Socio-economic Baseline Report

LNG Canada Export Terminal

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LNG CANADA

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Mitsubishi Corporation

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EXECUTIVE SUMMARY

LNG Canada Development Inc. (LNG Canada) is proposing to construct and operate a liquefied natural gas (LNG) facility (including a LNG processing and storage site and marine terminal) in the District of Kitimat, British Columbia (BC), and to export LNG from the facility by shipping. This proposed project is called the LNG Canada Export Terminal (the Project).

This baseline socio-economic report presents background information, methods, and results for the baseline and potential-effects studies conducted for the Project.

Professional judgment of the study team and input from consultation with regulators, aboriginal groups, and the public guided the scope of the study. The study was initiated with a review of existing information. Field studies were then conducted to address the gap between existing information and that required to support the anticipated Environmental Assessment Certificate Application.

The current condition is described for the following valued components (VC): economic environment, infrastructure and services, community health and wellbeing and marine transportation and use. The baseline capacity of each VC is described and data were primarily obtained from statistical information and published reports, supplemented with non-structured interviews with representatives from appropriate government departments and agencies, and other organizations (e.g., service providers and business organizations), as well as through surveys (phone and written), focus groups and workshops. Socio-economic research related to Haisla Nation and Kitselas First Nation was undertaken with the assistance of community researchers. Traditional knowledge and use studies and other plans provided to LNG Canada through consultation were used to inform the understanding of Aboriginal interests and knowledge with respect to each of the described VCs. The baseline findings of each of the VC sections (Section 3.1-.4) are further used to inform the assessment of potential effects as defined by the Application Information Requirements (AIR) for LNG Canada's Environmental Assessment Permitting Application.

The principal sources of statistical data for the economic environment and infrastructure and services were BC Stats, Statistics Canada (Census 2006, Census 2011 and National Household Survey 2011), the BC Ministry of Finance, Canada Mortgage and Housing Corporation (historical spring and fall market rental surveys), BC Northern Real Estate Board News Releases, traffic data from the Insurance Corporation of British Columbia (ICBC) and Ministry of Transportation and Infrastructure (MOTI) and relevant provincial, regional and local planning acts and policies.

Methods undertaken for the economic environment included a cost of living analysis, a labour force analysis and a Survey of Local Business and Economic Development (Appendix D). The BC Cost of Living Calculator (developed by the Economic Research Institute, of Redmond, Washington) was used to

compare the cost of living in Kitimat and Terrace and other communities in northern BC that have experienced resource development (e.g. Dawson Creek, Fort St. John and Prince George). Results of the cost of living calculator indicate that housing costs appear to be the primary cause of cost of living differences between these communities. The labour force analysis included an assessment of the labour force activity, skills levels, the overall availability and potential demand for labour in BC's northwest communities. Findings from the labour force analysis suggest that there is a shortage of skilled workers in northern BC to meet the labour demand expected with the growth of the province's natural gas industry. A telephone Survey of Local Business and Economic Development (Appendix D) was conducted for Kitimat and Terrace from February 17 to March 3 2014 using a semi-structured questionnaire. Findings of the survey indicate that worker recruitment and retention challenges are one of the main adverse effects of recent economic development, and wage increases are identified as an effect of recent economic development.

The primary research methods used for infrastructure and services included key informant interviews (in-person and by telephone), focus groups and workshops, and surveys. A short field program was undertaken to obtain information about crossing frequency and delay times at road-rail intersections. Secondary research methods included a capacity assessment based on local and provincial standards or with the application of quantitative capacity indicators (e.g., student-educator ratios, police officers per 1,000 residents, sewer and wastewater capacity analysis), traffic and transportation analysis on roads and intersections between Kitimat and Terrace, in addition to an assessment of housing availability and affordability using indicators such as STIR (salary-to-income ratio) and core housing need standards. Baseline findings indicate that community services (fire, police, and ambulance) are under pressure from related economic development, daycare providers are at capacity, and there is a moderate level of landfill capacity and capacity for water and sewer infrastructure. Traffic count data indicate that highways in the study area currently operate well below capacity and at a high level of service; however, issues regarding the capacity of the Haisla Bridge are identified. Airport passenger data indicate major increases in airport passenger traffic and issues and concerns around drugs and alcohol use. Housing indicators reflect a need for additional housing and that single and female lone parent families are at major risk of housing unaffordability. Aboriginal communities are experiencing overcrowding and couch-surfing issues; risk of homelessness, shelter and transition houses are at or over capacity and local residents are experiencing occurrences of 'reconviction', with landlords renovating apartments/houses and upping the rent for resource staff.

Data for community health and wellbeing were primarily obtained through a sub-consulting report commissioned by LNG Canada and written by Habitat Health Consulting. Primary data were collected through interviews and engagement with key informants, stakeholders, and community members. A Survey of Kitselas Traditional Foods (Appendix E) provided further baseline information. A review of

traditional use studies and secondary sources were used to identify issues of importance to Aboriginal Groups. A review of issue-specific studies and reports produced by governments, industry groups, and non-governmental organizations were also included. BC Stats provided information on income, education, crime rates, and children and at-risk youth, all used as social determinants of health. These quantitative and qualitative indicators of health were organized into four categories: health care and infrastructure services; physical and mental health outcomes; community cohesion and resilience; factors affecting families; and diet and nutrition.

Baseline information for marine transportation and use was obtained from publicly-available information, through consultation with stakeholders and First Nation groups, and from primary research. These sources include Department of Fisheries and Oceans' (DFO) Integrated Management Plans and statistical reports, strategic marine planning resources, three fisheries workshops (one held in Kitimat and two in Prince Rupert), and fisheries workshops with two different Aboriginal Groups (Kitselas First Nation, and Metklakatla First Nation), one-on-one interviews with recreational and commercial fishers, vessel surveys along the marine access route, a Survey of Recreation and Tourism Use (Appendix F) with eco-tourism operators, and vessel and shipping data from: Canadian Coast Guard Marine Communications and Traffic Services', Pacific Pilotage Authority (PPA), District of Kitimat, Cruise Lines International Association (CLIA), and the BC Ferries schedule of crossings, plus four types of DFO fisheries data for the period 2000 to 2012 on fisheries management areas (FMA) 4, 5, and 6.

Findings from DFO data and related marine planning reports on shipping indicate that an average of over 21,000 vessels move throughout the Prince Rupert traffic zone (Marine Communications and Traffic Services (MCTS data) and that, between 1978 and 2013, the average number of vessels to visit the Port of Kitimat was 203 commercial vessel visits per year, with a maximum total number of visits of approximately 280 vessels per year which occurred in the early 1990s (combined data District of Kitimat and Pacific Pilotage Authority). From the fisheries workshops and one-on-one interviews, it was identified that the majority of fishers fish in Devastation Channel and away from marine access route. Vessel surveys were conducted along the marine access route to characterize the use of the marine access route. Findings of the surveys were used to estimate the number of interactions between project-related vessels and other commercial and recreational vessels, and filled an an important information gap as smaller vessels (i.e., less than 30 m) are not reliably captured in other data sets. A Survey of Recreation and Tourism Use (Appendix F) contributed pertinent information regarding recreation and tourist business operators. Findings revealed that most tourists going to Kitimat go for fishing and outdoor wilderness experiences, and that the average cost per person for ecotourism is $750.00. A GIS analysis indicates the proportional change in the navigable channel occupied by the marine terminal. BC Marine Conservation Analysis (BCMCA) and DFO data support the determination of any overlap between the marine access route and fishing activities.

ACRONYMS AND ABBREVIATIONS

Alcan	Aluminum Company of Canada
BC	British Columbia
bcf/d	billion standard cubic feet per day
CDC	Conservation Data Centre
DFO	Fisheries and Oceans Canada
DWT	Dead Weight Tonnage
EA	environmental assessment
LNG	liquefied natural gas
LNG Canada	LNG Canada Development Inc.
LSA	local study area
PNCIMA	Pacific North Coast Integrated Management Area
Project	LNG Canada Export Terminal
RSA	regional study area
RTA	Rio Tinto Alcan

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1 INTRODUCTION

LNG Canada Development Inc. (LNG Canada) is proposing to construct and operate a liquefied natural gas (LNG) facility (including a LNG processing and storage site and marine terminal) in the District of Kitimat, British Columbia (BC), and to export LNG from the facility by shipping. This proposed project is called the LNG Canada Export Terminal (the Project).

This socio-economic baseline report presents background information, methods, and results for the baseline and potential effects studies conducted for the Project for the following valued components (VCs): economic conditions, infrastructure and services, community health and wellbeing, and marine transportation and use.

Professional judgment of the study team and input from consultation with regulators, Aboriginal Groups, and the public guided the scope of this baseline report, which was initiated with a review of existing information. Field studies were then conducted to address the gap between existing information and that required to support the Environmental Assessment Certificate Application.

1.1 Economic Conditions

The economic environment describes:

- current economic conditions, including existing businesses and industry
- key economic indicators and trends based on statistical data (Census Canada, BC Stats), and other published and non-published reports
- labour market, including employment/unemployment, current employers, available labour supply, and level of education/skills/training of the labour force, based on data from Census Canada, BC Stats, and Service Canada, *Northwest Regional Workforce Table Regional Skills Training Plan* (Ingenia Consulting 2013) and *Labour Market Supply Side Scan for BC's Natural Gas Sector* (Ingenia Consulting 2012), as well as primary information sources; and
- the supply of goods and services in the region based on information from the local government and chamber of commerce, other published and non-published data, and primary information sources.

1.2 Infrastructure and Services

Baseline data included in infrastructure and services describe prevailing conditions and trends affecting such conditions. This information characterizes baselines conditions and, where possible, the capacity of socio-economic indicators related to demographics, official community plans, regional governance, community services, land-based emergency services, sewage and water treatment facilities, garbage collection and disposal and recycling facilities, energy and utilities, communications infrastructure, land-based recreational resources, transportation infrastructure (including a description of the existing road network and other transportation modes used in the local study area [LSA]), and housing accommodations (including the availability, affordability, and demand for government-assisted housing).

1.3 Community Health and Wellbeing

The community health and wellbeing section includes information on local health services and infrastructure, community health determinants/indicators, statistical indicators of dysfunctional families and weakness in community controls, and health data such as birth and death rates, disease incidence, and accident rates. Most of the information is sourced from a sub-consulting report commissioned by LNG Canada and written by Habitat Health Consulting. Primary data were collected through interviews and engagement with key informants, stakeholders, and community members. A review of traditional use studies and secondary sources were used to identify issues of importance to Aboriginal Groups. A review of issue-specific studies and reports produced by governments, industry groups, and non-governmental organizations was also included. BC Stats provided information on income, education, crime rates, and children and at-risk youth, all used as social determinants of health. These quantitative and qualitative indicators of health were organized into five categories: health care and infrastructure services; physical and mental health outcomes; community cohesion and resilience; factors affecting families; and diet and nutrition.

1.4 Marine Transportation and Use

The marine transportation and use section of the report describes the approach and methods used to collect baseline marine traffic and resource use information, and identifies the sources of this information. Baseline conditions are characterized from primary and secondary data including:

- planning initiatives: Pacific North Coast Integrated Management Area and the Marine Planning Partnership for the North Pacific Coast
- Fisheries and Oceans Canada (DFO) statistical data and reports on commercial, recreational, and Aboriginal fisheries
- geospatial data related to commercial, recreational, and Aboriginal fisheries available from DFO and BC Marine Conservation Analysis
- observation data on marine users in the LSA and RSA based on field studies
- data and reports on recreational and tourism activities
- consulting reports on marine use and navigation prepared for previous projects, including the Kitimat LNG project and the Northern Gateway project
- marine traffic information provided by the Canadian Coast Guard Marine Communications and Traffic Services
- data from the Pacific Pilotage Authority, and
- information interviews with Aboriginal Groups and members of the marine community.

2 STUDY AREAS

2.1 Economic Conditions

2.1.1 Local Study Area

The LSA for this baseline overview encompasses the communities that will potentially experience economic effects related to Project requirements for labour, goods, and services: Kitamaat Village, Kitimat District Municipality, Terrace Census Agglomeration Area (this includes: the City of Terrace, Kitimat-Stikine E [Thornhill], and the Kulpsai Indian Reserve [IR] 6), Kitselas, Kitsumkalum, Prince Rupert, Port Edward, Kitkatla, Hartley Bay, Metlakatla, and Lax Kw'alaams (Appendix A, Figure A-1).

2.1.2 Labour Regional Study Area

The regional study area (RSA) for this baseline overview encompasses the Regional District of Kitimat-Stikine (RDKS) and the Skeena-Queen Charlotte Regional District (SQCRD) (including only the Regional District Areas (RDA) A and C) (Appendix A, Figure A-1).

2.2 Infrastructure and Services

2.2.1 Local Study Area

The LSA for this baseline overview encompasses the following communities and rural areas: Kitamaat Village (Kitamaat 2 Indian Reserve), Kitsumkalum, Kitselas, Kitimat District Municipality, and the Terrace Census Agglomeration area (which includes the City of Terrace, Kitimat-Stikine E [Thornhill], and the Kulpsai Indian Reserve 6) (Appendix A, Figure A-2). This area encompasses the potential effects of the LNG facility and associated activities, as well as demands on transportation and utility infrastructure between the City of Terrace and District of Kitimat, and the Northwest Regional Airport.

2.2.2 Regional Study Area

The RSA for this baseline overview encompasses the RDKS, Regional District Electoral Areas [RDEA] C (Part 1 and 2) and E, and the SQCRD RDEAs A and C (Appendix A, Figure A-2). Since the RSA encompasses all of the LSA, it includes the transportation and utility infrastructure between the City of Terrace and District of Kitimat, as well as the Northwest Regional Airport.

2.3 Community Health and Wellbeing

2.3.1 Local Study Area

The LSA for this baseline overview encompasses the communities in the Northwest Health Service Delivery Area (NWHSDA) of Northern Health with the greatest potential to experience direct community health effects as a result of the Project: communities in the Greater Kitimat and Greater Terrace areas, Haisla Nation, Kitselas First Nation and Kitsumkalum First Nation (Appendix A, Figure A-3).

The LSA for diet and nutrition encompasses the Kitimat District Municipality, the Terrace Census Agglomeration (the City of Terrace, Kitimat-Stikine E, Thornhill, and Kulsai Indian Reserve 6), Kitamaat Village, Kitselas First Nation, Kitsumkalum First Nation, Hartley Bay, Kitkatla First Nation, Lax Kw'alaams First Nation, and Metlakatla First Nation. The City of Prince Rupert and the District of Port Edward are excluded from the LSA for diet and nutrition because the potential for these communities to experience adverse effects on diet and nutrition as a result of the Project is negligible (Appendix A, Figure A-3).

2.3.2 Regional Study Area

The RSA encompasses the communities in the Kitimat Local Health Area (LHA), the Terrace LHA and the Prince Rupert LHA of the NWHSDA (Appendix A, Figure A-3).

2.4 Marine Transportation and Use

2.4.1 Local Study Area

The LSA encompasses waters surrounding the marine terminal where interference with navigation could occur, plus the confined channels along the marine access route and waters extending 6 km on both sides of the marine access route between Browning Entrance and the Triple Island pilotage station (Appendix A, Figure A-4).

2.4.2 Regional Study Area

The RSA encompasses the extent of Project marine shipping within the confined channels (e.g., Kitimat Arm, Douglas Channel, Principe Channel) and waters to the pilot station area near Triple Island in the north; and where the access route is not confined by geography, a buffer of approximately 10 km is used on both sides of the marine access route (Appendix A, Figure A-4).

2.4.3 Administrative Areas

All marine fisheries are managed by Fisheries and Oceans Canada (DFO). Fisheries management areas (FMAs) are spatially defined units used by DFO to delineate the management boundaries by which a fishery, defined by the target species and gear type used, are managed. The marine transportation and use RSA overlaps with FMAs 4, 5, and 6:

- FMA 4 extends to the top of the BC-Alaska border and south to Porcher Island.
- FMA 5 continues from FMA 4 and includes the inside passage (down to Wright Sound), Principe Channel (down to Otter Channel), and the nearshore areas off Banks Island (down to the southern edge of Banks Island).
- FMA 6 encompasses all of Douglas, Devastation, Whale, and Squally Channels, and Wright and Caamaño Sounds.

2.4.4 Other Areas

In addition to the study areas, the following descriptive areas are used:

- The shipping corridor is 2 km wide, extending 1 km from each side of the centre line of the marine access route. In confined waters where the width of the channel is less than 2 km, the shipping corridor is taken to be the entire width of the channel.
- The marine terminal includes the area for construction of the marine terminal and waters immediately surrounding the marine terminal (Appendix A, Figure A-5).
- The safety zone is an area extending 300 m around each berth of the marine terminal to satisfy the minimum requirements of the Canadian Standards Association (CSA) as a result of loading LNG (Appendix A, Figure A-6). During transit, LNG carriers will operate with an approximately 200 m safe shipping zone.

3 BASELINE CONDITIONS

3.1 Economy

3.1.1 Methods

3.1.1.1 Desktop Research

Information on baseline economic conditions in the LSA was obtained primarily from census and national household (NHS) data and published reports. Principal sources of statistical data included BC Stats, Statistics Canada (Census 2006, Census 2011 and National Household Survey [NHS] 2011, including Aboriginal Population Profiles), Aboriginal Affairs and Northern Development Canada (AANDC) Indian Register data, and the BC Ministry of Finance.

Labour force information specific to the LNG industry in BC was collected from several reports, including

- Labour Market Supply Side Environmental Scan – BC's Natural Gas Sector (Ingenia Consulting 2012)
- Labour Demand Outlook for BC's Natural Gas Industry (Petroleum Human Resources Council of Canada 2013)
- BC Natural Gas Workforce Strategy and Action Plan (BC Natural Gas Workforce Strategy Committee 2013).
- Northwest Regional Workforce Table Regional Skills Training Plan 2013–2018 (NWRWT 2013)
- BC Skills for Jobs Blueprint: Re-engineering Education and Training (Province of BC 2014)

Secondary baseline data sources for economic conditions are summarized in Table 3.1-1.

Table 3.1-1: Economic Conditions Desktop Research

Economic Conditions Baseline	
Component	**Data and Approach**
Local and Regional Labour Force Statistics	▪ Census and NHS data, BC Stats current and forecast population estimates ▪ Data from regional districts ▪ Aboriginal Affairs and Northern Development Canada (AANDC) Indian Register data
LNG Sector Labour Supply and Demand	▪ Provincial and regional government data sources ▪ Economic development plans, labour force skills training plans (Ingenia Consulting 2012; Petroleum Human Resources Council of Canada 2013)
Labour Force Skills Training	▪ Provincial and regional skills training plans (BC Natural Gas Workforce Strategy Committee 2013, NWRWT 2013)

Economic Conditions Baseline	
Component	**Data and Approach**
Economic development	▪ Provincial, regional, and municipal planning documents and industry profiles ▪ BC Major Project Inventory
Housing and Accommodation	▪ Census, NHS and BC Stats (housing starts, value and units) ▪ BC Housing, and Canada Mortgage and Housing Corporation (CHMC) data (spring and fall surveys, Housing in Canada Online 2014) ▪ BC Northern Real Estate Board News Releases 2005-2013 ▪ Local area community and development plans
Recreation and Tourism	▪ Local community planning documents

3.1.1.2 Primary Research

3.1.1.2.1 Information Interviews

Non-structured interviews with representatives from appropriate government departments and agencies (e.g., service providers and business organizations), and other organizations supplemented baseline information and were used to confirm economic statistics data and identify data gaps. Information on economic development and cost of living, including housing and accommodations prices was collected through interviews with representatives of Kitselas First Nation, the District of Kitimat municipal government, the Kitimat and Terrace Chamber of Commerce and the Terrace Economic Development Association (TEDA) (further detailed in Table 3.3-1).

3.1.1.2.2 Survey of Local Business and Economic Development

A survey on economic development and effects on local business for the Kitimat and Terrace area was conducted via a telephone from February 17th to March 3rd 2014 using a semi-structured questionnaire (QRG Inc. 2014 [Appendix D]). The research study aimed at gaining a better understanding of the extent to which resource development projects have had adverse effects on local business operations and activities in the area. In total, 473 businesses were selected for the sample frame (based on the businesses acquired from the local Chamber of Commerce), of which 50 businesses were sampled. A total of 20 questions were asked to the respondents and the interview length was approximately 15 minutes. Findings of the survey are identified in Section 3.1.2., and summarized in Appendix D.

3.1.1.2.3 Survey of Recreation and Tourism Use

Telephone surveys were completed to gather information related to recreation and tourism. This survey was used to collect baseline information for marine transportation and use and economic conditions. It was conducted with 20 local recreation and tourism business operators using a semi-structured questionnaire. The topic areas were divided into five sections, which ranged from basic demographics to

business location, types of services, gross year revenue and the respondents thoughts about increases in local shipping traffic and impacts on their business operations. Further details on survey methods are provided in Section 3.4.1.2.4 and Appendix F.

3.1.1.2.4 Cost of Living Analysis

The BC Cost of Living Calculator was used to compare the cost of living in Kitimat, Terrace and Prince Rupert and other communities in northern BC that have experienced resource development (e.g. Dawson Creek, Fort St. John and Prince George). The BC Cost of Living Calculator estimates household cost based on the expenses: consumables, transportation, healthcare, housing and taxes. It allows for comparison of expenses versus income in different communities for a range of user-defined scenarios, based on parameters such as family size, home ownership, and mode of transportation. For the purposes of this comparison, the scenario used was a family of four with a total income of $75,000 per year, including the following characteristics:

- home size: 2,000 sq. ft (average house)
- rent or own: own
- down payment: 20%
- number of adults: 2
- second income: 0
- dependent children under 18: 1
- type of transportation: car
- how many cars: 1
- travel km/day: 28 km
- other family expenses: 0

To compare expenses for a range of incomes, data for this scenario was also collected assuming total household income of $100,000 and $150,000.

3.1.1.2.5 Labour Force Analysis

The labour force analysis consisted of a review of recent community and regional reports from government agencies, community profiles produced by municipalities, community and regional websites, and various socio-economic community profiles e.g., Northwest Regional Workforce Table Regional Skills Training Plan (Ingenia Consulting 2013) and Labour Market Supply Side Scan for BC's Natural Gas Sector (Ingenia Consulting 2012). This information was then compared to local demographic characteristics on workforce statistics (from BC Stats 2011 and Statistics Canada 2011) to help determine the availability and potential need for skilled labour.

3.1.2 Results

3.1.2.1 Labour Availability

3.1.2.1.1 Labour Force Activity

In 2011, there were 30,665 people aged 15 years and older living in the LSA. The total labour force in the LSA was 19,695. At 64.2%, the local participation rate was comparable to the provincial rate (64.6%). In the RSA, there were 44,670 people aged 15 and older. With a participation rate of 62.4%, the total regional labour force was 27,870 people. The unemployment rate was higher in the LSA (11.6%) and the RSA (13.4%) than in BC as a whole (7.8%). In the LSA, there was considerable variation in participation and unemployment rates, especially between Aboriginal and non-Aboriginal communities (Table 3.1-2).

Table 3.1-2: Labour Force Activity, LSA and RSA, 2011

Location	Population Aged 15+	Participation Rate (%)	Labour Force	Employed	Unemployed	Unemployment Rate (%)
BC	3,646,840	64.6	2,345,245	2,171,465	182,775	7.8
LSA						
Kitamaat 2 IR (Kitamaat Village)	420	47.6	200	135	60	30
Kitselas I IR (Kitselas)	155	45.2	70	50	25	35.7
Kulspai 6 IR (Kitselas)	60	50	30	25	10	33.3
Kitsumkaylum 1 IR (Kitsumkalum)	NA	NA	NA	NA	NA	NA
Kulkayu 4 IR (Hartley Bay)	NA	NA	NA	NA	NA	NA
Lax Kw'alaams 1 IR	NA	NA	NA	NA	NA	NA
Dolphin Island 1 IR (Kitkatla)	335	35.8	120	75	45	37.5
s1/2 Tsimpsean 2 IR (Metlakatla)	NA	NA	NA	NA	NA	NA
Kitimat DM	6,965	61.3	4,270	3,765	505	11.8
Terrace CA	12,320	66.1	8,145	7,495	650	8
Port Edward	NA	NA	NA	NA	NA	NA
Prince Rupert CA	10,410	65.9	6,860	5,865	995	14.5
LSA Total	**30,665**	**64.2**	**19,695**	**17,410**	**2,290**	**11.6**

Location	Population Aged 15+	Participation Rate (%)	Labour Force	Employed	Unemployed	Unemployment Rate (%)
RSA						
RDKS	29,795	62.2	18,530	16,135	2,395	12.9
SQCRD	14,875	62.8	9,340	8,010	1,330	14.2
RSA Total	**44,670**	**62.4**	**27,870**	**24,145**	**3,725**	**13.4**

NOTES:
NA – data not available
SOURCE: Statistics Canada (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i)

The Terrace CA had the largest labour force (8,145) among communities in the LSA in 2011. The remainder of the local labour force mainly included individuals living in the Kitimat DM and Prince Rupert CA. The total labour force of the RSA had a larger percentage of people living in the RDKS (62.0%) compared to the SQCRD (38.0%).

Aboriginal labour force information for the LSA and RSA is summarized in Table 3.1-3. The percentage of the Aboriginal population in the LSA that participated in the workforce (59.5%) was lower than the LSA as a whole (64.2%). The total Aboriginal population aged 15 and older for the RSA was 15,245 people, of whom 7,575 were residents of communities in the LSA. The Aboriginal labour force in both the LSA and RSA had much higher unemployment rates than the total labour force figures. Dolphin Island IR 1 (Kitkatla) had the highest unemployment rate among communities in the LSA (30.1%). The unemployment rate for Aboriginal workers was 24.3% in the LSA and 25.7% in the RSA.

2011 labour force activity in the LSA and RSA is shown by gender in Table 3.1-4. The male participation rate in the LSA was lower than that for the province, while female participation in the local labour force was higher than the provincial rate. The RSA had lower participation rates for both males and females than the local and provincial rates. In the LSA, the labour force was composed of 52% male workers and 48% female workers. The male unemployment rate in the LSA (12.7%) was higher than the female unemployment rate (10.4%), with both rates being higher than unemployment rates by gender for the province overall. Male unemployment in the RSA was 15.3% and female unemployment was 11.3%.

Table 3.1-3: Aboriginal Labour Force Activity in 2011, LSA and RSA

Location	Population Aged 15+	Participation Rate (%)	Labour Force	Employed	Unemployed	Unemployment Rate (%)
LSA						
Kitamaat 2, (Haisla/Kitamaat Village)	415	47	195	135	55	28.2
Kitselas I IR (Kitselas/Gitause)	205	48.8	100	70	30	30
Kulspai 6 (Kitselas/Kulspai)	60	50	30	25	10	33.3
Kitsumkaylum 1 IR (Kitsumkalum/Kalum)	NA	NA	NA	NA	NA	NA
Kulkayu 4 IR (Gitga'at/Hartley Bay)	NA	NA	NA	NA	NA	NA
Lax Kw'alaams 1 IR (Lax Kw'alaams/Port Simpson)	NA	NA	NA	NA	NA	NA
Dolphin Island 1 IR (Gitxaala/Kitkatla)	330	34.8	115	70	45	39.1
s1/2 Tsimpsean 2 IR (Metlakatla/Metlaktla Village)	NA	NA	NA	NA	NA	NA
Kitimat DM	610	65.6	400	270	125	31.2
Terrace CA	2,205	66.4	1,465	1,170	305	20.8
Port Edward	NA	NA	NA	NA	NA	NA
Prince Rupert CA	3,750	58.7	2,200	1,675	525	23.9
LSA Total	**7,575**	**59.5**	**4,505**	**3,415**	**1,095**	**24.3**
RSA						
RDKS	9,200	56.7	5,220	3,775	1,445	27.7
SQCRD	6,045	52.9	3,200	2,480	720	22.5
RSA Total	**15,245**	**55.2**	**8,420**	**6,255**	**2,165**	**25.7**

NOTES:
NA – data not available
SOURCE: Statistics Canada (2013j, 2013k, 2013l, 2013m, 2013n, 2013o, 2013p, 2013q)

Table 3.1-4: Labour Force Activity by Gender, LSA and RSA for 2011

Location	Population Aged 15+		Participation Rate (%)		Labour Force		Unemployed		Unemployment Rate (%)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
BC	1,755,440	1,871,395	68.9	60.4	1,223,375	1,130,870	98,785	83,990	8.1	7.4
LSA Total	15,285	15,365	66.9	61.7	10,220	9,480	1,297	985	12.7	10.4
RSA Total	22,700	21,965	64.5	60.1	14,650	13,205	2,240	1,490	15.3	11.3

NOTES:
LSA totals for population and labour force are lower than actual totals because data for some communities are suppressed by Statistics Canada.
SOURCE: Statistics Canada (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i)

Aboriginal labour force participation rates for males and females in the LSA and RSA were lower than the provincial participation rates by gender in 2011 (Table 3.1-5). For the Aboriginal labour force in the LSA, the male unemployment rate was 28.5% and the female unemployment rate was 19.1%. For the RSA, unemployment rates were 30.7%_for males and 20.0% for females.

Table 3.1-5: Aboriginal Labour Force Activity by Gender, LSA and RSA for 2011

Location	Population Aged 15+		Participation Rate (%)		Labour Force		Unemployed		Unemployment Rate (%)	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
BC	81,770	89,840	65.3	59.7	53,405	53,635	10,005	7,500	18.7	14
LSA Total	3,495	3,820	63.8	56.2	2,230	2,145	635	410	28.5	19.1
RSA Total	7,755	7,495	58.0	52.3	4,495	3,920	1,380	785	30.7	20.0

NOTES:
LSA totals for population and labour force are lower than actual totals because data for some communities are suppressed by Statistics Canada.
SOURCE: Statistics Canada (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i)

Changes in the labour force for the LSA and RSA between 2006 and 2011 are shown in Table 3.1-6. The labour force in both the LSA and RSA decreased by 11.1% locally and 11.5% regionally. The overall unemployment rate in the LSA decreased slightly, from 11.7% to 11.6%. Among communities in the LSA, the Kitimat District Municipality had the largest increase in unemployment, with the unemployment rate rising from 9.5% to 11.8%. Unemployment in the Terrace CA, however, dropped from 10.6% to 8.0%. Regionally, unemployment decreased slightly, from 14.4% to 14.0%.

Table 3.1-6: Changes in Labour Force Activity, LSA and RSA

Location	Labour Force			Unemployed			Unemployment Rate	
	2006	2011	Change (%)	2006	2011	Change (%)	2006	2011
Kitamaat 2 IR (Kitamaat Village)	NA	200	NA	NA	60	NA	NA	30
Kitselas I IR (Kitselas)	NA	70	NA	NA	25	NA	NA	35.7
Kulspai 6 IR (Kitselas)	20	30	33.3	10	10	0	25	33.3
Kitsumkaylum 1 IR (Kitsumkalum)	125	NA	NA	35	NA	NA	40	NA
Kulkayu 4 IR (Hartley Bay)	55	NA	NA	10	NA	NA	18.2	NA
Lax Kw'alaams 1 IR (Lax Kw'alaams)	NA	NA	NA	NA	NA	NA	NA	NA
Dolphin Island 1 IR (Kitkatla)	120	120	0	75	45	40	62.5	37.5
s1/2 Tsimpsean 2 IR (Metlakatla)	55	NA	NA	25	NA	NA	45.5	NA
Kitimat DM	4,740	4,270	-9.9	450	505	12.2	9.5	11.8
Terrace CA	9,805	8,145	-16.9	1,040	650	-1.8	10.6	8
Port Edward	NA	NA	NA	NA	NA	NA	NA	NA
Prince Rupert CA	7,230	6,860	-5.1	950	995	4.7	13.1	14.5
LSA Total	**22,150**	**19,695**	**-11.1**	**2,595**	**2290**	**-11.0**	**11.7**	**11.6**
RDKS	19,340	18,530	-4.2	2,735	2,395	-12.4	14.1	12.9
SQCRD	10,665	8,010	-24.9	1,600	1,330	-16.9	15	14.2
RSA Total	**30,005**	**26,540**	**-11.5**	**4,335**	**3,725**	**-14.1**	**14.4**	**14.0**

NOTES:
NA – data not available
SOURCE: Statistics Canada (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i); Statistics Canada (2007a, 2007b, 2007c, 2007d, 2007e, 2007f, 2007g, 2007h, 2007i, 2007j).

In a S urvey of Local Business and Economic Development in the Kitimat-Terrace area (QRG 2014 [Appendix D]), worker recruitment and retention challenges were identified as one of the main adverse effects of recent economic development. Sixty-two percent of those surveyed indicated that it had become more difficult to hire staff for local businesses over the past several years. Wage increases were also identified as an effect of recent economic development, with 78% of the survey respondents indicating that their company has had to increase employee wages between 10% to 20% from 2011 to 2013.

There is a shortage of skilled workers in northern BC to meet the labour demand expected with the growth of the province's natural gas industry (BC Natural Gas Workforce Strategy Committee 2013; Ingenia Consulting 2012; Petroleum Human Resources Council of Canada 2013). Assuming a

development scenario in which five LNG projects are constructed by 2021, Thornton (2013) estimates that LNG project construction will generate 102,500 direct full-time equivalent (FTE) jobs, 198,700 indirect FTE jobs and 53,000 induced FTE jobs in BC. In this scenario, peak cumulative construction employment will occur in 2016, when total direct, indirect, and induced FTE jobs will reach almost 75,000. Of this peak total, 21,600 FTE jobs are estimated to be directly involved in the building of LNG export facilities and associated pipelines.

The Northwest Regional Workforce Table reports estimates for job creation in northwest BC (i.e., the North Coast and Nechako economic regions) during the 2010 to 2020 period. Conservative estimates suggest that the region will gain up to 6,000 jobs during this time. Optimistic estimates—assuming increased investment in mining, LNG projects, and pipelines—indicate 13,000 jobs created in the region during the same period (NWRWT 2012). Even in the conservative development scenario, it is expected that job growth will outpace labour supply in northwest BC. A labour supply shortfall (trades, labourers, semi-skilled workers, truck and equipment operators, manager and supervisors, and technologists and technicians) is expected to occur as early as 2013 (NWRWT 2012).

Assuming three LNG facilities are operational in BC by 2020, labour demand estimates prepared for the Natural Gas Workforce Committee indicate that the related construction workforce will peak at approximately 10,000 workers in 2016–2017 (Ingenia Consulting 2012). Skilled trades workers are expected to account for the greatest portion (43%) of this peak workforce, followed by trades helpers and labourers (38%). Based on the existing labour availability and skill levels in northern BC, labour supply shortfalls are expected for both construction and operations related positions. The Natural Gas Workforce Committee provides recommended strategies to address these shortfalls, including collaborative efforts by the natural gas industry working with governments, educational institutions, and under-represented groups (Ingenia Consulting 2012).

3.1.2.2 Labour Force Skill Levels

3.1.2.2.1 Educational Attainment

The highest level of education for people aged 25 to 64 years for 2011 is summarized in Table 3.1-7 for the LSA and the RSA. For the LSA, 20.6% of people in this age category had not completed high school. This compared to 21.0% for the RSA and 16.6% for the province overall. Aboriginal communities had higher percentages of people who had not completed high school than the other communities in the LSA. For example, the majority of people (70.1%) in this age group living in Kitkatla (Dolphin Island 1 IR) had not completed high school or any post-graduate education.

The LSA and RSA had comparable percentages of residents who had attained an apprenticeship or trades certificate or diploma (15.2% and 14.5%). The Prince Rupert CA had the highest percentage of

university graduates (16.8%). From Statistics Canada data none of the Aboriginal communities had any university graduates, with higher percentages of people who had completed apprenticeship or trades certificates compared to other communities in the LSA (e.g., the reserves of Kitselas and Kitamaat Village).

Table 3.1-7: Highest Level of Educational Attainment in 2011, Population Aged 25–64

Location	No Certificate, Diploma or Degree (%)	High School Diploma or Equivalent (%)	Apprenticeship or Trades Certificate or Diploma (%)	College or other non-University Certificate or Diploma (%)	University Certificate or Diploma Below Bachelor Level (%)	University Certificate, Diploma or Degree at Bachelor Level or Above (%)
Kitamaat 2, (Kitamaat Village)	37.1	23.4	19.5	17.6	3.9	0
Kitselas I IR (Kitselas)	38.1	19.0	19.0	19.0	0	0
Kulspai 6 (Kitselas)	37.5	25.0	25.0	0	0	0
Kitsumkaylum 1 IR (Kitsumkalum)	NA	NA	NA	NA	NA	NA
Kulkayu 4 IR (Hartley Bay)	NA	NA	NA	NA	NA	NA
Lax Kw'alaams 1 IR	NA	NA	NA	NA	NA	NA
Dolphin Island 1 IR (Kitkatla)	70.1	20.9	3.0	4.5	0	0
s1/2 Tsimpsean 2 IR (Metlakatla)	NA	NA	NA	NA	NA	NA
Kitimat DM	17.3	30.7	17.2	19.1	2.8	12.8
Terrace CA	16.0	26.2	15.2	23.9	4.2	14.6
Port Edward	NA	NA	NA	NA	NA	NA
Prince Rupert CA	20.7	27.3	12.7	17.0	5.7	16.8
LSA Total	**20.6**	**28.5**	**15.2**	**17.5**	**4.1**	**14.2**
RDKS	20.1	27.1	15.4	20.2	3.7	13.7
SQCRD	22.9	26.5	12.9	16.1	4.9	16.7
RSA Total	**21.0**	**26.9**	**14.5**	**18.8**	**4.1**	**14.7**

NOTES:
NA – data not available
SOURCE: Statistics Canada (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i)

Higher education and skills training programs are offered to residents of the LSA and RSA through post-secondary institutions (e.g. University of Northern British Columbia [UNBC] – Northwest Campus, Northwest Community College [NWCC]) and skills training centres (e.g. Kitimat Valley Institute {KVI], Northcoast Distance Education School [NDES]), and the Piping Industry of College of BC [PIC]), in-addition to local workplace and skills training programs offered through government and community led organizations. These institutions provide academic and professional training programs, as well as industry-specific training in trades, workplace skills (e.g. environmental sampling, monitoring and reporting) and safety.

Enrolment rates at UNBC and NWCC were both below their target for 2013/2014. In 2013/2014 UNBC enrolment rates were 16% below of 3,455 Full-time Equivalent (FTE) students, and NWCC enrolment rates were 41% below the target of 1,696 FTE students (Table 3.1-8) (Ministry of Advanced Education 2014a, 2014b). Demand for industry-specific skills training dramatically increased in 2013 as a result of the RTA facility KMP (Pope 2013. pers. comm.; Hammi 2014. pers. comm.). However, local skills-training institutions, such as KVI has been able to respond industry-related demand by directly working with proponents to determine the types of course needed for individuals to gain the training required for job opportunities. KVI anticipates that it would be able to respond to demand created by one or two LNG facilities starting construction concurrently, but if more facilities were to start construction at the same time, capacity would become an issue (Hammi 2014. pers. comm.).

Table 3.1-8: Highest – Post-Secondary Enrolment Targets and Actual Enrolments 2008/2009-2013/2014

Northwest Community College						
	2008/09	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**
Student Full-Time Equivalent Enrolment Targets	1,761	1,761	1,728	1,696	1,664	1,696
Actual Student Full-Time Equivalent Enrolment	1,468	1,486	1,689	1,508	1,271	1,009
Difference	293	275	39	188	393	687
% of positions remaining	17%	16%	2%	11%	24%	41%
University of Northern British Columbia						
	008/09	**2009/10**	**2010/11**	**2011/12**	**2012/13**	**2013/14**
Student Full-Time Equivalent Enrolment Targets	3354	3396	3431	3455	3455	3455
Actual Student Full-Time Equivalent Enrolment	2,976	3,054	3,005	2,934	2,884	2,888
Difference	378	342	426	521	571	567
% of positions remaining	11%	10%	12%	15%	17%	16%

SOURCES: Ministry Of Advanced Education 2014a, 2014b.

It has been noted by some Haisla Nation and Kitselas First Nation community members' that education and job-skills training are seen both as an opportunity and a barrier in accessing industry-related job opportunities (Grant 2014, pers. comm.; Kitselas Community Meeting 2013, pers. comm.). Reports from Haisla Nation community members reflect that the majority of job opportunities are in general labour, however there is room to move up/within some of the larger contractors companies (e.g., Betchel), and more opportunities are opening with respect to skilled trades (Grant 2014, pers. comm.). Kitselas First Nation community members have noted that the resource development projects create short-term positions only, and that the lack of local training and education opportunities is a challenges to securing long-term, permanent positions (Kitselas Community Meeting 2013. pers. comm.).

3.1.2.2.2 Industry Experience

The 2011 employment data for the LSA and RSA are summarized by industry in Table 3.1-9. In the LSA, there was a large portion of workers who were employed or who had been employed in service-based industries. Among service industries, high percentages of workers in the LSA had experience in "other services": for example, public administration at 21.0% and business services at 17.2%. For basic (goods-producing) industries, the highest percentage of workers were employed or had been employed in manufacturing (9.8%). There were 1,200 workers with construction industry experience in the LSA, which was 64.5% of the total number of workers who had such experience in the RSA (1,860 people).

The RSA had similar proportions of employment in basic and non-basic industries, compared to the LSA, in 2011. Of the 27,005 people in the RSA who were employed or had been employed in 2011, the highest percentage of workers had experience in other services (24.2%).

Employment in the LSA and RSA is shown by occupation type in Table 3.1-10. The number of workers employed in occupations related to trade, transport, and equipment operation gives an indication of the local and regional supply of workers with appropriate skills for construction employment. In the LSA, there were 3,580 people employed in this occupation category in 2011, accounting for approximately 19% of total employment in the LSA. There were 5,095 workers employed in trades, transport, equipment operations, and related occupations in the RSA.

Table 3.1-9: Employment by Industry, LSA and RSA, 2011

Location	Basic Industries							Non-Basic Industries					Total
	Agriculture, Forestry, Fishing & Hunting	Mining, Quarrying & Oil and Gas Extraction	Utilities	Construction	Manufacturing	Health Care & Social Services	Educational Services	Whole-sale Trade	Retail Trade	Finance & Real Estate	Business Services	Other Services	
Kitamaat 2	10	0	0	15	20	20	15	0	15	0	25	50	170
Kitselas I	0	0	0	0	0	10	0	0	0	0	0	25	35
Kulspai 6	0	0	0	0	0	0	0	0	0	0	0	0	30
Kitsumkaylum	NA	NA NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kulkayu	NA	NA NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lax Kw'alaams	NA	NA NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dolphin Island 1	10	0	0	20	0	10	10	0	0	0	0	60	115
s1/2 Tsimpsean 2 IR	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kitimat DM	45	40	0	420	1,205	335	240	80	345	140	530	725	4,105
Terrace CA	365	90	65	435	370	1,050	785	260	1215	300	1,195	1,825	7,955
Port Edward	NA	NA NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Prince Rupert CA	490	0	35	310	270	685	550	120	875	330	1,525	1330	6,685
LSA Total	**920**	**130**	**100**	**1,200**	**1,865**	**2,110**	**1,600**	**460**	**2,450**	**770**	**3,275**	**4,015**	**19,095**
RDKS	865	420	95	1,275	1,755	2,105	1,740	380	1,955	505	2,445	4,310	17,850
SQCRD	780	15	55	585	425	880	720	125	1,120	405	1,825	2,220	9,155
RSA Total	**1,645**	**435**	**150**	**1,860**	**2,180**	**2,985**	**2,460**	**505**	**3,075**	**910**	**4,270**	**6,530**	**27,005**

NOTES:
Data suppressed for Kulspai 6; however, total in all labour forces was reported and included
SOURCES: Statistics Canada (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i)

Table 3.1-10: Employment by Occupation, LSA and RSA, 2011

Location	Management	Business, Finance and Administration	Natural and Applied Sciences	Health	Education, Law, and Social, Community and Government Services	Art, Culture, Recreation and Sport	Sales and Service	Trades, Transport and Equipment Operators	Natural Resources, Agriculture and Production	Manufacturing and Utilities	Total
Kitamaat 2, (Haisla/Kitamaat Village)	20	20	0	0	25	0	35	45	15	10	170
Kitselas I IR (Kitselas/Gitaus)	0	10	0	0	0	0	15	20	0	0	45
Kulspai 6 (Kitselas/Kulspai)	0	0	0	0	0	0	10	10	0	0	20
Kitsumkaylum 1 IR (Kitsumkalum/Kalum)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kulkayu 4 IR (Gitga'at/Hartley Bay)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lax Kw'alaams 1 IR (Lax Kw'alaams/Port Simpson)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dolphin Island 1 IR (Gitxaala/Kitkatla)	10	20	0	0	25	0	20	30	10	0	115
s1/2 Tsimpsean 2 IR (Metlakatla/Metlakatla Village)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Kitimat DM	335	495	195	210	415	85	800	1,010	45	540	4,130
Terrace CA	380	1,035	510	465	1,295	145	2,120	1,215	280	215	7,660
Port Edward	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Prince Rupert CA	705	910	340	275	945	130	1,530	1,250	325	270	6,680
LSA Total	1,450	2,490	1,045	950	2,705	360	4,530	3,580	675	1,035	18,820
RDKS	1,470	2,175	960	1,005	2,805	355	3,925	3,415	845	915	17,870
SQCRD	1,080	1,145	460	410	1,165	185	2,055	1,680	605	360	9,145
RSA Total	2,550	3,320	1,420	1,415	3,970	540	5,980	5,095	1,450	1,275	27,015

3.1.2.3 Labour Incomes

3.1.2.3.1 Incomes and Earnings

Table 3.1-11 summarizes average and median income and earnings for residents of the LSA and RSA in 2010. The median and average income for Kitimat District Municipality were higher than for the province as a whole; the median income for BC was $28,765 and the average income was $39,415. In comparison, median and average incomes in Kitamaat Village (Kitamaat 2 IR) were well below provincial figures. Kitamaat Village (Kitamaat 2 IR) also had a much higher reliance on government transfers (32.3% of total income) compared to non-Aboriginal communities in the LSA. The highest average earnings (income from full-time employment) were for residents of the Kitimat District Municipality ($70,377). This was considerably higher than average earnings for BC, which was $58,016.

Table 3.1-11: Incomes and Earnings in the LSA and RSA, 2010

Location	Median Income ($)	Average Income ($)	Average Earnings ($)	Composition of Total Income			
				Wages & Salaries ($)	Self-Employment ($)	Other Income ($)	Government Transfers ($)
Kitamaat Village	$15,441	$20,751	$42,735	53.9	0.0	11.0	32.3
Kitimat District Municipality	$34,038	$44,316	$70,377	71.9	0.7	15.4	11.9
Terrace CMA	$29,433	$36,985	$53,028	72.0	2.6	10.6	14.8
Kitselas	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Prince Rupert	$28,432	$36,347	$55,220	72.4	3.2	9.6	15.0
Kitimat-Stikine Regional District	$26,752	$35,795	$55,590	70.7	2.7	11.4	15.3
Skeena-Queen Charlotte Regional District	$25,971	$34,256	$53,018	70.8	4.0	9.3	16.0

NOTES:
LSA and RSA totals are averages and are not true calculations of median income, average income, and average earnings
SOURCES: Statistics Canada (2013a, 2013b, 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i)

3.1.2.4 Cost of Living

3.1.2.4.1 Total Cost of Living

Table 3.1-12 presents cost of living data for a family of four with a total annual household income of $75,000, based on the BC Cost of Living Calculator for Kitimat, Terrace, and Prince Rupert. For comparison, data for Fort St. John, Dawson Creek (two other northern BC communities that have undergone several years of resource development expansion) and Prince George (the largest city in north-central BC) are also presented.

Table 3.1-12: Annual Cost of Living, Selected Communities, 2013

Expenses	Kitimat	Terrace	Prince Rupert	Dawson Creek	Fort St. John	Prince George
Consumables	$24,393	$24,608	$24,577	$25,097	$25,061	$24,259
Transportation	$2,955	$2,960	$2,996	$2,877	$2,759	$2,948
Health Care	$1,741	$1,738	$1,739	$1,733	$1,732	$1,742
Housing	$15,576	$19,364	$19,436	$29,277	$26,756	$23,365
Taxes	$-739	$-759	$-759	$-759	$-759	$-759
Total Cost of Living	$43,906	$47,911	$47,969	$58,225	$55,549	$51,555
Cost of Living Differential to Kitimat	$0	$4,005	$4,063	$14,319	$11,643	$7,649
Cost of Living Index (Kitimat =100)	100.0	109.1	109.3	132.6	126.5	117.4

SOURCE: Welcome BC 2014

These data indicate that the cost of living in Kitimat, Terrace, Prince Rupert and Prince George are similar and the overall cost of living in Dawson Creek is 4.2%, and in Fort St. John 7.7%, higher than in Kitimat. From these data, housing costs appear to be the primary cause for the cost of living differences between the communities. Baseline information on housing affordability is provided in Section 3.2.2.12.

The cost of living tends to be positively correlated with income. For example, in Kitimat, a family of three earning $75,000 per year and owning a small condo, is estimated to incur costs of $36,791; compared to $43,460 in annual expenses for a similar sized household with income of $100,000; and $57,989 for a household earning $150,000 per year (Table 3.1-13). Similar increases in expenses are shown for Terrace and Prince Rupert (Welcome BC 2014).

Table 3.1-13: Annual Cost of Living Compared to Income

	Annual Cost of Living					
	Kitimat		Terrace		Prince Rupert	
	$ Value	% of Income	$ Value	% of Income	$ Value	% of Income
Family of three earning $75,000 annually	36,791	49.1	39,347	52.5	37,929	50.6
Family of three earning $100,000 annually	43,460	43.5	46,068	46.0	44,600	44.6
Family of three earning $150,000 annually	57,989	38.7	60,707	40.5	59,144	39.4

SOURCE: Welcome BC 2014

The proportion of income that is spent on expenses decreases with rising income. Since lower income families spend higher proportions of total income on cost of living expenses, they are more vulnerable to adverse economic effects related to increased prices for goods and services.

3.1.2.5 Survey of Local Business and Economic Development Results

A review of available services and products offered in Kitimat and Terrace indicates that the majority are in the retail, construction/environmental and accommodations industries (QRG 2014). There is however a diverse range of services available locally. Business survey respondents (n=50) indicated that they offered products and services retail (24%), construction, engineering or environmental services (24%), accommodation (12%) and other services, including transportation and recreation (40%). All of the companies that were interviewed maintained business operations and activities throughout the year. Close to half the companies (42%) were relatively small in size with less than five employees, and the majority of staff working at the companies interviewed were employed full-time.

Survey results indicate that staff recruitment and retention are posing considerable challenges for local businesses, with 22% of respondents indicating that it is harder to find staff and difficult to maintain competitive wages. In addition, a large proportion of respondents (22%) indicated that stress on the local economy in terms of an increase in the cost of living and housing affordability were also some of the current effects that their business was experiencing as a result of recent economic development projects in the area.

Local business owners in the Kitimat and Terrace regions have noted an increase in business costs as a result of recent economic development (QRG 2014). In a survey of local businesses, 60% of survey respondents indicated that costs had increased over the past several years, due to increases in utilities such as gas and hydro, as well as a wide range of other costs. While the survey results indicate that the

cost of doing business has increased, the majority of survey respondents (54%) indicated that there had not been changes in the availability of goods and services required for business activities.

3.1.2.6 Economic Activity

3.1.2.6.1 Economic Dependency and Diversity

Income dependency is a measure of the extent to which specific industries directly and indirectly generate income. 2006 data on income dependency for Kitimat-Terrace and Prince Rupert are shown in Table 3.1-14. While there may have been changes in these figures since 2005 (e.g., due to global economic conditions, changes in economic markets, and business closures and openings), the data provide an overview of how local income dependency has compared with the province overall. Income dependence on resource industries was high in the Kitimat-Terrace region, where forestry, mining, and fishing accounted for 37% of total income, compared to 10% for BC.

Table 3.1-14: Percent Income Dependencies, Kitimat, Terrace, and Prince Rupert, 2006

Sectors	Kitimat (%)	Terrace (%)	Kitimat-Terrace (%)	Prince Rupert (%)	BC (%)
Forestry	17	11	14	5	7
Mining	41	6	22	1	3
Fishing	0	1	1	16	
Construction	2	6	5	3	8
Government transfer payments	9	18	14	18	15
Tourism	2	4	4	8	6
Public sector	15	35	26	32	26

SOURCE: Horne 2009

The economic diversity of a region is measured by diversity indices (DI), which range from zero (total dependence on a single sector) to 100 (equal dependence on all sectors). Kitimat-Terrace and Prince Rupert both showed economic diversity in 2001 and 2006 (Table 3.1-15). Economic diversity increased in Prince Rupert between 2001 and 2006, while Kitimat has remained equally diverse.

Table 3.1-15: Kitimat-Terrace and Prince Rupert Income Dependencies, 2005

Diversity	Kitimat (%)	Terrace (%)	Kitimat-Terrace (%)		Prince Rupert (%)	
Year	2006	2006	2001	2006	2001	2006
Diversity Index	60	66	70	70	66	69

SOURCE: Horne 2009

3.1.2.6.2 Current and Planned Projects in the RSA

As of December 2013, there were 13 major projects (i.e., projects valued at $15 million and above) under construction in the North Coast Economic Region, which comprises the Kitimat-Stikine and the Skeena-Queen Charlotte RDs (BC MJTST 2013). Total combined value for these construction projects is approximately $7.8 billion. Major projects under construction in the Kitimat–Terrace area include mining and hydroelectric projects and related infrastructure, as well as RTA's expansion project, valued at $3.3 billion. Current and expected economic expansion in the region has resulted in investments to harbour and port facilities, with three projects currently under construction in Prince Rupert, in addition to the recently completed Westview Pellet Terminal. Port development projects are also planned for Kitimat and Steward.

The development of LNG export facilities and related infrastructure could be a major driver of economic development in the LSA and RSA. Including the Project, there are nine proposed LNG export facilities for the North Coast Economic Region (Table 3.1-16; BC MJTST 2013) .

Table 3.1-16: LNG Projects Planned for the RSA

Project	Municipality	Proponent
LNG Canada	Kitimat	Shell, KOGAS, Mitsubishi and PetroChina
BC LNG (Douglas Channel) Energy Project	Kitimat	BC LNG Export Co-operative LLC LNG Partners (Texas) and Haisla Nation
Triton LNG Facility	Kitimat Area	AltaGas Ltd./ Idemitsu Canada Corp.
West Coast LNG Export Facility	Kitimat Area	WCC LNG Ltd.
Kitsault LNG Facility	Kitsault	Kitsault Energy Ltd. of Canada
Pacific Northwest LNG	Lelu Island	Petronas/Progress/JAPEX.
Aurora LNG Facility	Prince Rupert	Nexen/ Inpex Corp./ JGC Corp.
Grassy Point LNG	Prince Rupert	Woodside Petroleum
Prince Rupert LNG	Prince Rupert	BG Group

SOURCE: BC MJTST 2013

There are 43 proposed major projects in the North Coast ER with a total combined value of over $100 billion. In addition to the LNG projects discussed above, major projects proposed for the Kitimat-Terrace area include the Kitimat Clean Oil Refinery and Pipeline, with an estimated cost of $27 billion, as well as several pipeline and utilities projects (BC MJTST 2013).

3.2 Infrastructure and Services

3.2.1 Methods

3.2.1.1 Desktop Research

Baseline information was obtained from published reports, statistical information, academic literature and other quantitative and qualitative data sources (summarized in Table 3.2-1).

Table 3.2-1: Infrastructure and Services Desktop Research

Social Environment Baseline	
Component	**Data and Approach**
Demographics	▪ Census and NHS data, BC Stats current and forecast population estimates ▪ Data from regional districts ▪ Aboriginal Affairs and Northern Development Canada (AANDC) Indian Resister data
Social and Government Services	▪ Regional and municipal government data sources ▪ AANDC ▪ First Nations websites
Education	▪ The student/educator ratio and provincial classroom size standards (Statistics Canada 2011) ▪ Ministry of Education capacity utilization rate (Coast Mountains School District 2011) ▪ Northern Health Public Health Protection (NHPH 2012-2013)surveys and reports ▪ BC enrolment and capacity standards for daycare services (Ministry of Children and Family Development 2009; Community Care and Assisted Living Act 2013).
Housing and Accommodation	▪ Census, NHS and BC Stats (housing starts, value and units) ▪ BC Housing, and Canada Mortgage and Housing Corporation (CHMC) data (spring and fall surveys, Housing in Canada Online 2014) ▪ Data on building permits ▪ Local Multiple Listing Service listings and rental listings ▪ BC Northern Real Estate Board News Releases 2005-2013 ▪ Local area community and development plans
Transportation	▪ MOTI traffic count data for provincial highways ▪ Consultant reports for local road traffic data and analysis ▪ ICBC traffic collision data ▪ Transportation service provider websites
Community Services Infrastructure	▪ Local community planning documents ▪ Community investment profiles

Social Environment Baseline	
Emergency and Protection Services	▪ Local community planning documents and emergency response plans ▪ Ministry of Justice (2013), 2010-2012 crime statistics by region ▪ British Columbia Ambulance Association website
Recreation and Tourism	▪ Local community planning documents

3.2.1.2 Primary Research

3.2.1.2.1 First Nations Community Research Program

A Community-based socio-economic research program was undertaken with Haisla Nation and Kitselas First Nation. The program included the employment of two research coordinators (one from Haisla Nation and one from Kitselas First Nation) to support the collection of primary information. Primary research methods used included key one-on-one interviews, focus group discussions, workshops and a community meeting (summarized in Table 3.2-2). The results of which have been incorporated into Section 3.2.2, and used to determine the capacity of baseline conditions with respect to community infrastructure and services (e.g. water, waste and recycling sources and services, and the need for protection services), in addition to housing conditions with respect to the reserve communities of Kulspai, Gitaus and Kitamaat Village. Additional information collected through the program includes focus group discussions on community health with Haisla Nation Elders (further identified in Section 3.3.1), and a fisheries workshop with Kitselas First Nation (identified in Section 3.4.1) and a Survey of Kitselas First Nation Traditional Foods (further discussed in Appendix E and Section 3.3.1 and 3.3.2).

3.2.1.2.2 Interviews

Primary research entailed one-on-one key informant interviews and some small focus group discussions. Key informants were selected from appropriate regional, local, not-for-profit and special interests groups and Aboriginal Groups (i.e., Haisla Nation and Kitselas First Nation) through online public databases or websites. Additional key informants were also selected from a sampling method, whereby one key informant refers to another community member who has additional valued knowledge or information related to a particular socio-economic topic.

Table 3.2-2: Summary of Infrastructure and Services Key Informant Interviews

Agency	Contact	Date of Consultation	Method of contact
Public Works Department, City of Terrace	Rob Schibli, Director of Public Works	July 17, 2013	In-person interview
City of Terrace, Development Services Terrace	David Block, Director of Development Services	July 17, 2013	In-person interview
District of Kitimat	Daniel Martin, Planner District of Kitimat	July 19, 2013; Aug. 28, 2014; 30, Sept. 14, 2013	In-person interview,
District of Kitimat	Gwendolyn Sewell, District of Kitimat Senior Planner	July 19, 2013	In-person interview
Kitimat Child Development Centre	Adriana Menteiro	Aug. 9, 2013	Phone interview
Skeena Child Resource and Referral Centre	T. T. Anonymous	Aug. 12, 2013.	Phone Interview
Cast Away B&B	Hotel/Motel/BB	Aug. 14, 2013	Phone interview
Chalet Motel & Restaurant	Hotel/Motel/BB	Aug 14, 2013	Phone interview
Coast Mountains Board of Education School District 82	Ms. Carole Gagnon, EA to the Supt. & Secretary Treasurer	Aug. 14 & 20, 2013	Phone interview/ e-mail correspondence
Kitimat Economic Development	Rose Klukas, Kitimat Economic Development Officer	July 17, 2013; Aug. 29. 2014;	In-person interview, e-mail correspondence; follow-up phone interview
Terrace Economic Development Authority (TEDA)	Evan Van Dyk, Econ. Development Officer at TEDA	Aug 28, 2013	Phone interview
Terrace Visitors Centre	Anonymous, Terrace Visitors Centre	Aug 29, 2013	Phone interview
Kitimat Visitors Centre	Tyler Clarke, Manager Kitimat Visitor Centre	Sep. 9, 2013	In-person interview
Kitimat Chamber of Commerce	Trish Parsons, Executive Director Kitimat Chamber of Commerce	Sep. 9, 2013	In-person interview
Terrace Chamber of Commerce	Janice Shaben, President	Nov. 28, 2013	In-person interview
City of Terrace	Bill Downie, Counselor	Nov. 28, 2013	In-person interview
District of Kitimat	Joanne Monaghan, Mayor	Nov. 29, 2013	In-person interview
District of Kitimat	Bill Poole, Chief Administrator	Nov. 29, 2013	In-person interview
Piping Industry College of BC	Dan Pope, Instructor	Nov. 29, 2013	In-person interview
Ministry of Transportation and Infrastructure (Skeena District)	Lori Wiedeman	Nov. 29, 2013	Phone interview
Ministry of Transportation and Infrastructure (Skeena District)	Randy Penner	Nov. 29, 2013	Phone interview
District of Kitimat Engineering Services Department	Andrew Towse, Kitimat Waste Management	Dec. 2, 2013	Phone interview
City of Terrace Sustainability Department	Tara Irwin, Sustainability Coordinator	Dec. 2, 2013	Phone interview

Agency	Contact	Date of Consultation	Method of contact
Haisla Band Office (HBO)	Carolyn Ringham, Clerk to Council	Dec. 6, 2013	Community Researcher & In-person interview
Haisla Band Office (HBO)	Teena Grant, Community Development/Housing	Dec. 6, 2013	Community Researcher & In-person interview
Haisla Band Office (HBO)	Trish Grant, Executive Assistant	Dec. 6, 2013	Community Researcher & In-person interview
Haisla Band Office (HBO)	Colin Light, Clerk of the Works	Dec. 6, 2013	Community Researcher & In-person interview
Haisla Band Office (HBO)	Sherry Smith, Community Development Manager	Dec. 6, 2013	Community Researcher & In-person interview
Haisla Band Office (HBO)	Trevor Amos, Fisheries	Dec. 6, 2013	Community Researcher & In-person interview
Haisla Band Office (HBO)	Kevin Paul, Fisheries/Watchman	Dec. 6, 2013	Community Researcher & In-person interview
Haisla Band Office (HBO)	Mike Jacobs, Fisheries Manager	Dec. 6, 2013	Community Researcher & In-person interview
Haisla Band Office (HBO)	Chris Wilson, Marine Use	Dec. 6, 2013	Community Researcher & In-person interview
Kitimat Rod and Gun Club	Al Hummel, Representative of the Kitimat Rod and Gun Club	Sep. 10, 2013	In-person interview
Kitimat Rod and Gun Club	Mike Langagger, Regional President of the BC Wildlife Federation	Sep. 10, 2013	In-person interview
Kitimat Naturalists Club Member	April McCloud, Kitimat Naturalists Club Member	Sep. 11, 2013	In-person interview
Kitimat Naturalists Club Member	Sheryl Brown, Kitimat Naturalists Club Member	Sep. 11, 2013	In-person interview
MK Bay Marina	Bill Hickman, Interim Manager of MK Bay Marina	Sep. 11, 2013	In-person interview
North West Regional Airport	Carman Hendry, NWRA Airport Manager	Sep. 11, 2013; May 26, 2014; June 6, 2014	In-person interview, -mail correspondence; follow-up phone interview
Kitimat Child Development Centre/Kitimat Housing Committee, Kitimat	Margaret Warcup, Executive Director/Chair	Aug. 20, 2013; June 3, 2014	Phone interview; e-mail correspondence
Thornhill Fire Department, RDKS	Rick Boehm, Deputy Fire Chief	Sept. 26, 2013	Phone interview
Thornhill Fire Department	Wes Patterson, Fire Chief	Nov. 28, 2013	In-person interview
District of Kitimat Fire Department	Trent Bossence, District of Kitimat Fire Chief	Oct. 3, 2013	Phone interview
Terrace Fire Department, Terrace	John Klie, Fire Chief	July 17, 2013	In-person interview
Engineering Services Kitimat, District of Kitimat	Tim Gleig P. End. Director	Oct. 21, 2013; Nov. 6, 2013	Phone interview, e-mail correspondence
Terrace RCMP, Terrace	Mike Robinson, Staff Sergeant	Nov. 7, 2013	In-person interview (conducted by Habitat Health Consulting)

Agency	Contact	Date of Consultation	Method of contact
Kitimat RCMP, Kitimat	Phil Harrison, Staff Sergeant	Nov. 12, 2013	In-person interview conducted by Habitat Health Consulting)
RCMP, Terrace Detachment	J. Speech, Community Relations Officer	Nov. 26, 2013	In-person interview
British Columbia Ambulance Service (BCAS), Terrace	Norene Parke, Skeena District Unit Chief	Nov. 13, 2013	In-person interview
Kitselas Community Meeting, Terrace	Kitselas First Nation Community Members	Nov. 13, 2013	An in-person community meeting was held at the Kitselas First Nation Community Hall in Terrace, BC. Approximately 175 community members attended. Representatives from Shell (Michael Eddy and Joan Goldhawk), Stantec (Frank Bohlken and Kelly Sims), and Habitat (Angela Angel) were also in attendance.
Kitselas First Nation	Ulyses Vengas, Housing Manager	Nov. 26, 2013	Community Researcher & In-person Interview
Kitselas First Nation	Fred, Maintenance Manager	Nov. 26, 2013	Community Researcher & In-person Interview
Kitselas First Nation	Sandy Watson, Employment Counselor	Nov. 27, 2013	Community Researcher & In-person Interview
Kitselas First Nation	Matthew, Instructor, Adult Education	Nov. 27, 2013	Community Researcher & In-person Interview

3.2.1.2.3 Rail Crossing Study

Baseline information was not available related to the frequency or duration of crossing times at road-rail intersections. To fill in this data gap, a short field program was undertaken. This program included observations of train crossings at key road-rail intersections in and around the LSA to gain a broad understanding of the current frequency and duration of wait times, and how road traffic is subsequently affected. Three primary road-rail intersections were identified (Kenney St. x Highway 16, Haisla Blvd., and Substation Rd.) and three alternates (Frank St. x Highway 16, Eurocan Way, and Queensway Dr.) with respect to safety and access of recording observations. The intersections were chosen with respect to locations where increases in trains to and from the proposed Project site and between Kitimat and Terrace might interrupt traffic or increase the wait times of vehicles wanting to cross.

3.2.1.3 Analysis

3.2.1.3.1 Student-Educator Ratio

The student-educator ratio for schools located in the LSA was calculated by dividing the total number of students enrolled in September 2012 by the total number of educators employed by each school. Student enrollment numbers are based off the Province of BC's Public School Reports for 2012/2013 and the total number of educators employed by each school is based off information received from Coast Mountain School District #82 (Gagnon 2013, pers comm. 2013). These data were then compared by the provincial student educator ratio in BC (based on Statistics Canada's 2011 definition of 'educator') to determine if the average student: educator ratio in the LSA was below or above the provincial standard.

3.2.1.3.2 Rental Housing Affordability

Rental housing affordability was estimated by calculating the amount of gross household income needed to rent an apartment in Terrace and Kitimat. This consisted of two steps. First, average monthly rental costs for one and two bedroom apartment rental costs from CHMC's Fall Surveys were used to estimate average cost of rental accommodations in both Kitimat and Terrace. Second, the average monthly rental cost was multiplied by 12 and then divided by 0.3 to estimate the minimum gross household income needed to rent a typical apartment, in consideration of the CHMC's 30% shelter-cost-to-income affordability threshold.

3.2.2 Results

3.2.2.1 Population

In 2011, the total population in the RSA was approximately 56,160; of this, 24,925 people resided in the LSA. The largest population centre in the LSA was the Terrace census agglomeration (CA), with a population of 15,545, which is 28% of the total population of the LSA and 63% of the total population RSA. The second largest population centre in the LSA was Kitimat District Municipality (DM) with a population of 8,335 (Statistics Canada 2012a). Among the three IR's in the LSA, Kitamaat 2 IR was the most populous, with about 510 residents (Table 3.2-3) (Statistics Canada 2012c).

Compared with the median age of the population of BC (41.3 years), populations in the RSA were slightly younger, with the median ages of residents of RDKS and SQCRD being 40.3 and 39.9, respectively. In the LSA, the proportion of the population aged 15 years and older was greater than 80%, with the exception of Kitselas 1 IR and Kitsumkaylum 1 IR. There were slightly more males than females in the RSA (Appendix B, Figure B-1a-g) (Statistics Canada 2012a–2012g). Among the LSA communities, Kitamaat 2 IR had a female population of 48.5%, while Kitselas 1 IR had a female population of 64.4%.

Table 3.2-3: Gender Characteristics in the Local Study Area and Regional Districts of Skeena-Queen Charlotte, 2011

Population Segment	Total Population	Male		Female	
		Total	Percent	Total	Percent
Kitimat, DM	8,345	4,290	51.41	4,050	48.5
Terrace, CA	15,545	7,705	49.57	7,855	50.5
Kitamaat 2 IR	515	265	51.46	240	46.6
Kitselas 1 IR	225	100	44.44	145	64.4
Kitsumkaylum 1 IR	295	150	50.85	140	47.5
Kitimat-Stikine, RD	37,370	19,045	50.96	18,325	49.0
Skeena-Queen Charlotte, RD	18,790	9,505	50.59	9,275	49.4

3.2.2.1.1 Population Change

Between 2006 and 2011, the population of Kitimat, Terrace and the regional districts of Kitimat-Stikine and Skeena-Queen Charlotte decreased. In the LSA, the largest decrease was in Terrace CA where the population declined by 16.4%. Kitamaat 2 IR experienced no change, while contrary to regional trends the populations of Kitselas 1 IR and Kitsumkaylum 1 IR increased 188.5% and 18.0% respectively.

Historical population trends indicate a cyclical character to population change in the LSA community of Kitimat and the regional districts of Kitimat-Stikine and Skeena-Queen Charlotte. Between 1986 and 2011, they experienced periods of population growth interrupted by episodes of population contraction between 1996 and 2001 and again between 2006 and 2011 (Table 3.2-4).

Census data are not available for the Terrace CA before 2001; however, the Terrace CA experienced population growth between 2001 and 2006, followed by a decline in the subsequent five years. The three First Nation communities in the LSA do not follow the same trends in population change. The population of Kitamaat 2 IR declined between 1996 and 2001 and it continued to decrease through 2006 before stabilizing at about 514 residents.

Table 3.2-4: Population statistics and growth in the local study area and regional districts of Kitimat-Stikine and Skeena-Queen Charlotte, 1986 to 2011

Time Frames	LSA					RSA	
	Kitimat, DM	Terrace, CA	Kitamaat 2 IR	Kitselas 1 IR	Kitsumkaylum 1 IR	Kitimat-Stikine, RD	Skeena-Queen Charlotte, RD
2011 Population	8,335	15,545	510	225	295	37,370	18,790
2006 to 2011 Population Change (%)	-7.3%	-16.4%	0	188.5%	18.0%	-2.9%	-4.4%
2006 Population	8,987	18,585	510	78	250	38,476	19,665
2001 to 2006 Population Change (%)	12.6%	7.0%	-0.6%	NA	5.7%	5.9%	9.4%
2001 Population	10,285	19,980	511	NA	265	40,876	21,695
1996 to 2001 Population Change (%)	-7.6%	NA	-8.4%	NA	NA	-6.3%	-12.5%
1996 Population	11,136	NA	558	NA	NA	43,618	24,795
1991 to 1996 Population Change (%)	-1.5%	NA	NA	NA	NA	3.7%	4.3%
1991 Population	11,305	NA	NA	NA	NA	42,053	23,770
1986 to 1991 Population Change (%)	1.0%	NA	NA	NA	NA	6.5%	3.1%
1986 Population	11,195	NA	NA	NA	NA	39,483	23,060

NOTE:
NA = Data not available as suppressed by Statistics Canada.
SOURCES: Modified from Statistics Canada 2012a, 2012b, 2012c, 2012d, 2012e, 2012f, 2012g; Statistics Canada 2007a, 2007b, 2007c, 2007d, 2007e, 2007f;, BC Stats 2005a, 2005b,2005c,2005d,2005e; BC Stats 2001a, 2001b, 2001c, 2001d; BC Stats n.d.a, n.d.b; BC Stats 2010a, 2010b**.**

Population change occurs as a result of natural increase and migration. Statistics on natural increase (births and deaths) within the LSA and RSA are collected at the Local Health Area (LHA) level, but not at the regional district level. Kitimat LHA administers health care services in an area that includes the communities of Kitimat, Kitlakatla (Gitxaala First Nation) and Hartley Bay (Gitga'at First Nation) (Northern Health 2013a). The Terrace LHA includes the City of Terrace, the Tsimshian communities of Kitsumkalum and Kitselas and the Gitxsan communities of Gitanyow and Kitwanga (Northern Health 2013b). Of the two LHAs, Terrace LHA had the higher birth rate (11.5 live births per 1,000 population) and the lower mortality rate (6.2 deaths per 1,000 population) (Table 3.2-5).

Table 3.2-5: Births and deaths of Local Health Areas within the Local Study Area, 2011

	Kitimat LHA	Terrace LHA
2011 live births	89	240
2011 birth rate (births/1,000 population)	8.8	11.5
2011 deaths	83	144
2011 mortality rate (deaths/1,000 population)	8.2	6.9

SOURCES: Modified from Northern Health 2013a, 2013b

3.2.2.1.2 Population Projections

For the Sub-provincial Population Projection – PEOPLE 2013, BC Stats used a Component/Cohort-Survivals method projecting populations in BC, which relies on components of a population change (e.g. fertility, morality and migration) (BC Stats: PEOPLE 2013). Births and deaths stay generally stable over time; however migration data is more volatile. For example changes in government policies and regional economies can dramatically influence short-term impacts on migratory levels; major projects close to isolated area may influence a large influx of people for a number of years (BC Stats: PEOPLE 2013). To address these challenges BC Stats includes assumptions that would influence migration patterns from the Major Projects Inventory (MPOI) which provides a selection of large-scale infrastructure developments (roughly $15 million in capital costs), in addition to mine closures, and LNG development projects in the North Coast (BC Stats: PEOPLE 2013).

BC Stats 2013 regional population projections for the North Coast region indicate there will be an average annual growth of 0.1% between 2013 and 2036, one of the lowest rates in the province and far below the average annual growth rate of 1.0% for the province as a whole (Appendix B, Figure B-2) (Ip and Grundlingh 2013). At the regional district level, these models project a growth rate of 5.8% for Kitimat-Stikine and 2.1% for Skeena-Queen Charlotte over the same period (BC Stats 2013b).

Although population projections are not available for individual communities, BC Stats has developed projections at the LHA level. According to these projections, the Terrace LHA is expected to experience below average growth while Kitimat is projected to grow 8.9% between 2013 and 2036 (BC Stats 2013a).

3.2.2.1.3 Aboriginal Population

The Aboriginal population in the RSA is composed of members of Gitga'at First Nation, Gitxaala Nation, Lax Kw'alaams First Nation, and Metlakatla First Nation (Table 3.2-6). Aboriginal populations in the LSA include Haisla Nation, Kitselas First Nation, and Kitsumkalum First Nation. In 2012, the total population for these First Nations was 10,066 (Indian Register 2012). Of these individuals, approximately 19% lived

on reserves and mainly on their own IRs. For all First Nations considered, more than half of the registered population in 2012 lived off-reserve.

Among the First Nations in the LSA, Haisla Nation had the largest registered population with 1,741 members, and Kitselas First Nation had the smallest registered population with 591 members. Kitselas First Nation had the largest percentage (46.4%) of its registered population living on-reserve, and Kitsumkalum First Nation had the smallest percentage (33.7%).

Table 3.2-6: Indian Register Population Affiliated with First Nations in the RSA and LSA by Residency, 2012

First Nation	Total			On-Reserve		On Crown Land		Off-Reserve	
	Total	Male	Female	Total	Percent	Total	Percent	Total	Percent
RSA									
Gitga'at	729	348	381	146	20.0	0	0.0	583	80.0
Gitxaala	1,863	901	962	459	24.6	0	0.0	1,404	75.4
Lax Kw'alaams	3,575	1,794	1,781	NA	NA	NA	NA	2,835	79.3
Metlakatla	855	405	450	95	11.1	0	0.0	760	88.9
LSA									
Haisla	1,741	860	881	668	38.4	0	0.0	1,073	61.6
Kitselas	591	270	321	274	46.4	0	0.0	317	53.6
Kitsumkalum	712	349	363	240	33.7	0	0.0	472	66.3

NOTE:
NA = Data not available. Data suppressed by the Indian Register.
Source: Indian Register 2012

3.2.2.1.4 Population Mobility

In 2006, most residents living in Kitimat, Terrace, Kitsumkaylum 1 IR, and the regional districts of Kitimat-Stikine and Skeena-Queen Charlotte had lived at the same address the preceding year[1]. The percentage of the population who had changed addresses within the same community ranged from 0.0% in Kitsumkaylum 1 IR to 10.1% in Terrace. Residents of the LSA communities who had moved from another municipality between 2005 and 2006 ranged from 1.5% in Kitimat to 5.2% in Kitsumkaylum 1 IR. The percentage of individuals residing in the LSA communities in 2006 who had moved from either another province or country within the preceding year was approximately 1.0% in urban communities in the LSA and the regional districts in the RSA. Of the LSA communities, Kitimat had the highest percentage of new residents who had moved from another province (1.2%) or country (0.1%). No residents of Kitsumkaylum 1 IR had moved there from outside the province over the course of the 2005–2006 year (Table 3.2-7).

