Project Description
Proposed Natural Gas Transmission System

Northeast British Columbia to the Prince Rupert Area

Suite 2600, 425 - 1st Street SW
Fifth Avenue Place, East Tower
Calgary, AB T2P 3L8

Suite 1100, 1055 West Georgia Street
PO Box 11162
Vancouver, BC V6E 3R5

October 2012

Table of Contents

List of Tables

List of Figures

1.0 EXECUTIVE SUMMARY

Spectra Energy Corp's British Columbia ("BC") pipeline system has been the backbone of British Columbia's natural gas industry since 1957. With over 2,800 kilometres ("km") of pipeline and total installed compression of 685,000 horsepower ("HP"), the system transports approximately 2.4 billion cubic feet ("bcf") of natural gas on a daily basis. The company proposes to utilize this experience and expertise towards the provision of new pipeline transportation capacity to the north coast of the province through its British Columbia affiliate, 0948090 B.C. Ltd. (hereinafter collectively referred to as "Spectra Energy" or the "Company").

More specifically, the Company proposes to develop a natural gas transportation infrastructure system from northeast British Columbia to the Prince Rupert area of the province to support the export of liquefied natural gas ("LNG"). The northeast BC to Prince Rupert area pipeline project (referred to herein as the "Project"), is expected to involve the construction of a pipeline system consisting of either one or two adjacent pipelines, approximately 851 to 872 km in length and having a diameter of 914 mm (36 inch) to 1,219 mm (48 inch). The Project is considered a reviewable project under Part 4 of the *Reviewable Project Regulation of the BC Environmental Assessment Act* because the pipeline will have a diameter of greater than 323.9 mm and a length of greater than 40 km.

The proposed pipeline would start in the general area of Cypress, located in northeast BC, approximately 210 km south of Fort Nelson and terminate on Ridley Island, on the north coast of BC near Prince Rupert (Figure 1). A route is proposed from Cypress to Cranberry Junction (the "Primary Route"). However, as described in more detail below, three route options are being considered west of Cranberry Junction in order to access Ridley Island. It is anticipated that only one of such routes west of Cranberry Junction will ultimately be selected and constructed.

From Cypress the Primary Route would traverse south to Hasler Flat, paralleling both immediately adjacent to and offset by up to 1 km to the existing Spectra Energy transmission pipeline right of way; west through the Pine Pass, across the Parsnip Reach of the Williston Lake Reservoir just north of Mackenzie; west around the northern tips of Takla Lake and the upper Babine River near Kisgegas; and across the headwaters of the Skeena River, the Kispiox River and on into the Nass River watershed to Cranberry Junction. West of Cranberry Junction three route options are being considered. These consist of a land route ("Land Route") through the north Coast Mountains and two routes ("Kitsault Route" and "Nasoga Gulf Route") with marine segments (Figures 1 and 2).

The Land Route (Figure 2) would follow southwest along the Nass River Valley through Nisga'a Lands deviating near the village of Laxgalts'ap (formerly known as Greenville) to traverse south along the Ishkheenickh River, west through Kwinamaas Pass in the Ksi X'anmas Conservancy, southwest along Mouse Creek, across Khutzeymateen Inlet, Khutzeymateen Inlet Conservancy, Khutzeymateen Inlet West Conservancy, Work Channel and the Tsimpsean Peninsula to Ridley Island.

The Kitsault Route (Figure 2) would traverse northwest from Cranberry Junction and cross the Nass River enroute to Kitsault on the north coast and then offshore into the Pacific Ocean through Alice Arm, Observatory Inlet, Portland Inlet, and Chatham Sound before terminating at Ridley Island.

The Nasoga Gulf Route (Figure 2) would traverse the same alignment as the Land Route southwest from Cranberry Junction along the lower Nass River, but would depart near KP 720, continuing across Nisga'a Lands south of the Nass River. The route parallels the south bank of

the Nass River, then bears west and south, near the head of Iceberg Bay, then turns south, before heading west, connecting to the Chambers Creek Valley and terminating in vegetated land at the head of Nasoga Gulf. From the head of Nasoga Gulf the pipeline would traverse offshore into the Pacific Ocean through Nasoga Gulf, Portland Inlet and Chatham Sound before terminating at Ridley Island, along the same route as described above for the Kitsault Route.

While the Land Route and the Nasoga Gulf Route both contemplate crossing Nisga'a Lands, either option would only be undertaken with the consent of the Nisga'a Nation (the "Nisga'a"). The Company has initiated early discussions with the Nisga'a concerning the Project and is committed to working with the Nisga'a in this regard.

The Project will include two new metering and up to five new compressor stations that would be located along the pipeline system (Figure 1).

The purpose of the Project is to provide the required pipeline transportation capacity to meet the demands of a new LNG terminal being contemplated for the Prince Rupert area of British Columbia. This is in keeping with the Province's Jobs Plan and its goal of establishing up to three LNG facilities on the north coast by 2020.

The Project is expected to provide in the range of 3,000 to 3,600 person years of employment during construction, and approximately 50 to 60 permanent jobs for the life of the Project. The estimated capital cost is still being determined and is highly dependent on the route and pipeline design ultimately selected. At this early stage, capital costs are estimated to be in the range of $6 to $8 billion. With respect to property tax associated with the Project, it is estimated at this early stage that property tax could be as much as $23 million annually.

Figure 1: Proposed Project Overview Map

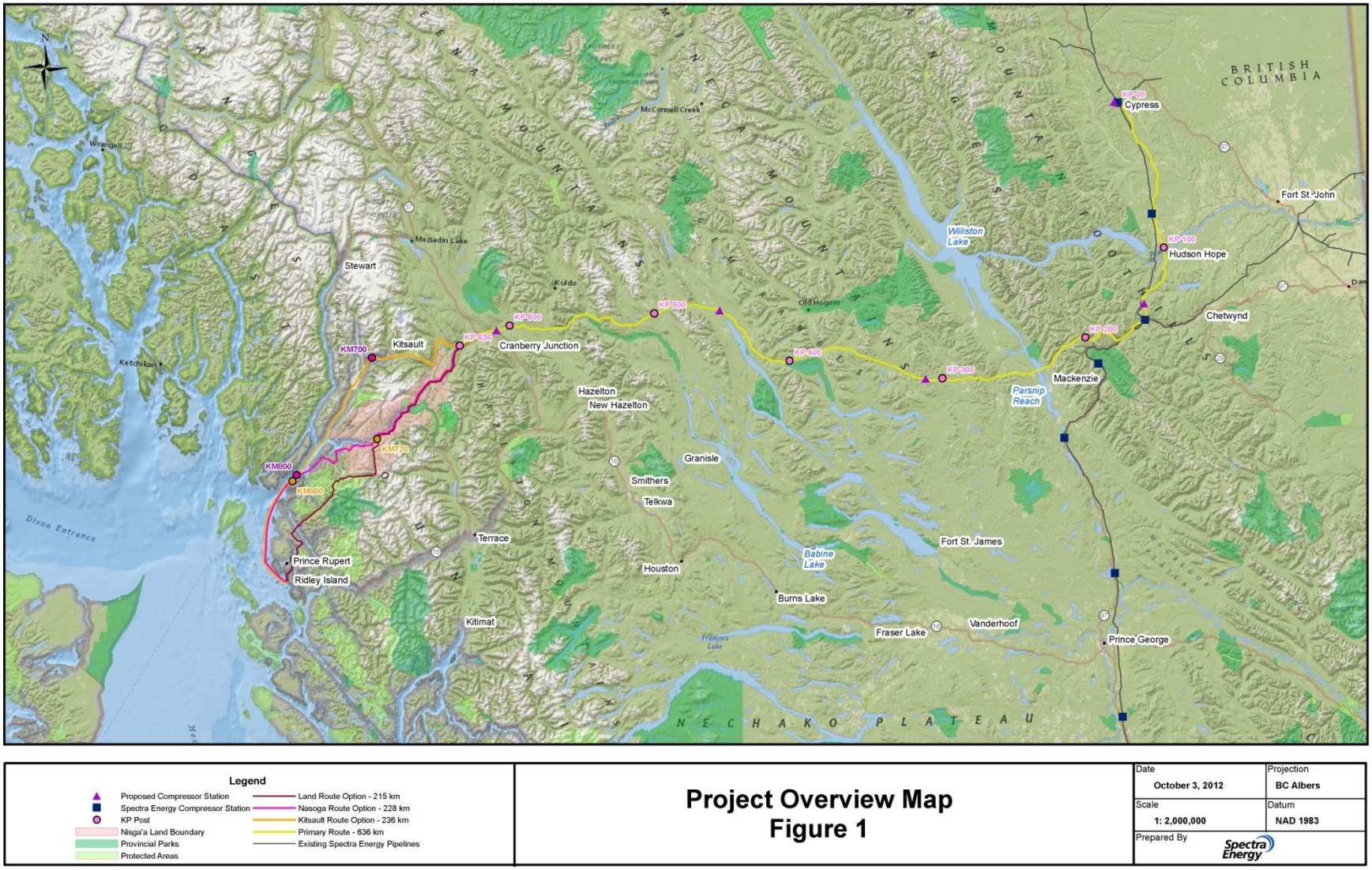
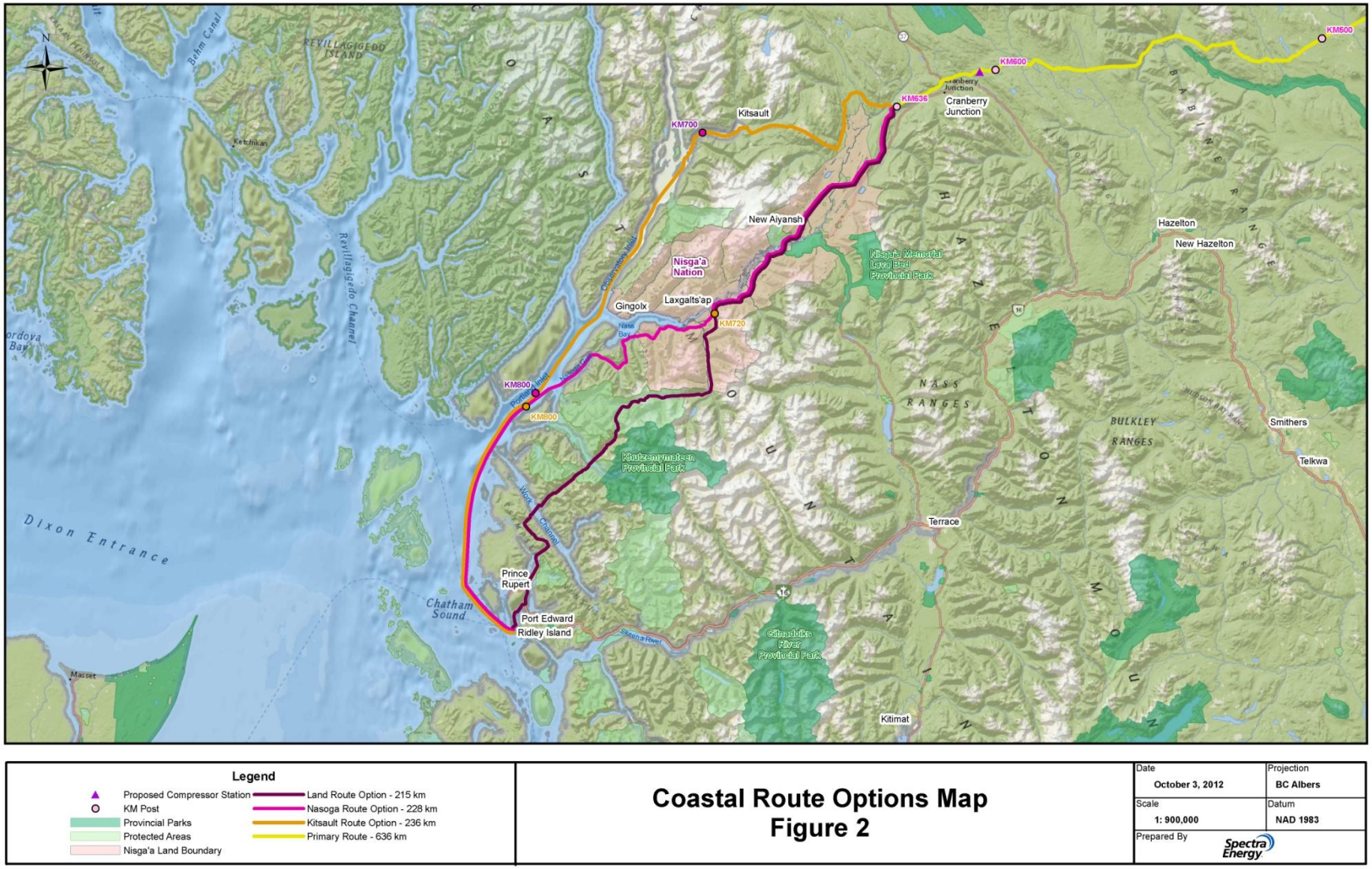


Figure 2: Proposed Coastal Route Options Map



2.0 PROPONENT INFORMATION

Proponent: 0948090 B.C. Ltd.

0948090 B.C. Ltd. is a British Columbia company, formed for the purpose of pursuing the Project on behalf of Spectra Energy and BG International Limited, doing business as BG Canada.

Website address: www.spectraenergy.com
Contact information for this Project is provided in Table 1.

Table 1: Contact Information

Contact	Address
Peter Spicker Director, Legal Affairs Spectra Energy	Suite 1100 – 1055 West Georgia Street Vancouver, British Columbia V6E 3R5 Phone: (604) 691-5020 Email: pspicker@spectraenergy.com
Brian Tanaka Director, Business Development, Special Projects Spectra Energy	Suite 2600 – 425 1st Street SW Calgary, Alberta T2P 3L8 Phone: (403) 699-1810 Email: btanaka@spectraenergy.com

3.0 GENERAL BACKGROUND INFORMATION

Spectra Energy Corp is one of North America's premier natural gas infrastructure companies serving key links in the natural gas value chain: gathering and processing; transmission and storage; and distribution. The Company's operations in Canada and the United States include approximately 31,000 km of transmission pipeline. The Company is committed to creating superior and sustainable value for its investors, customers, employees and communities by providing natural gas services in a safe, reliable and responsible manner.

The Company's commitment to operating safely and reliably is a core operating principle. The Company is keenly focused on asset integrity – both as an essential part of our deeply rooted safety culture and our responsibility to ensure safe, reliable delivery of natural gas to our customers. The Company is continually upgrading our pipeline system and invests approximately $700 million annually across North America towards maintenance of its pipeline system and other assets.

Thoughtful planning, stewardship and safe work practices are foundational elements of the Company's network of pipelines. The designs for new pipelines meet or exceed applicable regulatory requirements. Also, extensive quality assurance is performed on all phases of a pipeline project.

For existing pipelines, the Company employs a rigorous, comprehensive Integrity Management Program ("IMP") which advances system integrity through a risk-based, extensive schedule of inspections and predictive assessment. This IMP is aligned with the Company's Operations Performance Assurance framework and exceeds the requirements of the oversight agencies. The Company's Gas Control rooms are staffed 24 hours per day, 7 days per week, to continually monitor gas flows, pressure, temperature and the operating status of all pipeline facilities and are prepared to respond immediately.

Spectra Energy's IMP ensures that the Company is able to deliver on its customer commitments of providing leading, reliable service. To this end, the Company exceeded its 2011 targets for compression and processing reliability, achieving 99.7 per cent reliability across the entire system – exceeding the industry's top quartile of 99.3 per cent. These results were achieved while setting record volume peaks and overall throughput deliveries across the Company's system.

