



MUSQUEAM INDIAN BAND
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November 15, 2017

Jocelyne Beaudet
Chairperson
Roberts Bank Terminal 2 Review Panel

Dear Ms. Beaudet,

Re: Roberts Bank Terminal 2 (RBT2) - Musqueam Knowledge and Use Study of the Roberts Band Terminal 2 Project

Introduction

On behalf of the Musqueam Indian Band (“Musqueam”) please find attached a copy of the *Musqueam Knowledge and Use Study of the Roberts Band Terminal 2 Project* (“the Study”). We are providing you with our own self-funded Study to ensure that you are provided with substantive community-based research that assesses the interactions between all components of the Roberts Band Terminal 2 Project (“the Project” or “RBT2”) and Musqueam rights and current use of lands and resources for traditional purposes (“CULRTP”).

Due to lack of funding from the Proponent and the inadequate and flawed assessment of Musqueam CULRTP that appears in the Vancouver Fraser Port Authority’s (“VFPA” or “the Proponent”) Environmental Impact Statement (“EIS”), we have been compelled to rely upon our limited resources to undertake this supplementary work. The Study concludes that the Project is likely to result in residual adverse effects to Musqueam lands and waters, use of lands and waters, practice of Aboriginal rights (including culture), and Musqueam well-being. In addition, the Study acknowledges that a cumulative effects assessment is required before the severity of potential adverse impacts on Musqueam’s rights-based activities and culture can be properly characterized. We request that you accept this Study and its findings to inform your evaluation of the Project’s potential impacts on Musqueam rights and CULRTP.

Study finds that Project has clear potential to infringe Musqueam rights

The Study shows that Musqueam members use or have used the Project footprint for a range of rights-based activities, including fishing, collecting shellfish, hunting, and harvesting plants. Additionally, there are numerous areas within the Project Local Study Area (LSA) and Regional Study Area (RSA) used for the inter- and intra-generational transfer of knowledge and skills that support the cultural continuity of Musqueam. Musqueam site-specific values were found to be most dense in the northern portion of the Study Area, especially around the site of the proposed RBT2 terminal and along the coast between the Project footprint and Point Grey, as well as inland along all arms of the Fraser River. Further, many project-impact pathways, such as disruption of migration routes, disruption of tidal flows, habitat impacts from sedimentation, were identified in relation to priority fish species of special cultural concern. The Study provides detailed findings that identify project/use interactions and impact pathways for the following Musqueam CULRTP valued components (VCs):

- Fishing (e.g., salmon, crabs, eulachon, white sturgeon, prawns);
- Coastal harvesting (e.g., shellfish and subsistence and medicinal plants);
- Hunting (e.g., ducks, geese, pheasants); and
- Cultural Continuity (e.g., identity, sense of place, knowledge transmission).

The Study concludes that the interactions are likely to result in adverse effects on all Musqueam CULRTP VCs and Aboriginal rights, including Musqueam's proven fishing rights (i.e., *Sparrow*).

Inadequacy of EIS to assess Project impacts on Musqueam CULRTP

We undertook the Study due to the inadequacy of the EIS to utilize a credible methodology and approach for assessing project impacts to our rights and CULRTP. As detailed in our November 3, 2017 memo to the Panel (see enclosed), Section 32 of the EIS, *Potential or Established Aboriginal and Treaty Rights and Related Interests, Including Current Use of Lands and Resources for Traditional Purposes* ("Section 32"), is an unreliable assessment of Musqueam's CULRTP. Flaws in the Proponent's CULRTP assessment for Musqueam include, but are not limited to, the following:

1. No meaningful research into characterizing "current conditions" baseline information;
2. Omission of the current conditions of Musqueam's CULTRP, thereby grossly underestimating existing total effects loading on Musqueam CULRTP within the Project LSA and RSA;
3. Inappropriate reliance upon non-CULRTP VCs as proxies for CULRTP effects, rather than basing its analysis on the interactions between Musqueam VCs and Project components;
4. Analysis omissions of Project impact-pathways and adverse interactions with Musqueam rights-based activities;

5. Failure to take into consideration how project intersects with Musqueam rights, rights-based harvesting and cultural activities.
6. The generic analysis found in subsection 32.6.2, not specific to Musqueam, is inappropriately substituted as the impact analysis for Musqueam in subsection 32.3.2.2;
7. No Musqueam-specific project-CULRTP interactions have been included in the analysis that informs the conclusions;
8. Flawed identification of mitigation: Using a methodologically unsound practice, the Proponent has treated its own yet-to-be defined proposal for “future discussions” related to consultation and accommodation as a form of mitigation that the Proponent suggests would, sight unseen, offset all adverse residual effects on Musqueam CULRTP (and related rights-based practices);¹ and
9. Incorrect analysis characterizing post-mitigation residual effects of the Project.

In addition to failing to document direct project-specific Project Facility residual impacts on Aboriginal rights and associated CULRTP, Section 32 also omits any assessment of cumulative effects, as required under the *Canadian Environmental Assessment Act, 2012 (CEAA 2012)* for assessing 5(1)(c) effects. It also fails to provide any “contextual” analysis related to the seriousness of adverse effects on Aboriginal rights or incorporate the Aboriginal perspective, as required under common law.

In contrast to the failings of the CULRTP assessment in the EIS, the Study provides a Musqueam-specific analysis, based on interviews with over 30 community members, with consideration of the current context for Musqueam CULRTP, as well as a focus on the expected interactions between the Project and Musqueam rights-based harvesting and cultural activities.

Consideration of cumulative effects on CULRTP and Aboriginal rights and interests

We maintain that marine shipping effects, facility-specific effects, and other cumulative effects causing agents must be considered in combination to understand the net effects on Musqueam rights and CULRTP. This pre-existing cumulative adverse impact context, and its implications for the ability of the receiving environment and our members to carry additional impact loading, has not been adequately captured in the work done to date by the Proponent on this Project. Rather, as noted above, the Proponent has ignored this context, effectively “skipping over” the EIS Guidelines requirements for:

¹ “Port Metro Vancouver is working with Musqueam First Nation to draft Terms of Reference to guide future discussions related to accommodation for effects from the Project”, Section 32, p. 32-116. See also reference to the Proponent’s view that “the planned accommodation agreement with Musqueam” combined with other measures, will “be effective at addressing Project-related effects to Current Use access related to crab harvesting”, Section 32, p. 32-117.

- A cumulative effects assessment on Musqueam CULTRTP;
- A significance determination on total Project-specific and cumulative effects on Musqueam CULTRTP; and
- A proper consideration of the seriousness of adverse project-specific and cumulative effects on Musqueam Aboriginal rights.

The scope of the Study that we have provided along with this letter has not included a cumulative effects assessment, but has strongly indicated the need for one. We therefore request that the Panel issue a formal Information Request to the Proponent to assess cumulative effects related Musqueam's CULTRTP, and that this request be required to be fully addressed by the Proponent prior to proceeding to public hearings. Until a cumulative effects assessment has been completed, neither the significance determination for Musqueam CULTRTP nor the assessment of seriousness of impacts on Musqueam rights can be properly concluded upon.

Closure

Thank you for taking the time to review the Study and taking its findings into consideration in your evaluation of the Project's potential impacts on Musqueam rights and CULTRTP. Musqueam looks forward to working with the Panel in the coming months on this EA. In addition, in advance of the issuance of additional information requests to the Proponent, should you or other Panel members wish to meet to discuss any of the matters that we have raised in this letter, or if you have any questions, please don't hesitate to contact me at **<email address removed>** or by phone at <contact information removed> or <contact information removed>

Sincerely,

<Original signed by>

Dianne Sparrow
Divisional Lead – Intergovernmental Affairs
Musqueam Indian Band

Technical Contact: Technical Contact: Kaitlan Lay, <email address removed>

cc.

Debra Myles, Review Panel Secretariat
Analyse Saely, CEAA, Crown Consultation Coordinator

David Grace, BC EAO

Attachments:

Musqueam Knowledge and Use Study of the Roberts Band Terminal 2 Project

Memorandum to Panel, November 3, 2016, Effects on Aboriginal Rights/Current Use of Lands and Resources for Traditional Purposes



x^wməθk^wəyəm Musqueam Indian Band

KNOWLEDGE AND USE STUDY

PORT METRO VANCOUVER'S PROPOSED
ROBERTS BANK TERMINAL 2 PROJECT

Jordan Tam PhD, Rachel Olson PhD and Firelight Research Inc.

November 9, 2017



Final Report: Musqueam Knowledge and Use Study for PMV's RBT2 Project

Prepared and authored by:

Jordan Tam Ph.D., Rachel Olson Ph.D., and Firelight Research Inc. with the Musqueam Indian Band

On behalf of:

Dianne B. Sparrow, Associate Director
Treaty, Lands, and Resources

Thanks and acknowledgements go to Musqueam Indian Band members, elders, knowledge holders, land and water users, staff, and leadership who contributed. This report could not have been completed without their support and expert knowledge.

EXECUTIVE SUMMARY

The Musqueam Indian Band (Musqueam) retained Firelight Research Inc. to conduct a traditional knowledge and use study (the Study) in relation to Port Metro Vancouver's (The Proponent) Roberts Bank Terminal 2 Project (the Project).

The Project is a proposed three-berth marine container terminal to be located directly adjacent to the existing Deltaport and Westshore terminals at Roberts Bank in Delta, BC. Roberts Bank Terminal 2 is expected to be 117 hectares in size (Port Metro Van 2013). The Proponent estimates that an additional 260 ship calls would be made per year at Roberts Bank Terminal 2 by the year 2030, from ships ranging from 5,000 TEU to 18,000 TEU (Herbert Engineering 2014).

The principal components of the Project include the construction and operation of the terminal, berths, container storage yard, rail yard, and associated facilities; expansion of the existing tug basin to accommodate a second tug operations contractor; and a widened causeway to accommodate additional road and rail infrastructure (Port Metro Van 2013). If the Project proceeds, construction will take approximately six years and require extensive dredging (Port Metro Van 2013).

This Report provides Musqueam historical and current use information and existing and anticipated Project interactions based on current and available Musqueam knowledge and use data collected within traditional Musqueam territory and the vicinity of the Project.

Analyses of site-specific data were based on the proposed Project's footprint (within 250 m), a Local Study Area (LSA; within 2 km of the proposed shipping lane and 5 km of the Project's RBT2 terminal footprint), and a Regional Study Area (RSA; within the Proponent's defined Marine Shipping Area and within 25 km of the RBT2 terminal footprint). Within the Project footprint, Musqueam members reported 69 site-specific values, while 374 were reported within the LSA (including the footprint), and 1,382 within the RSA (including the LSA and footprint). While not every site-specific value recorded included time information, reported personal site-specific values dated from the early 1900s to 2017.

Musqueam members' historical accounts indicate that the significant industrialization of Roberts Bank that has occurred since 1959 has effectively alienated Musqueam harvesters from certain portions of Roberts Bank and surrounding waters. Despite this ongoing alienation, the site-specific data show that Musqueam members use or have used the Project footprint for their rights-based activities, including harvesting of salmon, crab, sturgeon, kelp, herring, clams, mussels, oysters, ducks, geese, pheasants, bulrush, and other resources. Additionally, there are numerous areas used for the inter- and intra-generational transfer of knowledge and skills that support the cultural continuity of Musqueam. Musqueam site-specific values were most dense in the northern portion of the Study Area, especially around the site of the proposed RBT2 terminal and along the coast between the Project footprint and Point Grey, as well as inland along all arms of the Fraser River.

Through discussions and interviews, Musqueam members identified a set of Valued Components (VCs) relating to Musqueam knowledge and use that may be impacted by the Project. These were grouped into the following categories:

- Fishing (e.g., salmon, crabs, prawns);

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- Coastal harvesting (e.g., shellfish and subsistence and medicinal plants);
- Hunting (e.g., ducks, geese, pheasants); and
- Cultural Continuity (e.g., identity, sense of place, knowledge transmission).

Musqueam members identified a number of potential Project interactions with each of the Study's VCs. Major interactions and impact pathways that emerged from the Study are given below.

Project interactions with Musqueam fishing values include:

- Exacerbation of the existing pattern of alienation from fishing resources caused by industrialization, settlement, and institutional policies imposed on Musqueam territory;
- Increased risks to safety and loss of gear from marine traffic while fishing and traveling on the water;
- Increased avoidance or loss of fishing grounds due to the presence of heightened marine traffic;
- Loss of fishing grounds due to the presence of marine traffic;
- Disruptions to fishing activities due to the presence of heightened marine traffic;
- Loss of fishing grounds due to restriction and regulations to access;
- Decreased access to seafood obtained from fishing;
- Loss of valued habitat for fishing resources from marine traffic, noise, movement, and pollution;
- Contamination of fishing resources from marine traffic pollution;
- Disruption of salmon and crab migration routes and lifecycles from construction and physical occupation of the Project;
- Loss of valued habitat for fishing resources from the disruption of tidal flows;
- Increased mortality of fishing resources from the disruption of tidal flows;
- Increased mortality of fishing resources from predation (e.g., seals and sea lions);
- Increased disruption of fishing activities from siltation and sedimentation from construction; and
- Loss of access to preferred fishing and crab harvesting areas from the construction and physical occupation of the Project.

Project interactions with Musqueam coastal harvesting values include:

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- Exacerbation of the existing pattern of alienation from coastal plant and shellfish resources caused by industrialization and settlement in Musqueam territory;
- Increased mortality of coastal plant and shellfish resources due to pollution generated from marine shipping;
- Increased contamination of coastal plant and shellfish resources due to pollution generated from marine shipping;
- Loss of viable habitat for coastal plant and shellfish resources due to pollution generated from marine shipping;
- Loss and disruption of historical, social, and cultural values associated with the avoidance of coastal harvesting activities due to pollution generated from marine shipping;
- Increased mortality of shellfish resources from dredging and construction, including the generation of silt and deposition of sediments; and
- Loss of viable habitat for shellfish resources from dredging and construction, including the generation of silt and deposition of sediments.

Project interactions with Musqueam hunting values include:

- Exacerbation of the existing pattern of alienation from hunting resources caused by industrialization and settlement in Musqueam territory;
- Loss of waterfowl habitat from wakes generated by marine shipping;
- Disruption of waterfowl movement and behavior from lighting and noise;
- Avoidance of hunting and restriction on hunting of waterfowl in the vicinity of the Project; and
- Loss of habitat for waterfowl from the construction and physical occupation of the Project.

Project interactions with Musqueam cultural continuity values include:

- Multigenerational exacerbation of the existing pattern of disruptions to cultural continuity caused by industrialization, settlement, and institutional policies;
- Decreased willingness and ability by Musqueam members to access the Project area due to Project-related marine traffic;
- Increased anxiety and fear regarding safety in the Project area due to the presence of Project-related marine traffic;
- Decreased willingness and ability by Musqueam members to access the Project area due to increased regulations;

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- Disruption and constraint of ceremonial and spiritual practices dependent on access to and harvest of natural resources;
- Lost opportunities for the transmission of traditional knowledge and practices, especially in the vicinity of the Project;
- Disruptions to Musqueam members' sense of place, identity, and spirituality;
- Loss of archaeological and heritage sites from the construction and physical occupation of the Project; and
- Disruptions to the social fabric of the community built from and around the practice and transmission of traditional activities.

When the physical works and activities required by the Project are considered alongside data reported in this Study, evidence indicates that Project interactions have the potential to constrain and adversely impact Musqueam rights practiced in the footprint, LSA, and RSA over multiple generations.

In addition, Project-based effects would occur in a context of existing, long-term, multi-source, and large-scale adverse impacts on Musqueam territory, rights, and interests, as identified by Musqueam members. Musqueam members provided a wide range of examples of how these cumulative effects have already substantially impaired their ability to practice Aboriginal rights in much of their territory. When combined with historical alienation from previous industrial development within Musqueam territory and marine shipping on and out of Roberts Bank and in the Salish Sea in general, the proposed physical works and activities required by the Project, the data collected in this study indicates that the additional Project interactions have a high potential to further constrain Musqueam rights practiced in the LSA and RSA over multiple generations. A full cumulative effects assessment is therefore strongly recommended to supplement this study.

This Report may contribute to, but is not a replacement for, other studies that may be required to support consultation.

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ACRONYMS AND ABBREVIATIONS

BC	British Columbia
CEA	Cumulative Effects Assessment
CEAA	Canadian Environmental Assessment Agency
CV	Curriculum Vitae
EA	Environmental assessment
EAO	Environmental Assessment Office
Firelight	Firelight Research Inc.
GIS	Geographic information system
IR	Indian Reserve
km	Kilometer(s)
LSA	Local study area
m	Meter
n.d.	No date
PhD	Doctor of Philosophy
PMV	Port Metro Vancouver
the Project	Roberts Bank Terminal 2 Project
the Proponent	Port Metro Vancouver
RBT2	Roberts Bank Terminal 2 Project
TEU	Twenty-foot equivalent units
TUS	Traditional use study or studies
VC(s)	Valued component(s)
ZOI	Zone of influence

1. INTRODUCTION

1.1 OVERVIEW

Firelight Research Inc. (Firelight) is pleased to provide this knowledge and use study (the Study) report (the Report) to the Musqueam Indian Band (henceforth Musqueam) for the Roberts Bank Terminal 2 Project (the Project) proposed by Port Metro Vancouver (the Proponent).

This Report provides baseline information and consideration of anticipated Project interactions based on current and available Musqueam knowledge and use data collected about the traditional lands and waters of Musqueam, with a focus on the area around the Project (the Study Area). This report includes non-confidential site-specific (i.e., mapped) and qualitative information related to Project area.

This Report is organized into five sections:

- Section 1 provides a brief overview of the scope of work and report limitations;
- Section 2 provides background information regarding Musqueam and the Project;
- Section 3 provides information on the methods used in the Study;
- Section 4 presents the findings, including site-specific and qualitative data, and potential interactions from the Project; and
- Section 5 summarizes the findings and conclusions.

1.1 SCOPE OF WORK

Musqueam retained Firelight to support an Indigenous knowledge and use study in relation to the Project. The scope of this work included:

- Detailed budgeting, scoping, work planning, preliminary meetings with Musqueam leadership and staff, and project management;
- Data and document review of existing and available data relating to the Study Area, and review of the Proponent's proposed Project documents;
- Development and tailoring of interview and mapping methodologies for the Study;
- Interview-based data collection followed by data verification and analysis; and
- Final reporting, including supporting Musqueam staff on communications to Musqueam leadership and members.

This Study is based on data collected through Project-specific interviews as well as on supplementary site-specific data held by Musqueam that is relevant to Musqueam knowledge and use values identified within the LSA and RSA. These additional studies are listed in Section 3.2.

The primary goals of the Study are to provide:

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- Reliable and defensible use and occupancy mapping, and documentation of Musqueam knowledge and key issues or concerns in the area of the Project;
- Documentation of Project-specific and cumulative effects of marine shipping on Musqueam's rights-based marine harvesting in relation to the Project (however, Project-specific and cumulative effects on Musqueam marine harvesting for trade was not within the scope of this Study);
- A non-confidential final report (this Report) prepared for consideration by Musqueam, the Proponent and regulators, to be submitted to Musqueam.

1.2 LIMITATIONS

Limitations of this Report include the following:

- Information provided herein is the most current available to Musqueam. However, one important limitation is that not all knowledge holders were able to participate in this Study. Efforts were made to include key knowledge holders active within the LSA and RSA.
- Data collected for each participant is limited by what the participant is able and willing to report.
- Site-specific mapped values (e.g., fishing routes and hunting kill-sites) reflect particular instances of use that anchor wider practices of culture, livelihood, and other Aboriginal rights within a particular area. For example, a single salmon fishing set (i.e., one deployment and retrieval of a net) may be mapped with a precise line, but that line does not capture the entire spectrum of related practices and values. Therefore, the area demarcated by mapped site-specific values should be understood to be a small portion of the actual area required for the meaningful practice of Musqueam way of life, as well as Aboriginal rights.
- GIS footprint and activity data regarding the Project requested from the Proponent for this Study were not provided in time to be integrated in the Study's data collection phase. Instead, the Project footprint used in data collection was limited to the main physical works identified by the Proponent in publicly available documents (e.g., Environmental Impact Statements). Ancillary developments such as access roads may be expected but were not identified spatially by the Proponent prior to the conduct of this Study and therefore were not considered part of the physical footprint. The lack of detail on the location and nature of ancillary development components and precise shipping routes available for this Study require that the analysis herein be considered conservative, with actual effects likely to be greater than predicted.

Given the above limitations, this Report can be used as a representational spatial account of only some Musqueam use in the Study Area. It is important to note that the Study does not reflect all Musqueam current use in those areas, and therefore **absence of data does not signify an absence of use or value.**

Final Report: Musqueam Knowledge and Use Study for PMV's RBT2 Project

This Report is based on the understandings and analyses of the authors and is not intended as a complete depiction of the dynamic way of life and living system of use and knowledge maintained by Musqueam members.

This Report is non-confidential and intended for consideration by regulators and the Proponent. However, all data included in this Report is the property of Musqueam, and may not be used or reproduced outside the Project regulatory process without the written consent of Musqueam.

Nothing in this Report should be construed as to waive, reduce, or otherwise constrain Musqueam rights within, or outside of, regulatory processes. Nor should this Report be construed as to define, limit, or otherwise constrain the Aboriginal or Treaty rights of other First Nations or Aboriginal peoples. It should not be relied upon to inform other projects or initiatives without the written consent of Musqueam.

2. BACKGROUND

2.1 MUSQUEAM INDIAN BAND PROFILE

Musqueam identity is closely linked to the Fraser River. Their name, Musqueam, or məθkʷəy̓, translates to “People of the River Grass”, signifying the grasses that grow through the Fraser River delta and tidal flats (Musqueam Indian Band 2007).

Musqueam is a ‘Band’ under the Indian Act with traditional, ancestral, and unceded territory located in what is now the city of Vancouver and surrounding areas in the province of British Columbia (Wilson 2015). Musqueam has three registered reserves: Musqueam IR2 (the largest reserve, also known as the ‘Musqueam Indian Reserve,’ located south of Marine Drive at the mouth of the Fraser River); Musqueam IR4 (located in Ladner); and Sea Island IR3 (located on the northwest corner of Sea Island at the outlet of the north arm of the Fraser River) (AANDC 2015; Musqueam 2011). Musqueam’s administrative center and principal community are located on Musqueam IR2. Musqueam currently has approximately 1,383 registered members, with approximately 672 members living on Musqueam IR2 (AANDC 2015).

Musqueam oral tradition establishes ancestral connections to the lands and waters of the region from time immemorial (Musqueam Indian Band 1976; Roy 2007). Musqueam IR2 was the site of an important historical village documented by Simon Fraser during his descent of the Fraser River in 1808, with archaeological evidence indicating habitation at the site for more than 3,000 years, and continuous occupation through the present. Additional settlements were also located along the river system of the delta, south of Musqueam IR2, and in Burrard Inlet to the north (Kew 1970).

Musqueam members are part of the regional Coast Salish cultural group and traditionally spoke həñqəmiñəñ, also known as Downriver Halkomelem, a dialect of Halkomelem of the Salishan language family (First Peoples’ Language Map of British Columbia 2005; Ham 2014; Wilson 2015). The Coast Salish cultural group is historically made up of interconnected families, alliances, and linguistic identities that extended past village boundaries to encompass larger geographical, cultural, and spiritual spaces (Roy 2007).

2.1.1 Traditional Uses of the Land and Water

Musqueam’s traditional territory is described in the Musqueam Declaration of 1976:

We, the Musqueam people openly and publicly declare and affirm that we hold Aboriginal title to our land, and Aboriginal rights to exercise use of our land, the sea and fresh waters, and all their resources within that territory occupied and used by our ancestors, namely:

The lands, lakes and streams defined and included by a line commencing at Harvey Creek in Howe Sound and proceeding Eastward to the height of land and continuing on the height of land around the entire watershed draining into English Bar, Burrard Inlet and Indian Arm; South along the height of land between Coquitlam River and Brunette River to the Fraser River, across to the South or left bank of the Fraser River and proceeding downstream taking in the left bank of the main stream and the South Arm to the sea, including all those intervening lands, islands and waters back along the sea shore to

Harvey Creek, and the sea, its reefs, flats, tidal lands and islands adjacent to the above described land and out to the center of Georgia Strait... (Musqueam Indian Band 1976)

Musqueam's traditional territory is a temperate zone including river deltas, eelgrass channels, rocky intertidal areas, marshes, and the open waters of the Strait of Georgia, all of which previously contained an abundance of resources (Kew 1970; Ham 2014). Evidence from archaeological sites between the Fraser River and Boundary Bay and from oral histories and place names demonstrate the abundance and importance of sea life for Musqueam people. The four largest archaeological sites in the Fraser River delta reveal a complex system of harvesting and dependency on delta ecological resources by Musqueam people dating back at least 3,500-4000 years, and cultural history in their traditional territory dating to at least 8,000 years (Musqueam Band Council 1984; Ham 2014; Musqueam Indian Band 1976; Roy 2007). Kew (1970) describes the wide variety of food resources that were used by Musqueam people:

The climate was mild, precipitation moderate; there was an abundance of fish, sea mammals, game, and a variety of vegetable foods. There was regional variation in the availability of resources according to the proximity to the sea, to large salmon streams, to parklands frequented by elk or favorable for the growth of edible lilies, and so on... As Kroeber (1939) has pointed out, this was an area unique in North America for its natural resources and for its dense Aboriginal population in the absence of horticulture. In its center lived the Musqueam. (Kew 1970, p. 12-13)

Resource use by Musqueam people continues today. It is seasonal, and "occurs on the water when the fish are running upriver, in the forest while collecting cedar bark, in the marsh during duck hunting season..." (Wilson 2015, p. 44). Kew also describes seasonal patterns of resource use:

Prior to the coming of the white man the spring and summer months were periods of intense activity as the successive migrations of fish arrived and the various root and berry crops ripened. The fall was an extension of this intense period of activity, but one in which the preservation of food—particularly the late running and easily drying species of salmon—demanded great attention. The winter was a time of relative leisure and surcease from movement. It would be misleading to affirm, however, that at this time there was complete respite from the work necessary to keep physical wants satisfied. Fishing and hunting was carried on throughout the year, and there was always a multitude of chores for women—weaving blankets, sewing rush mats, making baskets, and so on. A continual supply of wood had to be gathered by the men to heat the large houses. But the winter was the season in which much time and effort was devoted to ceremonies. (Kew 1970, p. 33)

In the past, these resources were accessed through year-round and seasonal settlements, which included numerous sites along the Fraser River delta (Kew 1970; Ham 2014). Distribution and sharing of food and goods was also an important part of Musqueam resource use, allowing access to an even wider range of foods and materials. This distribution often occurred through inter-village marriage alliances and potlatches. Ceremonies such as these were continued by Musqueam in spite of the potlatch ban in 1910 and were critical to the survival of their culture (Bierwert 1999).

But, the riches of specific places and seasons were widely shared through a complex socio-economic system which combined seasonal movements of people, legitimate access to resources over a wide area, effective means of food preservation, and finally, the exchange of the diverse products from different areas through the potlatch systems. (Kew 1970, p. 12-13)

In the early 1900s, working at the cannery was integrated into Musqueam's seasonal round. Springtime involved skinning and drying pelts, digging roots, and collecting bark. Summers were characterized by fishing for salmon, cutting wood, basket making, berry picking, working in the cannery, and travel. The fall also involved working at the cannery in addition to drying salmon and picking hops, and winter activities included skinning and drying pelts, knitting, or making baskets. Later, cars and boats with motors were also used to facilitate access to traditional activities. The dependence of Musqueam people on a wide range of natural resources from the land and sea did not, however, shift markedly with these changes. Kew describes this pattern of resource use:

... Musqueam households supplied themselves with considerable quantities of fresh and dried salmon, smelts, oolachens [i.e., eulachons], clams, ducks, geese and deer ... some families preserve considerable amounts of such fish [i.e., salmon] by freezing, home canning and salting. Deer are hunted on trips made by boat to the Gulf Islands, or by car to the mountainous areas north of Vancouver, and ducks are still hunted on the rush covered tidal flats in front of the village. (Kew 1970, p. 32-33)

Within these patterns of resource use, salmon and other fish were particularly important for Musqueam people. The Fraser River is a migratory route for all five species of Pacific salmon; spring or chinook, coho, sockeye, pink, chum, and also steelhead and cutthroat trout, and the Fraser River was one of the most productive salmon rivers in the world (Ham 2014; Fraser Basin Council 2016). These fish were extremely important for Musqueam people as a staple food, as well as being important for trade and identity. Access to this resource fluctuated seasonally, with salmon spawning in the Fraser River between spring and early winter, and migration reaching its peak in August and early September (Ham 2014). Musqueam people stored salmon for the winter, so this food source was a staple even outside of the migration periods.

The importance of salmon and other fish as an integral part of life, culture, and economic systems for Musqueam is well documented, and is described by Ham (2014), "The Musqueam depended upon fish for a major portion of their annual diet, as well as for surpluses that could be traded" (p. 12), and Musqueam Band Council (1984):

The significance of salmon and other maritime food resources in the Musqueam economy has been confirmed by archival documents, the research of archaeologists and anthropologists, and the recorded oral history of the Musqueam. The critical resource was the catch of the five species of Pacific salmon as well as steelhead caught at the customary fisheries in the lower Fraser River area. (Musqueam Band Council 1984, p.33)

Shellfish beds were another crucial resource for Musqueam people, particularly in English Bay, Burrard Inlet, Tsawwassen Beach, Point Roberts, and Boundary Bay (Ham 2014). Shells found in the Crescent Beach archaeological site (a shellfish and herring camp traditionally used by Musqueam), along with a 1913 report from the Commissioner of Fisheries, show that the Boundary Bay area once supported extensive and healthy shellfish beds (Ham 2014).

Furthermore, they outline the dependency of Musqueam people on intertidal resources, which included “clams, chitons, cockles, mussels, crabs, octopus, sea urchins, and seaweed” (Musqueam Band Council 1984, p. 34). Clams were the most abundant in Musqueam traditional territory, and salmon and sturgeon were used as trade items for shellfish (Woolman 2014).

At the end of perhaps a 2-3 week stay at kwə'səwəl or qwəmeyəs, [Whalen Farm and Crescent Beach, which were seasonal and occasionally year-round shellfish and herring settlement sites] people would return to Musqueam with wooden boxes and baskets filled with fried clams, sturgeon and spring salmon, in a good season enough both for food and trade. Some herring would be preserved as well, also by drying it on a stick, but it had to be consumed relatively soon. (Ham 2014, p. 8)

The location of Musqueam at the mouth of the Fraser River delta is deeply entwined with Musqueam oral histories, cultural identity, and position in historical trade networks. At time of contact, Musqueam had rights over salmon harvesting and other resource-harvesting areas in the lower Fraser River, and certain protocols existed that regulated access to these areas based on kinship and inter-village ties (Musqueam Band Council 1984). Protocols that determine access rights continue today, and other First Nations seeking access to waterways and resources in Musqueam's territory must apply through the Musqueam Fisheries Department (Woolman 2014). The 1990 *Sparrow* decision¹ recognizes Musqueam members' rights to fish in their territory, while the Comprehensive Fisheries Agreement between Musqueam and the Federal government, in place since 2001, acknowledges Musqueam marine harvesting throughout a wide area, including Roberts Bank and portions of the Salish Sea.²

2.1.1.1 Historical Industrial Development on Musqueam Territory

Over the past 150 years, Musqueam members have experienced an exceptionally high level of impacts brought about by industry, urban expansion, and associated issues.

As documented by Kew (1970), industrial development affecting Musqueam dates back to at least the mid-19th century; beginning with salmon canneries, logging, sawmills, and residential settlement. Such development led to profound displacement and dispossession of Musqueam people, whose numbers had already been reduced due to diseases brought to their region by European colonization.

First, new villages came into being with the growth of the sawmills and Indians moved to these centres from the older villages ... Secondly, as white towns became incorporated and Indian reserves established, the Indians moved or were moved to reserves, in effect, back to the old villages ... In general the authorities discouraged Indian “squatters”. For example, in 1887 the Canadian Pacific Railway cleared from its land grant, which took in most of the waterfront of Vancouver, a largely Indian settlement known as the “Kanaka

¹ <https://scc-csc.lexum.com/scc-csc/scc-csc/en/item/609/index.do>

² Comprehensive Fisheries Agreement, (FA 2001-1040), Chief Ernie Campbell, Musqueam Indian Band, Michael Alexander, A/Director General, Aboriginal Policy and Government, Department of Indian Affairs, signed August 1, 2001.

Rancherie" ... Thirdly, censuses show a reduction in the total population of these 'villages' in the last decade of the 19th century, which was a continuation of the long-term decline which began with the arrival of the white man and continued into the 20th century... (Kew 1970, p. 18-19)

The establishment and expansion of the city of Vancouver was, and continues to be, the largest driver of change in land-based portions of Musqueam territory, as increasing amounts of land and wetlands were taken up for residential areas, industrial zones, public parks, and agriculture.

... it was the building of the transcontinental railroad and the emergence of Vancouver as a major port and commercial city, which spelled out the course for the future. In 1886, the year the railroad arrived, the city of Vancouver was incorporated—a collection of frame shacks and stores stretching along a muddy track which skirted the southern shore of Burrard Inlet. (Kew 1970, p. 24)

The city's forests fell rapidly, bogs were drained and streetcar lines and suburban white homes crept steadily South and West. (Kew 1970, p. 25)

The coastline in the region was also heavily impacted, with Musqueam's traditional resource harvesting areas being converted to busy ports, residential areas, and public beaches. The river system of the delta was also heavily modified through dredging and canalization to allow shipping, jetties disrupting flow patterns, and the sealing off of other previously free-flowing areas. Industrial fisheries also placed pressure on many species traditionally harvested by Musqueam people.

Many key fish species have declined markedly in the region. Musqueam people depended on salmon, steelhead, sturgeon, eulachon and numerous other fish species for cultural and subsistence use for thousands of years. However, all of these species are now facing severe declines or are currently inaccessible for Musqueam people, partially due to habitat degradation and the industrialization of fisheries (Musqueam Band Council 1984; Cohen 2012; LFFA 2015). Regulations (sometimes self-imposed) aimed at conserving some species also further limit Musqueam's ability to harvest these fish. Harvesting coho is currently restricted, and limits have also been placed on spring stocks by Musqueam fisheries in a collaborative conservation effort with upriver bands (Woolman 2014). Pollution from industry and residential areas has also led to a decline in quality of many traditionally used resources, leading to a complete loss of use of these resources for Musqueam people. This includes the closure of all clam beds along the coastline from Boundary Bay to Canoe Pass and Westham Island at the mouth of the south arm of the Fraser River (Ham 2014).

Meanwhile, access to remaining resources is often severely limited, as in many areas resource harvesting is either banned, impossible, or highly impractical and unpleasant due to industrial and residential areas, heavy shipping, recreational use of waterways, busy public beaches, and other urban and industrial land and water uses that are incompatible with traditional harvesting. This combination of reduction in quantity and quality of resources, and greatly restricted access to resources that remain, currently puts intense pressures on Musqueam's cultural continuity and their ability to practice their way of life.

In summary, as a result of these changes, Musqueam people witnessed a severe decrease in natural resources within their territory, a decrease in the overall quality of those resources, and a decrease in access to the harvestable resources that remained. Musqueam members have been entirely alienated from the use of most of their traditional territory, with only portions of the Fraser estuary and the Salish Sea remaining (though in diminished capacity) as locations where Aboriginal rights harvesting practices can be meaningfully exercised.

2.2 THE PROJECT

The Roberts Bank Terminal 2 Project, herein referred to as 'the Project', is a three-berth marine container terminal proposed for an area immediately adjacent to the existing Deltaport and Westshore terminals at Roberts Bank in Delta, BC (Port Metro Van 2013). It would be approximately 35 kilometers south of Vancouver, 36 kilometers from Musqueam's IR2, and approximately six kilometers from Musqueam Indian Reserve 4. Roberts Bank Terminal 2 is expected to physically occupy 117 hectares (Port Metro Van 2013).

The principal components of the Project include the construction and operation of the terminal, berths, container storage yard, rail yard, and associated facilities; expansion of the existing tug basin to accommodate a second tug operations contractor; and a widened causeway to accommodate additional road and rail infrastructure (Port Metro Van 2013).

If the Project proceeds, construction will take approximately six years and require extensive dredging (Port Metro Van 2013). Construction of the Project would include: dredging of in-situ soils; densification of in-situ soils; disposal at sea of suspended fines and excess water from dredgeate; dredging of an underwater temporary transfer pit; temporary storage of Fraser River dredgeate; and dredging to expand and deepen the existing Roberts Bank tug basin (Port Metro Van 2013). Perimeter and interior dykes would also be constructed for the terminal area. Along with infilling, dyke construction would occur over four years (Port Metro Van 2013).

The spatial/physical occupation of the terminal (and ancillary facilities) would be indefinite, as would Project operations, the latter of which would include increased sensory disturbance (light, sound, vibration), as well as increased large vessel and tug traffic and associated impacts (Port Metro Van). More specifically, operations would include the berthing of ships; movement of tugs between the tug basin and terminal berths; discharge of ballast water from ships; 24-hour lighting; truck and train traffic; storm water collection and discharge; sanitary sewer collection, treatment, and discharge; and maintenance dredging (Port Metro Van 2013).

The Project is anticipated to expand Port Metro Vancouver's container capacity by 2.4 million twenty-foot equivalent units (TEU) per year; almost double the PMV's existing capacity (Herbert Engineering 2014). The Proponent estimates that 260 ship calls would be made per year at Roberts Bank Terminal 2 by the year 2030, from ships ranging from 5,000 TEU to 18,000 TEU (Herbert Engineering 2014). Ship traffic from Roberts Bank Terminal 2 and Deltaport terminal together is expected to total around 572 ship calls by 2030, alongside 313 ship calls by coal bulk carriers at the Westshore terminals (Herbert Engineering 2014).

3. METHODS

3.1 VALUED COMPONENTS

Data collection and analyses for this Study are organized around four Valued Components (VCs). A VC is defined as an important aspect of the environment that a project has the potential to affect (Hegmann et al. 1999). VCs may include tangible or biophysical resources (e.g., particular places or species), and may also encompass less tangible social, economic, cultural, health, and knowledge-based values (e.g., place names, Indigenous language, or traditional knowledge regarding a particular area).

For the purpose of this Study, the VCs were chosen to represent the critical conditions or elements that must be present for the continued practice of Musqueam culture and livelihoods, and that may be impacted by the Project. As such, VCs can range from the direct presence of traditionally hunted animals and gathered plants, to continued habitation, travel, and cultural activities on the land or water. VCs are also designated to include intangible cultural resources, such as the transmission of knowledge across generations. VCs for this Study are:

- Fishing (e.g., salmon, crabs, prawns);
- Coastal harvesting (e.g., shellfish and subsistence and medicinal plants);
- Hunting (e.g., ducks, geese, pheasants); and
- Cultural Continuity (e.g., identity, sense of place, knowledge transmission).

These VCs were determined through an analysis of data collected by Firelight with Musqueam for this Study.

For the purposes of this Study, “coastal” areas include the foreshore (between the mean low and high water marks), the backshore (above mean high water mark and only exposed to waves under extreme events with high tide and storm surge), and the coastal hinterland (defined for this Study as the area above the backshore up to a distance 1 km inland, where the ecosystem and Musqueam gathering and hunting practices are closely tied to coastal and marine environments).

3.2 USE AND OCCUPANCY MAPPING INTERVIEWS

initial primary data for this Study was collected through Project-specific mapping interviews with 31 Musqueam members. Interview teams prioritized the documentation of values within the Local Study Area (LSA; within 5 km of the proposed Project footprint and 2 km of shipping lanes), and those in close proximity of the Project. Values within and beyond the Regional Study Area (RSA; within the Proponent's identified Marine Shipping Area and within 25 km of the Project footprint) were documented where time and opportunity permitted.

Interview participants were identified and contacted by Musqueam staff. Participants were chronologically assigned identifier codes in the form of M##. Informed consent was obtained for all interviews (see the Consent Form in Appendix 1).

Interviews followed a semi-structured format, including open-ended and closed questions (see the Interview Guide in Appendix 2). Interview and mapping protocols used were based on standard techniques (Tobias 2009; DeRoy 2012). All interviews were conducted in English; all audio was recorded digitally.

In addition, supplementary site-specific data held by Musqueam relevant to Musqueam knowledge and use values identified within the LSA and RSA was incorporated into the Study. This data was obtained through additional mapping interviews conducted with Musqueam members between August 2016 and August 2017. All interviews followed the same methodology as described in Section 3.2.1 below.

3.2.1 Site-specific Data Collection and Analysis

For the purpose of this Report, *site-specific data* are values reported by Musqueam members that are specific, spatially distinct, and that may be mapped (however, exact locations may be treated as confidential).

Site-specific data were mapped and managed using a 'direct-to-digital' process, in which Google Earth imagery was projected onto a wall or screen. Points, lines, or polygons, geo-referenced at a scale of 1:50,000 or finer, were used to mark areas of reported use and value. Data collection focused on the proposed Project's footprint (within 250 m of the Project, and where available, related physical works, access routes, and activities), LSA, and RSA. See Figure 1 for a map of the Project and the Study Area.

Maps of site-specific values presented in this Report are generated from data mapped during the interviews. Points are randomized within a 250 m radius and then buffered by one kilometer. A one-kilometer buffer is also generated around each line and polygon. Buffering is done to account for a margin of error and to protect information confidentiality.

Site-specific data were mapped according to five categories (or 'Activity Classes') that were designed to capture multiple aspects of the Study's VCs:

- Habitation values (including temporary, occasional, seasonal, and permanent camps and cabins);
- Cultural and spiritual values (including burial sites, ceremonial areas, and community gathering areas);
- Subsistence values (including harvest and fishing sites, plant collection areas, and shellfish collection areas);
- Environmental feature values (including specific, highly valued habitat for salmon, herring, and ducks); and
- Transportation values (including trails, water routes, and navigation sites).

The temporal boundaries set for Musqueam use data collection include past, current, and planned future knowledge and use. For the purpose of this Study:

- A past value refers to an account of knowledge and use prior to living memory, passed down through history;
- A current value refers to an account of knowledge and use within living memory; and
- A planned future value refers to anticipated or intended knowledge or use.