[1] Data for Kitamaat 2 and Kitselas 1 was not available.

Table 3.2-7: Place of Residence of the Population in the Local Study Area and Regional Districts (one year previous), 2006

Resident Categories	Kitimat, DM	Terrace, CA	Kitamaat 2 IR	Kitselas 1 IR	Kitsumkaylum 1 IR	Kitimat-Stikine, RD	Skeena-Queen Charlotte, RD
Total population 1 year and over	8,905	18,250	NA	NA	290	37,450	19,385
Lived at the same address 1 year ago	8,050	15,570	NA	NA	275	32,790	16,340
Lived within the same province or territory 1 year ago, but changed addresses within the same census subdivision (municipality)	605	1,845	NA	NA	0	2,965	1,695
Lived within the same province or territory 1 year ago, but changed addresses from another census subdivision (municipality) within the same province or territory	130	675	NA	NA	15	1,360	1,175
Lived in a different province or territory 1 year ago	105	125	NA	NA	0	285	125
Lived in a different country 1 year ago	10	25	NA	NA	0	50	55

NOTE:
NA = Data not available. Suppressed by Statistics Canada.
SOURCE: Statistics Canada 2007a; 2007b; 2007c; 2007d; 2007e; 2007f; 2007g

Migration data complement mobility statistics for the RSA population because they describe the rates at which people are coming to and leaving the area. Population migration is driven by international, interprovincial and intra-provincial immigration and emigration. This information is not available at the local community level, but it is available for regional district level.

In 2011–2012, total net migration resulted in the loss of 663 individuals from the Kitimat-Stikine Regional District, with approximately 69.1% of these out-migrants moving to other regions within BC and 29.1% leaving for other provinces (Appendix B, Figure B-3). That same year, total net migration for the Skeena-Queen Charlotte Regional District was -233 individuals). The majority (81.8%) of these emigrants from Skeena-Queen Charlotte left for other regions of BC, with 17.2% leaving for other provinces.

Appendix B, Figure B-3 shows the change in net migration at the international, interprovincial, and provincial levels, as well as total net migration in the Kitimat-Stikine Regional District, between 1985 and 2012. The historical net migration trend was positive from 1989 to 1996 and then negative until 2011–12, with particularly strong out-migration in 2000–2001 (Appendix B, Figure B-3). Net migration rose to almost

zero prior to the 2008 global economic recession; however, since the start of the recession the total net migration has ranged from -437 in 2009/2010 to -663 in 2011/12.

Historical trends for net migration at the international, interprovincial and provincial levels as well as total net migration in the Skeena-Queen Charlotte Regional District between 1985 and 2012 are presented in Appendix B, Figure B-3. Unlike the RDKS, average total net migration remained relatively stable during that period. SQKRD experienced a notable out-migration in the late nineties similar, to that which occurred in Kitimat-Stikine, as well as total net migration approaching zero before 2008–2009.

3.2.2.2 Family and Household Structure

3.2.2.2.1 Family Structure

In 2006 and 2011, the average number of children at home per census family was larger in the LSA than the RSA. Between, 2006 and 2011, little change occurred in the LSA or RSA. Comparing the average number of persons per census family, non-First Nations communities in the LSA typically had slightly less people in a census family compared to the First Nation communities in 2006 and 2011. The majority of First Nations communities in the LSA had a higher average percentage of children at home compared to the non-First Nations communities in the LSA.

Comparing First Nations communities in the LSA, Kitselas 1 IR had the largest percentage of female lone parent families (75%) followed by Kitamaat Village (58.3%) and Kitsumkaylum 1 IR (50%) in 2011. In 2011, the majority of non-First Nations communities in the LSA and RSA had a higher percentage of female lone-parent families to male lone-parent families (typically a 20% to 30% difference). In comparison, Kitamaat Village and Kitsumkaylum 1 IR shared a less than 10% difference in the number of female verse male lone-parent families.

Table 3.2-8: Family Characteristics, 2006 and 2011

Community	Year	Total	% of Change	# of married-couple families	# of common-law couple families	# of lone-parent families[b]	[a] # of female lone-parent families	[b] # of male lone-parent families	Average # of children at home per census family %	Average # of persons per census family %
LSA										
Kitamaat 2 IR	2006	NA	*	NA	NA	NA	NA	NA	NA	NA
	2011	150	NA	43.3%	16.7%	40.0%	58.3%	41.7%	1.2	2.7
Kitsum Kaylum 1 IR	2006	85	*	52.9%	11.8%	35.3%	60.0%	40.0%	1.4	3.1
	2011	85	0	50.0%	22.2%	27.8%	50.0%	50.0%	1.4	3
Kitselas 1 IR	2006	NA		NA	NA	NA	NA	NA	NA	NA
	2011	60	NA	27.3%	36.4%	36.4%	75.0%	25.0%	1.4	3
Kitimat DM	2006	2,705	*	73.8%	13.0%	13.2%	78.6%	21.4%	1	2.9
	2011	2535	-6.70%	69.6%	15.0%	15.4%	69.2%	30.8%	0.9	2.8
Terrace CA	2006	5,290	*	67.1%	16.5%	16.3%	85.5%	14.5%	1.2	3
	2011	4,375	-17.3%	61.9%	18.2%	19.9%	78.2%	21.8%	1.1	2.9
RSA										
KSRD	2006	10,910	*	64.0%	17.4%	18.5%	75.6%	24.4%	1.1	3
	2011	10770	-1.3%	61.0%	19.2%	19.8%	70.6%	29.4%	1.1	2.9
SKQRD	2006	5,535	*	57.7%	19.3%	23.0%	80.8%	19.2%	1.1	2.9
	2011	5,290	-4.4%	55.6%	21.4%	23.0%	74.2%	25.8%	1.1	3
BC	2006	1,161,420	*	72.7%	12.2%	15.1%	79.8%	20.2%	1	3
	2011	1,238,155	6.2%	71.7%	13.0%	15.3%	78.5%	21.5%	1	3

NOTES:
NA Data not available. Suppressed by Statistics Canada.
[a] Subcategory of number of lone parent families.
[b] Subcategory of number of lone parent families.
SOURCES: Statistics Canada 2012a, 2013b, 2013c, 2013d, 2013e, 2013f; Statistics Canada 2007a, 2007b, 2007c, 2007d, 2007e, 2007f, 2007g, 2007h

3.2.2.3 Household Structure

Household structure may consist of more than one family living under one roof, or groups of unrelated adults and is therefore not assessed as a family unit. Comparing the percent of change from 2006 to 2011 in the total number of private households in the LSA and RSA, Kitsumkalum experienced the greatest increase (12.5%); while Kitselas had the greatest loss (-3.8%) (Table 3.2-9).

The largest provincial average of private households by household type was one-person households, which was a consistent trend across the RSA for 2011. Comparatively, in the LSA the majority of household types were characterized by 'other households' in 2011, especially for First Nations communities (in 2011 the subcategory of 'lone parent family households' was added to 'other household's types' which included this same sub-group in the 2006 definition of 'other household's types' [Statistics Canada 2006]). Overall, the majority of the communities in the LSA had more households containing a couple (married or common law) with children than without children. This trend is not consistent with the provincial average, where the number of households containing a couple (married or common-law) had more households without children than with children, in 2011 (26.1% with children vs. 27.3% without children).

In the LSA, the majority of First Nations communities had more households containing a couple (married or common-law) with children than without children in 2011. Kitsumkalum First Nation and Kitselas First Nation not only had the largest percentage of households containing a couple (married or common law) with children at home in the LSA (31.3% Kitsumaklum and 30.8% Kitselas) but, they also had the largest percentage compared to all of the LSA and RSA. Comparatively, Kitamaat Village had the lowest percentage of couples (married or common law) with children at home and the largest percentage of couples without children at home in all of the LSA and RSA in 2011.

Table 3.2-9: Household Structure, 2006 and 2011

Community	Year	Total [a]	% of change	Households containing a couple (married or common-law) with children	Households containing a couple (married or common-law) without children	One-person house-holds	Other house-hold types [a]	Average # of persons in private households
LSA								
Kitamaat 2 IR (Kitamaat Village)	2006	NA	NA	NA	NA	NA	NA	NA
	2011	180	NA	17.5%	12.5%	17.5%	52.5%	2.9
Kitsumkaylum 1 IR (Kitsumkalum)	2006	80	*	23.5%	23.5%	17.6%	35.3%	3.5
	2011	90	12.5%	31.3%	18.8%	12.5%	37.5%	3.3
Kitselas I IR (Kitselas	2006	78	*	NA	NA	NA	NA	NA
	2011	75	-3.8%	30.8%	15.4%	15.4%	38.5%	2.9
Kitimat DM	2006	3,625	*	31.3%	32.7%	24.8%	11.2%	2.5
	2011	3,630	0.1%	25.8%	31.8%	29.7%	12.7%	2.3
Terrace CA	2006	7,190	*	31.8%	31.3%	26.9%	10.0%	2.6
	2011	6,240	10.0%	29.3%	28.9%	31.2%	10.6%	2.5
RSA								
KSRD	2006	14,375	*	30.1%	28.5%	24.7%	16.8%	2.6
	2011	14,765	2.6%	26.5%	27.3%	27.5%	18.6%	2.5
SQCRD	2006	7,805	*	25.4%	25.0%	29.4%	20.2%	2.5
	2011	7,575	-2.9%	25.7%	24.2%	30.2%	19.9%	2.4
British Columbia	2006	1,643,150	*	26.3%	29.6%	28.0%	16.1%	2.5
	2011	1,764,635	7.4%	26.1%	27.3%	29.7%	16.9%	2.5

NOTES:
NA = Data not available. Suppressed by Statistics Canada. NS = Data not specified
[a] Data from 2011 Census for the 'Lone parent family' category has been added to 'Other household types' to compare with 2006 data, which is included in this category total. Number of private households by household type
SOURCES: Statistics Canada 2013c, 2013d, 2013e, 2013f, 2013g, 2013h, 2013i, 2013j. Statistics Canada: 2007a, 2007b, 2007c, 2007d, 2007e, 2007f, 2007g, 2007h

3.2.2.4 Regional Governance

Two regional districts are located in the RSA: RDKS and SQCRD (RDEAs A and C). The RDKS and SQCRD provide various local government services to northwestern BC, including rural land use planning, community water systems, fire protection, library services, transportation, and engineering.

Two municipal governments operate in the LSA: the District of Kitimat and the City of Terrace. A mayor and council are elected as representatives for each community and are accountable for filling the responsibilities outlined by the *Community Charter* (Part 5, Division 1, SBC 2003 [Queens Printer 2013]). The District of Kitimat and the City of Terrace provide various community services generally associated with: administration, community development and planning, economic development, public works and engineering, finance, emergency response, fire rescue, and leisure services.

Three First Nations are located in the LSA: Haisla Nation (Kitamaat Village), Kitselas First Nation (Gitaus and Kelspai), and Kitsumkalum First Nation (Kalum). The chief and council of each First Nation are elected every two years and are responsible for providing municipal services, such as social, education, and community-development programs.

3.2.2.4.1 Official Community Plans

Every local government in BC must adopt an Official Community Plan (OCP) following the BC *Local Government Act* (Part 26) (City of Terrace 2009). OCPs provide a statement of objectives and policies and are used to guide municipal government planning and manage land use for the future. The District of Kitimat's current OCP outlines how the community will physically and socially develop to 2027 (District of Kitimat 2008). The plan is reviewed and updated every five years. Policies and objectives in the following areas are used to guide the community's development: cultivate diversified economic growth; enhance 'sense of place'; maximize liveability; protect the natural environment; foster effective services; and meet responsibilities of governance (District of Kitimat 2008). Like Kitimat, the City of Terrace has an OCP, which outlines policies and objectives to guide its growth, in this case to 2050 (City of Terrace 2009). The City of Terrace's OCP policy and objectives fall into the following categories: abundant re-localized food systems; housing for all; compact complete neighbourhoods and community; diversified and coordinated economy; nature as identity and outdoor pursuit; visible and vibrant culture, heritage and the arts; social well-being and accessible recreation; water, energy, infrastructure and liquid waste management; integrated and active transportation network; and towards zero waste (City of Terrace 2009).

3.2.2.4.2 Community Centres

In the LSA, the residents of the District of Kitimat, City of Terrace, and each First Nations community have access to and use of community centres, which provide venues for various recreational, community, and

social activities. Most sport and recreational activities in Kitimat are provided through the Riverlodge Recreation Centre, the Tamitik Centre, and the Seniors Centre. In Terrace, most community recreation services are offered through the Sportsplex and Aquatic Centre. These community centres are not at capacity and thus are able to accommodate additional use (Sewell 2013, pers. comm.). Community members at Kitamaat Village have identified a need for additional community centre space (Powell 2013).

Capacity to offer social programs, which community centres are used for, is closely tied to the degree of volunteering and participation in community-led organizations (Neysmith and Reitsma-Street 2000). A recent study on social and economic transformation in Kitimat found that industry-related firms provided support in developing capacity for community centre-led organizations (Ryser and Halseth 2013). At the same time, the study found that community-led organizations have declined in membership and volunteers needed to support programs and services, which was attributed to the community's reliance on an aging cohort of senior citizen volunteers.

3.2.2.5 Utilities

3.2.2.5.1 Water

Water distribution and treatment (where available) is provided by First Nations, municipalities, and regional districts, as well as by individual water licensees and wells. Capacity and cost details of known providers are listed in Table 3.2-10. All providers listed have rated capacity above current peak demand. However, while the City of Terrace notes existing spare capacity, the information provided in Table 3.2-10 indicates this spare capacity is small. While the City of Prince Rupert indicates there is existing capacity, various documents indicate gaps and failings within the existing system.

In the LSA, the District of Kitimat provides water distribution and treatment to the town site, service center core area, and Cable Car neighborhood (Stantec Consulting 2013). Existing District facilities have unused capacity for future growth in demand, excepting in the case of future worker camps for over 500 persons (Stantec Consulting 2013). The City of Terrace owns and operates water distribution and treatment infrastructure, including the primary ground water source and backup surface water sources (The City of Terrace 2011). Upgrades to increase the reliability of the Terrace system were completed in 2009. No upgrades are currently scheduled because the existing system capacity is considered capable of meeting the city's needs, given regular maintenance and upgrades (The City of Terrace 2011).

Table 3.2-10: Water Infrastructure Capacity

Service Provider	Rated Capacity[2]	Average Daily Demand[3]	Peak Demand[4]	Cost - Residential	Cost - Industrial	Cost - Commercial	Connection Fee
LSA							
District of Kitimat (DM)	4 mgd[1]	1.7 mgd[1]	3.2 mgd[1]	144/ year	Do not supply	Metered rates	Residential $50 Commercial- at Cost
City of Terrace	5.0 mgd[1]	2.4 mgd[1]	4.8 mgd[1]	$9.60/month	$0.06 / 1,000 gallons	NA	Under 25 mm: $50 Over 25 mm: cost + administration fee
RSA							
Prince Rupert Area	5.3 mgd[1]	0.26 mgd[1]	1.32 mgd[1]	$0.56 / 1,000 gallons	$0.86 / 1,000 gallons	Varied depending on size/type	25 mm: $2,234 Industrial: cost + administration fee
City of Prince Rupert	14.3	4.89 mgd	10.83 mgd	NA	> 0.74 mg/d - $0.36, < 0.74 mg/d - $0.26 CDN	NA	$1100-1350
District of Port Edward	2 mgd	0.05 mgd	0.1 mgd	*$198/year*	*Monthly rate of $100 CDN, $0.34 CDN<739,682, $0.24 CDN>739,682*	NA	$1,300 (2" pipe) plus any extra cost

NOTES:

[1] mgd = millions of gallons/day[2] m^3 = metres cubed/day

[2] Rated Capacity = intended technical capacity of facility

[3] Average Daily Demand = typical daily demand

[4] Peak Demand = high demand point

SOURCES: City of Prince Rupert 2011; City of Terrace 2009; District of Kitimat 2013 a; Sussbauer. Personal Comm. 2013; Prince Rupert and Port Edward Economic Development Corporation 2013; Terrace Economic Development Authority 2010

In the RSA, Prince Rupert provides water treatment and distribution, although the reservoir and distribution systems are between 80 years to 90 years old and changes in legislation and standards for potable water require improvements to water treatment facilities (Prince Rupert and Port Edward Economic Development Corporation 2013). The City notes a need to expand into outlying areas as well as capacity concerns with high demand (City of Prince Rupert 2010). The District of Port Edward provides water distribution and treatment; a new water treatment plant was constructed in 2004 (Prince Rupert and Port Edward Economic Development Corporation 2013). This existing system was designed to accommodate a larger population (The Corporation of the District of Port Edward 2013).

In the RSA, the First Nations communities of Kitkatla, Hartley Bay, Metlakatla, and Lax Kw'alaams have water supply and distribution facilities (Aboriginal Affairs and Northern Development Canada 2012). The Regional District of Kitimat-Stikine's (RDKS) South Hazelton Water System provides a portion of the RSA with water distribution and treatment, but the capacity is unknown (Regional District of Kitimat-Stikine 2011). Those portions of the RSA that fall within the Skeena Queen Charlotte Regional District (SQCRD) have no water services provided by the SQCRD.

3.2.2.5.2 Sewage

Within the LSA, sewage collection and treatment for the District of Kitimat and the City of Terrace is self-provided and neither has plans to upgrade their existing system; however, both have noted capacity for expansion. The District of Kitimat currently provides secondary treatment for domestic sewage, waste water, and storm runoff and the existing facilities have unused capacity for future population growth, excepting in the case of worker camps for over 500 persons (Stantec Consulting 2013). The City of Terrace sewage treatment system includes two-cell aerated lagoon facilities (City of Terrace 2011). These have been upgraded several times, most recently in 2006, and the system has the capacity for a population of 20,000 (City of Terrace 2011).

Sewage collection and treatment facilities in the LSA and RSA are provided by First Nations, regional districts and municipalities, as well as by single owner septic systems. The capacity of known sewage service providers is listed in Table 3.2-11: Sewage Infrastructure CapacityTable 3.2-11. Of the providers listed, all have rated capacity above their current peak demand.

Table 3.2-11: Sewage Infrastructure Capacity

Service Provider	Rated Capacity[2]	Average Daily Demand[3]	Peak Demand[4]
LSA			
District of Kitimat (DM)	10.2 mgd[1]	2.1 mgd[1]	10.2 mgd[1]
City of Terrace	5.34 mgd[1]	1.19 mgd[1]	3.17 mgd[1]
RSA			
City of Prince Rupert	NA	NA	6.2 mgd
Prince Rupert Area	3.17 mgd1	1.32 mgd	2.11 mgd
District of Port Edward	NA	Average daily discharge: 930 $m^{3\,2}$	Peak discharge: 2,400 $m^{3\,2}$

NOTES:
[1] mgd = millions of gallons/day; [2] m^3 = meters cubed/day
[2] Rated Capacity = intended technical capacity of facility
[3] Average Daily Demand = typical daily demand
[4] Peak Demand = high demand point
SOURCES: District of Kitimat 2012; Prince Rupert and Port Edward Economic Development Corporation 2013; Terrace Economic Development Authority 2010

The RDKS owns and operates three water–sewer systems in the LSA. Individual properties in this system rely on septic tanks, where the effluent is pumped into a community collection system, and it is treated at a municipal dump or sewage facility (Regional District of Kitimat-Stikine no date a). The Thornhill water system serves approximately 1,640 customers using both wells and reservoirs (Regional District of Kitimat-Stikine no date a). The Regional District works with the City of Terrace to operate the Rural Terrace water systems (North Terrace and Brauns Island Water Service) (Regional District of Kitimat-Stikine no date b). The Queensway/Churchill Drive sewage system also provides water services to its service area, as well as to Kitselas, but the details are unknown (Regional District of Kitimat-Stikine no date a; Aboriginal and Northern Development Canada 2012).

Of the First Nations communities within the LSA, Kitsumkalum and Kitselas are known to have sewage facilities, but the details of ownership and capacity are unknown (Aboriginal Affairs and Northern Development Canada 2012). The Kitamaat Village sewer system was built in 1996 and has capacity for up to 800 people. The sewer system is gravity-fed and the wastewater treatment plant sludge is pumped out by Norco Septic at least every four to six months and disposed of at the Kitimat Municipal Dump (Powell 2013).

The Regional District of Kitimat-Stikine (RDKS) owns and operates three water–sewer systems in the LSA. Of these three, the Queensway/Churchill Drive Sewer System is explicitly sewage-related (Regional District of Kitimat-Stikine no date a). Individual properties within this system rely on septic tanks, but the effluent is pumped into a community collection system where it is treated (Regional District of Kitimat-

Stikine no date a). The exact use and capacity is unknown; however, the current lagoon site was selected for its ability to provide long-term expansion (Regional District of Kitimat-Stikine no date a). Additionally, there is an agreement between the RDKS and the Kitselas First Nation that the RDKS accepts sewage effluent from the Kulspai Reserve for treatment and disposal through the Queensway system (The Kitselas Band and Regional District of Kitimat-Stikine 2003). The two remaining RDKS facilities, the Thornhill Water System and the Rural Terrace Water Systems, are water systems (see water section), however it is unknown if sewage is also included in this infrastructure (Regional District of Kitimat-Stikine no date b; Regional District of Kitimat-Stikine no date c).

In the RSA, the First Nations communities of Kitkatla, Hartley Bay, Metlakatla, and Lax Kw'alaams have sewage facilities (Aboriginal Affairs and Northern Development Canada 2012). The RDKS's South Hazelton Water System provides a portion of the RSA with water services; however, it is uncertain if this includes sewage facilities (Regional District of Kitimat-Stikine 2011). Those portions of the RSA that fall within the Skeena Queen Charlotte Regional District have no sewage facilities provided by the regional district.

3.2.2.5.3 Solid and Hazardous Waste

Table 3.2-12 lists the waste capacities of landfills in the LSA. Kitimat has one landfill (the Kitimat Landfill) which has an assessed capacity sufficient to last 30 years, based on the average amount of waste disposal for a population of 8,000–9,000 (Towse pers. comm. 2013). The Terrace Area has two landfills, the City of Terrace Landfill and the Thornhill Landfill. The Terrace Landfill has an assessed capacity of over five years and the Thornhill Landfill is considered to be at or near capacity (Fall 2013) (Irwin pers. comm. 2013). However, the RDKS has plans to open a new landfill (Forceman Ridge Landfill) in 2016, which would make the Thornhill Landfill a transfer station and expand the overall waste capacity to over 50 years for Terrace Area residents.

All of the landfills in the LSA take domestic waste but do not accept industrial or hazardous waste. In the LSA and RSA, there are four licensed hazardous waste haulers. The only known hazardous waste sites in the LSA and RSA are those managed and owned on private industrial lands (Towse pers. comm. 2013). It has been noted that in the past five years waste disposal at the Kitimat Landfill has increased by 30% to 40%, especially between 2011 and 2013.

Table 3.2-12: Landfill Capacity

Facility	Owner	Landfill Capacity (at current rate – Fall 2013)	Plans for Upgrades	Population Served	Total Waste Disposed / year
Kitimat Landfill	District of Kitimat	30 years	No	8,000-9,000	NA
Terrace Landfill	City of Terrace	+/- 5 years	No	NA	NA
Thornhill Landfill	RDKS	Nearing capacity	To become transfer site	NA	NA
Forceman Ridge Landfill	RDKS	Minimum of 50 years	Proposed to open 2016	20, 000 for 50 years	excess of 955,600 tonnes

SOURCE: District of Kitimat 2012; Stantec Consulting 2013; Regional District of Kitimat-Stikine 2012; Terrace Economic Development Authority 2010; District of Kitimat. 2013C; District of Kitimat 2009; Lakelse Landfill Concerns No date.

Of the three First Nations communities in the LSA, Kitsumkalum and Kitselas do not have any formal garbage collection or disposal services or facilities. Kitamaat Village provides collection services with curbside pickup of garbage; however, neither the disposal location nor the capacity are known (Haisla First Nation no date a). There is no identified hazardous waste program or facility in the three communities. In the RSA, the First Nations communities of Kitkatla, Hartley Bay, Metlakatla, and Lax Kw'alaams do not have any formal waste collection or disposal services or facilities, or any hazardous waste services or facilities. Recycling Services

The District of Kitimat does not offer a curbside recycling program; however, the council provides financial support to the local not-for-profit recycling organization Kitimat Understanding the Environment (KUTE) to assist with their recycling depot (Stantec Consulting 2013). KUTE is under increasing pressure to deal with large amounts of recyclable material (Towse 2013, pers. comm.).Within the District, there are other facilities (e.g., private bottle depots) that provide options for diverting products from the landfill (Stantec Consulting 2013), but the total recycling capacity in the District is unknown. The OCP for the City of Terrace indicates that the City is searching for ways to improve access to recycling through awareness and availability of services (The City of Terrace 2011).

The Official Community Plan for the City of Terrace indicates that the City is searching for ways to improve access to recycling through awareness and availability of services (The City of Terrace 2011). The City partners with the RDKS and Zero Waste to provide information about the various depots within the City (Regional District of Kitimat-Stikine and City of Terrace 2013). Recycling in Terrace is provided by the Do Your Part Recycling company, which offers both drop off or curbside pickup service (Do Your Part no date). Additional facilities are Encorp Pacific Bottle Facility and an ABC Metal recycling depot. The total recycling capacity of the city is unknown.

The City of Prince Rupert offers curbside recycling (Recycling Council of British Columbia no date). The recycling services in Prince Rupert are provided by the SQCRD and funded through taxation and the sale of recyclables (City of Prince Rupert 2007). The overall capacity is unknown, although the OCP indicates that the City is working with SQCRD to increase recycling opportunities (City of Prince Rupert 2010). The SQCRD runs recycling programs that encompass Prince Rupert, Port Edward, and electoral areas A and C (The Corporation of the District of Port Edward 2013). The capacity of the program is unknown and the SQCRD has no additional recycling programs in the RSA.

In the LSA, the First Nations communities of Kitsumkalum and Kitamaat Village have no formal recycling programs or facilities. While Kitselas does not currently have a program or facility, the Land Use Plan notes recycling as a potential program that is under discussion (Lands Management Office 2012). In the RSA, the First Nations communities of Kitkatla and Lax Kw'alaams do not appear to have recycling programs or facilities. The Tourism Plan for Hartley Bay indicates that the community is developing (or has developed) a plan to ship recyclables to Prince Rupert if the development of local facilities is not feasible (Gitga'at First Nation 2003). The community of Metlakatla initiated a curbside recycling program of unknown capacity in the summer of 2013 (Metlakatla First Nations 2013).

3.2.2.5.4 Communication

There are three major telephone, internet, cable, and cellular providers in the LSA and RSA: TELUS, Rogers, and City West (Table 3.2-13). Coverage includes the City of Terrace and District of Kitimat in the LSA and the City of Prince Rupert and District of Port Edward in the RSA. While the RDKS and SQCRD are serviced, it is unclear what the level of coverage is for specific services. Plans for expansion of services are unknown, with the exception of investment in wireless coverage from Rogers. Of the providers, only City West is local (City West 2012a).

Table 3.2-13: Telecommunications Providers

Provider	Services Provided	Plans for Expansion
TELUS	▪ Telephone ▪ Internet ▪ Cable ▪ Cellular ▪ Switch technology – digital ▪ Fibre service ▪ 100 mbps LAN ▪ ISDN, ADSL, ADSL from switch	Unknown

Provider	Services Provided	Plans for Expansion
City West	▪ Telephone ▪ Internet ▪ Cable ▪ Cellular ▪ Switch technology – digital ▪ Fibre service ▪ 100 MBPS LAN ▪ ADSL, ADSL from switch	Unknown
Rogers	▪ Cellular (4G HSPA+ and GSM/EDGE)	$10 million investment to expand GSM wireless voice and data network. Expansion will extend Rogers Wireless service from Prince Rupert to Prince George (announced September 2007)

SOURCES: District of Kitimat 2012; City West 2012 A; Rogers 2012; TELUS 2013; Terrace Economic Development Authority 2010; Prince Rupert and Port Edward Economic Development Corporation 2013; Invest British Columbia, Port of Kitimat, District of Kitimat 2009

There are a number of radio stations within the LSA and RSA. CBC Radio One, Radio Two, and French are available throughout, broadcasting from inside the RSA (Prince Rupert/North Coast) and outside (Vancouver and Prince George (Radio Station World 2013). There are two First Nations Radio stations, with Northern Native Broadcasting broadcasts CFNR Classic Rock out of Terrace (CFNR Network Classic Rock no date) and the Kitamaat Village Radio out of Kitamaat Village (Haisla First Nation no date b). Additionally, across both the LSA and RSA there are approximately eight additional radio stations (e.g., music, community news, religious) (Radio Station World 2013). There are also two TV stations local to the LSA and RSA: Community Channel 10 and CFTK TV Terrace (CFTK-TV 2013; City West 2012b).

3.2.2.5.5 Electricity and Natural Gas

Throughout the LSA and RSA, BC Hydro provides electric power and Pacific Northern Gas provides natural gas (Trade and Invest British Columbia no date). BC Hydro's residential customers pay 6.9 cents/kilowatt hour (kWh) over two months for the first 1,350 kWh, above which the cost is 10.34 cents/kWh (BC Hydro 2013). Electricity rates for business and industry vary depending on size and quantity (Prince Rupert and Port Edward Economic Development Corporation 2013; District of Kitimat 2012; Terrace Economic Development Authority 2010). Natural gas rates are approximately $10.75/month for residential, $25-$150/month for commercial, and $410/month for small industrial with various other prices for propane (Pacific Northern Gas Ltd. 2012).

3.2.2.6 Education

The Coast Mountains School District (CMSD) 82 is responsible for providing educational services to the LSA communities of Kitimat and T errace. The BC First Nations Schools Association (FNSA), in association with Haisla Nation, Kitselas and Kitsumaklum Offices are responsible for providing educational services to members of their community (Table 3.2-14) (Haisla Nation 2013; FNSA 2013).

Table 3.2-14: School Infrastructure and Student-Educator Ratios[a]

Community	School Level	School Name	Number of Students[b]	Number of educators[c]	Student: Educator Ratio	Year Built
Coast Mountains School District 82[d]						
Kitimat	K-6	Kildala Elementary	185	21	9	1957
	K-6	Nechako Elementary	311	22	14.1	1955
	9-12	Kitimat City High	53	6	8.8	1991
	7-12	Mount Elizabeth Middle/Secondary	624	50	12.5	1956
	Independent Schools[e]					
	K-7	St Anthony's Catholic Elementary	104	13	7	NA
	Total	**5 Schools**	**1,277**	**112**	**11.4**	**-**
Terrace	K-3	Thornhill Primary	225	19	11.8	1967
	3-6	Thornhill Elementary	159	10	15.9	1962
	K-6	Cassie Hall Elementary	209	20	10.5	1957
	K-6	Suwilaawks Community School	252	21	12	1963
	K-6	Ecole Mountainview	151	8	18.9	2002
	K-6	Uplands Elementary	309	19	16.3	1957
	7-9	Skeena Middle	628	49	12.8	2003
	8-12	Parkside Secondary	136	16	8.5	1969
	10-12	Caledonia Secondary	709	47	15.1	1967
	K-12	North Coast Distance Education	682	10	68.2	NA
	Independent Schools					
	K-7	Veritas Catholic	196	NA	NA	NA
	K-9	Spring Creek Adventist Christian School	25	NA	NA	NA
	K-12	Centennial Christian School	136	12	11	NA
	K-12	Mountain View Christian Academy	51	8	6.4	NA
	Total/ Average	**14 Schools**	**3,868**	**239**	**16.2**	**-**
BC First Nations Schools Association and Band Run Education Programs						
Kitselas First Nation	NA	Wabsuwilaks'm Gitselasu Adult School	NA	1	NA	NA
Kitsumkalum First Nation	NA	Na aksa Gila Kyew Learning Centre	NA	NA	NA	NA

Community	School Level	School Name	Number of Students[b]	Number of educators[c]	Student: Educator Ratio	Year Built
Haisla Nation (Kitamaat Village)	K-7	Haisla Community School[f]	NA	4	NA	NA
LSA TOTAL	**-**	**19 Schools** **2 FN Educational Programs** **21 Total Educational Institutions**	**5,145**	**351**	**14.7**	**N/A**

NOTES:

NA – data not available

[a] Educator populations are calculated by publicly available data, CMSD Teacher and Administrator Information received from the CMSD on August 20, 2013, and other personal communications.

[b] Enrolment as of September 30, 2012

[c] From Statics Canada 2011, the reported term 'Educator' differs on reporting district. In BC 'Educators' includes "A teacher or administrator (vice-principal, principal, or director of instruction) having BC teacher certification (Ministry of Education 2013)." Therefore, 'Educators' in BC include: Regular Classroom Teachers, and other support staff such as Supervisors of Instruction, Teacher Consultants, Co-ordinators, Helping Teachers, Other Instructional Support, Testing & Assessment – Professional Staff, Department Heads, and Teachers who have administration duty but are not Department Heads; and, Administrators who are Principals, Vice-Principals, and Directors of Instruction (Ministry of Education 2013)."

[d] The number of educators is calculated in the Coast Mountains School District 82 by adding the total number of reported Teachers, Support Staff, and Administrative Staff employed between 2012 and 2013 (MSD Teacher and Administrator Information 2013, pers.comm.).

[e] Independent School Information has been collected through online or personal communication.

[f] Data was not made publicly available for Kitamaat Village to determine a student/educator ratio or for the age the Haisla Community School.

SOURCE: CMBESD 2011, Ministry of Education 2012, Ministry of Education 2013; Gagnon 2013, pers. comm..; AANDC 2009, Haisla First Nations 2013, Kitselas 2013a.

3.2.2.6.1 Student:Educator Ratio

The student:educator ratio is calculated by dividing the total number of students by the total number of educators employed by each school (Table 3.2-14). The national average student:educator ratio in 2010 was 14, with BC accounting for the highest provincial average of 16.6 (Statistics Canada 2011), using the definition of educator from Statistics Canada (2011): "Educators include all employees in the public school system (either school-based or school district-based) who belong to one of the three following categories: teacher, school, administrators and pedagogical support."

The average student:educator ratio for the LSA was 14.7 (Table 3.2-14). In 2012, Kitimat had a lower average student:educator ratio of 11.4, and Terrace ranked similar to the provincial average of 16.2. From the schools listed in the LSA, the North Coast Distance Education School has the highest ratio of 68.2. However, these numbers do not account for itinerant staff employed by the school district and may reflect distance and part-time students. Ecole Mountain Middle School ranks the second highest with 18.9, above the provincial average of 16.6.

3.2.2.6.2 District Average Class Size

In 2012, the district average class size in the CMSD 82 were 17.5 for kindergarten, 21.1 for Grade 1–3 (21.1), 23.1 for Grade 4–7, and 23.7 for Grade 8–12 (Ministry of Education 2012). The provincial-average class size for the same grade distribution was 19 for kindergarten, 21.1 for Grade 1–3, 25.4 for Grade 4-7, and 23.7 for Grade 8–13 (Ministry of Education 2012). On average, the district had a smaller average class size for kindergarten and for Grade 4–7. However, it had the same class size for Grade 1–3 and a larger average class size for Grade 8–12. The average elementary classroom capacity for grades 1–8 to 1–12 was 23.3 in the LSA, which is within or below the provincial average for classroom size (Ministry of Education 2012).

3.2.2.6.3 School Infrastructure Capacity

School infrastructure needs are assessed by the Ministry of Education's capacity utilization rate, which compares the percentage of occupancy compared to building capacity (Coast Mountains School District 2011). In 2010, the Ministry of Education reported the total capacity utilization of CMSD 82 was 61.8%, lower that the Ministry's target of 95%. In 2011, Kitimat was found to have the highest capacity of surplus educational infrastructure and a capacity utilization rate of 52%, a rate expected to drop to 39% by 2021. These percentages no longer represent the current capacity utilization rate of the CMSD 82 because the district underwent grade restructuring and school consolidations between 2011 and 2012 (CMSD 2011). However, they do indicate the additional amount of vacant or underutilized educational infrastructure available in the LSA and, especially, Kitimat.

From a 2010 report that used BC Stats PEOPLE 35 school age population projections, the population of all school age children (1-4, 5–12 and 13–17) will generally decline in the CMSD 82 from 2011 to 2036 (CMSD 2011). Even after planned school consolidation and grade restructuring, the district expects a decrease in enrolment rates (CMSD 2011).

3.2.2.6.4 Preschool and Childcare

In the LSA, there are 10 licensed childcare facilities and six pre-kindergarten facilities, of which one each is located in the three Aboriginal communities (Table 3.2-15). Surveys undertaken between 2012 and 2013 indicate all licensed preschool and childcare facilities in Kitimat and Terrace were at or over capacity (Northern Health Public Health Protection: 2012-2013a; 2012-2013b; 2012-2013c).

Capacity numbers reflect the total number of children allowed in the daycare facility at one time and do not include the number of children in part-time care (Anonymous T., 2013, pers. comm.). The capacity rates are determined by the Ministry of Health's child care licensing regulations, which consider the number and education of staff needed, the age of child being cared for, and the number of children (2013). Staffing numbers are not reported by Northern Health's inspection reports and are subject to

change based on demand and the availability of licensed early child-care educators (ECEs) in each community (Anonymous T., 2013, pers. comm.).

Current child care challenges in the LSA communities include a need for additional ECEs, turnover due to non-competitive wage salaries, and the need for more facilities for children at the age mothers return to work and more part-time child care options (before and after school care) (Anonymous T., 2013, pers. comm.). Of the LSA communities, Kitimat faces the most challenges in providing child care resources because projects like the Rio Tinto modernization located in the community have placed a strain on the availability of leasing space. With limited space available, it is anticipated more non-licensed child care options will result (Mentiero 2013, pers. comm.).

Table 3.2-15: Preschool-Childcare Services and Capacity Rates

Community	School Level	School Names	Enrollment[c]	Capacity[d]
Kitimat	Pre-K[a]/Child care[b]	Kildala Preschool and Out of School Care	44	44
	Child care	Smiley Kidz Daycare	7	7
	Pre-K	Kid's Place	15	15
	Pre-K/Child care	St. Anthony's Pre -Kindergarten	25	25
	Child care	Cormorant Child Care Centre	36	28
	Child care	Coolest Daycare	7	7
	Child care	Wee Ones Daycare	7	7
Terrace	Child care	Terrace Day Care Centre	25	25
	Pre-K/Child care	Terrace Sunflower Child Care Centre	43	35
	Child care	The Seven Little Dwarfs Daycare	7	7
	Pre-K	Thornhill Preschool	20	20
	Child care	Toynbee Daycare	7	7
	Child care	Veritas Catholic School	25	25
	Child care	Walk and Roll Childcare Centre	7	7
	Child care	Willow Creek Childcare Centre	36	35
Haisla Nation (Kitamaat Village)	Pre-K	Cimo'ca Childcare (Head Start Program)	20	20
Kitsumkalum (FN)	Pre-K	Gila Kyew Nluulk Headstart & Day Care	NA	NA
Kitselas (FN)	Pre-K	Kitselas Head Start Preschool Program	NA	NA

NOTES:
NA – data not available
[a] Pre-K represents preschool age children (30 months to school age).
[b] Child care includes group child care under 30 months and 36 months, family child care, and multi-age childcare.
[c] Numbers reflect the total number of children allowed in a day care facility at one time and do not include the number of children in part-time care (Skeen Resource Development Centre August 12, 2013, pers. comm.).

[d] Maximum capacity reflects the number of children allowed in a day care facility based on Ministry of Heaths' Child Care Licensing Regulations 2013, which considers the number and education of staff needed, age of child being cared for, and number of children.

SOURCES: NHPHP 2013; Kitimat Community Care Facilities NHPHP 2013; Kitamaat Village Community Care Facilities NHPHP 2013; Terrace Community Care Facilities, Anonymous T. 2013, pers. comm.; Ministry of Health 2013.

3.2.2.6.5 First Nations Preschool and Childcare Services

Band Councils, such as the Kitsumkalum First Nation, Kitselas First Nation, and Haisla Nation Councils administer early child care education and child care services under *Federal Aboriginal Head Start Standards* and in accordance with provincial licensing standards (Health Canada 2013; Ministry of Health 2011). Services are offered on and off reserve depending on the funding source and are based on six common objectives: education, health promotion, culture and language, nutrition, social support, and parental/family involvement (Health Canada 2013).

3.2.2.7 Emergency and Protective Services

Ambulance services are provided to the Kitimat and the Greater Terrace Area through the Skeena District British Columbia Ambulance Service (BCAS). Ambulance services are also provided by the Kitimat Fire Department through a fee for service agreement with the BCAS. On a regional level service, capacity for the Greater Terrace Area is at an all-time low, with major increases in call volumes from 2012–2013 and competition with industry for related jobs (e.g., paramedics) which pay more money and offer greater short-term stability. Specific issues of concern include resourcing and retention of staff, traffic between Kitimat and Terrace, demand on services on weekends (90% of calls are alcohol or drug related on these nights), and the increase in transfers being received from Kitimat to Terrace (Parks 2013, pers. comm).

Between 2007 and 2012, the District of Kitimat Fire and Rescue Services Department (which provides pre-hospital emergency care for Kitimat) had an increase in the annual average number of calls; except for 2011, which experienced a minor decrease (District of Kitimat 2012b). In 2012, the Department responded to 846 ambulance calls (70.5 calls per month), which was consistent with the rate for the previous five years (except 2011) (District of Kitimat 2012b). Between 2012 and 2013, the total call volume for the region was estimated at 3,400 calls, but this is expected to increase to more than 5,000 for 2014–2015 (Parks 2013, pers. comm.).

Table 3.2-16: Kitimat Ambulance Service Calls, 2007 to 2012

Ambulance Calls						
Total Calls Per Year	575	702	740	731	1,012	846
Average Calls Per Month	47.9	58.5	61.7	60.9	84.3	70.2
Year	2007	2008	2009	2010	2011	2012

SOURCES: Modified from Kitimat Ambulance Service Calls 2007-2012, District of Kitimat 2012

Compared with Terrace, Kitimat is somewhat better able to accommodate increased demand because employees are trained and employed full time, allowing for more stability and less competition from resource industry sector jobs (Bossence 2013, pers. comm.; Parks 2013, pers. comm.). Ambulance services in the LSA have overall limited capacity to respond to increased demands without increasing staff or experiencing a decline in service considering staff resources and service quality.

The BCAS provides air transport for emergency medical service: one helicopter is based out of Prince Rupert and one helicopter is based out of Kamloops. The Prince Rupert BCAS helicopter would most likely be called to serve the LSA communities for air transport and emergency medical services. All requests for ambulance services received from LSA communities are processed through the Kamloops Dispatch Operation Centre, which provides service to all communities in the interior and northern BC. It is one of the largest dispatch operations centres in North America, receiving 500 calls to 600 calls a day and having responsibility for dispatching ambulances to 98 communities (British Columbia Ambulance Service 2013).

3.2.2.7.1 Fire Protection and Emergency Response Services

Incident and Call Reports

The District of Kitimat Fire and Rescue Services Department and the Terrace Fire and Rescue Department provide and support fire protection and emergency response services to Kitimat and Terrace. The Haisla Nation Council Fire Department, through a service agreement with the District of Kitimat, provides supportive fire protection and emergency response services to Kitamaat Village on a service by rate fee (Bossence 2013, pers. comm.). Communities in the Greater Terrace Area (Thornhill, Kitsumaklum and Kitselas) are provided fire and emergency response services through the coordinated efforts of the Regional District of the Kitimat-Stikine and the Thornhill Fire Department. The Thornhill Fire Department acts as the primary fire hall coordinating services through two additional secondary satellite fire halls, located at Kleanza Creek and Lakelse Lake (Boehm 2013, pers. comm.).

Fire Service and Training

The majority of fire departments located in the LSA are heavily dependent on part-time and off duty volunteers. In 2012, the Terrace Fire Department logged approximately 40,592 hours for 25 volunteer fire fighters (1,624 hours per member) and 11,539 hours for eight career fire fighters (City of Terrace 2012). However, the Kitimat Fire Department is exclusively dependent on full-time members and does not have any volunteer fire fighters (Bossence 2013, pers. comm.). Services provided by fire departments in the LSA include, but are not limited to, first responders service, medical emergencies, hazardous material spills, fire calls, emergency protection, training, floods and helicopter service response, motor vehicle collisions, high angle incidents, confined space incidents, dangerous goods responses, rescue, and airport emergencies, fire prevention, public education, fire suppression, rescue, and hazard mitigation and coordination, and emergency response planning.

Personnel with the District of Kitimat Fire Department, the Terrace Fire Department and Thornhill Fire department, and those coordinated through the Kitimat-Stikine Regional District are trained to the National Fire Protection Association (N.F.P.A) 1001 standards (Patterson 2013, pers. comm.). For larger fire departments in the LSA, members are trained in both firefighter and primary care paramedic (PCP) certifications. Additionally, members obtain extra training for industry specific needs, such as responding to confined spaces, auto extrication, rapid intervention team (R.I.T.) and high angle rescue (District of Kitimat 2012; City of Terrace 2012).

Challenges for fire service in the LSA include skills development and maintenance. The majority of specialized training takes place in the lower mainland, making industry-related specific skills training costly (City of Terrace 2012). The Kitimat Fire Department is currently facing increased demands and resources in fire prevention services and responding to increased call demands (Bossence 2013, pers. comm.). Currently, the Terrace and Thornhill fire departments are staffed with enough volunteer hours to meet community needs (Boehm 2013, pers. comm.; Klie 2013, pers. comm.). However, there could be demand for additional volunteers in smaller fire departments such as the Haisla Nation Council Fire Department or those that provide fire and emergency response services to the communities of Kitselas or Kitsumaklum. In 2013, the major fire departments located in the LSA noted an increase in the number of calls; however, these calls are not specifically related to fire or emergency response incidents (Boehm 2013, pers. comm.; Bossence 2013, pers. comm.; Klie 2013, pers. comm.).

Table 3.2-17: Fire Services, LSA

Fire Department	Full-time Employees	Volunteer Employees	Services Provided	Administration & Area served
Kitamaat Village				
Haisla Nation Council Fire Department	1 Fire Services/Emergency Coordinator	15-20 volunteer fire fighters (7-10 available on a consistent basis)	Ambulance, emergency response, fire safety and education	Administration: Kitamaat Village and the District of Kitimat (Bylaw No. 1448) Service Area: Kitamaat Village other un incorporated nearby areas
Kitselas				
Thornhill Volunteer Fire Department	See RDKS Communities in the LSA		See Regional District of Kitimat-Stikine – Thornhill Fire Department serviced areas	Administration: Regional District of Kitimat-Stikine and The Kitselas Band (Owned by the Band) (Fire Protection [Kitselas Reserve #1] partnering Agreement) Serviced Area: Eastern part of the Skeena Fire Service
Kitsumaklum				
Kitsumaklum Volunteer Fire Department	Indicated but not specified	16 volunteer fire fighters (as of 2009)	Fire protection and emergency rescue,	Administration: Kitsumaklum First Nation Serviced Area: Kitsumaklum Reserve Lands
District of Kitimat				
District of Kitimat Fire & Rescue Services Department	2 Fire Chiefs (one deputy) 18 full-time fire fighters And 1 Administrative Assistant	None	Pre-hospital emergency care (ambulance), fire prevention and public education, fire suppression, rescue, and hazard mitigation	Administration: District of Kitimat Serviced Areas: District of Kitimat and support to some incorporated and First Nations reserves

Fire Department	Full-time Employees	Volunteer Employees	Services Provided	Administration & Area served
Terrace				
Terrace Fire and Rescue Department	1 Fire Chief, 1 Deputy Fire Chief And 8 full-time Firefighters and 1 part-time Administrative Clerk.	25 - 30 volunteer fire fighters	First responders service, and response to highway traffic accidents, medical emergencies, hazardous material spills and, fire calls, emergency protection, training, floods and helicopter service response.	Administration: City of Terrace's Fire and Rescue Department Serviced Area: The detachment area extends approximately 50 km north of the Nass Road (leading to New Aiyansh), 24 km south towards Kitimat, and 70 km east towards Cedarvale and 70 km west towards Prince Rupert
RDKS Communities in the LSA				
Thornhill Volunteer Fire Department (primary) Kleanza Creek Volunteer fire department (secondary) Lakelse Lake (secondary)	1 Fire Chief, and 1 Deputy fire Chief	33 volunteer fire fighters (shared between all of the fire halls) 5 are available in rural areas for medical response	Fire and Emergency Services relating to fire prevention, protection and suppression services, fire investigation , first responder service, and ambulance assistance to be provided by the Regional District from the Fire Hall The Fire Department also co-ordinates the Emergency Rescue Team, the Hazardous Material Response Team, and Terrace & District Emergency Services	Administration: The Regional District of the Kitimat-Stikine RDKS and through mutual aid agreements with differed communities (e.g., City of Terrace and Kitsakalum) Organization Structure: Hall 1- located in the community of Thornhill is the primary service centre; others rural volunteer fire halls include: Kleanza Lake, Lakelse Lake Fire Hall, and Guanza Fire Hall Serviced Area: Community of Thornhill and generally the highway corridor to the north side of Onion Lake all the way south to Highway 37 South and eastbound to Highway 16.

SOURCES: Haisla Nation Council 2012; Grant 2013, pers. comm.; District of Kitimat 1990; Kitimat-Stikine Regional Districts and Kitselas Band 2004; AMMSA 2013; City of Terrace 2013; Bossence 2013, pers. comm..; Klie, J. 2013, pers. comm.; Boehm , R. 2013, pers. comm..

Police Services

Police services are delivered in the LSA by two RCMP integrated detachments: the Kitimat Municipal/ Provincial Detachment and the Terrace Municipal/Provincial Detachment. An integrated detachment is comprised of two or more provincial and/or municipal police units working out of the same detachment building. The District of Kitimat has eighteen regular members, two auxiliary officers and five full-time, as well as part-time and casual employees (District of Kitimat 2013). The Terrace integrated detachment has forty-five regular members (a combination of municipal and regionally assigned members), ten municipal employees, five services employees, and two victim assistance contractors (City of Terrace 2013).

Common challenges noted by police staff from Kitimat and Terrace were an increase in call volumes related to drug and alcohol associated incidents. The most common incidents were primarily related to alcohol, marijuana and cocaine (Harrison 2013, pers. comm.; Robinson 2013, pers. comm.). It was noted by police officers in Kitimat and Terrace that crime-related incidents were perceived by community members to be caused by transient workers; however, often it was locals causing the incidents being reported (Harrison 2013, pers. comm.; Robinson 2013, pers. comm.). A common challenge for communities is the recruitment and retention of police staff. Police units from Kitimat and Terrace had unfilled positions in the fall of 2013; however, at the time of the interviews, it was reported that both the Kitimat and Terrace detachments had capacity to respond to current demand (Harrison 2013, pers. comm.; Robinson 2013, pers. comm.). Other common issues raised were increases in traffic between Kitimat and Terrace and the potential for increased traffic incidents, the majority of them involving men (approximately 80%) (Harrison 2013, pers. comm.). Perception of community safety and that the greater disposable incomes could lead to more drug and alcohol related activities. Additionally, more people will result in a greater need for police resources and staff (Harrison 2013, pers. comm.; Robinson 2013, pers. comm.).

Changes in crime rates and caseloads indicate that police services in the LSA are experiencing increased pressure, at least for the Terrace Area. Overall crime rates (the number of criminal code offences or crimes, excluding drugs and traffic, reported for every 1,000 permanent residents) increased in Kitimat by 2.8%, Terrace by 6.3%, and in the Terrace Provincial Area by 19% between 2010 and 2012. However the overall crime rate decreased in the Kitimat Provincial Area by 49% between 2010 and 2012, but increased by 3% between 2011 and 2012 (see Table 3.2-18) (Ministry of Justice 2013). In 2012, the Kitimat and Terrace municipal crime rates were both above the RCMP municipal forces average total crime rate of 69 for municipalities with population between 5,000 and 14,999. The Kitimat and Terrace provincial area crime rates were also above the crime rate for the RCMP provincial detachment total in 2012 (Ministry of Justice 2013). In 2012, the case load (the number of criminal code offences per

authorized police strength) of Kitimat (Municipal) was lower by 8.6% (63) than the RCMP municipal forces total case load of 70 and higher in Terrace (Municipal) by 25.6% (93).

Table 3.2-18: Crime Information, 2010 to 2012

Area	Year	Pop.	Police Strength	Police Case Load	Pop. Served per member	Total Criminal Code Offences	Total Crime Rate
District of Kitimat	2010	9,176	15	63	612	945	103
	2011	9,098	15	59	607	945	97
	2012	9,009	15	64	601	955	106
City of Terrace	2010	11,927	25	86	477	2,150	180
	2011	12,044	25	86	482	2,150	179
	2012	12,182	25	93	487	2,335	192
RCMP municipal forces total[1]	**2012**	**289,439**	**420**	**70**	**689**	**29,396**	**102**
Kitimat Provincial. Area	2010	522	2	30	261	59	113
	2011	522	2	15	261	29	56
	2012	521	2	15	NA	30	58
Terrace Provincial. Area	2010	7,326	7	76	1,047	530	72
	2011	7,327	7	77	1,047	540	74
	2012	7,313	7	NA	NA	66	89
RCMP provincial detachments total	**2012**	**689,468**	**769**	**62**	**897**	**47,652**	**69**
Kitimat Stikine RD[2]	2010	39,302	75	78	524	5,825	148
	2011	39,340	75	76	525	5,668	144
	2012	NA	NA	NA	NA	NA	NA
Skeena Queen[3] Charlotte RD	2010	19,537	54	74	362	4,012	205
	2011	19,527	54	81	362	4,354	223
	2012	NA	NA	NA	NA	NA	NA
BC[4]	2010	4,529,508	8,862	43	NA	382,857	84.5
	2011	4,576,577	8,952	40	NA	361,359	79.0
	2012	4,622,573	8,887	40	NA	357,192	77.3

NOTES:

[1] Total Municipal BC Comparison of crime statistics for communities with populations between 5,000 and 14,999

[2,3] Police Services Division did not produce regional profiles for 2012

[4] Comparison for BC provincial Police Case Load should be considered with conservative assumptions as population data and total number of police officers (police strength) was assed using statistics Canada data and not what was reported by the Police Services Division of BC

SOURCES: Ministry of Justice 2013. Ministry of Justice 2013a.

First Nations Policing

First Nations policing is administered by Public Safety Canada through the First Nations Policing Program (FNPP) (RCMP 2013). The FNPP provides First Nations communities the opportunity to participate with the federal and provincial or territorial governments in tripartite agreements to support policing services in their communities. Kitamaat Village, Kitselas and Kitsumkalum all have a First Nations Community Police Officer (Ministry of Justice 2013).

3.2.2.8 Municipal Government Finances

3.2.2.8.1 Revenue

Table 3.2-19 shows the sources of revenue and total revenues for Kitimat, Terrace, and the RDKS in 2012. In that year, Kitimat derived approximately 78% of its $26.3 million revenues from property taxes, 64.5% of which came from major industry, and the rest from light industry, commercial, and residential sources (District of Kitimat 2013b). The sale of services, including fees or charges for licenses, permits, refuse collection, recreation, water and sewer, accounted for much of the balance of Kitimat's revenue in 2012. Taxation accounted for 58% of Terrace's 2012 revenue of $21.5 million. In that year, Terrace obtained 19% of its revenues from the sale of services and 21% from transfers from provincial and regional governments.

Unlike municipalities, regional districts do not collect taxes directly from residents, but rather requisition their annual budgets based on approved five-year financial plans. Requisitions are based on the cost of services to be provided by the regional district, including costs shared with municipalities in the region. In 2012, the RDKS had revenues of nearly $11 million, of which requisitions accounted for 46%. The sale of services and transfers from other governments' accounted for much of the RDKS's other revenue in 2012.

3.2.2.8.2 Expenditures

Municipal expenditures data show that the District of Kitimat and City of Terrace have similar spending priorities (Table 3.2-19). For both communities, the top three non-financial expenditure areas in 2012 were: protective services (primarily fire protection and policing); transportation and transit; and parks, recreation, and culture (BC Ministry of Community, Sport and Cultural Development 2014). As a proportion of its total expenditures, Terrace spent comparatively more on municipal utilities, whereas Kitimat spent more on general government. Terrace's expenditures on debt amortization were substantially greater than Kitimat's (16.8% versus 7.9%).

Owing to its far larger industrial tax base and smaller population, Kitimat's revenues and expenditures on a per capita basis are substantially larger than Terrace's. In 2012, Kitimat spent approximately $2,674 per

capita, compared to $1,584 per capita expenditure for Terrace. Both communities experienced operational fiscal surpluses of approximately $2 million in 2012.

On a per-capita basis, the expenditures of the RDKS are far lower than for either Kitimat or Terrace. In 2012, the RDKS spent the largest portions of its budget on parks, recreation, and culture (23.2%), solid waste management and recycling (20.7%), protective services (15.5%), and general government (11%).

Table 3.2-19: Municipal Government Expenditures in the LSA and Kitimat-Stikine Regional District

	Kitimat	Terrace	RDKS
General government	13.3%	8.5%	11.0%
Protective services	20.8%	24.5%	15.5%
Solid waste management and recycling	5.1%	1.4%	20.7%
Health, social services, and housing	0.4%	0.0%	0.0%
Development services	5.1%	8.8%	7.0%
Transportation and transit	21.6%	13.7%	5.3%
Parks, recreation and culture	20.4%	19.4%	23.2%
Water services	3.3%	4.0%	6.9%
Sewer services	1.6%	2.7%	1.2%
Other services	0.5%	0.3%	0.0%
Amortization	7.9%	16.8%	3.7%
Other adjustments	NA	NA	0.0%
Debt payments for member municipality	NA	NA	5.6%
Total expenditure	$24,090,393	$19,272,298	$11,891,433
Fiscal surplus (deficit)			
2012 population	9,009	12,182	37,814
Per-capita expenditure	$2,674	$1,582	$314

SOURCE: BC Ministry of Community, Sport and Cultural Development (2014)

3.2.2.8.3 Budget Forecast and Capital Spending

Kitimat's 2014 budget's five-year outlook predicts revenue and expenditures averaging approximately $32 million per year, with no fiscal deficits or surpluses. Kitimat forecasts annual capital spending over the 2014 to 2018 period will be in the range of $3.0 million to $7.9 million per year (Table 3.2-20).

Terrace's 2014 to 2018 financial plan calls for revenues and expenses in the $20.5 million to $20.8 million range, with operating deficits of about $183,000 beginning in 2015. Terrace forecasts capital expenditures in the range of $1.9 million to $4.1 million per year over the 2013 to 2017 period.

Table 3.2-20: District of Kitimat and City of Terrace Forecast Capital Expenditures, 2013 to 2017

	2014	2015	2016	2017	2018
Kitimat	4,950,487	2,988,500	7,907,353	3,887,083	6,493,782
Terrace	4,068,500	2,081,500	1,941,000	2,713,599	3,283,000

SOURCE: City of Terrace (2014), District of Kitimat (2014b)

3.2.2.9 Tourism and Recreation

3.2.2.9.1 Outdoor Recreation Areas

Outdoor recreation opportunities in the LSA are abundant and diverse. The area draws recreationalists and tourists from all over the world to engage in a variety of outdoor activities, including hiking, wildlife and nature viewing, front- and back-country camping, hunting, and recreational fishing (British Columbia 2013a; Hittel 2013, pers. comm.; Parsons 2013, pers. comm.; Pont 2013, pers. comm.)

Outdoor recreation opportunities in and near the LSA are typically easily accessible within the boundaries of Kitimat and Terrace, and from Highway 37 outside these communities (District of Kitimat 2014b; City of Terrace 2011). However, Kitimat is an oceanfront community, and presently has limited to no public waterfront access (except Hospital Beach which is owned by Rio Tinto Alcan).

Retaining access to backcountry and outdoor recreation areas is important to local residents (Hummel and Langagger 2013, pers. comm.; McCleod 2013, pers. comm.; Pont 2013, pers. comm.; Wakita 2013, pers. comm.), and is identified as a key planning initiative in multiple land use and management documentation for the LSA (MFLNRO 2002; City of Terrace 2011; District of Kitimat 2013b). Because access has been identified as an important aspect of the ability to participate in recreation activities, land-based access points and routes that overlap with the LSA are included in the relevant sections that follow.

3.2.2.9.2 Municipal Outdoor Recreation Areas

The District of Kitimat and the City of Terrace offer local residents and visitors with a number of recreation sites and multi-use trails. The District of Kitimat Leisure Services operates and maintains a number of quality outdoor recreation facilities for use by the public, including parks and open spaces accounting for 25% of the land base (District of Kitimat 2014a). The City of Terrace manages and maintains over 220 hectares of parks and open space, providing easily accessible natural outdoor recreation opportunities for residents and visitors to the area (City of Terrace 2011).

There are five outdoor recreation areas in Kitimat, including two parks—Radley Park and Hirsch Creek Park—that provide camping, day use and opportunities for a variety of other outdoor recreation activities such as hiking and kayaking (District of Kitimat 2014a; Tourism Kitimat 2014). Ferry Island Campground provides local residents and visitors with outdoor recreation facilities less than 5 km from downtown Terrace (Visit Terrace BC 2014).

There are eight trails within or close to Kitimat:

- Fisherman's Trail (Rod and Gun Trail)
- Coho Flats Trail
- High School Trail
- Pine Creek Trail
- Hirsch Creek Trail
- Hirsch Creek Canyon Falls Trail
- Forest Avenue Mountain Bike Trails
- North Cove Trail

The North Cove Trail is currently closed due to access restrictions along Bish Road. All five trails in and around Terrace are located within or a short distance from the community: Ferry Island Trail, Grand Trunk Pathway, Terrace Mountain Hiking and Mountain Biking trails, and Howe Creek Trails (District of Kitimat 2014a; MFLNRO 2014a, 2014b; City of Terrace 2014a; Tourism Kitimat 2014).

The District of Kitimat and City of Terrace have identified goals to enhance and expand existing capacity of outdoor recreation areas and develop new outdoor recreation sites (City of Terrace 2011; District of Kitimat 2013b; District of Kitimat 2014a).

3.2.2.9.3 Public and Private Recreational Sites

The LSA overlaps with a number of outdoor recreation areas in provincial parks, on Crown land and outside of parks, municipalities or settlements, and protected areas.

There are six Class A Provincial Parks that overlap with or are near the LSA: Kitimat River Provincial Park, Nalbeelah Creek Wetlands Provincial Park, Lakelse Lake Wetlands Provincial Park, Lakelse Lake Provincial Park, and Hai Lake–Mount Herman Provincial Park (BC Parks 2014a, 2014b, 2014c, 2014d, 2014e, 2014f). Kitimat River Provincial Park and Nalbeelah Creek Wetlands Provincial Park are located

closest to the Project site and are within 10 km of the District of Kitimat, and are easily accessible from Highway 37. Lakelse Lake Provincial Park, located approximately 20 km south of Terrace, is the largest full-facility park (BC Parks 2014d). BC Parks has identified initiatives to improve visitor facilities, including recent enhancements to Lakelse Lake Provincial Park (BC Parks 2013a). A number of public recreation trails that overlap with the LSA are maintained by the Province or other outdoor recreation organizations in the Kitimat and Terrace areas.

There are a number of public recreation trails that overlap with the LSA that are maintained by the province or other outdoor recreation organizations in the Kitimat and Terrace areas:

- Robinson Lake Recreation Trail
- Claque Mountain Recreation Trail
- Robinson Ridge Recreation Trail
- Clearwater Lakes Trail
- Onion Lake Ski Trails
- Steinhoe Ridge Trail
- Gunsight Lake Trail

Table 3.2-21 provides a description of various public and private/commercial outdoor recreation sites that overlap with the LSA.

Table 3.2-21: Outdoor Recreation Sites, Terrace and Kitimat Areas

Site	Location	Facilities and Amenities		Activities	
Public Sites					
Upper Kitimat River Recreation Site	Approximately 38 km north of Kitimat, east side of Highway 37	Small, user maintained site Campsites: 5	Pit toilets	Camping Hunting Picnicking	Kayaking: Kitimat River
Chist Creek Recreation Site	Approximately 29 km north of Kitimat, east side of Highway 37	Small, user maintained site Campsites: 3	Pit toilets	Day use Hunting	Rock climbing Bouldering
Onion Lake Recreation Site	Approximately 28 km south of Terrace, west side of Highway 37	Small day use site		Day use Picnicking	Fishing
Hospital Beach	South of Kitimat and the RTA facility site	Picnic area Sandy beach	Boat launch Washrooms	Tourist attraction and local gathering spot	
Private/ Commercial Sites					
Waterlily Bay Resort	Approximately 20 km south of Terrace	Commercial recreation site Campsites: 28 (22 unserviced sites) Full service marina RV and boat storage		Camping Canoeing, kayaking, boating: Lakelse Lake	
		Showers Flush toilets	Boat launch		

Site	Location	Facilities and Amenities		Activities	
Wild Duck RV Park	Terrace	Campsites: 20 serviced		Day use Camping	
		Showers Laundry facility Tap water Gazebo	Sani-station Flush toilets Internet Cable		
Kitsumkalum RV and Boat Launch	Terrace	Campsites: 6 Pit toilets	Boat launch	Day use Camping	Boating
Copper River RV Park	Terrace	Full or partial service trailers Tent sites		Day use Camping	
		RV Sites: 11	Showers		

SOURCE: British Columbia (2014b); MFLNRO (2014b, 2014c)

Hiking, day use/picnicking, camping and fishing are the most prevalent activities supported by outdoor recreation areas in the LSA.

Outdoor recreation activities and informal recreation sites and trails frequented by local residents and visitors to the LSA have been identified through in-person interviews with Kitimat residents. Multiple trails along Kitimat River provide easy access to outdoor recreation opportunities such as ATV-ing and camping (MacCleod and Hittel 2013, pers. comm.). Snowmobiling is a prevalent activity within Kitimat along the rail line and in established recreation areas such as Hirsch Creek Park and Kitimat River Provincial Park (Hitell 2013, pers. comm.).

Freshwater fishing is a very popular outdoor recreation activity in the Kitimat area (Parsons, pers. comm. 2013). The Kitimat River experiences high volumes of anglers in the evenings and on Sundays, making it difficult to find a spot to fish (Hummel and Langagger, pers. comm. 2013). Emsley Creek is a popular fishing destination for local residents and tourists; however, access to this area is currently restricted, which has been identified as a concern by the public and local residents who use the area (Hummel and Langagger, pers. comm. 2013).

3.2.2.9.4 Demand for Outdoor Recreation Facilities

Municipal and public recreation trails within the LSA have been identified by local residents and municipal planning and tourism documents as popular and heavily used, with many trails providing easy access to alpine and remote wilderness areas (MFLNRO 2002; District of Kitimat 2014a; Tourism Kitimat 2014; British Columbia 2014b; Pont, and Hummel and Langagger, pers. comm. 2013). There has been a noticeable increase in activity along better known trails in the Kitimat area (Pont 2013, pers. comm.).

According to BC Parks, there was an increase in overall park attendance from 2011–2012 to the 2012–2013 seasons, with the Northern Region contributing to the province's highest rise in camping attendance

(BC Parks 2013a). Lakelse Lake Provincial Park experienced an increase in camping visitation and day use attendance between the 2011–2012 and 2012–2013 seasons. Kitimat River Provincial Park experienced a decrease in park attendance in 2012–2013 from the previous season (BC Parks 2013a).

In order to estimate the current demand on outdoor recreation sites in the LSA, participation rates for a variety of outdoor recreation activities in northern BC were used. According to a survey of BC residents, 93% participated in at least one outdoor recreation activity, with 91% of these respondents having participated in at least one outdoor recreation activity between October 2008 and September 2009 (British Columbia 2013b). A variety of highly accessible outdoor recreation areas occur in and near the LSA, which provide ample recreation opportunities and alternatives close to the Project site. In addition, municipal and provincial agencies have identified plans to manage capacity and improve or expand outdoor recreation areas and facilities in the LSA (Terrace 2011; BC Parks 2013b; Kitimat 2013, 2014a).

A higher number of visitors were recorded in Terrace; however, more visitors remained in Kitimat for at least one day or longer. The majority of visitor centre inquiries in Kitimat and Terrace related to maps or directions. Just over 23% of visitors in Kitimat and 35% of visitors to Terrace requested information about adventure recreation, parks and site facilities.

Table 3.2-22: Visitor Centre Statistics, 2013

Year to Date Total	Kitimat		Terrace		Northern BC	
Number of Visitors						
June - Sept	2,112		4,049		146,723	
Total	3,540		4,826		173,065	
Origin of Visitors						
Local	1,089	(43.2%)	649	(15.0%)	19,302	(24.0%)
BC	981	(38.9%)	1,097	(25.3%)	22,745	(28.3%)
AB	245	(9.7%)	223	(5.1%)	5,923	(7.4%)
Other Canada	102	(4.0%)	896	(20.6%)	6,991	(8.7%)
US/Mexico	30	(1.2%)	316	(7.3%)	12,054	(15.0%)
Europe	56	(2.2%)	575	(13.2%)	11,158	(13.9%)
Asia / Australia	13	(0.5%)	208	(4.8%)	1,410	(1.8%)
Other	4	(0.2%)	377	(8.7%)	742	(0.9%)
Nights in Community						
Same Day	667		7		27,596	
1 to 3 Days	497		42		18,066	
One Week	145		13		2,023	
> One Week	94		0		2,210	

Year to Date Total	Kitimat		Terrace		Northern BC	
Information Requests[1]						
Adventure Recreation	937	(9.7%)	458	(10.9%)	13,092	(7.4%)
Parks	540	(5.6%)	152	(3.6%)	9,137	(5.2%)
Maps/Directions	1,360	(14.1%)	1,301	(31.1%)	31,054	(17.6%)
Site Facilities	626	(6.5%)	779	(18.6%)	32,543	(18.5%)
Other	992	(10.3%)	54	(1.3%)	10,119	(5.7%)

NOTE:
[1] List of Information Requests is not comprehensive.
SOURCE: Tourism BC 2014.

According to the visitor centre statistics, visitation to the Kitimat and Terrace areas peaks during the summer and early fall period (from June through September) (Tourism BC 2014). In 2013, Kitimat experienced an increase in visitors to the area. Foreign tourists from countries, such as Germany and Austria, travel to Kitimat to fish the Kitimat and Skeena rivers (Parsons 2013, pers. comm.). For at least one commercial fishing guide, international clientele accounts for close to 60% of total business, and they tend to stay in the area for longer durations (Hittel 2013, pers. comm.) (See Section 3.5.4-Marine Transportation and Use for further analysis on the overall use and demand for recreational related activities located within and near the LSA).

3.2.2.10 Transportation

3.2.2.10.1 Road Network Overview

The LSA includes roads within the District of Kitimat and the Terrace CA area, and Highway 37 between the City of Terrace and District of Kitimat.

Highway 37 is the primary access corridor into Kitimat, connecting to the City of Terrace, and to Highway 16 beyond. This provincial highway has two-, three-, and four-lane sections, narrow shoulders, and a paved surface. Rural roads connect to Highway 37 at unsignaled intersections. Highway 16 runs through Terrace and forms the main east-west thoroughfare for both local and intercity vehicle traffic.

Haisla Boulevard connects directly with Highway 37 at the Nalabila Boulevard/Kitamaat Village Road intersection in Kitimat, and is under municipal jurisdiction. This urban arterial is the main road passing through residential areas and the Central Business District on the east side of Kitimat River, and through the industrial and service areas on the west side. Farther along Haisla Boulevard, the Haisla Bridge, an aging two-lane truss bridge, is currently the only vehicle crossing of Kitimat River in the LSA. It has been identified as an area of concern because it is a key link for much of the industry-related business on the

west side of Kitimat, as well as emergency services such as police, ambulance and fire protection. Special permits are required for oversized (greater than 2.4 m wide and greater than 4 m high or greater than 4 m high) loads crossing the Haisla Bridge, and there are restrictions on crossing times and requirements for signage, lights, and flag persons. There are two signaled intersections on Haisla Blvd., one at Lahakas Blvd., and one at Kuldo Blvd. There is also one pedestrian-actuated signal crossing of Haisla Blvd., just west of Lahakas Blvd. at Tsimshian Blvd. These signaled intersections have also been identified as areas of concern because the signal equipment is in need of upgrade (Sussbauer 2013). The need for an industrial utility and transportation corridor (IUTC) as an alternate route along the west side of the Kitimat River has been identified in the Kitimat OCP (Stantec Consulting Ltd. 2008).

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The RSA includes roads connecting to the LSA in the broader scope of the RDKS and the SQCRD. This baseline overview focuses on Highways 16 and 37 and Kalum Lake Drive (also referred to as the Nisga'a Highway) because they are not only the main corridors in the RSA, but are those most likely to be affected by the Project need for workers, equipment, materials and other goods originating from outside the LSA.

3.2.2.10.2 Road Traffic Volumes

Metrics for Measuring Traffic Volumes

Road traffic is typically assessed by comparing the traffic volume with the road or intersection capacity. Both are measured in vehicles per day. Traffic volume is usually expressed as AADT (annual average daily traffic), though it is sometimes also useful to measure SADT (summer average daily traffic) where there are high seasonal fluctuations. Adjustment factors are used when comparing volume to capacity in order to account for traffic characteristics such as heavy vehicles, buses, and recreational vehicles, and for such road characteristics as lane width, no-passing sections, speed limits, and terrain type.

Level of service (LOS) is a rating system used to describe how well a road is currently operating. Computations can be made based on the traffic volume, capacity, and characteristics, resulting in a LOS rating from A to F (LOS A is the best and LOS F is the worst).

Road segment LOS can be described as follows (Transportation Research Board 2010; InterCAD 1991):

- LOS A—Motorists' speed and ability to pass is not hindered or delayed by other traffic, only by road conditions or speed limits. Drivers are essentially unaffected by other traffic, though a small amount of platooning (groups of cars travelling together) is expected on highways.
- LOS B—Traffic is still free flowing, though the presence of other drivers begins to affect maneuverability. Platooning on highways is noticeable, and some reduction in speed due to other traffic is expected.
- LOS C—Traffic is no longer free flowing, and other drivers affect maneuverability. Most vehicles are travelling in platoons on highways, and speed noticeably reduced due to other traffic. Driver comfort tends to decline at this point.
- LOS D—Traffic is highly dense, and maneuverability is restricted. Platooning increases as there are few opportunities to pass and speeds are further reduced due to other traffic.
- LOS E—Traffic volume is at or near capacity. Speed, maneuverability, and the ability to pass are severely restricted. Driver frustration is typically high at this point.
- LOS F—Traffic volume exceeds capacity. Operating conditions are unstable, heavy congestion occurs, and traffic moves in stop-and-go waves.

Intersection LOS is defined using the same A to F rating system, though the criteria is based on average vehicle delay times (seconds per vehicle) at signaled or unsignaled intersections as follows (Transportation Research Board 2010; Boulevard Transportation Group 2009):

- LOS A—Delays less than 10 s at both unsignaled and signalized intersections
- LOS B—10 s to 15 s at unsignaled intersections; 11 s to 20 s at signaled intersections
- LOS C—16 s to 25 s at unsignaled intersections; 21 s to 35 s at signaled intersections
- LOS D—26 s to 35 s at unsignaled intersections; 36 s to 55 s at signaled intersections
- LOS E—36 s to 50 s at unsignaled intersections; 56 s to 80 s at signaled intersections
- LOS F—Greater than 51 s at unsignaled intersections; greater than 81 s at signaled intersections

Traffic Volumes in the Local Study Area

There have been few publicly available traffic or transportation studies completed for the District of Kitimat recently. The Ministry of Transportation and Infrastructure (MOTI) is currently conducting a comprehensive transportation study for the area, but it was not available at the time Application submission. The Kitimat Port Access Study (InterCAD 1991) is the most recent comprehensive study of the road network available. The following is a summary of the key findings of the report with a focus on Haisla Boulevard, the main road traffic corridor in Kitimat:

- Analysis of traffic count data collected at intersections along Haisla Boulevard reveal that the traffic volumes have a high peaking characteristic (volumes are high during "rush hour" compared to the rest of the day) and that the peak hour was 3:45 to 4:45 pm.
- Capacity analysis of the three signalized intersections along Haisla Boulevard determined that each were operating at LOS B during the peak hours, and LOS A or B outside of these hours.
- Capacity analysis of key unsignaled intersections along Haisla Boulevard determined that a similarly high LOS occurs, with the exception of left-turning movements from Kingfisher Boulevard onto Haisla Boulevard for about 15 minutes per day (LOS D).
- The Haisla Bridge was found to have the lowest LOS throughout the network. With an AADT of about 8,700 vehicles per day the bridge averages a LOS A throughout the day, but due to the high peaking characteristic, the bridge was found to operate at LOS D during the peak hour, and LOS E during the peak 15-minutes.