The Company's BC pipeline system has been the backbone of BC's natural gas industry for 55 years. With over 2,800 km of pipeline and total installed compression of 685,000 HP, the system transports approximately 2.4 bcf of natural gas on a daily basis. With the experience and expertise that has been acquired by operating in BC since 1957, the Company has the technical expertise and stakeholder engagement strategies to execute the Project.

4.0 PROJECT OVERVIEW

4.1 Project Description

The Project will consist of a new sweet natural gas[1] pipeline starting from the Cypress area in northeast BC, traversing south west across the province to the Prince Rupert area.

The Project will include the following facilities and activities that are associated with the construction, operation and maintenance of the pipeline:

- Approximately 851 to 872 km pipeline having a size of 914 mm (36 inch) to 1,219 mm (48 inch) in diameter from Cypress in northeast BC to Ridley Island, near Prince Rupert on the north coast of BC. The pipeline will be buried along its entire length with the exception only of aerial crossings of certain watercourses, aboveground facilities and the bottom lay within any marine segments and Parsnip Reach. The proposed pipeline route will contain either one or two adjacent pipelines.
- A route is proposed from Cypress to Cranberry Junction (see Figure 1). Three route options are being considered west of Cranberry Junction to Ridley Island. These, in no order of preference, are:
    - the Land Route through the north Coast Mountains;
    - the Nasoga Gulf Route, containing an approximately 102 km marine segment; and
    - the Kitsault Route, containing an approximately 179 km marine segment.

  These three route options are shown on Figure 2. Note that preliminary discussions with the Nisga'a have raised the possibility for modest deviations from the specific routes shown on Figure 2 for the Land Route and the Kitsault Route. The Company is amenable to considering the fine-tuning of such route options based upon consultation with the Nisga'a and other stakeholders.
- The approximate total route lengths from Cypress to Ridley Island for the three route options being considered are:
    - Cypress to Ridley Island via Land Route = 851 km;
    - Cypress to Ridley Island via Nasoga Gulf Route = 864 km; and
    - Cypress to Ridley Island via Kitsault Route = 872 km
- Up to five compressor stations to be located along the proposed pipeline system. Each compressor station will comprise the following:
    - to be located within a fenced area up to 15 ha of land

[1] After processing to "clean" raw natural gas by removing impurities and various non-methane hydrocarbons and fluids to produce what is known as "sweet" natural gas, the gas is injected into gas transmission pipelines and transported to the end users.

    - to likely include natural gas fired compressor unit(s) and auxiliary/control, power generation equipment and a fuel gas module
    - to include access roads as required
- Two metering stations, to measure delivery and receipt of gas on to and off of the pipeline system.
- A connection to Spectra Energy's existing transmission pipeline at its Compressor Station 2 is proposed.
- Isolation valves and barrel assemblies.
- Supervisory Control and Data Acquisition ("SCADA") system linking the pipeline and associated compressor station facilities to the control center.
- Necessary communication links and electrical power supply to service compressor stations, metering stations and other pipeline facilities.
- Various temporary construction workspaces, potential work camps, pipe and material storage areas, equipment lay-down areas, and temporary and permanent access roads to be reclaimed and re-vegetated, where appropriate, following construction.
- Pipeline maintenance activities and vegetation management along the right-of-way.

4.2 Alternative Means to Carry Out the Project

"Alternative means" are the various ways to implement and carry out a project in a technically and economically feasible manner. These could include alternative locations/routes and methods of development and implementation.

There are a variety of ways that natural gas can be transported including via pipeline, rail or road. Of these options, pipeline transportation is by far the safest and most reliable method.

Selecting a suitable pipeline route is a collaborative process involving the viewpoints of lands, environmental, engineering and construction experts as well as those of potentially impacted stakeholders. Route selection ultimately consists of balancing the following:

- minimize length of new land disturbance;
- minimize or mitigate landowner/stakeholder and First Nations concerns;
- avoid unstable terrain conditions both onshore and offshore;
- minimize impact on environmentally sensitive areas and minimize length traversing important wildlife habitat;
- minimize impact on Traditional Land Use areas;
- minimize length of the pipeline;
- minimize the creation of new access;
- maximize operational efficiency; and
- minimize construction and operational costs.

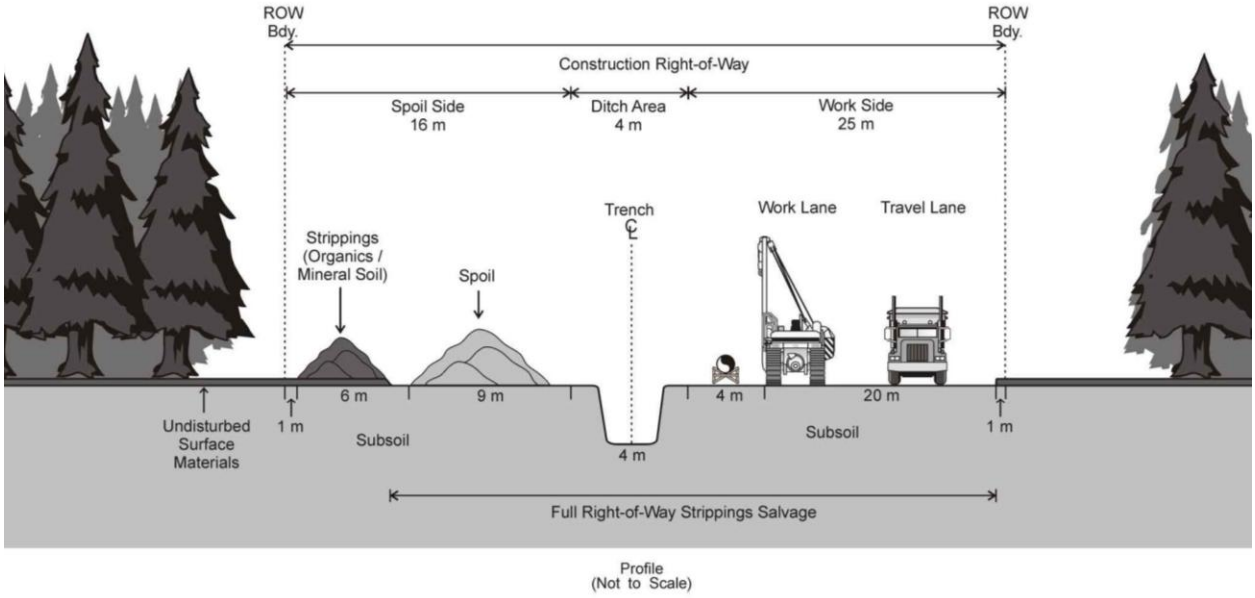
A thorough pipeline route identification, analysis and evaluation process is being undertaken for the Project. The route evaluation process to date has resulted in selection of the Primary Route from Cypress to Cranberry Junction. West of Cranberry Junction, the three route options identified in section 4.1 (Land Route, Kitsault Route and Nasoga Gulf Route) are being considered. Ultimately, it is anticipated that only one pipeline route from Cypress to Ridley Island will be selected.

4.3 Right-of-Way Characteristics

The width of the statutory right-of-way required to accommodate a single large diameter pipeline would be approximately 45 meters. The width of the statutory right-of-way required to accommodate two large diameter pipelines would be approximately 55 meters. To accommodate construction, additional temporary workspace would be required along the route at select locations for access, rail and watercourse crossings, sharp side bends, contractor lay-down yards, pipe storage yards and log decks. The overall width for construction is expected to range from 45 or 55 meters (depending upon the number of pipelines) to as much as 100 meters where the maximum additional temporary workspace is required.

Figure 3 illustrates a typical cross section of the right-of-way over level terrain showing the width of the area required for construction in a conventional pipeline installation.

Figure 3: Typical Installation Method for Single Large Diameter Pipe



4.4 Project Activities

4.4.1 Pipeline Construction

Table 2 describes the activities associated with the pipeline construction phase of the Project.

Table 2: Construction Phase Activities for the Pipeline

Construction Phase	Associated Activities
Engineering	The proposed pipeline will be designed and constructed in accordance with all applicable Canadian Standards Association ("CSA") standards and BC Oil and Gas Commission ("BCOGC") regulations. Route determinations are based on table top assessments with field validation of geotechnical concerns. This would include the potential for slope failures, seismic activity, avalanche, debris flows, erosion and other geohazards, as well as high water table and rock management. Geohazards will be avoided or mitigated as required.
Construction Survey	Activities include line-of-sight clearing, flagging and staking boundaries of the construction right-of-way, temporary workspace, facility sites, trench line and existing utilities. Archaeological sites and environmental sensitive areas will be identified and appropriately fenced or flagged.
Clearing	Trees, stumps, brush and other vegetation will be cleared from the construction right-of-way, extra temporary workspace and approved access roads, where required. Salvageable timber will be cut, decked and hauled to local mills. Non-salvageable vegetative debris will be burned unless required for mulch, corduroy, rollback, etc. Resources used during clearing activities will include hand fallers, feller-bunchers, mulchers, bulldozers, backhoes, skidders, timber processors and other tree clearing equipment.
Topsoil Salvage	Topsoil in agricultural areas will be salvaged, segregated and managed throughout the build to ensure soil capability is maintained. Surface organic material will be salvaged in forested areas for use in land reclamation whenever practical. The width and depth of topsoil salvage depends on the land use, soil conditions, microtopography, regulatory requirements and grading requirements. Resources used during topsoil handling activities include bulldozers, graders and backhoes.
Grading	Grading will be conducted to provide level surface transverse to the right-of-way. During and post construction, the use of conventional erosion control methods such as silt fences and hay bales on moderately erodible areas and during wet weather is a required practice. In steep slope terrain, the use of runoff diversion ditches and other specialized erosion control methods will be deployed throughout the width of the right-of-way. Graders, backhoes and bulldozers will be used for grading. Blasting will be required where hard bedrock has been identified.

Construction Phase	Associated Activities
Stringing and Welding	The pipe, manufactured to design strengths and toughness to control propagating fractures, will be transported by truck from the stockpile sites to the right-of-way. The pipe will be bent, aligned, welded, joint-coated and inspected prior to being lowered into the trench. Resources used during stringing and welding activities include pipe trucks, pipe layers, and pick-up trucks. The automated welding process will be employed with welds being inspected both visually and using a non destructive process such as x-ray or ultrasonic inspection equipment.
Trenching	The trench will be excavated using tracked excavators to a depth sufficient to ensure the depth of cover is in accordance or in excess of applicable codes. Trenching will generally occur after stringing, bending and welding. Areas with hard rock will require blasting. Main arterial roads and railway crossings will be bored.
Lowering-In	The pipe will be lowered into the trench using pipelayers. Trench dewatering may be required to ensure acceptable bedding for pipe. The pipe will be negatively buoyed by weights where the water table is expected to be at the bottom of the trench or greater.
Backfilling	The trench will be backfilled using backhoes, graders, bulldozers or specialized backfilling equipment. Backfill material will generally consist of native trench spoil material. In rock and aggressive backfill material the pipe will be armoured with concrete or the pipe will be imbedded in imported granular material. Displaced subsoil will be crowned over the trench to compensate for settlement and, after settlement, any excess trench spoil will be feathered out over adjacent portions of the right-of-way. Topsoil will be replaced in its original position.
Testing	The completed pipeline will be pressure tested to a minimum of 1.25 times designed operating pressure in sequential segments, using water as the test medium. The water will be drawn from suitable sources and returned to the appropriate watersheds in accordance with permit requirements.
Cleanup and Reclamation	Garbage or debris along the right-of-way will be removed regularly and disposed of in compliance with local regulations. Final clean-up and reclamation procedures will be employed once weather and soil conditions permit. The right-of-way drainage will be achieved to ensure a future stable and maintenance free condition. All disturbed areas will be seeded with an appropriate seed mix, and special reclamation measures will be applied as required.
Watercourse Crossings	Crossing methods typically used during watercourse construction include dry open cut, isolation dam and pump or flume, horizontal directional drill (HDD), aerial crossings, spans and bottom-lay (e.g. Inlet and/or lake crossings and/or river crossings).

Construction Phase	Associated Activities
Offshore Pipeline Crossing	Pipe will be laid down on the sea floor from an ocean vessel specifically designed for this purpose. HDD's will be used to create the transition from onshore to offshore at both ends of marine pipe segments. Some dredging of the exit hole and transition areas of the drill path may be required. If required, underwater welding will be accomplished using the hyperbaric chamber technique. The entire marine segments will be pressure tested with seawater and then subsequently dried.

4.4.2 Construction of Compressor Stations

Table 3 describes the construction activities for the compressor stations for this Project.

Table 3: Construction Phase Activities for the Compressor Stations

Construction Phase	Associated Activities
Engineering	The proposed compressor stations will be designed and constructed in accordance with all applicable CSA and industry standards and BCOGC and other applicable regulations.
Site Preparation	Site preparation will involve surveying, clearing, salvage and storage of topsoil, excavating and removal of unsuitable fill, grading, site drainage, placement and compaction of gravel and the installation of foundations and piles. Resources used will include hand fallers, feller-bunchers, mulchers, skidders, timber processors, earth moving equipment, pile drivers, cranes, compactors and other site preparation equipment.
Facility Construction	Construction of the new compressor stations will entail the erection of new structures, installation of equipment, non-destructive examination, pressure testing, testing of safety equipment and control systems and commissioning.

4.4.3 Operations and Ongoing Maintenance

Table 4 describes operations and ongoing maintenance activities for the pipeline right-of-way and associated facilities.

Table 4: Operations and Ongoing Maintenance Activities

Operation and Maintenance Phase	Associated Activities
Line Patrols	As part of routine operation and maintenance procedures, patrols will be conducted to visually inspect for: environmental issues; evidence of pipeline damage; erosion and wash-out areas; areas of sparse vegetation; damage to permanent erosion control structures; exposed pipe; and other potential problems that may affect the integrity and safe operation of the pipeline. In addition, pipeline markers and signs will be inspected, and maintained or replaced, as necessary, to ensure the pipeline location is visible.
Vegetation Management	The pipeline right-of-way and areas within the valve sites that are not required for ongoing operation and maintenance will be specifically managed to revert to a natural vegetative state where feasible or in accordance with landowner/stakeholder agreements. Vegetation control (including weeds), if warranted, will be conducted in accordance with requirements from the appropriate government authority.
In-Service Inspections	In-line inspection tools will periodically inspect the operating pipeline. The pipeline will be cathodically protected and externally coated to prevent or minimize external corrosion of the pipeline. In the event that an actual or suspected pipeline integrity problem is identified, the pipeline will be exposed and inspected visually. Repairs will be made as needed. Maintenance digs will be conducted in a manner similar to the pipeline construction activities (*i.e.*, ground disturbance procedures will be implemented, stripped material will be salvaged and replaced; subsoil will be stockpiled separately, backfilled and feathered-out; and reseeding and reclamation will be undertaken).

Spectra Energy has systems in place to manage the safe operation and long-term integrity of its existing facilities. These programs will be expanded to reflect the addition of this pipeline system. The new pipeline and facilities will have specific integrity management plans ensuring the ongoing requirements of this pipeline and facilities are met throughout their respective service lives. Internal inspection is an integral part of Spectra Energy's current Integrity Management Program and the proposed pig launching and receiving facilities will be designed to allow passage of various types of pigs including cleaning pigs, and high and low resolution in-line inspection tools.

Spectra Energy performs corrosion and condition monitoring on its pipelines to identify areas of reduced integrity and a regular schedule will be developed for this pipeline system. Spectra

Energy retains qualified contractors to perform high resolution in-line inspection tool runs designed and selected to achieve the desired objectives.