3.2.2 Qualitative Data Collection and Analysis

Qualitative data were also collected during the semi-structured interviews. The environmental and cultural values of Musqueam members that may be impacted by the Project (baseline) and the potential impacts from the Project on these values (Project interactions) were explored.

Audio from the interviews was transcribed. Transcripts were then reviewed, coded thematically, and analyzed for issues and concerns identified by Musqueam respondents. These data are summarized in Section 4.2.

4. RESULTS

4.1 MAPPING INTERVIEW RESULTS

4.1.1 Overview

In total, the site-specific values of 59 unique individuals were found within this Project’s Study Area (i.e., RSA), and included in this Report. The site-specific data clearly demonstrate that Musqueam members use or have used the Project footprint for fishing, collecting shellfish, hunting, and collecting plants. Additionally, there are important areas used for the inter- and intra-generational transfer of knowledge and skills that support the cultural continuity of Musqueam. Musqueam interviewees also commonly emphasized the vital nature of the Salish Sea west of the existing Deltaport and Westshore terminals and south of Canoe Pass as habitat, not only for salmon, but also crabs, eulachons, waterfowl, and sea mammals.

Table 1: Musqueam site-specific values reported within the Project footprint, LSA, and RSA of Port Metro Vancouver’s Roberts Bank Terminal 2 Project. Numbers are cumulative with increasing spatial scales (i.e., RSA includes LSA, and footprint).

Valued Components	Within 250 m of the proposed Project (footprint)		Within 5 km of the proposed Project footprint and within 2 km of shipping lanes (LSA)		Within 25 km of the proposed Project footprint and the Proponent’s Marine Shipping Area (RSA)	
	# of reported values	% of reported values	# of reported values	% of reported values	# of reported values	% of reported values
Fishing	43	62%	166	44%	545	39%
Coastal Harvesting	8	12%	32	9%	156	11%
Hunting	13	19%	108	29%	239	17%
Cultural continuity	5	7%	68	18%	442	32%
TOTAL	69	100%	374	100%	1,382	100%

4.1.2 Total Reported Site-specific Values

A total of 1,382 site-specific values are reported in the Study Area (the Project footprint, LSA, and RSA combined; see Table 1).

As noted in Section 1.3 of this Report, **an absence of data does not signify an absence of use or value**. In addition, sampling was limited; not all Musqueam knowledge holders were able to participate. The above limitation is a necessary consideration when interpreting the geographic

distribution and quantity of mapped values. It is possible that new information regarding use by Musqueam members will become available in the future.

4.1.3 Site-specific Values Reported in the Project Footprint

Within the proposed Project's footprint, 17 Musqueam members reported 69 site-specific values. While not every site-specific value recorded includes time information, Musqueam use was reported from 1950 to 2016. Site-specific values reported in the Project footprint include:

- **Fishing** values including:
 - **Subsistence values:** catch sites for salmon (including sockeye and spring), halibut, cod (including ling cod and rock cod), crab, and prawns;
 - **Environmental values:** salmon migration routes and habitat (including feeding ground for juvenile salmon); eulachon habitat; and a movement corridor for crabs and crab habitat; and
 - **Transportation values:** water routes used for fishing salmon.
- **Coastal harvesting** values including:
 - **Subsistence values:** sites used for collecting clams and oysters, and a collection site for nettle;
 - **Environmental values:** habitat for hog fennel; and
 - **Cultural values:** sites used for the collection of medicinal plants.
- **Hunting** values including:
 - **Subsistence values:** kill-sites for ducks and geese.
- **Cultural continuity** values including:
 - **Cultural values:** areas used for the inter- and intra-generational transfer of knowledge and skills (including how and where to hunt, fish, and collect and use medicinal plants).

4.1.4 Site-specific Values Reported in the Project LSA

Within the proposed Project's LSA, 49 Musqueam members reported 374 site-specific values. While not every site-specific value recorded includes time information, Musqueam use was reported from the early 1950s to 2016.

In addition to the site-specific values described for the Project footprint, Musqueam participants also reported the following site-specific values in the proposed Project's LSA:

- **Fishing** values including:

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- **Subsistence values:** catch sites for salmon (including chum, coho, sockeye, pink, and spring), sturgeon, halibut, flounder, eulachon, crab, and prawn;
- **Environmental values:** a eulachon spawning site; a eulachon and sturgeon staging area; salmon habitat; sturgeon habitat; and eagle and osprey habitat;
- **Cultural values:** a processing site where fish are smoked; and
- **Transportation values:** water routes used for fishing.
- **Coastal Harvesting values** including:
 - **Subsistence values:** sites used for the collection of roe, seaweed, and shellfish (including mussels, clams, and cockles); harvesting sites for a variety of plants including blackberries, nettles, cattails, and bulrush;
 - **Environmental values:** habitat for scouring rush; and
 - **Cultural values:** collection sites for a variety of medicinal plants.
- **Hunting values** including:
 - **Subsistence values:** kill sites for geese, ducks, pheasants, and muskrat.
- **Cultural continuity values** including:
 - **Cultural values:** a gathering place where Musqueam members collected mussels and clams; a potential location of fishing weirs used by Musqueam ancestors; an archaeological site containing Musqueam belongings and heritage resources; a transformer site; an old village site; traditional place names; and areas used for the inter- and intra-generational transfer of knowledge and skills (including how and where to fish, collect shellfish, and hunt);
 - **Habitation values:** temporary and permanent (i.e., frequently used) campsites, as well as homes and cabins; and
 - **Transportation values:** a number of water routes used to access fishing areas and for travel.

4.1.5 Site-specific Values Reported in the Project RSA

Within the proposed Project's RSA, 59 Musqueam members reported 1,382 site-specific values. While not every site-specific value recorded includes time information, Musqueam use was reported from the early 1900s to 2017.

In addition to the site-specific values described for the Project footprint and LSA, Musqueam participants also reported the following site-specific values in the proposed Project's RSA:

- **Fishing values** including:

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- **Subsistence values:** catch sites for salmon (including spring, sockeye, coho, chum, and pink), sturgeon, smelt, eulachon, flounder, lingcod, crab, and prawn;
- **Environmental values:** eulachon spawning habitats and movement corridors; spawning areas for salmon; habitat, staging areas, and rearing areas for sturgeon and salmon; and salmon bearing streams and creeks;
- **Cultural values:** processing sites where fish are cleaned, smoked, and canned; and
- **Transportation values:** a number of water routes used for fishing.
- **Coastal Harvesting values including:**
 - **Subsistence values:** areas used for berry picking, including blackberries, huckleberries, blueberries, hawthorn berries, cranberries, and other species; areas used for the collection of other plant foods such as dandelion, saskie, kelp, and seaweed; and areas used for gathering shellfish, including clams and mussels;
 - **Environmental values:** valued salt marsh habitat and habitat for shellfish (i.e., clams, oysters, and crabs); and
 - **Cultural values:** areas used for the collection of medicinal plants; areas used for the collection of plants and plant components used for artisanal and ceremonial purposes, such as nettle and bulrush; and collection sites for mosses and dye plants.
- **Hunting values including:**
 - **Subsistence values:** kill-sites for ducks, geese, and pheasants; kill-sites and hunting areas for bear, deer, rabbit, and harbor seal; and trapping sites for beaver, muskrat, and mink;
 - **Environmental values:** habitat for deer and bear;
 - **Transportation values:** trails used for hunting; and
 - **Cultural values:** a processing site for mink, muskrat, and weasel.
- **Cultural continuity values including:**
 - **Subsistence values:** spring water locations used to collect drinking water;
 - **Cultural values:** artisanal crafting sites; a birth place; burial sites of Musqueam ancestors; sites used for a range of ceremonies; community gathering places; numerous heritage resources and locations, including old village sites and documented archaeological sites; traditional place names; sacred areas and places of spiritual importance; and areas used for the inter- and intra-

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generational transfer of knowledge and skills (including where and how to fish, hunt, collect berries, harvest and use medicinal plants, and process and dry fish);

- **Habitation values:** temporary and permanent (i.e., frequently used) habitation areas, including homes, campsites, and mooring areas; and
- **Transportation values:** water routes.

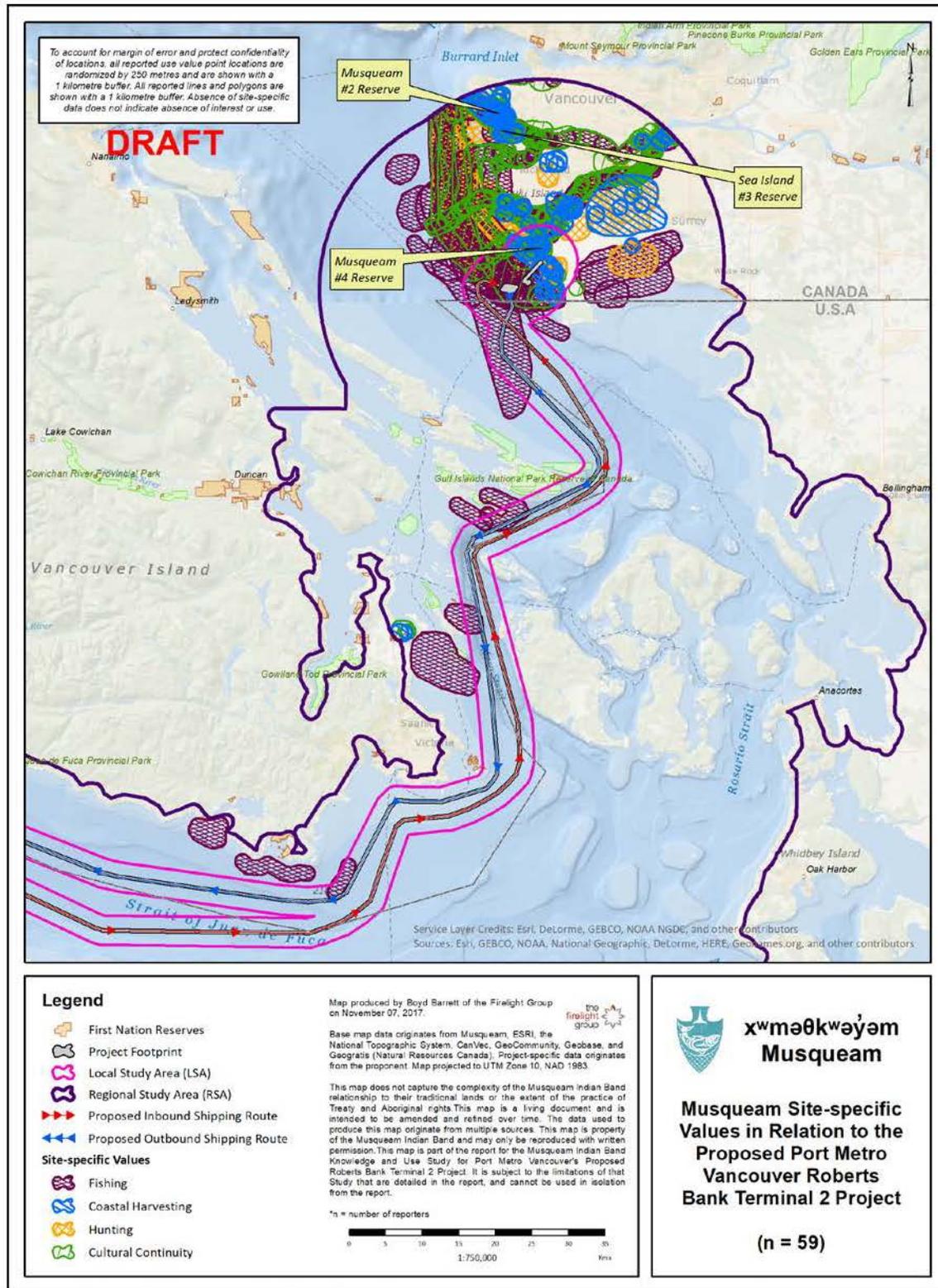


Figure 2: Musqueam reported site-specific values within the footprint, LSA, and RSA of Port Metro Vancouver's Roberts Bank Terminal 2 Project.

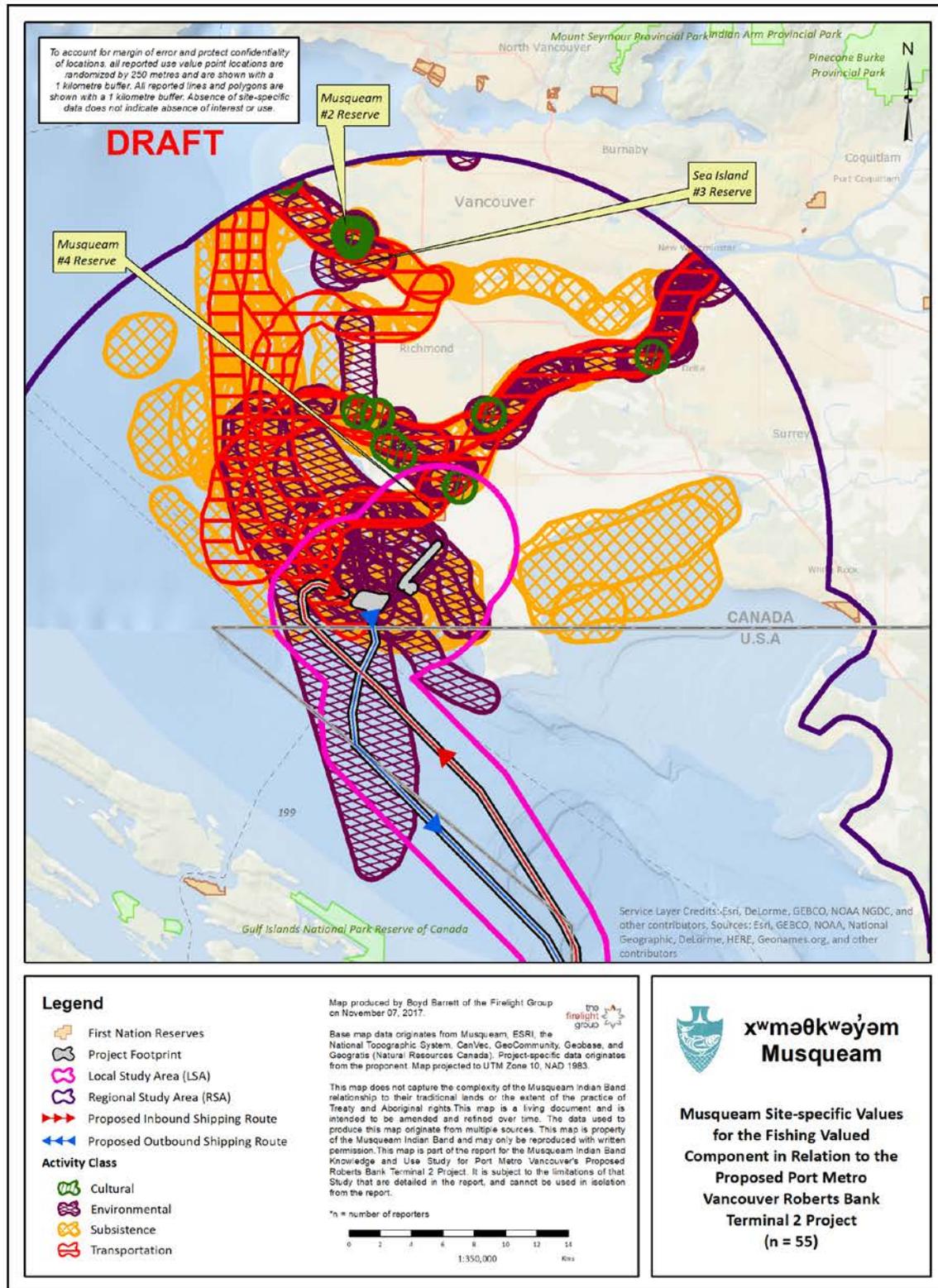


Figure 3: Musqueam reported site-specific fishing values in the Study Area.

4.2 DISCUSSION OF KEY ISSUES AND PROJECT INTERACTIONS WITH MUSQUEAM VALUED COMPONENTS

This section (Section 4.2) discusses the importance, impacted baseline, and potential Project interactions with each Musqueam Valued Component in turn. This draws primarily from the qualitative data collected during semi-structured interviews.

4.2.1 *Fishing*

4.2.1.1 Importance

Fishing is a fundamental part of Musqueam culture, a Musqueam way of life, and identity. Many Musqueam participants communicated, throughout the interviews, the importance of fishing in the ocean and the Fraser River. Interviewees frequently recounted memories from their early childhood fishing with their family members and friends, learning an art that has been passed down for generations.

Fishing's the biggest part of my life, for sure. It is my life. (M33 2016)

I used to go out [fishing] with my dad. As a matter of fact my dad was a commercial fisherman and he would go right up here. He would go right up the coast, and he had a gillnetter. Even when I was a baby, I would go fishing with my parents on his boat so I grew up fishing ... [my sons] they learned to fish with my father. So they actually learned firsthand from their grandfather. (M13 2016)

[I've been fishing] My entire life pretty much... started fishing when I was six, seven... and I started fishing on the river... probably when I was eleven I started crabbing, and then I started salmon seining with my dad when I was fourteen... then we started seining salmon out on the flats, in Roberts Bank. (M33 2016)

4.2.1.1.1 Key species

Present-day fishing in the Study Area is focused on salmon of all species, including sockeye, spring, coho, chum (or dog salmon), and pink. Crabbing (for dungeness especially) is also a major fishery engaged in by many Musqueam members within the Study Area. Prawning continues in the Study Area as well, although not at the scale of salmon fishing and crabbing.

Historically, other species such as sturgeon and eulachons were also actively sought but fisheries for these species are highly limited or no longer exist (see Section 4.3.1.2), yet remain vital to Musqueam culture. Musqueam members often reported that now-rare eulachon and herring roe on kelp are highly prized as delicacies.

Yeah, herring roe on kelp and cedar branches and everything. And they used to just go down out around Point Grey and drop their cedar boughs and stuff like that. And then if they had to they'd run over to Bowen Island and get their roe on kelp and everything. (M04 2016)

Oh my God, it was, the river would be loaded [with eulachon]. We used to go down the beach here, with buckets and get them, just with a bucket. Sometimes, the tides would go

by and wash them up on the beach. But that's how many there was, they'd get washed up. So you'd get your whole supply in a couple of days. (M31 2016)

I miss the taste if eulachons. And I still want to get spring salmon, and they'll be starting up soon. I like salmon head, or spring heads. (M15 2016)

4.2.1.1.2 Key locations

Musqueam participants reported fishing over wide swaths of the ocean and Fraser River. Traditional food fishing is especially concentrated in parts of the Salish Sea and in all arms of the Fraser River running from the Salish Sea to the Port Mann Bridge.

It'd be all the flats... well we currently have a management area defined by DFO, so ... Musqueam's fishing management area... so the Project understands our fishing area, our current imposed management area, so... it goes from here to Point Atkinson, and then it goes down through here. [Interviewer: to Point Grey area?] Yeah... and then it cuts over to Port Mann Bridge, and then it comes back around here... right at the [US] border... so it goes just north of the border, and then it cuts, and it goes straight all the way around here. All the way back to Bowen Island... Musqueam originally agreed to that salmon area as a way of managing our fishery, so its, and then they have overlaid our crab and prawn fishing using our salmon map ... (M12 2016)

See our boundary goes right from the Tsawwassen Ferry terminal over to the lightship, the, right around there somewhere ... it goes right from there over to Cape Roger Curtis. Over to Point Atkinson, over to Point Grey ... That's our salmon fishing area, and all the way up to, up to Douglas Island, Port Mann bridge ... mostly over in the south arm [of the Fraser]. (M04 2016)

All the way to the Port Mann Bridge [fishing for]... Sockeye, spring, and – oh, I went chumming last year. (M19 2016)

Horseshoe Bay there, that's Passage Island, and that's Bowen Island. We prawn fish all around in here ... Yeah, and straight across from Lion's Bay, all the way down to UBC. (M16 2016)

Notable fishing areas include: the shallow shelf found west of Vancouver, running north and south; the Roberts Bank area; and Canoe Pass, found directly north of the existing Deltaport and Westshore terminals. Crabbing occurs extensively in the shallow shelf and flats of the Salish Sea, including in Roberts Bank and by the existing terminals.

To answer your crab question, you know, we typically leave, even – there's guys who even fish even around the [Roberts Bank] terminal here, even though they're not really supposed to because it's the shipping area [Interviewer: for crab?] yeah. So they fish crab all through these flats right here, all through here. And then you can also fish them in here, around here, and there's a lot of prawn fishing around Bowen Island and Point Atkinson... (M12 2016)

Yeah, I've been crabbing in here [existing Deltaport terminal] ... I did just this last summer I was out, right there. (M09 2016)

Yeah [has fished towards Roberts Bank]. On the flats, I've fished crab out here ... It's more recent now, cause we used to go on another side. In between the south arm and north arm, but we came down in here early in the year now, more recent in the last ten years ... We eat it ... Crab move around, right. So this time of the year we do good down there, and then a little bit later we do good on the other side. (M16 2016)

We've just got them scattered out [crab traps around Steveston and Deltaport], you know, maybe ten [traps] here and about 15 here and another 30 or 40 over here ... Like there's one shelf, and then there's a little lower, where the tide gets, where they get deeper. And we fish by the last one from there all the way across, all the way over to the lightship. (M04 2016)

Canoe Pass, the Roberts Bank flats, and the waters of Tsawwassen area are also contemporary (and historic) fishing grounds for salmon and also halibut. In general however, large areas are required for fishing to accommodate for the seasonal and natural movement of fish.

[Interviewer: ... key spots along the area that we should get?] Canoe Pass... outside Canoe Pass...just right in the flats here [fishing]. Like actually, that's really shallow there. This is all the flats still right here, right. So it would be this whole area ... You see cause depending on how the tide is we might be fishing right down by the [Deltaport] terminal, and then if the tide's not good for us there then we'd be making a move and trying to find some fish here at the pass. (M33 2016)

[Interviewer: show us where you're getting the halibut?] It's hard to say, it's a big area but ... Yeah, from right off the ferry, right off the [BC] ferry terminal, out like ... you can catch them, right from the ferries ... you're allowed there. Just close to the border. (M27 2016)

[By the current Roberts Bank terminal] we can fish, when we go for pinks, they gather up there sometimes ... they'll gather along the drop off ... you can trap them on the flats a little bit, that's why – they go up on the flats and then when the tide changes they shoot off the flats, you know. And then when they shoot off the flats they'll come down, like they'll push out, or they'll just shoot straight off. (M17 2016)

Ya we fished a lot on the North Arm, basically what we'd do is when the tide was running out we'd fish out in this area and down further off and right down into the – off of Tsawwassen. And then when the tides started coming in that's when the fish started moving up into the north arm and the main arm [of the Fraser River], so we'd move in – and as I say we did a lot of our fishing here on the north arm, we didn't ignore the main arm, sometimes we'd go fish there – depended on how the fish were moving. (M06 2016)

4.2.1.1.3 Key habitat

The aforementioned areas are highly valued habitat for salmon and crabs, and many other species including waterfowl. Many Musqueam members reported that the zone at the mouth of Canoe Pass, hemmed in by the existing Deltaport and Westshore terminals to the south, is a critical staging area for migrating salmon. Furthermore, Canoe Pass and the greater Fraser River and Salish Sea are highly regarded by Musqueam members as culturally vital and key salmon migration routes.

So I talked about the salt marshes up along. There's also some down here at Tsawwassen. Musqueam and Tsawwassen are two of the last places that still have salt marshes. There are still little patchy places around the rest of the estuary but the biggest one's are at Musqueam and Tsawwassen. And as I said, that's important habitat for such things as Great Blue Herons, all different species of waterfowl. Also important for the salmon, the smolts when they come down and stop in the salt marshes and spend a lot of time in the salt marshes, acclimatizing to the salt water. Because if they go straight into the salt water they'll die. (M06 2016)

Yeah ... there would be chum, sockeye, pink salmon, spring salmon, there's eulachon going up and down that area [Canoe Pass], you know, sturgeon heavily reliant on that area, and so those are very culturally significant species that are reliant on that area. And further environmental impacts to that area are quite concerning to a lot of our community members. (M12 2016)

Yeah, all [species] of them [salmon]. Cause they take rest on this entire [Roberts B]ank, like, before they go up the river. Like they all make their journey to get there and then they all hang out and wait for the right time when the water's the right temperature, and they've got the right tides, and then they start going up the river... so you get millions and millions of salmon congregating in this whole entire Roberts Bank. Like back when they had that last big Adams River run, every single salmon that went up that river was there on the bank for days before it went up, and that's when we're catching them is when they're coming on and off the bank ... They do that with every river before they go up... they just have to wait for the right temperature to go up the river. (M33 2016)

... there's fish that are going to be coming out of the river, like through Canoe Pass, and they're not just going to dart straight out [to the ocean]... they're going to hang around for a bit until they get a little bit bigger ... cause you can see the sports fishermen, they just nail them all year round out there. Cause those migratory springs are all year round... they're not a seasonal ... yeah, [chinook, chum and sockeye] they swim through there at their time of the year. (M33 2016)

4.2.1.1.4 Food security

Fishing and seafood are inextricably linked to the Musqueam way of life (also see Section 4.2.4) and history, and are central to the food security and broader wellbeing of the Musqueam community. For many members, fishing is an essential activity and supply line that feeds the Musqueam community physically, spiritually, and mentally.

... the real estate of greater Vancouver is only for the rich. And we are not rich in personal financial wealth. And many of our people live on close to the poverty line. Therefore, we now recognize that we really rely on that sea resource because that is what is – we fill our freezers and that allows us to carry on and we call it a happy life, you know? But if you remove that and deny us any ability then it's going to be a life changing experience. Not only from a health perspective and a way of life perspective and a historical perspective, but from a humane, social perspective as well. (Qiyəplenəx^w 2016)

Well the salmon are sustenance for us, a traditional food, one of our traditional foods, the main one as a matter of fact – It's the abundance of salmon in pre contact and early contact period that was what allowed our people to develop such a sophisticated ceremonial complex. The population here was one of the largest populations that was supported by a nonagricultural society ... (M06 2016)

It [sturgeon]'s a cross between cod and halibut. It is my favorite fish I've ever eaten in my life. And I've eaten every kind of fish in every kind of way and it is absolutely my favorites. It, is a cross between, it had that kinda nice oil richness of a cod but not that over the top and that sort of texture of halibut when you eat it. Absolutely delicious. And that was pan-fried with just a little bit of flour on the outside to keep it in there. And it was that good ... (M23 2016)

Salmon, crabs, and other species are consumed regularly and frequently, and are staples of the Musqueam diet. Many interviewed members expressed a great desire to consume and catch wild fish and seafood.

Well we would all be pretty disappointed, I would think [if wild fish was unavailable]. Couldn't have any spring salmon on the table, and no crabs, and you know – we'd have to be going and buying our own stuff from the store ... [I eat seafood] probably every second day, at least. Yeah. I eat spring salmon probably about four times a week, times a week. Yeah. (M33 2016)

I mean, I think it's common knowledge, but I think just for the record in Musqueam we've been harvesting salmon since time immemorial. I mean, that's a staple in our diet, and you take that away, that changes a lot. Yeah, I don't know if I even need to elaborate on that more. That's just the basic thing. When you grow up Musqueam, I mean, salmon is the – I grew up, honestly [interviewer's name], I grew up thinking salmon was peasant food, I really did, because we had it all the time. Because that's what was in our freezer all the time. And it wasn't until I went and hung out at non-Native friends' houses and they'd get excited because they're having salmon for dinner, where I was like ... What are you getting excited about? ... it's just common knowledge that salmon is our life. I mean, it really is. It's probably the main source of food for us, I'll go as bold as saying forever. Obviously we had other things, but I mean, that's number one, and it's always been number one. (M19 2016)

Sharing of the catch is also a common practice, especially the supply of fish and crabs to elders. The sharing of seafood is crucial not only for the wider food security of the community, but also helps to build social ties among Musqueam members.

It [crabbing] was, it would be for the needs ... it would be myself and my grandma, my aunt, my grandpa had passed at that time, but you know, more of my immediate family. So I was basically taking care of my family. My needs would be go out and get 'X'. My boat was also quite smaller at the time too. (M23 2016)

It's pretty low right now, we're only catching about, maybe about – It's really low right now, we're only getting about 80-90 crabs per trip ... It's normal for this time of year ... On a good run? We load up, we catch lots ... That'd be, in maybe two or three weeks, there'll

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be tons of crabs right there ... Me and my son though, we give out a lot of crab in the community, we – he posts it on Facebook eh, and we cook it right in the yard. (M04 2016)

Jump in a boat sometimes, go over to Steveston, fish on the main river. Yeah, we all got together and got your food, your food fish for the year ... Or normally we would send a couple of boats up there and they'd supply all the elders. (M31 2016)

[Sharing with f]amily, like before I know it's gone for funerals. Dances in the longhouse and stuff like that. Ceremonies ... I think it's big, even for funerals and stuff, I know, like a lot of elders and families request food like that. Like they ask for crab and prawns and traditional food I guess, right? (M10 2016)

Seafood is also shared during community events such as feasts, ceremonies, and funerals. Musqueam members explained how they contributed their catch to such events, and how they would be incomplete if fish and shellfish could not be supplied.

[Interviewer: Are there any other things you collect which are more, which also have a ceremonial – ?] All of the shellfish ... Yeah. Crab and prawn for funerals and community events. Yep ... Oh we just go out, we send out, my boat when there's either a community celebration or community dinner and also for funerals, for ceremonial. (M16 2016)

Oh yes. So whenever there's a funeral, and especially for the head table, so that being the family that sustain the lines, we always try to have fresh sockeye, herring, roe on kelp, on seaweed, crabs, prawn, whatever we can get. And if it's in season, for the whole dinner, and if not at least for the head table. (M13 2016)

Yeah, there's seafood. For the ceremonies like, hundreds of people come when they're fed right. It's potlatch style, right? Feed everybody, that shows up. (M08 2016)

Um, for me, it's like – It's just something that I've grown up knowing [salmon and fishing], like it's just always been there. And then just thinking about the fact that maybe one day it won't be there, it's a little bit like, upsetting. It's just extremely important for not only my way of life, but like, our whole community, cause it's kind of like, any kind of community gathering or even just like tiny little committee meetings, there's usually always some kind of salmon, crabs, prawns, halibut. And then just recently we actually had eulachons at a funeral, and it was actually my first time having eulachons like, in my whole life ... (M05 2016)

Fishing is a seasonally variable activity, and so the processing of fish has always occurred alongside fishing. Fish are often smoked, dried, frozen, or canned for consumption over the year, thus stabilizing the food supply. Like fishing, fish processing requires specialized knowledge and techniques, and have been passed on from generation to generation.

It's [salmon] one of our main staple foods, like we're canning, smoking, freezing for everything. (M04 2016)

I helped him [grandpa dry eulachon and] eat it too. In my head I thought I was helping but I was like ten too, so I was probably more of a hindrance but I do remember watching him tying, like you know, he would have a great big spool of fishing line and so I would help

thread the needles so that he could use it and I remember him putting it like, through the eulachon eyes and then hanging it on the hooks ... So see how we're just right above the water there? So we would get more wind and then of course those trees weren't as high then either. So we would have more wind and more sun there than there is now. (M13 2016)

As an example, my mother talked about as children that in the winter season that they would pull a cedar branch into the water at the mouth of the Fraser River, whereby the herring would come and spawn, thus allowing our people to have herring. And they would preserve that into vats and whatever else ... (Qiyəplenəx^w 2016)

Can it [fish], smoke it, wind dry. Freeze it ... So I learned how to do it with the herring, the small fish and the salmon. So I became quite proficient at cleaning. And so it also worked well for me in my own life. (M13 2016)

It [salmon] would be eaten fresh, you know barbequed, and then the bulk of it would be smoked, dried for the wintertime. So as I say there's an abundance from March to October and then almost everything shut down after that, between October and the end of February. (M06 2016)

Yeah, I still enjoy going out [fishing], but it also helps to support my family ... we'd fill up our freezers, food fisheries ... Yeah, all around it's just, it's very important I find. (M14 2016)

4.2.1.1.5 Health

Musqueam participants linked fish, and seafood more generally, to their wellbeing in terms of their mental and physical health. Many Musqueam members explained obtaining fish and seafood from fishing cannot be replaced by a grocery store, not only due to the lost experience, but also because wild resources are perceived and understood to be healthier. Participants noted how transitions away from traditional diets that emphasize wild fish, crabs, and other wild foods have led to a decline in community health.

But then also our health because like they say it takes seven generation for your body to be able to accept something so like without the berries and without the fish, and having to transfer to, you know, what you buy at the grocery shelf, it's affecting, like you can go to almost every family in Musqueam and one of them has a health issue. Like a chronic health issue, whether it be liver, diabetes, that kind of thing. (M01 2016)

I mean it's [fishing] changed, it's changed people's, I think it's had an all around effect as people move away from their traditional, like because the numbers have dropped, because people aren't eating the same way they use to, it's changed the way we eat, so they've moved away from their traditional diet and then they're trying to eat what they can afford, so then to me that leads to more processed food and then that leads to an increase in chronic disease like diabetes and high blood pressure and heart disease. So to me it has like, it's just a giant domino effect. (M13 2016)

Between like, my mom and dad, aunts and uncles, like everybody has fish when we go fishing – we even make smaller portion size, we bought a vacuum packer, to make smaller

portion size for like our grandma, and you guys got some too, right. Smaller packages for individuals. But for me I've got a family of – so, we'll fillet our fish – I need, we basically have fish once a week, right. So that's one fish a week. So I need 52 fish just for me, right. Nevermind what my uncle's side of the family needs, my aunt's side of the family needs ... yeah, you can go buy – like, you can go buy fish, you can go buy pig. The fish that you buy is normally farm fish anyways, so its been raised in pens and it tastes like frickin' crap. You can buy a cow, or you can raise it yourself. Like, I'd rather raise it and catch it myself, or shoot it myself, than have to do it somewhere else – get it from the grocery store. And who knows what's – you don't know what's in the feed that they're giving the fish in the farm, they're getting sick, so now they're feeding antibiotics to them. So now you're eating antibiotics through the fish, so it's like the super bug that – like my dad just got out of the hospital... and he's got some kind of super bug... so what's the next step? (M09 2016)

4.2.1.1.6 Cultural continuity

As mentioned above (and also detailed in Section 4.2.4), fishing is rooted deeply in the psyche and socio-cultural fabric of the Musqueam people. The ability to fish, and a long history of fishing, is part of the Musqueam identity and just as important for its intangible attributes. Many interviewees communicated a desire to teach their children how to fish and how they have already taken their children fishing since a young age. Younger Musqueam participants also discussed their desire to learn and, at times, lamented the lost opportunities to do so due to existing impacts on resources and rights.

4.2.1.2 Impacted Baseline

4.2.1.2.1 *Decline in abundance*

Over time, fishing and fished species within the Study Area have experienced marked declines from historic levels. Musqueam participants expressed numerous causes for the loss in abundance and health of fishing resources, including (but not limited to) the loss of valuable habitat to development, dredging, and pollution. The act of fishing itself has also been heavily impacted in terms of both the ability of Musqueam members to undertake the activity, and the efficiency of their efforts.

There used to be some 50 salmon spawning streams in Vancouver alone. Eighty, something like 80 in all of Musqueam Territory, and right now, what the fishing industry relies on, is about six runs of salmon from six individual creeks or streams or rivers. The 80 that I mentioned are just in Musqueam Territory. There are hundreds more, all the way to the headwaters of the river. And so you can imagine when all of those streams were productive, how big the salmons were ... You know, people said that the salmon runs were so big they could actually walk across the water on the backs of the salmon. I'm sure that was a bit of an exaggeration but it's a really good indicator of how plentiful these salmon were. And it's something that we've said time and time again, that when the explorers first arrived here, the natural resources were so plentiful that, you know, Bill Reid said it best, I think, he said, "Only an idiot could starve on this coast," we were so plentiful. And in the space of some 200 years they've reduced it to what it is now. (M06 2016)

Everything's changed here. These docks have changed, the pile driving, dredging to build the Port Mann [Bridge] itself with the wharf, and the footings for the bridge, now I don't even fish up there anymore right. Now I come down and fish below the Pattullo Bridge, that was my dominant spot ... Like I said, the north arm's [of the Fraser River] really died down, really been destroyed. Not too much fishing goes on there ... Because of all the things I think we've killed that. Not us I think, in general, the population down here has killed that river, the north arm. (M32 2016)

... Typically we would be fishing in the Fraser River every day, you know, throughout the entire year. 365 days. But because of the decline in a lot of the salmon stocks, there's been a voluntary, you know, Musqueam voluntarily does not go fishing at this time of the year because we're trying to protect and conserve those species for future generations. You know, we should be fishing right now for spring salmon. And we should be fishing right now for eulachon. And we should be fishing right now for sturgeon. And there's a lot of steelhead going up the river, and that also. But we're not. And it's not because of anything we've ever done, it's because of the overall impacts to those species that rely on this critical habitat. You know, this is where they transition from salt water into fresh water and so it's very, very, important that the habitat itself is healthy enough to support that transition. So it's, you know, I couldn't even put into words how important salmon and other species are for us ... (M12 2016)

We used to fish sturgeon, gill net them, but that year all the sturgeon died off they stopped us from fishing them. Cause we used to bring home, like, two or three sturgeons a week

... Yeah I don't know, something killed – they started dying. They were finding them all over the place, and then they stopped everybody from fishing them. (M04 2016)

I think [the loss of the eulachon] it's a loss of traditional food because if you ask anybody, probably up to ten years younger than me, they don't know what they taste like. I don't know. They don't even know to try them because they think they taste weird or something. When I was growing up, it was just a regular thing. Just like salmon, crabs and stuff. (M08 2016)

I saw eulachon coming up but as a young boy there was still a lot of them. But within my short time that they, they were gone, you know? Have you [asking co-researcher] ever, when you were young, a little short lifetime here. Have you seen any up the river here? See, you know, she didn't. And I think the last one I really saw was with [his children]. Because [son's name] was a young boy, and then I used to take him and we'd walk and I'd show him. We'd go in the Celtic shipyards, there, I think it was. You'd put a light out there and you'd just see a big school of them. You'd just put a bucket in there and you just used to scoop them up. [Back in the] 60s, 70s? ... (Qiyəplenəx^w 2016)

4.2.1.2.2 Loss and destruction of habitat

The loss of fish habitat was commonly identified by Musqueam members as being a major factor responsible for the decline of fish and fishing. Participants recognized and named many human activities as having had (and continuing to have) adverse effects on fish health and habitat, including: dredging; log booms and log transportation; sedimentation; pollution; and residential and industrial development, among others.

Dredging associated with shipping was frequently stated as a destructive activity that has severely altered migratory fish habitats, especially in combination with changes in water temperature, water levels, and water velocity to negatively impact fish (see also Section 4.2.5). Dredging for shipping has also resulted in more sedimentation of waterways.

It affects everything, really, it does. Its because of shipping, they have to constantly dredge the river. So its affecting hydrology, affecting the natural flow of the hydrology itself, you know, because of the affected hydrology its having a severe impact to the stability of the foreshore itself, thus having to protect the foreshore, and to, you know, put it in this – there's all of these various stability measures, you know, that takes away from the natural habitat in terms of there's no longer any like, there's very little to no back eddies in the lower reach here of the Fraser River, so there's no holding areas for salmon. When you're in a freshet type of year when there was a large snowpack, and when that's all – you know, when the freshets coming down in July, beginning of August, there's no place for the salmon to hold in the lower reach here. Which, you know, takes away from the salmon to be able to hold, but also takes away from all the desired fishing areas for our community... yeah, that's where a good spot to fish is [in the back eddies]. Because of the impacts of the shipping, they have to customize the Fraser River in this area to allow them to dredge as deep as they're trying to dredge, which we'll see even more of now with the removal of the [George] Massey Tunnel, which will allow them to dredge 'x' amount, 'x' feet deeper, which would, you know, cause further impacts to the hydrology of the river, which has further impacts to the salmon, which has an impact to our fishing. (M12 2016)

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[Interviewer: How has the river changed in your lifetime...?] Yeah, it's got – it fills up with silt and sediment, a lot more than when I was younger. Cause they're constantly dredging, so... and I don't know if this matters, but we used to be able to fish a lot more springs, back like, years ago ... (M33 2016)

Industrial development has furthermore affected critical ecosystems, such as salt marshes and eelgrass, including in Roberts Bank from the existing marine terminals; ecosystems that previously supported migrating salmon, leaving them more vulnerable to predation.

Well going out the [salmon] juveniles go a lot shallower because all along this shoreline, not so much at the south of this terminal but there used to be marsh grasses, but then once the ferry terminal came in, those marsh grasses got less, and less, and less, and the eel grass beds, where the juvenile salmon can hide as they're adjusting themselves to the saltwater from migrating out of the Fraser [River], which is freshwater. The juveniles going out were greatly affected by this and they had to come out around, get out of their habitat where they can hide amongst the eelgrass and the shore grass in the marshes, marsh area, and escape predators. But it's all changed ever since then. (M24 2016)

Totally against having this pink area [Project footprint] for the new island for storage. Totally against that. We've already disturbed their migration routes, juvenile and adult salmon that we've been dependent on since time immemorial. By having these two terminals here now and to put it farther out into the Gulf of Georgia, along our shallow water migration route, is, it's just bad business, it doesn't make sense to me ... (M24 2016)

The build-up and transformation of shorelines elsewhere in Musqueam territory, through the construction of spits, jetties, and infilling, have similarly impacted other fish habitats with deleterious consequences for fishing and fish populations.

... And the reason why for that [disappearance of eulachon], as I said, they put a hurdle over here, the spit, then they put another hurdle by closing off McDonald Slough. Then they did even more damage by building the industrial encroachment right down to the water's edge up in, by the slough and that area. And that's where the eulachon and whatnot were spawning. So they created a gauntlet over time. And you think they would learn, but they haven't. (Qiyəplenəx^w 2016)

A leading contributor to the decline of various fish habitats for the Musqueam has been the numerous sources of pollution. Agriculture runoff, litter, and other non-point sources of pollution have added to the stress on fish habitats and health.