The above findings are supported by a more recent traffic impact study of a proposed development near the intersection of Haisla Boulevard and Kuldo Boulevard (AllNorth 2014).

For the purposes of traffic analysis, the current population of Kitimat is estimated to be about 10,000 people (in 1991, the population was 11,305 in the Kitimat DM, from Table 3.2-4) and, therefore, the current total daily traffic trip generation should be about 32,000 trips. Trends in MOTI traffic count data along Highway 37 generally support this estimate (MOTI, various dates). Given that there have not been major changes in the road network since 1991, it can be assumed that the current LOS should be equal to or better than the LOS in 1991.

Similar to Kitimat, there have been few publicly available traffic or transportation studies completed for the City of Terrace recently. The Terrace Transportation Corridor Study (Boulevard Transportation Group 2009) evaluated the Highway 16 corridor from approximately Frank Street to the Sande Overpass in the context of evaluating rail siding expansion options in the area. While this study is not comprehensive for the Terrace Census Agglomeration Area, the Highway 16 corridor is important for both local and through traffic. It is also the corridor within the LSA most likely to be used to support the Project, particularly for truck transport. The following is a summary of key findings of the report, with a focus on intersections:

- Traffic conditions were generally worst in the afternoon peak period between 3:00 pm and 4:30 pm.
- Many movements through the intersection at Keith Ave and the Sande Overpass were found to operate at LOS E or F during the morning, midday, and afternoon peak periods.
- LOS generally improved westward along Highway 16 such that the intersections of Highway 16 with Frank Street and Kalum Lake Road were found to operate at LOS A all the time. This is an indication that the majority of the traffic over the Sande Overpass is locally generated, rather than through traffic.

Like Kitimat, the population in Terrace has declined since the Terrace Transportation Corridor Study. It is therefore assumed that the current LOS should be equal to or better than the LOS in 2009.

MOTI conducts regular traffic counts at select locations in the LSA, particularly along provincial highways. Table 3.2-23 below provides an overview of traffic count data collected for Terrace, Kitimat and Highway 37 from the Kitimat Port Access Study, the Terrace Transportation Corridor Study, and MOTI.

Table 3.2-23: Traffic Counts for Roads and Intersections in the LSA

Loc. ID[a]	Road or Intersection Name	Type	AADT[1]	Year
Terrace				
48-001	Highway 16	Highway	4,556	2011
48-002	Kalum Lake Road	Arterial	1,959	2000
48-003	Highway 16	Highway	7,949	2011
48-004	Lakelse Road	Arterial	5,935	2001
48-005	Highway 16/37	Highway	12,195	2012
48-007	Highway 37	Highway	5,176	2007
48-009	Highway 16	Highway	12,515	2012
48-013	Highway 16/37	Highway	5,597	2011
NA	Sande Overpass x Keith Avenue	Intersection	19,080	2009
NA	Sande Overpass x Greig Avenue	Intersection	18,180	2009
NA	Highway 16 x Kenney Street	Intersection	9,640	2009

Loc. ID[a]	Road or Intersection Name	Type	AADT[1]	Year
NA	Highway 16 x Kalum Lake Drive	Intersection	5,180	2009
NA	Highway 16 x Frank Street	Intersection	2,960	2009
NA	Keith Avenue x Kenney Street	Intersection	7,200	2009
Highway 37 between Terrace and Kitimat				
48-010	Highway 37	Highway	1,930	2005
48-905	Highway 37	Highway	2,816	1998
48-906	Highway 37	Highway	2,669	1998
48-907	Highway 37	Highway	2,220	1998
Kitimat				
48-921	Kitamaat Village Road	Collector	925	2012
NA	Haisla Boulevard x Nalabila Boulevard	Intersection	4,810	1991
NA	Haisla Bouelvard x Kingfisher Avenue	Intersection	7,880	1991
NA	Haisla Boulevard x Tsimshiam Boulevard	Intersection	11,340	1991
NA	Haisla Boulevard x Lahakas Boulevard	Intersection	19,150	1991
NA	Haisla Boulevard x Kuldo Boulevard	Intersection	12,650	1991
NA	Haisla Bridge	Bridge	8,700	1991

NOTES:
NA – data not available
[a] AADT = annual average daily traffic. SADT (summer annual daily traffic) was used in some cases to estimate AADT where SADT data were more recent
SOURCES: InterCAD (1991); MOTI (2001, 2011, 2012).

The data from Terrace agree with the information above that traffic volumes along Highway 16 are generated locally because the volumes at Location 48-001 (the westernmost point in the LSA) and Location 48-013 are low compared to those in Terrace. The differences between Location 48-010 and the other points along Highway 37 are indicative of the general change in traffic volume between 1998 and 2005.

Traffic Volumes in the Regional Study Area

Three MOTI traffic count locations were identified for the RSA and the traffic volume data are presented in Table 3.2-24 below.

Table 3.2-24: Traffic Counts for Roads in the RSA

Road Name	Road Type	AADT	Year
Highway 16	Highway	1,232	2001
Highway 16/37	Highway	2,301	2011
Kalum Lake Dr.	Arterial	810	2012

NOTES:
[a] AADT = Annual Average Daily Traffic (year specified in parentheses)
SOURCE: InterCAD (1991); MOTI (2001, 2011, 2012).

These traffic volumes indicate that these road segments operate well below capacity and at a high level of service.

3.2.2.10.3 Traffic Safety

Metrics for Measuring Traffic Safety

The relationship between collision frequency and exposure is positive (Hadayeghi et al. 2003): the more vehicles driving along a corridor or entering an intersection, the more collisions are expected to occur. Historically, collision rates (number of collisions per unit of exposure; exposure typically measures in million vehicle kilometers travelled for road segments, and million entering vehicles for intersections) have been used to quantify traffic safety. The relationship between exposure and collisions, however, has been shown to be non-linear (de Leur and Sayed 2008): the number of collisions is not necessarily directly proportional to the traffic volume (this makes collision rate an inadequate metric).

Collision frequency (collisions per year) is used in BC to quantify traffic safety, and it is analyzed statistically to identify collision prone locations and to measure the effectiveness of road safety improvements (de Leur and Sayed 2008).

Traffic Safety in the Local Study Area

Traffic collision statistics were obtained from the Insurance Corporation of British Columbia (ICBC) for 2008 to 2012. They are classified into two main types of collisions: *Property damage only (PDO)* where only motor vehicles or other outside property was damaged, and *casualty* where at least one person involved in the collision was injured or killed. Table 3.2-25 below provides a summary of the collision statistics within the LSA, broken down by intersection.

Table 3.2-25: Collisions in the LSA, 2008 to 2012

Location	PDO	Casualty	Total[a]
Terrace			
Highway 16 (Keith Avenue) x Kalum Street	9	13	32
Highway 16 x Kenney Street	21	10	31
Kalum Street x Park Avenue	14	7	21
Kalum Street x Lakelse Avenue	14	4	18
Kalum Street x Lazelle Avenue	13	5	18
Keith Avenue x Kenney Street	7	8	15
Sande Overpass x Greig Avenue	8	5	13
Highway 16 x Mall Access Road	5	8	13
Highway 16 x Munroe Street	12	1	13
Eby Street x Highway 16	6	5	11
Hall Street x Keith Avenue	6	5	11
Lakelse Avenue x Sparks Street	7	3	10
Keith Avenue x Sparks Street	6	3	9
Keith Avenue x Tetrault Street	5	3	8
Highway 16 x Kalum Lake Drive	5	1	6
Other	6 or fewer each		236
Highway 37 between Terrace and Kitimat			
Highway 37 (Kitimat to Terrace)	30	17	47
Kitimat			
Haisla Boulevard x Lahakas Boulevard	7	6	13
Haisla Boulevard x Kuldo Boulevard	6	1	7
Haisla Boulevard x Tsimshian Boulevard	4	3	7
Lahakas Boulevard x Nalabila Boulevard	3	1	4
Albatross Avenue x Lahakas Boulevard	1	2	3
Alexander Avenue x Nalabila Boulevard	1	2	3
Columbia Avenue x Kuldo Boulevard	2	1	3
Gryfalcon Avenue x Kingfisher Avenue	1	2	3
Haisla Boulevard x Nalabila Boulevard	2	1	3
Haisla Boulevard x Kingfisher Avenue	3	0	3
Highway 37 x Oolichan Avenue	3	0	3

Location	PDO	Casualty	Total[a]
Other	2 or fewer each		47
Total			

NOTES:
[a] Information presented are not statistical counts but reported raw data
Collisions that occur on segments between intersections are counted under the nearest intersection
[b] MEV = Million entering vehicles, used for intersections; MVKT = million vehicle kilometers travelled, used for road segments
[c] NA = Not available.
Collisions/MEV or collisions/VKT could only be calculated where both collision and traffic volume data were available
SOURCES: ICBC 2013**;** Tazmin Surani 2013

Traffic Safety in the Regional Study Area

Table 3.2-26 provides a summary of the ICBC collisions statistics on roads in the RSA. These statistics are a combination of police reports and ICBC claims and may not be exhaustive. Legislation changed in 2008 such that police are no longer required to attend all collisions; those unattended by police are not captured by these data. ICBC data only include accidents reported for insurance purposes and those collisions where the location cannot be defined or agreed upon.

At police-attended collisions, officers can assign up to four contributing factors to each person or vehicle involved in the collision. It is noted that road condition was the first or second top ranked contributing factor for all five major highway sections in the RSA.

Table 3.2-26: Collisions in the Regional Study Area, 2008 to 2012

	2008	2009	2010	2011	2012	Total	Top 5 Contributing Factors
Highway 16 – East of Terrace to Hazelton							
PDO	41	63	48	59	101	312	Road condition, speed, distraction, weather, impaired
Casualty	10	36	29	48	50	173	
Highway 16 – West of Terrace to Prince Rupert							
PDO	45	54	44	57	52	252	Distraction, road condition, speed, weather, failed to yield right of way
Casualty	29	24	27	31	25	136	
Kalum Lake Drive (Nisga'a Highway) – North of Terrace to Cranberry Junction							
PDO	5	2	4	5	7	23	Road condition, weather
Casualty	1	1	2	1	3	8	
Total	**62**	**104**	**88**	**117**	**166**	**537**	

NOTES:
Data may be over-representative of number of collisions on highway segments due to spatial boundaries of collision counts extending outside the RSA
Police can assign up to four contributing factors to each motorist, pedestrian or cyclist involved.

Road Condition: presence of ice, snow, slush, water on the road
Speed: unsafe or excessive speed, exceeding the speed limit, or driving too fast for conditions
Distraction: use of technology while driving, inattentive driving, or internal/external distractions
Weather: conditions such as fog, sleet, rain or snow
Impaired: driver impaired by alcohol, illegal drugs or prescription drugs
SOURCES: Tazmin Surani 2013

3.2.2.10.4 Airports

The Northwest Regional Airport is located south of Terrace and is the main air hub in the Regional District of Kitimat–Stikine. It currently has two runways, one of which is able to accommodate instrument approach. The airport can accommodate up to a Boing 757 aircraft without issue, but anything larger would require special procedures (e.g., tire pressures). The Air Terminal Building supports Boing 737-800 passenger aircrafts, three at the time; however the terminal would need to be expanded or modified to accommodate large aircraft (Hendry 2014, pers. comm).

There are four commercial airlines servicing the airport, with direct flights to and from Vancouver, Prince George, and Smithers, BC. The airport is also used by small air couriers, private air charter and helicopter companies, a floatplane service, and private aircraft (Northwest Regional Airport 2012).

The Northwest Regional Airport traffic has grown since 2011, the majority of which is tied to prospective new industrial projects in the Terrace–Kitimat region and Prince Rupert. Commercial airlines providing service at the Northwest Regional Airport have responded to the additional demands by adding flights, but passenger feedback indicates that they are near or at capacity most of the time, making it difficult to book seats. The number of airport staff has increased, as have the hours of operation, to accommodate the additional demand. Time allocated for runway maintenance has become more limited (Hendry 2013a, pers. comm.).

Table 3.2-27 lists passenger volumes from January 2005 to September 2013; 2013 passenger volumes increased by as much has 30% over the 2012 volumes.

In January 2014, the airport released its 20-year plan, with a focus on accommodating long-term air passenger traffic of about 250,000 air passengers and even more in the short term. Key changes outlined in the plan to increase capacity include conversion of a runway into a taxiway and development of two new taxiways to improve efficiency as aircraft movements increase; development of the apron to accommodate larger aircraft (a Boeing 737 or an Airbus A320); and expansion of the terminal building and parking facilities (AirBiz 2014).

Table 3.2-27: Passenger Statistics at the Northwest Regional Airport

	Month	2005	2006	2007	2008	2009	2010	2011	2012	2013
Passengers	Jan	7,011	7,342	8,467	9,342	8,014	8,079	7,554	8,916	9,818
	Feb	6,937	7,270	8,279	9,488	7,698	6,173	7,635	9,536	10,595
	Mar	8,387	8,312	10,095	10,843	9,751	9,554	9,899	11,368	12,836
	Apr	7,312	7,820	10,254	10,180	8,517	8,502	9,258	10,939	13,150
	May	8,584	9,415	10,176	10,147	9,069	9,211	9,779	11,994	14,203
	Jun	8,311	8,647	10,824	9,519	8,904	9,017	10,404	11,795	14,536
	Jul	8,879	9,986	11,471	10,606	10,301	9,707	11,229	12,682	16,596
	Aug	9,155	10,093	11,542	10,852	10,629	10,251	12,319	13,808	18,026
	Sep	8,888	9,321	10,444	9,777	9,410	8,821	11,291	12,703	16,476
	Oct	8,892	9,586	10,580	10,306	8,964	9,084	11,415	13,086	NA[a]
	Nov	7,730	8,518	9,945	9,095	8,069	8,353	9,836	11,656	NA[a]
	Dec	8,283	8,776	9,993	9,205	8,670	8,637	9,765	10,710	NA[a]
	Total	**98,369**	**105,086**	**122,070**	**119,360**	**107,996**	**105,389**	**120,384**	**139,193**	**177,000[b]**

NOTES:
[a] NA = Information not available
[b] Estimate
SOURCES: Hendry 2013b, pers. comm.

3.2.2.10.5 Railways

VIA Rail provides passenger service to and from Terrace along the Jasper–Prince Rupert route. There is scheduled service westbound towards Prince Rupert and e astbound towards Prince George; the frequency of service is once in each direction on three days a week (VIA Rail 2013).

CN Rail is the primary heavy rail service provider for goods movement in the LSA. Three routes service this area: the Bulkley route between Smithers and Terrace; the Kitimat route between Terrace and Kitimat; and the Skeena route between Terrace and Prince Rupert (CN Rail 2013).

Road-rail crossings are an area of concern from both safety and traffic efficiency standpoints (Jephson 2013, pers. comm.). When trains cross roads at grade, road traffic must stop and wait. This can impede traffic flow and cut off access to certain areas, including access for emergency vehicles. In the LSA, key potential conflict points include crossings at Kenney Street and Frank Street in Terrace; Substation Avenue and Queensway Drive near Thornhill; and Alcan Way and Eurocan Way in Kitimat.

Results from Field Work

Field observations indicate that a few trains per day cross at these key locations (Table 3.2-28). Crossing times vary greatly from about 30 seconds (10 rail cars) during the 5:00 p.m. peak period to 21 minutes (126 rail cars) late at night. Queue lengths on adjacent roads were not observed to exceed eight vehicles.

Table 3.2-28: Road-Rail Intersection Field Observations

Date	Time	Train Cars	Vehicle Queue (# vehicles)	Crossing time	Location
Feb 14.2014	5:17pm	10	5	30 seconds	Queensway Drive
Feb 26.2014	9:05am	65	8	16 minutes	Queensway Drive
Feb 28.2014	2:55pm	15	0	2.5 minutes	Queensway Drive
March 3.2014	2:34pm	41	4	7 minutes	Frank Street
March 4.2014	10:54pm	34	2	9 minutes	Queensway Drive
March 7.2014	3:34am	126	6	21.4minutes	Frank Street

3.2.2.10.6 Other Transportation Modes

Public Transit

Public bus transit in the LSA has three main components: the Skeena Regional Transit Service, the Terrace Regional Transit service, and the Kitimat Transit service. HandyDART services are also available in the region, providing a door-to-door transit option upon request for persons with disabilities. These transit services have seen growth in the past few years with increased ridership, extended hours, and a greater number of trips. Table 3.2-29 presents details of the services provided by each.

Table 3.2-29: Overview of Public Transit Services

Kitimat Transit Service			
Ridership: 144,125 passenger trips per year (2012/2013)			
Route Number	**Route Name**	**Trips / Day**	**Days**
Route 1	Whitesail (via Nalabila)	15	7 days a week
Route 1B	Whitesail (via Kingfisher)	11-13	Mon, through Sat.
Route 2	Nechako	15-30	7 days a week
Route 3	Kildala	15-30	Mon. through Sat.
Route 4	Crosstown	1	Mon. through. Fri.
HandyDART	N/A	On request	7:00am-7:30pm, 7 days a week

SOURCES: (BC Transit 2013a; Burton 2013)

Skeena Regional Transit Service			
Ridership: 35,000-40,000 passenger trips per year (2012)			
Route Number	**Route Name**	**Trips / day**	**Days**
Route 11	Terrace-Kitimat Connector	3	Mon. through Sat.
Route 12	Kitamaat Village	3-4	Mon. through Sat.
Route 13	Kitsumkalum	3	Mon. through Sat.
Route 14	Queensway-Gitaus	5	Mon. through Sat.
HandyDART	N/A	On request	7:00am-7:30pm, 7 days a week

SOURCES: (BC Transit 2013b; Stantec Consulting Ltd. 2012a)

Terrace Regional Transit Service			
Ridership: 185,000 passenger trips per year (2012)			
Route Number	**Route Name**	**Trips / day**	**Days**
Route 1	College/Halliwell	8-13	Mon. through Sat.
Route 2	City Shuttle	8-12	Mon. through Sat.
Route 3	Southside	9-16	Mon. through Sat.
Route 5	Thornhill	5-10	Mon. through Sat.
Route 99	Special	1	Mon. through Fri.
HandyDART	N/A	On request	8:45 am-4:20 pm, Mon. through Fri.

SOURCES: BC Transit 2013b; Stantec Consulting Ltd. 2012b

Intercity Bus

Greyhound Bus Lines provide intercity coach bus services in the LSA and RSA. There is daily service between Terrace and Prince George, where passengers can connect to and from other routes. Greyhound also has one cargo trip per day to and from Terrace, where other connections can be made (Anonymous 2013).

Taxi and Limousine

A few small taxi and limousine companies operate in Terrace and Kitimat. Coastal Taxi operates a fleet of seven vehicles, with service available 24 hours a day in Kitimat. Valley Taxi is also a popular taxi option in Kitimat, operating a single vehicle during regular business hours (District of Kitimat 2009). Kalum Kabs provides taxi service in the Terrace area, including trips to and from the Northwest Regional Airport. There are also a few small limousine firms based in the region.

Active Transportation

Kitimat has a unique and comprehensive network of sidewalk trails, separate from the vehicular road network. These trails are widely used by cyclists, walking commuters, dog-walkers, and recreationalists. They provide comfortable and safe access between most neighbourhoods, including exclusive access to many of the parks in the community. Conventional sidewalks are also available on most of the major roads (District of Kitimat 2009). About 6% of employed residents walk or bike to work (Statistics Canada 2007d).

Active transportation is also popular in Terrace; 13% of employed residents walk or bike to work. This is notably higher than the provincial average of 9%. Terrace has about 13 km of off- and on-road cycling facilities and about 44 km of separated sidewalks and trails (LEES + Associates and DPL Consulting 2009).

3.2.2.11 Housing and Accommodations

Communities in the LSA are experiencing changes in the demand for and availability of housing and temporary accommodations (Martin 2013, pers. comm.; Sewell 2013, pers. comm.). These changes have occurred in a relatively short period and are likely associated with large infrastructure and construction projects that are either complete or underway (i.e., Northwest Transmission Line, RTA Modernization Project) or anticipated (e.g., Kitimat LNG, LNG Canada, Coastal GasLink). The influx of temporary workers associated with these projects has increased demand for rental accommodations, while both increased demand and speculative activity have increased housing prices.

Kitimat and Terrace both have housing advisory committees that are responsible for identifying immediate and projected housing needs for their respective communities. Housing prices have seen a dramatic increase in values compared to previous years (Table 3.2-33). However, along with price increases, Kitimat's aging housing infrastructure is being renovated to accommodate the demand and especially the need for rental units. Concerns with the housing boom are that after construction, Kitimat will be left with an oversupply of rental units and the housing market will revert to a previous situation when Kitimat's housing market was one of the lowest in the province (Terra 2012).

3.2.2.12 Housing Characteristics

In 2011, most LSA residents lived in their own homes. However, there was an overall decrease in the percentage of owned homes compared to rented homes in the LSA and RSA from 2006 to 2011. Most houses in the LSA are single-detached homes with a very limited supply of bachelor apartments, larger apartments, and town houses. Between 2006 and 2011 Kitimat, Terrace and the Kitimat–Stikine Regional District reported a decrease in the percentage of homes in need of major repair. The majority of people in Kitimat live in homes built in 1960 or before (Table 3.2-31).

Table 3.2-30: LSA Housing Characteristics

Community	Census year	Total private dwellings occupied by usual residents	Single-detached houses (%)	Owned (%)[b]	Rented (%)	Band Housing (%) [a]	Homes in need of major repair (%)
Kitsumkalum (FN)	2006	85	100	87.5	12.5	0	35.3
	2011	90	100	NA	NA	NA	NA
Kitselas (FN)	2006	7	NA	NA	NA	NA	NA
	2011	70	100	73.3	26.7	0	14.3
Haisla Nation (Kitamaat Village)	2006	173	NA	NA	NA	NA	NA
	2011	180	94.4	83.3	8.3	8.3	48.6
Kitimat DM	2006	3,625	62.3	81	19	0	9.0
	2011	3,630	63.4	77.1	22.9	0	7.7
Terrace CA	2006	7,190	70.9	75.2	24.7	0	14.6
	2011	6,240	67	71.2	28.7	0.2	11.1
Kitimat-Stikine RD	2006	14,370	72.9	74	23	2	17.5
	2011	14,765	73.2	72.5	24.3	3.1	16.4
Skeena Queen Charlotte RD	2006	7,805	68.6	67	33	0	17
	2011	7,560	67.3	67.4	31.3	1.2	19.8
British Columbia	2006	1,643,150	49.2	70	30	0	7.4
	2011	1,764,635	47.7	70	29.8	0.3	7.2

NOTES:

[a] Kitsumkalum, Kitselas and Kitamaat Village are the First Nations (Indian) reserves in the LSA and do not reflect the total Aboriginal population of each First Nations group.

[b] Percentages of owned, rented, and band housing is divided by the total tenure of housing indicated for each census year

NA – data not available

SOURCES: Statistics Canada 2012a, 2013b, 2013c, 2013d, 2013e, 2013f. Statistics Canada 2007a, 2007b, 2007c, 2007d, 2007e, 2007f, 2007g, 2007h

Table 3.2-31: Percent of Population Living in Occupied Private Dwellings Built from 1960 (or before) to 2011[a]

Community	Total	1960 or before	1961 - 1980	1981 - 1990	1991 - 2000	2001 - 2005	2006 - 2011
Kitsumkalum (FN)	NA	NA	NA	NA	NA	NA	NA
Kitselas (%) (FN)	70	0.0	0.0%	0.0%	13.3%	13.3%	73.3%
Kitamaat Village (%) (FN)	180	5.4%	21.6%	32.4%	18.9%	8.1%	13.5%
Kitimat DM (%)	3,640	37.1%	44.3%	12.2%	4.7%	0.0%	1.8%
Terrace CA (%)	6,235	14.0%	51.4%	13.8%	15.8%	2.4%	2.6%
Kitimat–Stikine RD (%)	14,755	17.9%	43.1%	18.4%	14.7%	2.4%	3.5%
Skeena Queen Charlotte RD (%)	7,555	28.5%	38.4%	17.6%	11.6%	1.9%	2.1%
British Columbia (%)	1,764,630	16.0%	31.3%	17.5%	18.7%	7.6%	9.0%

NOTE:
[a] Reflects percent of total number of occupied private dwellings by period of construction
SOURCES: Statistics Canada 2012a, 2013b, 2013c, 2013d, 2013e, 2013f

Home Construction, Sales, and Prices

Kitimat and Terrace have both experienced increases in residential and commercial development (BC Stats 2012; District of Kitimat 2014b; Thomson Consulting 2014). Kitimat experienced a substantial increase in the total number of dwellings under construction in 2013 as a result of the phased development of two subdivisions: Strawberry Meadows and Forest Hills (District of Kitimat 2014c). In both Terrace and Kitimat, the number and value of building permits has increased since 2011, but are still below peaks experienced during 2006 to 2008 (Appendix B, Figure B-4, Figure B-5). New home construction for Terrace and Kitimat (data only available until 2011) follows trends in building permit issuances (Appendix B, Figure B-6). Kitimat currently has 114 residential building lots available and another 5 land lots could provide approximately 169 units (District of Kitimat 2014c). Information on residential building lots for Terrace was not available.

The volume and price of homes sold in Terrace and Kitimat has risen steadily since 2009–2010 (Appendix B, Figure B-7). Between 2010 and the first quarter of 2014, the average selling price of a single family home increased by $47,430 (33%) in Kitimat and by $91,678 (45%) in Terrace (Northern Real Estate Board 2008 to 2013). In early 2014, the average value of a single-family dwelling in Kitimat was at an all-time high of $228,000 (District of Kitimat 2014c).

Vacancy and Rental Market

Between 2012 and 2013, the average apartment vacancy rate of Kitimat decreased from 21.9% to 5.5%, while the rate in Terrace increased from 3.6% to 4.1% (CHMC 2013a). However, as of late 2013, Kitimat and Terrace had vacancy rates of 1.0% and 0.0%, respectively (Martin 2014, pers. comm.; CMHC 2013b). Between 2000 and 2013, the average cost to rent a one- or two-bedroom unit in Kitimat and

Terrace increased by about 20% and 46%, respectively. As of early 2014, rental prices in Kitimat and Terrace ranged from $1,250 per month for a two-bedroom home to $3,300 per month for a three-bedroom home (March–April 2014 Listings) (Craigslist, Skeena-Bulkley April 15, 2014; Kijiji, Skeena-Bulkley Area, April 15, 2014).

Between 2007 and 2013, the average cost to rent a one and two bedroom unit in Kitimat nearly doubled. The cost to rent a one be droom increased by 45.3% from an average monthly cost of $429 in 2007 to $784 a month in 2013 (CMHC Spring Survey 2013). The cost of renting a two-bedroom unit increased by 38% from $524 a monthly average in 2007 to $841 a month in 2013. The average cost of renting a one and two bedroom unit also increased in Terrace between 2007 and 2013; however, not as dramatically as Kitimat.

Table 3.2-32: Vacancy Rates and Rental Market Survey Results, 2006 to 2013

Terrace				Kitimat		
Year	Average Apartment Vacancy Rate (%)	One Bed	Two Bed	Average Apartment Vacancy Rate (%)	One Bed	Two Bed
2007	N/A	$486	$546	44.4	$429	$524
2008	3.1	$504	$561	23.2	$428	$500
2009	7.1	$544	$612	16.9	$441	$520
2010	13.7	$569	$641	22.4	$453	$513
2011	6.9	$563	$632	12.8	$540	$608
2012	3.6	$566	$662	21.9	$687	$792
2013	4.1	$589	$714	5.5	$784	$841

SOURCES: CMHC Rental Market Survey Results (Spring Survey) received 2013.

Table 3.2-33: Shelter Costs and Average Home Values, 2006 to 2011

Census Area	Census year	Median monthly payments for rented dwellings ($)	Average owner major payments ($)	Median monthly payments for owner-occupied dwellings ($)	Average value of owned dwelling ($)	$ Change of the average value of owned dwellings (%)
Kitimat DM	2006	551	771	624	$115,171	38,851 (233.7%)
	2011	600	(775	608	$154,022	
Terrace CA	2006	599	756	667	$146,952	53,410 (36.3%)
	2011	706	841	633	$200,362	
Kitimat-Stikine RD	2006	584	715	620	$132,285	68,915 (52.1%)
	2011	665	790	612	$201,200	

Census Area	Census year	Median monthly payments for rented dwellings ($)	Average owner major payments ($)	Median monthly payments for owner-occupied dwellings ($)	Average value of owned dwelling ($)	$ Change of the average value of owned dwellings (%)
Skeena Queen Charlotte RD	2006	551	830	671	$155,755	41,131(26.4%)
	2011	662	905	829	$196,886	
British Columbia	2006	752	1,119	876	418,703	124,932 (29.8%)
	2011	903	1,228	1,023	543,635	

SOURCES: Statistics Canada 2013c, 2013d, 2013e, 2013f; Statistics Canada 2007d, 2007e, 2007f, 2007g, 2007h

Temporary Accommodations

Of the LSA communities, Terrace has the largest number of listed hotels, motels, lodges and cabins, bed and breakfasts and RV and campsites (Table 3.2-34). Out of the different accommodation types available in the LSA, the motels and hotels offer the largest yearly type of temporary lodging.

In total, the LSA has 48 year-round short-term rental accommodations of which 16 are hotels or motels, 21 are lodges or cabins, and 11 are bed and breakfasts. There are also 35 recreational vehicle (RV) and campsites located in the LSA. It has been estimated that most hotels, motels, and campsites are at 90% to 100% capacity on most days, especially in the summer months (Clark 2013, pers. comm.). The limited availability of short-term accommodations has been partially attributed to block-booking for temporary workers (Martin 2013, pers. comm.; Sewell 2013, pers. comm.). There are recent proposals for new hotel or motel developments in Kitimat and Terrace: a 60-bed hotel, a 149-bed master built-branded hotel; and a 600-bed hotel have been proposed and or are undergoing rezoning or development permit agreements (Martin 2014, pers. comm.).

Table 3.2-34: Accommodation Characteristics

Community	Accommodation Type	Number of Units	Name/(Capacity[a])
Kitimat	Hotels and motels	4	Chalet Motel & Restaurant (48); City Centre Motel (23); Kitimat Hotel (30); North Star Inn.
	Lodges and cabins	5	Kitimat Cosy Cottage (2); Kitimat Lodge (18); Poff's Fisherman's Apartment (1) b ;Tookus Inn, Minette Bay Lodge
	Bread and breakfasts	4	Natures Edge Bed and Breakfast (2); Kitimat Estuary B & B (5); R & J Bed and Breakfast (3); Cast Away B&B
	RV and camp sites [c]	5	Hirsch Creek Park; Jed Stump's Estates (18); Kitimat Lodge Campsite; Radley Park Campground (50); MK Bay Marina
	Total	**18**	**Total Known Year Round Room Accommodations:13** **Total Short Term Accommodations : 5**

Community	Accommodation Type	Number of Units	Name/(Capacity[a])
Terrace	Hotels and motels	12	Inn of the West (50); Cedars Motel; Best Western Terrace; Northern Motor Inn (3); Costa-Lessa Motel (35); Sandman Inn Terrace (70); Yellow Cedar Lodge (11); Wild Duck Motel & RV Park (20); Bear Country Inn (10); Reel Inn Motel; Rainbow Inn & RV Park; Copper River Motel and RV Park and Campground (14); Kalum Motel and RV Park
	Lodges and cabins	16	Vetter Falls Lodge (4); Waterlily Bay Resort (5); Kasiks Wilderness Resort (11); Z-boat Lodge & River Guide Ltd. (6); Shames Country Lodge (10); Nicholas Dean Lodge (11); Kermodei Bear Fishing Lodge; Pioneer Fishing Lodge; Lorene's Lava Lodge; Vetter Falls Lodge (2); Deep Creek Lodge; Kalum River Lodge; Spey Lodge; Skeena River Fishing Lodge; The Lodge at Skeena Landing; Komaham Lodge
	Bread and breakfasts	7	Ar-dels B&B (4); Lavinia's B&B (7); Nisga's Salmon Lodge B&B; Nisga's Salmon Lodge B&B (2); Remo Ridge B&B; Fisherman's#1 B&B (12); CJs B&B
	RV and camp sites	5	Kleanza Creek Prov. Park; Exchamsiks River Prov Park; Ferry Island Campground (103); Lakelse Lake Prov. Park (156); Nisga'a Memorial Lave Bed Prov. Park (16)
	Total	**40**	**Total known year round room accommodations:35** **Total short term accommodations : 5**
	Total Combined	**58**	**Total combined known year round room accommodations:48** **Total combined short term accommodations : 10**

NOTES:

Some categories reflect dual types of occupancy i.e., a motel and RV site in one.

No information was found on the number of hotels, motels, lodges, cabins, bed and breakfasts, or RV and campsites for the Aboriginal communities that make-up Kitsumaklum, Kitselas, or Kitamaat Village.

[a] Capacity for the number of units/rooms is given when information is publicly available

[b] Listed as 'not available until September 2013'

[c] Capacity is noted by the number of campsites/ hookups reported

SOURCES: Kermodei Tourism Society 2013, Tourism Kitimat 2013a, Tourism Kitimat 2013b.

Worker accommodations that have been developed or planned for the LSA are listed in Table 3.2-35. To help alleviate pressure on the rental market, the District of Kitimat approved the zoning and construction of a 2, 160-bed temporary worker accommodation facility adjacent to the downtown core (District of Kitimat 2014b). Temporary worker accommodations have included a 500-bed cruise ship, which is being used for the RTA Modernization Project (Globe and Mail 2014).

Table 3.2-35: Temporary Worker Accommodations in the LSA

Owner/Operator	Location/Name	Current Capacity	Maximum Capacity	Status	Work Camp Type
Bechtel	Kitimat aluminum facility modernization project village	1,760	2,160	Operating	Project work camp
Bechtel	Delta Spirit (Cruise Ship)	400–500	NA	Operating	Project work camp
Kitimat LNG	Eurocan way	260-600	NA	Operating	Project work camp
PTI Group	Loganberry Avenue/Kitimat lodge	0	2,154	Approved development permit	Open lodge
Bryton Group	28 Highway 37/Crossroads Project	0	1,000	Proposed	Open lodge

NOTES:
NA – data not available
SOURCE: District of Kitimat (2014c)

Housing Affordability

A household is considered susceptible to housing unaffordability if it spends more than 30% of its gross total income on shelter (including utilities for renters and related taxes and fees for owners)(CMHC 2014 and Statistics Canada 2010). In 2006 and 2011, Terrace and Kitimat had a l ower proportion of households with a shelter to income ratio (STIR) of more than 30% compared with the BC average (Table 3.2-36). House prices and rents have increased in recent years, resulting in a high proportion of households with a STIR of more than 30% (Appendix B, Figure B-8, Figure B-9).

Renters are typically more vulnerable to changes in the housing market because they may be susceptible to short-term fluctuations in rental prices. Based on census figures, the average family would have been able to afford a one- or two-bedroom apartment in either Kitimat or Terrace in 2011, while female lone-parent families were at severe risk of being unable to afford housing in both communities. In 2014, lone-parent households with median earnings might face difficulty in renting a two-bedroom unit in Terrace, owing to the gap between affordable housing ($772 per month) and average rents ($1,210 per month) (Thomson M. Consulting 2014). Single persons not in census families and earning a m edian income would also face challenges renting a one-bedroom apartment in Terrace.

Table 3.2-36: Home Owners and Renters Spending 30% or More of Their Total Household Income on Shelter Costs

Census Area	Census year	Total number of non-farm, non-reserve private dwellings occupied by usual residents	Number of owner households in non-farm, non-reserve private dwellings	Percent of owner households spending 30% or more of household total income on shelter costs	Number of tenant households in non-farm, non-reserve private dwellings	Percent of tenant households spending 30% or more of household total income on shelter costs
Kitimat DM	2006	3,630	2,925	5.0	700	32.9
	2011	3,630	2,805	10.9	835	33.5
Terrace CA	2006	7,035	5,285	13.5	1,745	40.7
	2011	6,195	4,410	10.7	1,790	45.3
Kitimat–Stikine RD	2006	12,025	9,200	11.5	2,825	37.7
	2011	12,355	9,190	11	3,190	38.9
Skeena Queen Charlotte RD	2006	6,815	4,350	17	2,465	31
	2011	6,610	4,325	16.1	2,295	34.8
BC	2006	1,606,875	1,118,160	22.7	488,720	43.4
	2011	1,717,195	1,202,000	23.8	519,855	45.3

SOURCES: Statistics Canada (2007d, 2007e, 2007, 2007g, 2007h, 2013c, 2013d, 2013e, 2013f)

Because of high demand for rental units, and in a bid to increase rents, some property owners have given notice to their tenants to vacate the premise so that it can be renovated, a phenomenon known as 'renoviction' (CBC News 2014). This has led to overcrowding and increased the potential for homelessness (Grant 2013, pers. comm.). Other instances of renoviction and displacement of low-income tenants have been reported in Kitimat (Monaghan 2013, pers. comm.; Poole 2013, pers. comm.).

Non-market Housing

Kitimat has two non-market housing projects, Delta King Place and Kiwanis Village (Terra 2012). They each provide affordable housing primarily to seniors and may be used to support people with physical disabilities. Both are operating at capacity (Terra 2012). Kitimat has one emergency shelter, operated by the Tamitik Status of Women Association, which was nearing maximum capacity with rates of 95% occupancy in 2012 (Terra 2012). In 2010, the City of Terrace partnered with BC Housing to provide 24 affordable housing units for seniors, while in 2013 BC Housing maintained 11 units of affordable housing in Terrace (CMHC 2012; BC Housing 2013a).

In a study on Terrace's housing needs, Thomson (2014) found that, since 2009, vulnerable populations (e.g., low-income and fixed-income households, individuals with mental illness or addiction issues,

individuals with physical or cognitive disabilities, new arrivals, and youth in transition from foster care) have experienced increasing difficulty in accessing affordable housing.

Government-assisted housing includes anywhere costs are reduced by provincial or Crown Corporation funding targeted at those in need of shelter. Low-income families receiving rental assistance subsidies fall into a number of categories: families with children and dependents, rent assistance seniors, rent assistance families, and women and children fleeing violence. Within Kitimat and Terrace, demand on government-assisted housing is addressed through different subsidized service programs, including Emergency Shelter & Housing for the Homeless, Transitional Supported and Assisted Living, Independent Social Housing, and Rent Assistance in the Private Market.

Potential demand on government-assisted housing is assessed using BC Housing's housing income limits (HILS). To be eligible for government assisted housing an applicant's gross household income must be below certain income limits as established by the HILS (BC Housing 2010). HILS represent the income required to pay the average market rent for an appropriately sized unit in the private market (BC Housing 2010). For example, in 2012, households in Kitimat and Terrace could have a maximum income of $17,500 and $21,500, respectively, to qualify for government-assisted housing for a bachelor-sized unit (BC Housing 2012). In 2013, BC Housing increased its housing income lim

Between 2010 and 2013, the demand for subsidized housing decreased in the LSA and RSA, except in Terrace where the number of families requiring housing support increased by 7.1% to 163 families from 2012 to 2013 (Appendix B, Figure B-10).

its for a bachelor-sized unit by $2,000 in Kitimat and by $500 in Terrace (BC Housing 2013b).

Table 3.2-37: Income Limits to Qualify for Government Assisted Housing, 2012 to 2013

Planning Area	Bachelor	1 bedroom	2 bedroom	3 bedroom	4+ bedroom
2012 Housing Income Limits					
Kitimat	$17,500	$20,500	$24,500	$29,500	$32,000
Terrace	$21,500	$26,000	$30,000	$35,000	$38,000
2013 Housing Income Limits					
Kitimat	$19,500	$23,000	$27,000	$31,000	$33,500
Terrace	$22,000	$26,000	$30,500	$36,000	$39,000
Change In 2012 – 2013 Housing Income Limits					
Kitimat	$2,000	$2,500	$2,500	$1,500	$1,500
Terrace	$500	0	$500	$1,000	$1,000

SOURCES: BC Housing (2012, 2013b)

Housing and Aboriginal Communities

The federal government and First Nations located in the LSA (Haisla Nation, Kitsumkalum First Nation, and Kitselas First Nation) share responsibility in managing housing for each respective First Nation reserve. Each First Nation has a housing department or a housing coordinator who is responsible for accessing funding for new housing, funding repairs for renovation, managing construction, and reporting on funding use (Kitselas 2013b; Kitsumkalum First Nation 2013).

In 2011, Kitsumkalum (Kitsumkalum IR) and Kitamaat Village (Kitamaat 2 IR) each had a higher percentage of homes needing major repair compared to other communities in the LSA. The housing stock at Kitselas First Nation was in comparatively good repair, with 14.3% of dwellings being in need of major repair, likely reflecting that much of Kitselas have a higher proportion of people living in newer homes than other LSA communities.

Increased rents and eviction notices in Kitimat and Terrace has led to a number of housing issues for First Nations communities in the LSA. Increases in homelessness were reported to have started several years ago in Kitamaat Village (Light 2013, pers. comm.). Multiple families from Haisla Nation are living under one roof in Kitamaat Village (Terra 2013; Light 2013, pers. comm.). Kitselas First Nation has a waiting list of 80 individuals for on-reserve housing (Venegas 2013, pers. comm.). Squeezed between high market rents and limited band-owned housing, people are finding shelter by "couch-surfing" and staying with friends and family (Venegas 2013, pers. comm.). Other housing challenges associated with First Nations reserve communities include limited developable land and overcrowding (Terra 2013). In Kitamaat Village, estimates vary on the number of people reported to be residing in each home, based on seasonal changes in the resource sector and labour market opportunities (MacTavish et al. 2009).

3.3 Community Health and Wellbeing

3.3.1 Methods

3.3.1.1 Desktop Research

Information on existing conditions relevant to community health was obtained between September 2013 and May 2014 through the following secondary data sources:

- federal census data available from Statistics Canada
- data from the Canadian Community Health Survey (CCHS)
- data from the Canadian Institute for Health Information (CIHI) Discharge Abstracts Database regional health and administrative information from the BC Ministry of Health, the BC Centre for Disease Control, Vital Statistics, Work Safe BC, and local health authorities in B
- project-specific commissioned socio-economic information provided by First Nations

- relevant issue-specific studies and reports produced by governments, industry groups, and non-governmental organizations
- peer-reviewed research literature

3.3.1.2 Primary Research

Primary research was conducted to fill information gaps identified during the desktop review of existing information. Primary research included:

- Key Person Interviews— held with community members and individuals engaged in organizations and groups related to health care, social services, emergency response and social well-being.
- Focus Group Meetings — held with elders from the Haisla Nation and Kitselas First Nation concerning availability and access to country foods and marine transportation and use
- Survey of Kitselas Traditional Foods – conducted through the First Nation Community Research Program (see Section 3.2.1.2.1), surveyed Kitselas First Nation members regarding access and availability to traditional foods

3.3.1.2.1 Key Person Interviews

Primary research was conducted through interviews with key informants in the LSA. Stakeholder consultation served the following purposes:

- verifying at a local level the importance of health areas that have been selected as indicators
- providing an opportunity for stakeholder input and viewpoints on community health issues
- providing an opportunity to obtain baseline data and information
- providing an opportunity to gather qualitative information about effects on community health endpoints for a specific locality
- providing an opportunity for input on mitigation and monitoring plans for community health effects
- enabling the community health assessment and LNG Canada to meet regional and provincial guidelines
- identifying additional key informants who should be consulted

A list of key informant sources consulted is provided in Table 3.3-1. Key informants and the results of interviews presented in Sections 3.1, 3.2 and 3.4 further inform baseline conditions and the analysis of community health and wellbeing.

Table 3.3-1: Summary of Key Informant Interviews

Agency	Contact	Date of Consultation	Method of contact
Quintessential Research Group, Victoria	Jacqueline Quinless	Sept. 3, 2013	Phone interview
Northwest Counselling Centre, Terrace and Kitimat	Susan Vivieros, Operations Manager/Counsellor	Sept. 4, 2013	Phone interview
Kitimat Child Development Centre/Kitimat Housing Committee, Kitimat	Margaret Warcup, Executive Director/Chair	Sept. 5, 2013	Phone interview
Emergency Management BC, Terrace	Maurie Hurst, Regional Manager, Northwest	Sept. 5, 2013	Phone interview
Terrace Churches Food Bank, Terrace	John Wiebenga, President	Sept. 10, 2013	Phone interview
Kitimat Food Bank, Kitimat	Marjorie Phelps, President	Sept. 19, 2013/ Nov. 12, 2013	Phone interview/in-person interview
Kitimat Food Bank, Kitimat	Sally Rizoni, Director	Sept. 19, 2013/ Nov. 12, 2013	Phone interview/in-person interview
PTI Group, Calgary	Bob Greaves, Director, Business Development	Oct. 6, 2013	Phone interview
Kitimat General Hospital and Health Centre, Kitimat	Jonathan Cooper, Health Service Administrator	Nov. 6, 2013	In-person interview
Terrace RCMP, Terrace	Mike Robinson, Staff Sergeant	Nov. 7, 2013	In-person interview
Terrace Victim Services, Terrace	Sherry Pellegrino, Program Manager	Nov. 7, 2013	In-person interview
Kitimat Valley Naturalists, Kitimat	Cheryl Brown, Member	Nov. 7, 2013	In-person interview
Kitimat Valley Naturalists, Kitimat	April Macleod, Member	Nov. 7, 2013	In-person interview
Douglas Channel Watch, Kitimat	Lucy McRae, Member	Nov. 7, 2013	In-person interview
District of Kitimat, Kitimat	Corinne Scott, Councillor	Nov. 8, 2013	In-person interview
Tamitik Status of Women Association, Kitimat	Cheryl Rumley, Outreach Worker/Stopping the Violence Coordinator	Nov. 8, 2013	In-person interview
District of Kitimat/Kitimat Health Advocacy Group (KHAG), Kitimat	Robert Goffinet, Councillor/Chair	Nov. 8, 2013	In-person interview
Kitimat General Hospital and Health Centre, Kitimat	Howard Mills, GP	Nov. 9, 2013	In-person interview
Kitimat Health Advocacy Group (KHAG), Kitimat	Robert Goffinet, Chair	Nov. 9, 2013	Attended the KHAG monthly meeting
Kitimat RCMP, Kitimat	Phil Harrison, Staff Sergeant	Nov. 12, 2013	In-person interview
Kitimat Food Bank, Kitimat	Bill Willis, Vice President	Nov. 12, 2013	In-person interview
Ministry of Child and Youth Mental Health, Terrace	Marilyn Carey, Team Lead, Child and Youth Mental Health	Nov. 12, 2013	In-person interview
British Columbia Ambulance Service (BCAS), Terrace	Norene Parke, Skeena District Unit Chief	Nov. 13, 2013	In-person interview
Ksan House Society, Terrace	Carol Sabo, Executive Director	Nov. 13, 2013	In-person interview
Northern Health, Prince George	Finlay Sinclair, Regional Director, Business Development	Nov. 15, 2013	In-person interview

Agency	Contact	Date of Consultation	Method of contact
Northern Health, Terrace	Jacquie Hakes, Northwest Area Manager, Preventative Public Health	Nov. 27, 2013	Phone interview
Northern Health, Terrace	Penny Anguish, Chief Operating Officer, Northwest Health Service Delivery Area (NWHSDA)	Nov. 28, 2013	Phone interview
Rod and Gun Club, Kitimat	Shannon Hummel, Rod and Gun Club, Member	Dec. 5, 2013	Phone interview
Terrace Fire Department, Terrace	John Klie, Fire Chief	July 17, 2013	In-person interview (conducted by Stantec)
Kitimat Fire Department, Kitimat	Trent Bossence, Fire Chief	Oct. 3, 2013	Phone interview (conducted by Stantec)
Thornhill Fire Department, Thornhill	Rick Boehm, Deputy Fire Chief	Sept. 26, 2013	Phone interview (conducted by Stantec)
Haisla Health Centre, Kitamaat Village	Eric Bottah, Health Manager	Nov. 12, 2013	In-person interview

3.3.1.2.2 Focus Group Meetings

Focus group meetings serve a similar purpose to that of key informant interviews (see Section 3.3.1.2.1) but allow for additional collaboration, problem solving and aid in identifying themes. A list of focus group meetings held with First Nation Elders concerning, in-part, country foods and a list of those in attendance is provided in Table 3.3-2. Primary research conducted in the form of focus group meetings also provided information about baseline conditions.

Focus group meetings were semi-structured whereby previously established lines of questioning where delivered; facilitation of focus group discussions were adaptive to the material, themes and concerns identified by attendees. Structured lines of questioning focused on: understanding baseline conditions regarding health, health service provision and health-related issues and concerns; access and availability to country foods; potential benefits and adverse effects on health and wellbeing if the Project were to proceed; and community recommended mitigations that could be implemented by LNG Canada.

Table 3.3-2: Summary of Focus Group Meetings

Agency	Contact	Date of Consultation	Method of contact
Haisla Nation Elders' Centre, Kitamaat Village	Nelson Grant, Elder Annie Woods, Elder Susan Walker, Elder Ivy Maitland, Elder Marilyn Furlan, Elder Darlene Duncan, Elder Lorraine Robinson, Elder Dan Paul, Elder Loretta Gray, Elder Corrina Wilson, Community Coordinator	Nov. 12, 2013	In-person group meeting
Kitselas First Nation Elders Meeting, Terrace	Maureen Engelmyer, Elder Orlando Bolton, Elder Rose Bolton, Elder George Chinn, Elder Angeline Chinn, Elder Rhoda Seymour, Elder Mary Seymour, Elder Beverly Bolton, Elder Lloyd McDames, Elder Sherry McDames, Elder Faye Miller, Elder Lorna Johnson, Elder Stella Wright, Elder Amy Bevan, Elder Merle Bevan, Elder Dorothy Joseph, Elder Morris Mason, Elder Mederick Mason, Elder Jacquiline McNeil, Elder Roxanne Ridler, Elder Jada Seymour, Elder	March 13, 2014	In-person group meeting

Primary baseline themes identified through focus group meetings as having the potential to be further affected by the Project include:

- changes in access, availability and quality of country foods due to increased industrial activity and pollution. This leads to changes in harvesting and other cultural practices and increases reliance on market foods; could prove detrimental to the nutrition of individuals
- increased costs of living: housing and grocery (goods)
- lack of access to and availability of health professionals, in particular doctors and specialist doctors
- increasing rates of disease (primarily cancers) and illness (primarily respiratory disease and sexually transmitted infections)
- increased rates of violence, drug and alcohol use and prostitution related to transient populations

3.3.1.3 Survey of Kitselas Traditional Foods

Through the First Nation Community Research Program, 512 voluntary traditional foods surveys where distributed to members of Kitselas Fist Nation for a distribution rate of 86% of the total 2012 on- an off-reserve registered population (Appendix E). Surveys were distributed through direct (door to door) delivery, direct mail and were also included in Kitselas First Nation Newsletters. Surveys were largely completed without aid (unassisted) from survey distributors (87.5%).

Of the 512 surveys, 24 were completed and returned for an overall response rate of 4.7%; voluntary surveys conducted by Statistics Canada typically receive a response rate of 70% (Statistics Canada 2013a). Due to a low response rate survey bias is considered moderate to high. The survey consisted of 11 questions, many of which required multiple selections or responses for 45 measurable responses per questionnaire (Appendix B). The average completion rate of the returned surveys was 87.4%.

3.3.1.4 Analysis

Analysis of qualitative data regarding health and wellbeing was conducted in accordance with assessment criteria and best practice methods prescribed by Health Canada (1999), the World Health Organization (WHO, 2003), the International Finance Corporation (IFC, 2009), and the Public Health Agency of Canada (PHAC, 2014). Assessment methods presented in academic literature also guided the analysis of qualitative health and wellbeing data.

3.3.2 Results

3.3.2.1 Health Care Infrastructure and Services

There are three hospitals in the RSA: the Kitimat General Hospital and Health Centre, the Mills Memorial Hospital in Terrace, and the Prince Rupert Regional Hospital. There are also 35 doctor offices and medical clinics combined in the RSA: six in Kitimat, 16 in Terrace (two associated with local First Nations in Kitselas and Kitsumkalum), nine in Prince Rupert and one e ach in Kitamaat Village, Kitkatla, Hartley Bay, Lax Kw'alaams. Table 3.3-3 presents an overview of hospitals and health care facilities in the RSA.

Table 3.3-3: Hospitals and Health Care Facilities in the RSA

Community	Hospital	Doctor Offices / Medical Clinics	Staff
Kitimat	Kitimat General Hospital and Health Centre	City Centre Medical Clinic Kitamaat Village Health Centre Dr. Harry F. Murphy West Wahl Van Wyk Dr. H.J.P. Mills Dr. Sabina Kay	7 to 8 general practitioners 1 full time anaesthetist 1 general surgeon Monthly visits by specialists in: dermatology, neurology, ophthalmology, and radiology.
	Services available: 20 acute care beds; 36 residential care beds (attached as Mountainview Lodge); case room and operating room units; physiotherapy; laboratory departments; full service, 24-hour emergency outpatient department; x-ray; and ultrasound CT.		
Terrace	Mills Memorial Hospital	Park Avenue Medical Centre Dr. Mariette De Bruin Nourishing Life Wellness Clinic Dr. Jaco Strydorn Dr. Johnathan Moolman Dr. T Nagy Dr. Shun Chi Wong Dr. Barrie L. Phillips Dr. Greg Linton Dr. Harry F. Murphy Dr. Lennox Brown Dr. Ivan Jardine Dr. Francis Osei-Tutu Dr. W. Evans Community Cancer Clinic Terrace Health Unit (Public Health)	16 general practitioners 21 specialists
	Services available: 44 acute care beds; 10-bed psychiatric unit; 3 surgical suites, full service, 24-hour emergency outpatient; x-ray; ultrasound; CT; and a 4-bed intensive care unit.		

Community	Hospital	Doctor Offices / Medical Clinics	Staff
Prince Rupert	Prince Rupert Regional Hospital	Dr. Frank Pyde Inc. Large Clinic Dr. George K. Watson Dr. Marius Perrus Pienaar Dr. Michael Ryeburn Casey Clinic Dr. P Nel Brombach Services Ltd. 2nd Avenue Medical Clinic	15 general practitioners 7 specialists
	Services available: 24 acute care beds; 61 residential care beds (attached as Acropolis Manor); diagnostics, ultrasounds, CAT scan, surgery, emergency, day care, acute care, additional services (e.g., diabetes education, healthy heart and rehabilitation programs)		
Gitga'at First Nation	-	Hartley Bay Nursing Station, Hartley Bay	community health representative (CHR) doctor: monthly visits (twice) nurse: 1 full-time social worker social assistance (SA) worker education coordinator
		Service available: non-emergency health care services; ground water quality testing; National Native Alcohol and Drug Abuse Program (Native Alcohol and Drug Abuse Program [NNADAP])	
Gitxaala Nation	-	Kitkatla Nursing Station, Kitkatla	CHR doctor: monthly visit (once) nurse: 1 full-time education coordinator: part-time prenatal infant/child development worker: part-time
		Non-emergency health care services; community water testing	
Haisla Nation	-	Kitamaat Village Health Centre, Kitamaat Village	nurse: 2 full-time, 1 Part-time social worker: Part-time SA Worker education coordinator prenatal infant/child development worker family services coordinator
		Services available: non-emergency health care services; NNADAP	

Community	Hospital	Doctor Offices / Medical Clinics	Staff
Kitselas First Nation	-	Kitselas Health Department, Gitaus/Terrace	CHR nurse: 1 part-time dental therapist: 3 yearly visits for 3 weeks SA Worker alcohol and drug worker: part-time social development worker education coordinator prenatal infant/child development worker youth care worker: part-time
		Service available: non-emergency health care services; transportation services	
Kitsumkalum First Nation	-	Kitsumkalum Health Station, Terrace	CHR SA/social worker education coordinator
		Service available: non-emergency health care services; NNADAP	
Lax Kw'alaams First Nation	-	Lax Kw'alaams Health Centre, Laxkwalaams	CHR doctor: monthly visits (twice) nurse: 1 full-time dental: 1 visit every 3 months for 1 week alcohol and drug/mental health worker: monthly visit for 2 weeks SA Worker education coordinator prenatal worker youth care worker
		Service available: non-emergency health care services	
Metlakatla First Nation		Metlakatla Health Station, Prince Rupert	CHR nurse: 1 full-time infant/child development worker youth care worker
		Services available: non-emergency health care services; community water testing	

Source: Rural Coordination Centre of BC [RCCBC] 2012a,b,c; Northern Health 2012a

3.3.2.2 Socio-Economic Health

3.3.2.2.1 General Health Measures

The general health measures shown in Table 3.3-4 are commonly used to describe the overall health of a population and to compare health status across regions. Data on these health measures are available at the level of the Northwest HSDA[2] and the province; data are not specifically available for the LSA or RSA and its constituent communities.

Table 3.3-4: General Health Measures, 2009 to 2010

	Northwest HSDA			BC		
	Total	Male	Female	Total	Male	Female
Perceived health, very good or excellent (%)	53.1	54.5	51.5	59.6	60.1	59.1
Functional health, good to full (%)	74.5	78.5	70.3	81.5	82.1	80.9
Low birth weight (% of live births)	4.4	3.7	5.1	5.7	5.3	6.1
Infant mortality (per 1,000 live births)	4.9	3.8	5.9	4.2	4.7	3.6
Life expectancy at birth (years)	77.9	75.5	80.8	81.7	79.5	83.9
Life expectancy at age 65 (years)	18.6	16.9	20.6	20.7	19.2	22.0

SOURCE: Statistics Canada 2013

Perceived health (i.e., self-reported health) is an excellent measure of the wellness of the population and is one of the strongest, most consistent predictors of subsequent illness and premature death (Idler and Benyamini 1997). Perceived health is also strongly linked to socio-economic status. The percent of the population reporting “very good” or “excellent” health was substantially lower in the Northwest HSDA compared with BC as a whole: 53.1% vs. 59.6% of the population. In the Northwest HSDA, males were slightly more likely to report very good or excellent health than females; for BC as a whole, the rates between men and women were much closer, as they are for Canada as a whole.

Functional health represents an individual’s functional ability in vision, hearing, speech, mobility, dexterity, feelings, cognition and pain. Self-rated “good to full” functional health was lower for the Northwest HSDA (74.5%) than for BC as a whole (81.5%). As with perceived health, men reported higher levels of functional health than women in the HSDA, with the difference greater than that found at the provincial level.

Low birth weight in babies (i.e., babies born weighing less than 2,500 grams or 5.5 pounds) is a health concern because it influences the survival and health and development of the child. Low birth weight is

[2] The Northwest Health Service Delivery Area (HSDA) is one of three subregions of the Northern Health Authority. It extends from BC’s northern border down to the southern tip of the Haida Gwaii and from the westernmost part of the province to the east of Hazelton. The population in the Northwest HSDA is 75,000.

associated with lower socio-economic status, as measured by education, occupation or income (Parker 1994). Infant mortality describes death among children under one year of age and is closely associated with pre-term and low birth weight births. The Northwest HSDA appeared to fare better than the BC average for low birth weight (4.4% vs. 5.7% of live births) but poorer in terms of infant mortality (4.9 vs. 4.2 per 1000 live births). However, it should be noted that infant mortality rates are often unreliable for smaller populations because infant mortality is—fortunately—a very rare outcome in Canada.

Life expectancy at birth is one of the most widely used measures of the health of a population and describes how many years, on average, a person born today may be expected to live if current trends in mortality continue. Life expectancy at 65 describes how much longer someone who has attained age 65 can expect to live. For both these measures, there is a gap between the Northwest HSDA and the BC average, with Northwest HSDA having a slightly lower life expectancy at birth than BC (77.9 vs. 81.7 years), and a slightly lower life expectancy at age 65 years (18.6 years vs. 20.7). In the Northwest HSDA, across BC, and indeed worldwide life expectancy is longer for females than for males.

3.3.2.2.2 Chronic Conditions

Table 3.3-5 compares the rate of a number of important chronic conditions between the Northwest HSDA and BC. The Northwest HSDA appears to have somewhat higher rates of arthritis, high blood pressure, cancer incidence and hospitalized acute myocardial infarction (heart attacks) than the province as a whole. Rates of diabetes, asthma and mood disorder are more similar between the two areas. However, due to the small population of the Northwest HSDA (around 75,000 people), the confidence intervals around these estimates may be large.

Table 3.3-5: Chronic Conditions, 2009 to 2010

	Northwest HSDA			BC		
	Total	Male	Female	Total	Male	Female
Arthritis (%)	18.7	14.1	23.4	15.2	12.6	17.6
Diabetes (%)	5.4	5.3	5.5	5.3	6.1	4.5
Asthma (%)	7.7	7.0	8.4	7.5	6.0	8.9
High blood pressure (%)	16.7	16.6	16.7	14.9	15.5	14.4
Mood disorder (%)	8.4	6.5	10.4	7.1	5.5	8.6
Cancer incidence (per 100,000 population)	417.9	469.3	371.0	367.9	420.5	325.5
Hospitalized acute myocardial infarction event rate (per 100,000 population)	212	263	150	163	235	97

NOTE:
Not age-standardized except acute myocardial infarction
SOURCE: Statistics Canada 2013A

3.3.2.2.3 Health Behaviour Measures

Table 3.3-6 shows data for a number of important health-related behaviours: smoking, exposure to second-hand smoke, heavy drinking, and physical activity. At an individual level, these behaviours can strongly influence an individual's overall health; they are also strongly associated with socio-economic conditions. The Northwest HSDA had a higher percentage of people smoking or exposed to second-hand smoke than the whole of BC, for both men and women. Heavy drinking was higher in women in the Northwest HSDA, but very similar for men in the Northwest HSDA compared with BC as a whole. Rates of physical activity were similar for both areas.

Table 3.3-6: Health Behaviour Measures, 2009 to 2010

	Northwest HSDA			BC		
	Total	Male	Female	Total	Male	Female
Current smoker, daily (%)	17.5	17.7	17.2	12.3	14.0	10.7
Second-hand smoke, exposure at home (%)	8.5	9.8	n/a	3.2	3.4	3.0
Heavy drinking (%)	19.5	22.9	15.8	15.8	22.0	9.8
Leisure-time physical activity, moderately active or active (%)	59.4	61.1	57.8	59.3	60.8	57.9

SOURCE: Statistics Canada 2013

3.3.2.3 Infectious Disease

Infectious disease is a common problem in resource development projects in Canada and internationally, which results from an influx of people moving temporarily into a rural or remote area, combined with high density and overcrowding in homes or camps. There are three types of infectious diseases that are relevant to the Project: sexually transmitted infections, infectious respiratory diseases, and gastrointestinal illnesses.

3.3.2.3.1 Sexually Transmitted Infections (STIs)

STIs include gonorrhea, chlamydia, syphilis, hepatitis C, HIV/AIDS, and human papilloma virus (HPV). These diseases are transmitted from one person to another through unprotected sexual contact. STIs can cause irritating symptoms that need to be treated; however, they can result in more serious consequences including infertility or sterility, or even death. They represent a large public health concern because of their ability to spread rapidly through the population and their increasing resistance to antibiotics.

As shown in Table 3.3-7, the most prevalent sexually transmitted infection (STI) in the region is chlamydia, followed by hepatitis C and gonorrhea. Chlamydia and gonorrhea rates have been steadily

increasing in BC over the last 10 years, a trend that has also been seen across Canada. As of 2011, the rate of chlamydia was almost 75% higher in the Northwest HSDA than for BC as a whole. The rate of hepatitis C and HIV infections appeared higher in the Northwest HSDA than the BC average and gonorrhea was lower, although the difference was not as great.

STI rates in BC tend to be highest among young adults ages 20–24. Men and women have different patterns of disease diagnosis. Chlamydia is reported much more often in women than in men in BC, with rates of diagnosed disease about double. However, this may be related to chlamydia detection that occurs during routine medical screening rather than reflecting a true difference in prevalence. Conversely, men in BC are around twice as likely to be diagnosed with gonorrhea than women. In this case, this difference is likely to reflect an actual difference in disease patterns because gonorrhea tends to cluster in certain sexual networks, such as men who have sex with men (BCCDC 2012a). The same gender-based disease pattern applies for infectious syphilis and HIV (BCCDC 2012a, 2012b).

Table 3.3-7: Sexually Transmitted Infections, 2011

STI	Northwest HSDA (Rate per 100,000 population)	BC (Rate per 100,000 population)
Chlamydia	451.3	255.4
Gonorrhea	29.2	34.2
Hepatitis C	48.9	43.1
HIV	11.9	6.3
Syphilis (infectious)	0.0	4.2

SOURCE: BCCDC 2012c

3.3.2.3.2 Infectious Respiratory Diseases

Common respiratory infections include the common cold, strep throat, influenza, pneumonia, bronchitis, measles, and chicken pox. Infectious respiratory disease can be very serious or life- threatening, and those who are very old, very young, or who have pre-existing health conditions are usually at highest risk.

Infectious respiratory diseases occur frequently throughout all segments of the population. The common cold is the most prevalent type of respiratory infections and is the leading cause of patient visits to the physician, as well as work and school absenteeism (Dasaraju and Liu). Seasonal influenza is also common, with annual totals of over 20,000 laboratory-confirmed cases per year across Canada (CHICA 2013) and numerous other cases unreported. Influenza can be particularly serious among infants, children, the elderly and people whose immune systems are already compromised; between 500 and 1,500 influenza deaths are reported each year. The influenza vaccine may be effective in preventing the spread of influenza throughout the community as well as inhibiting the development of influenza in the

immunized individual. In 2011, 29.9% of the population in the Northwest HSDA reported having received the influenza vaccine in the previous year, similar to the vaccination rate of 30.8% across BC (Statistics Canada 2013). In contrast to seasonal influenza, pandemic influenza outbreaks (such as avian influenza or swine flu) occur infrequently but are a serious public health threat because they can spread rapidly through the population and can be associated with very high levels of mortality among all ages.

Table 3.3-8 shows the rates of notifiable respiratory infections in the Northwest HSDA and BC. *Notifiable* refers to the fact that health care facilities are required to report cases of this disease to the provincial registry. Not all respiratory diseases are notifiable; for example, bronchitis, pneumonia, chicken pox (varicella) and the cold are not notifiable in BC. As shown in the table, invasive pneumococcal disease was the most common notifiable respiratory disease in both the Northwest HSDA and BC in 2011. Streptococcal infection and tuberculosis were also important sources of illness. It should be noted that rates of infectious respiratory diseases in a given location can vary substantially from year to year due to localized outbreaks; therefore, higher or lower rates in any given year may not be reflective of the general trend.

Table 3.3-8: Infectious Respiratory Diseases, 2011

Infectious Respiratory Disease	Northwest HSDA (Rate per 100,000 population)	BC (Rate per 100,000 population)
Measles	0.0	0.2
Mumps	0.0	2.9
Pertussis	0.0	1.3
Pneumococcal disease (invasive)	17.2	7.1
Streptococcal Disease (Group A invasive)	4.0	4.0
Tuberculosis	4.0	5.9

SOURCE: BCCDC 2012a

A number of infectious respiratory illnesses can be prevented by routine immunization (vaccination). These include mumps, pertussis, measles and a number of other highly infectious and sometimes devastating illnesses. The number of cases of vaccine-preventable illness in northwest BC varies substantially from year to year, consistent with patterns of localized outbreaks (Table 3.3-9). Kitimat and Terrace follow the same pattern of episodic outbreaks.

Table 3.3-9: Vaccine-Preventable Disease

Community	2000 (number of cases)	2001 (number of cases)	2002 (number of cases)	2003 (number of cases)	2004 (number of cases)	200 (number of cases)5	2006 (number of cases)	2007 (number of cases)	2008 (number of cases)	2009 (number of cases)	Total (number of cases)
Kitimat	4	2	1	2	1	0	0	0	0	2	12
Terrace	19	2	3	5	0	3	3	2	4	3	44
Northwest BC	83	21	37	23	5	12	13	17	39	10	260

SOURCE: Northern Health 2011a, 2011b

Gastrointestinal Illnesses

Gastrointestinal (GI) illnesses, such as norovirus, E. coli and hepatitis A, are caused by a variety of bacterial and viral pathogens. Depending on the organism causing the illness, people may experience stomach cramping, fever, vomiting, and/or diarrhea for several hours up to several weeks. Gastrointestinal (GI) illnesses can occur sporadically throughout the population, or can spread rapidly through segments of the population that are infected from a common source, such as contaminated food or drinking water. A number of GI illnesses are considered notifiable diseases within BC.

Campylobacteriosis, salmonellosis and giardiasis were the GI illnesses most commonly experienced in both BC and the Northwest HSDA. E. coli, cryptosporidiosis and hepatitis A were also a concern. As with infectious respiratory diseases, there is often substantial year-to-year variation in rates of GI illnesses due to localized outbreaks (Table 3.3-10).

Table 3.3-10: Gastrointestinal Illnesses, 2011

Gastrointestinal Illness	Northwest HSDA (Rate per 100,000 population)	BC (Rate per 100,000 population)
Campylobacteriosis	18.5	37.7
Cryptosporidiosis	0.0	1.2
E. coli	0.0	2.4
Giardiasis	10.6	13.5
Hepatitis A	0.0	2.3
Salmonellosis	18.5	24.1

SOURCE: BCCDC 2012C

3.3.2.3.3 Mental Wellbeing, Stress and Anxiety

Stress and anxiety are key factors that affect mental wellbeing and the presence, recovery or absence of mental illness. Stress can make some individuals feel frustrated, angry or nervous. When individuals continue to feel stress after the immediate stressor is gone, it is called anxiety. Anxiety is characterized by fear, unease and worry, and often times the source of these feelings cannot be pinpointed. In general, stress and anxiety have been linked to the development of a number of health problems, including diabetes, high blood pressure, heart disease, stroke, upper respiratory disease, weight gain or loss, gastrointestinal problems, and reductions in immune system efficiency as well as psychological effects and mental health issues such as sleep problems and depression (Schneiderman et al. 2005). High levels of prolonged stress and anxiety can also contribute to maladaptive behaviours among some individuals, such as unhealthy eating habits, smoking, substance misuse, and anxiety disorders.

Limited data are available that characterize mental wellbeing specifically for the communities in the LSA and RSA. A number of relevant indicators are, however, available at the level of the Northwest HSDA, taken from the Canadian Community Health Survey. As shown in Table 3.3-11, as of 2009–10, the majority of residents of both the Northwest HSDA and BC reported their mental health as "very good" or "excellent", although these positive attributes are higher for BC as a whole than in the HSDA. In both locations, men were more likely than women to report very good or excellent mental health.

Life satisfaction is another way to indicate whether people have sufficient mental wellbeing to live fulfilling and productive lives. Over 90% of both the Northwest HSDA and BC population, and around the same percentage across Canada, reported being "satisfied or very satisfied" with life. Perceived life stress can erode mental wellbeing, and may contribute to unhealthy behaviours such as smoking and excessive alcohol consumption.

Among Northwest HSDA residents, just over 20% reported high life stress levels and men were less likely than women to report high life stress. Mood disorders, including depression, were reported by 8.4% of the population ages 12 and over in the Northwest HSDA, slightly higher than the BC average. Self-injury hospitalizations and self-inflicted injury or suicide provide an indication of extreme mental anguish and lack of wellbeing. Rates of these conditions are far higher in the Northwest HSDA than in BC as a whole. While men are more likely to commit suicide, women are more likely to be hospitalized for self-injury not resulting in death.

Table 3.3-11: Mental Wellbeing Indicators, 2009 to 2010

Indicators	Northwest HSDA			BC		
	Total	Male	Female	Total	Male	Female
Perceived mental health, very good or excellent (%)	63.4	65.6	61.2	71.0	72.2	69.8
Life satisfaction, satisfied or very satisfied (%)	91.4	93.1	89.7	91.2	91.3	91.1
Perceived life stress (%)	20.2	15.8	24.8	21.4	20.6	22.2
Mood disorder (%)	8.4	6.5	10.4	7.1	5.5	8.6
Self-injury hospitalizations (per 100,000 population)	210	146	277	76	60	93
Suicides and self-inflicted injuries, deaths (per 100,000 population)	16.7	23.4	10.1	8.8	13.4	4.4

SOURCE: Statistics Canada 2013

Prescriptions for antidepressant and anxiolytic medications also provide a useful indication of the mental wellbeing in the population. Antidepressant medications are used for managing depression and anxiolytics medications are used for short-term relief of extreme anxiety and nervousness caused by psychological problems. In 2006, (the latest year for which data is available), antidepressants were prescribed to 11.9% and anxiolytics to 9.2% of the non-Status Indian population in the Northwest HSDA. This compared with 11.6% and 10. 2% of non-Status Indian residents across BC. Among the Status Indian population in the Northwest HSDA, antidepressants were prescribed for 9.7% and anxiolytics for 8.6%, compared with 9.6% and 8.8% across BC (Fraser Health Authority 2010).

Table 3.3-12 shows the number of existing cases (prevalence) of depression and the number of new cases of depression per year (incidence) for the Kitimat municipal district, the city of Terrace and the Terrace LHA. Community-level estimates are not available for other areas in the LSA or RSA. Because denominator information is not available, comparisons cannot be made to other regions or to BC as a whole.

Table 3.3-12: Prevalence and Incidence of Depression in Kitimat and Terrace

Cases	Kitimat municipal district	City of Terrace	Terrace LHA
Depression – existing or treated cases	3,010	3,761	6,598
Depression – new cases per year	102	161	283

SOURCE: Northern Health 2012c, 2012b

In addition, several key informants in the human service sector have noted an increase in mental health issues, addictions, assault and domestic violence in the past few years (Carey 2013, pers. comm.; Pellegrino 2013, pers. comm.; Robinson 2013, pers. comm.; Rumley 2013, pers. comm.; Sabo 2013; pers. comm.).

Alcohol and Drug Misuse

Individuals with poor mental health are more prone to misuse of alcohol, drugs and other substances. In BC, mental illness and problematic substance use is the number one cause of disability, the largest contributor to disease burden among the population aged 15-34 and is the third largest contributor to the province's overall burden of disease through its effects on chronic disease, injury, and other adverse health outcomes (Northern Health 2012b). Moreover, substance misuse can also cause harm at an individual, system, and social level as shown in Table 3.3-13.

Table 3.3-13: Negative Outcomes Associated with Substance Misuse, 2009 to 2010

Outcomes	Description
Individual harms	Intoxication, injury, participation in risky behaviours, acute and chronic illness, disruption of social function
System harms	Long-term effects on health and resultant burden on health care system, burden on criminal justice system, opportunity costs of ineffective drug laws
Social harms	Family breakdown, violence, crime, child neglect, absenteeism from work, unemployment, financial and legal problems, drug-related criminal activity

SOURCE: Northern Health 2012b

Table 3.3-14 presents data on substance use for the Kitimat LHA, Terrace LHA and for BC. The data indicate that both the Kitimat and Terrace LHAs have a higher prevalence of alcohol consumption and heavy drinking than the province as a whole, with Terrace higher than Kitimat for most indicators. Non-cannabis drug offences among adults appear lower for Kitimat and Terrace than the provincial average; however, drug offence rates reflect not only underlying drug use, but also RCMP capacity and approach. Additionally, drug offence rates have high year-to year variability for these LHAs that have a relatively small population.

Table 3.3-14: Indicators of Alcohol and Drug Misuse in Kitimat, Terrace and BC

Indicators	Kitimat LHA 80	Terrace LHA 88	BC
Heavy drinking (%) 2009/2010	19.5% (NW HSDA)		15.8%
Per Capita Alcohol Sales – 2012 – dollars spent, per ages 19+	$935	$1,069	$796
Per Capita Alcohol Sales – 2011 – litres consumed, per ages 19+	139	161	103
Per capita alcohol consumption, ages 15+ (litres of absolute alcohol per year, 2011)***	9.13	11.67	8.56
Non-cannabis drug offences (per 100,000 population, 2009-2011 average)	74.7	126.5	170.3
Juvenile (ages 12-17) non-cannabis drug charges (per 100,000 population, 2009-2011 average)	40.8	88.7	40.4

NOTES:
Heavy drinking = five or more drinks on one occasion at least once per month. 1 litre of absolute alcohol = 58 standard drinks.
SOURCES: Statistics Canada 2013, BC Stats 2012a, 2012b

Hospitalizations related to alcohol and drug use are another useful indicator (Table 3.3-15); the rate of alcohol-related hospitalizations increased steadily between 2002 and 2011 in the Kitimat LHA, while remaining relatively stable in the Terrace LHA. Illicit drug-related hospitalizations increased in both areas, although they are less than the peak numbers in 2006 to 2007. This increase, peak and drop were seen not just in Kitimat and Terrace, but across the Northern Health Authority and all of BC. Because the coding of alcohol- and drug-related hospitalizations is based on a subjective judgment of the admitting physician and available codes for admission, it is difficult to gauge whether this trend reflects underlying substance misuse or a change in coding protocols across the province. The trend is the same as for overdose or drug deaths across the province, which are much more definitive in terms of how they are coded (Vallance et al. 2012), which suggests the trend may not be based on changing protocols.

