and mica clasts. The combination of rounded and weathered rock, along with terrestrial and marine macrofossils would be consistent with deposition on a supratidal berm (Figure 3-3). Stratum XI is comprised of three sub-strata: XIc, XIb, and XIa.

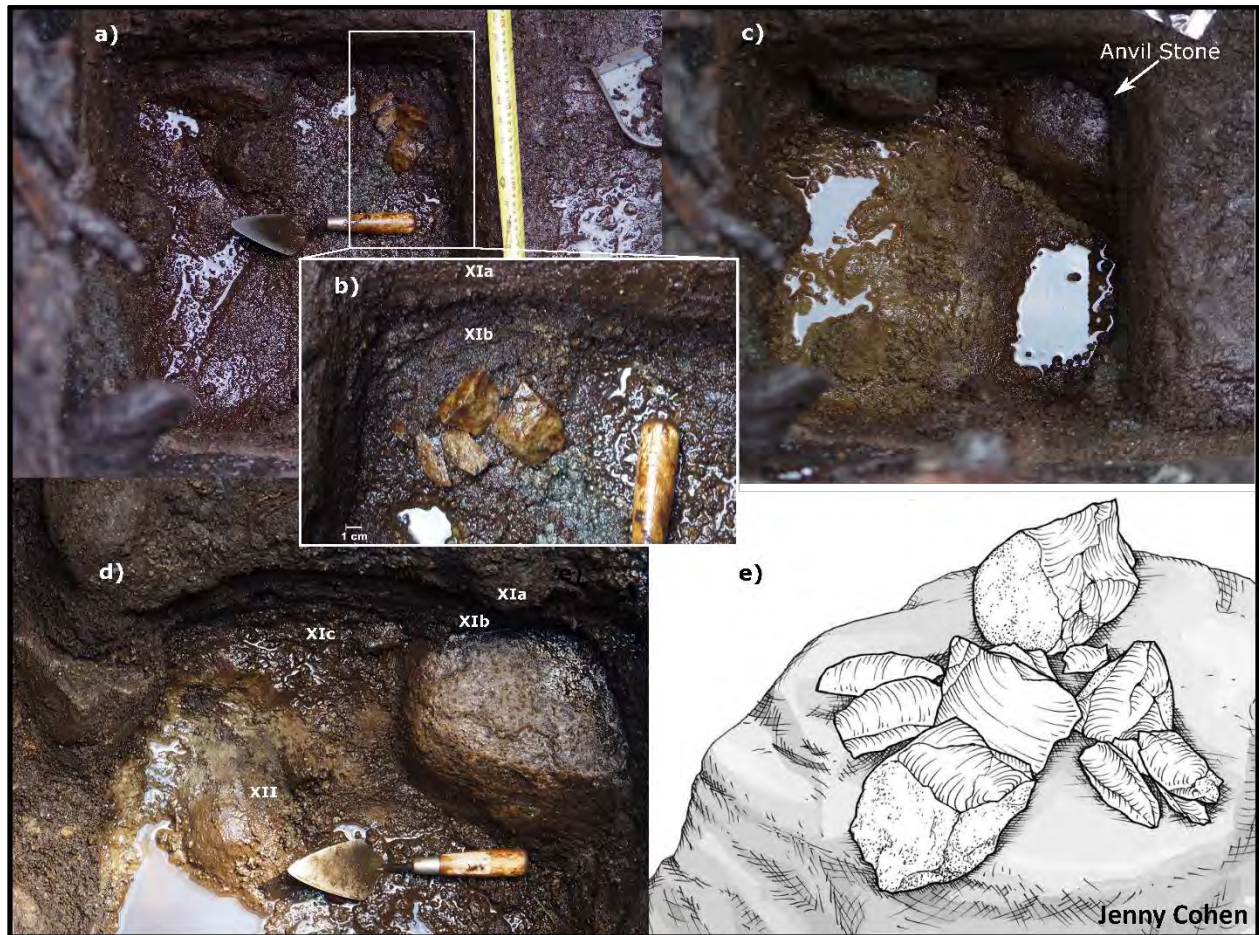
The lower part of the berm is Stratum XIc which overlies Stratum XII; it is a compact dark brown organic-rich coarse sand with pea gravels overlain by slightly lighter brownish-beige fine sand with gravel, flakes, a core, and debitage (Compact Dofc Horizon). This layer has the first indication of human presence. Stratum XIc demonstrates restricted drainage, as well as cool, wet, and acidic conditions. Sediments are iron stained and cemented, and close to the water table which is between approximately 3 to 3.5 m below surface at this area of the site. Groups of boulders were present in the stratum floor, like those visible today in the upper intertidal beach area at the northeastern extent of the site. Organics and fauna are absent in Stratum XIc; it is possible they were once present but did not preserve due to the acidic nature of this stratum and/or exposure to the elements at the time of deposition.

Stratum XIb overlies Stratum XIc; it is a thin dark brown paleosol within the berm deposit. A cluster of flakes and cores were recovered from the surface of a boulder in the stratum floor of XIb; the boulder was likely deposited by natural processes in Stratum XIc, but the surface of the boulder (within XIb) appears to have been used as an anvil stone to produce the flakes (evidenced by pitting on the boulder) (Figure 3-9). There are no indications of substantial

disturbance in Stratum XIb, therefore the position of the flakes on the boulder surface likely represents an intact context (Figure 3-9). Miniscule flecks of charcoal from Stratum XIb were recovered using a microscope and pipette from a sample taken from the north wall at the same elevation as the lithic cluster and boulder surface, yielding a radiocarbon date of ca. 14,802 – 13,478 Cal BP (Table 3-1). Stratum XIb consists of sediment derived from erosion of granite cobbles and bedrock; significant amounts of pea-gravel were present. As with Stratum XIc, fauna and organics are absent from this stratum (Figure 3-7).

Figure 3-9 Lithic cluster and anvil stone (boulder) in the excavation trench.

Portion of lithic cluster in-situ on anvil stone (boulder), resting in paleosol (Stratum XIIb). (b) Close-up of lithic cluster being exposed in Stratum XIIb with transition from XIa to XIIb shown. (c) Anvil stone after excavation in 2015. (d) Plan view of portion of anvil stone (boulder) exposed in the northwestern quadrant of EU 2015 during the 2016 field season. (e) Idealized drawing of lithic cluster resting on anvil stone (boulder) prepared by Jenny Cohen. Photos (a) to (d) taken by D McLaren.



Stratum XIa overlies Stratum XIb and is the top of the berm deposit; it is a light brownish-beige fine sand with decaying granite. Preserved macrobotanical specimens were collected from the interface of Stratum XIa and overlying Stratum X. Enough charcoal was present in the very top of Stratum XIa for two radiocarbon ages: 11,311 – 11,201 Cal BP (9,845 ±25 14CBP; UCIAMS 163730) and 11,606 – 11,262 Cal BP (Table 3-1).

Stratum X overlies Stratum XIa; it is a Compact Dof Horizon, comprised of a very black charcoal-rich silt layer with decaying granite (resulting in pockets of coarse sand/gravel), preserved faunal remains, lithics, and some preserved organics (Table 3-3). Preserved wood chips, macrobotanicals (conifer cones, needles, seeds), and burnt wood, as well as chunks of charcoal, abundant shellfish periostracum (most likely California mussel [*Mytilus californianus*]), and other organics (seaweeds and algae) were collected from Stratum X, indicating that the layer was subject to infiltration by water. Stratum X averages approximately 10 – 25 cm in thickness. Charcoal collected from the lower level of Stratum X yielded a radiocarbon date of 10,402 – 10,232 Cal BP (9,140 ±25 14CBP; UCIAMS 1122631; Table 3-1).

Stratum IX is interbedded with Stratum X; unidentified seeds collected from the interface of Strata IX/X yielded a radiocarbon date of 7,788 – 7,682 Cal BP (Table 3-1). Stratum IX is an acidic, mostly anaerobic, water-logged Dof Horizon comprised of dark brown peat with medium-hard soil consistency. Red elderberry seeds (*Sambucus racemosa*) collected from upper Strata IX were radiocarbon dated to 7,713 – 7,612 Cal BP (6,840 ±20 14CBP; UCIAMS 118004) (Table 3-1). Preserved organics, faunal remains, lithics, as well as decaying granite and sandstone cobbles, including angular pebbles, were also present in Stratum IX.

Sediments in Strata IX through VI are distinctively peaty in character with variable degree of organic preservation (Dof/Dom Horizons); these deposits are limited to the

southwestern extent of the site. Peat deposits are typically formed in wetland conditions, suggesting that this area was subjected to significant freshwater inundation or flooding in anoxic conditions which slowed the rate of decomposition of the organic matter contained therein (Keddie 2010). These types of podzols are typical of hypermaritime island environs with flat topography (Lacourse et al. 2012; Sanborn et al. 2011). The developing peat deposits started to retain freshwater and by ca. 7,000 years ago these water-saturated areas created the conditions for the peatland to expand (Lacourse et al. 2012).

Stratum VIIIb overlies Stratum IX; it is a permanently waterlogged Dof Horizon with medium-dense soil consistency. Strata XI and VIIIb contain clumps of seaweed (*Ulva intestinalis*) and *Sphagnum* that are typical of former upper intertidal seepage areas (Of/LFH Horizons). A sample collected from a yew (*Taxus brevifolia*) wood atlatl recovered from Stratum VIIIb yielded a radiocarbon date of 7,264 – 7,165 Cal BP (6,300 ±20 14CBP; UCIAMS 118000) (Table 3-1) (McLaren et al. 2019b).

A distinct and extensive thin sheet of moderately sorted grey sand and silty sand (Stratum VIIIa) with abundant wood and other plant detritus is wedged between peaty Strata VII and VIIIb (i.e., with sharp upper and lower contacts with these strata). The composition and orientation of the sand grains in Stratum VIIIa is therefore like palaeotsunami deposits recorded at archaeological sites in northern Japan (Shinkai et al. 2015) and palaeotsunami deposits identified beneath tidal marshes on the west coast of Vancouver Island (Clague and Bobrowski 1994). In the west wall profile (Figure 3-7), Stratum VIIIa appears to exhibit landward fining and thinning. Interestingly, a large section of a decaying log was uncovered in the excavation trench that was resting atop of the sand sheet, with other detritus that had been preserved in the peat (Figure 3-7). A very fine wash of sand was similarly observed on the northern side and upper

surface of the log section; it is possible that this log was deposited during a palaeotsunami event or big storm event. Stratum VIIIa is distributed across the entirety of the excavation trench (Figure 3-7) as well as all nearby subsurface tests (Figure 3-4 and Figure 3-6). Stratum VIIIa is expressed in test AT-2017-DJJ1 between 155-160 cm below surface (approximately 3.5 m above hht); AT-2017-DJJ1 is located upslope approximately 23 m east of the excavation trench (Figure 3-4). Charcoal collected from AT-2017-DJJ1 Stratum VIIIa sand yielded a radiocarbon date of 6,620 – 6,314 Cal BP (5,674 ±48 14CBP; UOC-8927) (Table 3-2). Stratum VIIIa is expressed in test VC-2017-3 between approximately 195-196 cm db; VC-2017-3 is located approximately 1 m northwest and slightly upslope of the excavation trench (Fig 4). Unidentified seeds collected from VC-2017-3 Stratum VIIIa sand yielded a radiocarbon date of 6,931 – 6,748 Cal BP (6,000 ± 35 14CBP; UCIAMS 206012) (Table 3-2). These radiocarbon ages indicate Stratum VIIIa was deposited sometime between ca. 6,900 and 6,300 years ago.

The possible palaeotsunami deposit (Stratum VIIIa) is overlain by peaty Stratum VII (Dof Horizon) with preserved organics. A single lithic (hammerstone) was collected from this stratum; preserved wooden artifacts and faunal remains are absent. A western hemlock (*T. heterophylla*) needle collected from the base of Stratum VII yielded a date of 6,777 – 6,658 Cal BP (5,885 ±20 14CBP; UCIAMS 118003) (Table 3-1).

Stratum VI (Dof Horizon) overlies Stratum VII and has an associated radiocarbon date of 5,732 – 5,604 Cal BP (4,965 ±15 14CBP; UCIAMS 118002) yielded from red elderberry (*Sambucus racemosa*) seeds (Table 3-1); wooden artifacts, lithics, and faunal remains are present. Combined, the peat associated with Strata VII/VI average about 50 cm in thickness and accumulated over approximately 1,500 years (Hugron et al. 2013).

Strata V/IV (shell midden deposits; Dom Horizon) were similar in composition and averaged about 40 cm in thickness in the excavation trench; they had medium-dense soil consistency and were damp. Strata V/IV consists of alternating layers of dense compact shell and silty crushed shell with charcoal, lithics, as well as intact hearth features (domestic fire features retaining their original structure with charred organics, burnt or calcine fauna and overlying ash) and combustion features (degraded hearths and burned materials in secondary positions due to human or natural process) (Mentzer 2014). The calcium carbonate (shell) present in the strata enabled the preservation of faunal remains. Basal Stratum V has an associated radiocarbon date of 5,714 – 5,595 Cal BP (4,930 ±20 14CBP; UCIAMS 117999; charcoal).

Stratum IIIb (Do Horizon) overlies Stratum IV and averages 15 – 20 cm in thickness, characterized by a medium to very hard and compact charcoal-bearing silty peat with intrusive roots and contains worked bone and stone artifacts. Charcoal collected from basal Stratum IIIb date to 5,647 – 5,583 Cal BP (4865±15 14CBP; UCIAMS 179730). Stratum IIIb is overlain by Stratum IIIa; a 1 to 3 cm-thick lens of grey, fine sand identified in the excavation trench. Charcoal collected from this thin sand lens dates to 5,599 – 5,483 Cal BP (4,840±20 14CBP; UCIAMS 163731).

Strata I/II overlie Stratum IIIa, consisting of an undulating veneer of mottled yellow-grey silty clay (Bg Horizon) of variable thickness (1 – 10 cm). Strata I/II underlays the organic horizons, coloured by leached sediments and minerals with interspersed charcoal and decaying granite. Cultural deposits lie under roughly 80 to 100 cm of relatively well-drained sterile humic organic sediment (the LFH, AH, and Ae horizons) across the site.

Siliceous Microfossils

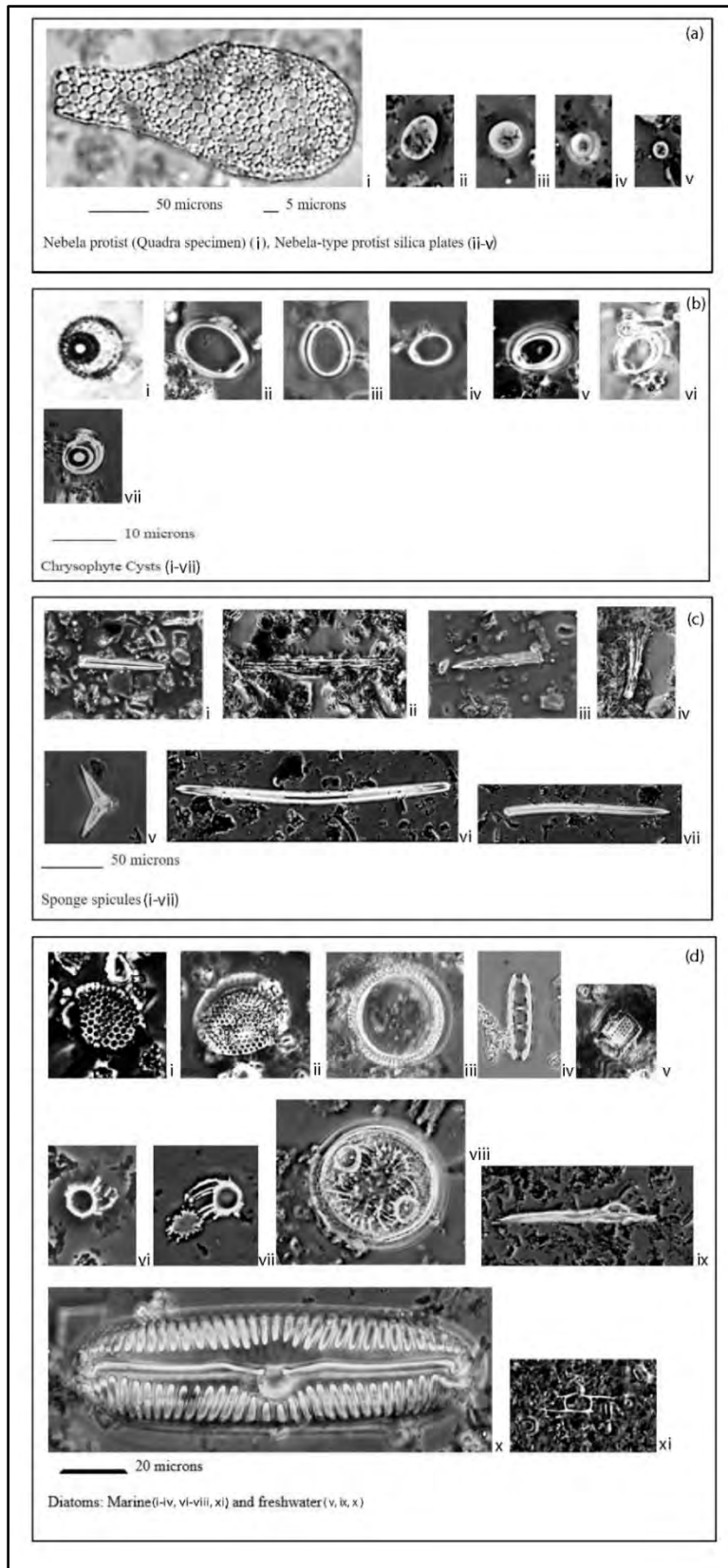
Siliceous microfossils recovered from Strata XII, XIc-XIa, X, VIIIb, VIIIA, and IIIa in the excavation trench include the siliceous elements of diatoms, testate protists, chrysophyte cysts and sponges, which can help correlate these strata to changes in relative sea level. Preservation of fine silica structures in the peaty and seasonally groundwater-saturated sediments was generally poor, with only highly silicified specimens preserved (Bennett et al. 1991; Ryves et al. 2009). Sponge spicules, the siliceous plates and spines of some protists, and chrysophyte cysts were preserved moderately well in these strata (Figure 3-10). However, only robust diatom taxa were preserved (Figure 3-10). Use of multiple proxies helped mitigate the effect of differential preservation of these microfossils. Overall, taxa identified were quite limited due to sampling issues (separating microfossils from mineral sediment) and preservation (high pH or silica-undersaturated bogs or groundwater).

Protist plates and spines, and chrysophyte cysts in these deposits derive from freshwater or terrestrial environments (Rühland et al. 2000), whereas sponge spicules are likely marine in origin as there are no clear freshwater bodies (ponds, streams, etc.) in the vicinity of the excavation trench and they do not grow in peat or on wet soils (Nortrup and Watts 2010). Sponge spicules recovered from deposits at EkTb-9 are mostly smooth curvate oxeae that compare well to those of the intertidal glass sponge *Halichondria panicea* which is present on the rocky shores of Triquet Island today.

Basal Stratum XII produced abundant small fragments of sponge spicules, some marine diatoms, and a few protist silica plates (Table 3-4). Sponge spicules and diatoms, except for specimens of *Grammatophora* and *Ehrenbergii*, ranged from fragmented to sand size. No freshwater diatoms or chrysophyte cysts were observed. These data are consistent with

interpretation of the stratum as a beach or subtidal deposit. Strata XIc through XIa produced both terrestrial and marine diatoms (Table 3-5). The terrestrial diatom species observed in these strata are mostly poorly preserved but those identified to species inhabit ponds, wet soil, peat and groundwater seeps (Bahls et al. 2018). The marine diatoms are largely littoral planktonic types. A number of these are complete which suggests deposition on top of, rather than within, the high-energy deposited coarse sand and gravel. Sponge spicules are common in Stratum XIb and include many complete or nearly complete specimens, also suggesting deposition on a terrestrial surface rather than in an active wave zone. This stratum, especially in that part identified as a paleosol (between 288 and 291cm below surface), also produced relatively large numbers of chrysophyte cysts and testate protist silica plates and spines, indicative of a vegetated wet terrestrial environment. These data are consistent with a very wet hypermaritime terrestrial nearshore setting with occasional inundation by extreme tides or storm surges (Pennock et al. 2015).

Figure 3-10 Magnified photographs of microfossils from Triquet Island and Quadra Island (shown for comparative purposes), BC.



(a) *Nebela* protists and *Nebela*-type specimens: (i) microfossil *Nebela* protist from a sediment sample collected from Quadra Island, BC, (McLaren et al. 2018), and (ii-v) *Nebela*-type silica plates identified in sediment samples collected from upper Strata IIIa, VIIIa, and VIIIb, and basal Strata X through XII in the excavation trench at the southwestern extent of EkTb-9. (b) Chrysophyte cyst specimens: (i) chrysophyte cysts identified in sediment samples collected from peaty Strata VIIIa, and VIIIb, and basal Strata X through XII, in the excavation trench at the southwestern extent of EkTb-9. (c) microfossil sponge spicule specimens: (i-vii) Sponge spicules identified in sediment samples collected from upper Strata IIIa and VIIIa, and basal Strata X through XII, in the excavation trench at the southwestern extent of EkTb-9. (d) microfossil marine and freshwater diatom specimens: (i-iv, vi-viii, xi) marine diatom and (v, ix, x) freshwater diatom species identified in sediment samples collected from upper Strata IIIa, VIIIa and VIIIb, and basal Strata X through XII, in the excavation trench at the southwestern extent of EkTb-9. Prepared by D Fedje. Comparative marine diatom specimen from Quadra Island (viii) (Fedje et al. 2018).

The base of Stratum XIa has a strong marine signature (diatoms and sponge spicules) with relatively few terrestrial microfossils whereas the upper part of the stratum is strongly terrestrial. This may indicate that a paleosol developed upon the berm (storm surge) of marine sediment.

Stratum X produced relatively abundant terrestrial or freshwater diatoms, a few small fragments of a marine planktonic diatom and large numbers of protist silica plates and spines as well as several chrysophyte cysts (Table 3-4). Only two small sponge spicule fragments were observed. This suggests that, at the time of deposition, sea level had fallen sufficiently to stop marine waters from reaching the landform during extreme tides and storm surges.

Strata VIIIa and IIIa (fine grey sand layers) and adjacent peat deposit (Stratum VIIIb) were examined for microfossils to determine their origin (tsunamis or storm surges). Results of microfossil analysis of Strata VIIIa and IIIa are presented in Table 3-5. Diatom preservation was poor as compared to the preservation of sponge spicules, *Nebela*-type silica plates, and chrysophyte cysts. Strata VIIIa contained both well-preserved and fragmentary marine diatoms. Terrestrial diatoms were common in samples from VIIIb and IIIa but rare in the Stratum VIIIa sample. Sponge spicules were relatively common in both sandy layers (VIIIa and IIIa); most being complete specimens or long fragments. In the peaty layer (VIIIb) fresh water or terrestrial microfossils were abundant and sponge spicules absent. Sedimentological analysis of Stratum VIIIa revealed water-rounded fine sand clasts of consistent size class, and relatively abundant marine diatoms and spicules sandwiched between peat deposits, therefore demonstrating the signatures of a tsunami deposit or big storm. Stratum IIIa, in contrast, likely represents a cultural surface; mineral clasts (silt to fine gravel) are largely angular and unsorted.

Table 3-4 Microfossils from basal Strata XII through X (263-317 cm dbs).

Layer and Depth Below Surface (cm dbs)	Diatoms											Protists				
	Marine							Freshwater				Chrysophyte cyst	Nebela-like silica plates	Testate amoeba siliceous spines		
	<i>Thalassiosira</i> sp. ^a	<i>Arachnoidiscus ehrenbergii</i>	<i>Cocconeis costata</i>	<i>Ehrenbergii granulosa</i>	<i>Grammatophora serpentina</i>	<i>Hyalodiscus scoiticus</i>	<i>Paralia sulcata</i>	<i>Plagiogramma stauroforum</i>	<i>Rhabdonema minutum</i>	<i>Aulacoseira</i> sp.	<i>Cyclotella meneghiniana</i>				<i>Pinnularia</i> sp.	<i>Stephanodiscus medius</i>
X 263-265	(2)				-	-			12		13		-	4	>300	>650
XIa 265-270	(4)				-	-			1	1	7		-	8	91	193
XIa 279-284	(17)	1			-	1	1				3		1	32	7	
XIb 288-291	1, (15)				3		1				5		-	146	75	59
XIb 289-290	4, (11)		1		-		1	1	1	1	7	1	-	151	30	15
XIb 291-293	1, (9)				-		-				1		-	7	6	
XIc 294-297	(3)				-		-				-		-	1	4	
XII 307-312	(3)			1	-		-	2	1		-		-	-	2	
XII 312-317	(3)				-		-				-		-	-	3	

^a 25-100% complete, (x) = small fragment.

Prepared by D Fedje.

Table 3-5 Microfossils from VIIIa (212-219 cm dbs) and Strata IIIa (131-132 cm dbs), representing possible palaeotsunami deposits.

Depth below surface (cm dbs)	Diatoms						Cysts	Protists	Sponge spicules ^a
	<i>Thalassiosira</i> sp. (Small fragments)	<i>Auliscus sculptus</i> fragment (<i>ocellus</i>)	<i>Cocconeis pseudomar-ginata</i>	<i>Paralia sulcata</i>	<i>Pinnularia</i> cf. <i>P. lata</i>	<i>Pinnularia</i> sp.	Chrysophyte cysts	Nebela-like silica plates	
IIIa 131-132	1	-	-	1	-	1	-	1	58
VIIIa 212-217	3	8	1	-	2	16	2	45	24
VIIIa 214-219	-	1	-	-	-	46	24	40	-

^a Sponge spicules are well preserved. Most are long fragments or complete.
Prepared by D Fedje.

Pollen

Fossil pollen and spores (hereafter pollen) were recovered and analyzed from lower sandy and silty Strata XII, XIc, and XIb (ca. 14,802 – 13,478 Cal BP), XIa and X (ca. 11,606 – 10,232 Cal BP) (Hebda 2020) (Figure 3-11; Table 3-1) and peaty upper Strata VIIIb to VI (ca. 7,263 – 5,604 Cal BP) (Lucas 2013) (Figure 3-12; Table 3-1). Pollen yields from samples in Strata XII/XIc, XIb, XIa, and X were high, with assemblages characterized by a non-arboreal, shrubby component consisting of green alder and leptosporangiate ferns (monolete and trilete types) with other herbaceous taxa and some conifers (Figure 3-11). Samples associated with Strata XII, XIc and the lower portion of XIb are also characterized by shrubby and herbaceous taxa but yielded less pollen (72, 27, and 66 grains, respectively). In particular, the low-count sample from Stratum XIc has been omitted from Figure 3-11 and is not described in the text, but the count is included in the Supporting Information.

In the deepest sample analyzed from Stratum XII, the arboreal assemblage is a minor component of the total pollen, consisting of a small amount of spruce (*Picea* 6%), pine (*Pinus* 3%), western hemlock (*T. heterophylla*; 3%), and mountain hemlock (*T. mertensiana* 1.4%). Most of the assemblage consists of shrub, herb, and fern taxa including alder (*Alnus* 14%, predominantly shrubby *A. viridis*-type) and willows (*Salix* 4% and cf. *Salix* 24%) with monolete-type fern spores (18%) as well as grass (*Poaceae* 8%), rose (*Rosaceae* 7%), heather (*Ericaceae* 4%), and minor components of clubmosses (*Lycopodium* 3%), umbellifer (*Apiaceae* 1.4%) and amaranth (*Amaranthaceae* 1.4%). At the transition between Strata XII and XIc, arboreal taxa comprise a somewhat larger percentage than in the Stratum XII sample, including spruce (*Picea* 19%) with a smaller amount of western hemlock (*T. heterophylla* 5%) and trace amounts of mountain hemlock (*T. mertensiana*), pine (*Pinus*), and cedar (*Cupressaceae*). The

non-arboreal component of this sample is dominated by shrubby alder (*Alnus* 13%, mostly green alder [*A. viridis*-type]), monolete-type fern spores (28%), and rose pollen (Rosaceae 15%) along with skunk cabbage (*Lysichiton* 7%), grass (Poaceae 4%), heather (Ericaceae 2%), sedge (Cyperaceae 1.7%), trilete-type fern spores (1.7%), sagebrush (*Artemisia* 1.1%), and trace amounts of umbellifer (Apiaceae) and amaranth (Amaranthaceae).

The assemblages in the two samples from Stratum XIb are largely similar, with the arboreal fraction of the upper XIb sample containing a modest proportion of conifers including spruce (*Picea* 8%), pine (*Pinus* 1.8%), western hemlock (*T. heterophylla* 1.3%), and trace amounts of fir (*Abies*) and cedar (Cupressaceae) pollen. The non-arboreal portion of the upper XIb assemblage is again dominated by shrubby alder (*Alnus* 35%; primarily *A. viridis*-type) with monolete-type fern spores (31%) and other herb and shrub constituents including rose (Rosaceae 7%), grass (Poaceae 3%), willow (*Salix* 2%), sedge (Cyperaceae 1.3%), and heather (Ericaceae 1.3%) as well as skunk cabbage (*Lysichiton* 5%) and trace amounts of umbellifer (Apiaceae) pollen.

Stratum XIa is characterized by a notable increase in mountain hemlock (*T. mertensiana*) in the lower sample as well as increasing alder (*Alnus*). The lower sample from Stratum XIa is composed of alder (*Alnus* 38%) and conifers including spruce (*Picea* 14%), mountain hemlock (*T. mertensiana* 3%), western hemlock (*T. heterophylla* 3%) and smaller amounts of pine (*Pinus* 1.2%) and fir (*Abies* 1.2%). The non-arboreal fraction of the lower XIa sample includes monolete-type fern spores (22%) and pollen derived from rose (Rosaceae 10%) and skunk cabbage (*Lysichiton* 3%), trilete-type fern spores (2%), and trace amounts of numerous taxa including grass (Poaceae), willows (*Salix*), heather (Ericaceae), sedge (Cyperaceae), knotweed (Polygonaceae), umbellifer (Apiaceae), and parsley ferns (*Cryptogramma*). The upper sample

from XIa contains an even greater preponderance of alder (*Alnus* 64%) and a concomitant reduction in monolete-type fern spores (14%), spruce (*Picea* 8%), and mountain hemlock (*T. mertensiana* 0.3%) among other small shifts. Non-arboreal taxa including rose (Rosaceae 4%), grass (Poaceae 1.5%), sedge (Cyperaceae 1.8%), and heather (Ericaceae 1%) continue to contribute a smaller but notable percent of the total pollen counts in XIa.

In Stratum X, conifers continue to represent a modest proportion of the total, including spruce (*Picea* 10%), pine (*Pinus* 5%), and an increase in fir (*Abies* 1.4%) pollen above trace amounts. Alder (*Alnus* 60%) remains the major taxa in Stratum X and is comparable with XIa below. Non-arboreal taxa persist in the assemblage at small amounts including rose (Rosaceae 5%), willow (*Salix* 3%), grass (Poaceae 2%), and trace amounts of others including heather (Ericaceae), sagebrush (*Artemisia*), umbellifer (Apiaceae), and burnets (*Sanguisorba*). The increases in conifers and other taxa in Stratum X is accompanied by a further reduction in monolete-type fern spores (6%).

Previous analysis indicates that the assemblage from peaty Strata VIIIb to VI consists primarily of pollen from arboreal taxa (Figure 3-12), including spruce (*Picea*) and western hemlock (*T. heterophylla*), as well as abundant fern spores and lesser amounts of Cupressaceae pollen representing either western redcedar (*T. plicata*) or yellow cedar (*Xanthocyparis nootkatensis*) (Lucas 2013). Some herbaceous taxa including grasses (Poaceae), sedges (Cyperaceae), asters (Asteraceae), umbellifers (Apiaceae), and others were observed in this assemblage along with aquatic plants including pond-lily (*Nuphar* sp.), cattail (*Typha latifolia*), and peat mosses (*Sphagnum* sp.) (Lucas 2013). The presence of these aquatic taxa and *Sphagnum* are indicative of standing/slow moving freshwater and acidic peat-forming environments.

Arboreal taxa identified in these upper strata are consistent with a cool, wet, rainforest climate. However, few cedar (Cupressaceae) pollen grains were recorded in these samples (Lucas 2013).

Figure 3-11 Pollen Taxa observed in EkTb-9 Strata XII to X (ca. 14,802 – 10,232 Cal BP) of the excavation trench (EU2012, EU2015, EU2016).

Results of pollen analysis of Strata XII to X from EkTb-9 plotted as a percentage of the total pollen and spores counted for each sample. A 5x exaggeration has been applied to select infrequent taxa. Pollen and spore count totals and pollen concentrations (grains cm³) are presented to the right of the main panel for each sample. Key to colour fill: trees (green), shrubs (beige), herbs (purple), bryophytes (orange), pteridophytes (blue). Prepared by CFG Hebda and N Hebda (Hebda 2020).

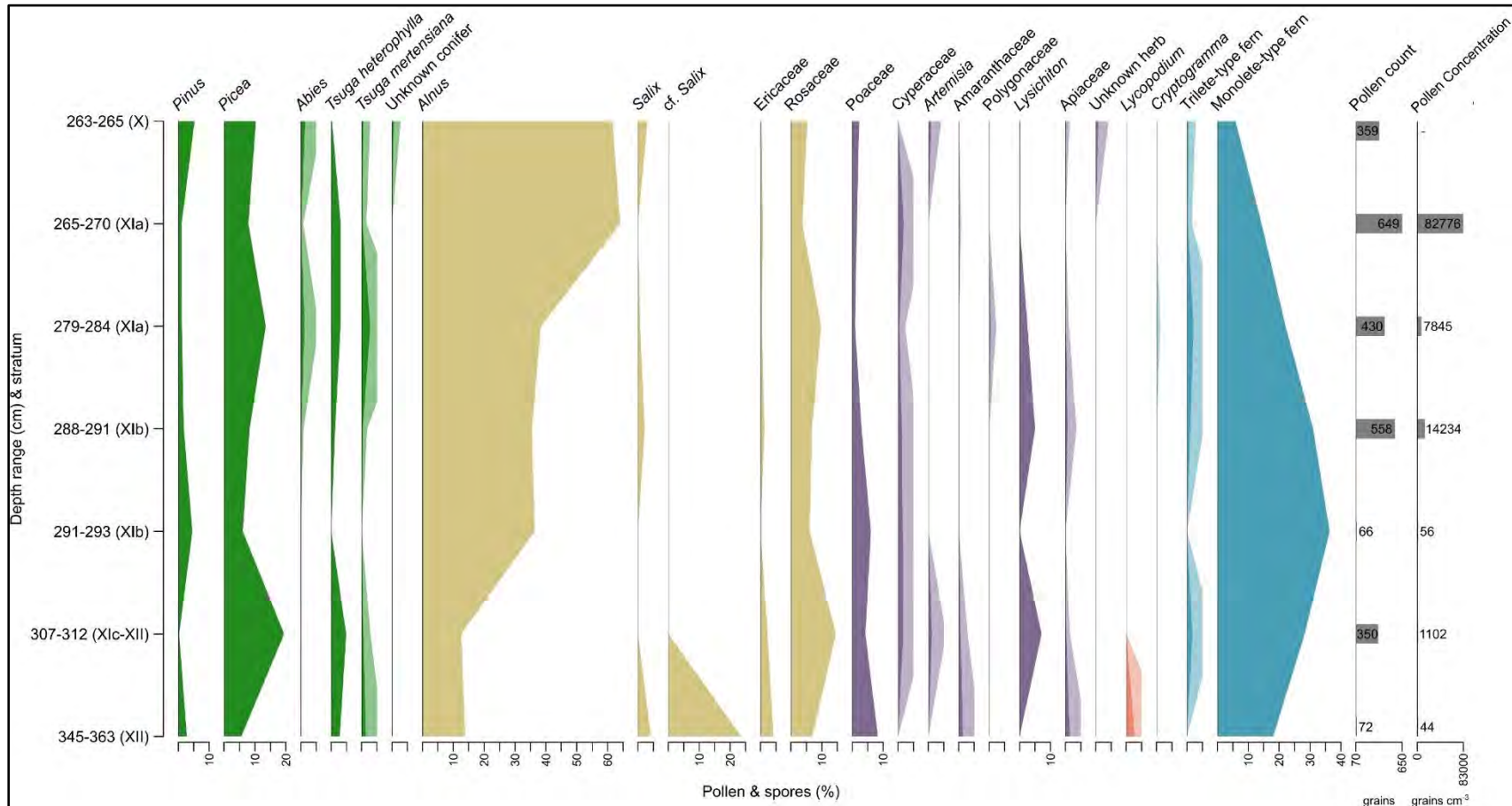
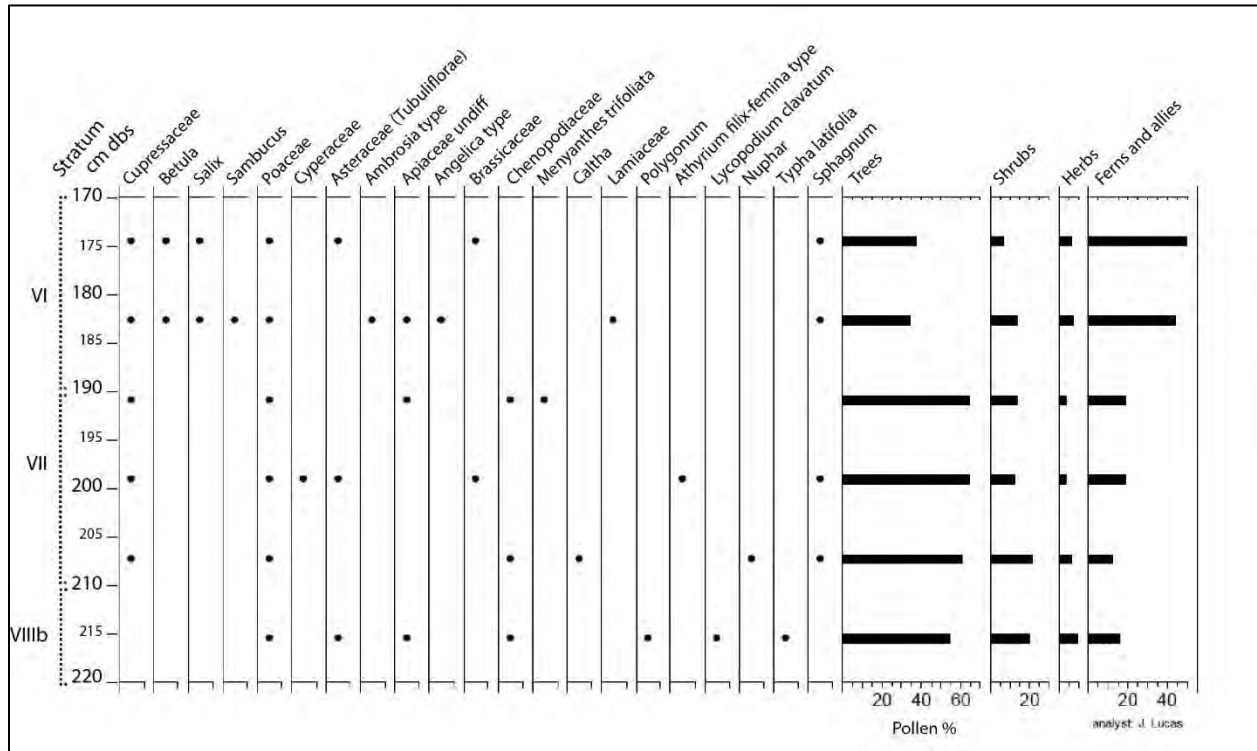


Figure 3-12 Presence diagram of pollen taxa observed in EkTb-9 Strata VIIIb to VI (ca. 7, 263 – 5,604 Cal BP) of the excavation trench (EU2012).