My mother was Katzie, which is just up the river. We spoke the same language. My father was Musqueam, but just to show, when we were kids, they were still drinking out of the [Fraser] River. And so it was my grandmother that explained pollution to me ... That, the more people came, the more pollution that came, that showed up in the river and then the forest. (M11 2016)

It [the river]'s a lot dirtier. It used to be a lot clearer, you could see the fish and now it's very murky. You can't, like, mostly dirtier, the banks aren't the same. Like there used to be

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sandy beaches, now there aren't sandy beaches ... And abundance of fish, the fish stocks have just dropped. (M13 2016)

Chief among the major polluters identified by Musqueam members are the Iona sewage plant and the Westshore coal port.

And its not because of this Project itself, you know, you have the sewer pumping out from the Iona sewer plant right here, and they're discharging the sewer, you know, it comes out to about here, but you know, its very concerning of once again, all the cumulative effects of this area ... Well its out to about here that the discharge takes place, but with the constant flushing and movement of the water, I'm sure some of the stuff washes back up into the area, and that's the crab that we feed our elders in our community, right, so. (M12 2016)

And also he said they [herring roe] disappeared. Well there's a certain kelp that they need to spawn off, and it's, like I guess probably, pollution killed it off ... when I fished with my grandfather, he used to go up there and he used to, the village would walk, use the rowboats and come out and ... there was enough for people to have a good feed off of. (M31 2016)

There used to be what they call eelgrass. And that's completely destroyed and that's the reason the herring don't come back there anymore. They got nothing to spawn on. They need the grass, right? ... See when they, when they discharge [the sewage], the head that's over here somewhere, I guess it's around a mile and a half from shore, they have that rock jetty, that's the discharge. So they think they're doing good by doing that. It's ok, because the tide will drift this way and the sludge is gonna come back on the incoming tide and just lay there. (M31 2016)

Ya once they put the sewage plant and the sewage eddy in and closed that off, eulachon declined and then eventually petered off, there's still some that come in through the main arm but almost nothing come through the main arm anymore. (M06 2016)

I'm concerned over that sewer and that septic tank. The sewer comes out from the jetty, right in here. Right in there. They still have, they still have a water, Iona Plant still has a pipe that runs somewhere out here and just pumps raw sewage out into the gulf, right? Somewhere there ... But we do have problems like, where all that mud's gone, like, really black now. And we've told the Department of Fisheries and Oceans all the time that you get some crab that are just black, like on the bottom of them. Kinda like a goddamn oil just about. So they go in there and they bury, they must bury themselves in the mud and everything to protect themselves, right, from predators when they're soft shell. Sometimes you get, especially around in this area here, you get lots at a certain time that are covered in that mud but it's like the real stinky black ... Yeah, no but a slimy, it's not just mud. I don't know what the hell's – We've reported the Fisheries, they did take a few crabs in but I don't think we ever got a report back ... No, I won't eat them, I just chuck them away. (M16 2016)

Pollution has also affect key marine species directly, such as in the case of crabs in the vicinity of the Westshore terminal in Roberts Bank. Fishers described observing blackened crab due to their exposure to coal dust that had settled on the seafloor and on their shells.

Oh [expletive], of course [I worry about contaminants]. Of course. And that's my concern with the Deltaport, right? Like look at the coal that's there and that blows into the water every day. You get a southeast wind, which blows from this area to that way, right? You see what I mean, it runs from the southeast and blows over that Deltaport. You go out there at slack water and it's a big huge thing of coal and they do not take care of that. The put sprinklers on it, but still it doesn't stop it, right? It stops it a bit but, I mean you should see some of those crabs out there, they've got black spots all over their backs, just from the chunks of coal landing on their backs when they're, would you say, molting in the mud. When they pop their shells off and they molt, they hide down in the sand, right? Well when a piece of coal lands on it's back when it's there, it burns right into it's shell, you can see it. (M20 2016)

The crab, I just realized, we fished them out here because we didn't want to fish them in here, because the coal port used to get a certain black looking lungs on them from the coal overage, over here. So that was another reason we used to fish, and that's been going on for a while. (M23 2016)

There's still crabs in the area. But a lot of them are, there lungs, when you crack them open, they're dark and discolored from the coal dust at the bottom and the shells get stained greyish black color from the coal dust at the bottom; from the coal terminal. (M24 2016)

Well you know, there's been a lot of discussion about that, especially with the dust that comes from all the coal being shipped via rail, you know, where is it all settling, is there an impact to the resources that are within this area? It's been discussions and some reports of black crab ... Port Metro's [PMV] attempted to do some studies there, but no real commitment to actually try to figure out what is going on there. So it's something that needs to be looked at also, right ... Yeah, I'm very concerned with that [if it's safe to consume] ... (M12 2016)

Musqueam members also voiced that wild salmon stocks have become sick due to exposure to diseased farm fish, and partly attributed the decline in salmon numbers to the proliferation of commercial salmon pens.

The depletion of the stocks, for one [has changed over their lifetime]. You see a lot of them [salmon] get sea lice on them ... which we never saw when I was younger. But the more and more of the pens they put up river – up the coast, and they're swimming through all that crap, right. (M09 2016)

You can't really make much of a living off it now [salmon fishing], you'd make a couple of months out of the year and that's pretty much it. [Because of], the decline, the mismanagement [by DFO]. Mainly mismanagement ... Yeah ... allowing fish farms for one, that's a big one. And allowing overfishing, and allowing industry to dictate openings to them ... And the fish farming thing is a real big one too, for killing off the fish that are

leaving. I was just up in Port Hardy, and back in Alert Bay and everything, I went through a lot of the back channels up by ... Knight's Inlet and man there's fish farm after fish farm, all the way through Broughton [Archipelago], all the way through the Johnson Straits, any little side channel, there's fish farms everywhere. They've been just quietly going in, and it wasn't like that when I fished up there before, they're just everywhere. The fish are on a gauntlet going out, and it's definitely having an effect on them. (M17 2016)

Concerns have incrementally grown within the Musqueam community over the human health consequences of consuming seafood from the Fraser River and the Salish Sea as levels of pollution have mounted. As articulated by one Musqueam elder, the amount of pollution in fish and shellfish is especially disconcerting for Musqueam members due to their relatively high levels of dependence on, and consumption of, seafood.

And then, more importantly from an environmental perspective is the fish that we're going to be catching if we go up river a bit where by it now has to run the gauntlet of chemical waste of sorts. When I say chemical I'm saying coal dust, oil and all of the, whatever else. Now, we consume salmon ten to three hundred times than the non-Aboriginal person. Like, my daughter at home. She would eat salmon every day if she could. So currently the mercury content in salmon for the non-Aboriginal person who consumes maybe a fish a month, it's within the safe limit. But my daughter, who eats it every day, I doubt it if she reaches that safe limit. So when you start looking at the fish that are coming in now, and they're finding more and more wrong with the fish because what's happening out in the ocean. (Qiyəplenəx^w 2016)

And further to that they now, they're even pointing at the fish as the cause of a lot of our diseases. (M01 2016)

4.2.1.2.3 Overfishing

Further contributing to the decline of fish stocks is overfishing. Musqueam members described how, compared to the past, the quantity of fishers has gone up along with the intensity of commercial fishing operations in their territory. Mismanagement was also perceived by some Musqueam members as playing a role, for instance in the decline of salmon runs, as well as the depletion of the eulachon fishery from its opening to commercial fishing.

Yeah, and when we were fishing on the outside, if you drifted in too close on the sturgeon bank you could lose your net with crabs. I've seen guys out there that got a few fish in their net and drifted up on the crabs, and the crabs just went right through their whole net. And I've seen guys pulling in their nets, and they were just cutting the net free and taking the lines out, and there was so much crab in it, it was just like falling back into the water. It was just loaded out here, back in the day. Massive crab bank ... I noticed the change when we started fishing, when more guys started to follow me into it, cause I was the only one that was doing it in '83, and then right through to the '90s I was the only one out there, nobody would bother with it ... since the mid-90s, the decline, there's not rest on it anymore. They're fished year-round, and fished through crucial times right now, like with the molt going on. It's really not a good time to be fishing them, because they are – when they first molt they're almost like gelatin soft, like they're kind of a pinky looking color, and they're just squishy ... like there was so much crab off of there I never had to go

anywhere until all the guys started coming around it, pushing me out of my area. I started to move and try other areas that would have been like the mid-90s when I started to move over that way. (M17 2016)

I think nobody, I think everybody is going to remember the last fish being caught. And I think it'll be the Natives on the end of that gun. Nobody will remember all the fish being caught in between but they'll remember the last one being caught. Like with the crabbing as well, when we see the sand flats, and you see the commercial crabbing out there it's hard to believe there's anything left ... And what's not being already, like I said, all these species are being decimated, by our impacts on this planet as a whole right. (M32 2016)

Eulachon, there was millions of them. No matter where you went, north arm [of the Fraser River], middle arm, Canoe Pass. There was millions of them. If a tugboat went by there was so much that the tugboat waves would wash them up on to the beach, and all the kids on the beach would be picking them up when they're still flipping around and loading them into buckets, bring them home, and I guess it was when I was about 16, 17 they just disappeared. Cause they commercialized those eulachons, eh. They seen us getting them and smoking them and everything, and then they commercialized them and they went out there with great big long nets and they just wiped them out ... It's really hardly any now, I think they limited our band to a 50 pound quota ... per year. A few years back I think it was only about two or three years ago they only allowed us to catch 25 pounds for the band, and I think each elder only got about five or six eulachons or something like that ... So it's only enough to distribute amongst the elders, eh ... Well those of us that used to eat them all the time, like my grandpa and I, used to smoke them, and me and my brothers smoked them later on, but um – we miss them eh. We used to go down on the beach and watch for them, and they just never showed up anymore. They just vanished, eh ... They were just all over the place, millions of them ... (M04 2016)

Like, just to give you an example, what year was it now, it was a real bad year, I think it was 2009 and they closed us [Musqueam] down for sockeye because they weren't showing up. And apparently it was a pink year, so they allowed the commercial seine fleet to fish pinks and catch sockeye as bycatch in the Johnson Straits and that was the year I think there was about, there was less than a million fish that came back to the total, to the system. And probably lost that much in the straits when they opened it for the pinks against – just because industry wanted it, so they allowed it and they killed off a good chunk of the run that year. They closed us [Musqueam] all down here, we weren't allowed to catch them at all, and then in September there was still a good few of them coming through there, and then they got wiped out by the same fleet. (M17 2016)

4.2.1.2.4 Regulatory restrictions

The decline of valued fish and shellfish species are troubling, not only for the Musqueam, but non-Aboriginal fisheries as well. As a result, the Department of Fisheries and Ocean (DFO) have implemented increasingly stringent restrictions on when, where, and how Musqueam members can fish. While recognizing the need for conservation, Musqueam fishers have nonetheless been highly affected by institutional barriers that have contributed to hindering and limiting Musqueam's fishing access and rights.

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So as I grew up we lost the ability to, the freedom to economically access the fish because of DFO regulation, okay? Because when they allocated land to us, we have one of the smallest reserves, if not the smallest reserve in Canada. And one of the justifiable, defensible rationale that they used as your backyard, you have the sea, and the resources of the sea. You know, little did we realize that that would all be taken away from us because of legislation and other policy initiative and economic initiative. (Qiyəplənəx^w 2016)

Among the greater regulatory restrictions encountered by Musqueam fishers has been the shortening of openings for salmon. Musqueam participants discussed how the increasingly shorter windows for fishing not only restrict the amount of fish they can obtain, but also the time available to teach traditional fishing knowledge (see Section 4.2.4.2) and their personal safety. One participant also noted how the allowable catch has not kept pace with the needs of the community.

Sometimes we get to go the first weekend in September but because of, like, you know, because of the species and the return is so poor nowadays, we're sanctioned so many days and so many numbers of fish by DFO. So one day we got six hours, one year we got six hours. (M02 2016)

We've got a quota on [salmon fishing] that's – it hasn't changed and we've been fighting for that too, cause since we started fishing our population has increased, you know, dramatically, and we only had about 900 members when we first started fishing, and now we're almost 1500 and we haven't seen any increase in our quota or anything yet. So. (M04 2016)

Like I'm lucky enough to work here at the office in our community. We're, I don't know when I'm going to be taking my days off to go fishing, we have an agreement that most of the time I'll be able to, at short notice say I won't be in this afternoon, I won't be in tomorrow because fishing has opened you know bit, if I had some important meeting you know like I wouldn't be able to take the day off that easily, right? Or it could be in the middle of the week and everyone's like, what?! You know ... (M28 2016)

See we're still restricted under that fishing agreement, which is, to me, a lot of people won't agree with me, but it's stupid. We used to be allowed to fish 52 weeks before under that agreement, and it's being taken away from us ... What they allowed us to do is 48 hours every week, 52 weeks a year. Which meant if you want to catch a spring [salmon] this weekend, you go out and try to catch one, that's what you could do. But now we can't do that anymore under that agreement. See, we should be able to fish here this weekend, right. What's restricting us? The fisheries department's put a rule on us that you can't go ... Now we're restricted, now the same way as my dad or whatever, through these – through the government. And your Aboriginal rights are everything, are getting shot out the window... it's the same thing as if your grandfather was allowed to fish there, now you can't... okay, explain to me why you can't? And they'll bring up a rule to stop it ... (M26 2016)

Because the less salmon that there are, the more dangerous it becomes. It's like salmon fishing today, or herring fishing today, either or. When I was a commercial fisherman, we

had four to five days a week fishing, you know? You miss it today, well there's tomorrow. Nowadays, you get twenty-four hours or thirty-six hours and that's it. You know, come hell or high water, that wind is blowing seventy miles an hour, you've got to go or else you're gonna starve ... Absolutely, like, I tell my children. I teach my children how to fish properly. We have a small boat and we only fish daylight hours and we only fish certain tides ... Because safety is important to me. (Qiyəplenəx^w 2016)

Alongside temporal restrictions on fishing, Musqueam fishers also face and have long faced spatial boundaries imposed by the government. Although spatial boundaries on Musqueam fishing have been expanded in the recent past, due in no small part to Musqueam legal efforts (i.e., the Sparrow Case), their rights continue to be constrained by institutionally enforced borders.

But yeah, our boundaries used to be right there, right here, and up in the top corner right there. We were only allowed in this area right there. We weren't allowed into the main channel back before ... We were only allowed to fish in that little small area. It kept us out of the main channel ... Yeah, and just so they could monitor us better I guess. So they kept us in a nutshell pretty much. (M17 2016)

So in the, when I first started fishing with my grandfather, we were only allowed to, we were just allowed at Speddy's [Spetifore's] then. That's what they called Spetifore's drift, but it was always Canoe Pass. That's why in the Sparrow Case that we won at the Supreme Court it was in Canoe Pass. Because DFO was trying to restrict us, to tell us we weren't allowed in these other areas that I just identified. And they kept us down in there and then we used our nets and that's how we got the Sparrow Case, in the Supreme Court. That's why I was saying we're the only ones in this area that have an Aboriginal right that's proven through the Supreme Court. So when they, when they talk about all these areas in the Roberts Bank, which is only a kilometer, two kilometer's away, is where Musqueam won their Supreme Court decision. Tsawwassen is in here, they've got a treaty right, right, they signed their treaty. So when they make decisions about a lot of this stuff, it will affect us a little bit different than Tsawwassen, which is now a treaty band, right? (M16 2016)

[about fishing] I went with my dad quite a bit. And when I got older I was the only one who went out fishing in the family then, so I went out by myself ... yeah, it's we were, back then we weren't allowed to fish in the main river, we were only allowed to fish in these little channels leading to the river. (M15 2016)

I fished there with my dad [in the Fraser River], yeah, after the boundaries were removed, because we were so proud and happy to be fishing in the river, because we got caught quite a few times by fisheries. Remember the guy who had the binoculars, cause we would sneak into the river and we thought we were so crafty. But the thing is, he couldn't prove it because, it was his word against ours. But anyways, we were proud to be and happy to be in the main river. (M13 2016)

Institutional restrictions on time, space, and lastly, gear have served to alienate the Musqueam from their traditional fishing practices. Many Musqueam members expressed dissatisfaction with the restrictions on the type of fishing gear they were allowed to use, which have served to alienate them from certain areas.

I haven't been there [fishing] for a few years because now we have restrictions on net length, so you can't fish out in the deep with a small little net anymore. So we've lost that. I don't know why the band accepted that condition ... You can fish if you want to, it'd be crazy. (M31 2016)

I don't know what the purpose was, the boundaries for the Natives at the time were smaller. And the commercial fisherman they got to fish the whole river and – but we're allowed bigger nets back then too. Our nets were like, 75 fathoms back then. [and now it's limited to] 50 ... I used to cover the whole, I could cover the whole river with my net in Canoe Pass ... (M15 2016)

Ah yeah, we follow them [rules], we have had a lot of trouble with them because a lot of the restrictions say they enforce on us, they don't do any consultation, and there's supposed to be consultation ongoing before anything is put down onto paper, because see like when we first started crab fishing we were allowed 300 traps. And then they went and asked how many, asked somebody how many traps that we had, and somebody said oh maybe 50, so then they restricted us to 50 traps. And a lot of the things they do without consultation, and it's right in their agreements. And the Sparrow Case, the fisheries has to – can't do anything without consultation eh. They always find a way around that. (M04 2016)

The importance of the waterways, fishing is another, it goes along with the medicine, well you take, this is 1916. Last year one of the elders got fishing distribution within the community, whereas when I was young I used to go fishing with my dad, the allotted fishing times, and as a gillnetter, as a company fisherman, then he would fish for relatives and community. You can't do that anymore, you know, in our own territory we're not allowed to do that. (M11 2016)

4.2.1.2.5 Conflict

Depletion of fishing resources, incongruous fishing regulations, and the growth of commercial fishing in the Study Area has furthermore led to conflicts between fishing groups, such as the Musqueam and commercial fishers. Many Musqueam interviewees referenced tensions and aggressive encounters between the Musqueam and commercial fishermen on the Fraser River in the 1980s and 1990s, which disturbed Musqueam fishing activities and arose from competition for space and resources.

The worst times ever were when the Fisheries Coalition would come and stage their protests because they would deliberately try to affect our fishing ... They were the ones who didn't believe in Aboriginal fishing. So they would come and they would throw, like shopping carts in the river in front of us. They would, like we would be fishing and they would, say this is my boat, they would drive around and around in circles, around our boat. Or they would drop anchor in front of us. Like, so you're coming down with a 50 fathom net and you're drifting down the river and someone comes here and drops their anchor in front of you, the rule of the river is that you have to pick up your net. And if it's all the way out and there's fish on it, like you're, it's really and then if you get trapped on their anchor ... They were the commercial fishermen ... I would say 1987; I think it got really bad. We had a few court cases from 1987 to probably 1995. (M13 2016)

He [grandfather] said well, he called me grandson, he said well, grandson, because that's the way the white guy did it. He said, they put us down on the reserve here and they gave us the water, he said, until they found out we used to fish here all the time. And when the government found out they could make money off it, they shut the Indians down, said you guys can't fish here anymore. The only ones that can fish here, more now, is the commercial fishermen. So in order to go fishing here, you have to have a commercial license. So he says, we weren't allowed to fish anymore. Then he says what the bad part was, was they would not give commercial licenses to Indians. So he said, we were hooped. That was the way too – and it stayed that way. Cause once they let the commercial guys in here, they took control of it and said hey, this, all this area is our license, we paid for that and you cannot have the Indians come in here. Those are our fish, and they are not the Indians' fish. (M26 2016)

4.2.1.2.6 *Marine traffic and safety*

Intergroup conflicts aside, safety concerns also exist over encounters with larger ships such as tugboats, dredgers, and freighters, which are persistent for Musqueam members on the water. Many Musqueam members reported being exposed to hazards from the wakes of large shipping vessels, and also the risk of being run over when in the path of larger ships. Disruption to fishing is common for Musqueam members who are obligated, for fear of their own safety, to pick up their nets and evade oncoming traffic. Loss of gear was also a common theme during interviews with Musqueam members when they were unable to avoid large watercraft.

Wariness of large ships has affected the areas in which Musqueam members feel comfortable, and is illustrated by members' explanations of why certain locations are favored, such as Canoe Pass.

[Spetifore's] This is a safe area, because you can see ships coming down the river and you can see ships coming up the river. But when you're here at this corner, you can't. Right, so if you're right here, you can't see oncoming traffic or oncoming traffic so. This is a very active, like you've gotta be on your toes and know what you're doing to fish in here. Right, because those big ships come up the river at 20 knots 25 knots and they're not moving. (M32 2016)

We were only allowed to fish certain areas, like, we weren't allowed in the main river back in the day. But this was the place [Canoe Pass] that there was no commercial traffic in there at all, so I was safe to go in there and play around when I was young. (M17 2016)

The reason why we don't go there is because they have a terminal right there [Roberts Bank], so I'm not going to set my traps right here where the ships are going in and out, and I want to be able to, so that needs to be captured, and the fact that we don't have [crab] traps right here because there's a terminal there, but that's where we traditionally harvested, there's never been any type of compensation and justification as to why that current structure is there ... you can take a look at the ship right there, so the ship's taking off and heading this way, and we're constantly aware of these ships going back and forth, and there's barges with, you know, like a kilometer long worth of logs being towed behind them, running over top of our buoys and we're losing traps left and right, and so the reason why we're not there right now is because of this and because of the ferry terminal, and

because of the ships that are going in and out. These guys are coming and yelling at us – get your traps out of the way – because they think they have the priority to come and move their ships in and out. (M12 2016)

Many Musqueam fishers observed seeing greater quantities of large ships traveling the Fraser River and Salish Sea, which have become constant objective hazards and obstructions to their fishing activities. In most instances, Musqueam fishers using smaller vessels are required to cede the way to oncoming traffic.

Oh, a lot of freighters now, cause they tie up down at New Westminster, eh. Never used to be much when I was just younger ... Yeah, you gotta get out of their way, cause they can't stop. They can't stop and they can't turn on a dime. (M04 2016)

Right here where we call this chum bay and this is like a port, a shipping port in here. Container port. So this kind of screws things up too, because you've got these big boats coming through here ... You have to get out of the way and you can't fish when they're coming through right ... [A risk is] not being able to get your net out of the water in time, so you've just got to let it go. And they chew it up ... That's a loss of thousands of dollars. And not only that I mean it's a loss of fish ... You have to or you're going to get destroyed. I don't even play games with one of those ships hey ... And coming up the river they say right on the, on your VHF we will not sway from the reach. And the reach is the deep part of the river where they come right. That's there; it's like a lane on the highway right. It's been made for them and not for you. (M32 2016)

Yeah, it's nerve-wracking. Like, it's scary, because you'll see them [large ships] coming, and then you're like, oh man, I need to get my net out of the water and get out of the way because they're not going to stop for me, like they're not going to make sure, and they aren't going to worry about my safety, they're just doing their job going through the river. Cause the one time I was driving the boat and my mom and auntie were pulling in the net, like as fast as they could. And I had to, like, keep – like I had to hold on to the wheel the whole time and keep like redirecting the boat so that we wouldn't – cause the waves are really big and then we would go up on the wave and then we would be going down and another one would be coming in just as fast, so it was like, this huge boat, these huge waves, and then our tiny little boat, like I was really concerned about water coming in through the bow and then just making us sink. That didn't happen, but it was really, like, a huge concern for our safety. (M05 2016)

God, there are numbers of numerous different impacts that are not fully realized in regards to what can happen, what will happen, you know? Still today, when did Exxon Valdez break up? They're still finding pockets of oil on the beaches, you know? And they say that LNG will dissipate, and yes, I don't disagree, you know? But to what degree will it affect the environment? And coal, because we've seen the winters here. We've seen the winds, we've seen the fog and the narrow passage ways that have to be used by these ships that are going in and out. Mistakes can happen. And it's all human error, I understand that, you know? You punch in the wrong code, that's a human error. So, so I worry about it. I worry about the safety of my family, I worry about the safety of my people. I know one boat just went right under a tug and a barge, already. That kind of

thing. You know, thank god the guys were able to swim away from it. But the draft will suck you under as well, that kind of thing. (M07 2016)

4.2.1.2.7 Marine traffic and fishing opportunities and costs

In the context of more marine traffic, Musqueam fishers recounted having lost their catch and gear to large ships or having had close encounters that threatened their personal safety. Opportunities to fish are also lost to larger ships when Musqueam fishing is obligated to stop to avoid collisions.

There is a lot more traffic in the river from what I remember when I was younger. I may have not noticed it then, I know we used to fish with a 200 fathom net, and we could leave it out there for quite a while and not worry about it, but now it's like, you're constantly looking upriver, downriver, upriver, downriver with a 50 fathom net, and you either have to pull it in or run with the river instead of cross it ... Yeah... they'll run it over. You'll lose your net. So it's up to you if you want to – if the captain's good he'll try to steer clear. But a lot of guys, if you're listening to the radio, they'll come on and say I'm following the markers, and if you're not out of the way I'm running your net. So. [Interviewer: is there any effect of those boats on your safety...?] If you're in a smaller skiff, absolutely. You see them rocking pretty bad. The boat that we fish in is a gillnetter, so it handles a bit better, but we've had dinner on the floor before, and broken coffee pots and all kinds of stuff from being rocked so bad from the ships. [Interviewer: From the wakes?] Yeah ... That's just the cost of doing business. (M09 2016)

I lost one right here, due to a big boat coming up. I had to get, I was right here, I was setting here on a small boat, and I couldn't tow out of his way fast enough, like, pull net from side to side so I could cut it and let it go, and then I went shooting across the river and the net got chewed up by the boat ... I take a lot of the cost myself because I make them myself. But if you were to go buy one it would probably be a couple thousand dollars brand new. (M32 2016)

It's – it can – it [the Fraser River] has its busy times. It all depends too, right? Yeah. I'm not a big fan of it because like I said, I'm in a smaller boat, I don't have radios and stuff too, so I'm kinda just have to look. You usually see them coming for a bit but you have to move your stuff ... Yeah. Well, right at the bend, that's the bend right here. Probably right along this, there's just a, it's like a rock wall all the way up and I've set this way and my net, my boats just on the inside and my net comes and these big tugs and freighters come up. And this way I have to pull really close, so my net doesn't get run over. Yeah, it gets pretty close. (M10 2016)

There's a lot more people on the river than there used to be, cause when we go out now there's these big like, freighters and ships that come through. But when I was younger I can only remember seeing like, other fishermen on the river. it makes it less fun. It's more where you're like, concerned. Like it used to be like, you're having fun and you're doing this work that didn't actually feel like work, and then it felt like, extremely calm. And now when we go out and I have to be in charge of driving the boat it's a little bit nerve wracking cause these huge waves come in and you're trying to control this tiny little boat that can just flip over, cause even if it's in the river and people think that the waves don't get that

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high, if it's really windy and if there's these big freighters going through the waves can get, like, pretty treacherous I guess. Cause one time we had to be, like – we pretty much had to be towed out of the river, cause my cousin [personal name], he drove in front of us, cause he has a bigger boat. So he drove in front of us to make, like, a clear way and we had to follow right behind him because the waves were just way too big, like, it got out of hand. Yeah. (M05 2016)

It's – you've gotta be aware of it. You've got to be aware of your surroundings. When you do have, say, a tugboat going down or coming up and you've got to tow your net out just to make sure that you can clear it, it can be a little sketchy sometimes. Uneasy... we are seeing more and more boat traffic I think, though. Like major, bigger vessels coming up... you know, they try to get out of our way, but at the same time they're such large vessels that they can't really maneuver around such large nets like, that we have. And sometimes when its really busy and there's a lot of fishermen out, we're not too far away from each other... it can affect our harvest, because, you know, we might have to pick up and not have our nets out in the water for a long enough time, and then we've got to go back up because we've got a huge line of people. And you've got to go back up and set out there, or you've got to tow it in. yeah, it can be a headache, that's for sure. (M14 2016)

For some Musqueam members, the volume of marine shipping and other traffic has already reached a threshold leading to avoidance of certain areas. Musqueam participants frequently described impediments created by larger vessels, including lost opportunities to fish.

When I was growing up, I never thought about the impacts that having a ferry and having, noticing all these ships. But as I got older and I started fishing and going out on the water and, I have totally come to my senses in that, with that, because I think about all the times that I was able to go out on the water and fish when I was younger and that wasn't even very much considering how, you know, how my dad and them fished before. So, and how little in that short amount of time, now, like you know it went from when I was in my twenties, fishing quite a bit or being able to go out like if I wanted on the weekends when it was open, to not even, or to thinking am I going to be able to fish this year? And so, I, being out on the water I've noticed all the other marine traffic you know, because I am in a small boat with my brothers. And we don't have a drum so we're not able to pull in our net as fast. We don't have a larger boat so we're not able to tow our net so the marine traffic is, it causes danger to us. Like, to everybody, but more to like, with the little boats. We're not able to move as fast and get out of the way as fast and these huge tankers are coming by us in our little tiny fishing boat. (Qiyəplənəx^w 2016)

Well that place there [Roberts Bank terminal], nobody would go in there because of the ferries anyways because in those days, whatever, you could go fishing in there, but I just wouldn't go in there because there's too much traffic and everything ... (M26 2016)

Yeah [we would cross the Project footprint] ... We'd probably stay around here ... Once you start getting into the shipping lanes it gets too deep and too busy. (M09 2016)

That's what happens when you have a good fishery, in the month of July we'd run up here to make our sets up here and we'd sometimes, the set would be so slow because you'd have to pick up just about after you set, you have to pick up because these guys [the log

boom tugs] are running down river ... Like I said, the sets, the activity that's going up and down the river, it's just not worth it. (M31 2016)

Oh yeah [marine traffic interferes with fishing], it does for sure...they can only go in the river at certain times, and that's the best time to have your net across the river, or catch fish. And they only come up on the peak time of the tide, so if you're not fishing with your net out, waiting for them to come by, then you're not catching any fish, right? Same with, you won't be able to have any gear around that place for crabbing either, so. (M27 2016)

I would fish up here, this was a good spot to fish for spring and sockeye but there are some pretty big, like freighters and stuff and you just have to get out of their way ... Yeah, so if you see a freighter coming, you would just kinda tuck into this, snug into the beach. And then when they passed you, you could pull it back out ... it was just ... The way it was, yeah. I, to me it happened more in the north arm [of the Fraser] than it did in the middle arm, or the middle arm was bigger so it didn't make mas much of a difference whereas in the north arm, you are constantly towing in and out because there was so much traffic there ... But yeah, like did it affect the fishing, definitely ... (M13 2016)

And that's the other thing when I talk about small boats versus larger boats. Like [personal name] doesn't fish on a really large boat either but you think about when they, there's marine traffic, all of these huge ships coming through, and the tide might not be the right tide and so sometimes the smaller boats aren't able to fish because like I said, you're not able to get your net out of the way in time of these big ships coming, tides running out so quickly so you have many different facets of, things going against you when you're trying to get out there. And when you're trying to get out there for three hours you know that's what like, for a small boat could only be two sets because you're hand pulling and getting the fish out of there, so. (M28 2016)

The presence of recreational users and pleasure craft in the waters of the Study Area are also impediments to Musqueam fishing and travel in their territory. The increase in recreational users on the water in the Study Area represent both an additional hazard and increased risk of collisions and a disturbance to members' sense of place.

I've fished the whole front all the way to Tsawwassen, I've fished where they're putting that new port [the Project] a few times, but it's quite a way to run so I didn't stay over there too much. Just too much traffic there, the guys are checking each other's gear ... but yeah, so I've done the whole waterfront pretty much, the whole sturgeon bank, the whole thing. (M17 2016)

Yeah that was towards the end when I stopped fishing, it was crazy, there was recreational traffic. (M03 2016)

4.2.1.2.8 Debris and sedimentation

In combination with increasing sedimentation and amount of debris (or 'snags'; e.g., from logging operations) in the Fraser River, Musqueam fishing is facing growing numbers of hazards, alienating members from their traditional fishing grounds, and leading to economic and cultural losses.

Well that's the same thing as the dredging and the [marine] traffic, you never know where the snags are. So sometimes you have to be careful of certain areas because, oh. But that's what we do as fishermen; stay out of that area, there's a big snag in there so we talk to each other. But like you never know, like with storms and with the traffic and with the things like that, how the tide kinda changes, or under the water kinda changes ... Yeah, yeah, definitely. Like we fished forever in this one spot and last year we got like two or three snags in a row, like every weekend I ripped my net and never did that before so I just think it's like, again we're fishing alongside the dredger all the time. So it's crazy. (M01 2016)

Well, it seems like the pollution is getting worse, it's always been bad but it's getting worse... in our nets sometimes we bring up a lot of debris and garbage... and then the past couple of years during spring time when everything is thawing out up river and coming down it seems like more and more, you see more and more debris, like natural debris, like logs and twigs and stuff like that... that can affect our nets if it gets caught up in our nets, and it can possibly rip our entire net, but mainly it creates problems that we have to deal with as they come up, like taking the net, taking the sticks and the logs out of our nets and trying to move them... we've seen more and more snags areas, areas that typically don't have snags, have snags. So when we have our net out, we're drifting down, and all the corks will drop, and then, you know, you hit a snag. Those are usually big trees, logs, on the bottom of the river. (M14 2016)

So many snags because a lot of times these guys drop booms, logs, and they'll sink and stay there. So you make your set and you catch them and you're done ... You'd lose your net, yeah? ... It can be, it sure can be. I've hit one once and it cost me 5000 bucks that day. (M31 2016)

They have destroyed the area, there's so much snags there now. I did try it on a quick set and it was slack water and I was looking all over and I just picked it up and got out of there, it wasn't worth it. (M31 2016)

That area [Canoe Pass] is so filled up with sediment, it's very shallow. Last year we tried to go fishing in this area... but it was during high tide even, and we were hitting sand. There used to be an old fishing cannery here, and its not there anymore, but this used to be really good fishing grounds... and we used to be able to catch, we used to be able to set our net out right here and have no problems but, yeah, like I said last year we tried to go up this area here, it was during high tide and we were hitting sand, it was crazy ... Well it's been building up, building up, building up. I'm not too sure if it's because of where the port is here [Roberts Bank], if maybe the currents kind of diverge this way and maybe push some more sediment up this way? I'm not really sure. But up here as well, when we're trying to leave our dock... it's very shallow as well, the sediment's just built up quite a bit... (M14 2016)

4.2.1.2.9 Impediments of development infrastructure

The continued expansion and construction of infrastructure on the Fraser River and in the Salish Sea have challenged the ability of Musqueam fishers to navigate their territorial waters, and have created obstructions to travel and fishing, and also safety. A recent example raised by

several Musqueam members was the construction of the Canada Line over the Fraser River, which mirrored the effects of similar structures in the past. Log booms were also common obstructions identified by Musqueam participants.

So we had fishermen that fished this drift right here. So this Canada Line, wherever it went in here. So they don't even have a free drift anymore because they already dealt with this booming here ... So they drifted in here until these logs, these cements posts had to go in. I think there's one there and one there. So they don't have this free drift. So first they, I think they were compensated like \$600 because they were trying to figure out what they would have lost at the time they had to wait for them to do the development. So then when you drift, you can't just have your net, like our net stretches a 100, 50 fathoms. So they had to pick up or swing around and do there, carry on with their drift so that was an impediment. So now, like I said my uncle no longer fishes that area, he fishes over with us in the middle arm and that's where he's had, like, mishaps only because he's not familiar with it. And even us, we go out there year to year and it's a little bit different because of all the traffic and the dredging and things like that. And so I was telling about this past year, the first time we went to our same spot, forever we caught those ugly snags. (M01 2016)

You don't have room to fish there no more [on the north arm of the Fraser], because of the Canada Line going there. (M31 2016)

Well, a lot of it's changed now, like you can't even fish this side [of the Fraser] anymore because they've put in all the bridges and everything ... (M04 2016)

There's more and more of it now, our people hardly fish it now, it's just not worth it. They'll run all the way up to New Westminster, up the North Arm because it's a shorter run ... Because yeah, it affects everything. Because when they have these logging booms out, they'll have sometimes a four row that's coming out to almost half the river, right? And you want to be able to fish along this side here? That's the route of the fish and now you can't do it anymore. There's just so many log booms out there, it's unbelievable. (M31 2016)

4.2.1.2.10 Predation and fishing efficiency

The ability of Musqueam members to fish successfully has also been diminished by other direct and indirect anthropogenic and environmental drivers. The decline in the abundance of fish has also increased costs in time, money, and effort to obtain fish. Pollution that has affected the health and quantity of fishing resources in the Study Area has also impacted the efficacy of gear in some cases.

Oh, the abundance of fish, gone. You know, there's, you can still get them but you've got to work a lot harder ... Well I think if I went [fishing] and did it myself right now, it would probably take, probably the whole summer to get what you need [rather than a couple of weeks in the past]. And that's based on the run size too. (M31 2016)

But to give you an example, I had like nine traps and I'd get nearly a garbage can full of crab out of each trap and nowadays it would take you ten times or more to get that,

maybe 20 times I'd say, right now, to get that amount of crab. Like I could hardly lift them out, they were so full back then... (M17 2016)

[Interviewer: Do you have to spend more money, more time out there to get fish?] Well yeah, I mean, if back in the day you could think of coming home early because you've got enough [fish] – you've got what you need. Nowadays, yeah, you have to plug away just to come close to even that number that you need to supply for, you know, yourself and your family ... (M19 2016)

I know this place right here [Roberts Bank terminals], supposedly has, I heard stories about the dust and stuff that comes off of there, it's supposed to be not too good ... Yeah. The coal port there. I know the dust and stuff that comes off that coal is not good, you can even see it get stuck in your net and stuff too, when you're fishing there. I think a lot of people used to fish out here, but they say they can't anymore because the coal dust sticks on the net and then you can't catch fish with that on there ... Because they smell it or, they see it or something, just nobody goes there anymore. (M27 2016)

Participants furthermore recounted mounting losses of catch and fishing gear from the predation of seals directly from fishing nets.

Oh, they [seals] pick your net. We talk about it being like, especially [personal name] says, cherry picking. You drop your net and they just come along and you see the fish hit and there's a seal on it. One or two. Like mummies bring ... their babies along with them right? You know, so it's like, so you, they, if they get scared, like if you do something or you're pulling a net in, they can get tangled in the net, and they'll just break the net. So you lose also your gear. But it, so yeah they constantly are eating. (M01 2016)

There's a lot more seals around now ... if they're starting to get full, they only eat the bellies. So if there's a lot of fish around, they'll just eat the belly part of the fish and throw the rest away. They don't actually eat the whole fish. If there were not as many fish around they'd eat more of the fish, but they just take the soft gooey spots. They damage gear – I've had a seal in the boat before. It wasn't pleasant for me or it ... oh yeah, there's, probably in the last ten years there's been a lot more seals around ... no seal hunting, I don't know. (M09 2016)

See in the commercial days those guys used to shoot the seals all the time – they culled them. The government had five dollars a nose on them [bounty]. If you shot a seal in the 1960s, boy, five bucks was big money to you. So nowadays, you're not allowed to shoot them. They're protecting them more than they are – your rights are gone out the window because they're protecting the seals. I'll give you an example – you can't fish there anymore because you might catch a seal and kill them. But, that's pretty well the whole scenario, what they're doing with it... they tell Musqueam that you can't fish because it's under conservation and we need those fish to go through. They have to go up to see the Bonaparte, or whatever those rivers are up there. So we can't do that. Now, Musqueam has accepted that as a band, okay? That's the way I see it. Now, last weekend, they're fishing in Chehalis getting the same fish that we're not allowed to have. They're catching them just up above us. That's – if you're fishing in Chehalis or wherever it is, those fish are going to the Bonaparte River, same thing. Why are they allowed to do it? (M26 2016)

Musqueam's fishing moreover suffers from incidents of theft in the case of crab traps (although it is difficult to ascertain by whom), in some cases leading to wholesale avoidance.

I just stayed on the north side for a while and it was getting too crowded, people were raiding, raiding our crab traps so I moved somewhere over there. (M08 2016)

Around these areas, there's like thousands of crab traps and crab lines and like I said, I know it's going to have an impact, and I know it's going to hurt right ... Yeah [crab traps and lines] they get hit, run over, people steal them. You lose gear, it's part of the game right. (M32 2016)

4.2.1.2.11 Decline in fishing cultural practices

A natural corollary of the combined influence of the aforementioned existing impacts on Musqueam fishing and fishing rights has been the associated decline in related cultural practices (see Section 4.2.4 for more details). These include traditional means to process fish, such as the wind drying of eulachon, the disappearance of smoke houses, and lost opportunities to teach current and future generations the means, methods, and knowledge of fishing activities, and even the practice of sharing catch.

Foreshore rights, booms [changed the Fraser River]. They put a booming ground in there ... we used to go there before the booms, well, when the booms weren't there, they were already there, but sometimes they'd shift them around. And like now we'd start going down and wait for the eulachon run and we'd just scoop them out of the river with bread bags. And we'd, you know, fill up our bread bags and we'd go to the elders [with the fish] ... they would just say keep going, keep going, and they would put them on sticks and dry them. Now that's gone to... yeah, that was in the same spot there, too ... That's like gold, cause we don't get them anymore. I think we got a bit last year, and that was it. (M11 2016)

But also with the fish, the importance that no one thinks about is yes, it was the way we lived because it was convenient. We were Coast people. But also, with that fish, before we got everything from the stores, say from Safeway or an IGA or whatever, there were certain parts of the fish that the kids ate, certain parts of the fish that the adult ate, and you know, that every part of that fish was utilized. We don't see that anymore. And its not being taught anymore. I had younger brothers with health issues, and this is how they survived as long as they did, and they didn't survive long, is through my grandmother's experience of different ways to deal with things, and, you know, not only have – the environment around us is deteriorated and polluted, the fish is no longer there, you know. There were certain ways to cook five different species of fish and there was no outlaws – you can't have sturgeon, you can't have this, you know. They used to eat all of it. And for health reasons as well. (M11 2016)

So you used to see, every elder on this reserve used to have a smoke house for smoking salmon and stuff ... And there's, as far as I can see, there's only two. I've got one, and there's one [personal name]'s got one ... and I think [personal name] has one. That's three. That's only three smokehouses on this reserve compared to when our elders were alive, there was one at every house. And the band's got one, so. That makes that four compared

to about the thirty or so we used to have. I remember in the fall you could just smell the smoke, cause there was – everybody was smoking salmon and stuff eh. (M04 2016)

... That's why I'm here today, to try to protect this area for my kids, so they're able to say yeah, I went fishing in Canoe Pass also. Cause right now it's a very inconsistent resource gathering of salmon. Every year is different. Last year we only had like two sockeye fisheries for our community, we weren't even able to harvest enough fish to do – we usually do a typical distribution of fish to our elders and individuals who don't have means of gathering salmon, so for the past couple of years its been pretty slim in terms of salmon returns. So it's an ongoing downward trend that I've noticed... quite dramatically over the past ten years. And there's been very little to no restoration of these areas, you know, Port Metro Vancouver, they think they're doing a good job and patting themselves on the back with this habitat banking. You know, and all they're doing is restoring one area just so they could justify and have enough credits in the bank so they could build structures like Roberts Bank. So it's a – they're just counter balancing what they're actually doing, there's no actual real benefit... and its at an extreme negative right now because of all the other industrial impacts up and down the river. (M12 2016)

4.2.1.3 Project Interactions

Musqueam members registered numerous concerns regarding the Project and its potential impact on their fishing activities and rights including from, but not limited to, marine shipping traffic and the construction and physical occupation of the Project.