According to a key informant working in mental health and addictions counselling in both Kitimat and Terrace, there have always been alcohol and drug challenges in the community but these issues have been increasing recently. Substances of greatest concern in Kitimat are alcohol and cocaine, and there has been an increasing trend of substance use among worker and the at-risk youth populations in both Kitimat and Terrace (Warcup 2013, pers. comm.; Viveiros 2013, pers. comm.).

Table 3.3-15: Alcohol and Drug Hospitalizations

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Alcohol-related hospitalizations (per 100,000 population)										
Kitimat LHA	574.48	647.05	617.45	689.69	979.54	1,074.05	1,053.09	910.94	778.40	1,229.21
Terrace LHA	743.56	777.15	714.65	684.47	732.64	844.33	684.96	712.36	792.33	767.06
Northwest HSDA	785.49	803.40	830.75	838.32	909.15	1,054.28	942.23	938.50	895.69	959.65
Northern Health Authority	619.14	662.49	690.35	701.67	712.22	739.66	744.04	727.66	686.08	741.04
BC	377.57	387.89	393.18	408.26	415.69	419.36	436.31	433.99	421.63	436.66
Illicit drug-related hospitalizations (per 100,000 population)										
Kitimat LHA	43.76	89.38	44.96	80.05	164.17	227.42	135.07	65.35	97.86	105.50
Terrace LHA	94.99	145.71	158.42	147.33	167.67	136.47	113.79	84.60	103.14	134.50
Northwest HSDA	136.53	118.84	130.19	140.99	160.76	182.25	155.89	117.23	119.31	171.38
Northern Health Authority	102.58	97.78	120.42	131.76	145.67	161.88	147.62	121.71	127.61	140.63
BC	81.95	88.42	97.84	113.16	113.47	113.16	109.40	91.91	86.38	94.69

NOTE:
Age- and sex-standardized
SOURCE: CARBC 2013

3.3.2.4 Aboriginal Health

Aboriginal health is a distinct component because there are several important ways in which the health of Aboriginal peoples may differ from that of the general population, such as:

- the way that health is understood and the factors that influence health outcomes
- systematic inequities in health outcomes, and
- the way that health care services are organized and delivered in Aboriginal communities.

Underlying the many diverse cultures in Canada are distinct paradigms of how people see themselves in, and experience, the world. Given these unique cultural paradigms, health is understood and experienced differently for Aboriginal people versus people within dominant Canadian culture. For many Aboriginal peoples, health is a concept that is holistic in nature and centres on the interconnectedness of people and the land (Loppie-Reading and Wein 2010). Health generally involves four interconnected spheres: the physical (body), the spiritual (spirit), the emotional (heart) and the mental (mind) and is traditionally represented by the Medicine Wheel (Government of Alberta 2013). In this way, balance and harmony are at the core of Aboriginal culture and the definition of health.

A new health and wellness model was launched at the *Gathering Wisdom for a Share Journey Forum,* hosted by the First Nations Health Council in the summer of 2013. Drawing on these traditional ideas and concepts, the new health and wellness model involves spiritual, emotional, mental and physical aspects of health and how one must understand and maintain balance of the four aspects. The model also incorporates healing practices, including holistic and natural medicines, and spiritual and emotional counsel from a First Nations perspective.

Given Aboriginal peoples' unique history, culture and governance structures, researchers and health experts have identified a number of health determinants that may partially explain the present-day health disparities between Aboriginal people and their non-Aboriginal counterparts. Determinants of health that appear to operate distinctly for Canada's Aboriginal peoples include historic, political, social and economic contexts, community infrastructure, resources, systems and capacities, as well as health behaviours, and physical and social environments (Loppie Reading and Wien 2009). Therefore, pathways of potential effects may be, to some degree, different for Aboriginal populations versus non-Aboriginal populations. In particular, culture and land are important to Aboriginal identity and lifestyle (Government of Alberta 2013). More than influencing health, culture and land can be considered components of health.

3.3.2.4.1 Biophysical Health Outcomes

Historically, there has been a gap between the health status of the Aboriginal and non-Aboriginal populations in Canada as measured by many disease, injury, and mortality outcomes (Health Canada 2012). While these differences have been decreasing over time, there are a number of studies that point

to substantial improvements in the health of the First Nations populations (FNHC 2013); however, considerable health disparities continue to exist between First Nations and non-First Nations populations in terms of biophysical measures of health. The First Nations Health Council (FNHC) cite prevalent health concerns as poor mental health, diabetes, obesity, cancer, respiratory disease, dental health, HIV/AIDS, addictions and children's health (FNHC 2013).

Published health care statistics for First Nations communities in the LSA are limited and many indicators of health status for Aboriginal populations in BC are available only at a provincially aggregated level. Applicable available data are presented in Table 3.3-16. These data come from the First Nations Regional Health Survey (RHS), a nation-wide longitudinal survey that is conducted by and within First Nations communities across Canada. Data from the survey are available for the 2002–2003 and 2008–2010 cycles, allowing for a comparison of health status over time. Table 3.3-16 presents key findings of the 2008–2010 RHS; the table provides comparisons of the 2002–2003 RHS results with non-First Nations population in BC. Overall, findings indicate that there has been improvement in some important health areas from the 2002–2003 and the 2008–2010 survey cycles for BC's First Nations populations. These improvements include lower smoking rates for both youth and adults. less binge drinking, and fewer suicide attempts. Some measures, however, still remain poor among BC First Nations survey respondents compared with their non-First Nations counterparts; for example, lower self-reported health status, higher incidence of several chronic health conditions (e.g., arthritis, asthma, diabetes, heart disease), and higher tobacco use. But, information is not available that would indicate whether these trends for the First Nations population across BC are also true of the First Nations communities in the LSA.

In addition to presenting data on biophysical health outcomes, the 2008–2010 RHS asked participants to report on the factors respondents felt were important for maintaining health. The responses included good diet (77.4%); being happy or content (70.4%); getting regular exercise (69.9%); good sleep; having good social supports (67.3%); being in balance physically, emotionally, mentally, and spiritually (57.9%); and reduced stress (52.4%). The RHS also reported on community strengths (factors that support health) and community issues (barriers to achieving good health). These factors can be understood as the broad determinants of health that shape Aboriginal health and wellbeing among BC First Nations. The top five factors reported as supporting community wellbeing were intact family values, respect for Elders; active traditional ceremonial activities; strong social connections; and active community/health programs. The top five barriers to health were alcohol and drug abuse; lack of employment or few available jobs available; inadequate housing; low levels of funding and education; and lack of training opportunities.

Table 3.3-16: General Health Measures for the BC First Nations Population

Health Concerns	2008–2010 RHS	2002–2003 RHS	BC non-First Nations
Overall wellbeing			
Self-reported health status (% excellent or very good health)	43.2	45.1	60.1
Good to full functioning health (%)	53.0	n/a	n/a
Self-reported health conditions (%)			
Arthritis (rate per 100,000 population)	26.5	n/a	17.8
Back problems (rate per 100,000 population)	23.6	n/a	20.7
Hypertension (rate per 100,000 population)	15.5	n/a	16.3
Asthma (rate per 100,000 population)	12.0	n/a	7.2
Diabetes (rate per 100,000 population)	9.0	n/a	5.7
Heart disease (rate per 100,000 population)	6.4	n/a	4.2
Cancer (rate per 100,000 population)	2.2	n/a	2.1
Lifestyle factors			
Eat fruit once a day or more - adults (%, male/female)	50.5 63.8	n/a	n/a
Eat vegetables once a day or more - adults (%, male/female)	63.3 67.2	n/a	n/a
Physically active – adults (%)	62.1	n/a	n/a
Physically active – youth (12-17 years) (%)	83.6	n/a	n/a
Current smoker (daily or occasional) – youth (%)	22.5	27.2	5.4
Current smoker (daily or occasional) – adult (%)	44.6	48.5	17.2
Non-smokers living in smoke-free homes (%)	85.7	74.8	n/a
Alcohol consumption in year prior to survey - adults (%)	62.8	59.7	79.8
Never used non-prescription drug in the previous year (%)			
Cannabis	65.6	n/a	n/a
Cocaine	94.1	n/a	n/a
Sedative/sleeping pill	94.3	n/a	n/a
Opioids	95.4	n/a	n/a
Amphetamine-type stimulant	97.8	n/a	n/a
Mental wellness			
Binge drinking once a week or more in previous year – adults (%)	10.2	15.7	n/a
Ever seeking treatment for substance abuse or addiction (%)	16.1	n/a	n/a
High risk of depression (%)	7.5	n/a	n/a
Ever attempted suicide (%)	14.5	17.4	n/a

NOTES:
RHS – First Nations Regional Health Survey; n/a – not available
SOURCE: FNHA 2012

3.3.2.4.2 Health Care Service Delivery

In Canada, the organization and delivery of health care services are structured differently for Aboriginal and non-Aboriginal populations. While Aboriginal people are able to access health care services anywhere across the province they live in, as is the case for all Canadians, health care provision on reserves in Canada falls under the jurisdiction of the federal government through the First Nations and Inuit Health Branch; whereas, for non-Aboriginal populations and for Aboriginal populations off-reserve, it is under provincial jurisdiction.

In BC, health care services for Aboriginal populations have been undergoing dramatic changes in the past few years. These changes began in 2005 with the signing of the Transformative Change Accord (Government of BC et al. 2005), whereby the federal and BC governments committed to closing the gap between First Nations and other BC residents in terms of health, education, economic opportunities and housing. This was followed by the federal government signing the Tripartite First Nations Health Plan in 2007 (First Nations Leadership Council et al. 2007), which ensured that First Nations were involved in decision-making about health.

In May 2011, BC First Nations adopted the Tripartite Framework Agreement on First Nations Health Governance, which transferred the governance of health care services for BC First Nations from the federal government to the First Nations Health Council and the First Nations Health Authority (First Nations Health Council and First Nations Health Authority 2013). Although changes to health care services delivery are expected to occur, these changes may take several years to be established and it is not yet entirely clear how health care delivery may change as a result. However, this transfer is unprecedented in Canada and is likely to strongly influence health care delivery, self-governance and empowerment, and the health of the Aboriginal population.

3.4 Marine Transportation and Use

3.4.1 Methods

3.4.1.1 Desktop Research

3.4.1.1.1 Literature Review

Baseline information on marine transportation and use was obtained from publicly available information, through consultation with stakeholders and First Nation groups, and f rom primary research. These sources are:

- DFO fisheries data, including landings, value, licence, and spatial data, for the period 2000 to 2012 were requested for fisheries management areas (FMA) 4, 5, and 6
- DFO's Integrated Fishery Management Plans (IFMPs) and statistical reports
- BCMCA online database provided spatial data for fisheries, recreation, and tourism (2013)
- strategic marine planning resources, such as the Pacific North Coast Integrated Management Area (PNCIMA) Plan (2013) and MaPP initiative (2013)
- environmental assessments for similar projects, existing reports, and news publications
- the District of Kitimat website
- Canadian Coast Guard Marine Communications and Traffic Services' (MCTS) records of vessel movements in the Prince Rupert traffic zone (MCTS 2013)
- Pacific Pilotage Authority (PPA) records of vessel movements requiring pilotage to or from the port of Kitimat (Pacific Pilotage Authority 2013)
- District of Kitimat's statistics for vessels arriving and departing from the port (Kitimat Chamber of Commerce 2013)
- Cruise Lines International Association (CLIA) records of cruise ship movements (Cruise Line International Association 2013)
- BC Ferries schedule of crossings (BC Ferries 2013)
- Being Gitka'a'ata: A Baseline Report on Gitka'a'ata Way of Life, a Statement of Cultural Impacts Posed by the Northern Gateway Pipeline, and a Critique of the ENGP Assessment Regarding Cultural Impacts (Satterfield et al. 2011)
- Gitga'at Economic Development Strategy (Hartley Bay Council 2011)
- Giga'at Sustainable Tourism Strategy (Gitga'at Nation 2003)
- Gitxaala Use Study: LNG Export Terminal Project (Calliou Group 2014a)
- Gitxaala Valued Components Report: LNG Canada Development Inc. Application (Calliou Group 2014b)

- Gitxaala Nation Socioeconomic Study: Interim Report for the LNG Canada Project (The Firelight Group 2014)
- The LNG Canada Proposed Terminal Site and Tanker Route within Haisla Traditional Territory: Haisla TLUS and Socio-economic Profile (Powell 2013)
- Report to the Ktiselas First Nation Regarding Kitselas Traditional Use/Occupancy of the Coastal Territories Between the Mouths of the Kitimat and Skeena Rivers (Smith 2008)
- Report on the Kitselas Traditional Histories and Territories Project August 1998 to 1999 (Smith 1999)
- Interim Letter Report for LNG Canada's Environmental Assessment Application Submission– Kitsumkalum First Nation TUS and SIA Preliminary Information (Crossroads Cultural Resource Management Ltd. 2014)
- Interim Land and Marine Resources Plan of the Allied Tsimshian Tribes of Lax Kw'alaams (Lax Kw'alaams 2004)
- Metlakatla First Nation Traditional Land Use and Ecological Knowledge of LNG Canada Export Terminal Project – Interim Report #1 (DM Cultural Services Inc. and Metlakatla First Nation 2014)
- Metlakatla Draft Marine Use Plan Executive Summary (Metlakatla First Nation 2014)
- Social and Economic Assessment and Analysis of First Nations Communities and Territorial Natural Resources for Integrated Marine Use Planning in the Pacific North Coast Integrated Management Area (Ference Weicker & Company Ltd. 2009), and
- Economic Impacts of the Enbridge Northern Gateway Project on the Gitga'at First Nation (Gregory et al. 2011).

This information was used to understand the baseline conditions of marine transportation and use along the marine access route. Great effort was taken to collect the most accurate and up-to-date information form as many sources as possible. In most cases, the data were summarized in table format and were not subject to complicated modeling exercises. Consequently, only a brief description and treatment of several data sets is required to explain how the data were used.

DFO Fisheries Data

All available commercial, recreational, and Aboriginal fishing data were requested from DFO. Information obtained included catch landings (quantity of catch, usually denominated as a weight), value (dollars), and the number of licenses issued for each fishery. These data were received in raw form and required additional input to be summarized in a relevant format.

Integrated Fisheries Management Plans

These documents were used to understand fishing open times and closures, licensing and quotas, and gear restrictions and other constraints for each individual fishery.

British Columbia Conservation Data Analysis (BCMCA)

The BCMCA is an online repository for spatial data. All relevant and available spatial data were downloaded, reviewed, and included in the report. Spatial information for fisheries, recreation, and tourism were predominantly sourced from this website.

Coast Guard Marine Communications and Traffic Services

The MCTS assist with regulating marine traffic, broadcasts safety communications, and promotes safety and environmental awareness, as outlined in the Canadian *Shipping Act* and Regulations. The primary services provided by MCTS include:

- monitoring international distress signals
- broadcasting marine weather information and providing notices of hazards to navigation
- regulating movements of commercial ships, and
- monitoring ships entering or leaving Canada.

Data requested from the MCTS include information on all ship movements (from participating vessels) reported within the Prince Rupert vessel traffic zone between 2003 and 2013. These data were collected over a large area and can inform general patterns in the Prince Rupert region.

The *Canadian Shipping Act* (2001) stipulates that all prescribed vessels must report to Vessel Traffic Services when entering, leaving, or travelling within a traffic zone. Prescribed vessels and exceptions according to the Vessel Traffic Service (VTS) Zone Regulations (2007) are:

- piloted, reporting traffic, foreign registered ships over 350 gross registered tonnes (GRT) and Canadian registered ships over 10,000 GRT. This class of ship must carry a local marine pilot and must comply with the MCTS and Vessel Traffic Services (VTS).
- non-piloted, reporting traffic, foreign and Canadian registered ships that do not require a pilot but that are in excess of vessel-type size restrictions. This class of ship must comply with VTS reporting requirements.
- non-reporting traffic, all vessels under a certain size. This class of ship is not required to report to VTS and includes:
    - all vessels under 20 m in length
    - pleasure craft under 30 m in length
    - fishing vessels actively engaged in fishing activities

- fishing vessels in transit that are under 24 m in length and less than 150 GRT
- tugs with tow, where the object in tow is less than 20 m in length, and
- tugs with tow, where the combined length of the vessel and object in tow is less than 45 m.

The total number of annual vessel movements is the sum of:

- inbound (a vessel entering a zone from outside the zone limits)
- outbound (a vessel exiting the limits of a zone)
- transiting (no arrival or departure port within the zone)
- in-zone (any movement of a vessel, which begins and ends within the limits of a zone and does not exit the zone), and
- out-of-zone (any participating vessel but which is not within a specified zone of responsibility).

Pacific Pilotage Authority

The PPA is a not-for-profit Provincial Crown corporation responsible for providing experienced marine pilots for commercial vessels (foreign vessels over 350 GRT and Canadian ships over 10,000 GRT). The PPA provides services in compulsory pilotage areas in Canada, as established by the *Pilotage Act* (2011) and *Pacific Pilotage Regulations* (2009). The PPA has records of piloted movements to, from, and within the port of Kitimat between 1999 and 2013. These data are specific to vessels that are most likely travelling along the proposed marine access route for the Project. Data from 1999 – 2013 were available.

District of Kitimat

The district of Kitimat collected shipping data from RTA, Eurocan, and Methanex between 1978 and 2008. They include information on both import and export deep sea vessel traffic and barges carrying various products, including paper, linerboard, lumber, pitch, green coke, ingots, ammonia, methanol, and condensate. These data are the best estimate for the number of vessels frequenting the Port of Kitimat.

3.4.1.2 Primary Research

Primary research was conducted to fill information gaps identified during the desktop review of existing information. Primary research included:

- vessel surveys along the marine access route to supplement shipping data, especially with respect to recreational boating and placement of fishing gear (e.g., floats attached to trap lines)
- fisheries workshops in Kitimat and Prince Rupert to meet with commercial, recreational, and guided angling outfitters to identify potential Project effects and solicit ideas for mitigation

- fisheries workshops held with the Metlakatla First Nation and Kitselas First Nation on March 3 and March 13, 2014 respectively, and
- one-on-one interviews with Kitimat residents to discuss fisheries, recreation, guided angling, and
- phone surveys with eco-tourism operators to determine the nature and size of the eco-tourism industry (including guided angling operators).

3.4.1.2.1 Vessel Surveys

Stantec, on behalf of LNG Canada, conducted vessel surveys to characterize non-reporting marine traffic (i.e., recreational traffic less than 30 m and active fishing vessels that are not reliably captured by the available shipping data) that could interact with shipping traffic. Boat traffic was observed during marine mammal surveys that were conducted along the marine access route. Because the marine resources RSA is larger than the marine transportation and use RSA, vessels were recorded outside the marine transportation and use RSA. Those observations are shown on the figures for reference, but are not included in the analyses.

A total of five, two-week surveys were conducted during high-season for marine activities (e.g., fishing, recreation, and eco-tourism) between June and August 2013. When a vessel was spotted, its type, activity, and distance from the ship were recorded. Vessel density (observations, hectare, day) was calculated for five traffic zones.

3.4.1.2.2 Fisheries Workshops

Marine Community

A total of three workshops were held in Kitimat and Prince Rupert. A workshop in Kitimat was held December 11, 2013, while two workshops in Prince Rupert were on December 12, 2013 and March 3, 2014. The workshops were designed to share fisheries information and seek input from the community regarding how shipping related activities might affect commercial and recreational fisheries along the marine access route. The format included a presentation, question and answer period, and interactive group work lead by a facilitator. Each workshop lasted approximately four hours.

A total of 45 stakeholders were identified and invited to the Kitimat and Prince Rupert workshops. Invited stakeholders included federal and provincial government representatives, recreational, commercial, and First Nations fishers (operating commercially) and additional special interest groups, and guided angling operators. Those invited were identified to have specific knowledge or represent important interests related to recreational and commercial fishing activities within the marine transportation and use local study area.

First Nation

Fisheries workshops were held with representatives of the Metlakatla First Nation and the Kitselas First Nation. A workshop with the Metlakatla First Nation in Metlakatla was held on March 3, 2014, and with the Kitselas First Nation in Terrace on March 13, 2014.

3.4.1.2.3 One-on-One Interviews

Key informant (KI) interviews occurred in person in Kitimat to obtain information related to marine transportation and use. KIs were selected from appropriate regional, local, not-for-profit and special interests groups with specialized knowledge or experiences in providing primary information not publicly available. Additional KIs were interviewed as a result of a snow-ball sampling method, where one key informant referred another community member.

3.4.1.2.4 Survey of Recreation and Tourism Use

A sample of 60 recreation and tourist business operators was originally selected based on their geographic location within the LSA and services/products offered. This was done using internet searches of local and regional business listing websites and business names found in the BCMCA online data repository. However, it was discovered that some of the contact listings were duplicates, invalid or the businesses were no longer operational. As a result, a total of 50 businesses where deemed active and further contacted for interviewing. After three separate follow-up attempts, a total response rate of 40% (n=20) was achieved for this study. See Appendix F for more details.

Data collection was conducted via a telephone survey during the period from December 6th to December 20th, 2013 using a semi-structured schedule. The topic areas were divided into five sections which ranged from basic demographics to business location, types of services, gross year revenue and the respondents thoughts about increases in local shipping traffic and impacts on their business operations. A total of 23 questions were asked to the respondents and the interview length was approximately 15 minutes.

3.4.1.3 Data Analyses

In most cases data were summarized in table format and were not subject to complicated modeling exercises. However, analyses that warrant further explanation and are described below.

3.4.1.3.1 Vessel Surveys

Stantec, on behalf of LNG Canada, conducted vessel surveys to characterize non-reporting marine traffic (i.e., recreational traffic less than 30 m and active fishing vessels that are not reliably captured by the available shipping data) that could interact with shipping traffic. Boat traffic was observed during marine mammal surveys and data were conducted along the marine access route. Because the marine

resources RSA is larger than the marine transportation and use RSA, vessels were recorded outside the marine transportation and use RSA. Those observations are shown on the figures for reference, but are not included in the analyses.

Five, two-week surveys were conducted during high-season for marine activities (e.g., fishing, recreation, and eco-tourism) between June and August 2013. When a vessel was spotted, its type, activity, and distance from the ship were recorded. Vessel density (observations, hectare, day) was calculated for five traffic zones.

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Data collection was conducted via a telephone survey during the period from December 6th to December 20th, 2013 using a semi-structured schedule. The topic areas were divided into five sections which ranged from basic demographics to business location, types of services, gross year revenue and the respondents thoughts about increases in local shipping traffic and impacts on their business operations. A total of 23 questions were asked to the respondents and the interview length was approximately 15 minutes.

3.4.1.4 Data Analyses

In most cases, data were summarized in table format and were not subject to complicated modeling exercises. However, analyses that warrant further explanation and are described below.

3.4.1.4.1 Vessel Surveys

Vessel density (observations, hectare, day) was calculated for five traffic zones by dividing the number of vessels observed by the area and search effort attributed to the zone. Density calculations were done for different data sets to provide specific estimates for different types of vessels (e.g., fishing and non-fishing vessels).

The RSA was divided into five sections, based on geographic and marine features. Section 1 begins at the Kitimat River estuary and extends south 3.5 km to encompass vessel activities occurring at the head of the channel. Section 2 begins at the edge of Section 1 south through Douglas Channel to Hartley Bay. Section 3 begins at Hartley Bay and extends southwest through Wright Sound to Principe Channel. Section 4 covers the length of Principe Channel and Section 5 spans from Browning entrance north to Triple Island.

Traffic density estimates are presented for three different data sets:

- all traffic
- fishing vessels and gear, and
- non-fishing recreational vessels.

Commercial traffic such as ferries, planes, helicopters, and Coast Guard were not included in the fishing or non-fishing data sets (because they are not considered recreational vessels) and are only included in the data set and analysis that used the entire data set.

3.4.2 Results

3.4.2.1 Use of the Marine Terminal Area

3.4.2.1.1 Haisla Nation

The asserted territory of Haisla Nation includes the head of Kitimat Arm and extends the length of Douglas Channel to Bluejay Falls (near to the south end of Maitland Island) and is called *Q'axdlalisla*. The existing terminal is located in an area called *Yaksda*, which means "dirty water". Haisla are concerned about potential pollution (Powell 2013) and habitat loss in the estuary.

3.4.2.1.2 Public

Road access to the estuary is limited; however, public use occurred when the RTA facility service roads were open. The estuary has been used for bird watching, fishing and hunting. At present, the only way to access the estuary is by boat because the roads have not been accessible to the public for some time (Hummel and Langagger 2013; MacCleod 2013; Wakita 2013).

The area surrounding the proposed marine terminal has been used for recreational crab fishing because of ease of access and proximity to shelter. However, many residents avoid crabbing in this area because of perceptions of contamination (Hummel and Langagger 2013). For example, the Eurocan pulp and paper mill is thought to have leached contaminates into the Kitimat River estuary in the late 1970s and might have contributed to the decline of the eulachon run (Powell 2013). Other fishing activities, such as trolling for salmon or jigging for halibut occurs along the east bank of the arm, where the Kitimat River delta ends and deep water begins. Fishing from shore has also been reported (Hummel and Langagger 2013; Wakita 2013).

3.4.2.2 Navigational Aids, Communications, Coast Guard Services, and Safety

Aids to navigation include any features placed along the coast that increase marine safety, such as fixed aids such as lighthouses, beacons and lights, and floating aids such as buoys. The Canadian Coast Guard (CCG) publishes annual information about these aids in *List of Lights, Buoys, and Fog Signals* (CCG 2013). Some examples include fixed aids located on Triple Island and within Hecate Strait, Principe Channel and Douglas Channel. CCG also tracks information on damaged or missing navigational aids and other hazards and disseminates that information in Notices to Mariners.

Radio aids to navigation include global positioning system (GPS), differential GPS, radar reflectors, and radar beacons. Automatic Identification Systems (AIS) are another tool that improves navigational safety at sea. This system is required for all vessels with gross tonnage (GT) of 300 t or more and all passenger ships regardless of size (International Maritime Organization 2014).

The CCG runs the MCTS, which provides marine safety communications coordination with rescue resources. Prince Rupert is one of the centres where this service is provided. The nearest CCG station is located in Prince Rupert at the Seal Cove Seaplane Base and offers the following services to assist maritime safety:

- MCTS provides information on marine weather conditions, first response to distress calls, and monitoring and regulation of vessel traffic movement in Canadian waters
- Aids to Navigation deploys and maintains buoys and beacons
- Environmental Response coordinates pollution preparedness planning, aerial surveillance, environmental education, pollution prevention, monitoring and response
- Search and Rescue (SAR)
- Office of Boating Safety promotes marine and boating safety through distribution of safety information and publications, and
- Waterways Development is responsible for the safety and accessibility of active fishing harbours.

There are several anchorages and areas of refuge located in the RSA that could accommodate large vessels in the event of an emergency. These locations include:

- Anger Anchorage (off Anger Island at the junction of Principe and Petrel channels)
- port of Kitimat
- Kitkiata (Douglas Channel; emergency only, with tug assist), and
- Coghlan Anchorage (near Wright Sound; emergency only, with tug assist.)

The mean number of annual vessel movements according to the MCTS was 21,552 (Table 3.4-1). Traffic volumes peaked in 2004 (33,192 movements) and declined considerably until 2008 (1,802 movements) (Appendix C, Figure C-1). Volumes rose again between 2009 and 2013 with some fluctuations. Ferries and tugs (with tows) are the largest and second-largest components of reported traffic. On average, ferries were 43% of traffic volume, and tugs were 19%, although these percentages varied considerably from year to year. For example, in 2008 ferries were about 62% of the observed movements in the Prince Rupert region, while in the previous year (2007), they were about 9% of vessel traffic. The number of movements made by ferries and tugs is likely tied to local and international economic conditions and

should, therefore, be expected to fluctuate. For a breakdown of vessel movements by type see Appendix C, Table C-1 and Table C-2 and Appendix C, Figures C-2, C-3, and C-4.

Table 3.4-1: Annual Vessel Movements in the Prince Rupert Traffic Zone

Year	Movements	Ferry		Tug with Tow	
	Count	Count	Percentage of traffic	Count	Percentage of Traffic
2003	21,140	3,163	15.0	3,163	29.9
2004	33,192	15,115	45.5	15,115	19.3
2005	30,479	15,013	49.3	15,013	17.4
2006	28,030	14,328	51.1	14,328	18.9
2007	13,437	1,171	8.7	1,171	26.2
2008	1,802	1,110	61.6	1,110	10.5
2009	25,190	13,902	55.2	13,902	9.2
2010	15,867	8,363	52.7	8,363	10.9
2011	23,349	-	-	-	-
2012	23,817	-	-	-	-
2013	20,766	-	-	-	-
Mean	21,552	9,021	42.4	9,021	17.8

NOTE:
Data for 2011 – 2013 was provided in a different format and therefore only the total number of movements is shown.
SOURCE: MCTS (2013)

Characteristics of the merchant vessels visiting the port of Kitimat (e.g., length overall and gross tonnage (GT)) can be inferred from MCTS data provided for 2013 since earlier data was limited to the number of transits and was not accompanied by ship attribute information. A summary is provided in Table 3.4-2.

Table 3.4-2: Attributes of Merchant Ships Arriving at the Port of Kitimat, 2013

Vessel Name	Country of Origin	Length Overall (m)	Gross Tonnage (m^3)
AAL Bangkok	Singapore	149	14,053
AAL Hongkong	Marshall Islands	194	23,930
AAL Kembla	Marshall Islands	194	23,930
Alster Bay	Panama	190	30,816
BBC Konan	Liberia	127	8,831
Bridgegate	United Kingdom & Colonies	190	29,977
Clipper Anne	Liberia	139	9,627
Copenhagen	Antigua and Barbuda	108	4,591
Durban Bay	Panama	190	32,726

Vessel Name	Country of Origin	Length Overall (m)	Gross Tonnage (m^3)
Geiranger	Singapore	201	27,972
Green Frontier	Panama	120	9,727
HHL Indication	Liberia	162	11,130
JS Phoenix	South Korea	190	27,986
Julie C	United Kingdom & Colonies	138	9,530
Martini Scan	Netherlands	116	6,693
Pronoi R	Malta	200	34,795
Star Alabama	Norway	169	20,916
Star America	Norway	169	20,929
Star Atlantic	Norway	169	20,125
Star Dieppe	Norway	183	27,911
Star Evviva	Norway	180	24,479
Star Grip	Norway	198	27,192
Star Ismene	Norway	198	32,628
Star Kvarven	Norway	209	37,158
Sunbird Arrow	Bahamas	144	12,959
Taagborg	Netherlands	172	14,695
Tenna Bulker	Singapore	169	16,960
Tern Arrow	Bahamas	188	28,349
Thor Glory	Panama	125	10,021
Thorco Liva	Hong Kong, China	132	13,110
Virginia	Malta	190	28,029
Median		171	20,923

SOURCE: MCTS 2013

3.4.2.3 Pacific Pilotage Authority

These data are summarized in Table 3.4-3. The mean number of piloted movements to and from Kitimat between 1999 and 2013 was 204. Since vessels will always have an inbound and outbound portion to their journey, dividing by two gives an estimate of the number of ships using the marine access route (e.g., 102). However, piloted vessel movement data may not be an exact descriptor of shipping traffic. For example, a vessel might make smaller movements between two nearby anchorages or terminals or change BC coast pilots and make no movements, all of which are recorded in the PPA database as a movement. Nevertheless, the data provide an estimate of traffic patterns along the proposed marine access route.

The data show an overall declining trend with piloted vessel movements peaking at the start of the time series (1999, with 316 piloted movements) and declining until 2013 (Table 3.4-3 and Appendix C, Figure C-5).

Table 3.4-3: The Number of Piloted Movements to or from the Port of Kitimat

Year	Total*	Alcan	Eurocan	Methanex	Anchorage
1999	347	74	112	130	31
2000	333	76	127	111	19
2001	251	60	95	83	13
2002	257	63	72	99	23
2003	232	76	53	88	15
2004	222	61	69	82	10
2005	216	72	63	70	11
2006	174	73	63	27	11
2007	181	64	69	33	15
2008	152	56	55	32	24
2009	238	104	80	44	57
2010	151	80	13	46	29
2011	142	100	0	34	44
2012	94	62	20	8	12
2013	68	50	13	0	32
Mean	204	71	60	59	23

NOTE:

* The total number of movements may be less than the sum of each row since movements between terminals in Kitimat or an anchorage and a terminal are counted twice.

SOURCE: PPA (2013)

3.4.2.4 District of Kitimat

On average, 203 vessels visit the private port of Kitimat annually (Table 3.4-4). Ship volume increased gradually from 1978 until 1993, when it peaked at 279 vessels. Traffic declined gradually from 1993 to 2008 (Appendix C, Figure C-6; there was an abrupt drop in traffic volume preceding the peak in 1993.) At present, the RTA facility generates most of the deep sea vessel traffic visiting Kitimat. However, this facility is currently being expanded and it is expected to nearly double its processing capacity and, likely, its shipping volume by 48% (Rio Tinto Alcan 2014). Since 2005, when Methanex closed, the jetty is used by eight vessels on average per year for the import of condensate and methanol.

Table 3.4-4: The Number of Vessels Visiting the Port of Kitimat

Year	Vessel traffic				
	Alcan	Eurocan	Methanex	Encana	Total
2008	55	42	13	11	121 Not including barges
2007	42	43	8	9	102 Not including barges
2006	62	80	4	7	153
2005	59	80	35	-	174
2004	63	89	42	-	194
2003	53	59 – 4 month strike	45	-	157
2002	51b	81	57d	-	189
2001	68	75c	44 - restart in July after 12 month shutdown	-	187
2000	72	85	60	-	217
1999	64	71	74	-	209
1998	69	70	66	-	205
1997	74	88	79	Methanex	241
1996	70	94	69	Celanese[a]	233
1995	70	95	74	22	261
1994	74	88	75	18	255
1993	99	92	73	15	279
1992	107	N/A	66	18	191
1991	110	89	51	24	274
1990	113	86	55	19	273
1989	106	77	64	17	250
1988	110	75	53	22	260
1987	104	76	55	15	250
1986	68	66	30	6	170
1985	82	65	35	21	203
1984	81	53	28[e]	23	185
1983	85	58	30	17	190
1982	90	50	11	-	151
1981	84	44	-	-	128
1980	89	49	-	-	138
1979	79	47	-	-	126

Year	Vessel traffic				
	Alcan	Eurocan	Methanex	Encana	Total
1978	90	56	-	-	146
Mean	80	71	48	17	203

NOTE:
[a] Methanex wharf handles vessels for Celanese.
[b] Alcan deep sea vessels only; approximately 15 deep sea barges carrying coke in addition to this traffic.
[c] Eurocan: 17 vessels with lumber, 18 barges, some with both paper and lumber.
[d] Methanex: 13 vessels with methyl tert butyl ether, 20 vessels with methanol, 24 vessels with ammonia.
[e] April 1 to December 31, 1984.
SOURCE: Kitimat Chamber of Commerce (2013)

3.4.2.5 Ferry Traffic

BC Ferries operates two year-round services that will cross the shipping route 450 times annually according to the normal operating schedule.

Routes

The first ferry crossing is between Port Hardy and Prince Rupert (with stops along the way at Bella Coola, Ocean Falls, Shearwater, Bella Bella, and Klemtu), and the second service operates between Prince Rupert and Skidegate on Haida Gwaii. Each of these services crosses the marine access route in one place. The first is for ferries that travel between Prince Rupert and Skidgate and occurs near Porcher Island (Appendix C, Figure C-7). The second occurs when ferries pass through Wright Sound traveling between Port Hardy and Prince Rupert.

Schedule

During summer months (i.e., June 26 through September 2) one trip between Prince Rupert and Port Hardy is made every day. The ferry travels either north or south between these two locations on alternating days (i.e., 7 crossings per week for a total of 90 crossings). During winter, only one trip is made each way per week (i.e., 2 crossings per week for a total of 72 crossings), but supplemental trips do occur (BC Ferries 2013).

The second route, between Prince Rupert and Skidegate is travelled three times each way per week during summer and winter months (i.e., 6 crossings per week for a total of 288 crossings) (BC Ferries 2013). Thus, in total, ferries cross the marine access route approximately 450 times annually. Ferry traffic patterns were corroborated during Stantec's vessel surveys and were observed in Sections 2, 3, and 5, in areas where they crossed the marine access route.

3.4.2.6 Cruise Lines International Association

Cruise vessels traveling through PNCIMA may remain entirely in Hecate Strait or can choose to take the inside passage, but must carry two BC coast pilots if taking the latter route (Spalding 2013, pers. comm.). Piloted cruise ships may begin their journey in Hecate Strait or can transit the area using either or both Laredo or Principe Channels (MacConnachie et al. 2007). Non-piloted cruise ships are required to remain in Hecate Strait outside of compulsory pilotage areas as per PPA regulations.

In 2005, cruise ships made more than 300 trips using the inside passage en route to Alaska, with only 49 of those stopping in Prince Rupert (MacConnachie et al. 2007). While this route continues to be used by large cruise ships (Table 3.4-5), considerably fewer trips were reported by the Cruise Line Interactional Association in 2013. For example, 71 trips were made through Laredo Channel. Fifty cruise ships that went through Laredo Channel also passed through Principe Channel. Twenty-one passed through Grenville Channel. Vessels travelled between 14 and 21 knots (Cruise Line International Association 2013). Several ships that used the inside passage in 2013 are listed in Table 3.4-5. A complete list of active cruise ships in the Northwest Pacific is provided in Appendix C, Table C-3.

Table 3.4-5: Characteristics of Cruise Ships Using the Inside Passage, 2013

Member Line	Ship Name	Home Port	Passenger Capacity	Gross Tonnage	Length (m)
Celebrity	Millennium	Vanc/Seward	1,900	90,100	294
Disney	Wonder	Seattle	2,809	83,308	294
Holland America	Amsterdam	Vancouver	1,380	61,000	238
Holland America	Statendam	Vanc/Seward	1,258	55,819	185
Holland America	Voledam	Vancouver	1,432	61,396	237
Holland America	Zuiderdam	Vancouver	1,916	82,000	285
Norwegian	Sun	Vanc/Whittier	1,936	78,309	259
		Median	1,900	78,309	259

NOTE:
Not all member lines using the inside passage were made available.
SOURCE: Cruise Line International Association Data (2013).

3.4.2.7 Other Marine Industry

Other marine industry in the RSA includes Coast Guard, military, and marine aviation. For example, Coast Guard and military vessels were observed during vessel surveys. Very few of these ships were sighted, with slightly more observations in Wright Sound and outside of the RSA in Caamaño Sound. Aircraft were also observed south of Hartley Bay. See Appendix C, Table C-4 for full results.

3.4.2.8 Vessel Surveys

3.4.2.8.1 All Vessel Observation Survey Results

Vessel surveys revealed that existing traffic is greatest in Douglas Channel and Wright Sound (Appendix C, Figure C-8 and Table 3.4-6).

Table 3.4-6: Vessel Survey Summary for All Observations

Traffic section	Number of Vessels Observed	RSA Section Area (ha)	Duration of Survey in Section (days)	Density (Observations/ha/ day)
1: Head of Kitimat Arm	8	1,022	0.11	0.070893
2: Douglas Channel	96	28,656	1.90	0.001763
3: Wright Sound	198	31,360	3.82	0.001654
4: Principe Channel	28	46,036	3.98	0.000153
5: Browning Entrance to Triple Island	84	168,875	4.02	0.000124

NOTE:
Data for all observations were included.
SOURCE: Stantec Vessel Survey Data

3.4.2.8.2 Commercial and Sport Fishing Vessel and Gear

Higher commercial and recreational fishing activity was observed in Douglas Channel and Wright Sound. Fewer fishing vessels were observed in Sections 1, 4 and 5 (Appendix C, Figure C-9 and Table 3.4-7).

Table 3.4-7: Commercial and Sport Fishing Vessels or Gear Observed

Traffic section	Number of Vessels Observed	RSA Section Area (ha)	Duration of Survey in Section (days)	Density (Observations/ha/ day)
1: Head of Kitimat Arm	3	1,022	0.11	0.026585
2: Douglas Channel	28	28,656	1.90	0.000514
3: Wright Sound	84	31,360	3.82	0.000702
4: Principe Channel	2	46,036	3.98	0.000011
5: Browning Entrance to Triple Island	28	168,875	4.02	0.000041

NOTE:
Data for all fishing vessels or gear were used.
SOURCE: Stantec Vessel Survey Data; see 7.3.6 for further details.

3.4.2.8.3 Recreational Traffic (Non-Fishing Power and Sail)

Higher recreational boating activity was observed in Douglas Channel and Wright Sound. Fewer power and sailboats were observed in Sections 1, 4 and 5 (Appendix C, Figure C-10 and Table 3.4-8).

Table 3.4-8: Recreational Vessels (Non-Fishing Power and Sail) Observed

Traffic section	Number of Vessels Observed	RSA Section Area (ha)	Duration of Survey in Section (days)	Density (Observations/ha/ day)
1: Head of Kitimat Arm	2	1,022	0.11	0.017723
2: Douglas Channel	57	28,656	1.90	0.001047
3: Wright Sound	101	31,360	3.82	0.000844
4: Principe Channel	17	46,036	3.98	9.27 x 10-5
5: Browning Entrance to Triple Island	27	168,875	4.02	3.98 x 10-5

NOTE:
Non-fishing recreational power and sail vessel data were used.
SOURCE: Stantec vessel survey data.

3.4.2.8.4 Other Traffic

Surveyors recorded cruise ships, aircraft, Coast Guard/military, tanker and tug/barge traffic. The number of observations of these vessels was much lower than for fishing and recreational vessels; see Appendix C, Table C-4.

3.4.2.8.5 Fisheries Workshops

Marine Community

Concerns and potential solutions related to the Project identified during fisheries workshops with the marine community from the Kitimat and Prince Rupert region included:

- decreased fishing efficiency as a result of:
  - displacement by shipping traffic, especially around Triple Island, and
  - noise from large vessels, including tugs affecting fish behaviour.
- pick-up of BC coast pilots suggested 7 km farther away from shore from Triple Island so as to manage potential interference with fishers.
- some gill net tie-off points exist along the route that might be affected by shipping traffic. These spots are valuable fishing locations and many times fishers will wait turns to use the tie-offs since they are productive compared to other areas.
- halibut long line gear used along shore, not likely affected by shipping.

- prawners fish close to shore, not along marine access route and are therefore not expecting to be affected by shipping traffic
- shipping traffic is not likely to interfere with dive based fisheries during harvesting, but could affect access to the packer boats. These boats provide efficiencies to the whole fleet.
- recreational fishers not anticipating large effects from shipping traffic due to how and where they fish (e.g., trawling close to shore)
- cumulative effects on the fishing industry, specifically the salmon industry
- increased risk of vessel accidents and malfunctions as a result of increased shipping traffic. Small vessels with basic electronic equipment may be at risk for collision, especially during extreme weather events.
- minimum speeds permissible for LNG vessels to maintain adequate steerage.
- concern regarding the size safety zones around LNG carriers
- wake effects
- fishers feel unsupported by government due to low financial contributions to BC GDP
- recreational fishing and guided angling enforcement limited and not a DFO priority
- access to the marine environment and the Kitimat River estuary is limited
- suggestion for a “legacy project”, which could include funds for either reinvigorating the fish hatchery or enhancing marine access (e.g., boat launch or improvements to Minette Bay area for use as an outdoor recreation area)
- LNG Canada should increase outreach efforts to engage the commercial sector
- environmental concerns, including:
    - construction in the Kitimat River estuary and effects on fish and fish habitat, and
    - discharge of ballast water and introduction of invasive species.

First Nation

Concerns and potential issues identified during fisheries workshops with marine community from the Kitimat and Prince Rupert region included:

- interference with traditional harvesting activities around Triple Island, Chatham Sound, Douglas Channel. Mechanisms suggested included increased boat traffic, pollution, vessel collisions and accidents and malfunctions, altered migratory routes for marine species such as salmon due to vessel noise, and large vessels anchoring in harvesting areas.
- adverse effects from increased vessel traffic, including LNG carriers, escort tug, or BC pilot boats on:
    - marine infrastructure (e.g., docks)

  - visual quality of the marine environment
  - marine resources (e.g., decrease ability to harvest or change migration patterns)
  - eco-tourism operations (e.g., change of whale migration routes or timing, and collisions with marine mammals), and
  - archaeological sites (e.g., via shoreline erosion processes).
- increased risk of vessel accidents and malfunctions. Highlighted mechanisms included human error and extreme weather conditions. Other issues related to navigational safety identified were the need for improvements and modernization of the aids to navigation along the marine access route.
- effects resulting in decreased success and sustainability of existing and proposed conservancies. The need for support and management of Stephens Island conservancy and marine management zones was expressed.
- environmental effects related to the introduction of invasive species through ballast water, air and water quality (e.g., engine exhaust and spills),
- the adequacy of environmental clean-up strategies
- Gitga'at are interested in preserving fishing opportunities in Principe Channel (despite its current closure to seine and gill nets since the 1980s)
- Gitga'at are concerned about halibut long line gear used in Principe Channel and shipping traffic

3.4.2.9 Commercial Fisheries

All major fisheries occurring in FMA 4, 5, and 6 are listed in Table 3.4-9. Catch landings, value, and licensing data, are provided in Appendix D for all major fisheries in FMAs 4 – 6. Similar data were generally not available for minor fisheries and are, therefore, not included in this review.

Table 3.4-9: Major and Minor Fisheries in FMAs 4 through 6

Reviewed	Minor Fishery
Pacific salmon ▪ coho ▪ chinook ▪ chum ▪ pink ▪ sockeye	Black cod (sablefish)
Groundfish (multiple spp.)	Red snapper (rockfish spp.)
Pacific halibut	Sole (multiple spp.)
Pacific herring (including roe, spawn-on-kelp, food and bait)	Lingcod
Spot prawn	Sea snails

Reviewed	Minor Fishery
Shrimp (*Pandalus* spp.)	Squid
Dungeness crab	Scallop
Red sea urchin	King crab
Geoduck clam	Pilchard (sardines)
Giant Pacific octopus	Eulachon
Sea cucumber	Spiny dogfish
	Pacific cod (grey cod)
	Manila clams
	Horse clam

NOTE:
A major fishery is one where DFO catch statistics were available (e.g., landings, value, and licences issued).
SOURCE: DFO (2013a)

3.4.2.9.1 Pacific Salmon

Pacific salmon include five species belonging to the genus *Oncorhynchus*: coho (*O. kisutch*), chum (*O. keta*), chinook (*O. tshawytcha*), pink (*O. gorbuscha*), and sockeye (*O. nerka*). Their natural range includes the waters of the north Pacific Ocean, Bering Strait, southwestern Beaufort Sea, and the surrounding freshwaters (DFO 2013b). Pacific salmon are anadromous fish and depend on both freshwater and marine ecosystems. All five species of Pacific salmon (see Table 3.4-9) are targeted in a limited access, competitive fishery, meaning that a restricted number of fishers compete against each other for a share of the TAC.

Location

Salmon fishing occurs using gill nets, purse seines, and troll gear throughout FMAs 4, 5, and 6 (Appendix C, Figure C-11). As a result, the three FMAs are potential fishing grounds (Appendix C, Figure C-12).

Open Times and Closures

Commercial salmon fishing can occur along the Pacific coast any time between May and October. Exact dates for fishing opportunities will vary according to local run timing, distribution, and health of the salmon stock. In FMAs 4, 5, and 6, salmon fishing usually begins early June and starts to slow down in September. Exact opening and closing dates are posted as Fishing Notices on the DFO website.

Gear, Restrictions, and Other Constraints

Commercial salmon licences are issued for all five species of Pacific salmon and are issued according to gear type:

- Seine nets are deployed around a school of fish with the aid of a small skiff. The bottom of the net is drawn closed and the school becomes trapped in the net. This gear type is allocated 40% of the total coast wide annual allowable commercial salmon catch.
- Gillnets are rectangular nets that float from the surface and are usually deployed parallel to shore near to coastal rivers and inlets. Fish swim into the net and become trapped as their gill plates get tangled in the monofilament mesh. This gear type is allocated 38% of the total coast-wide annual allowable commercial salmon catch.
- Trolling is done by attaching multiple lines with hooks from poles that extend from the vessel while it is in motion. This gear type is allocated 22% of the total coast-wide annual allowable commercial salmon catch.

Within each FMA, commercial salmon fishing is regulated according to the species of salmon targeted and the type of gear used to harvest the fish. For example, gill netters must respect mesh size and net dimensions regulations, while trollers may have hook style and/or number restrictions. These rules might vary between FMAs or they could be identical. Fishing restrictions regarding openings and closures and raising or lowering the TAC are also used to achieve management objectives and are related to the health and size of the target stock (DFO 2013b).

Licensing and Quotas

Commercial salmon fishing licences and quotas (e.g., TACs) are issued by FMA and gear type. Setting appropriate catch quotas in order to support economic development while maintaining ecosystem health is one of DFO's top priorities (DFO 2014b)

While fisheries management issues such as licensing and determination of catch quotas is coordinated regionally (e.g., through the development of Integrated Fisheries Management Plans (IFMPs), many management decisions are made locally. For example, fisheries managers will incorporate the use of local stock information, feedback from the fishing community, and First Nations interests and concerns to develop strategic catch quotas and licensing plans that support DFO's long-term vision (DFO 2013b).

Landings, Catch Value, and Licence Issued

The number of salmon landed in the commercial salmon fishery, their value, and the number of licences issued fluctuate from year to year, possibly due to variation in run sizes, management actions, and market conditions. All species of salmon and gear types used are considered together unless otherwise stated.

Landings

Peak landings occurred in odd years, starting at 2001 through to the year 2009 (Appendix C, Figure C-13 and Table C-5). Landings in 2010 were dramatically lower than previous years. The annual number of salmon landed in FMAs 4 through 6 follow similar trends with alternating peaks and valleys, although some exceptions exist. For example, the number of salmon landed in FMA 6 had an early peak in 2002 before transitioning to the odd-year pattern. The mean total number of salmon landed is highest in FMA 6 (1.8 million), followed by FMA 4 (1.1 million) and the lowest in FMA 5 (0.2 million).

Catch Value

The fishery achieved its highest value 2000 ($26.2 million) and declined rapidly over the next two years. It currently generates about $5 million to $10 million annually (Appendix C, Figure C-14 and Table C-6). A notable exception occurred in 2010, with the reported fishery value being only $0.5 million. The mean total value of salmon landed was the highest in FMA 4 ($6.4 million), followed by FMA 6 ($1.8 million), and the lowest in FMA 5 ($0.2 million).

There are indirect benefits resulting from the salmon harvest. For example, the coast-wide salmon fishery supports the seafood processing sector and has accounted for 25% of the total wholesale value derived from seafood processing since 2000. Processing occurs primarily in the Greater Vancouver (47%) and Skeena–Queen Charlotte (38%) regions, but recent evidence suggests that salmon caught along the north coast is increasingly being sent south for processing (DFO 2013b).

DFO estimates that coast-wide salmon export value has declined by 49% between 2005 – 2009, with exports going primarily to the USA, Japan, and the UK. The trend of declining catches and landed value was interrupted by a very large harvest of sockeye in 2010, which resulted in a record annual export value of $100 million, which contributed more than 10% of the total value of all BC seafood exports that year (DFO 2013b).

Licences Issued

Commercial salmon fishing licence data were only provided by DFO for 2005 – 2012. Between 300 and 700 commercial salmon fishing licences were issued by DFO (Appendix C, Figure C-15; and Table C-7. The number of licences fluctuated for each FMA, but was generally highest in FMA 4 (Mean = 353), followed by FMA 6 (Mean = 119), and FMA 5 (Mean = 28). However, exceptions exist. For example, in 2005, the number of licences in FMA 6 exceeded those in FMA 4 and, in 2010, more licences were issued in FMA 5 than in FMA 6. Catch statistics are further discussed below according to gear type.

3.4.2.9.2 The Salmon Gillnet Fishery

Landings

When all FMAs are considered, combined landings had three peaks. The first occurred in 2001 (1.7 million fish landed), the second in 2006 (1 million fish landed), and the third occurred at the end of the time series in 2012 (0.4 million fish landed) (Appendix C, Figure C-16 and Table C-8). The gill net fishery appears to be driven primarily by landings in FMA 4. However, a considerable number of fish were caught in FMA 6 in 2005 (i.e., 0.2 million fish) and made up nearly the entire catch that year. Landings in FMA 5 remained relatively low throughout the entire time series. The mean number of salmon landed was generally highest in FMA 4 (0.6 million), followed by FMA 6 (0.1 million), and FMA 5 being the lowest (0.01 million).

Catch Value

While the value of the salmon caught in gill net fishery fluctuated dramatically from year to year, likely due to variation in run sizes, management actions, and economic conditions of the market, it was dominated by earnings largely attributed to FMA 4 (the combined value for all FMAs closely follows the line depicting the value for FMA 4 alone) (Appendix C, Figure C-17; and Table C-9). While the value of this fishery peaked in 2000 ($15.3 million), it steadily declined for the next five years. Earnings increased again between 2006 and 2008, before dropping sharply for two years, and then rising again to similar levels observed between 2006 to 2008 (e.g., approximately $4.5 million). The mean value of salmon caught in the gill net fishery was the highest in FMA 4 ($4.8 million), followed by FMA 6 ($0.2 million dollars), and the lowest in FMA 5 (less than $0.1 million) (Appendix C, Table C-9).

Licences Issued

Commercial salmon fishing licence data were provided by DFO for 2005 – 2012. Between 0 and 500 commercial salmon gill net licences were issued by DFO in FMAs 4–6 (Appendix C, Figure C-18 and Table C-10). The number of licences fluctuated for each FMA, but was generally highest in FMA 4 (Mean = 293), followed by FMA 6 (Mean = 60), and the lowest in FMA 5 (Mean = 14). However, a number of exceptions to these rankings exist for specific years. For example, in 2005, the number of licences in FMA 6 exceeded those in FMA 4 and in 2008 and 2010, more licences were issued in FMA 5 than in FMA 6.

3.4.2.9.3 The Salmon Seine Net Fishery

Landings

When all species are considered, peak landings occurred in odd years, starting at 2001 through 2009. While the annual number of salmon landed in FMA 4, 5, and 6 appear to follow similar trends with

alternating peaks and valleys, some exceptions exist. For example, the number of salmon landed in FMA 5 peaked in 2002 before transitioning to the odd-year pattern (Appendix C, Figure C-19 and Table C-11). The mean number of salmon landed was highest in FMA 6 (mean = 1.8 million), followed by FMA 4 (mean = 0.5 million), and the lowest in FMA 5 (0.2 million). Note, that the seine net fishery drives the observed pattern when the landings from all gear types are combined.

Catch Value

The highest values of the fishery occurred in 2000 ($10.4 million) and 2009 ($5.7 million). The combined yearly value of the fishery in FMAs 4- 6 fluctuated between $38,000 (2010) and $4 million (2003). The mean value of salmon landed per year was the highest in FMA 4 ($2.0 million), followed by FMA 6 ($1.5 million), and the lowest in FMA 5 ($0.2 million) (Appendix C, Figure C-20 and Table C-12).

Licences Issued

Commercial salmon fishing licence data were provided by DFO for 2005 – 2012. Between 10 and 150 seine net fishing licences were issued by DFO (Appendix C, Figure C-21; Table C-13). The number of licences fluctuated for each FMA, but was generally highest in FMA 4 (mean = 44), followed by FMA 6 (mean = 42), and the lowest in FMA 5 (mean = 13). However, many exceptions exist and the ranking for any single year of licence data can be different from the next. For example, the rankings are different between 2005 and 2006. Moreover, data was not available for some FMAs and for some years. These data were either restricted due to confidentiality reasons or no licences were issued that year.

3.4.2.9.4

3.4.2.9.5 The Salmon Troll Fishery

Landings

Landings in this fishery were in general much lower than in the gill or seine net fishery. The number of fish caught was highly variable and no trend emerged. The highest landings occurred in 2005 (80,000) and the lowest in 2001 (6,000) (Appendix C, Figure C-22; and Table C-14). The highest mean catch occurred in FMA 4 (23,000), then FMA 6 (19,000), and the lowest in FMA 5 (6,000).

Catch Value

The peak value of this fishery occurred in 2004 ($290,000), which is relatively low compared to the other gear types (Appendix C, Figure C-23 and Table C-15).

Licences Issued

Between 40 and 90 troll fishing licences were issued by DFO (Appendix C, Figure C-24 and Table C-16). The number of licences fluctuated for each FMA, but were highest in FMA 4 (mean = 27), followed by FMA 6 (mean = 25), and the lowest in FMA 5 (mean = 6). However, many exceptions exist and the ranking for any single year of licence data can be different from the next. For example, the rankings are different between 2007 and 2008. Moreover, data was not available for some FMAs and for some years. These data were either due to either confidentiality reasons or no licences were issued that year. It is assumed that missing data means no fishing licences were issued.

3.4.2.9.6 Pacific Salmon Fishery Management

The commercial salmon fishery was first regulated in 1969 when DFO required that fishers purchase a licence for $10 each; 5,870 licences were purchased that year. By 1981, DFO had initiated the first licence buy-back program in an effort to reduce the salmon fishing fleet, which was estimated at 5,200 vessels. Further efforts to reduce fleet size and overall capacity were started, with notable initiatives such as:

- ton-for-ton rule, whereby vessels purchasing new licences should not increase the capacity of the fleet (1971)
- Mifflin Plan, which, among other actions, permitted licence stacking, meaning that one vessel could harvest the quota assigned to two different licences (1996)
- licence retirement programs, which successfully bought back 1,406 licences and reduced the entire fleet by approximately 40% (1998)
- Pacific Fisheries Reform initiative, which aimed to define catch shares through individual quotas (2005), and
- Pacific Integrated Commercial Fisheries Initiative (PICFI), which sought to buy back licences and their quota with the intent to provide greater opportunities to First Nations (2007).

Stock assessments are done to provide fishery managers with information to improve conservation and sustainable management of salmon resources. Advice and recommendations for stock management are primarily delivered by the Stock Assessment Section of the Freshwater Ecosystem Division. The Stock Assessment Coordinating Committee (SACC) develops stock assessment programs with input from First Nations, industry, non-government organizations (NGOs), academics, and other interested stakeholders. Programs are administered by local staff and include activities such as collecting and analyzing data; summarizing information and report writing; and providing science-based recommendations for sustainable stock management to resource managers.

At present, the Wild Salmon Policy (WSP) is the guiding document used by DFO to manage more than 9,600 individual salmon stocks, which are grouped into 457 discreet conservation units (CUs). A

standardized process assigns Pacific salmon to a CU, with particular emphasis on genetic and polygenic traits, life histories, and geographic distributions. Conservation Units are defined as "groups of wild salmon living in an area that are sufficiently isolated from other wild salmon such that the area is unlikely to be recolonized naturally in an acceptable period of time if they are extirpated" (DFO 2005). The biological condition of each CU is evaluated and assigned a colour code of red, amber, or green, primarily based on an assessment of spawner abundance and distribution. However, the assignment of a colour status to a CU is not completely objective; subjective considerations include the quantity and quality of data available, the level of risk tolerance accepted, and First Nations concerns.

Management focuses on immediate conservation actions for red coded CUs (actions focus on protection of fish, restore productivity, reduce potential for loss), a cautionary approach for amber assigned groups, and sustainable harvest of salmon that are green assigned. Within each code, DFO has established benchmarks to help guide the type and extent of management intervention required.

The Department of Fisheries and Oceans has identified more than 9,600 distinct Pacific salmon populations in BC. Many populations may make up a stock, which can generally be thought of as a geographically segregated group of fish (or resources unit) that is subject to the same hunting pressure. Populations, and overall stocks, vary in size and productivity (DFO 2013b). Seventy-five percent of the total BC and Yukon salmon populations are supported by three major river systems: the Skeena and Nass River in the north, and the Fraser River in the south (DFO 2013b).

3.4.2.9.7 Groundfish

Groundfish generally live on or near to the bottom of the sea floor. They are harvested for consumption domestically and for export.

Location

Fishing in the RSA occurs in groundfish management areas 5C (FMA 6) and 5D (FMA 3 - 5), with landings concentrated in the deep water in Hecate Strait with some overlap of the identified fishing grounds occurring in Principe Channel and north towards Triple Island (Appendix C, Figure C-25). Bottom trawling is only permitted in selected areas in Hecate Strait and is not allowed in the protected waters surrounding the proposed marine access route.

Open Times and Closures

The commercial groundfish fishery comprises seven sectors (DFO 2013c) that use both hook and line (e.g., hook and line, jig, and troll) and trawl (e.g., bottom or midwater trawl) gear types and includes:

- groundfish trawl, open year round using trawl gear
- halibut, open March 27 to November 7 using hook and line gear

- sablefish, open year round using hook and line and trap gear
- inside rockfish, open year round using hook and line gear
- outside rockfish, open year round using hook and line gear
- lingcod, open April 1 to November 15 using hook and line gear (excluding long lines) and
- dogfish, open year round using hook and line gear.

In-season updates are provided using Fishery Notices posted online regarding closing times, remaining quota, and other relevant information.

Gear, Restrictions, and Other Constraints

Hook and line and trawl gear are used to harvest groundfish. For example, halibut are targeted using long lines while lingcod are fished under a Schedule II licence using hook and line, jig or troll methods; long line gear is not allowed for targeted lingcod fishing. Dogfish are harvested using all types of non-trawl gear. Sablefish are taken using hook and line and traps, while rockfish (outside and inside) are caught using hook and line, long line, jig, and troll techniques (DFO 2013c). Detailed restrictions for the hook and line and trawl fisheries are outlined in DFO (2013c).

Licensing and Quotas

Licensing and quotas are set for each of the seven sectors of the groundfish fishery. Vessels are only allowed to land the catch for which they have quota. Similarly, non-target species are caught (called bycatch) and landed in the same way as are target species; however much less quota is available for these species. Bycatch is managed through the Individual Tradeable Quota (ITQ) system, meaning that vessels from other fleets (e.g., between the halibut, rockfish, dogfish fisheries) can purchase additional bycatch quota from different sectors if it is available and if there is a seller (e.g., DFO or another fisher). When either the quota for the target species of that allowed for bycatch is reached, fishing must stop (DFO 2013c). Reported landings for all groundfish (excluding halibut) in FMAs 4 to 6 peaked at approximately 335,000 kg in 2006 (Appendix C, Figure C-25). The majority of the catch in 2006 came from FMA 4 (Appendix C, Table C-17).

Landings, Catch Value, and Licences Issued

Landings for all groundfish sectors (except halibut) and gear types are amalgamated and shown in Appendix C, Table C-17. This includes landings recorded for the groundfish trawl, sablefish, rockfish (inside and outside), lingcod, and dogfish. Because the landings from multiple fisheries are combined, a clear pattern is not apparent. Landings were very high in 2006 for FMA 4, but, on average, were highest in FMA 6.

In 2010, the commercial groundfish fishery accounted for approximately 35% of the GDP for the fish harvesting sector. From 2007 to 2010, there was a 23% decline in the landed value of commercially caught groundfish, with the wholesale values mirroring this decline, which is primarily due to decreased landings. The decline in landed value also translates into smaller earnings for commercial fishers, despite a decrease in the number of active licences during the same three-year period (304 to 265). To address concerns over the economic sustainability of the small-boat groundfish fleet, a cost-benefits analysis was undertaken by the Canadian Fisheries Research network that involves industry, government, and academia (DFO 2013c). The results of this study have yet to be released.

The value of the commercial groundfish fishery cannot be accurately estimated because very limited data were available from DFO. However, the value of groundfish taken using long line and jig gear in the year 2000 is estimated at $500,319 for FMA 4, 806,661 for FMA 5, 459,563 for FMA 6.

Fishing effort within the groundfish fishery is generally reported as the number of sets, which is the number of times gear was deployed and retrieved. Overall effort, which includes the number of sets reported for long line and trawl gear has been amalgamated and shown in Appendix C, Table C-18 (excluding the halibut fishery since it is treated separately) and provides an estimate of overall fishing effort. Groundfish sectors reported are rockfish (inside and outside sectors), sablefish, dogfish, lingcod, and trawl.

3.4.2.9.8 Pacific Halibut

Location

The majority of Pacific halibut are caught in deep water outside FMAs 4, 5, and 6; however, low levels of fish are harvested along the proposed marine access route, in Principe Channel for example (Appendix C, Figure C-26).

Open Times and Closures

The halibut fishery is open between March 23 and November 7, with in-season updates available on the Fishery Notice Website. The fishery occurs in the RSA, with FMAs 4 to 6 being open annually unless advised otherwise. This includes groundfish management areas 5D and 5C. In-season updates are provided using Fishery Notices posted online regarding closing times, remaining quota, and other relevant information.

Gear, Restrictions, and Other Constraints

Halibut are targeted using hook and line gear, which includes long lines, jig, and troll methods. Long line gear consists of multiple baited hooks that are deployed on a single line that sits along the bottom. These lines are retrieved at regular intervals to land fish and reset lines (DFO 2013c).

Licensing and Quotas

The halibut fishery is a limited entry and vessel-based, meaning that a regulated number of fishers are allowed to target halibut. The commercial halibut licence fee is based on the following formula: $310 multiplied by the number of tonnes of Halibut initially allocated to the licence eligibility, less 40% of that product, up to a maximum reduction of $1,000. Each is allocated a portion of the TAC for the fishery. For 2013, the International Pacific Halibut Commission recommended a Canadian commercial and recreational catch limit of 7,038,000 pounds (fresh, dressed, head-off weight) for Area 2B, Canada's Pacific waters. Bycatch is managed through the Individual Tradeable Quota (ITQ) system as outlined in DFO (2013c).

Landings

Landings for halibut taken by long line were highest in FMA 6, with an annual average landing of 73,000 kg (Appendix C, Table C-19). Peak landings occurred in FMA 6 in 2008, with a notable decline since. Landings in 2013 were much lower than the historic average.

Value

Value data are limited to the year 2000. The total value, as extracted from the groundfish longline fishery for halibut, was reported as $454,345 for FMA 4, $722,387 for FMA 5, and $422,450 for FMA 6. In the absence of additional 'fish slip data', which is essentially a sales receipt between fisher and purchaser, the value of the fishery cannot be accurately estimated. For example, landings data are often greater than what is actually sold to market. Use of these data would therefore would, therefore, overestimate the total value of the fishery.

Effort

Fishing effort is reported using the number of sets (the number of times or pieces of gear that are deployed and retrieved), not the number of licences issued and is shown in Appendix C, Table C-20 (DFO was unable to provide licence data). The average annual number of halibut long line sets was highest in FMA 6, at 286. Similar to landings, fishing effort was relatively low in 2013.

3.4.2.9.9 Pacific Herring

The herring roe and spawn on kelp fisheries are the largest, with their products being almost entirely exported to Japan (DFO 2013d).

Location

Known fishing locations occur around Browning Entrance and to the west of Goshen Island (Appendix C, Figure C-27). Fishing effort has been restricted by DFO due to low stock abundance. For example, no landings have been reported in FMA 6 since 2007.

Open Times and Closures

Herring spawning occurs from late February to mid-April and forms the basis of the timing of the four commercial fisheries (DFO 2013d):

- roe herring:
  - timing based on roe quality
  - occurs from February 10 to April 30 and lasts for several days, and
  - occurs in FMA 4 and 5, but remains closed in FMA 6.
- spawn on kelp:
  - timing based on spawn activity
  - occurs from February 1 to June 30 and lasts for several days, and
  - occurs in FMA 4 and 5, but remains closed in FMA 6.
- food and bait herring
  - timing based on avoiding spawning times
  - occurs from November 7 to February 15, and
  - occurs in FMA 4, 5-1, 5-2, 5-3, and 5-10, but remains closed in FMA 6.
- special use herring:
  - timing based on avoiding spawning times
  - occurs from November 16 to February 15, and
  - occurs in FMA 4 and 5 but remains closed in FMA 6.

In-season updates are provided using Fishery Notices posted online regarding closing times, remaining quota, and other relevant information.

Gear, Restrictions, and Other Constraints

Herring are caught using purse seine and drift nets (drift nets are only permitted in the roe fishery), while the spawn-on-kelp fishery involves collecting kelp or tree boughs that herring have spawn on, by hand from small boats.

Licensing and Quotas

Pacific herring are managed in seven distinct areas: five major and two minor stock areas. The herring management areas in the RSA are the Prince Rupert district (FMAs 3, 4, and 5) and the central coast area (FMAs 6, 7, and 8).

Landings, Catch Value, and Licences Issued

Herring landings are greatest in FMA 4 followed by 5, with a very small amount of herring taken in FMA 6 (this FMA has been closed for fishing for the last three years; Appendix C, Table C-21). While the overall mass of landings is low in comparison to other fisheries, much of what is landed is herring roe only, which has a high value per kg.

Catch value is reported for all four herring fisheries combined. The highest average value for herring fishery products is derived in FMA 4 (which also has the highest landings). Catch value statistics were not available for FMA 6 (Appendix C, Table C-22).

Fishing effort is reported as the number of boat days fished, not the number of licences. Overall, fishing effort is variable from year to year and from FMA to FMA. Average annual fishing effort was almost 4 times higher in FMA 4 than in FMA 5. The maximum number of boat days fished in FMA 4 peaked in 2004 and declined for the following five years. Fishing effort peaked in 2009 in FMA 5 with no evident patterns. Effort data were not available for FMA 6 (Appendix C, Table C-23).

3.4.2.9.10 Prawn and Shrimp

The prawn and shrimp fishery harvest occurs by means of trap and trawl net. Although each method is managed through individual IFMP, the two methods are discussed together in the following.

Location

The use of traps occurs along the majority of the proposed marine access route south of Browning Entrance, while shrimp trawls are concentrated in areas east of Triple Island. However, some trawling occurs at the head of Kitimat Arm. Known fishing locations for prawn and shrimp are shown in Appendix C, Figure C-28. The primary target of the trap fishery is the spot prawn, which is the largest of the Pacific shrimp species and is over 90% of the total catch by trap (DFO 2013e).

Open Times and Closures

The commercial prawn and shrimp fishery is managed by seasonal closures, in-season area closures, gear limits, gear marking requirements, trap mesh size requirements, minimum size limits, daily fishing time restrictions and a daily single haul limit. In-season updates are provided using Fishery Notices posted online on the DFO website (DFO 2013e, f).

Trap

In 2013, the coast-wide commercial prawn and shrimp by trap fishery was scheduled to open no earlier than May 9 (confirmation issued by Fishery Notice). There is no fixed date for the closure of the coast-wide commercial fishery; closures are dependent on when spawner indices approach management targets (baseline plus 10% in most coastal areas). Seasonal closures are applied when fishing effort reaches a monthly index and, when implemented, the area remains closed through to the end of the spawning cycle and the opening of the commercial season the following year. This allows for protection of the egg-bearing females from fishing-related mortality throughout the larval hatching period (DFO 2013e).

Trawl

The regular opening of the commercial shrimp trawl fishery in all SMAs runs from approximately June 1, 2013 to March 31, unless the total allowable catch (TAC) for a given species is reached sooner than this. An early opening may be considered in the Prince Rupert District SMA under the following circumstances: shrimp biomass in the previous year was large, fishing effort was low, 30 per cent of the catch ceiling remained on March 15, and there is a minimum of 1,360 kg of quota. Due to conservation concern, Prince Rupert Harbour (Subareas 4-10 and 4-11) is permanently closed to the harvest of shrimp or prawn (DFO 2013f).

Gear, Restrictions, and Other Constraints

A single prawn and shrimp licence holder is permitted to fish a maximum of 300 traps on six groundlines. Trap size is limited to a volume of 170 L (web or soft mesh traps), 100L (wire or hard mesh trap, unless the mesh size of the bottom and all sides will pass a 22.2 mm square peg), or 50 L (solid sided trap or bucket trap). Stacking of trap allotments is permitted; however, where two trap limits of 300 traps each are combined and fished from a single vessel, a reduced maximum of 500 traps on 10 groundlines is permitted on the receiving vessel. The maximum groundline length between each buoy length is 1,100 m, and trap gear may be hauled only once per day. All gear must be appropriately marked with tags and buoys, as described in the Integrated Fisheries Management Plan (Section 4.5, DFO 2013). Other than the first day of any opening, when the start time of the fishery is 12:00 noon, trap gear setting, hauling, handling, and re-setting is limited to the hours between 07:00 and 19:00 hours. The minimum legal size limit for prawns is 33 mm carapace length (measured from the posterior most part of the eye orbit to the posterior mid-dorsal margin of the carapace) (DFO 2013e).

Licensing and Quotas

The commercial shrimp and prawn by trap fishery is a limited entry fishery with 250 licence eligibilities coast-wide. Of these, 13 licences are grandfathered (i.e., non-transferable and expire with the exit of the

licence eligibility holder from the fishery) and 55 licences are designated communal commercial for First Nations.

The commercial trap fishery began as early as 1914 in Howe Sound, and continues to be most prevalent on the south coast; only 25% of the total coast-wide catch comes from the north coast. The commercial prawn and shrimp by trap fishery is among the most valuable fisheries on the Pacific coast. In 2011, it was the third most valuable wild capture fishery with a landed value of $40.5 million, exceeded in value by only the halibut and geoduck/horseclam fisheries (DFO 2013e). While prawn harvests have been primarily exported to Japanese markets in the past, a more recent domestic interest in the fishery and its recognition as a sustainable option has resulted in an increasing amount of live and fresh prawns being sold to local markets and restaurants or through dock sales. Exports to China, the United States, Taiwan, and Hong Kong are significant and increasing. While most trap licence eligibility holders live in the south coast region (Vancouver Island, the Sunshine Coast, or the lower mainland), there are several licence holders that are based on the north coast. A typical prawn and shrimp trap licence is valued at $547,500 (DFO 2013e)

Since 2003, the shrimp trawl licence year has run from April 1 to March 31 of the following year. A total of 227 regular and 16 communal commercial licence eligibilities are available. The regular shrimp trawl category S licence can be obtained for $100 (DFO 2013f).

The commercial trawl fishery targets smaller shrimp species such as northern or spiny pink shrimp, smooth pink shrimp (collectively referred to as the pink shrimp), and sidestripe shrimp, with minor incidental catch of coonstripe shrimp and humpback shrimp. There is no minimum size for species of shrimp other than the spot prawn.

Landings, Catch Value, and Licences Issued

Incomplete data were available for the commercial prawn and shrimp fishery. Data for the two gear types are combined. The largest landing occurred in 2000 and was an order of magnitude greater than others observed in the time series (Appendix C, Table C-24).

Catch value for the trap and trawl fisheries are combined. On average, FMA 4 had the highest value reported for prawn and shrimp landings sold and were approximately four times higher than the next highest which occurred in FMA 5. FMA 6 had the lowest reported sales of prawn and shrimps (Appendix C, Table C-25).

The highest number of licences also occurred in FMA 4, with FMA 6 being fished by the fewest number of licence holders. Historically, the number of licences has fluctuated in FMA 4, 5, and 6, with the greatest number issued in FMA 4 in 2005 (Appendix C, Table C-26).

3.4.2.9.11 Dungeness Crab

Crabs are harvested using traps set on ground lines or floated singly between 5 m and 100 m depth. In addition to Dungeness crab, red rock crab are caught throughout BC coastal waters, with occasional harvest of golden king crab and red king crab on the north and central coast (DFO 2013g).

Location

Identified Dungeness crab fishing grounds do not have much overlap with the proposed marine access route and are concentrated northwest of the Banks Island and west of Porcher Island (Appendix C, Figure C-29).

Open Times and Closures

There are seven crab management areas (labeled A through J) on the Pacific coast with each area having distinct management regulations. FMAs 4, 5, and 6 fall within crab management Area B, which encompasses the north and central coast mainland.

The closed time for the commercial crab fishery is varied. In Area B, year-round crab closures occur in all or portions of Subareas 4-9, 4-10, 4-11, 5-3, 5-10, 6-1, and 6-2 to allow for First Nations FSC and recreational access to the fishery. Seasonal crab closures were in place in all of Area B from January 1 to March 1, and December 1 to December 31, 2013. Seasonal closures are in place in Subareas 4-8, 4-9, 5-4, 5-5, 5-6, 5-7, 6-3, 6-4, and 6-23 for First Nations FSC and recreational access, and Subarea 5-8 during the herring seine and roe-on-kelp fishery. Several First Nations and the Sport Fishing Advisory Board (SFAB) have requested commercial crab fishery closures for portions of Area B and, thus, there is the potential for in-season closures in 2013 (DFO 2013g).

Gear, Restrictions, and Other Constraints

Trap limits are established for each crab management area coast-wide. For Area B (FMAs 3 to 10), the current limits are as follows:

- area limit, 7,600 traps
- area limit per licence, 475 traps
- individual cap, 400 traps

Additional area-specific constraints are also enforced for the crab fishery. For Area B, this includes the additional limitation of 200 traps per vessel in the boundaries of the seasonal opening of the Nass River estuary (included as part of the overall 400 trap allowance per vessel). Traps used to fish Dungeness crab are not to exceed 400 L. Only traps that will be used to fish for king crab (at the request of the harvester) are permitted to exceed this volume.

Crab Size and Shell Softness Limitations

Canadian regulations stipulate a minimum harvestable size of 165 mm point to point (including spines) for Dungeness crab. In addition, soft-shell crabs (those with a carapace that yields or flexes under pressure) may not be retained at any time.