Spectra Energy's Pipeline Operations and Maintenance Manual will be available to all employees through the use of an intranet based document filing system. The manual is a collection of documents that outlines the instructions and requirements for maintaining Spectra Energy's BC Pipeline and Field Services pipeline assets. The purpose of these documents is to ensure that a safe and functional pipeline system is maintained. The information in these documents is also used as a guide for the requirements of certain design and construction functions on new and existing installations. Items covered within the Pipeline Operations and Maintenance Manual include instructions and requirements for:

- corrosion control
- right-of-way maintenance
- incident reporting
- lands and right-of-way management
- pipeline pigging
- pipeline patrol, class locations and leak detection
- shutdown, commissioning, deactivation, reactivation and abandonment
- aerial crossing inspection and maintenance
- safety
- valve inspection and maintenance
- maintenance welding and branch connections
- emergency and incident procedures
- communications
- measurement and gas quality
- excavating and line locating
- integrity assessment and mitigation
- coating and recoating
- permanent and temporary repair
- pressure testing
- integrity management plan
- environmental protection programs
- management of change
- custody transfer
- risk assessment
- training
- media and public communications
- materials replacement and new construction

SCADA monitoring

Spectra Energy will have the ability to monitor and control the emergency shut-down valves from its Gas Control rooms in both Fort St. John, BC and Calgary, Alberta. Staffed 24-hours per day, 7 days per week, information is gathered by the operators, and using specialized software, the information is trended to analyze equipment function over time as well as provide an ability to quickly detect and react to any depressurization events.

4.5 Accidents and Malfunctions

The application for an environmental assessment certificate will provide a summary of potential accidents and malfunctions which could occur in connection with the Project, the potential effect of such incidents on the environment and mitigation measures that will be implemented as part of the Project design.

During the construction and commissioning phases, the potential for accidents and malfunctions is similar to that of any other large diameter natural gas pipeline development - they can occur as a result of the use of machinery and equipment, and in particular, the storage of fuels and lubricants and refueling procedures. The potential for spills during these phases is limited to materials used in site preparation, fabrication and installation of the pipeline and facilities and equipment/vehicles. For example, gasoline, diesel fuel, propane, grease, motor oil, and hydraulic fluids are all needed for heavy equipment. Construction of facilities (e.g. metering sites and compressor stations) may also require hazardous materials such as acetylene, oxygen and other compressed gases, oils, paints, epoxies, concrete additives, glycol/methanol, cleaners, and solvents. Accidents may occur as a result of equipment and vehicular traffic required to carry out construction and commissioning. Stringent procedures which comply with or exceed all applicable laws and regulations will be used to minimize the potential for any accidents or malfunctions during the construction and commissioning phases.

During the operations phase, the potential for accidents and malfunctions exists in two respects. The first is in respect of potential spills, similar to that described above for the construction and commissioning phases, although to a much lesser degree. Also, safety risks such as working on energized systems, welding, and cutting, working at height or in confined spaces, exist in connection with the operations phase. All procedures referred to above will be used to minimize the potential for such occurrences during the operations phase. The second potential for accidents or malfunctions during the operations phase relates to the pipeline as on operating natural gas transmission system. The key risk relates to accidental releases of natural gas to the environment either as a result of a rupture or maintenance activities. The environmental effects of an accidental release of sweet natural gas to the atmosphere would (other than in respect of the related greenhouse gas emissions) be minimal. However, in the case of fire associated with a release, the potential for environmental effect is greater (although localized to the vicinity of the fire). These potential environmental effects include alteration or degradation of soil productivity, surface freshwater/marine water quality, groundwater quality, fish and fish habitat, riparian habitat, wetland function, plants and plant communities, wildlife and wildlife habitat and/or human health. The risk to human health is considerably reduced due to the remoteness of the proposed pipeline.

In fact, malfunctions and accidents involving operating natural gas pipelines have a very low probability of occurrence and are likely to be short term and localized. The short term and

localized nature serves to mitigate most of the risks described in the preceding paragraph. Further mitigation measures in these events will include notifying appropriate authorities and following specified emergency response and health and safety procedures which will be contained in the Project's Emergency Management Plan.

4.6 Project Development Schedule

PROJECT COMPONENT	Period
Complete Pre-Application Phase and Submit EA Application	Q1 2014
Complete Application Phase/EA report submitted to Ministers	Q4 2014
Environmental Assessment Certificate Issuance	Q1 2015
Final Investment Decision	Q1 2015
Start Construction	Q2 2015
Complete construction	Q3 2018
In-service	Q4 2018
Post-construction Monitoring	Q3 2019+

At this early stage of the Project, Spectra Energy is not in a position to determine the life span of the proposed pipeline. With a prudent and timely maintenance program, the proposed pipeline would have an indeterminate life. Spectra Energy would also need to take into account the commercial life of the pipeline and that would be subject to future negotiations and market conditions that cannot be determined at this time. However, at the end of its useful life, the pipeline would be decommissioned in accordance with applicable laws and regulations.

4.7 Resources and Materials Requirements

4.7.1 Energy Requirements

Spectra Energy's proposed compressor stations will be operated by natural gas and will generate electrical power for compressor station use.

4.7.2 Water Requirements

The environmental assessment will address water requirements, proposed water sources, potential impacts, cumulative effects and mitigation. Water is required during construction for horizontal directional drilling, hydrostatic pressure testing of the pipeline, fire suppression and for dust control. Domestic water and sewage disposal will be required for temporary construction camps and for operation of compressor stations. Withdrawal and return of hydro test water used during construction will be undertaken in consultation with appropriate regulators, including the Department of Fisheries and Oceans ("DFO"), the BCOGC, and the BC Ministry of Environment ("BC MOE"). All applicable laws and regulations relating to water withdrawal and discharge will be adhered to.

Special measures may be required to protect water resources and sensitive areas outlined by the Land and Resource Management Planning process.

4.7.3 Excavation and Fill Requirements

Soil disturbance will include right-of-way and facility site grading and trench line excavation. Native materials will be processed as required and used as backfill. In the areas of blasted ditch, concrete coated protected pipe, sand padding, or other protective measures will be utilized before backfilling.

4.7.4 Toxic and Hazardous Materials

Specific identification of hazardous substances, potential impacts, spill prevention and emergency contingencies will be addressed in the environmental assessment. Spectra Energy will implement a management system to oversee compliance with all applicable environmental laws and regulations relating to the handling, transport, storage and use of potentially hazardous materials over the life cycle of the Project.

4.7.5 Waste Disposal

The Spectra Energy Waste Management Program focuses on building best practices associated with waste disposal. With a goal of continuous improvement around environmental performance the Spectra Energy Waste Management Program includes regulatory compliance, administrative streamlining, comprehensive waste characterization, pre-qualified third party services, transportation, reporting, waste and invoice tracking, and waste recycling and disposal.

5.0 PROJECT SETTING

5.1 Environmental Setting

This section contains a general description of the existing biophysical and land use features along the pipeline route. Project setting information is presented for the following pipeline route segments:

- Cypress to west of Cranberry Junction (KP 0 to KP 636); and
- West of Cranberry Junction to Ridley Island (KP 636 to approx. KP's 851 - 872) for the following options:
  - Land Route
  - Kitsault Route; and
  - Nasoga Gulf Route.

5.1.1 Landforms and Terrain

Cypress to West of Cranberry Junction (KP 0 to KP 636)

Alberta Plateau and Rocky Mountain Foothills (KP 0 to KP 200)

This flat and gently rolling upland landform lies east of the Rocky Mountains Foothills (Holland 1976). The Alberta Plateau in the vicinity of the pipeline route drains into the Peace River. Drainage of the upland surface of the plateau is irregular as streams meander across the surface deposit and muskeg areas. Tributary streams and rivers of this portion of the Alberta Plateau flow into the Peace River. Organic soils and muskeg are common along this segment of the pipeline route.

The Rocky Mountain Foothills, located between the Rocky Mountains and the Alberta Plateau physiographic units are folded and faulted sedimentary formations consisting mainly of limestones, sandstones, calcareous siltstones and shale. The topography of the foothills varies from gently rolling hills and valleys to rugged hills and steep mountainous terrain in the segment of the pipeline route from KP 160 to KP 200.

Rocky Mountains (KP 200 to KP 230)

The Hart Ranges and Misinchinka Ranges of the Rocky Mountains are considerably lower in elevation than the front range mountains north of the Peace River and the Park Ranges located to the south along the British Columbia-Alberta border.

The mountains of Misinchinka range generally have rounded forested summits and range up to 2,150 m. The drainages on the west side of this range flow into the Rocky Mountain Trench and Williston Lake. Schists and other metamorphic rocks of Precambrian and Cambrian age are the main components of the Misinchinka range and are responsible for the subdued alpine topography crossed by this segment of the pipeline route.

Alluvial soils are common in the valley bottoms and shallow mineral soils of weathered rock occur over bedrock through this mountainous segment of the pipeline route.

Rocky Mountain Trench (KP 230 to KP 240)

The Rocky Mountain Trench is a remarkable topographic feature that extends northward from the Canada-USA border. This sinuous valley varies in width from approximately 3 km to 16 km over its 1,440 km length. The Rocky Mountain Trench in the vicinity of the pipeline crossing is approximately 10 km wide.

The pipeline route crosses the northern half of the Rocky Mountain Trench, which runs in a northwesterly direction from the headwaters of the Parsnip River to the Liard Plain, near the British Columbia-Yukon border.

Williston Lake is located in the Rocky Mountain Trench. The landforms of non-flooded portion of the trench are level to gently sloping. Small lakes and wetland areas such as Mugaha marsh, located east of Williston Lake are found in low-lying areas and oxbows.

Productive mineral and organic soils occur in the Rocky Mountain Trench, on both sides of Williston Lake along the pipeline route.

Nechako Plateau and Omineca Mountains (KP 240 to KP 470)

The Nechako Plateau is a large area of low relief, flat to gently rolling land, located between Williston Lake and Takla Lake. The landforms of the plateau include post-glacial deposits such as drumlins, eskers and meltwater channels. Wetlands, ponds, muskeg and several large lakes such as Takla Lake, Stuart Lake and Babine Lake occur on the Nechako Plateau.

The pipeline route between KP 310 and KP 370 crosses the Swannell Ranges of the Omineca Mountains. These mountains occur north of the Nechako Plateau and are characterized by granites, volcanic, sedimentary and metamorphic rock covered by shallow mineral soils.

Skeena Mountains (KP 470 to KP 570)

The Skeena Mountains physiographic unit is a high elevation landform located north of Babine Lake and east of the headwaters of the Nass River. These mountains are drained by tributaries to the Nass and Skeena Rivers. The Skeena Mountains were formed from sedimentary rocks consisting of shale, argillite and greywacke. The valley bottoms are generally broad and contain mineral soils of eroded shale and argillite plus glacial drift.

Nass Basin (KP 570 to KP 636)

The Nass Basin is a low-relief landform situated between the Skeena Mountains and the Coast Mountains physiographic units. The basin is flat or gently rolling and was occupied by glacial ice. Numerous small lake basins of glacial origin and watercourses run through the drumlin-like terrain ultimately draining into the Nass River and through the Kispiox Valley into the Skeena River.

West of Cranberry Junction to Ridley Island

- Land Route

  West of Cranberry Junction the Land Route crosses the Nass Basin and enters the Coast Mountains physiographic unit, crossing the north end of the Kitimat Ranges of the Coast Mountains (Figure 2). The Kitimat Ranges are granitic mountains. Many have rounded tops with summit elevations ranging from 2,150 m to 2,500 m. These dome-like mountains have been glaciated and often have cirques on the north and northeastern sides. Deep fjords such as Work Channel and Khutzeymateen Inlet extend into the Coast Mountains. These fjords are long, straight channels characterized by steep-sided slopes and cliffs leading to the Pacific Ocean.

  The western 20 km of the pipeline route occurs in the Hecate Lowland physiographic unit. This low-lying, coastal landform is about 15 km to 40 km in width and includes the mainland coast, the Tsimpsean Peninsula and adjacent islands. This area has been heavily glaciated, and is characterized by bedrock and large expanses of shallow muskeg.

- Kitsault Route

  The Kitsault Route begins in the Nass Basin physiographic unit and trends in a northwest direction into the Boundary Ranges of the Coast Mountains physiographic unit (Figure 2). The Boundary Ranges have a core of granitic rock and have been heavily glaciated. Cirque basins are common on the north and northeast sides of peaks and ridges of the mountains of the Boundary Ranges. The pipeline route then descends down slope into Observatory Inlet (Alice Arm) at Kitsault.

  The Kitsault Route contains the longest marine lay section under consideration. Approximately 179 km of the pipeline will be installed as a sub-sea, marine lay section from Kitsault, down Alice Arm, Observatory Inlet and Portland Inlet and south through Chatham Sound, west of the Tsimpsean Peninsula to its terminus at Ridley Island. This marine segment is situated in the Hecate Depression, a sub-sea physiographic unit that occurs between Prince Rupert and Haida Gwaii.

  Alice Arm, Observatory Inlet and Portland Inlet are contained in coastal fjords. These fjords are the product of intense glaciations of the western side of the Coast Mountains, range in width from approximately 2 km to over 7 km, and have steep glaciated sides of granitic rock that rise from the water's edge in unbroken slopes to summits ranging in height from 2,000 m to 2,700 m above the water surface. The depths of the fjords are not uniform, ranging from less than 20 m in the shoals at the entrance to Alice Arm, to over 800 m deep in Portland Inlet. Bathymetric data collection and sub-bottom profiling of the Kitsault route option in Portland Inlet, Observatory Inlet and Alice Arm are currently being investigated. Mine tailings have been deposited in Alice Arm near Kitsault. Information on the extent and characteristics of the tailings is currently being assembled.

- Nasoga Gulf Route

  From KP 636 to KP 720, the Nasoga Gulf Route and Land Route are the same. West of KP 720 the Nasoga Gulf Route traverses along the south side of the Nass River through the Kitimat Range of the Coast Mountains physiographic unit. The Nasoga Gulf Route then follows the river valleys south of Iceberg Bay and runs for 7 km across gentle to steeply-sloping side hills on the north side of Chambers Creek. The Nasoga Gulf Route contains an approximately 102 km sub-sea, marine lay section that enters the ocean south and west of Nass Bay from a wide, level area located at the head of Nasoga Gulf (Figure 2). The marine-lay pipeline section will run

approximately 45 km from Nasoga Gulf into Portland Inlet then follow the same route alignment through Portland Inlet into Chatham Sound and onto Ridley Island as the Kitsault Route described above.

5.1.2 Climate

Cypress to West of Cranberry Junction

The climate of the Alberta Plateau portion of the pipeline route east of the Rocky Mountain foothills is characterized by long and extremely cold winters. The summer growing season is warm, but short. This area receives relatively little precipitation and low snowfall. Small pockets of permafrost occur in peat lands in the northern portion of the pipeline route.

West of the Rocky Mountains the Nechako Plateau has a continental climate. This central portion of the pipeline route is characterized by short but warm summers with daytime temperatures that occasionally reach into the high 20s. Winters can be severe, with extended periods below -10°C and extremes that can reach -40°C or colder. Most of the area is under snow for four to five months of the year, from November to March. In summer, frequent thunderstorms sweep through the area.

The Omineca and Skeena mountains portion of the pipeline route has cold and snowy conditions for five to seven months of the year and snowpacks as deep as two to three metres are common. In the drier areas, where snowfalls are relatively light, soils usually freeze early and remain frozen for several months. In subalpine parkland, at the highest elevations of the zone, snows are heavy and can stay on the ground until July. Not only are winters long and cold, summers are typically short and cool.