4.2.1.3.1 *Marine shipping*

4.2.1.3.1.1 SAFETY

Musqueam participants expect that the increase in marine shipping associated with the Project would affect both their ability to fish and fishing resources. Among the potential interactions of Project-related marine shipping on Musqueam fishing values are Project-related vessel encounters with Musqueam fishing vessels and threats to physical safety and loss of gear and catch in the Study Area. This would further exacerbate existing impacts as detailed in Section 4.2.1.2, largely following historical patterns of alienation. Threats to safety, as previously reported, include not only direct physical interactions with larger ships but also wakes generated by tugs, freighters, and other large watercraft.

So, you know, I have, you're constantly in fear when you're out on that water, because when those ships are coming around the corner, like I said earlier, they can't get out of your way. They have to continue going at the speed they're going so that they can make it to their destination, and when you have a small vessel... you know, there's not only an impact to your fishing or gear loss, but there's a huge safety issue out on the water. So that's something that's never really – you know, we've been trying to work with Port Metro Vancouver and, you know, getting not only the mega ships but getting these tugboats, the big tugboats that are ripping by and creating a huge wake, that may swamp some of the smaller boats, and this is all in relation to shipping ... They're there for industrial and commercial use, and are having an impact on our Aboriginal rights. (M12 2016)

You know, look at some of the big ships that have run aground up in Prince Rupert ... with the 80% increase in the traffic, it's going to definitely increase the chances of accidents happening as well. (M33 2016)

It's bad enough, back in the day when we would have the odd freighter going by the lighthouse out there. And you kinda had to restrict yourself from drifting too far. Because some of the runs you'd go, they'd be out deep, so you would just drift way out there. And we've always been run over by ferries, sorry I mean freighters, back in the day. But there was very little of them, so you know, they never had much impact but you still had to watch. So imagine, what it is to have regular freighters coming through there. It's gonna have a big impact. It's gonna be dangerous is what it's gonna be. (M31 2016)

I always have concerns about the ship traffic because when the guys are in there, right, a lot of our guys don't have radiophones. That's the biggest concern is the traffic, increased traffic. (M16 2016)

No yeah, it would. [Increases in shipping would] tremendously affect our fishing. Tremendously ... when you're out there and you're a smaller vessel compared to these

guys coming through, it's – it becomes a real risk to us out there ... I mean, we have our drift nets, and the river's only so big, that when these guys come through, it's tough now for them even to navigate when there's a native fishery coming over, working together as much as you'd like to, and they're telling us on CB Radios, you know, we're coming up the river. Well, not everyone has the luxury of having a CB radio out there, so I mean, they – we already have that risk of people getting their nets run over, or even their boats being hit and stuff by these big, big vessels where it's not easy for them to navigate and do quick turns and stuff like that, so I understand that, but at the same time we're out there, like I said, trying to make – or provide for our families. Then it becomes a lot more difficult when there's an abundance of big vessels coming through, I mean, there is – we only get short windows of time. So it becomes a safety concern where someone's saying hey, I gotta make this extra set, because I need this food to bring home. But really, should I when I know for a fact there's a massive vessel coming down river and I know there's another one coming up river? So I think it's going to become even more of a problem with the intense traffic upgrade that there will be once there's that. (M19 2016)

As elucidated by one Musqueam member, potential Project impacts to Musqueam members' safety may also emerge from changes in hydrology and sedimentation created by Project facilities: by disrupting highly valued fishing grounds, Musqueam fishers may be pushed into shipping lanes in search of new ground.

Finally, when you look in that area, those of us who fish in the area of Canoe Pass, we have learnt how to fish that area very, very well ... and now you're going to install some facilities. It's going to change the flow and the current system that will have us scratching our heads in regards to okay, where is the salmon going? Because they find new routes as well. So that changes our ability in how we would be able to catch some salmon. And furthermore, if it moves us outward into the fishing [sic] lanes, into the tanker lanes, then it creates another kind of barrier, which is safety. Because those ships are now moving at thirty plus knots and they can't turn. (Qiyəplənəx^w 2016)

4.2.1.3.1.2 AVOIDANCE AND LOSS OF FISHING AREAS AND OPPORTUNITIES

Musqueam members also noted greater avoidance of the Project area due to the increased presence of marine shipping as a likely result. Crowding of the Roberts Bank tidal flats with Project-related boat traffic would also result in a loss of fishing territory as the area is currently used and fished by Musqueam members, especially for crabs.

And I'm thinking like, more shipping traffic would probably lessen the area that people could crab in and stuff anyway as well. Like I don't know a lot about that and I'm just thinking about it, you know. It's not a large area to begin with and I see these boats out there and I think when I'm out on the ferry and they have their crab traps and there's little boats out there taking their crab traps in. But with all of that shipping traffic, increased shipping traffic I'm, I think it will definitely have negative impacts on what our fishermen are able to do there ... (M28 2016)

And it all depends, if I was say fishing in the area, crab fishing, then it goes up to very or extremely [due to the terminal] because then I have to plan my, my fishing time around is that boat coming in while I'm doing this? So that can depend from somewhat to very, I'd

even go extremely because then I'm not free to exercise my Aboriginal right, I have to wait on the shipping traffic to be done, then I can exercise my constitutionally entrenched Aboriginal right. (M23 2016)

I mean, yeah, you won't be able to fish right in that [Project] area if they have all that traffic going in there, that will pretty much eliminate that one spot right here, eh ... Yeah, you'd definitely be in their way if you were in there fishing. (M17 2016)

Yeah... I think it's [the Project] going to really change how often, and even if we'll really continue to be able to go fishing because as it is now I don't get as much opportunity to go out as I would like. And then if this, like when, or if this Project happens, it's going to increase, like, it's definitely going to increase the traffic ... And then it will just affect the fish habitat, and just, everything. (M05 2016)

I really believe that it [the Robert's Bank Terminal] will impact those [fishing] opportunities. We didn't think that, that skytrain pass [Canada Line] would impact us as much as it has. I mean, we kinda thought, but they assured us, and then you believe that ... I imagine, with the traffic that has, the ship, the water traffic that has increased since I've been fishing. With another terminal [i.e., the Project] I can only imagine that it would at least double. And I really, I don't like to say it, but I really think that fishing won't be there anymore, like by the time I have grandkids who are ready to learn. Not only for the traffic but it, it will impact the aquatic life. (M02 2016)

At a minimum, marine traffic represents a greater impediment to fishing than already exists in Roberts Bank, such as the need to halt fishing activities to avoid larger vessels.

So like the fishing aspect is huge, there's a huge impact, direct impact, to our Aboriginal rights in terms of shipping channels, navigable channels, cause those ships that they're going to be using [the Project], they're not going to be able to navigate around our boats. We have to stop fishing and get out of the ship's way, which is, you know, there needs to be – and that has an impact to our Aboriginal rights and title to fish... well, it makes you stop fishing while those ships are going by. And there's no, there's never been any discussion with, you know, depending on who's doing the shipping, you know, how that impact is going to be justified, with the infringement on our rights there needs to be justification... (M12 2016)

Musqueam members also feared further reductions in fishing grounds from Project-related closures and restrictions.

I've just seen where the [Project] ship traffic was, I was concerned about, I mean the thing is, I could still get in there to fish every once and a while but, I mean if they're gonna expand this way over to here, it's gonna cut out all these fishing areas, for everybody. So if there is a way they can make sure the ships come in this way and leave the rest of this area open for commercial fishing and Native fishing would be, I mean that's my main reason why. Because I'm concerned they're gonna cut this area, like see where the ships come in here, right? This is already closed from here over to here. Like from this boundary here? It's closed here. So the thing is, where are these ships gonna come in now? ... This is

all gonna get cut out because I fish all over here too, right? We're gonna lose all that.
(M20 2016)

Ultimately, threats to the safety of Musqueam fishers, the increased potential of gear losses, and the navigational and fishing restrictions imposed by the presence and movement of even more traffic are likely to lead to avoidance, lost access, and hindrance of Musqueam fishing activities. Consequently, marine shipping from the Project may result in decreased access to seafood obtained from fishing in the Study Area.

Yeah you kind of stay on the inside right [near Steveston], you stay on the inside right, you don't go out into this area because this is like I said the big shipping channel right ... You don't really go in between these two areas much because of the amount of traffic and volume of boats right. So you typically stay here and here ... you wait and then you make sure there's no boats or ships then you go through and set your gear ... And I think that's all going to be more so affected with the new Deltaport right [i.e., the Project] ... What are our kids going to do? Buy crab at the store like everyone else? Artificial crab? (M32 2016)

4.2.1.3.1.3 DISRUPTIONS TO FISH MIGRATION AND ECOLOGY

Musqueam members conveyed that shipping from RBT2 would also directly affect fishing and crabbing resources, leading to a decline in the abundance of wild seafood available to them. Among the pathways of potential impact are increased incidences of collisions between whales (i.e., orcas) and ships, and disruption of whale habitats through noise, leading to an increase in seals and sea lion populations due to the release of predation pressure, with consequent losses of salmon.

" ... the food chain. Okay? Now say for example people have never fully recognized that seals and sea lions are one of the biggest culprits of why the reduction in the amount of salmon from here to the mouth to here. Because if there's enough salmon at the mouth of the river, and if we're fishing and if I'm on a set, I will have a hundred fish hit my net. And when I pick up my net I'll only have twenty fish ... Yeah, because they don't eat the whole thing, they only eat the juicy part, i.e., the belly. And they know that. And more importantly, they're looking for the spring salmon who has a lot of eggs. They love that, that's the caviar of the sea to them. So the sea lion population is here. And now years ago my mother would tell me that as children and with no Iona Spit the sand was white. And their [his parents'] television was watching the killer whales school up the sea lions and the spring salmon and chases them to the shores, and just scoops them up and eats them. So the food chain, they were getting rid of a lot of the seals ... From killer whales. Now if the shipping lane comes through here the killer whales may no longer come in here. If we're going to increase the traffic and the noise level, you know, what is it going to do to them, you know? And yes they'll still come, I think. Because they [orcas] love fish but how many are going to die? They're going to get totally confused because of the noise and what not. So if we lose one member of the food chain it'll affect a domino effect.
(Qiyəplenəx^m 2016)

You hear of the whales dying out there, I think it's because of the shipping and all the – cause whales, they move by sonar eh, and I think a lot of this increased shipping and

everything throws their sonar off, that's why a lot of them get beached, or they die or they get trapped ... (M04 2016)

[On his concerns about RBT2] is there a more sustainable way of doing this? Is there a more sustainable option? ... decimation of species, creating dead zones, you know. All of those things that go hand in hand with these developments ... this all has an impact on us right, isn't it like shipping ... produces more than 3% of our pollution? ... it makes our air a little harder to breathe ... in Vancouver, and not only that, all the stuff that goes into the water with it ... All the sea life getting hit and damaged and destroyed along the way, with ships coming in and out. Seeing the whales get hit. (M32 2016)

The Study Area broadly, and the region in the vicinity of the Project (e.g., west of the existing Deltaport and Westshore terminals, and the footprint) are commonly recognized by Musqueam members as prime habitat and holding areas used by salmon in their migration to and from the Fraser River (see Section 4.3.1.1.3). Both juvenile and mature salmon were recorded in interviews as congregating and traveling through the Roberts Bank tidal flats.

The sockeye runs come in, they're split up differently in volume from year to year. Part of them come in through Johnson Straits along the Vancouver Island shoreline from like, top of Vancouver Island down through Johnson Straits and then part of them come in through Juan de Fuca Strait through the Gulf Islands on the US side. But the ones that come in along Juan de Fuca, they're all affected by this expansion idea of the coal port [i.e., the Project]. The one's coming from Johnson Straits, which is way up there somewhere and comes down, they're coming through the Gulf from Texada Island and Comox area of Vancouver Island as they come out of Johnson Straits. They're not affected so much by this but they are affected somewhat because they'll all come down in the middle of the Gulf, go down towards Point Roberts and come back up this way. And they'll do that circle a lot of times before they ever go up the river. (M24 2016)

I know when they [the salmon] come back as adults, they school, right? But I know, when the fish leave, they've got to come out too, right? And that's when they're tiny. So this is when all the stuff in here's for them too, right? ... Like I guess they're little fry when they're coming out. (M10 2016)

Depending on run timing, it [the fishing] could be very, just because of the disturbance of the fish that would be waiting on the outside of Canoe Pass, susceptible to sound and movement and whatnot. Dependent on run timing or issues related thereof, if there's sediment in the water, if there's something that creates a different sort of smell in the water it might push them over to the other side, away from where they usually stage in order to wait to come up with the tide through Canoe Pass. (M23 2016)

Many Musqueam members voiced concern that the shipping (e.g., sounds and movement) would scare fish away and disrupt this key part of salmon migration, with potential effects further upriver in areas that are heavily used by Musqueam fishers. Crabs were also noted as vulnerable to shipping activity deriving from the Project.

I mean, with that many more tankers coming, I mean it's going to affect the migration of the salmon ... I mean, they all run through ... they all run through all of these areas, right

down into those shipping lanes, right. I mean, different runs, different stocks, so yeah, it's definitely, definitely going to affect it. I mean, I think a lot of the traffic that was coming through here has affected the north arm salmon stock ... I mean, it's just common sense to me that salmon are instinctively know where to go by points in the river or in the ocean, and that's how they travel back. When you start drastically changing that, it's like us. If I was from 100 Mile House, and I knew only by signs how to get back home, and you start changing that stuff, I'm obviously going to get lost. And who knows what happens once that happens. (M19 2016)

There's different runs that like, travel through here and travel through here. Like they travel on either side of [Vancouver] Island ... Yeah. Definitely [Project shipping would have an effect] ... I think it's just like their size ... of the boats, and then um, probably like the amount, like the increase of how many ships go through here. Because if there's like, the added terminal, then there's definitely going to be an increase in the water traffic. (M05 2016)

Yeah, the springtime when the smolts are moving out, I mean, so that would be like right now until about the beginning of June ... July, they're still coming out. They come out at different times. But right now is when the bulk of them come out though, like April. I'd say around April is the – would be the most sensitive time [for fish to shipping] around there, because there's so many juveniles in the area. It'd be just saturated – the whole waterfront is ... crab, for them it would be a sensitive time. Because the crabs are vulnerable, they're right up in there molting, and they're pretty sensitive to anything like that. (M17 2016)

... Shipping will be all year round. So it could affect, it could affect the timing of fish that are running up. Because our windows are very short right now, considering the size of the fishery that we have, what's left. So our hours, in order to get to those fish, and fish those fish, are getting shorter and smaller. And it's a bit of luck and I mean, when we have an orca pod that's in the area, that gets weighed into, hey, maybe we should go fishing now because they're going to push the springs up. So maybe now is our chance to get them. I mean, if an orca pod can do that, what is a 50-ton or a 100-ton or 150-ton vessel do? And the sound that it makes and everything else. So maybe it either makes some runs stage or they stage somewhere else. Stage deeper, they stage out where they're liable to predation by seals and the orca pods, and everything else. (M23 2016)

The increase in shipping right away is obvious. That one will impact, just from noise, sound, potential for pollution, potential for spill, the amount of driving curb and all that, that's going to increase along this area ... (M23 2016)

4.2.1.3.1.4 POLLUTION, ACCIDENTS, AND SPILL POTENTIAL

Well just I guess, basically pollution [is my main concern about the Project]. Pollution for the salmon and for the crabs, prawns, lingcod, rock cod, everything in the area. I mean, any kind of dumps, fuel dumps, garbage dumps, oil spills, anything, is a big concern. (M20 2016)

An increase in shipping traffic, in addition to noise effects, also elevates levels of pollution and the risk of an accident producing fuel spills. Pollution may in turn adversely affect fish and crab habitats and fishing resource health directly.

If anything were to happen there, and it would only be a matter of time, it could be 10 years, 20 years, 50 years. Something will happen ... When those ships go through there, they're not just carrying whatever they're carrying, they're also letting go of things. They're going into our oceans. You take the ships that are going across the ocean and back again or travelling wherever they are, they're getting things off, the ocean's full of crap and garbage now and now we want to bring it to this area, we're already, we're already over done with this kind of stuff. And now because they can't go up the inlet on Burrard, they want to come this way? That's only what's happening. They're switching their whole idea over to this side now. And I'm against it ... Not only will the fish die but so will we from all the inhalants that will come off there. So how much do we think our rivers and our oceans can take, along these shorelines without, it's just, to me I can't even believe it. (M21 2016)

Yeah, that's where everybody goes [crabbing by the existing Roberts Bank terminals] ... For the crabbing area I'm worried about the grounds being disturbed. Where are they gonna go? What's going to happen to them? Obviously, in case of some kind of a spill or something, that would be devastating to this whole area ... There's lots I'm worried about... it could possibly [have an effect] on the migration of the fish in and out of the river. (M14 2016)

Pollution [is a major Project concern], I'd say, I mean that's a pretty sensitive area in behind there. I mean, the estuary area, that's where the salmon live when they come out of the river, they stay in that – right where you're showing, way up in there, in these grassy areas right up in here. Those are the juvenile salmon coming out, they live there for a good period of time. I mean, that's the only impact I could see, from pollution. I mean if they ever have some kind of a, if they ever spilled bunker fuel in there again they'd decimate the bank. (M17 2016)

Even in the course of normal operations in the absence of a malfunction or accident, ships traveling to and from the Project may affect fishing resources through pollutants washing off the ships, deliberate fouling of the water by irresponsible crews, and the release of polluted and contaminated (e.g., with invasive species) ballast water into the region.

I mean, I think that's got a lot to do with safety concerns with big boats coming in and out. Waste, I don't know, accidental waste or ships pumping their bilges or something like that could destroy this area too. I mean is that a concern that you guys got, or how's that, you know? ... I have that strings right in here, right where they're putting that port too, he? Right there. (M20 2016)

It [shipping] affects our fishing... [it affects the fish] depending on how clean those ships are... I've seen some pretty old ships coming in there ... from other countries where their regulations aren't as strict as transport Canada ... They could be releasing ballast water that is contaminated or just breaking the rules and pumping over bilge, or they could be leaking fuel as well out of their fuel vents. (M33 2016)

The shipping, the increase in shipping is a huge concern for me ... The pipeline for the jet fuel. Like where's that going? Have we been consulted? Like this is just one of many and the increased shipping I think will have a big impact. That increased traffic. And what those freighters will be dumping, polluting, excreting, like all of that pollution. So it's going to have an impact. (M03 2016)

[About increased boat traffic] Any time you have a ship in a harbor there's a hazard right, like a possibility of a hazard... the percentage of the likelihood of that happening is going to rise because as you said it's going to increase 80%, the traffic, right. Then you have that much more chance of a ship losing oil, or you know, or if they're pumping stuff out and all sorts of stuff like that. (M33 2016)

Yeah there's probably lots of stuff [impacts from the Project]. A lot of traffic will be coming in and out of there... [From shipping] everything, the oil, the pollutants, everything they put off, that get in the way ... Yeah all that kind of stuff, right ... Traffic will be a big one ... (M27 2016)

And I think it all has an impact like I said, its just how big of an impact. How much are they [ships] polluting the water, how much exhaust is going through the water, how many contaminants, et cetera, right, bottoms of ships, grease, oil, dirt, whatever, right. (M32 2016)

Well what we're talking about, you were saying do we feel safe out there, do you have that picture? When we're fishing, we're fishing and we're like in a, not literally but we're in a boat like this, against a boat like this, you know? And so, and they constantly have the oil run out them ... So see the difference, it's like a mall going by you. And so it's like, you think of the oil and the debris and the air pollutants and stuff like that. It's hitting and going into and our fish are living off that water. Sometimes I think, we eat the fish that come out of this water ... Some of our boys have got hit by the tugs. (M01 2016)

4.2.1.3.2 Construction and physical occupation of the Project

4.2.1.3.2.1 POLLUTION

Construction and installation of the terminal itself represents a unique set of pathways of potential impact on fishing alongside shipping traffic, as well as a number of similar interactions. As with marine traffic, pollution from construction and Project-related road traffic is also disconcerting for Musqueam members.

Well, I'm not, like I said, I don't know a lot about this area but we even just like knowing people that do fish crab there and seeing the boats out there I'm like, how can that be very healthy? You know I'm thinking there's all this pollution and, I love to eat crabs and prawns and I'm thinking, they're in this water where all this constructions happening, where the ferries are going, the ships are coming in and out. You know even all the semis, the trucks that are going on the whatever, the causeway there. You know the run off when it rains it goes into the water so that pollution is going in. You know already, like you're not able to go you know clam digging and you know those sorts of things that people would have done before so I think it will just, you know I think that it's going to decrease the amount of shellfish that people are able to fish in that area anyway. (M28 2016)

4.2.1.3.2.2 DISRUPTIONS TO MIGRATION ROUTES

One of the major issues for Musqueam members with regard to the Project's construction and occupation of the projected site is that it represents another physical barrier for salmon to negotiate in their migration route.

So obviously Canoe pass has always been a very important area for Musqueam. The Canoe Pass area itself was where Ron Sparrow was charged, and that's where the Sparrow case comes from, so that area's significantly important to us, to Musqueam people. I've fished there quite often. So I mean, this is right adjacent to the terminal expansion proposal, so Canoe Pass all through Ladner Reach, all up in the main arm of the Fraser River. Our management area for fishing expands all the way up to the Port Mann Bridge. And also encompasses the north arm of the Fraser River, also. So our, you know Musqueam, we typically fish in the main stem all the way up to the Port Mann bridge, as well as Canoe Pass and Ladner Reach, which flows right into the main reach, so. So that's where we fish. And you know all migratory salmon are going right past this terminal, whether they're escaping smolts or returning adults, they will all have, you know, migrate past this terminal in one way or another ... Well [the Project] it's just further, additional impacts to what they're already encountering. You know, there's already an existing terminal there. We already have the BC ferry terminal there itself, and it's just constant dredging that's going on. You know, they're going to have to dredge in this area, reducing additional habitat. So what the impacts are going to be is, you know, it depends on how we're going to look at it. Are we going to look at what is the impact of the expansion itself, only? Or what is the cumulative impact to the migratory salmon? You know, you have up here, right here, we have the proposed LNG terminal, right across the river there, there's the airport fuel facility, there's expansion to the Surrey docks in Port Metro Vancouver, and not to mention all the other existing industrial impacts that are taking place with all – and every one of them has a shipping aspect to them, so. (M12 2016)

Totally disagree with having it where the pink area is here now, the port expansion. And I don't know what study's have been done by government or Port Metro or whoever's planning on the position of this expansion, I've not been aware of any of the meetings, haven't been attended any of the meetings. But I think it's totally wrong to expand it seawards here. It's just gonna further disturb the migration route and adversely effect the migration route of the adult salmon and the juveniles, especially the juveniles. (M24 2016)

It is an extremely important area, you know. In the shallow banks outside of the Fraser River is where salmon hold, when they're waiting for the tide to start backing up, they all hold... they all hold right by the Canoe Pass, they all hold right up in this area here when there's an extremely low tide, you know, in August or depending on the species, the time of year, they'll hold in here until the tide starts rising, so they'll be, you know, swimming around, and you know, eating, and then once the tide starts coming up they go up river. So, additional expansion like this will just be decreasing the available habitat for those adults and for the smolts that are migrating in and out. (M12 2016)

4.2.1.3.2.3 DISRUPTIONS TO HABITAT

Unique to the installation of the physical occupation of the Project is the exacerbation of impacts to the habitat of fished species in the Roberts Bank tidal flats through the disruption of tidal flows and flushing. Musqueam participants recounted how sections of the Tsawwassen foreshore have been turned into a veritable “dead zone” devoid of marine life due to the interruption of tidal flushing and currents from the creation of the Deltaport, Westshore, and BC Ferries terminals.

Well see this is the big issue is, like you can see the sediment build up in this area because of the existing causeway, there's no, you know, the flushing that should be taking place in this area because of the rising and low tide, from the currents, is not happening because of the fact that we have this wall here. So there's like a gathering of the silt from all the dredging that's taking place, and it's all gathering here and it's just piling on top of the vegetation and, you know, eel grass, you know, all the crab and everything else that relies on a natural habitat that no longer exists here ... there would have been better habitat, yeah. For them to be further expanding the current berth out further, there's just going to be additional – you know, I call this area here like a dead zone because of the fact that there's not adequate flushing taking place here, so if they're going to be expanding it out even further we're probably gonna see this change even more here ... (M12 2016)

Well, I'd just tell them [PMV] that they're damaging the system, the habitat system where the areas where the salmon wait when they come out of there as fry, they wait there for a while until they're old enough to go out to the sea, and then the crabs live there all this time, and their vegetation is going to change, and their water temperatures and everything, and they're going to die ... (M04 2016)

Yeah, so in this [Project footprint] area, which is – it's gonna stop the tidal current. See here's Canoe Pass, the water comes and flows all the way out this way during the low water run and then the high water, but in this area here it's gonna be kind of, become dead. (M04 2016)

The interference of natural tidal flows and flushing may also affect water temperatures, to which salmon in particular are highly sensitive. As articulated by Musqueam participants, warmer temperatures may kill salmon or affect the timing and movement of salmon upriver, areas that are critical fishing areas for the community.

It's a habitat area [Roberts Bank]. That chinook and sockeye – and coho, yeah, the fry. They'll stay in the streams – sockeye will stay in the lakes up to two years or something, and chinook will stay up for a while, but when they come out they were here for a while ... Cause the water flow will change here [if they build out the RBT2 expansion], and it will always be warm here, cause the tidal current will change, and this water flow in here will be warm all the time, cause it will be kind of like, still ... They'll die, because the water's too warm ... you can see where it comes through right here, right along here, this is going to be all kind of like – the water flow's gonna change ... All those creeks [along the shore] will, they're going to change their flow and probably change this way, but this water will be too warm in here. A lot of this in here is dead already ... [This area is habitat for] sockeye, chinook ... probably eulachon. (M04 2016)

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On the high water you know, all the salmon would come through right there and go up there through here, all this [Project] area. All the salmon would come through, and they're going to come around now, come up that way ... Salmon travel by current eh, cause the water temperature has a big impact on the fish entering the river, and if the river's too warm they won't enter it, they'll just come in, go up so far, taste the warm, and then go back out. You can tell when we're fishing when the tide's coming in, you'll catch the fish going one direction there, but then when the tides' going to change you'll find the fish, you're catching them in another direction. Cause they're going back out, cause the water's too warm. (M04 2016)

Oh yeah [the Project would change a lot], because we fish the, like we fish the fish coming in and out off the bank, coming with the tide, with that whole new area there... that whole area there is going to change the entire tide for this whole area here ... Yeah. With the tide coming in and out it's going to change it a lot ... They [salmon] could go there and they could stay there for a long time too until it's too late to go up the river as well... cause you know, salmon, they react to instinct right. With the tide and the temperature and that's how they work. And if you're going to mess around with that, then, you know, their schedule's going to get messed up too. (M33 2016)

In general, Musqueam interviewees commonly emphasized the vital nature of the Salish Sea west of the existing Deltaport and Westshore terminals and south of Canoe Pass as habitat, not only for salmon, but also crabs, eulachons, waterfowl, and sea mammals. This area is also vulnerable to Project-related dredging activities, as one member explained, while another member discussed the reliance of smaller fish like eulachon on this habitat for staging.

I talked about the salt marshes where the smolts come down and spend, actually a couple of years in there, acclimatizing themselves to the salt water before they actually go out to sea. So, the dredging that they're proposing for that shipping terminal [i.e., the Project] is gonna have an effect on the mud flats. They'll slide down in to the dredged area which will then in turn affect the salt marsh in behind it because you know, it's just like when you dig away at the base of a, the foothills of a mountain, you dig deep enough and you're gonna have materials slide down behind where you excavated. It's the same thing. And it's gonna have a negative impact on not only salmon but multiple bird species, mammals like muskrats and sea otters. All kinds of different things. Different species. As well as the vegetation of course ... if there's sliding that's going on there and you have the material that the plants dig, set their roots into, sliding away then the plants aren't gonna grow and the whole ecological system is disturbed. (M06 2016)

Eulachon, these staging areas become so vital because they're the areas that they sit in for a bit while they build up and then they run to the next staging area. So if something were to happen to these staging areas, it, it can create a catastrophe because the biomass doesn't have enough size to it, to have the attrition rate to make it to the next staging area. That's why things like this are kind of important to me, to mention. We're going through conversation with the George Massey Tunnel. I brought this one up numerous times, just because of that, because it's upstream of it. And then RBT being built below, these are things, points of impact ... (M23 2016)

They [PMV] really gotta watch all the eel grass and all the feed cause a lot of that crab came out of the deep, that's why I'm saying it varies from time to time for the crab... because a lot of them go into the shallows, and that's where they lay their eggs, right, for small crab and stuff. A lot of the feed's in there too, that's why, for the immature crab ... So from an environmental side they've got to really watch the habitat ... (M16 2016)

4.2.1.3.2.4 LOSS OF FISHING AREAS AND OPPORTUNITIES

Dredging and interruption of tidal flows from the Project had some Musqueam participants worried that sedimentation rates would increase at the mouth of the Fraser River, particularly by Canoe Pass, a vital contemporary and historical fishing area.

You know, like having what they're going to have there with the Port expansion, it's going to cause different tidal flows for Canoe Pass coming in and out ... Over time it could dry the pass out as well, cause if you don't have very strong currents coming in and out then it's not going to take all the river silt back out. [I've seen sedimentation buildup] everywhere in the river. That's why you see, like the dredges are working constantly everywhere ... When we're gillnetting in the river, yeah, that's a huge thing. (M33 2016)

The Chinese people call it the ying and the yang, the white people call it the push and the pull. You push something here on the Michelin tire; it's going to pop over here. Likewise, when you dredge an area that something is going to happen somewhere else. And that indeed is going to be the case with that. Because you have to recognized because Sparrow was won right in that area, in Canoe Pass. And now government has legislated the denial to access that salmon resource to some degree if not a major degree. Because by changing the channel and eliminating, similar to the Iona Spit and McDonald slough, the salmon run is no longer going to directly come through Canoe Pass. It's going to go around it, potentially, and deny the opportunity for our fishermen. Thus, centralizing all of our boats into a singular area, which again is not a good way to go. (Qiyəplenəx^w 2016)

Access to the areas in the vicinity of the Project, too, would be inhibited by the construction and operation of the Project shipping terminal, most obviously by the Project's physical occupation of currently fished areas. Expansion of the tug basin, causeway, and terminal all represent a physical loss of space to Musqueam fishers. In addition, Musqueam members are worried that access restrictions may be put into effect around the terminal to an indeterminate distance from the Project's physical features.

Oh yeah, like [personal name] was talking to one of the boys in the meeting the other night. He's got pots sitting there right now. We have so many boys that, this is, like this is their livelihood throughout the year. This is what they live on, they don't work anywhere else, they only fish, they only crab ... So if you take this area from them, what? (M01 2016)

Oh yeah ... It's [the Project] gonna affect their fishing and everything cause with everything that's proposed now, there's gonna be more and more of these ships coming into the river, into the port and everything. They're going to create a larger buffer zone for the container port and we'll have to stay out farther from it, and there's not very much fishing as it is not, so they're just going to put more of a headache on us and restrictions. Our lifestyle's going to come – it's almost close to coming to a stop now, cause we get

hardly any fish as it is now. Compared to what we used to get, and what our grandparents used to get ... (M04 2016)

When you're fishing salmon out on the flats, out on the Gulf here, there's not very much space to do your fishing, so if there, like, there's lots of water there, but there's only a certain amount of space where you can actually catch the fish and when they have the expansion there that's going to be taking away from our small amount of space ... Cause you have to fish them in the shallows on the flats... you can't just go out in the deep, cause then they'll go underneath your net ... You have to catch the fish when they back onto the flats, and then they back off with the tide, you have to get them coming in and out as they're – cause they used that whole are of Roberts' Bank just for like a relaxing area before they head up the river, until they're ready to go. (M33 2016)

4.2.1.3.2.5 PREDATION

Participants also suggested that the creation of the proposed Roberts Bank Terminal 2 would increase rates of predation on salmon and crabs by hosting predators such as lingcod, seals, and octopus. Potential knock-on effects include a reduction in fish and species available to Musqueam fishers.

When that expansion comes out, what that's going to cause is it's totally going to change the environment for everything living there, and the currents not going to flow through there as much as before, and there's going to be a lot of dead water. It's also going to act as a trap for even all the small salmon that are coming back out of the river, you know, they might not make it all the way out there. There's lots of predators in the shallows there, like ling cod and sea lions and it'll just be a feeding zone pretty much. (M33 2016)

So this area here is still free-flowing on the flood and the ebb tide. But if they put this terminal here, it's not any more. Then it's extending farther into the Gulf and the migration route that the fish have to have when they're coming back. Or leaving too, I mean the juvenile salmon, they have to get to sea, too. And the way this is set up, this will be a natural fish trap for the one's migrating out, they'll be coming along through the flats here. They hit this one, they come around already, they'll end up being in the pocket in here, confused, there's gonna be a lot more, everybody will tell you, from sea birds and adult species of fish like halibut, cod, dogfish, pike, a lot of the juveniles salmon going to sea, which vary in size from like an inch and a half to 7 or 8 inches for the steelhead smolts in the spring. They'll be trapped here and gone to being dinner, it'll be just a natural fish trap ... (M24 2016)

This marsh area [in Roberts Bank], when this starts to go dead as well, what the seals are gonna live off ... The minute we drop our net, we just have seals there. Because they don't have anything else, right? So now this is gonna also, I'm going to say, this debris and this amount of traffic is gonna kill that area, then what are the seals gonna live off of again? Only what we've fished, right? (M01 2016)

4.2.1.3.3 Summary of Potential Project Interactions

In brief summary, potential Project interactions on fishing values in the Study Area include, but are not limited to:

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- Exacerbation of the existing pattern of alienation from fishing resources caused by industrialization, settlement, and institutional policies imposed on Musqueam territory;
- Increased risks to safety and loss of gear from marine traffic while fishing and traveling on the water;
- Increased avoidance of fishing grounds due to the presence of marine traffic;
- Loss of fishing grounds due to the presence of marine traffic;
- Disruptions to fishing activities due to the presence of marine traffic;
- Loss of fishing grounds due to restriction and regulations to access;
- Decreased access to seafood obtained from fishing;
- Loss of valued habitat for fishing resources from marine traffic, noise, movement, and pollution;
- Contamination of fishing resources from marine traffic pollution;
- Disruption of salmon and crab migration routes and lifecycles from construction and physical occupation of the Project;
- Loss of valued habitat for fishing resources from the disruption of tidal flows;
- Increased mortality of fishing resources from the disruption of tidal flows;
- Increased mortality of fishing resources from predation (e.g., seals and sea lions);
- Increased disruption of fishing activities from siltation and sedimentation from construction; and
- Loss of access from the construction and physical occupation of the Project.

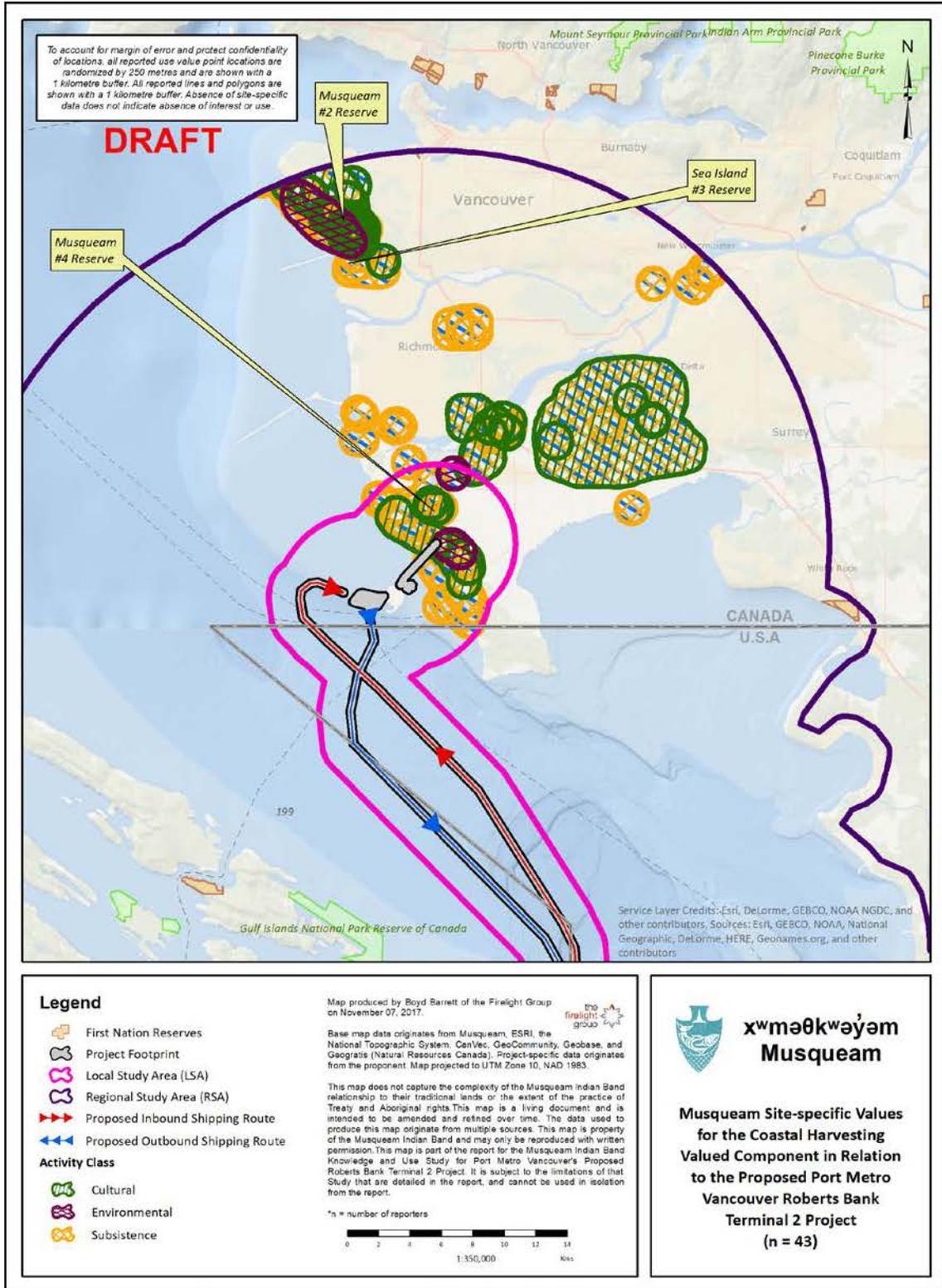


Figure 4: Musqueam reported site-specific coastal harvesting values in the Study Area.

4.2.2 Coastal harvesting

4.2.2.1 Importance

Modern Musqueam subsistence and lifeways are strongly oriented around fishing but harvesting of shellfish and plants in the coastal zone were no less important in the Musqueam cultural assemblage in the past. Although local harvesting of shellfish resources such as clams, cockles, mussels, and oysters is no longer possible in and around the Lower Mainland, these are still highly valued and sought, at times, by trade. The collection of plants in coastal areas, both as foodstuffs and medicine, were also strong aspects of Musqueam culture, and heavily affected by the loss of plant resources.

4.2.2.1.1 Plants

The Musqueam have traditionally collected and made use of innumerable plants both inland (e.g., found in forests) and in the coastal zone (such as in marshes) (see Section 4.1). Plants found in the coastal zone include mosses, bog berries, snowberries, frog leaves, wild rose, grasses, nettles, reeds, and much more (see Ham 2014), many of which have experienced steep declines in abundance (see Section 4.2.2.2).

And, yeah, as today, our bulrush is limited, snowberries are limited, nettles are limited, burdock bushes, frog leaves, anything that the older, you know, crabapple trees, that grew plentiful on the waterfront when I grew up. [hənqəmiḱəm phonetic], I only say [hənqəmiḱəm phonetic] because I don't know the English name. These are all foreshore plant life. (M11 2016)

Kelps were also highly valued on their own and for their collection of herring roe, which was also collected on in the coastal zone.

We used to eat seaweed too when I was a kid and we used to call it bubblegum, we used to call it Indian bubblegum ... Because when you, like, it would be dried and so when you chew it, you could keep chewing it. It's like we call sockeye, smoked sockeye, Indian candy. So we had Indian candy and Indian bubblegum. (M13 2016)

We used to catch them [eulachons], no, just down there in Point Grey, and then we used to go out to Tsawwassen mostly in the wintertime when they'd have the big winds, cause in the spring the wind would blow the kelp and roe up on the beach and the seaweed, and the, my uncles and them used to go get it, either that or they used to get on their boats and go across to Bowen island, or go across down by Point Grey and get them. (M04 2016)

We would have like a garbage bag of seaweed in the closet and we could just go and get it and eat it ... That [herring roe on kelp] was more of a delicacy. But it was, it's always been, yeah, it's always been a part of something that we ate and loved. (M13 2016)

Plants found in the coastal zone have been used and continue to be used for medicines and food, but also for ceremonies, art, and decoration (for instance in the dyeing of wools).