Licensing and Quotas

The commercial fishery for Dungeness crab on the Pacific coast is managed through limited entry licensing, size, sex, and hardness restrictions, seasonal closures, gear limits, gear marking and size requirements, daily fishing time restrictions and weekly haul limits (DFO 2013g).

The commercial fishery is a limited entry fishery with 221 licence eligibilities distributed among single-licence vessels in seven management areas of the Pacific coast. For the 2013 season, all 221 licences were allocated, and consisted of 189 standard commercial licences and 32 communal commercial licences. Every three years, commercial crab licence holders are given the opportunity to select a management area in which they would like to fish for the following three-year period. The current selection period commenced on January 1, 2013, and will end on December 31, 2015. Sixteen licence holders have chosen to fish in the Area B (north and central coast) crab management area during this period (DFO 2013g).

Landings, Catch Value, and Licences Issued

Average annual landings of Dungeness crabs were greatest in FMA 4 and was double the catch in FMA 5. The smallest landings were reported in FMA 6. Landings in all three FMAs fluctuate, with peaks in 2003, 2007, 2010 (Appendix C, Table C-27).

Crab is one of most valuable species harvested in BC; the average annual landing value of the commercial crab fleet from 2007 to 2011 was $32.5 million (DFO 2013). Dungeness crab is sold live to both domestic and international markets. In 2009, the USA surpassed China as the largest importer of BC crab. Together, these two countries account for 88% for the total export market for BC (DFO 2013d).

DFO data indicate that FMA 4 reports the highest annual value from crab sales. The reported average annual value was approximately three times greater for FMA 4 than FMA 5 and was six times greater than reported for FMA 6. There are no major trends in the reported value; however, a notable decline in total value reported in all FMAs occurred from 2007 to 2009, with an increase in value toward the end of the times series data (Appendix C, Table C-28).

There are relatively few Dungeness crab licences issued for FMAs 4 to 6. On average, the highest number are fished in FMA 4 (13 licences), then FMA 5 (9 licences), followed by FMA 6 (4 licences). The

number of licences was lowest in the mid-2000s, possibly with another declining trend beginning in 2012 (Appendix C. Table C-29).

3.4.2.9.12 Red Sea Urchin

The commercial red sea urchin fishery on the Pacific coast is the only one of its kind in Canada, with red sea urchin being one of three urchin species harvested in BC. Red sea urchins are harvested by SCUBA divers who collect the invertebrate from the seafloor. Urchins are typically found on rocky substrates from the intertidal zone to depths of 50 m with moderate to strong currents. Urchin roe, their reproductive organs, are a prized delicacy in Japanese and European markets. Male and female gonads are not differentiated in the market (DFO 2013h).

Location

Urchin diving is most concentrated in Principe Channel, but likely occurs close to shore because divers are limited to shallow depths (Appendix C, Figure C-30). Green sea urchin are not targeted in FMA 4 to 6.

Open Times and Closures

The commercial red sea urchin fishery opens on August 1 at the earliest, and closes no later than July 31 of the following year (though the typical season runs from August to May). The actual opening date and time is announced through a Fishery Notice and, on the north coast, is scheduled to provide a continuous year-round supply of urchin roe in order to meet market demands. Quota Areas are opened and fished in sequence, with each Quota Area being harvested to completion before the opening of the subsequent Quota Area. Permanent closures for the commercial red urchin fishery are in place in FMA 5 for First Nations FSC access (Kitkatla Inlet/Schooner Pass, Subarea 5-3; a portion of Subarea 5-10; and Kitkatla Village, a portion of Subarea 5-10). No such permanent closures are in place in FMAs 4 or 6 (DFO 2013h).

Gear, Restrictions, and Other Constraints

Red sea urchin divers are limited to the use of short aluminum hand rakes to facilitate urchin gathering into mesh collection bags. The minimum harvestable size limit is 90 mm test (shell) diameter, between the spines, measured through the greatest diameter of the urchin test. This conservative limit is in place to allow sea urchins several years of spawning before entering the commercial fishery. The commercial red sea urchin fishery is managed through a TAC, limited entry licensing, area quotas, and a size limitation. Landings are tracked through the coast-wide Dockside Monitoring Program (DFO 2013h).

Licensing and Quotas

Licences are issued for geographic regions within two areas: the north coast and the south coast. FMAs 4, 5, and 6 fall within the north coast licensing area. For the 2012–2013 season, of the 110 red sea urchin licences available, 61 were allocated to the north coast (compared with 49 to the south coast) (DFO 2012). Twenty-five commercial licences are designated communal commercial licences and issued to First Nations for participation in the commercial red sea urchin fishery. Historically, vessels were permitted to combine up to five active licence eligibilities for economic efficiency; however, as part of a pilot program for the 2012–13 season, the licence stacking limit was waived (DFO 2013h).

The coast-wide TAC for red sea urchin is set at 4.5 million kg. Individual Quotas (IQs) are set by dividing the TAC for each licence area by the number of licences associated with that area, resulting in differing IQs for the north and south coasts. The majority of the red sea urchin TAC (approximately 84%) is in the north coast licence area; for the 2012–2013 season the TAC was 3.8 million, with the IQ being 62,500 kg (DFO 2013h).

Landings, Catch Value, and Licences Issued

The greatest average annual landings occurred in FMA 6 and was nearly double the size of the catch reported in FMA 5. The lowest landings occurred in FMA 4 (Appendix C, Table C-30).

Following the coast-wide peak of red sea urchin landings in 1992 at approximately 12.9 million kg , the market decline that began in the mid-2000s has led to only about half of the TAC being landed between 2006 and 2011, with only 60 to 70 licence eligibilities (of 110 available) being fished. From 2011 to 2012, BC exported an average of 252 tonnes of processed urchin roe per year, the majority of which was purchased in Japan (90%) (DFO 2012). Value-added economic benefit from the processing of red sea urchin roe is substantial: the wholesale value of processed urchins in BC in 2010 was $8.2 million, which was $5.5 million more than the landed value alone (DFO 2013h).

Limited value data revealed that FMA 6 had the highest reported sales of urchin roe and averaged around $1.8 million from 2000 to 2002. More recent data were not available for review (Appendix C, Table C-31).

Average annual fishing effort was highest in FMA 6, followed by FMA 5 and then FMA 4 (Appendix C, Table C-32).

3.4.2.9.13 Geoduck Clam

With a potential lifespan of over 150 years, geoducks are thought to be capable of reproducing for over 100 of these years, reaching sexual maturity at age two and achieving full recruitment into the fishery at 6 to 12 years of age (DFO 2011b). They inhabit a depth range spanning from the intertidal zone to over

110 m, burying themselves as much as 1 m deep in their surrounding substrate (DFO 2013i). Geoducks are typically only harvestable in soft sand, mud and small aggregate sediments (DFO 2011b).

Location

Known geoduck harvesting areas were identified in Estevan Sound, Principe Channel, and along the west side of the islands north of Browning Entrance (Appendix C, Figure C-31).

Open Times and Closures

Commercial licences are granted on an annual basis from January 1 to December 31, with varying pre-determined openings and closures to allow for a continual supply of geoducks to the market. The north coast area operates on a three-year rotation period, meaning it is divided into three sub-units with roughly equal geoduck harvest areas (Prince Rupert, central coast and Haida Gwaii), each of which is fished at a rate of three times the annual exploitation rate once every three years. The RSA overlaps with the Prince Rupert rotational area, which was harvested in 2008 and 2011, and will be harvested every 3 years thereafter (e.g., the next harvest will be in 2014) (DFO 2013i).

Geoduck is harvested year-round coast-wide, with the exception of closures due to biotoxin or sanitary contamination (which may be permanent or seasonal), or other reasons such proximity to Aboriginal and recreational access, parks, marine reserves, research, and navigation. Harvest is not permitted in areas with biotoxin or sanitary concerns of any kind except by special permit issued under the Management of Contaminated Fisheries Regulations.

Areas where no bivalve harvesting is permitted except by special permit licence under the *Management of Contaminated Fisheries Regulations* are (DFO 2014a):

- 300 m radius around industrial, municipal, and sewage treatment outfall discharges; closures around outfalls may change in-season and are announced by Fishery Notice
- 125 m radius of any marina, ferry wharf, finfish net pen, and any floating living accommodation facility, and
- 25 m of any floating living accommodation facility located within a shellfish aquaculture tenure where a zero-discharge waste management plan is a condition of the provincial aquaculture licence and is approved by the Regional Interdepartmental Committee.

Bivalve shellfish biotoxin closures are in effect for FMA 4 through FMA 6, with the exception of FMA sub-areas, which are only open to geoduck and horse clams (DFO 2014a):

- 4-2, 4-4, 4-9
- 5-10, 5-11, 5-12, 5-13

Bivalve shellfish sanitary contamination closures are in effect for FMA sub-areas (DFO 2014a):

- 4.1 to 4.4 encompasses Humpback Bay and Hunt Inlet, Porcher Island; Prince Rupert Harbour; Metlakatla Bay and Venn Passage
- 5.1 and 5.A encompasses Kitkatla, Dolphin Island; Grenville Channel (seasonal closure May 1 to October 15)
- 6.1, 6.2, 6.3, 6.5 encompasses Kitimat Arm, Higgins Passage, Hartley Bay, Swindle Island

Other Closures

Permanent closures for commercial geoduck harvest are in place for areas shallower than 10 feet at lowest tides and in eelgrass beds. Seasonal bivalve harvesting closures are implemented coast-wide to protect herring spawn, herring spawning grounds, and herring fisheries. On the north coast of BC, timing of such closures is disseminated through the north coast OGMs, service provider, or geoduck resource manager. Additional commercial geoduck closures, for example, are in place for marine conservation areas, national parks, and marine research stations; however, none of these type of closures apply within FMAs 4, 5, and 6 (DFO 2014a).

Gear, Restrictions, and Other Constraints

Although geoducks can be found in eelgrass beds, no harvesting is permitted in these sensitive habitats. Horse clams are largely harvested incidentally to during commercial geoduck harvest. There are currently no minimum size requirements for geoduck harvest because death will result if the clam is removed from its surrounding substrate and left on the seafloor. Discarding is not allowed and high-grading (discarding low quality geoducks in favour of filling quota with higher value individuals) is deterred through peer pressure within the industry and by OGM oversight (DFO 2013i).

Licensing and Quotas

There are currently 55 commercial licences allocated by DFO under a limited entry fishery, which are distributed among approximately 40 fishing vessels. Landings of geoduck in BC peaked in 1987 at 5.7 million kg, with subsequent decreases in TAC due to increasingly conservative management strategies that reflected stock assessments. Landings between 2005 and 2010 dropped to approximately 1.5 million kg annually, and the TAC remained relatively constant for many years until 2012 when it was decreased by approximately 4% to just under 1.5 million kg. Licences have become more concentrated in the north coast area of the province since 1994 (DFO 2013i).

This fishery is deemed to be sustainable under the current assessment and management framework (DFO 2013i). However, the expansion of predator sea otter populations in BC is anticipated to continue to negatively influence the geoduck fishery.

Commercial licences are granted on an annual basis from January 1 to December 31, with varying pre-determined openings and closures to allow for a continual supply of geoducks to the market. The fishery operates under a Total Allowable Catch (TAC), with a maximum annual harvest rate of 1.8% of the current biomass (with deductions for clams harvested for scientific surveys, aquaculture broodstock and biotoxin monitoring) (DFO 2013i). The north coast area operates on a three-year rotation period, meaning it is divided into three sub-units with roughly equal geoduck harvest areas (Prince Rupert, central coast, and Haida Gwaii), each of which is fished at a rate of three times the annual exploitation rate once every three years. This management method allows for concentration of the fishing fleet, increasing the ease of monitoring quotas, verifying landings, and analyzing fisheries data. The RSA overlaps with the Prince Rupert rotational area, which was harvested in 2008 and 2011, and will be harvested every 3 years thereafter (e.g., the next harvest will be in 2014) (DFO 2013i).

The 2013 coast-wide commercial TAC for geoducks is 1.5 million kg, which provides for 550 Quota Blocks of 2,700 kg each (DFO 2013i). Of this, the north coast area is allocated a geoduck quota of 1.1 million kg (plus an additional 1,800 kg for biological samples), divided among 400 Quota Blocks (unchanged from 2012). Quota transfers (permanent or in temporary blocks) have been permitted since 2012 under a two-year pilot program operated by DFO. By-geoduck-bed (and subbed) quotas have been in place in all areas since 2007, and are assigned based on available information about the bed (biomass calculations using survey densities or estimates, harvest records, and harvest options). Geoduck landings are validated at designated ports by a third-party service provider. On the north coast, this service provider, through an On-Grounds Monitor (OGM), is responsible for notifying the commercial geoduck vessel crews of the allocated quota in each bed (or subbed) to be fished. The OGM's role also includes monitoring during harvesting operations, directing fleet activities, and collecting anecdotal information to aid with fisheries management (DFO 2013i).

Landings, Catch Value, and Licences Issued

Average annual geoduck landings are relatively evenly distributed among the three FMAs and occur on a three-year cycle as a result of the fishery being opened and closed in specific areas every three years (Appendix C, Table C-33).

Live geoduck is a high-value product exported primarily to Asian markets, with 97% of the harvest being exported to Hong Kong (72%) and China (25%). The price paid to geoduck harvesters has increased from 7.5 cents per pound at the inception of the fishery in 1975, to approximately $12.00 per pound in recent years due to an evolution from frozen harvest being used locally for bait, clam chowder, and clam fritters to fresh, live geoducks being prized by foreign markets. A licence value was estimated to be $2.75 million in 2009, with typical earnings of more than $350,000 per vessel before interest, taxes, depreciation, and amortization. From 2006 to 2010, the average annual value of Canada's geoduck

exports was over $39 million, accounting for 24% of total shellfish wholesale value, making it one of the province's most lucrative fisheries (DFO 2013i).

Barring closures due to biotoxins or sanitary contamination, the fishery operates year-round in any given year. However, landings do fluctuate monthly due to market demands and supply from other countries. The largest harvests are in the winter months, peaking in January at 441,957 lb. (200.5 tonnes). Less geoduck is landed over the summer, with a low of 151,396 lb. (68.7 tonnes) in August (DFO 2011b).

In 2002, approximately $3.6 million in landed value was reported for FMA 5. No other data were available from DFO.

The average annual number of geoduck licences is similar across all three FMAs and ranges from 16 to 22 (Appendix C, Table C-34).

3.4.2.9.14 Pacific Octopus

The giant Pacific octopus primarily inhabits rocky intertidal areas of the Pacific coast, establishing dens in caves, rocks, or soft shell substrates to depths of over 100 m. Given their habitat preference and nocturnal behavior, octopus are most commonly harvested by SCUBA divers. There is also a small bycatch fishery, primarily from crab and prawn trap fisheries but also from some other trawl fisheries (DFO 2011a).

Location

Octopus harvesting areas have very limited overlap with the proposed marine access route (Appendix C, Figure C-32). Subarea 6-2 at the head of Kitimat Arm is closed for commercial harvesting and reserved for FSC fishery purposes.

Open Times and Closures

The 2011–2012 exploratory octopus fishery was open year round from August 1, 2011 to July 31, 2012. The only permanent closure in place in the north coast management area was Subarea 6-2 (in the Douglas Channel), which remains closed to enable access for First Nations FSC purposes (DFO 2011a).

The Pacific coast is divided into three octopus licensing areas:

- Licence Area A, east coast Vancouver Island (which encompasses FMAs 11 to 20 and Subarea 29-5)
- Licence Area B, west coast Vancouver Island (FMAs 21 to 27), and
- Licence Area C, north coast (FMAs 1 to 10).

Licence Area C (north coast) encompasses FMAs 4, 5, and 6, which lie in the RSA.

Gear, Restrictions, and Other Constraints

Harvested octopus must be a minimum size of 2 kg, and collected from a depth of at least 3 m below the lowest low tide level (DFO 2011a). In accordance with the nature of the exploratory fishery, biological data collection is required at the time of harvest to inform future management planning. Determinations of sex and maturity are made and reported in addition to location of harvest, dive time, depth, piece count, catch weight and number of brooding females (DFO 2011a).

Licensing and Quotas

Current octopus fishery management measures include non-transferable exploratory licensing and scheduled openings.

Octopus harvest by trap, dive, and limited by-catch from some trawl fisheries in the Pacific region were historically licensed as commercial fisheries. As part of an initiative to manage this fishery in a conservative manner and guided by a biologically based management plan, DFO began implementing a phased, experimental approach to developing the octopus fishery in 1999. In 2000, a transition from commercial dive licences to personal, vessel-based scientific licences for those harvesters who met a certain set of criteria occurred. Concerns about using scientific licences for this fishery subsequently led to the licensing of the octopus by dive fishery with non-transferable exploratory fishing licences in August 2007. Since 2009, consultation with stakeholders regarding the possibility of converting to a commercially licensed octopus fishery has been ongoing (DFO 2011a).

Harvesting for the octopus by dive fishery is authorized under an exploratory non-transferable licence system. Eligibility for participation is based on a past record of substantial landings, which was established through consultation with commercial harvesters to be at least 4,500 kg harvested between January 1, 1993 and October 14, 1997. In addition, harvesters must submit timely and accurate biological harvest logs. Those who satisfy these requirements but do not apply for a licence may lose future eligibility for the octopus fishery. The licence period is from August 1 to July 31 of the following year, and the harvester must select one of the three areas of the coast (DFO 2011a).

Landings, Catch Value, and Licences Issued

The octopus by dive fishery is concentrated in areas of the south coast of BC, with only minor landings reported on the north coast. A peak in landings also occurred in 1997 following a heightened interest in octopus for human consumption, but has been decreasing since 2002 (DFO 2011a).

No landings data or value data for FMA 4 to FMA 6 were provided due to privacy reasons (e.g., less than three fishers were licensed for the FMA).

Only one licence existed per management area for the harvest of octopus and, therefore, data are not available. As a result, this fishery is assumed to be very minor in the three fisheries management areas in the RSA (Appendix C, Table C-35).

3.4.2.9.15 Sea Cucumber

The giant red or California sea cucumber ranges from the Gulf of Alaska to southern California, and exhibits a preference for areas of moderate current and complex boulder or bedrock substrate at depths from the intertidal to 250 m. The only commercial fishery in Canada exists on the Pacific coast, although a drag fishery for a different sea cucumber species occurs on the east coast (DFO 2013j).

Location

Fishing for sea cucumbers occurs throughout the RSA, with areas in Principe Channel, Wright Sound, and Douglas Channel more heavily used (Appendix C, Figure C-33).

Open Times and Closures

In 2012, all licence areas opened on October 1 to November 30 (DFO 2013j). The commercial sea cucumber fishery is managed by quota management areas (QMAs), which are subdivided into smaller sections for a rotational fishery (similar to the commercial geoduck fishery on the north coast). Starting in 2011, a three-year Adaptive Rotational Fishery Strategy was implemented by DFO. This management regime was adaptive for the first 2 years (2011 to 2013) because the process of re-opening harvesting areas along the coast that were closed under the AMP is ongoing. In each re-opened area of the coast, commercial no-take reserves have been established as insurance against uncertainties in sea cucumber stock assessment. To date, fifteen such reserves are in place along the coast, two of which occur in the north coast area (a portion of Subarea 4-2 that includes West Stephens Island and Subarea 6-23 that includes Khutze Inlet). Additional closure areas for fisheries management, First Nations food, social, and ceremonial purposes, and research purposes also occur within FMAs 4, 5, and 6 (DFO 2013j).

Gear, Restrictions, and Other Constraints

Harvest of sea cucumbers is restricted to hand picking while SCUBA diving, which generally occurs in water shallower than 20 m. At present, there are no restrictions on harvestable sea cucumber size (DFO 2013j).

Licensing and Quotas

There were 85 licences available in 2012–13. Licensed vessels are allowed to dive for cucumbers and often collect other invertebrates by diving if they are licensed to increase economic efficiency. Quotas are

set and managed under a conservative approach. Quotas are subject to change annually and are updated online by DFO.

Landings, Catch Value, and Licences Issued

Sea cucumber are landed in higher quantities in FMA 6 and peaked in 2005. The landings in FMA 5 peaked the following year in 2006 and more recently in 2010 in FMA 4. However, landings were only reported in FMA 4 for three years (2009 to 2012), but were relatively high compared to some years in FMA 5 or 6 (Appendix C, Table C-36).

The landed value of sea cucumber appears to fluctuate, mirroring landings. Overall, the highest average landings occurred in FMA 6, followed by FMA 4 and then FMA 5 (Appendix C, Table C-37).

The number of licences issued is highest in FMA 6 (27), followed closely by FMA 4 and FMA 5 (19 and 20, respectively). Fishing for cucumbers appears to be a relatively new fishery for FMA 4 since the records for landings, value, and licences issued indicate that it only occurred for three years (2009 to 2012) (Appendix C, Table C-38).

3.4.2.10 Recreational Fisheries

Approximately 72% of all non-resident fishing trips occur in BC and Ontario and BC has the fourth highest number of active recreational tidal water fishing licences across the country (DFO 2012) (Appendix C, Figure C-34).

3.4.2.10.1 Licensing

Recreational fishing refers to non-commercial fishing and includes sport fishing but does not include First Nation FSC fishing and subsistence fishing (DFO 2012). Recreational fishing licences are issued by DFO and are required before harvesting any marine species. A salmon tag, which is an additional licensing option, is needed if salmon are to be fished. Licences may be valid for up to one year (April 1 to March 31) for several days. In BC tidal and non-tidal waters, salmon are the most sought after species (DFO 2012) and can therefore be an important source of economic income for entire communities.

3.4.2.10.2 Salmon

All five species of salmon were caught in the recreational salmon fishery in FMA 6; chinook and coho salmon made up approximately 45% and 48% of the total number of salmon landed in FMA 6. On average, 7,664 salmon were caught annually by recreational anglers in FMA 6 (Appendix C, Table C-39). Over 61,000 salmon have been landed since 2000. There are no records for fish caught in FMA 4 and 5; however, it is likely fish were caught but DFO was unable to sample in these FMAs.

3.4.2.10.3 Groundfish

There are two recreational groundfish categories: lingcod and rockfish. Catch statistics are mainly for FMA 6, with an average of 865 lingcod caught annually in the recreational saltwater fishery (Appendix C, Table C-40). Twenty-nine lingcod were reported in 2000 in FMA 4. There are no records for fish caught in FMA 4 and 5; however, it is likely fish were caught but DFO was unable to sample in these FMAs.

Similarly, catch statistics are mainly for FMA 6, with an av erage 1,174 rockfish caught each year (Appendix C, Table C-41). In 2000, 199 rockfish were caught in FMA 4. There are no other records for fish caught in FMA 4 and 5; however, it is likely fish were landed but DFO was unable to sample in these FMAs.

3.4.2.10.4 Halibut

FMA 6 had t he largest mean annual landings of halibut (3,122) (Appendix C, Table C-42). The records indicated that some fish were taken in both FMA 4 and 5, but it is possible that the records did not capture the full extent of fish landed.

3.4.2.11 Aboriginal Fisheries

3.4.2.11.1 Important Species

Aboriginal fisheries occurring in the LSA include seven First Nations: Gitga'at, Gitxaala, Kitsumkalum, Metlakatla, Lax kw'alaams, Haisla, and Kitselas. Fishing techniques used to harvest marine species for food, social and ceremonial (FSC) purposes are wide ranging and might include traditional methods such as dip nets and non-traditional methods such as modern vessels specialized for commercial fishing. Harvesting marine resources is an important part of traditional life for most coastal First Nations, with over 40% of meals being traditionally sourced for some First Nation Groups. Marine resources are also heavily relied on to sustain Aboriginal economies (Gregory et al. 2011). Key species harvested are listed in Table 3.4-10.

Table 3.4-10: Species Harvested by Aboriginal Groups

Fish	Invertebrates	Marine Plants
Sable fish	Abalone	Sea grass
Lingcod	Chitons (various spp.)	Seaweed
Kelp greenling	Clams	Kelp (spp.)
Cod (Red, Black, Grey)	Cockles	
Flounder	Crab	
Hake	Mussels	
Halibut	Octopus	

Fish	Invertebrates	Marine Plants
Herring (and eggs)	Prawns/Shrimps	
Needle fish	Scallops	
Eulachon	Sea cucumber	
Rockfishes (incl. red snapper)	Barnacles	
Salmon (all spp.)	Sea urchin	
Steelhead	Sea anemone	
Bullhead		
Turbot		
Skate		
Pilchard or smelt		
Pollock		

SOURCE: Calliou Group (2014), The Firelight Group (2014), Powell (2013), Robinson (2012), Gregory et al. (2011), Smith (2008 and 1999), and Lax Kw'alaams (2004).

Some of the most desired seafood items include eulachon, salmon, herring eggs, crab, seaweed, abalone, mussels, black cod, shrimp, prawns, halibut, clams and cockles (Gregory et al. 2011; Vanderjagt 2013). Cockles and seaweed are not available from the market and must be sourced locally. Some of the most valuable fisheries include pink, chum, coho, and sockeye salmon, geoduck and red urchins, and (in the case of Gitga'at) these fisheries can make up 99% of the total wholesale value of all their fisheries combined (Gregory et al. 2011).

3.4.2.11.2 DFO Catch Statistics

Fisheries and Oceans Canada catch statistics revealed that sockeye salmon are the single species harvested in the highest numbers and made up 95% to 98% of the total salmon caught annually in FMAs 4 and 6. Catch data also indicated that bottom fish such as halibut, lingcod and rockfish were caught but in much smaller numbers compared with salmon. Chinook and pink salmon are important species used for FSC purposes. First Nation landings reported in FMA 4 and 6 are shown below (Table 3.4-11 and Table 3.4-12). Landings for FMA 5 were not available from DFO.

Table 3.4-11: Aboriginal Finfish Catch Reported in FMA 4

Species	2000	2001	2002	2003	2004	2006	2007	2008	2009
Chinook	13,397	10,354	6,290	NA	12,920	7,184	4,828	8,901	6,675
Chum	823	NA	434	423	971	204	1,216	336	103
Coho	1,515	4,542	5,653	3,526	6,485	2,390	2,122	2,711	5,268
Pink	21,895	9,736	NA	14,407	19,557	8,462	9,325	4,119	15,734
Sockeye	960,153	NA	NA	130,108	136,219	142,717	137,154	169,216	118,494
Steelhead	3,098	1,820	3,357	1,095	2,857	1,433	770	2,269	1,660
Total salmon	1,000,881	26,452	15,734	149,559	179,009	162,390	155,415	187,552	147,934

NOTE:
NA = Not available
Source: DFO (2013h).

In FMA 6, sockeye salmon are the dominant species taken by FSC fisheries, making up between 79% to 98% of the annual catch (except in 2010 where other species dominated the total landings). Bottom fish, including lingcod, halibut and rockfish are also harvested.

Table 3.4-12: Aboriginal Finfish Catch in FMA 6

Species	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Black rockfish	NA	NA	NA	NA	NA	NA	10	NA	NA	NA	NA
Chinook	NA	86	NA	40	27	45	1	17	NA	NA	596
Chum	NA	2	NA	7	4	NA	5	NA	6	68	300
Coho	37	NA	98	378	31	141	66	206	273	54	76
Halibut	NA	NA	NA	NA	NA	51	173	NA	NA	NA	NA
Lingcod	NA	NA	NA	NA	NA	1	NA	NA	NA	NA	NA
Pink	NA	16	18	48	NA	55	5	1	53	29	151
Rockfish	NA	NA	NA	NA	NA	30	71	NA	NA	NA	NA
Sockeye	3,276	1,850	3,229	1,774	2,559	1,770	2,315	1,173	1,809	581	38
Steelhead	11	NA	NA	NA	1	NA	NA	NA	3	3	NA
Yellow eye	NA	NA	NA	NA	NA	NA	12	NA	NA	NA	NA
Total salmon	3,324	1,954	3,345	2,247	2,622	2,011	2,392	1,397	2,144	735	1,161

NOTE:
NA = Not available
SOURCE: DFO (2013h)

DFO spatial data on FSC fishing locations were supplemented with information obtained during consultation. Overlap of DFO identified First Nation fishing grounds and the proposed marine access route occurs at Hartley Bay, Otter Channel, and Browning Entrance (Appendix C, Figure C-35). Additional, smaller fishing areas are scattered throughout the LSA.

3.4.2.11.3 Aboriginal Group Specific Information

Gitga'at First Nation

The marine environment provides a way of life for the Gitga'at First Nation, providing traditional foods, market based income, and employment, for example (Gregory et al. 2011; Gill and Ritchie 2011). Gitga'at expressed concerns relating to potential wake effects, access to fishing grounds, and pollution (Gregory et al. 2011; Gill and Ritchie 2011; Sea Science Inc. 2011). Their concerns are directly tied to the importance they place on a pristine environment and their responsibility to care for it (Gregory et al. 2011).

Marine species, especially fish and shellfish, are extremely important, not just for subsistence, but also for cultural and spiritual reasons. Herring, eulachon, salmon, snapper, cod, trout, halibut, flounder and a variety of different rockfish are important fish species. Abalone, clams, cockles, octopus, prawns, scallops, shrimps, chitons and sea urchins are important resources, many of which are collected from the intertidal zone (Satterfield et al 2011). Many Gitga'at consume traditional foods, with up to 40% of meals being traditionally sourced (Gregory et al. 2011).

Some of the most valuable fisheries include pink, chum, coho, and sockeye salmon, geoduck and red urchin. For Gitga'at, these fisheries usually make up 99% of the total wholesale value of all their fisheries combined (for the years 1996 to 2007; Gregory et al. 2011). Gitga'at First Nation may develop a micro seafood processing facility in Hartley Bay and are participating in a larger initiative to develop a scallop farm on Fin Island. These initiatives are intended to improve employment and income for the community (Hartley Bay Council 2011).

Gitxaala Nation

Gitxaala Nation's cultural identity, like many other Aboriginal Groups, is tightly linked to their ability to access their territory and harvest marine resources (Calliou Group 2014a). Gitxaala expressed concerns about reduced access to their territory, including fishing grounds and other important places, disruption or displacement of marine species, potential effects from vessel wakes (e.g., shoreline harvesting and erosion processes), pollution, and cumulative effects (Calliou Group 2014a,b; The Firelight Group 2014). Other concerns includes the physical presence of shipping traffic that may act as obstacles along the marine access route and perceived effects surrounding encounters with LNG carriers that might lead to

decrease connection with the territory (i.e., avoidance of certain areas with greater shipping traffic; Calliou Group 2014b).

Gitxaala Nation has a predominantly marine-based economy and harvest many species listed in Table 3.4-10, but have a special reliance on halibut and abalone for trading and consumption during feasting. Feasting is a very important activity that relies heavily on the availability of traditional foods (The Firelight Group 2014). Other species used for trade include dried seaweed and shellfish, which are often traded for eulachon grease, since is not currently fished in Gitxaala territory (i.e., the proposed marine access route does not overlap with any areas used to harvest eulachon). Gitxaala also harvest salmon, cockles, clams, seals, and herring roe-on-kelp (The Firelight Group 2014).

Fishing locations were identified by the Calliou Group (2014a), but traditional and commercial harvesting locations were not distinguished. Salmon are fished along the entire proposed marine access route except for sections around Otter Channel, north of Hartley Bay to the southern end of Maitland Island, and at the head of Kitimat Arm north of Clio Bay. Some fishing locations, such as those where seine nets are used, are passed down from generation to generation and belong to, and are used by, one person. Fishing locations for halibut and sablefish overlaps with the marine access route in Principe Channel. Many other groundfish fishing sites do not overlap. Clams and cockles harvesting sites potentially exposed to the marine access route include those on the west sides of Gurd, Goschen, Dolphin, and Spicer Islands north of Principe Channel, areas in Principe Channel, Otter Channel, and at the junction of Grenville Channel at Wright Sound. Eulachon, abalone, mussels, scallops, seaweed, sea cucumber, squid, octopus, crab, prawn, and shrimp fishing locations do not overlap with the marine access route.

Gitxaala Nation harvest seaweed, clams, cockles, abalone, octopus, and kelp species by hand along shoreline. Harvesting times are limited by season and tide height. As a result, Gitxaala Nation estimates that they have 31 days per year to harvest seaweed, which cannot be harvested at night or in the rain according to cultural harvesting protocols. Fifty-seven days are suitable to collect clams and cockles, with some members collecting at higher tides but with reduced efficiency (Calliou Group 2014b).

Haisla Nation

Haisla Nation use all *wa'wais* (traditional territories) to gather traditional foods during different times of year. Village preference is to fish close to Kitamaat using small skiffs because of high fuel prices. However, decreasing seafood availability has forced Haisla to travel greater distances for harvesting marine resources. As examples, pollution from the Eurocan pulp and paper mill caused Haisla to stop harvesting butter clams and cockles at the head of the inlet, forcing them to travel as far as Clio Bay to harvest these species. Shoreline harvesting of clams and cockles occurs primarily during nighttime tides. Eulachon fishing has not occurred in Haisla territory for the past three years due to low Eulachon returns.

Some stocks, however, do appear to be rebuilding and there is presently a fishery on Kemano River with the possibility of another on K itimat River if recovery continues (Powell 2013). Traditional Haisla harvesting areas identified in Powell (2013) are listed in Table 3.4-13. Check marks indicate in which *wa'wais* mussels, cockles, or clams are harvested in.

Table 3.4-13: Location of Haisla Shoreline Harvesting Activities

Wa'wais (Traditional Harvesting Area)	Shoreline Harvesting Activities			
	Mussels	Cockles	Clams	Sheltered From Vessel Wake
Kitamaat Village Area	✓			NA
Clio Bay and Mud Bay				Yes
Coste Island	✓	✓		Partially
Eagle Bay	✓	✓	✓	Yes
West side of Maitland Island				NA
Sue Channel, East Maitland, North Hawkesbury, and Loretta Islands	✓	✓	✓	Partially
Bish Creek or Bees		✓		Partially
Elmsley Cove south to Jesse Falls	✓	✓		Partially
Jesse Lake and Upper Jesse Creek				Yes
Echo Bay	✓			Partially
Miskatla Inlet	✓	✓	✓	Yes
East side of Giltoyees Inlet	✓	✓	✓	Yes
West side of Giltoyees Inlet	✓	✓	✓	Yes
Foch Lagoon and, River and Lake	✓	✓	✓	Yes
Upper Foch Creek	✓	✓	✓	Yes
Drumlummon Bay	✓	✓	✓	Partially
Blue Jay Falls to Drumlummon Bay*	✓	✓	✓	NA
Gander Island				Partially
Percentage of Wa'wais' Used or Sheltered	83	67	50	83

NOTE:
[a] Ownership of this wa'wais is contested between Haisla and Gitga'at.
Harvesting for all species occurs year round.
SOURCE: Powell (2013).

Kitselas First Nation

Kitselas rely on both marine and freshwater resources, which includes clams, seaweed, and herring (Smith 1999, 2008). The locations of marine resource gathering areas were identified during a fisheries workshop in Kitkatla (Kitselas Community Engagement 2014, pers. comm.). Most fishing locations do not overlap with the proposed marine access route. As examples, clam and seaweed harvesting sites are around Dolphin and North Porcher Islands, and in Kitkiata Inlet. Other important fishing areas are on the northwest side of Fin Island, (used to catch sable fish using long lines), "mink trap" (the area between Anger and Pitt Islands that is used to catch salmon by gill nets), the southeast side of McCauley Island, and the southwest side of Pitt Island (used to catch prawns and crabs by traps). Fishing for salmon using gill nets in Principe Channel has reportedly been prohibited by DFO since the 1980s. Halibut long lines are fished by setting gear parallel to shore, following the contours of the bottom. Long line gear is not fished in the centre of the channel (Kitselas Community Engagement 2014, pers. comm.).

Lax Kw'alaams First Nation

Lax kw'alaams First Nation use their traditional territory for fishing and eco-tourism. Important fish habitats identified by Lax Kw'alaams include kelp beds, estuaries, tidal flats, and rocky reefs. Important areas identified include Big Bay, the Khutzeymateen, Lucy Island, west of Digby Island, and Stephen's Island (Lax Kw'alaams 2004). The places most heavily used for harvesting include Dundas Island (Boat Harbour) and Stephen Island. Other locations used by Lax Kw'alaams are Zayas Island (for spring salmon), Porcher Island (for roe-on-kelp), north arm to Grenville Channel and Kinkolith (for cockles), Red Bluff on the Nass (for eulachon), Canoe Pass (for groundfish), Bernie Island, Finlayson, Melville Island, Work Channel, and Steamboat Pass. Skeena River is also used to harvest eulachon, salmon, and halibut (Lax Kw'alaams 2004). Commercial fisheries with little to no involvement by Lax Kw'alaams include groundfish (e.g., halibut, lingcod, sablefish), geoduck, sea urchin, crab, and shrimp.

Metlakatla First Nation

Fishing occurs primarily away from the marine access route in the Tree Nob Group, around Melville and Lucy Islands, North of Stephens Island, and along the inner coast in areas such as Duncan Bay, Tugwell and Kinahan Islands, and around Flora Banks (Metlakatla Community Engagement 2014, pers. comm.). The Tree Nob group is used to harvest clams, cockles, abalone, lingcod, and rockfish. Lucy Island is a preferred area to fish for halibut and collect shellfish, while Duncan Bay is used to harvest herring roe on kelp. Salmon fishing occurs primarily along the inner coastline as the fish travel to their spawning grounds. Modern gill nets that are approximately 400 m long are used. Metlakatla conduct annual community fishing operations whereby approximately five fishers will harvest seafood for the community (Metlakatla Community Engagement 2014, pers. comm.).

3.4.2.12 Recreation and Tourism

The greater Kitimat region is rich in recreational and tourism opportunities. Activities enjoyed include fishing, camping, hiking, kayaking, and scuba diving.

3.4.2.12.1 Recreation

Marine Accessible Parks

BC has a wide range of parks, including ecological reserves, protected areas, provincial parks, and conservancies (hereafter collectively referred to as parks) located along its coast. There are 14 parks that boarder the RSA (Appendix C, Figure C-36).

Table 3.4-14: Provincially Protected Parks Located in the Kitimat Region

Name
Alty Conservancy
Banks Nii Luutiksm Conservancy [a b]
Bishop Bay-Monkey Beach Conservancy
Bishop Bay-Monkey Beach Corridor Conservancy
Byers/Conroy/Harvey/Sinnett Islands Ecological Reserve
Coste Rocks Parkab
Dala-kildala River Estuary Park
Dewdney and Glide Islands Ecological Reserve
Eagle Bay Park
Ethelda Bay-Tennant Island Conservancy
Foch - Gilttoyees Parka
Foch-Gilttoyees Protected Area
Gitnadoiks River Park
Gitxaala Nii Luutiksm/Kitkatla Conservancy [a]
Jesse Falls Protected Area [a]
K'distsausk/Turtle Point Conservancy [a b]
Kitimat River Park
Kitson Island Marine Park
K'mooda/Lowe-Gamble Conservancy
K'nabiyaaxl/Ashdown Conservancy
Ksgaxl/Stephens Islands Conservancy [a b]
Ktisgaidz/Macdonald Bay Conservancy [a b]
K'waal Conservancy
Lax Ka'gaas/Campania Conservancy [a b]
Lax Kul Nii Luutiksm/Bonilla Conservancy

Name
Lax Kwaxl/Dundas And Melville Islands Conservancy [a]
Lax Kwil Dziidz/Fin Conservancy [a]
Lucy Islands Conservancy
Maxtaktsm'aa/Union Passage Conservancy [a]
Moksgm'ol/Chapple -- Cornwall Conservancy
Monckton Nii Luutiksm Conservancy
Moore/Mckenny/Whitmore Islands Ecological Reserve
Nalbeelah Creek Wetlands Park
Smithers Island Conservancy
Stair Creek Conservancy [a]
Sue Channel Park (Loretta Island & Hawkesbury Isla
Union Passage Marine Park
Weewanie Hot Springs Park
Winter Inlet Conservancy

NOTES:
[a] Borders the RSA
[b] Borders in the LSA
SOURCE: BCMCA (2013)

The five parks located in the LSA include areas of high cultural importance to First Nations, sheltered inlets and anchorages, and support activities such as fishing, kayaking, and sightseeing. While it was not empirically possible to determine the frequency of use of these parks, information regarding their relative importance can be gleaned from the community interviews. For example, three natural hot springs (Weewanie, Shearwater, and Bishop Bay) are popular recreational, tourist and boat anchorage areas used by local residents and tourists (Hummel and Langagger 2013; Parsons 2013; Wakita 2013; Walker and Peacock 2013). These hot springs are not located on the marine access route and exist outside of the RSA (No data were available to estimate the frequency of use for marine accessible parks.)

Most parks are accessible by boat only and many offer sheltered bays for anchoring or going ashore; however, there are no wharves or docks and visitors access the sites from the beach. Some sites offer camping and have nearby streams with suitable drinking water, but generally do not offer any amenities such as electricity, showers, or shelter. Several parks have individual management plans that focus on maintaining flora and fauna, protecting plant communities and species at risk, and protecting special features in both the terrestrial and marine environment, protecting First Nation values, including harvesting and hunting areas, access, and culturally significant areas. Finally, management plans focus

on enhancing important recreational opportunities for boating, kayaking, saltwater angling, camping, picnicking, and day hiking (BC Parks 2011).

Recreational Boating Routes

Established recreational boating routes occurring in the marine transportation and use RSA were identified using BCMCA spatial data (coloured lines) and information obtained from marine community interviews (green polygon) (Appendix C, Figure C-37).

Commercial traffic and recreational vessels are most likely to interact along high-use recreational boating routes that overlap with the proposed marine access route in several places. The longest continuous high-use recreational boating route begins near Klemtu and continues north towards Prince Rupert. It passes behind Princess Royal Island, across Whale Channel, through Wright Sound, continues along the inner passage between Pitt Island and the mainland, and finally passes by Porcher Island and then towards Prince Rupert. This recreational boating pathway crosses the proposed marine access route only once; most of the boating route is outside the RSA.

A second, shorter high-use route exists parallel to the proposed marine access route, beginning in Wright Sound and terminating at the head of Kitimat Arm (approximately 85 km). As a result, there is high potential for interactions between recreational vessels and Project marine traffic. However, most local mariners (up to 90% of mariners; (Parsons 2013)) travel on the east side of Hawkesbury Island in Devastation Channel due to its relatively sheltered nature compared to the west side of the arm (Hittel 2013; Wakita 2013; Walker and Peacock 2013). A comparison of recreational boat traffic on different sides of the channel was not possible because Devastation Channel is outside the RSA.

Several less traveled and shorter sections of various routes (e.g., moderate to high-use) may also interact with the Project marine traffic on the north sides of Porcher, McCauley, and Promise Islands, and within Wright Sound. Wright Sound is a main traffic hub (Enbridge Northern Gateway Project 2010; Stantec Consulting Ltd. 2014) and requires cautious navigation.

Anchorages and Scuba Dive Sites

Approximately 329 anchorages and safe boat havens exist in the greater Kitimat area (Appendix C, Figure C-38). Safe boat havens were identified by the Council of British Columbia Yacht Clubs, and differ from a simple anchorage in that mariners can be reasonably assured of securing anchor in an area that offers protection from foul weather (BCMCA 2013).

Approximately 37 dive sites also exist within the RSA. Eight dive sites were identified in the RSA and one in the LSA. While access to the sites is mostly unknown (green triangles), most are likely only accessible by boat.

Additional sites anchorage areas (blue polygons) and dive sites (purple contour) were identified through consultation, with Coste Island identified as a SCUBA dive site used by the Kitimat Dive Club (Wakita 2013). Overall, these two types of sites appear scattered throughout the RSA and show no pattern or clustering on or near to the proposed marine access route.

Sea Kayaking

Sea kayaking routes were compiled by the BCMCA (2013) and assigned to a category based on relative importance. One additional kayak crossing was identified during consultation (Hickman 2013) and is shown by the purple polygon (Appendix C, Figure C-39). Sea kayakers are most likely to interact with commercial shipping traffic as they travelling through Wright Sound along a high-use route which continues north up the inside passage or south towards the east side of Princess Royal Island (Route A). A second high-use route encircles Triple Island, which is heavily used by shipping traffic during PPA boarding (Route B). Most other sea kayaking routes are associated with small inlets and around islands and do not overlap with the proposed marine access route.

Route A

The longest continuous high-use sea kayaking route begins near to Gribbell Island and continues north towards Prince Rupert. It passes across Whale Channel, through Wright Sound, continues along the inner passage between Pitt Island and the mainland, and finally passes by Porcher Island and towards Prince Rupert. The route splits off at the northern tip of Pitt Island and Kennedy Island and heads west around Porcher Island. This sea kayaking route crosses the proposed marine access route only once; the kayaking route is mostly outside the RSA (Appendix C, Figure C-39).

Route B

Additional shorter high-use routes in the RSA include those around Triple and Fin Islands. The route most likely to interact with Project marine traffic encircles Triple Island because this is the primary pilotage boarding station for much of the shipping traffic headed to Kitimat. As a result, kayakers may wish to use an alternate route and avoid passing in front of the station. This decision of which course to take will vary by individual, but it is assumed that those circumnavigating the island are aware of the navigational hazards associated with passing in front of a major shipping route that has been established since the early 1950s (Appendix C, Figure C-39).

3.4.2.13 Eco-Tourism and Guided Angling

Marine eco-tourism is an important industry for coastal BC. Fifty marine recreation and eco-tourism businesses were identified and selected for a Survey of Recreation and Tourism Use based on their

operations or headquarters being in the LSA and 20 (40%) responded. Key results from this study follow; for further information, see Stantec Consulting Ltd. (2014) and Appendix F.

Of the respondents, close to half (42%) operate in Kitimat, and close to one quarter (21%) in Prince Rupert. The remaining 37% are located in other geographic areas such as Victoria and the lower mainland of Vancouver. Most businesses (65%) have been in operation for 15 years or more.

The study also indicated substantial variability in the areas of the ocean and the proposed marine access route in which the businesses operate. For example, many of the tourism operations in the Kitimat and Prince Rupert area also use the areas in Haida Gwaii, Bella Bella and other parts of the northwest coast. Meanwhile, businesses located on Vancouver Island and the lower mainland access water routes from Campbell River to Prince Rupert and up to the Great Bear Rain Forest. Table 3.4-15 shows the where respondents are located.

Table 3.4-15: Location of Eco-tourism and Guided Angling Outfitters

Location	Number of businesses	Percentage
Prince Rupert	4	21.0%
Victoria	2	10.5%
Kitimat	8	42.1%
Lower Mainland	3	15.7%
Other	2	10.5%
Total Responses	19	100%

SOURCE: Survey of Recreation and Tourism Use 2014

Most (75%) of the businesses operate seasonally, but tend to keep have few full-time staff. Aboriginal staff members are employed at approximately half (55%) of all businesses. These results are consistent with findings from Ference Weicker and Company (2009). Gitga'at and Metlakatla have the largest percentage of their labour force employed in the tourism industry, while Gitxaala have the highest percentage of their labour force employed in the fisheries industry. Metlakatla and the Kitsumkalum also have a large percentage of their work force employed in fisheries (Table 3.4-16). Meetings with Metlakatla and Kitselas First Nation confirm their interests in continuing to develop commercial eco-tourism operations in their territories (Metlakatla and K itselas Community Engagements 2014, pers. comm.). Gitga'at also identified this sector as an area of potential growth and have worked to develop this sector for over 10 years (Gitga'at Nation 2003; Hartley Bay Council 2011). They are aware of some of the pitfalls (e.g., loss of natural and cultural heritage; and managing expectations) that can occur as a result of improper management (Gitga'at Nation 2003) and appear to be proceeding carefully.

Table 3.4-16: Employment of Residents of North Coast Nations

Employment Category	Gitxaala	Haisla	Gitga'at	Kitsumkalum	Kitselas	Metlakatla
In the labor force	242	354	79	119	100	55
Fisheries	28%(68)	2%(71)	3%(3)	11%(13)	NA	17%(9)
Tourism	2%(5)	NA	16%(12)	NA	2%(2)	10%(6)
Other	5%(12)	47%(166)	2%(2)	29%(35)	21%(21)	20%(11)

NOTE:
Numbers is brackets indicate the number of people employed.
SOURCE: Reproduced from Ference Weicker and Company Ltd. 2009.

Business owners reported that the main reason customers use their services (60%, the number of reasons given = 71) are for saltwater fishing, wildlife tours, and experiencing the outdoors in a rain forest or pristine setting. These findings are consistent with recent reports by Ference Weicker and Company (2009) and Gregory et al. (2011), which agree that saltwater fishing, wildlife tour, and experiencing the outdoors are the main reasons tourists visit the region.

Seventy two percent of respondents said that they believed that shipping would negatively affect their business, while 27% thought it would have a neutral or positive effect. The most common reason given for a negative effect was that shipping traffic would alter the aesthetic quality of the area to tourists (Stantec Consulting Ltd. 2014). In contrast, Powell (2013) did not report any concerns regarding Project marine shipping affecting commercial tourism prospects for Haisla.

No business reported boat rentals as one of their services. This result suggests that there are very few operators that rent boats for self-guided marine excursions in the region.

According to BC Stats (2013), real gross domestic product (GDP) in BC's tourism sector was $6.5 billion in 2011, which was over 4% of the GDP in provincial economy. In fact, the tourism sector expanded 1.2% in 2011 but overall experienced only modest growth. In addition, revenues in the tourism sector rose slightly (+1.4%) in 2011, to 13.4 billion and employed over 125,000 people (BC Stats 2013). The data presented in Table 3.4-17 shows that 42% of the tourist and recreation business owners estimated their yearly gross revenue was less than $300,000 while close to 30% estimated that their gross revenue was $500,000 or more.

The average cost per visitor per day was approximately $750 (using a weighted average based on information obtained during interviews) and was lower than what was reported by Gregory et al. (2011) (e.g., $915 per day). In 2002, the eco-tourism industry was estimated at 18,000 user-days and valued at over $16 million for the coastal area near Prince Rupert (Gregory et al. 2011). The estimates suggest that the industry has expanded since 2002 and is now estimated to be worth approximately $30 million per

year (Table 3.4-18). The extrapolated values were based on 51 businesses potentially operating in the north coast region. This estimate is conservative since it was calculated using all businesses known to operate in area and was not restricted to those areas that overlapped with the proposed marine access route. For example, many of the services offered by these businesses do not occur along the route and, therefore, the estimated value of the industry and what could be affected by Project marine shipping is overstated.

Table 3.4-17: Estimated Annual Gross Revenue for Eco-tourism and Guided Angling Businesses

Estimated Revenue ($)	Number of Businesses	Percentage (%)
Less than 99,999	3	21.4
100,000 to 299,999	3	21.4
300,000 to 499,999	2	14.2
More than 500,000	4	28.5
Don't know	2	14.2
Total respondents	14	

SOURCE: Stantec Survey of Recreation and Tourism Use 2014.

Table 3.4-18: Statistics for North Coast Marine Eco-tourism Operators

Tourism Statistics	Approximate Values
Weighted Average Cost per Visitor Day (n = 12)	$750
Total Visitor Days Reported (n = 15)	16,000
Average Visitor Days per Business per Year (n = 15)	1,100
Value of Responding Tourism Industry (n = 15)	$12,000,000
Extrapolated User Days of Entire Tourism Industry (n = 51)	38,500
Extrapolated Value of Entire Tourism Industry (n = 51)	$30,000,000

SOURCE: Stantec Survey of Recreation and Tourism Use 2014.

It is also understood that in addition to commercial eco-tourism marine traffic, local boaters will also be using the waterways.

3.4.2.14 Marinas and Moorage Facilities

3.4.2.14.1 Regional Coastal Facilities

Coastal facilities, types, and their location within the Kitimat region are listed in Table 3.4-19. Twenty-eight facilities, including marinas, eco-tourism lodges, and public wharfs, among others, are located in the greater Kitimat region (Appendix C, Figure C-40).

Table 3.4-19: Coastal Facilities Located in the Greater Kitimat Region

Facility Name	Facility Type	Location
Big Time Fishing Lodge	Floating fishing lodge - Closed	Hawk Bay
Butedale Lodge	Marina	Butedale Passage, Princess Royal Island
Cow Bay Port Edward Harbour Authority	Harbour authority	Prince Rupert
Dodge Cove Harbour Authority	Harbour authority	Dodge Cove, Digby Island, Prince Rupert
Dolphin's North Lodge	Floating fishing lodge	Worsfold Bay
Fairview Port Edward Harbour Authority	Harbour authority	Fairview, Prince Rupert
Hartley Bay Public Dock and Small Craft Harbour [a]	Public wharf	Hartley Bay
Hunts Inlet Small Craft Harbour	Public wharf	Hunts Inlet, Porcher Island
Kemano Yacht Club	Yacht club - Closed	Kemano Bay, Barrie Reach
King Pacific Lodge	Floating fishing lodge	Barnard Harbour, Princess Royal Island
Kitamaat Village - Haisla Harbour Authority [a]	Harbour authority	Kitamaat
Kitkatla - Gitxaala Harbour Authority [a]	Harbour authority	Kitkatla, Dolphin Island
Klemtu Public Dock	Public wharf	Klemtu
Klemtu Tourism Dock / First Nations Fuels	Marina	Klemtu
Metlakatla	Marina	Metlakatla
Minette Bay Lodge [a]	Ecotourism lodge	Minette Bay, Kitamaat
MK Bay Marina [a]	Marina	Kitimat
Moon Bay Marina a	Marina	Facility removed
North King Lodge	Floating fishing lodge	Borrowman Bay, Aristzabel Island
Oona River - Oona River Community Association	Harbour authority	Oona River, Porcher Island
Oona River Retreat	Ecotourism lodge	Oona River, Porcher Island
Port Edward Harbour Authority	Harbour authority	Porpoise Harbour, Port Edward
Port Simpson	Marina	Port Simpson
Port Simpson Small Craft Harbour	Public wharf	Port Simpson
Prince Rupert Yacht Club	Marina	Prince Rupert
Rushbrooke Port Harbour Authority	Harbour authority	Prince Rupert
WCR - Whale Channel	Floating fishing lodge	Whale Channel

NOTE:
[a] Located in the RSA.
[b] Located in the LSA.
SOURCE: BCMCA (2013)

3.4.2.14.2 Key Facilities

Five important marinas and moorage facilities were identified based on their location in the LSA:

- MK Bay Marina
- Minnette Bay Marina
- Kitamaat Village Small Craft Harbour
- Hartley Bay Small Craft Harbour
- Kitkatla Bay Small Craft Harbour

(Moon Bay Marina has been decommissioned and is no longer operational.)

Table 3.4-20 provides a summary of relevant facility information. Small craft harbours have a federal mandate to provide a safe network of harbours in support of economically prosperous fisheries. Local harbour authorities are contractually responsible for the day-to-day operations of their respective harbours through a lease agreement with DFO. Because of this mandate, the local harbour authority may give priority moorage to fishers, but the harbour authority will generally make every effort to accommodate all vessels. While the moorage facilities are built by the federal government, the collection of revenue to cover operational expense such as utilities and minor maintenance is fulfilled by the Harbour Authority. As an independent not-for-profit business, the Harbour Authority is also responsible for setting the rates for berthage and any additional services (Richardson 2014).

Table 3.4-20: Identified Marinas and Moorage Facilities in the LSA

Facility Name	Operator	Location	Services Offered	Ranking of Nearest Recreational Boating Route	Distance from the proposed LNG facility (km)
MK Bay Marina	Regional District of Kitimat-Stikine	Head of Kitimat Arm	Moorage (147 boats), gas, boat launch, dry dock storage, and accommodation	Moderate-high	2.1
Kitamaat Village Small Craft Harbour	Haisla Port Authority	Head of Kitimat Arm	Moorage (40 boats)	Moderate-high	3.5
Minnette Bay Marina	Private business	Head of Kitimat Arm	Moorage (40 boats) and accommodation	Moderate-high	6
Hartley Bay Small Craft Harbour	Gitga'at Port Authority	Hartley Bay	Moorage (40 boats), gas, accommodation, and recreation facilities	Moderate-high	80
Kitkatla Bay Small Craft Harbour	Gitxaala Port Authority	Dolphin Island	Moorage (25 boats)	Moderate	220

SOURCE: BCMCA 2013

MK Bay Marina

MK Bay Marina is located on the east side of the channel and is approximately 2 km southeast from the proposed LNG facility (Appendix C, Figure C-41). It is run by the Regional District of Kitimat–Stikine and supports much of the boating activity occurring in the area. It offers a refueling station and general supplies. It has capacity for approximately 147 vessels and is fully booked year round. There is currently a waitlist for permanent moorage space; the 'first in line' on the list has been waiting two to three years and the list has over 90 people on it (Hickman 2013). MK Bay marina staff reported making considerable effort to maintain availability for transient vessels that may only visit the area overnight or for several days. Many community members are frustrated by the long waits and high fees to use MK Bay's boat launch (Hummel and Langagger 2013; Kitimat Daily Online 2011). Regional District of Kitimat–Stikine is currently developing plans to expand services and update infrastructure, including new concrete breakwaters (the existing breakwater is made of rafted logs), floating lodges, concrete fuel dock, and additional marina floats (Regional District of Kitimat–Stikine 2014).

Minette Bay Marina

Minnette Bay Marina is located in the Kitimat River estuary and is approximately 6 km east from the proposed LNG facility (Appendix C, Figure C-42). It is a private business with capacity for approximately 40 boats. However only 10 to 12 boats are reported to be using the marina; therefore, it is not operating at capacity (Hickman 2013; Hummel and Langagger 2013). This is most likely because access to this marina is restricted during low tide (Hittel 2013; Hummel and Langagger 2013; Wakita 2013). The breakwater is made of rafted logs and an active log sort exists next to the marina.

Kitamaat Village Small Craft Harbour

Kitamaat Village dock is approximately 3.5 km southeast from the proposed LNG facility (Appendix C, Figure C-43). It is a SCH managed by the Haisla Harbour Authority. Based on GIS analysis and consultation, it has three 30 m long floats (fingers) extending off the 50 m main float and can accommodate approximately 40 boats. It is currently operating at full capacity and expansion of the facility (e.g., larger platform and breakwater, and the creation of a boat launch) is needed (Amos 2014).

Hartley Bay Small Craft Harbour

Hartley Bay small craft harbour is located within Gitga'at community (180 full time residents) and is approximately 80 km south from the proposed LNG facility (Appendix C, Figure C-44). It is managed by the Gitga'at Port Authority and offers refueling services, indoor and outdoor recreation facilities, and internet services and is reportedly operating at full capacity (40 boats) (Gitga'at website 2014). A total of 12 Gitga'at operated fishing vessels, including salmon gillnetters, seiners, boats with halibut gear and one with crab gear, were moored in Hartley Bay in recent years (Gregory et al. 2011).

Kitkatla Small Craft Harbour

Kitkatla Small Craft Harbour is located within Gitxaala community on Dolphin Island and is approximately 220 km from the LNG facility (Appendix C, Figure C-45). It is a SCH managed by the Gitxaala Harbour Authority. Based on GIS analysis, it is made up of a single float that is approximately 140 m long and has an estimated capacity of 40 boats. The dock is sheltered by a small island located nearby.

3.5 References

3.5.1 Economy

3.5.1.1 Literature Cited

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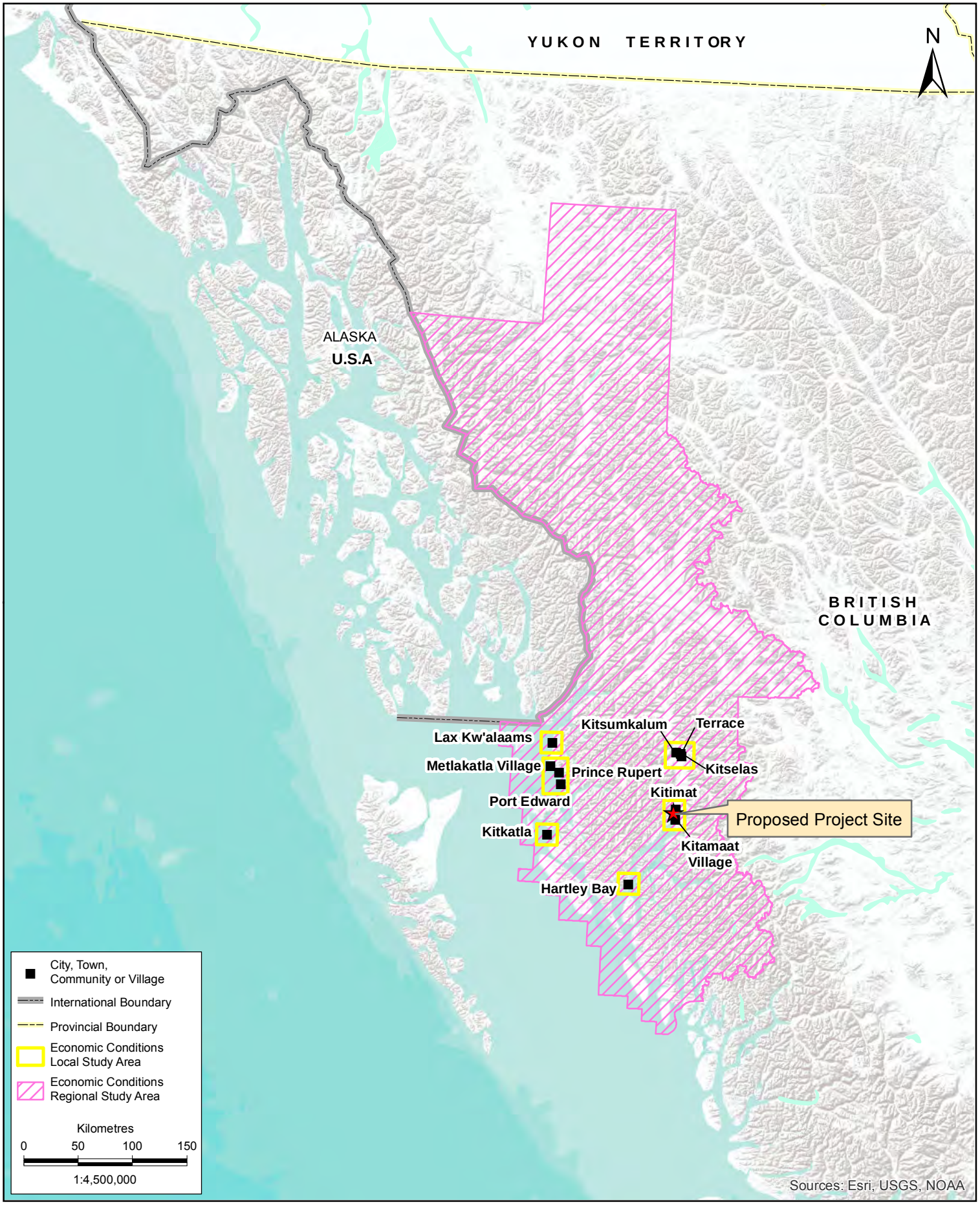
APPENDIX A

Study Areas



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SOCIO-ECONOMIC BASELINE REPORT

ECONOMIC CONDITIONS
LOCAL AND REGIONAL STUDY AREAS

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KITIMAT, BRITISH COLUMBIA

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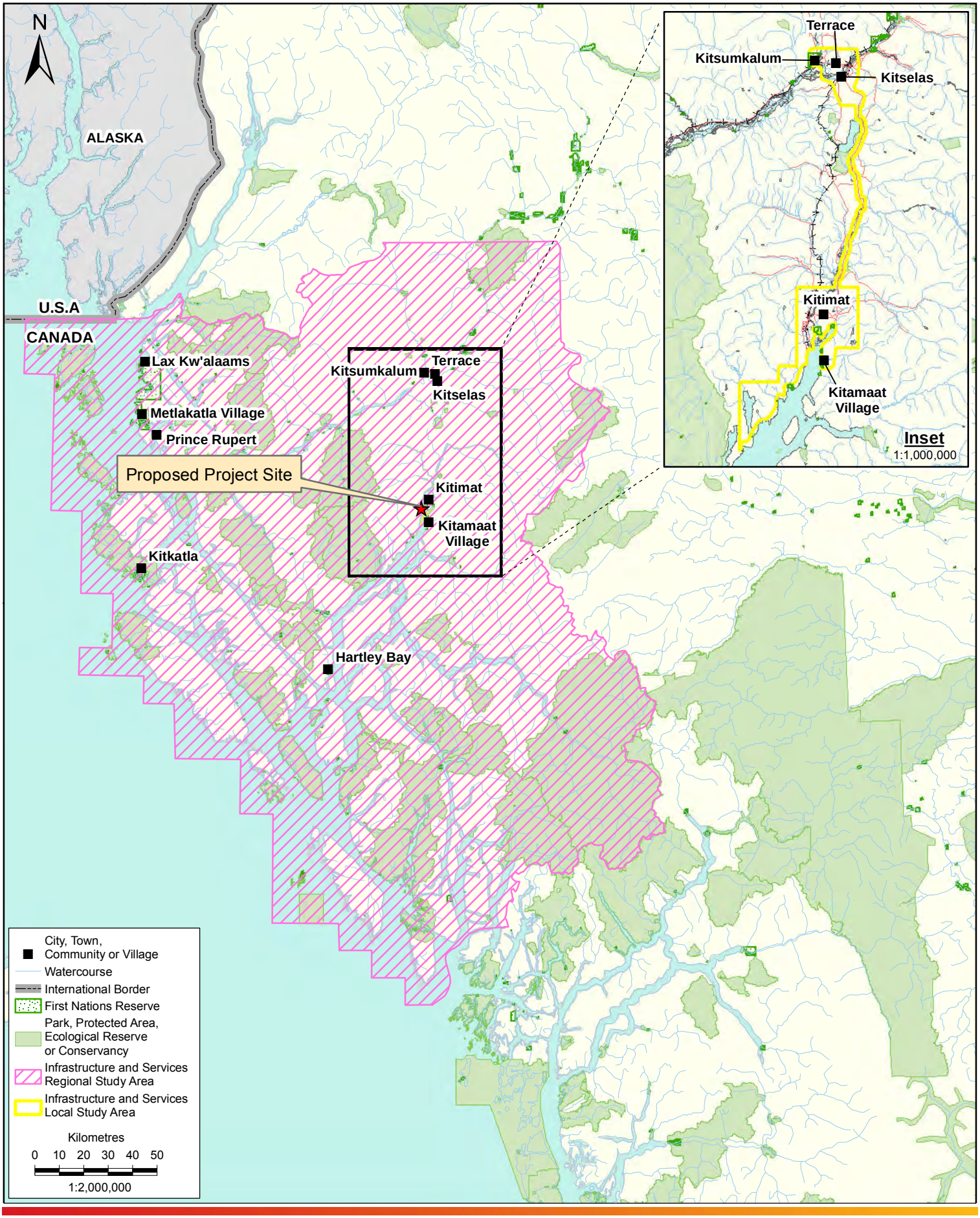

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SOCIO-ECONOMIC BASELINE REPORT

INFRASTRUCTURE AND SERVICES LOCAL AND REGIONAL STUDY AREAS

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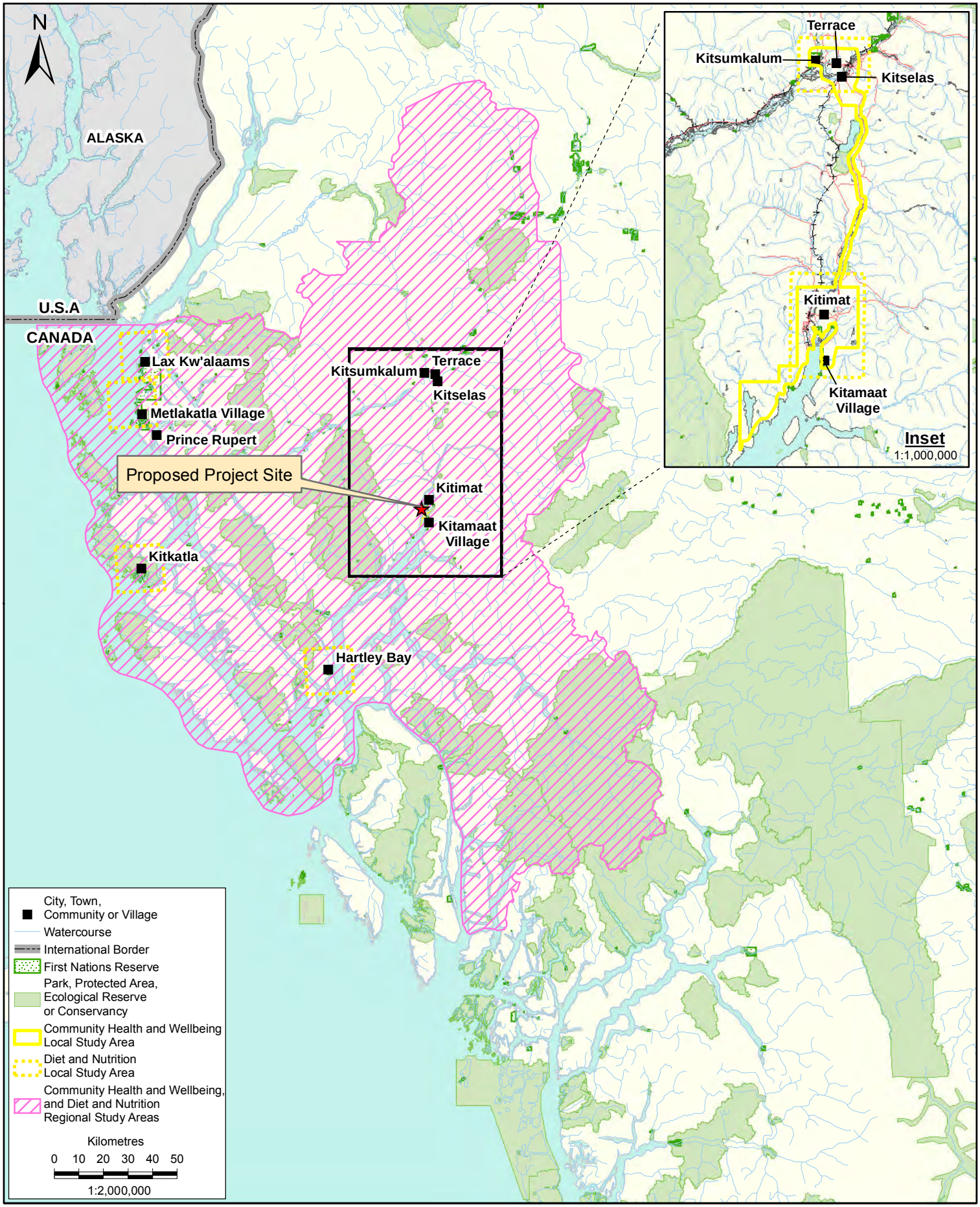

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SOCIO-ECONOMIC BASELINE REPORT

COMMUNITY HEALTH AND WELLBEING, AND DIET AND NUTRITION LOCAL AND REGIONAL STUDY AREAS

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

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SOCIO-ECONOMIC BASELINE REPORT

MARINE TRANSPORTATION AND USE LOCAL AND REGIONAL STUDY AREAS

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

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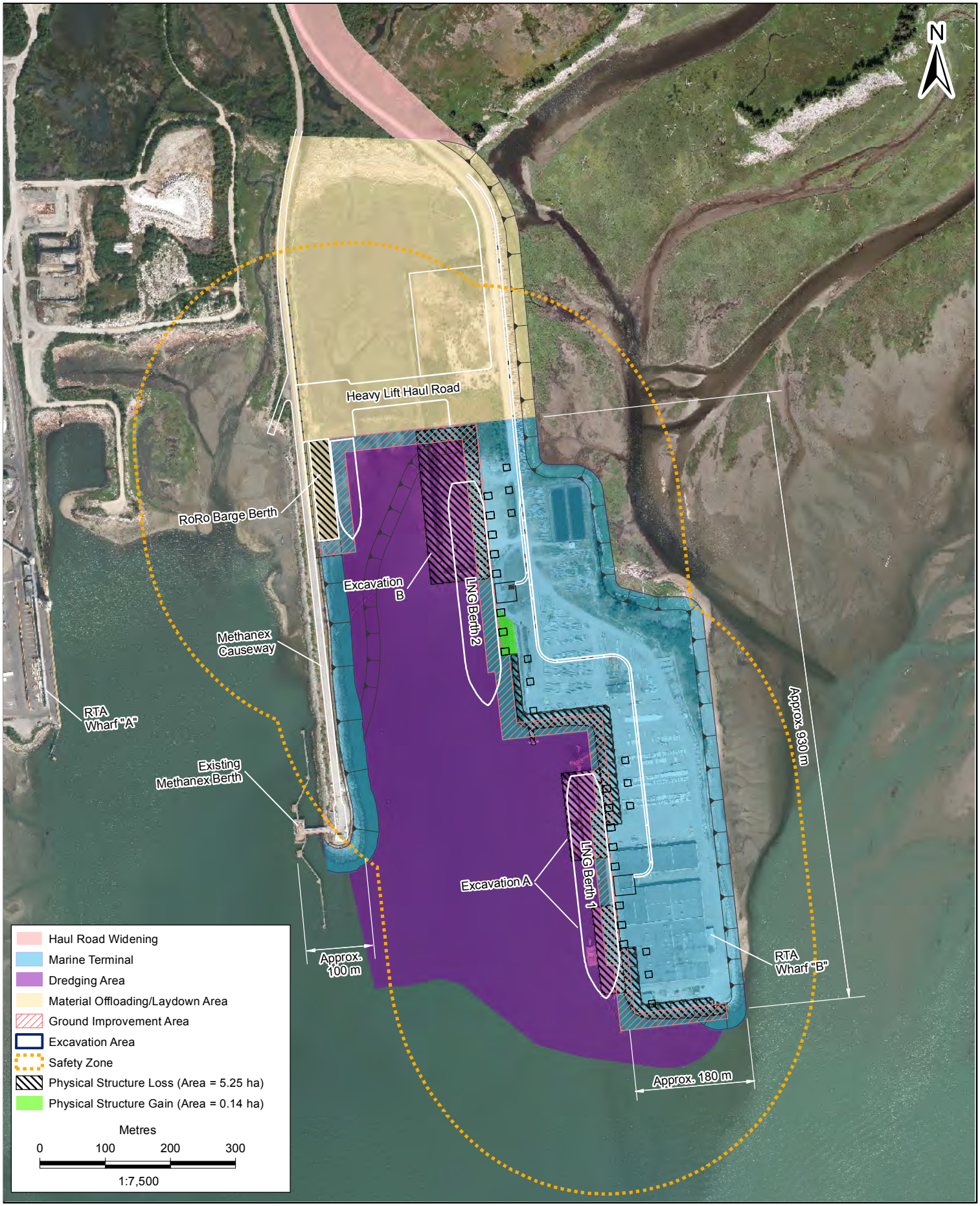

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SOCIO-ECONOMIC BASELINE REPORT

