

4.0 SCOPE OF ASSESSMENT AND METHODS

Section 4 of the EIS provided a description of the environmental assessment methods used in its preparation. This section of the EIS Addendum provides:

- An update to the environmental assessment methods resulting from the project changes
- Responses to requests for additional information from the federal government (August 14, 2014 and September 11, 2014).

Table 4-1 lists the documents applicable to Scope of Assessment and Methods submitted by PNW LNG as part of the environmental assessment process to date and identifies if information is either *updated by EIS Addendum*, *superseded*, *not relevant*, or *not affected* by information in the EIS Addendum. The remainder of this section of the EIS Addendum contains information that updates the documents classified as *updated by EIS Addendum* in Table 4-1. Figure 4-1 has been updated from that provided in the EIS to reflect the project changes and any other applicable updates.

Table 4-1 Status of Previously Submitted Documents

Document Name	Status
Section 4 of the EIS (February 2014)	Updated by EIS Addendum
Technical Memorandum: Cumulative Effects and Methods (June 2014)	Updated by EIS Addendum
Responses to the Working Group (June 2014)	Updated by EIS Addendum

4.1 UPDATE TO THE SCOPE OF ASSESSMENT AND METHODS

4.1.1 Environmental Assessment Methods

4.1.1.1 Valued Components

The VCs considered in the EIS were finalized after consultation with members of the PNW LNG Working Group, in consideration of input received from the public and direction from the BC Environmental Assessment Office (BC EAO) and Canadian Environmental Assessment Agency (CEA Agency). The VC selection was also influenced by regulatory issues and guidelines and the professional judgment of the study team.

Consideration was given to the original group of VCs based on the project changes (redesign of marine terminal and relocation of berths; moving construction worker accommodation facility off of Lelu Island; and updated engineering information on the amount of sediment within the materials off-loading facility (MOF) dredge area) and no changes (revisions, additions or subtractions) to this group were deemed appropriate.

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4.1.1.2 Assessment Boundaries

The temporal boundaries of the assessment are defined by the timing and duration of project activities that could result in effects on the biophysical and human environment. The project schedule has been updated to reflect the current status of the federal regulatory process (see Section 2, Table 2-4). Based on the current project schedule, the temporal boundaries for each project phase are:

- **Construction** Approximately 5 years from the *Canadian Environmental Assessment Act* approval
- **Operations** Over 30 years from construction completion
- **Decommissioning** After cessation of operations.

The spatial boundaries for the assessment were reconsidered in the context of the project changes. The project development area was adjusted to account for the redesign of the marine terminal and relocation of the berths (see Figure 4-1). The local assessment area (LAA) and regional assessment area (RAA) for the individual VCs were not affected by the project changes and remain the same as described in the EIS.

4.1.1.3 Baseline Conditions

The EIS provided a description of baseline conditions for each VC assessed. As a result of project changes and information requests from the Working Group, additional baseline information was collected for relevant VCs. This information is presented in the specific VC sections of the EIS Addendum.

4.1.1.4 Assessment of Project-Specific Effects

The assessment of potential project effects depends on the project activities and physical works that could result in an environmental effect of concern. As a result of the project changes; there is a new physical work that prompted inclusion of an additional project effect in this EIS Addendum. The suspension bridge component of the marine terminal design mitigation will be supported by two towers that will be approximately 140 m above sea level. Due to the height of these towers, the potential effect of interference with air navigation was added to the assessment. Please refer to Section 15.1.2.3 for further details.

4.1.2 Assessment of Cumulative Effects

Cumulative effects were considered in the EIS for each VC that was shown to have residual effects. As a result of project changes and information requests from the Working Group, the cumulative effects assessments for affected VCs were updated accordingly. This information is presented in the relevant VC sections of the EIS Addendum.

4.1.3 Accidents or Malfunctions

Section 22 of the EIS provided an assessment of the potential effects resulting from accidents or malfunctions. The project changes do not affect any of the five accident and malfunction scenarios assessed in the EIS. However, one additional scenario was considered in light of the project change – an aircraft collision with the flare stack or the bridge towers. Please refer to Section 22 for further information.

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4.1.4 Effects of the Environment on the Project

Section 23 of the EIS provided an assessment of the potential effects of the environment on the Project, including extreme weather, seismic activity, tsunamis, climate change and sea level rise. This assessment has been updated to reflect the marine terminal design mitigation. Please refer to Section 23 for further information.

4.1.5 Environment Management Plans

Section 24 of the EIS outlined the environmental management plans (EMPs) meant to help ensure the Project would be constructed and operated in an environmentally responsible manner. These EMPs have been developed in further detail in order to be relevant for the Project as it is currently designed and to address requests for further information from the CEA Agency. Please refer to Section 24 and Appendix J.

4.1.6 Aboriginal Rights and Related Interests

An assessment of the potential project effects on Aboriginal Rights and related interests was provided in Section 27 of the EIS. This section of the EIS was completed by using primarily publicly available information since project-specific Traditional Use/Traditional Knowledge (TU/TK) information was not available. During the environmental assessment process, project-specific TU/TK reports were provided by five First Nations groups. The information provided in these reports along with subsequent discussions with those First Nations has enhanced the understanding of potential project effects on Aboriginal Rights and related interests. In the context of this project-specific TU/TK information and in light of the project changes, Section 27 has been completely revised. This revised chapter also addresses requests for further information from the CEA Agency and Working Group. Please refer to Section 27 and Appendix C of this EIS Addendum.

4.1.7 Benefits to Canadians

Section 29 of the EIS provided an overview of the benefits to Canadians of the Project and the environmental assessment process. An update to this discussion has been completed in consideration of the project changes. Please refer to Section 29 for further information.

4.1.8 Follow-up Program

Section 30 of the EIS provided an overview of the follow-up programs presented to verify the accuracy of the environmental assessment and the effectiveness of mitigation measures and listed the associated compliance monitoring and reporting required for the Project. The EIS Addendum provides a follow-up program framework that has been developed in further detail to reflect the Project as it is currently designed and to address requests for further information from the CEA Agency and Working Group. Please refer to Section 30 for further information.