Results of pollen analysis of Strata VIIIb to VI from EkTb-9. Dots indicative of presence in a sample, with summary columns for total. Prepared by J Eamer (Lucas) (Lucas 2013; McLaren 2013).



Macrobotanicals

Pollen evidence in the basal cultural strata is augmented by the recovery and identification of numerous macrobotanical remains from these deposits. A rounded tip fragment from a flat conifer needle was identified from Stratum XIa (ca. 11,606 – 11,201 Cal BP; Table 3-1) that could represent either subalpine fir (*Abies lasiocarpa*), western hemlock (*T. heterophylla*), or Douglas-fir (*Pseudotsuga menziesii*) (Puseman and Briles 2019). Conifers and other taxa may have been propagated among outer coastal islands during the early post-glacial period by aeolian and flotsam transport. Clumps of seaweed (*Ulva intestinalis*) were also preserved (Strata X and

IX; ca.10,402 – 7,612 Cal BP; Table 3-1); these species thrive in tidepools (high upper intertidal seepage areas) and protected brackish waters (Linndberg and Lindstrom 2010). A variety of additional preserved macrofossil remains have been identified in Strata XIa through IV.

Preserved macrobotanicals include red elderberry seeds (*Sambucus racemosa*), spruce (*Picea sp.*) roots and cones, and western hemlock (*T. heterophylla*) cones and needles (Strata IX and IV; ca. 7,713 – 5,604 Cal BP; Table 3-1) – species which thrive in moist riparian or nearshore environments (Hawkes and Cohen 2013; Puseman and Briles 2019). Hałzaqy words for identified macrobotanical specimens are listed in Table 3-6.

Table 3-6 List of plant species identified in the archaeological deposits at EkTb-9.

Common Name (English)	Scientific Name (Latin)	Haítzaqv Name (Haítzaqv!a)
Amaranth family	Amaranthaceae	-
Aster family	Asteraceae	-
Burnets	<i>Sanguisorba</i> sp.	-
Clubmosses	<i>Lycopodium</i> sp.	p'łh̄s (moss)
Common cattail	<i>Typha latifolia</i>	-
Douglas-fir	<i>Pseudotsuga menziesii</i>	máwálas
Ferns	Leptosporangiate ferns/Polypodiidae	kálaš (fern)
Grass family	Poaceae	g'íłlá
Green alder	<i>Alnus viridis</i>	łáqvías (alder)
Heather family	Ericaceae	Nkvt
Knotweed family	Polygonaceae	-
Mountain hemlock	<i>Tsuga mertensiana</i>	
Western yew	<i>Taxus brevifolia</i>	łmqás
Parsley ferns	<i>Cryptogramma</i> sp.	
Peat mosses	<i>Sphagnum</i> sp.	p'łh̄s (moss)
Red alder	<i>Alnus rubra</i>	łáqvías
Red elderberry	<i>Sambucus racemosa</i>	K'íbat
Rose family	Rosaceae	Gúlalı or Lqáxlás
Sagebrush	<i>Artemisia</i> sp.	-
Sedge family	Cyperaceae	-
Shore pine	<i>Pinus contorta</i>	łina
Sitka spruce	<i>Picea sitchensis</i>	h'niwas
Skunk cabbage	<i>Lysichiton americanus</i>	Kvkvíkv
Subalpine fir	<i>Abies lasiocarpa</i>	-
Umbellifer family	Apiaceae	G'isd̄m
Water lilies	<i>Nuphar</i> sp.	g'łwát
Western hemlock	<i>Tsuga heterophylla</i>	lúqvas
Western redcedar	<i>Thuja plicata</i>	dnyás
Willows	<i>Salix</i> sp.	Qvávıllayas
Yellow cedar	<i>Xanthocyparis nootkatensis</i>	díwás

The common name (English), scientific name (Latin), and Haítzaqv Name (Haítzaqv!a) is provided for all recovered floral specimens that were identifiable to family or species level. Prepared by A Gauvreau with support from C Hebda, W Housty, R Housty, M Humchitt, and members of the Haítzaqv Language Program.

Perishable Artifacts

A modest assemblage of 850 perishable wooden artifacts have been recovered from EkTb-9 deposits spanning ca. 7,788 – 5,604 Cal BP (Strata IX through VI; Table 3-1) (McLaren et al. 2019b; Chapter 5). These include 518 woodchips, 8 strips of bark, 9 bipoints, 9 points/tool tips, 6 fish-hook barbs/fishhook preforms, 11 formed tools of unknown function (including a carved wooden ball or knob), 201 split roots/split sticks, 50 pieces of chopped/split wood, 35 pieces of carved/incised wood, one piece of bent wood, an atlatl throwing board, and one small, fragmented bark-wrapped cedar tool handle. All but one of the perishable wooden artifacts recovered from EkTb-9 were collected from the excavation trench. One of the 9 carved wooden points was collected from VC-2017-3 (Figure 3-6); the coring process damaged the point (cutting off one end), and may represent a bi-point.

Fauna

The faunal assemblage comprises 15,185 specimens from deposits spanning ca. 10,402 – 450 years ago (Strata X through IIIb; Table 3-1); 8,752 of these specimens were recovered from the excavation trench (Table 3-7). A few worked bone tools (biconically drilled needle, possible bird-bone straw), fragments of cut bone (domestic dog and stellar sea-lion), and unidentifiable fragments of worked mammalian bone were identified during laboratory analyses.

Thirty-six vertebrate taxa are represented within the excavated assemblages at EkTb-9, including eleven taxa of birds, fourteen taxa of fish, six taxa of land mammals, and five taxa of sea-mammals. Near-shore fish species such as Pacific herring (*Clupea pallasii*), greenling (*Hexagrammos sp.*) and rockfish (*Sebastes sp.*) dominate the faunal assemblage. Cormorants constitute the bulk of the bird remains (though albatross [*Phoebastria sp.*] is also present), and stellar sea lion (*Eumetopias jubatus*), fur seal (*Callorhinus ursinus*), and harbor seal (*Phoca*

vitulina) dominate the assemblage of mammals. An unidentified section of a whale bone was also recovered from VC-2017-2 (Figure 3-6). Domesticated dog (*Canis familiaris*) and wolf (*Canis lupus*) remains were also collected. Recovered shellfish include California mussel (*Mytilus californianus*), butter clam (*Saxidomus gigantea*), cockle (*Clinocardium nuttalli*), sea urchin (*Strongylocentrotus sp.*), abalone (*Haliotis kamtschatkana*), chiton (Polyplachopora), acorn barnacle (*Balanus glandula*), limpets (*Tectura sp.*), and various snails. Haitzaqv terms for identified faunal species are listed in Table 3-7.

Interestingly, periostracum – the thin quinone-tanned protein layer or coating on the outermost layer of shell (Taylor and Kennedy 1969) – were abundantly present in the peat and basal water-saturated strata (Strata XIa, X, IX; coarse sand and gravel layers) where the rest of the shell did not preserve well due to soil acidity and other taphonomic processes. The periostracum is most likely derived from decayed California mussel (*Mytilus californianus*) shells, as there are indentations in the fragmented and complete pieces of periostracum created by the radiating rib lines along the shell that are consistent with (and specific to) the morphology of California mussel shell (Gosling 1992). The periostracum is a dark brown to heavy blue-black color (Jones and Rickman 1995), slightly altered through oxidization upon excavation. Periostracum preserved where shell did not as it is more akin to keratin-based horn, hair, or fingernails and composed of fibrous cysteine-rich proteins that can withstand humic acids (Tanzi et al. 2019).

The faunal assemblage indicates a specialized marine-based subsistence that spanned the early to late Holocene. Sea-mammal remains are the most relatively abundant component of the faunal assemblage in the early-mid Holocene from ca. 11,606 – 5,604 Cal BP (Strata XIa through VI; Table 3-1). In the mid-late Holocene from ca. 5,604 – 494 Cal BP (Strata VI through III;

Tables 3-1 and 3-2), there is a shift towards outer coastal fish species; greenling, rockfish, and Pacific herring are the most relatively abundant species preserved in the sediments at EkTb-9 during this time. Harvesting of invertebrates is demonstrated in Strata XIa through IX (11,606 – 7,612 Cal BP; Table 3-1) and peaty strata VIIIb through VI (7,264 – 5,604 Cal BP) by an abundance of preserved periostracum, and in Strata V through IV (8,335 – 494 Cal BP; Tables 3-2 and 3-2) by preserved shell, mussel, abalone, chiton, and sea urchin spine accumulations.

Table 3-7 Faunal remains (NISP) per stratum recovered from the excavation trench (EU2012, EU2015, EU2016).

		Approximate Cal BP Range / Stratum																	
Taxon	Scientific Name (Latin)	Haítzaqv Name	ca. 5,483 – 5,714 Cal BP				ca. 5,604 – 7,713 Cal BP				ca. 7,682 –10,402 Cal BP				EU Total	% of identified			
			(Haítzaqvla)																
			I/II	III	IV	IV/V	V	V/VI	VI	VI/VII	VII	VIII	IX	X	XI	XII			
FISH	Arrowtooth flounder*	<i>Atheresthes stomias</i>	páís	0	2	0	0	1	0	2	0	0	0	1	0	0	0	6	0.06
	Capelin	<i>Mallotus villosus</i>		0	0	0	0	15	0	0	0	0	0	0	0	0	0	15	0.10
	Great Sculpin	<i>Myoxocephalus sp.</i>		0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.01	
	Greenling	<i>Hexagrammous sp.</i>	Máglís (bottom fish)	2	78	18	22	23	0	28	0	0	3	18	6	0	0	198	2.30
	Ling cod	<i>Ophiodon elongatus</i>	nátrn	1	57	56	21	18	2	31	2	0	0	2	6	0	0	196	2.20
	Pacific Halibut	<i>Hippoglossus stenoleps</i>	p úái	0	5	2	0	1	0	4	0	0	0	2	0	0	0	14	0.20
	Pacific Herring	<i>Clupea pallasii</i>	wáh áí	0	14	6	24	113	4	608	84	0	1	5	124	0	0	983	11.20
	Perch	Embiotcidae	lá mú	0	0	0	1	0	0	3	0	0	0	0	0	0	0	4	0.05
	Ratfish	<i>Hydrolagus colliie</i>	Gvú má	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0.01
	Red Irish Lord	<i>Hemilepidotus</i>		0	1	0	0	0	0	2	0	0	0	0	0	0	0	3	0.03
	Rockfish	<i>Sebastes sp.</i>	lá k á lá	4	158	145	56	179	113	307	1	0	2	20	10	0	0	995	11.40
	Salmon	<i>Oncorhynchus sp.</i>	miá	0	0	1	5	0	0	5	0	0	0	0	2	0	0	13	0.14
	Spiny dogfish	<i>Squalus acathias</i>	q vágvíná	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0.01
	Starry flounder	<i>Platichthys stellatus</i>	Páís	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0.01
	Ray-finned fish			16	1,346	506	290	918	6	1,245	105	0	2	63	71	0	0	4,568	52.20
	Total Fish			23	1,661	735	419	1,269	125	2,236	192	0	8	111	220	0	0	6,999	80.00
MAMMAL	Deer	<i>Odocoileus sp.</i>	qárhí lá	0	1	0	0	0	0	2	0	0	0	1	1	0	0	5	0.06
	Domestic Dog	<i>Canis familiaris</i>	w á c	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0.01
	Harbor Seal	<i>Phoca vitulina</i>	ságvn	0	0	0	0	0	0	0	0	0	0	1	7	0	0	8	0.09
	Mink	<i>Neovision vision</i>	kvñ á	0	0	0	1	0	0	1	1	0	0	0	0	0	0	3	0.03
	Mustelid	<i>Mustela sp.</i>	Glñ (weasel); Msá gn (marten);	0	0	0	0	0	0	0	1	0	0	6	0	0	0	7	0.08
	Northern Fur Seal	<i>Callorhinus ursinus</i>	Núkví	0	0	0	0	0	0	0	0	0	0	0	9	0	0	9	0.1
	Porpoise	<i>Phocoena sp.</i>	l á ð á	0	0	0	1	0	0	1	0	0	0	0	0	0	0	2	0.02
	Sea lion	<i>Eumetopias jubatus</i>	máwák	0	0	0	0	0	0	0	0	0	1	4	5	0	0	10	0.1
	Sea otter	<i>Enhydra lutris</i>	q asá	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0.02
	Sitka deer	<i>Odocoileus hemionus</i>	qárhí lá	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0.01
	Wolf / (Dog ?)	<i>Canis lupus</i>	k vsls	0	1	1	1	0	0	1	0	0	0	1	0	0	0	5	0.06
	Sea Mammal			0	0	0	0	0	0	0	0	0	0	48	461	0	0	509	5.8
	Medium Land Mammal			0	0	0	0	1	0	0	0	0	0	8	6	0	0	15	0.2
	Small/ Medium Land Mammal			0	0	0	0	0	0	0	0	0	1	7	12	0	0	20	0.3
Mammal			0	12	10	1	13	1	9	0	0	25	735	311	0	0	1117	12.8	
Total Mammal			0	14	11	4	14	1	15	2	0	27	813	813	0	0	1714	19.6	
BIRD	Albatross	<i>Phoebastria sp.</i>	Báka	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0.01
	Canada Goose	<i>Branta canadensis</i>	hñgáx or hñgáq	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0.01
	Ca'sin's auklet	<i>Ptychoramphus aleuticus</i>		0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0.01
	Cormorant	<i>Phalacrocorax pelagicus</i>	ç háw i	0	1	1	0	0	1	1	0	0	0	0	0	0	0	4	0.05
	Goose	<i>Branta sp.</i>	hñ gáx or hñgáq	0	0	1	0	0	0	0	0	0	1	0	0	0	0	2	0.02
	Large Alcíd	<i>Uria sp.</i>		0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0.01
	Loon	<i>Gavia immers</i>	ç áwí	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	0.03
	Shore bird	<i>Larus sp.</i>	Çígilága	0	0	0	4	0	0	1	0	0	0	0	0	0	0	5	0.06
	Murre	<i>Uria sp.</i>		0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	0.02
	Waterfowl	<i>Anserinae sp.</i>	Hñgáx (goose) qvñvúqv (swan)	0	0	0	1	0	0	1	3	0	0	0	0	0	0	5	0.06
	Western Grebe	<i>Aechmophorus occidentalis</i>		0	1	0	0	0	0	1	0	0	0	0	0	0	0	2	0.02
Unidentifiable Bird			0	1	0	0	3	1	1	2	0	0	0	4	0	0	12	0.1	
Total Bird			0	3	4	9	3	2	8	5	0	1	0	4	0	0	39	0.4	
Grand total			23	1,678	750	432	1,286	128	2,259	199	0	36	924	1,037	0	0	8,752	100.00	

The common name (English), scientific name (Latin), and Haítzaqv Name (Haítzaqvla) is provided for recovered faunal remains that were identifiable to family or species level. Prepared by A Gauvreau, with support from W Housty, R Housty, M Humchitt, and members of the Haítzaqv Language Program.

Lithic Artifacts

Terrestrial excavations at EkTb-9 recovered a modest assemblage of 159 lithic artifacts, 82% of which consisted of flakes of variable size and material type (n = 94), debitage (n = 18), and tools (n = 19) (Table 3-8; Figure 3-13, Figure 3-14, and Figure 3-15). 157 lithics were recovered from the excavation trench, and two flakes were recovered from VC-2017-1 (Table 3-8; Figure 3-6). Both ground stone and chipped stone technology are present, with the latter being dominant (only two ground stone artifacts were found in later Holocene aged deposits). Percussive methods utilized include hard hammer, soft hammer, and anvil supported percussion (ASP) consisting of anvil-rested percussion (ARP) and bipolar reduction.⁴⁵ A wide range of medium to coarse grained material types (with a few fine-grained volcanics) were utilized by island inhabitants through time, with milky quartz, andesite, basalt, dacite, and metamorphic materials occurring with the most frequency.

Nearly half of the total lithics collected from the excavation trench come from the basal-most cultural layers (Strata XIc to X) (Table 3-8). Late Pleistocene and early Holocene cultural layers with an associated radiocarbon date range of ca. 14,802 – 10,232 Cal BP (Table 3-1) yielded 70 lithics, most notably the ASP lithic cluster, 14 freehand percussion flakes, one graver, four hammerstones, six retouched tools (four pebble tools, one core tool, and one flake tool), and two sandstone fragments (manuports; heavily degraded) (Table 3-1 and Table 3-8). Of these 70 lithics, six were found within Stratum XIc – the deepest stratum containing cultural materials. Stratum XIc remains undated but is presumably older than Stratum XIb just above it. Twenty-five lithics were collected from within Stratum XIb, including 22 lithics produced by ASP, a

⁴⁵ Refer to Appendix B – Lithic Analysis section for discussions on variability within bipolar/ anvil percussion.

hammerstone, a bifacial pebble tool, and one early reduction flake produced by freehand percussion.

The most notable lithics recovered from Stratum XIb are the 15 lithics positioned as a cluster on a battered boulder within the excavation trench (Figure 3-9, Figure 3-14 and Figure 3-15). The cluster was embedded in, and the surface of the boulder was overlain by, dark brown sediment (paleosol; Stratum XIb) between 289-291 cm below surface (Figure 3-9). There are no indications of substantial disturbance in Stratum XIb, therefore the position of the flakes on the boulder surface likely represents an intact context (Figure 3-9). The base of the boulder sits 300 cm below surface, resting in Stratum XII. The ASP lithic cluster found on the boulder within XIb consists of 12 flakes and three cores made of quartzite. This cluster includes three cores produced by ARP as revealed by the location and position of the flake scars, and the twelve flakes produced either through ARP or bipolar reduction. Two of the three cores exhibit elongated, linear flake removals and five of the flakes are linear and elongated. One core (Figure 3-14) has a pyramidal shape and shows a very controlled reduction sequence with multiple, linear flake scars evident. The flakes and cores were determined to be cultural in origin for the following reasons: 1) they all variably exhibit morphology that is consistent with ASP (positive to diffuse bulbs of percussion, proximal and distal crushing, bidirectional or multidirectional scarring, and variable presence of multiple platforms), 2) the flake removals are systematic and the crushing/battering is present in anticipated locations, which would be difficult to achieve naturally, 3) their material type is unique and differs noticeably from the surrounding black and white granodioritic cobbles and boulders, and 4) they were found in a cluster that does not refit (indicating selective removal/loss of pieces) upon a boulder that exhibited battering on its top (as an anvil stone would).

Four milky quartz lithics produced from bipolar reduction are also present in Stratum XIb; milky quartz is often reduced using bipolar reduction because it is commonly found as small pebbles and is difficult to freehand knap (Barham 1987; Kaplan 2021). Five lithics were recovered from the very top of Stratum XIa, with an associated date of ca. 11,311 – 11,201 Cal BP (Table 3-1) and two were collected from the transition between Stratum X and XIa (Table 3-8). The remaining 32 lithics were collected from Stratum X, with an associated date of ca. 10,401-10,232 Cal BP (Tables 3-1 and 3-8). Three obsidian lithics were collected from Stratum IX and the interface of X/IX (ca. 7,788 – 7,682 Cal BP; Table 3-1) (Figure 3-13); these consist of one late-stage flake, one utilized flake, and one un-utilized microblade. Other lithics present in Stratum IX and the interface of X/IX include one early-stage flake, two mid-stage flakes, three general reduction flakes, six ASP flakes, one tested core, and six pieces of debitage. Utilized and intentionally snapped obsidian microblades (n=2) were also collected from the interface of Strata IX/VIIIb (ca. 7,713 – 7,165 Cal BP; Table 3-1) (Figure 3-13). Sixty-two pieces of chipped stone, two ground-stone abrader fragments, and a pigment stone (graphite nodule) were collected from mid-to-late Holocene cultural layers (Strata VII to IIIb) with an associated radiocarbon date range of ca. 6,777 – 5,583 Cal BP (Figure 3-13; Table 3-1). Chipped stone recovered from this later occupation of the site includes 14 early-stage flakes, nine mid-stage flakes, one late-stage flake, nine general reduction flakes, one biface reduction flake, seven ASP flakes, three bipolar split pebbles/cobbles, three unidirectional cores, a water-rolled obsidian flake, two hammerstones, a cobble chopper, a pebble tool, four flake tools, and six pieces of debitage. In addition to this assemblage, comparable early Holocene aged lithics were found during intertidal excavations conducted at EkTb-9 in 2017 (Dyck et al. 2020).

Table 3-8 Description of the terrestrial lithic assemblage from EkTb-9.

Type	EkTb-9 Excavation Trench (EU 2012-2016 Strata)															EkTb-9 VC-2017-1		Total			
	IIIb	IIIb/ IV	IV	IV/V	V	V/VI	VI	VII	VIIb	VIIIb/IX	IX	IX/X	X	X/XIa	XIa	XIb	XIc		XII	Tube A (Upper IV)	Tube B (Mid IV)
Abrader/Abrader Fragment	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Biface Reduction																					
Flake	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
ASP Core	-	-	-	-	-	-	-	-	-	-	-	1	-	-	4	-	-	-	-	-	5
ASP Flake	4	-	1	-	1	-	1	-	-	-	6	-	5	-	2	18	1	-	-	-	39
Bipolar SplitCobble	-	-	-	1	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Bipolar SplitPebble	1	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-	-	-	-	3
Core Tool	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	2
Core	-	-	-	-	-	-	-	-	-	-	1	-	1	-	1	-	-	-	-	-	3
Debitage	4	-	-	1	-	-	-	-	-	-	4	2	6	-	-	-	-	-	-	1	18
Flake	22	1	4	2	3	-	-	-	-	-	4	2	10	1	1	1	1	-	-	-	52
Flake Tool	-	-	-	3	1	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	5
Graver	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1
Hammerstone	-	-	1	-	-	-	1	1	-	-	-	-	2	-	-	1	1	-	-	-	7
Manuport	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	2
Multidirectional Core	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	1
Obsidian Flake	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	-	2
Obsidian FlakeTool (utilized)	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Obsidian Microblade	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	1
Obsidian Microblade (utilized)	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	2
Pebble Tool	1	-	-	-	-	-	-	-	-	-	-	-	2	-	-	1	1	-	-	-	5
Pigment stone	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
UnidirectionalCore	1	1	-	1	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	4
Total	34	2	8	9	6	1	2	1	0	2	16	6	32	2	5	25	6	0	1	1	159

The table is arranged by artifact type and stratum. The assemblage includes lithics from the excavation trench (EU2012, EU2015, EU2016) and a single Vibracore test “VC-2017-1.” Prepared by A Gauvreau and A Dyck.

Figure 3-13 Select lithics from EkTb-9 terrestrial excavations: Strata IX/X, VIIIb/IX, and V.

(a) Selection of lithics collected from the upper shell midden accumulations of the excavation trench at EkTb-9 in 2015: (i) Utilized sandstone abrader with multiple incisions and grooves resulting from utilization, collected from stratum IV (EkTb-9:499). (ii) Utilized graphite nodule with multiple incisions and grooves for mineral (crystalline carbon) extraction for pigment production, collected from stratum V (EkTb-9:495). Lithics photographed by J McSporran, and layup prepared by A Dyck. (b) Obsidian artifacts collected from the terrestrial excavations at EkTb-9. Dots indicate areas of utilization: (i) Utilized obsidian flake tool collected from interface of strata IX/X in the excavation trench (EkTb-9:583). (ii) Obsidian flake collected from VC-2017-1 stratum IV (EkTb-9:636). (iii) Utilized obsidian microblade collected from interface of strata VIIIb/IX in the excavation trench (EkTb-9:623). (iv) Utilized obsidian microblade collected from interface of strata VIIIb/IX in the excavation trench (EkTb-9:621). (v) Distal end of an obsidian microblade collected from interface of stratum IX/X in the excavation trench (EkTb-9:622). Obsidian artifacts (i) and (iii-v) sourced via XRF to Bes But'a (Anahim Peak) by R Reimer. Lithics photographed by J McSporran and A Dyck. Layup prepared by A Dyck and A Gauvreau.

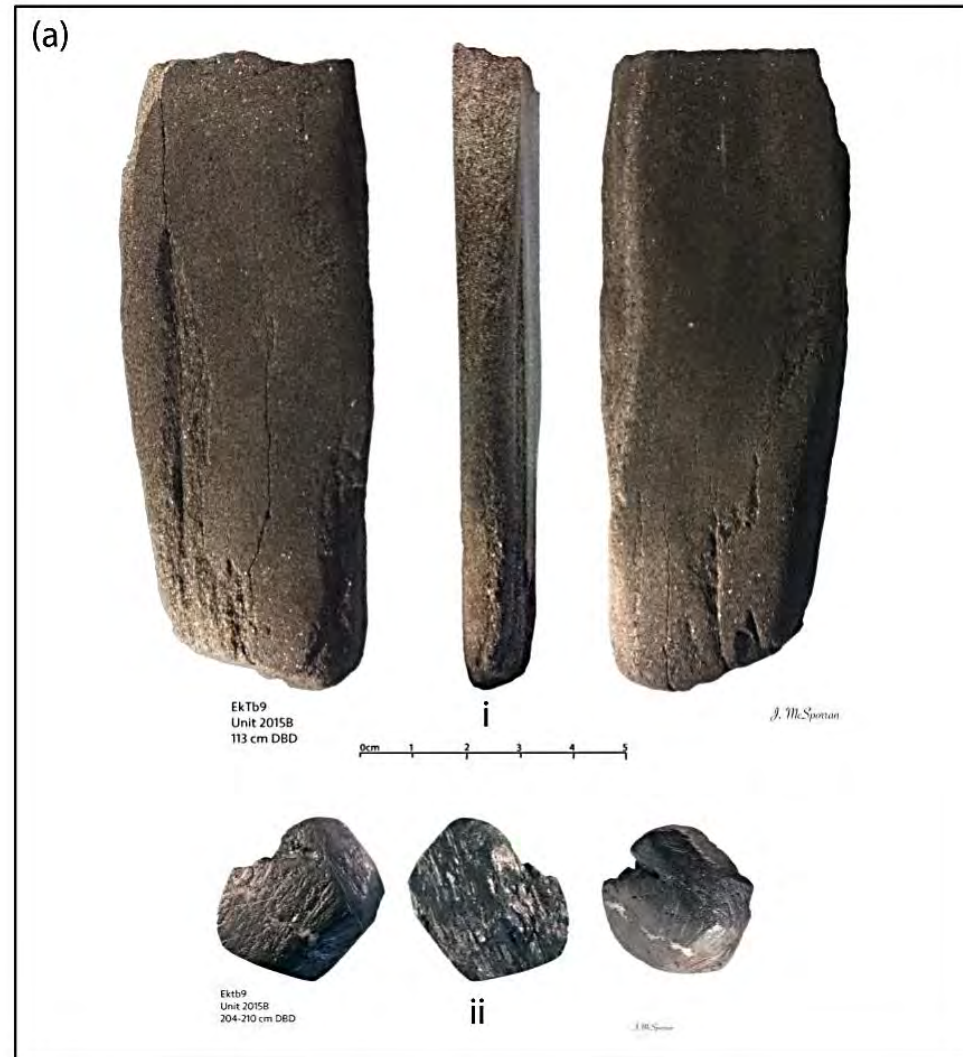


Figure 3-14 Select lithics from EkTb-9 terrestrial excavations: Stratum XIb.

Photographs (colour) and 3D scans (grey scale) of a selection of quartzite artifacts from the anvil supported percussion (ASP) lithic cluster collected from the excavation trench in 2016: (a) Anvil-rested percussion (ARP) core (EkTb-9:535). Note the oblique angle of the flake removals. (b) ARP core with pyramidal profile. Note the elongated linear flake scars (EkTb-9:536). (c) ASP flake with intact platforms on proximal and distal ends (EkTb-9:542). (d) ASP flake with positive bulb of percussion and proximal/distal crushing (EkTb-9:545). (e) ASP flake with three intact platforms (EkTb-9:539). (f) ASP flake with proximal and distal crushing (EkTb-9:538). (g) ASP flake with proximal and distal crushing (EkTb-9:546). Lithics photographed by A Dyck, layup prepared by A Dyck. 3D scans created by Camosun Innovates.

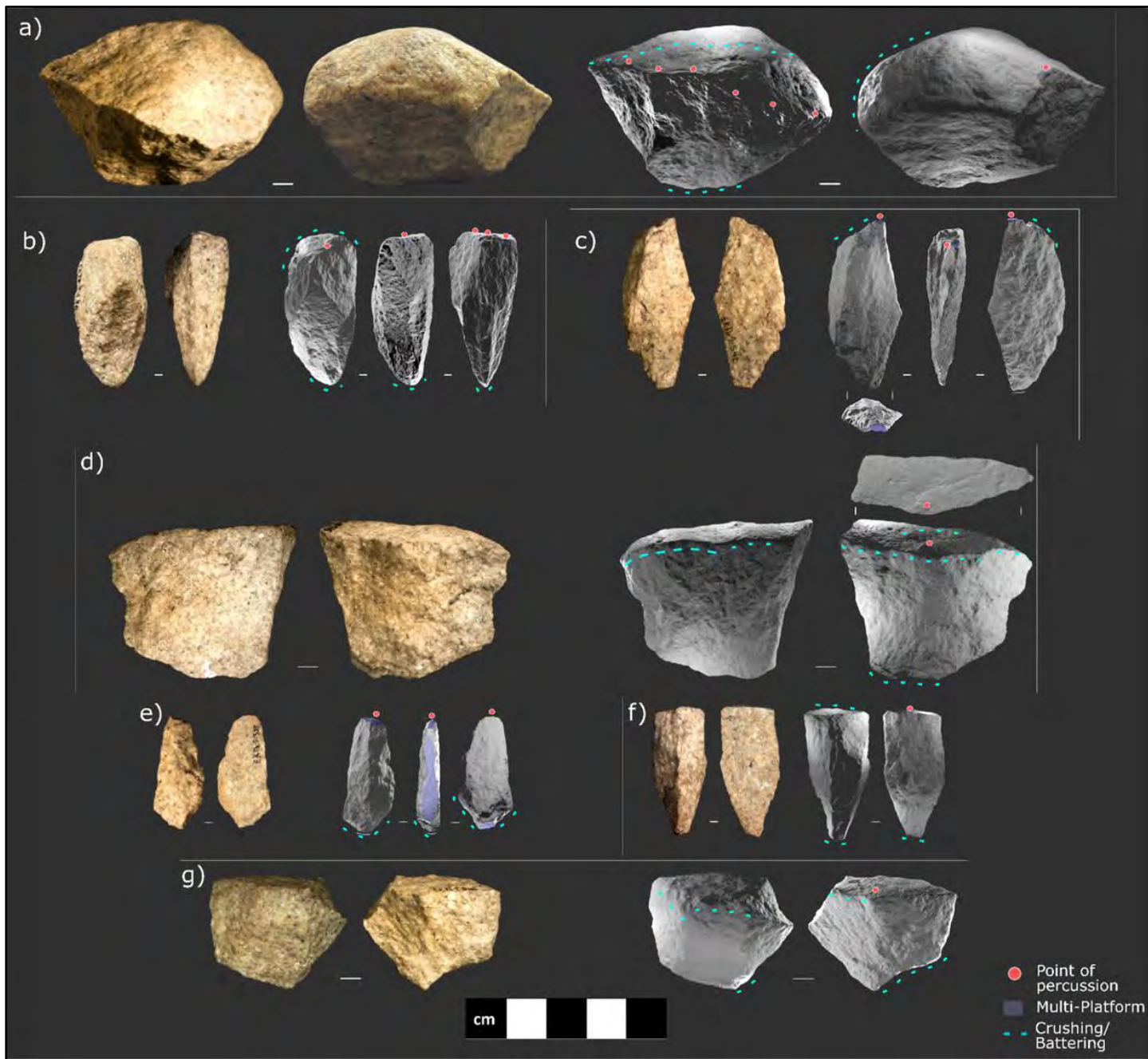
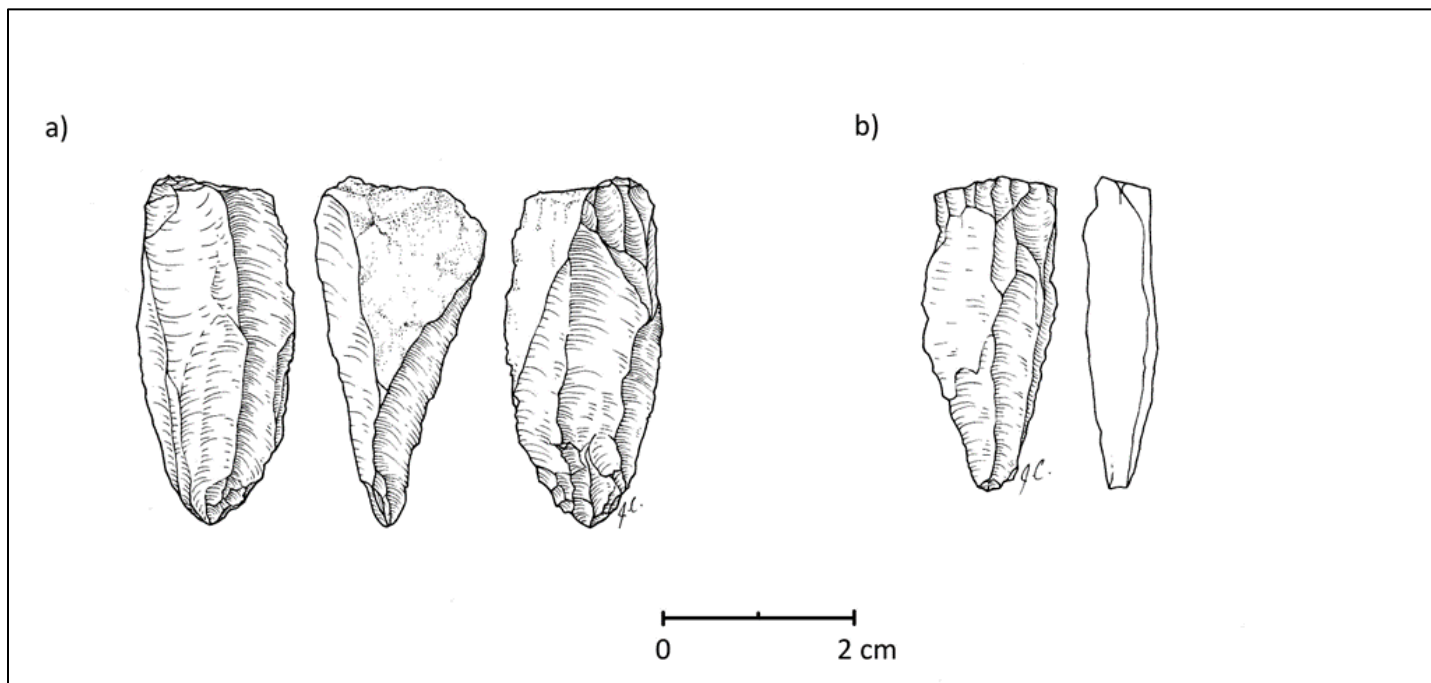


Figure 3-15 Technical drawing of select lithics from EkTb-9 terrestrial excavations: Stratum XIb.

(a) EkTb-9:536. (b) EkTb-9:538. Technical drawing prepared by J Cohen.