West of Cranberry Junction to Ridley Island

The climate for the area of the three coastal pipeline route options (Figure 2) between the Coast Mountains and Hecate Lowland varies considerably from east to west. The Cranberry Junction area has long, warm summers and cool, wet winters due to the prevailing easterly-flowing air mass. Although summers in most of the zone are relatively dry, the slow-melting snowpack helps keep soil moisture levels high during the summer. In general, warm moist conditions prevail in southeast parts of the zone while the northwest parts are cooler and wetter.

Marine weather on the north coast represents a coastal temperate zone characterized by mild temperatures and high rainfall due to the Pacific Ocean, prevailing wind patterns, and the orographic effect of the coastal mountains. Weather conditions are influenced by the relative size and position of the Aleutian Low and North Pacific High pressure systems. During winter, the Aleutian Low dominates, bringing in storms and strong southeast to southwest winds across the Pacific (Fisheries and Oceans Canada. 2007). Strong outflow winds occur during the winter months in the coastal fjords from Kitsault to Prince Rupert. These winds are caused by continental high pressure that pushes cold / arctic air out of the interior down mainland inlets out onto the coast. Strong outflow winds can generate rough seas, turbulence and blizzard-like conditions (Nav. Canada 2001). During summer the North Pacific High dominates with lighter winds mostly from the northwest. Rainfall is highest on the mainland near the coast, with limited mountain rain shadow effects on the eastern coasts of the Queen Charlotte Islands. This mild and wet climate supports temperate rainforests along the coast (Fisheries and Oceans Canada. 2007).

Marine currents on the north coast are controlled by wind conditions, freshwater input, and topographic controls. The North Pacific High dominates in summer and produces mild winds from the northwest. Its influence is stronger along southern portions of the coast. The Aleutian Low dominates in winter and produces strong winds from the southwest, bringing winter storms across the Pacific. The result is that wind tends to be the dominant surface current control in the winter, pushing water north through Hecate Strait and northwest out of Dixon Entrance. In the summer, winds have less effect on currents, and topography and freshwater driven estuarine circulation dominate. This results in a general seaward flow of surface waters (both at a basin wide scale, and within inlets and channels) and landward flow of bottom waters. Due to topographic effects, large scale eddies are common in southern Hecate Strait and Dixon Entrance. These eddies cause the retention of water (and anything in the water, such as plankton) within coastal waters. Water mixing is strongest around narrow channels, shallow areas, and points of land (Fisheries and Oceans Canada. 2007).

The climate of the Prince Rupert area including Hecate Strait, Chatham Sound, Portland Inlet and Observatory Inlet are strongly influenced by Pacific, marine air masses. Fog, rain, mist and low cloud are common throughout the year.

Prince Rupert, reported to be the cloudiest and wettest city in Canada, receives 2,590 mm of annual precipitation, with most of this total being rain. Summer months at the western end of the pipeline route are mild and damp. Snow depths in winter are moderate and generally do not persist except at higher elevations.

5.1.3 Aquatic Resources

The Nisga'a, First Nations and Aboriginal groups throughout the Project area rely on freshwater and marine resources. West of Takla Lake the salmon runs, and on the north coast the eulachon runs, provide important food resources and are used for cultural purposes. The eulachon run in the Nass River is the largest found in British Columbia. Commercial fisheries are well established on the west coast of British Columbia for the five species of Pacific salmon which utilize rivers found in the Project area for spawning and juvenile rearing. Sportfishing is also economically beneficial to the area. The Nass and Skeena systems provide world class fisheries for Pacific salmon and steelhead trout attracting anglers from around the world. Resident fish such as rainbow trout, bull trout and Arctic grayling also provide fishing opportunities for local and visiting anglers.

The following section describes the freshwater and marine aquatic resources found in the Project area. Freshwater fish species information is presented by watershed basin. Species at risk are also described. Table 5 provides a list of the named rivers and creeks crossed by the proposed route, including all three options west of Cranberry Junction, and a list of fish species present. Biological features, such as marine mammals, fish, invertebrates, birds and plants are also briefly described under the "Marine" heading below.

Freshwater

Cypress to West of Cranberry Junction

This segment of the pipeline route will cross the Peace, Fraser, Skeena and Cranberry River basins and approximately 1,078 named and unnamed watercourses. Named watercourses crossed within these watershed basins are outlined below.

Lower Peace River Basin

The proposed crossing site of the Peace River is downstream from the Peace Canyon Dam. The Halfway and Moberly rivers are major tributaries to the Peace River. The Cameron River and Ground Birch, Harold Ellis, Cab and Monteith creeks flow into the Halfway River. Shangweshi, Pete and Highrise creeks are direct tributaries to the Moberly River. The Pine River, located east of Williston lake is a direct tributary to the Peace River. Farrell, Mackie, Lynx and Brenot creeks also flow into the Peace River. Crassier, Fisher, Cleveland, Coyote, Big Boulder, Little Boulder, Silver Sands, Doonan and Callazon creeks are tributaries to the Pine River.

Upper Peace River Basin

Williston Lake Reservoir is a large impoundment upstream from the W.A.C. Bennett Dam. The Parsnip Arm of Williston Lake Reservoir is crossed by the proposed route. Mugaha Creek drains directly into the east side of the Parsnip Arm and the Nation River drains directly into the west side. The Klawli River and Kwanika Creek are tributaries to the Nation River. Moosmoos, Gillis and Valleau creeks drain into the Klawli River and West Kwanika Creek is a tributary to Kwanika Creek. Gaffney Creek is a tributary to the Manson River, which is a tributary to Williston Lake Reservoir.

Fraser River Basin

Within the Fraser River Basin the pipeline route crosses the Takla Lake watershed. The Driftwood and Kotsine rivers are crossed, as well as Hudson Bay, French, Sitlika, Bates and Elmore creeks.

Hudson Bay, French, Sitlika and Bates creeks drain directly into Takla Lake. The Driftwood River is a major tributary to Takla Lake and Elmore Creek is a tributary to the Kotsine River, which is a direct tributary to the Driftwood River.

Skeena River Basin

Within the Skeena River Basin the Cypress to Cranberry Junction section crosses the Nilkitkwa, Shelagyote, Babine, Skeena and Kispiox rivers as well as Hanawald, Gunanoot, Le Clair, Shenismike, Shegisic, Carrigan, Cullon, Elizabeth Lake, Ironside, Corral, Skunsnat, Clifford, Steep Canyon, Beaverlodge and Brown Paint creeks. Unnamed tributaries to these named waterbodies are also crossed by the Project.

The Babine and Kispiox rivers and Carrigan Creek are direct tributaries to the Skeena River. The Nilkitkwa and Shelagyote rivers and Hanawald, Le Clair, Shenismike and Shegisic creeks are tributaries to the Babine River. Gunanoot Creek is a tributary to Hanawald Creek. Cullon, Elizabeth Lake, Ironside, Corral, Skunsnat, Clifford, Steep Canyon, Beaverlodge and Brown Paint creeks are direct tributaries to the Kispiox River.

Cranberry River Basin

Within the Cranberry River Basin, Greasetrail Creek is crossed by the Cypress to Cranberry Junction section, as well as unnamed tributaries to Greasetrail Creek, Greasetrail Lake and Aluk Creek.

Species at Risk

No species 'at risk' listed on Schedule 1 List of Wildlife Species at Risk under the federal *Species At Risk Act* are documented to occur in the waterbodies in the vicinity of the proposed Cypress to west of Cranberry Junction section (Species at Risk Public Registry 2012). However, there is potential for the red-listed White Sturgeon to occur downstream of identified watercourse crossings in Takla Lake within the Fraser basin.

No fish species 'at risk' listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) are known to occur within the waterbodies in the vicinity of the proposed Cypress to west of Cranberry Junction section (COSEWIC 2012a). However, pygmy whitefish, steelhead, pink salmon, chum salmon and coho salmon are high-priority candidates for a detailed status assessment by COSWEWIC (COSEWIC 2012b). Arctic grayling, coastal cutthroat trout, lake whitefish and slimy sculpin are mid-priority candidates for a detailed status assessment (COSEWIC 2012b) and may occur in the study area where suitable habitat exists.

Three species, bull trout, coastal cutthroat trout and northern redbelly dace, are Blue-listed in BC, indicating that they are considered to be of 'Special Concern' in the province and "have characteristics that make them particularly sensitive or vulnerable to human activities or natural events" (BC CDC 2012).

West of Cranberry Junction to Ridley Island

- Land Route

The Land Route crosses the Lower Nass River, Ksi X'anamas River, Khutzeymateen Inlet and Work Channel basins, 3 inlets (Khutzeymateen Inlet, Work Channel and Fern Passage) and approximately 245 watercourses. The Lower Nass River Basin crosses a number of named rivers including the Cranberry, Kiteen, Nass, Ishkheenickh, Ksga'maal, Ksi Ts'oohl Ts'ap and Ksi Hlginx Rivers as well as Aluk, Ginmiltkun, North Seasinnish, Chemainuk, Kwinyarh, Ansedagan, Ksemamaith, Ginlulak, Quilgauw, Voshell and Lachballach creeks.

Nass River Basin

The Nass River watershed is the third largest watershed in BC. The watershed has a few large lakes and the climate is typical of coastal watersheds in the north, with moderate air temperatures with abundant precipitation throughout the year. The Nass River watershed is large and relatively pristine, with fewer development activities than watersheds in the Georgia Basin or Southern Interior. There are no agricultural activities or large urban centres adding

stressors to salmon habitats and water supplies. Logging does occur in lower elevation areas from the mouth to the headwaters.

Co-management, rigorous stock assessment, as well as fish habitat protection and rehabilitation have played major roles in protecting Nass River salmon stocks. Joint management through the Nisga'a Fisheries Program has been instrumental in minimizing impacts of over harvesting and habitat loss. Salmon are harvested in multi-species, mixed stock fisheries that take into account priorities including conservation, Nisga'a and other First Nations, recreational, and commercial interests. The Pacific Salmon Treaty has played an important role in protecting returns of Nass River fish stocks.

Economic opportunities associated with the commercial catch are significant, notably for the Nisga'a Nation, to maintain control over their livelihood and maintain salmon-centred cultural activities. Salmon contribute marine-derived nutrients and biomass to forest, stream, and lake ecosystems, which are especially important in nutrient-deprived coastal watersheds (Pacific Fisheries Resource Conservation Council, 2011).

Major watercourses crossed by the Land Route include the Nass River and a major tributary, the Cranberry River. The Kiteen River and Aluk Creek are tributaries to the Cranberry River. The Ksga'maal, Ksi Ts'oohl Ts'ap and Ksi Hlginx rivers are direct tributaries to the Nass River.

North Coast Fjords and Watercourses

South of the Nass River Basin, the Land Route traverses the Ksi X'anamas River watershed (formerly known as the Kwinamass River) then turns south to cross Khutzeymateen Inlet, and Work Channel. In addition to the fjords, the Land Route crosses the Ksi X'anmas and Ensheshese rivers as well as Mouse, Silver, Scissors and Kaien creeks.

- Kitsault Route

  The Kitsault Route traverses the lower Nass and Illiance and Kshwan River basins in BC and approximately 130 watercourses before entering the Pacific Ocean near the former mining town of Kitsault at the head of Alice Arm. Named watercourses crossed in the lower Nass River Basin include: Aluk and Calmin creeks and the Nass River. Clary Creek is the only named waterbody crossed within the Illiance River Basin and there are no named streams crossed within the Kshwan River Basin.

- Nasoga Gulf Route

  The Nasoga Gulf Route crosses approximately 221 watercourses. From KP 636 to KP 720 the Nasoga Gulf Route is the same as the Land Route described above. Named tributaries to the Nass River crossed by the Nasoga Gulf option west of KP 720 include: Ishkheenickh River, Ksi Hlginx, Ksgyukwsa'a, Quilgauw, Welda, and Chambers creeks.

Species at Risk

Three species found in the West of Cranberry Junction to Ridley Island route options are Blue-listed in British Columbia including bull trout, coastal cutthroat trout and eulachon. Green sturgeon are Red-listed in BC (BC CDC 2012).

Eulachon populations in the Nass and Skeena Rivers are designated as 'Threatened' by COSEWIC (COSEWIC 2012a). Pygmy whitefish, steelhead trout, pink salmon, chum salmon

and coho salmon are high-priority candidates for a detailed status assessment by COSEWIC (COSEWIC 2012b). Coastal cutthroat trout, brassy minnow and slimy sculpin are mid-priority candidates for a detailed status assessment (COSEWIC 2012b) and may occur in the study area where suitable habitat exists. Pearl dace and round whitefish are on the low priority list for detailed status assessment (COSEWIC 2012b).

Table 5: Named Watercourse Crossings and Fish Species Present for the Proposed Project

Basin	Named River and Creek Crossings	Fish Species Present
Cypress to West of Cranberry Junction		
Lower Peace River Basin	Peace River	Burbot, brook stickleback, bull trout, prickly sculpin, mottled sculpin, sculpin, slimy sculpin, spoonhead sculpin, largescale sucker, cutthroat trout, Dolly Varden, brook trout, finescale dace, flathead chub, goldeye, arctic grayling, kokanee, lake chub, longnose dace, longnose sucker, lake trout, lake whitefish, mountain whitefish, northern pike, northern pikeminnow, peamouth chub, northern pearl dace, pygmy whitefish, rainbow trout, redside shiner, spottail shiner, sucker, troutperch, walleye, white sucker and yellow perch
	Cameron River	Rainbow trout, steelhead, burbot, slimy sculpin, largescale sucker, flathead chub, arctic grayling, lake chub, longnose dace, longnose sucker, mountain whitefish, northern pikeminnow, redside shiner
	Halfway River	Arctic grayling, bull trout, kokanee, rainbow trout, lake whitefish, mountain whitefish, burbot, northern pike, white sucker, largescale sucker, longnose sucker, northern pikeminnow, redside shiner, spottail shiner, flathead chub, lake chub, longnose dace and slimy sculpin
	Moberly River	Arctic grayling, bull trout, mountain whitefish, lake whitefish, burbot, northern pike, walleye, goldeye, largescale sucker, longnose sucker, white sucker, northern pikeminnow, flathead chub, lake chub, peamouth chub, redside shiner, longnose dace, spottail shiner, spoonhead sculpin, prickly sculpin and slimy sculpin
	Nation River	Burbot, bull trout, slimy sculpin, largescale sucker, dace, Dolly Varden, arctic grayling, kokanee, lake chub, longnose dace, longnose sucker, lake trout, mountain whitefish, northern pikeminnow, rainbow trout, redside shiner and sucker
	Klawli River	Slimy sculpin and rainbow trout
	Farrell Creek	Rainbow trout, lake chub and slimy sculpin
	Mackie Creek	Rainbow trout
	Lynx Creek	Arctic grayling, bull trout, rainbow trout, kokanee, mountain whitefish, burbot, largescale sucker, longnose sucker, white sucker, northern pikeminnow, reside shiner, lake chub, longnose dace and slimy sculpin
	Brenot Creek	Slimy sculpin, lake chub, longnose sucker, rainbow trout
	Crassier Creek	Arctic grayling, bull trout, rainbow trout and mountain whitefish
	Fisher Creek	Bull trout, rainbow trout, mountain whitefish
	Big Boulder Creek	Bull trout and bull trout, and rainbow trout
	Little Boulder Creek	Bull trout and bull trout, and rainbow trout
	Silver Sands Creek	Bull trout, mountain whitefish and slimy sculpin
	Doonan Creek	Bull trout, mountain whitefish and slimy sculpin
	Callazon Creek	Arctic grayling, bull trout, rainbow trout, mountain whitefish and slimy sculpin
Upper Peace River Basin	Williston Lake Reserviour	Arctic grayling, bull trout, lake trout, rainbow trout, kokanee, mountain whitefish, lake whitefish, pygmy whitefish, burbot, largescale sucker, longnose sucker, white sucker, northern pikeminnow, peamouth chub, lake chub, redside shiner, prickly sculpin and slimy sculpin
	Mugaha Creek	Arctic grayling, bull trout, rainbow trout, kokanee, mountain whitefish, burbot, largescale sucker and northern pikeminnow
	The Nation River	Arctic grayling, bull trout, lake trout, kokanee, rainbow trout, mountain whitefish, burbot, largescale sucker, longnose sucker, northern pikeminnow, redside shiner, longnose dace, lake chub and slimy sculpin
	Gaffney Creek	Rainbow trout, burbot, longnose dace and sculpin
Fraser River Basin	Takla Lake	Sockeye salmon, kokanee, rainbow trout, bull trout, lake trout and white sturgeon