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4.2 RESPONSES TO THE OUTSTANDING INFORMATION REQUESTS

4.2.1 Scope of Assessment and Methodology Information Request #2

4.2.1.1 Government of Canada - Outstanding Information

Agency: *The proponent conducted a cumulative effects assessment (CEA) for individual effects and not for each valued component (VC) as a whole considering different types of effects, pathways and trends.*

- A) *For the Marine Resources VC, the proponent assesses the following three effects to the Marine Resources VC separately: change in sediment or water quality, direct mortality or physical injury to fish and marine mammals, and change in behavior of fish or marine mammals. Although each effect is examined cumulatively with other projects, their impact to Marine Resources as a whole is not assessed.*
The effects of vessel collisions on marine mammals are assessed as a part of Accidents and Malfunctions but should also be included in the assessment of cumulative effects on Marine Resources with the other effects noted above. Please see Marine Resources IR #7 which references a CEA for marine mammals and the outstanding information that is still required to help assess the cumulative effects to marine mammals.
- B) *Similarly, the cumulative effects assessment required for species at risk as part of Terrestrial Wildlife and Marine Birds IR#9 should include a consideration of all effect pathways on the VC (i.e., consideration of how the different types of effects identified for the Project and other projects could act additively on a species).*
- C) *In addition to the projects in the Project Inclusion List, provide any updates to the cumulative effects assessment that arise from future physical activities (such as forestry and fisheries) that are certain and/or reasonably foreseeable for, at a minimum, the following Valued Components: Terrestrial Wildlife and Marine Birds, Marine Resources, Human and Ecological Health, Navigation and Marine Use, and Current Use of Lands and Resources for Traditional Purposes.*

4.2.1.2 Response

- A) Please refer to Appendix A (Marine Resources: Section 13.6 – Cumulative Effects) for the response to this information request.
- B) Please refer to the response provided for Terrestrial Wildlife and Marine Birds IR #9 found in EIS Addendum Section 11.
- C) The updated cumulative effects assessment for the Terrestrial Wildlife and Marine Birds VC, Marine Resources VC, Human and Ecological Health VC, and Current Use of Lands and Resources for Traditional Purposes VC have incorporated consideration of future forestry and fisheries activities. Please refer the corresponding sections of the EIS Addendum for further information.

With respect to the Navigation and Marine Use VC, there is no expectation that future forestry activities would have effects on navigation and marine resource use that would interact cumulatively with the Project. Current fisheries activities have been considered when characterizing the baseline conditions for navigation and marine resource use. It is reasonable to expect that future fisheries activities will likely remain similar to those currently undertaken in the RAA. As such, there are likely no new effects from future fisheries activities that have not already been considered in the project effects assessment on navigation and marine resource use.

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4.2.2 Scope of Assessment and Methodology Information Request #5

4.2.2.1 Government of Canada - Outstanding Information

Agency (August 14, 2014): *Where outstanding baseline information has been requested, the cumulative effects assessment must be updated accordingly. At a minimum, this includes Terrestrial Wildlife and Marine Birds, Marine Resources, Human and Ecological Health, and Current Use of Lands for Traditional Purposes.*

Agency (September 11, 2014):

- A) *The updated cumulative effects assessment should consider the possible temporal overlap with other projects and activities based on an updated project schedule. This includes an update to the assessment of cumulative effects on Marine Resources, and Navigation and Marine Use arising from the construction and use of PNW LNG Project Marine Offloading Facility (MOF) and the Prince Rupert LNG Project MOF considering their proximity in Porpoise Channel*
- B) *The EIS Guidelines (Section 10.2) require the proponent to summarize where and how Aboriginal traditional knowledge was incorporated into the consideration of environmental effects and potential adverse impacts on potential or established Aboriginal rights and related interests. In the EIS, PNW LNG commented that as Traditional Knowledge/Traditional Use studies became available over the course of the EIS review phase, PNW LNG would use information from the studies to inform project development and further refine mitigation measures.*
- Since the EIS was submitted, the proponent has received additional traditional knowledge and traditional use information, including information about traditional use species of plants, marine and freshwater resources, wildlife and birds. Summarize where and how Aboriginal traditional knowledge acquired since the submission of the EIS has been incorporated into any revised consideration of environmental effects, including effects on: traditional use species of plants, marine and freshwater resources, and wildlife and birds; and potential adverse impacts on potential or established Aboriginal rights and related interests. If no change is required to the information presented in the EIS based on the additional traditional knowledge and traditional use information, provide a rationale.*

4.2.2.2 Response

August 14, 2014: Updates to the cumulative effects assessments for each VC based on the project changes are included in the corresponding EIS Addendum sections. In addition, new baseline information was obtained during the EA review process for the following VCs: Terrestrial Wildlife and Marine Birds, Marine Resources, Human and Ecological Health, and Current Use of Lands for Traditional Purposes. This new information has been incorporated into the updated cumulative effects assessments found in each of the associated EIS Addendum sections: Terrestrial Wildlife and Marine Birds (see Section 11); Marine Resources (see Section 13 and Appendix A); Human and Ecological Health (see Section 19); and Current Use of Lands for Traditional Purposes (see EIS Addendum Section 21 and Appendix B).

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September 11, 2014:

- A) Changes to the project schedule have been considered and incorporated into the updated cumulative effects assessment undertaken for each VC section in the EIS Addendum.

Changes to the project schedule are not expected to increase the potential for cumulative effects to the Marine Resources VC and Navigation and Marine Resource Use VC resulting from the construction and use of the project MOF and the Prince Rupert liquefied natural gas (LNG) MOF. On October 29, 2014, BG Group PLC publicly announced that it would be delaying its final investment decision. BG Group did not set a specific new target date for a final investment decision, but indicated that, at earliest, it would be 2017. Based on this decision, the construction of the MOF for the Prince Rupert LNG project would be delayed by a minimum of 1 year from the presented project schedule included in its project description submitted to government in April 2014. As the current project schedule estimates that the dredging, blasting and piling associated with the construction of its MOF would be completed in mid-2016, there would be no possibility of cumulative effects with the construction of the Prince Rupert LNG MOF. Similarly, due to the delay in the schedule for Prince Rupert LNG, there would be no new interactions between the use of the PNW LNG MOF and Prince Rupert LNG MOF that have not already been considered in the cumulative effects assessments for the Marine Resources VC and Navigation and Marine Resource Use VC previously presented in the EIS.