Discussion (ῥάλáqvla) and Interpretation (λúlyayú)

This section is organized around the site chronology (periodization) established for site EkTb-9 wherein we discuss the key topical areas of our investigation and focus on λúlyayú (a presentation of our key interpretations). The EkTb-9 site chronology was collaboratively developed with co-authors Ĝvúí Rory Housty, Dúqváislá William Housty, and Ķíxítasu Yímázalas Elroy White (Table 3-9). Table 3-9 builds on previously established chronologies for the Central Coast that have primarily been derived from work at Namu (ElSx-1) (Carlson 1991, 1993, 1996; Maas 1990). Three major temporal phases were observed and assigned Haítzaqv nomenclature, with the caveat that each temporal phase be named after a primary component of the archaeological assemblage for which a Haítzaqv word exists.⁴⁶ The inclusion of Haítzaqv nomenclature allowed us to co-create the site chronology, thereby enhancing our mutual understanding and λúlyayú (interpretation) of the site history. Periodization is discussed in reverse chronological order, beginning at the earliest period with evidence of archaeological materials and features. The late Pleistocene-early Holocene period is called the **Gálgla** (arrive on the beach) **Phase** (ca. 14,000 – 8,000 Cal BP), or “*layasi gálgla*” the time when the first People arrived at the island (Table 3-9).⁴⁷ The early to mid-Holocene period is called the **Ćícxvpat** (layers of shells) **Phase** (ca. 8,000 – 5,500 Cal BP); a time where shell is better preserved in the strata (Table 3-9).⁴⁸ The mid to late Holocene period is called the **Dhýás** (cedar) **Phase** (ca. 5,500 – 400 Cal BP), or *layasi qvaxxit dhýásaxi* the time when the western redcedar became more abundant at Triquet Island (Table 3-9).⁴⁹

⁴⁶ i.e., not necessarily an “exclusive” component of that phase, nor a wholly “summative” or “representative” term.

⁴⁷ Gálgla is pronounced Gal-gell-ah.

⁴⁸ Ķícxvpat is pronounced Zi-zix-bot.

⁴⁹ Dhýás is pronounced Den-yass.

Table 3-9 Haíłzaqv temporal phases for terrestrial deposits identified at EkTb-9.

Haíłzaqv Temporal Phases for EkTb-9	The Gálgla Phase	The Cícxvpát Phase	The Dńýás Phase
Haíłzaqv Description and English Translation of Temporal Phases	<i>Layńtxv gálgla</i> (when we arrived on the beach) or <i>layasi gálgla</i> (when they arrived on the beach) “In the beginning there was nothing but water and ice, and a narrow strip of shoreline.”(Farrand 1916)	Cícxvpát: shells of shellfish, layers of barnacle shells on a beach	dńýás: redcedar <i>layasi qvaxʔit dńýásaʔi</i> (when the redcedar started to grow)
Geological Era	Terminal Pleistocene - Early Holocene	Early to Mid-Holocene	Mid to Late Holocene
EkTb-9 Cal BP Ranges	ca. 14,000 – 8,000 Cal BP	ca. 8,000 - 5,500 Cal BP	ca. 5,500 - 450 Cal BP
EkTb-9 Strata	-II - X	IX-VI	V-IIIb
Central Coast Periodization (Carlson 1991, 1996)	The Early Period, 10,000-5,000 years ago Period II Period III	The Middle Period, 5,500-1,500 years ago Period IV Period V	The Late Period, 1,500 years ago & The Contact Period 1793 AD
Central Coast Stone Tool Traditions (Carlson 1991, 1996)	Interface of Pebble Tool Tradition and Microblade Tradition Namu I – Zone IIa Namu I – Zone IIb	Namu II McNaughton I Cathedral Phase Namu III Namu IV McNaughton II	Anutcix Kwatna Phase
EkTb-9 Palaeoenvironmental Reconstruction	Hypermaritime; likely open or parkland; exposed, relatively flat; bedrock; shrubby alder, ferns, and rose-family with few conifers; Younger Dryas and early Holocene bring more conifers; gradual sedimentation from erosion and marine deposition; Subsiding Sea level	Hypermaritime; cool, wet, temperate; conifer forests form closed stands; western redcedar and yew appear; berry bushes; peat formation; storm surges/tsunamis; periods of higher relative sea level	Hypermaritime; cool, wet, temperate; modern rainforest co-dominated by western hemlock, Sitka spruce and western redcedar; berry bushes; peat formation; storm surges/tsunamis; periods of higher relative sea level
EkTb-9 Subsistence	Specialized marine-based subsistence: Sea-mammal are the most relatively abundant species group, followed by fish (herring, lingcod, greenling, rockfish) and invertebrates (primarily evidenced by periostracum from California mussels)	Specialized marine-based subsistence: Greenling, rockfish and pacific herring are the most relatively abundant species. Sea-mammal also present in assemblage Shellfish (abalone, chiton, butter clam, California mussel, littleneck, barnacle, sea urchin) harvesting and propagation Traditional plant management: estuarine root gardens, eelgrass beds, berry bush patches	Specialized marine-based subsistence: Greenling, rockfish, and Pacific herring most relatively abundant species Shellfish (abalone, chiton, butter clam, California mussel, littleneck, barnacle, sea urchin) harvesting and propagation Traditional plant management: estuarine root gardens, eelgrass beds, berry bush patches, CMTs Domesticated dogs
EkTb-9 Settlement Type	Temporary structures (tents/lean-tos; inferred) Stratum X: water saturated shell-less midden accumulations with abundant periostracum and charcoal	Accumulations of preserved shell (intentional midden terraforming) settlement expansion (plank houses; inferred)	Continuation of shell midden terraforming, plank houses (inferred)
Haíłzaqv Stone Tool Traditions at EkTb-9	The tssía Tradition		The diáka tradition
	<i>tssía</i> : to break, smash a stone in half <i>Layńtxv tssía</i> (when we smashed rocks to make stone tools)		<i>diákas</i> : whetstone, grindstone; <i>layńtxv diáka diákasax</i> (when we sharpened tools on whetstones and grindstones)
EkTb-9 Stone Tool and Maritime-Adapted Organic (Composite Wooden Tool) Technology	Boats (inferred) Cobble reduction industry with bipolar technology Locally available raw material (basalt, quartzite and granite) Composite tools (stone, wood)	Boats (inferred) Composite tool technology (Carved harpoon foreshafts, bentwood fishhooks, bark wrapped-stick, bi-points) Chipped and flaked stone tools; Locally available and imported raw material Imported obsidian from Anahim Peak (microblades, flake tools) Imported Graphite: Pigment stone (art, personal adornment, spiritual, ritual)	Boats (inferred) Flaked and Chipped stone tools Ground stone tools Worked bone tools (Textile production; Inferred)

Prepared by A Gauvreau, R Housty, W Housty, and E White, with contributions from J Carpenter (Haíłzaqv Cultural Education Center), the Haíłzaqv Integrated Resource Management Department, and M Humchitt (Haíłzaqv Language Program).

Gálgla Phase (ca. 14,000 – 8,000 years ago)

This section reviews the evidence of human occupation during the *Gálgla* Phase and includes a discussion of palaeoenvironmental conditions, artifacts, and faunal assemblages for this period.

Evidence of human occupation during the Gálgla Phase

The earliest evidence of human occupation at EkTb-9 occurs during the *Gálgla* Phase and is revealed in Strata XIc and XIb in the excavation trench (Figures 3-4, 3-7, 3-9, and 3-14). The occurrence of lower stratigraphic units with lithics in an intact context, palaeoenvironmental correlates, and a single radiocarbon date (14,802 – 13,478 Cal BP; Table 3-1) indicates a late Pleistocene occupation is likely. Our interpretations are consistent with the relative sea level history of the area that shows that relative sea level was ca. 6 m above modern about 14,500 years ago (McLaren et al. 2014, 2015) (Figure 3-3). Once sea level dropped 2 to 3 m from its position of 6 m above modern (sometime between ca. 14,500 – 14,300 years ago), the area encompassing the EkTb-9 trench and the associated elevation of Stratum XIc and XIb became suitable for vegetation development and human occupation (Figure 3-3 and Figure 3-8).

Environment during the Gálgla Phase

When the first people arrived in the sheltered bays at what is now called “EkTb-9” during the *Gálgla* Phase, the landscape would have looked very different than it does today though nevertheless welcoming compared to some of the more steeply sided islands in the region. Pollen in basal cultural strata suggests that the island had pioneering vegetation dominated by shrubby alder and rose-family taxa alongside ferns, herbs, and few conifers, with soil surfaces that were repeatedly exposed to the elements. Pollen spectra from lower Strata XII to X suggest few trees were present on Triquet Island in the late Pleistocene and earliest Holocene, potentially the result

of the island's hypermaritime isolation in the post-glacial period (Figure 3-12). The early co-occurrence of ferns with alder and herbaceous taxa seen here has also been documented in post-glacial deposits at Hippa Island, another hypermaritime site off the west coast of Haida Gwaii (Lacourse et al. 2012). Similar non-arboreal assemblages — though without the prevalence of alder — have also been described from elsewhere in coastal BC (Barrie et al. 1993; Lacourse et al. 2003, 2005; Mathewes et al. 2019; Warner 1984) and are often interpreted to represent cool and dry climatic conditions prior to ca. 14,700 years ago.

The notable presence of taxa associated with wet to mesic soils including alder, rose-family taxa, and skunk cabbage amongst other non-arboreal indicators, especially in Strata XII, XIc, and XIb, may indicate warmer, moister conditions on the island coincident with global climatic amelioration during the Bølling-Allerød interstadial (ca. 14,700 – 12,900 years ago). These conditions are also supported by paleosol formation in the top of Stratum XIb, which would have required the presence of sufficient moisture and vegetation to undergo such marked soil formation processes. At most sites in coastal BC, the pollen records for the period from ca. 14,700 – 12,900 years ago demonstrate the presence of a pine and/or mixed conifer woodland (Godbout et al. 2008; Hebda 1995). There is, however, no indication of substantial pine growth on the island in any of the sediments examined at EkTb-9, including Stratum XIb. Rather, the island's distance from potential refugia for arboreal species off northern Vancouver Island (Lacourse et al. 2003) and Haida Gwaii (Godbout et al. 2008) coupled with its hypermaritime character may have prevented pine trees from establishing an early foothold, despite having done so on nearby Calvert Island (Wúíga) by ca. 14,500 years ago (Eamer 2015).

Modest incidence of conifer pollen in the early period assemblages from Triquet Island may have resulted from aeolian transport of pollen (Hebda and Allen 1993) or from oceanic

waves and currents transporting coniferous cone-bearing flotsam.⁵⁰ A notable increase in pollen from mountain hemlock in the lower sample from Stratum XIa likely corresponds with the onset of the Younger Dryas (ca. 12,900 – 11,700 years ago) at the site (Mathewes 1993), which is concordant with outer constraining dates on Stratum X above (ca. 11,311 – 11,201 Cal BP; Table 3-1) and Stratum XIb below (ca. 14,802 – 13,478 Cal BP; Table 3-1). Overall, conifer pollen remains low in both Stratum XIa and Stratum X, suggesting slow forest development on the island into the early Holocene.

Artifact and faunal assemblages of the Gálgla Phase

The stone tool technology during the *Gálgla* Phase comprise the *íssiá* Tradition; the Haílzaqv term “*íssiá*” means to break or smash a stone in half.⁵¹ This is demonstrated in the lithic assemblage through production by ASP and hard-hammer freehand percussion. Cultural activities are evidenced as early as Stratum XIc and XIb with the presence of lithics in these layers (n=31; Table 3-8) (Mathewes et al. 2019). Early island inhabitants produced stone tools using a wide range of locally available, medium to coarse grained material types (with a few fine-grained volcanics), as well as quartzite, fine-grained milky quartz, volcanic andesite/basalt, and metamorphic materials. Stone tools recovered from basal cultural strata have practical application for woodworking, processing mammalian, avian, fish, and invertebrate resources, and other ecological management applications. Towards the end of the *Gálgla* Phase, and continuing into the *Ćícxvápát* Phase, the perishable tools and faunal remains recovered from the site demonstrate a well-developed maritime-adaptation (atlatls, carved wooden bi-points, composite tools, fishhooks). Part of this maritime adaptation likely involved extensive

⁵⁰ Especially common for Pinaceae species (Hebda and Allen 1993).

⁵¹ *íssiá* is pronounced diss-we-yah

knowledge and awareness of outer coastal floral and faunal resources, as faunal evidence suggests that island inhabitants were primarily reliant upon sea-mammals, bottom feeding fish, and shellfish.

Within the assemblage, the lithics recovered from Stratum XIb (the oldest dated layer) are of particular interest. The five elongated linear flakes and the flake scars on two cores produced by ARP may indicate that elongated flakes were a desired outcome. Recent studies have shown that ASP is particularly efficient at producing small, elongated flakes (Pargeter 2017; Pargeter and Eren 2017; Pargeter et al. 2019). Interestingly, the early Holocene lithic assemblage in the intertidal zone of EkTb-9 also contains a sizable bipolar component (Dyck et al. 2020). The relatively common presence of lithics resulting from ASP in various areas of the site suggests that this reduction method may have been a preferred strategy for inhabitants during earlier periods of occupation on the island. The early date obtained from Stratum XIb, and the associated lithic cluster indicates that an occupation may have occurred ca. 2,700 years prior to the occupation associated with Stratum XIa and X, however, the radiocarbon ages from XIa are from its interface with Stratum X above, and the lower deposit in XIa remain undated. The lower deposit in XIa could comprise sediments dating to this observed 2,700-year gap.

Terraforming during the Gálgla Phase

The cultural remains in Stratum X very closely resemble the components in shell midden strata, except that all the shell has degraded. The presence of abundant periostracum in Stratum X is likely representative of a process of decay (not a change in diet or resource availability), indicating that shellfish was a staple of ancestral diets and actively discarded at the site during at least the latter part of the *Gálgla* Phase. Charcoal rich water saturated shell-less midden deposits with abundant periostracum are also documented at nearby sites EjTa-4 (Calvert Island) and

EjTa-15 (North Pruth Bay) (McLaren et al. 2015). Like the shell-less midden deposits encountered at EjTa-4 and EjTa-15, shell discarded at the southern extent of EkTb-9 (Stratum X; Figures 3-4, 3-6 and 3-7) may represent the early onset of intentional terraforming activities.

Ć'ćxv'át Phase (ca. 8,000 – 5,500 years ago)

This section reviews the evidence of human occupation during the *Ć'ćxv'át* Phase and includes a discussion of terraforming activities, palaeotsunamis, intentional investment in place, and the artifact and faunal assemblages for this period.

Terraforming during the Ć'ćxv'át Phase

Terraforming activities are more concretely expressed during the *Ć'ćxv'át* Phase, evidenced vertically across the rocky promontories as well as horizontally along and within the nearby intertidal flats through dense accumulations of preserved shell (See Figure 3-8; with terraformed layers removed). Terraforming activities were perpetuated into the late Holocene (*Dńy'ás* Phase), resulting in substantial accumulations of altered and unaltered shell across the site (Figures 3-4, 3-6 and 3-7). Evidence of preserved shell accumulations (calcine, burned, and unaltered) begin ca. 5,732 – 5,604 Cal BP at the southern extent of the site, capping the peat-fringed pond. Shell midden accumulations begin at the northwestern extent of the site ca. 8,163 – 7,668 Cal BP, atop shell-less midden, bedrock, and intertidal beach sand deposits (Tables 3-1 and 3-2). This would have been necessary to create more liveable space for an increasing population and would have established well-draining foundations for plank house construction. A single house depression is visible on the landscape at EkTb-9 today (Stafford et al. 2009).⁵² A similar pattern of population and site expansion with permanent outer coastal settlement is revealed at

⁵² Additional house platforms may be present at EkTb-9 and elsewhere on Triquet Island, likely obscured by very tall and very dense vegetation (Stafford et al. 2009).

archaeological sites GcTr-6, EjTa-15, and EjTa-4 during this time (Martindale et al. 2009; McLaren 2008; McLaren et al. 2015).

Palaeotsunamis and intentional investment during the Čičxv́át Phase

During the Čičxv́át Phase, stable relative sea level and increasingly thick vegetation likely enabled consistent access to terrestrial and marine resources, however, a possible palaeotsunami event is (*Gńń? Ala* – referring to big waves and large swells of water) is recorded in the stratigraphy at EkTb-9 and is discussed further below (Figure 3-6 and Figure 3-7; Stratum VIIIa). During the mid-Holocene, the possible palaeotsunami event (*Gńń? Ala*) occurred at EkTb-9 ca. 6,931-6,314 Cal BP, depositing water-rounded fine grey sand clasts of consistent size class and relatively abundant marine diatoms and spicules (Stratum VIIIa) across much of the site within a few meters of the modern southern shoreline (between approximately 2.25-3.5 m above hht; Tables 3-2 and 3-5; Figures 3-4, 3-6 and 3-7) (Shinkai 2015). Evidence of between 10 to 22 palaeotsunami events have been documented along the Pacific coast of Canada spanning 4,500 Cal BP to AD 1700 (Goff et al. 2020) however no intensive palaeotsunami investigations have yet focused on the immediate region surrounding Triquet Island. The island is located north of the Cascadia Subduction Zone and east of the Queen Charlotte Fault and Explorer Plate within the active tectonic zone of the broader Pacific-North American plate boundary (Goff et al. 2020). The characteristics of the Pacific-North American plate boundary (side-slip plate) are unlikely to produce large tsunamis (Clague et al. 2003; Goff et al. 2020; Peterson et al. 2013). Localized earthquake-generated tsunamis are however possible, as demonstrated in 2012 when the largest tsunami of the year (worldwide) occurred on a subsidiary thrust fault off the west coast of Moresby Island (southern Haida Gwaii) following Canada's second-largest recorded earthquake (Fine et al. 2015; Leonard and Bednarski 2014). The tsunami had maximum runup heights of up

to 7.6 m in sheltered areas and up to 13 m in a less sheltered area of Moresby Island; waves triggered by the event were recorded throughout the entire Pacific Ocean (Fine et al. 2015; Leonard and Bednarski 2014).⁵³

As Triquet Island has low topographic relief and is exposed to the Pacific Ocean, an earthquake is the most likely tsunamigenic source for the Stratum VIIIa deposit (Figures 3-6 and 3-7) (Goff et al. 2020). Sea level was around 0.5 to 1 m below modern ca. 7,000 – 6,000 Cal BP when the palaeotsunami occurred (Figure 3-3). Although we do not know if it occurred at low tide or high tide, nor the length of the wave, nor if there were successive waves, the palaeotsunami may have had a runup height of approximately 3 m as the deposits are presently expressed between 2.25 and 3.5 m above modern sea level. With enough force behind it, a wave of this height would have had implications for anything or anyone in its path.

Palaeotsunami events identified in archaeological contexts along the Cascadia Subduction Zone have been linked to resource fluctuations and displacement of site inhabitants (Hutchinson and Clague 2017; Hutchinson et al. 2019; Minor and Peterson 2017; Thrush and Ludwin 2007), however, archaeological and oral historical evidence indicates that settlements (primarily shell midden sites) that were located in favoured settings were reoccupied (Goff et al. 2020; Hutchinson et al. 2019; McMillan 2011; McMillan and Hutchinson 2002; Minor and Peterson 2017; Thrush and Ludwin 2007). On the Central Coast, a Haítzaq̓ oral historical account shared by Máğağa (Mrs. Charley Windsor) to Ronald Olson in 1955 describes a deluge or palaeotsunami event that occurred at Húy̓at (Olson 1955; McMillan and Hutchinson 2002).⁵⁴

⁵³ Waves associated with the event measuring between 5 and 50 cm were recorded on tidal gauges in the United States, Canada, Japan, New Zealand, and the Pacific Islands. The tidal gauge at the Haítzaq̓ village of Bella Bella registered a small wave height of 24 cm (Fine et al. 2015).

⁵⁴ The paleotsunami event at Húy̓at remains undated, however, through interpretation of Máğağa's account (Olson 1955) and identification of a large slope failure scarp on the western shore of a lake located southwest of Fannie Cove, it has been hypothesized that this narrative speaks of a potential earthquake generated slope failure which would have had localized effects (Goff et al. 2020).

Húy'at is the location of several important Haíłzaqv villages (shell midden sites and associated features) located along Fannie Cove on northern Hunter Island (approximately 29 km northeast of Triquet Island) (Jackley 2013). Haíłzaqv ancestors decided to return and rebuild their villages at Húy'at after the waters receded and the area remains a cultural keystone place for Haíłzaqv Nation today (Olson 1955; Lepofsky et al. 2017). EkTb-9 was similarly reoccupied following the palaeotsunami event that occurred in the mid-Holocene. Reoccupation of village sites following tsunami events highlights the importance of these places for the inhabitants and their descendants and signals the inhabitants continued intentional investment in these terraformed landscapes.

Artifact and faunal assemblages of the Č'č'xv'át Phase

The terrestrial lithic assemblage of the Č'č'xv'át Phase primarily reveals a cobble reduction industry useful for woodworking, processing mammalian, avian, fish, and invertebrate resources, and other ecological management applications, such as pruning/coppicing (Turner et al. 2013). The majority of the lithics appear to be produced from locally available materials except for the obsidian, quartz crystal, and graphite that are exotic to the area. Obsidian artifacts were sourced to *Bes But'a* (Anahim Peak), located approximately 206 linear km northeast of Triquet Island (Reimer 2018).⁵⁵ The origin of the graphite nodule (bearing distinct incisions from repeated modification and use as a pigment stone) remains unknown; however, a lump vein is located near Bella Coola, approximately 110 km east of the island (Simandl et al. 2016).

Faunal remains associated with the Č'č'xv'át Phase demonstrate specialized marine-based subsistence that included fish, shellfish (including mussel, abalone, sea urchin), and sea-

⁵⁵ See Appendix B – Lithic Analysis section. Obsidian artifacts were sourced X-Ray Fluorescence (XRF) using a Bruker Tracer III-V+ portable XRF spectrometer (Reimer 2013). This is a non-destructive technique whereby trace elements of lithic material can be identified (Reimer 2013).

mammal; most of which were accessible year-round. Perishable artifacts associated with this phase demonstrate that the island inhabitants were skilled woodworkers and carvers, producing a range of carved wooden tools used for land and sea-mammal hunting, deep-sea fishing, textile and other production, including composite tool technology.

Dñýás Phase (ca. 5,500 – 450 years ago)

This section reviews the evidence of human occupation during the *Dñýás* Phase and includes a discussion of environmental conditions, artifacts, and faunal assemblages for this period.

Environment during the Dñýás Phase

Preserved pollen and macrobotanicals from upper cultural layers reveal a hypermaritime rainforest environ was fully established by the *Dñýás* Phase. During this time, parts of Triquet Island were densely vegetated, like conditions found on the island today (Lucas 2013). Western redcedar slowly entered the ecosystem, joining Sitka spruce, western hemlock, and a rapidly developing understory with dense stands of salal, ferns, and berry bushes.

Artifact and faunal assemblages of the Dñýás Phase

During the *Dñýás* Phase, rockfish and Pacific herring are the most relatively abundant species encountered in the deposits at EkTb-9 signaling a shift in species targeted, but a continuation of a marine based subsistence. Flaked and chipped stone tools persist, and ground stone tools appear, as well as worked bone for weaving and sewing (Carlson 1996). A shift in stone tool technologies therefore occurred and is referred to as the *Diáka* (whetstone or grindstone) tradition.⁵⁶ “*Láyñtxv diáka diákasax*” refers to the time when Haiłzaqv people sharpened organic and lithic tools (e.g., knives) on whetstones and grindstones as an addition to

⁵⁶ Diáka is pronounced Dee-ah-gas

the already established chipping and flaking stone tool tradition. These technologies are well suited for harvesting bark from the thriving western redcedar trees for textile and other production (woven cedar hats, mats, blankets) as well as large planks for the construction of plank houses necessary to accommodate an expanding population.

Oral History, Persistent Places and the Coastal Route into the Americas

The deep-time palaeoenvironmental and archaeological record for EkTb-9, layered with the available oral historical records for the broader Núláwít̓x̄v tribal area, demonstrates a pattern that is suggestive of long-term cultural continuity. Collectively, these data support the contention that the EkTb-9 site — and Triquet Island more broadly — is a persistent place of repeated human occupation (McLaren et al. 2015). The stable relative sea level in the region coupled with the long-term assertion of Haíłzaqv tenure and proprietorship and the lack of historic era development on the island are factors that have contributed to the preservation of the archaeological deposits at EkTb-9. The substantial size, depth, and integrity of the terrestrial deposits and nearby intertidal features reveal that the site was a terraformed landscape, that is, a *built environment* with substantial *human investment in place* (Grier and Schwadron 2017; Letham et al. 2020); it is a major outer-coastal occupation site with inferred intentional landscape modification. The abundance of shellfish and fish remains recovered from EkTb-9 and the presence of nearby intertidal features (petroforms and stone fishtraps) demonstrate evidence of deliberate investment and enhancement of marine resource harvesting technologies on and around the island. Haíłzaqv Elders interviewed for the traditional use studies undertaken between 1996 and 2009 identified important fishing locations (notably flat fish), as well as shellfish and seaweed harvesting locations within a 1 km radius of Triquet Island, highlighting the continued

importance of the island and nearby marine resources for Haílzaqv Nation today (Stafford et al. 2009).

The higher general marine productivity of the Central Coast (as compared to inland waters) (Barrie and Conway 2002; Breivik 2014; Mackie et al. 2011) coupled with a long-standing system of prerogatives (McLaren et al. 2015), and marine adaptation enabled ancestral populations to settle and thrive in these outer coastal environs for thousands of years. Oral historical, ethnographic, and recent accounts demonstrate a long-standing system of community specific prerogatives that have been reasserted and transmitted over millennia (McLaren et al. 2015). These long-standing prerogatives comprise exclusive rights and privileges for occupation of the island and access to available resources. Like other persistent places on the NWC, EkTb-9 is a manifestation of deep-time human connection to place, long-term place making, expression of socio-political complexity, and dynamic geomorphological processes (Letham et al. 2020; McLaren et al. 2015, 2019a).

Persistent and early places of human occupation on the outer Central Coast have implications for the peopling of the Americas (McLaren et al. 2015, 2019a). Triquet Island is located along the proposed coastal corridor which may have permitted human expansion southward from Asia into the Americas along the western margin of the Cordilleran Ice Sheet (Erlandson et al. 2007; Fladmark 1979, 1983; Li et al. 2023; Letham 2024; McLaren et al. 2019a; Potter et al. 2018). Despite ongoing debates (Bennett et al. 2021), robust archaeological, linguistic and genetic evidence suggest that the peopling of the Americas occurred as ice began to retreat (Li et al. 2023; Madsen et al. 2022; Nichols 2023). Results from EkTb-9 contribute to this growing body of evidence and suggest that some of the remote islands on the outer Central Coast were not only desirable places to stop along the proposed coastal route, but also places

capable of supporting human population settlement and expansion (Mackie et al. 2018; McLaren et al. 2015, 2019a), therefore challenging long-held hypotheses (Borden 1951; Kroeber 1939; Pirazzoli 1996) that people may have been unable to inhabit the outer coast during the late Pleistocene. Archaeological and oral historical evidence demonstrate that people were not only capable of arriving in the area during the late Pleistocene but were also sufficiently experienced in such environs to both survive and thrive using available marine, terrestrial, and associated wetland resources. Over time, people repeatedly inhabited the outer coast, investing and modifying the landscape through terraforming, thereby establishing persistent places of human occupation.

Ames and Martindale correctly identified that “the distance between the archaeological record and the peoples whose lives we seek to describe and explain is *great*” (Ames and Martindale 2014). Collaborating with descendent community members to bridge Indigenous oral histories with archaeological methods of investigation can help us span this chasm, providing a better understanding of site formation processes, resource use, and material culture on the NWC (Gauvreau and McLaren 2016; Chapter 2). Although our geo-archaeological data align with some Haílzaqv oral historical descriptions of the environment during the early post-glacial period (Davis et al. 2019; Farrand 1916; White 2006), our interpretations of *how* people arrived on the Central Coast express an imperfect alignment.

The contemporary archaeological and oceanographic hypothesis is that travel along the Pacific Rim and southward from Beringia would have required marine vessels (skin-boats, rafts, and vessels made with materials of local origin) to transport people and goods (Barrie and Conway 2002; Cannon et al. 1999; Erlandson and Braje 2011; Heusser 1960; Letham et al. 2020; Letham 2024). Vessels are therefore assumed to be the primary mode of transportation utilized

along the proposed coastal route (Barrie and Conway 2002; Cannon et al. 1999; Erlandson and Braje 2011; Heusser 1960; Letham et al. 2020; Chapter 4). Due to the relative stability of the regional sea level, Triquet Island has been an island since at least 15,000 years ago, which means settlement would have necessitated paddling between the mainland and other islands in between (approximately 25 km). This is similarly assumed for the settlement of other locations along the Pacific Rim, including the Kuril Islands ca. 17,000 years ago, as the islands are spaced between 26 km and 66 km apart (Erlandson and Braje 2011).

When the first people arrived on Triquet Island during the late Pleistocene, they must have done so by boat, and archaeological evidence of a well-established maritime adaptation with long distance trade and/or material point-sourcing (obsidian, graphite; mainland, deep-water and pelagic faunal resources) suggests that boat use continued throughout the period of human occupation. In the *Haílzaqv Núym* told by Ai'wageł (Káwázıl), the celestial deity Ýágis descended from the sky and met an anthropomorphized being — a killer whale with the face of a man — at Núlú, and through their conversation, determined that they were the first people in this outer coastal world, a “*place with no names*” (Boas 1932). Although boat travel is not mentioned in the transcribed oral historical account told by Ai'wageł (Káwázıl), there is a clear distinction of a time *before settlement* and a time *when people settled* and attributed a name to a place, and thus, attributed an identity to a people, and an identity for all descendants thereafter. The environmental description transcribed by Farrand (1916), “*In the beginning there was nothing but water and ice, and a narrow strip of shoreline*” suggests that the events described by Ai'wageł (Káwázıl) may be temporally anchored to the late Pleistocene (McLaren et al. 2015). The place name Núlú, meaning ‘the eldest’, aligns with our understanding of the archaeological and palaeoenvironmental evidence. Further to this, a reflection of the long-term patterns of

repeated use at Triquet Island is affirmed through Haílzaqv living in Bella Bella (Wáglísla) and elsewhere today, including co-authors Qíxítasu Yímázalas Elroy White and Ğvúí Rory Housty, who trace descent from common ancestors that once inhabited the area around Núlú.

Conclusion

Our multi-proxy analysis of the archaeological deposits of EkTb-9 indicate repeated human occupation and long-term intentional human-environment interactions on a hypermaritime island on the Central Coast, spanning the late Pleistocene to the present day. Stratigraphic records at EkTb-9 show a complex array of natural site formation processes. Marine beach sediments (Strata XII – X) are elevated above modern sea level, consistent with the stable relative sea level history of the Hakai West Region (less than 5 m elevation change over the last 14,500 years) (McLaren et al. 2014). Peat accumulations (Strata IX – VI) are limited to the southwestern extent of the site and suggest that this area was subject to persistent water saturation, consistent with hypermaritime islands with flat topography. A possible palaeotsunami event occurred during the mid-Holocene and distributed fine grey sand deposits across much of the site within a few meters of the modern shoreline. Cultural strata include both shell-less deposits with abundant periostracum (the shell has decayed) and deep (5 m +) preserved shell accumulations consistent with sites where shell terraforming has been observed elsewhere in coastal BC (Grier et al. 2017). The results of radiometric dating and the analysis of sediments, pollen, macrobotanicals, and diatoms combined with geospatial modelling demonstrate that this outer coastal island gradually changed from what was likely an open shrubby landscape during the late Pleistocene to the productive very wet hypermaritime coastal temperate rainforest environs of the present day. Early pioneering vegetation is characterized by largely non-arboreal taxa such as alder, ferns, and other shrubby and herbaceous taxa developing on otherwise

exposed soil surfaces. Present-day island vegetation is dominated by culturally important species including western redcedar and yellow cedar, shore pine, Sitka spruce, western hemlock, yew, and dense stands of salal, ferns, and berry bushes.

The stratified archive of natural and cultural deposits at EkTb-9 broadens our archaeological understanding of early maritime technological developments and the viability of early post-glacial settlement and population expansion on outer coastal islands on the NWC. The site chronology for EkTb-9 established through radiometric dating demonstrates that people lived on and invested in Triquet Island from the late Pleistocene until at least 450 years ago and culturally modified trees reveal continued use of the island over the last 300 years. Additionally, ethnographic accounts reveal the island was inhabited until the late AD 1800s at which time island inhabitants relocated approximately 40 km northeast of Triquet Island to the village of Wáglíslá (Bella Bella Indigenous Reserve No.1), located on the eastern coast of Campbell Island (Olson 1955).

Triquet Island remains an important part of the cultural landscape for Haíłzaqv Nation. The island's natural and cultural resources are safeguarded for future generations through the Hakai Lúxvbálís Conservancy Program, and the island is regularly monitored by members of the Haíłzaqv Guardian Watchmen Program. Through ongoing collaboration, our archaeological data may help inform local resource management efforts including sensitive species such as rockfish, abalone, and Pacific herring. Following the completion of our work at EkTb-9 in 2017, restoration efforts were conducted in accordance with HIRMD and BC Parks requirements, and the site was inspected during a final visit in 2019 to confirm site protections were in place. Like the hundreds of other sites in Haíłzaqv Nation territory, Triquet Island is a repository enriched through thousands of years of prerogatives, oral historical transmission, deliberate human

investment in the landscape, and ongoing intimate connection to place. In the spirit of the Hakai Lúxvbálís Conservancy Program, there are no current plans or active archaeological investigation permits to return to Triquet Island for additional archaeological work; rather, it has been decided that the site be conserved for the future.

Chapter 4 Signatures of Seafaring on the Central Coast: Zooarchaeological and other Proxies from site EkTb-9, Triquet Island, Núláwítxv Tribal Area, BC, Canada⁵⁷

Signatures of Seafaring Along the Pacific Rim

The ocean influences freshwater systems, oxygen production, climate and weather, and the myriad marine habitats and associated food webs upon which modern humans depend. Through intentional, place-to-place, open-water voyaging, Pleistocene seafarers are believed to have harnessed from the oceans many services while dispersing along the Pacific Rim (Barrie and Conway 2002; Bednarik 2003; Braje et al. 2020; Erlandson and Braje 2011; Fladmark 1979; Gaffney et al. 2021; McLaren et al. 2019a; O’Connell 2010:57). Maritime dispersal during the Last Glacial Maximum is supported by mitogenomic evidence of linkages among a founding ancestral population from northern coastal China and the gene pools of contemporary Japanese peoples and Indigenous peoples of North America (Li et al. 2023). Unfortunately, the early marine vessels that would have been used for such voyages required specific conditions to resist decay as they were made of wood, bark, sinew and skins and archaeological specimens presently remain sparse. Globally, the oldest direct evidence of boat use consists of the early Holocene (ca. 10,000 years ago [KYA]) dugout “Pesse” canoe recovered from a riverine peatland site in the Dutch village of Pesse, Holland, and a few accessories (paddles; possible boat rib) from elsewhere in the world; no Pleistocene-aged boats have yet been recovered (Bednarik 1997a, 1997b, 1999; Beuker and Niekus, 1997; Clark 1971; Erlandson 2017; McGrail 1987, 1991; Strasser et al. 2010; Van Zeist 1957). In the absence of direct evidence, archaeologists around the world have looked to paleoenvironmental and other proxies for signatures of seafaring through

⁵⁷ This chapter is a manuscript that has not yet been submitted for publication; I am the sole author and analysts on the manuscript. This manuscript will be submitted to the Journal of Maritime Archaeology. Early drafts were heavily revised through review by Dr. Quentin Mackie and Dr. Duncan McLaren. The HIRMD working members, Qíxítasú Yíñázalas Elroy White and Dúqváisla William Housty, also reviewed the paper and provided comments and edits.

time. Strong evidence is derived from archaeological sites located on islands that were never connected to a continent during the Pleistocene, as accessing and occupying these sites would have necessitated the use of watercraft (Bednarik 1997b, 1998, 1999, 2003; Erlandson 2017; Gaffney 2021; Strasser et al. 2010; Takamiya et al. 2019).⁵⁸

Some of the Upper Pleistocene sites falling into this category include the early occupations of Sahul (ca. 47 - 50 KYA), New Britain Island (ca. 40 KYA) and the Wallacean island of Timor (ca. 42 KYA) in South-east Asia / Australia, as well as Kozushima Island (ca. 38 KYA) and the Ryukyu Islands (ca. 30 - 35 KYA) of Japan (Birdsell 1977; Groube et al. 1986; Ikeya 2014; Kaifu 2017, 2022; Kaifu et al. 2015, 2020; O’Connell 2010; O’Connor 2011; Takiyama et al. 2019; van den Bergh et al. 2016a,b) (Figure 4-1).⁵⁹ Site investigations have revealed that ocean currents surrounding some of these island sites would have made it impossible to arrive fortuitously by drifting and indicate that these islands must have been intentionally accessed by boat; other sites have faunal assemblages pointing to marine specialization and harvesting at sea, and lithic assemblages suggesting trans-pelagic material transport or trade (Bednarik 1997b; 1999; Erlandson 2017; Ikeya 2014; Kaifu 2022; Kaifu et al. 2020; O’Connell 2010; O’Connor 2011; Strasser et al. 2010; Takamiya et al. 2019).

Interestingly, some of the earliest evidence of the “adaptive flexibility” (Gaffney 2021) required for water crossings over considerable distances comes from Telapu, Sulawesi Island (ca. 200 KYA) and Flores Island (ca. 800KYA) in Wallacea (Figure 4-1) (Bednarik 1997b, 2003; Erlandson 2001, 2017; Erlandson and Braje 2013; Moorwood et al. 1998; van den Berg 2016; Verhoven 1968).⁶⁰ Hominid remains, stone tools and other cultural materials and features

⁵⁸ Or islands that were not connected to a continent at any time during human occupation.