... these are all the roots [from the foreshore] that you could use for medicinal purposes, but also for the weavers, the basket weavers, and the wool weavers would utilize the roots

of these to make different colors. Cause we didn't have paint back in the day. (M11 2016)

Right here is the marsh too [in front of the Musqueam Indian Reserve], so. Yeah... And then of course you get your bog berries, which change from time to time, because ... As it grew along in there, because it was marshy. And your different types of mosses that weavers would use, and medicine people would use. It was just there, convenient. We never, ever thought it was going to be extinct. (M11 2016)

While many Musqueam members signaled that their ceremonies are private matters, they also indicated that they are very important to their way of life. One participant described picking bulrushes every year for their ceremonial regalia, while another member discussed collecting bulrushes for ceremonial dances, providing a glimpse into the importance of plant resources for non-subsistence purposes. The collection of foreshore plants can also be steeped in history and are connections for present-day Musqueam members to their past.

This whole area, the foreshore and this whole area? I collect cattails from for ceremonial use and that's yearly. Twice yearly. To this day, I mean I'll do it once in the spring and once in the fall ... It would be all along that foreshore, all the way there from where our relatives in Tsawwassen. But they have new regulations now, about taking things. And I'll respect that so I've moved from this, so in the past I have taken from there. And then starting two years ago I've stayed out of that area and I've moved up here. And this area here is known even in our history, some of our oldest history, as a place to cut cattails ... So I go there yearly to collect cattails. And then they, the level, the reason why there is because there's that traditional connection to the land and also there's a realm of keeping things pure. (M23 2016)

Like I said, traditionally this would be a place you could cut down as much [cattails] as you want because we didn't just use them for ceremonial purpose. They were used as our beds and our, you know, our interior mats to separate homes. So these would have been cut down yearly, right? For all of our fishing camps and villages in this area, they would have been cut down in this sort of area here. Well now if we flash backwards, 300 years ago ... (M23 2016)

I'm a ceremonial dancer and so we've gone out to the marsh area to collect some of the material we need for our ceremonial dance – bulrushes ... And I've gone up into the woods in Musqueam Park and Pacific Spirit Park and collected materials up there as well for the dance. (M06 2016)

The collection of plants inland and on the foreshore for medicine is also highly relevant for contemporary Musqueam members, and used to treat a variety of ailments. Uses of plants and where and how they can be harvested are specialized knowledge that have been and continue to be passed down between Musqueam members; the availability of such resources helps to ensure Musqueam's cultural continuity.

You can also get liquorice fern in there too ... It smells like liquorice ... I actually picked some last week and you rub it in your hands and it smells like liquorice and you can chew on it. It's for sore throats and that ... It grows on the broad leaf maple trees. It actually

grows on the ... On the tree. Tree has a lot of moss, and then you see the little ferns coming out. It's liquorice fern ... So I started chewing some and the grandkids wanted to know what I was doing. I was going [rubs hands together] I was squish on up I my hands. They only grow about that tall. And then I let them smell it and they liked it and they start eating it too. (M15 2016)

I forgot the name of the plant. I actually got it for my brother because he had liver problems ... yeah. Yeah. It looks like a salal berry or salal plant but it's different ... Well a friend told me about what plant to get. And he brought me there he showed me what plant it was ... Yeah there's a little horse trail coming in through here, and we went, or the other, we went in through the horse trails ... Brought it home and made a tea out of it. Got enough for a week's supply. (M15 2016)

[We use stinging nettles for] Medicine and cordage. Especially when I'm replicating belongings, rope and, nettles. So medicine, which I use to this day, like in fact I'm just getting over a cold and it's a part of your, you take it when you're getting over a cold. When you've been through that, you use that. It's part of our medicine. Part of my teaching, because I use it to teach my kids, when you see me at this time of year. So it's part of our calendar even, when you look at it. Cause there's a time when the nettles come up, but when you look at, you can almost tell how much time is left before things are going to change because the nettle goes from a woody to a, I'm sorry, form a soft to this. A certain butterfly will show up at a certain time of year, I think. The white guy name is, red admiral moth, and they nest in those. So it's all part of our calendar. (M23 2016)

I've walked across this dyke trail. And I haven't seen any yet, because I don't know how to recognize it but it looks like prime habitat for one of our medicinal plants, we called [name in hənq̓əminəm]. It's also known as hog fennel or Indian hemp, it's really important medicinal plant. And this, all along this back trail is prime habitat for that. I don't know if it grows there ... The Indian hemp likes, it's too damp for it out here, too wet and marshy out here but up here it's drier. And it's windy there and the hemp likes a place where it's windy. (M06 2016)

[My grandmother] still was very independent, and taught us the ways of the river, but she also was a basket maker and a medicine person. Everyone in each family had a trained – cause I was fifteen before I went to a, an actual doctor. My grandmother treated us at home. And so, she utilized these different sites because, I didn't understand when I was younger – it wasn't until I was older – because then we also had forest. And um, she used to go out for roots and barks and herbs and different kinds of plant life, and as time evolved, we started being unable to go into the forest in our own territory. And so she utilized more, of course, the plant life differentiating between foreshore into the forest. And then there wasn't as much pollution, because that's what she was afraid of, because at that point she didn't want to treat anyone or anyone of us because of the pollution. (M11 2016)

As indicated in the preceding quote, harvesting of plants for medicines was a large part of Musqueam's way of life and heritage, and the cleanliness or purity of plants to be used as medicines is paramount as the power of medicines are diminished by pollution and disturbance.

It is also clear from interviews with Musqueam members that different aspects of plant usage (e.g., between medicines and art) often existed in the same repertoire.

Bog areas were not used for like basketry, and different kinds of medicinal, depending on what your ailment was that you went to either mountains or the forest ... My granny didn't go down there, because she liked to go where there were no other people around, or had been, because she said it wouldn't be as effective. (M11 2016)

Sharing is similarly a strong component of plant gathering and medicines. Like the distribution of fish resources, many people may use plants collected by one individual.

[Aunt] collects [medicinal plant] and everything here. In which case she gives it out to the grand or the nieces and nephews and grandnieces and nephews and then, by way, makes it through the reserve and stuff like that. (M23 2016)

So that's part of that. Like I said, I've had to go out here for stinging nettle. In the last two years, actually I should mention. In that last two years I've come out here for stinging nettle more because I can't find it up here, in any kind of – like, I can find it but I will take out the whole patch in order to get my needs ... So I'm also collecting for more people than I did before. Where it used to be just myself and my grandma and you know, my aunts, granddads and whatnot. Now I'm collecting for more people who don't know how to resource it or don't know when to pick it. Or just can't. (M23 2016)

Today, Musqueam members are making active efforts to preserve and revive the traditions that surround these coastal harvesting activities despite the tremendous loss of availability of plant and shellfish resources in their territory. For example, one Musqueam member discussed their ambitions to transplant traditionally used vegetation back onto the Musqueam Indian Reserve. Musqueam members, from young to old, articulated a desire to learn about this aspect of their culture.

Certain plants grew in the forest ... Yeah, and foreshore, but there's a different type of plant, like that's what I was saying was like, as time went on where the older ladies started to start to not want to go to the forest because of pollution, and when you get medicine you either go high ground or where nobody frequents, but that wasn't possible anymore, and at that time we had more foreshore than we did anywhere else, but like I said now we're looking at transplanting bulrushes, snowberries, burdocks, you know, things that are plentiful that we thought were just, you know, we just took it for granted, you know ... (M11 2016)

I'm just now starting to be aware of some of the plant species ... yeah, I pick up information from other people I work with and then ... In the community and outside. Yeah ... I did a forestry program when I was a teenager. You learn about plants so I till have an interest in plants. (M15 2016)

... Because they're [native species of plants] tied to our culture and our history as well. We're basically cleaning up the classroom and rebuilding the classroom the way we need it. (M23 2016)

4.2.2.1.2 *Coastal shellfish*

Like fish, plant foods and shellfish collected in the foreshore have historically been staples of the Musqueam diet, and together comprised the cornucopia that was once found in their territory. Unfortunately, more recent generations of Musqueam have not had the benefit of harvesting shellfish close to home (see Section 4.2.2.2). However, Musqueam members and elders recalled past shellfish harvesting on the banks of the Fraser River (e.g., Canoe Pass) and clams and crabs in the Tsawwassen foreshore.

I do remember my dad and uncles that were somewhat next door going to dig shellfish in Canoe Pass. They would go and, clams mostly, but at certain times they'd have other things. I wasn't interested – I only ate clams. And I went a couple of times, but they did it mostly at night with other neighboring people, depending on the tide ... (M11 2016)

Well it would have been all along here [Musqueam Indian Reserve foreshore], this is probably our original clam bed area right here. So like all this. So all along, all along the point. Because we have history and documentation and traditional territory. Like our traditional language has place names for all of this. So this would have been all harvesting areas. (M01 2016)

Musqueam participants nonetheless continue to value shellfish as part of their diets, and also as integral parts of ceremonial and gathering events, as described in Section 4.2.4.1. Members also retain a desire to collect shellfish if the opportunity were available.

No never [seen shellfish around for harvest]. They were wiped out before my time, because of projects like this. I just hear from my dad and them, saying they used to get them ... Yeah, it would be nice to have access to that but, we can't. A lot of people, they didn't have access to it when I was growing up but my mom being from lower Vancouver Island, we always had those. Now I hardly ever did that. It would be nice to go out again. (M08 2016)

The harvest of shellfish was not a solitary endeavor (as indicated in the preceding quote); rather families together with friends and even neighboring communities and Nations would work together. The communal aspect of subsistence activities helped to strengthen the social fabric within Musqueam and across communities, and was thus important beyond the provision of food. Gifting, trade, and barter for shellfish across the Salish Sea also characterized these coastal resources, with similar social benefits.

[Clam harvesting in Canoe Pass] It wasn't even just family, there was a number of people in the community that used to go, and I think they'd meet up with different people as well, so that it got to be ... Part of a group, yeah ... Yeah, I think it was mostly clams. (M11 2016)

Maybe I was ten, and uncle [personal name] lived next door, [personal name] used to live next door from Kuiper Island on a canoe, and bring clams and oysters and whatever. I mean there again, there's your knowing open water and there were just certain times of year he would come with clams and oysters on his way in, which he brought us. And he would stay here for a while and go up to my uncle in ... That was long ago, but not that long ago. (M11 2016)

I fished at north arm [of the Fraser River]; I fished all the way up to Douglas Island. At Canoe Pass, and when we started to have early access, re-access to the main river and what not I was one of the first ones to be fishing out there with old man [surname], you know? And as well, too. Here as a younger man, with my relatives on the island. You know, going shellfish, and still today my relatives will bring over a sack or two of clams, you know? And then again, looking for trade. But it's that kind of economic alliances.
(Qiyəplenəx^w 2016)

Seafood in general, including shellfish, as well as the use and collection of plants continue to be important parts of Musqueam's community identity, entwined with health, ceremony, food security, and social and spiritual wellbeing.

4.2.2.2 Impacted Baseline

The ability of the Musqueam people to harvest plants and shellfish in the coastal zone has been severely diminished over time from point source and non-point sources of pollution, as well as the intense industrial and residential development that now surrounds them. For instance, the buildup of Iona Island and the sewage treatment plant and the creation of Iona Beach Regional Park have irrevocably changed the coastal landscape close to the Musqueam Indian Reserve to the detriment of coastal resources and harvesting.

Right at the front here, were the sewer plant is? That used to be a good place, used to be able to dig clams there. Do a lot of black duck hunting there and do a lot of, summertime, spring too, spent a lot of days over there, you know what I mean, the whole community's over there in the summer time. It's a beautiful white beach, now it's not there no more because the slush from the sewer plant is there. Me and my twin brothers stopped there a few years ago when we were waiting for the tides. He said lets go for a walk over there, see if the beach is good. No beach ... About this high with that sludge form there. All the way up on the beach there's, I just got a stick, it's like soup there, low water. (M31 2016)

I think another thing would be, a problem where we get it all in there, would be, if you look, this is McDonald Slough. Right here. They closed that off, eh? That used to flow all the way right through ... that used to be all natural before. That was another arm [of the Fraser River]. And when they put the [sewer] plant and everything all in there. This, that pipe I was telling you about, see it runs out here? Keep going. It runs out to there and it goes underground and it's dumping raw sewage out here somewhere ... Yeah, and this used to be all open where you used to be able to bring your boat right through. But you can see the color change in it now, even from now right? It's all like brown compared to everything else because that's all dead water in there now, right? Even in here, right in here, but all along, down the beach that was all sand before. (M16 2016)

It's devastating and like I said, we're also, women have always done things, like harvested from the area, the foreshore for the guys and things like that. And now that we talk about, when you go by there and it's just stinky and smelly because that soil is dead and there's no life there so it's another thing that we've lost that area as well. (M01 2016)

4.2.2.2.1 Plants

Manmade infrastructure, such as jetties and infilling, have led to the erosion and destruction of beaches, marshes, and other coastal features that are crucial habitats for shellfish and plants. The former abundance of plants (and kelp) once available to past generations in the Study Area is now largely isolated to stories.

Fishing, my dad was always fishing. He did not hunt be we would, gather from the land, like we were always picking berries. There were certain roots that we could just play or eat while we were playing. We knew which ones we could pick and play. We used to be able to drink out of the creek. Back in the day. And play with many minnows, like the baby fish. And that went away, all of that went away. The best you can have now is the wild blackberries. And that's about it. (M02 2016)

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In Tsawwassen we used to get the kelp and roe all the way in here, because the winds would blow it in. cause they'd spawn out here in the kelp beds or something, and then it would blow it in in big winds, and then elders used to go out and collect it ... All along the beach, just right along here... out to about here somewhere, you can't go too far cause it used to be the American border would come out here somewhere ... So right from there all the way to around here somewhere, I remember the elders used to go out and get them. Like [names of relatives] used to phone uncle [personal name] and them and then they'd tell the rest of the people and then they'd go out and start getting some in buckets, but those that had boats they used to go out and go this way, and get it... it's pretty hard to get around here now, a lot of the island people are lucky, they still get it. (M04 2016)

Perhaps symbolic of the state of foreshore plant resources available to the Musqueam today, their namesake plant, məθkʷəy̓, can no longer be found on the Musqueam Indian Reserve.

Like now we say we used to have the məθkʷəy̓ grass out here, we used to have the clams out here. But now, no more. And this might be just another extension to that. We used to fish salmon in this land. Oh, like you know, they would say when I was little, my mum and aunty did this but we can't do it anymore because, you know, the resource has been depleted. So it's like, it could be very well the end of an era. (M01 2016)

Musqueam members shared many potential sources of stress that have led to the decline of coastal plants that the community once had in volumes. Among the reasons has been the replacement of native species by invasive ones.

Stinging nettle, as I said, stinging nettle was abundant in Musqueam. But it's been replaced by the Himalayan blackberry. And we have a crew that works five days a week, eight hours a day, just to remove invasive species all year long. And the purpose of that is to, that we can replant our native species to the area, (M23 2016)

Musqueam members also expressed that a specific cause for the decline of aquatic plants has been the marine traffic associated with the logging industry, as well as the appearance of log booms on the Fraser River.

So a lot of impact there that happened is that there's logging ... Yeah, and they would be towing their logs at high water and they'll go right through into the Vancouver Harbor from there, out of the [Fraser] River, north arm ... They would be ripping out the kelp. You know, there's and then the boats would be tearing it up too. So there used to be a lot of kelp, I remember when I was with my grandfather, my dad, there used to be lots of kelp, there's very little out there now. (M31 2016)

As far as other plants in this area here we used to have a marine type of bugwort, I don't see that growing anymore... I'd love to be able to get the [hənqəmiñəm phonetic] around here, but I don't, I get that from the island... it did grow around here... a long long time ago, it's been gone... I don't know, it wasn't around when I was growing up... probably because of the logs and the barges, the log storage along the river there. (M25 2016)

Yeah like the last [məθkʷəy̓], we lost it when, like the '60s ... Due to the expansion of the traffic of the, or the development of the log booms. (M01 2016)

In the vicinity of the proposed Project, medicinal plants that remain have been rendered unusable to some by pollution and disturbance from marine and terrestrial traffic, as well as the Westshore terminal.

I make medicines with plants. I can tell you right now, I wouldn't take anything from that shoreline because of the sea traffic, and also the truck traffic going through. I know that it's quite polluted from the coal coming in and going out, coming in. I've been told by members of the Tsawwassen band that there's a coating on the air, you know, the dust flies all over, but if people really knew what was going on I think they'd be up in arms about it. And that's going to increase. I don't think that's very healthy for anyone's lungs. There is a plant that grows there on the shoreline, it's called [həŋqəmiŋəm phonetic]. I think the English name for it is Indian consumption plant, they used to use it for treating TB. It still grows there, apparently, but I would never drink it. I know people do go and harvest it but I think they're crazy, you know, it's – maybe I'm wrong, but I would think that area must be very polluted... so the plants would be sucking that up, and that is not healthy, especially if you're using it for your lungs. It's treating your lungs with what's causing it probably. (M25 2016)

Some Musqueam members further attributed the loss of plant resources to irresponsible harvesting and overharvesting in their territory.

It's also hard to get liquorice fern there, too, because people think that – you know, they get lazy. And they don't replant them, they pull it out ... I've gone in to Pacific Spirit Park where I used to go, there's not even any on the trees anymore, they just pull it off without sticking part of the root back and packing it in ... so if you're doing ethical harvesting, what you do it – like you don't go and clear out the whole patch because you're not going to have anything you can go back to next year, so this is what's happened in this area. (M25 2016)

There's a lot more people using the trail, and huckleberries are really good, so people see huckleberries, and they're like, oh wow, I didn't know huckleberries were here still, and just like, pick them all. (M05 2016)

What plants remain to be harvested by the Musqueam community tend to be insufficient to serve their needs, even in modest amounts, and continue to recede.

So basically as soon as I could drive I've been going up there. Because the stinging nettles ... we don't have any sort of volumes. So if you want to make a rope or cordage to go with another piece that you're doing, you need far more volume ... (M23 2016)

The vegetation on the bottom, that's growing. I've noticed that the cattails have receded about threefold. I can't tell you why, I don't know the answer to that one. I have more of an understanding of fish and fish species, because I've lived it, breathed it. But the ecology of why the cattails are receding, because I don't see any other invasive species taking over. They're just not there to the same degree as they were before. So something environmental has happened there. And they're, they're being impacted, so that line that would go out would have been three times as dense and three times out ... right now,

there wouldn't be enough, there wouldn't be enough cattails there to supply the needs that we would need them for. (M23 2016)

For many Musqueam members, the inability and difficulties encountered when harvesting plants for food, medicines, art, and ceremonial purposes are more than an inconvenience. Scarcity of plant resources so central to the Musqueam way of life and history can also be emotionally and psychologically distressing, evoking sentiments and feelings of being cheated, loss of dignity, and sadness. Members often have to resort to barter and trade to obtain plants that used to grow on their shores.

... I've gone with elders out in various locations in the Tswawwassen area as well as Iona Island and on Sea Island. I actually quite saddened and disappointed that I'm not able to plant gather. And the reasons are that we don't have the native species and the abundance of plants that my aunts that are older and my mom and my, that they were to gather plants when they were younger and the stories I've heard about my family that is passed on and all the medicines that they used to make and the things that they've done. Because the city has grown around us and the environment has changed so much that I don't have that opportunity. And it's very unfortunate that things keep happening and you know there's so much development still that these types of things may very well completely die out. And I'm hoping that the work we are doing here with this study as well as other studies will help us bring those types of things back ... (M28 2016)

I think that I have been gypped out of like, all of these things. Like my grandmother, like she'd be boiling devil's club and all of these plants like. But now, you know nowadays we have to buy or trade for these plants like devil's club and [həŋqəmiŋəŋ phonetic] and labrador tea. Like we're lucky that we have our [personal name] who does these types of things, you know like plants gathering. But she still has to barter and trade and buy. And it's really not fair, these plants and this, these resources that should be at our fingertips and the things that go along, all the teachings that go along with them are in jeopardy of being lost if they're not already because we don't have the opportunity because over the years ... (M11 2016)

I weave. And my granny was a basket maker too, which is why we grew roots ... But now I can't do it, because we have to go to someone else's territory to get the materials. [Interviewer: Can you talk a little bit about how that's changed?] Well, its not – before you even begin, you're bartering. You know, like [personal name] can I go onto your territory, and she's going "Again, [M11]? Now what do you want?" You know, so you get that feeling where you feel – oh okay [personal name], I'll weave you a blanket I guess, you know, so you're in debt before you even start your project, so, yeah. And it's the same with medicine, I know there are bartering deals that go on, like, because we have no more foreshore and we have somewhat bog, that I won't mention anywhere, that we're bartering now with Tsawwassen because they have more foreshore, and things that we can't do here, which is why [personal name] and I are trying to transplant. (M11 2016)

4.2.2.2.2 Coastal shellfish

Infrastructure has similarly disrupted previously productive clams beds and also habitat for mussels and cockles. Many members remembered hearing about obtaining clams and other

shellfish from beaches on the Fraser River by the Musqueam Indian Reserve, from Roberts Bank, and many other areas. Today, nearly all mollusks in the vicinity of Vancouver have been lost. Among the most prominent stories told by members was the impact of the Iona sewage plant and jetties that wiped out the shellfish that once drew harvesters from across the Salish Sea.

[Interviewer: ... were there clam beds here before?] That was before my time, there was. My grandfather used to tell me about it, but during my time that was all done away with ... Well they disappeared, he told me they just – my grandfather talked about it a lot when they, just below the Iona Island here. They built the rock jetty all the way down to Point Grey there ... that was to make the channel for the big tug boats and everything, and that changed all the water flow, and then they built the Iona Island sewage plant, and when they built that they, where the water flowed through at McDonald's Slough, it used to go right through, and they landfilled it right across and made the road there, the highway, or the access road to Iona Island and that did the same thing, killed the flats out, for quite a ways out. And then they built the discharge jetty that goes out into – way out into Sandheads there. And we used to go to Iona Island, and we used to walk around after they built that discharge jetty, and we used to see the dead crabs and clams all over when they first built it, they'd just be on the surface of the sand, because the water temperature changed and the water flow, so the vegetation died and the shellfish that were in closer, so we could walk out about a hundred, two hundred feet, but everything was dead after that. (M04 2016)

Yeah. I think the last, they used to harvest shellfish up here before [near Musqueam] ... Probably in the 20s. Before the jetty got put in ... It used to be sandy beaches along here ... Yeah, sort of like the sandy beds you see on Spanish Bank side over here. The white sand and, it used to be that way here ... Yeah, elders and they used to pick clams along there and they dug a trench here about ten years ago out into the marsh and they hit the sand bottom and they exposed, cause I went rooting around in the sand to see what was there, and I came across the big butter clams shells. The clams were huge, they were that were in the area ... I think bands from other areas I heard used to go to this place to pick clams too, so it wasn't just Musqueam that visited the site but people from other areas went there to pick clams. (M15 2016)

Now in a related note in this salt marsh up here, it's very important to the salmon right now but it's a recent development also related to the installation to the sewage jetty. My late grandpa talked about how before that sewage jetty went in all the sands from Musqueam up to Point Grey were white sands and there were so much shellfish there that people used to come from all over Coast Salish territory to collect shellfish along here, people would come from across the border, from Lummi – people would come from up coast ... the shellfish were still plentiful there – my dad used to like to tell the story of my two grandfathers they were, that we didn't know until into my parents marriage that they were good friends when they were kids and they used to start out, when they first were big enough they'd start off from Musqueam with a sack and they'd go all the way out Point Grey collecting shellfish and then eventually they figured out it was better to take their empty sack and go all the way out to the end and fill it on the way back. (M06 2016)

I hear we used to have a good return of, in the north end of the [Fraser] River I hear we used to have a good return of clams, mussels etcetera, until they put in these artificial

dykes. ... Going out at Iona Island. And now they're going to destroy that population ... [there used to be] abundant shellfish, even here at the local beach, Musqueam beach there ... [they were] destroyed by the jetties. (M32 2016)

One Musqueam participant noted how shellfish resources adjacent to the Musqueam Indian Reserve were a preferred source for the Musqueam community; however, areas such as Canoe Pass were also utilized for harvests. In addition to the spits and jetties that were progressively built south of IR2, the growth of log booms were also identified as a reason for the decimation of nearby shellfish stocks.

We were talking actually to canoe paddlers and that type of thing, and they were talking about when they were, um, where the booming grounds are now that ... would run along the sand out to the point and back on the sand, which is now mudflats. So that again must have been before. He was near to 100 before he died. So he seen, you know, and then they talked about shellfish then, and by the time I was a kid, then they were going out to Canoe Pass, because this was no longer – you could no longer get [hənqəmiñəm phonetic] and shellfish and that kind of thing there. (M11 2016)

... We also had shellfish that was there for our people. But when they started to allow log storage and other industrial activity taking place on the north arm of the [Fraser] River, that eliminated our access, our ability to access that resource because it became polluted and non-existent. As the bark fell from the log storages that were in place the ground beneath it became a dead body of land. And then they installed what they call the Iona Spit. That's a manmade spit, which then further – and then they closed off McDonald Slough, which then eliminated the ability for the eulachon run to come to our shores directly. So you could see, you could hear and see in my lifetime that erosion of our economic and sustainable, sustenance, being gradually eliminated from access ourselves ... (Qiyəplenəx^w 2016)

Many Musqueam members recalled the area between the BC Ferries, Deltaport, and Westshore terminals as being good shellfish harvesting grounds in the past. As has been discussed in previous sections of this Report, existing impacts from the construction and physical occupation of the Deltaport, Westshore, and BC Ferries terminals have had major deleterious effects on the abundance and availability of shellfish in Musqueam's territory. Elders in particular spoke of harvesting clams in the Roberts Bank tidal flats as children, while younger participants remembered hearing stories of bountiful harvests in the vicinity of the Project in previous generations.

Yeah, we used to – like there's the Tsawwassen reserve eh. We'd walk out there, and the old man [personal name], he'd go up here to the hill right here, and he'd cut some vine maple branches, and he'd get about this long, and he'd have a prong on it like that. Cause you know, you can't pick up the crab, he'll bite you, eh ... We used to, he used to show us how to, you push the crab out of the mud, cause they'd bury themselves when the tide goes out, they'd bury themselves in the sand. So you'd poke under them, pull them out of the sand, and then as soon as they'd come out they'd go like that, so you just stick the prong in their claws, pick them up, and drop them in the sack. And we walked from there, and here's the ferry causeway, we came all over this area here, and we used to come in here, and we used to get crabs and cockles and clams, just walking in this area, and then

we'd drag them down to here, and somebody would be waiting for us there, and put them in the buggy there, in the truck. And then you'd drive it down and the women would cook the crabs and clams and cockles and everything ... But we were just kids when we used to do that, eh! And we used to get about two sacks of crabs ... That was dredged in there ... Used to – there's nothing in here now. There's nothing, like, from there to there there's nothing, it's all dead ... If you go out there in the water you can smell it, eh. All the dead vegetation ... There's no more crabs or cockles or clams there. (M04 2016)

It's all basically dead water in this area between the terminals now. With no tidal flow so therefore less oxygen and less food for the rearing of the juvenile salmon and the juvenile crabs. Well we used to harvest clams and oysters there too. But the oysters are now contaminated in between the two causeways here because they don't have the fresh seawater flowing through there ... they would have [had] more oxygenated water, better food supply of juvenile herring and different species of the one's we traditionally utilize. (M24 2016)

According to Musqueam members shellfish and the practice of harvesting have been decimated by pollution, which has been part and parcel of intensifying and dense industrial developments in Musqueam territory. The small amounts of shellfish that may remain are moreover contaminated to a degree that consumption is not possible.

Not in my day [harvesting shellfish] because of the impacts to the industrial expansions in the past up and down the Fraser River, and so it's been all of the cumulative effects of all those industrial resource gathering projects that have taken place that have had a detrimental environmental impact to the habitat that the clams and mussels and oysters and everything relied on in our traditional territory. That's primarily in the Roberts Bank area near IR2, the mud flats outside UBC, and everywhere. There's no longer – the habitat is not healthy enough to support resources for actual consumption ... I think there are some there still, but I don't harvest them, I wouldn't feed them to anybody ... It's the contaminants that the many, many, years of pollution in the sediment and in the sand banks there themselves, they're just not safe to eat anymore ... it's cumulative... I've never harvested shellfish there. Though that's something that I'd like to do. I always see communities on Vancouver Island and the central coast and the north coast, you know, it's always been said that when the tide goes out the table's set for First Nations communities, although that's never been the case in my generation because of the fact that pollution of the foreshore is so high that, you know, our elders, our community members would say don't harvest that, because there's a high risk that you're gonna get sick or ill or – because of the pollution in that area ... I think it would be sometime in my parent's generation that they stopped harvesting off the foreshores ... I've never seen anybody do it [in my generation]. (M12 2016)

There still are oysters along the rocks here. On this causeway, that one I'm not sure, I've never been out on the outside of this causeway. But the oysters are, because of lack of flow, the ones that are on the inside, lack of flow of water to cleanse themselves properly, they're contaminated. Not safe to eat ... I quit harvesting them about 20 years ago because you would get sick from eating them ... Now if we want any clams we go over to the Gulf Islands. Galiano, Valdez, and Gabriola. We have to have a protocol agreement with those guys to harvest in their territory. You know, traditional territory. (M24 2016)

Yeah there were [clams and oysters around this area]. Yep, yep, all contaminated now, I believe. I wouldn't touch them. (M31 2016)

The loss of shellfish resources has concurrently translated into the halting of harvesting and the attendant benefits brought about through the harvest, including teaching and learning and the building of social capital. Rather, Musqueam members now have to resort to harvesting further afield and trade, the latter of which has also become less tenable due to declines in the broader region in concert with regulatory restrictions.

... But there again [shellfish harvesting in Canoe Pass], it was pollution that stopped that. And at that point it was a cooperative thing, that they were still able to work with other Nations, now whereas they did it cooperatively as two tribes working together, utilizing the village site. (M11 2016)

Yeah, because around Porlier Pass and that area and right within that vicinity, our guys go shrimp fishing, or prawn fishing. But in towards Cooper Island way and what not, it's more that the oyster beds are prevalent over there. And over up towards Chermainus Bay and Yellow Point that clam beds are. You know, years ago we didn't really have to go there because we had our own. But as we started to lose that we had to start now moving and trading that commodity a lot more. (Qiyəplenəx^w 2016)

They, back in the day, there was no clams and oysters, they used to trade for them with the people up in, from Vancouver Island and they would come over do trades. That seems to slow down quite a bit, I don't see them coming around any more ... Well DFO's put limits on them, they've got a quota on them now so I guess the quota, what they get pretty much has to go towards their own village ... So they have some access that they'll bring over and then the band will trade them with the halibut for sockeye. (M31 2016)

4.2.2.3 Project Interactions

4.2.2.3.1 Marine Shipping

The large-scale disappearance of desirable and viable plants and shellfish from Musqueam's territory, that were once fit for human consumption, fits a broader pattern of alienation caused by industrialization and settlement, a pattern that the Project is anticipated to propagate.

Pollution from marine traffic related to the Project is expected to aggravate the contamination of shellfish and plants and contribute to the sterilization of habitats, making steps toward any recovery less possible.

I would say yeah, both. All of it. The construction [of the Project] definitely would have a huge impact that, maybe part of the ecosystem could recover in how many years? Probably 20 to 50 ... The shipping, the increase in shipping is a huge concern for me ... the increased shipping I think will have a big impact. That increased traffic. And what those freighters will be dumping, polluting, excreting, like all of that pollution. So it's going to have an impact. (M03 2016)

Oh yes [the Project will have an impact on plants]... well, look at, you know, those big freighters run on what? What do they run on? It's probably diesel. No, like all that traffic, even the fish boats that have gone up and down, eventually all that is going to be washed to shore, you know, whatever is coming off, whether it's somebody spills a can of gas or oil, or just chucking stuff overboard, you know. Eventually it's all going to go to shore. I would suggest that the Tsawwassen band test their plants out there, that's what I would do. Especially that area, cause I know they're still using it. They're harvesting and using it. We used to be able to harvest shellfish along the shoreline here. You can't now, and neither can you get crab close by. I don't think there's even rock cod around now... now that is gone and there's some people that say they wouldn't even eat anything that came off the shore around here. And they're fishermen, so. You know, we're looking at not only this, but we're looking at the effects of Fukushima, and that's starting to show now. (M25 2016)

But with all of that shipping traffic, increased shipping traffic I'm, I think it will definitely have negative impacts on what our fishermen are able to do there. And along the foreshore, like the little plants that are there that would definitely decrease what's able to grow and live there as well. (M28 2016)

They never had it in my time [oysters and clams], it was gone by then too... we certainly never had it, any shellfish came from the island or ... or some place like that ... Can't eat them, well, I feel really bad about it because you know like, look at Burrard, Tsleil-Waututh, what they're faced with. Well same thing, we don't have any shellfish around here either that's edible. The oil tankers are chugging through, and now you're going to have more traffic coming through, it's just going to kill more. Whatever's out there is just going to spread further out into the ocean. (M25 2016)

As expressed by Musqueam participants, losses sustained from Project-related marine shipping pollution may extend beyond the provision of seafood to include historical, social, and cultural values attached to harvesting as well.

Yeah, and that's a, I wouldn't know until it's done cause it would take, ok if there was a spill of bunker fuel in one of the marine areas, the area that it's going to go is right where I'm going. In which case, those plants won't be, as I've said, it's a matter of purity, those plants will be unusable for me ... And that is a huge impact on me. It's of a very core cultural significance that gets impacted ... the reason why I go to that specific place is because that's a place my ancestors went to, the culture's transferred, I teach my children that, I teach them the history or how Musqueam was here and how we come to name this place. The history is transferred. Now if I can't go back to those places because there's a spill of bunker fuel, the impact of marine traffic, in there is affected. (M23 2016)

We also then had to broaden our ability because if you look from a governance perspective, that we developed what I call the Golden Triangle to the Vancouver Island, to Nanoose down to the Cowichan area, including the Gulf Islands. For a number of reasons. One, for economic alliances, and for defense alliances, and for social alliance ... And based on that, gave us the ability to seek not the right, but the privilege to ask to take from those areas, other shellfish and other kinds of things such as prawns and whatnot. So when you look at this area here in Howe Sound and over here on Porlier Pass, that well, the old people would call it devil fish, to be very careful. And what they meant by devil fish was the octopus. Again, that was a very desirable piece of food consumption. So we had that opportunity. As well, over on the island here, our relationship allowed us the access of oysters. You have large oyster beds in this area. So that still concerns me in regards to this modern time. So you now have a recognition that we're now plying our economic opportunities within the Gulf Islands as well to secure prawns and other edible sea resources, sea cucumbers etc. And because we no longer have herring coming into our area, we now have to secure it from that area. So we're mindful of that tanker route that you've drawn on the map [i.e., the Project shipping route] ... (Qiyəplənəx^w 2016)

4.2.2.3.2 Construction and physical occupation of the Project

Pollution from Project-related marine shipping is not the only potential interaction on coastal harvesting values. The stirring up and deposition of silt and sediment from Project construction and dredging could also affect coastal harvesting resources.

Well there would be a lot of siltation then for sure, during the dredging and construction [of the Project] ... the siltation problem you cannot get away from, and that would adversely affect all the clams that live in the area and the oysters because the area would be silted up a lot as they were dredging and then filling with, you know, the rock that would provide the base for the new terminal land area. (M24 2016)

Everything [would be affected by the Project], razor clams, cockles, crabs, eel grass, salmon fry coming out of the river, they tend to hold there [the Project area]. Geez, where do you stop, you know? I mean, they're basically gonna wipe out that whole razor clam bed and there's horse clams in there, the crabs feed on. It'll basically take away all their food for now, you know? ... I mean they're [the Project is] gonna take the stuff away and

when they lift everything up, they're moving everything and when they deposit that stuff, will it go through a pump or how are they moving it? You know what I mean? ... you dig something up, you're gone screw something up and not only that but the tidal run. What ways the tide's gonna move through there now, is it gonna affect, is it gonna kill some areas ... because they're changing the whole route of the tide? Which way it pushes north and south? (M20 2016)

4.2.2.3.3 Summary of Potential Project Interactions

In brief summary, potential Project interactions on coastal harvesting values in the Study Area include, but are not limited to:

- Exacerbation of the existing pattern of alienation from coastal plant and shellfish resources caused by industrialization and settlement in Musqueam territory;
- Increased mortality of coastal plant and shellfish resources due to pollution generated from marine shipping;
- Increased contamination of coastal plant and shellfish resources due to pollution generated from marine shipping;
- Loss of viable habitat for coastal plant and shellfish resources due to pollution generated from marine shipping;
- Loss and disruption of historical, social, and cultural values associated with the avoidance of coastal harvesting activities due to pollution generated from marine shipping;
- Increased mortality of shellfish resources from dredging and construction, including the generation of silt and deposition of sediments; and
- Loss of viable habitat for shellfish resources from dredging and construction, including the generation of silt and deposition of sediments.

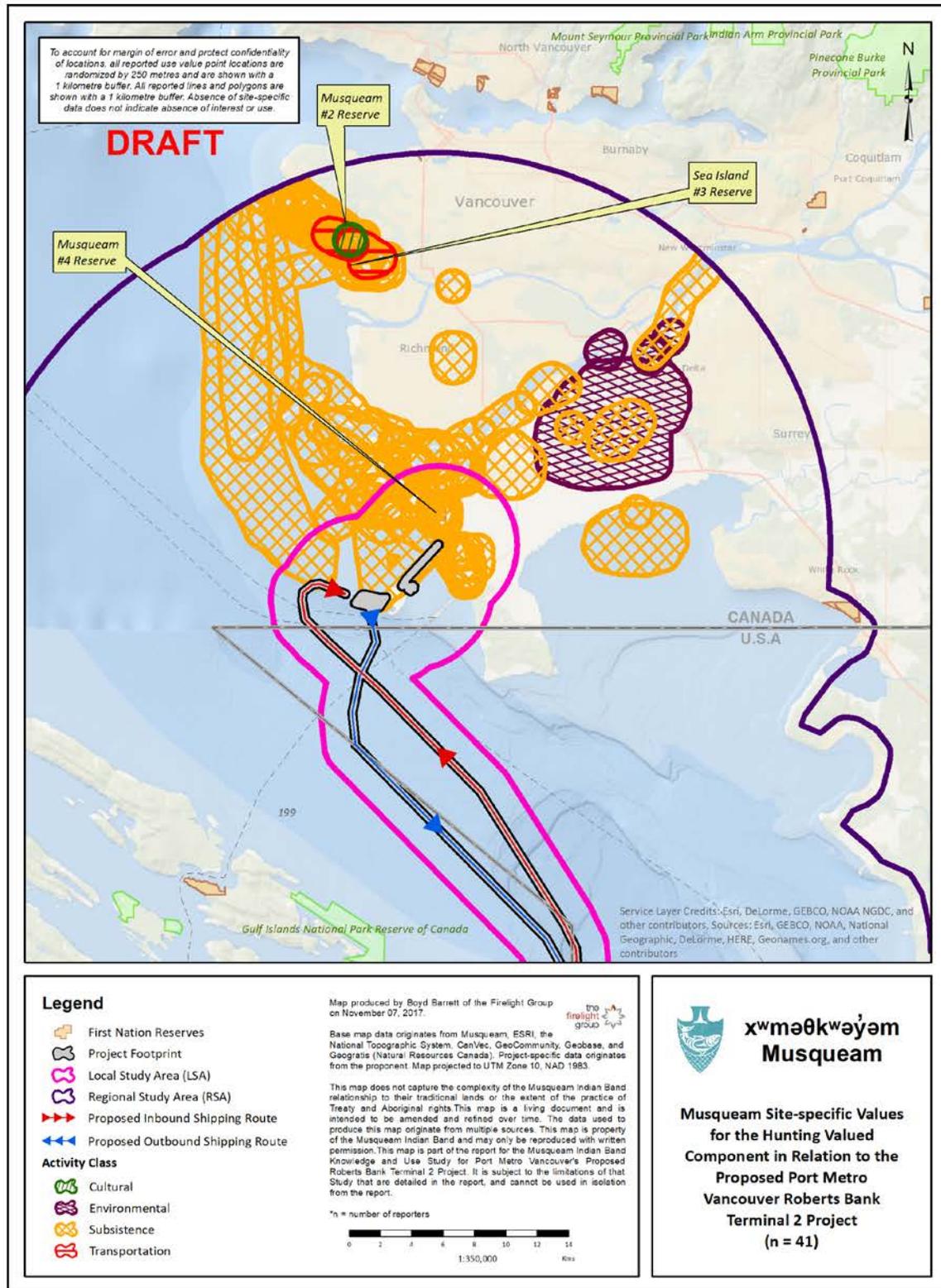


Figure 5: Musqueam reported site-specific hunting values in the Study Area.

4.2.3 Hunting

4.2.3.1 Importance

Hunting, along with fishing and coastal gathering, is one of the bases of Musqueam subsistence, and includes both small and large game in terrestrial and marine environments. Because of the presence of hunting restrictions and an absence of large game in the Lower Mainland, hunting elk, deer, and moose is locally impossible even if highly desired by members (see Section 4.2.3.2). Instead, Musqueam hunting in the LSA primarily targets waterfowl, including many different species of duck (e.g., black, mallard, pintail), as well as geese (e.g., Canada, snow, brant), and pheasants.

As described by Musqueam members, hunting of waterfowl occurs by boat and on land, and is an important supply of food for members today. For some individuals, duck hunting is preferred over fishing.