- B) The following summarizes how the traditional knowledge and traditional use information provided by Aboriginal Groups has helped inform the revised consideration of environmental effects, including effects on traditional use species of plants, marine and freshwater resources, and wildlife and birds. Additional discussion pertaining to how this traditional knowledge and traditional use information was incorporated into the revised sections on current use of lands and resources for traditional purposes and Aboriginal rights and interests are found in EIS Addendum Appendices B and C.

Five First Nations communities have potential or established Aboriginal rights and related interests on Lelu Island and the surrounding area: Metlakatla First Nation, Lax Kw'alaams First Nation, Gitxaala Nation, Kitselas First Nation, and Kitsumkalum First Nation. In addition, the Gitga'at First Nation has identified that they currently use the area around the Project for traditional harvesting practices. After the submission of the EIS, five project-specific TU/TK studies were provided to PNW LNG by potentially affected Aboriginal groups. These studies included:

- Metlakatla First Nation Traditional Land Use and Ecological Knowledge of the Proposed Pacific NorthWest LNG Project (Metlakatla report)
- Gitxaala Use Study, Prepared for Port Edward Area LNG Projects (Gitxaala Use Study)
- Kitselas First Nation Traditional Use Study Analysis: The North Coast Territories—Lelu Island (Kitselas Report)
- Kitsumkalum Traditional Interim Use Study Report and the Kitsumkalum Traditional Use Study Report for Pacific Northwest (Kitsumkalum Interim Report and the Kitsumkalum Final Report)
- Gitga'at First Nation Traditional Use and Occupancy Study. Prince Rupert Region. Preliminary Results Report (Giga'at Preliminary Report).

These studies were reviewed for information regarding traditional knowledge and traditional use within the Prince Rupert Harbour Area. The types of information these reports were reviewed for included:

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- Species traditionally harvested
- Species of cultural importance
- Areas where species are harvested or generally observed
- Information on migration or habitat.

4.2.2.2.1 Traditional Knowledge on Traditional Use Plants

Background

The EIS included a list of traditional use plants that was determined through a review of existing literature sources. The list in the EIS included seven tree, 24 shrub, 10 herb and one fern species. Subsequently, through review of the TU/TK studies provided by First Nations (Inglis Consulting Services 2014, Calliou Group 2014, Pulla 2014, DM Cultural Services Ltd and Metlakatla First Nation 2014 and Crossroads Cultural Resource Management Ltd 2014), twelve tree, 44 shrub, 43 herb, four fern and two lichen species were added to the list of traditional use plants.

The EIS provided a list of six tree, 11 shrub, five herb and one fern traditional use species that were observed within the LAA during field studies. Using the information provided in the TU/TK studies, an additional three tree, five shrub, eight herb and four fern species were added to the list of traditional use species found within the LAA (Inglis Consulting Services 2014, Calliou Group 2014, Pulla, S. 2014, DM Cultural Services Ltd and Metlakatla First Nation 2014 and Crossroads Cultural Resource Management Ltd 2014).

Some of the species identified as those used by First Nations were unable to be identified from the name provided, including black mountain berry, lily root and Pacific clover root.

Discussion

Vegetation clearing for project components will lead to loss of traditional use plants within the project development area (PDA). TU/TK studies indicate that portions of the LAA are used for harvesting traditional use plants by some communities (DM Cultural Services Ltd and Metlakatla First Nation 2014, Calliou Group 2014, Pulla 2014).

The detailed abundance and distribution of traditional use plants within the RAA is unknown; however, most traditional use species present within the LAA are common both regionally and provincially. One exception is scarlet paintbrush (*Castilleja miniata*), which was observed on Lelu Island. The taxonomy of this species is uncertain (Douglas et al 1998; BC CDC 2014; ITIS 2014); however, to be conservative, occurrences of this species within the LAA should be managed as uncommon and associated with specialized habitats (coastal cliffs and/or coastal wetlands), but not significantly threatened, until their sub-specific taxonomic identification can be confirmed (M. Eggers pers comm 2014). Stantec is currently investigating the sub-specific taxonomic identification of the species further. Current known locations are within the LAA, but outside the PDA and are expected to persist, although the availability of populations located on Lelu Island for traditional use will be limited by the project activities. The Species at Risk Discovery Contingency Plan, a component of the Environmental Management Plan, will be implemented if the *Castilleja* species is identified as being red- or blue-listed provincially.

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The cumulative effects assessment for traditional use plant species indicates that although the Project will result in the localized loss of approximately 162 ha of vegetation communities containing traditional use species within the PDA, these species remain so common and abundant throughout the RAA that there is no expectation that the addition of the project residual effect would cause a change in cumulative effects that could affect the quality or sustainability of identified traditional use plant species in the region. The traditional use species identified in this addendum can be accessed in different areas throughout the RAA.

In addition to the elements of the wetland compensation plan described in Appendix F of the EIS, PNW LNG is committed to implementing wetland compensation in the form of local trail and/or parks improvements (EIS Addendum Section 10 [Wetland Compensation]). These measures are intended to increase access to traditional use plants within the traditional territories of potentially-affected First Nations. Partners involved in compensation measures will incorporate traditional use plants in the detailed wetland compensation designs to the greatest extent that is technically-feasible.

After considering the traditional knowledge information provided in the four TU/TK studies, PNW LNG anticipates the residual effects on traditional use plants to be adverse in direction, low in magnitude, local in extent, long-term, will only occur once and will be reversible. Traditional use plants are in an undisturbed state at baseline and show moderate resilience to disturbance. The likelihood of a residual effect is high since clearing for project components will lead to loss of traditional use plants.

Conclusion

The additional information provided by the TU/TK studies helped enhance PNW LNG’s understanding of terrestrial vegetation and its traditional uses by Aboriginal peoples. The conclusions reached in the EIS remain the same. Although traditional use species will be lost within the LAA effects on traditional use plants are not significant because these species will remain available within the RAA.