MARINE TERMINAL AND SAFETY ZONE

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KITIMAT, BRITISH COLUMBIA

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APPENDIX B

Population and Housing Figures

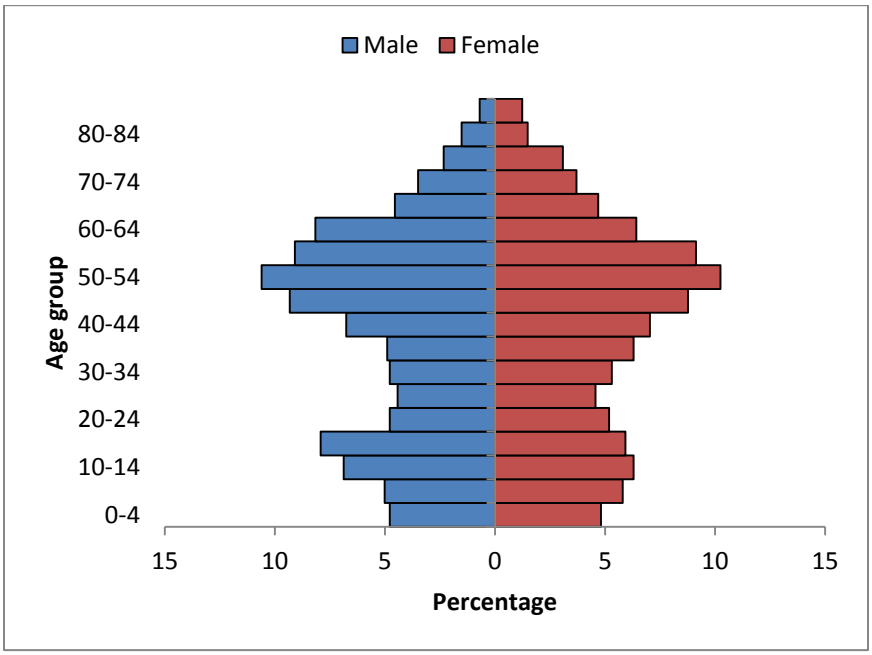


Figure B-1a: Population Characteristics of Kitimat District Municipality, 2011

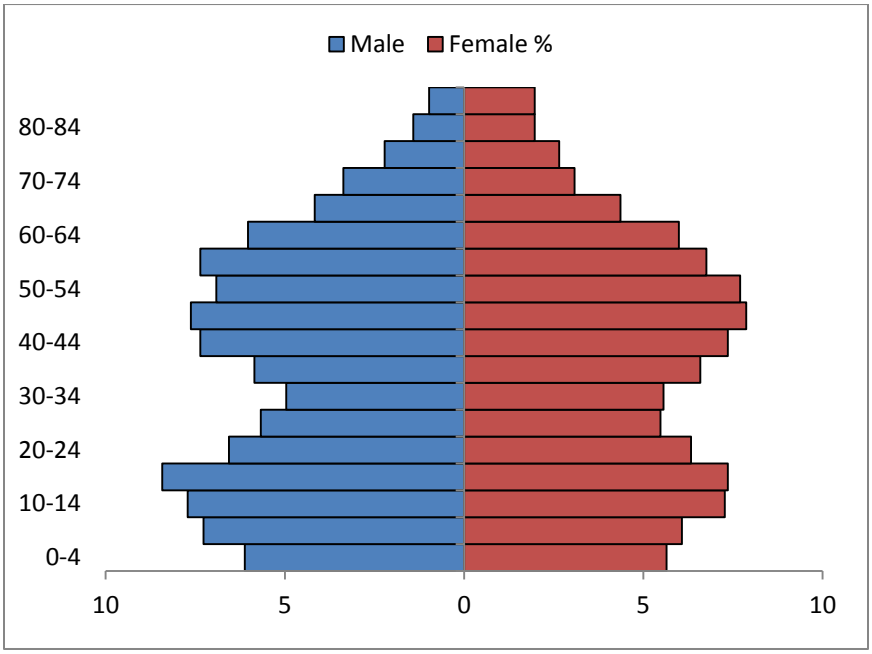


Figure B-1b: Population Characteristics of Terrace, Census Agglomeration, 2011

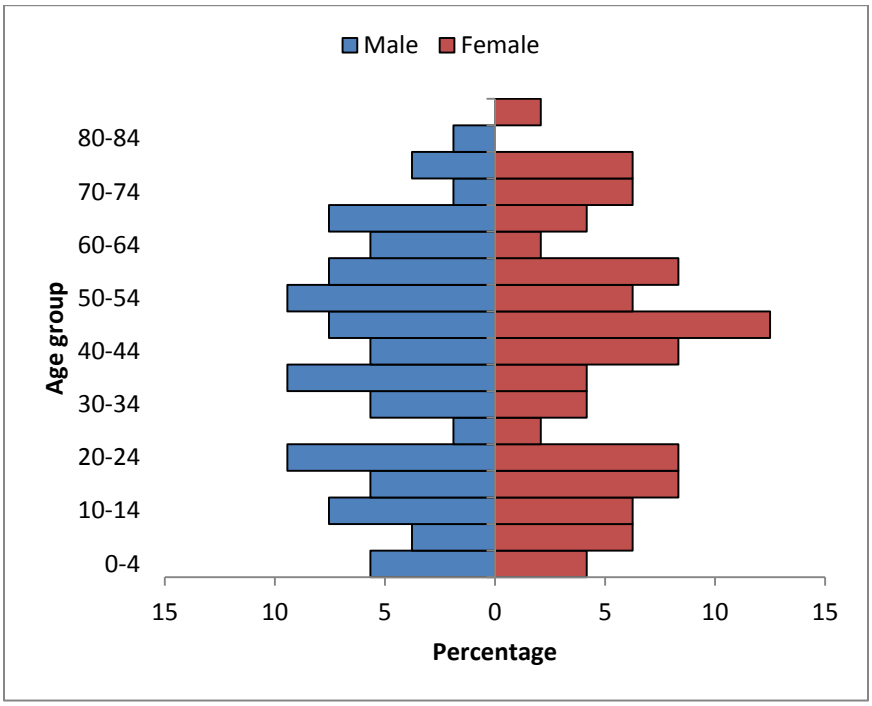


Figure B-1c: Population Characteristics of Kitamaat 2 Indian Reserve, 2011

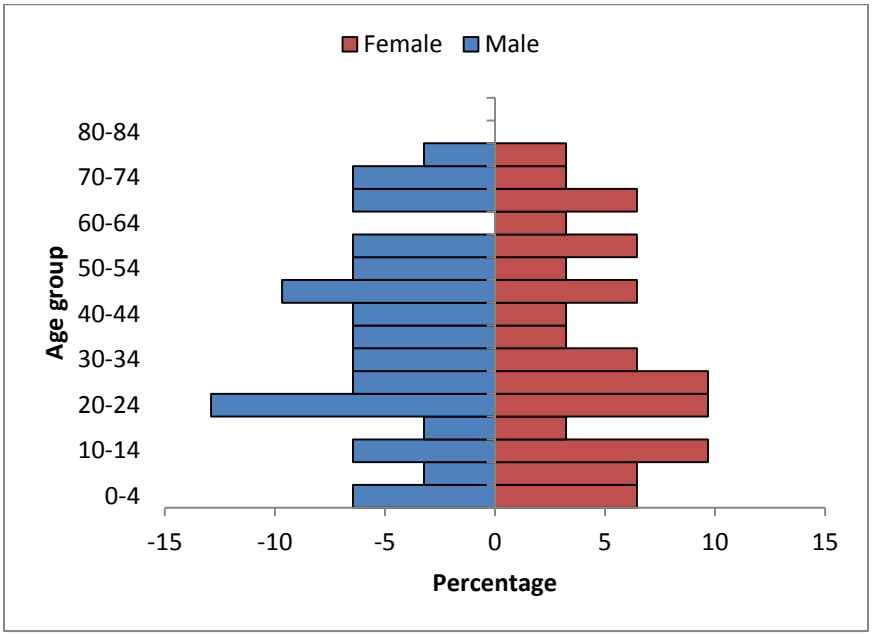


Figure B-1d: Population Characteristics of Kitsumkaylum 1 Indian Reserve, 2011

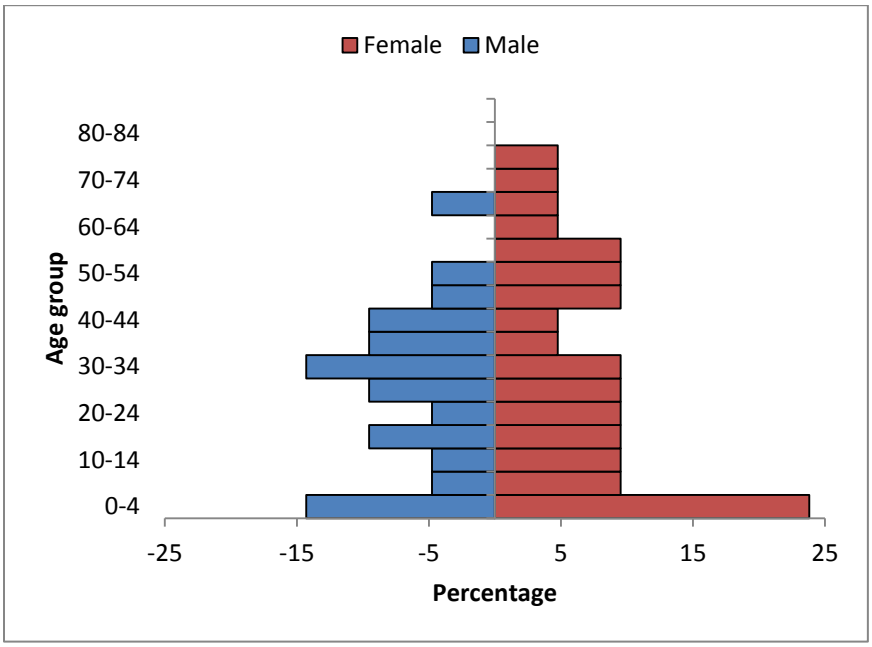


Figure B-1e: Population Characteristics of Kitselas 1 Indian Reserve, 2011

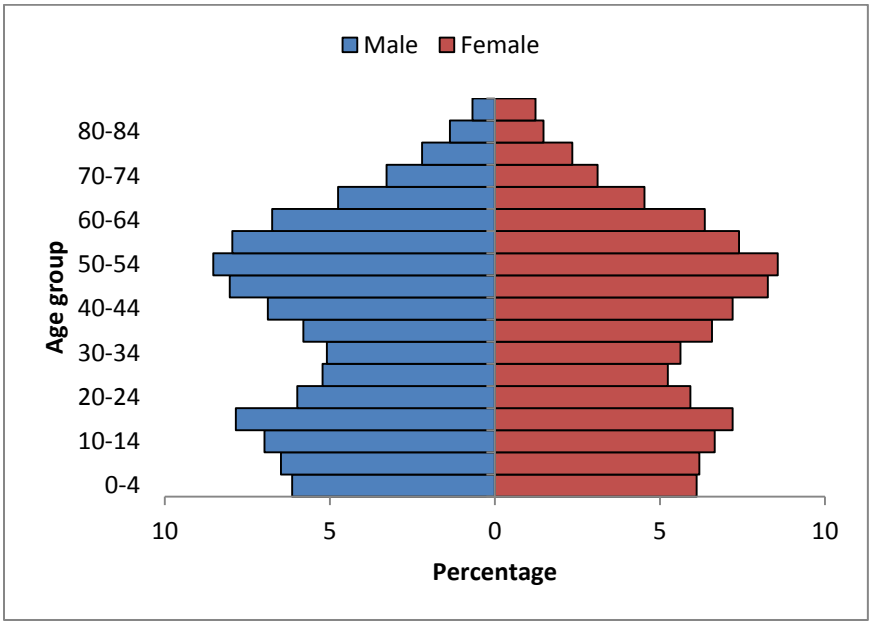


Figure B-1f: Population Characteristics of Kitimat-Stikine Regional District, 2011

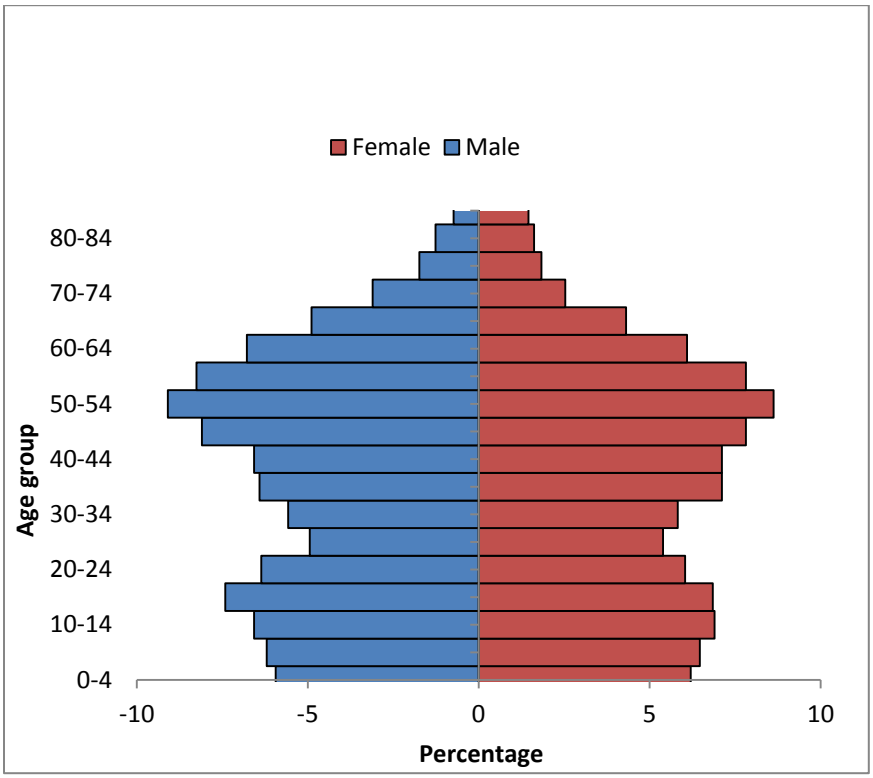


Figure B-1g: Population Characteristics of Skeena-Queen Charlotte Regional District, 2011

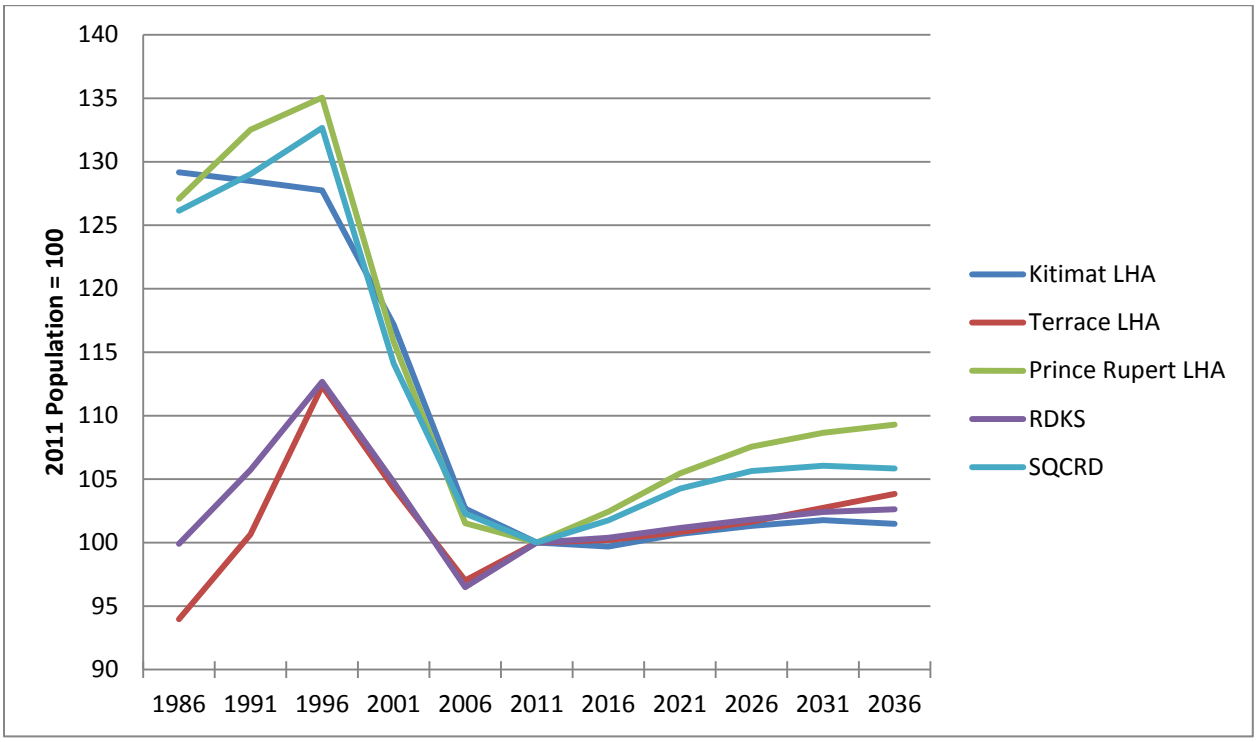
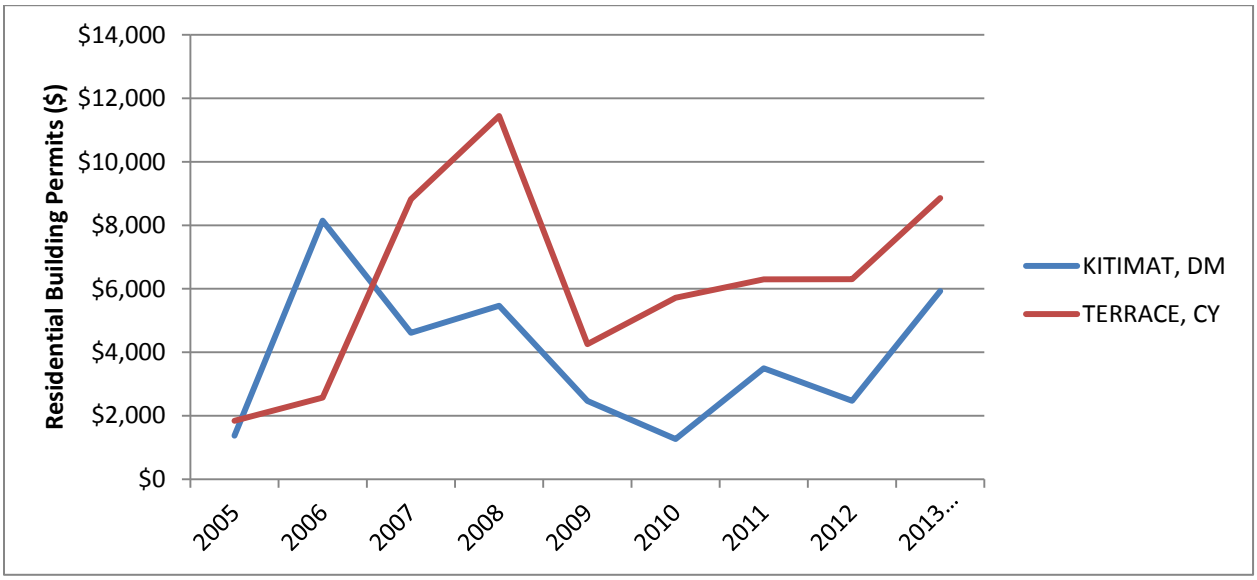


Figure B-2: Population Projections in the LSA and RSA

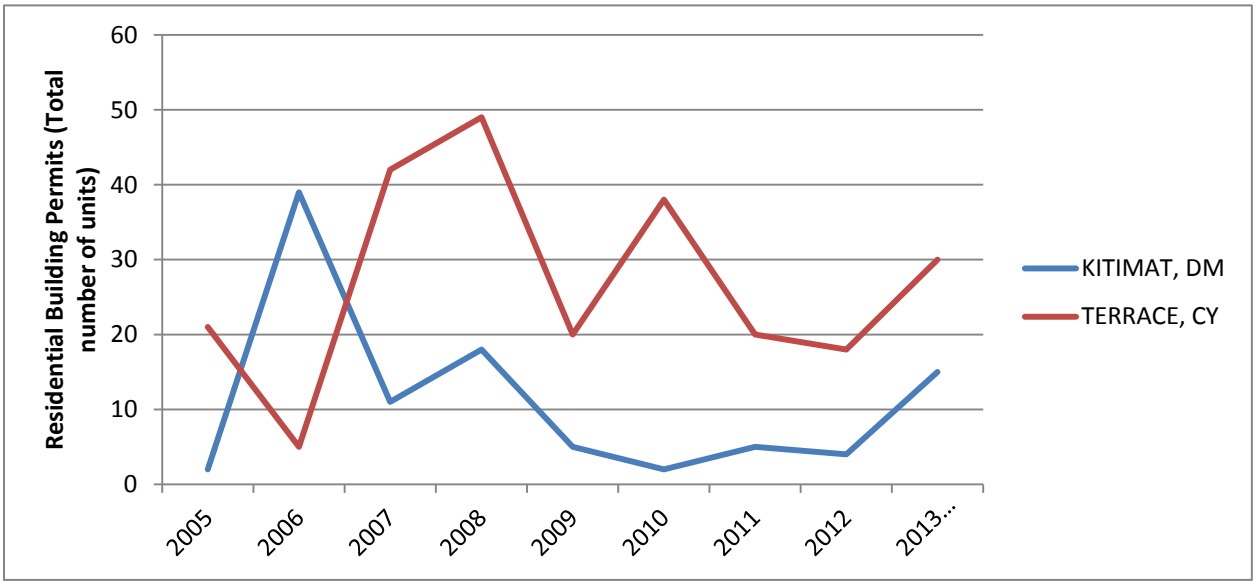
SOURCE: BC Stats (2013c)

Figure B-3: Net Migration in Kitimat–Stikine Regional District, 1985 to 2012



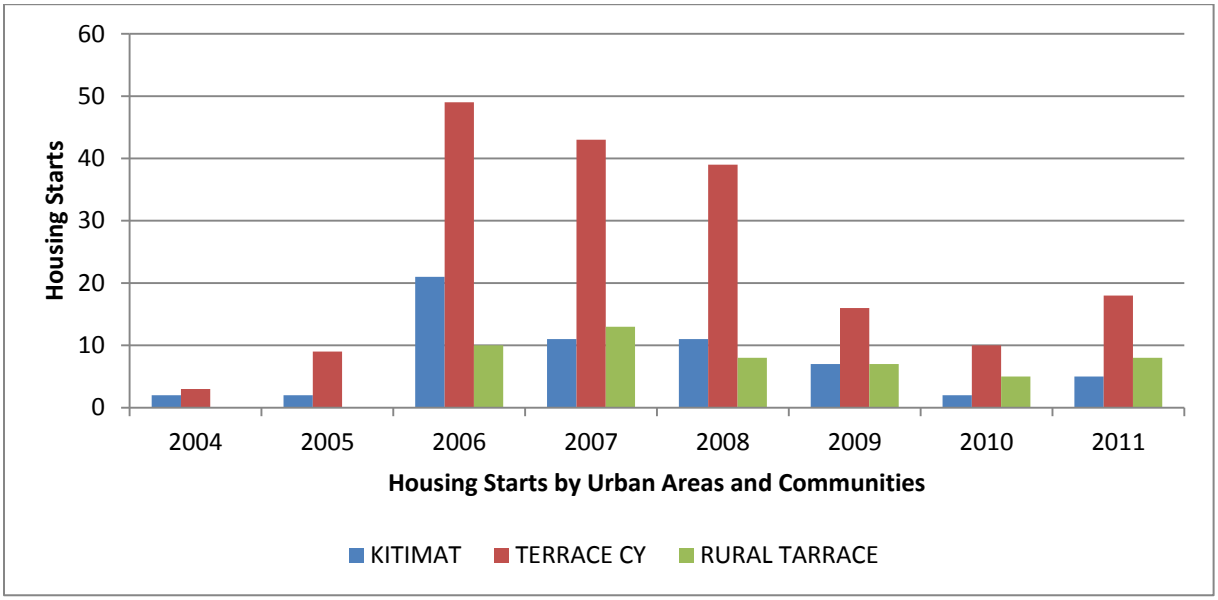
SOURCE: BC Stats (2014a)

Figure B-4: Value of Residential Building Permits in the LSA, 2005 to 2013



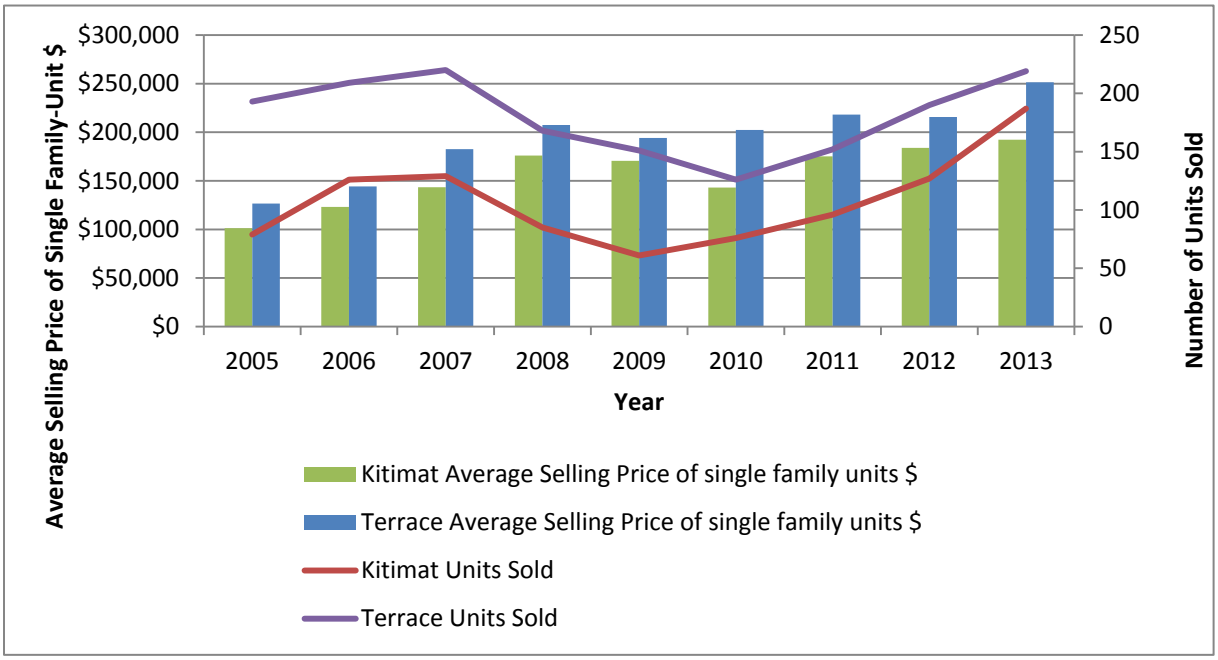
SOURCE: BC Stats (2014a)

Figure B-5: Number of Residential Building Permits Issued in the LSA, 2005 to 2013



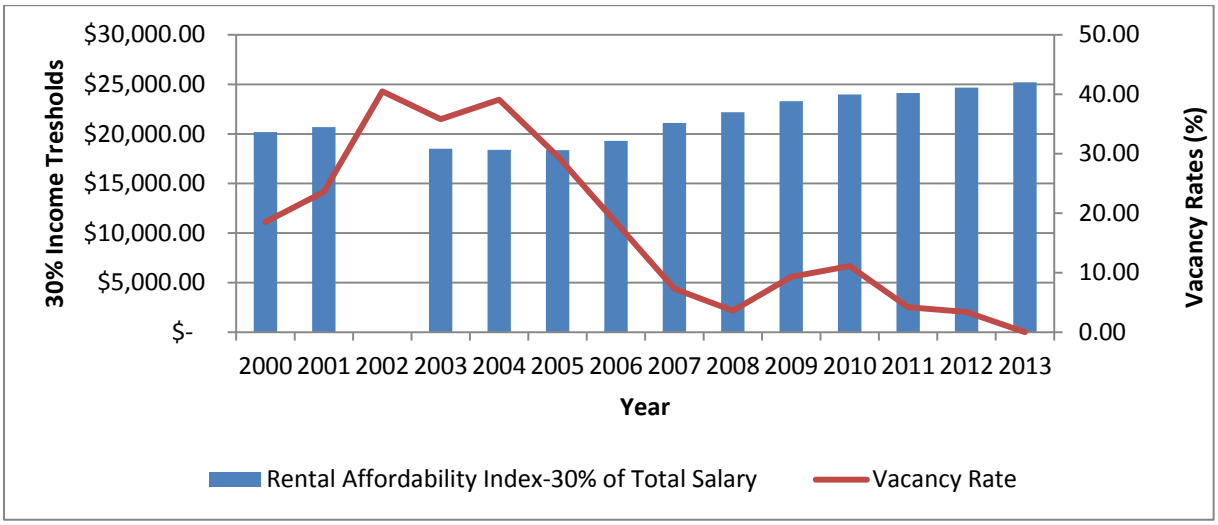
SOURCE: BC Stats (2012h)

Figure B-6: New Home Construction in the LSA, 2004 to 2011



SOURCE: BC Northern Real Estate Board News Releases 2005–2013.

Figure B-7: Volume and Average Selling Price of Single-Family Homes Sold in Kitimat and Terrace, 2005 to 2013[a,b]



NOTES:

[a] In 2002 data was suppressed by CMHC for confidentiality reasons. [b] Salaries are derived from one- and two-bedroom average rents from CMHC's Fall Rental Market Survey

SOURCE: CMHC Fall Survey 2000 -2013

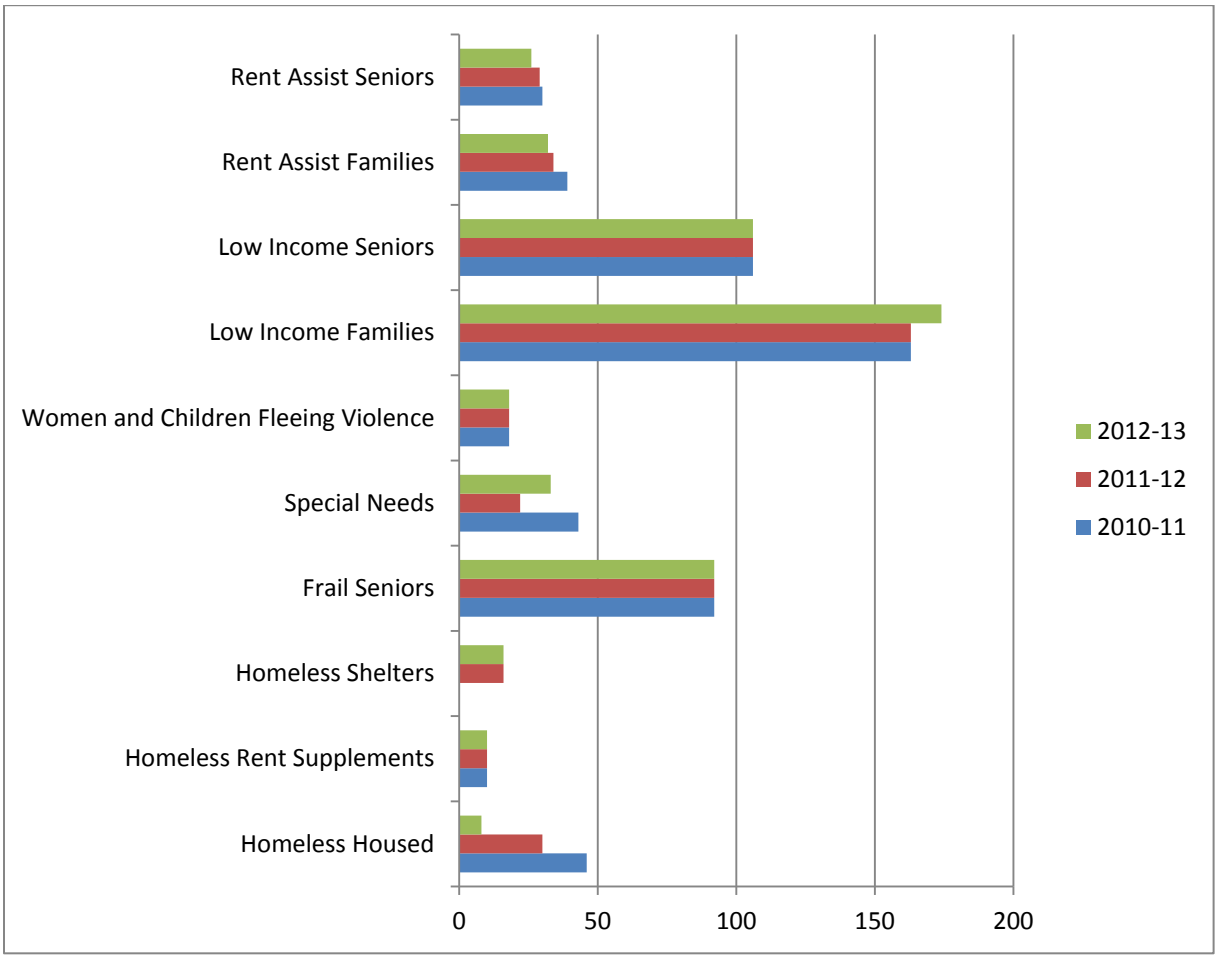
Figure B-8: Rental Vacancy Rate and Affordability in Terrace, 2000 to 2013

NOTES:

Salaries are derived from one- and two-bedroom average rents from CMHC's Fall Rental Market Survey

SOURCE: CMHC Fall Survey 2000–2013

Figure B-9: Rental Vacancy Rate and Affordability in Kitimat, 2000 to 2013

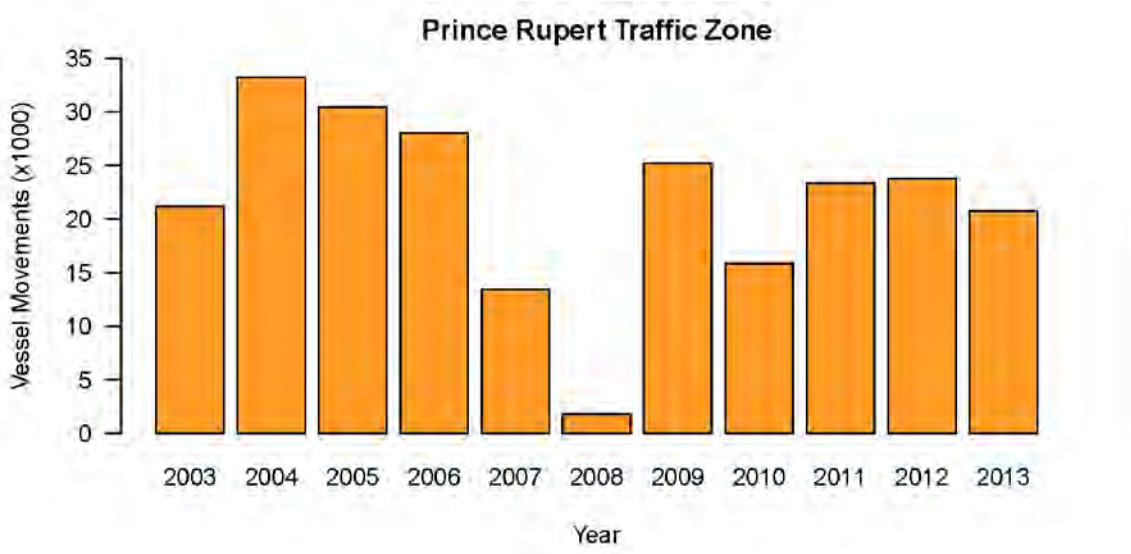


SOURCE: BC Housing (2014)

Figure B-10: Number of BC Housing Subsidized Housing Units in the LSA, 2010 to 2013

APPENDIX C

Marine Transportation and Use Figures and Tables



Stantec	LNG CANADA Opportunity for British Columbia. Energy for the world	*SOCIO-ECONOMIC BASELINE REPORT* **VESSEL MOVEMENTS REPORTED BY THE MCTS IN THE PRINCE RUPERT TRAFFIC ZONE** LNG CANADA EXPORT TERMINAL KITIMAT, BRITISH COLUMBIA	PROJECTION: UTM9 DATUM: NAD 83 DATE: 04-SEP-14	DRAWN BY: SHS CHECKED BY: SW APPENDIX NO.: **C-1**

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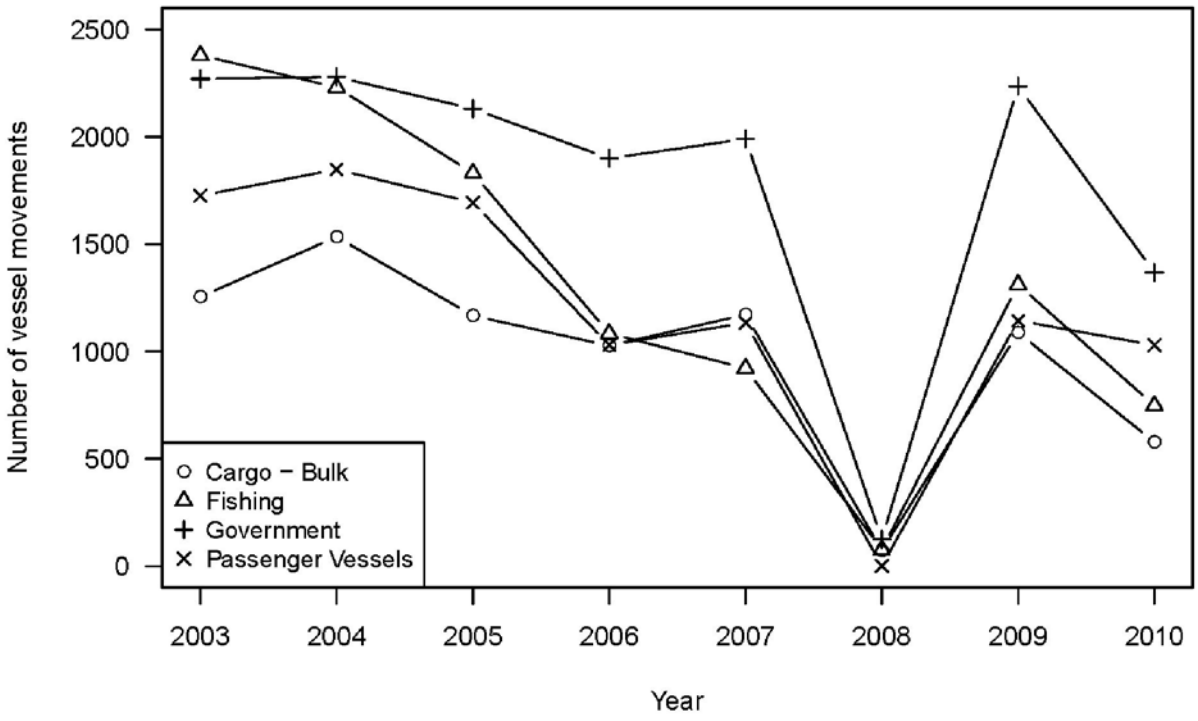

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SOCIO-ECONOMIC BASELINE REPORT

THE NUMBER OF VESSEL MOVEMENTS IN THE PRINCE RUPERT TRAFFIC ZONE (HIGH)

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SHS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-2**

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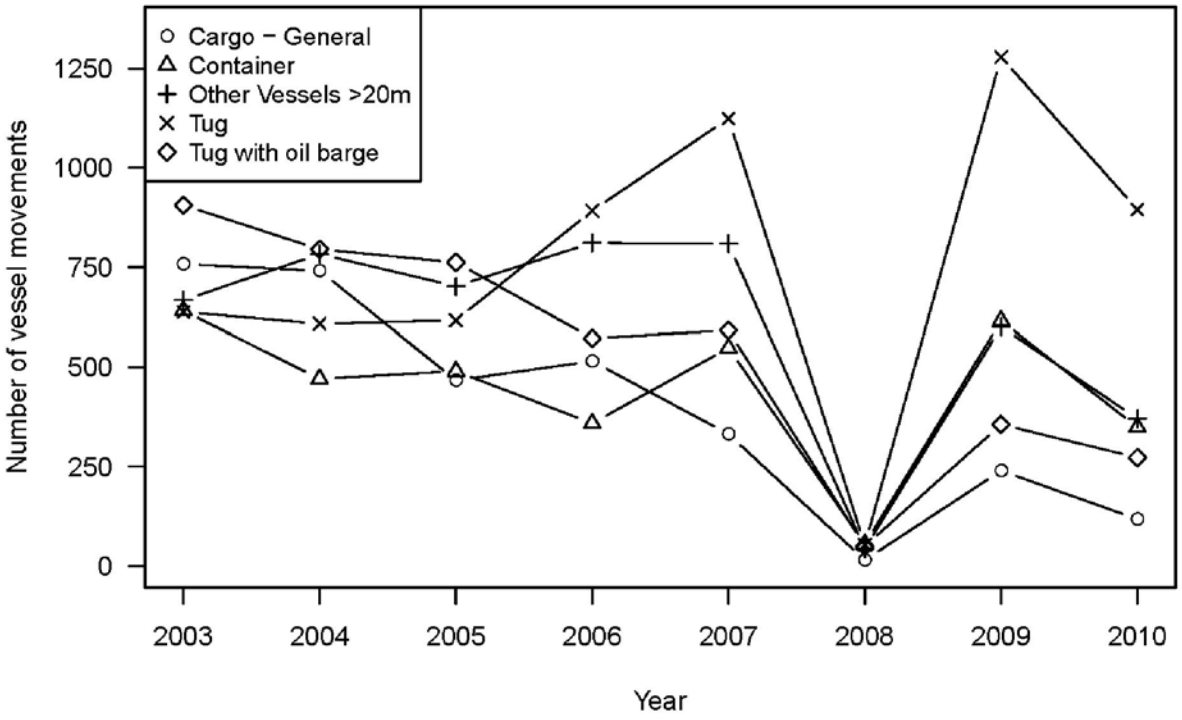

SOCIO-ECONOMIC BASELINE REPORT

THE NUMBER OF VESSEL MOVEMENTS IN THE PRINCE RUPERT TRAFFIC ZONE (MEDIUM)

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SHS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-3**

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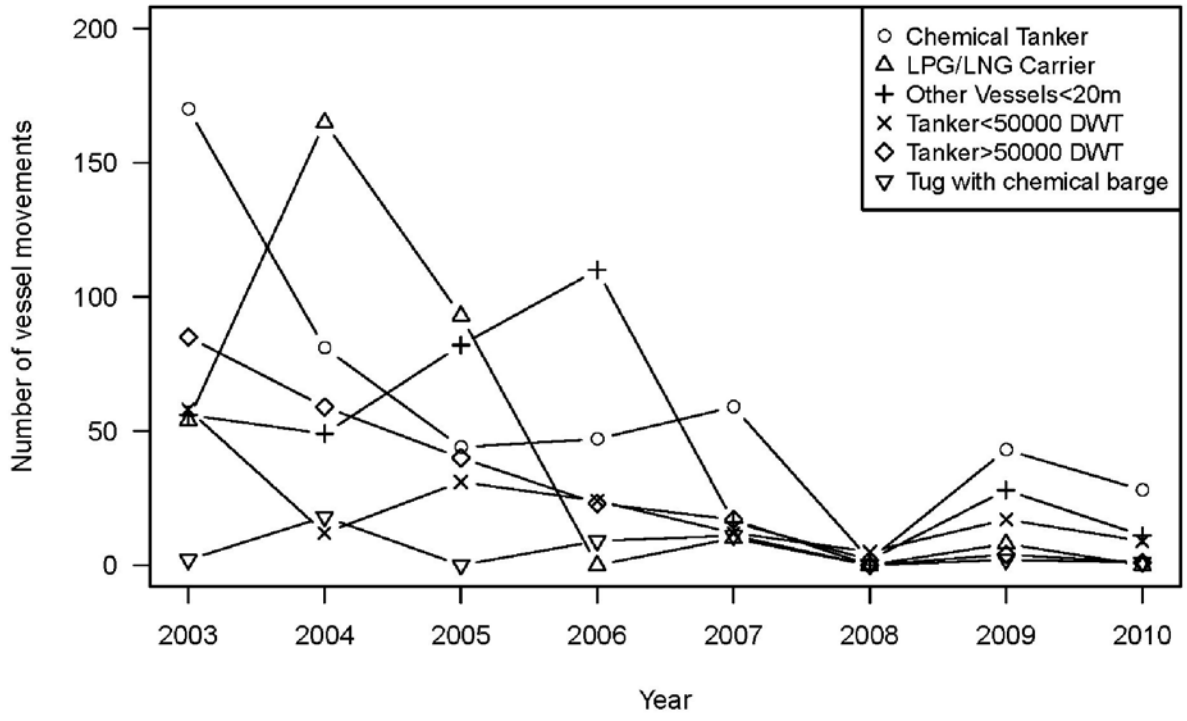

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SOCIO-ECONOMIC BASELINE REPORT

THE NUMBER OF VESSEL MOVEMENTS IN THE PRINCE RUPERT TRAFFIC ZONE (LOW)

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SHS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-4**

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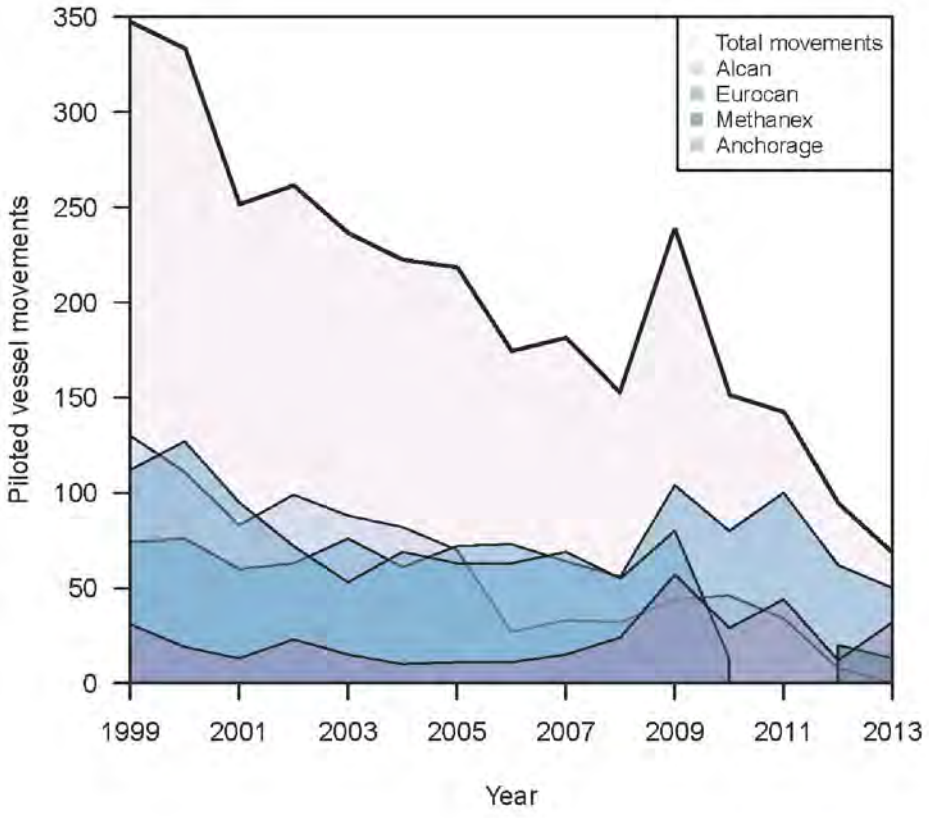

SOCIO-ECONOMIC BASELINE REPORT

PILOTED VESSEL MOVEMENTS REPORTED BY THE PPA

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SHS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-5**

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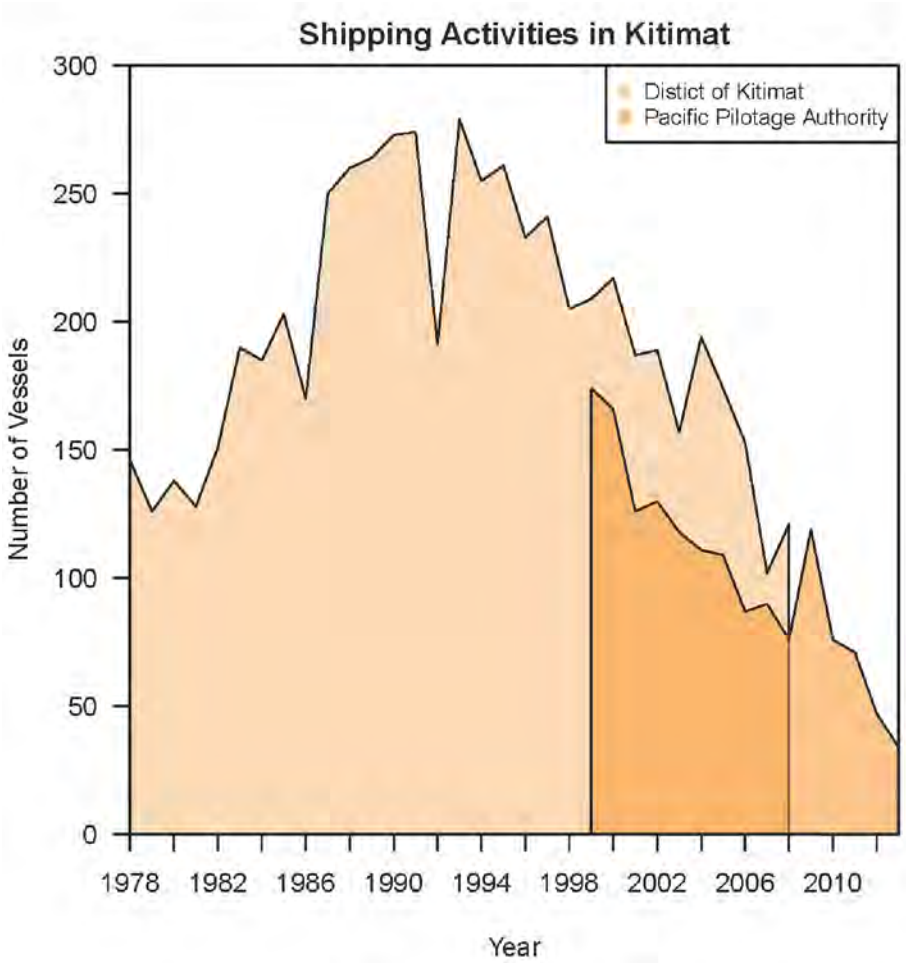

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SOCIO-ECONOMIC BASELINE REPORT

VESSEL MOVEMENTS REPORTED BY THE DISTRICT OF KITIMAT

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SHS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-6**

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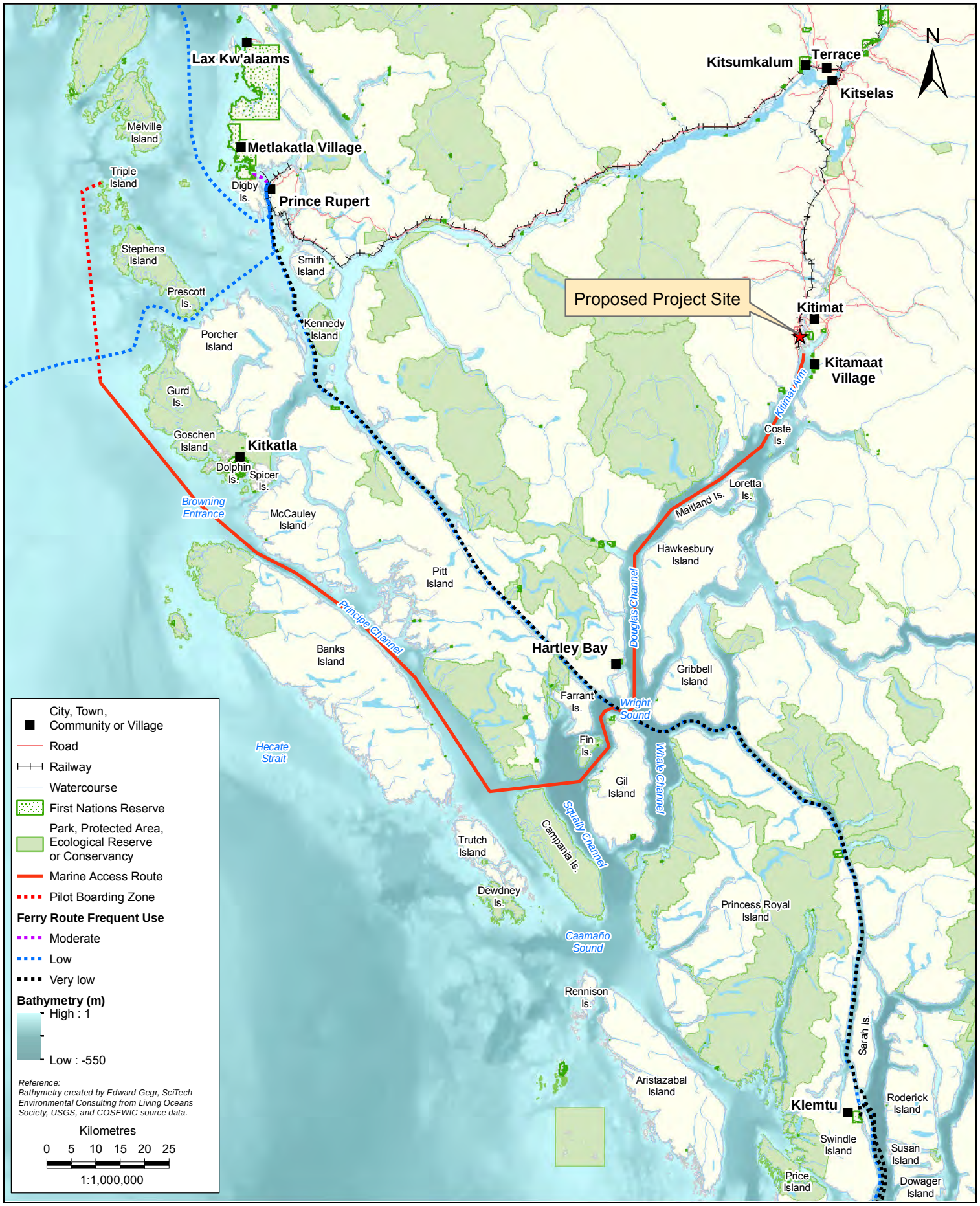

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SOCIO-ECONOMIC BASELINE REPORT

BC FERRY ROUTES

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SHS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	C-7

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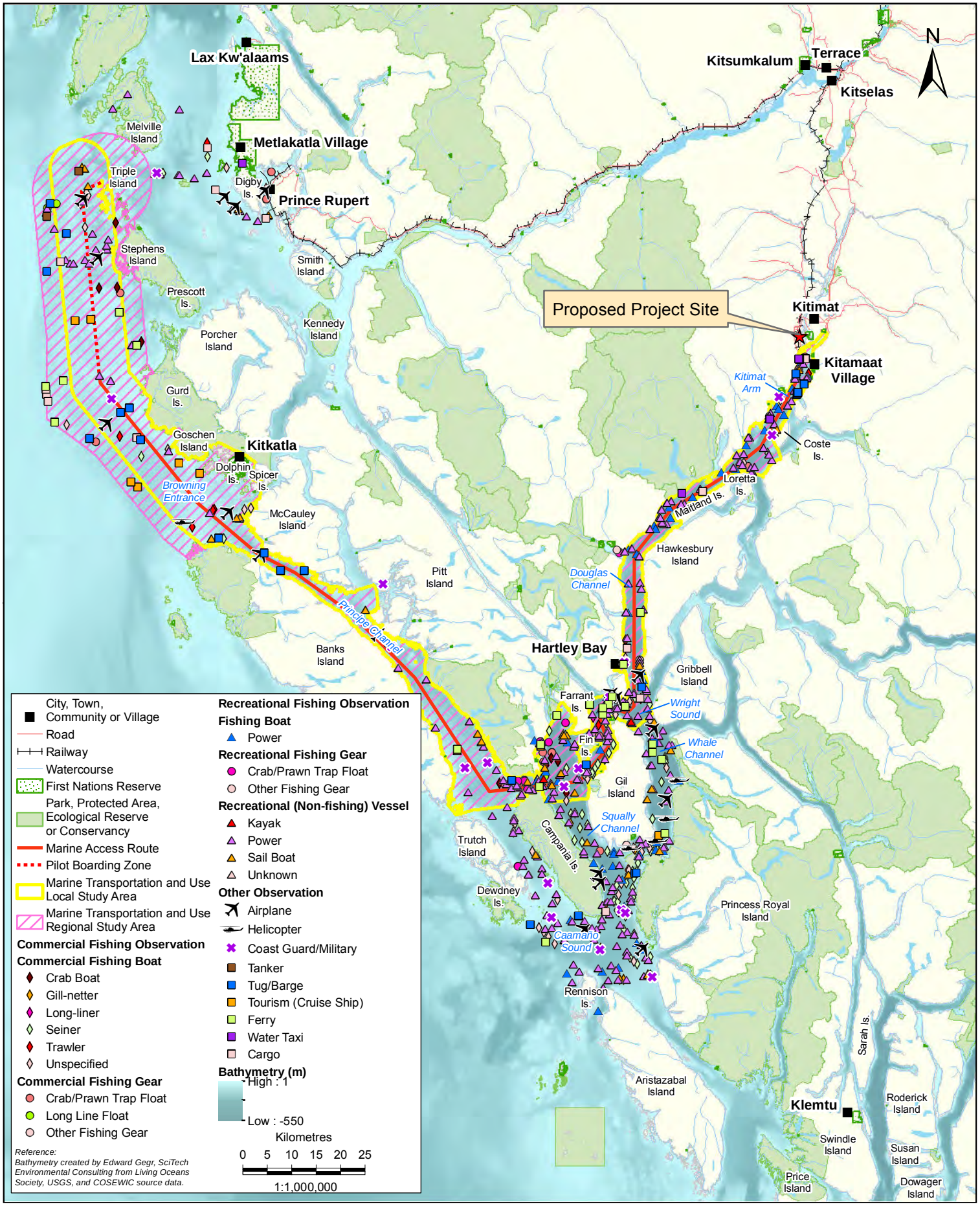

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SOCIO-ECONOMIC BASELINE REPORT

MARINE VESSEL SURVEY RESULTS: ALL ACTIVITY

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	C-8

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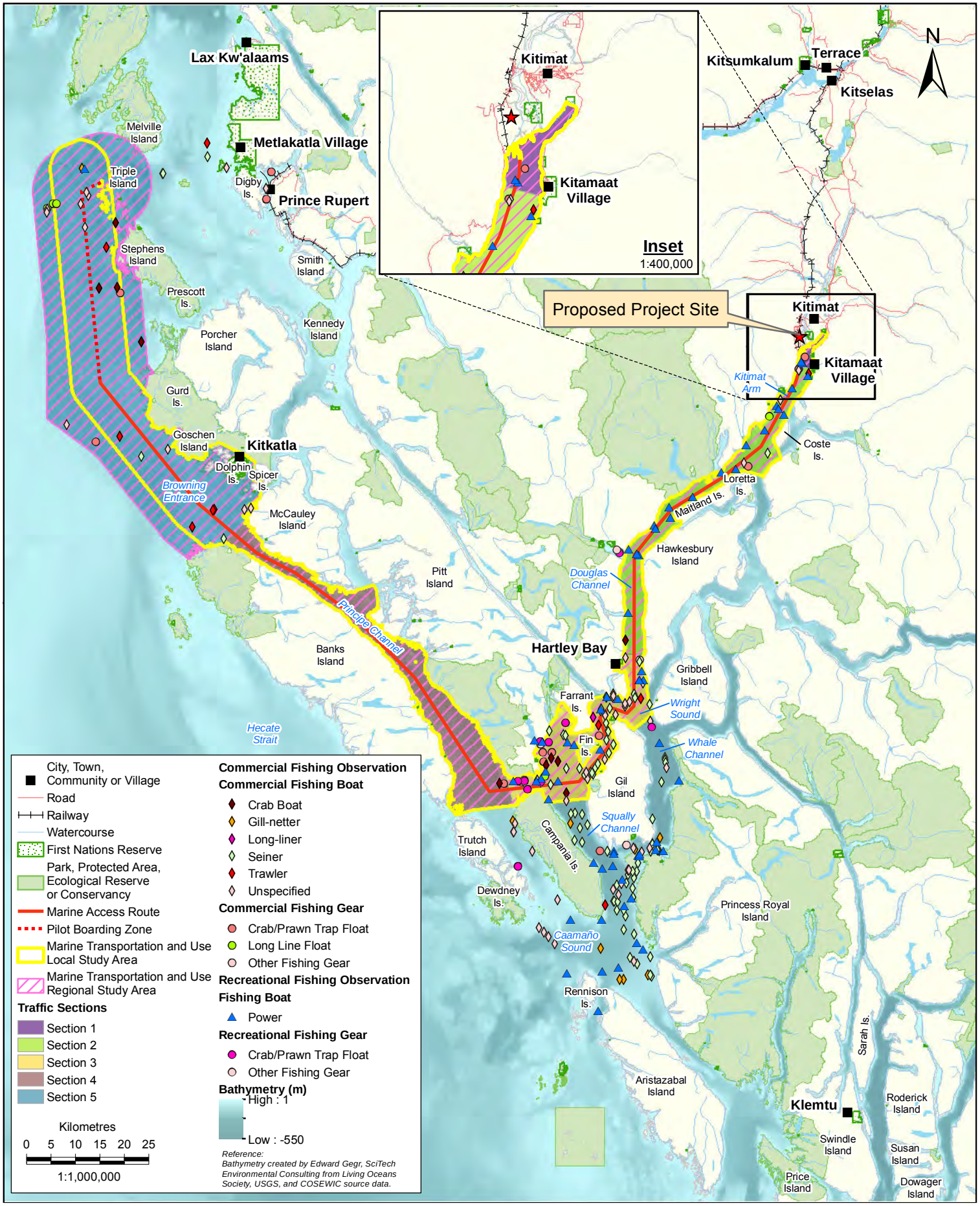

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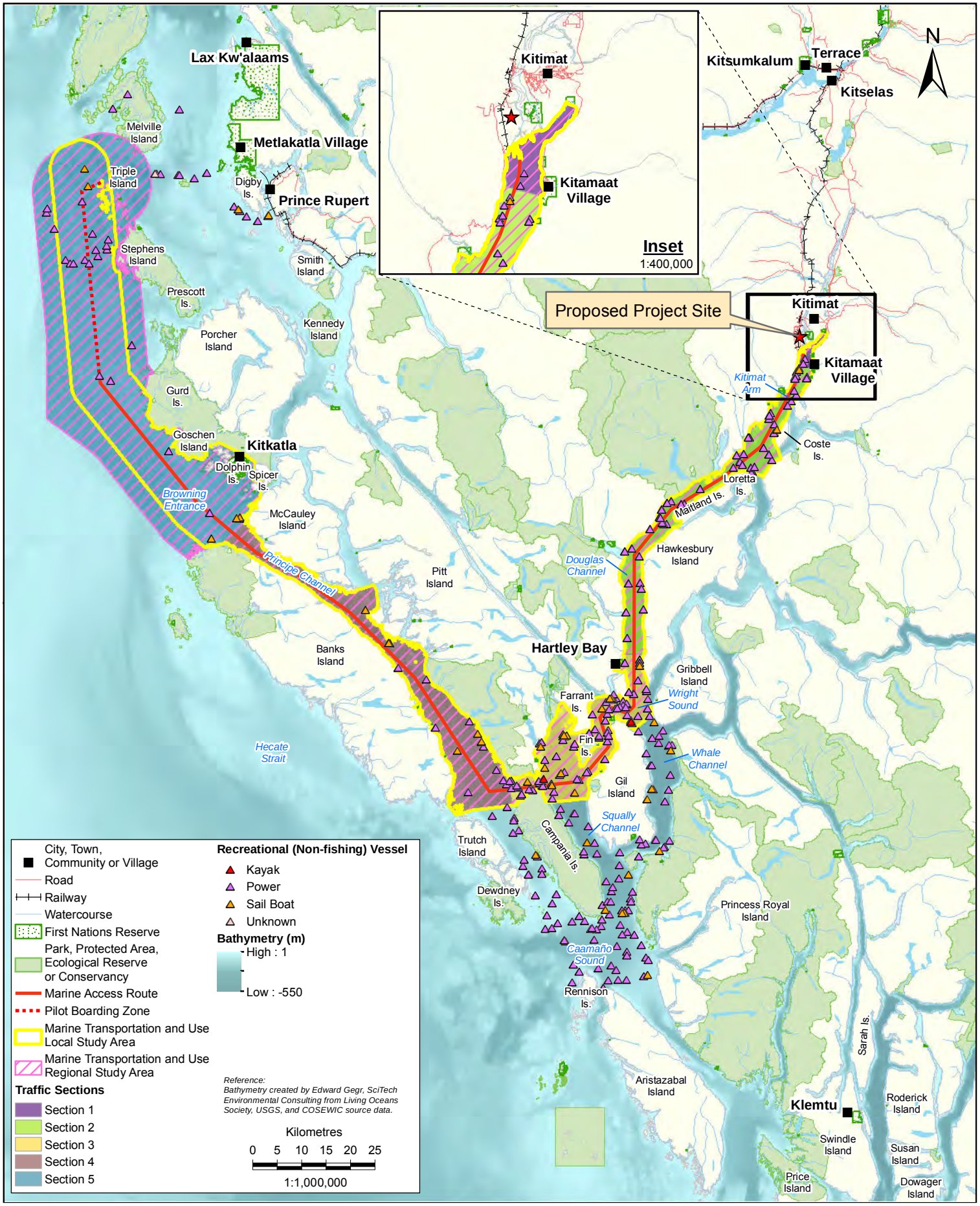
SOCIO-ECONOMIC BASELINE REPORT

MARINE VESSEL SURVEY RESULTS: COMMERCIAL AND RECREATIONAL FISHING VESSEL OR GEAR

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	C-9



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SOCIO-ECONOMIC BASELINE REPORT

MARINE VESSEL SURVEY RESULTS: RECREATIONAL VESSELS (NON-FISHING)

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	C-10

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SOCIO-ECONOMIC BASELINE REPORT

MARINE ACCESS ROUTE AND DFO FMAS AND SUBAREAS

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-11**

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SOCIO-ECONOMIC BASELINE REPORT

COMMERCIAL FISHING GROUNDS: SALMON

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-12**

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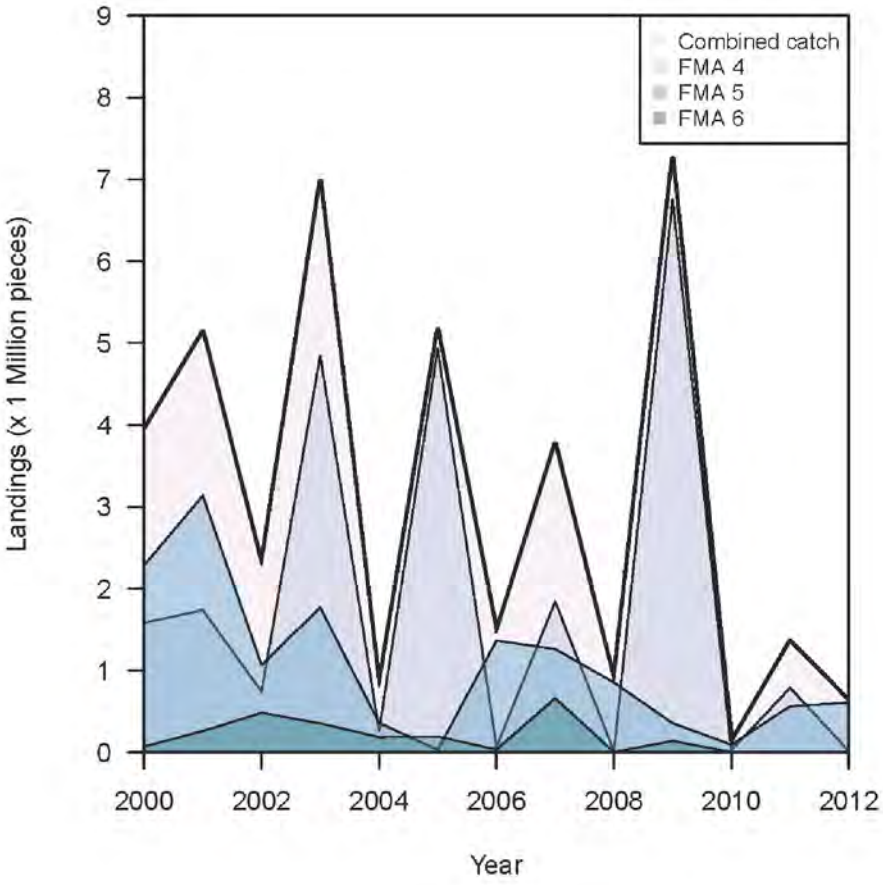

SOCIO-ECONOMIC BASELINE REPORT

THE NUMBER OF SALMON LANDED BY ALL COMMERCIAL GEAR TYPES (GILLNET, SEINE, TROLL) IN FMAS 4-6

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SHS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-13**

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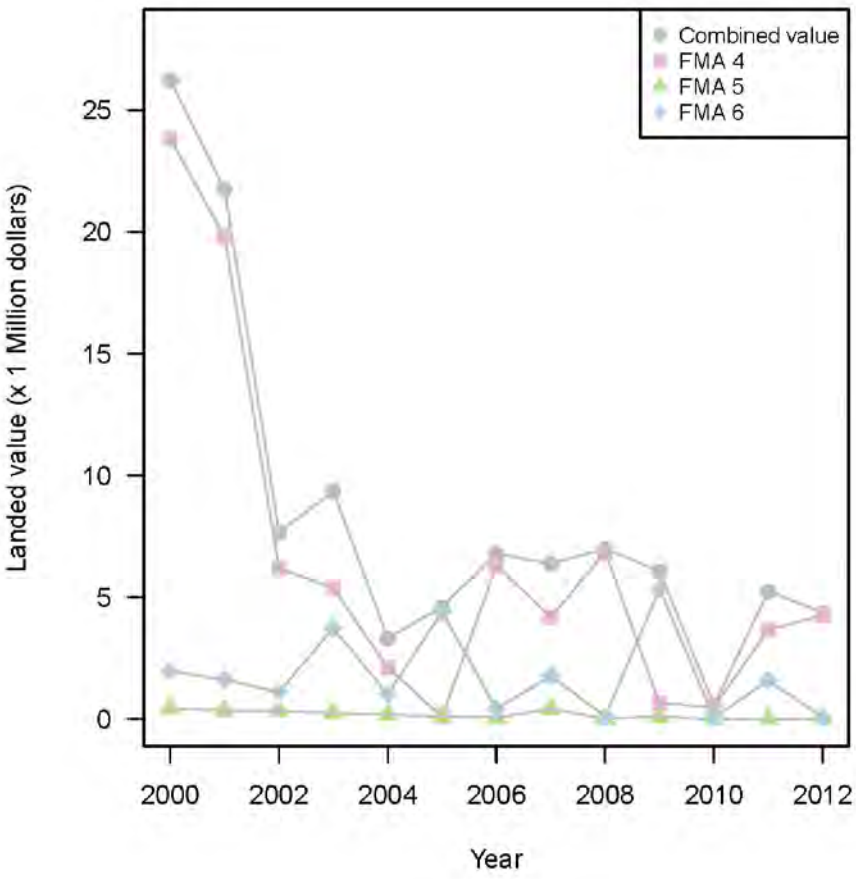

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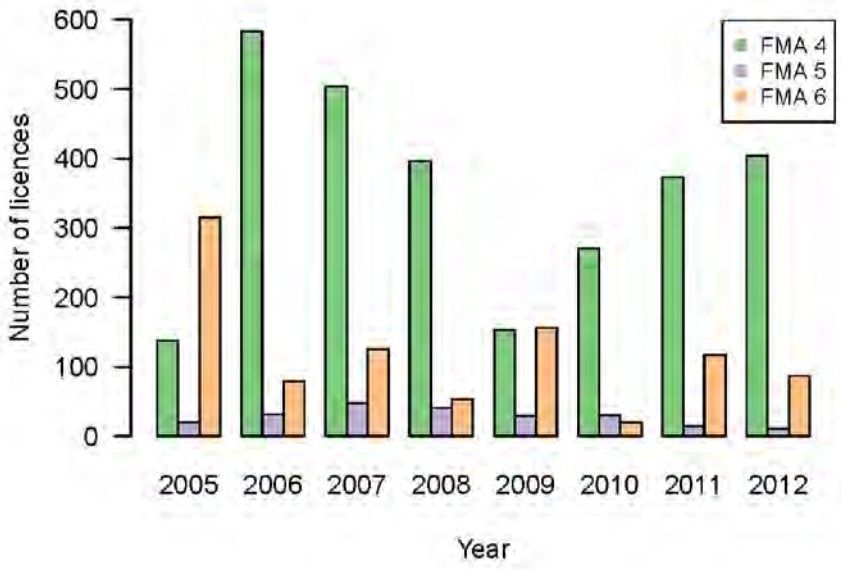
SOCIO-ECONOMIC BASELINE REPORT

THE LANDED VALUE OF SALMON FROM ALL COMMERCIAL GEAR TYPES (GILLNET, SEINE, TROLL) IN FMAS 4-6

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SHS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-14**



Stantec	LNG CANADA Opportunity for British Columbia. Energy for the world	*SOCIO-ECONOMIC BASELINE REPORT* **THE NUMBER OF COMMERCIAL SALMON FISHING LICENCES FOR ALL GEAR TYPES (GILLNET, SEINE, TROLL) IN FMAS 4-6** LNG CANADA EXPORT TERMINAL KITIMAT, BRITISH COLUMBIA	PROJECTION: UTM9 / DRAWN BY: SHS DATUM: NAD 83 / CHECKED BY: SW DATE: 04-SEP-14 / APPENDIX NO.: **C-15**	

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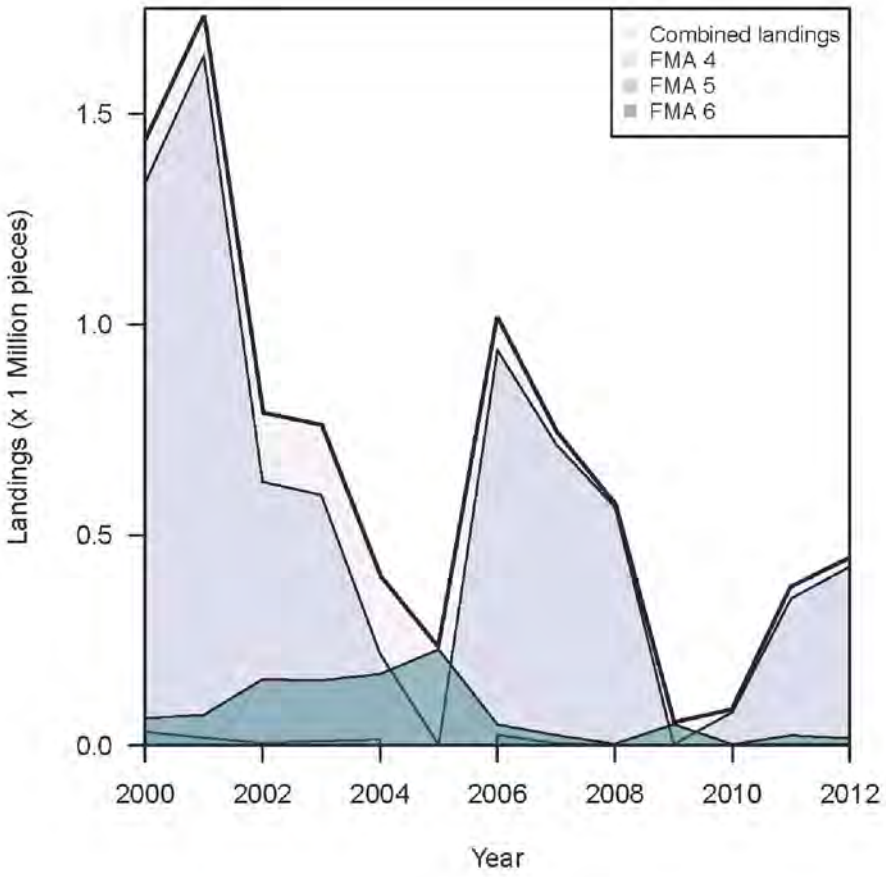

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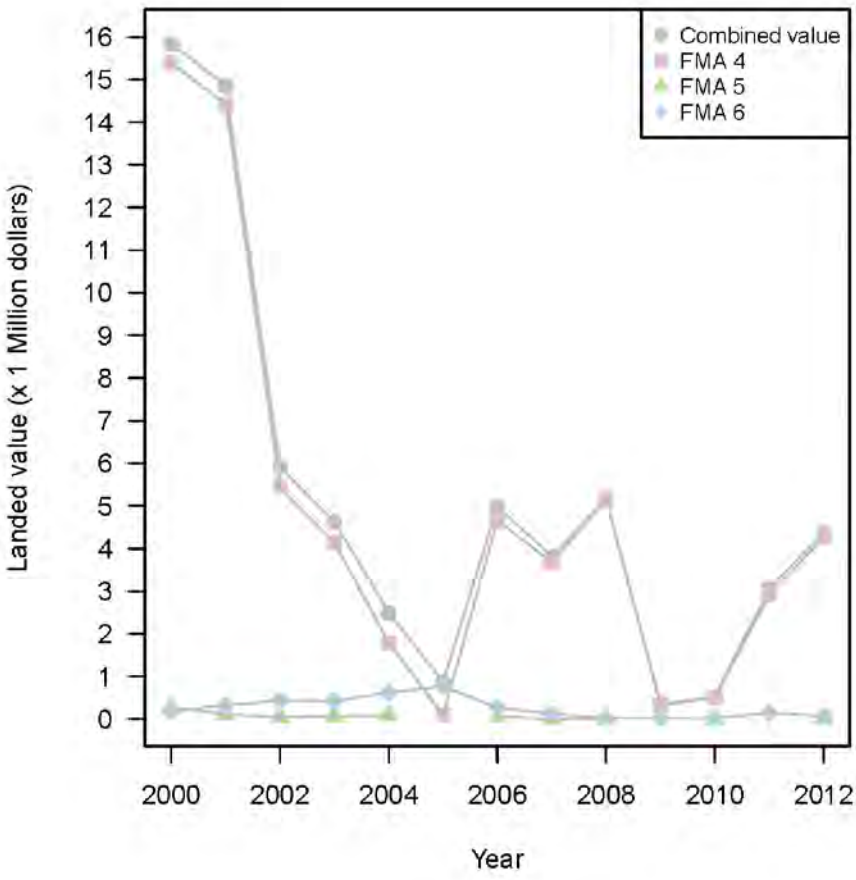
SOCIO-ECONOMIC BASELINE REPORT

THE NUMBER OF SALMON LANDED IN THE COMMERCIAL GILLNET FISHERY IN FMAS 4-6

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SHS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-16**



Stantec	LNG CANADA Opportunity for British Columbia. Energy for the world	*SOCIO-ECONOMIC BASELINE REPORT* **THE LANDED VALUE OF SALMON FROM THE COMMERCIAL GILLNET FISHERY IN FMAS 4-6** LNG CANADA EXPORT TERMINAL KITIMAT, BRITISH COLUMBIA	PROJECTION: UTM9 DATUM: NAD 83 DATE: 04-SEP-14	DRAWN BY: SHS CHECKED BY: SW APPENDIX NO.: **C-17**