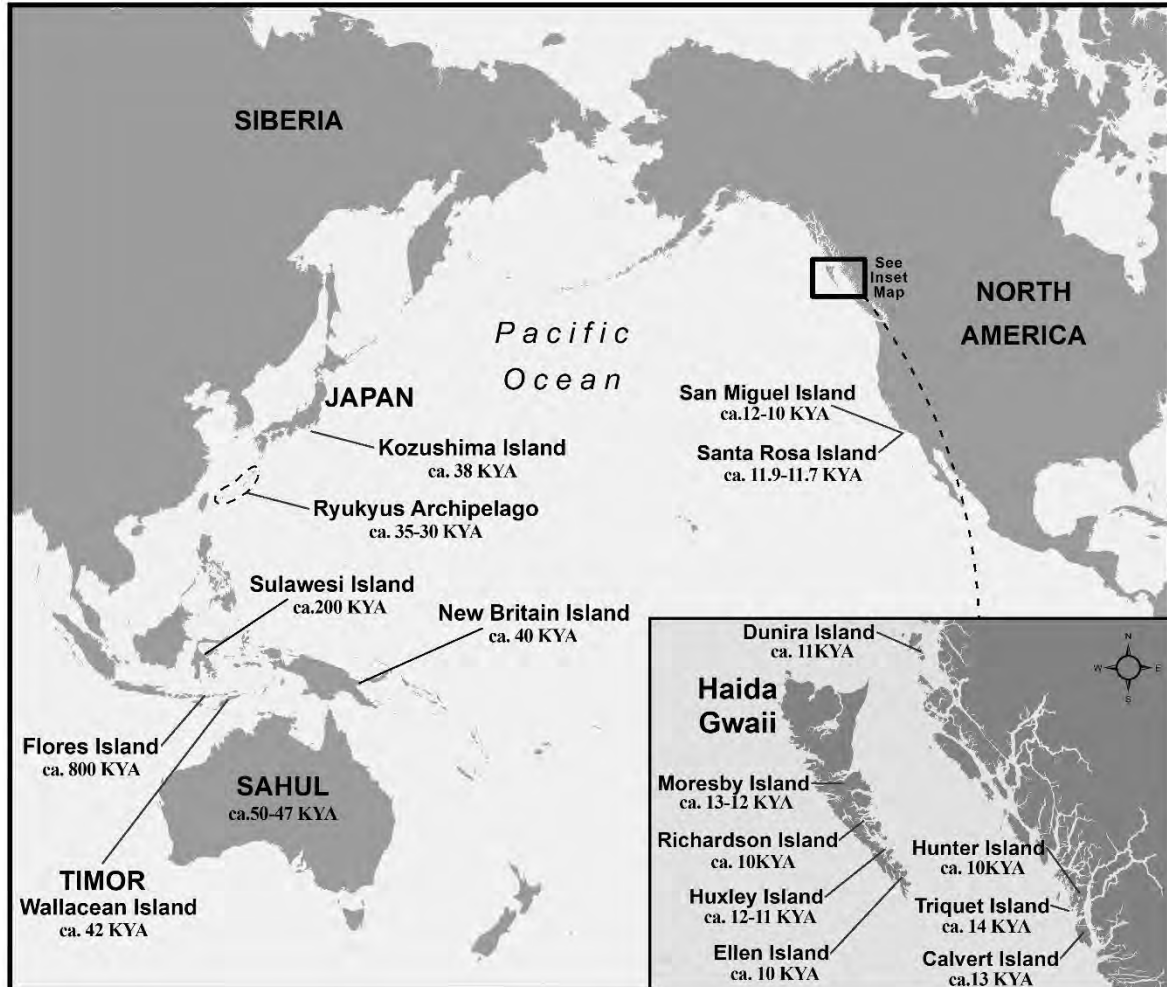
⁵⁹ The Ryukyu archipelago is a 1,200 km long chain of islands, and in 2019, a replica dugout canoe was made using replica stone axes, and five researchers travelled 200 km from Taiwan to Japan along the Ryukyu Islands (Kaifu 2022).

⁶⁰ For example, minimal crossing distance between Flores Island and Sulawesi Island would have been approximately 85 km (Gaffney 2021).

recovered from these island sites suggest that populations of archaic hominins (e.g., *Homo ergaster*; *Homo erectus*; *Homo floresiensis*) possessed sufficiently advanced maritime skills to enable their expansions into these new coastal and outer coastal environments during periods of glacial and interglacial transgressions (Bednarik 1997b; Erlandson 2001, 2017; Erlandson and Braje 2013; Gaffney 2021; Moorwood et al. 1998; van den Berg 2016; Verhove 1968). The investigations conducted at these middle Pleistocene sites are demonstrative of the foundational adaptability, intentionality, and mobility of early hominids (Bednarik 1997b; Erlandson 2001; Gaffney 2021).

Figure 4-1 Location of Select Examples of Pleistocene – Early Holocene Archaeological Sites (> ca. 10 KYA) on Islands Situated Along the Pacific Rim.

Figure prepared by K Holmes (Hakai Institute).



Like studies conducted at outer coastal island sites around the world, archaeologists on the NWC of BC, Canada, have looked to other proxies for indirect evidence of seafaring in the absence of preserved boats and associated accessories (Table 3-1) (Ames 2002; Bernick 2017; Fedje et al. 1996; Hebda and Mathewes, 1984; Kennett and Fitzhugh 2010; Letham et al. 2015; Letham et al. 2022; Mackie 1998, 2003; Mackie et al. 2013; McLaren 2008; McLaren et al. 2019a, 2019b; Orchard and Clark 2014; Tobiasz 2015). Indirect evidence of early (> ca. 10

KYA) seafaring on the NWC is largely derived from a few archaeological sites on islands that were never connected to the mainland. Some examples include Richardson Island (ca. 10KYA; site 1127T), Ellen Island (ca. 10 KYA; 1325T), Moresby Island (ca. 13-12 KYA; FgUc-6) and Huxley Island (ca. 12-11 KYA; 1693T; 1906T), all part of the Haida Gwaii archipelago (Fedje et al. 1996; Fedje et al.; 2021; Mackie 2018; Steffen 2006), as well as Triquet Island (ca. 14 KYA; EkTb-9), Calvert Island (Wúiga) (ca.13 KYA; EjTa-4), Dunira Island (ca. 11KYA; GcTr-6), (Dundas Archipelago), and Hunter Island (ca. 10KYA; ElTb-10) on the central and northern coast of BC (Letham et al. 2015; McLaren 2008; McLaren et al. 2015, 2018; Chapter 3; Figures 4-1 and 4-2). Faunal, lithic, and perishable artifact assemblages as well as other proxies (Table 4-1) from these sites serve as additional indirect evidence of ancestral seafaring on the NWC. A few other notable sites with similar assemblages indicative of early seafaring activities include those located south of BC on Santa Rosa Island (ca. 11.9-11.7 KYA; CA-SRI-512 / ca. 13-12.7 KYA; CA-SRI-173) (Erlandson et al. 2011; Johnson et al. 2001; Orr 1962) and San Miguel Island (ca. 12 KYA; CASMI-678 and CA-SMI679/ ca. 11 – 8 KYA; CA-SMI-261), both of which are part of the Channel Islands along the outer coast of California (Erlandson 1994, 2007; Erlandson and Jew 2009; Erlandson et al. 1996, 2011) (Figure 4-1).⁶¹

⁶¹ Investigations of the Arlington Springs site (CA-SRI-173) on Santa Rosa Island also resulted in the identification and recovery of ca. 10 KYA human remains (Orr 1962).

Figure 4-2 Location of EkTb-9, Triquet Island, and other select sites along the NWC of BC.

Figure prepared by K Holmes (Hakai Institute).

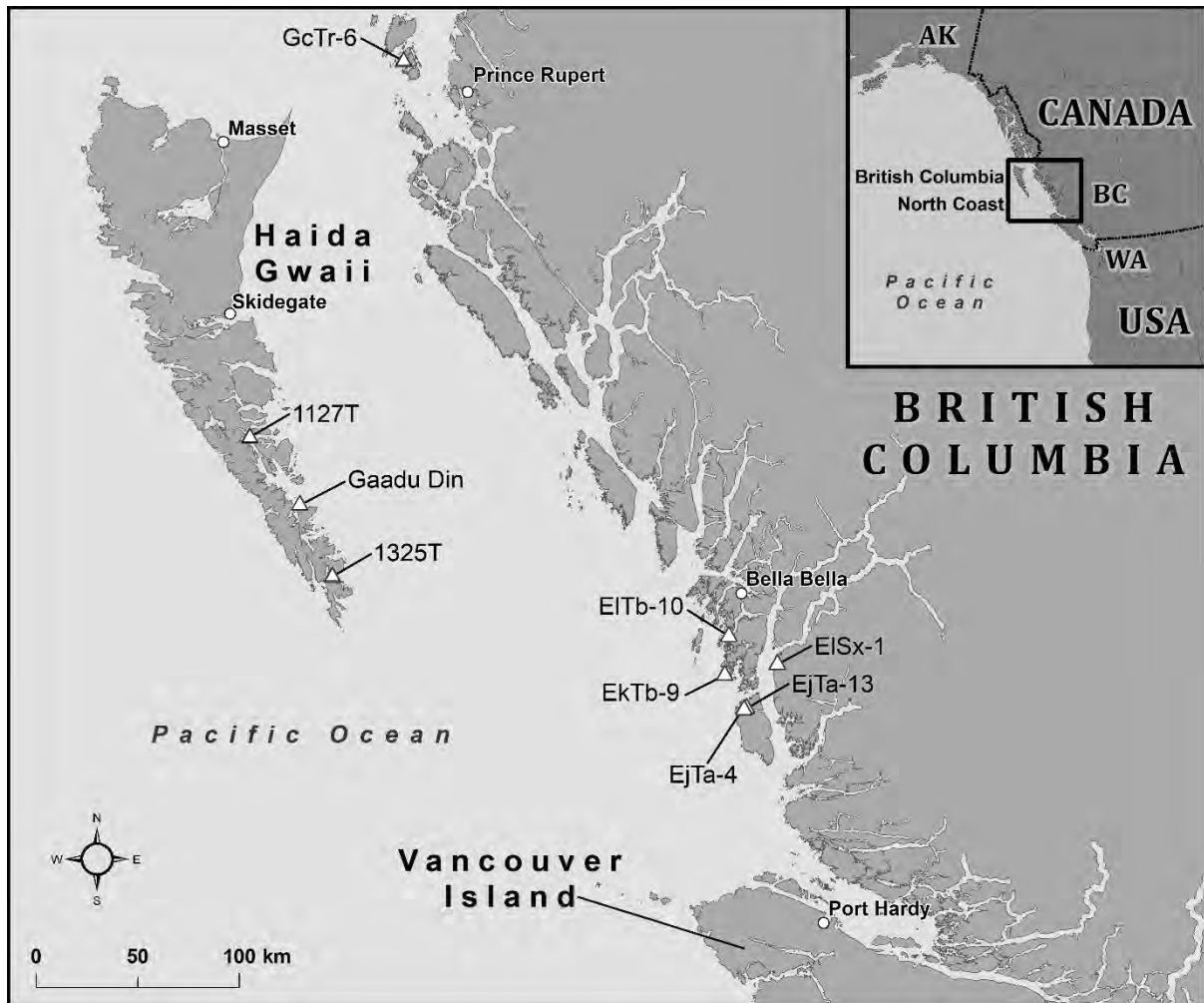


Table 4-1 Examples of signatures of seafaring on the NWC.

Proxies	Description / Justification
Diatom assemblages and radiocarbon dating	Refine local / regional sea-level histories; understand change in site accessibility and habitability through time; identify approximate time during which an island may have only been accessible by boat.
Faunal assemblages	Biology and ecology of animals; structure and function of human behaviours over time; technology and harvesting / hunting / fishing strategies; mobility.
Artifact assemblages (stone, bone, shell, ivory, wood)	Technology types, material types, local vs. imported material; trade / travel implications; use of floral and faunal species through time.
Petroforms	Intertidal stone features such as canoe runs consisting of cleared rows with parallel cobble / boulder alignments to facilitate dragging a canoe / boat to a village / campsite from the shore.
Pollen and macrobotanicals assemblages	General forest composition and associated availability of botanical material types for boat building through time (cedar; spruce, etc.)

As archaeological site EkTb-9 on Triquet Island is currently one of the oldest and longest occupations on the NWC, it is well suited for an exploration of the legacy of boat use in this area of the world. This paper therefore presents a case study of the zooarchaeological and other proxies from site EkTb-9 that support the inferred use of boats in Haílzaqv territory over the last 14,000 years (Dyck et al. 2020; Hebda 2020; Lucas 2013; McLaren et al. 2015, 2019b; Chapter 3). Results contribute to the evolving narrative of early seafaring and associated activities on the NWC of BC from the early post glacial period to the present day and contribute context to global discussions of early seafaring activities in outer coastal environments along the Pacific Rim. Results are also relevant to present day members of Haílzaqv Nation who trace descent from common ancestors who once inhabited the Núláwítǵv Tribal Area where the site is located, and for those members who continue to engage in the Tribal Canoe Journey along the NWC each year (Brown and Brown 2009; Brown et al. 2021, 2023; Smethurst 2012; Chapter 3).

EkTb-9, Triquet Island

Triquet Island is situated approximately 25 km west of the mainland coast of BC and is fully exposed to the Pacific Ocean making it well positioned for investigations of early maritime adaptation, mobility, boat use and repeated and persistent investment in place (Erlandson et al. 2007; Fladmark 1983; Letham et al. 2020; Letham 2024; Mackie et al., 2018; McLaren. et al. 2015, 2019; Chapter 3) (Figures 4-1 and 4-2). The small (144 ha) hypermaritime island is part of a larger archipelago north of Hakai Passage, located at the entrance to Kildidit Sound within the Hakai Lúxvbálís Conservancy. The island has a maximum elevation of 49 m above modern sea-level, and six archeological sites (EkTb-3, 8 and 11-14) are recorded there in addition to EkTb-9 (Figure 4-3). There are no major freshwater systems or fish bearing streams on the island, however a small pond is located approximately 845 m west south-west of the site, and intertidal fish traps / petroforms have been recorded at sites EkTb-3, EkTb-12, and EkTb-13 which are located along the northeastern embayment opposite EkTb-9 (Figure 4-3 and 4-4) (Dyck 2018a, 2018b; Dyck et al. 2020; McLaren 2013, 2018; Chapter 3). EkTb-9 is the largest site on the island (157 m x 109 m) and comprises expansive (17,000 m²) and deep (6 m below surface) shell midden deposits along its northern extent and water saturated deposits along its southern extent (Chapters 3 and 5). Cultural deposits at EkTb-9 span 14,000 years, and demonstrate a complex array of site formation processes, including preserved-shell and shell-less "midden" matrices, peat deposits bearing preserved vegetal artifacts and macrobotanicals, and sand-washes from one or more paleotsunami events (Chapter 3).

Three cultural phases were identified for the site through collaboration with Haítzaqv Nation. These include the *Gálgla* Phase ca. 14,000 – 8,000 years ago, the *Ćícxyvát* Phase ca.

8,000 – 5,500 years ago, and the *Dñýás* Phase ca. 5,500 – 450 years ago (Chapter 3).⁶² During the *Gálgla* Phase, the island’s pioneering vegetation included shrubby alder, rose-family taxa, ferns, herbs, and few conifers (Hebda 2020; Chapter 3). Tree species such as western hemlock (*Tsuga heterophylla*), Sitka spruce (*Picea sitchensis*), and pine (*Pinus sp.*) were present and were likely used for food, medicinal, or technological purposes (Hebda 2020; Turner 2014; Chapter 3). The stone tool technology during the *Gálgla* Phase (*tssiá* Tradition) includes anvil supported percussion, hard-hammer freehand percussion, and pebble tools (one bifacial), core tools, and flake tools (Chapter 3).⁶³ Ancestral peoples used a wide range of locally available, medium to coarse grained material types (including few fine-grained volcanics), as well as quartzite, fine-grained milky quartz, volcanic andesite/basalt, and metamorphic materials. Lithics from the *Gálgla* Phase have practical application for woodworking, processing mammalian, avian, fish, and invertebrate resources, and other ecological management applications (Dyck et al. 2020; Carlson 1979; Turner et al. 2013; Chapter 3).

Arboreal species present on Triquet Island during the *Gálgla* Phase persisted into the *Ćícxvpát* Phase. Cedar was slower to establish on Triquet Island when compared to nearby Calvert Island (Hebda 2020; Eamer 2015), however, it does appear to have arrived earlier than initially hypothesized (Hebda and Mathewes 1984; see Chapters 3 and 5 for additional context). The terrestrial lithic assemblage of the *Ćícxvpát* Phase reveals pebble tools and a cobble reduction industry with applications consistent with those identified during the *Gálgla* Phase. Except for a few exotic material types (obsidian, quartz crystal, graphite), most of the lithics dating to this phase were made of locally available materials (Dyck et al. 2020; Chapter 3).

⁶² Approximate English pronunciation of the three cultural phases identified for EkTb-9 are as follows: *Gálgla* is pronounced “Gal-gell-ah”, *Ćícxvpát* is pronounced “Zi-zix-bot”, and *Dñýás* is pronounced “Den-yass.”

⁶³ The Hailzaqy term “tssiá” means to break or smash a stone in half.

Obsidian artifacts were sourced to *Bes But'a* (Anahim Peak) located over 200 km northeast of Triquet Island (Reimer 2018) and the graphite may have come from a site approximately 110 km east of the island, where a lump vein is known in Bella Coola (Simandl et al. 2016).

By the beginning of the *Dñyás* Phase, the island had transitioned to the productive very wet hypermaritime coastal temperate rainforest environs of the present day (Chapter 3). The terrestrial lithic assemblage of the *Dñyás* Phase (*Diáka* Tradition) indicates a shift in stone tool technologies with the appearance of some ground stone tools (abrader; abrader fragments) as well as worked bone for weaving and sewing, however flaked and chipped stone tools continued to be made and used during this time (Chapter 3). Like the lithics of the *Gálgja* Phase and *Ćícxvpat* Phase, lithics of the *Dñyás* Phase could have been used for woodworking and harvesting bark or other materials from hemlock, spruce or cedar trees present at the time. The chronology for EkTb-9 demonstrates that people lived on and invested in Triquet Island from the late Pleistocene until at least 450 years ago and culturally modified trees indicate continued use of the island over the last 300 years. Ethnographic accounts suggest the island was inhabited until ca. 1863 AD at which time ancestral peoples relocated approximately 40 km northeast to *Qélc* on Campbell Island (Figure 4-2) and moved again a few years later (ca. 1897-1899 AD) approximately 3 km north along the coast of Campbell Island to *Wáglisla* (Bella Bella), BC (Cook and Grympa 2020; Olson 1955).

Figure 4-3 Location of site EkTb-9 and sites EkTb-3, 8, 11-14 on Triquet Island.

Figure prepared by K Holmes (Hakai Institute).

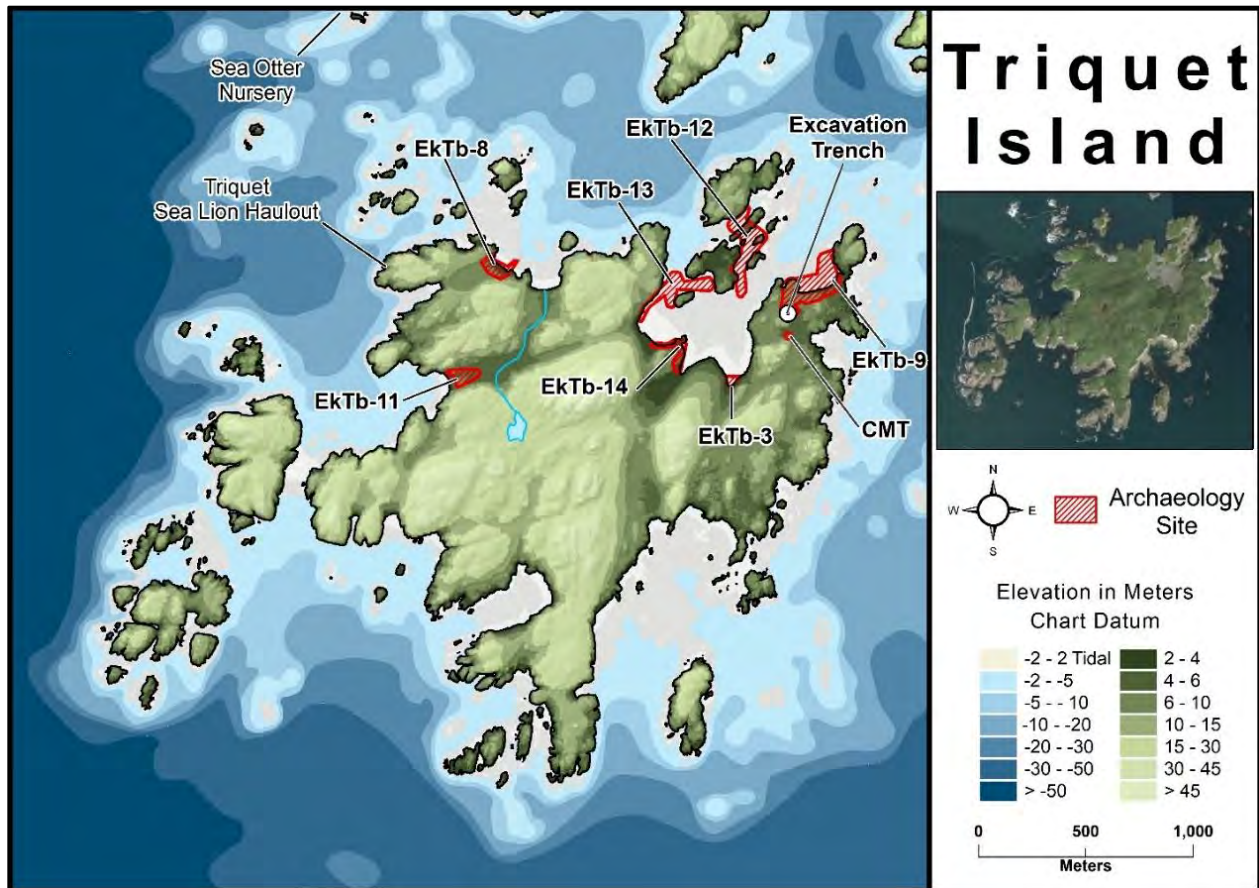
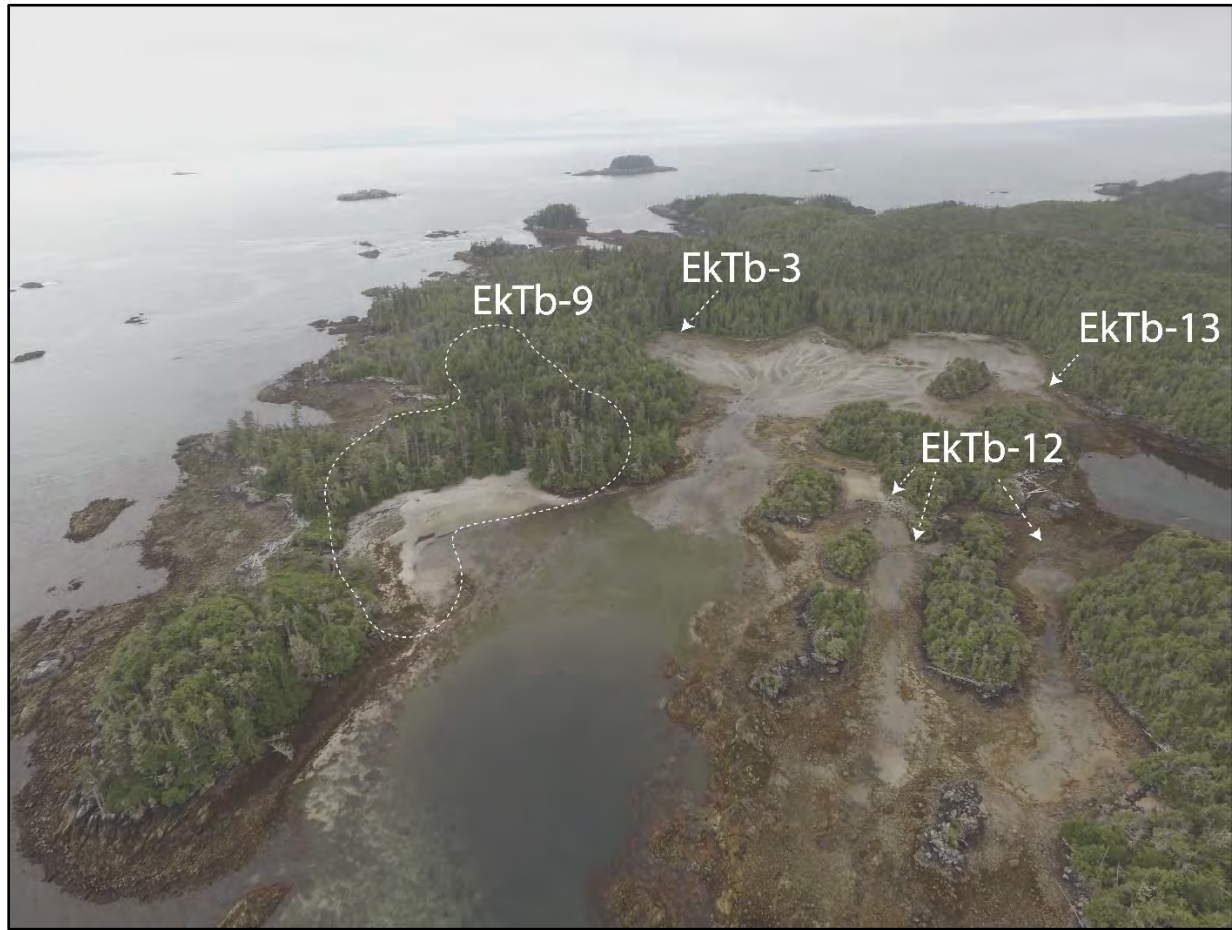


Figure 4-4 Aerial view of Triquet Island (looking west-southwest). Approximate boundaries of site EkTb-9 captured by white dashed polygon. Arrows indicate locations of fish traps associated with sites EkTb-3, EkTb-12 and EkTb-13.

Figure prepared by the author. Photo credit Keith Holmes (Hakai Institute).



Haílzaqv Nation

Haílzaqv territory spans 35,553 km² of the central coast, encompassing various islands, archipelagos, outer exposed waters, protected inner channels, and portions of the BC mainland. Haílzaqv Nation members descend from marine-based people who acquired their primary subsistence from the Pacific Ocean and coastal river systems (White 2006). Prior to contact, Haílzaqv Nation, along with other Nations on the NWC, used a variety of boats through time to

harvest, steward and manage resources and to travel to neighbouring or distant settlements. Haíłzaqv members have reported that the “canoe made Haíłzaqv society what it is, that it mobilized Haíłzaqv people, so they could harvest the abundance of the sea and the land to evolve to be great cultures” (Baker 2021:2; Brown et al. 2021). Haíłzaqv Nation have oral historical records (*Núym*) connecting them to the lands and waters of the Núláwítǵv Tribal Area (outer central coast of BC and Triquet Island) (Boas 1932; Farrand 1916; HTC 2018; Olson 1955), and many Haíłzaqv members trace descent from common ancestors that once inhabited the area (HTC 2018; Chapter 3). Canoes and boats feature prominently in the Haíłzaqv language (Híłzaqvłá) and núym. A search for the word “canoe” in the online Híłzaqvłá Dictionary produced a list of 39 words (HLCMP 2023) (Table 4-2). Of these, four words are provided for different types of canoes, and others describe resource harvesting from canoes, travel by canoe, building canoes, and technologies related to canoes (Table 4-2). A search for the word “boat” produced an additional list of 49 terms (HLCMP 2023). While the online Híłzaqvłá Dictionary is only a snapshot of the many words and phrases used by Haíłzaqv Nation regarding canoes and boats, it highlights the enduring cultural significance of these vessels to Haíłzaqv Nation. Of the 94 oral histories and narratives documented in Boas (1932) *Bella Bella Tales*, 68 narratives (65 %) mention canoes, including travel and trade by canoe, resource harvesting by canoe, men and women building canoes, and the use of canoes by supernatural beings / Haíłzaqv ancestors. The oral narratives shared by Haíłzaqv Nation and the contemporary significance of marine vessels today demonstrate interactivity among marine environments and linguistic vocabularies of the region and the long-term importance of seafaring to coastal Indigenous identity and lifeways. (Eidshaug et al. 2024).

Table 4-2 Hítzaqv̄la words for canoes from the Haítzaqv̄ Online Dictionary.

Hítzaqv̄la words for canoes	English translation /description
gíw̄a	Canoe
ǰc̄ái	River canoe
háłákv̄	Dug-out canoe
h̄líw̄aci	Seal hunters canoe
pkv̄uñǰv̄	Borrowed canoe
k̄váǰsálá	To sit in a canoe
háłsgíu	Good canoe builder
tát̄m̄ssila	To repair an old canoe
háłakálá	Sound of canoe building
lálúkt̄iw̄aláȳa	To try to get off the canoe
k̄vágiwa	To sit in the bow of the canoe
ǰíǰs	In the canoe for a long time
gíw̄alá	Going by canoe; using a canoe
máisa	To spear cockles from the canoe
q̄t̄ǰsá	To lift a person into a canoe
q̄úǰvs	Water in the canoe, bilge water
k̄vaǰláí	To sit at the stern of the canoe
háł̄a	To build a canoe up in the woods
ǰalás	Hole in the canoe caused by bailing
ǰǰlís	To start off from the beach in a canoe
tám̄amas	Old, moldered canoe that is beyond repair
lám̄ukt̄iw̄á	To go out of the canoe (said of group)
hágułt̄iw̄á	To empty the canoe, to go all out of the boat
h̄úk̄váli	To stop on the water (said of a canoe)
ǰǰh̄ákv̄l̄á	To be travelling along (said of a canoe)
ǰh̄ǰasuála	Bumping against each other (said of canoes)
ǰxá	To put the crosspiece on the canoe
háw̄ániqkv̄	Canoes tied together and covered with boards
báxv̄bułílá	Deep in the water at the bow (said of a canoe)
ǰǰh̄c̄sa	To slide a canoe down to the beach
ǰǰláí	To start off, set out on the water (as a canoe)
ǰǰá	To shove, slide, slip as a canoe; to plane
háw̄ániǰit	To start to tie canoes together and cover them with boards
búłl̄á	Loaded down at the bow (as a canoe), hanging one's head down
táǰvm̄	Covering sheet to keep the sun out of the canoe; tarpaulin
háyák̄iaǰsi	To bend (fold, double) over an edge (as when bending over the edge of a canoe)

ítmá	To sew wood together with cedar withes (e.g., the beams of a canoe)
háwáníqa	To tie canoes together and cover them with boards (to form a platform upon which to move the slabs of the longhouse)
qáqapa	To try to, prepare for or be on the verge of turning over a container or container-like thing (such as a cup, a basin, a canoe)

Seafaring, Settlement, and Foraging Radii

Multiple environmental factors, including site location, physiographic conditions, sea-level history, and resource proximity and availability influenced the suitability of settlement areas along the NWC during (and after) the early post glacial period (Bicho et al. 2011; Binford 1990, 2001; Brown 2016; Erlandson 2017; Lepofsky 1985; Mackie 1998, 2003; Mackie et al. 2018; McLaren et al., 2015; McLaren et al. 2019a; Shaw et al. 2020; Tobiasz 2015; Chapter 3). Cultural factors, including Nation-specific systems of prerogatives and praxis, also influenced how people chose to invest and settle along coastal areas through time (Letham et al. 2020; Letham 2024; Mackie 1998; Mackie, 2003; McLaren. et al. 2015; Chapter 3). The subsistence practices and mobility strategies that enabled people to thrive on the NWC are reflective of this spatial and temporal variation (Brevik 2014; Mackie et al. 2011). Maritime adapted peoples with boats are understood to have had higher population densities, greater residential stability (sedentism) and social and cultural complexity when compared to interior populations along the NWC (Ames 2002; Keeley 1988; Kelly 1995). This is supported by the increased range of marine foraging areas available for exploit at coastal village sites and the perpetuation of specialized marine technologies and harvesting strategies (Erlandson 2017; Mackie 1998, 2003; McLaren. et al. 2019; Chapter 3). For example, boat use allows for longer logistical forays for point sourcing (lithics) or trade, harvesting calorie rich marine resources at sea (marine birds; sea mammals), and transporting considerably larger loads when compared to pedestrian transport (Ames 2002; Erlandson et al. 2020; Mackie 1998, 2003).

Conceptually, foraging radii help inform our understanding of mobility patterns on the NWC and highlight possible transportation routes (shortest-path water distances) and networks among various outer coastal island sites occupied contemporaneously (Ames 2002; Mackie 2003). Foraging radii calculated for boats (dugout canoes) on the NWC suggest travel over 15 km of open water would take about 3-5 hours of paddling one way; 30 km would take 6 to 10 hours one-way; and 60 km about 10 to 20 hours one-way (Ames 2002).⁶⁴ Trips of 30 km or longer may have been multi-day expeditions, as ancestral peoples stopped to rest or to camp at sheltered places along their route during storms or for other reasons. However, when marine conditions were favourable, a fast-moving group of paddlers could likely cover 50 km in a single day without having to stop at any islands in between (Ames 2002). If needed, the archipelago-based transportation networks of the NWC would have provided desirable landing sites on multi-day expeditions and sheltered access routes between island sites occupied contemporaneously (Mackie 2003; Figure 4-5). Figure 4-5 shows the location of mid to late Holocene camp sites and/or village sites where preserved shell matrices (shell midden) have been identified within 30 km of Triquet Island.⁶⁵ There are at least 50 known shell midden sites within 15 km foraging radii from EkTb-9 (Figure 4-5). Given the substantial distance between islands on the coast (1 to 8 km + apart), and the cold temperatures of the Pacific Ocean in this part of the world (around 8 – 12°C), it would not have been feasible to swim between these sites, therefore watercraft must have been used. As accessing these sites by boat would have taken around 3 to 5 hours one way, it would have been possible for an individual or group to travel out from EkTb-9 to one or more of these sites and back in a single day (or vice versa) (Figure 4-5; Ames 2002). Contingent on

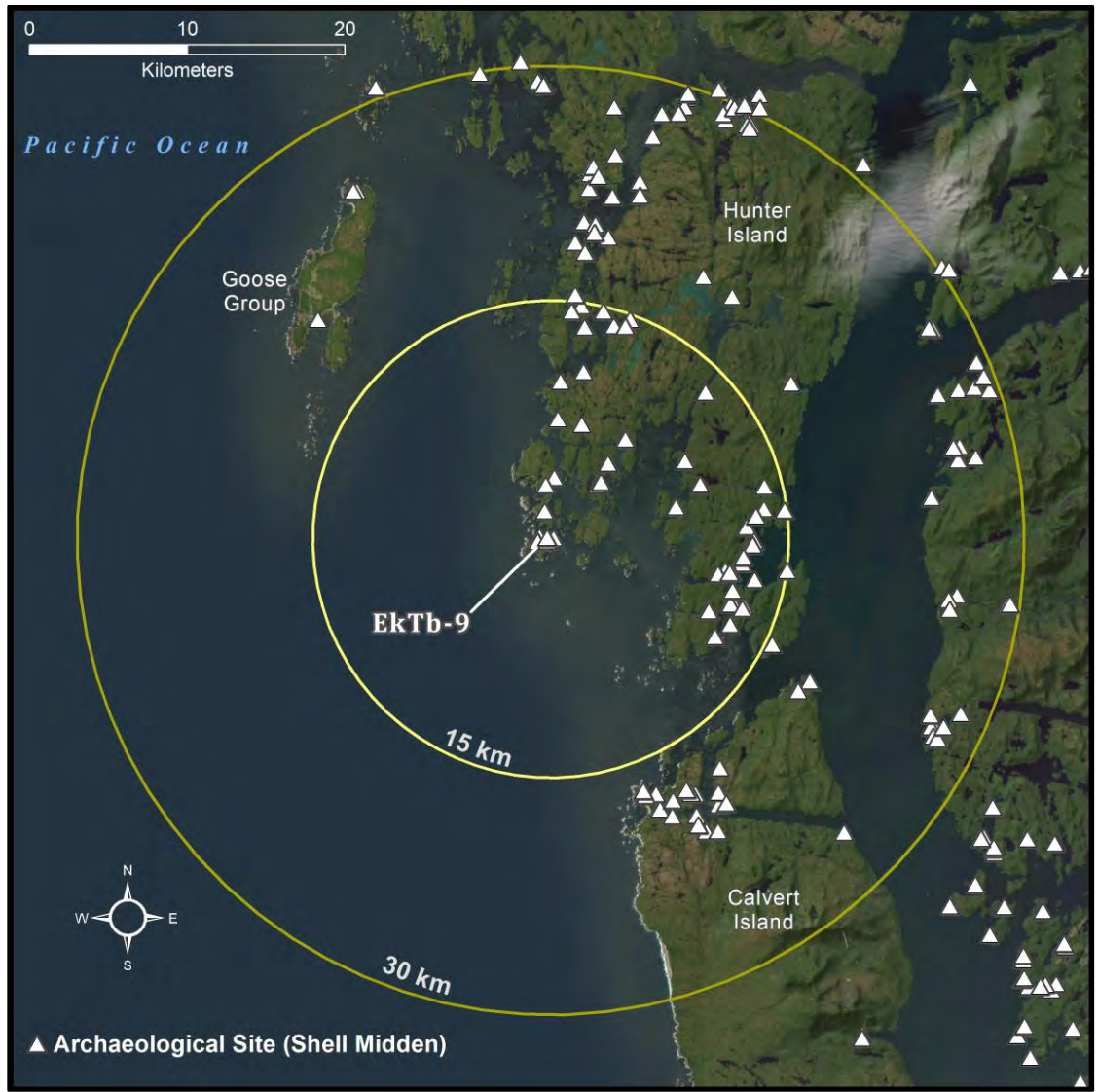
⁶⁴ There is limited available data regarding the foraging radii of open skin boats (umiaks, baidarkas) (Ames 2002; Durham 1960), but presumably they are like the calculations determined for dugout canoes on the NWC.