Table 4-2 Traditional Use Plants

Species	Latin Name	First Nation Use
Trees		
Balsam	<i>Abies</i> spp.	^a
Balsam poplar	<i>Populus balsamifera</i>	Medicine, material
Birch	<i>Betula</i> spp.	Material
Black cottonwood	<i>Populus trichocarpa</i>	Food
Engelmann spruce	<i>Picea engelmannii</i>	Material, food
Hemlock	<i>Tsuga species</i>	Food (cambium)
Lodgepole pine	<i>Pinus contorta</i>	Food, medicine, material
Maple	<i>Acer</i> spp.	^a
Mountain hemlock	<i>Tsuga mertensiana</i>	Medicine, food
Pacific crabapple	<i>Malus fusca</i>	Food, material

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Species	Latin Name	First Nation Use
Pacific silver fir / coastal balsam	<i>Abies amabilis</i>	Food, medicine, material
Pacific yew / Western yew	<i>Taxus brevifolia</i>	Food, material, medicine
Paper birch	<i>Betula papyrifera</i>	Material
Ponderosa pine	<i>Pinus ponderosa</i>	Food
Red alder	<i>Alnus rubra</i>	Medicine, food
Shore pine / jack pine ^b	<i>Pinus contorta</i> var <i>contorta</i>	Material
Sitka spruce	<i>Picea sitchensis</i>	Food (cambium), material
Subalpine fir / alpine fir	<i>Abies lasiocarpa</i> var <i>lasiocarpa</i>	Material
Trembling aspen	<i>Populus tremuloides</i>	Food, medicine
Western redcedar	<i>Thuja plicata</i>	Material, cultural purposes
Western hemlock	<i>Tsuga heterophylla</i>	Food, medicine, material
Yellow-cedar	<i>Chamaecyparis nootkatensis</i>	Material
Shrubs		
Alaska blueberry	<i>Vaccinium alaskaense</i>	Food
American highbush-cranberry	<i>Viburnum edule</i>	Food, medicine
Arctic willow	<i>Salix arctica</i>	^a
Beaked hazelnut	<i>Corylus cornuta</i>	^a
Bearberry	<i>Arctous</i> spp.	Food, medicine
Black crowberry	<i>Empetrum nigrum</i>	Food
Black currant	<i>Ribes nigrum</i> <i>Ribes hudsonianum</i>	Food
Black hawthorn	<i>Crataegus douglasii</i>	Food, material
Black huckleberry	<i>Vaccinium membranaceum</i>	Food, medicine
Black mountain berry ^c	-	Food
Black raspberry Black cap	<i>Rubus leucodermis</i>	Food, medicine
Black swamp gooseberry	<i>Ribes</i> spp.	Medicine
Black twinberry	<i>Lonicera involucrata</i>	Medicine
Blackberry	<i>Rubus</i> spp.	Food
Blueberry	<i>Vaccinium</i> spp.	Food
Bog cranberry	<i>Oxycoccus oxycoccus</i>	Food
Choke cherry	<i>Prunus virginiana</i>	Food
Cloudberry	<i>Rubus chamaemorus</i>	Food
Copper-bush	<i>Elliottia pyroliflora</i>	Medicine
Creeping raspberry	<i>Rubus pedatus</i>	Food

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Species	Latin Name	First Nation Use
Devil's club	<i>Oplopanax horridus</i>	Food, medicine
Elderberry	<i>Sambucus racemosa</i>	food, medicine
False azalea	<i>Menziesia ferruginea</i>	Medicine
False box	<i>Paxistima myrsinites</i>	Medicine
Gooseberry	<i>Ribes</i> sp	Food
Grouse berry	<i>Vaccinium scoparium</i>	^a
Hazelnut	<i>Corylus cornuta</i>	Food
Highbush cranberry	<i>Viburnum edule</i>	Food
Hudson bay tea	<i>Rhododendron</i> spp.	Food, medicine
Juniper	<i>Juniperus</i> spp.	Food, material
Kinnikinnick	<i>Arctostaphylos uva-ursi</i>	Food
Labrador tea	<i>Rhododendron groenlandicum</i>	Medicine, food
Laughing berries ^b	-	Medicine
Low-bush cranberry	<i>Vaccinium vitis-idaea</i>	Food
Mountain alder	<i>Alnus incana</i> ssp. <i>tenuifolia</i>	Medicine
Mountain ash	<i>Sorbus</i> spp.	Medicine
Mountain huckleberry	<i>Vaccinium</i> sp.	Food, medicine
Nootka rose	<i>Rosa nutkana</i>	Food, medicine
Northern black currant	<i>Ribes hudsonianum</i>	Food
Pacific willow	<i>Salix lasiandra</i> var <i>lasiandra</i>	Material
Pigeon berry ^c	-	^a
Raspberry	<i>Rubus</i> sp	Food
Red currant	<i>Ribes</i> sp	Food
Red elderberry	<i>Sambucus racemosa</i>	Food
Red huckleberry	<i>Vaccinium parvifolium</i>	Food, medicine
Red osier dogwood	<i>Cornus stolonifera</i>	Food, material
Rocky mountain juniper	<i>Juniperus scopulorum</i>	Material
Rocky mountain maple	<i>Acer</i> spp.	Material
Rose	<i>Rosa</i> spp.	Food, medicine
Salal	<i>Gaultheria shallon</i>	Food
Salmonberry	<i>Rubus spectabilis</i>	Food
Saskatoon berry	<i>Amelanchier alnifolia</i>	Food
Scouler's willow	<i>Salix scouleriana</i>	Material
Sitka alder	<i>Alnus viridis</i> ssp. <i>sinuata</i>	Medicine, material
Sitka mountain ash	<i>Sorbus sitchensis</i>	Medicine