Mallard, a lot of pintails out there ... Mallard [is their favorite]. More meatier, right? Pintails are kinda scrawny and skinny. We make a lot, we just make duck soup out of the pintails and widgeons. They're smaller. Mallards we roast them all the time. Widgeons. Used to be really good pheasant hunting in there, on the back of the reserve. (M16 2016)

Around Point Grey we used to hunt – this is a rock jetty right here, and it used to only go to right here. But we used to come around, this used to be open here. Right here, that used to be open, the water used to flow through here. And we used to come around here with our skiff, and just hook it, tie it under the rocks, and we'd sit on the rocks and wait for the – the black ducks would fly in. fly in here, and that's where we get them, right in here ... Mallards, pintail, goldeneye, get widgeons and stuff, and we fished black ducks on this side of the jetty, all the way out to Steveston lightship ... (M04 2016)

Depending on the time of the year and the weather, um, it varies so much. It's really good hunting out there [by Canoe Pass] when all the fields freeze up, all the ducks move out to the estuary, so if you get a cold snap you get [expletive] piles out there ... you get, I don't know, whatever you have shelves for, 20-30 ducks, ten ducks ... (M17 2016)

[About hunting geese] right across from Steveston, we were in here all the time... [personal name] used to drop us all along there on his boat ... we came on the boat from Steveston ... Right over from across. [Personal name], when it was cold, used to anchor his boat right in the channel there ... Yeah, September ... we always did this first and then the snow geese would come later, and then we'd go on into there, all the time, for about ten, fifteen years doing that. [We could feed] Two or three people, that's all I guess, with a snow goose. A little bit more with a Canada. (M16 2016)

Out here I, whether I came this way or this way back to Musqueam I get the saltwater ducks, they're like the surf scooters. And, goldeneyes they're called. And I come out here, head back to Musqueam along here, all the saltwater ducks would be along there. They're different from the dabbling ducks you see in the marsh ... The saltwater ducks they mainly eat shellfish ... Yep, and the sawbills that I get [inland] they're strictly fish eating birds ... (M15 2016)

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I still duck hunt every year. I like that better than fishing ... I liked it better ... I don't know, hunting is, I like the taste of duck meat ... My parents said they used to feed my duck meat when I was six months old ... And I wouldn't eat anything else they told me, so. (M15 2016)

Local hunting of waterfowl occurs in many areas, including by the Musqueam Indian Reserve and Canoe Pass, but also in the direct vicinity of the footprint of the terminal and causeway of the proposed Project. One participant also identified the area by Musqueam and in Tsawwassen as key habitat for waterfowl because of the presence of salt marshes that have become rare.

... it's one of the few places [Musqueam] including Tsawwassen that have salt marshes, there used to be lots of salt marsh all around most of the Fraser – that's extremely important for the waterfowl coming along the Pacific flyway for great blue heron, great blue heron is an endangered species but if you look at the salt marshes in Musqueam and Tsawwassen you wouldn't think so there's so many of them, it's because they concentrate in these areas because of the salt marshes, it's a great habitat for them to feed and lay their eggs and everything ... And all other kinds of waterfowl, mallards and black ducks and everything. (M06 2016)

Left and right of the existing terminal...We would go brant hunting... this dries out the sand, right, so you have limited time to hunt by boat there. But all in here... (M09 2016)

Hunted ducks right from there, all the way across Point Grey ... Yeah, I used to run out there in my punt, all the way out to Point Grey, and sit around Point Grey right there ... Yeah, I hunt ducks all around there [Point Grey], all around here. Not much ducks over here anymore, cause they're just starting to come back. (M04 2016)

Lots of my cousins, and other people from Tsawwassen reserve, they hunt all right here, right on the marsh... I, the only place that I do all my duck hunting is right on the Musqueam Indian reserve [IR4]... it's right in Ladner. (M33 2016)

North, there's the middle arm [of the Fraser River], there's the main arm, all out in front of here and right to Canoe Pass, I've hunted [ducks and geese] to here. All the way around the front ... I'd say start from Canoe Pass, right around the front there. All in here, and all the way over there ... and then on the backside of Shady Island ... (M17 2016)

Duck and goose hunting is a frequent and common activity among Musqueam participants over the fall and winter months. Like fishing and coastal harvesting, the social and family aspect to hunting activities is a crucial part, allowing for the transference of knowledge and practices, especially to younger participants.

... As far as I'm concerned, the whole area is a classroom for different aspects. As for hunting of black ducks, that whole area would be a teaching. And then I would use the Musqueam foreshore as well, because that's after you come in, you're taking the ducks, that's the history gets transferred ... Food, food, hunting and I would say with every aspect that we do, a transference of history is with every action. So when you're hunting it's a classroom, when you're fishing it's a classroom. So everyone of those is tied to that. And I always pull that back to say the Sparrow Decision, part of the Sparrow Decision is that we are, we recognize that we have the right to fish not the right to be given fish because the

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actual action is where culture transfers as we do it. I think it's important to remember those. And that's not just citing the court decision, that's how we're raised. (M23 2016)

I probably hunted there last year, my son and I ... Ducks, geese. We probably hunted there 20 times last fall ... See the thing is you get those ducks coming in from the Deltaport, landing in there, right? So that's kinda, they stay in the Deltaport when the wind gets too heavy out in the water and it starts crashing on the beach so they've got really nowhere to nest for the night. So they want to go into these fields to get like a more comfortable place ... (M20 2016)

That is even longer, probably from eight years old [that I've been hunting ducks] with some of the uncles still present ... It's my job to pull them into the boat at first and then start plucking it as we're going in, because some of them like them plucked right away and some of them like to hang them for a bit, it just depends if it was this uncle or that uncle. (M23 2016)

... my dad used to go out there all the time with my uncles, they were avid duck hunters, mostly my dad was a pheasant hunter, he hunted them all the time. Lyle, my uncle, he was a duck and a goose hunter so we went all over the place in there ... See in those days they were called migratory and non-migratory. You could hunt on the reserve, we could hunt pheasants all year round, okay, cause they're non-migratory. Anything migratory we had to follow the rules. We couldn't go shoot ducks after it closes, because they're migratory. (M26 2016)

[Being able to hunt] it means a lot right... I taught my son and all them. We just mostly did the hunting on IR4 ... I still shoot geese when we're fall fishing down there eh, cause we go to fish at Canoe Pass ... Yeah... we'd pull into the shed all the time [on IR4] and then we'd just do the whole loop around the whole property, with a dog, right. Lots [amount of pheasants hunted] ... yeah, way more ducks in there ... thousands. (M16 2016)

Hunting resources are not only acquired for personal use and consumption but are frequently shared between community members. Hunting is thus integrated with wider socio-cultural norms, such as taking care of elders and others in the community.

My dad was an avid hunter, so we did that quite often. He gave quite a bit away to people around here. He really liked doing that stuff. (M17 2016)

Oh yeah. More so [sharing] with big game than the birds, like I used to go hunting here to try to get – [grandfather] used to love pintail. He started getting older, and once you get that old you stop hunting, and every time I try, I get one and I go and give it to him. (M09 2016)

Akin to the intangible values associated with fish, plants, and shellfish, hunting and hunting resources are also important for their role in ceremonies, art, and a broader connection of members with their history and land. Waterfowl and the hunting of waterfowl, as well as larger game, each requiring considerable effort to obtain, are central to ceremonies and feasts where sharing of foodstuffs also occurs.

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Yeah, so the foods that would be served at like a large gathering at our long house, larger ceremonies where you know three to four hundred people will come and you want to you know feed them your traditional foods, it takes a lot of people to be able to gather the food that you need to feed you guests and to feed your community. And so that's travel time out of the, out of the city to go and hunt and that's times where you have like you know, you only have specific times during the summer so you're having to ask for special permission to go and fish in your waters to be able to have the salmon to feed the people as well. And yeah like, again the small hunting areas that we have, like ducks don't feed a lot of people. One little duck, you need to have many ducks and geese to be able to feed that many people. (M28 2016)

Well just the longhouse that's here [is used for ceremonies] ... Yeah, I got naming ceremonies ... Memorials, yeah ... When we have those we always want traditional food. So yeah it's usually what, salmon, prawns, crabs, deer, elk, is the food you try to incorporate there, I guess. Like when I do a lot of deer hunting, I do a lot of deer hunting in the Interior. For the last, probably six years my deer has gone to the longhouse for those namings or memorials or whatever ceremony that's there. And same thing, like the ducks and all that stuff, that's the kind of stuff that goes in there too. Just traditional foods, right? (M10 2016)

I got some [ducks] for the longhouse right in there when I was there. I went and shot them right there ... Yeah [shared them], they take the feathers for the cultural. So when they initiate a new dance or they use the duck feathers for the traditional. They spread it on the floor ... It's for when they initiate new dancers. It's supposed to like cleanse the floor and clean it. So they use the duck feathers for that. (M16 2016)

But the flip side is, it's not just about the sustenance, the meat [from the deer], so that's when I started learning or started perfecting my craft of carving bone out of stone tools, was at that age. I put it away for about 20 years, where I did a piece here, a piece there but not the same levels. So it's with those deer, it wasn't just about the pelts, which I use for drums, the meat which I eat ... But the bones themselves I used, bones and tendons I used for making those tools, because the uncles that had taught me had also passed away by this point. So I wanted to take what they had taught me and put it into, into use. And at that point I needed bones, I need this, I needed that. (M23 2016)

... But we don't just eat the ducks we use the down, and there's other birds that we use, like feathers for ceremonial purposes. We use, I guess it's the bones, like cause we can use those for straws and stuff in our cultural practices. So those types of, like the fish and the ducks and the wild game ... So for our ceremonial purposes that's the only kind of food that you can eat. You can't go to the grocery store and buy pork chops and stuff and go and fry them at the longhouse ... M28

4.2.3.2 Impacted Baseline

The absence of large game in the Lower Mainland is perhaps emblematic of the wider impacts sustained to-date by the Musqueam community in terms of their hunting activities and values. Most obvious among the drivers of change has been the development of the City of Vancouver, which has not only eliminated viable hunting habitat, but also introduced many restrictions and sources of pollution that have affected hunting and hunting resources.

Like the City of Vancouver, they took all our hunting away. Took all our game away. Cause we used to have a lot of deer, a lot of woods. Lot of trees. It was beautiful, it must have been beautiful, a long time ago ... Oh that was way before me. Well I've seen pictures of the deer that they had hanging, it was pretty big compared to the deer nowadays. (M22 2016)

There's no deer around, they have to go to other, other reserves to get permissions so they can go hunt where there's deer available ... Well there's the few hunters on here, they go up, up country to go and hunt deer and elk, moose. Vancouver Island deer are too small. (M22 2016)

Musqueam members reported that waterfowl populations have also experienced precipitous drops, especially saltwater varieties.

But the saltwater population [of waterfowl] has dropped. Especially in this area. I don't see any ... Up by Point Grey there, there used to be hundreds of surf scooters and goldeneyes. They're population dropped right off ... Even the ones I didn't hunt like the loon, the common loon and the longtail duck, they're gone. I don't see them anymore. Greeps, western greeps, we used to, the Musqueam called them helldivers but we never ate them. I didn't eat them, but I don't see them around anymore ... Something's changed in the environment. They're not being hunted, some of the species, but they're disappearing. (M15 2016)

Yeah, just down here [by the reserve hunting ducks]. And now there's, really slow. You can sit down there all day and get just one duck. As a teenager, we used to shoot down there, there used to be constantly, non-stop. Duck hunting season was a big thing around here, now you don't ... I think it was all of a sudden ... (M08 2016)

Yeah. That's Point Grey, right? That's the north arm [of the Fraser River], right here? Well sort of right across from these things here, you get a lot of black ducks up in this area. You don't get them anymore. They disappeared ... That was one of our main sources of food here, was the black duck. Over and above geese and ducks ... Cause they were so plentiful. I remember when we used to start hunting those things and there would be thousands of them. (M31 2016)

As a kid I remember there being more of an abundance of species, like the eulachon. The crab, the prawn. Clams. And then of course there was the ducks. Pheasants ... it [hunting] was on the water because we would use the duck hunts to, or our boats, because that was where they were down in the marshy areas. So you would, they like, run the duck hunts,

up off the water and they could just get the ducks or the geese or the pheasants right at the marsh there. (M13 2016)

There was a few that were locals [black ducks] that stayed there all year round, but not that many but when the herring season, it looked like a black cloud going along the river or the outside of the river I mean. Now they're gone ... (M31 2016)

Musqueam participants noted that a loss of waterfowl habitat, in part as a result of the Westshore terminal and proliferation of log booms, was to blame for the decline in waterfowl populations. Light pollution has also changed bird behavior and habitat with consequent effects for Musqueam hunting.

As far as the duck hunting goes, probably the only thing that has been affected adversely by the coal terminal is the brant hunting. It's not as productive as it used to be because the water not being able to float freely, there's less eelgrass; eelgrass is what the brant eat for food. (M24 2016)

... we've got no more ducks down here, or very few, eh ... [because of] the booming grounds ... All the bark mulch and everything, you know, that fell off the logs and everything. That settled to the bottom and died, and killed all the vegetation and everything. (M04 2016)

From the elders, like I said, when I worked with the language program in the mid-80s, we did a research on duck blind hunting, and Canoe Pass is the place that they talked about, that was several generations above. But pollution hit Point Grey first, and that's where they got black ducks, and that was sort of a delicacy to them at the time, and that was the other main place that they'd dig was around that Canoe Pass area ... looking at this and understanding before the day begins, you figure out which way the wind's blowing, you know, how much air pollution are we going to suffer from that? Because we already have Iona Island and how strong is that air pollution going to affect us? And noise ... (M11 2016)

...something that I've found over the years that has hindered the hunting in the area is not just like growth of the city, but you've got Deltaport – you've got the greenhouses. Their lights are on all night long. So before the birds would come in when it would start to get – sunset. And they'd start coming in to rest for the night, but now the lights are on, the whole – you can see, you don't even need a flashlight anymore when you go walking out there there's so much light coming off ... the greenhouses and the port, like- the port's pretty bright. So are the greenhouses, but ... So environmentally, now you're supposed to quit hunting half an hour after sunset for birds, but it being so bright out, they might not come in until like eight, nine o'clock. So every now and then you hear shots late at night, and you're not supposed to be shooting, but somebody is ... It's gonna get brighter ... it's an environmental, wildlife concern ... I'm not sure what's caused it, but there used to be a lot more northern mallards. There used to be a lot more Canada geese. The snow geese used to stay longer, right. So the more and more greenhouses they have, the more and more foreshore they lose, the less and less places they have for habitat, right. For their food ... there's more predator presence for them... less security, right, from the cover of darkness. (M09 2016)

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As one Musqueam member explained, levels of pollution have reached levels where there is anxiety, concern, and even avoidance regarding the consumption and harvest of waterfowl in Musqueam territory.

The only reason I'm very uncomfortable in harvesting anything nowadays is because a lot of it is [non-migratory], they don't spend their life in here, I wouldn't want to eat anything that lived in that area, because they've been living in pollution. (M12 2016)

A lot of people in our community are even hesitant to harvest waterfowl within our area because of, you know, the pollution within the foreshore and within the entire watershed. You know, everything is affecting everything else, and so when you're impacting the natural resources like the waterfowl or any type of aquatic resources, they're feeding within that area also. And then for us to harvest them or consume them, there's concern of what's the contamination effect overall of those resources, so. So because of that I've been a little hesitant to actually go and harvest, you know, ducks and geese, you know, most recently. Just because of my awareness of what's going on within our traditional territory, and I'm just a little skeptical of a lot of these waterfowl species are not migratory, so they spend their entire lifespan in one – within our area, and are consuming, you know, vegetation or whatever their diet consists of throughout the year within a polluted environment ... I go out less... I attribute that all to the industrial impacts within my traditional territory. (M12 2016)

Musqueam hunting activities in their territory have furthermore been severely affected by access restrictions and regulations concerning the use of firearms as a result of residential and industrial developments. In other words, Musqueam's traditional hunting rights have been displaced by settlement, including in the Delta and Tsawwassen area.

We can't hunt [waterfowl] there no more [Point Grey area, in the water], cause it's too populated, they got the hiking trails and ... everything ... We used to yeah, but we can't hunt there no more. (M04 2016)

See right there, we can't hunt there no more, eh. The place is just mapped off because of the – they've got that nature trail there? ... yeah, so we can't hunt there, and then anywhere from this side around there's that Wreck Beach, and then all the other beaches, so we can't go anywhere in there anymore, and there's always real lots of sport boats anchored in there, just sitting in there, and tons of people there now ... Not allowed to hunt down there, no... that's been like that for years now. (M04 2016)

The first place I went hunting with my dad when I was a little kid on Gambier Island further up ... Right up in Brigade Bay, right there... that's where I went up on my first hunting trip with my dad ... it's all developed there now, if you went there now there's houses all along the shore, everywhere, all the way along in here and all the way around the island there's roads. (M17 2016)

I know guys used to go out in the bog and get deer, like a long time ago. I don't even know if you're allowed to anymore. (M33 2016)

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My dad used to bring me out there when I was younger even, probably 1970 [hunting geese] ... I still hunt there yeah ... I used to hunt all the way up here before ... No longer, Richmond turned this into a park ... Yeah, Iona Island. But there's no black ducks or goldeneyes at the mouth so I don't head that way ... Well if I want to shoot there I have to come up here more ... But I used to come along in here and shoot ... Yeah. Richmond closed off the whole, everything for hunting. (M15 2016)

Like Bowen Island, that's a place we used to hunt all the time. Now they've got lots of housing there. So you're kind of cut off. (M31 2016)

They would be harvesting [before the existing terminal], you know, everything. All the aquatic resources. They would be hunting in there. There would be, you know, for waterfowl, and there would be vegetation harvesting, medicinal harvests, salmon harvesting in there... crab and prawn, halibut, round fish. You know, so – who cares about that stupid border, we used to go outside of there all the time. (M12 2016)

We used to hunt [duck in] the foreshore here [in Delta] but then there's too many houses along here now, float homes and that, so they don't want you hunting there anymore ... There's foreshore and marshland in here right, but you just take the – we had a duck hunt, and we'd paddle across ... and then come in here, cause you could hunt both sides ... I remember all of a sudden we couldn't just paddle across anymore and shoot, we had to go over this way ... (M09 2016)

Well they're under development [the Tsawwassen hunting area] and my cousins that live there, I think it was this house here, the [surname] family, I think they moved out and. That house there, right there ... There's too many people near the inland, or into the marsh area so there's too much traffic along here now. (M15 2016)

Historical governmental restrictions (that also affected fishing) have also affected levels of hunting. As described by one Musqueam member, past opportunities to hunt when resources were more abundant have been lost due to discriminatory policies, affecting contemporary records of use and practice of rights.

In the old days, when we were younger and everything we weren't allowed to go and do all that, because the government took everything away from you. It's hard now to come in there now and say, okay, how would you guys used to use over there? Because we weren't allowed to go in there. Now, we can. See what I mean? Cause even food fishing here when we were younger, there was no – Indians weren't allowed to fish, the government wouldn't let them. We'd have to get a permit here to go get fish for the band ... nobody was allowed to go out and food fish like we're doing now. The government wouldn't let you do that. And your hunting rights and everything too, so its kind of hard now to do that, so I'm just saying that now its coming into a fact. The government, I don't know how long it was, 50 years, or something – wouldn't allow you to do it. Like we weren't allowed to, there was no fishing here when we were kids, unless you had a commercial license. The only place the guys used to get any fish was from the commercial fishermen, because the government wouldn't let the Indians go and fish here. Even hunting they wouldn't allow you. We had to follow by what we call their rules. Like I said, you ask about hunting – hunting ducks here. You open at Thanksgiving every year, and

you close the third week in January. If I went down there and started shooting one day after it's closed, they'd have the cops on me. So like I say, ... that's what it was like. (M26 2016)

... Used to be a lot of pheasants here when we were younger, before they put in all these houses and everything... there used to be lots when my dad was here, I'm just saying. Now we could hunt those twelve months a year, but we had to hunt ducks in – I'd guess you'd call the white man's rule, October to January, and that's it. (M26 2016)

In the same vein, another Musqueam participant lamented these lost opportunities to hunt and also gather coastal resources, as current conditions do not allow the full practice of these traditional activities and thus the loss extends to the cultural continuity of a Musqueam way of life.

No [gathering of shellfish or seaweeds], no because by the time I was old enough to do any – there was nothing left to be able to do those types of things. And that's why I sad it saddens me because I hear stories. Well not stories, I hear others' recollection of what they were able to do or what their family members were able to do and it saddens me, I just. It really makes me think about things that I didn't think about when I was younger. You know, all of the things that I have missed out on because of all of the construction and all of the pollution and the things that have been done to the waterways, to the land. And there is nowhere to practice, really nowhere to practice our cultural practices, to be able to learn the things that we would have normally learned in the wooded area. You know I've heard people talking about how there was so much more wildlife and people hunting and trapping in our area that were sort of in the local area here. That my grandaunts would trap like muskrats and trade them for food and other supplies and it wasn't, these aunts of mine and my grandmother. You know I was, like my grandmother passed away when I was fifteen and my aunt probably passed away when I was in my mid-twenties. My grandaunt, so it was in their lifetime, that I got to hear the things that they did in order to survive. And so that quickly those traditions and cultural practices have been taken away by the city being built around us and the environment and changes to the environment. (M28 2016)

The rare areas that remain open for hunting and can sustain populations of animals in exploitable quantities are already insufficient for current numbers of Musqueam hunters, making them treasured places for supporting the cultural continuity of Musqueam hunting values.

Can you imagine if the population that's of the age that's able to go duck hunting all went to those two areas, small areas that I showed in the mapping? So if every man and young boy or woman that wanted, like that knew how to hunt ducks and to shoot them and kill them ... there would be, it would be dangerous. You couldn't hunt ducks ... (M28 2016)

4.2.3.3 Project Interactions

Industrialization, residential development and settlement, pollution, and other drivers of change have over several recent generations transformed the ability and opportunities of Musqueam members to hunt. The historical pattern of alienation created by these aforementioned factors (as described in Section 4.3.3.2) threatens to be exacerbated and prolonged by the Project.

A Musqueam member explained that remaining waterfowl habitat could be disrupted and destroyed by the wakes and movement of large ships from the Project. As members recognized the salt marshes by the proposed Project footprint as rare and highly valuable, the loss of such habitat (and related food sources, such as shellfish for saltwater waterfowl) is of great concern for the community.

They're [the Project] gonna be impact all that stuff, even the wash that they make from the big boats coming in, there'll be wrecking all the marsh and everything, you know. It can't be good ... I know for sure they send pretty big waves, it'll be ruining all the marsh and stuff like that where all the ducks are. (M27 2016)

That's more my primary concern, is, I mean the, having big returning runs of salmon that come and shoot through here [Ladner Reaches]. ... I know they [salmon] come down the straight here, Straight of Georgia. I also think it's going to have a huge impact when you extend this [the Project] on the smaller tidal zones, the birds you know. Amongst many of the smaller ... Microorganisms ... I know there's a lot of birds, and I know there's a lot of like small shell, you know small shellfish etcetera, there's also a lot of crabs that live and breathe along the sand flats here. (M32 2016)

Lighting and noise from the proposed Project could also, in parallel with existing light pollution from the Deltaport terminal and greenhouses nearby, worsen the disruption to waterfowl migrations and behavior, as well as hunting practices.

So, but if we lose that [ability to supply ducks for a gathering], due to this, and there's, I see a big potential, just because that one greenhouse in here, as they turn the lights on at night, the ducks don't stop flying at all ... And it casts a glow like this, this whole area lights up. The birds fly over top of that or they fly this way and sort of stop like they're not going towards it anymore. So, that's how close that is. Now if we've gotten them being drawn out by the lights this way more ... they might just land in these fields over here and we don't have access to them anymore. And due to modern regulation we're not allowed to set bigger lights, too. Which is actually traditionally what we did, we would set a fire and the ducks would go towards the fire ... (M23 2016)

It [the Project] may affect ducks and migrating ducks, they get attracted to the lights ... They may actually just circle over the light. Rather than go to their usual resting place at night ... It was shown on the news when they built a greenhouse up the valley. The green house had permanent lighting and the ducks were actually circling over the greenhouse at nighttime. (M15 2016)

The construction and physical occupation of the Project was reported by Musqueam participants as potentially leading to avoidance and loss of access for hunting in the vicinity. Overall, any

diminishment of hunting activities as a result of the Project would correspondingly impinge on Musqueam food security, teachings, ceremonies, art, spirituality, and sense of place that are dependent on hunting.

Duck hunting would be, would be actually, from the Project all the way out to Musqueam, or to the Musqueam IR ... so I wouldn't be shooting anywhere around here, its more out, kinda the same area as the crabbing starts there. So in this area and all the way out. So the coal port itself has been an impediment to me hunting closer to that area. (M23 2016)

Um, well, right now [the biggest concern regarding the Project] down there its considered a MARSEC [Maritime Security] area, so you can't be in that area with a gun hunting... I'm not sure what the number is, if it's 150m off the centerline of the property, but something like that. And who knows what's going to happen ... so it's still up to Delta if they, say they make that a no shooting area, then there goes all those hunting spots. Mhm [for brant and geese] ... it's what we live on ... I don't make enough money to buy that... (M09 2016)

4.2.3.3.1 Summary of Potential Project Interactions

In brief summary, potential Project interactions on hunting values in the Study Area include, but are not limited to:

- Exacerbation of the existing pattern of alienation from hunting resources caused by industrialization and settlement in Musqueam territory;
- Loss of waterfowl habitat from wakes generated by marine shipping;
- Disruption of waterfowl movement and behavior from lighting and noise;
- Avoidance of hunting and restriction on hunting of waterfowl in the vicinity of the Project; and
- Loss of habitat for waterfowl from the construction and physical occupation of the Project.

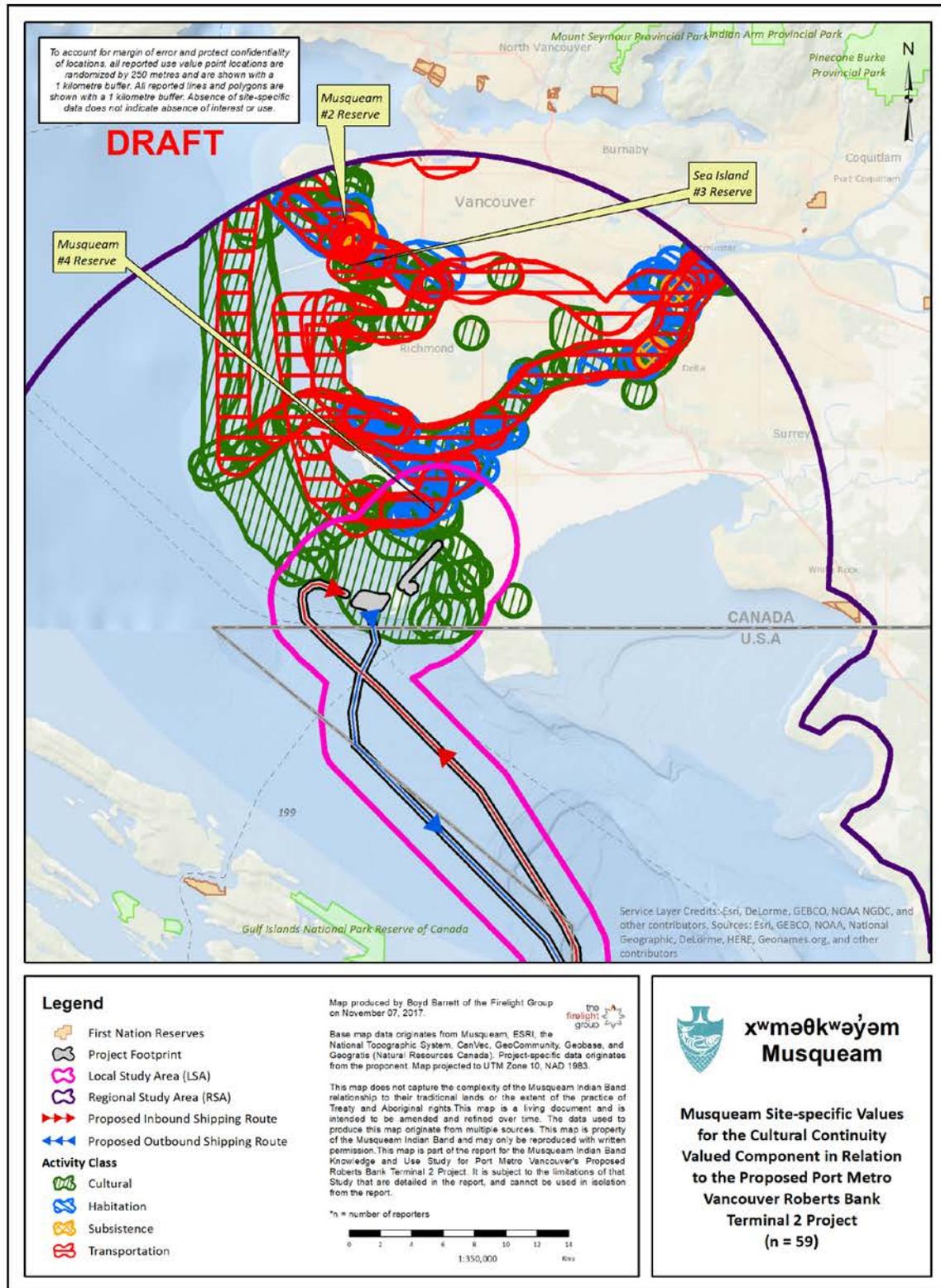


Figure 6: Musqueam reported site-specific cultural continuity values in the Study Area.

4.2.4 Cultural continuity

Cultural continuity encompasses the fundamental intangible and non-consumptive values associated with all traditional subsistence and non-subsistence activities. More broadly it is a holistic category that captures the transmission and persistence of Musqueam values through time, including knowledge, language, norms and protocols, and social relationships, as well as identity, sense of place, spirituality, and ceremonies. Because of the vast and complex nature of these values, this Section (like those before it) is not meant to be comprehensive, but only indicative of some of the values that may be affected by the Project.

4.2.4.1 Importance

4.2.4.1.1 Sense of place and identity

The Musqueam community's connection to the sea and land runs deep and is reinforced and passed on through subsistence and non-subsistence activities. In the words of Musqueam members, they are people of the sea and river grass, and in the context of the Project, two participants articulated this identity and sense of place thusly:

Nature has been able to overcome many obstacles that have been placed before it. You know, you see herring coming back in the Howe Sound area, you see whatever coming back in other areas. But in this area we don't learn. We create obstacles, we see the reduction and return and yet we continue to place more obstacles. And one day we're never going to have that, you know? To the local citizen it may be of little consequence, but to us who have survived and rely upon the sea and its resources, in particular the salmon that it's going to be a life-changing situation for us. We are people of the sea, we are people who have come to clearly and still today enjoy a food that is healthy. We live in an area that allows us to survive. (Qiyāplenəx^w, 2016)

... [Speaking of a cousin who died of cancer] And so many people say 'I know just what you're going through.' No, I don't know what you're going through. I'm unable to imagine that, you know? I can express to you my emotion, you know? But not what you're going through. And that's the only way I can sort of describe when you ask me what about this river, you know? I can give you and I say here is my little shiny rock that my grandma gave to me. And it means so much to me because the day that she gave it to me was the day that she told me that she was leaving or whatever, you know? So I mean, it has so many memories. It's more than just that moment. And now I give it to you [the interviewer], and it means nothing to you, you see? And so when I look at that river and I look at that expansion and that economic growth it has in the "interest of the people of British Columbia", I say bullshit. You know? It should be in the interest of those who live and thrive and exist as a result of that river. But it's never about us, you know? (Qiyāplenəx^w, 2016)

And then to see how it affects our land because you know, as First Nations people, we're so connected to our land and our territory, that to see something, you remember that old commercial, I think you might be too young. But there used to be a commercial with the pollution and the one man in the canoe and the one tear coming down. That affects us, when we see things, when we see a tree cut, when we see someone stomped on our sasky [saskatoon berry] bushes, or man, they're cutting down more blackberry bushes ... And so

those kinds of things affect us physically as well as emotionally and mentally. It's so funny that, like another race can't see that and can't feel that. (M01 2016)

As captured by the preceding quotes, 'being Musqueam' is profoundly felt, and fiercely protected and valued. Musqueam identity and the linkages to Musqueam territory have emerged from long histories over wide areas, as indicated by archaeological evidence and records of old village sites. Heritage sites also continue to be discovered in the vicinity of the proposed Project.

*All across the territory [there are burial grounds] ... Marpole Midden, Locarno Beach. East end of this village ... Yeah, there's burials all the way along. I don't know exactly where they'd be except for the ones over by Fraser Arms. You can pretty much follow the street and shoreline, is where the *časnaḡəm* village was. (M06 2016)*

*Yeah, wherever village you were at. Almost every village was at a stream. So here at Musqueam village you go up into either Musqueam Creek or Cutthroat Creek. Find pools up there that are deep enough to bathe in. And whichever village you were at in what's now known as Capilano Village, which is known to our people, *Ḳwemelch'stn*. It would be Capilano Creek or you go further up into what we call, Sister's Creek. It's now called Brother's Creek, the white people call it Brother's Creek. Various different channels up from there. Depending on what village you were at you'd go up into the creeks adjacent to the village where you were. Just find suitable pools and of course the pools became pretty much regularized but we'd go to the same pools all the time. (M06 2016)*

In this area [near Canoe Pass] it's really, I have some other interests in this area besides the fishing, I want to kind of explore. So ... I've heard there was a shipwreck out here from the 1800s and I think I may have pinpointed it on Google Earth ... I was working [with] another guy, his last name was [personal name] he said he hunted out here, he's from Ladner and he said there were some stakes in the mud. Fish weir stakes. I want to connect with him and show him a map and ask if he can pinpoint where the fish weir stakes are ... They're old and they could be pre-contact. (M15 2016)

Together, the suite of Musqueam activities on the water and land (and the resources and environment on which they depend) including fishing, hunting, coastal gathering, art, ceremonies, and more serve to define the identities of individual Musqueam members and the community. The environment, its wellbeing, and that of the Musqueam people are accordingly intimately linked.

I'll do this [fish] as long as I live. Definitely it becomes a part of you, ... the [Fraser] River. ... Not only that, I think it becomes a way of life. Definitely part of me. (M32 2016)

Everything that we do is tied to the water, like, everything. Cause we even used to have, like, a canoe team, and we would- there was like, canoe races. Just everything that has to do with Musqueam also has to do with the water, like we're very – people of the river grass, we'd just live in the water if we could. (M05 2016)

I feel like I'm at home [when fishing]. I'd much rather be out there than here. (M04 2016)

I've thought of the 44 village sites that Musqueam utilized, but more importantly our lifeline being the river, and the waterways ... we had to know the river, I mean my house

was where the cultural center is, and our first house was on stilts. Because the river would come up – it was – that was the river flow, so. By the time, before we entered public school, we also had to know tides, the river, you know. (M11 2016)

My dad said, "Your great-grandpa," My great-grandpa [personal name] was visiting at the house at the time. He said, "Set aside a couple of those sockeye, we'll bring them home and grandpa can have a feast on sockeye". And so we did and we brought them home and then dad carried them into the house and he said to grandpa, "You want to have some sockeye steak for dinner?" and grandpa said, "Oh yeah. That'll be nice. But bring them over here first, I want to have a look at them". So my dad brought them over, wondering what was going on. And he held one of them out for grandpa and grandpa looked at it. He said, "Oh, this one's going to such-and-such a creek". And he held another one up and looked at it and said, "This one's going to this other creek, a little further up". And dad was looking at him incredulously. Grandpa saw him and said, "Oh yeah," he says, "You just have to look at the scales, there's a little bit of different shape on the scales. I'm not very good at it," he says, "I can tell you maybe six creeks, the old people, they could tell you every creek all the way up to the headwaters" ... So you know, that's a demonstration of how intimate our people's knowledge of the environment was and their relationship to the species that they harvested. (M06 2016)

The Musqueam identity is also tied to an ethic of stewardship, exhibited by the voluntary limitations undertaken by members in their harvests for the sake of conservation and future generations.

[Importance of salmon, crab and prawns] I don't think you could even capture it in words how important that is, you know, I've always been told by no coincidence that Musqueam is located where we are. We've always been reliant on the natural aquatic resources within our traditional territory, we've always been reliant on those resources, and it's a part of who we are. You know, we are a fishing community. Its something that I've always relied on and always been, you know, its always just been what we do. You know, its always – it's a strong part of our culture also and when we hold ceremonies or gatherings of any sort, you know, within our cultural gatherings also that mainly take place in the winter now, um, you know, there's always a big feast of these natural resources, we always feed everybody that gathers and so it really showcases how wealthy we are as First Nations people, that we're able to provide those natural resources to our guests, and also to our families, so. How important are the crab and salmon and anything else that we're able to currently gather? It's incredibly important, and you could never put a value on that because of how important it is to us. And its, you know, its unfortunate that there are many natural resources that we are no longer able to gather because of the pollution and the overfishing and the various species that are currently in such a dire shape right now that we aren't able to harvest ... Like I said, we're a fishing community. That's who we are. We've always been, you know First Nations communities upriver have always thanked us for, you know, the Sparrow case itself, for being situated at the mouth of the [Fraser] River. We've always been referred to as the Guardians and the Keepers of the Fraser River. We're the ones who protect the salmon, we're the first ones there to do that important work. (M12 2016)

I tend not to go out crabbing anymore, I think it's very dangerous, and like I said, I think we're taking more than our fair share ... Yeah I just, it's like my salmon fishing, I've reduced the time I'm going out there just because of my own concerns. (M32 2016)

I mean, if we catch them all, what's going to happen to our kids. You know, only up to the last fish has been caught, last tree has been cut down ... Can't eat money ... This earth was not left to us by our ancestors but was lent to us by our children ... You've gotta leave something for them. (M32 2016)

Like I said, the eulachon are important to us. They're part of our calendar. Even that time of year is called, named after them. Like right now. The areas that have all these, in general the fishing is not the way, the salmonids are not how they used to be 20 years ago. At all. They're going the over way on us, and they're going that way fast. And it's not just by species but the subset species, so the run timing of individual species is even being hit. And that's affecting us because we can't go fishing, well it's the salmon, or the sockeye on the river. But this particular run is over this particular run. So if we catch those, we're impacting that. So being stewards and to first, for conservation, we'll be the first one's to say, no we shouldn't go out, but no one else should. And nothing should happen to impact them on their way. To give them their best chance for the future generations, right? So that's the salmonids, the sturgeon, the birds and then everything's connected after that. Everything, from the eagles to the ospreys, everything's all connected. (M23 2016)

The importance of a strong Musqueam identity can have profound effects for the resilience of members in other aspects of life. One elder elucidated how their identity as Musqueam served as a foundation and compass, but that such an identity is not incorruptible to loss.

But when I went to public school I had, I was cocky and confident because I knew who I was. My mother and auntie and whatnot told me to be proud of who I was. Where I come from, who my family was, you know? And so that gave me, because I asked my brother the question of how come we were so successful in school, you know? Because at that time three out of four people graduating in one household was a phenomena. And two of us going to post-secondary was even more of a phenomena. So, and my mom couldn't speak or write English very well, and my dad died when I was a little boy. So I asked my brother how come? What motivated us? What was the inspiration to do that? You know, like I could have fooled my mom every darn day of my life and said, you know? But she always said education is important. That's the only thing I remember in that sense of her motivational speech. So, but pride and knowing where you come from and who you are, is so important. And they're taking that away from us. The more they encroach, the more they remove, the more that they displace the more that they change it, remold it. Now it doesn't, you know, belong to us, sort of. You have no memory of it. So it's more than just a physical loss. (Qiyəplənəx^w 2016)

4.2.4.1.2 Knowledge transmission

How to be Musqueam and what it means to be Musqueam depend in large part, on the ability of members to transmit knowledge, values, and practices that have come to define the community. Musqueam members clearly expressed the sense of responsibility they felt in teaching future generations.

I collect, I hunt, and I fish from a very, very young age. I also was raised by my grandmother to identify and collect medicinal plants from our area, using our traditional medicines and how to collect them at certain times of year. Tiny windows for those. And I also collect traditional material for making some of our hunting and fishing tools. And things that spread from that as well. A little bit of basketry and that sort of thing. My grandmother also taught me to carve and weave as many of us have had to take the paddles and put them across each other and all the history that goes when you participate in those aspects. So kind of everything you need to do when you're Musqueam. (M23 2016)

Yeah, so I mean a lot of our stories of our people will go back to that life on the river, you know? The grandpa, your great-grandpa [personal name], you know, what did they do on the river. And your uncle will tell you stories about that and each one of us has family stories that can be talked about, and should be. And that allows you to grab a foothold and a sense of belonging there, you know? And nobody can take that away from you, nobody. (Qiyəplenəx^w 2016)

Well I think it's crucial for our children to not only know who they are as salmon people and then this territory was ours and this is, like the stories of our grandfathers and our great-grandfathers. And it's not only establishes our territory but it also establishes who we are and our identity and our connection to the land and then of course our cultural and traditional teachings. You know harvesting and being a salmon people and living off the land and it's, like we said earlier about the making us as a whole person and how this feeds our life, our livelihoods and our spirit of who we are. And it's like if I don't teach this to them, then it stops here and then it's a shame on me too. Our family. So, I think it's, there's not even a, it's like get up, wash your teeth, brush your face and now we go fishing and this is what we do as our people and this is what was taught to us ... Well we have a thing that we talk about in our, it's our ways and it's like who we are? It's our identity, our culture, it's like our way, it's always been this way you hear about all the time. And she's [sister] working in our cultural department where she's hearing the stories of our grandfather. And it's like, it was our way, this is the way it's been done, this is the way it was told, this is the way. This is our way, when it's time to fish you fish, when it's time to hunt, you hunt. When it's time to gather you gather and put away and things like that. Like this is the way you do things so it's, it's our cultural identity and our traditional ways to how we've survived 10,000 years on this delta. So it's a way, it's our way. (M01 2016)

Important to me is, it's as important as making sure my kids learn to fish because it feels like it's an identity. It's another hook in who I was. (M02 2016)

And then in the 60s there was a group of people who were intent on not letting it [the Musqueam language] die and disappear. So since then, there's been sporadic revitalization. And thankfully those people who started, did a lot of work of documenting and recording and documenting really. Writing and having interviews like this. So there's been a lot of effort to make sure the language doesn't die. So from then until now, we have no more fluent speakers in our language. So everything that we do now is all based on those recordings ... We have a partnership with UBC to teach the language to anyone who is willing to learn, so it's an accredited course as well as any community member can take the course because it's there language and they want to learn. (M02 2016)

Yeah... I pass down everything I've been able to gather in terms of knowledge, information about this area has all been taught to me by my uncles and by my dad and, you know, hearing stories, listening during our cultural gatherings, all that type of information, so I feel also responsible to pass that information down too... that's what it's all about. (M12 2016)

For many Musqueam members, knowledge transmission occurs as a part of practice in day-to-day life from very young ages, as well as lessons and knowhow passed down through oral histories from parents, relatives, and friends.