⁶⁵ Many of these shell midden sites have not been directly dated, however, all are assumed to fall into the mid to late Holocene period, consistent with those sites for which direct dates have been obtained.

weather and oceanic conditions, transportation networks spanning 30 km foraging radii from EkTb-9 may have required a full day's travel.

Figure 4-5 Mid to late Holocene Shell Midden Sites within 15 km and 30 km foraging radii from EkTb-9 with Overlapping Records of Occupation.

Figure prepared by K Holmes (Hakai Institute).



Boats of the Northwest Coast

The form, function, fabrication methods, and materials used for boats, and the community-specific socio-political and spiritual embeddedness of boats, are well documented for the NWC and nearby areas to the north and south (Ames 1996, 2002; Anichtchenko 2012; Arima 1975; Arnold 1995; Barnett 1939; Bernick 2017; Boas, 1909; Brown et al., 2021; Castille 1985; Chappelle 1994; Drucker 1951; Duff 1981; Durham 1960; Holm 1987, 1991; 1994; Lincoln 1991; McGrail 2001; Moulton 1990, 1991; Nelson 1899; Oberg 1973; Olson 1927; Reid 2015; Rousselot 1994; Sproat 1987; Swan 1967; Waterman 1967; Waterman and Coffin 1920).

Ethnographically known boats used by Indigenous groups on the NWC include dugout canoes (ocean-going canoes, war canoes, freight canoes, children's canoes, dugouts modified with planks, reef-net canoes [no transom]) (Boas 1909; de la Pérouse 1799; Drucker 1951; Duff 1981; Durham 1960; Holm 1987, 1991, 1994; Olson 1927; Sproat 1987; Swan 1967; Waterman 1967; Waterman and Coffin 1920; Suttles 1974), folded cedar-bark canoes (Durham 1960; Barnett 1939; Boas 1909), open skin boats (umiaks; baidarkas) (Bernick 2017; Rousselot 1994), decked skin boats (kayaks) (Adney and Chappelle 1964, Anichtchenko 2012; Arima et al. 1991; Chappelle 1994; Durham 1960; McClellan 1975; Osgood 1940; Rousselot 1994), and frameless plank boats (Tomol) (Boas 1909; Durham 1960; Fagan 2004; Gamble 2002; Meroz 2013).

Although well documented in the ethnographic literature, archaeological remnants of preserved precontact era boats remain scant along the NWC (Ames 2002; Bernick 2017; Kennett and Fitzhugh, 2010). Skin boats (open and decked) are suggested to have preceded dugout style boats on the NWC (Borden 1968), and the West Coast whaling canoe is believed to have evolved from the umiak as they share similar form, function, and components (Duff 1981). Various boat types

were likely constructed and used concurrently on the NWC as well as in areas to the north and south (de la Pérouse 1799).

Some of the earliest direct evidence of seafaring has been located far north of the NWC culture area. It consists of the ca. 2,000 years old decked sealskin kayak fragments from the Seward Peninsula, Alaska (Fitzhugh and Arutiunov 1988; Bernick 2017; Zimmerly 2000), and a ca. 1,700-year-old ivory kayak fitting recovered from the Aleutian Islands (Lubischer 1991; Zimmerman 2000). South of Alaska, direct evidence of boats includes a few ca. 80 to 300-year-old cedar canoe blanks (partially formed dugout canoes) on Haida Gwaii and Meares Island (Bernick 1984, 2017; Mobley and Eldridge 1992; Stryd and Eldridge 1993), fragments of a possible pre-contact-aged dugout and paddle at Heguhms (Hopetown; EfSq-2), Watson Island (Odwak 2014), and an undated dugout canoe in Campbell River, Vancouver Island (Bernick 2017). From the southern NWC, an undated dugout was recovered from Green River in Kent, Washington, and two others (undated) were recovered from Angle Lake, Washington (Bernick 2017; Brown 1990; Long 1990). Ca. 500-year-old boat fragments have also been recovered from the Ozette Site (45CA24) on Washington's Olympic Peninsula (Bernick 2017; Mauger 1991). Far more numerous are ca. 2,500 and 3,000-year-old boat equipment and accessories (bailers, paddles, woven cedar sail mats) recovered from various wet sites along the NWC of BC (Arima 1991; Barnett 1955; Bernick 1983, 1989, 1998, 2017; Friedman 2005; Inglis 1976; Waterman 1967). To date, no early-post glacial boats or boat accessories have been recovered from archaeological sites on the NWC.

Field and Laboratory Methods

Detailed descriptions of the field methods, laboratory methods, radiometric dating and geospatial modeling conducted at EkTb-9 are reported in a previously published manuscript (Chapter 3) and not repeated here. Subsurface testing at EkTb-9 occurred during the spring seasons of 2011 to 2017 and involved coring (JMC Environmentalist's Sub-Soil Probe tests; Vibracore tests), Dutch augering, shovel testing, and trench excavation (Chapter 3). All material recovered from auger and shovel testing and the excavation trench was wet screened using 3 mm mesh. Material recovered from the vibracore tests was wet screened through 2 mm and 1 mm nested screens. Screened vibracore sediments were then dried and screened again through 2 mm and 1 mm nested screens to keep the fractions separate. Three of the four cores (VC-2017-1, VC-2017-2, and VC-2017-4) were processed at the Hakai Archaeology Lab on Quadra Island following the methodologies outlined in Duffield's (2017) master's thesis and related publication (Duffield et al. 2022). The fourth core, VC-2017-3, was kept refrigerated and later processed at the Hakai Institute's Ocean Sciences and Genomics Laboratory in Victoria, BC, as it was subsampled for ancient sedimentary DNA analyses. All four cores were eventually sectioned, photographed, sampled for radiocarbon assay and diatom analysis, and then subsampled in 5 cm intervals and bagged for subsequent faunal and other analyses.

The analysis of the faunal material (vertebrate and invertebrate) collected in 2012 (n=1,404 elements) and the vertebrate assemblage (n=12,920) collected between 2015-2017 was analyzed at the University of Victoria Zooarchaeology Lab with use of the comparative collection developed by Pacific Identifications Inc. (Fargo 2013; Chapter 3).⁶⁶ Faunal specimens

⁶⁶ During the period in which the analyses occurred, Pacific Identifications Inc. was operated by zooarchaeologists Rebecca Wigen and Dr. Gay Frederick. Both Gay and Rebecca offered mentorship and assistance with the identification of challenging specimens, and Rebecca conducted periodic review of my faunal identifications to evaluate adherence to professional standards.

were inventoried and metrics recorded.⁶⁷ Each specimen was identified to the nearest level of specificity (optimally, family or species level) following the Linnean taxonomic classification system and equivalent word in *Hitzaqvla*. Relative abundance of each species was calculated for strata encountered in the excavation trench and other subsurface tests.^{68,69}

Results: EkTb-9 Faunal Assemblage (ca. 10,402 - 450 years ago)

The vertebrate faunal assemblage from EkTb-9 comprises 14,246 specimens from deposits spanning ca.10,402 - 450 years ago (Table 4-3). Vibracore tests conducted in areas with deeper accumulations of preserved shell (5 m +) are resulted in the recovery of a greater density of vertebrate faunal remains when compared to the density of remains recovered from the excavation trench (Table 4-4). This is largely a reflection of the nature of the strata encountered in the excavation trench, which include peat deposits and basal water saturated strata where bone did not preserve, versus the shell-rich matrices along the central and northern portions of the site that provide excellent conditions for the preservation of bone. A few worked bone tools (biconically drilled needle, possible bird-bone straw), fragments of cut bone (canid sp. and Steller sea-lion), and unidentifiable fragments of worked mammalian bone were identified during laboratory analyses (Chapter 3).

⁶⁷ See Appendix A and Appendix B. A temporary identification number was assigned to each specimen or group of species-specific elements (specimens) in the excel spreadsheet, for example, multiple Pacific herring vertebra from the same sample were given a single temporary identification number. Subsequent columns in the excel spreadsheet documented the provenience of the specimen(s), beginning with the bag #, archaeological unit or test designation (e.g., EU2016), the corner of the unit (if applicable), followed by the depth and stratum from which the specimen(s) was/were collected. Provenience data was followed by columns detailing the results of the identification. Specimen class, order, family, genus, species, and common name were recorded. Taxonomic classification was followed by columns detailing the total count of each specimen(s), the element identified, siding, portion, degree of completeness, whether the element was fused or unfused, degree of weathering, stage of burning, degree of mineral staining, presence of cutmarks, and any additional comments about the specimen(s).

⁶⁸ Relative abundance consists of the “percentage of a particular [specimen] relative to all other specimens within the same category. Relative abundance does not include unidentified specimens, such as those that have not been identified to species, genus or family [level]” (McKechnie et al., 2014:262).

⁶⁹ Only vertebrate specimens were analyzed for this study; analysis of the abundant shellfish remains recovered in bulk, column, and vibracore samples was beyond the scope of this study. Select shellfish specimens were analyzed for presence/absence only; samples from shell-midden and non-shell midden contexts collected at EkTb-9 from 2012-2017 have been dried and stored for future analysis.

Table 4-3 Faunal remains (NISP) per stratum recovered from the excavation trench and other subsurface tests.

Taxon	I/II – V/VI (450 - 5,500 Cal BP)	VI – IX (5,500 – 8,000 Cal BP)	X (8,000 – 10,400 Cal BP)	Site Total	% ID
Arrowtooth flounder; <i>Atheresthes stomias</i> ;	22	10	0	32	0.7
Capelin; <i>Mallotus villosus</i>	22	6	0	28	0.6
Great Sculpin; <i>Myoxocephalus sp.</i>	0	0	1	1	0.02
Greenling; <i>Hexagrammous sp.</i>)	327	272	6	605	13
Ling cod; <i>Ophiodon elongatus</i> ;	177	35	6	218	5
Pacific Halibut; <i>Hippoglossus stenoleps</i>	8	6	0	14	0.3
Pacific Herring; <i>Clupea pallasii</i> ;	1490	1134	124	2748	58
Perch; <i>Percidae</i>	1	3	0	4	0.08
Ratfish; <i>Hydrolagus colliei</i>	1	0	0	1	0.02
Red Irish Lord; <i>Hemilepidotus hemilepidotus</i>	3	4	0	7	0.1
Rockfish; <i>Sebastes sp.</i>	702	331	10	1043	22
Salmon; <i>Oncorhynchus sp.</i>	13	6	2	21	0.4
Smelt; <i>Osmeridae</i>	22	0	0	22	0.5
Spiny dogfish; <i>Squalus acathias</i> ;	9	1	0	1	0.2
Starry Flounder; <i>Platichthys stellatus</i>	0	1	0	1	0.02
Total NISP Fish	2797	1809	149	4755	100
Ray-finned fish	5656	1873	71	7600	
Total Fish	8453	3682	220	12355	
Deer; <i>Odocoileus sp.</i>	1	3	1	5	9
Domestic Dog; <i>Canis familiaris</i>	0	1	0	1	2
Harbor Seal; <i>Phoca vitulina</i>	0	1	7	8	14
Mink; <i>Neovision vision</i>	1	2	0	3	6
Mustelid; <i>Mustela sp.</i>	0	7	0	7	13
Northern Fur Seal; <i>Callorhinus ursinus</i>	0	0	9	9	17
Porpoise; <i>Phocoena sp.</i>	1	1	0	2	4
Sea lion; <i>Eumetopias jubatus</i>	1	5	5	11	20
Sea otter; <i>Enhydra lutris</i>	0	2	0	2	4

Taxon	I/II – V/VI (450 - 5,500 Cal BP)	VI – IX (5,500 – 8,000 Cal BP)	X (8,000 –10,400 Cal BP)	Site Total	% ID
Sitka deer; <i>Odocoileus hemionus</i>	0	0	1	1	2
Canis sp. (wolf or dog); <i>Canis lupus</i>	3	2	0	5	9
Total NISP Mammal	8	24	23	54	100
Sea Mammal	0	59	461	520	
Medium Land Mammal	9	8	6	23	
Small/ Medium Land Mammal	1	8	12	21	
Mammal	126	770	337	1233	
Grand Total Mammal	143	869	839	1851	
Albatross; <i>Phoebastria sp.</i>	0	1	0	1	3.6
Canada Goose; <i>Branta canadensis</i>	1	0	0	1	3.6
Ca'sin's Auklet; <i>Ptychoramphus aleuticus</i>	0	1	0	1	3.6
Cormorant; <i>Phalacrocorax pelagicus</i>	4	1	0	5	18
Goose; <i>Branta sp.</i>	1	1	0	2	7.2
Large Alcid; <i>Uria sp.</i>	1	0	0	1	4
Loon; <i>Gavia immers</i>	3	0	0	3	11
Shore bird; <i>Larus sp.</i>	4	1	0	5	18
Common Murre; <i>Uria sp.</i>	1	1	0	2	7.2
Waterfowl; <i>Anserinae sp.</i>	1	4	0	5	18
Western Grebe; <i>Aechmophorus occidentalis</i>	1	1	0	2	7.2
Total NISP Bird	17	11	0	28	100
Unidentifiable Bird	5	3	4	12	
Grand Total Bird	22	14	4	40	
Total Vertebrate Fauna	8618	4565	1063	14246	

Table 4-4 Density of vertebrate faunal remains recovered within the excavation trench and four vibracore tests.

Test	Distance of unit from northern shore	Total Fauna (NISP)	Total liters of Sediment	Density per litre
EU Trench	70 m south	8752	6000	1
VC2017-1	25 m south	2310	22.8	101
VC2017-2	34 m south	2171	9.3	233
VC2017-3	69 m south	268	9	30
VC2017-4	13 m south	740	8.4	88

Fish are the most abundant taxon representing 80% of the site assemblage.

Approximately 38% of the 12,355 fish bones were identifiable to species (Table 4-3). The four highest ranked fish species in order of abundance are Pacific herring (*Clupea Pallasii*), followed by Rockfish (*Sebastes sp.*), greenling (*Hexagrammous sp.*), and ling cod (*Ophiodon elongatus*) (Table 4-3). All other fish species were present in low amounts (<1%). Mammals are the second most abundant taxon, representing 13% of the site assemblage (Table 4-3). Most of the mammal bones were recovered from the excavation trench. No mammal bones were recovered from the auger tests or VC2017-3 through VC2017-4; a weathered vertebral epiphysis from a sea lion was recovered from VC2017-1 and an unidentifiable cored section of sea-mammal bone (most likely whale) was recovered from VC2017-2. Approximately 2.9% of the mammal assemblage was identifiable to species. Heavily degraded mammal and sea-mammal remains are the most common within the site assemblage. The three highest ranked mammalian species in order of abundance are Steller sea lion (*Eumetopias jubatus*), northern fur seal (*Callorhinus ursinus*), and harbor seal (*Phoca vituline*). Two of the harbour seal specimens recovered from Stratum X and one sea lion specimen recovered from Stratum IX are from juveniles. Northern fur seal is represented by four vertebrae, one vertebral facet, a radius, and fragments of a phalanx and

maxilla recovered from Stratum X between approximately 215-220 cm below surface, and likely represent a single individual. Porpoise and sea otter are also present.

Five specimens of wolf/dog (*Canis sp.*) were recovered from Strata VI through III. These comprise an adult humerus (left side), incisor, phalanx, C1 vertebrae, and a juvenile humerus (right side); these Canid bones are relatively small compared to the modern wolf specimens from the Central Coast. One of the Canid specimens (the juvenile humerus), with an associated date of ca. 5,732-5,604 Cal BP, was submitted to the Ancient DNA Lab at the Department of Archaeology at Simon Fraser University and was confirmed to be *Canis lupus familiaris* (Zhang and Yang 2021). Unfortunately, a haplotype identification was not provided (Zhang and Yang 2021). The confirmation of domestic dog presence in Stratum VI and the small size of the other Canid specimens suggests that the other Canid remains may also originate from domestic dog (McKechnie et al. 2020), however additional ancient DNA analysis or access to a more robust comparative collection is necessary to confirm this hypothesis.

Birds are the least abundant taxon recovered, representing 0.3% of the site assemblage (Table 4-3). Relatively few bird bones were recovered from the excavation trench and a single bird bone was recovered from VC-2017-1. Approximately 70% were identifiable to species (Table 4-3). Waterfowl (*Anserinae sp.*), shorebirds (*Larus sp.*) and cormorant (*Phalacrocorax sp.*) are present in equal numbers. Followed by loon (*Gavia immers*), western grebe (*Aechmophorus occidentalis*), murre (*Uria aalge*) and goose (*Branta sp.*) in order of abundance. Canada Goose (*Branta canadensis*), large alcids (*Uria sp.*), Cassin's Auklet (*Ptychoramphus aleuticus*) and albatross (*Phoebastria sp.*) are also present, each represented by a single specimen. Invertebrate remains recovered from testing at EkTb-9 have not been quantified, as it was beyond the scope of the current study. Identified shellfish specimens from EkTb-9 include

California mussel (*Mytilus californianus*), butter clam (*Saxidomus gigantea*), cockle (*Clinocardium nuttalli*), sea urchin (*Strongylocentrotus sp.*), abalone (*Haliotis kamtschatkana*), chiton (Polyplachopora), acorn barnacle (*Balanus glandula*), limpets (*Tectura sp.*), and various snails. Abundant shellfish periostracum (fragmented and complete) were also recovered from the excavation trench, often in strata lacking preserved shell; the majority of the periostracum exhibits indentations created by radiating rib lines along the shell, suggesting it is most likely from decayed California mussel (*Mytilus californianus*) shells (Gosling 1992). California mussel was the most abundant shellfish species identified from non-shell contexts from subsurface tests conducted at the site in 2012 (Fargo 2013). Abalone fragments were recovered from upper shell midden deposits in VC-2017-1 (Stratum IV; 160 cm below surface) at the northern extent of the site, and fragment of abalone shell as well as intact membrane were recovered from peaty Stratum VI (ca. 6,700 – 5,600 years ago) in the excavation trench.

Discussion

By ca. 18,000 – 16,000 years ago deglaciation of the outer NWC of BC was underway and by ca. 13,800 years ago, the diminishment of ice influenced regional sea-levels and the growth and spread of post-glacial vegetation (Shaw et al. 2020; Mackie et al. 2018). Human presence, and the faunal remains they left behind, are documented on the coastal landscape after ca. 14,000 – 13,000 years ago (McLaren et al. 2018, 2019a; Vogelaar 2017; Chapter 3). Like other outer coastal island sites that were never connected to a continent during the Pleistocene / early Holocene, Triquet Island has always been an island and accessing the site would have required the use of boats (Bednarik 1997b, 1999; Erlandson 2017; Fedje et al. 1996; Fedje et al. 2021; Ikeya 2014; Letham et al. 2015; Mackie 2018; McLaren 2008; McLaren et al. 2015, 2019a; O'Connor 2011; Strasser et al. 2010; Takamiya et al. 2019; Takiyama et al. 2019; Chapter

3).⁷⁰ While the islands paleoenvironmental history, geographic positioning, and 14,000-year record of repeated human occupation and investment represents strong indirect evidence of seafaring, other proxies further bolster this inference.

As boats were needed to access the site, all species in the EkTb-9 faunal assemblage are in some way connected to seafaring. However, the ecology, seasonality and associated harvesting methods known for the most relatively abundant species identified at the site indicate a strong preference for procurement from boats versus land (Table 4-5; Figure 4-6; Figure 4-7). The vertebrate assemblage of the *Gálgla* phase indicates an early focus on sea-mammal hunting by ca. 10,400 – 8,000 years ago. Early maritime adaptation necessitated extensive knowledge, specialized technologies, and targeted harvesting strategies to procure calorie-rich faunal resources such as sea-mammals, bottom feeding fish, and marine birds while at sea (Table 4-5; Figure 4-7). Perishable wooden artifacts recovered from the site include a harpoon foreshaft, atlatl throwing board and points (and other related plant technologies) that were likely employed by ancestral peoples when collectively hunting sea mammals (Harbour porpoise, harbour seal, sea lion, sea otter) from their boats (Chapters 3 and 5). As the average male sea lion weighs between 400 to 1100 kg and the average female weighs between 200 to 300 kg, they would have been an excellent food resource for outer coastal peoples and efficiently moving their carcasses would have required boats. In addition to the identified sea mammals, the fish species (Pacific herring, rockfish, greenling, lingcod, halibut) and marine bird species (pelagic cormorants, albatross, Cassin's auklet) recovered from the site also indicate a strong outer-coastal orientation (Table 4-5; Figure 4-6).⁷¹

⁷⁰ At least during the Last Glacial Maximum.

⁷¹ Herring and rockfish are also known to have been integral to inner coastal subsistence as well (Duffield 2017; McKechnie et al. 2014; McKechnie and Moss 2016).

Table 4-5 Zooarchaeological signatures of seafaring at EkTb-9.

Species	Ecology	Seasonality	Harvesting Methods
Harbour porpoise	Shallow near-shore and deep outer coastal waters	Year-round	Hunted with spear or harpoon from a boat
Harbour seal	Found near shore and between 20 km to 100 km offshore; densities average around 2.6 seals per km ² ; dozens of haulouts near Triquet Island	Year-round	Clubbing at haulouts; harpooning / netting in open waters; cooperatively hunted / multiple canoes
Northern fur seal	Highly migratory; breeding rookeries in Bering Sea (Pribiloff and Commander Islands) and southern California (no breeding rookeries are currently known on the NWC though it is suspected they did exist in the past)	Arrive on central coast in Winter; peak in May; Disperse south in late July	Hunted with spear or harpoon from a boat
Steller Sea lion	Haulouts at north end Triquet Island (1.5 km from EkTb-9), Airacobra Rock (4.5 km to the south), Gosling Rocks (15 km to the north), and others within 25 km and 50 km from the site	Year-round	Clubbing/ use of atl-atl and dart technologies at haulouts; harpooning / netting in open waters; cooperatively hunted / multiple canoes
Sea otter	Rarely haulout; commonly found afloat on their backs in rafts (tight groups of multiple individuals); occupy shallow waters (<50 m deep) within 1 – 2 km from shore; range spans outer central coast of BC from Triquet Island to Athlone Island	Year-round	Hunted with spear or harpoon from a boat
Pacific herring	Pelagic; migrate closer to rocky shores, inner harbors and estuaries along the NWC to spawn; including in shallow protected waters within 3 m from EkTb-9's northern intertidal boundary;	Spawn late winter / early spring	Herring rake; roe on kelp or hemlock branch; Net
Rockfish	Inhabit continental shelf and upper slope regions; often categorized as "nearshore/shelf/slope" rockfish; can be found in shallow, rocky and weedy areas	Year round	Hook and line
Greenling	Inhabit shallow, rocky and weedy areas	Year round	Hook and line

Species	Ecology	Seasonality	Harvesting Methods
Ling cod	Spawn in shallow waters; occupy areas of strong currents over rocky substrates in both shallow to deep waters	Year round; spawn late fall	Hook and line; baited and lured to the surface and obtained with spear
Albatross	Open ocean; most common over upwellings or over continental shelf; rarely close to shore	Winter/ early Spring	From boat with darts / spears; nets
Cassin's Aucklet	Offshore most of the year; gather in large numbers on small outer coastal islands used as breeding colonies	Year round; at breeding colonies in summer	From boat with darts / spears; nets
Pelagic cormorant	Occupy bays, inlets, and outer coastal areas, including near shore waters < 100 m deep; nest in groups within sea caves or on the edges of steeply sided islands and other narrower ledges	Year round	From boat with darts / spears; nets

Sources: DFO 2001; Duffield 2017; Eschmeyer and Herald 1983; Ford 2014; Fretwell and Starzomski 2014; GoC 2022; Hart 1973; McKechnie and Moss 2016; Meschkat et al. 2014; Munro and McTaggart-Cowan 1947; Tobiasz 2015; Wigen 2011, 2018.

Figure 4-6 Harvesting Methods Per Taxon Recovered from EkTb-9

This figure was prepared by calculating the amount (NISP) of each taxon and dividing the total amount into one of two categories: “harvested by boat” or “harvested by land.” Categorical designations were assigned based on the known ecology, seasonality and associated harvesting methods for the species identified at the site. For the fish taxon, I include “harvested by boat or from land” as many of the fish species may have been harvested from nearby fish traps or along the shallow edges of the island either directly from land or from a boat, or both.

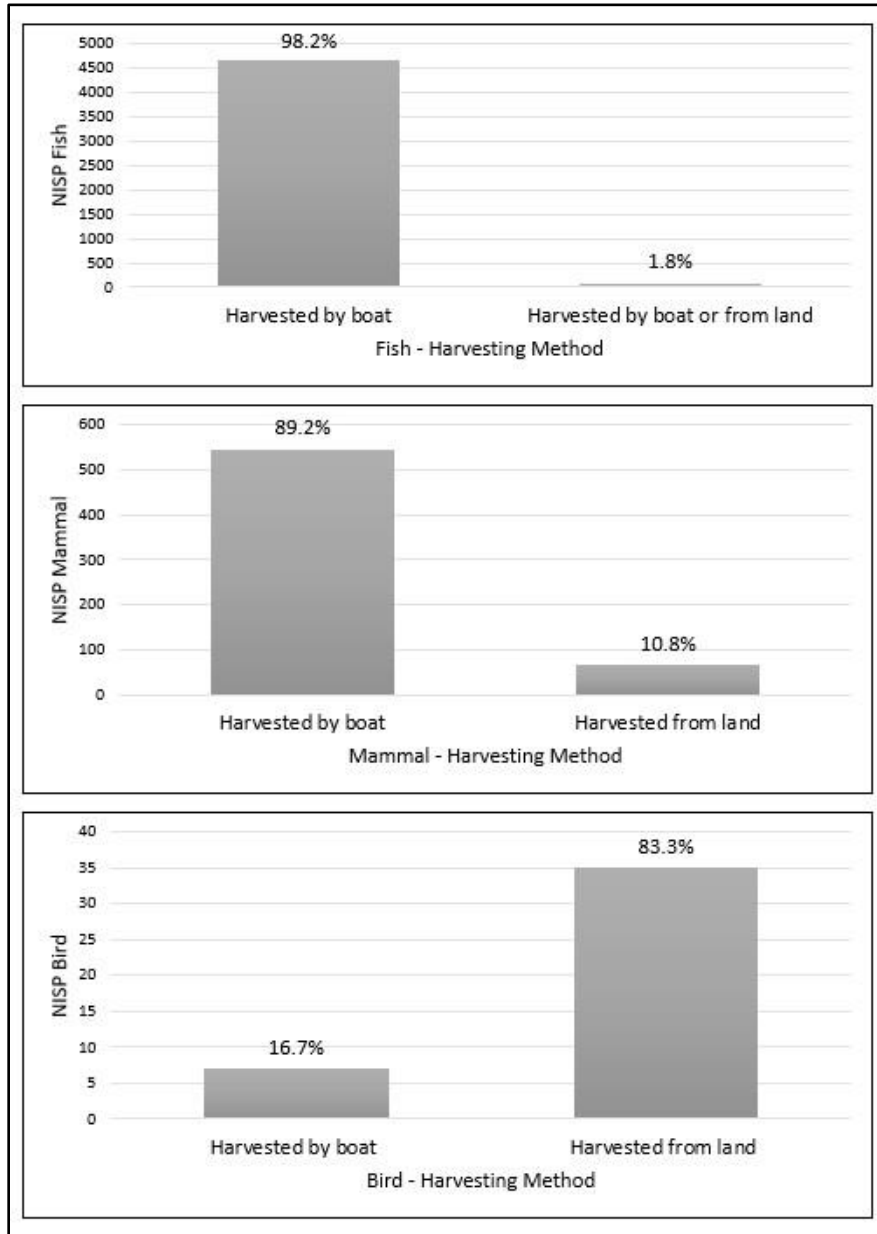
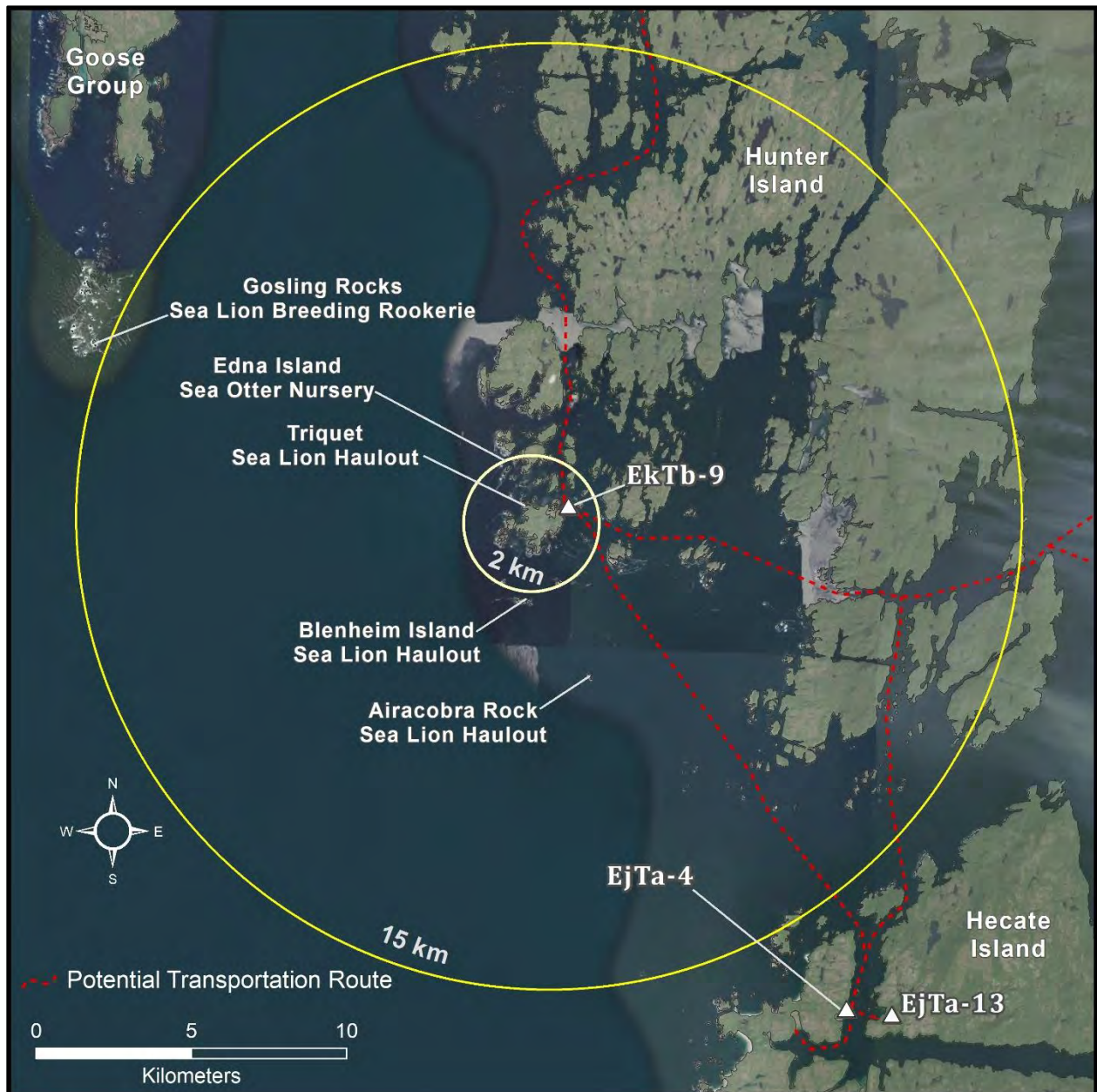


Figure 4-7 EkTb-9 Proximity to Known Marine Resource Harvesting Locations on the Central Coast and Potential Marine Transportation Routes Favouring Protected Passageways to Select Sites Mentioned in Text.



Interestingly, few fish specimens were recovered from sediments dating to the *Gálgla* phase (Table 4-3). The absence of preserved fish remains may be a product of taphonomic processes, as the acidic lower cultural strata similarly demonstrate absence of preserved shell, and only periostracum remains. Sea-mammal bones are more robust than those of most fish and given the highly degraded state of the sea-mammal remains, its likely that tiny fish bones succumbed to acidity and accelerated degradation. Of the few fish specimens recovered for this phase, Pacific herring is the most relatively abundant, followed by rockfish, greenling and lingcod. While greenling, rockfish, and lingcod would have been accessible year-round, Pacific herring was likely harvested in the late winter / early spring when the species migrate closer to rocky shores, inner harbors and estuaries along the NWC to spawn, including shallow protected waters immediately north of EkTb-9 (Table 4-5) (Eschmeyer and Herald, 1983; DFO, 2001; Hart, 1973). Ancestral peoples may have paddled to these protected areas to sweep their herring rakes through the schooling fish and load up their canoes or may have used nets woven from available floral and faunal materials (Gauvreau et al. 2017; Stewart 1984; Chapter 5).⁷² Analysis of coastal faunal assemblages dating to the late Holocene (ca. 2,500 years ago) has revealed that herring are the most ubiquitous and relatively abundant fish species recovered from archaeological sites on the NWC (McKechnie and Moss 2016). The early Holocene faunal assemblage from EkTb-9 demonstrates continuity with this pattern.

⁷² Historically, herring eggs were (and are still) collected from boats by setting various substrates (kelp, western hemlock branches) suspended from logs or floats at various depths of the water column in areas where herring are known to spawn (Gauvreau et al. 2017; Stewart 1982; Wigen 2011). Herring eggs are often harvested from various substrates and were (and still are) consumed fresh or they are dried / frozen and stored for later consumption. Preserved herring eggs were likely consumed during winter months when travelling to access other resource harvesting sites may have been inhibited by inclement weather. Although herring eggs are unlikely to preserve in archaeological matrices, and as associated harvesting practices are similarly unlikely to leave a trace, presence of western hemlock trees on Triquet Island and nearby kelp beds during the *Gálgla* phase suggest that contemporary and historic strategies employed to harvest herring eggs may have earlier origins than are currently known (Gauvreau et al. 2017; McKechnie et al. 2014; Chapter 5).

As western redcedar was not established in the region during the *Gálglá* Phase (ca. 14,000 – 8,000 years ago) ancestral peoples of the NWC would have used other available materials to fabricate their boats such as locally available spruce and western hemlock (Cohen 2014; Hebda 2020; Chapters 3 and 5). Pebble tools, scrapers, and other lithics associated with this phase have practical application for processing mammalian, avian, fish, and invertebrate resources, as well as for ecological management and other applications including boat manufacture (Carlson 1979, 1996, 1998; Fladmark 1979; Chapter 3). During the *Gálglá* Phase, pebble-tools used at the site could have had applications for the dugout canoe industry and scrapers could have been used to produce skin boats; the numerous woodchips recovered from peaty Stratum VI (ca. 6,700 – 5,600 years ago) at the southern end of the site further support this inference (Carlson 1979, 1996, 1998; Fladmark 1979; Chapters 3 and 5). Based on our understanding of available floral and faunal species during the *Gálglá* Phase, skin boats comprising a wooden frame lashed with thong and covered with sea-mammal hides (seal, Sea lion) are a likely boat type used by the first peoples who arrived at EkTb-9 (Erlandson 2017; Chapter 3). These vessels would have likely been similar in form and function to open skin boats (Koryak baidara; Chukchi and Inuit umiaks), and/or decked skin boats (Aleuts and Koniags baidarkas; Chukchi and Inuit kayaks) (Anichtchenko 2012; Rousellot 1994). The remains of these types of vessels are unlikely to be recovered from water saturated contexts at EkTb-9 as preservation in basal cultural strata within the excavation trench was generally poor, and the likelihood of recovering boats and/or accessories and being able to accurately identify them as components of these types of boats, is low.

Like EkTb-9, nearby site EjTa-4, Calvert Island (Figure 4-1 and Figure 4-2), also has an early and persistent record of occupation, however, limited faunal remains were recovered from

the earliest cultural deposits at the site (McLaren et al. 2018; Wigen 2016). Although deer and salmon were the most abundant, marine species including sea-otter, porpoise, rockfish, and greenling were also recovered (McLaren et al. 2018; Wigen 2016). Assemblages from outer island sites 1325T (Kilgii Gwaay) and 1127T (Richardson Island), part of the Haida Gwaii archipelago, were also occupied during the early Holocene, and both indicate a fully developed marine adaptation during the early Holocene period with use of watercraft (inferred) and ability to utilize a range of ecological niches (Cohen 2014; Fedje et al. 2001, 2005; Mackie et al. 2011; Steffen 2006; Wigen 2003). Collectively, these early faunal assemblages, coupled with other available proxies, demonstrate that seafaring and specialized maritime adaptation were already established by the early post-glacial period, contradicting earlier hypotheses that NWC cultural complexity did not emerge until the late Holocene following the establishment of western redcedar and the salmon economy (Cannon 1991, 1996, 2002, 2003; Coupland 1998; Donald 2003; Hebda and Mathewes 1984; Sutton 2017, 2018).