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Species	Latin Name	First Nation Use
Sitka willow	<i>Salix sitchensis</i>	Material
Snowberry	<i>Symphoricarpos albus</i>	Food
Soapberry	<i>Shepherdia canadensis</i>	Food
Sourberries ^c	-	a
Stink currant	<i>Ribes bracteosum</i>	Food
Swamp gooseberry	<i>Ribes</i> spp.	a
Thimbleberry	<i>Rubus parviflorum</i>	Food
Thunderberry ^c	-	a
Western mountain ash	<i>Sorbus scopulina</i>	Medicine
White-stemmed gooseberry	<i>Ribes inerme</i> var. <i>inerme</i>	Food
Willow	<i>Salix</i> spp.	a
Herbs		
Arctic lupine	<i>Lupinus arcticus</i>	Food
Arrowhead	<i>Sagittaria latifolia</i>	Food
Baneberry	<i>Actaea rubra</i>	Medicine
Black lily	<i>Fritillaria camschatcensis</i>	Food
Branchless horsetail	<i>Equisetum</i> spp.	Material
Bunchberry (western cordillera)	<i>Cornus unalaschkensis</i>	Food
Cattail	<i>Typha latifolia</i>	Material
Chocolate lily	<i>Fritillaria affinis</i> var. <i>affinis</i>	a
Clover	<i>Trifolium</i> spp.	Food
Common red paintbrush	<i>Castilleja miniata</i>	Medicine
Cow parsnip / Indian celery	<i>Heracleum maximum</i>	Food, medicine
Cut-leaved anemone	<i>Anemone multifida</i>	Medicine
Desert parsley	<i>Lomatium</i> spp.	Medicine
False solomon's seal	<i>Maianthemum racemosum</i> ssp. <i>amplexicaule</i>	Food, medicine
Field mint	<i>Mentha arvensis</i>	Medicine
Fireweed	<i>Epilobium angustifolium</i>	Food
Common horsetail	<i>Equisetum arvense</i>	Food
Hedge mustard	<i>Sisymbrium officinale</i>	Medicine
Hemlock parsley	<i>Conioselinum gmelinii</i>	Food
Hemp-nettle	<i>Galeopsis tetrahit</i>	Material
Indian celery ^c	-	a
Indian hellebore	<i>Veratrum viride</i>	Food, medicine

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Species	Latin Name	First Nation Use
Kneeling angelica	<i>Angelica genuflexa</i>	Medicine
Lance-leaved stonecrop	<i>Sedum lanceolatum</i>	Medicine
Lily bulbs	Liliaceae	Food
Lupines	<i>Lupinus</i> spp.	Food
Nodding onion	<i>Alium cernuum</i> var <i>cernuum</i>	food
Nootka lupine	<i>Lupinus nootkatensis</i>	Food
Northern starflower	<i>Trientalis europaea</i> ssp <i>arctica</i>	Food
Pacific Clover root	<i>Trifolium</i> spp.	Food
Parsley ^b	-	Food
Red clover	<i>Trifolium pratense</i>	food, medicine
Red columbine	<i>Aquilegia formosa</i> ssp. <i>formosa</i>	Food, medicine
Reed canary grass	<i>Phalaris arundinacea</i>	Material
Rhubarb	<i>Rheum rhabarbarum</i>	Food
Sheep sorrel	<i>Rumex acetosella</i>	^a
Silverweed	<i>Potentilla anserina</i>	Food
Single-delight wax flower	<i>Moneses uniflora</i>	Medicine
Skunk cabbage	<i>Lysichiton americanus</i>	Food
Solomon's seal	<i>Maianthemum racemosum</i>	Medicine
Springbank clover	<i>Trifolium wormskioldii</i>	Food
Stinging nettle	<i>Urtica dioica</i> ssp. <i>gracilis</i>	Medicine, material
Stink cabbage	<i>Lysichiton americanus</i>	^a
Strawberry	<i>Fragaria</i> sp	Food
Sylvan goat's beard	<i>Aruncus dioicus</i>	Medicine
Water parsley	<i>Oenanthe sarmentosa</i>	Medicine
Wild calla	<i>Calla palustris</i>	Medicine
Wild celery (sea watch)	<i>Angelica lucida</i>	Food
Wild onion	<i>Allium</i> spp.	Food
Wild tobacco	<i>Nicotiana attenuata</i>	Medicine
Woodland strawberry	<i>Fragaria</i> spp.	Food
Yarrow	<i>Achillea millefolium</i>	Medicine
Yellow water / pond lily	<i>Nuphar polysepala</i>	Medicine
Ferns		
Bracken fern	<i>Pteridium aquilinum</i>	Medicine, food
Deer fern	<i>Blechnum spicant</i>	Medicine
Lady fern	<i>Athyrium filix-femina</i>	Food, medicine

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Species	Latin Name	First Nation Use
Licorice fern	<i>Polypodium glycyrrhiza</i>	Food, medicine
Spiny wood fern	<i>Dryopteris expansa</i>	Food
Lichens		
black lichen ^c	-	Food, material
lichen ^c	-	^a

NOTES:

^a The specific use (food, medicine, material or ceremony) was not indicated in TU/TK studies, but the species was identified

^b The common name Jack pine is typically associated with *Pinus banksiana*, a species which occurs east of the Rocky Mountains; therefore, it is assumed that the species being referred to is shore pine (*Pinus contorta* var *contorta*).

^c Where the common name provided was inconclusive, no scientific name was entered.

Table 4-3 Traditional Use Plants Observed in the LAA

Species	Latin Name	First Nation Use	Occurs in the LAA
Trees			
Hemlock	<i>Tsuga species</i>	Food (cambium)	Yes
Mountain hemlock	<i>Tsuga mertensiana</i>	Food, medicine	Yes
Pacific crabapple	<i>Malus fusca</i>	Food	Yes
Pacific silver fir / Amabilis fir	<i>Abies amabilis</i>	Food (cambium)	Yes
Red alder	<i>Alnus rubra</i>	Food, medicine	Yes
Shore pine	<i>Pinus contorta</i> var. <i>contorta</i>	Material	Yes
Sitka spruce	<i>Picea sitchensis</i>	Food (cambium)	Yes
Western redcedar	<i>Thuja plicata</i>	Material	Yes
Yellow-cedar	<i>Chamaecyparis nootkatensis</i>	Material	Yes
Shrubs			
Alaska blueberry	<i>Vaccinium alaskaense</i>	Food	Yes
Black crowberry	<i>Empetrum nigrum</i>	Food	Yes
Black mountain berry	-	Food	unconfirmed
Blueberry	<i>Vaccinium</i> spp.	Food	Yes
Bog blueberry	<i>Vaccinium uliginosum</i>	Food	Yes
Bog cranberry	<i>Oxycoccus oxycoccos</i>	Food	Yes
Cloudberry	<i>Rubus chamaemorus</i>	Food	Yes
Devil's club	<i>Oplopanax horridus</i>	Medicine (bark)	Yes
Dwarf blueberry	<i>Vaccinium caespitosum</i>	Food	Yes
False azalea	<i>Menziesia ferruginea</i>	Medicine	Yes
Juniper	<i>Juniperus</i> spp.	Medicine	Yes