[Interviewer: Where did you learn to hunt?] My grandpa... yeah, you know, ever since I was a kid, like, before I was even – younger than one, I was in a boat. My mom got me out there all the time, well, to start, and then as I got older I wanted to go out with my grandpa, just to go out on the water and fish. I had no desire to make any money or anything, I just wanted to be out on the water and – be on the water... I liked it, I liked learning... (M14 2016)

I was watching when I was a kid, when I was just too little to do anything, but as soon as I got old enough to pick up a fish I had to be in the stern, helping to take fish out of the net there, throwing the fish from the stern into the side lockers or hatches. (M04 2016)

Geez, well I guess the hunting area, cause that's the teaching of the, fundamentals of teaching hunting would be in that area as well ... Nieces, nephews, children. I mean there's also cousins and dad involved but I'm, how would you say it in our culture, I would not be their primary teacher. They have their, they have their direct uncles and their aunts but I would be say, the secondary teacher. Because we don't, in Musqueam, have one teacher, one this, one that, you will hear the same thing over and over and over so. (M23 2016)

I've taught probably 95% of the fishermen who are fishing today, they've all passed across my deck at one time or another ... I started fishing on my own when I was fourteen, because my dad was one of – there was a lot of guys who really commercial fished from here, back in the day there was just a handful of them, so I was always doing it right from the get – go, yeah ... I was potty trained on a gillnetter up in the central coast, so I was on there right from day one. (M17 2016)

So we've taught, like we were taught [how to fish]. He was taught by his dad, like my great-grandpa [personal name] and my grandpa [personal name] and my dad. He taught us and now we're teaching our children. (M01 2016)

But I'm not here just for [personal name], I'm not here just because I want to make a statement. I'm here on behalf of my grandfather who's not here, [personal name], and because of all his stories. Because what he's passed to me and what I know to be true from him, from listening to him, from watching my own father and all the fishing that they did here and how important it was to them. So I'm gonna be their voice and that might sound a little bit, you know, off to you but in the way in which, why we are Musqueam is because of that, because of what he's passed to me, it's because of the knowledge that he's instilled in me to always remember who we came from and why this river is important to us, these waters that you're talking about, he fished, he hunted, he dug clams, he did all

the things to sustain himself and his families and his people since the beginning of time. So he could take you and he could take my sister [personal name], my brother [personal name] when he was a little boy and take them fishing into all of these areas that we're talking about, because he knew, he knew where the water churned, he knew where the fish gathered, he knew all the things he needed to know to be sustained. (M21 2016)

Lessons constitute more than how to perform certain activities; they may also focus on morals and ethics that are as fundamental to the Musqueam identity as the art of fishing. As previously stated, stewardship is part of the Musqueam cultural identity and is also transmitted through stories and action.

Yeah, it's a little different [teaching his kids what he learned from his father and grandfather], but it's basically the same fundamentals, right. Like, take what you can eat or process. Take what you can eat or process. He taught me some things too, just like safety, gun safety. Not to stand on the bight when you're on the fishing boat. What to do, what not to do with lines. How to tie the boat up... (M09 2016)

Transmission also requires consistent opportunities for teaching and learning to occur in the appropriate environments with adequate and healthy resources, opportunities that have been eroded over time (see Section 4.2.4.2).

... And, well to the, obviously it won't be to the place where it was previously but, I'll be able to pass that knowledge on to my children and keep that knowledge going strong. Because not only have we already almost lost our language those types of important things like the language will continue to weaken if we are not able to go out on the land to teach our children about the plant gathering, the hunting, the fishing and all of the things that go with those. It's not just going out and setting a net in the water, it is all the time you spend getting ready, things that you, stories that you would be hearing from your family. It's about learning the waterways and the different navigation, the safety. It's all about the preparation and then what you do afterward, you know how do you prepare the salmon? And if you're lucky enough to go to another Nation and hunt all of those [larger game], the prep and the post- of the hunting as well ... (M28 2016)

The seasonal things – along with the tides and everything, you had to know the seasons. What tides, what fish, fowl, that type of thing. What you could go and hunt. And speaking to the plant environment, fauna, we have nothing left now, which is why [personal name] and I are trying to find ways to transplant traditional plants and everything just to see if we can. Because not only is it for medicinal purposes, exposure for the young people, this is what we use for this, that, we can't even do that when I – hey [personal name], here's a picture of what we used to be able to do. It's not – she's not going to retain that, unless – I know First Nations children learn differently than mainstream people, and, because we're, our history is all oral, so the repetitiveness ... that's why, until we're old and grey, we still hear the same stories over and over, cause that's how we learn. And, yeah, as today, our bulrush is limited, snowberries are limited, nettles are limited, burdock bushes, frog leaves, anything that the older, you know, crabapple trees, that grew plentiful on the waterfront when I grew up. [hənqəmīnəm phonetic], I only say [hənqəmīnəm phonetic] because I don't know the English name. These are all foreshore plant life. And these are the kind of things we're trying to look at planting so that people younger than us are

actually able to visualize and have hands on, other than in a book or in technology. (M11 2016)

Many Musqueam members, both young and old, stressed the need for repetition and hands-on experience as a part of learning and knowledge transmission. Much of Musqueam practice is taught through stories, but also through trial and error, and learning from experience with guidance of knowledgeable peers and family.

It's definitely not something [fishing] that someone can just tell us, and then we can go out and do, you have to be out, on the river, doing it. And then you learn by doing. (M05 2016)

And I learned how to fish by my dad right in here in Canoe Pass ... That's where I learned – I fished the whole area, I was like, I don't know, 12 years old ... they just kind of started throwing nets at me to get me out there... I was running my own little skiff, I had a small little boat, just a little 14 footer they used to send me out on. They just taught me, they kept throwing nets at me and I'd rip them up and they'd give me another one and send me back out ... I usually fish springs [chinook salmon] there all the time, that was when they'd get me out there was early springtime, all the time. And then when I got my own boat, then I started taking my dad's boat out and going down there ... (M17 2016)

[Interviewer: How did you first learn about how to fish, where to fish?] All my brother ... Along with in the north arm as well ... I think right off the bat it was kind of a crash course in how you do it, and then a lot of it is learning, I don't want to say as you go, but I mean – the more repetition that you do, the more you learn. I mean, you can sit there and have someone tell you this is what you do, this is what you do, this is what you do, but you gotta actually physically be doing it for it to become second nature in your head, right ... I think it's like driving a car, the answer that I think, that comes to my head is no, because, I mean, someone can tell you all day how to drive, but until you're actually in that element and facing different things that are coming your way, that's the only way you're really going to learn. (M19 2016)

The Sparrow Decision is ... that we have the right to fish not the right to be given fish because the actual action is where culture transfers as we do it. I think it's important to remember those. And that's not just citing the court decision, that's how we're raised. (M23 2016)

4.2.4.1.3 Ceremonies and spirituality

For many Musqueam members, their territory is much more than a place on a map. Rather, places and acts such as fishing come with a history and spiritual connections. Archaeological and heritage sites such as *čəsnaʔəm?* are also more than markers of history or curiosities for the community, but are proof of who they are and where they have come from.

I've always liked living here ... right where it says Canoe Pass has always been special... just family ties... grew up, my grandpa was born down there, grew up there. My mom grew up there. Everybody has a connection to there ... (M09 2016)

It's like laying on the prairie wheat field and laying back, putting your head between your arms on an early evening and watching the stars appear. And fishing for me at that time was as, what's the word here? As inviting and imaginary as what I described to you. It wasn't just a way of life or a hard job. Fishing was hard, we had pulled our nets. But it was so, it was so relaxing and meditative ... (Qiyəplenəx^w 2016)

We never were allowed to go down there except to get medicine because ... that is also a village site, but it was also a site where we weren't allowed to go and play, because that was a war zone between the Musqueam and the Haida, or the West Coast people and there's a lot of artifacts and bones there ... the foreshore is where the plants grew in abundance, and the elders used to take us down there to get sacks and sacks of stuff ... Musqueam were protectors of the river, so they had to deal with any northern people ... there's lot of, um, rushes in that time, in that area, cause we used to go there and show, well, the sacred ... people used to go there for their male rushes and that kind of thing, but now it's not there anymore ... it was just used by, again, sacred ceremony type place. (M11 2016)

Musqueam ceremonies are sacred and private occasions, the details of which are tightly held. Ceremonies include dances, feasts and potlatches, namings, canoe races, as well as memorials and funerals.

Ya in the wintertime we have our spirit dance in the big house ... a masked dancer – that's held for various change of life events, like you can use them for birth ceremonies, when somebody has a new baby, it's a hereditary ceremony. For passing on of ancestral names, marriage, funerals, memorials, basically change of life events ... (M06 2016)

It's a cleansing ceremony, and as I say it's done for changing of life events. So basically it's a spiritual cleansing ceremony where we as the dancers are agents that are clearing the ceremony space of malevolent spirits, the work can go on unfettered. (M06 2016)

So, hidden in these trees along here, there are more ancient, actual burial sites. And burial mounds there. And generally when you find those burial mounds, you'll find that they've actually planted a tree right in the middle of the mound so you'll find these burial mounds at the bases of trees ... So that's an earlier practice that preceded our practice of putting people in platforms up in trees when they passed away. (M06 2016)

Ceremonies performed by the Musqueam, like many aspects of Musqueam life, are tied to the environment and dependent on natural resources and the seasons.

Early March, during the wintertime that was basically our ceremonial season because most of the salmon and other runs of fish stopped coming in and then so our people lived off of preserved foods in the wintertime and the eulachon was the first fresh catch of fish that came in in early March – so the end of the preserved food season. (M06 2016)

You know, one of the things that's not really the focus of these kinds of interviews is that the crucial importance of our relationship of these species. We consider them as I'm sure your people are the same way, we consider them our brethren. And we consider them to have souls the same as we do. When, in the morning before dawn, the rising of the sun,

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our people would go up into the creeks behind our villages and ritually bathe in the creeks and pray to [həŋqəmiŋəŋ phonetic], the creator and to the spirits of the creatures that they were about to harvest. Asking permission to take the harvest and thanking the spirits for giving themselves up so we can have ourselves sustenance. That was all done before the harvest ever began. You know, Christians pray at the table when the food is already killed and at the table. Our people prayed before they went to do the harvest. (M06 2016)

4.2.4.2 Impacted Baseline

4.2.4.2.1 *Eroded sense of place and identity*

Because of our spiritual beliefs, if you will, we have no more forest and so you utilize what you have, like I say, we're starting to exist and not live anymore. (M11 2016)

The preceding quote captures how the foundations of a Musqueam way of life have been eroded over generations, from the implementation of overtly discriminatory policies and institutions, such as the residential school system, to the ongoing infringement of Musqueam rights through industrial developments and urban development. In other words, the foundations of the Musqueam identity and their sense of place have been and continue to be threatened.

There used to be huckleberries, cause there was a tree that fell over so we used to be able to cross like, back and forth over the creek. And so there was like, huckleberries and blackberries, and there were salmon berries ... And that was all just practically next door. And now they like re-packed the trail. It used to be kind of like this just wooded like bike trail, like a horse trail, but they repacked it and now it's gravel in there ... they re-did it so that runners and bikers could use it. It used to primarily just be, like, for the community, like no one ever really came close to our reserve, because like, times have changed and the reserve was like a no-go zone, now it's kind of like, everyone's like oh wow, it's so beautiful down here, I'm gonna go into their space and their land-It kind of makes you feel like you can't go out and do anything because you don't want to, like, interact with like, strangers. I used to regularly go down to the river with my cousins, and we would watch the sunset and just kind of be by the river, because it's beautiful, and sometimes it smells nice and sometimes it doesn't, because of the sewers like, right across the way. And um, now it's like – people are down there walking their dogs and taking pictures. And then they look at us as if to question why we're there. But it's kind of like, this is our river. Why are you here? (M05 2016)

And it's sad because my grandmother always said, well, one day you won't be able to help anybody using our traditional methods because, from the time when my youngest brother was young, you know, we were living in subdivisions and whatever, which is why our population deteriorated because that wasn't how we were accustomed to living. (M11 2016)

It was like meditating out there, like, calming. But now, today you have to be so concerned about you know, traffic on the river, traffic on the sea and whatnot, it becomes. It's like driving on the streets here versus down on Hastings Street ... It has not changed my connection to the water. Because, how do I say this? If your father was an alcoholic ... you love your mother and you love your father no matter what, you know? So I love the sea no matter what. But I cry because I see the crippling effect that is being placed upon it. And I wonder will my grandchildren have the same opportunity or opportunities as I did to have that connection with nature, you know? (Qiyəplenəx^m 2016)

During community meetings, Musqueam members articulated the value of artifacts, archaeological sites, and heritage sites as being more than physical objects and places but of

immense importance to their identity and sense of place. Many of these records of Musqueam's story have been destroyed or disturbed by development.

I think that's about 3000 to 3500 years ago, in this area [there were burials around Locarno Beach]. So probably what would have happened with this burial is that traditionally our people didn't bury our dead in the earth. We'd start off, when they first passed away; we'd put them on platforms up in the trees. And then once the, once the remains had been reduced to only bones, then they'd be removed from the platforms and put into communal boxes. So likely what happened with this one is that it was probably disturbed as development encroached upon the mortuary site. And so the bones were probably removed from the trees or from the burial, from the communal box where they were being kept and then interred ... And so by the time the contact period, our people had gone to that practice of putting our dead up in trees until the remains had been reduced to bone and then putting them in those communal boxes. But there are older actual burial sites at the east end of Musqueam Village. (M06 2016)

Yeah, so right in here [by the Arthur Laing Bridge], underneath in here. They unearthed the shell middens ... So you've heard of časna?əm? That was the big, right in here, this was the big protest that we had for this development to stop because this is burial grounds here. And so this whole area was part of one of our settlements. So there is, that's where they proved there, dated the shell middens to be existing 10 000 years ago. (M01 2016)

Along with intensive urbanization and industrialization of Musqueam's territory, the community has also suffered immense losses (physical, mental, spiritual, and cultural) from harmful governmental policies over their history. These policies and institutions include residential schools, the reserve system, the restrictions on Musqueam harvesting and fishing, and much more, all of which have had irrevocable adverse impacts on the cultural continuity of the practices and identity of the community.

When I was a child, it wasn't there. I had a lot of First Nations friends, mostly from the [United] States who knew their traditional language. They spoke Blackfoot to each other, and they spoke, I have, Idaho. Anyway they spoke their language and it was neat. And they had just little phrases, like, "Do you know where it is," or, "I'm tired, I'm so hungry". Like these kinds of things. And then there were families who seriously, they didn't speak English because their Indian language was their everyday. And so we were shocked, my siblings and I when we would visit. And we would say, "What? You're really speaking your language, that's so cool." And they're like, it was nothing to them. And so we picked up a lot of phrases with our friends, but my dad was forbidden to learn his language because his parents had gotten so punished for learning their language that they didn't want him to experience that punishment so they said no. So it was almost extinct. (M02 2016)

Before we went to school, well back in the day we were bilingual – English was not our first language. It wasn't until after my grandmother passed and we went to public school that we started to lose that. (M11 2016)

That I was fortunate to not have to go to residential school. Therefore, I was the captive audience of all of the grannies, grandpas and uncles and aunts and parents who had no opportunity to express or to talk to their children. So I became somewhat of a surrogate

child ... They gave me their experiences. And you have to understand that most of our children went to residential school during the winter, and – fall, winter and spring months, which is the time that families are at home, having already done all of their economic work that needed to be done. So it gave me an added value in that sense to say that I have had clearly the opportunity to be able to have my greatest learning curve from the age of five to twelve at a long reaching advantage over my relatives. So having said that, I got to hear the stories of where we fished, where we no longer are able to fish and to look at how we were interrelated and economically joined by other First Nations ... (Qiyəplenəx^w 2016)

And you have to remember that Tsawwassen wasn't called Tsawwassen then, it was just all one people, we were just a people. And we actually became, the border wasn't there, so we went back and forth, there was no border, we didn't know, there was no such thing as going into the USA, we were just going to our next relative's village. So there was no border for us, you know? So it was kind of all one, we spoke the same language but as you move farther south of course the language starts to change ... (M21 2016)

It [čāsnaʔəm] started there about, about maybe 4000 years ago, 4500 years ago. It was, the village was there from the time the ocean shore was up there. Up that far. So you're looking about 4500, something like that ... Until, until the, shortly before the first contact with Europeans. Old people talked about how European diseases came to us, they preceded the arrival of the Europeans, they came across the mountains. The old people described it like being like a black cloud coming over the mountains. And so this village was wiped out by disease before any Europeans ever arrived here. Probably about ten years before they arrived. (M06 2016)

4.2.4.2.2 Impacts to ceremonies and spirituality

The implementation and enforcement of damaging governmental policies have furthermore adversely altered the ceremonial and spiritual activities and places of the Musqueam people, for instance where, when, and how ceremonies occur, and also the social structure of the community.

... But it's [spirit dance] something that went underground when the anti-potlatch law came into effect. Traditionally it would have been done either outdoors in the summer time or in the big houses it's done today but after the anti-potlatch law came into effect it went underground and was held almost exclusively in the big house. And then in the last couple of decades it's started to come back out. The thing about it is that a lot of people up until – say the last couple of decades, thought of it as being a winter dance ceremony, winter dance complex but that only came about because of the anti-potlatch law. (M06 2016)

Interesting thing about the Big House is you were asking about how practices have changed in the post-contact period. These Big Houses were originally residences. Today they're ceremonial places. It wasn't exclusively a ceremonial place. It was a residence. And you'd have extended family living in there. So there'd be an individual that owned the house and his extended family would live there. So there would be his children and his grandchildren. His parents and his grandparents and his great-grandparents would all live in the same place. Of course the style of house has changed as well since Europeans. Originally the house would be a single pitch or shed roof, what they call a shed roof house.

Now we build gabled roof houses. Yeah and when, when nuclear family, individual family houses were introduced. It's been said that some of the biggest impacts to our culture are single-family houses and television because here at Musqueam. Many of these Big Houses along 51st avenue, up along here. There were, I can't remember how many now, somewhere between 15 and 20 houses along there. And of course each one would be owned by an individual and his extended family would live in there. So those are the kinds of things that were encountered by Simon Fraser when he came down in 1808. (M06 2016)

In tandem with the consequences of residential school policies and other governmental actions that have obstructed Musqueam's ceremonial activities, changes in geography, the decline of wildlife and quality of the environment, and increases in urban and industrial activity in their territory have also impinged on these practices.

It was what was left of the sandbar, and it was – what did I say? Somewhere in the 80s, and there was the sand, like where the ramp is now? And I dug a steam pit there and of course you had to have the ferns and the skunk cabbage leaves and all the other things that you have to line, and different people donated the fish and the fish heads, and the clams and whatever else they wanted in there, and we threw it in and then you have to build a fire and find the big rocks, heat the rocks, and ... But that was the last time it was done ... Because there was no other place we could do it – that was, we don't have a sandy beach anymore ... [and] Otherwise it's polluted ... we also did open fire, like bread on rocks and that kind of thing ... we don't have access to those type of food anymore so I guess it's getting to be a special occasion, and it – we no longer can because we don't have the space or the foreshore to do it anymore ... because its polluted. Because there's garbage and ... yeah. (M11 2016)

Well they used to practice [canoe races] out, just out on our river and then because the water traffic increasing and the log booms, we weren't able to practice anymore. Like there's not enough space because how much river's left here. Tugboats and those big, like carrier ships coming through here and it's just not safe to even try and practice ... Yeah, because both of our grandpas were actually on the canoe team. (M05 2016)

So okay, we have no more forest ... there are certain spiritual rituals if you're traditional that you have to deal with, which become very challenging when we don't have any more forest, but if you're taught then you use the open water, you use open water, you use wind, and you use the moon, and you use water. You have to know all of those. There it is ... (M11 2016)

And like I said, we grew up playing, eating eulachons our whole life, that was a big feast at my auntie's, we always got together doing that. And that's something that's, like if there's ever one at a funeral or some kind of a ceremony, and the eulachons are there, we're all salivating and kinda like wanting to fight over them. And I've only seen two, three funerals in 15 years that maybe we've had those. And so yeah, it's like, it's a depletion of development all the way around us, that Vancouver's growing and Musqueam's stuck in the very center of it. (M02 2016)

4.2.4.2.3 *Disrupted knowledge transmission*

Expectedly, a consequence of institutional restrictions and barriers and environmental deterioration has been that knowledge transfer between generations has been severely interrupted. As examples, Musqueam members spoke of how real hands-on experiences are no longer possible, while traditions and knowledge have also declined.

Along with language comes, of course, the teachings and our way of life. We were losing our language, our ways – our way of life. And it's a hard pill to swallow. Because you're teaching from anybody – [personal name] on down, learning by technology and papers and hearsay. Whereas at least in our era we had grandparents who still did these things. (M11 2016)

Like that smokehouse over there? My grandfather would turn in his grave if he saw plywood. "Plywood smokehouse?!" He'd say, "Are you kidding me? Knock it down." Because it has to be done by proper cedar, proper cedar siding shakes. So the cedar can absorb through the years it's smoking. That's what you're gonna get the taste from. It doesn't cook very fast; it has to be slowly looked after. And when you heat up plywood, heats up to fast. It cooks wrong. So it's gotta be done in the old traditional way and that should be knocked down and a new cedar smokehouse should go up. These are the kinds of things, today people go so what? No, some things don't change in your tradition. That's one thing that doesn't ... I say no. Because he told me, you don't do that. Well how come nobody's paying attention to that? That's important to know. So, they knew things, because they experienced it, they lived through it. And today, we're sort of; we're sort of lured away by that other way. (M21 2016)

Because of the changes [in the water, knowledge and teaching are affected], every year is a little different. You know, desired fishing areas are changed because of the dredging, and the dispersing of the materials that they have dredged, it's filling in areas that we've adapted to use now. A lot of our traditional fishing areas are being compromised by fishing itself and the dredging and, so it's, the navigational channels are becoming a big issue for us, so, um, you know, a lot of our guys have been noticing and really keeping track of depth sounders, and they've seen over the past few years that they've gone from 20 feet down to 25 feet. You know, that's how far down they're starting to dredge now. And it's having a direct impact to where we go fishing. (M12 2016)

The opportunities for current and future generations to learn have also been affected by the presence of industry, as the amount and quality of resources available have been reduced, and the time they are able to devote and are allowed to practice their traditional activities have gradually been shortened. The loss of learning opportunities extend to all parts of Musqueam life, not least of which is fishing, hunting, the gathering of coastal resources, and all aspects of their use and experience.

Because of how much, like, the industry has changed – because I remember when I was younger, even my grand – my grandpa and my mom they would go out [salmon fishing] like all the time, and sometimes I would be able to go out with them, but it was just so time consumed and such a small time frame then that sometimes I wasn't included because they had to get out there and they had to do it because it was their job, and um,

if they got a fairly long opening then I would be able to go out with them. And then even since then, just in the past few years, it's only been like a Saturday or a Sunday, it's very rare now that they get to go out on Saturday and Sunday, so because of that it's so constricting that – it's so rushed that we don't get to learn as fully as our people used to be able to learn, because they were just out there all the time. So they would like, get to know the ins and outs, the way the tide moves, like, how to take care of the net, how to mend it – like I don't know how to do that at all ... Yeah [I want to learn]. Yeah, cause I can remember my grandpa – he would, um, take his net and he would stretch it out in the back yard, and he would just sit there like day in and day out mending all the rips and tears, and tying knots, and making sure that all the little holes, like I don't even know what it's called, but he would make sure they were all like the proper size and um, it was just cool. Like, it's sad that I missed out on learning that. (M05 2016)

... from the time I was a kid walking in the forest collecting these things with my grandmother ... I had hands on experience. We no longer have that. (M11 2016)

My oldest son has been out fishing with me. He hasn't spent a lot of time on the river. And that's again because, I haven't spent a lot of, as much time as I should have because of the restricted times that we're able to go out there. But my oldest son, he comes out now and he's learning from my dad and his uncles and my youngest son hasn't yet been out there because again it's about safety and like I said it's that we have such a small boat and we're out there for such a small opening, like a short period of time, that I don't have the opportunity to spend, and my dad and my brothers don't have the opportunity to spend, for hours sitting on the river talking about where they fished or where our grandfather would have fished, and all of the things they need to know about the change in tides and the water flow and where to fish, and the best areas. Because you're only out there for three hours in a day. And those three hours are so quick that you don't even have time to talk so you don't have the time to pass those teachings on to like to my younger son, my youngest son. So he hasn't been out on the boat once because we just, it's unfortunate, we don't have the time we need to try to make the best of the three hours that we would get. (M28 2016)

... so many people in our community don't have that opportunity [to hunt large game] so those teachings are being lost. The young men in our community that sense of, of pride and those teachings that would have been passed down to them about respecting the land and the earth, like there's no hands on way of teaching them that anymore. And for the young women there's no, you know by the time somebody comes home and feeds their family with the one animal that they may have got, like so these young girls aren't able to learn how to process the meat, to jar wild meat and take care of hides and stuff because there's not enough of that resource to go around. You know you find yourself trading some wild meat for some salmon because somebody went fishing and somebody else went hunting and with your own people your doing that. And its very saddening that, and a lot of time I've heard in our community with young people that they're actually even embarrassed because I think that society imposed upon them that if you have to hunt or fish for your food it kind of means you're poor, but it's not. Like those are things that make us rich, those teachings that go along with hunting and fishing and gathering and being able to provide for your family those are things that other people would pay money to do

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and so these young people don't understand the wealth that they have in their very own community with the knowledge and the teachings, so. (M28 2016)

4.2.4.3 Project Interactions

Nearly all Musqueam interview participants contextualized the potential effects of the proposed Project on the continuity of Musqueam's culture as occurring within an already heavily impacted setting and environment, and anticipate that it would function as yet another impediment to Musqueam efforts to persist in their territory. Musqueam members felt especially strongly that further effects on their ability to access and utilize the sea would be an extension of an injustice perpetrated on them by the allocation of a small reserve, justified at the time by the presence of vast and rich resources in their local waters.

First we're put on this [reserve], our reservation was encroached and we were set on this smaller part of land, and then to develop and do stuff like this, we had leases put in on different parts. So we have the golf courses. So now we're land poor. And now we have development going all the way around us, so it's like we're losing our way of life by the natural resources that we have ... We're named Musqueam, our traditional name is məθkʷəy̓, so the people of the [river] grass. So with the development up here, with the boats and the foreshore loss that we had here, our məθkʷəy̓ grass is gone, it's a thing of the past, and so, just to talk about our identity and things like that. And so you just keep giving and giving and giving and giving and now this [the Project area] is another part of our land ... (M02 2016)

Because Musqueam identity and sense of place are composed of many parts (including fishing, hunting, and coastal harvesting), and are more than the sum of their parts, all previous potential Project interactions identified (see Sections 4.2.1.3, 4.2.2.3, and 4.2.3.3) would serve to undermine them. For many Musqueam participants, the thought of the Project on their territory was emotionally and spiritually injurious, as captured in the following quote:

Late [personal name] was dying of cancer, and he was my playmate, and he was much older than I am. He would have been 100 now. But because I was the only kid in this community every one of those guys who was an adult ... They became my playmates. And then I went to visit him in the hospital and I had tears in my eyes and I said "Oh, uncle, what am I gonna do without you?" Because he and I were the historians of our community. And he said "Oh, nephew. You just have to close your eyes and just remember all of the stories that our old people talked to you about when you were a little boy," and it made me cry. Even now it sort of brings tears to my eyes. And that's the missing thing we don't have right now, [personal names]. How do we educate people in our lives here to have the same emotional feelings that I have? That anything you touch in our river is like taking a piece of clothing off of my sister or my mother, and you're denuding them, and making them more susceptible to the ills of this world. Do you understand? (Qiyəplənəx^w 2016)

Another Musqueam member explained how the proposed Project and Project-related shipping is a threat to the teachings transmitted to him from his ancestors, as well as his people's history and identity. Knowledge that is 'current' could also be rendered obsolete, affecting traditional practices and member wellbeing.

Our fishing, since the beginning of time it was passed on from his grandfather who raised him, his father didn't raise him, his grandfather did. So you're going back now, a couple hundred years before there was anybody, before there was any ferry dock, before there

was any boats going back and forth here. That's why I'm here, this is important, this is a valuable, valuable situation and it really bothers me to see this being mapped out and to even go as far as to say this is Delta, this is where the ferry dock is, this is where our land is. This is where our water rights are. I would exclude even thinking about them but when I come back to the contemporary life we have, this really bothers me that they would come this far and do a study now instead of doing it when they were mapping this all out, probably two, or three, or five, or ten years ago. And that's what I stand on and that's how important this is to me, and in the words my grandfather, passed to me and my family, he said, "Know who you are and know who you come from. Cause if you don't know that, they're gonna get you". You know who he's talking about? The government, the fisheries, all the people who give us boundaries where we didn't have them. So this is way more important than just a little pink dot on the map [the Project footprint]. You know, this about why we exist, this about our history and the protection of what's gonna happen when those ships start coming through here. (M21 2016)

I was already telling you about the Canada Line going in, what it did to my uncle's fishing route ... And now my uncle is, is older and he's in trouble all the time because he never fished where we fish, we grew up fishing with our dad in that middle arm and so now he is constantly suffering something, like mishap on his boat because he's not familiar with the area, that kind of thing. So that's another thing he had to forego just because of development. And now here we go again [with the Project]. (M02 2016)

For many Musqueam members, the potential impacts from the proposed Project on the transmission of traditional knowledge would be multigenerational, as vital resources that have already been depleted (as highlighted in other Sections of this Report) would suffer further. At the same time, the ability to form the emotional connections to place would be further damaged by Project-related effects on the environment, over and above the effects of existing urbanization and industrialization in Musqueam territory.

I guess if I were to say anything it would be like this impact, like the impact is not just me. It's going to be generational because I really do doubt that, I'll be able to teach my grandkids the way my dad taught me and then for them to be able to pass it farther. What you didn't, you don't consider, 20 years ago you didn't consider that this kind of thing would have happened. I didn't anyways. (M02 2016)

As a young boy, this, there was no subdivision here. This was my natural playground, you know? Houses were a quarter mile apart, you know? And I lived in a countryside next to the biggest city in western Canada. Yet I enjoyed that country atmosphere. Now, my children and whatnot and my relatives don't have that enjoyment ... they didn't, they'll never experience what I've experienced. Now, with the Salish Sea, I see something of similar concern, you know? They'll never have that same wonderful enjoyment. I go fishing not because of the fish, per say ... you know, fishing isn't about making a million dollars ... Fishing is about having my daughter and my son and me talking to them, and me teaching them without them really knowing, you know? And that is what it's all about ... see, now you've got guys out there that are so motivated because of money ... and that's what's happening. People are motivated by money with Roberts Bank too. It's going to eliminate the real purpose of life. (Qiyəplenəx^w 2016)

Archaeological and heritage resources that situate Musqueam's place in history and define contemporary identities may also be lost from the Project, including resources that have not yet been identified.

I've been trying to think of that with the port expansion [the Project]. It's already, it's already Roberts Bank right there ... yeah, yeah depending on the currents ... this area [south of Canoe Pass] could silt up more ... And there's probably undocumented archaeological sites along here. If they're going to upgrade the road ... Might be a good chance to get in there and do some AIA [archaeological impact assessment] work before they do anything ... Could be [archaeological sites there]. Be good to get in there and do an assessment of this area. (M15 2016)

Musqueam members also viewed pollution and contamination emerging from the proposed Project as a risk to their ceremonial traditions.

I really, really can't [tell you about ceremonies]. I really can't other than that they're based, they're an ancestral right to belong to them and that they're based around purity. So those things, for reference to what we're using them for, if that place [the Project area] were to become contaminated or tainted, it would affect me. On a personal level and my, my immediate family, very greatly. (M23 2016)

Ultimately, as articulated by Musqueam members, Musqueam cultural continuity is underpinned by the abundance, health, and availability of natural resources and access to those resources; resources threatened by the proposed Project (as documented in other Sections of this Report). As such, the proposed Project represents an additional source of adverse negative effects on Musqueam cultural continuity by disturbing members' sense of place, comfort, and safety in their territory, as well as the environmental resources upon which they have thrived for generations.

4.2.4.3.1 Summary of Potential Project Interactions

In brief summary, potential Project interactions on cultural continuity values in the Study Area include, but are not limited to:

- Multigenerational exacerbation of the existing pattern of disruptions to cultural continuity caused by industrialization, settlement, and institutional policies;
- Decreased willingness and ability by Musqueam members to access the Project area due to Project-related marine traffic;
- Increased anxiety and fear regarding safety in the Project area due to the presence of Project-related marine traffic;
- Decreased willingness and ability by Musqueam members to access the Project area due to increased regulations;
- Disruption and constraint of ceremonial and spiritual practices dependent on access to and harvest of natural resources;

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- Lost opportunities for the transmission of traditional knowledge and practices, especially in the vicinity of the Project;
- Disruptions to Musqueam members' sense of place, identity, and spirituality;
- Loss of archaeological and heritage sites from the construction and physical occupation of the Project; and
- Disruptions to the social fabric of the community built from and around the practice and transmission of traditional activities.

4.2.5 Preliminary Characterization of Cumulative Impacts

The potential impacts to Musqueam knowledge and use from the Project identified in Sections 4.2.1 to 4.2.4 is to be understood in the context of adverse effects from other sources (past, present, and likely future). Although a comprehensive cumulative effects assessment was not conducted for this Study, the data presented below serves to underscore that impacts from the Project would be adding to, and compounding, damage already inflicted on Musqueam culture and cultural persistence.

Nearly all Musqueam interviewees stressed the need to account for the potential effects of the Project in the context of, in interaction with, and in addition to past, present, and likely future projects. One participant discussed this need to examine cumulative effects, and that special attention needs to be paid to Musqueam's proven right to fish (i.e., the Sparrow Case).

[Interviewer: If you had the chance to talk to Port Metro Vancouver, what would you tell...] stop looking at these projects piecemeal, and start really taking a look at the environmental impacts in relation to all of the projects that have taken place, and that are currently being reviewed, and ensuring that Musqueam is aware of any conceptual potential projects so that they can have our input on what the potential impacts would be before they even move forward with the potential Project. And that, you know, I've said it to them many times until I was blue in the face that, you know, when we're taking a look at potential impacts to Aboriginal rights and title, Musqueam is the only community that has a proven Aboriginal right to fish. All other First Nation communities assert their rights – they have not gone to the Supreme Court of Canada to prove that right, so when Port Metro Vancouver's looking ... provide some justification as to how Aboriginal rights may be impacted, Musqueam must be looked at under a different lens, because of the fact that we have the Sparrow Case, and no other community in the Fraser River has that. So just ensuring that, in terms of looking at those impacts, that Musqueam is looked at in a different way. But it's the overall, the cumulative effects that, not only Port Metro Vancouver, but also the provincial and the federal government needs to take a look at the overall- mega projects that are constantly being proposed, and are constantly taking place, and are undergoing. I mean, just take a look at all the agricultural impacts to the Fraser River. All the discharging that takes place constantly, and all the boat homes that are currently moored up and down, constantly bringing up and down of log booms, that are stored up and down the Fraser River. You know, you've got recreational use, commercial use, and this is where we feed our families. The Fraser River is, you know, an extremely cultural significant area to our community, and its something we've been trying to protect, and will continue to protect as long as we can. (M12 2016)

The findings of this Study strongly suggest the need for a complete and detailed assessment of cumulative effects with regard to the proposed Project at a regional scale. This case is made in light of the consistent observations and experiences of Musqueam members of environmental deterioration over time linked to numerous sources and drivers including, but not limited to, past, present, and foreseeable future:

- Marine terminals and shipping

I'm learning about the cumulative effects of all of these projects that have happened before my lifetime and that are still happening. Like with the bridges and the tunnels and these types of port facilities and it just, it seems like is it ever going to stop, right? So it just, it's more and more, the more they build and when they meet with you they say, oh well you know this is just one project. But it's not one project. You can see like the first terminal has led to the second terminal and now you know are they going to need to do work on the ferry terminal after or are they like, the more terminals you make the more ships that come. And it just seems like its going to keep escalating and it's, the changes that my, I've seen in my time, and my parents' and my grandparents', it's not a long time for all these huge changes to happen. So it scares me to think about what my children may or may not see or be able to do when their time comes. (Qiyəplenəx^w 2016)

- Urbanization and residential development

There's a lot more people... with more people there's like, more impacts on our environment. Like, there's more people, there's just more people everywhere doing everything. So then with more people there needs to be more spaces for people to live, and so then that means there's going to be more development on like, empty land, which then takes away from us and other First Nations because, like, it's our land. (M05 2016)

... You have to eat a very traditional diet [for ceremonies]. So, of course, you can imagine when you don't have a lot of places and you can't just go out and get salmon whenever you want or even eulachons for that matter that people, only the elders get because there's such a low amount of them nowadays. So when you're trying to eat a very traditional diet during those months when you're doing in the longhouse it's very tough to have the abundance of resource that you need. And also you don't have the area where you can go out and be on the land. So that's very important to our cultural practices as well, is to be able to go out and be in a forested area, for like, to use, for cedar, the running water that you would need. There's nowhere to go. It's all been developed or is parkland I guess. So, with trails and so. Some of these practices are very private and can't be done in our territory because we don't have the land to do it on or the waterways to do it. (M28 2016)

- Industrial development and point source and non-point source pollution

Started to see the decline [in fish]. It wasn't quite, it wasn't so pronounced at first and then into the 90s, then it started to become more severe ... I think because of environmental conditions. Changes in weather patterns and such. There was always a problem with, with pollutants in the water, right from the time they first started industry on the river. Because environmental, environmental legislation didn't come into effect until around the late 60s, early 70s. So industry at that time, pretty much had a free hand just to dump whatever they wanted in the water ... And now we have the legislation in place but enforcement is a problem. There's just too much industry for, and they don't have enough personnel to enforce the legislation. (M06 2016)

- Coastal and foreshore infrastructure

Like I said it's all this cumulative stuff that over the, oh well we're just going to build this one little bridge and so it, you know. Oh you never used to do this here. Well yes we did it just hasn't happened in the last hundred years because this bridge has been here, or the change in the waterway, the change in the foreshore. And just like you know, it's project after project after project and all these different things have been taken away and our elders are being lost over the years that were able to do these types of things [gather medicines]. And so that means teachings are being lost because we're not able to go out and do the things on the river and the land that we were able to do ... (M11 2016)

Their plans are to build another runway [at the airport] coming out to here, out into the water. And we keep telling them they can't do that because they're gonna take the habitat away from those prawns and everything, right? (M16 2016)

- **Overfishing**

You know what, as a 12 year old, I didn't even think about that kind of stuff, but just reflecting back, I mean, I remember it, how do I say this without sounding pompous? I remember it being easy, that you know, you kind of threw your net out and ... Yeah, even, I know I'm on record, so excuse my language, but even the shittiest fisherman could catch fish. And now its- its clearly changed in that, you know, you've got to find the right spots and the right times to do it, it's not just anyone can throw a net out and catch an abundance of fish. I think there's a bunch of different reasons, man, I mean, I think obviously overfishing, I think the environment has something to do with it, I think everyone's pointing the fingers at each other when, you know what, I think it's a combination of all of it. I mean, overfishing from the same boats, from the gillnets, to the sporties and not only that, climate change has got to be playing some sort of a role in this. And I would also say that, since I was a boy, the pollution in the river has to have something to do with it. I mean, I could almost, I remember being able to kind of see through the water down on the Fraser River, and now it's just murk. So I would imagine that has to do something, I mean, I don't, I'm not a salmon swimming up so I don't know how much it's affecting them, but I mean it's got to be doing something, it really does. I remember as a boy walking down on our beach here, on the north arm, and tugboats going by, and once their waves had kind of receded off of the shore, there would be eulachons flopping around on the beach, and you could just pick them up and put them in a bucket and bring them home. Now I mean, it's- you don't even hear of eulachons around anymore. And I think it all has to do with all of those things that I mentioned before. (M19 2016)

- **Dredging and climate change**

The environmental conditions were so hot because there was no snow impact. So all the fisheries were worried and saying that fish needed to be returned to a high level but now with that water being warm like that, there's an added stress on that fish, it's gonna take way more to get up the river to the spawning grounds. So nobody even got on the radar about all this dredging and how fast they're making this river flow which will put even more stress on them. (M16 2016)

And as they're dredging the river out, they're making the water flow faster. So when the water flows faster the small fry got nowhere to rear when they're going out and then when

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the mature salmon are coming back they would stop and move there way up river and when you keep taking it out, you're making that water thing, the pressure on those fish, by the time they get to the spawning grounds, has doubled or tripled. And what I was saying, their dredging, the bottom line is with this tunnel [George Massey], they're not concerned about getting these people from Ladner over the bridge. They're worried about the LNG plant that's going over here and the Surrey Docks that are going there. Those ships can't make it through here because they'll hit the tunnel, right? (M16 2016)

The above list is necessarily incomplete given the amount of impacts that have already occurred and the amount of industrial activity that is slated to occur in Musqueam territory. Many members also referenced the existing Iona sewage plant, the construction of jetties, infilling of sloughs, runoff from golf courses and agriculture, logging booms and operations on the Fraser River, and much more. Moreover, Musqueam interviewees indicated great concern regarding the major industrial projects that are currently planned in their territory, including, but not limited to: the George Massey Tunnel replacement project; WesPac Marine Jetty project; Kinder Morgan TransMountain Pipeline Expansion project; and PMV Vancouver Airport Fuel Delivery project, among others.

In sum, interactions from the Project would occur in the context of existing and ongoing impacts from various sources. For many Musqueam members the Project represents a serious risk to their way of life in an already extremely vulnerable state where one accident could have devastating effects.