The vertebrate faunal assemblage from the *Ćí'xv'p'át* Phase (ca. 8,000 to 5,500 years ago) indicates a continued focus on sea-mammal hunting with appearance of sea otter and porpoise remains in addition to sea-lion, northern fur seal, and Harbour seal. Pacific herring remain the most relatively abundant fish species during this phase however rockfish, greenling and lingcod are present in higher numbers. Shellfish were clearly a staple of ancestral diets, and an abundant variety of shellfish are present in the immediate intertidal areas along the northern and western extent of the embayment adjacent EkTb-9 today (Figures 4-3 and 4-4). These species would have been similarly abundant during the early Holocene, serving as a reliable source of food throughout the year (Chapter 3). Terrestrial mammals, including deer, mink, mustelids, and canid

sp. (wolf / dog) are also present during the *Ćíćxvǰát* Phase, though each represented by very few specimens.

Although cedar was slowly becoming established in the area during the *Ćíćxvǰát* Phase, it would have taken several hundred years for the trees to grow to sizes substantial enough to be used for the construction of dugout canoes consistent with those known ethnographically and those used in the present day.⁷³ Island inhabitants likely continued to use skin boats and/or dugouts made of other species (spruce) until western redcedar trees became fully established in the region. Presence of exotic materials at EkTb-9 during the *Ćíćxvǰát* Phase, including obsidian originating over 200 km away and graphite likely to originate at least 100 km away, are another clear indication of boat use and associated requirement for travel/trade activities with ancestral peoples and places on the mainland of BC (Reimer 2018; Simandl 2016). While exotic materials signal seafaring, the extensive preserved shell matrices indicative of terraforming suggest sustained and deliberate investment in the island was occurring concurrently (Letham et al. 2020; Chapter 3). Ancestral investment through shell-based terraforming likely enhanced the proliferation and growth of newly established cedar trees during this phase (Trant et al. 2016). Direct evidence of seafaring dating to the *Ćíćxvǰát* Phase may be recovered from EkTb-9, as a modest assemblage of perishable wooden artifacts (n=850) have been recovered from peat deposits spanning ca. 7,788 – 5,604 Cal BP at the southern extent of the site, many of which strongly point to marine orientation (Chapters 3 and 5). As the full extent of the peat deposits have not been delineated, additional perishable wood artifacts, including boats, boat fragments, or accessories and equipment may be recovered through potential future work at the site (Chapters 3 and 6).

⁷³ Perhaps assisted by human agency (Trant et al. 2016).

Western redcedar has been emphasized as integral and foundational for the complexity underpinning “classic” NWC culture (Coupland 1998; Hebda and Mathewes 1984; Donald 2003; Turner 1998), and the *Dynyas* phase (ca. 5,500 – 450 years ago) is aptly named for the timing of the establishment of this tree species on Triquet Island (Chapter 3). Fish species including rockfish and herring continue to dominate the vertebrate assemblage during the *Dny'ás* phase and sea mammal remains are largely absent. The reduced presence of sea mammal in the late Holocene deposits may be a product of the sampling strategy, as the shell midden deposits within the excavation trench are considerably thinner (50 cm thick) compared to the deeper (5 m +) preserved shell accumulations where the vibracore testing occurred. The recovery of two distinct sea-mammal remains in upper cultural strata suggest other sea-mammal remains dating to this later period may potentially be recovered through additional investigations at the site (Chapter 6). Deer, mink, mustelid, and canid (wolf/dog) specimens occur in the *Dny'ás* assemblage consistent with the *C'ixv'át* Phase, however, one of the canid specimens (juvenile humerus; ca. 5,732-5,604 Cal BP) was confirmed to be domestic dog (Zhang and Yang 2021; Chapter 3).

The confirmation of domestic dog during the *Dny'ás* Phase indicates that this species would have been deliberately transported to the island via boat (Ames 2002; Fedje et al. 2021; Chapter 3). Domestic dog remains of similar antiquity have also been recovered from sites ElSx-1 (Cannon 1991), EjTa-4 (Crockford and Frederick 2013), and ElTb-10 (Pomeroy 1980) (Figure 4-1 and 4-2). Domestic dog remains (tooth; premolar) recovered from Gaadu Din 1 (1693T) karst cave on Haida Gwaii (ca. 13,100 years ago) are the oldest specimens presently known from the NWC; stable Isotope results indicate the dog had a marine based diet and ancient DNA analyses determined the dog to be haplotype W (part of haplotype D6 and haplotype B1) (Fedje et al. 2021). Ancient (ca. 9,900 year ago) domestic dog remains have also been recovered from

the Lawyer's Cave site in Southeast Alaska (da Silva Coelho et al. 2021). Other than the specimen recovered from Gaadu Din 1 (169T3) and those from nearby Southeast Alaska, the earliest domestic dog remains recovered from the NWC of BC date to ca. 6,000 years ago and represent various unique haplotypes (genetically distinct lineages) (Barta 2006; McKechnie et al. 2020); the domestic dog remains from EkTb-9 joins these mid-Holocene specimens.

Domesticated dogs played a variety of cultural, social and economic roles for ancestral peoples of the NWC, and discrete lineages were established for specific traits and associated purposes (McKechnie et al. 2020). For example, village dogs served as hunting companions and defense mechanisms (deterring bears; signaling presence of intruders), and the fur of the woolly-dog lineages was used in textile production (Crockford 1997; McKechnie et al. 2020). The ubiquity of domestic dog remains in outer coastal archaeological contexts, coupled with genetic, ethnographic and oral historical information, suggest that boats likely played an important role in the emergence, spread, and continuity of dog domestication and husbandry practices on the NWC (Ames 2002; da Silva Coelho et al. 2021; Fedje et al. 2021; McKechnie et al. 2020).

Western redcedar dugout canoes are understood to have been the dominant form of marine vessel during the late Holocene and were produced in great numbers along the NWC (Bernick 2017; Rousset 1994). As previously described, forms varied in relation to their intended function, and it is likely that multiple types of vessels continued to be used after cedar became established in the area. Overall, the zooarchaeological assemblage and other associated proxies from the *Dñýás* phase indicate a continuation of the complex marine technologies that were already expressed by the *Galgla* Phase and *Ććxvpát* Phase, as well as adaptation and innovation alongside evolving environmental conditions. By ca. AD 1863, the last occupants of the village of EkTb-9 boarded their boats and paddled 40 km up the coast to the eastern shores of

Campbell Island, the same area in which Haíłzaqv people reside today (Figure 4-2) (Cook and Grympa 2020; Olson 1955).

Contemporary Haíłzaqv Canoe Culture

Following the amalgamation of Haíłzaqv people at ‘Qélc and Wáglíslá, and the enduring effects of the various systems of oppression that emerged shortly thereafter, Haíłzaqv canoe culture was nearly extinguished (Brown et al. 2021).⁷⁴ However, people-plant relationships persisted on the NWC despite colonial attempts to eliminate associated knowledge and practices (Chapter 5). Haíłzaqv master carver and high-ranking hereditary Chief *Du’ kwayella* Captain Richard Carpenter was considered “the most renowned wood carvers among the Bella Bella” during the late 19th and early 20th centuries” (Black 1998: 249). Captain Carpenter was a member of the *Qvúqvayáitxv* tribe (people of the calm water) and was born in the Haíłzaqv village of *’Qvuzvai* ca.1841 AD (Jacknis 2002; RRN 2014). He made several canoes and paddles, as well as highly ornamented seats, boxes, and other art during his lifetime (Jacknis 2002; Black 1998). From AD 1900 until 1930, Captain Carpenter was the lighthouse keeper at Bella Bella, and he sold many of his pieces to museums and art collectors that were exploring the region (Jacknis 2002; Black 1998). Today, many of Captain Carpenters creations are housed in museums around the world and Haíłzaqv members are actively seeking their repatriation (Jacknis 2002; Black 1998; RRN 2014; BCMA 2021; RBCM 2022). Captain Carpenter passed in AD 1931, approximately a decade or so after the last Haíłzaqv canoe was known to have been carved in Wáglíslá (Brown et al. 2021).

Nearly a hundred years later, Haíłzaqv canoe culture was revitalized when Frank Brown, a member of the Haíłzaqv Nation, gathered a group of 14 Haíłzaqv community members who

⁷⁴ Missionaries; trading posts; the *Indian Act*; the potlatch ban, mandatory residential / industrial school attendance; the *Fisheries Act*

paddled over 500 km from Bella Bella to Vancouver, BC, to represent Pacific Indigenous cultures at the World Exposition (Expo '86) (Brown et al. 2021; Wenstob 2016). Two years prior, Frank Brown and Hailzaqv cultural leader Chief David Gladstone organized a canoe-carving training program to support Hailzaqv community members reconnect with the fabrication process and cultural significance of the canoe (Brown et. al. 2021). The initial canoe journey of 1986 is considered historic as “it brought people together to celebrate the gǫ́wa. In doing so, the gǫ́wa became a vessel for initiating a new era of cultural resurgence up and down the Pacific coast” (Brown et al. 2021:33). Since 1986, the Tribal Canoe Journeys have occurred almost every year with Indigenous Nations from Alaska to Oregon embarking in canoe travel along the NWC, travelling hundreds of kilometers by sea to partake in cultural exchange and to perpetuate their canoe culture and protocols (Brown et al. 2021, 2023).⁷⁵ The Tribal Canoe Journeys has “become an important teacher and cornerstone for awakening [Indigenous] cultures” (Brown et al. 2021:27, 2023). Participating in Tribal Canoe Journeys has been demonstrated to contribute to the well-being and mental health of Indigenous youth, as it strengthens their connection to their language(s), stories, songs, and territorial lands and seas (Smethurst 2012). Boats likely served similar health, social, and cultural purposes for ancestral peoples of the NWC as well.

⁷⁵ Except for a few years during the COVID-19 pandemic.

Conclusion

No direct evidence of Pleistocene/early Holocene boats has been recovered from archaeological sites on the NWC. In the absence of direct evidence, paleoenvironmental and other proxies have been used to infer use of boats at coastal archaeological sites through time. The results of zooarchaeological analysis conducted at EkTb-9, coupled with the results of previous multi-proxy analyses (Dyck et al. 2020; Hebda 2020; Lucas 2013; McLaren et al. 2015; McLaren et al. 2019b; Chapter 3) broadens our understanding of outer coastal subsistence spanning the last 10,000 years and supports the inferred 14,000-year legacy of seafaring in Haílzaqv Territory. Island inhabitants possessed a maritime tool kit useful for woodworking and boat building and available evidence suggests that the earliest boats to be built and used at EkTb-9 were likely made of spruce and/or bone frames covered with sea mammal skins, such as kayaks, umiaks, or baidarkas. Dugout canoes were also likely fashioned from spruce during this time. Throughout the mid to late Holocene, island inhabitants may have continued to use skin boats and/or dugouts made of other species (spruce) until western redcedar trees became fully established in the region. Although dugout canoes made of western redcedar are understood to have been the dominant form of marine vessel along the NWC during the late Holocene, vessel forms likely varied in relation to their intended function, and multiple types of vessels continued to be used long after cedar became established in the area.

Based on the size and depth of the preserved shell deposits, the nature of the faunal assemblages recovered, the presence of house platforms and other features, and proximity to other shell midden sites and fish traps within the immediate sheltered bay on Triquet Island, EkTb-9 likely represents a permanent outer coastal village site. Ancestral inhabitants could

access abundant marine and terrestrial resources within steps of their homes, or through deliberate seafaring to other outer coastal and mainland sites year-round.

Overall, it appears that multiple factors, including the island's outer coastal position, sea-level history, year-round access to both high and low trophic level resources, as well as cultural factors (prerogatives; praxis) influenced ancestral actions and investment in the landscape at EkTb-9. The subsistence pattern emerging from faunal assemblages recovered from early-post glacial island sites on the NWC is one of sophisticated maritime adaptation and continuity. In the absence of direct evidence of boats, faunal assemblage and other proxies provide a robust case for inferred seafaring along the NWC during the early post-glacial period. Early coastal inhabitants were using specialized marine vessels for strategic travel and resource procurement during the late Pleistocene, and by the early Holocene, had arrived on the NWC of BC with sufficient experience and expertise to not only survive but thrive in this outer coastal environment.

Ocean-going canoes and other marine vessels have been integral to Hałtzaqv identity and lifeways since time immemorial, and as reported by Brown et al. (2023:27), the Tribal Canoe Journeys “have helped participants reconnect and heal from intergenerational trauma caused by residential schools, the potlach ban, and other assimilation policies.” Members of Hałtzaqv Nation continue to practice their canoe culture and participate in the Tribal Canoe Journeys every year; helping youth, elders, and other community members reconnect with their traditions and culture (Brown et al. 2021:27). In much the same way that seafaring enabled people to mobilize across the Pacific Rim, it has also enabled the mobilization of Indigenous knowledge and protocols across generations (Brown et al. 2021, 2023). Seafaring has strengthened the

connection that Indigenous people share with the lands and waters of their traditional territories for thousands of years and is likely to continue to do so for many years to come.

Chapter 5 Persistent People-Plant Relationships on the Northwest Coast: Results from Wet Site EkTb-9, Triquet Island, Núláwítǵv Tribal Area, BC, Canada⁷⁶

“Every woven or stitched container, every fishnet, every digging stick, every dugout canoe reflects an immense array of complex [Indigenous] knowledge about plants and their materials, where to find them, how and when to harvest them, how to prepare them for use, the techniques of creating the final product, and finally, how to use or apply the finished item in procuring food, creating shelter, or whatever other purpose is intended. All of this knowledge is built up over generations of experimentation and observation and is passed on to succeeding generations through experiential learning, demonstration, and instruction.”

Nancy Turner (2014: 334).

Introduction

Wet sites are created through social practices and the discard of vegetal cultural material in water saturated contexts where anaerobic (low oxygen) conditions occur (peat bogs, lake beds, intertidal zones) (Bernick 2019). Wet sites can reveal lasting records about the processes and activities of ancestral generations and their varied relationships with plants (Hill 2019; Speller and Forbes 2022). The analysis of pollen and macrobotanicals from wet sites can provide information about environmental conditions (climate; forest composition) during past occupations, and how these conditions changed through time (Eldridge 2019). Lamentably, archaeological records of human-plant interactions are presently sparse along the NWC. As approximately 90 to 95% of NWC material culture is likely to be based on perishables, our current understanding of Holocene settlement, subsistence, technology, and mobility is constrained by a lack of identified and investigated wet sites and a persistent focus on artifacts of stone and bone (Croes 2003; Turner 2014).

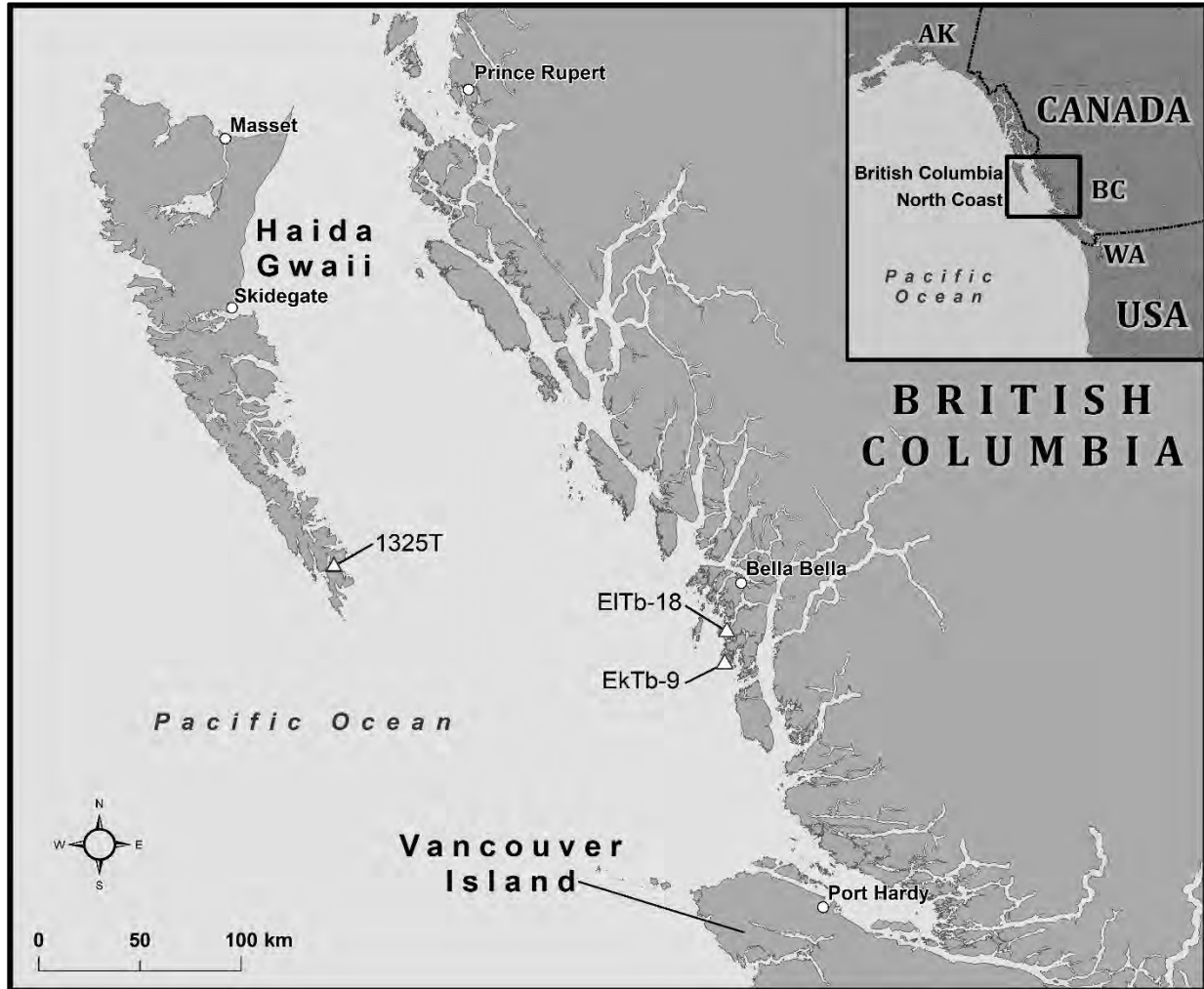
⁷⁶ This chapter is a manuscript that has not yet been submitted for publication; I am the sole author and analysts on the manuscript. This manuscript has been submitted to the Society of Ethnobiology: Research Communications. Early drafts required minimal revisions following review by Dr. Quentin Mackie and Dr. Duncan McLaren and HIRMD working members Qíxítasu Yímázalas Elroy White and Dúqváísła William Housty.

Kilgii Gwaay (1325T; Ellen Island, Haida Gwaii) is the oldest wet site (ca.10,600 years ago) currently known on the NWC (Cohen 2014; Fedje et al. 2001; Mackie et al. 2011) (Figure 5-1). Although post-glacial sea level rise constrained the occupation of Kilgii Gwaay to a brief period of occupation, over 100 wood artifacts were recovered from the site including stakes, wedges, planks, withes, twine, and composite tools (Cohen 2014). These were primarily made of Sitka spruce (*Picea sitchensis*) or western hemlock (*Tsuga heterophylla*), and indicative of well-developed woodworking technology and use of watercraft (inferred) (Cohen 2014). Preliminary evidence of early-Holocene (ca.10,600 – 10,500 years ago) wet site deposits consistent in age with those of Kilgii Gwaay were identified further south along the NWC at EITb-18 (Kildit Narrows, Hunter Island) and Holocene (ca. 8,000 – 5,500 years ago) wet site deposits were identified at nearby site EkTb-9 (Triquet Island) (Figure 5-1). Unlike Kilgii Gwaay, both EITb-18 and EkTb-9 are associated with persistent places of human occupation (McLaren et al. 2019). Persistent places manifest through social (prerogatives; praxis) and environmental factors (stable sea-level; anaerobic deposition) that result in repeated and sustained human habitation and investment at a single location (village) or broader area (network of villages / camps) over millennia (McLaren et al. 2015).

This case study draws on previously published information (Cohen 2014; Fedje et al. 2001; McLaren et al. 2015, 2019; Chapter 3) and presents new data from the EkTb-9 wet site to increase our collective understanding of persistent people-plant relationships on the NWC. Results are considered in the context of known Indigenous uses for identified plant species (Turner 2014) and are demonstrative of early cultural complexity and continuity on the NWC. Collectively, these data enable an exploration of the interactivity of wetlands, social practice, and knowledge transmission spanning the early Holocene to the present day.

Figure 5-1 Study area map showing location of early and mid-Holocene wet sites on the NWC of BC mentioned in text.

Figure prepared by K Holmes (Hakai Institute).



Methods

Study Location

Deglaciation of the outer NWC was underway by ca. 18,000 – 16,000 years ago, and by ca. 14,500 years ago, the diminishment of ice influenced regional sea-levels and the growth and spread of post-glacial vegetation (Shaw et al. 2020; Mackie et al. 2018). Unlike Haida Gwaii, the outer central coast of BC has maintained a stable relative sea level since ca. 14,500 years ago (McLaren et al. 2015; Shugar et al. 2014). Human presence is documented on the NWC by ca. 14,000 – 13,000 years ago (McLaren et al. 2018; Chapter 3), however, only a handful of outer coastal sites are known to pre-date ca 12,000 years ago (Vogelaar 2017). With a 14,000-year record of repeated human occupation and investment, EkTb-9 is an important component of the post-glacial record of the NWC (Chapter 3).

Triquet Island is located approximately 25 km west of the Pacific mainland coast of BC within the Hakai Lúxvbális Conservancy (Figure 5-1). Despite the small size of the hypermaritime island (144 ha), seven archaeological sites (EkTb-3, 8, 9 and 11-14) are recorded there. Of these, EkTb-9 is a permanent outer coastal village site that is centrally located along a protected northern facing bay (Figure 5-1). Shell midden deposits have a surface area greater than 17,000 m² and extend up to 6 m below surface along the northern extent of the site. Peat accumulations are limited to southwestern areas subject to persistent water saturation. There are estuarian root gardens along the northern bay, established berry bushes across the island, and bark-stripped western redcedar trees at the southern end of the site.

The pollen assemblage from mid-Holocene peat deposits (Strata VIIb to VI) indicate presence of arboreal taxa consistent with a cool, wet, rainforest climate, including spruce, western hemlock, and few cedar (Cupressaceae) as well as herbaceous taxa (grasses [Poaceae], sedges

[Cyperaceae], asters [Asteraceae], umbellifers [Apiaceae]), and aquatic plants (pond-lily [*Nuphar sp.*], cattail [*Typha latifolia*], peat mosses [*Sphagnum sp.*]) (Lucas 2013). Identified macrobotanical specimens include species that thrive in moist riparian or nearshore environments (red elderberry seeds [*Sambucus racemose*], spruce roots and cones, and western hemlock cones and needles). During the late Holocene (ca. 5,500 – 450 years ago), western redcedar (*Thuja plicata*) and yellow cedar (*Callitropsis nootkatensis*) joined the stands of spruce and hemlock and a rapidly developing understory rich in salal, ferns, and berry bushes. The mid-Holocene faunal assemblage demonstrates specialized marine-based subsistence targeting fish, shellfish, and sea-mammals. Greenling (*Hexagrammos sp.*), rockfish (*Sebastes sp.*), and Pacific herring (*Clupea pallasii*) dominate the assemblage, whereas salmon (*Oncorhynchus sp.*) represent a mere 0.2%.

Data Collection

EkTb-9 was recorded in 2009 (Stafford et al. 2009) and subject to further investigation from 2012-2017; detailed descriptions of field and laboratory methods are previously published (McLaren et al. 2015, 2019; Chapter 3) and not repeated here. Almost all the wooden artifacts were recovered from the excavation trench, which was located at the southern extent of the site. Peat deposits encountered in the excavation trench were removed in 25 x 25 x 5 cm sections; some sections were wet screened through 3 mm mesh at the site while others were individually wrapped in polytarp, packed into totes, and transported to cold storage for later processing.⁷⁷ The packed peat sections were processed at the Quadra Island Ecological Observatory operated by the Hakai Institute. Recovered vegetal material was packaged in plastic containers / bags filled with water and refrigerated.

⁷⁷ Excavation of the trench was conducted as three separate 1 x 1 m units over three field seasons (2012, 2015, 2016). Combined, the excavation trench measured approximately 3 m long x 1 m wide x 3 m deep. See Chapter 3 Methods for more information.

Analyses

Preserved wood demonstrating evidence of potential and/or obvious signs of human modification were inventoried, described, and subject to analysis at the University of Victoria (UVic), the Royal BC Museum (BRCM), or the Pacific Northwest Archaeological Services (PNAS) Laboratory. Nine of the wood artifacts were selected for cellular analysis. Of these, six were examined by Hawes and Croes (2013), and four were examined at the RBCM for this study. Cellular analysis involved the following steps: (1) removal of small thin section with razor blade, (2) mounting thin section on glass microscope slide, (3) examination with compound microscope, and (4) identification of diagnostic anatomical characteristics (tangential, radial, cross section) where possible (Florian et al. 1990; Freidman 1978, 2005; Hoadley 1990; Panshin and de Zeeuw 1990).

Following analysis, wood artifacts were sewn into plastic mesh bags and submerged in containers filled with a mixture of 50% Polyethylene Glycol (PEG) 400 mol wt and 50% water to initiate the stabilization process. The containers were stored for nine months and were periodically checked to confirm they remained free of mold. As the water evaporated over time, the ratio of PEG was gradually increased to support stabilization. Each specimen was inspected prior to initiating the drying process due to their variable size and density. Once subject to air-drying, they were monitored for evidence of cracking / checking and promptly resubmerged to resume the stabilization process, as applicable.

Results

A total of 850 wood artifacts falling into 20 types were recovered from deposits spanning ca. 7,788 – 5,604 CalBP (Table 5-1; Figure 5-2). Most of the wood artifacts are from Stratum VI (58%; ca. 6,700 – 5,600 years ago) and Stratum VIIIb (29%; ca. 7,500 – 7,100 years ago). Wood

chips are the most abundant artifact type, 60% of which derive from Stratum VI and 27% from Stratum VIIIb. A sample of the wood chips (n =43; 8.5%) range from 1.6 to 13 cm long, 0.2 to 2.8 cm wide, and 0.2 to 1.9 cm thick. Approximately 33% of the woodchips, 5% of the split wood, and 8% of the split sticks exhibited burning / charring. One tool, three tool tips, three pieces of worked wood and one artifact of unknown type exhibited fire-hardening (Figure 5-2). A few wedges, split roots (some spruce) and abundant chopped wood were recovered from Stratum VI. Two carved wood balls / knobs were recovered from Stratum VIIIb. Bipoints from Stratum VI are of variable lengths (10 to 21 cm) and exhibit multiple tool marks. Evidence of composite tool technology from Stratum VIIIb and VI includes an atlatl throwing board, bipoints, fish hooks, a possible harpoon foreshaft , and a bark wrapped stick.⁷⁸ Pieces of worked wood exhibit different modification types (both whittled and chopped; splitting and whittling) and were either too fragmented to further categorize or could not be specifically classified as one or the other.

⁷⁸ Artifact EkTb-9: 828 is hypothesized to have been a harpoon foreshaft (or pre-form) based on its dimensions and rounding of its distal and proximal ends that would have facilitated hafting, its similarity to other preserved wooden harpoon foreshafts available in the collections at the RBCM, and through discussions with Grant Keddie at the RBCM. Although identified as a harpoon foreshaft, it is also possible that it served a different function. Other hypothesized functions include weaving (as a shaft for a spindle), or a fire-drill (however neither end is fire-hardened).

Table 5-1 Wood artifacts per stratum recovered from EkTb-9.

Type	Strata ca. 7,788 – 5,604 CalBP					Site Total
	V/VI	VI	VI/VII	VIIIb	IX	
Atlatl throwing board	0	0	0	1	0	1
Ball / knob	0	0	0	2	0	2
Barkstrip	0	6	0	2	0	8
Bipoint	0	5	0	0	0	5
Bark board	0	4	0	0	0	4
Bark wrapped Stick	0	1	0	0	0	1
Carved wood	0	1	0	0	0	1
Carved?	1	1	0	0	0	2
Chopped wood	1	23	1	12	3	40
Fishhook fragment	0	1	0	2	0	3
Harpoon foreshaft	0	1	0	0	0	1
Point	0	7	0	3	0	10
Split root	0	10	1	2	0	13
Split stick	6	30	0	47	1	84
Split wood	0	77	0	59	0	136
Tool	0	1	0	1	0	2
Tool tip	0	5	0	0	0	5
Tool?	0	1	0	3	0	4
Wedge	0	2	0	0	0	2
Wood chip	15	305	11	135	38	504
Worked root	0	0	0	1	0	1
Worked wood	0	9	1	4	0	14
Worked wood?	1	6	0	0	0	7
Total	24	496	14	274	42	850

Figure 5-2 Select wood artifacts from Strata VIIIb-VI.

(i) Harpoon foreshaft (EkTb-9:828). (ii) Tool tip (EkTb-9:895). (iii) Tool tip EkTb-9:803. (iv) Tool tip EkTb-9:870). (v) Tool tip (EkTb-9:824). (vi) Tool tip (EkTb-9:698). (vii – xiv) Bipoints (EkTb-9:825 - 827). (viii) Fishhook (EkTb-9:749). (ix) Carved ball (EkTb-9:763). (x) Bark-wrapped stick (EkTb-9:783). (xi) Wedge (EkTb-9:866). (xii) Damaged point (EkTb-9:906). (xv a-d) Unknown (EkTb-9:884).



Table 5-2 describes the wood artifacts subject to cellular analysis for this study. Earlier analyses conducted on select specimens indicated that most were made of spruce or western hemlock, however, two artifacts (atlatl throwing board; fish hook barb) were made of Douglas fir (*Pseudotsuga menziesii*) and a split stick was made of Yellow cedar (McLaren et al. 2019). Consistent with these earlier analyses, the bipoint and piece of worked wood (type unknown) were made of spruce, and the bark-wrapped stick and harpoon foreshaft were made of Western redcedar (Table 5-2; Figure 5-2).

Table 5-2 Description of select wood artifacts (Stratum VI ca. 6,700 – 5,600 years ago) subject to cellular analysis at the Royal BC Museum.

Artifact	DBS (cm)	Dimensions (L x W x H) (cm)	Description and sample location	Diagnostic characteristics and species ID
EkTb-9:783 Bark-Wrapped Stick	145 - 150	3.4 x 0.8 x 0.3	Small flat rectangular handle; carved, smoothed; (inferred) distal end wrapped with thin bark strip. Ends are broken. Sample: flattened edge opposite bark strip.	<i>T. plicata</i> : abrupt transition from early to latewood; resin canals absent; parenchyma present; longitudinal parenchyma banded and end-walls nodular; rays uniseriate; spiral thickening absent; double row large, bordered pits on radial walls.
EkTb-9:826 Bipoint	160 - 170	14.5 x 0.8 x 0.5	Wooden bipoint; carved, whittled. Sample: pointed end.	<i>Picea sp.</i> : resin canals present, thick-walled epithelial cells; ray parenchyma with nodular end walls; one row ray tracheids on ray margins.
EkTb-9:828 Possible Harpoon Foreshaft	175- 180	22.7 x 1.3 x 1.2	Tapered cylindrical shaft; carved, smoothed. Shaft is widest at proximal end; tapers toward distal end; both ends rounded, smoothed. Sample: distal end.	<i>T. plicata</i> : abrupt transition from early to latewood; resin canals absent; parenchyma present; longitudinal parenchyma banded and end-walls nodular; rays uniseriate; spiral thickening absent; double row large, bordered pits on radial walls.
EkTb-9:884 Worked – Unknown Type	–38 - 145	3.3 x 2.9 x 2.0	Carefully worked, carved, smoothed, burnt; artifact has 5 sides; tapers from rectangular proximal end to finely tapered distal edge; two fire hardened lateral faces (spade-shaped). Sample: inferred proximal end.	<i>Picea sp.</i> : resin canals present, thick-walled epithelial cells; ray parenchyma with nodular end walls; one row ray tracheids on ray margins.

Discussion and Conclusions

Results from EkTb-9 reveal plant harvesting and use, a specialized vegetal marine tool kit, use of watercraft (inferred), woodworking, and composite tool technology were well established on the NWC by the mid-Holocene (Chapters 3, 4). The bark wrapped stick is a

significant example of composite tool technology, indicative of the innovative combination of multiple material types, including those that may have been procured at different times and/or places. For example, EkTb-9's mid-Holocene lithic assemblage includes utilized obsidian microblades and a pigment stone (graphite) that were both imported to the site (Chapters 3,4). A precision cutting tool may have been created by hafting a microblade to the stick, or fibers may have been attached to create a brush for pigment application (art; personal adornment) (Stewart 1984). The bark wrapped cedar stick, harpoon foreshaft and pollen assemblage signal the early presence of cedar on the island (ca. 6,700 – 5,600 years ago), though it is possible that the materials were imported to the site, such as the artifacts made of Douglas fir (McLaren et al. 2019; Lucas 2013).

Abundant wood artifacts in Strata VI and VIIIb signal periods of increased activity, and the absence of artifacts in Stratum VII is likely a product of the palaeotsunami that occurred ca. 6,931-6,314 CalBP (Stratum VIIIa) (Chapter 3). The smaller, wider bipoins were likely used as fishing gorges, whereas longer, narrower bipoins were likely used for spearing, and the carved wooden balls may be fishing floats (Stewart 1984). Presence of worked roots, bark, branches and wood indicate use of all tree parts for specific, though varied, purposes. Burnt and charred wood and botanicals were used as fuel, though may also represent discard of processed plants that served food, medicinal, or ritual purposes (Cohen 2014). Wedges, woodchips, chopped and split wood, and split sticks suggest large to fine scale woodworking was occurring at the southern extent of the site for over 2,000 years. As mid-Holocene conditions were generally consistent with those experienced today, this area of the site would have been rich in food and medicinal plants and sheltered from cool northwesterly winds.

The EkTb-9 assemblage is overall contiguous with that of early-Holocene wet site Kilgii Gwaay (Cohen 2014). Both assemblages indicate locally dominant spruce and hemlock were used to produce many of the same products and tools (planks, wedges) during the early and mid-Holocene that are known to be made of cedar today. Both Haida Nation and Haíłzaqv Nation have oral historical records that tell of ancestral relationship with these coniferous species (Turner 2014; Boas 1932). Together, the assemblages indicate that seafaring, marine adaptations, plant technologies, and other aspects of the socio-cultural complexity underpinning “classic” NWC culture began in the absence of cedar and much earlier than some (Coupland 1998; Hebda and Mathewes 1984; Donald 2003; Turner 1998) had initially hypothesized.

Results from EkTb-9 demonstrate persistent people-plant relationships on the NWC, as all the identified plant species are known to be of great cultural importance to coastal Indigenous nations today (Turner 2014). Several of the plant uses identified in Table 5-3 were likely practiced by ancestral peoples throughout the mid to late Holocene, and likely earlier, as demonstrated by the assemblage from Kilgii Gwaay (Cohen 2014; Turner 2014). The perpetuation of these practices from an immemorial past to the present day demonstrates continuity among NWC cultures and the power of knowledge transmission over at least 8,000 years (320 generations).⁷⁹ The diversity of plants at EkTb-9 and elsewhere along the NWC, and the enduring relationships that Indigenous people maintain with these plant communities, represents “a complex product of the history, dynamics, and development of [regional] flora [...] over time and of the interweaving of human migration and settlement with the synchronous

⁷⁹ A single “generation” is generally understood to be about 20 to 30 years ($8,000 / 25 = 320$).

acquisition, transmission, and adaptation of knowledge, practices, and beliefs about these flora”
(Turner 2014: 29).

Table 5-3 Turner (2014) known Indigenous uses for plant species recovered from EkTb-9 mid-Holocene deposits.

Plant species listed here were identified through analysis of pollen and spores, macrobotanicals, and perishable artifacts subject to cellular analysis.

Species ⁸⁰	Technology	Food	Medicine	Turner (2014) Page #
Cattail <i>Typha latifolia</i> (Typhaceae) -	Seed fluff tinder for starting fires; leaves for mats, bags, baskets	Rhizomes roasted and eaten; famine food	-	272, 340
Douglas fir <i>Pseudotsuga menziesii</i> (Pinaceae) <i>máwálas</i>	Harpoon and spear shafts, dip net poles and hoops, arrow shafts, fish-barbecuing stakes; bark slabs split off standing trees and used for shelter covering, siding; thick bark and wood hot-burning fuels	-	Decoction drank in sweathouse for purification	339, 340, 344, 428
Pond-lily <i>Nuphar sp.</i> (Nymphaeaceae) -	-	-	Infusion / decoction of rhizomes as tonic; for colds, coughs; rhizome slices chewed, grated, or for tea to treat arthritic pain; bathe affected joints	420, 424, 427
Red alder <i>Alnus rubra</i> (Betulaceae) <i>łáqvtás</i>	Bowls and trays, masks, canoe bailers, paddles, fire drills	-	Decoction of bark as tea; for ulcers, internal bleeding; washing solution for skin ailments, rashes, infections	340, 420, 422, 425
Red elderberry <i>S. racemose</i> (Caprifoliaceae) <i>Kíbat</i>	Pithy stems for bird arrowheads; hollowed for whistles and to inflate animal intestines as soft food containers	Berries eaten; cooked	Infusion of bark and roots as purgative, emetic; hastens childbirth during prolonged labour (strongly purgative; contains cyanogenic glycosides)	274, 345, 421, 426
Salal <i>Gaultheria shallon</i> (Ericaceae)	Leafy branches used in cooking pits, used for soapberry whippers	Berries eaten; leaves to flavour smoked fish and to remove fishy taste when cooking	Leaves mashed or bruised and applied to burns	272, 277, 344,

⁸⁰ Common (English), scientific (Latin), and Hailzaqv (Hailzaqv|a) names provided.