Basin	Named River and Creek Crossings	Fish Species Present
	Kotsine River	Dolly varden, sockeye salmon and rainbow trout
	Driftwood River	Sockeye salmon, kokanee, rainbow trout, Dolly Varden and whitefish species
	Hudson Bay Creek	Dolly varden, kokanee, mountain whitefish, rainbow trout and sockeye salmon
	French Creek	Cutthroat trout, atlantic salmon, chinook salmon, chum salmon, coho salmon, pink salmon, rainbow trout, steelhead, sculpin, largescale sucker, mountain whitefish, westslope (yellowstone) cutthroat trout, bull trout, prickly culpin, Dolly Varden, kokanee and sockeye salmon
	Sitlika Creek	Dolly varden and rainbow trout
	Bates Creek	Dolly varden, kokanee, rainbow trout and sockeye salmon
Skeena River Basin	Skeena River	Chum salmon, chinook salmon, coho salmon, pink salmon, sockeye salmon, steelhead, rainbow trout, cutthroat trout, Dolly Varden, mountain whitefish, pygmy whitefish, burbot, Pacific lamprey, longnose sucker, largescale sucker, white sucker, northern pikeminnow, longnose dace, lake chub, peamouth chub, redside shiner, coastrange sculpin, prickly sculpin and threespine stickleback
	Babine River	Chum salmon, chinook salmon, coho salmon, pink salmon, sockeye salmon, kokanee, steelhead, rainbow trout, cutthroat trout, Dolly Varden, lake trout, mountain whitefish, lake whitefish and burbot
	Kispiox River	Chum salmon, chinook salmon, coho salmon, pink salmon, sockeye salmon, steelhead, kokanee, rainbow trout, cutthroat trout, Dolly Varden, lake trout, mountain whitefish, lake whitefish largescale sucker, longnose sucker, lamprey, peamouth chub, longnose dace and prickly sculpin
	Nilkitkwa River	Chinook salmon, coho salmon, cutthroat trout, Dolly Varden, mountain whitefish, rainbow trout, sockeye salmon, steelhead, sucker and whitefish
	Shelagyote River	Bull trout, Chinook salmon, coho salmon, Dolly Varden rainbow trout and steelhead
Cranberry River Basin	Cranberry River	Chinook salmon, coho salmon, pink salmon, steelhead, rainbow trout, Dolly Varden, mountain whitefish and lamprey
West of Cranberry Junction to Ridley Island		
Land Route		
Nass River Basin	K'"Alii Aksimlisims (Nass River)	Chinook salmon, chum salmon, sockeye salmon, pink salmon, coho salmon, steelhead, rainbow trout, cutthroat trout, Dolly Varden, eulachon, green sturgeon, mountain whitefish, lamprey, threespine stickleback and sculpin
	Cranberry River	Chinook salmon, coho salmon, pink salmon, steelhead, rainbow trout, Dolly Varden, mountain whitefish and lamprey
	Ksga'maal	Coho and pink salmon
	Ksi Ts'oohl Ts'ap	Chinook salmon, chum salmon, coho salmon, pink salmon, sockeye salmon, steelhead, cutthroat trout, Dolly Varden, lamprey, threespine stickleback and sculpin
	Ksi Hlginx	Chinook salmon, chum salmon, coho salmon, sockeye salmon, pink salmon, steelhead, rainbow trout, Dolly Varden, eulachon and lamprey
	Kiteen	Chinook salmon, coho salmon, Dolly Varden, mountain whitefish, pink salmon, rainbow trout and steelhead
	Kwinyarh Creek (500-136800)	Coho salmon, chum salmon, pink salmon, steelhead, Dolly Varden, sculpin and stickleback
Work Channel Basin	Ksi X'anmas	Chinook salmon, chum salmon, coho salmon, pink salmon, steelhead, cutthroat trout and Dolly Varden
	Ensheshese River	Chinook salmon, chum salmon, coho salmon, pink salmon, steelhead rainbow trout and Dolly Varden

Basin	Named River and Creek Crossings	Fish Species Present
Kitsault Route		
Lower Nass River Basin	K'"Alii Aksimlisims (Nass River)	Chinook salmon, chum salmon, sockeye salmon, pink salmon, coho salmon, steelhead, rainbow trout, cutthroat trout, Dolly Varden, eulachon, green sturgeon, mountain whitefish, lamprey, threespine stickleback and sculpin
	Aluk Creek	Coho salmon, rainbow trout and steelhead
	Cranberry River	chinook salmon, coho salmon, pink salmon, steelhead, rainbow trout, Dolly Varden, mountain whitefish and lamprey
	Kshwan River	Chum salmon, coho salmon and pink salmon
	Illiance River	chum salmon, pink salmon, coho salmon, steelhead, Dolly Varden and sculpin
Illiance River Basin	Clary Creek	Rainbow trout
Kshwan River Basin	No named stream	N/A
Nasoga Gulf Route		
Lower Nass River Basin	K'"Alii Aksimlisims (Nass River)	Chinook salmon, chum salmon, sockeye salmon, pink salmon, coho salmon, steelhead, rainbow trout, cutthroat trout, Dolly Varden, eulachon, green sturgeon, mountain whitefish, lamprey, threespine stickleback and sculpin
	Ksgyukwsa'a (Burton Creek)	Chum salmon, coho salmon, Dolly Varden, pink salmon and rainbow trout
	Ksi Hlginx	Chinook salmon, chum salmon, coho salmon, sockeye salmon, pink salmon, steelhead, rainbow trout, Dolly Varden, eulachon and lamprey
	Quilgauw Creek	Chum salmon, coho salmon, cutthroat trout, pink salmon and stickleback
	Welda Creek	Sculpin, coho salmon, Dolly Varden, pink salmon and stickleback
	Chambers Creek	Cutthroat trout, sculpin, chinook salmon, chum salmon, coho salmon, Dolly Varden, lamprey, pink salmon, rainbow trout and steelhead

Source: Fisheries Inventory Data Queries (FIDQ) 2011

Marine

Each of the route options west of Cranberry Junction to Ridley Island (Figure 2) include segments of varied lengths through the marine aquatic environment. The Land Route intersects the coastal fjords of Khutzeymateen Inlet and Work Channel and crosses Fern Passage near Ridley Island. The Kitsault Route follows along Alice Arm, Observatory Inlet, Portland Inlet, and Chatham Sound. The Nasoga Gulf Route follows Nasoga Gulf, Portland Inlet and Chatham Sound.

Chatham Sound (Tsimpsean Peninsula to Ridley Island) is identified by the Pacific North Coast Integrated Management Area (PNCIMA) as an ecologically and biologically sensitive area due to coastal tidal mixing and nutrient upwelling that is responsible for seasonal increases in marine productivity (Lucas *et al.* 2007).

Chatham Sound and Hecate Strait are used by chinook, chum, coho, pink and sockeye salmon (steelhead). Other fish species of commercial, recreational, Nisga'a and First Nations interest known to occur along the marine pipeline route segments include groundfish (rockfish, Pacific Ocean perch, Pacific cod, sole, lingcod, sablefish, Pollock, hake, skate and halibut), shrimp (humpback, pink and sidestripe), herring, crab and green urchin. Harvesting methods include offshore shrimp trawl, commercial crab harvest, commercial salmon net-fishing and trolling.

Marine plants, especially kelp and eelgrass, occur in sub-tidal areas of the marine pipeline routes. These plant species provide important habitat for a number of species of juvenile and

adult fish, provide a substrate for herring spawn and other marine invertebrates and seabirds. Kelp and eelgrass occur in the nearshore area of Chatham Sound.

The marine environment of Chatham Sound, Portland Inlet, Observatory Inlet, Alice Arm, Work Channel and Khutzeymateen Inlet is an important movement corridor, marine rearing area, and staging area for salmon migrating out to sea then returning as adults to their coastal watersheds of origin. Both Skeena and Nass River stocks occur in the Project area offshore of Ridley Island. Salmon harvesting in the Chatham Sound is mainly sockeye and pink salmon with chum, coho and chinook being commercially harvested in lesser amounts. Pink salmon, followed by sockeye, dominate the annual salmon harvest in Portland Inlet, Nasoga Gulf and Nass Bay and Observatory Inlet.

Marine mammals are commonly observed in the near shore areas of Hecate Strait. Humpback whales and gray whales use Chatham Sound for foraging and migration. Northern killer whales (orca) and Pacific white-sided dolphin are found in the area year round.

Harbour seals are common in the area throughout the year and northern fur seals, stellar sea lions, and california sea lions also occur in the area year round or migrate through Chatham Sound annually.

Marine birds including pelagic seabirds (*e.g.*, fulmars, shearwaters, cormorants, gulls, murres, guillemots, murrelets and auklets); waterfowl and waterbirds (loons, grebes, seaducks, geese) shorebirds, herons, raptors (osprey, eagles, falcons) and scavengers such as ravens and crows occur as summer residents or year round in the coastal zone.

5.1.4 Vegetation Resources

The following discussion of vegetation resources is organized by the biogeoclimatic zones crossed by the Project. Vegetation information is presented at a zonal level, however, sub-zones are examined where they have specific ecological importance. Common trees, shrubs and herbs are listed for each zone, as well as representative site associations that may occur. Additional information regarding Old-growth Management Areas (OGMAs), rare plant occurrences crossed or near the proposed routes and insect infestations is also presented.

Cypress to West of Cranberry Junction

The pipeline route between Cypress and west of Cranberry Junction crosses five biogeoclimatic zones, including the Boreal White and Black Spruce Fir (BWBS); Sub-Boreal Spruce (SBS); Engelmann Spruce-Subalpine Fir (ESSF); Mountain Hemlock (MH) and, Interior Cedar-Hemlock (ICH).

From KP 0 to KP 160 the pipeline route crosses the BWBS zone. The BWBS is predominantly a mixture of upland forests and muskeg ecosystems that occur over an elevation between 230 m to approximately 1,300 m (Delong *et al.* 1991). Forested areas are characterized by trembling aspen, white spruce, lodgepole pine, black spruce, balsam popular and larch, while in the low-lying, saturated areas characterized by poor drainage, sedges, mosses and grasses are more common. Forest succession events are common in the BWBS due to the large number of forest fires started by lightning strikes. A 10 km section of this route crosses a CDC rare vascular plant occurrence located west of Hudson Hope between KP 85 and KP 100.

As the pipeline route moves westward across the Rocky Mountains it traverses the SBS zone between KP 160 and KP 175. The SBS zone occurs at 1,100 m to 1,330 m (Meidingner *et al.*

1991). The majority of the SBS biogeoclimatic zone is covered with dense coniferous forest. The dominant tree species are hybrid white spruce and subalpine fir. In the more moist regions of the zone lilies, ferns, berry bearing plants and devil's club can be found in the understory. Throughout the SBS zone are various wetlands. These features are often characterized by acid-tolerant plants such as Labrador tea, bog laurel and peat mosses. Horsetails, sedges, cattail, bulrush and spike rush are also common within riparian areas and wetlands near lakes.

The SBS zone gives way to the ESSF zone between KP 175 to KP 215. The highest forested elevations in BC occupy the ESSF which occurs at elevations between 1,200 m and 2,100 m. Engelmann spruce and Subalpine fir are the dominate climax tree species but give way to heath, meadows and sub-alpine grasslands at higher elevations (Coupe *et al.* 1991). Mountain heather and krummholz can be found above the dominant tree line. White-flowered rhododendron, black huckleberry, grouseberry and false azalea are common shrubs through the zone. Isolated subalpine meadows contain herbs such as Indian hellebore that often possess showy flowers. Avalanche tracks create micro-habitats for a variety of tall, woody shrubs and herbaceous plant species. An approximately 15 km section of the route located between KP 173 and KP 190 crosses a CDC rare vascular plant occurrence to the north of Pine Le Moray Provincial Park.

As the pipeline route descends the steep mountain slopes from KP 215 to KP 243, it crosses back into SBS zone near Williston Lake located in the Rocky Mountain Trench (subzone SBS mk2). The SBS mk2 subzone is a distinct, moist site association of Hybrid spruce-huckleberry-highbush cranberry (Meidingner *et al.* 1980). The SBS mk2 subzone is also represented by a well-developed moss (red-stemmed feathermoss, knight's plume and step moss) and lichen layer.

The route then leaves the Rocky Mountain Trench, starts traversing the Nechako Plateau and crosses the SBS and ESSF zones between KP 243 and KP 395. North of the plateau, the pipeline crosses an ecological notable subzone. The ESSF mv3 is a moister, colder interior subzone that is characterized by the presence of knight's plume, bunchberry and heart-shaped arnica (Coupe *et al.* 1980). The increased moisture of this subzone often supports a subalpine fir, lady fern-horsetail site association.

As the route extends westward, it crosses the MH zone between KP 395 and KP 482. The MH zone occurs at relatively high elevations (400 m to 1,000 m) and is characterized by short, cool summers, and long, cool, wet winters, with heavy snow cover for several months (Pojar *et al.* 1991a). The most common tree species in the zone are mountain hemlock, amabilis fir and yellow-cedar, although they do not grow in continuous stands and are largely confined to lower elevations. Other characteristics of the MH zone are the high occurrence of shrubs such as blueberries and copper bush; the relatively low importance of herbs; the dominance of bryophytes, and the high significance of advanced generation of amablis fir and mountain hemlock (Pojar *et al.* 1991a). Subalpine heath areas located at higher elevations are dominated by heathers, partridge foot, clubmoss and liverworts.

Between KP 130 and KP 482, the proposed route crosses a region that is severely affected by the mountain pine beetle (*Dendroctonus ponderosae*). According to the BC Ministry of Forests Land and Natural Resource Operations, the severity of the infestations in this area is commonly rated between Medium and High. Mature lodgepole pines are the most common species targeted by the mountain pine beetle. One response to the epidemic is extensive forest harvesting in and around the affected areas.

The segment of the route between KP 482 and KP 534 crosses the southern end of the Skeena mountains. The eastern portion, located between KP 482 and KP 510, occurs in the moist and

wet variants of the SBS (SBSmc and SBSvk) biogeoclimatic zone. Common tree species in these variants include: hybrid white spruce, sub-alpine fir and lodgepole pine. Black huckleberry, bunchberry, high-bush cranberry, devil's club and five-leaved bramble are typical shrubs in the area. Leafy mosses and ferns occur as groundcover in the wettest parts of this subzone. As the pipeline route climbs to the west between KP 510 and KP 534 it crosses a high elevation variant of the ESSF zone (ESSFwv). This very cold and wet vegetation type is characterized by sub-alpine fir, Englemann spruce, mountain hemlock and Sitka mountain ash. Common shrubs of this portion of the pipeline route include black huckleberry, five-leaved bramble, and white flowered rhododendron. Oak fern, knight's plume and mosses are generally found as groundcover in this variant.