I looked at the Pearl River Delta [in China], and I said wow, this is no different than the Fraser River. And yet the Pearl River is a dead river. It's dead, there are no people who are from there, living there. And that's what's going to happen to us. Not you, but your grandchildren. If it keeps going the way it's going, our community is going to keep shrinking ... And if we make one too many mistakes we become non-existent. (Qiyəplənəx^w 2016)

5. CONCLUSION

5.1 SUMMARY AND RECOMMENDATIONS

The overarching findings that emerged from this Study for Port Metro Vancouver's proposed Roberts Bank Terminal 2 Project with the Musqueam Indian Band are effects (and associated impacts) on fishing, coastal harvesting, hunting, and cultural continuity. Fishing and cultural continuity impact pathways, in particular, were many and their potential implications on those values substantial.

The Study Area is of high importance to Musqueam knowledge, use, and occupancy. Use and occupancy are at particularly high levels by the existing Westshore and Deltaport terminals, in Canoe Pass and all arms of the Fraser River, and the eastern waters of the Salish Sea. As noted in Section 4.1, within the Project footprint, Musqueam members reported 69 site-specific values, while 374 were reported within the LSA (including the footprint), and 1,382 within the RSA (including the LSA and footprint).

This Study has also concluded that the Project will likely interact with a wide range of Musqueam activities and values related to fishing, coastal harvesting, hunting and cultural continuity. The summaries of Project-VC interactions for each VC are provided in subsections 4.2.1.3.3, 4.2.2.3.3, 4.2.3.3.1 and 4.2.4.3.1. Together, these summaries list a total of 36 discrete, major Project impact pathways with the potential to adversely impact Musqueam values in the Study area, including 15 major impact pathways related to fishing, 7 for coastal harvesting, 5 for hunting, and 9 for cultural continuity. It can be concluded that the interactions identified in this Report are likely to result in adverse effects on Musqueam use and occupancy, including on proven fishing rights (i.e., the *Sparrow* Case) and Aboriginal rights.

In addition, the potential for Project-based effects indicated above would occur in a context of pre-existing, long-term, multi-source, and large-scale adverse impacts on Musqueam territory, rights, and interests, as identified by Musqueam members. Musqueam members provided numerous examples of how these cumulative effects have already substantially impaired their ability to practice Aboriginal rights in much of their territory. When combined with historical alienation from previous industrial development and marine shipping on and out of Roberts Bank and in the Salish Sea in general, the proposed physical works and activities required by the Project, the data collected in this study indicates that the additional Project interactions has the potential to constrain Musqueam rights practiced in the LSA and RSA over multiple generations. A full cumulative effects assessment is therefore strongly recommended to supplement this study.

Further study of the potential impacts of the Project on Musqueam's rights, interests, and use are also recommended, as GIS footprint and activity data regarding the Project requested from the Proponent for this Study were not provided at the time of primary data collection.

5.2 CLOSURE

Should you wish to discuss any aspect of this Report further, please do not hesitate to contact Jordan Tam.

Sincerely,

<Original signed by>

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APPENDIX 1: CONSENT FORM

I (name) _____, on this day (complete date) _____, give permission for _____ to interview me for the Musqueam Indian Band (henceforth 'Musqueam') Knowledge and Use Study of Port Metro Vancouver's Roberts Bank Terminal 2 Project.

I understand that the study is being conducted by Musqueam. The purpose of this study is to document the rights and interests of the Musqueam in the area of Port Metro Vancouver's Roberts Bank Terminal 2 Project.

By signing below, I indicate my understanding that:

- (a) I consent to have my words and responses recorded on maps, in notes, and using audio and video recording equipment.
- (b) I am free to not respond to questions that may be asked and I am free to end the interview at any time I wish.
- (c) Musqueam will maintain intellectual property rights over information and recordings collected through my participation and may use the information and recordings, including audio, video, or pictures, in pursuit of its claims, and for defending and communicating the rights, interests, and titles of its members. This includes, but is not limited to, sharing information for the purposes of negotiation or participation in regulatory or court proceedings.
- (d) Musqueam will ask permission from me or my descendents, before using my information for purposes not indicated above.

For more information, please contact Jordan Wilson at the Musqueam Indian Band: (604) 716-9676.

Signature of participant

Witness

PIN #:

APPENDIX 2: INTERVIEW GUIDE

**INTERVIEW GUIDE FOR THE MUSQUEAM INDIAN BAND
KNOWLEDGE AND USE STUDY OF THE
PORT METRO VANCOUVER ROBERTS BANK TERMINAL 2 PROJECT**

This guide includes:

- Interview questions
- Mapping notes
- Mapping codes

1. INTRODUCTION

[Complete the interview checklist, then read with AUDIO & VIDEO RECORDERS ON at the start of each interview.]

Today is [DATE]. We are interviewing [PARTICIPANT NAME] for the **Musqueam Indian Band Knowledge and Use Study** of the **Port Metro Vancouver Roberts Bank Terminal 2 Project**. Thank you for coming.

My name is [NAME] and my co-researcher(s) is/are [NAME]. We're at the [BUILDING/OFFICE] in [COMMUNITY] in [REGION/PROVINCE]. [PARTICIPANT NAME] has read and signed the consent forms, and we have assigned him/her participant ID [NUMBER]. We have explained the purpose of the study, mapping process, and interview plan. We will be mapping in Google Earth at 1:50,000 or better.

Primary Goal: to document community knowledge and use in the area of the Roberts Bank Terminal 2 Project. We'd like to know how you have used these areas, as well as what you may know about how community members have used it.

2. BACKGROUND AND EXPERIENCE

PERSONAL INFORMATION

- Full name?
- Place of birth?
- Age and year of birth?
- Where you were raised?
- Membership of Musqueam?
- Parents' and grandparents' names?

GENERAL USE QUESTIONS

Have you ever used the area around the proposed Roberts Bank Terminal 2?

For hunting / trapping / fishing / camping / plant gathering / passing on traditional knowledge or language / gatherings or ceremonies

- If yes
 - When?
 - What do you do there?
 - Who with?
 - How did you learn about this area?
- If no, why?

Have your family or community members ever used the area around the proposed Project, or areas nearby?

- If yes
 - What activities did they do there?
- If no, why?

Is the RBT2 area important to you / your family / your community? Why?

Relevant Information to include
How they learned about the Project area
First hand experience
*Second hand knowledge (map with *)*
Trapline number(s) of individual / family members
Other named family members
Remember to spell out all proper names

4. HABITATION

PERMANENT HABITATION (PX) & TEMPORARY HABITATION (TX)

Can you show us places you have stayed overnight?

Examples: a cabin you built or used, campsite, tent, other temporary or permanent structures

How many times have you stayed there?

- Once or short-term (less than 3 days): TX
- More than once or long-term (more than 3 days): PX
 - When did you first stay there?
 - When was the last time you stayed there?

SUGGESTED PROMPTS FOR DETAILED KNOWLEDGE AND USE ON HABITATION

Describe the location / the conditions

Why do you go there?

How did you find out about this place? / Who showed it to you?

What do you like about the place?

What activities do you do when staying there?

What does this place mean to you?

Is this place important to you / your family / community? Why?

Is this place important to sustaining your culture / way of life? How?

Do you teach younger generations there? (map as TA)

How would you explain the importance of this place to the government / industry?

4. TRAVEL ROUTES

TRAIL (TR)

Can you show us routes you have travelled by foot, quad, or truck etc? (usually for hunting, trapping, gathering plants, accessing camping or fishing areas etc., rather than driving on a highway)

- When did you first use this route?
- When did you last use this route?
- What did you use this route for? (e.g. For hunting or plant gathering, or to reach fishing, camping, or other locations)

Can you show us old trails that have been used by community members? (*map with **)

- When was this route used?
- Who was using this route?
- What did they use it for? (e.g., For hunting or plant gathering, or to reach fishing or camping sites, or other locations)

WATER ROUTE (WR)

Can you show us routes you have travelled in the ocean or along creeks, lakes or rivers by boat?

- When did you first use this route?
- When did you last use this route?
- What did you use this route for? (e.g., for hunting, fishing, or to reach campsites of other locations)

Can you show us old water routes that used to be used by community members? (*map with **)

- When was this route used?

- Who was using this route?
- What did they use it for? (e.g. for hunting, fishing, or to reach campsites of other locations)

Travel routes and all linear features should be controlled

Follow the actual route and natural features (not a straight line from A to B)

Include relevant modifiers after the site code (,?,+,§)*

SUGGESTED PROMPTS FOR DETAILED KNOWLEDGE AND USE ON TRANSPORTATION

How did you learn about this route?

What do you do when you are travelling along here?

Is this the only route to get from point A to B, or is there an alternative?

Was this a new route, or a well-travelled, well-recognized route?

Is this route important to you / your family / community? Why?

Is this route important to sustaining your culture / way of life?

What is the farthest point that you have travelled along this route?

5. HUNTING, TRAPPING, FISHING & GATHERING PLANTS AND RESOURCES

[See codes at back of this guide for species – these may also be used as prompts]

HUNTING AND TRAPPING

Can you show us places where you have killed or trapped mammals or birds?

[Prompt by most important species first, e.g. moose, elk, deer, bear ... See codes at the back of this guide]

- For each:
 - Which species?
 - When?
 - Why? (e.g. to feed you / your family / your community, or for other uses such as medicines, crafts, ceremonies, sale)

FISHING

Can you show us places where you have caught fish?

- For each:
 - Which species?
 - When?
 - Why? (e.g. to feed you / your family / your community, or for other uses such as for medicines, ceremonies, sale, or simply to enjoy fishing / catch-and-release)

[NB: Didn't catch anything and catch-and-release should be marked as EF]

SUGGESTED PROMPTS FOR DETAILED KNOWLEDGE AND USE FOR KILLED OR TRAPPED MAMMALS, BIRDS AND FISH

Why do you hunt / trap / fish?

Who taught you how to hunt / trap / fish? Where? [mark as TA]

Have you taught anyone how to hunt / trap / fish? Who? Where? [mark as TA]

How important are these animals / birds / fish to your daily life?

What did you do with the meat or fur?

How many people can an animal feed? For how long? (individual / family / community)

What does it mean to you to be able to hunt / trap / fish?

*Are these animals / birds / fish important to sustaining your culture / way of life? How?
How would you explain the importance of these animals to the government / industry?
Are any of these animals / birds / fish hard to find? Which ones?*

HARVESTING BERRIES / OTHER PLANTS / FUNGI

Can you show us places where you've collected:

- berries or other food plants?
- medicine plants?
- mushrooms or other fungi?
- plants for crafts or other uses?
- For each:
 - Which species?
 - When?
 - Why? (e.g. to feed you / your family / your community, or for other uses such as medicines, crafts, ceremonies, sale)

SUGGESTED PROMPTS FOR DETAILED KNOWLEDGE AND USE

*How important are these medicines / plants / fungi / resources to your daily life?
Who taught you about collecting and using medicine / plants / fungi / resources? Where? [mark as TA]
Have you taught anyone about collecting and using medicine / plants / fungi / resources? Who? Where? [mark as TA]
Are these medicines / plants / fungi / resources important to sustaining your culture / way of life? How?
How would you explain the importance of these medicines / plants / fungi / resources to the government / industry?
Are any of these medicines / plants / fungi / resources hard to find outside of the Project area and nearby areas?
Who were you with when gathering plants / fungi / other resources?
Species, if applicable?*

6. ENVIRONMENTAL FEATURES

ENVIRONMENTAL FEATURES (EF)

Can you show us the locations of good habitat or environmental features that are important for mammals / birds / fish / plants?

Examples: calving or mating areas, mineral licks, fish spawning areas

ENVIRONMENTAL FEATURE CORRIDOR (EC)

Can you show us routes that animals use to move across the area?

7. CULTURAL USE

GATHERING PLACE (GP)

Can you show us important places where your community holds or attends gatherings?

Examples: pow wows, rodeos, treaty celebrations

- When?

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- Who? (e.g. Use by you / your family members / your community / many communities)
- What happened there?

TEACHING AREA (TA)

Can you show us places that are used for teaching knowledge to children or others?

- When?
- Who? (e.g. use by you / your family members / your community / many communities?)
- What was taught there? How?

Can you show us any places that have special knowledge or stories associated with them?

Examples: creation stories, dreamer stories, histories

- Who told you about this place and the stories? When?

BURIAL (BU)

Can you show us places where members of your First Nation are buried or where their remains are (e.g. cremation)?

- Know firsthand or heard from family / community members?

PLACE NAME (PN)

Can you show us any places that have special place names?

[include the place name and translation in Google Earth description field]

Include for each mapped site in Google Earth description field of the dialogue box
First and last use (day / month / season AND year / decade)

8. IMPAIRED USE

Specific and general impaired use due to impacts from industry and other environmental or social changes

General impaired use (GL) & Specific impaired use (SL)

Can you show us any general areas or specific sites where you used to hunt / gather / fish / camp / practice other rights, but do not go anymore because of impacts from industry or other reasons?

- What did you used to do there? Why? (e.g. hunting because there were lots of moose)
- When did you last use that place?
- Why did you stop using that place?

Include for each mapped site in Google Earth description field of the dialogue box
First and last use (day / month / season AND year / decade)
Reason for avoidance

SUGGESTED PROMPTS FOR DETAILED KNOWLEDGE AND USE

Why can you no longer go to this area?

What activities did you used to do in this area?

How often did you go to or use this area?

Can you do those activities somewhere else?

How does it make you feel that you can no longer go to or use this area?

How has the loss of use impacted you / your family / your community?
Has the loss of use impacted your culture / way of life? How?
How would you explain the importance of this area to the government / industry?
How would you explain the impact that not being able to use the area has had on you to the government / industry?

9. KNOWLEDGE OF USE BY OTHER COMMUNITY MEMBERS

[Map with *]

After you have covered a participant's personal use, and if there is still time, you may want to ask about their knowledge of how other community members use the area. You may do this particularly for important areas, if the participant does not have much personal experience of an area, or if you are trying to collect historical use data.

Can you show us places where members of your family or community or your ancestors have:

- Camped or stayed in cabins?
- Killed or trapped animals or birds?
- Caught fish?
- Collected berries / plants / fungi / water / other resources... ?
- Attended ceremonies or gatherings?
- Travelled across the area?
- Other activities... ?

10. PROJECT IMPACT QUESTIONS

[Make sure data and participant's mapped sites are on the screen]

[Refer back to the participant's use in the Study area, e.g. if they do a lot of fishing]

Based on your understanding of the RBT2, do you think it affects:

- your ability to enjoy your treaty rights or way of life?
- your children's or grandchildren's ability to enjoy their treaty rights or way of life?
- If so, how so?

What do you think the most important issues are for your community to focus on in relation to the RBT2?

Are there any other important places or issues related to the RBT2 that you think we should be documenting today?

Are there other community members that we should talk to?

[Note: You may want to ask some of these questions earlier in the interview, for example if a participant has talked a lot about moose hunting in the Study area, ask them if they think the Project will impact their hunting, and why.]

11. CONCLUSION

[Read with audio & video recorders on after every session]

Today is [DATE]. We have just finished interviewing [PARTICIPANT NAME] for the **Musqueam Indian Band Knowledge and Use Study** of the **Roberts Bank Terminal 2 Project**. Thank you for coming.

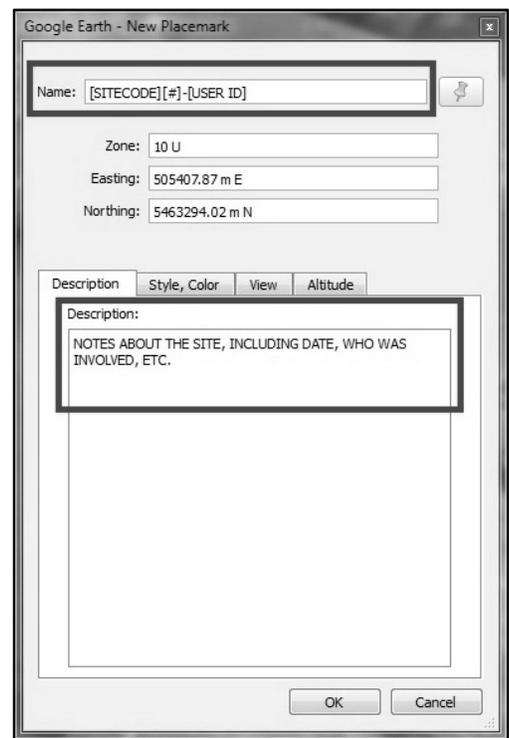
My name is [NAME], my coresearcher is [NAME] and we are here at [OFFICE/BUILDING] in [COMMUNITY/TOWN]. We've given [PARTICIPANT NAME] participant ID [#]. We've mapped a total of [#] sites in Google Earth at 1:50,000 or better, and recorded a total of [#] tracks on the digital recorder. Notes are recorded in/on [NOTEBOOK/COMPUTOR]. This interview has taken approximately [#] hours [#] minutes.

12. MAPPING NOTES

Map all points, lines and polygons at an eye height of approximately 10km or less (1:50,000 or better)

Label each site consistently in the NAME FIELD of the site properties dialogue box (see ex.)

- Each code should indicate
 - Site use
 - Site number
 - Modifiers (if relevant)
 - Source (participant ID)
- Modifiers (after the site number)
 - Firsthand knowledge has no modifier
 - Example: TX01-S08 (member with ID# S08 reports first mapped temporary shelter place where she has camped)
 - Secondhand knowledge is mapped with a *
 - Example: TX01*-S08
 - Approximate spatial information is mapped with a ?
 - Example: TX01?-S08
 - If the participant was present but did not take part in an activity, map with a +
 - Example: BE01+-S08
 - Commercial use (including guiding/outfitting) is mapped with a \$
 - Example: TX01\$-S08
- If multiple modifiers are used, a code could look like: TX01*?-\$-S08



All other information goes in the DESCRIPTION FIELD of the dialogue box (see example)

Transportation routes and all linear features should be controlled

- Zoomed in to less than 10km eye height
- Follow the actual route and natural features (not a straight line from A to B)

Include for each mapped site in Google Earth DESCRIPTION FIELD of the dialogue box

- First and last use (day / month / season AND year / decade)
- Frequency of use

- Species (if relevant)
- Number and names of members who were present
- Any additional information you are told

Other

- Keep list of place names
- Spell out proper names and place names where possible for the recording

Use prompts to gain detailed access and use information

13. MAPPING CODES

HABITATION & TRANSPORTATION

PX = Permanent Habitation

TR = Trail

TX = Temporary Habitation

WR = Water Route

ENVIRONMENTAL FEATURES

EC = Environmental Feature Corridor

EF = Environmental Feature

MAMMAL KILL SITES

BB = Black Bear

BI = Bison / Buffalo

CA = Caribou

EK = Elk

GB = Grizzly Bear

GW = Whale

HS = Harbor Seal

LI = Sealion

MD = Mule Deer

MM = Whistler / Marmot

MO = Moose

OG = Other Game

OT = Otter

PO = Porcupine

RC = Raccoon

SH = Sheep

WD = White-tailed Deer

FURBEARING KILL SITES

BR = Beaver

CO = Coyote

FI = Fisher

FO = Other Fur Bearer

FX = Fox

LX = Lynx

MT = Marten

MU = Muskrat

OT = Otter

RB = Rabbit

SQ = Squirrel

TP = General Trapping Area

WO = Wolf

WV = Wolverine

BIRD KILL SITES

BM = Blue Heron

EA = Eagle

FL = Falcon

GE = Goose

GR = Grouse / Chicken

SW = Swan

DU = Duck

HA = Hawk

OB = Other Bird

OW = Owl

SN = Sandpipers

FISH CATCH SITES

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BT = Bull Trout
DV = Dolly Varden
EE = Eel
FN = Flounder
GD = Goldeye
GM = Cod (Pacific, Rock, ocean Ling-Cod)
GY = Grayling
HE = Herring
HL = Halibut
JF = Jackfish / Pike
KO = Kokanee
ZR = Roe (herring)

LT = Lake Trout
MR = Maria / Burbot
OF = Other Fish
PK = Pickerel / Walleye
RT = Rainbow Trout
SM = Salmon
ST = Sturgeon
SU = Sucker
TN = Tuna
WF = Whitefish
ZL = Smelt

MOLLUSC AND CRUSTACEAN SITES

AE = Sea Cucumber
AL = Abalone
AM = Mussels
CL = Clams
CY = Crayfish
EH = Sea Urchin
GN = Goose-neck Barnacle

OC = Octopus
OY = Oysters
PD = Scallops
PW = Prawn/Shrimp
RK = Rockstickers/Chiton
SI = Squid
KB = Crab

PLANTS & OTHER RESOURCES

BA = Barks (crafts, construction, etc.)
BE = Berries/Wild Fruit
DP = Dye Plant
EG = Eggs
EM = Earth Material (rocks, clays, etc.)
FE = Feathers
FP = Food Plant (roots, bulbs, cambium)
FU = Fungus

FW = Firewood
KE = Kelp/Seaweed (all)
MP = Medicine Plant
MS = Mosses/Mushrooms
OP = Other Plant
PC = Pine Cones
WA = Water

CULTURAL USE

BU = Burial
CP = Ceremonial Place
DR = Drying Rack
PN = Place Name
SP = Spirit
TA = Teaching Area

IMPAIRED USE

GL = General Loss
SL = Specific Loss

APPENDIX 3: C.V. JORDAN TAM

Education

Doctor of Philosophy in Resource Management and Environmental Studies, University of British Columbia, BC, expected 2016

Master of Arts in Resource Management and Environmental Studies, University of British Columbia, BC, 2010

Bachelor of Arts in Psychology, University of British Columbia, Vancouver, BC, 2005

Employment History

The Firelight Group, Vancouver, BC, Canada

Senior Researcher (2015-present)

Researcher for traditional use studies (TUS). Working in collaboration with First Nations communities to:

- Plan and carry out field research for traditional use studies with First Nations communities in Canada
- Analyze map data and qualitative data
- Write TUS reports

Frontier Geosciences Inc. – Sandspit, Haida Gwaii

Field Assistant (September 2014)

Fieldwork assistant in the seismic survey of a BC Hydro substation. Installed geophones and Buffalo gun operation on rough terrain.

Canadian Parks and Wilderness Society – Vancouver, BC

Intern (January – April 2012)

Tasked with identifying, from the primary literature, factors that might help forge strong relationships between children and youth with the natural environment. Wrote and submitted a report to CPAWS-BC.

David Suzuki Foundation – Vancouver, BC

Contract (February 2009)

Report writing position investigating the scope of ecosystem goods and services in the Pacific North Coast Integrated Management Area (PNCIMA) and the degree to which they have been researched and identified. Provided summary information on the social, economic, and health benefits of the marine environment.

Climate Decision Making Center – Vancouver, BC

Research Assistant (September – December 2008)

Conducted statistical analyses and aided research on expert judgments of sockeye salmon vulnerability under climate change in the Fraser River for a project supported by the National Science Foundation through the Climate Decision Making Center at Carnegie Mellon University, Pittsburgh.

Level Ground Trading – Vancouver, BC

Sales Representative (January 2008 – July 2008)

Engaged in sales, account management and maintenance of Level Ground Trading clients across the Lower Mainland. Grew sales and expanded the distribution of Level Ground's fairly traded goods.

Wilson Banwell – Vancouver, BC

Intake Counselor (August 2005 – November 2006)

Conducted intake interviews with clients, clinicians, and employers with regard to a wide spectrum of mental health problems of varying magnitude, often dealing with crises. Primarily operated in a coordinator capacity to facilitate client treatment and engaged in client record management.

Project Experience – Traditional Use Studies (TUS)

Musqueam Indian Band

Southern British Columbia, Canada

Co-researcher for the collection of traditional use knowledge and data for Port Metro Vancouver's Roberts Bank Terminal 2 Project. The project involved methods development, data collection, analysis, and authoring of reports.

Mattagami First Nation

Northern Ontario, Canada

Methods development, data analysis, and authoring of reports for Canadian National Railway's Gogama 88 and Ruel 111 Train Derailments.

Saulteau First Nations

Northern British Columbia

Co-researcher for the collection of traditional knowledge use knowledge and data for Shell Canada Ltd., BC Hydro, TransCanada Pipelines Ltd., Boralex Inc., and Aeolis Wind Power Corp. projects. These projects involved data collection methods development, data analysis, and authoring of interim and final reports.

Mikisew Cree First Nation

Northern Alberta

Co-researcher for the collection of traditional use knowledge and data for Prosper Petroleum's Rigel Oil Sands Project. The project involved data collection, analysis, and authoring of interim and final reports.

Wabun Tribal Council

Northern Ontario

Co-researcher for the collection of traditional use knowledge and data for TransCanada's Energy East Pipeline Project. The project involved data collection, analysis, and authoring of interim and final reports.

McLeod Lake Indian Band; Nak'azdli Whut'en; Brunswick House First Nation; Chapleau Cree First Nation; and Chapleau Ojibwe First Nation

Methods development and review of reports for various projects, including mining and hydroelectric developments.

Project Experience – Resource Management and Environmental Science

University of British Columbia

Fieldwork in Region V, Chile

Ph.D. thesis research. This interdisciplinary dissertation focuses on understanding adaptation to social and ecological change in small-scale (rural and urban) Chilean fishing communities. The project recorded Local Ecological Knowledge regarding environmental change and its perceived drivers, as well as marine resource use behaviors and impacts to livelihoods. Involved the collection and management of extensive datasets including hundreds of in-person surveys as well as interviews, field notes, and observations. Conceived, planned, and executed as the lead researcher; worked with academic and local experts, and hired, trained, and directly supervised a six-person research team

University of British Columbia

Vancouver, BC

M.A. research. This thesis examined risk perceptions of biological conservation practices under climate change. The project involved the design, launch, and analysis of an online survey. The survey assessed various psychological factors, such as conservation attitudes, and their influence on perceptions of risk.

Selected Publications

Refereed Publications

Singh, G.G., Tam, J., Sisk, T.D., Klain, S.C., Mach, M.E., Martone, R.G., Chan, K.M.A. (2014). Conducting a more social science: Barriers and incentives for scientists engaging in policy. *Frontiers in Ecology and in the Environment*, 12(3), 161-166.

Russell, R., Guerry, A. D., Balvanera, P., Gould, R. K., Basurto, X., Chan, K. M. A, Klain, S.C., Levine, J., and Tam, J. (2013). Humans and Nature: How Knowing and Experiencing Nature Affect Well-Being. *Annual Review of Environment and Resources*, 38(1), 473-502.

Raymond, C. M., Singh, G. G., Benessaiah, K., Bernhardt, J. R., Levine, J., Nelson, H., Turner, N.J., Norton, B., Tam, J., and Chan, K. M. A. (2013). Ecosystem Services and Beyond: Using Multiple Metaphors to Understand Human-Environment Relationships. *BioScience*, 63(7), 536-546.

Ban, N. C., Mills, M., Tam, J., Hicks, C. C., Klain, S., Stoeckl, N., Bottrill, M.C., Levine, J., Pressey, R.L., Satterfield, T., and Chan, K. M. A. (2013). A social–ecological approach to conservation planning: embedding social considerations. *Frontiers in Ecology and the Environment*, 11(4), 194-202.

Tam, J., & McDaniels, T. L. (2013). Understanding individual risk perceptions and preferences for climate change adaptations in biological conservation. *Environmental Science & Policy*, 27, 114-123.

Chan, K.M.A., Guerry, A., Klain, S., Balvanera, P., Satterfield, T., Basurto, X., Bostrom, A., Chuenpagdee, R., Gould, R., Halpern, B., Hannahs, N., Levine, J., Norton, B., Ruckelshaus, M.,

Russell, R., Tam, J., and Woodside, U. (2012). Integrating 'cultural' and 'social' into ecosystem services: A framework for making decisions about what matters. *BioScience*, 62(8), 744-756

Daniel, T.C., Muhar, A., Arnberger, A., Aznar, O., Boyd, J.W., Chan, K.M.A., Costanza, R., Elmqvist, T., Flint, C.G., Gobster, P.H., Gret-Regamey, A., Lave, R., Muhar, S., Penker, M., Ribe, R.G., Schauppenlehner, T., Sikor, T., Soloviy, I., Spierenburg, M., Taczanowska, K., Tam, J., and von der Dunk, A. (2012). Cultural ecosystem services: Potential contributions to the ecosystem services science and policy agenda. *Proceedings of the National Academy of Sciences*, 109(23), 8812-8819.

Vignola, R., Klinsky, S., Tam, J., & McDaniels, T. (2012). Public perception, knowledge and policy support for mitigation and adaptation to Climate Change in Costa Rica: Comparisons with North American and European studies. *Mitigation and Adaptation Strategies for Global Change*, 1-21.

Select Non-refereed Publications

Tam, J. (2012). Fostering connections between youth and the environment in British Columbia. Report submitted to the Canadian Parks and Wilderness Society British Columbia Chapter.

Sisk, T.D., Singh, G., Tam, J., Chan, K.M.A., Klain, S., Mach, M., and Martone, R. (2011). Barriers and Incentives to Engagement in Public Policy and Science-based Advocacy. *Bulletin of the Ecological Society of America*, 92, 276–280.

Chan, K.M.A., Öberg, G., Anderson, E., Chamberlain, B. B., Empey, E., Evans, C., Klain, S., Levine, J., Mach, M., Clarke-Murray, C., Reckermann, J., Tam, J., Sihota, N., Singh, G. (2009). An ecosystem services approach to sustainability at the University of British Columbia. Report submitted to the UBC Sustainability Office.

Molnar, M., Clarke-Murray, C., Whitworth, J., & Tam, J. (2009). Marine and Coastal Ecosystem Services: A Report on Ecosystem Services in the Pacific North Coast Integrated Management Area (PNCIMA) on the British Columbia Coast. The David Suzuki Foundation, Living Oceans Society, and Sierra Club of BC, (p. 1- 102).

Tam, J. & Klain, S. (2008). Marine planning for ecosystem services: Fisheries and cultural values in Gwaii Haanas. Report submitted to Parks Canada.

Select Presentations

Tam, J. (2013, October 29). Social-ecological systems in theory and in practice. Guest lecturer in RMES 510 Social Ecological Systems class, Vancouver, BC.

Tam, J., Singh, G., Chan, K.M.A. (2012, September 20). "Social" Science: Barriers and Incentives for Science to Engage in Policy. Talk presented in UBC's Institute for Resources, Environment and Sustainability seminar series, Vancouver, BC.

Tam, J. (2010, July 26). The psychology of climate change adaptation for protected areas: the challenge of online experiments. Talk presented at the Norms Evolving in Response to Dilemmas Workshop 2010, Vancouver, BC.

Chan, K.M.A., Klain, S., Tam, J., & Satterfield, T. (2010, July 7). Marine planning for ecosystem services and cultural values: a proposed framework. Talk presented at the 24th International Congress for Conservation Biology, Edmonton, AB.

Tam, J. (2010, July 4). The psychology of climate change adaptation for protected areas: beliefs, feelings, risk and uncertainty. Talk presented at the 24th International Congress for Conservation Biology, Edmonton, AB.

Tam, J., Levine, J., Satterfield, T., & Chan, K. (2010, February 10). Decision-making for ecosystem services: values and process. Poster presented at the First Barkley Sound Knowledge Symposium, Barkley Sound, BC.

Other Information

Proficient user of software applications including SPSS, R, MS Excel, MS Word, MS PowerPoint, Adobe Photoshop

Fluent in English, semi-fluent in French and Spanish, conversational Cantonese

APPENDIX 4: C.V. RACHEL OLSON

Education

PhD in Social Anthropology, University of Sussex, Brighton, UK, 2013

MRes in Social Anthropology, Ethnology and Cultural History with Distinction, University of Aberdeen, Scotland, UK, 2003

BA in Anthropology with Distinction, University of Alberta, Edmonton, AB, 1999

Employment History

The Firelight Group – North Vancouver, BC

Director (2009 to Present)

Responsible, as co-founder and director, for helping establish The Firelight Group, a firm of Aboriginal and non-Aboriginal professionals specialized in providing respectful and respected environmental and social science research, consulting, and support services in processes where Aboriginal and non-Aboriginal interests interact, and where good relationships are desired by all sides. Tasks include business development, as well as design, development, and delivery of technical services including community-based traditional knowledge research and documentation systems, environmental and socio-cultural impact assessments and monitoring programs, indigenous land use mapping, GIS technical support and training, archival research, community involvement processes, and First Nations consultation support services.

National Aboriginal Health Organization – Ottawa, ON

Research Officer (2007 to 2008)

As a member of the First Nations Centre research team, my primary research areas were the topics of maternity care and environmental health. Also held the research proposal development and workshop development files. Tasks included primary research, technical writing, and participating in various committees and workshops across Canada. Was primary author of NAHO's series entitled, "Celebrating Birth".

United Nations Educational, Scientific and Cultural Organization - Paris, France

Consultant (2006-2007)

Worked with the LINKS (Local and Indigenous Knowledge Systems) program in the Science Sector and facilitated ongoing projects with indigenous communities in New Zealand, Micronesia, and Central America. Also focused on proposal development and editing and publishing various LINKS documents, including edited volumes.

School of Nursing Research, University of British Columbia – Vancouver, BC

Social Science Researcher (2004-2005)

Position of Health Research Associate for the research project, "Access to Primary Care Services for Aboriginal People in an Urban Centre." Duties include literature reviews, project coordination, and data collection, including participant observation of an Emergency Department, and in-depth interviews with Aboriginal patients and health professionals.

Ecotrust Canada – Vancouver, BC

Aboriginal Mapping Network Coordinator (2003-2004)

Managed the Aboriginal Mapping Network program by meeting and engaging with like-minded individuals and organizations at various conferences and workshops. Coordinated of over 120 Aboriginal mapping professionals from across North America, Malaysia and Panama for the “Mapping for Communities: First Nations, GIS and the Big Picture” conference, held on November 20-21, 2003 in Duncan, BC. Conducted a comprehensive evaluation of the Aboriginal Mapping Network.

Dene Tha' First Nation - Chateh, AB

Data Collection Manager (2001 to 2003)

Developed and implemented Traditional Use Study in two First Nations communities, Chateh and Meander River. Included developing research design, methodology, training community researchers, and reporting to the Steering Committee of the Dene Tha' Consultation Pilot Project.

Treaty 8 Tribal Association - Fort St. John, BC

Interview Coordinator (1999-2000)

Coordinated land use mapping and life history interviews with community researchers in two communities, Halfway River and Doig River, focusing on qualitative methods and mapping processes.

Project Experience – Traditional Ecological Knowledge (TEK) and Traditional Use Studies (TUS)

Tlicho Government

Northwest Territories

Project manager and technical lead for the Tlicho Government indigenous knowledge study for the Fortune Minerals NICO project. The project involved methodology development, data collection, analysis and final reporting. Presented findings at the public hearings of the MacKenzie Valley Environmental Impact Review Board.

Treaty 8 Tribal Association

Northeastern British Columbia

Researcher for a Traditional Knowledge, Use and Occupancy Study for the Proposed 'Site C' Area along the Peace River. The project involved work planning, gap analysis, methodology development, and leading field interviews using direct-to-digital mapping.

Mikisew Cree First Nation

Northern Alberta

Co-researcher for an Indigenous Knowledge study for assessing Shell-specific oil sands development projects near Fort McKay. The project involved work planning, gap analysis, methodology development, and leading and participating in field interviews using direct-to-digital mapping.

Athabasca Chipewyan First Nation and the Mikisew Cree First Nation

Northern Alberta

Co-researcher for the collection of traditional ecological knowledge data for the Athabasca River Use and Traditional Ecological Knowledge Study. The project involved interviews with community members and active land users, established methodologies, data analysis, and final reporting.

UNESCO-LINKS

New Zealand

Coordinated the Maori language version of the CD-ROM project, *The Canoe is the People*, entitled *He Waka He Tangata*. The goal of the CD-ROM is to revitalize the transmission of indigenous knowledge by strengthening the dialogue between elders and youth. New ICT tools like CD-ROMs are recognized as powerful vehicles for traditional knowledge and the bolstering of oral traditions. The CD-ROM includes 70 videos, 41 stories and accounts, 40 images and diagrams, of which 11 are animated, in addition to numerous maps, photos and texts.

Dene Tha' Nation

Alberta

Developed and implemented Traditional Use Study in two First Nations communities, Chateh and Meander River. Included developing research design, methodology, training community researchers, and reporting to the Steering Committee of the Dene Tha' Consultation Pilot Project.

Halfway River First Nation

British Columbia

Coordinated land use mapping and life history interviews with community researchers. Included training in qualitative methodologies and mapping processes.

Doig River First Nation

British Columbia

Coordinated land use mapping and life history interviews with community researchers. Included training in qualitative methodologies and mapping processes.

Tr'ondek Hwech'in First Nation

Yukon

Oral History Project (1999), focused on collecting life history interviews with elders, and stories of life in fish camps along the Yukon River.

Halfway River First Nation

British Columbia

Completed site reports for the Halfway River First Nation Traditional Use Study as a research assistant for Third Stone Community Research.

Project Experience – Health and Social

National Aboriginal Council of Midwives

Canada-wide

Assisted in the organization of the annual meeting, and wrote the annual report for the Council. Ongoing participation with the Council and continue to support through technical writing/proposal development as requested.

Norway House Cree Nation

Manitoba

On-going engagement with the community and local midwifery program. Designing and implementing a body mapping workshop with mother's focused on their childbirth experiences. Working collaboratively with the midwifery program and students on a broader project with regards to rural and remote maternity care.

Ktunaxa Nation

Southern British Columbia

Wrote the health and language section of "Section C: Ktunaxa Nation Use, Rights and Interests Assessment for Teck Coal's Line Creek Operations Phase II Project". The project involved interviews, data analysis and final reporting.

National Aboriginal Health Organization

Canada-wide

Celebrating Birth Series. Researched and wrote all papers and documents associated with the National Aboriginal Health Organization's series on maternal health.

Opaskwayak Cree Nation

Manitoba

Assisted in the conducting of interviews for a qualitative study on mother's experiences of childbirth from a northern Manitoban community. Part of the Strengthening Families: Maternal Child Health Program Evaluation program.

Red Road HIV/AIDS Network

British Columbia

Researcher for the "Mapping the Road to Healthier Communities" map directories of health services for the City of Vancouver and the Northern British Columbia region. Guest Editor for "Bloodlines" magazine. Continuing support in research and writing as requested.

Mother Saradadevi Social Service Society

Tamil Nadu, India

MSSSS is a grassroots NGO working with HIV/AIDS, both in prevention and care, in the Dindigul District of Tamil Nadu. Conducted a baseline survey of youth and sexual health issues to aid in the development and implementation of prevention programmes in the district.

Selected Publications

Olson, Rachel and Carol Griffin. (2012). An Evaluation of Midwifery Services in Manitoba. Midwives Association of Manitoba for Manitoba Health. Winnipeg, Manitoba.

Olson, Rachel and Carol Couchie. (2010). Clearing the Path: An Implementation Plan for Midwifery Services in First Nations and Inuit Communities. Ottawa: Government of Canada.

Olson, Rachel. (2010). Restoring the Connection: Exploring Aboriginal midwifery and the context of the relocation for childbirth and in First Nation communities in Canada. In, Reproduction, Migration, and Identity. Unnithan-Kumar, Maya, and Sunil Khana (eds). Forthcoming.

National Aboriginal Health Organization. (2009). Celebrating Birth- Aboriginal Midwifery in Canada. Ottawa: National Aboriginal Health Organization. [Primary Author]

National Aboriginal Health Organization. 2008. Celebrating Birth - Exploring the Role of Social Support in Labour and Delivery for First Nations Women and Families. Ottawa: National Aboriginal Health Organization. [Primary Author]

Olson, Rachel. (2008). Exploring the Potential Role of Doulas and Doula Training for the Children and Youth Division of First Nations and Inuit Health, Health Canada. Ottawa: Government of Canada. Internal circulation only.

Corbett J. M., Giacomo Rambaldi, Peter A. Kwaku Kyem, Daniel Weiner, Rachel Olson, Julius Muchemi and Robert Chambers (2006). Overview - Mapping for Change the emergence of a new practice." Participatory Learning and Action 54. 13-20.

Candler, Craig, Rachel Olson, Steven DeRoy, and Kieran Broderick. (2006). PGIS as a Sustained (and Sustainable?) Practice: The Case of Treaty 8 BC. Participatory Learning and Action 54.

Guest Editor. Participatory Learning and Action. Issue 54, April 2006. International Institute for Environment and Development. London, UK.

Guest Editor. Bloodlines Magazine. Issue 5: Spring 2005. Red Road HIV/AIDS Network Society. West Vancouver, BC.

Olson, Rachel. Contributor to Encyclopaedia of the Arctic. 2003. Ed. Mark Nutall. Fitzroy Dearborn, Routledge: New York, NY.

Conferences / Workshops

Paper presentation, Uncertainty and Disquiet: 12th European Association of Social Anthropologists Association. Paris, France, July, 2012.

Presenter, Workshop on Indigenous Mapping and Cartography. United Nations Educational, Scientific and Cultural Organization, Paris, France, November, 2007.

Keynote Presenter, Mapping for Change, September 7 – 11, 2005 in Nairobi, Kenya, Africa

Participant of Strategic Planning Sessions, ESRI International User Conference, July 2004 in San Diego, California

Paper presentation, Indigenous Communities Mapping Initiative Conference, March 10 – 15, 2004 in Vancouver, British Columbia

Paper presentation, Breaking the Ice: Transcending Borders through Collaboration and Interdisciplinary Research, 7th ACUNS Student Conference on Northern Studies, October 24-26, 2003 at the University of Alberta, Edmonton, Alberta

Other Information

Final Report: Musqueam Knowledge and Use Study for PMV's RBT2 Project

Member of the BC Aboriginal Perinatal Health Committee. Member of the Doula Training Committee.

Member of the Reading Panel for the 2004 Buffet Award for Indigenous Leadership in Portland, Oregon.

Proficient user of software applications such as Microsoft Office, Nvivo, and SPSS.

Completed the Labour Support Course – Training Doulas, held by the Doulas of North America. October, 2004.

Registered member of the Tr'ondek Hwech'in First Nation