Species ⁸⁰	Technology	Food	Medicine	Turner (2014) Page #
<i>Nkvt</i>		halibut heads; leafy branches used in pit cooking		422
Sedge family (Cyperaceae)	Leaves for twining baskets	-	-	339, 342
-				
Peat mosses <i>Sphagnum sp.</i> (Bryophytes) <i>Płms</i> (moss)	Diapers, wiping fish, stuffing mattresses; fuel for smoking hides, meat	-	-	339, 343
Sitka spruce <i>Picea sitchensis</i> (Pinaceae) <i>hniwás</i>	Bows, wedges, blanket pins, arrows and arrow points, tongs, clubs, implement handles, ladders, drying racks, containers, fish traps, deadfalls, shelters; pitch for sealing canoes and baskets, waterproofing, glue	-	Pitch as salve (wounds, slivers); tea from inner bark applied to rashes, eczema, sores; tips boiled in house and branches used on floor to keep sickness away; disinfectant	340, 344, 422, 428
Western hemlock <i>Tsuga heterophylla</i> (Pinaceae) <i>Lúqvas</i>	Bentwood fishhooks, harpoon shafts, fish weir stakes, points, paddles; harvesting herring eggs	Cambium and inner bark tissues eaten; cooked / dried; served with grease, berries	Infusion / decoction of bark for colds, tuberculosis, ulcers, internal injuries	276, 340, 344, 423, 424, 425
Western redcedar <i>Thuja plicata</i> (Cupressaceae) <i>dnyás</i>	Dugout canoes, house posts, totem poles, boxes, pegs, fish weirs, arrow shafts and points; wood and shredded bark as tinder, kindling, fire drills, hearths; branches, roots for baskets, mats, clothing, cordage	-	Infusion of boughs for colds; also used as inhalant for coughs, colds	339, 340, 342, 423
Yellow cedar <i>Xanthocyparis nootkatensis</i> (Cupressaceae) <i>diwás</i>	Inner bark for baskets, mats, clothing, blankets; bows, canoe paddles, carving	-	-	340, 342

Woodworking practices uncovered at EkTb-9 are perpetuated in their current forms by contemporary Haíłzaqv carvers, woodworkers, and weavers and these activities are supported by several Haíłzaqv organizations (Qqs Projects Society; Haíłzaqv Káxlá Society; Qíłcutkv Wellness Project) to promote cultural revitalization, community healing, knowledge perpetuation, language and skill development, and youth empowerment (Chapter 4). Aligned with these goals, the HIRMD and Qíłxítasu Yíłmázalas Elroy White (CCA) have facilitated youth and other community trips to Triquet Island to monitor and connect with the site and share Haíłzaqv history from an internalist or Mńúxvit approach (White 2006; Yellowhorn 2002, 2006, 2012).⁸¹ Like other wet sites on the NWC, EkTb-9 remains an “encultured place full of meaning, of teaching and learning, of associating with the ancestors, and the rest of the world” (Hill 2019:68). Every single woodchip, split stick, and wedge at Kilgii Gwaay and EkTb-9, and those in the carving sheds of coastal Indigenous peoples today, reflect transmission of complex and dynamic knowledge of plants and associated technologies.

Should additional investigations be conducted at the site, testing would permit the delineation of the peat deposits and the broader site boundaries. Excavation in the vicinity of the former trench is likely to produce additional mid-Holocene wood artifacts and botanical remains with potential to reveal further patterns of plant use and manufacture over time.

⁸¹ For additional context see <https://coastalfirstnations.ca/hai%C9%ABzaqv-archeologist-practices-m%CC%93%E1%B9%87uxvit-approach-to-ancestral-work/>

Chapter 6 Conclusion

“In the beginning there was nothing but water and ice, and a narrow strip of shoreline.”

Ancestor of the Killer Whale Clan, Núláwítǵv Tribal Area, as transcribed by Farrand (1916:883).

“Haítzaqv oral history talks of a strip of land in that area where the excavation took place. This find is very important because it reaffirms a lot of the history that our people have been talking about for thousands of years. When we do go into negotiations, our oral history is what we go to the table with. So now we don't just have oral history, we have this archeological information. It's not just an arbitrary thing that any one is making up. We have a history supported from Western science and archaeology.”

Dúqvaís!a William Housty (2017).⁸²

Through a multi-proxy, interdisciplinary and collaborative act of *remembrance*, this dissertation has documented various components of, and considerations for, the ca. 14,000-year record of repeated human occupation and investment at archaeological site EkTb-9, Triquet Island.⁸³ Located in the Núláwítǵv Tribal Area of Haítzaqv Territory on the outer NWC of BC, site EkTb-9 is a richly storied landscape enfolding the “lives and times of predecessors who, over the generations, have moved around in it, and played their part in its formation” (Ingold 1993:153). Overall, this dissertation makes several original contributions to archaeological perspective, practice, and process with implications for the NWC and beyond. These include:

- Direct evidence of early human occupation along the NWC portion of the hypothesized coastal corridor, in an area and time for which archaeological data remains sparse though promising.

⁸² <https://www.cbc.ca/news/canada/british-columbia/archeological-find-affirms-heiltsuk-nation-s-oral-history-1.4046088>

⁸³ (Ingold 1993, 2017)

- Direct evidence of long-term human settlement, subsistence, and site formation processes indicating that some of the remote islands on the outer NWC were places capable of supporting long-term human investment. Storied landscapes such as EkTb-9 challenge earlier hypotheses that doubted the habitability and maritime economy of the outer coast during the late Pleistocene.
- Indirect evidence of early seafaring and associated activities on the NWC of BC from the early post glacial period to the present day, with implications for global discussions of early seafaring activities in outer coastal environments along the Pacific Rim.
- Direct and indirect evidence of patterned expressions of long-term cultural continuity on the NWC.
- Frameworks to support the practical applications of imbrication and two-eyed seeing for archaeological and other research on the NWC and beyond. Including the identification of need for amendments to the *Heritage Conservation Act* and associated archaeological impact / overview assessment guidelines to include requirements for ethical, community-guided consideration and incorporation of Indigenous knowledge and oral histories for the determination of site significance and interpretation of site contents and features, where appropriate/applicable.
- Ethical and regulatory considerations for navigating the social and political embeddedness of archaeology. This includes identification of best practices, strengths and challenges of community collaboration, and the importance of collaboratively developing an adaptive plan for the dissemination of results.

- Empirical data supportive of Hailzaqv resource management, stewardship, and governance objectives, including the Hailcistut Reconciliation Process.⁸⁴ As described by Dúqváislá William Housty in the opening statement of this section, archaeological data can be used to legally support strengths of a claim or the seriousness of any impacts to an Indigenous Nation's Aboriginal rights and title (and related interests) as recognized and affirmed by Section 35 of the *Constitution Act*, 1982 (CIRNAC 2010a; HIRMD 2023).

Recognizing the social and political embeddedness of this dissertation, I sought to address questions of interest to Hailzaqv Nation as well as those necessary to address lingering lacunae in the archaeological record of the NWC. To kick off this pursuit I asked, “*How have archaeology and Indigenous oral narratives been imbricated on the NWC? What ethical and epistemological considerations are necessary when combining these two ways of knowing the past? And what implications does this information have for the discipline of archaeology and Indigenous communities today?*” As described in Chapter 2, Indigenous communities on the NWC have transmitted their complex and dynamic oral narratives across generations for millennia, and knowledge keepers have upheld rigorous standards of transmission to maintain the legitimacy of these oral historical accounts. Archaeologists have therefore looked to Indigenous oral records as a legitimate and informative source for insight and interpretation. Through the application of archaeological survey and dating methods, archaeologists have been able to temporally and spatially anchor events recounted in oral narratives on the NWC. In concert, the results have added significant contributions to science, history, jurisprudence, and

⁸⁴ The Hailzaqv word Hailcistut means “to turn things around and make things right again” (HIRMD 2023). The Hailcistut Reconciliation Process is founded on the Hailzaqv Potlatch concept and supports negotiation of a new Government to Government relationship between Hailzaqv Nation and the Federal and Provincial Governments (HIRMD 2023).

other socio-political pursuits. The results of Chapter 2 (and later, Chapters 3 to 5) have demonstrated how the imbrication of archaeology and Indigenous oral narratives has resulted in a much more robust understanding of the regional history of the NWC of BC and has enabled a more nuanced and community-centered approach to archaeological investigations.

Through the application of information garnered in Chapter 2, my second set of research questions asked, “*What can archaeological science and Haiḷzaqv oral history tell us about the record of human occupation at Triquet Island and the antiquity of ancestral lifeways on the NWC? What does the earliest evidence from EkTb-9 contribute towards our collective understanding of access requirements and habitability of NWC landscapes during and after the early-post glacial period?*” As described in Chapter 3, investigations of the stratified archive of natural and cultural deposits at EkTb-9 broadened our archaeological understanding of early maritime technological developments and the viability of early post-glacial settlement and population expansion on the NWC. Importantly, this data is from a previously underexplored area of the proposed coastal corridor hypothesized to have supported early human dispersal into the Americas (Erlandson et al. 2007; Fladmark 1975,1979,1983; Li et al 2023; Mackie et al. 2018; McLaren et al. 2019a, 2023; Nichols 2023; Potter et al. 2017). EkTb-9’s chronology, established through radiometric dating and the analysis of palaeoenvironmental correlates, indicate that the site was a persistent place of repeated human residency spanning the early post-glacial period to the present day. Stratigraphic records show a complex array of site formation processes. Marine beach sediments are elevated above modern sea level, an extensive sand sheet consistent with a possible palaeotsunami event is present, as well as organic soils and peat deposits. Cultural strata are interbedded with these and include both shell-less and preserved shell accumulations demonstrative of investment through terraforming. Results presented in

Chapter 3 indicate that the outer coastal island changed from what was likely an open landscape during the early post-glacial period to the productive hypermaritime coastal temperate rainforest environs of the present day. Aligned with Bartlett et al.'s (2012) *two-eyed seeing*, the research program of historical ecology, and the framework of the *Declaration Act*, Chapter 3 was coauthored with members of Haíłzaqv Nation to ethically combine archaeological interpretations with Haíłzaqv oral history, and to identify Haíłzaqv temporal/cultural phases for the Núláwítǵv Tribal Area. These include the *Gálgla* Phase (ca. 14,000 – 8,000 years ago), or “*layasi gálgla*”, the time when the first People arrived at the island, the *Cícxvpát* Phase (ca. 8,000 – 5,500 years ago), a time where shell is better preserved in the strata, and the *Dhýás* Phase (ca. 5,500 – 450 years ago), or *layasi qvaxpit dhýasaxi* the time when the Western redcedar became more abundant at Triquet Island. Combining Indigenous knowledge with archaeological interpretations enhanced our collective understanding of the storied landscape of EkTb-9.

After documenting the chronological, paleoenvironmental, and cultural contexts of site EkTb-9, it was possible to ask more focused questions targeting two key assemblages produced from the site; these include the faunal assemblage and perishable artifact assemblage. Focusing on the faunal assemblage, the third set of research questions asked, “*As Triquet Island has always been an island, what additional proxies might support the inferred use of boats at the island from the late Pleistocene to the present day? What implications does seafaring have for the peopling of the new world? What role does seafaring play for Haíłzaqv people today?*” As described in Chapter 4, seafaring has been integral to the identity and lifeways of coastal Indigenous people around the world for millennia, and it is largely by boat that modern humans are believed to have dispersed and settled outer coastal islands along the Pacific Rim. However, limited direct evidence of Pleistocene and early Holocene boats have been recovered from

archaeological contexts. The results of zooarchaeological analysis conducted at EkTb-9, coupled with the results of previous multi-proxy analyses described in Chapter 3 broadens our understanding of outer coastal subsistence spanning the last 10,000 years and supports the inferred 14,000-year legacy of seafaring in Haítzaqv Territory. Based on the earliest available evidence, it seems likely that ancestral peoples of the NWC used marine vessels akin to kayaks, umiaks, or baidarkas made of spruce frames covered with sea mammal skins to access the site and surrounding environs during the early post-glacial period. Dugout canoes were likely fashioned from spruce during this time as the species was well established in the area. Throughout the mid to late Holocene, skin boats and/or dugouts made of spruce likely continued to be used until Western redcedar trees became fully established in the region.

Although dugout canoes made of Western redcedar are understood to have been the dominant form of marine vessel along the NWC during the late Holocene, it is likely that vessel forms varied in relation to their intended function and materials at hand, and that multiple types of vessels continued to be used long after cedar became established in the area. Overall, the zooarchaeological assemblage and other associated proxies from the *Dh̄yás* phase indicate a continuation of the complex marine technologies that were already expressed by the *Gálgla* Phase and *Cícxv́át* Phase, as well as adaptation and innovation alongside evolving environmental conditions. As described in Chapter 4, ocean-going canoes and other marine vessels have been integral to Haítzaqv identity and lifeways since time immemorial, and the Tribal Canoe Journeys undertaken by Haítzaqv and other Indigenous peoples today “have helped participants reconnect and heal from intergenerational trauma caused by residential schools, the potlach ban, and other assimilation policies” (Brown et al. 2021:27). In much the same way that

seafaring enabled people to mobilize across the Pacific Rim, it has also enabled the mobilization of Indigenous knowledge and protocols across generations.

Continuing with the theme of knowledge transmission and the interactivity of plants and technologies of the NWC, the fourth set of research questions asked, “*What does the investigation of archaeological site EkTb-9 reveal about the interactivity of people / plant relationships on the NWC through time?*” As described in Chapter 5, archaeobotanical investigation of the wet site component at EkTb-9 enhanced our collective understanding of the relationships that ancestral people had with plants, and how these relationships have evolved and persisted into the present. This is because wet sites like EkTb-9 can reveal lasting records of the processes and activities of ancestral generations and can also provide information about environmental conditions and how these conditions changed through time (Chapters 3 – 5). As approximately 90 to 95% of NWC material culture is likely to be based on botanical products (Croes 2003), our current understanding of Holocene settlement, subsistence, technology, and mobility has been constrained by a lack of investigated wet sites and a persistent focus on artifacts of stone and bone. Results of the analysis of vegetal artifacts, pollen and macrobotanicals from EkTb-9 revealed that plant harvesting and use, a specialized vegetal marine tool kit, woodworking, and composite tool technology were well established on the NWC by the mid-Holocene (Chapters 3 – 5). The EkTb-9 assemblage is overall contiguous with that of early-Holocene wet site Kilgii Gwaay, as both assemblages indicate locally dominant spruce and hemlock were used to produce many of the same products and tools (planks, wedges) during the early and mid-Holocene that are known to be made of cedar today, and both Haida Nation and Haílzaqv Nation have oral historical records that tell of ancestral relationship with these coniferous species (Turner 2014; Boas 1932). The assemblages from these sites indicate that

seafaring, marine adaptations, plant technologies, and other aspects of the socio-cultural complexity underpinning “classic” NWC culture began in the absence of cedar and salmon and much earlier than some had initially hypothesized (Coupland 1998; Hebda and Mathewes 1984; Donald 2003; Turner 1998). Collectively, these data enabled a preliminary exploration of the interactivity of wetlands, social practice, and knowledge transmission on the NWC from the mid-Holocene to the present day.

Taken together, information gathered and presented in Chapters 2 through 5 allowed me to answer the fifth question, “*What do the combined results of the work at EkTb-9 contribute to evolving theories of change, continuity, and complexity on the NWC through time?*” Past archaeological research on the NWC has demonstrated long-term cultural continuity in the absence of sustained political conflict, environmental upheavals, group migrations, and cultural replacement (Cannon 2003:11). Few village sites were permanently abandoned, implying that people were choosing to stay in places where they had millennia-old settlements rather than finding alternative locations (Cannon 2003:11). The option to remain and repeatedly reoccupy settlements over millennia was possible, in part, because of the stable relative sea level in the region (Mackie et al. 2018; McLaren et al. 2014, 2015, 2018, 2019a, 2019b). This dissertation joins a growing body of archaeological literature recognizing that iterative processes of human life, endowment, and habit have simultaneously shaped and been shaped by the environs of the NWC for millennia (Balée 2006; Balée and Erickson 2006; Ingold 1993, 2017; Letham et al. 2020, 2022; Mackie 1998, 2003; McLaren 2008; McLaren et al. 2015, 2018, 2019a, 2019b). Multiple factors, including the regional sea-level history, the island’s outer coastal position and immediate year-round access to both high and low trophic level resources as well as cultural factors, influenced ancestral actions, interactivity, and investment in the storied landscape of

EkTb-9 through time. Overall, the palaeoenvironmental and archaeological record for the site, layered with the available oral historical records for the broader Núláwítǵv tribal area, demonstrate a pattern that is suggestive of long-term cultural continuity. Some examples include:

- The faunal and lithic assemblages suggest shifts in subsistence and stone tool manufacture during the mid-Holocene but are overall indicative of a sustained specialized marine-based orientation spanning the early post-glacial period to the present day (Chapters 3 and 4). This trend also demonstrates continuity with those Indigenous communities of the NWC that remain intimately connected to the Pacific Ocean today for its provision of food, livelihood, mobility, and more.
- The abundance of shellfish and fish remains recovered from EkTb-9 and the presence of nearby intertidal features (petroforms and stone fishtraps) demonstrate evidence of deliberate investment and enhancement of marine resource harvesting technologies on and around the island through time (Chapter 3). Haílzaqv Elders interviewed for traditional use studies undertaken between 1996 and 2009 identified important fishing locations, as well as shellfish and seaweed harvesting locations on and within a 1 km radius of Triquet Island, highlighting the continued importance of the island and nearby marine resources for Haílzaqv Nation today (Stafford et al. 2009).
- Analysis of coastal faunal assemblages dating to the late Holocene (ca. 2,500 years ago) has revealed that herring are the most ubiquitous and relatively abundant fish species recovered from archaeological sites on the NWC (McKechnie and Moss, 2016) and the early Holocene faunal assemblage from EkTb-9 demonstrates continuity with this pattern (Chapter 4).

- The presence of domestic dog during the *Díy'ás* Phase indicates that this species would have been deliberately transported to the island via boat (Chapters 3 and 4), and the ubiquity of domestic dog remains in coastal archaeological contexts, coupled with genetic, ethnographic and oral historical information, suggest that boats likely played an important role in the emergence, spread, and continuity of dog domestication and husbandry practices on the NWC (Ames 2002; Fedje et al. 2021; McKechnie et al. 2020).
- The history of seafaring along the NWC speaks to the antiquity and continuity of Indigenous marine specialization and proficiency (Chapter 4). Additionally, participating in the Tribal Canoe Journeys has been demonstrated to contribute to the well-being and mental health of Indigenous youth, and it is likely that boats served similar health, social, and cultural purposes for ancestral NWC peoples as well (Smethurst 2012).
- All the plant species that were used and/or present at EkTb-9 throughout the Holocene are known to be of great cultural importance to coastal Indigenous nations today (Turner 2014). The perpetuation of these people / plant relationships from an immemorial past to the present day demonstrates continuity among NWC cultures (Chapter 5).
- Every single woodchip, split stick, and wedge at Kilgii Gwaay (Haida Gwaii) and EkTb-9 (Triquet Island), and those in the carving sheds of coastal Indigenous peoples today, reflect continuity through transmission of complex and dynamic knowledge of plants and associated technologies and woodworking practices across hundreds of generations (Chapter 5).

Like other persistent places on the NWC, EkTb-9 is a manifestation of dynamic geomorphological processes and rich expression of socio-political complexity. The site is a storied landscape enriched through thousands of years of prerogatives, praxis, oral historical

transmission, deliberate human investment, and ongoing intimate connection to place. It remains an “encultured place full of meaning, of teaching and learning, of associating with the ancestors, and the rest of the world” (Hill 2019:68). Overall, this dissertation presents a robust case supportive of cultural continuity and complexity on the NWC spanning the early post-glacial period to the present day. However, many gaps remain in our collective understanding of the history of this portion of the coast, as well as the broader implications of this type of community-engaged research. While we’ve come a long way together, there remains much room for collective growth and reconciliation at the intersections of Western science and Indigenous sovereignty.

This dissertation serves as one example among many aimed at democratizing the discipline of archaeology to improve our collective understanding of the past and to promote the protection of cultural and environmental values in the present. It also serves as an example of the troubled waters one may have to navigate when conducting community engaged research. Lamentably, the unanticipated secondary manipulations of data collected for this dissertation through sensationalized and other spin-off media coverage in 2017 strained and tested our collaborative efforts. As an academic and non-Indigenous person, it was challenging to navigate anxieties of potential secondary data manipulations in tandem to carrying the responsibility of communicating information in a manner aligned with Western scientific principles as well as Haíłzaqv expectations and protocols.⁸⁵ Overall, I went through the very same thought process described by Schablitsky (2020:1):

“Some scholars believe that in order to avoid any misrepresentation of scientific results, the safest response to the media is to simply not engage with them or rely on popular print to reveal one’s preliminary findings and interpretations. However, protesting the

⁸⁵ See Appendix E for a weblink to Graeme’s (2018) article in The Martlet for some candid thoughts expressed while all of this was unfolding.

delivery of archaeology through avoidance may be futile and perhaps even a disservice to the discipline.”

Recognizing this reality, our collaborative work proceeded through collective efforts to establish a plan for the mobilization of accurate information in culturally sensitive and ethically informed ways. During this time, the HIRMD updated their research agreement policies to include pre-emptive measures to streamline future media engagement processes. In advance of the final site visit in 2019, Dr. Duncan McLaren and I travelled to Bella Bella for meetings and presentations with HIRMD staff and the broader Haítzaqv community; we received direct feedback and identified a positive path forward for this community-engaged research.⁸⁶ Part of the path forward included the formation of a HIRMD Working Group comprised of representatives with intimate knowledge of Haítzaqv history and protocols. To promote a more balanced narrative than had been propagated by some of the early media coverage, our plan included the requirement that at least one member of the HIRMD Working Group participate in any engagement with the media. This was instrumental for mobilizing information regarding the cultural significance of the site for Haítzaqv Nation, as I’d persistently deferred the question in earlier media engagements. As an archaeologist, collaborator, and facilitator, I can speak to the scientific and theoretical significance of these archaeological pursuits, but the contemporary cultural significance of such matters is best described directly by members of the Nation whose material culture is in the spotlight. Unfortunately, we were not long into our renewed solidarity when the worldwide COVID-19 Pandemic erupted and constrained our mutual abilities to keep lines of communication open. Nevertheless, we persisted and despite these and other challenges we have collectively succeeded in mobilizing the factual results of the work described herein for

⁸⁶ The 2019 trip to Bella Bella was funded by the Hakai Institute c/o the Tula Foundation, and the Haítzaqv Guardian Watchmen c/o the HIRMD provided transportation to and from the site.

current and future generations of Haílzaqv Nation, as well as other interested members of the public and academic communities around the world.⁸⁷⁻⁸⁸

In the present day, Triquet Island’s natural and cultural resources are safeguarded for future generations through the Hakai Lúxvbálís Conservancy Program, and the island is regularly monitored by members of the Haílzaqv Guardian Watchmen Program. As described on BC Parks website (Province of British Columbia 2023b):

“The Hakai Lúxvbálís Conservancy is managed under an agreement between the Heiltsuk Nation and the Province of BC to co-operatively attain conservation and recreation objectives for the area. This agreement will also allow the Heiltsuk Nation to access land and resources for their use within the Hakai Lúxvbálís Conservancy in accordance with their Aboriginal rights.”

Following the completion of our work at EkTb-9 in 2017, restoration efforts were conducted in accordance with HIRMD and BC Parks requirements, and the site was inspected during the final visit in 2019 to confirm site protections were in place. As of April 4, 2019, Triquet Island has remained closed to all public access until further notice to protect its associated archaeological, cultural, and conservation values (Province of British Columbia 2023b). Accordingly, there are no current plans or active investigation permits for additional archaeological work to be undertaken at EkTb-9, or at the other sites in the immediate embayment on Triquet Island. Should provincial regulatory permits and Haílzaqv consent be obtained for additional archaeological investigations at Triquet Island, this dissertation concludes with the identification of possible future directions for collaborative research.

⁸⁷ “We” includes members of the community and governmental organizations of the Haílzaqv Nation described in the Acknowledgements Section and other sections of this dissertation, as well as folks at the Hakai Institute, the Tula Foundation, and the University of Victoria.

⁸⁸ See Appendices C and E for more information.

Future directions

Possible future directions identified following completion of this dissertation include: (1) analysis using existing samples collected from EkTb-9, (2) new investigations at the site, (3) work at other sites on Triquet island, and (4) future work for the broader NWC.

Future Work with Existing Samples

A primary future direction for this project is publishing the results of the sedaDNA samples collected from EkTb-9 that were processed at the Center for GeoGenetics at the University of Copenhagen in 2018, and later re-processed at Hakai's labs in Victoria and Quadra Island, BC. The minimally invasive coring methods employed for this dissertation and other projects on the coast, coupled with new data technologies (aDNA, eDNA, sedaDNA analyses), have significantly improved our collective interpretations of the dynamic early-post glacial environment of the NWC (Hebda 2019; Hebda et al. 2022; McLaren et al. 2023).

Additional fruitful avenues for study include grain analysis, micromorphology, OSL dating of sediments with poor organic preservation, residue analysis, and isotopic analysis. Isotopic work on the domesticated dog remains would help establish the canids' diet with implications for ancient human diet at the site, and aDNA analyses could establish the canid's haplotype (Cannon et al. 1999; Fedje et al. 2021). Ancient DNA or ZooMS work could be performed on the fortuitously retrieved sea-mammal remains obtained from the Vibracore test (VC-2017-2) as well as the degraded sea-mammal remains obtained from the basal cultural strata in the excavation trench to allow species level identifications.

As described in Chapter 3, it was beyond the scope of this otherwise comprehensive dissertation to quantify and complete a detailed analysis of the invertebrate remains recovered from testing at EkTb-9. The vibracore samples collected along the northern extent of the site

where the shell midden deposits are deepest (5+m), as well as the one conducted near the excavation trench where the shell midden deposits are less thick (20 - 50 cm), were processed following the methodologies outlined in Duffield's (2017) master's thesis and related publication (Duffield et al. 2022). All four cores were eventually sectioned, photographed, sampled for radiocarbon assay and diatom analysis, and then subsampled in 5 cm intervals and bagged for subsequent analyses. Subsequent analyses of these bagged samples that are specifically focused on the invertebrate remains would provide useful contributions to remaining gaps in our understanding of settlement and subsistence on the NWC, as well as more nuanced information regarding the value and role of intertidal resources. The results of such work are also likely to have practical implications for present day resource management initiatives and other stewardship objectives for the NWC (Caldwell et al. 2012; Holmes et al. 2022; Jackley 2014; Jackley et al. 2016; Lepofsky et al. 2015).

Quantification and analysis of the invertebrate remains collected from the site could also inform future considerations of the evidence of acts of recycling that were exhibited at the site through time (i.e., discard of shell, fire altered rock, and other materials for the purpose of terraforming). A study focused on this topic may also consider other evidence including lithics from the site demonstrative of retouch and the biconically drilled ground bone needle (EkTb-9:907). As it is not described elsewhere in this dissertation despite being an object of particular interest, additional context regarding the needle artifact is included in the footnotes.⁸⁹

⁸⁹The biconically drilled ground bone needle was recovered from Stratum IIIb (130-135 cm db) in the excavation trench (EU 2016) with an associated date of 5,559 - 5,483 Cal BP (Figure 6-1) (Chapter 3). This bone needle is fashioned from the long bone (compact bone) of a mammal, most likely land mammal (deer). The artifact was recovered in two fragments. The proximal portion was recovered during wet screening at Triquet Island in spring 2016 and the distal portion was recovered during analysis of bulk bagged faunal remains conducted at UVic during the fall of 2016, resulting in the fortuitous refitting of these two fragments. Combined, the artifact measures 48 mm long. The artifact is widest at the proximal end (7 mm wide) and tapers toward the distal end (4 mm wide). The artifact shows evidence of polishing along the tip and shaft. The proximal end of the artifact was biconically drilled (meaning it was drilled from both sides) to create an eyelet through which sinew or other cordage could be inserted. The eyelet was likely drilled via use of key drill or hand drill, though none have yet been recovered from the site (Stewart 1996). Evidence of another previous drilled eyelet is present at the proximal tip, approximately 5 mm above the present functional eyelet.

Figure 6-1 Bone Artifact EkTb-9:907. Biconically drilled bone needle collected from Stratum IIIb of the excavation trench (EU 2016).



Additional beneficial future research and education directions for EkTb-9 that would not require additional fieldwork (ground disturbance) include place name studies conducted by Haílzaqv community members, as well as the preparation of teaching materials for Haílzaqv youth, and Haílzaqv-led eco-tourism or camps, field-schools, or other community trips. As described in Chapter 4, this is already underway as the HIRMD and Qíxítasu Yímázalas Elroy White (CCA) have facilitated a few youth and other community trips to Triquet Island over the last few years to monitor and connect with the site and share to Haílzaqv history from internalist perspectives (White 2006; Yellowhorn 2002, 2006, 2012).

Future Work at EkTb-9

Should Haílzaqv Nation decide that additional archaeological investigations be conducted at the site, the following future directions for research have been identified. Although a chronology has been established for the terrestrial component of EkTb-9, these results have been

primarily derived from the excavation trench and auger and vibracore tests and could be enhanced through additional subsurface testing at the site (e.g., excavation units or additional vibracoring). Although preservation in basal cultural strata is generally poor, additional excavation and exploration of the earliest cultural deposits at EkTb-9 may yield more dateable material that would further support the early record of occupation on the NWC.

Additional testing along the northwestern extent of the site would permit the assessment of basal shell midden and other deposits in that area, aiding in the refinement of our understanding of site formation processes and terraforming activities. Additional testing would also permit the delineation of the peat deposits and the broader site boundaries. Excavation in the vicinity of the former trench is likely to produce additional wood artifacts and botanical remains with potential to reveal further patterns of plant use and manufacture over time.

Future Work on Triquet Island Outside of EkTb-9

An auger/coring program coupled with radiometric dating conducted at nearby sites on Triquet Island (EkTb-3, EkTb-8, EkTb-11, EkTb-12, EkTb-13, and EkTb-14) would help to establish a chronology of settlement and expansion on the island. Collecting additional sediment samples for pollen analysis from Triquet Island and comparable hypermaritime sites would permit a refinement of the post-glacial vegetation history for the area. Additional testing on Triquet Island should also focus on palaeotsunami investigations and/or investigations of the wet site deposits identified at EkTb-8.

Future Work in the Central Coast Region of the NWC

Palaeoenvironmental evidence and GIS modelling suggest coastal environments and resources were available for human occupation and use earlier than the earliest archaeological evidence currently available (Fedje et al. 2021; Gustas and Supernant 2019; Lausanne et al.

2019; Mackie et al. 2018; Matson 2003; Vogelaar 2017); therefore, more collaborative archaeological research at previously recorded archaeological sites as well as additional investigations to find new sites on the NWC remains a promising and worthwhile pursuit. Additional collaborative palaeotsunami investigations and focused wet-site investigations should also be considered for the NWC region.

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Appendices

Appendix A Supplemental Data

Supplemental data include the EkTb-9 faunal, lithic, and perishable artifact analysis logs and the vibracore sample logs. You can find the files listed below on UVicSpace, the University of Victoria's Research and Learning Repository: <https://dspace.library.uvic.ca/home>.

Supplemental Data on UVicSpace	File Name
EkTb-9 Faunal Analysis	Gauvreau_Alisha_PhD_2024_supp_file_fauna.xlsx
EkTb-9 Lithic Analysis	Gauvreau_Alisha_PhD_2024_supp_file_lithics.xlsx
EkTb-9 Perishable Artifact Analysis	Gauvreau_Alisha_PhD_2024_supp_file_perishables.xlsx
EkTb-9 Vibracore Sample Analysis	Gauvreau_Alisha_PhD_2024_supp_file_vibracore.xlsx

Appendix B Repository and Methods

Artifact Repository

As per our research agreement with the HIRMD and the HTC, and the terms of *HCA* Permit 2011-0171 issued by the BC Archaeology Branch, artifacts recovered from excavations at EkTb-9 through the HALAP are destined for the HCEC repository in Bella Bella, BC. Dried sediment samples and other natural and cultural materials will be submitted to the HCEC and/or the RBCM.

Perishable Artifact Analysis

A total of 220 perishable wooden artifacts were collected from the site in 2012 (EU-2012) and sent to the Pacific Northwest Archaeological Services (PNWAS) laboratory in Olympia WA for analysis and reporting (Hawes and Croes 2013; McLaren et al. 2019). I analyzed an additional 630 perishable wooden artifacts that were collected during the 2015-2017 excavations (EU-2015, EU-2016, and VC-2017-3), with support from Haítzaqv laboratory assistant *łáqvaíł*/ Larissa Dixon at the University of Victoria. Select specimens were subject to cellular analysis at the RBCM in collaboration with Dr. Ken Marr between 2015-2017.⁹⁰ Additional information about the methods employed for the analysis of perishable artifacts is provided in Chapter 5.

Lithic Analysis

I conducted the analysis of the terrestrial lithic assemblage at the University of Victoria with support and guidance from lithic specialist Angela Dyck between 2016 and 2019. Select lithics were reanalyzed by Angela Dyck in 2021 and 2022 at the Hakai Institute Archaeological Laboratory in Victoria, BC. A typology developed for lithics collected during the 2011-2012 HALAP was used for descriptive identification (Porter and McLaren 2011). Visual identification

⁹⁰ As described in Chapter 5 and in the Acknowledgement section.

(aided by magnification) of material types was conducted and artifact metrics were recorded. Lithic reduction techniques that were determined to involve anvil supported percussion (ASP) were categorized as bipolar reduction if the lithics exhibited evidence of being struck with 90° angles, or as anvil-rested percussion if they exhibited oblique percussion angles. When ASP type could not be differentiated, as is generally the case with flakes, they were categorized only as ASP, as it is the more inclusive term (see Callahan 1987, Hiscock 2015, Pargeter and de la Peña 2017, Shott and Tostevin 2015, and Tabrett 2017 for discussions on variability in percussion methods utilizing anvils).

Jenny Cohen prepared an idealized drawing of the lithic cluster on top of the anvil identified in the excavation trench. Camosun Innovates produced the 3D scans of the lithic cluster in Stratum XIb, and Angela Dyck prepared the image layup via opensource software programs Blender™ and Inkscape. Dr. Rudy Reimer conducted X-ray fluorescence (XRF) analysis of the obsidian artifacts at Simon Fraser University in 2018 (Reimer 2018). XRF analysis is a non-destructive technique whereby trace elements of lithic material can be identified; in this case, using a Bruker Tracer III-V+ portable XRF spectrometer (Reimer 2018). A diagnostic trace element value most common to characterize obsidian compared directly to those known or established through published literature, allows for source designation (Reimer 2018). This includes known obsidian sources in the Simon Fraser University Department of Archaeology reference collection and other known obsidian source values reported in the literature and unpublished elemental data collected through the analysis of other labs (Reimer 2018). For additional information relating to limitations and advantages of using the Bruker Tracer III-V+ portable XRF spectrometer see Reimer dissertation (Reimer 2012).

Faunal Analysis

The analysis of the faunal material (vertebrate and invertebrate) collected in 2012 (n=1,404 elements) was conducted by D. Fargo and reported in the 2013 HALAP report (Fargo 2013). I conducted all subsequent faunal analyses of the vertebrate assemblage (n=12,920) and select invertebrate specimens (n=861) recovered from terrestrial excavations conducted between 2015-2017 (n = 13,781 elements). Both of our faunal analyses utilized the comparative Zooarchaeology Lab Collection at the University of Victoria, with support from Senior Laboratory Instructor Rebecca Wigen. All material recovered from the excavation trench was screened using 3 mm mesh. The vibracore samples were sectioned into 5 cm levels within the stratigraphic layers. The sectioned material was wet screened through 2- and 1-mm nested screens and set to dry. Once dried, the samples were re-screened through 2- and 1-mm nested screens. Screened samples were visually sorted, including with use of dissecting microscope and tweezers into the following categories: shell, organics (detritus; seeds: preserved wood), charcoal, fauna, lithics, and sediment (coarse sand, silt). Additional information about the methods employed for the faunal analysis is provided in Chapter 4.

Sediment, Pollen, Macrofloral, Diatom and Siliceous Microfossil Analyses

Sediment, pollen, macrofloral, diatom and siliceous microfossil analyses were conducted on subsamples from select bulk and column samples obtained from the excavation trench and other subsurface tests between 2012 and 2016 (Hawes and Cohen 2013; Hebda 2020; Lucas 2013). Sampling focused on layers exhibiting significant sedimentological change. Detailed sediment analyses focused on the basal layers of the trench to ascertain the nature of landform development, and paleoecology generally, during the time of earliest known human occupation of the site. This analysis included interpretation of marine and terrestrial depositional factors

through examination of mineral sediment character, various plant, algal and protist proxies, and by reconstruction of the floral environment through pollen analysis. Chronological control was obtained by radiocarbon dating organic samples such as seeds and conifer needles where sediment characteristics or diatom analysis indicated a transition in the environment of deposition.