As the route approaches the leeward side of the Coast Mountains, it enters the ICH zone between KP 534 to KP 636. The slow melting snow pack combined with relatively dry summers extend the growing season. One result of these growing conditions is increased species diversity. The ICH contains more tree species than any other biogeoclimatic zone (Pojar *et al.* 1991). Besides western red-cedar and western hemlock (climax species), Douglas-fir, western larch, lodgepole pine, western white pine, western yew, trembling aspen, paper birch are found in the ICH. In newly burnt areas, fireweed is prevalent. Wetland complexes are not common in this zone. One subzone crossed by this portion of the route is ICH mc2. It extends from Hazelton to Meziadin Lake and constitutes the northern most subzone. Spruce and western hemlock are common species in this subzone (Meidinger *et al.* 1991). The moderate, moist climate allows trees to grow to great sizes. Near KP 600 the route passes through approximately 2 km of an Old Growth Management Area (OGMA) (Legal).

West of Cranberry Junction to Ridley Island

- Land Route

The Land Route crosses two biogeoclimatic zones, including the Interior Cedar- Hemlock (ICH) and Coastal Western Hemlock (CWH) zones.

From approximately KP 636 to KP 689 the Land Route crosses ICH mc2. As previously described these areas are exposed to cool wet winters and warm dry summers. Western red cedar and mountain hemlock are the climax species. On the dry, warmer slopes of the lower regions of this zone pine is present. The climate in this region permits extreme tree growth. Where forest fires are infrequent trees can grow to sizes and ages rivaling those located in coastal regions.

The western most portion of the Land Route (KP 689 to KP 851) is located in the CWH biogeoclimatic zone. This zone is characterized by a rainy, temperate climate, thick underbrush, high productivity and complex stand structure. Western hemlock is the dominant species, however, amabilis fir may be the dominate species at higher elevations. A sparse herb layer is a defining characteristic of this zone (Pojar *et al.* 1991a). This zone also possesses a number of wetlands including both open bogs and 'closed' bog forests. Within the CHW zone crossed by the Land Route, two CWH sub variants are present. CWH ws2 is a wet sub-maritime variant characterized by queen's cup, one-sided winter wintergreen and red-stemmed feathermoss that is located in the region surrounding the Nass and Ishkheenickh River between KP 689 and KP 745. CWH vh2 is a very wet hyper-maritime variant characterized by the presence of Western hemlock, step moss, deer fern, salal, Sitka spruce, Yellow cedar and Western red cedar *(*Pojar *et al*. 1991a) located adjacent to the Portland Inlet and the region surrounding

Prince Rupert. Near its terminal location the Land Route traverses a CDC rare vascular plant occurrence between KP 823 and KP 843.

The Land Route passes through approximately 2 km of an Old-growth Management Area (OGMA) located near KP 670.

- Kitsault Route

  The 76 km long terrestrial portion of the Kitsault Route crosses two biogeoclimatic zones, including the Interior Cedar- Hemlock (ICH) and Coastal Western Hemlock (CWH) zones.

  Between KP 636 and KP 682 the Kitsault Route is situated in ICH mc2. The terrestrial vegetation of the Kitsault Route is similar to that of the previously discussed Land Route.

- Nasoga Gulf Route

  The 45 km long terrestrial portion of the Nasoga Gulf Route that extends west from the Land Route alignment in the Nass River Basin and out to Nasoga Gulf is situated within the Coastal Western Hemlock (CWH) zone. In this segment, the route crosses four sub-variants of the CWH that range from wet sub-maritime to very wet hyper-maritime. Western hemlock and Western red cedar are the most common tree species in all four sub-zones.

5.1.5 Wildlife Resources

The following discussion of wildlife resources is a brief summary of common species found to occur within the areas that are crossed by the Project. Wildlife habitats are presented by biogeoclimatic zone. Included in the discussion are important local wildlife habitat areas such as Provincial Parks, Conservation Areas and old-growth forests.

Cypress to West of Cranberry Junction

A section of woodland caribou range land located in the Boreal White and Black Spruce Fir (BWBS) is crossed between KP 70 and KP 80. This area is preferred caribou habitat due to the relatively low amount of snowfall in the area which increases feeding and movement opportunities (Delong *et al.* 1991). The BWBS provides habitat for moose, mule deer, elk, and white-tailed deer. Deciduous forests that colonize the landscape after forest fires provide habitat for bird species such as warblers, thrushes, vireos and flycatchers and small mammals. Bald eagles nest in balsam poplars (black cottonwood) that grow on floodplain and riparian areas. The abundant forested bogs and fens of the BWBS provide year-round habitat for great gray owls and sharp-tailed grouse. Solitary sandpiper, less yellowlegs, tundra swan, sandhill crane and various warblers are common migratory birds that use the wetlands at various times in the year.

The Sub-Boreal Spruce (SBS) zones along the route, primarily located in the Interior Plateau between KP 228 and KP 513, are characterized by deep snow cover in winter. Large populations of moose are found in the SBS due to their ability to travel though deep snow (Meidinger *et al.* 1991). Old-growth coniferous forests within this zone are utilized by ungulates (mule deer), grey wolves, various rodents (deer mouse, voles), hares, migratory birds and owls . The wetlands in the SBS zone support waterfowl, provide breeding grounds for eared grebe, herring gull and shorebirds. The wetlands of the SBS zone are an important breeding area for barrow's goldeneye (Meidinger *et al.* 1991).

Engleman Spruce-Subalpine Fir (ESSF) zones crossed by the Land Route occur primarily between KP 176 and KP 215, KP 250 and KP 395, and KP 496 and KP 534. The long, cold, snowy winters and steep terrain have a strong influence on wildlife composition. Mountain goats and caribou are capable of overwintering, while other ungulates such as moose, and mule deer use the area as summer range only. Between KP 130 and KP 450 the route is almost exclusively contained within caribou range with the exception of KP 265 to KP 285. Grizzly bears are common in this zone and utilize the abundant avalanche tracks as feeding area (Coupe *et al.* 1991). The coniferous forests of the ESSF provide habitat for fur bearing animals such as wolverine, marten, fisher and red squirrel. Old-growth stands provide habitat for birds such as varied thrush and three-toed woodpeckers among others. Red crossbill, white-winged crossbill, pine siskin and Clark's nutcracker are seed eating birds that also use the forests as habitat. Fast-flowing streams found on steep slopes of the ESSF are important habitat for harlequin duck and American dipper.

The Mountain Hemlock (MH) zone has a low biodiversity in general due to its long winters, long lasting snow pack and high elevations (Pojar *et al.*1991b). Mountain goats may use the rock outcrops all winter and grizzly bears find denning locations within the MH forests. Blue grouse and willow ptarmigan may use rock out crops and subalpine meadows as well. The mature and old-growth forest of the zone provide habitat for furbearers such as snowshoe hare, rodents such as the northern flying squirrel, red squirrel, heather vole, and birds such as the great horned owl, northern flicker and common raven.

West of Cranberry Junction to Ridley Island

- Land Route

The Land Route crosses two biogeoclimatic zones, including the Interior Cedar-Hemlock (ICH) and Coastal Western Hemlock (CWH) zones.

The most common large mammals in the ICH zone, located between KP 534 and KP 630, are grizzly and black bears. The bears take advantage of the high-protein vegetation and abundant spawning salmon streams in summer to acquire the energy needed to hibernate through the long winters that characterize the climate of the area. Moose and mule deer are the most common ungulates in this segment of the pipeline route. Birds found in mixed and old-growth forests include golden eagles, woodpeckers (pileated, black-backed three-toed, hairy), sapsuckers (yellow-bellied) and owls (great horned, northern pygmy, long-eared, saw-whet). The habitat provided by Nass Basin wetlands are utilized by sandpipers, dabbling and diving ducks and used as a breeding area by loons. Large trees of the area provide habitat for many wildlife species. Standing dead trees (snags) are high-quality habitat for nesting bird species while coarse woody debris is an important habitat feature for ground species.

The eastern portion of the Land Route (KP 689 to KP 845) is contained within the CWH zone. A large proportion of colony-nesting bird habitat is found in the CWH. Tufted puffins, ancient murrelets, cassin's auklets and rhinoceros auklets can be found along the west and central coast of BC. Estuarine locations located within the coastal fjords of BC's central coast provide over-wintering habitat for birds and serve as nurseries to young fish. The old forests within the CHW provide shelter for species such as the black tailed deer by intercepting a large proportion of snowfall (Pojar *et al.*1991a). The Pacific giant salamander, tailed frog, spotted owl and marbled murrelets, are species of interest that rely on specific habitat features of the undisturbed segments of the pipeline route.

Near the western extent of the Land Route, the route crosses the Khutzeymateen Inlet and the KsiX'anmaas, Khutzeymateen Inlet and Union Lake Conservancies between KP 740 and KP 770, and KP 780 and KP 785. These conservancies border the Khutzeymateen Grizzly Bear Sanctuary – the first area in Canada to be protected specifically for grizzly bears and their habitat. These conservatories provide additional grizzly bear habitat by protecting key intertidal areas and multiple salmon bearing streams (BC Parks 2012). Near KP 825, the Land Route also passes the Kts'mkta'ani/ Union Lake Conservancy.

- Kitsault Route

  The majority of the terrestrial wildlife information relevant to the Kitsault Route is similar to that described for the Coastal Western Hemlock (CWH) biogeoclimatic zone. However additional information is discussed below.

  Chatham Sound provides important habitat for migratory and domestic birds. Bird species common to the sound include loons, grebes, cormorants, geese, ducks, shorebirds, gulls, alcids herons and eagles. Chatham Sound is an integral component of the Pacific coast flyway for migratory birds which is occupied with species from three continents at various times throughout the year (Canadian Wildlife Service 1980). Large concentrations of migratory birds such as shearwaters are present in the sound. Numbers of more than 100,000 birds are estimated to have used the tidal-line feeding area in Chatham Sound (Canadian Wildlife Service 1980).

  Alice Arm, located west of Kitsault is potential habitat for six marine mammals listed under the *Species at Risk Act* (SARA) (Government of Canada 2012). The species are: the grey whale, humpback whale, northern resident population orca, west coast transient population orca, harbour porpoise and Steller's sea lion.

- Nasoga Gulf Route

  The majority of the terrestrial wildlife information relevant to the Nasoga Gulf Route is similar to that described for the Coastal Western Hemlock (CWH) biogeoclimatic zone. Minor discrepancies may exist between the terrestrial wildlife composition of the Land Route and the Nasoga Gulf Alternative. However, at a desktop, review-level the previous information is assumed to adequately describe the terrestrial fauna of the area crossed by the Nasoga Gulf Route. The marine resources of this route alternative are similar to those previously described for the Portland Inlet-Chatham Sound segment of the Kitsault Route.

5.1.6 Heritage Resources

The proposed Primary Route and route options west of Cranberry Junction cross several archaeologically recognized cultural areas that are characterized by regional adaptations to local environments spanning the last 12,000 years. Although many portions along the pipeline segments have not been investigated for cultural remains, regional information is available for estimating the nature and time of past land occupation. An Archaeological Impact Assessment (AIA) will be conducted for all areas that might be disturbed during construction of the Project. Areas of moderate and high archaeological potential will be identified, surveyed and assessed. Areas of particular archaeological, paleontological and heritage interest at this time include areas of high or moderate archaeological potential adjacent to water sources, such as river terraces and valleys as well as river cutbanks, gravel bars and pits, and bedrock exposures.

Cypress to West of Cranberry Junction

In the Cypress to west of Cranberry Junction section, a total of 71 previously identified sites are located within 2 km of the proposed centreline of the pipeline route. Of these sites, 57 are classified as pre-contact/historic, 2 are post-contact, 10 are traditional use, and 2 are of mixed classification. Site types include artifact scatters, ceremonial/religious sites, culturally modified trees (CMTs), cultural depressions, habitation sites, structures, and transportation related features .

It is expected that the archaeological sites encountered could represent the full temporal range of occupations from the earliest post-glacial to the recent proto-historic periods. Potential to encounter early sites may occur in the Peace Region as demonstrated by the Charlie Lake and Pink Mountain sites in northeastern British Columbia. Sites within the regions northeast of Williston Reservoir are generally expected to consist of artifact scatters within the vicinity of water sources or terrain features such as shorelines of extinct glacial lakes and outwash channels. Occasional post-contact structures such as trappers' cabins and trails are also expected to be encountered.

West of Williston Reservoir the archaeology is poorly known due to a limited amount of development within the area. The nearest detailed archaeological work has been conducted around the Kitselas Canyon area on the Skeena where the excavation of two sites has suggested a culture history of at least 5,000 years. Known sites within the pipeline route are primarily related to a transitory use of the landscape associated with hunting and gathering. Sites within this portion of the pipeline route are generally expect to be lithic scatters, cache pits associated with pre-contact fishing camps, culturally modified trees (CMTs) associated with cambium collection and traditional trails associated with cambium collection and the Hazleton-Omineca Grease trail network. Habitation sites relating to villages are also expected within the area. Post-contact archaeological sites that may be within the corridor include the Yukon Telegraph Trail as well as various historic cabins relating to homesteading and the fur trade. In areas of known homesteading, burials may be associated with the cabins.

West of Cranberry Junction to Ridley Island

- Land Route

In the Land Route, a total of 144 previously identified sites are located within 2 km of the proposed centerline of the pipeline route. Of these sites, 55 are classified as pre-contact/historic, 9 are post-contact, 67 are traditional use, and 13 are of mixed classification. Site types include artifact scatters, ceremonial/religious sites, culturally modified trees (CMTs), cultural depressions, fishing features, habitation sites, shell middens, structures and transportation related features.

As with other regions associated with the proposed pipeline routes, it is possible that the archaeological sites encountered could represent the full temporal range of occupations from the earliest post-glacial to the recent proto-historic periods. The coastal segment of the corridor is characterized by the occurrence of CMTs, burials, petroglyphs and village and midden sites associated with exploitation of maritime resources. These sites generally post-date to 5,000 years ago. Traditional trails associated with the Grease trail network and cambium collection are also expected within the area. Post-contact sites may include cabins and transportation infrastructure such as telegraph and railway lines.

- Kitsault Route and Nasoga Gulf Route

  A total of 28 previously identified sites are located within 2 km of the proposed centreline of these route options. Of these sites, 9 are classified as pre-contact/historic, 2 are post-contact, and 17 are traditional use. Site types include artifact scatters, ceremonial/religious sites, CMTs, cultural depressions, fishing features, shell middens, and structures. These sites are not marine located sites, but are found on coastlines and islands adjacent to the proposed marine segments of the Kitsault Route and Nasoga Gulf Route.

  It is expected that the marine portions of the Kitsault Route and Nasoga Gulf Route may cross submerged landforms that could contain archaeological materials related to the late Pleistocene to the early Holocene. Heritage wrecks, such as boats, ships and airplanes may also be located within the vicinity of these marine portions.

5.1.7 Traditional Land Use

Nisga'a and Aboriginal engagement for the Project has been initiated. This work is designed to assist in identifying and addressing the Project-related interests and concerns of potentially-affected communities. Areas of particular interest at this time include Crown lands. A list of potentially affected Nisga'a and Aboriginal communities, key comments and concerns, and on-going engagement activities are described in the Consultation section of this Project Description.

Based on the outcome of this initial engagement process, traditional land and resource use studies may be conducted by potentially affected Nisga'a and Aboriginal communities. These studies will focus on nature, spatial and temporal extents to assess the potential impact of the Project on a community's aboriginal rights or title or treaty rights, whether asserted or established.

5.2 Social and Economic Setting

Cypress to West of Cranberry Junction

The Project route between Cypress and the area west of Cranberry Junction crosses the following regional districts:

- Peace River,
- Fraser-Fort George,
- Bulkley-Nechako, and
- the eastern portion of Kitimat-Stikine.