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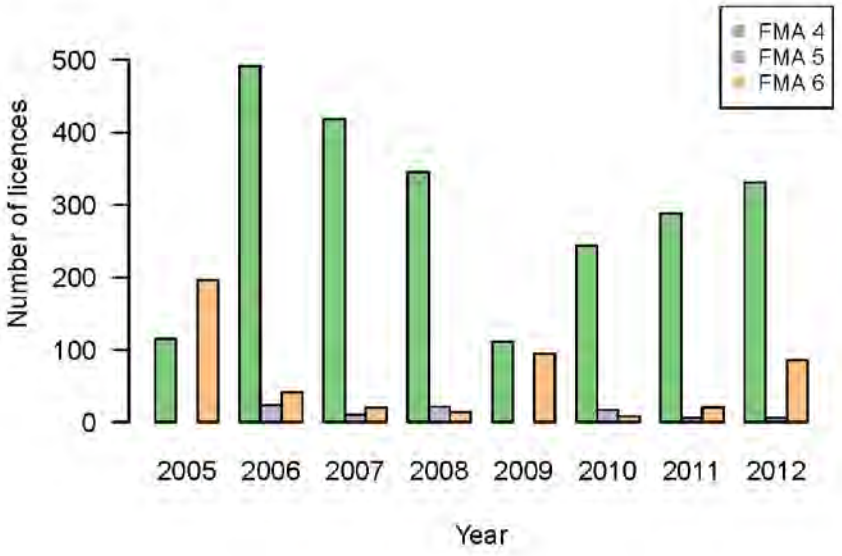

SOCIO-ECONOMIC BASELINE REPORT

THE NUMBER OF COMMERCIAL GILLNET LICENCES FOR SALMON IN FMAS 4-6

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SHS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-18**

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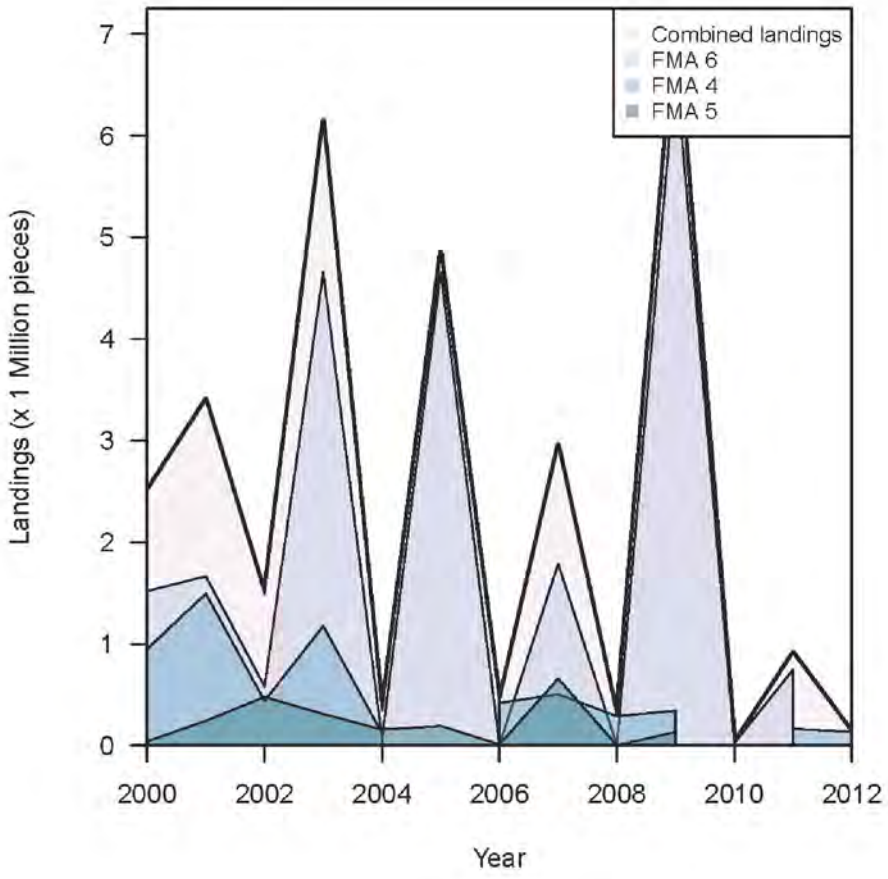
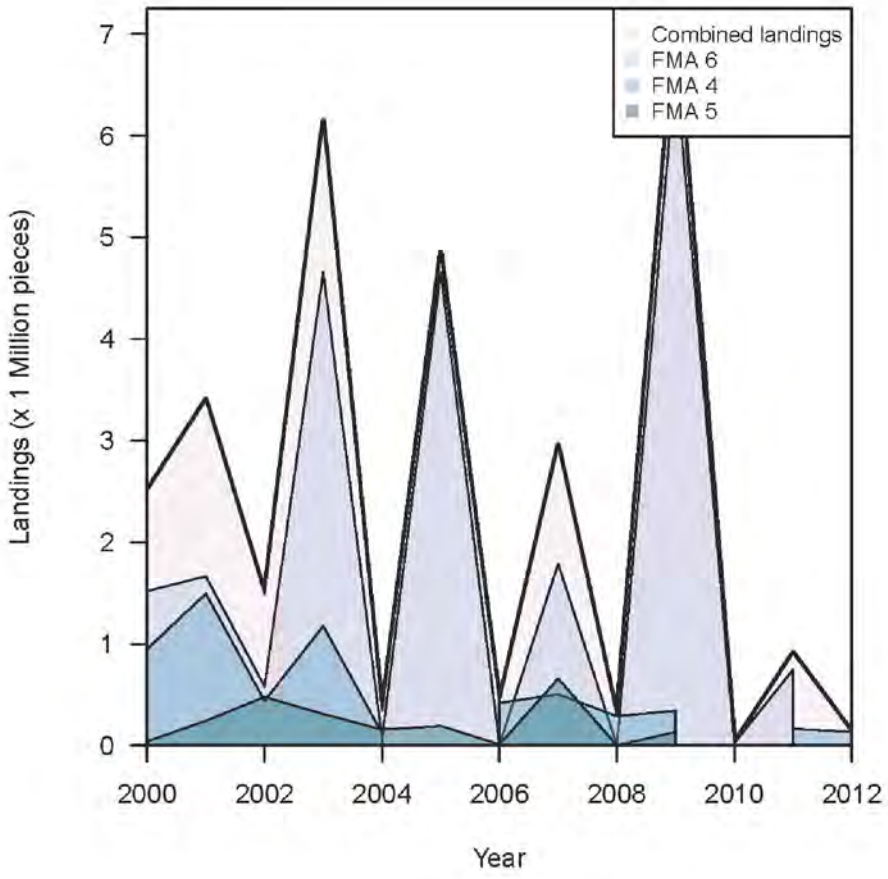
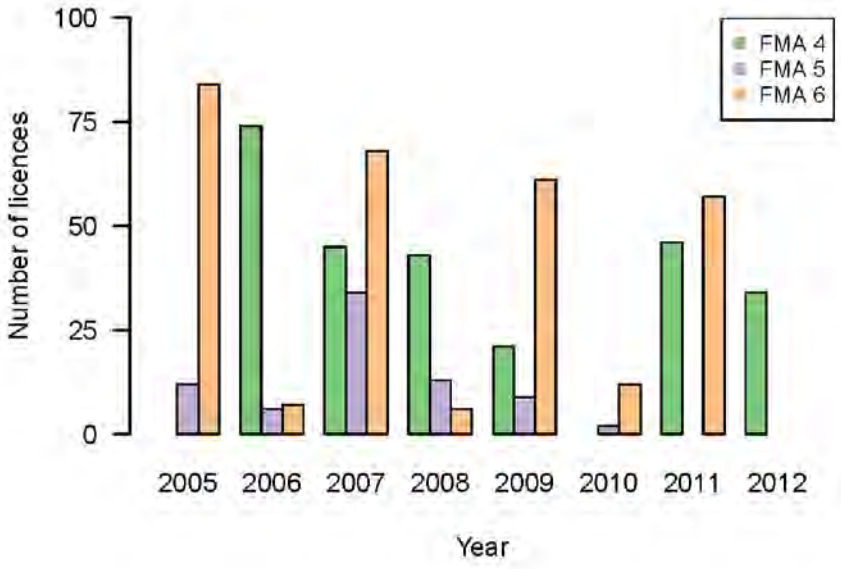

Combined landings
FMA 6
FMA 4
FMA 5
Landings (x 1 Million pieces)
0
1
2
3
4
5
6
7
2000
2002
2004
2006
2008
2010
2012
Year


Combined landings
FMA 6
FMA 4
FMA 5
Landings (x 1 Million pieces)
0
1
2
3
4
5
6
7
2000
2002
2004
2006
2008
2010
2012
Year



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SOCIO-ECONOMIC BASELINE REPORT

THE NUMBER OF COMMERCIAL SEINE LICENCES FOR SALMON IN FMAS 4-6

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SHS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-21**

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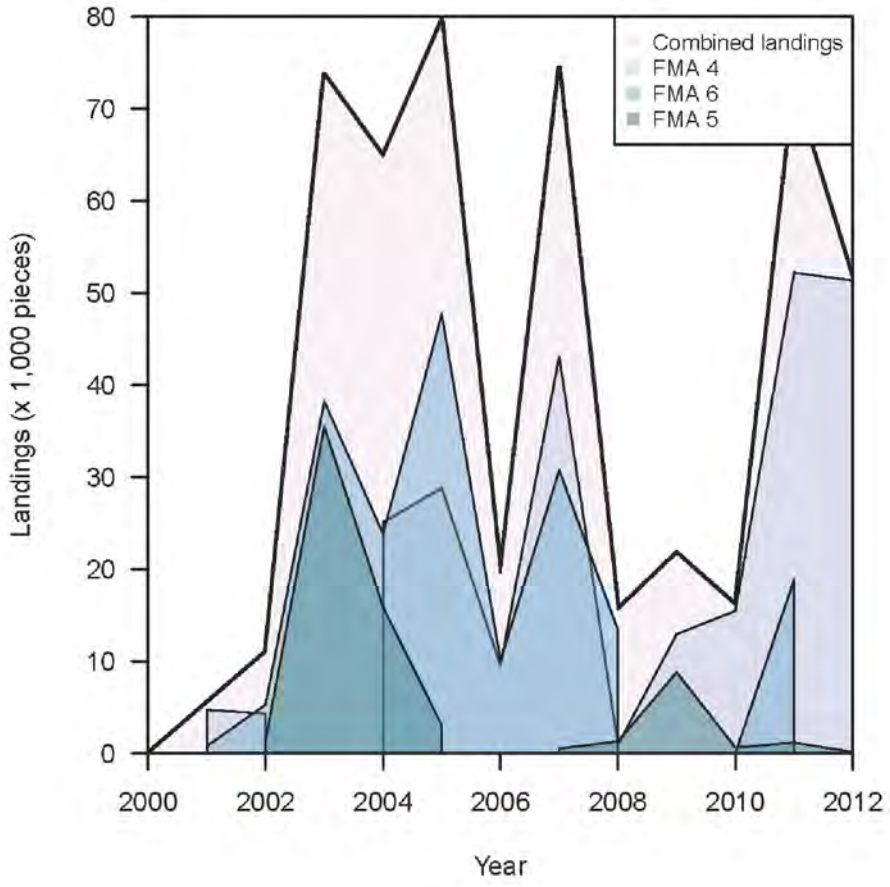
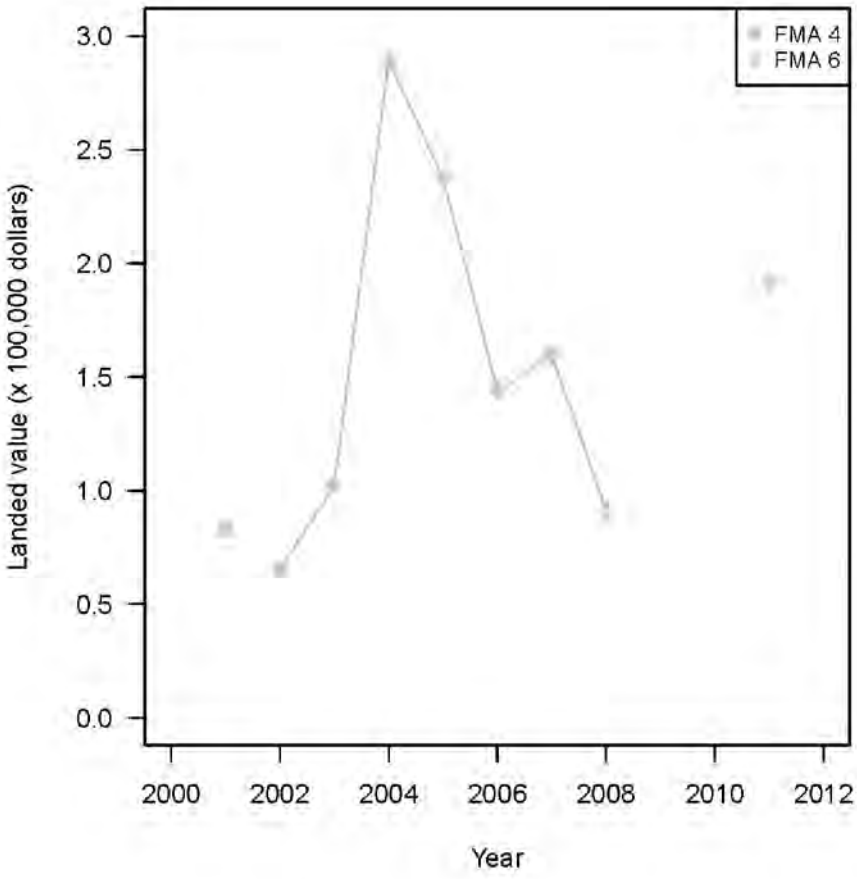

Combined landings
FMA 4
FMA 6
FMA 5
Landings (x 1,000 pieces)
0
10
20
30
40
50
60
70
80
2000
2002
2004
2006
2008
2010
2012
Year



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SOCIO-ECONOMIC BASELINE REPORT

THE LANDED VALUE OF SALMON FROM THE COMMERCIAL TROLL FISHERY IN FMAS 4-6

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SHS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-23**

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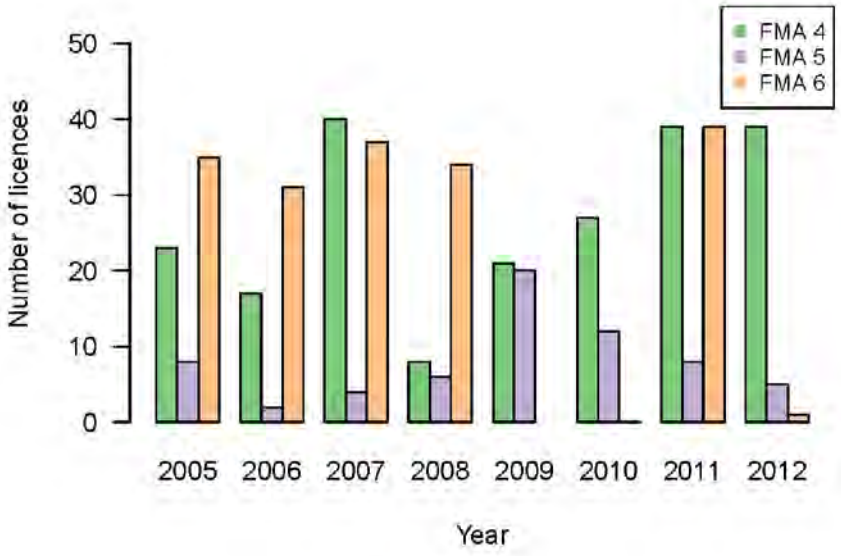

SOCIO-ECONOMIC BASELINE REPORT

THE NUMBER OF COMMERCIAL TROLL LICENCES FOR SALMON IN FMAS 4-6

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION: UTM9	DRAWN BY: SHS
DATUM: NAD 83	CHECKED BY: SW
DATE: 04-SEP-14	APPENDIX NO.: **C-24**

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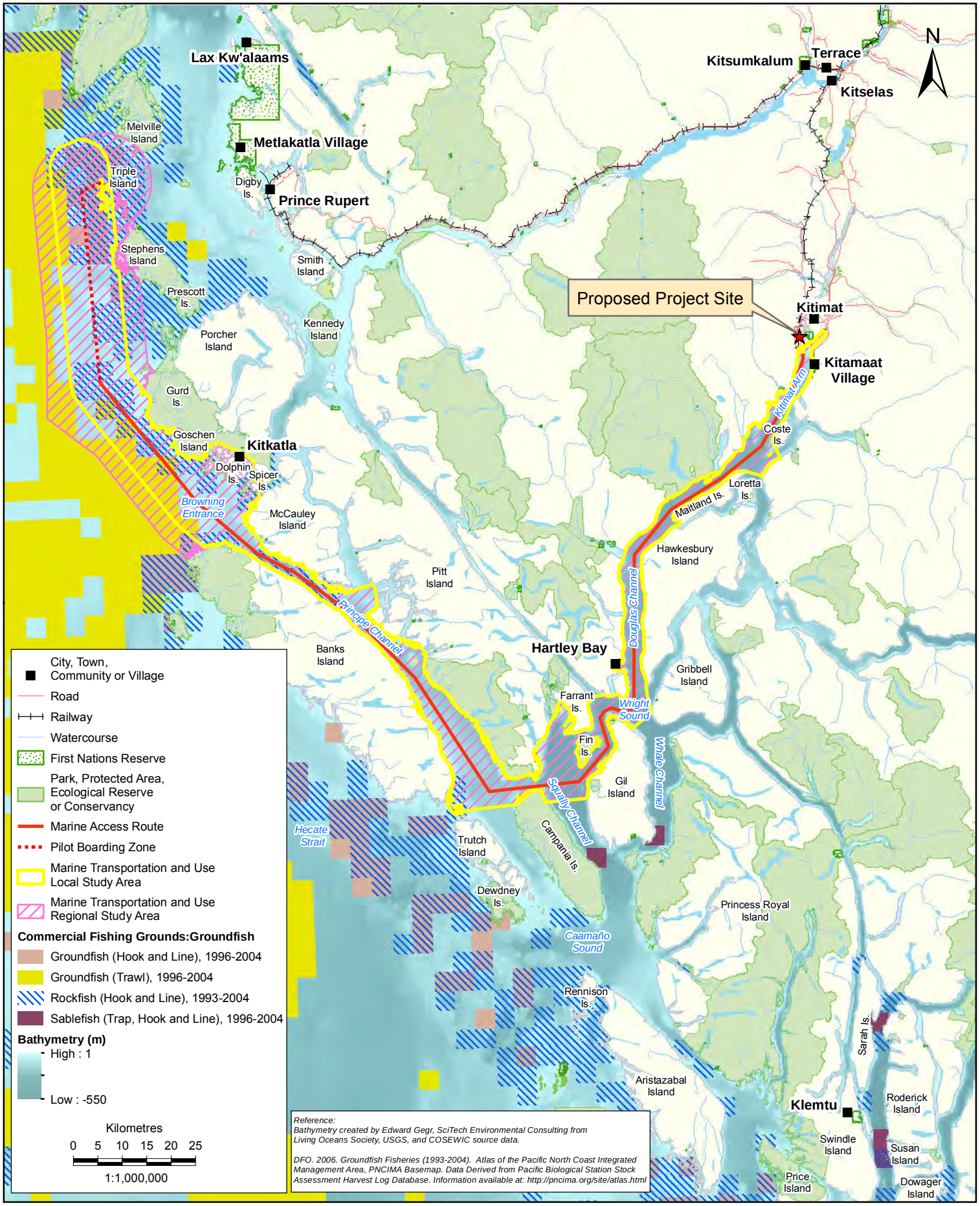

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SOCIO-ECONOMIC BASELINE REPORT

COMMERCIAL FISHING GROUNDS: GROUNDFISH

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-25**

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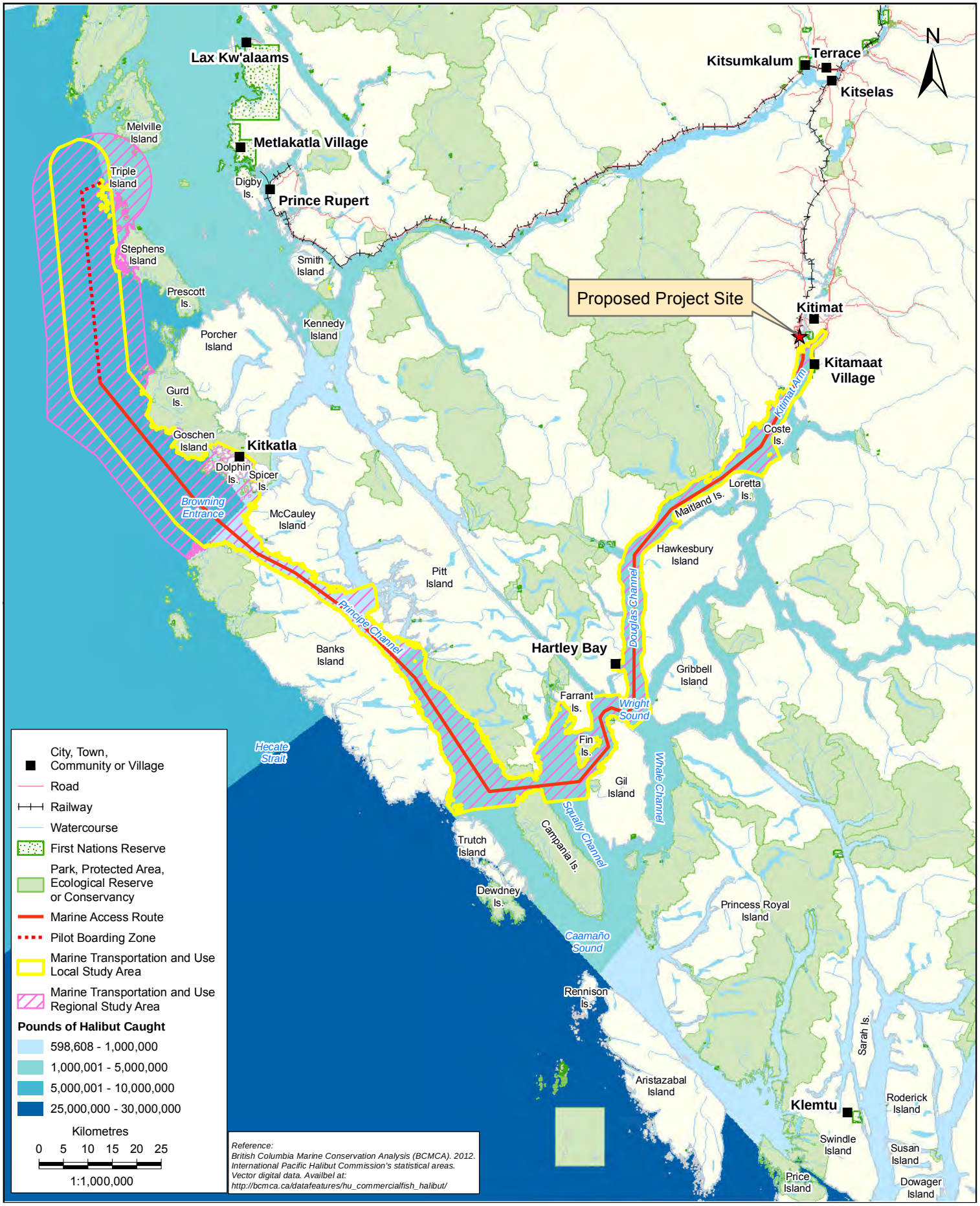

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SOCIO-ECONOMIC BASELINE REPORT

COMMERCIAL FISHING GROUNDS: PACIFIC HALIBUT

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-26**

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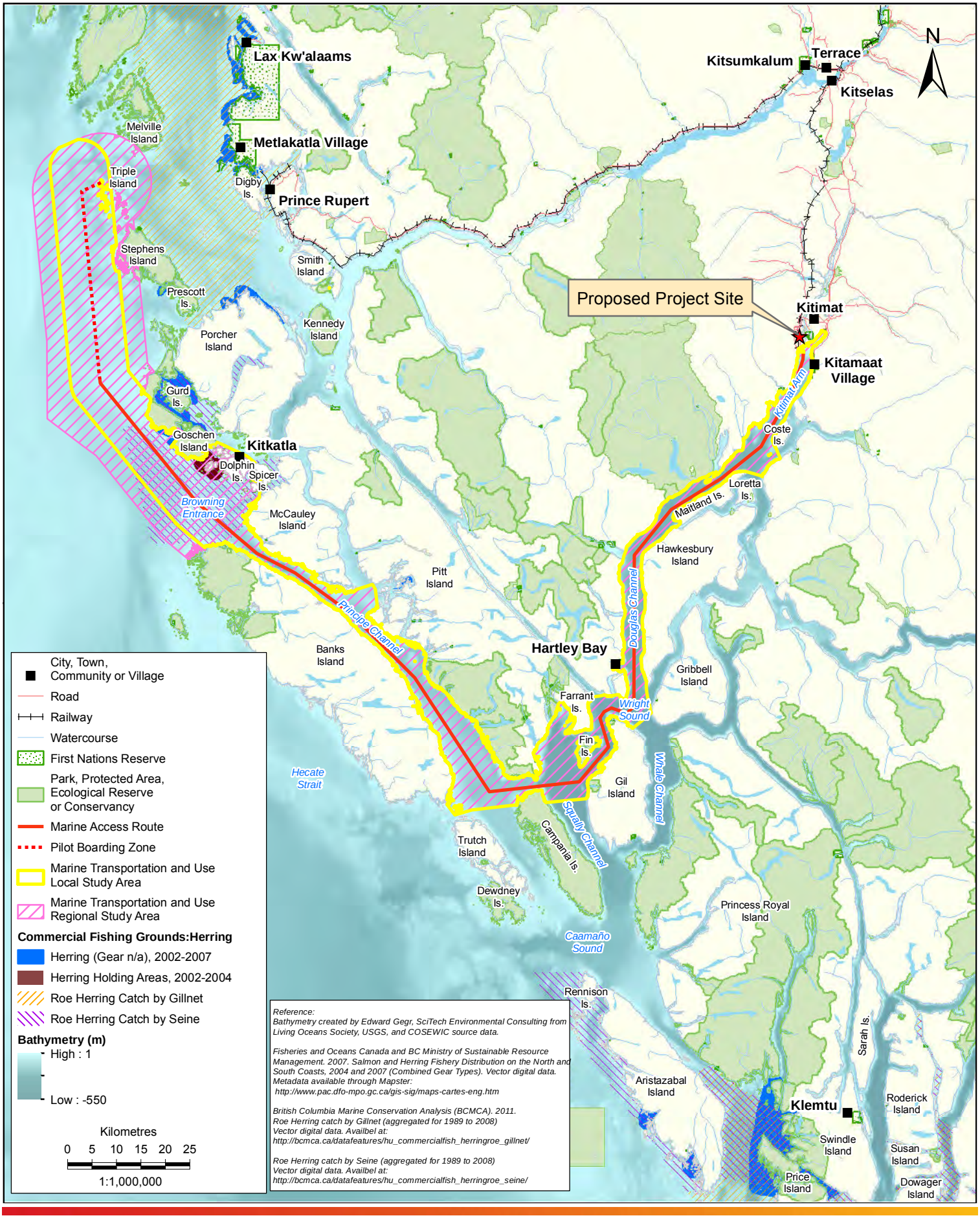

Reference:
Bathymetry created by Edward Gegr, SciTech Environmental Consulting from Living Oceans Society, USGS, and COSEWIC source data.

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Roe Herring catch by Seine (aggregated for 1989 to 2008) Vector digital data. Availbel at: http://bcmca.ca/datafeatures/hu_commercialfish_herringroe_seine/

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SOCIO-ECONOMIC BASELINE REPORT

COMMERCIAL FISHING GROUNDS: PACIFIC HERRING

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
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DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-27**

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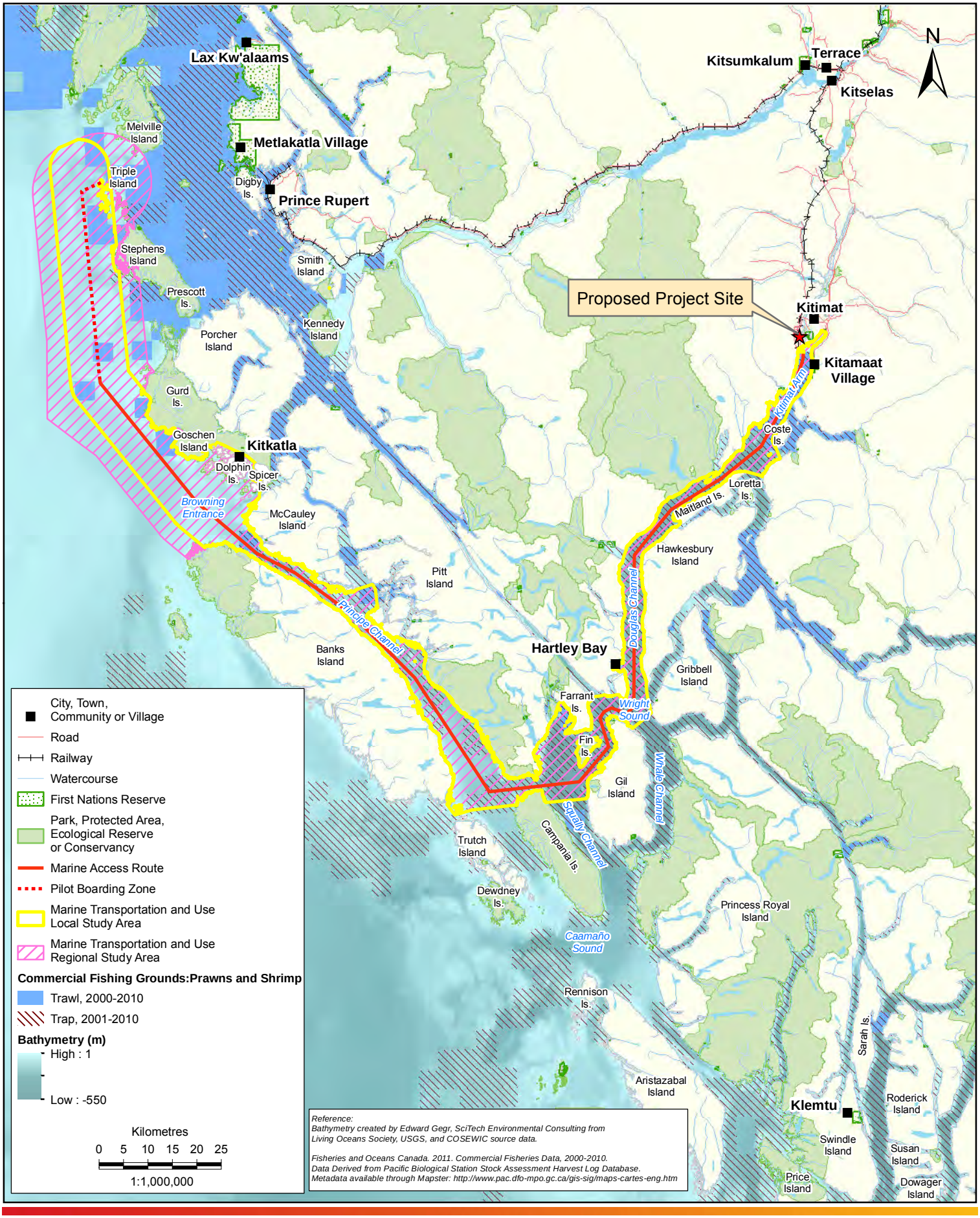

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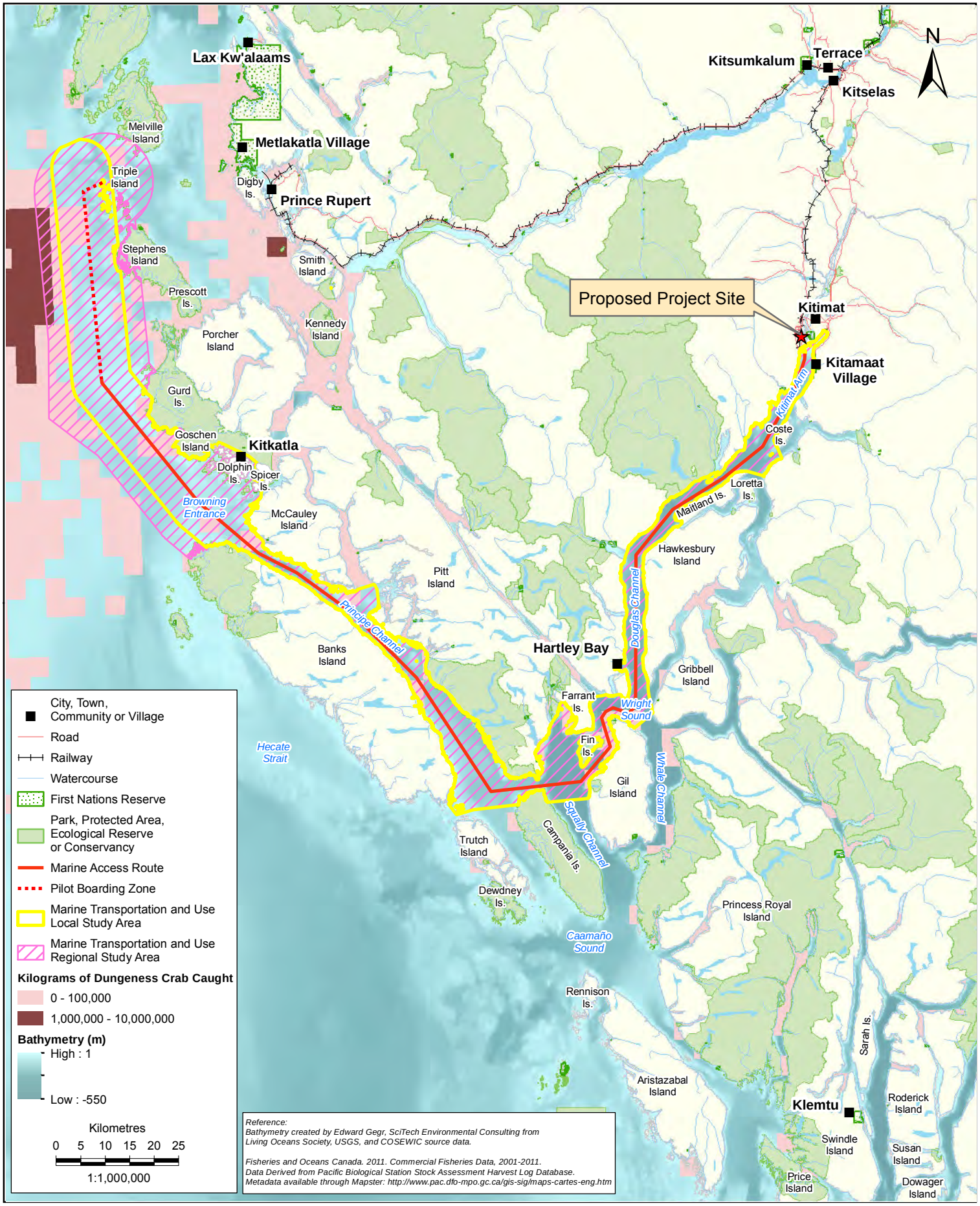
SOCIO-ECONOMIC BASELINE REPORT

COMMERCIAL FISHING GROUNDS: PRAWNS AND SHRIMP

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-28**



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SOCIO-ECONOMIC BASELINE REPORT

COMMERCIAL FISHING GROUNDS: DUNGENESS CRAB

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-29**

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SOCIO-ECONOMIC BASELINE REPORT

COMMERCIAL FISHING GROUNDS: RED URCHIN

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
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DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
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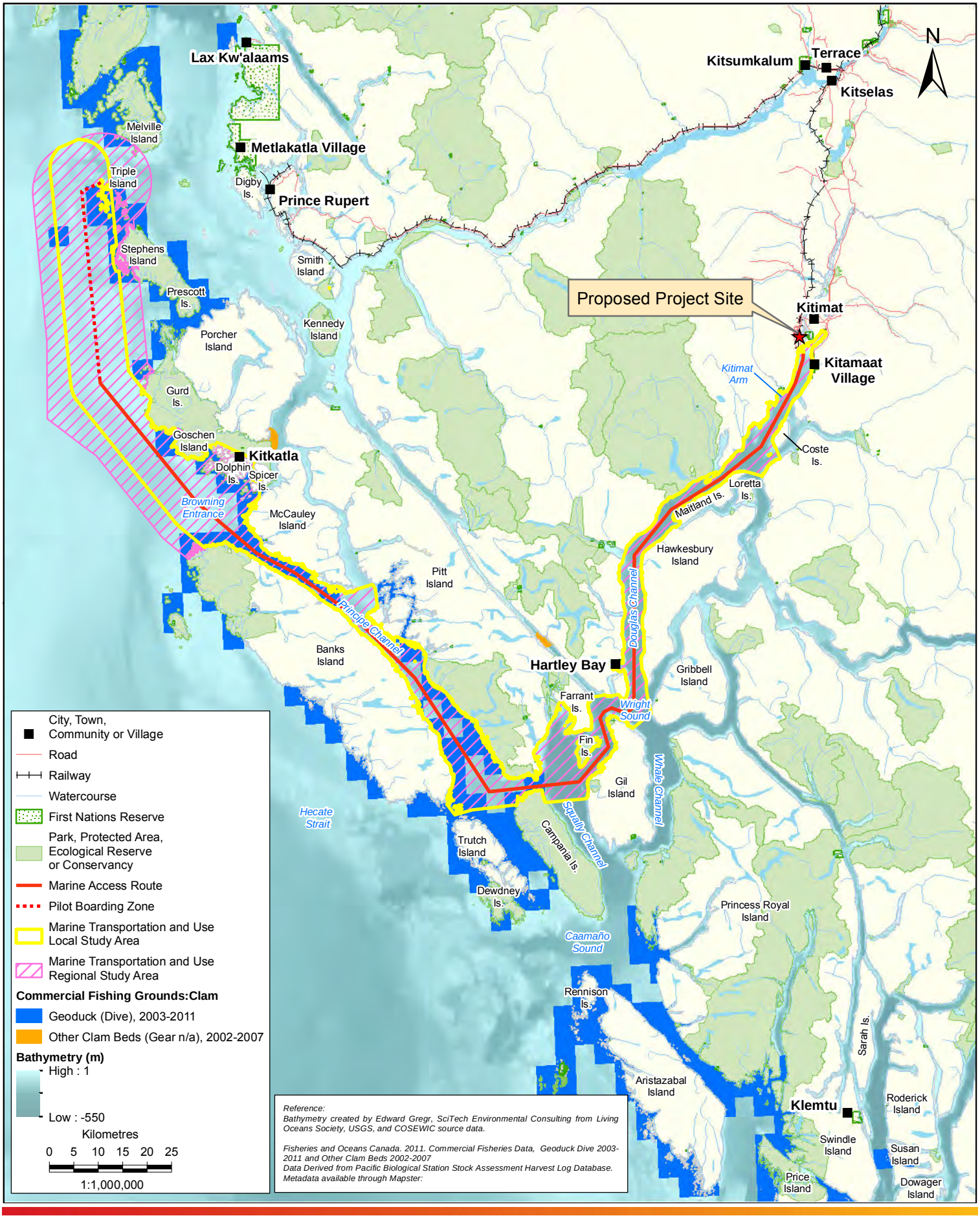

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SOCIO-ECONOMIC BASELINE REPORT

COMMERCIAL FISHING GROUNDS: GEODUCK CLAM (*PANOPEA GENEROSA*)

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
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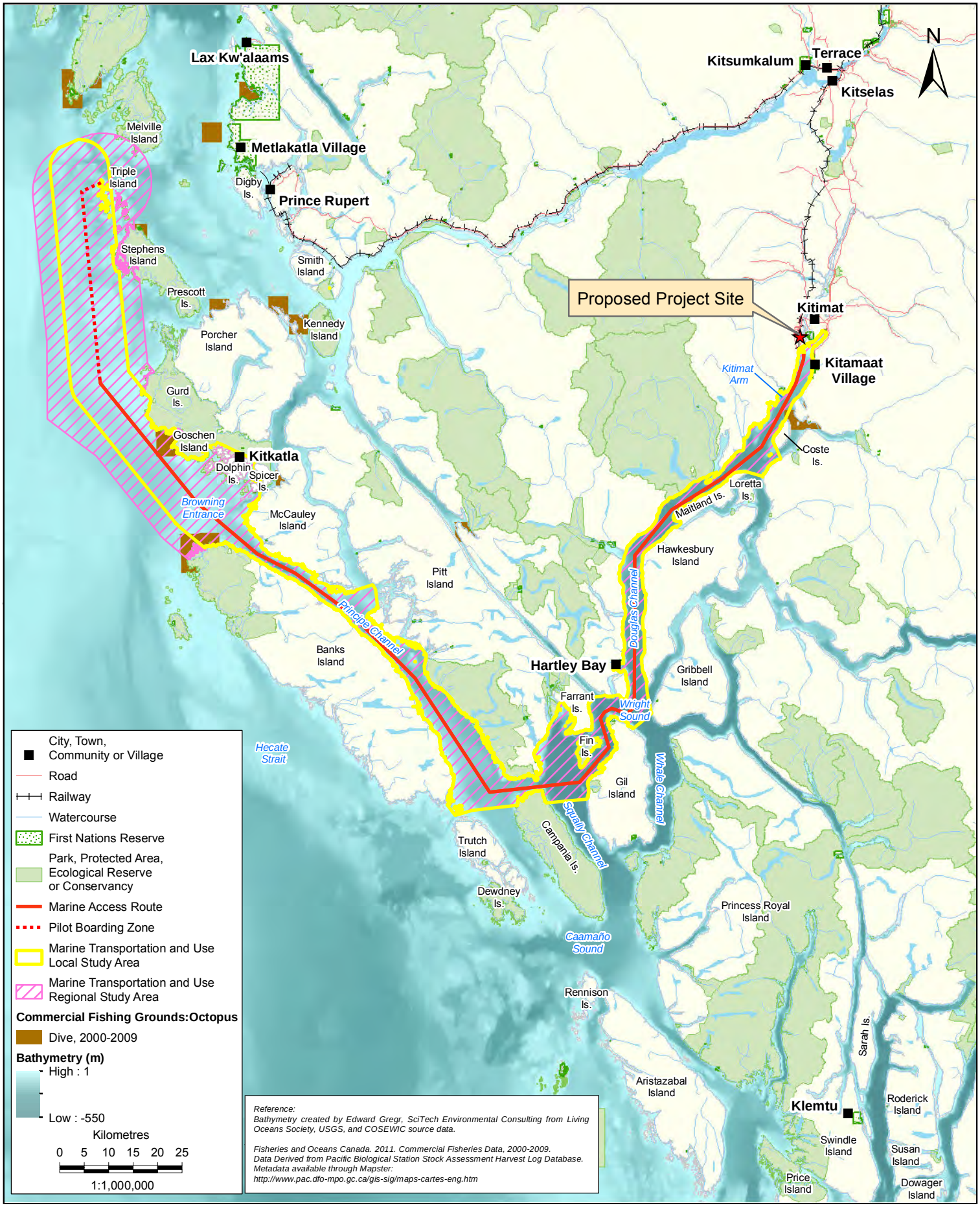

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SOCIO-ECONOMIC BASELINE REPORT

COMMERCIAL FISHING GROUNDS: PACIFIC OCTOPUS

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	C-32

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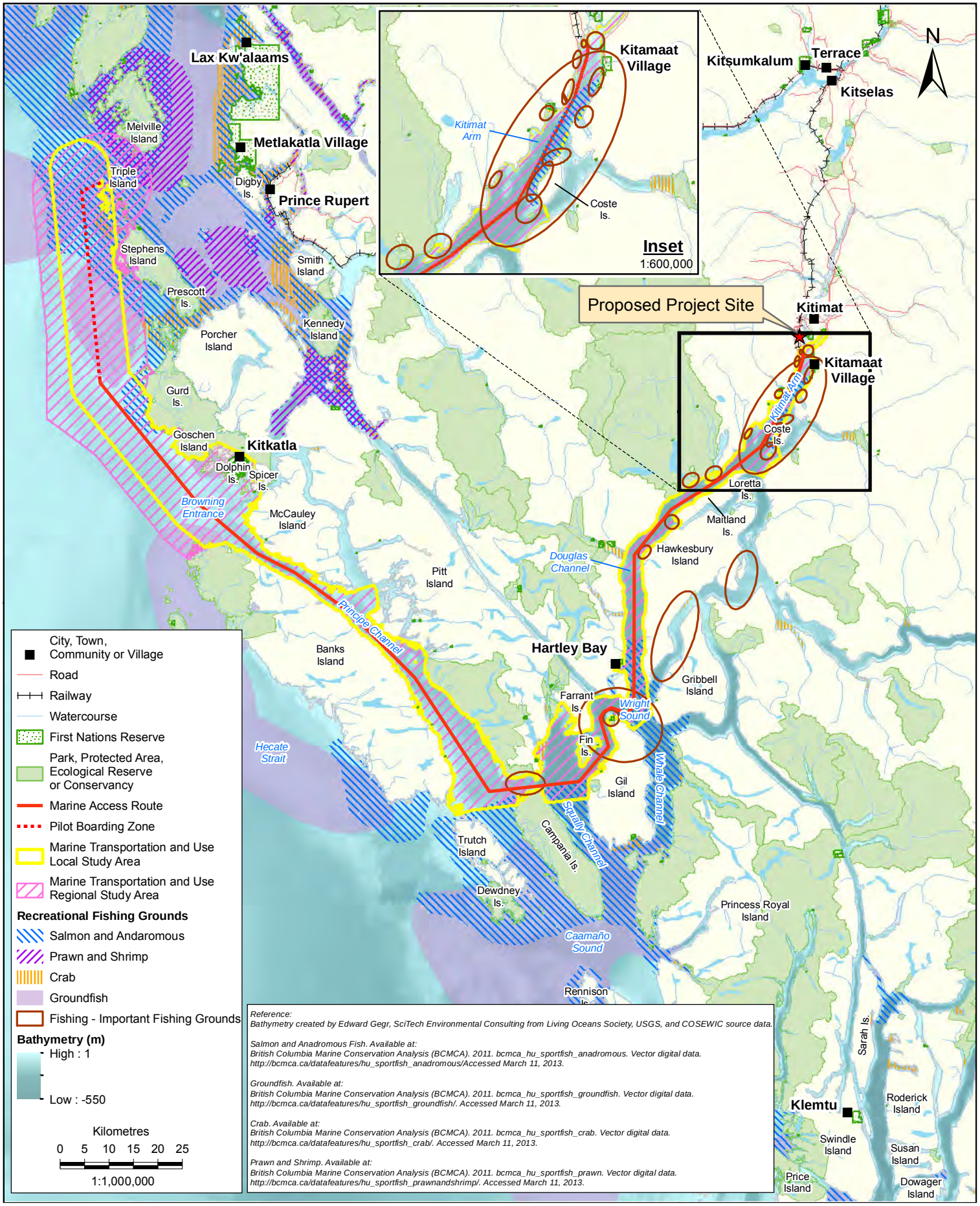
SOCIO-ECONOMIC BASELINE REPORT

COMMERCIAL FISHING GROUNDS: SEA CUCUMBER (*PARASTICHOPUS CALIFORNICUS*)

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-33**



Reference:
Bathymetry created by Edward Gegr, SciTech Environmental Consulting from Living Oceans Society, USGS, and COSEWIC source data.

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http://bcmca.ca/datafeatures/hu_sportfish_groundfish/. Accessed March 11, 2013.

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http://bcmca.ca/datafeatures/hu_sportfish_crab/. Accessed March 11, 2013.

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SOCIO-ECONOMIC BASELINE REPORT

RECREATIONAL FISHING GROUNDS

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	C-34

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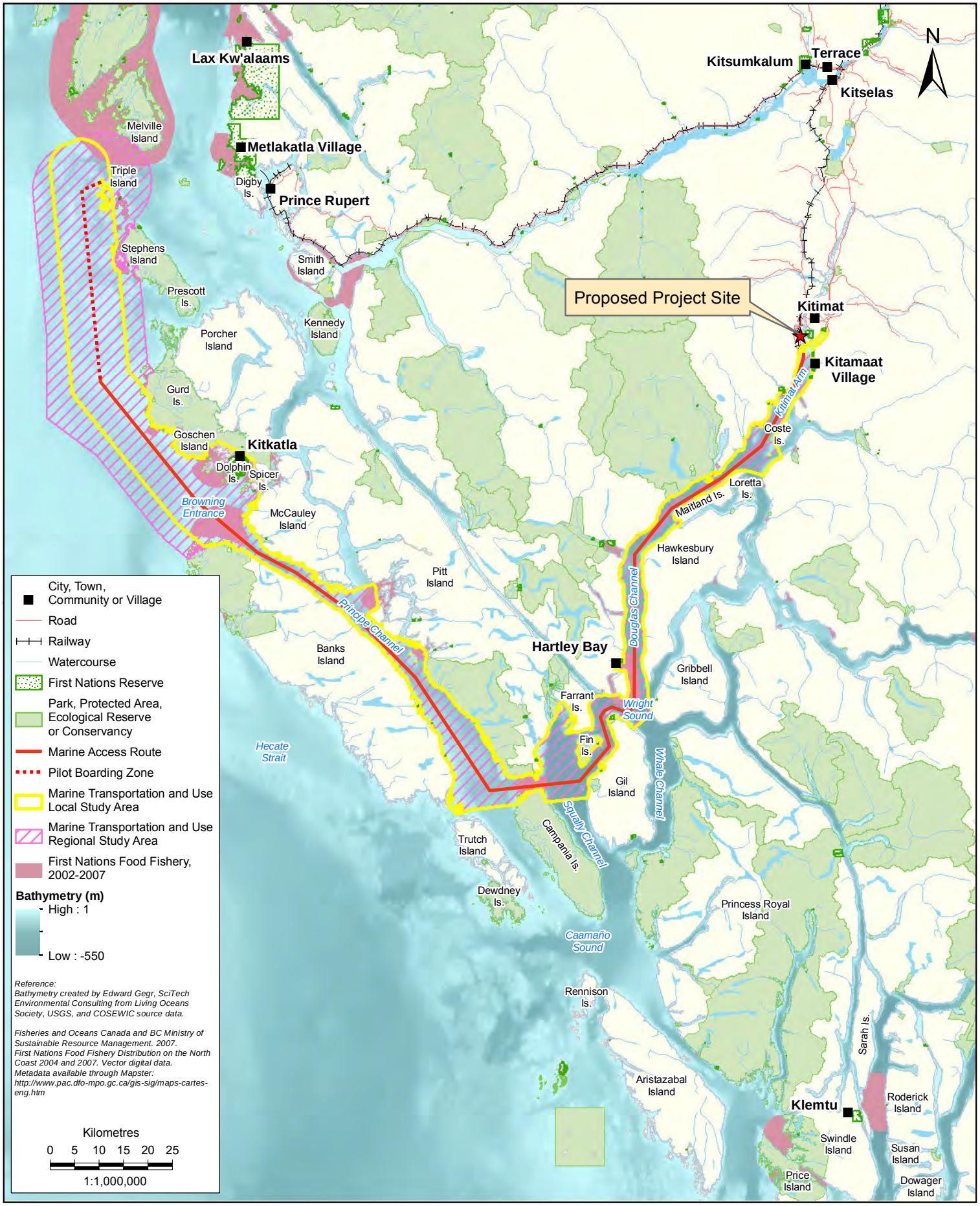

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SOCIO-ECONOMIC BASELINE REPORT

ABORIGINAL FISHING LOCATIONS IN FMAS 4-6

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SHS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-35**

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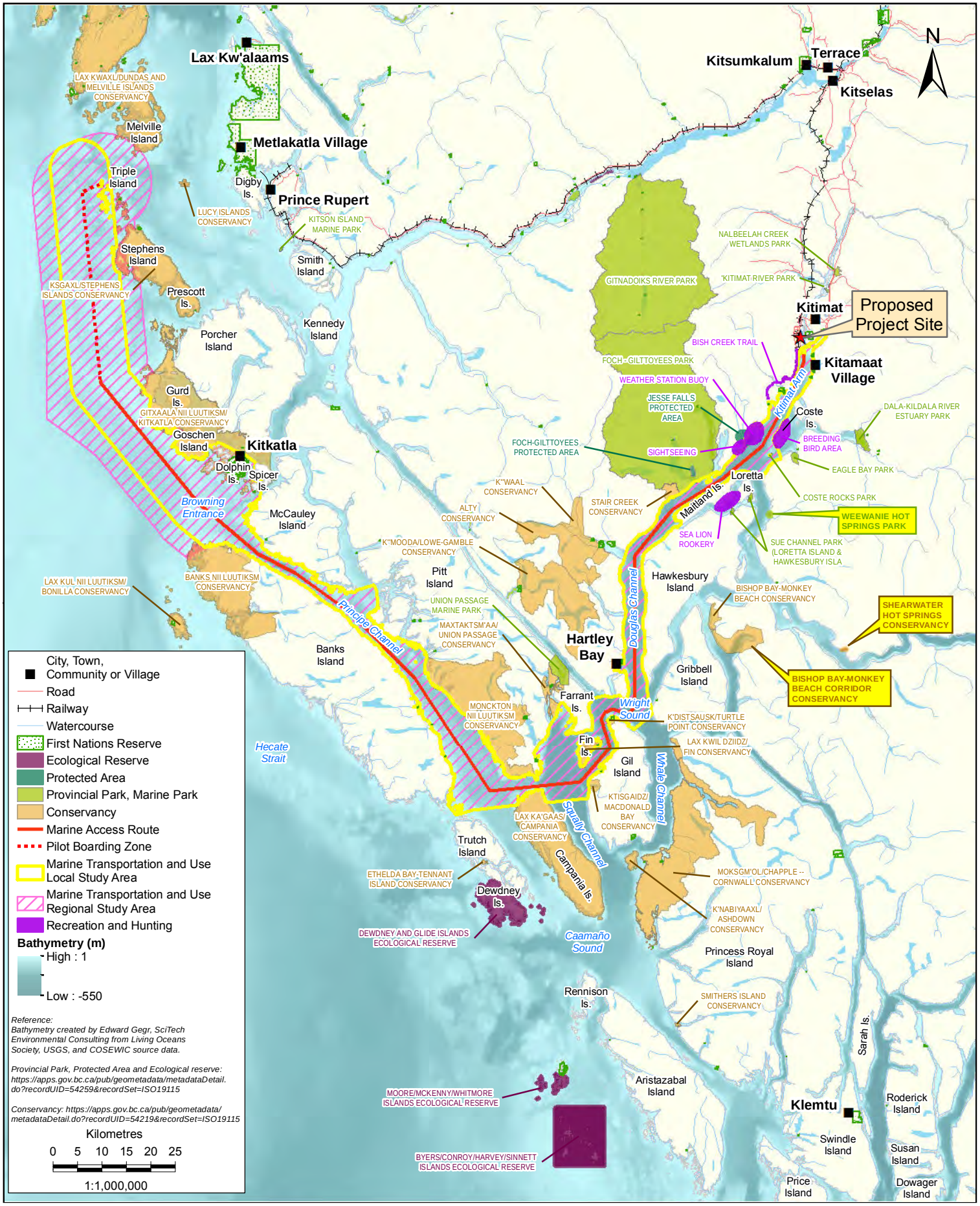

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SOCIO-ECONOMIC BASELINE REPORT

MARINE ACCESSIBLE PARKS AND IMPORTANT AREAS

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-36**

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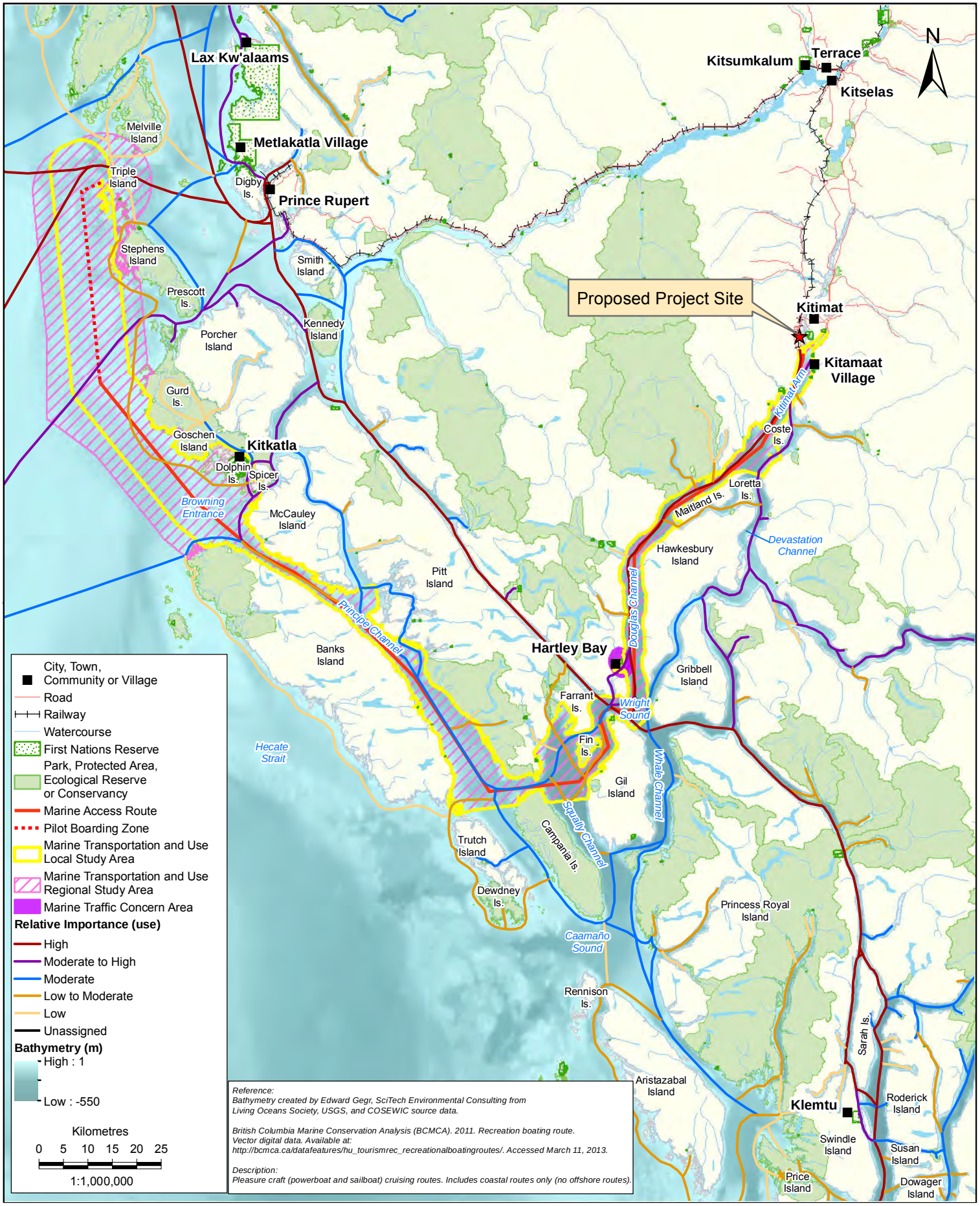

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SOCIO-ECONOMIC BASELINE REPORT

RECREATIONAL BOATING ROUTES

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-37**

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SOCIO-ECONOMIC BASELINE REPORT

ANCHORAGES AND SCUBA DIVE SITES

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-38**

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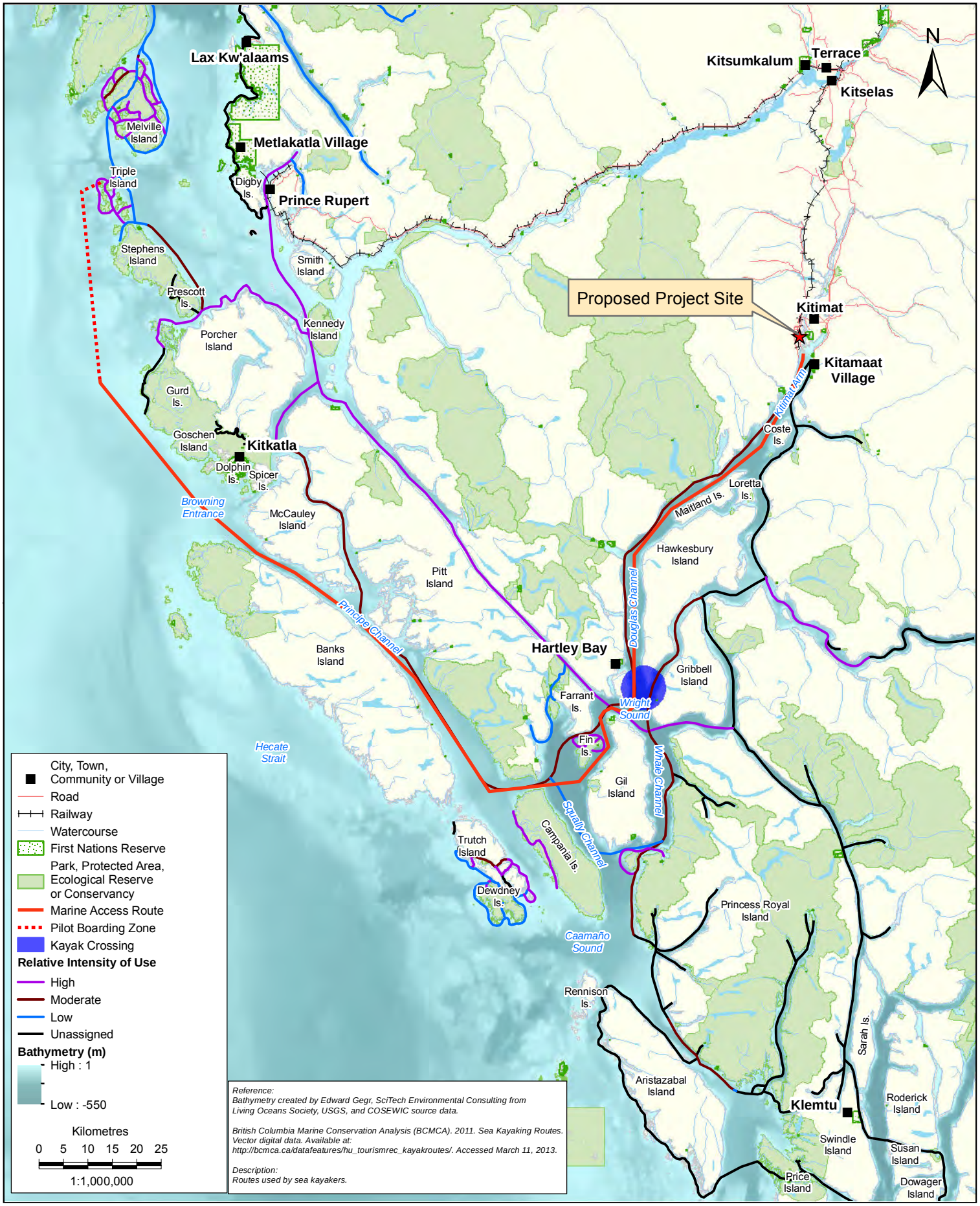

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SOCIO-ECONOMIC BASELINE REPORT

SEA KAYAKING ROUTES

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-39**

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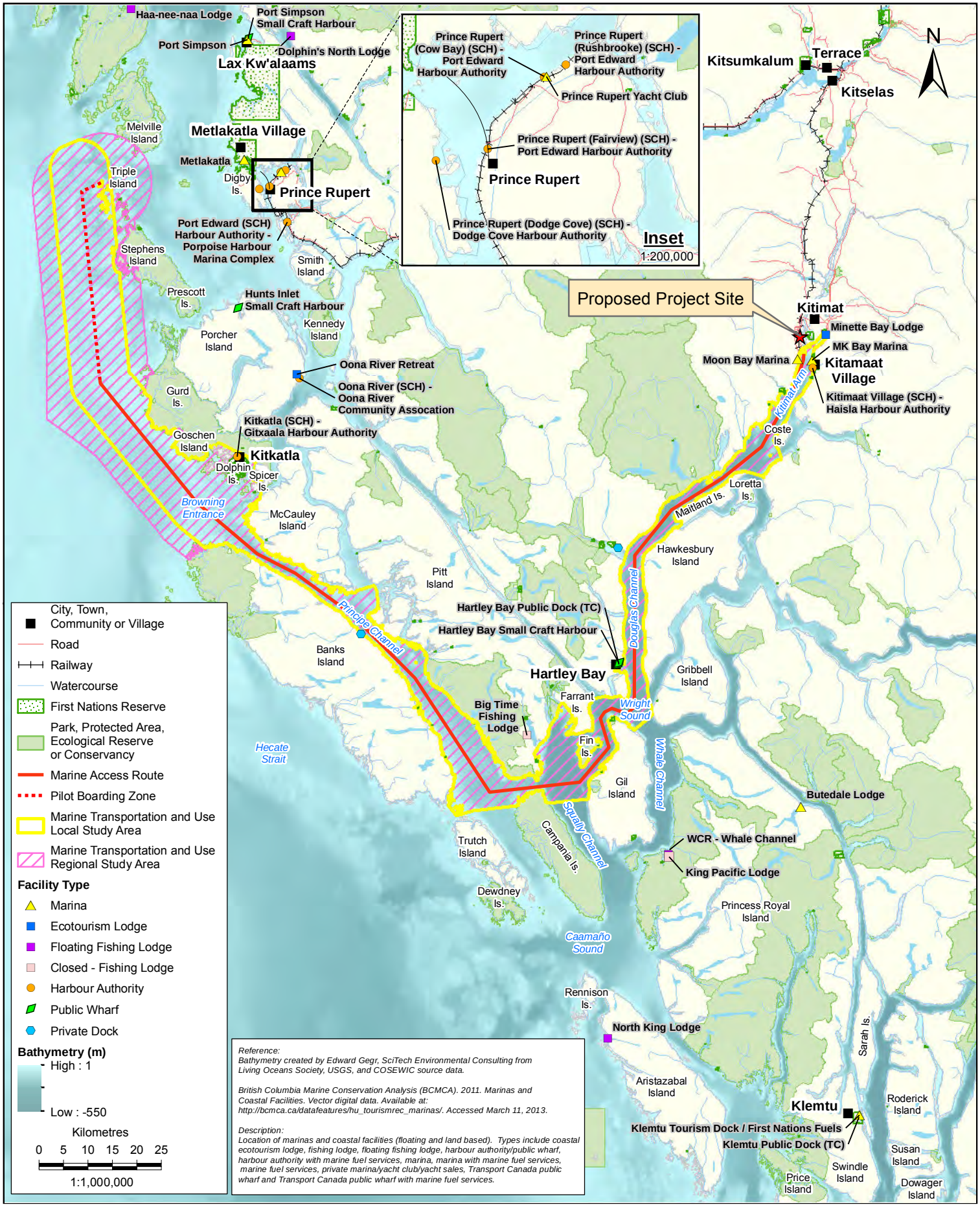

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SOCIO-ECONOMIC BASELINE REPORT

COASTAL FACILITIES LOCATED IN THE GREATER KITIMAT REGION

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
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SOCIO-ECONOMIC BASELINE REPORT

LAND TENURE
MK BAY MARINA

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
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DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
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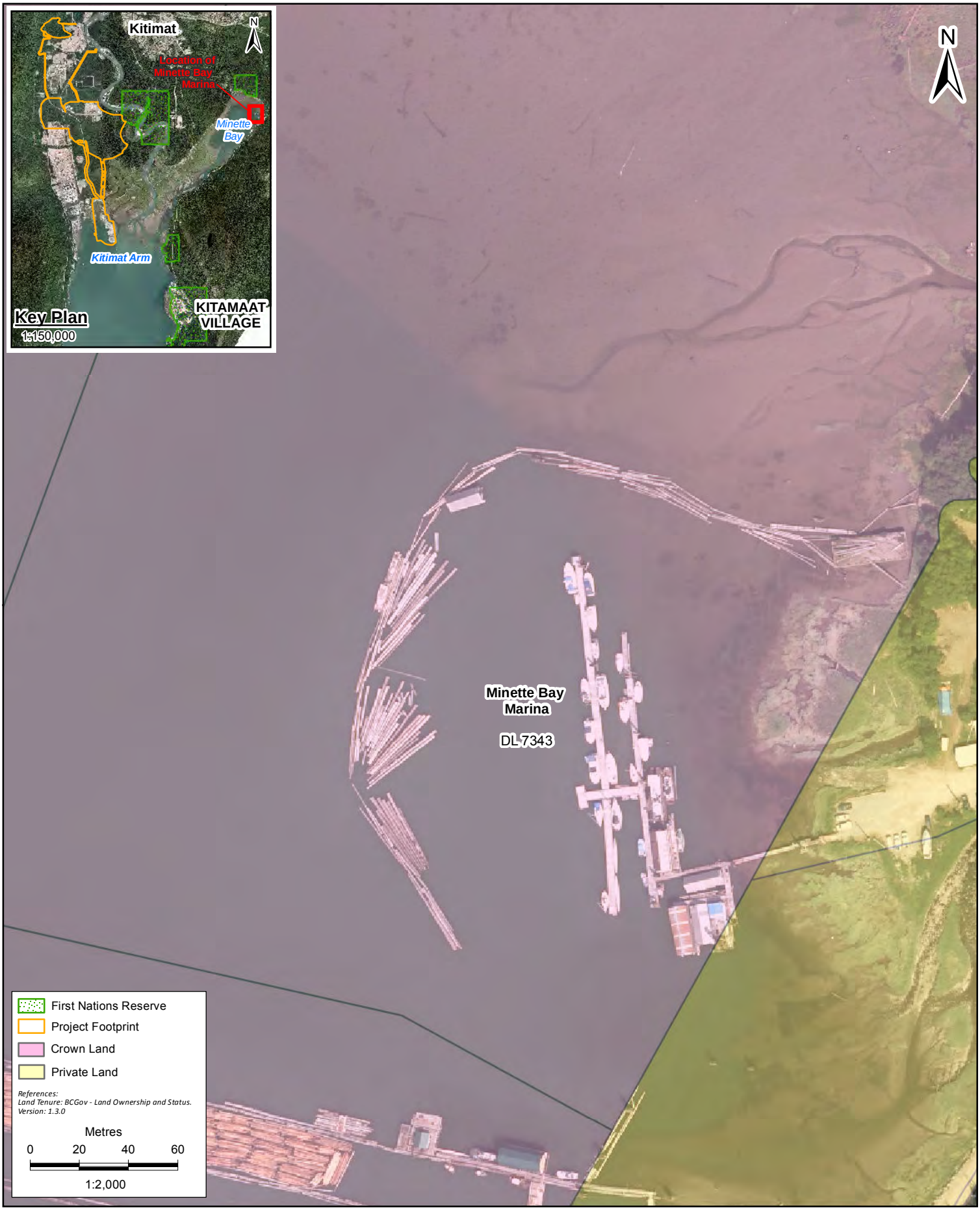

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SOCIO-ECONOMIC BASELINE REPORT

LAND TENURE
MINETTE BAY MARINA

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

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SOCIO-ECONOMIC BASELINE REPORT

LAND TENURE
KITAMAAT VILLAGE SMALL CRAFT HARBOUR

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
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SOCIO-ECONOMIC BASELINE REPORT

LAND TENURE
HARTLEY BAY SMALL CRAFT HARBOUR

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-44**

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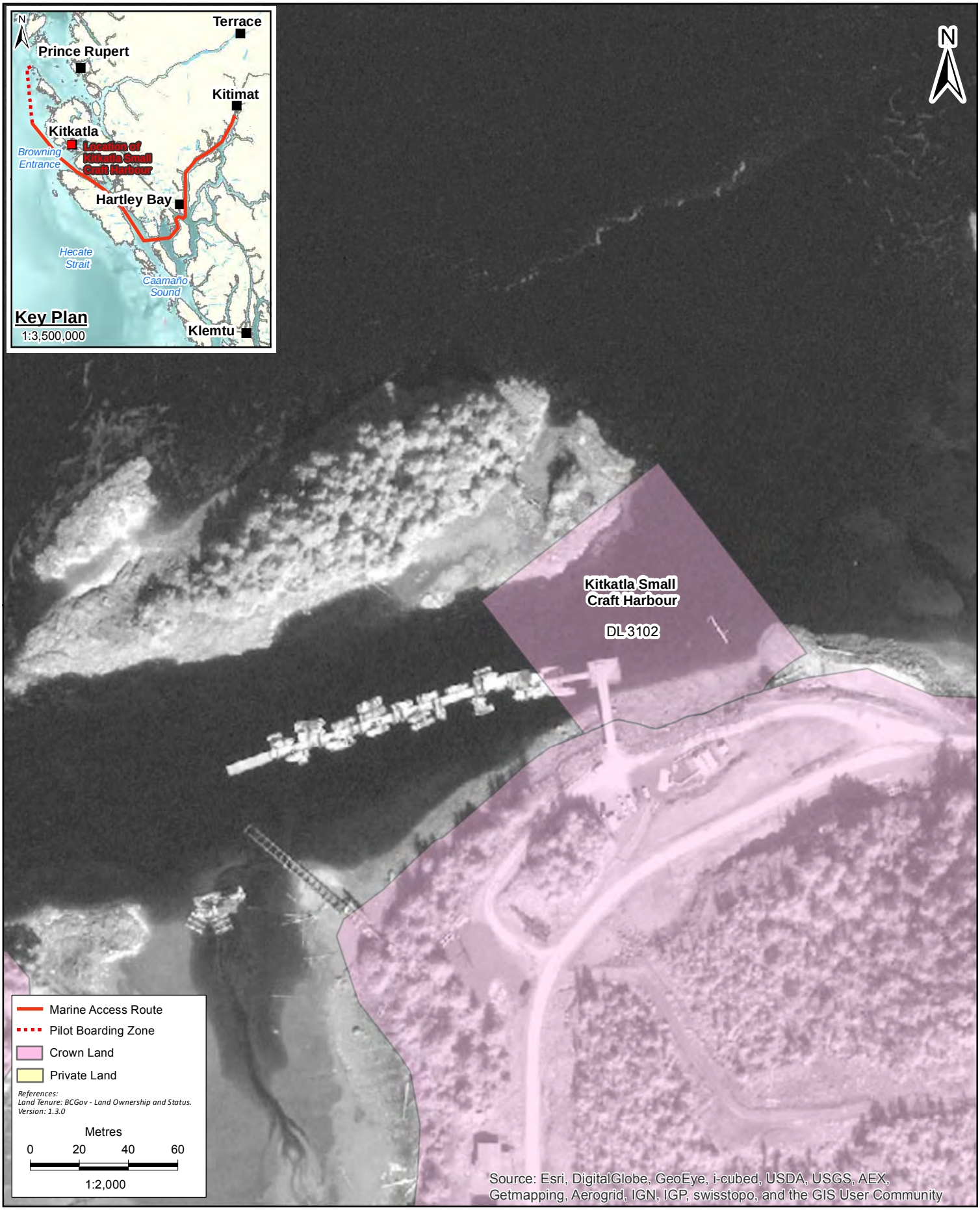

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SOCIO-ECONOMIC BASELINE REPORT

LAND TENURE
KITKATLA SMALL CRAFT HARBOUR

LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA

PROJECTION	DRAWN BY
UTM9	SS
DATUM	CHECKED BY
NAD 83	SW
DATE	APPENDIX NO.
04-SEP-14	**C-45**

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Shipping Data

Table C-1: Number of Vessel Movements in the Prince Rupert Traffic Zone

Vessel type	Year									
	2003	2004	2005	2006	2007	2008	2009	2010	Mean	Median
Cargo - Bulk	1,255	1,534	1,167	1,027	1,172	73	1,088	578	987	1,128
Cargo - General	758	741	467	515	332	-	240	118	453	467
Chemical Tanker	170	81	44	47	59	-	43	28	67	47
Container	641	471	490	359	548	-	616	349	496	490
Ferry	3,163	15,115	15,013	14,328	1,171	1,110	13,902	8,363	9,021	11,133
Fishing	2,380	2,231	1,831	1,084	922	77	1,312	748	1,323	1,198
Government	2,270	2,279	2,131	1,900	1,990	126	2,236	1,369	1,788	2,061
LPG/LNG Carrier	54	165	93	0	10	-	8	0	47	10
Other Vessels >20m	667	783	702	811	809	44	601	371	599	685
Other Vessels <20m	56	49	82	110	16	-	28	11	50	49
Passenger Vessels	1,726	1,848	1,694	1,030	1,134	-	1,144	1,029	1,372	1,144
Tanker<50000 DWT	58	12	31	24	12	-	17	9	23	17
Tanker>50000 DWT	85	59	40	23	17	-	4	1	33	23
Tug	638	608	617	892	1,124	53	1,278	895	763	765
Tug with chemical barge	2	18	0	9	11	-	2	1	6	2
Tug with oil barge	906	795	762	572	592	50	356	273	538	582
Tug with Tow	6,311	6,403	5,315	5,299	3,518	189	2,315	1,724	3,884	4,409
Mean	**1,244**	**1,952**	**1,793**	**1,649**	**790**	**215**	**1,482**	**933**		
Median	**667**	**741**	**617**	**572**	**592**	**75**	**601**	**349**		

SOURCE: MCTS (2013).