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Species	Latin Name	First Nation Use	Occurs in the LAA
Labrador tea	<i>Rhododendron groenlandicum</i>	Medicine, food	Yes
Oval-leaved blueberry	<i>Vaccinium ovalifolium</i>	Food	Yes
Red huckleberry	<i>Vaccinium parvifolium</i>	Food	Yes
Salal	<i>Gaultheria shallon</i>	Food	Yes
Salmonberry	<i>Rubus spectabilis</i>	Food	Yes
Herbs			
Bunchberry (western cordillera)	<i>Cornus unalaschkensis</i>	Food	Yes
Common silverweed	<i>Potentilla anserina</i>	Food	Yes
Fireweed	<i>Epilobium angustifolium</i>	Food	Yes
Indian hellebore	<i>Veratrum viride</i>	Food, medicine	Yes
Lily root	-	Food	unconfirmed
Northern starflower	<i>Trientalis europaea</i>	Food	Yes
Pacific Clover root	-	Food	unconfirmed
Pond lily	<i>Nuphar polysepala</i>	Medicine	Yes
Scarlet paintbrush	<i>Castilleja miniata</i>	Medicine	Yes
Indian celery	<i>Angelica lucida</i>	Food	Yes
Single delight	<i>Moneses uniflora</i>	Medicine	Yes
Skunk cabbage	<i>Lysichiton americanus</i>	Food	Yes
Yarrow	<i>Achillea millefolium</i>	Medicine	Yes
Ferns			
Bracken fern	<i>Pteridium aquilinum</i>	Food, medicine	Yes
Deer fern	<i>Blechnum spicant</i>	Medicine	Yes
Lady fern	<i>Athyrium filix-femina</i>	Food, medicine	Yes
Licorice fern	<i>Polypodium glycyrrhiza</i>	Food, medicine	Yes
Spiny wood fern	<i>Dryopteris expansa</i>	Food	Yes

4.2.2.2.2 Traditional Knowledge on Wildlife and Birds

4.2.2.2.2.1 Background

A review of the TU/TK studies provided to PNW LNG by Aboriginal groups after the submission of the EIS identified 26 mammal species/species groups and six bird species/species groups have as being of traditional importance (Inglis Consulting Services 2014, Calliou Group 2014, Pulla 2014, DM Cultural Services Ltd and Metlakatla First Nation 2014 and Crossroads Cultural Resource Management Ltd 2014). Table 4-3 lists these species and their associated importance to Aboriginal peoples.

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Baseline surveys completed for the EIS included detections of some of the 26 mammal species: black bear (*Ursus americanus*), black-tailed deer (*Odocoileus hemionus columbianus*), wolf (*Canis lupis*), coyote (*Canis latrans*), Pacific marten (*Martes Caurina*), red squirrel (*Tamiasciurus hudsonicus*), and river otter (*Lontra canadensis*). A number of other mammal species are expected to occur in the traditional territories of Aboriginal Groups that extend further inland but are unlikely to occur within the local assessment area (LAA) based on habitat requirements [e.g., mountain goat (*Oreamnos americanus*) and grizzly bear (*Ursus arctos*)].

Baseline surveys also detected most bird species identified in the TU/TK studies provided to PNW LNG, with the exception of swans. Ducks, bald eagles (*Haliaeetus leucocephalus*), geese, common raven (*Corvus corax*), and multiple marine bird species were observed in the LAA during baseline surveys (see Appendix H of the EIS for details). Swans were not observed during baseline surveys but may stage in the area during spring or fall migration.

Discussion

The greatest effects on the availability of terrestrial and marine habitat as a result of the clearing and construction of the Project will be on those species expected to use shrub-dominated bog and treed swamp communities on Lelu Island [e.g., black-tailed deer, porcupine (*Erethizon dorsatum*), and Pacific marten]. Change in marine habitats will be low in magnitude and localized within the LAA.

The Project may result in direct mortality to terrestrial wildlife and marine birds and effects would be highest for those species with limited means of dispersal such as small mammals, birds, or amphibians that occupy nests, dens, or burrows during breeding [e.g., hare (*Lepus americanus*), weasel, and red squirrel]. Potential for mortality will be substantially reduced by avoiding clearing during the breeding season. Direct mortality to bird species could also result from project lighting. However, light-induced mortality is unlikely to be an effect for traditional use bird species. Lighting mitigations and the retention of a 30 m riparian buffer around the PDA are expected to decrease light dispersal and further reduce the potential for light-induced mortality events.

Project-induced changes to terrestrial wildlife and marine bird movement patterns could affect species whose range is restricted to the LAA. Under baseline conditions, terrestrial wildlife and marine birds are exposed to a low to moderate degree of disturbance and displacement based on existing activity in the LAA. Species are expected to exhibit a moderate degree of resilience to the incremental contribution of the Project.

Conclusion

The additional information provided by the Traditional Knowledge studies enhances PNW LNG's understanding of terrestrial wildlife and marine birds and the traditional uses of those resources by Aboriginal peoples. In keeping with conclusions reached in the EIS, the Project is not expected to affect the sustainability of regional populations for any species identified as being of Traditional Importance. Accordingly, project effects on terrestrial wildlife and marine birds of Traditional Importance are not significant since these species will persist within the RAA.

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Table 4-4 Terrestrial Wildlife and Marine Bird Species of Traditional Importance