Pollen Analysis

Methods for the analysis of pollen samples from Strata X and VIIIb to VI are described in previous reports prepared by the analysts Hebda 2020; Lucas 2013; Puseman and Briles 2019). Pollen samples from Strata XII to XIa were prepared using standard methods (Faegri et al. 1989; Smol et al. 2006) including an exotic *Lycopodium* spike (Lund Department of Geology, batch 100320 201, contains 14,285 +/- 501 grains/tablet), treatment with 10% HCl to neutralize carbonates and the removal of organic material via acetolysis. Samples were further purified by dense-media separation using lithium heteropolytungstate (LST) (Caffrey and Horn 2013; Nakagawa et al. 1998). Two dense-media separations were performed on each sample: for each separation, 10 ml of LST modified to 2.0 g/ml was added to the acetolyzed sample, which was then centrifuged at 900 RCF for 20 minutes. The resulting supernatant was decanted off and passed through a 10 µm filter, with the coarse fraction (>10 µm) retained for mounting and pollen analysis. Pollen grains and spores were counted using a Zeiss Axio Scope.A1 compound microscope and an AmScope T690C-10MA compound microscope at 400x magnification; ambiguous grains were identified at 600x and/or 1000x magnification under oil immersion. A minimum of 300 pollen grains or spores were counted per sample whenever possible, though a few counts were below this threshold in particularly pollen-poor samples. Pollen and spore identifications were carried out to the highest possible taxonomic resolution and relied on

reference materials including (Faegri et al. 1989; Hebda and Rouse 2002; Kapp 1969; Klinkenberg 2019; Martin and Harvey 2017; McAndrews et al. 1973) and the spore reference collection at the University of Victoria. Where possible, differentiation of *Alnus viridis*-type pollen and *Alnus rubra*-type pollen was performed with reference to the characteristics of specimens from western North America (May and Lacourse 2012). Charcoal counts are raw particle counts visible on the counted portion of pollen slides. All scientific and common names are consistent with those documented in the online database e-Flora BC (Klinkenberg 2019). The pollen diagram was prepared by N. Hebda and C.F.G. Hebda using a custom implementation of the rioja package in RStudio Desktop with R 4.2.1 and additional modifications in Inkscape (Hebda 2020).

Macrofloral Analysis

Macrofloral sample preparation began with flotation using a bucket system; the light fraction was screened through a 150 µm mesh sieve and the heavy fraction through a 0.5-mm-mesh screen (Puseman and Briles 2019). The light fraction was examined with a Bausch and Lomb Stereozoom microscope under 10 to 70 power light microscopy and the heavy fraction was examined with a 2x magnifying light (Puseman and Briles 2019); macrofloral samples were identified through reference to published sources (Carlquist 1988; Davis 1993; Delorit 1970; Hoadley 1990; Martin and Barkley 2000; Panshin and de Zeeuw 1980, online databases (InsideWood 2004; Schweingruber and Landolt 2005), and the Department of Geography and Environmental Science's modern comparative collection at the University of Colorado Denver.

Siliceous Microfossil Analysis

Siliceous Microfossil Analysis was conducted by Daryl Fedje. Diatom taxa were identified to environment, either to aquatic habitat (marine, brackish, fresh, benthic, planktonic, etc.) or to specific terrestrial settings (wet soils, seeps, etc.). Siliceous microfossils were identified with reference to comparative data sets (Bahls et al. 2018; Campeau et al. 1999; Charman 2015; Cummings et al. 1995; Foged 1981; Harrison and Warner 1986; Hein 1990; Hooper and Soest 2002; Hustedt 1953; Pientiz et al. 2003; Wilson et al. 1996; Spaulding et al. 2019; Witon and Witkowski 2006). Diatoms were assigned to five salinity classes: (1) halophobian (fresh, salt intolerant), (2) oligohalobous indifferent (freshwater), (3) oligohalobous halophilous (freshwater species tolerant of salinity to 0.2 ppt), (4) mesohalobous (brackish water species with optimal salinity between 0.2 and 30 ppt), and (5) polyhalobous (marine water species with optimal salinity greater than 30 ppt) (Guiry and Guiry 2017; Hustedt 1953; Marohasy and Abbot 2007; Wilson et al. 1996; Zong and Sawai 2015).

Preparation of diatom and siliceous microfossil samples began with removal of the coarse and fine fractions. The coarse fraction (mineral clasts and plant detritus) was removed through timed settling in distilled water (retaining material still in suspension in a 15 ml tube after one minute). The fine fraction (clay and fine organics) was then removed by adding distilled water and repeated decanting (discarding sediment still in suspension every two hours). For samples rich in humates and fine organics, decanting was followed by several hours processing in hot 10% hydrogen peroxide. Slides were prepared following standard procedure (Battarbee 1986; McAndrews et al. 1973) and examined under 400x to 1000x light microscopy.

Pollen Count Data (Hebda 2020)

	263-265 (X)	265-270 (XIa)	279-284 (XIa)	288-291 (XIb)	291-293 (XIb)	294-297 (XIc)	307-312 (XIc-XII)	345-363 (XII)
<i>Pinus</i>	19	7	5	10	3		1	2
<i>Picea</i>	37	51	58	46	4	5	68	4
<i>Abies</i>	5	1	5	1				
<i>Tsuga heterophylla</i>	1	20	13	7			17	2
<i>Tsuga mertensiana</i>	2	2	12	2		1	2	1
Cupressaceae				1			1	
Unknown conifer	2							
<i>Alnus</i> sp.	215	381	61	182	21	6	7	1
<i>Alnus rubra</i>			13					
<i>Alnus viridis</i>	6	35	91	16	3		37	9
<i>Salix</i>	11		3	12				3
cf. <i>Salix</i>								17
Ericaceae (>36 µm)		5	2	5			6	3
Ericaceae (30-36 µm)				2			2	
Ericaceae (<30 µm)	1							
Rosaceae large (>20 µm)	19	22	42	38	4		51	5
cf. Rosaceae		2						
<i>Cornus</i>	2							
Poaceae	8	10	4	17	4	1	15	6
Cyperaceae		12	2	7	1		6	
<i>Artemisia</i>	3						4	
Amaranthaceae		1					2	1
Polygonaceae			2					
<i>Lysichiton</i>			11	28		3	25	
Apiaceae	1		1	4			1	1
<i>Sanguisorba</i>	1							

	263-265 (X)	265-270 (XIa)	279-284 (XIa)	288-291 (XIb)	291-293 (XIb)	294-297 (XIc)	307-312 (XIc-XII)	345-363 (XII)
Unknown herb	3							
<i>Nuphar</i>							1	
<i>Lycopodium</i>								2
<i>Cryptogramma</i>			1					
Trilete smooth	2	2	9	6			6	
Monolete fern verrucate	3	2	4	5	3	1	14	1
Monolete fern rugulate			1				1	
Monolete fern undiff.	18	91	90	168	21	10	84	12
<i>Sphagnum</i>		1						
Unknown		4		1	2			2
Exotic (<i>Lycopodium</i>)	-	28	261	140	4184	4129	1512	7711
Total (Exotic/Aquatics)	359	649	430	558	66	27	350	72

Appendix C Hałzaqv Newsletter Prepared for Hałzaqv Nation

N'ÚLÁWITXV

Triquet Island



Aerial view of Triquet Island and the Ektb-9 site, an important Haítzaq village in N'ÚlÁwítxv Tribal Area and the Hakaí Lúxvbáíls Conservancy, on the outer coast of Haítzaq Territory, Central Coast, British Columbia.

The Haítzaq village site at site Ektb-9 on Triquet Island is a persistent place of human occupation. The village site, and the island (Ákaí) more broadly, have been occupied and cared for by Haítzaq Nation year after year, for thousands of years (hsηxhíalá). Haítzaq ancestors (gálágiwa) built foundations for their houses (gvúkv) using layers of shell (cícxvpát). Over time, they created more livable space on the island (Ákaí). Haítzaq ancestors (gálágiwa) also built rock walls on the tidal flats to manage and harvest fish and other marine resources. This newsletter (láláxiλayv) shares Haítzaq history (núym) for the the N'ÚlÁwítxv Tribal Area and some of our key results and interpretations (λυjúyayv) derived from our work at the site.

14,000
years of
Haítzaq
núym

"In the beginning there was nothing but water and ice, and a narrow strip of shoreline."

A núymas layaxšv gaíglis nálayaxv (story about the beginning of time when the world was created) shared by a member of the Killer Whale clan who originates from the N'ÚlÁwítxv tribal area.

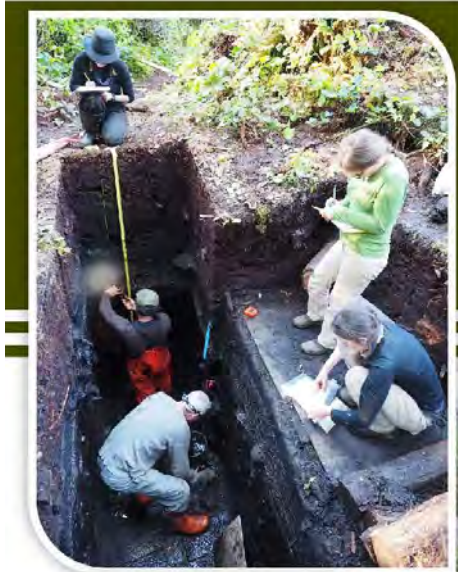
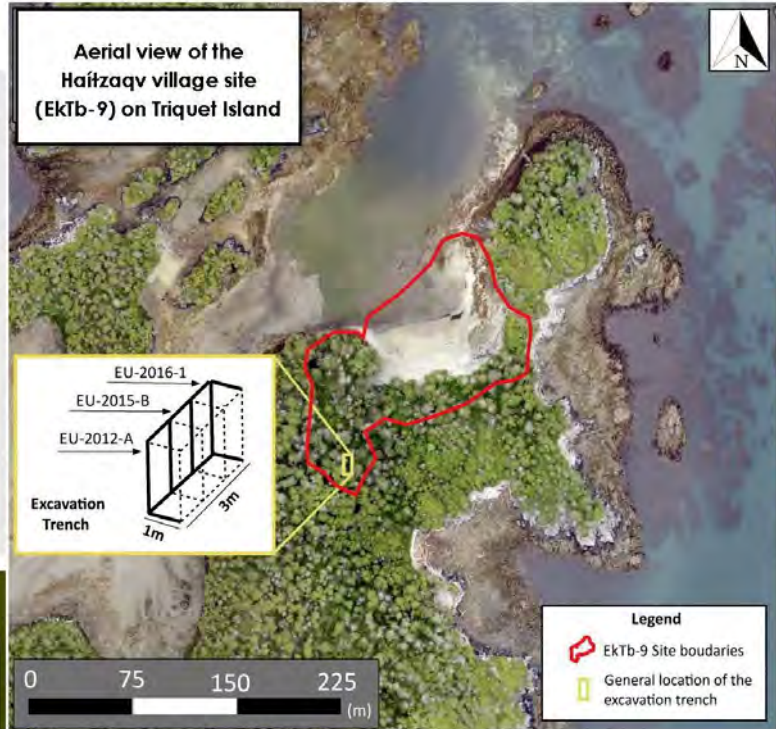
Gvixsdmáx yis
nálayaxv layaxšv
qváxi tgvánmíhaxv.

"That is the way the world was when man began."

Hoffman Harris
Interview in 1968,
HCEC

The site was registered in 2009 and more archaeological work was conducted between 2011 and 2017. There are currently no plans or active permits for additional work at the site.

The largest test area was the excavation trench at the southern extent of the site. The trench consisted of three 1 x 1 m units that formed a 1 m wide by 3 m long trench. Other tests conducted at the site include shovel tests and coring tests.



< Alisha Gauvreau, Dr. McLaren, Angela Dyck, Seonaid Duffield and John Maxwell conducting a column sample in the excavation trench in 2016.



^ Kelly Windsor and Dr. McLaren extracting core samples in 2011.



^ Andrea Walkus wet screening cultural sediments on the beach.



< Maxwell Johnson Jr. preparing to conduct a vibracore test at EkTb-9 in 2017.

The sea level has been relatively stable in the Núláwítx̄v area for the last 14,000 years.

Work at the site has revealed that the island (ǎkaf) was an open shrubby landscape with rocky shores (wú'á) when it was first inhabited by Haítzaqv ancestors (gálágiwa). Around 5,000 years ago cedar trees (dñ'yás) were present on the island (ǎkaf) and it transitioned to the temperate rainforest we know today.

A núym̄ from NÚLÚ re-affirms the name of the Núláwítx̄v Tribal Area and explains the origins of the ancestors of the Núláwítx̄v. This núym̄ was told by Ai'waget (Káwázít)/ Ellen Anderson (née Douglas), a Núláwítx̄v descendant, and was transcribed by Anthropologist Franz Boas in *Bella Bella Tales* (1932):

In NÚLÚ lived a Killer Whale with a human face. Yágis, who had also the name Haítm̄lisa, came down from the sky and arrived in NÚLÚ. He said to the Killer Whale, "Who is older in this world, you or I?" The Killer Whale replied, "When we came into life there were no place names. We were the first ones to come into this world". Then Yágis said, "You must be the first of men, and therefore this place shall be called NÚLÚ.

Then the Killer Whales became men. They were the ancestors of the No'loidexu (Núláwítx̄v). They always had plenty of food at Wuiga (Calvert Island) and at the Wuigaxstú River. And they also had plenty of food which they obtained at the Sea Otter Rocks, Sisiumt or wáwis.



< View of the rock wall fish trap at site EkTb-3, located a short walk away from site EkTb-9. This would have been used to harvest marine fish.



▲ Maxwell Johnson Jr., Seonaid Duffield, and Aisha Gauvreau conducting a vibracore test at the site in 2017.



▲ Larissa Dixon in front of the rock wall fish trap at EkTb-3 on Triquet Island (southwest of EkTb-9) during the final site visit in 2019.

Haítzaqv ancestors (gálágiwa) harvested a variety of marine and terrestrial animal species on the island (ǎkaf) and other areas nearby.

Sea-mammals, shellfish, and near-shore fish species such as herring (wání ái), greenling (Máglís), and rockfish (lá'k' álá) and other marine and terrestrial species were harvested over thousands of years.

A few bones from a domesticated dog (w'ác) were also found at the site, indicating that Haítzaqv ancestors (gálágiwa) were bringing their dogs (w'ác) to the village (gvuxvdñ'á) in their dug-out canoes (há'álákv).

Several stone and wooden artifacts and a few bone artifacts have been collected from the site and will be stored at the Haítzaq Cultural Education Center in Wáglisla (Bella Bella, BC).

Las dúqnlá qux̄n f̄is̄máx̄n...

Do you now see these stones...

P̄áyúá yis gálayats tgvánm̄

The tools of the first people.

P̄áúq̄alami yis gálayats p̄ála tgvánm̄hax̄i

They are actually the creation of the one who first made man

P̄áúq̄alami q̄n q̄ix̄n gálaya q̄vax̄'it la wáx̄n:wúisax̄n

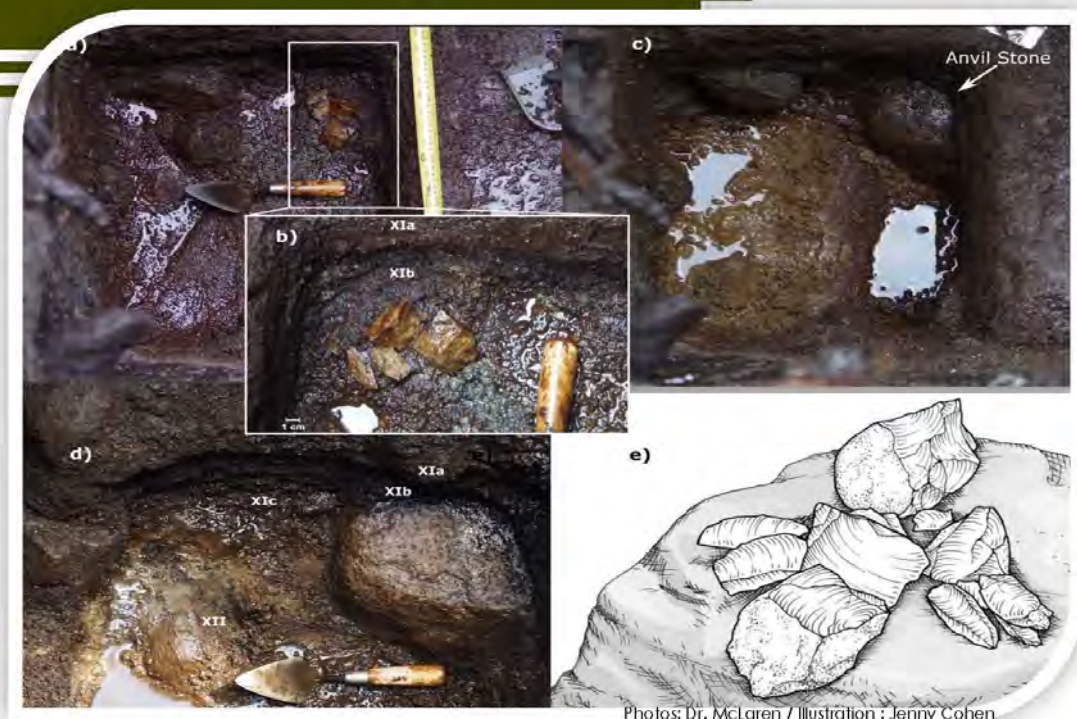
They are created for those born first in this area.

(Hoffman Harris 1968, HCEC)



A cluster of stone artifacts was found resting on an anvil stone (shown below) and is associated with the earliest date from the site.

14,802 – 13,478
years ago



Obsidian artifacts including a small scraper, a flake, and three microblades. Obsidian was sourced to Bes But'a (Anahim Peak), located approximately 206 linear km northeast of Triquet Island.

A small fragment of a carved wooden stick wrapped with bark. An obsidian microblade may have been attached to the end of it to create a cutting tool for precise work.

v



^ A sandstone abrader used for sharpening knives and other tools as well as a graphite nodule used to create pigment for artwork.

^ Guvi'ba (Josh Vickers) holds up one of several carved wooden points collected from the site. Smaller points may have been used as gorges attached to weighted lines to catch bottom feeding fish. Larger points may have been used as spear points.





Three time periods have been identified for the site history.

The late Pleistocene-early Holocene period is called the **Gálgja Phase** (arrive on the beach phase) (~ 14,000 – 8,000 years ago), or *layási gálgja* the time when the first People arrived at the island (*ákdá*).

The early to mid-Holocene period is called the **Cícxvpát Phase** (layers of shells phase) (~ 8,000 – 5,500 years ago); a time where shell is better preserved at the site.

The mid to late Holocene period is called the **Dnyás Phase** (cedar phase) (~ 5,500 – 400 years ago), or *layási dnyásit dnyásañ* the time when the western red cedar became more abundant.

< North wall of the excavation trench in 2016. Roman numerals indicate the stratigraphic layer designations.

The earliest date from the site comes from layer XIb, a buried forest floor (paleosol) associated with the cluster of stone tools.



A 2015 Field Crew (left to right): Dale Cross, Andrea Walkus, Guv'ba (Josh Vickers), Alisha Gauvreau, John Maxwell, Cal Abbott, Jenny Cohen, Daryl Fedje, Rika Shinkai, Dr. Tomonori Kanno, Dr. Naoto Yamamoto, and Dr. Duncan McLaren.

Giáxsixá! (Thank you!)

Special thanks are owed to the Hailzaqv Nation, the Hailzaqv Integrated Resource Management Department, the Hailzaqv Guardian Watchmen, the Hailzaqv Tribal Council, the Hailzaqv Cultural Education Center, and the Hailzaqv Language Group for their support, collaboration and guidance. The Hailzaqv Language Group was instrumental in the identification of Hailzaqv words that were representative of the three cultural phases identified for the site. The Hailzaqv Guardian Watchmen continue to monitor the site to preserve the area for use by current and future generations.

Many thanks also to Eric Peterson and Christina Munck for coordinating the generous financial and logistical support for the project through the Tula Foundation and the Hakai Research Station. Fieldwork conducted between 2011-2017 was based out of the Hakai Institute located on Calvert Island (Wuiga). We also wish to thank the Hakai Ancient Landscape Archaeology Project field crew members, and colleagues at the University of Victoria's Department of Anthropology and Simon Fraser University.

To find out more about our work at Ektb-9, you can read our publication at <https://doi.org/10.1016/j.jasrep.2023.103894>

and explore the Hakai Institute's website at <https://inquest.hakai.org/>

For additional inquires, please contact: William Housty william.housty@hakai.org and Alisha Gauvreau alisha@uvic.ca

Appendix D Additional Haíłzaqv / Haíłzaqvıa Resources

Qnts núym - Our History and Story

<https://heiltsuknation.ca/our-history-and-story/>

Haíłzaqvıa Revitalization Programs

<https://heiltsukrevitalization.com/>

Haíłzaqv Cultural Education Centre

<https://hcec.ca/index.php/home-page/>

Haíłzaqv Integrated Resource Management Department

<https://www.hirmd.ca/>

Haíłzaqv Tribal Council

<https://heiltsuknation.ca/>

Háíłzaqvıa Adult Immersion

<https://heiltsukrevitalization.com/programs/hai%c9%abzaqv%e1%b8%b7a-adult-immersion/>

The Haíłzaqv Language and Culture Mobilization Partnership

<https://heiltsuk.arts.ubc.ca/>

Híłzaqvıa Mother Tongues Dictionary

<https://mothertongues.org/heiltsuk/dictionary/#/home>

First Voice Haíłzaqvıa Home Page

<https://www.firstvoices.com/explore/FV/sections/Data/Wakashan/Hailhzaqvıa/Hailhzaqvıa>

Húyat

<https://www.hauyat.ca/home.html>

Sacred Journey Travelling Exhibit

<https://sacredjourneyexhibit.com/>

Glwa Resurgence of the Ocean-Going Canoe

<https://www.glwafilm.com/>

Appendix E Site EkTb-9: Additional Resources and Select Coverage

<https://triquet.hakai.org/>

This website was co-developed with the Hakai Institute with input from the HIRMD working group (see Acknowledgements Section). The website focuses on the results of our work at EkTb-9, Triquet Island. It includes an interactive infographic with videos, audio clips, and images.

https://www.academia.edu/35335663/Long_term_culture_landscape_development_at_EkTb_9_British_Columbia_Canada

This is a link to the poster that I prepared and presented at the Society for American Archaeology Conference in Vancouver, BC in 2017.

<https://hakai.org/guest-post-view-archaeology-japan/>

This is a link to an article written by Rika Shinkai that reports on our Japanese colleague's visit to the Hakai Institute and Triquet Island in 2015.

<https://martlet.ca/archaeologists-and-heiltsuk-community-brace-for-next-public-release/>

This is a link to a news article written in 2018 by Mike Graeme (The Martlet, University of Victoria) that describes some of the challenges we faced regarding some of the more sensationalized media coverage centred on site EkTb-9.

<https://www.smithsonianmag.com/smart-news/one-oldest-north-american-settlements-found-180962750/>

This is a link to a news article written by Brigit Katz (Smithsonian Magazine) that details some of the work undertaken at site EkTb-9 and some of the implications of our findings.

<https://www.cbc.ca/news/canada/british-columbia/archeological-find-affirms-heiltsuk-nation-s-oral-history-1.4046088>

This is a link to a news articles written by Roshini Nair that details some of the work undertaken at site EkTb-9 and some of the implications of our findings.

<https://anthrosource.onlinelibrary.wiley.com/doi/abs/10.1111/AN.412>

This is a link to a news article written by Bob Muckle (Anthropology News; American Anthropological Association) that details some of the work undertaken at site EkTb-9 and some of the implications of our findings.

<https://www.sciencefriday.com/segments/a-14000-year-old-discovery-emerges-from-oral-history/>

This is a link to a podcast hosted by Ira Flatow (Science Friday) that explores some of the work undertaken at site EkTb-9 and some of the implications of our findings.

Appendix F Glossary of Technical Terms⁹¹

Ae Horizon	A type of A horizon characterized by the eluviation of clay, or organic matter alone or in combination. When dry, it is usually lighter colored than an underlying B horizon.
Ah horizon	An A horizon enriched with organic matter, that is darker and/or has more organic Carbon.
Archaeological site	Archaeological sites are locations where former human activity is manifested. Possible evidence of events within sites includes structural features, artifacts, macro-, and microscopic flora and fauna, as well as molecular evidence such as lipids, DNA, and stable isotopes.
Artifact	A general term for a portable item made or given shape by humans, such as a tool or a work of art, especially an object of archaeological interest. Such objects can be made of stone, bone, shell, wood, metal or plant fibers.
Assemblage	An assemblage is an archaeological term meaning a group of different artifacts found in association with one another / in the same context. An assemblage is a group of artifacts recurring together at a particular time and place and representing the sum of human activities during that time.
B Horizon	The B horizon is a mineral horizon that is affected by pedogenic processes characterized by enrichment from organic matter or clay; or by the development of soil structure; or by a change of color denoting hydrolysis, reduction, or oxidation.
Bg Horizon	The Bg horizon has dulled, grayish colors and/or prominent mottling within 50 cm of the soil surface, indicating permanent or periodic intense reduction. These horizons are most often found in depressional areas subject to frequent saturation.
Bulk Sample	Sediment samples collected from specific targeted areas while excavating or from stratigraphic sections.
C Horizon	A C horizon is a mineral horizon, and it is comparatively unaffected by the pedogenic processes operating in A and B horizons, except the process of gleying (Cg) and accumulation of calcium and magnesium carbonates (Cca) and more soluble salts (Cs, Csa). Marl, diatomaceous earth, and rock with a hardness ≤ 3 on Mohs' scale are C horizons.

⁹¹ These definitions are largely verbatim with slight modifications and have been pulled from the following sources: Canadian Society of Soil Science 2020; Duffield 2017; McKechnie 2013; Pennock et al. 2015; Renfrew and Bahn 2008; Szabó 2017; Watkinson and Corfield 2008.

Column Sample	Small (typically 10 x 10 cm) vertical ‘column’ of archaeological sediment sampled from the sidewalls of an excavation area.
Diatom	Diatoms are single-celled silica-based organisms. They occur either as solitary cells or in colonies, which can take the shape of ribbons, fans, zigzags, or stars.
Do Horizon	Anthropic (human-made) horizon that has been significantly modified physically and/or chemically by human activities.
Dof Horizon	Horizon visibly disturbed by human activity; fibric organic material; peatland.
Dofc Horizon	Horizon visibly disturbed by human activity; with fibric material that are readily identifiable to botanical origin; peatland; partially cemented pedogenic horizon.
DOm Horizon	Horizon visibly disturbed by human activity; organic material is partially altered both physically and biochemically.
Duric	This strongly cemented horizon usually has an abrupt upper boundary to an overlying podzolic B or to a Bm horizon and a diffuse lower boundary. Cementation is usually strongest near the upper boundary, which occurs commonly at a depth of 40 to 80 cm from the mineral surface. The color of the duric horizon usually differs little from that of the moderately coarse textured to coarse textured parent material, and the structure is usually massive or very coarse platy.
Fauna	The animals of a particular region, habitat, or geological period.
Feature	A non-portable expression of human activity. Some examples from the NWC include hearths, stone wall fish traps, petroglyphs, post holes.
Flora	The plants of a particular region, habitat, or geological period.
LFH Horizon	An organic horizon developed primarily from the accumulation of leaves, twigs, and woody materials with or without a minor component of mosses. Normally associated with upland forested.
Macrobotanical	Macrobotanical remains are archaeological plant remains that are large enough to be seen with the naked eye. These remains usually range in size from several centimeters (e.g., wood charcoal and tubers) down to 250 µm (e.g., very small seeds).
NISP	Number of identifiable specimens. Unit applied in faunal analyses to describe the total number of skeletal specimens that have been identified to family, genus, or species level. NISP does not include “unidentified

specimens”, which are quantified under the more general category “NSP” (number of specimens).

Pollen grains	Pollen is a powdery substance produced by flowers of seed plants. It consists of pollen grains, which produce male gametes. Pollen grains are produced by seed plants (angiosperms and gymnosperms), and spores by ferns, lycopods, horsetails, mosses and fungi. They are produced in generally very large numbers during the reproduction process, and are dispersed by wind, water and animals. Pollen and spores are made up of an extremely resistant organic material. They preserve well and thus the pollen and spore associations in sediments give us a very detailed overview of the complex vegetation and climate history of the past.
Provenience	The place of origin or earliest known history of something.
Relative Abundance	The percentage of an assemblage of a particular specimen or group of specimens within a specific category and/or of the larger assemblage. Also referred to as “relative frequency”, or % NISP.
Shell Midden	Shell middens are deposits composed primarily of molluscan shells, and often include other materials such as fire altered rock, faunal remains, artifacts, decaying organic material, and charcoal. Although they are most frequently thought of as comprising the refuse of ancient human meals, shell piles can also be accumulated through other cultural behaviors such as building and terraforming activities. Shell midden sites are found in coastal, near coastal and intertidal or other submerged environments.
Specimen	The intact or fragmentary remains of floral or faunal elements (e.g., intact, or fragmented bone, shell, seeds, needles, cones, vegetal artifacts). Specimen is used to refer to faunal remains (bone) as skeletal elements recovered from archaeological contexts are often fragmentary and the various pieces can be quantified more than once. Specimen is used to refer to floral remains (seeds, vegetal artifacts) for the same reason.
Strata/ Stratum	Strata is plural / Stratum is singular. Refers to discrete layers of natural or cultural deposits encountered below surface.
Stratigraphy	Stratigraphy is the study of sub-surface layers of natural and cultural deposits.
Taphonomic processes	Includes all the events that happen to an organism following death, its burial, and removal from the ground. Different examples of these processes include transport, surface weathering, and movement of elements by animals. Taphonomic processes include necrolysis (the breakup of organisms after death), biostratinomy (the burial process itself), and diagenesis (the post-burial transformation of the organic material).

Taxa / Taxon	Linnaean categorization system that is used to sort and described fauna (animals) and flora (plants) at genus level designations.
Ubiquity	Frequency of occurrence or the percentage of contexts in which a certain item is present versus absent.
Vertebrate	An animal of a large group distinguished by the possession of a backbone or spinal column, including mammals, birds, reptiles, amphibians, and fishes.
Vibracore	Vibracoring is one of many subsurface sediment- acquisition (sediment-coring) techniques, each of which fills a role dependent on task objective and environmental parameters. Vibracoring obtains sediment samples by vibrating a core barrel into the sediment.

Appendix G Haíłzaqvı́a Glossary

This glossary was compiled and/or verified by members of the Haíłzaqv Language Program. It provides Haíłzaqvı́a words/names for Haíłzaqv sub-groups, tribal areas, village sites, flora, fauna, canoes, and phrases mentioned in this dissertation.

<i>Haíłzaqvı́a</i>	Translation / Explanation
Haíłzaqv sub-groups and tribal areas	
<i>Ñúłáwıtı́xv (No'loidexu)</i>	People of the oldest place in the world; a local Haíłzaqv sub-group who later amalgamated with the Wúyalıtı́xv sub-group when relocating to the village of Qı́c; outer central coast
<i>Qvúqvayáıtı́xv</i>	People of the calm water; one of the five local groups in Haíłzaqv territory
<i>Wúyalıtı́xv</i>	People of the outside; one of the five local groups in Haíłzaqv territory
<i>Xı́ı́s</i>	Down river People; one of the five local groups in Haíłzaqv territory
<i>Yı́sdáıtı́xv</i>	People of the inlet; inside water People; one of the five local groups in Haíłzaqv territory
Places	
<i>Húyat</i>	Network of Haíłzaqv villages sites along Fannie Cove on northern Hunter Island, BC
<i>Qı́c</i>	Old Bella Bella, Campbell Island, BC
<i>Ñúlı</i>	The eldest; mentioned in several oral narratives and is believed to be associated with an important village site, EITb-1
<i>Wáglı́sı́a</i>	Bella Bella, Campbell Island, BC
<i>Wúı́ga</i>	Calvert Island, BC
Cultural Phases at EkTb-9	
<i>Ćı́cxvpát</i>	Shells of shellfish, layers of barnacle shells on a beach
<i>Dńyás</i>	Redcedar
<i>Gálgı́a</i>	Arrive on the beach
Stone tool traditions at EkTb-9	
<i>diákas</i>	Whetstone, grindstone
<i>ı́ssı́a</i>	To break, smash a stone in half
Phrases	
<i>núyńas laýaǵsı́xv gaı́glis ńalayaǵı́xv</i>	Story about the beginning of time when the world was created

<i>layasi gálgla</i>	When they arrived on the beach
<i>layasi qvaxʔit dhýásaaxi</i>	When the redcedar started to grow
<i>layntxv diáka diákasax̃</i>	When we sharpened tools on whetstones and grindstones
<i>Layntxv gálgla</i>	When we arrived on the beach
<i>Layntxv tssiá</i>	When we smashed rocks to make stone tools

General

<i>Haítciístut</i>	To turn things around and make things right again
<i>wálaqvlá</i>	Discussion
<i>Yímás</i>	Hereditary Chiefs
<i>Gññ? Ala</i>	Big waves and large swells of water
<i>lúluýayú</i>	Interpretation

Fauna

<i>lak' alá</i>	Spiny dogfish
<i>ł' alá</i>	Porpoise
<i>Bála</i>	Albatross
<i>lamú</i>	Perch
<i>Bála</i>	Albatross
<i>Čígílagǎ</i>	Shore bird
<i>é itáw' í</i>	Cormorant
<i>Głñ</i>	Weasel
<i>Gvúma'</i>	Ratfish
<i>kvñ' á</i>	Mink
<i>k' vsłs</i>	Wolf
<i>Mágłís</i>	Bottom fish
<i>máwák'</i>	Sea lion
<i>miá'</i>	Salmon
<i>Msł' gñ</i>	marten
<i>nałm</i>	Ling cod
<i>hñgáx̃</i>	Goose
<i>Núkví</i>	Northern Fur Seal
<i>páis</i>	Arrowtooth flounder / starry flounder
<i>p' uái</i>	Pacific Halibut

<i>w' áć</i>	Domestic Dog
<i>wáñ áí</i>	Pacific Herring
<i>qámíłá</i>	Deer
<i>q' asá</i>	Sea otter
<i>qvǵvúqv</i>	Swan
<i>q' váǵvíná</i>	Spiny dogfish
<i>sáǵvṃ</i>	Harbor Seal
<i>ǵ áwí</i>	Loon

Flora

<i>ǵáqvíás</i>	Alder
<i>ǵíña</i>	Shore pine
<i>ǵmǵás</i>	Western yew
<i>díwás</i>	Yellow cedar
<i>dnyás</i>	Western redcedar
<i>ǵ'wát</i>	Water lilies
<i>ǵlíǵlá</i>	Grass
<i>ñíwas</i>	Sitka spruce
<i>káláx</i>	Fern
<i>Kíbat</i>	Red elderberry
<i>Kvkvúkv</i>	Skunk cabbage
<i>lúqvas</i>	Western hemlock
<i>máwáı́as</i>	Douglas-fir
<i>płm̄s</i>	Moss
<i>Qvǵvı́łayás</i>	Willows

Canoes

<i>ǵ'wa</i>	Canoe
<i>ǵcái</i>	River canoe
<i>háǵákv</i>	Dug-out canoe
<i>h'ı́waci</i>	Seal hunters canoe
<i>pkvúñǵv</i>	Borrowed canoe
<i>kvaǵsáı́á</i>	To sit in a canoe
<i>háǵsgı́ı́</i>	Good canoe builder
<i>ı́atm̄ssı́la</i>	To repair an old canoe

<i>há'aká'á</i>	Sound of canoe building
<i>lálúttiwalayá</i>	To try to get off the canoe
<i>k'vágiwa</i>	To sit in the bow of the canoe
<i>g'íxs</i>	In the canoe for a long time
<i>g'wá'á</i>	Going by canoe; using a canoe
<i>máisa</i>	To spear cockles from the canoe
<i>q'íxsá</i>	To lift a person into a canoe
<i>q'úxvs</i>	Water in the canoe, bilge water
<i>k'va'x'á'á</i>	To sit at the stern of the canoe
<i>há'á</i>	To build a canoe up in the woods
<i>x'á'ás</i>	Hole in the canoe caused by bailing
<i>λ'x'í's</i>	To start off from the beach in a canoe
<i>í'amá'mas</i>	Old, moldered canoe that is beyond repair
<i>lámútti'wá</i>	To go out of the canoe (said of group)
<i>há'gútti'wá</i>	To empty the canoe, to go all out of the boat
<i>húk'vá'á'i</i>	To stop on the water (said of a canoe)
<i>λ'x'í'á'kv'á'</i>	To be travelling along (said of a canoe)
<i>x'í'x'asu'á'la</i>	Bumping against each other (said of canoes)
<i>λ'x'á'</i>	To put the crosspiece on the canoe
<i>há'wániqkv</i>	Canoes tied together and covered with boards
<i>bá'xvbutí'á'</i>	Deep in the water at the bow (said of a canoe)
<i>λ'x'í'csa</i>	To slide a canoe down to the beach
<i>λ'x'á'á'</i>	To start off, set out on the water (as a canoe)
<i>λ'x'á'</i>	To shove, slide, slip as a canoe; to plane
<i>há'wáni'x'pít</i>	To start to tie canoes together and cover them with boards
<i>bú'ł'á'</i>	Loaded down at the bow (as a canoe), hanging one's head down
<i>tá'g'v'v'v</i>	Covering sheet to keep the sun out of the canoe; tarpaulin
<i>há'yá'kia'x'si</i>	To bend (fold, double) over an edge (as when bending over the edge of a canoe)
<i>í'má'</i>	To sew wood together with cedar withes (e.g., the beams of a canoe)
<i>Há'wáni'qa</i>	To tie canoes together and cover them with boards (to form a platform upon which to move the slabs of the longhouse)
<i>qá'qá'pá</i>	To try to, prepare for or be on the verge of turning over a container or container-like thing (such as a cup, a basin, a canoe)