Table 6 presents the populations of the regional districts and municipalities that have or may have an interest in this portion of the Project. Other small communities, most of them unincorporated, are located along the Project route.

Table 6: Populations of Jurisdictions near the Eastern Portion of the Project Route

Jurisdiction	2011 estimated population
Peace River Regional District	64,280
District of Hudson's Hope	1,055
District of Chetwynd	2,706
City of Fort St. John	20,408
City of Dawson Creek	12,257
Fraser-Fort George Regional District	96,928
District of MacKenzie	3,738
City of Prince George	75,828
Bulkley-Nechako Regional District	39,371
Town of Smithers	5,437
District of Fort St. James	1,339
Village of Granisle	389
Village of Telkwa	1,441
District of Vanderhoof	4,114
Village of Burns Lake	2,116
Village of Fraser Lake	1,172
District of Houston	3,039
Kitimat-Stikine Regional District	39,702
Village of Hazelton	314
District of New Hazelton	617

Source: www.bcstats.gov.bc.ca

The economy in the Peace River Regional District is based on mining, oil and gas exploration, farming, and construction. Hydroelectricity is generated and transmitted from BC Hydro's facilities on the Peace River and independent power producers area wind farms. A large service sector also functions in the region, offering education, health care, transportation, and retail

services. Pipeline construction and oil and gas drilling by major companies have expanded substantially in recent years. Employment in oil and gas exploration and production presently is greater than any other industrial sector.

The economies of Fraser-Fort George and Bulkley-Nechako Regional Districts are led by the forest industry, including timber harvesting, lumber production, and (near Prince George), pulp and paper manufacturing. Mining is a growing part of the economy, as the area is rich in minerals, including copper, gold, zinc and lead. The two operating mines in the region, Endako Mine and Huckleberry Mine, have helped support strong growth in this sector. Local companies provide services to primary sector industries and the populations they support. Tourism resources include wildlife and scenic mountainous terrain. A system of lakes and rivers offers opportunities for water-based recreation, including kayaking, canoeing and sport fishing. Provincial government services are offered in Prince George and Smithers. Regional District main offices are located in Dawson Creek, Prince George, Burns Lake, and Terrace.

First Nations with traditional territories and treaty lands overlapping the route in the eastern portion of the Project include Saulteau First Nation, West Moberly First Nation, Halfway River First Nation, Blueberry River First Nation, McLeod Lake Indian Band, Nak'azdli First nation, Takla Lake First Nation, Babine Lake First Nation, Gitxsan First Nation, Gitanyow First Nation and Nisga'a.

The economies of the Peace area First Nations include contracting and employment in the mining, oil and gas and forestry sectors. First Nation economies west of the Peace River area include forestry, mining, fishing, government and tourism.

West of Cranberry Junction to Ridley Island

West of Cranberry Junction, all three route options cross the Kitimat-Stikine and Skeena-Queen Charlotte Regional Districts. The Land Route and Nasoga Gulf Route also pass through Nisga'a Lands, a 2,019 square kilometre area governed by Nisga'a Lisims Government (NLG) under the terms of the *Nisga'a Final Agreement* of 2000.

Table 7 identifies the regional, municipal, and Nisga'a jurisdictions in the western portion of the Project route, and provides estimates of their 2011 populations.

Table 7: Populations of Jurisdictions in the Western Portions of the Project Route

Jurisdiction	2011 estimated population
Kitimat-Stikine Regional District	39,702
City of Terrace	12,044
District of Stewart	499
District of Kitimat	9,098
Nisga'a Lands	3,070
Gingolx,	500
Gitwinksihlkw (New Aiyansh),	250
Laxgalts'ap	520
Gitlaxt'aamiks	1,800
Skeena- Queen Charlotte Regional District	19,482
City of Prince Rupert	12,935
District of Port Edward	566

Source: www.bcstats.gov.bc.ca; Nisga'a Lisims Government 2011

The economic base of the Kitimat-Stikine Regional District is primarily forestry, lumber, and pulp and paper production, though there has been substantial growth in the mining and oil and gas sector in recent years. Construction of BC Hydro's Northwest Transmission Line project can be expected to stimulate further mining and other industrial development in the Highway 37 corridor. Retail and other support services, along with government, health, and education also contribute to the regional economy. Regional District offices are located in Terrace and Prince Rupert.

In the Nisga'a Lands, fishing and forestry are major employers, as is employment in the government, education, and healthcare sectors.

The economy of Skeena-Queen Charlotte Regional District and its biggest city, Prince Rupert, has been undergoing a transformation in recent years. A marked decline in logging and forest products industries has seen an employment decline of 62% in the region and 72% in Prince Rupert between 2001 and 2006. Support industries and public administration declined substantially during that period. Employment growth has been spurred by investment in the Port of Prince Rupert, which was accompanied by an expansion of Prince Rupert's transportation and warehousing sector. Employment growth also has occurred in wholesale trade and

administrative support. Expansion of the tourism sector has resulted in increased employment in accommodation, arts, entertainment, and recreation.

Area First Nations, include Kitsumkalum, Kitselas, Lax Kw'alaams, Metlakatla and Gitxaala. These marine-oriented communities have traditionally depended on fishing and fish processing, with substantial involvement in forestry.

5.3 Land Use

Cypress to West of Cranberry Junction

Land use in most of the study area reflects the socioeconomic setting of adjacent lands. The initial 21 km of the route is parallel to, and 1 km east of, the existing Spectra Energy transmission pipeline. From KP 21 to KP 28, the pipeline route is immediately adjacent to the existing Spectra Energy transmission pipeline, so the immediately adjacent land is used for pipeline infrastructure. The route then passes through land used primarily for forestry and range in upland areas, with several ranches located near the Halfway River (KP 40). From KP 75 to KP 85, land use is characterized by gas wells and gathering infrastructure. The forested and logged uplands give way to agricultural production in valley bottoms as the pipeline route passes west of Hudson's Hope (KP 100). Much of the initial 110 km of the pipeline route crosses land included in the Agricultural Land Reserve.

Between Hudson's Hope and the crossing of Williston Lake Reservoir, the land is characterized by both logged and mature forest. From KP 116 to KP 125, the pipeline route crosses TFL 48. Other forest tenures are intermittently crossed along the entire pipeline route. From KP 132 to KP 138, the Project pipeline is immediately adjacent to another existing Spectra Energy pipeline. A portion of this pipeline segment passes through an area designated as a coal tenure (KP 155 to KP 171) and crosses a major electricity transmission right-of-way at KPs 132, 162, and 172. The route parallels Highway 97 from KP 163 to KP 170. Approaching Williston Lake Reservoir from the east, the route crosses a placer mining tenure (KP 222 to KP 224) at Mugaha Creek, passes north of residential developments, and crosses recently-logged land before the pipeline enters Parsnip Reach.

West of the Williston Lake Reservoir, the route again crosses forested Crown land where recent logging activity is evident. From KP 230 to KP 400, the landscape is a patchwork of logged and unlogged areas, resource roads, placer tenures, other mineral tenures, and range tenures. This section of the pipeline route is devoid of settlements.

Passing northeast of Takla Landing (KP 416), the pipeline route crosses through an area of increasingly intensive forestry activity. The route passes to the east of Takla Lake Marine Park, Cheztainya Lake Indian Reserve , and North Takla Lake Indian Reserve. The area is laced with forest service roads and dotted with small lakes and streams. As the route passes to the east and north of Bulkley House (KP 448), logging activity declines and the landscape becomes more forested.

The pipeline route turns west at KP 450, crossing the oxbows and wetlands of the Driftwood River north of Takla Lake. Climbing up the forested Kotsine River and Elmore Creek valleys to Kotsine Pass (KP 486) through the Skeena Mountains, the route then drops to cross the Nilkitwa River (KP 492). From KP 467 to KP 486, the landscape has not been affected by mining, logging, or other resource extraction activities. Once in the Nechako Plateau, the pipeline route crosses forested and logged land (KP 493 to KP 500). Approaching Gunanoot

Lake (KP 509) from the east, the route passes scores of small lakes and wetlands in land that is presently unlogged from KP 497 to KP 541, though much of this area is in the Babine Timber Sales Business Area.

West of Gunanoot Lake, the pipeline route crosses unroaded and unlogged land north of Babine River Corridor Provincial Park. Passing through and to the west of the forested Kisgegas Indian Reserve from KP 541 to KP 547, the pipeline route once again enters land that is subject to extensive forestry activity. After crossing the Skeena River, the route passes through more logged and standing forest before crossing several tributaries of the Kispiox River (KP 569 to KP 585) and the main stem of the Kispiox at KP 589. Most of the area, leading to Cranberry Junction, has been previously logged.

Cranberry Junction to Ridley Island

- Land Route

The Land route parallels Highway 113 and the Cranberry River, upslope and north of both the road and the river until the pipeline crosses the road, the Cranberry River and the Kiteen River in the vicinity of KP 640 to 650. The forested slopes in this area have been logged and are in various stages of regrowth. The route also crosses several mineral tenures in this area.

At KP 655, the route enters Nisga'a Lands, which are subject to Nisga'a governance under the *Nisga'a Final Agreement*. These Nisga'a Lands, like that of their Crown neighbours, have been logged and roaded. The route crosses an electricity transmission line and veers west toward its crossing of the Nass River. To the west of the Nass River, the route turns south again, through lands with evidence of sporadic logging. The route passes just north of the Nisga'a community of Gitwinksihlkw, which faces the Nass River to the south.

Just past Gitwinksihlkw, the pipeline route turns south and crosses the Nass River further downstream. Trending southwest, the route crosses Highway 113 for the third time, just west of Nisga'a Memorial Lava Bed Provincial Park. The route then heads roughly southwest, upslope of Highway 113, through a partially logged and regrowing forest landscape. Crossing Ksi-Mat'in Creek, the pipeline route stays to the south of the Nass River, whereas Highway 113 crosses to the north side. The pipeline parallels Ginulak Creek and Ginulak Road at which point, the pipe route turns south to border the steep slopes of the Boundary Range, avoiding the floodplain of Quilgauw Creek. This area is largely unroaded and unlogged.

Crossing Quilqauw Creek, the route bears southwest and then follows Ksi Hlginx or Ishkheenickh to the south. Occasional cutblocks are on the steep slopes of the valley sides in this area. Veering west and crossing Ishkheenickh, the route continues west, upslope of Lachballach Creek and exits Nisga'a Lands.

The route enters the KSI X'anmas Conservancy and continues west and south along the Mouse Creek drainage into the Khutzeymateen Inlet West Conservancy at the confluence of Mouse Creek and the Khutzeymateen Inlet. The route then crosses Khutzeymateen Inlet and the Khutzeymateen Inlet Conservancy to the south. The route is located approximately 10 km west and outside of the Khutzeymateen Park (also known as Khutzeymateen/K'tzim-a-deen Grizzly Sanctuary). The hill slopes and valleys are unlogged and unroaded through these conservancies.

The Khutzeymateen Inlet Conservancy and the Khutzeymateen Inlet West Conservancy were set aside in 1987 and approved in 2011 for the protection and maintenance of their biological diversity and natural environments; as well as the preservation and maintenance of social,

ceremonial and cultural uses of First Nations; the maintenance and protection of their recreational values and to ensure that development or use of their natural resources occurs in a sustainable manner.

Crossing Work Channel, the route follows the Ensheshese River valley, once again entering a logged area. These land uses persist until the route enters Kaien Island, Prince Rupert. Here, the route parallels an electricity transmission line and Highway 16, heading south. The route turns west at Ridley Island Road, passing north of a gravel pit. Crossing Ridley Island Road, the pipeline route crosses rail lines and the northwest arm of Porpoise Harbour before ending in the heavily disturbed landscape of Ridley Island.

- Kitsault Route

  The Kitsault Route connects to the eastern segment of the pipeline route near KP 636 and heads northwest crossing the Nass River and traversing outside Nisga'a Lands toward Kitsault (Figure 2).

  Paralleling Kshadin Creek, the route continues west through land that has been logged until it reaches 50 km west of the KP 636 junction. West of this point, logging becomes less common and to the end of the land portion of the Kitsault Route, there is little evidence of logging or other resource extraction. The pipeline route skirts the northern edge of the community of Kitsault, and the land use setting of the route does not include urban land. The terminus of the route crosses a portion of the Illiance River estuary in Alice Arm.

- Nasoga Gulf Route

  The upland portion of the Nasoga Gulf Route follows the same route as the Land Route until KP 720. West of KP 720, the route promptly crosses Quilgauw Creek and its floodplain, and then crosses forest land with some evidence of logging. Dropping to cross Ksi Hlginx, the route proceeds west across forested, logged, and wetland areas south of the mouth of the Nass River. The route parallels the south bank of the Nass River, and then bears west and south, crossing Ksgyukwsa'a (Burton Creek). The lands in this area are largely unroaded forest. Near the head of Iceberg Bay, the route turns south in an unlogged and forested valley, before heading west, connecting to the heavily-logged Chambers Creek Valley and terminating in vegetated land at the head of Nasoga Gulf.

5.3.1 Land Use Plans

The proposed pipeline route, including the three route options west of Cranberry Junction to Ridley Island, crosses eight Land and Resource Management Plans (LRMP), five Sustainable Resource Management Plans (SRMP) and one Land Use Management Plan (LUMP) (see list of Land Use Plans in Table 8). The Land Use Plans will be used as a resource to help inform and guide the environmental assessment process.

Table 8: Land Use Plans Crossed

Land Use Plan	Plan Type	Plan Status	Date
Fort St. John Land and Resource Management Plan	LRMP	Approved	1997
Dawson Creek Land and Resource Use Management Plan	LRMP	Approved	1997
Mackenzie Land and Resource Management Plan	LRMP	Approved	2001
Mugaha Marsh Sensitive Area Plan	SRMP	Approved	2002
Fort St. James Land and Resource Use Management Plan	LRMP	Approved	1999
Bulkley Land and Resource Management Plan	LRMP	Approved	2000
Kispiox Land and Resource Management Plan	LRMP	Approved	1997
Xsu gwin lik'l''inswx: West Babine Sustainable Resource Management Plan	SRMP	Approved	2004
Nass South Sustainable Resource Management Plan	SRMP	Draft	2012
Kalum Land and Resource Management Plan	LRMP	Approved	2002
Kalum South Sustainable Resource Management Plan	SRMP	Approved	2006
North Coast Land and Resource Management Plan	LRMP	Draft	2004
Khutzeymateen Protected Areas Management Plan	SRMP	Approved	2011
Port of Prince Rupert 2020 Management Plan	LUMP	Draft	2011

Sources: British Columbia Ministry of Forest, Lands and Natural Resource Operations; BC Parks, Coast Forest Conservation Initiative

6.0 VALUED COMPONENTS

Valued Components ("VCs") are specific attributes within the broader categories of environmental, health, heritage, economic and social matters that may be affected by the proposed Project. They are generally selected having regard to their importance to people and ecosystems and the potential for the proposed Project to interact with them. The selected VCs and associated indicators provide useful categories upon which to evaluate potential impacts of the proposed Project and inform the baseline data collection and analysis.

VCs to be considered in the preparation of an application for an environmental assessment certificate will be approved by Environmental Assessment Office ("EAO"), having regard to the requirements of the *Environmental Assessment Act* to assess for potentially significant adverse environmental, health, heritage, economic and social effects and having regard to the provisions of Chapter 10 of the *Nisga'a Final Agreement*. Chapter 10 of the *Nisga'a Final Agreement* includes section 8(f) which requires assessment of the effects of the proposed Project on the existing and future economic, social and cultural well-being of Nisga'a citizens who may be affected by the proposed Project.