Species or Group	Scientific Name ^a	First Nation Use
Mammals		
Black Bear	<i>Ursus americanus</i>	Traditionally hunted
Black-tailed deer	<i>Odocoileus hemionus columbianus</i>	Traditionally hunted
Caribou	<i>Rangifer tarandus</i>	Traditionally hunted
Cougar	<i>Puma concolor</i>	Traditionally hunted
Coyote	<i>Canis latrans</i>	Traditionally hunted
Elk	<i>Cervus elaphus</i>	Traditionally hunted
Fox	<i>Vulpes vulpes</i>	Traditionally hunted
Grizzly bear	<i>Ursus arctos</i>	Traditionally hunted
Groundhog	<i>Marmota monax</i>	Traditionally hunted
Hare	<i>Lepus americanus</i>	Traditionally hunted
Kermode Bear	<i>Ursus americanus kermodei</i>	Cultural importance
Lynx	<i>Lynx canadensis</i>	Traditionally hunted
Marmot	<i>Marmota caligata</i>	Traditionally hunted
Marten, American or Pacific	<i>Martes Americana, Martes Caurina</i>	Traditionally hunted
Mink	<i>Neovison vison</i>	Traditionally hunted
Moose	<i>Alces americanus</i>	Traditionally hunted
Mountain Goat	<i>Oreamnos americanus</i>	Traditionally hunted
Mountain Sheep	-	Traditionally hunted
Muskrat	<i>Ondatra zibethicus</i>	Traditionally hunted
Porcupine	<i>Erethizon dorsatum</i>	Traditionally hunted
Rabbit	<i>Oryctolagus cuniculus</i>	Traditionally hunted
Raccoon	<i>Procyon lotor</i>	Traditionally hunted
Red Squirrel	<i>Tamiasciurus hudsonicus</i>	Traditionally hunted
River otter	<i>Lontra canadensis</i>	Traditionally hunted
Weasel	-	Traditionally hunted
Wolf	<i>Canis lupus</i>	Cultural importance (Gitxaala)
Wolverine	<i>Gulo gulo</i>	Traditionally hunted
Birds		
Ducks	-	Traditionally hunted
Eagle	-	Traditionally hunted
Geese	-	Traditionally hunted
Raven	<i>Corvus corax</i>	Cultural importance
Marine birds	-	Eggs traditionally harvested
Swans	-	Traditionally hunted

NOTES:

^a Where the common name provided was representative of a group of species (e.g., ducks), no scientific name was entered

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4.2.2.2.3 Traditional Knowledge on Navigation and Marine Resource Use

Background

The TU/TK studies provided to PNW LNG indicate that sites currently accessed for traditional uses via marine navigation routes have considerable overlap with areas of interest identified in the EIS. While a variety of identified sites occur within the LAA/RAA, two important areas outside of the LAA/RAA were identified: Metlakatla Pass and the west side of Stephen's island.

The TU/TK studies support the assertion that First Nations navigate through the PDA and LAA/RAA for a variety of reasons, including:

- Access to sites with terrestrial resources (berry/plant gathering, hunting and trapping, gardening, resource material sites)
- Access to ceremonial, spiritual and sacred areas (burial sites, medicinal/therapeutic sites, storied places)
- Access to traditional places and routes (temporary or permanent dwelling sites, preparation sites, teaching areas, manufacturing areas, trading places, trails and hereditary territories).

In the absence of information specific to navigation routes, PNW LNG has included the location of these sites as a means of extrapolating travel routes around these locations. The response to Navigation and Marine Resource Use Information Request # 6 (see EIS Addendum Section 15) contains a figure (Figure 15-14) that illustrates marine navigation routes that were either identified directly in the reports provided to PNW LNG, or extrapolated from this information. However, it is understood that travel happens throughout the LAA/RAA, and is not limited to the areas identified.

Discussion

While a variety of identified sites occur within the LAA/RAA, two important areas outside of the LAA/RAA were also identified. These include the west side of Stephen's Island and Metlakatla Pass. However, any project-related effects on navigation to and from these locations would be captured by the current LAA/RAA.

PNW LNG has developed a series of mitigation measures to avoid or reduce potential project effects on navigation and marine resource use, including traditional use. The key mitigation for potential effects to navigation is providing a minimum of 11.3 m clearance (above highest high-water) beneath the bridge to Lelu Island and the suspension bridge/trestle which would allow continued navigation for the majority of local vessels (including gillnetters) to and from Porpoise Channel over Flora Bank. For a complete list of mitigations, please refer to EIS Addendum Section 15.

Conclusion

The additional information provided by the TU/TK studies has helped enhance PNW LNG's understanding of marine navigation uses for traditional purposes by Aboriginal peoples. By implementing the collection of mitigation measures presented in Section 15 – Navigation and Marine Resource Use of the EIS Addendum, PNW LNG is confident that any project-related effects to navigation and marine resource uses will be addressed, including traditional uses.

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4.2.2.2.4 Traditional Knowledge on Marine Resources

Background

The EIS included information regarding important marine habitat and species of interest to Aboriginal Groups collected either from baseline desktop research or through consultation activities. A review of the TU/TK studies provided by First Nations confirmed the identification of valued species and locations.

Species identified in the TU/TK studies include; salmon, black cod, lingcod (*Ophiodon elongatus*), red snapper, eulachon (*Thaleichthys pacificus*), herring (*Clupea pallasii*), seals, whales, clams, cockles, mussels, chitons, sea cucumber, Dungeness crab (*Metacarcinus magister*), king crab, prawns, and shrimp, while specific areas of concern included; Flora and Agnew Banks and Brown Passage (Inglis Consulting Services 2014, Calliou Group 2014, Pulla 2014, DM Cultural Services Ltd and Metlakatla First Nation 2014 and Crossroads Cultural Resource Management Ltd 2014). Harvesting locations were identified and reviewed with respect to navigation and marine resource use.

Discussion

The identified species of cultural importance are either assessed directly or indirectly (through associated habitat or analogous species) in the updated Marine Resources VC section (Appendix A of the EIS Addendum). Specific areas of concern (e.g., Flora Banks, and effects on fish and marine mammals from underwater noise) also confirm the results of the effects assessment and related IR responses.

Conclusion

The additional information provided by the TU/TK studies helped to enhance PNW LNG's understanding of marine resources and the traditional uses of those resources by Aboriginal peoples. After reviewing and assessing all relevant information, PNW LNG is confident that with the project redesign, other mitigations, and fish habitat offsetting measures, project-related effects to marine resources of traditional importance will not be significant.

4.2.2.2.5 Traditional Knowledge on Freshwater Aquatic Resources

Background

A review of the TU/TK studies provided by First Nations confirms PNW LNG's understanding of important freshwater species and resources. The list of important species includes:

- Salmon species (e.g. coho, pink, sockeye, chum, spring) (*Oncorhynchus* spp.)
- Steelhead (*O. mykiss irideus*)
- Sturgeon
- Trout (rainbow, cutthroat, brook, dolly varden, char)
- Whitefish
- Suckers
- Chubs.