Table C-2: Number of Vessel Movements in the Prince Rupert Traffic Zone in 2011

Vessel type	Movements
Barges - no load	374
Coast Guard vessels	1,018
Excursion vessels	23
Fishing vessels	872
Merchant vessels	5,521
Other type vessels	2
Pleasure crafts	286
Special vessels	2,458
Tankers	41
Tugs	4,880
U.S. Coast Guard vessels	13
War vessels	131
Multiple towings	5,785
Simple towings	1,945
Mean	**1,668**
Total	**23,349**

SOURCE: MCTS (2013).

Table C-3: Cruise Line International Association's Ship List for Canada West 2013

Name	Lower Berths (count)	Gross Tons (t)	Length (m)	Home Port
Carnival Cruise Lines				
Carnival Miracle	2,124	88,500	294	Los Angeles
Celebrity Cruises				
Century	1,814	71,545	248	Vancouver
Millennium	2,034	91,000	294	Vancouver
Solstice	2,850	122,000	315	Fort Lauderdale
Crystal Cruises				
Crystal Symphony	940	51,004	238	San Francisco
Disney Cruise Line				
Disney Wonder	2,400	83,308	294	Vancouver
Holland America				
Amsterdam	1,380	61,000	237	Seattle
Oosterdam	1,916	82,305	290	Seattle
Statendam	1,258	55,819	219	Vancouver
Volendam	1,432	61,396	238	Vancouver
Westerdam	1,916	82,500	290	Seattle
Zaandam	1,432	61,396	239	Seattle
Zuiderdam	1,916	82,000	285	Vancouver
Norwegian Cruise Line				
Norwegian Jewel	2,376	93,502	294	Seattle
Norwegian Pearl	2,394	93,530	294	Seattle
Norwegian Sun	2,359	78,309	260	
Oceana Cruises				
Regatta	684	30,277	182	Vancouver
Princess Cruises				
Coral Princess	1,970	92,000	294	Vancouver
Diamond Princess	2,670	116,000	290	Vancouver
Golden Princess	2,590	109,000	290	Seattle
Grand Princess	2,592	109,000	291	San Francisco
Island Princess	1,970	92,000	294	Vancouver
Sapphire Princess	2,670	116,000	290	Seattle
Star Princess	2,590	109,000	285	Seattle
Regent Seven Seas Cruises				
Seven Seas Navigator	490	28,550	200	Vancouver

Name	Lower Berths (count)	Gross Tons (t)	Length (m)	Home Port
Royal Caribbean International				
Radiance of the Seas	2,112	90,090	293	Vancouver
Rhapsody of the Seas	1,998	78,491	279	Seattle
Silversea Cruises				
Silver Shadow	382	28,258	186	Vancouver
Mean	1,902	80,635	268	

SOURCE: CLIA 2013

Table C-4: LNG Canada Vessel Observations Survey Results

Vessel Type	Vessel Sub-Type	Observations	Observations/ha/day
Section 1			
Fishing Boat	Power	2	0.017723
Pleasure Boat	Kayak	0	0.000000
	Power	2	0.017723
	Sail Boat	0	0.000000
	Unknown	0	0.000000
Fishing Gear	Crab/Prawn Trap Float	0	0.000000
	Other Fishing Gear	0	0.000000
Fishing Boat	Crab Boat	0	0.000000
	Gill-netter	0	0.000000
	Long-liner	0	0.000000
	Seiner	0	0.000000
	Trawler	0	0.000000
	Unspecified	0	0.000000
Fishing Gear	Crab/Prawn Trap Float	1	0.008862
	Long Line Boat	0	0.000000
	Other Fishing Gear	0	0.000000
Other	Airplane	0	0.000000
	Helicopter	0	0.000000
	Coast Guard/Military	0	0.000000
	Tanker	0	0.000000
	Tug/Barge	0	0.000000
	Tourism (Cruise Ship)	0	0.000000
	Ferry	0	0.000000
	Water Taxi	2	0.017723
	Cargo	1	0.008862
Section 2			
Fishing Boat	Power	18	0.000331
Pleasure Boat	Kayak	0	0.000000
	Power	55	0.001010
	Sail Boat	2	0.000037
	Unknown	0	0.000000
Fishing Gear	Crab/Prawn Trap Float	0	0.000000
	Other Fishing Gear	0	0.000000

Vessel Type	Vessel Sub-Type	Observations	Observations/ha/day
Fishing Boat	Crab Boat	1	0.000018
	Gill-netter	0	0.000000
	Long-liner	0	0.000000
	Seiner	1	0.000018
	Trawler	1	0.000018
	Unspecified	4	0.000073
Fishing Gear	Crab/Prawn Trap Float	2	0.000037
	Long Line Boat	1	0.000018
	Other Fishing Gear	0	0.000000
Other	Airplane	0	0.000000
	Helicopter	0	0.000000
	Coast Guard/Military	2	0.000037
	Tanker	0	0.000000
	Tug/Barge	4	0.000073
	Tourism (Cruise Ship)	0	0.000000
	Ferry	1	0.000018
	Water Taxi	2	0.000037
	Cargo	2	0.000037
Section 3			
Fishing Boat	Power	17	0.000142
Pleasure Boat	Kayak	2	0.000017
	Power	79	0.000660
	Sail Boat	13	0.000109
	Unknown	0	0.000000
Fishing Gear	Crab/Prawn Trap Float	7	0.000058
	Other Fishing Gear	0	0.000000
Fishing Boat	Crab Boat	4	0.000033
	Gill-netter	0	0.000000
	Long-liner	1	0.000008
	Seiner	30	0.000251
	Trawler	2	0.000017
	Unspecified	14	0.000117
Fishing Gear	Crab/Prawn Trap Float	6	0.000050
	Long Line Boat	1	0.000008
	Other Fishing Gear	2	0.000017

Vessel Type	Vessel Sub-Type	Observations	Observations/ha/day
Other	Airplane	2	0.000017
	Helicopter	0	0.000000
	Coast Guard/Military	4	0.000033
	Tanker	0	0.000000
	Tug/Barge	3	0.000025
	Tourism (Cruise Ship)	0	0.000000
	Ferry	10	0.000084
	Water Taxi	0	0.000000
	Cargo	1	0.000008
Section 4			
Fishing Boat	Power	0	0.000000
Pleasure Boat	Kayak	0	0.000000
	Power	10	0.000055
	Sail Boat	7	0.000038
	Unknown	0	0.000000
Fishing Gear	Crab/Prawn Trap Float	0	0.000000
	Other Fishing Gear	0	0.000000
Fishing Boat	Crab Boat	1	0.000005
	Gill-netter	0	0.000000
	Long-liner	0	0.000000
	Seiner	0	0.000000
	Trawler	0	0.000000
	Unspecified	0	0.000000
Fishing Gear	Crab/Prawn Trap Float	1	0.000005
	Long Line Boat	0	0.000000
	Other Fishing Gear	0	0.000000
Other	Airplane	2	0.000011
	Helicopter	0	0.000000
	Coast Guard/Military	3	0.000016
	Tanker	0	0.000000
	Tug/Barge	3	0.000016
	Tourism (Cruise Ship)	0	0.000000
	Ferry	0	0.000000
	Water Taxi	1	0.000005
	Cargo	0	0.000000

Vessel Type	Vessel Sub-Type	Observations	Observations/ha/day
Section 5			
Fishing Boat	Power	1	0.000001
Pleasure Boat	Kayak	0	0.000000
	Power	21	0.000031
	Sail Boat	6	0.000009
	Unknown	0	0.000000
Fishing Gear	Crab/Prawn Trap Float	0	0.000000
	Other Fishing Gear	0	0.000000
Fishing Boat	Crab Boat	4	0.000006
	Gill-netter	1	0.000001
	Long-liner	0	0.000000
	Seiner	2	0.000003
	Trawler	5	0.000007
	Unspecified	10	0.000015
Fishing Gear	Crab/Prawn Trap Float	2	0.000003
	Long Line Boat	3	0.000004
	Other Fishing Gear	0	0.000000
Other	Airplane	4	0.000006
	Helicopter	1	0.000001
	Coast Guard/Military	1	0.000001
	Tanker	2	0.000003
	Tug/Barge	8	0.000012
	Tourism (Cruise Ship)	6	0.000009
	Ferry	4	0.000006
	Water Taxi	0	0.000000
	Cargo	3	0.000004

Fishing Data Tables

Pacific Salmon

Table C-5: Number of Salmon Landed in the Commercial Fishery in FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	2,284,627	3,136,190	1,067,416	1,770,280	361,604	30,625	1,366,577	1,262,064	854,746	356,914	94,452	563,894	609,357	1,058,365	13,758,746
5	71,264	260,760	483,444	354,896	185,599	194,267	34,778	661,994	4,202	140,514	3,325	3,958	2,968	184,767	2,401,969
6	1,583,487	1,737,295	743,299	4,849,997	261,617	4,930,694	67,159	1,842,144	17,972	6,752,148	26,124	788,967	16,810	1,816,747	23,617,713
Year Mean	1,313,126	1,711,415	764,720	2,325,058	269,607	1,718,529	489,505	1,255,401	292,307	2,416,525	41,300	452,273	209,712	N/A	N/A
Year Total	3,939,378	5,134,245	2,294,159	6,975,173	808,820	5,155,586	1,468,514	3,766,202	876,920	7,249,576	123,901	1,356,819	629,135	N/A	N/A

SOURCE: (DFO 2013a)

Table C-6: Value of Salmon Landed in the Commercial Fishery in FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	23,820,801	19,796,326	6,210,175	5,366,718	2,111,215	97,416	6,304,549	4,193,106	6,859,488	641,647	506,081	3,662,757	4,265,649	6,448,918	83,835,929
5	446,093	353,074	341,247	245,940	186,983	107,474	61,261	422,330	18,547	94,165	4,551	0	30,055	177,825	2,311,721
6	1,968,878	1,617,161	1,111,061	3,733,741	1,019,908	4,402,290	419,379	1,768,913	110,826	5,340,924	57,921	1,591,335	72,344	1,785,745	23,214,680
Year Mean	8,745,257	7,255,520	2,554,161	3,115,467	1,106,035	1,535,727	2,261,730	2,128,116	2,329,620	2,025,579	189,518	1,751,364	NA	N/A	N/A
Year Total	26,235,771	21,766,561	7,662,483	9,346,400	3,318,106	4,607,180	6,785,189	6,384,349	6,988,861	6,076,736	568,553	5,254,092	NA	N/A	N/A

SOURCE: (DFO 2013a)

Table C-7: Number of Commercial Salmon Licences issued in FMAs 4 through 6

FMA	Year								Summary	
	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	138	583	504	396	153	271	373	404	353	2,822
5	20	32	48	41	29	31	14	11	28	226
6	315	79	125	54	156	20	117	87	119	953
Year Mean	158	231	226	164	113	107	168	167	N/A	N/A
Year Total	473	694	677	491	338	322	504	502	N/A	N/A

SOURCE: (DFO 2013a)

Salmon Gil Net Fishery

Table C-8: Number of Salmon Landed in the Commercial Gill Net Fishery in FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	1,336,307	1,638,211	626,041	594,718	217,715	1,796	938,726	715,162	566,100	2,570	78,975	348,969	424,420	576,132	7,489,710
5	31,832	18,450	5,630	10,466	14,098	NA	25,224	4,715	2,104	NA	2,679	2,791	2,815	10,982	120,804
6	64,653	72,110	156,994	154,482	169,412	227,889	49,463	24,267	3,379	50,303	2,412	23,621	16,810	78,138	1,015,795
Year Mean	477,597	576,257	262,888	253,222	133,742	114,843	337,804	248,048	190,528	26,437	28,022	125,127	148,015	N/A	N/A
Year Total	1,432,792	1,728,771	788,665	759,666	401,225	229,685	1,013,413	744,144	571,583	52,873	84,066	375,381	444,045	N/A	N/A

SOURCE: (DFO 2013a)

Table C-9: Value of Salmon Landed in the Commercial Gill Net Fishery FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	15,394,741	14,423,407	5,431,602	4,138,007	1,795,521	97,416	4,659,597	3,683,100	5,134,040	325,484	506,081	2,918,714	4,265,649	4,828,720	62,773,359
5	267,642	116,205	42,433	69,956	82,083	ND	61,261	3,500	12,013	ND	4,551	ND	30,055	68,970	689,699
6	179,553	323,380	438,124	426,603	619,662	774,687	264,438	123,897	16,006	31,432	19,121	148,759	72,344	264,462	3,438,006
Year Mean	5,280,645	4,954,331	1,970,720	1,544,855	832,422	436,051	1,661,765	1,270,166	1,720,686	178,458	176,584	1,533,737	1,456,016	N/A	N/A
Year Total	15,841,935	14,862,992	5,912,159	4,634,566	2,497,266	872,102	4,985,296	3,810,497	5,162,059	356,916	529,752	3,067,473	4,368,048	N/A	N/A

SOURCE: (DFO 2013a)

Table C-10: Number of Commercial Gill Net Licences for Salmon in FMAs 4 through 6

FMA	Year								Summary	
	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	115	492	419	345	111	244	288	331	293	2,345
5	NA	24	10	22	NA	17	6	6	14	85
6	196	41	20	14	95	8	21	86	60	481
Year Mean	156	186	150	127	103	90	105	141	N/A	N/A
Year Total	311	557	449	381	206	269	315	423	N/A	N/A

SOURCE: (DFO 2013a)

Salmon Seine Net Fishery

Table C-11: Number of Salmon Landed in the Commercial Seine Fishery in FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	948,320	1,493,260	437,056	1,175,562	118,799	NA	418,306	503,791	287,705	341,403	NA	162,723	133,591	547,320	6,020,516
5	39,432	242,310	476,430	308,968	155,583	191,219	9,554	656,751	809	131,704	NA	NA	NA	221,276	2,212,760
6	1,518,834	1,664,403	581,009	4,657,279	68,375	4,655,128	7,607	1,787,121	1,186	6,701,845	23,712	746,479	NA	1,867,748	22,412,978
Year Mean	835,529	1,133,324	498,165	2,047,270	114,252	2,423,174	145,156	982,554	96,567	2,391,651	23,712	454,601	133,591	N/A	N/A
Year Total	2,506,586	3,399,973	1,494,495	6,141,809	342,757	4,846,347	435,467	2,947,663	289,700	7,174,952	23,712	909,202	133,591	N/A	N/A

SOURCE: (DFO 2013a)

Table C-12: Value of Salmon Landed in the Commercial Seine Fishery in FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	8,426,060	5,289,924	778,573	1,228,711	315,694	ND	1,644,952	510,007	1,725,448	316,163	ND	744,043	ND	2,097,958	20,979,576
5	178,451	236,869	298,814	175,985	104,900	107,474	ND	418,830	6,535	94,165	ND	ND	ND	180,225	1,622,022
6	1,789,325	1,293,780	607,713	3,204,783	110,969	3,390,002	11,176	1,485,427	3,368	5,309,491	38,800	1,251,121	ND	1,541,330	18,495,958
Year Mean	3,464,612	2,273,525	561,700	1,536,493	177,188	1,748,738	828,064	804,755	578,450	1,906,606	38,800	997,582	N/A	N/A	N/A
Year Total	10,393,836	6,820,574	1,685,100	4,609,479	531,563	3,497,476	1,656,128	2,414,264	1,735,351	5,719,819	38,800	1,995,165	N/A	N/A	N/A

SOURCE: (DFO 2013a)

Table C-13: Number of Commercial Seine Licences for Salmon in FMAs 4 through 6

FMA	Year								Summary	
	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	NA	74	45	43	21	NA	46	34	44	263
5	12	6	34	13	9	2	NA	NA	13	76
6	84	7	68	6	61	12	57	NA	42	295
Year Mean	48	29	49	21	30	7	52	N/A	N/A	N/A
Year Total	96	87	147	62	91	14	103	N/A	N/A	N/A

SOURCE: (DFO 2013a)

Salmon Troll Fishery

Table C-14: Number of Salmon Landed in the Commercial Troll Fishery in FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	NA	4,719	4,319	NA	25,090	28,829	9,545	43,111	941	12,941	15,477	52,202	51,346	22,593	248,520
5	NA	0	1,384	35,462	15,918	3,048	NA	528	1,289	8,810	646	1,167	153	6,219	68,405
6	NA	782	5,296	38,236	23,830	47,677	10,089	30,756	13,407	NA	0	18,867	NA	18,894	188,940
Year Mean	N/A	1,834	3,666	36,849	21,613	26,518	9,817	24,798	5,212	10,876	5,374	24,079	25,750	N/A	N/A
Year Total	N/A	5,501	10,999	73,698	64,838	79,554	19,634	74,395	15,637	21,751	16,123	72,236	51,499	N/A	N/A

SOURCE: (DFO 2013a)

Table C-15: Value of Salmon Landed in the Commercial Troll Fishery in FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	NA	82,994	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	82,994	82,994
5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	N/A	0
6	NA	NA	65,223	102,354	289,277	237,602	143,766	159,589	91,452	ND	ND	191,455	ND	160,090	1,280,717
Year Mean	N/A	82,994	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Year Total	N/A	82,994	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

SOURCE: (DFO 2013a)

Table C-16: Number of Commercial Troll Licences for Salmon in FMAs 4 through 6

FMA	Year								Summary	
	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	23	17	40	8	21	27	39	39	27	214
5	8	2	4	6	20	12	8	5	8	65
6	35	31	37	34	NA	0	39	1	25	177
Year Mean	22	17	27	16	21	13	29	15	N/A	N/A
Year Total	66	50	81	48	41	39	86	45	N/A	N/A

SOURCE: (DFO 2013a)

Groundfish

Table C-17: Weight (kg) of Groundfish Landed (mixed spp.) in the Commercial Fishery (multiple gear types) in FMAs 4 through 6

FMA	Year														Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	FMA Mean	FMA Total
4	24,562	26,895	22,304	125,993	31,745	81,460	232,924	38,634	24,925	36,784	15,523	22,035	14,724	2,312	50,059	387,861
5	63,859	36,197	31,853	55,242	21,019	11,335	40,294	25,495	17,259	37,436	31,510	34,165	35,657	0	27,727	221,815
6	NA	15,242	17,437	5,446	7,062	5,086	61,302	122,732	156,290	168,861	113,836	59,760	56,829	17,881	94,686	757,491
Year Mean	44,210	26,111	23,865	62,227	19,942	32,627	111,507	62,287	66,158	81,027	53,623	38,653	35,737	6,731	N/A	N/A
Year Total	88,420	78,333	71,594	186,681	59,827	97,882	334,520	186,862	198,475	243,081	160,868	115,960	107,210	20,193	N/A	N/A

NOTE:
All available fisheries except Pacific halibut have been included.
All gear types have been included (e.g., trawl and non-trawl gears).
SOURCE: (DFO 2013a)

Table C-18: Number of Sets Fished in the Commercial Groundfish Fishery (multiple gear types) in FMAs 4 through 6

FMA	Year														Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	FMA Mean	FMA Total
4	16	280	448	435	384	253	116	190	123	223	22	150	25	0	190	849
5	70	174	134	183	124	98	108	39	99	175	117	77	108	52	97	775
6	0	92	83	38	29	36	76	177	266	450	260	172	246	147	224	1,794
Year Mean	29	182	222	219	179	129	100	135	163	283	133	133	126	66	N/A	N/A
Year Total	86	546	665	656	537	387	300	406	488	848	399	399	379	199	N/A	N/A

NOTE:
Effort is reported in the number of sets not licences. Sets from different gear types have been combined (e.g., long line and trawl tows).
All available fisheries except Pacific halibut have been included.
SOURCE: (DFO 2013a)

Pacific Halibut

Table C-19: Weight (kg) of Halibut Landed in the Commercial Long Line Fisheries in FMAs 4 through 6

FMA	Year								Summary	
	2006	2007	2008	2009	2010	2011	2012	2013	FMA Mean	FMA Total
4	15,521	16,626	17,569	18,989	13,676	8,290	11,909	2,312	13,112	104,893
5	24,397	25,495	11,991	18,299	14,513	27,768	21,189		17,956	143,652
6	51,480	106,290	136,696	126,062	84,223	43,968	28,445	7,762	73,116	584,928
Year Mean	30,466	49,470	55,419	54,450	37,471	26,675	20,515	3,358	N/A	N/A
Year Total	91,398	148,411	166,256	163,351	112,412	80,026	61,544	10,074	N/A	N/A

SOURCE: (DFO 2013h)

Table C-20: Number of Long Line Sets Fished for Halibut in FMAs 4 through 6

FMA	Year								Summary	
	2006	2007	2008	2009	2010	2011	2012	2013	FMA Mean	FMA Total
4	99	109	143	110	67	51	90	13	85	682
5	224	217	82	171	172	290	186	0	168	1,342
6	169	369	434	489	360	232	183	49	286	2,285
Year Mean	164	232	220	257	200	191	153	21	N/A	N/A
Year Total	492	695	659	770	599	573	459	62	N/A	N/A

SOURCE: (DFO 2013h)

Pacific Herring

Table C-21: Weight (kg) of Herring Landed in all Commercial Fisheries in FMAs 4 through 6

FMA	Year												Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	FMA Mean	FMA Total
4	2,825	1,890	2,325	2,568	2,203	2,050	1,618	969	1,148	1,286	1,010	1,264	1,763	21,156
5	1,239	1,012	2,077	1,446	1,909	1,750	957	513	713	475	883	466	1,120	13,439
6	NA	NA	548	289	NA	NA	NA	56	NA	NA	NA	NA	298	56
Year Mean	2,032	1,451	1,650	1,434	2,056	1,900	1,287	513	931	880	946	865	N/A	N/A
Year Total	4,064	2,902	4,950	4,302	4,112	3,800	2,575	1,539	1,862	1,761	1,892	1,730	N/A	N/A

SOURCE: (DFO 2013a)

Table C-22: Value of Herring Landed in all Commercial Fisheries in FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	8,488,943	5,735,776	6,420,835	6,150,575	5,131,038	3,592,408	2,248,192	3,422,534	3,102,384	3,769,382	1,602,399	417,971	677,069	3,904,578	50,759,508
5	2,405,679	1,724,637	3,171,069	1,729,671	1,992,406	1,419,746	358,541	-	441,213	972,562	324,320	291,857	164,481	1,249,682	14,996,182
Year Mean	3,632,207	2,487,471	3,197,969	2,627,416	2,375,149	1,671,386	869,580	1,712,270	1,181,869	1,581,318	642,909	237,280	281,187	N/A	N/A
Year Total	10,896,622	7,462,414	9,593,907	7,882,249	7,125,448	5,014,159	2,608,739	3,424,541	3,545,606	4,743,953	1,928,728	711,839	843,562	N/A	N/A

SOURCE: (DFO 201a)

Table C-23: Number of Boat Days Fished in all Commercial Herring Fisheries in FMAs 4 through 6

FMA	Year										Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	FMA Mean	FMA Total
4	233	175	152	176	335	175	272	193	140	189	204	2,040
5	35	64	61	46	65	88	NA	NA	0	94	57	453
Year Mean	134	120	107	111	200	132	272	193	70	142	N/A	N/A
Year Total	268	239	213	222	400	263	272	193	140	283	N/A	N/A

SOURCE: (DFO 2013a)

Prawn and Shrimp

Table C-24: Weight (kg) of Prawns and Shrimps Landed in the Commercial Trap and Trawl Fisheries in FMAs 4 through 6

FMA	Year						Summary	
	2000	2002	2004	2005	2008	2011	FMA Mean	FMA Total
4	351,440	NA	NA	NA	NA	NA	NA	351,440
5	NA	35,162	17,630	NA	15,652	NA	22,815	68,444
6	NA	8,586	NA	5,373	NA	76,279	30,079	90,238
Year Mean	N/A	21,874	N/A	N/A	N/A	N/A	N/A	N/A
Year Total	N/A	43,748	N/A	N/A	N/A	N/A	N/A	N/A

SOURCE: (DFO 2013h)

Table C-25: Value of Prawns and Shrimps Landed in the Commercial Trawl Fishery in FMAs 4 through 6

FMA	Year										Summary	
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	294,979	448,627	762,549	633,700	594,485	217,645	470,332	150,939	280,694	173,704	402,765	4,027,654
5	21,501	29,398	85,655	135,560	28,392	21,038	79,812	8,609	61,145	38,886	51,000	509,996
6	13,303	20,074	45,172	49,645	6,998	26,977	38,055	4,930	8,605	23,995	23,775	237,754
Year Mean	109,927	166,033	297,792	272,968	209,958	88,553	196,066	54,826	116,815	78,862	NA	NA
Year Total	329,782	498,099	893,377	818,905	629,875	265,659	588,198	164,478	350,445	236,586	NA	NA

SOURCE: (DFO 2013h)

Table C-26: Number of Commercial Prawn and Shrimp Trap Licences in FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	142	75	97	50	86	88	14	70	41	59	NA	13	NA	67	735
5	42	53	39	51	43	38	32	40	33	28	NA	17	NA	38	416
6	10	34	47	41	6	14	6	9	31	21	4	26	6	20	255
Year Mean	65	54	61	47	45	47	17	40	35	36	4	19	6	N/A	N/A
Year Total	194	162	183	142	135	140	52	119	105	108	4	56	6	N/A	N/A

SOURCE: (DFO 2013h)

Dungeness Crab

Table C-27: Weight (kg) of Dungeness Crab Landed in the Commercial Trap Fishery in FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	95,881	51,742	105,817	128,561	79,276	81,539	107,948	124,103	100,013	102,283	116,421	95,597	83,260	97,880	1,272,441
5	NA	62,097	24,792	46,034	39,303	42,207	54,800	47,069	21,189	37,012	44,187	44,603	42,672	42,164	505,965
6	5,645	8,503	13,361	NA	NA	NA	11,875	17,432	11,600	12,999	31,251	16,671	10,579	13,992	139,916
Year Mean	50,763	40,781	47,990	87,298	59,290	61,873	58,208	62,868	44,267	50,765	63,953	52,290	NA	N/A	N/A
Year Total	101,526	122,342	143,970	174,595	118,579	123,746	174,623	188,604	132,802	152,294	191,859	156,871	NA	N/A	N/A

SOURCE: (DFO 2013a)

Table C-28: Value of Dungeness Crab Landed in the Commercial Trap Fishery in FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	592,782	463,573	759,284	808,500	606,531	800,404	582,671	508,682	325,147	190,585	473,478	484,451	679,624	559,670	7,275,710
5	261,674	138,602	209,276	198,772	326,705	165,294	191,566	222,731	267,664	92,484	38,378	92,343	282,851	191,411	2,488,340
6	39,766	64,800	99,836	127,735	79,449	49,930	109,043	260,965	39,054	193,790	52,847	105,760	69,982	99,458	1,292,958
Year Mean	298,074	222,325	356,132	378,336	337,562	338,543	294,427	330,793	210,622	158,953	188,234	227,518	344,152	N/A	N/A
Year Total	894,222	666,975	1,068,396	1,135,008	1,012,685	1,015,628	883,280	992,378	631,865	476,858	564,703	682,554	1,032,456	N/A	N/A

SOURCE: (DFO 2013a)

Table C-29: Number of Commercial Crab Trap Fishing Licences in FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	16	16	14	15	13	14	10	11	12	12	11	13	12	13	169
5	NA	18	7	6	6	9	5	8	8	9	10	12	10	9	108
6	5	4	4	2	2	2	4	4	3	5	6	8	7	4	56
Year Mean	11	13	8	8	7	8	6	8	8	9	9	11	10	N/A	N/A
Year Total	21	38	25	23	21	25	19	23	23	26	27	33	29	N/A	N/A

SOURCE: (DFO 2013a)

Red Sea Urchin

Table C-30 Weight (kg) of Red Urchins Landed in the Commercial Dive Fishery in FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	392,859	467,648	363,896	354,499	392,134	313,030	266,065	106,851	132,827	377,202	366,987	330,682	NA	322,057	3,864,680
5	640,240	706,281	644,089	673,924	550,695	523,192	685,399	331,220	420,512	319,221	635,487	525,694	NA	554,663	6,655,954
6	1,453,865	999,412	NA	2,243,742	1,121,229	951,097	NA	1,425,723	530,874	634,245	627,828	776,160	NA	1,076,418	10,764,175
Year Mean	828,988	724,447	503,993	1,090,722	688,019	595,773	475,732	621,265	361,404	443,556	543,434	544,179	NA	N/A	N/A
Year Total	2,486,964	2,173,341	1,007,985	3,272,165	2,064,058	1,787,319	951,464	1,863,794	1,084,213	1,330,668	1,630,302	1,632,536	NA	N/A	N/A

SOURCE: (DFO 2013a)

Table C-31: Value of Red Urchins Landed in the Commercial Dive Fishery in FMAs 4 through 6

FMA	Year			Summary	
	2000	2001	2002	FMA Mean	FMA Total
4	613,618	714,493	559,648	629,253	1,887,759
5	1,005,275	1,117,563	1,045,630	1,056,156	3,168,467
6	2,327,957	1,627,171	1,496,635	1,817,254	5,451,763
Year Mean	1,315,617	1,153,076	1,033,971	N/A	N/A
Year Total	3,946,850	3,459,227	3,101,912	N/A	N/A

SOURCE: (DFO 2013a)

Table C-32: Number of Commercial Red Urchin Dive Licences in FMAs 4 through 6

FMA	Year												Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	FMA Mean	FMA Total
4	55	51	37	46	48	38	37	16	20	24	28	24	35	424
5	46	63	54	56	40	53	51	27	30	21	26	34	42	501
6	82	77	NA	162	86	66	NA	122	31	27	28	33	71	714
Year Mean	61	64	46	88	58	52	44	55	27	24	27	30	N/A	N/A
Year Total	183	191	91	264	174	157	88	165	81	72	82	91	N/A	N/A

SOURCE: (DFO 2013a)

Geoduck

Table C-33: Weight (kg) of Geoducks Landed in the Commercial Dive Fishery in FMAs 4-6

FMA	Year										Summary	
	2001	2002	2004	2005	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	NA	375,710	NA	182,098	NA	175,625	121,475	NA	336,613	NA	238,304	1,191,521
5	NA	272,203	NA	420,940	NA	446,394	NA	NA	415,233	12,847	313,523	1,567,617
6	179,790	345,878	265,961	343,549	191,082	385,105	90,972	266,726	253,217	45,865	236,815	2,368,145
Year Mean	N/A	331,264	N/A	315,529	N/A	335,708	106,224	N/A	335,021	29,356	N/A	N/A
Year Total	N/A	993,791	N/A	946,587	N/A	1,007,124	212,447	N/A	1,005,063	58,712	N/A	N/A

SOURCE: (DFO 2013a)

Table C-34: Number of Commercial Geoduck Dive Licences FMAs 4-6

FMA	Year											Summary	
	2001	2002	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	NA	24	NA	11	NA	NA	15	9	NA	23	NA	16	82
5	NA	25	NA	25	NA	NA	25	NA	NA	27	6	22	108
6	12	22	22	26	NA	18	21	10	22	15	9	18	177
Year Mean	N/A	24	N/A	21	N/A	N/A	20	10	N/A	22	8	N/A	N/A
Year Total	N/A	71	N/A	62	N/A	N/A	61	19	N/A	65	15	N/A	N/A

SOURCE: (DFO 2013a)

Pacific Octopus

Table C-35: Number of Commercial Octopus Dive Licences in FMAs 4 through 6

FMA	Year								Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	FMA Mean	FMA Total
4	1	1	1	1	1	1	1	NA	1	7
5	1	1	1	1	NA	NA	NA	1	1	5
Year Mean	1	1	1	1	1	1	1	1	N/A	N/A
Year Total	2	2	2	2	1	1	1	1	N/A	N/A

SOURCE: (DFO 2013h)

Sea Cucumber

Table C-36: Weight (kg) of Sea Cucumbers Landed in the Commercial Dive Fishery in FMAs 4-6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	NA	NA	NA	NA	NA	NA	NA	NA	NA	61,947	82,725	73,813	NA	72,828	218,485
5	43,440	45,919	NA	102,775	74,643	NA	179,038	84,362	94,413	78,943	44,405	22,855	NA	77,079	770,793
6	117,848	126,709	133,789	142,129	NA	276,749	139,287	142,134	118,113	60,773	63,044	72,857	NA	126,676	1,393,432
Year Mean	80,644	86,314	N/A	122,452	N/A	N/A	159,163	113,248	106,263	67,221	63,391	56,508	NA	N/A	N/A
Year Total	161,288	172,628	N/A	244,904	N/A	N/A	318,325	226,496	212,526	201,663	190,174	169,525	NA	N/A	N/A

SOURCE: (DFO 2013h)

Table C-37: Value of Red Urchins Landed in the Commercial Dive Fishery in FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	ND	ND	ND	ND	ND	ND	ND	ND	ND	188,008	458,546	380,153	ND	342,235	1,026,706
5	123,067	115,426	53,676	137,592	125,657	149,456	89,962	125,208	204,895	207,125	193,131	111,388	ND	136,382	1,636,582
6	350,008	445,596	451,210	645,242	763,570	643,914	527,744	461,202	501,611	393,355	568,058	239,680	ND	499,266	5,991,190
Year Mean	236,537	280,511	252,443	391,417	444,613	396,685	308,853	293,205	353,253	262,829	406,578	243,740	N/A	N/A	N/A
Year Total	473,075	561,022	504,886	782,833	889,226	793,370	617,706	586,410	706,506	788,487	1,219,735	731,221	N/A	N/A	N/A

SOURCE: (DFO 2013h)

Table C-38: Number of Commercial Sea Cucumber Dive Licences in FMAs 4 through 6

FMA	Year													Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	FMA Mean	FMA Total
4	NA	NA	NA	NA	NA	NA	NA	NA	NA	15	22	21	NA	19	58
5	13	20	NA	29	18	NA	40	18	21	19	11	11	NA	20	200
6	32	35	30	29	NA	52	25	29	23	13	13	14	NA	27	295
Year Mean	23	28	30	29	18	52	33	24	22	16	15	15	N/A	N/A	N/A
Year Total	45	55	30	58	18	52	65	47	44	47	46	46	N/A	N/A	N/A

SOURCE: (DFO 2013h)

Recreational Fishery – Salmon, Groundfish and Halibut

Table C-39: Number of Salmon Caught in the Recreational Fishery in FMAs 4 through 6

FMA	Year										Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2010	FMA Mean	FMA Total
6	-	6,814	5,571	10,619	NA	4,584	8,886	10,555	9,972	4,310	7,664	61,311

SOURCE: (DFO 2013h)

Table C-40: Number of Lingcod Caught in the Recreational Fishery in FMAs 4 through 6

FMA	Year										Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2010	FMA Mean	FMA Total
6	-	460	960	806	-	223	980	1,151	1,334	1,002	865	6,916

SOURCE: (DFO 2013h)

Table C-41: Number of Rockfish (mixed spp.) Caught in the Recreational Fishery in FMAs 4 through 6

FMA	Year										Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2010	FMA Mean	FMA Total
6	-	1,042	1,631	1,379	-	167	520	1,622	1,860	-	1,174	8,221

SOURCE: (DFO 2013h)

Table C-42: Number of Halibut Caught in the Recreational Fishery in FMAs 4 through 6

FMA	Year										Summary	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2010	FMA Mean	FMA Total
4	3	-	-	-	-	-	-	-	-	-	3	3
5	-	100	-	1,225	-	-	-	-	-	-	663	1,325
6	-	1,327	-	-	-	-	-	5,115	5,420	624	3,122	12,486
Year Mean	N/A	714	N/A	N/A	N/A	N/A	5,808	N/A	N/A	N/A	N/A	N/A
Year Total	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

SOURCE: (DFO 2013h)

APPENDIX D

Survey of Local Business and Economic Development

Prepared by Jacqueline Quinless, QRG Inc
February, 2014

Summary of Findings

Kitimat is a world-class port and manufacturing centre in the Pacific Rim region of BC and currently has substantial infrastructure, secondary industries, a skilled workforce, and holds the potential for new and emerging industrial development. The region has a strong community and is capable of responding to the investment needs of government agencies, and multi-national firms in order to compete in the global, AsiaPacific, North American, and domestic industrial, transportation, trade, and manufacturing sectors.

This research study is aimed at gaining a better understanding of the extent to which resource development projects have had adverse effects on local business operations and activities in the area. Data collection activities were conducted via a telephone survey for the Kitimat and Terrace area during the period from February 17th to March 3rd 2014 using a semi-structured questionnaire. The topic areas ranged from basic demographics to number of people employed in the business, types of products/ services offered by the business, gross annual revenue and questions geared towards understanding the respondent's opinions as to whether economic development in the Terrace and Kitimat area may be affecting their business operations and activities. A total of 20 questions were asked to the respondents and the interview length was approximately 15 minutes.

While the vast majority (60%) of the services and products offered in Kitimat and Terrace are in the retail and construction/environmental and accommodation industries, there is also a great deal of diversity of other products and services offered by the local business community which ranges from transportation services such as truck services to recreation activities. While close to half (42%) of the companies were relatively small in size with less than 5 people currently employed we also observe that the vast majority (70%) of staff worked for these companies on a full time basis compared to less than 20% who worked only part time.

While the average weekly wage may be close to $26.00 per hour ($976.79) the data presented in this study also reveals that based on the companies included in this study there appears to be a polarization of wage earners in the region. While close to half (44%) of workers earn a wage over $20.00 per hour, a larger percentage of the population (55%) earns less than $20.00 per hour.

The largest adverse economic effect (30%) that is currently impacting local businesses in the area is directly related to business growth over the past several years; many business owners suggested that increased sales and revenue is also accompanied by a very hectic and busy work life and there is

difficulty in finding a balance. Staff recruitment and retention are also posing considerable challenges for local business owners in the area and many respondent (22%) described staff as “harder to find” and “competition in wages” difficult to maintain. In addition, a large proportion of respondents (22%) indicated that stress on the local economy in terms of an increase in the cost of living, housing affordability and not having enough goods to services to meet local demand were also some of the current effects that their business was experiencing as a result of recent economic development projects in the area.

Many of the survey respondents (36%) suggested that the largest adverse economic effect that they expect will occur into the future as a result of economic development is related to business growth and staff shortages. There were also concerns over increased revenue that will lead to further increases in housing costs and wage increases for staff. For example one respondent claimed that it is “good to have the extra business, but there’s continual struggle with labour issues, and it is hard to hire from outside the local area due to more cost and more risk.” While another respondent stated that “until the population base starts to grow and can meet the employment needs of the projects, hiring staff won’t get any better”.

Survey of Local Business and Economic Development
LNG CANADA:

Preamble:

Hello, my name is _____and I am calling from QRG Research on behalf of LNG Canada. We are conducting a br ief telephone survey with small business owners in the Kitimat and Terrace area that should take approximately 10 minutes to complete. The information we are collecting will help us to understand the degree to which the economic development in the area is affecting local business operations and activities. Who is the best person to speak with in your organization about business activities?

PART A. GENERAL QUESTIONS ABOUT THE BUSINESS

Q1. What are the main services/products that your business provides for your clients?

Retail

Accommodation

Recreation services

Tourism

Business Services

Financial Service – by type as in bank or financial investment firm

Insurance

Manufacturing

Consulting by type

Restaurants –type – fast food or dine in

Janitorial

Legal

Automotive services

Auto Sales

Housing Sales

Trades services by type

Construction

Business Development

Travel

Health – by type

Education

Service Club

Safety Services

Utilities – phone, hydro, gas, cable, internet

Other_____

Q2. What is the estimated gross revenue of your business per year? Would you say that it is between:

____Less than $500,000

____$500,000 to $2,000,000

____ $2,000,000 to $5,000,000

____ Over $5,000,000

Q3. Where is your business located?

q Terrace

q Kitimat

q Other _____

Q4. How many years have you been operating the business?

q less than 5 years

q 6-10 years

q 11-20 years

q more than 20 years

Q5. Do you operate your business year-round?

q Yes

q No

Q6. Approximately how many people do you employ at your business?

q 0 employees (except business owner)

q 1-5 people

q 6-10 people

q 11-25 people

q more than 25 people

Q7. Would you say the majority of your employees are employed at your business

q Full time

q Part time

q Seasonal

Q8. On average, the wages per hour that is paid to your employees is between:

q $10/hr - $15/hr

q $15.50/hr - $20/hr

q $20.50/hr - $25/hr

q $25.50/hr +

We want to know your opinion as to whether economic development in the Terrace and Kitimat area may be affecting your business operations and activities.

Q9. Have there been changes in ability to hire service staff for your business?

q Yes

q No

Q10. More recently, would you say that the ability to hire service staff has been:

q More difficult

q Less difficult

q Stayed the same (no change)

Q11. New staff are more likely to be

q Local residents

q people who have recent relocated to the region

q Both local residents and people who have recent relocated to the region

Q12. To the best of your knowledge, would you say that over the last two years would you say that the average wages paid to hourly staff have in the region has:

q Declined

q Not changed.

q Increased by roughly 10%

q Increased by roughly 20%

q Increased by over 20%.

Q13. Have there been changes in availability of goods and services needed to run your business operations and activities (for example, availability of skilled trades people).

q Yes

q No

Q14. Other than wage rates, have other operating costs increased recently?

q Yes

q No

Q15. Please identify operating costs that have recently increased for your business (i.e. rent)

Q16. In the past few years, would you say that there been changes in customer purchasing behaviour related to your business such that there has been:

q Increased purchasing of goods/services

q Decreased Purchasing of goods/services

q Purchasing of goods services has stayed the same

Q17. When you think about your business clientele, would you say that in the past few years there have been changes in your customer base such that:

q There is now a larger proportion of new customers in your business.

q There is now a smaller proportion of new customer.

q Not much change at all in that there is still mostly traditional customers (familiar/repeat business).

Q18. In your opinion has recent economic development in the Kitimat and Terrace area affected your business operations and activities?

q Yes, positively (i.e. increased revenue/profitability

q Yes, negatively

q No

Q19. In your opinion to what extent has economic development in the Kitimat and Terrace area affected your business operations and activities? Please explain.

Q20. In your opinion, how may future economic development in the Kitimat and Terrace area affected your business operations and activities? Please explain.

APPENDIX E

Survey of Kitselas Traditional Foods

Prepared by Stephen Roberts and Kelly Sims
Survey Distribution: Geneva Roberts
April-May, 2014

Summary of Findings

The LNG Canada socio-economic and health consultants distributed 512 surveys to the Kitselas First Nations. Twenty-four of the 11 question surveys returned with a completion rate of 87.4%. See below for survey results.

Question 1 results to traditional food consumption by respondents (e.g., 1a, 8.7% of respondents consume plants daily).

Options	Daily	2-3/week	Monthly	Seasonally	Response Rate*
1a) Plants	8.7%	30.4%	17.4%	43.5%	95.8%
1b) Meat	4.2%	25%	29.2%	41.7%	100%
1c) Fish	8.3%	54.2%	12.5%	25%	100%

* Response Rate= total number of responses/ number of respondents in survey

Question 2 results to methods of obtaining traditional food (e.g., 2a, 87.5% of respondents or another member of their household harvest traditional food).

Options	Yes	No	Response Rate*
2a) Either I or another member of my household harvest them	87.5%	12.5%	100%
2b) I get them from other households in the community	41.7%	58.3%	100%
2c) I trade or buy them with other first nations in the region	45.8%	54.2%	100%
2d) Other	16.7%	83.3%	100%

* Response Rate= total number of responses/ number of respondents in survey

Question 3 results to frequency of traditional food harvest participation by respondents and/or respondent's household members (e.g., 3a, 50% of respondents and/or respondent's household members participate in traditional food harvest one to two times a week).

Options	Yes	No	Response Rate*
3a) One to two times a week	50%	50%	100%
3b) One to two times a month	12.5%	87.5%	100%
3c) Once every four to six months	8.3%	91.7%	100%
3d) Once a year	16.7%	83.3%	100%
3e) Rarely to never	12.5%	87.5%	100%

* Response Rate= total number of responses/ number of respondents in survey

Question 4 results to percentage of household participation in traditional food harvesting activities (e.g., 4a, 25% of respondents claim that 0-25% of their household participates in hunting).

Options	0-25%	25-50%	50-75%	75-100%	Response Rate*
4a) Hunting	25%	29.2%	29.2%	16.7	100%
4b) Fishing	12.5%	8.3%	29.2%	50%	100%
4c) Gathering/ picking plants/berries	20.8%	25%	29.2%	25%	100%

* Response Rate= total number of responses/ number of respondents in survey

Question 5 listed responses to the most commonly harvested traditional foods.

Options	Listed Responses	Response Rate*
5a) Berries	Huckleberries, Soapberries, Salmonberries, Strawberries, Saskatoon's, Blueberries, Raspberries, Cranberries (high and low bush), Thimbleberries, Cherries, Blackberries, and all edible berries in BC.	95.8%
5b) Other plants/roots	Fiddleheads, Mushrooms (pine mushroom), Devils Club (including root), Cedar Bark, Indian Tea, Dandelion (including root), Stinging Nettle, Seaweed, all edible plants in BC, and anything useful for cooking. Supplied by family member (respondent not responsible for obtaining food).	66.7%
5c) Large mammals	Moose, Deer, Black Bear, Mountain Goat, and Sea Lion. Supplied by family member (respondent not responsible for obtaining food).	79.2%
5d) Small mammals	Rabbit, Beaver, Sea lion, Otter, Marmot, and Grouse. Supplied by family member (respondent not responsible for obtaining food).	37.5%
5e) Birds	Turkey, Chicken, Grouse, Goose, Duck, and Quail. Supplied by family member (respondent not responsible for obtaining food).	54.2%
5f) Fish and other sea foods	Crab (all species), Cockles, Herring, Herring eggs, Shrimp, Lobster, Salmon (all species), Trout (all species), Oolichans, Clams, Sea lion, Seal, Cod, Prawn, Oysters, Dog fish, Halibut, Rock-fish, Sea urchin, Anything seaweed, and all seafood. Supplied by family member (respondent not responsible for obtaining food).	91.7%

* Response Rate= total number of responses/ number of respondents in survey

Question 6 results to changes in traditional food consumption or harvesting over the last 3-5 years (e.g., 6a, 56.5% of the respondents believe that there has been a decrease in the quality or availability of foods over the last 3-5 years).

Options	Yes	No	Response Rate*
6a) Decrease in the quality or availability of foods	56.5%	43.5%	95.8%
6b) Increase in the quality or availability of foods	0%	100%	95.8%
6c) No change	34.8%	65.2%	95.8%
6d) Other	8.7%	91.3%	95.8%

* Response Rate= total number of responses/ number of respondents in survey

Question 7 results to barriers towards community members obtaining and eating traditional foods (e.g., 7a, 70% of participants perceived changes in the environment as a barrier towards community members obtaining and eating traditional foods).

Potential Barrier	Yes	No	Response Rate*
7a) Perceived changes in the environment	70%	30%	83.3%
7b) Perception of limited resources compared to the past	85%	15%	83.3%
7c) Concerns about the quality of food	65%	35%	83.3%
7d) Concerns about foodborne illness/preparing the food properly	50%	50%	83.3%
7e) Lack of knowledge/ skill for hunting/ gathering	55%	45%	83.3%
7f) Locations to harvest are not known	45%	55%	83.3%
7g) Loss of transmission of knowledge between generations	85%	15%	83.3%
7h) Reduced interest in a traditional diet	35%	65%	83.3%
7i) Access and ease of commercial foodstuffs	65%	35%	83.3%
7j) Perceived inconvenience of procuring and preparing traditional foods	40%	60%	83.3%
7k) Time limitations (due to full time work; child care; family obligations)	75%	25%	83.3%
7l) Costs of obtaining traditional foods (example: gas and boating equipment)	90%	10%	83.3%
7m) Other	15%	85%	83.3%

* Response Rate= total number of responses/ number of respondents in survey

Question 8 results to what would support and increase consumption of traditional foods.

Theme	Listed Responses[1]	Response Rate*
Knowledge (Improve mechanisms to assist in knowledge transfer to youth)	Regular community outing for berry picking and fishing	95.8%
	Training in traditional harvesting and preserving techniques – non-formal; family relationships, stories and on-site learning	
Programs	Programs to expose youth to traditional harvesting techniques; busy moms and dads	
	Develop well organized volunteering programs (concise tasks, times, rotations)	
	Programs to facilitate transportation – elderly and those without personal transportation	
	Develop community processing stations (such as smoke houses, canning station, drying stations with equipment and freezers)	
	Costal First Nation traditional food trading agreements	
	Formal training programs in traditional harvesting and preserving techniques	
	Workshops on how to identify traditional plants and habitat	
	Funding programs offered to youth to facilitate traditional harvesting knowledge	
	Community traditional food sharing program	
	Traditional harvesting camps	
	Nutritional workshops/community kitchens to teach community members how to prepare/preserve traditional foods	

* Response Rate= total number of responses/ number of respondents in survey

[1] Responses verbatum

Question 9 results to household member's participation in harvesting, fishing, or hunting activities in or around the proposed LNG Canada Project or marine access route (e.g., 9a, 89.5% of respondents participate in harvesting, fishing, or hunting activities in or around the Terrace area).

Location	Listed Responses1	Yes	No	Response Rate*
9a) Terrace area	Kitselas traditional area, Skeena River, Upper Kitimat/Lakes watershed, and under the old bridge	89.5%	10.5%	79.2%
9b) Kitimat area	Kitimat Village and Kitimat River (upper and lower)	73.7%	26.3%	79.2%
9c) Marine access	Prince Rupert, Nass area, Marine areas in traditional area, Kitimat, Douglas Channel, Port Edward boat launch, and Metlakatla Pass	73.7%	26.3%	79.2%
9d) Other	You are going to impact it all	36.8%	63.2%	79.2%

* Response Rate= total number of responses/ number of respondents in survey

[1] Responses verbatum

Question 10 comments to whether the proposed LNG Canada Project will impact traditional food harvesting and consumption.

Listed Responses[1]	Response Rate*
You are going to impact it all	83.3%
I am not aware of the specifics of the project	
Not if it's done properly and maintained	
Yes, I do because I feel that there will be a spill that will destroy our fishing, hunting and gathering areas	
Fish spawning grounds are already being affected	
There is always the risk of a spill and the environmental impact of putting the pipeline will change the habitat	
You are going to impact it heavily	
Increased marine traffic	
Right-of-way clearing	
Interruption of fish migration, wildlife migration	
After, environment will affect natural growing of foods	
Yes, any problems or spills will affect the entire region and foods	
Yes, increase in population ca increase harvesters	
Acidification may impact country food productivity	
Should there ever be a leak or break in the pipes it will truly ruin our seafood harvest	
Impact could be if there are any accidents, disasters form LNG that will have little to no food left	
Construction activity and preventing access	
Access to marine resources altered	
Yes, because of the change in their environment but wildlife will adapt to change	
Yes, we are already limited to our food sources, it seems to only be getting worse	
Yes, with all the boats, all the marine fuel leaking from the boats and noise as well will scare all mammals off	

* Response Rate= total number of responses/ number of respondents in survey

[1] Responses verbatum

Question 11 comments about traditional foods and the LNG Canada Project.

Listed Responses[1]	Response Rate*
Please protect our resources	54.2%
Unfortunately, many may not harvest or eat as much traditional food because of ease of access to grocery store and changes in our daily schedule (i.e. shopping, TV, internet) rather than grading, harvesting/gathering, berries, hunting)	
Traditional foods will not survive if the LNG goes through	
I would like to know what the plans are after the short term jobs and the natural gas runs out. Will the pipeline be removed? Will there be environmental restoration provided?	
Please protect our First Nation rights	
Pipeline corridors may increase berry and ungulate habitat but provide more access for harvesters. Impact is expected to be low.	
I don't agree with the pipeline and I see my voice will not be heard along with all other traditional hands	
No reck the land or pollute the water	
The precautions need to have more effort than the clean-up then you won't have a mess in the end	
I feel that these surveys are information gatherings that will be used against us but I filled it out anyway because some information of what we use and harvest is better than nothing at all, which strengthens your argument.	
Bring on the LNG because you need money to live not just food	
I am concerned about dredging which will release dioxins and furans	

* Response Rate= total number of responses/ number of respondents in survey

[1] Responses verbatum

Survey of Kitselas Traditional Foods

Thank you for taking the time to answer our survey. We are a team of socio-economic and health consultants working on the environmental and health assessment of the **LNG Canada Project**. The LNG Canada Project is a proposed LNG facility and marine exporting terminal located in the Kitimat area (see attached map or there website at http://lngcanada.ca/). The purpose of this survey is to learn more about the harvesting and consumption of traditional foods by the people of Kitselas First Nation. Your valuable response will help to inform LNG Canada about how its proposed LNG Canada Project might affect the Kitselas First Nation, and what LNG Canada can do to minimize any potential negative effects and enhance any benefits of the Project on traditional foods. All of the responses in this survey will remain anonymous and be kept in a secure location. At the completion of the survey the results will be compiled into a report and shared with the communities. The results will be further used to inform LNG Canada's Environmental Assessment Application and corresponding socio-economic and health studies, and management plans.

In reference to the survey being undertaken traditional foods, (also sometimes referred to as country foods) includes any food which are not bought at your typical grocery store and are items that would be found through activities such as hunting, fishing or collecting/picking food stuff items. The consumption of traditional foods means eating or enjoying the products of traditional foods.

In writing your responses, please use the attached sheet of paper if you do not have enough space. We would like to learn as much as we can about traditional foods and the Kitselas First Nation and greatly appreciate your sharing of this important information. **Please return your completed survey to Geneva Erickson at the Kitselas Lands and Resources Office by April 30, 2014.**

Additionally, if you choose please provide your name and phone number (**which will not be shared or used in the results of this survey**) and you will be entered in a draw for a $50.00 pre-paid MasterCard gift card. At the time the results are compiled we will announce and the winners who will be notified. The winners can pick-up their prize up at the Kitselas Land and Resource Office. **To ensure your anonymity please cut off the draw information below and place it in the Kitselas Draw Box located at the Kitselas Lands Department by April 30th to be eligible for the draw.**

DRAW INFORMATION

Name: _____

Contact: _____

Kitselas First Nation Traditional Food Survey

SURVEY

SECTION 1: BASIC HOUSEHOLD DEMOGRAPHIC INFORMATION

Please tell us about the members whom make up your household i.e. how many people usually live in your household

No.	Relationship (e.g., sister/mother)	Sex	Age	Resident On/Off Reserve
Survey Respondent				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

SECTION 2: TRADITIONAL FOOD ACTIVITIES

1. Do you consume traditional foods? YES OR NO. If YES, how often do you consume the following types of traditional foods? Please check the answers that best apply to your or your household.

Options	**Daily**	**2-3/Week**	**Monthly**	**Seasonally**
A) Plants (e.g., berries, roots)	☐	☐	☐	☐
B) Meat (e.g., moose, deer, bear)	☐	☐	☐	☐
C) Fish (e.g., salmon, halibut, shellfish)	☐	☐	☐	☐

2. Of the traditional foods that you consume, how do you obtain them? Please check the answer that best applies to your or your household.

   A) ___ Either I or another member of my household harvest them.

   B) ___ I get them from other households in the community.

   C) ___ I trade or buy them with other First Nations in the region.

   D) ___ Other, please explain.
   _____
   _____
   _____

3. How often do you or someone else in your household participate in traditional food harvesting activities, such as hunting, fishing or collecting berries? Please check the answer that best applies to you.

   A) ___One to two times a week, depending on the season and weather.

   B) ___One to two times a month, depending on the season and weather.

   C) ___Once every four to six months.

   D) ___Rarely to never

4. Approximately what percentage of your household participates in the following traditional food harvesting activities? Please check the percentages that best apply to your household.

Options	**0-25%**	**25-50%**	**50-75%**	**75-100%**
A) Hunting	☐	☐	☐	☐
B) Fishing	☐	☐	☐	☐
C) Gathering/picking plants/berries	☐	☐	☐	☐

5. What are the most commonly harvested traditional foods? Please list these.

   a) Berries _____

   b) Other plants/roots_____

   c) Large mammals _____

   d) Small mammals _____

   e) Birds _____

   f) Fish_____

6. Has the harvesting or consumption of traditional foods changed over the last 3 to 5 years? Please check the answer that best applies with you or your household.

   A) ___ Decrease in the quality or availability of foods.

   B) ___ Increase in the quality or availability of foods.

   C) ___ No change.

   D) ___Other, please explain.

   _____

   _____

   _____

7. What are the barriers to community members obtaining and eating traditional foods? Please check Yes or No to those that apply to you or your household.

Potential Barrier	Yes	No
Perceived changes in the environment		
Perception of limited resources compared to the past		
Concerns about the quality of the food		
Concerns about foodborne illness/preparing the food properly		
Lack of knowledge/skills for hunting/gathering		
Locations to harvest are not known		
Loss of transmission of knowledge between generations		
Reduced interest in a traditional diet		
Access and ease of commercial foodstuffs (i.e., groceries, restaurants)		
Perceived inconvenience of procuring and preparing traditional foods		
Time limitations (due to full-time work; child care; family obligations)		
Costs of obtaining traditional foods (e.g., gas and boating equipment)		
Other		

   What do you feel would support increased eating of traditional foods? (For example, community nutrition and training programs and/or greater inter-generational transfer of knowledge).

   _____

   _____

   _____

8. Do any members of your household participate in harvesting, fishing, or hunting activities in or around the proposed LNG Canada Project or marine access route? (***Please see the map attached***). Please check those that best apply to you or your household.

   A) ___ Terrace Area, please explain.

   _____

   B) ___ Kitimat Area, please explain

   _____

   C) ___ Marine Access Route, please explain.

   _____

   D) ___ Other, please explain.

   _____

   Do you think the proposed LNG Canada Project could impact traditional foods harvesting and consumption? Why or why not? Please explain.

   _____

   _____

9. Do you have any additional comments about traditional foods and the LNG Canada Project? Please provide them here.

   _____

   _____

Thank you very much for your time. If you have any further questions or concerns please feel free to contact _____

Kindest Regards,

The LNG Canada Team


N
Lax Kw'alaams
Kitsumkalum
Terrace
Kitselas
Metlakatla Village
Prince Rupert
Proposed Project Site
Kitimat
Kitamaat Village
Kitkatla
Hartley Bay
Melville Island
Triple Island
Digby Is.
Stephens Island
Smith Island
Prescott Is.
Porcher Island
Kennedy Island
Gurd Is.
Goschen Island
Dolphin Is.
Spicer Is.
McCauley Island
Browning Entrance
Banks Island
Pitt Island
Hawkesbury Island
Maitland Is.
Loretta Is.
Coste Is.
Gribbell Island
Farrant Is.
Fin Is.
Gil Island
Hecate Strait
Trutch Island
Dewdney Is.
Princess Royal Island
Caamaño Sound
Rennison Is.
Skeena River
Kitimat River
Douglas Channel
Whitesail Channel
Squally Channel
City, Town, Community or Village
Marine Access Route
Pilot Boarding Zone
Road
Railway
Watercourse
First Nations Reserve
Park, Protected Area, Ecological Reserve or Conservancy
Kilometres
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Stantec
LNGCANADA
Opportunity for British Columbia. Energy for the world
MAP OF LNG CANADA PROJECT
LNG CANADA EXPORT TERMINAL
KITIMAT, BRITISH COLUMBIA
PROJECTION UTM9
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APPENDIX F

Survey of Recreation and Tourism Use

Prepared by Jacqueline Quinless, QRG Inc
December, 2013

Summary of Findings

1) Data Collection

Marine Transportation and Use has been selected as a VC because Project activities have the potential to interfere with the public's right to navigate and may also affect commercial and recreational uses of the marine environment due to increased shipping activity. This assessment describes potential Project effects on this VC, identifies measures taken at the planning stage to avoid or manage adverse effects, as well as proposed mitigation measures that would be implemented during construction and operation. The use of primary data collection procedures was applied to gather pertinent information related to a selected sample of 60 recreation and tourist business operators in the LSA; each vendor was selected based on their geographic location within the LSA and services/products provided through internet searches of local and regional business listing websites. While there were originally 60 recreation and tourism businesses selected for the sample frame based on available businesses that could participate in the study, it was discovered that some of the contact listings were duplicates, invalid or the businesses were no longer operational. As a result, a total of 50 businesses were deemed active and further contacted for interviewing. After three separate follow-up attempts, a total response rate of 40% (n=20) was achieved for this study.

Data collection activities were conducted via a telephone survey during the period from December 6th to December 20th, 2013 using a semi-structured questionnaire. The topic areas were divided into five sections which ranged from basic demographics to business location, types of services, gross year revenue and the respondents thoughts about increases in local shipping traffic and impacts on their business operations. A total of 23 questions were asked to the respondents and the interview length was approximately 15 minutes. To review the questionnaire, please see Section B. All research materials generated from this primary data collection activity such as completed questionnaires, memo notes, and excel data files have been forwarded to the Stantec office in Burnaby.

2) Basic Demographics

Crown lands have been used for commercial recreation for more than 100 years. Before 1998, there was no policy to regulate commercial recreation use on Crown land, except for mechanized ski guiding and commercial hunting and fishing activities. In 1998, after eight years of industry and stakeholder consultation, the BC government adopted a commercial recreation management program that required existing and new recreation operators to acquire tenures for the provincial Crown lands they needed or were already using[3]. The policy now includes a wide variety of activities. Some examples are:

- nature viewing, river rafting and sea kayaking
- horse pack trips
- off-road cycling tours
- heli-hiking and cross-country skiing

While Vancouver, Whistler, and Victoria are major hubs of activity in BC, outdoor adventure opportunities span the province in terms of recreation and tourism. The findings in this study showed that the vast majority 65% of business operators (n=13) have been in business for 15 years or more[4]. The data presented in Table 1 shows that close to half (42%) of the recreation and tourism business operators selected for this study are located in Kitimat BC followed by roughly one quarter (21%) which are located in Prince Rupert. The remaining 37% of the tourism and recreation business operators are located in other geographic areas such as Victoria and the lower mainland. The data gathered for this study also indicated that while the business may be located in a specific geographic location, there tends to be a great degree of variability in the area of the ocean and marine access route to where these businesses normally conducts their business operations[5]. For example, many of the tourism operations in the Kitimat and Prince Rupert area also utilize the marine access routes in Haida Gwaii, Bella Bella and water of the Northwest coast of BC. Meanwhile those businesses located on Vancouver Island and the lower mainland access water routes from Campbell River to Prince Rupert and up to the Great Bear Rain forest[6].

[3] Land Management Bureau (2013) http://archive.ilmb.gov.bc.ca/adventure_tourism/
[4] (see Table 2 Section A)
[5] (see Table 1 Section A)
[6] (see Table 1 Section A)

Table F-1: Business Location and Operations

Location	Frequency	Percentage
Prince Rupert	4	21.0%
Victoria	2	10.5%
Kitimat	8	42.1%
Lower Mainland	3	15.7%
Other	2	10.5%
Total Responses	**19**	**100%**

The data presented in Table 2 provides a brief overview of the relative size of each business operations based on number of staff members. From the data we see that the majority (75%) of businesses tend to be seasonal in operation and therefore do not operate year round. Approximately 73% of the businesses maintain staff on a full-time basis (n=11) and just over half (55%) of all businesses have staff members who are First Nations (n=20).

Table F-2: Business Operations and Number of Employees

Q4. Do you operate your Business year round?								
Yes - 5 No - 15 Total 20								
Q5 On average, approximately how many people do you employ in your business?								
Full time	**# of Employees**	**Frequency**	**Part Time**	**# of Employees**	**Frequency**	**Seasonal**	**# of Employees**	**Frequency**
	1	1		1	2		1	1
	2	4		2	1		2	2
	3	2		4	1		3	1
	5	1		7	1		6	2
	8	1		10	1		7	1
	10	1					8	1
	25	1					15	2
							16	1
							25	1
							150	1
Total Responses		11	**Total Responses**		6	**Total Responses**		13
Q6. Are any of your employees First Nations								
Yes -11 No -9 Total-20								

3) Types of Services

BC has 1,030 provincial parks and protected areas, attracting about 20 million visits every year. Since 2001, the provincial government has established 84 new parks, 156 conservancies, two ecological reserves and 13 protected areas. BC has also expanded more than 75 parks, six ecological reserves, three protected areas and is protecting more than 2.3 million hectares (an area over four times the size of Prince Edward Island.) This includes 200,000 hectares of habitat for the world-famous Spirit Bear, BC's official mammal. Today, 14.7 per cent (or more than 13.9 million hectares) of BC is protected, more than any other province in Canada[7].

The Great Bear Rainforest is one of the largest temperate rainforests left on the planet, a total of 18,000 sq. km (6, 950 sq. mi) of land and sea. It is comprised of some of the oldest and largest trees in the world, sheltering coves and coastlines, which return the favour in the form of winds and rain created by the ocean's currents. In 2006, loggers, First Nations peoples and environmental groups came together to ensure the protection of the biodiversity of the thousands of species that have made the land home. The forest takes its name from its most mystic resident, the Kermode, or "spirit" bear, a unique white subspecies of the black bear whose territory ranges from Prince Rupert and Stewart to the north, Hazelton to the east, and Kitimat and Bella Coola to the south[8].

The findings in this study showed that of business owners reported that while there are multiple reasons as to why people visit their business, the main reasons 60% (n=71) are related to saltwater fishing, wildlife tours and experiencing the outdoors in a rain forest/pristine setting. Given the “mystique” surrounding the Great Bear Rain Forest, it comes as no surprise that the data generated in the report also shows that of the many services and products provided by local tourist and recreation operators, the most popular among their clientele are the chartered tours to the Great Bear Rain Forest.

[7] Government of British Columbia (2013) http://www.gov.bc.ca/bcfacts/
[8] Government of British Columbia (2013) http://www.gov.bc.ca/bcfacts/

Table F-3: What are the reasons people visit your business?

	Frequency
Educational tours	1
Saltwater fishing	10
Bottom fishing	1
Freshwater fishing	3
Steel head fishing	1
To see a rain forest	7
Wildlife viewing/tours	9
Eco tourism	6
Adventure tourism	5
Kayaking	3
Whale watching/dolphin watching	6
Quiet outdoor recreation experience in the wilderness in an unspoiled, pristine setting	7
Bird watching	3
Great Bear Rainforest	1
To see First Nations culture	1
Grizzly bear tours	2
Sailing	1
Stellar reputation of customer service	1
Stellar reputation of safety	1
Recreational boating	1
Walking and hiking	1
Total responses	71

What are your most popular products or services. Please describe.					
3 day charters	1	Tours to the Great Bear Rain Forest	6	Saltwater fishing	1
3 to 5 day charters	1	Tours to Haida Gwaa	1	Sport fishing	1
4 and 5 day trips	1	Spirit Bear 5 to 9 day trips	1	Wild life viewing	2
5 day charters	1	Whale watching	1	Natural outdoor experience	1
Day charters for saltwater fishing	1	Photography	1	Salmon fishing	1
Staff	1	Rock cod fishing	1	Bottom fishing	1

4) Revenue Generation and Perceived Project Impacts

According to BC Stats real gross domestic product (GDP) in BC's tourism sector was $6.5 billion in 2011, which accounted for over 4% of the GDP in provincial economy. In fact, the tourism sector expanded 1.2% in 2011 but overall experienced only modest growth. In addition, revenues in the tourism sector rose slightly (+1.4%) in 2011, to 13.4 billion and employed over 125, 000 people[9]. The data presented in Table 4 shows that 42% of the tourist and recreation business owners surveyed in this study estimated their yearly gross revenue was less than $300,000 while close to 30% estimated that their gross revenue was $500,000 or more.

Table F-4: Estimated Gross Revenue of your Business per Year

Estimated Revenue	Frequency	Percentage
Less than 99,999	3	21.4%
100,000 to 299,999	3	21.4%
300,000 to 499,999	2	14.2%
More than 500,000	4	28.5%
Don't Know	2	14.2%
Total Respondents	14	

[9] BC Stats (2013) http://www.bcstats.gov.bc.ca/StatisticsBySubject/BusinessIndustry/Tourism.aspx

Many of the tourist operators surveyed in this study tended to operate small to mid-size businesses on more of a seasonal basis. When questioned as to whether they thought that increases in industrial shipping channels would have a negative or positive impact on their business 72% of respondents (n=13) indicated that the impact would be negative while 22% thought that the increased shipping traffic would have no impact on their business (see Table 5).

Table F-5: Increases in Shipping Traffic and Impacts on Local Businesses

Do you think that increased industrial shipping traffic along the confined channels to Kitimat will have a positive or negative impact on your business?	
Positive	1
Negative	13
No Impact	4
No response	*2*
Total Responses	18

Of the 72% of business owners who indicated that the impacts on their business would be negative the data in Table 6 provides an overview as to the reasons why. We see that 35% of these people thought that the impacts would be negative because the increased shipping traffic will alter the aesthetic quality of the local area to tourists. Consequently, we can assume that this would cause a rippled effect such that less people would then travel to the area and business operations would slow down and yearly gross revenues would decrease. One of the business owners stated that their specific concern was that, “Qualitative perception of industrialization of the areas will not be good for business” while another said that “people won’t come because of the perception of industrialization”. A review of selected verbatim concerns as stated by respondents can be reviewed in Table 6.

Table F-6: Types of Impacts on Local Business

What might some of these effects be? Frequency	
Less people might travel to the area	7
Availability of Accommodation could be effected	1
Could Create a shortage of workers	2
Could bring more tourists to the area	
Shipping traffic will have an impact on the marine environment	8
Shipping traffic will alter the aesthetic quality of the local area to tourists	11
Major spills would impact tourism	2
Total Responses	31

EXAMPLES OF OTHER COMMENTS
Wave action and wakes from the freighters will create problems
Tanker wash will destroy the spirit bear feeding grounds and food supply and will have a real impact on the bears
Tankers will impact fishing as their wakes will rock the boats
There will be short and long problems during the transition that will impact my business in adventure tourism
Some tourists and eco people won't like it
There will be congestion with larger vessels having an impact on the boating channels used by recreational businesses
Qualitative perception of industrialization of the areas will not be good for business
People won't come because of the perception of industrialization
Safety for the tour and fishing boats
Tanker traffic will impact the places I can take people
Tanker traffic will bother the whales
Bottom fishing is already impacted by what is going on and it will only get worse
If the tankers impact the fishing this will impact my business
Risk Factors
Sonic Impact on the humpback whale population will be very negative
In the confined channels, tanker ships will be getting in the way of the recreation and tourism ships
In kimano Sound, the ships will have a negative impact on the whales
There is a risk of pollution due to ship wrecks
Frequency of tanker traffic will have an impact
Ship wash will have a negative effect
Noise pollution, air pollution
Accidents could have a huge negative effect
Whales will be affected by the tankers

5) Section A

Table F–7: Business Operations

Where do you normally conduct your business? (e.g.) what area of the ocean and marine access route).
Douglas Channel - 3 respondents indicated the Douglas channel with no additional information ▪ North End of Dundas ▪ Prince Rupert, Hartley Bay, Bella, Bella, Haida Gwaii ▪ On the ocean ▪ Kitimat, Prince Rupert ▪ Haida Gwaii, Great Bear Rain Forests, waters of the Northwest coast of BC ▪ Kitimat ▪ Kitimat, Clio Bay ▪ North Central Coast, Bernard Harbour, Louisa Cove, Millbank Sound ▪ Campbell River to Prince Rupert and up to the Great Bear Rain Forest ▪ Oona River ▪ Hartley Bay area, follows the fish so it varies ▪ Great Bear Rainforest ▪ Chatham Sound, Portland Canal, Work Channel ▪ North of Prince Rupert Two respondents did not identify specific areas they worked in.

Table F–8: How many years have you been operating your business

No. Years	Frequency	Cumulative Frequency
Less than one year	1	1
3 years	1	2
5 years	1	3
10 years	2	5
12 years	1	6
13 years	1	7
15 years	1	8
16 years	1	9
17 years	1	10
19 years	1	11
20 years	2	13
21 years	1	14
22 years	1	15
25 years	2	17
27 years	1	18
30 years	1	19
40 years	1	20
Total Responses	20	20

6) Section B

LNG Canada: Marine Transportation and Use VC. Effects on Recreation or Tourism Survey

Hello, my name is _____and I am calling from QRG Research on behalf of LNG Canada. We are conducting a brief Recreation and Tourism Survey that should take approximately 15 minutes to complete to assess how Project related shipping activity may affect recreation and tourism activities along the marine access route. Who is the best person to speak with in your organization about recreation and tourism?

PART A. GENERAL QUESTIONS ABOUT THE BUSINESS

Q1. Where is your business located? If you have more than one business location, please indicate your primary location.

City/Town: _____

Q2. Where do you normally conduct your business? (e.g., what area of the ocean and marine access route).

_____

Q3. How many years have you been operating the business?

_____

Q4. Do you operate your business year-round?

- ☐ Yes
- ☐ No

Q5. On average, approximately how many people do you employ at your business?

Full time_____
Part time_____
Seasonal_____

Q6. Are any of your employees First Nations?

- ☐ Yes
- ☐ No

Q7. Which First Nations community are they from?

_____

Q8. How many Aboriginal people do you employ?

_____

PART B. TYPES OF SERVICES

Q9. What services/products does your recreation and/or tourism business provide for your clients?

- ☐ Guided Tours
- ☐ Accommodation
- ☐ Fishing Boat Charters
- ☐ Whale/ Dolphin Watching
- ☐ Eco Tourism
- ☐ Adventure Tours
- ☐ Wild life Viewing (non marine)
- ☐ Restaurants
- ☐ Water Taxi
- ☐ Heli-Skiing
- ☐ Other_____

Q10. What are the reasons people visit your business?

- ☐ Salt Water Fishing
- ☐ Fresh Water Fishing
- ☐ Hunting
- ☐ Recreational Boating
- ☐ Outdoor experience in the wilderness
- ☐ To see a rainforest
- ☐ Wildlife viewing/tours
- ☐ Bird watching
- ☐ Sailing
- ☐ Personal Water Crafting 'jet skiing'
- ☐ Walking/hiking
- ☐ Ecotourism
- ☐ Adventure tourism
- ☐ Kayaking
- ☐ Whale watching/dolphin watching
- ☐ Water skiing
- ☐ Horse riding
- ☐ Canoeing
- ☐ Diving
- ☐ Off roading
- ☐ Swimming
- ☐ Land yachting
- ☐ Snorkeling
- ☐ Shoreline angling
- ☐ Motor towed inflatable's
- ☐ Other_____

Q11. Please estimate how many individuals undertake the activities listed above, and if so, please state your best guess for the activities you have selected.

_____

_____

Q12. What are your most popular products or services? Please describe

_____

_____

PART C. CLIENT PROFILE

Q13. How many customers do you estimate use your business in a year? Please select an appropriate range of number from the drop down box below.

____Less than 500

____501 to 1,000

____1,001 to 2,000

____2,001 to 3,000

____3,001 to 4,000

____4,001 to 5,000

____More than 5,000

Q14. Do you know the exact number of visitor days for your business?

_____

Q15. What percentage of your clients would you say are local residents?_____

Q16. **What percentage of your clients would you say are tourists?**_____

Q17. What are your busiest seasons?

- Spring
- Summer
- Fall
- Winter

Q18. On average, how many visitors frequent your business?

Spring _____

Summer_____

Winter _____

Fall _____

PART D:REVENUE GENERATION

Q19. Generally speaking, what would you estimate is the cost per day per customer for each of the following services that you provide?

Accommodation $ _____

Equipment Rental $_____

Boat Rental $_____

Guide services $ _____

Meals $ _____

Charters $ _____

Q20. What is the estimated gross revenue of your business per year? Please select an appropriate range of number from the drop down box below.

____ Less than $99,999

____ $100,000 to $299,999

____ $300,000 to $499,999

____ More than $500,000

PART E. ENVIRONMENTAL IMPACTS

Q21. Do you think that increased industrial shipping traffic along the confined channels to Kitimat will have a positive or negative impact on your business?

- Positive
- Negative

Q22. What might some of these effects may be?

- Less people might travel to the area
- Availability of Accommodation could be effected
- Could create a shortage of workers
- Could bring more tourists to the area

- ☐ Shipping traffic will have an impact in the marine environment
- ☐ Shipping traffic will alter the aesthetic quality of the local area to tourists
- ☐ Major spills would impact tourism

Other_____

Q23. What suggestions do you have that could mitigate the effects of increased industrial shipping traffic on your business?

_____
_____
_____
_____
_____
_____

LNG CANADA will be hosting two workshops; one in Kitimat and the second in Prince Rupert. Each event will be 2 hours long followed by a lunch, to:

Inform and confirm our understanding of fisheries occurring in the region, and

- Identify potential Project effects on commercial and recreational fishing. The workshops will include an introduction to the Project followed by a short presentation of current work on marine transportation and use, with a focus on marine fisheries. The sessions will then break into two small groups with a facilitator to provide an opportunity for people to share ideas, feedback, and insights on the research being undertaken and discuss potential issues and concerns.

  Venue and Dates:

- Sessions 1- Kitimat: Wednesday, December 11, 2013 – Activity Room located at the Riverlodge Recreation Centre, 654 Columbia Ave W. Kitimat, BC Time: 10:00 am -1:00 pm

Sessions 2 - Prince Rupert: Thursday, December 12, 2013 – British Columbia Room located at the Crest Hotel, 222 West 1st Ave. Prince Rupert, BC Time: 10:00 am -1:00 pm

Are you interested in receiving an invitation to these workshops?