Cumulative effects for the selected VCs will be determined for the proposed Project in combination with other past, current and reasonably foreseeable future projects. Detailed methodology and rationale used to determine if the proposed Project is anticipated to have significant adverse cumulative effects and how the other projects will be identified will be provided in Spectra Energy's application for an environmental assessment certificate. The cumulative effects assessment will consider:

- Approved land use plans that designate the most appropriate activities on the land base;
- Baseline studies and historical data that factor in the effects of past development and set out the current conditions;
- Potential overlapping impacts due to present developments; and
- Predicted impacts from future developments that are sufficiently certain to proceed.

In developing its proposed VCs for consideration and approval by the EAO, Spectra Energy will utilize information and views obtained through consultation with the Nisga'a Nation, First Nations and Aboriginal groups, government agencies, local government, stakeholders and the public, as well as land use plans, species recovery plans, VCs used in other similar projects, information gathered through route reconnaissance and preliminary assessment and other relevant information. Spectra Energy will also ensure that the process and rationale for selection of the VCs is documented in its application for an environmental assessment certificate.

7.0 CONSULTATION

Spectra Energy is committed to engaging with the Nisga'a Nation, First Nations and Aboriginal groups, local communities, interested parties, stakeholders and landowners through an open and interactive consultation process that is fully integrated with the environmental assessment process for the proposed Project. The Company has already begun a comprehensive project consultation and communications program, beginning with general meetings with First Nations and Aboriginal groups, including an informal introduction with the Nisga'a Nation, local governments and other stakeholders. Early consultation began during the fall of 2011 and has continued to date, including participation by the Company in conferences, seminars and meetings with various groups and individuals. To date, the majority of discussions have been of an informal nature, serving to introduce the Company and provide information about concepts related to the construction of additional large diameter natural gas pipeline infrastructure from the northeast of BC to the north coast. As a requirement of the environmental assessment process, Spectra Energy will draft a First Nations Consultation Plan and a Public Consultation Plan for EAO approval. Spectra Energy will be required to report to EAO on the implementation and results of the consultation plans at specified periods during the environmental assessment process.

The following is a preliminary list of parties the Company would anticipate consulting with in respect of each of the potential route options. The list may be augmented or otherwise modified based on guidance and direction provided by the EAO at the commencement of and during the course of the environmental assessment:

7.1 First Nations

- British Columbia Treaty 8 First Nations:
    - Fort Nelson First Nation
    - Prophet River First Nation
    - Blueberry River First Nations
    - Doig River First Nation
    - Halfway River First Nation
    - West Moberly First Nations
    - Saulteau First Nations
    - McLeod Lake Indian Band
- Nak' azdli Band
- Tsay Keh Dene First Nation
- Takla Lake First Nation
- Lake Babine First Nation
- Gitxsan (includes Hereditary Chiefs and Village councils
- Gitanyow (includes Hereditary Chiefs and Village Councils)
- Kitsumkalum First Nation
- Kitselas

- Nisga'a Lisims Government
  - Village of New Aiyansh
  - Village of Laxgalts'ap
  - Village of Gitwinksihlkw
  - Village of Gingolx
- Lax kw'alaams Nation
- Metlakatla First Nation
- Gitxaala First Nation

7.2 Communities, Aboriginal Groups, Stakeholders, Private Landowners and General Public

Local Government

- Peace River Regional District
  - City of Fort St John
  - City of Dawson Creek
  - District of Taylor
  - District of Chetwynd
  - District of Tumbler Ridge
  - District of Hudson's Hope
  - Village of Pouce Coupe
- Fraser Fort George Regional District
  - District of Mackenzie
  - City of Prince George
- Bulkley Nechako Regional District
  - District of Fort St James
  - Village of Granisle
  - Village of Telkwa
  - Town of Smithers
  - District of Vanderhoof
  - Village of Burns Lake
  - Village of Fraser Lake
  - District of Houston
- Kitimat Stikine Regional District
  - Village of Hazelton
  - District of New Hazelton
  - District of Kitimat
  - City of Terrace

    - District of Stewart
- Skeena Queen Charlotte Regional District
    - City of Prince Rupert
    - District of Port Edward

Aboriginal Groups and Associations

- Métis Associations or “other” groups
    - Kelly Lake First Nation
    - Kelly Lake Cree Nation
    - Kelly Lake Métis Settlement Society
    - Métis Nation of BC
    - North East Métis Association
- First Nations
    - Carrier Sekani Tribal Council
    - Treaty 8 Tribal Association

Stakeholders

- Registered trappers
- Registered guides and outfitters
- Backcountry recreation tenure holders
- Wilderness lodges
- Commercial fishing industry representatives
- Sport fishing
- Forest tenure holders
- Mining tenure holders
- Gas and Oil tenure holders
- Ecotourism operators
- Other tenure and license holders as identified

Private Landowners

- Land owners on or adjacent to right of way

General Public

- Residents of rural and local communities

Consultation and communications consistent with standard Spectra Energy practices and approaches will be used to satisfy regulatory requirements and respond to the needs of stakeholders and interested parties. These may include:

Communications

- information advertisements
- public event advertisements

- project fact sheets/backgrounders/newsletters
- presentation materials
- website materials
- public resource files

Consultation Activities

- meetings with selected groups and parties
- one-on-one/small group meetings
- presentations
- public open houses

Contact/Feedback Mechanisms

- toll-free information line
- e-mail address/mailing address/facsimile
- website with link to e-mail address

Consultation with First Nations and Aboriginal groups would be undertaken in accordance with applicable legal principles. In the case of the asserted aboriginal rights and title, the Company will, as directed by the Crown, engage in direct consultation to assist the Crown in discharging its duties under the Supreme Court of Canada's decision in *Haida Nation vs. British Columbia (Minister of Forests)* and related case law. In the case of the Nisga'a, consultation would be undertaken as directed by the Crown, in support of the Crown in fulfilling its obligations under the *Nisga'a Final Agreement*.

8.0 REQUIRED PERMITS

8.1 Permits

Various aspects of the planning, construction and operation of the Project will require permits, licenses and approvals under the *Oil and Gas Activities Act* and other statutes administered by provincial and federal regulatory agencies. These may include but are not necessarily limited to those set out in Tables 9, 10 and 11:

Table 9: Potential Permit Requirements during Project Planning

Permit / Consent	Legislation	Responsible Agency
Provincial		
Investigative use permits (e.g. drilling investigations, helipad construction)	*Land Act*	BCOGC
Section 14 Heritage Investigation Permit	*Heritage Conservation Act*	BCOGC / Archaeology Branch
Fish Collection Permit	*Wildlife Act*	BC Ministry of Forests, Lands, and Natural Resource Operations ("MFLNRO")
Forest Service Road use	*Forest Act*	BCOGC
Licence of Occupation (e.g. camps)	*Land Act*	BCOGC
Section 9 Approval for Changes in and about a Stream	*Water Act*	BCOGC
Section 8(1) Approval for Short Term Use of Water	*Water Act*	BCOGC

Table 10: Potential Permit Requirements prior to Project Construction

Permit / Consent	Legislation	Responsible Agency
Provincial		
Pipeline Permit	*Oil & Gas Activities Act*	BCOGC
Facilities Permits	*Oil & Gas Activities Act*	BCOGC
Master Licence to Cut	*Forest Act*	BCOGC
Forest Service Road use	*Forest Act*	BCOGC
Licence of Occupation	*Land Act*	BCOGC

Permit / Consent	Legislation	Responsible Agency
Heritage Conservation Act Clearance	*Heritage Conservation Act*	BCOGC / Archaeology Branch
Section 12 Site Alteration Permit	*Heritage Conservation Act*	BCOGC / Archaeology Branch
Section 9 Approval for Changes in and about a Stream	*Water Act*	BCOGC
Section 8(1) Approval for Short Term Use of Water	*Water Act*	BCOGC
Non-farm use on ALR lands (for facilities)	*Agricultural Land Commission Act*	ALC/BCOGC
Federal		
Section 35(2) Authorization	*Fisheries Act*	DFO
Section 5(1) approval	*Navigable Waters Protection Act*	Transport Canada
Approval of Caribou Protection Plans / Restoration Plans	*Species at Risk Act*	Environment Canada
Explosives User Magazine License	*Explosives Act*	Natural Resources Canada

Table 11: Potential Permit Requirements during and following Project Construction

Permit / Consent	Legislation	Responsible Agency
Provincial		
Fish Collection Permit	*Wildlife Act*	BC MFLNRO
Wildlife Sundry Permits (Beaver dam removal, wildlife salvage, amphibian relocation)	*Wildlife Act*	BC MFLNRO
Burning Permits	*Forest Act*	BC MFLNRO
Waste Discharge Permit (Air Emissions at facilities)	*Environmental Management Act*	BCOGC
Regional		
Food, Water, Accomodations and Sewarage for Industrial Camps	*Health Act*	Local Health Authority
Various Zoning Permits		Regional Districts

In addition, the Project is expected to trigger the need for an environmental assessment pursuant to the *Canadian Environmental Assessment Act*. Spectra Energy will be requesting the provincial Minister of Environment to seek equivalency or substitution in respect of the British

Columbia environmental assessment process, under sections 32 to 36 of the *Canadian Environmental Assessment Act*, 2012. If for any reason this does not occur, Spectra Energy will work with both the EAO and the Canadian Environmental Assessment Agency to harmonize the two review processes to the extent possible.

8.2 Concurrent Permitting

Spectra Energy currently intends to make application under section 23 of the *Environmental Assessment Act* and the *Concurrent Permitting Regulation* for concurrent permitting. Concurrent permitting between the EAO process and other provincial agencies (such as BCOGC) will require that all permit application materials and a request for concurrent review be provided to the executive director of the EAO within seven days of acceptance of the application for an environmental assessment certificate. Consultation with the EAO and the BCOGC will be undertaken well in advance of the submission of the application for an environmental assessment certificate, to ensure the appropriate documents are presented in sufficient detail, related to matters such as:

- pipeline engineering and footprint
- access roads (both new and re-developed)
- borrow/disposal sites
- stockpile sites
- temporary construction camps
- metering and compressor stations

9.0 REFERENCES

British Columbia Parks 2012. Kutzeymateen and Khutzeymateen Inlet West Conservancies Information. Website: http://www.env.gov.bc.ca/bcparks/explore/cnsrvncy/khutz_inlet/. Accessed: July 2012.

British Columbia Conservation Data Centre. 2012. British Columbia Species and Ecosystems Explorer. British Columbia Ministry of Environment. Victoria, British Columbia. Website: http://a100.gov.bc.ca/pub/eswp/. Accessed: July 2012.

British Columbia Ministry of Forest, Lands and Natural Resource Operations. 2011. Land and Coastal Marine Plans in BC. Website: http://www.ilmb.gov.bc.ca/slrp/lrmp/index.html. Accessed:September 2012.

British Columbia Ministry of Forest, Lands and Natural Resource Operations. 2001. Mugaha Marsh Sensitive Area Plan. Website: http://www.ilmb.gov.bc.ca/sites/default/files/resources/public/PDF/SRMP/MugahaMarsh_Order.pdf. Accessed: September 2012.

British Columbia Parks. 2012. Khutzeymateen Protected Areas Management Plan. Website: http://www.env.gov.bc.ca/bcparks/explore/parkpgs/khutzeymateen/pdf/khutzeymateen-mp-dec2011.pdf. Accessed: September 2012.

Canadian Wildlife Service. 1980. Marine-oriented birds and mammals of Chatham Sound, British Columbia Winter 1977-1978. Report prepared for the Environment and Land Use Committee on Northeast Coal Development. Department of Environment, Delta, BC. xii + 39p.

Committee on the Status of Endangered Wildlife in Canada. 2012a. Wildlife Species Search. Database of Wildlife Species Assessed by COSEWIC. Website: http://www.cosewic.gc.ca/eng/sct1/searchform_e.cfm. Accessed: July 2012.

Committee on the Status of Endangered Wildlife in Canada. 2012b. Candidate Wildlife Species. http://www.cosewic.gc.ca/eng/sct3/index_e.cfm#3. Accessed: July 2012.

Coupe, R., A.C. Stewart and B.M. Wikeem. 1991. Chapter 15: Engelmann Spruce-Subalpine Fir Zone. In Ecosystems of British Columbia: Special Report Series 6, pp. 223-236.

Delong, C. R.M. Annas and A.C. Stewart. 1991. Chapter 16: Boreal White and Black Spruce Zone. In Ecosystems of British Columbia: Special Report Series 6, pp. 237-250.

Fisheries and Oceans Canada. 2007. Marine Environmental Quality in the North Coast and Queen Charlotte Islands, British Columbia, Canada: A Review of Contaminant Sources, Types, and Risks. Website: http://www.dfo-mpo.gc.ca/Library/329206.pdf. Accessed: September 2012.

Fisheries Inventory Data Queries. 2011. FISS – Fish Distributions Query. Website: http://a100.gov.bc.ca/pub/fidq/fissSpeciesSelect.do. Accessed: July 2012.

Government of Canada. 2012. BC Conservation Data Center. Website: http://a100.gov.bc.ca/pub/eswp/. Accessed: July 2012.

Holland, S. 1976. Landforms of British Columbia: A Physiographic Outline. Bulletin 48. British Columbia Department of Mines and Petroleum Resources, Victoria, BC.

Lucas, B.C., S. Verrin and R. Brown (Ed.). 2007. Canadian Technical Report of Fisheries and Aquatic Sciences 2667. Ecosystem Overview. Pacific North Coast Integrated Management Area (PNCIMA). Fisheries and Oceans Canada. Institute of Ocean Sciences. Sidney, BC.

Meidinger D. and J. Pojar. 1991. Ecosystems of British Columbia. Special Report Series No. 6. Research Branch and Forest Sciences Section of the BC Ministry of Forests. Victoria, BC.

Nav Canada. 2001. The Weather of British Columbia: Graphic Area Forecast 31. Website: http://www.navcanada.ca/ContentDefinitionFiles/publications/lak/bc/1-BC31E.PDF. Accessed: September 2012.

Nisga'a Lisims Government. 2011. Laxgalts'ap: Where River Meets Sea. Website: http://www.nisgaalisims.ca/laxgaltsap-where-river-meets-sea. Accessed: July 2012. Pacific Fisheries Resource Conservation Council. 2011. Pacific Fisheries Resource Conservation Council: Pacific Salmon Resources in Northern British Columbia and Yukon Transboundary Rivers. Website: http://www.fish.bc.ca/files/PFRCC-Northern-BC-Yukon-Stock-Status-2012.pdf. Accessed: July 2012.

Pacific Fisheries Resource Conservation Council. 2011. Pacific Fisheries Resource Conservation Council: Pacific Salmon Resources in Northern British Columbia and Yukon Transboundary Rivers. Website: http://www.fish.bc.ca/files/PFRCC-Northern-BC-Yukon-Stock-Status-2012.pdf. Accessed: July 2012.

Pojar, J., K. Klinka and D.A. Demarchi. 1991a. Chapter 7: Mountain Hemlock Zone. In Ecosystems of British Columbia: Special Report Series 6, pp. 113-123.

Pojar, J., K. Klinka and D.A. Demarchi. 1991b. Chapter 6: Coastal Western Hemlock Zone. In Ecosystems of British Columbia: Special Report Series 6, pp. 95-111.

Prince Rupert Port Authority. 2011. Port of Prince Rupert 2020 Management Plan. Website: http://www.rupertport.com/documents/prpa-land-use-management-plan/pdf. Accessed: September 2012.

Species at Risk Public Registry. 2012. Schedule 1. List of Wildlife Species at Risk 2010. Website: http://www.sararegistry.gc.ca/species/schedules_e.cfm?id=1. Accessed: July 2012.

THIS PAGE INTENTIONALLY LEFT BLANK