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Though understanding the importance of these species to Aboriginal Groups is important to PNW LNG; watercourses on Lelu Island do not provide habitat to maintain any resident or anadromous populations.

Discussion

During baseline studies, no Lelu Island watercourses were identified as habitat for resident freshwater fish species. Further, none of the TU/TK studies indicated any current or traditional freshwater fishing on Lelu Island. This supports the conclusion (refer to Appendix A - updated Marine Resources VC) that the Project will have limited effects to freshwater fish habitat on Lelu Island.

With respect to freshwater resources outside of Lelu Island, an Aquatic Acidification and Eutrophication Follow-up Program will verify acidification and eutrophication effects on the freshwater aquatic environment predicted in the EIS. This will include monitoring at Hayes Creek, Wolf creek, Alvin Lake, and headwater lakes on Kaien Island, all which have the potential to be of importance to Aboriginal people in the area, though not specifically identified in any provided study.

Conclusion

The direct impacts to freshwater resources from the Project are not predicted to have any significant effect on traditional use species identified in the studies provided to PNW LNG. PNW LNG's follow-up and monitoring programs will include these identified species wherever relevant.

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4.3 REFERENCES

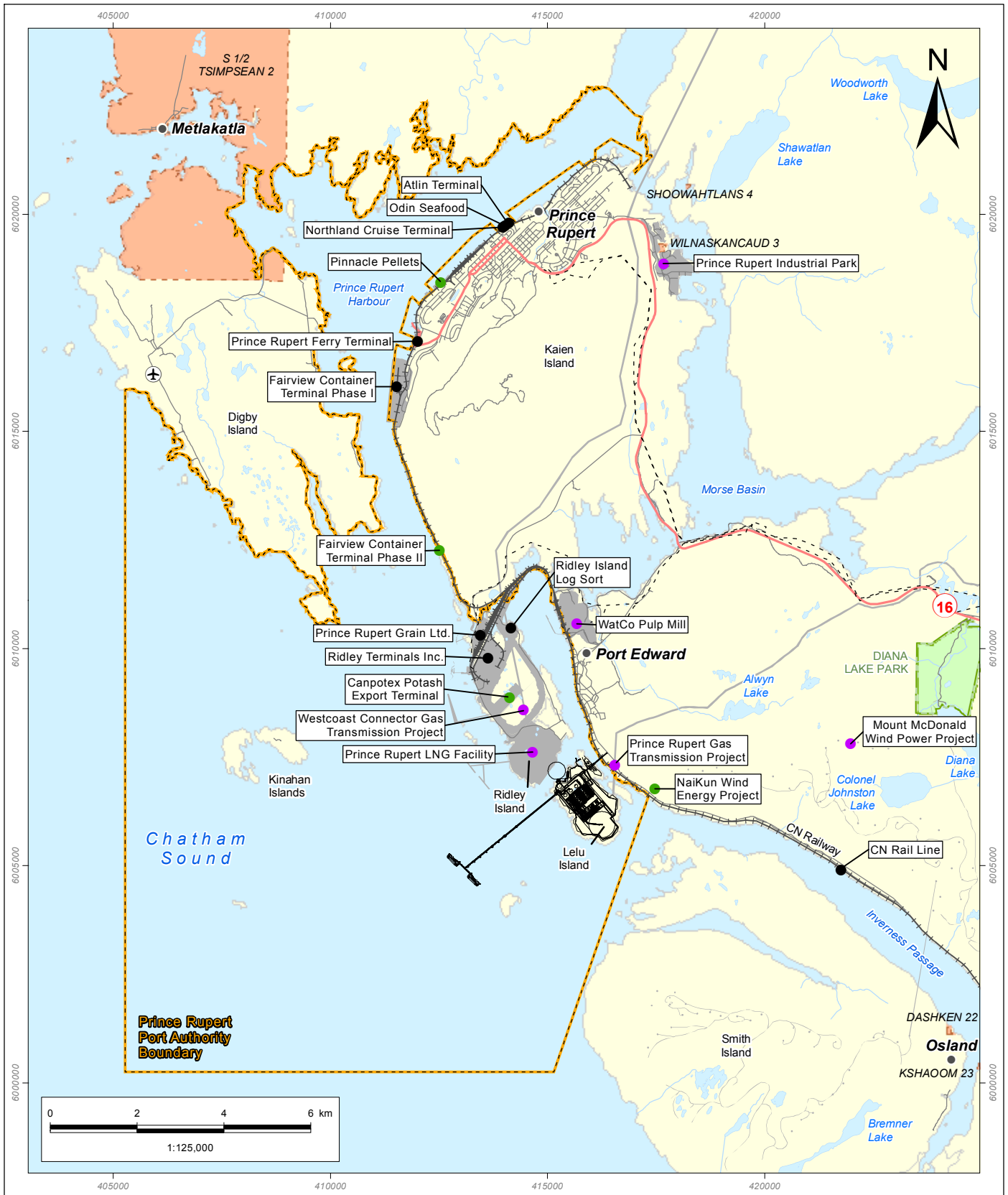
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4.4 FIGURES

Please see the following pages.



Project Locations Status		Legend	
● (Green)	Approved	✈️	Airport
● (Black)	Operational	● (Black)	City or Town
● (Purple)	Proposed	■ (Orange)	Indian Reserve
— (Grey)	Project Component	□ (Yellow with orange border)	Prince Rupert Port Authority Boundary
■ (Grey)	Proposed or Existing Industrial Development Footprint	■ (Green)	Protected Area
		— (Dashed)	Electrical Power Transmission Line
		— (Red)	Highway
		■ (Blue)	Waterbody
		— (Black with cross-ticks)	Railway
		— (Thin)	Secondary Road
		— (Blue)	Watercourse

Pacific NorthWest LNG

Past, Present, and Reasonably Foreseeable Projects Near the PNW LNG Project

EIS ADDENDUM

Sources: Government of British Columbia; Government of Canada, Natural Resources Canada, Centre for Topographic Information; Progress Energy Canada Ltd.

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present.

DATE: 20-NOV-14	PROJECTION: UTM - ZONE 9
FIGURE ID: 123110537-312	DATUM: NAD 83
DRAWN BY: K. POLL	CHECKED BY: B. BYRD

PREPARED BY:

PREPARED FOR:

FIGURE NO:

4-1

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