



# PNG Reactivate Capacity Project

## Environmental Constraints Report

Prepared for:



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January 28, 2021	Final V 1.1	Senior	Kevin Doddridge, B.Sc., R.P.Bio. Project Manager

## Acknowledgements

Triton Environmental Consultants Ltd. is a leading employee-owned environmental consulting firm with a team of project managers, qualified biologists and environmental professionals who have delivered more than 5,000 projects in Western Canada for over 30 years. Our success as an industry leading environmental consulting service provider can be, in part, attributed to our focus on partnerships with Indigenous communities and businesses.

This work was delivered with thanks to our Indigenous partnership businesses in North-central BC and Northwest BC, through which Pacific Northern Gas Ltd. has operated their Western Transmission Gas Line for over 50 years. These partnerships include:

**Khtada Environmental Services LP** is a 7-year running partnership between Metlakatla Development Corporation (MDC) and Triton Environmental Consultants Ltd. operating in Metlakatla Territory. MDC is the business arm of Metlakatla First Nation and is the majority partner in Khtada.

**YLP-Triton CGL Joint Venture** is a Joint Venture between Yinka Dene Economic Development Limited Partnership (the economic development arm of the Wet'suwet'en Nation) and Triton Environmental Consultants Ltd. operating in Wet'suwet'en Territory.

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This report is based on facts and opinions contained within the referenced documents, including the results of any data collection programs carried out in relation to this report. We have attempted to identify and consider facts and documents relevant to the scope of work, accurate as of the time period during which we conducted this analysis. However, the results, our opinions, or recommendations may change if new information becomes available or if information we have relied on is altered.

We applied accepted professional practices and standards in developing and interpreting data. While we used accepted professional practices in interpreting data provided by PNG or third-party sources, we did not verify the accuracy of any such data.

This report must be considered as a whole; selecting only portions of this report may result in a misleading view of the results, our opinions, or recommendations.

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## 1.0 Introduction

Pacific Northern Gas Ltd (PNG or The Company) is planning an upgrade to their Western Transmission Gas Line between Summit Lake, BC and Prince Rupert, BC to deliver increased natural gas volumes to meet the supply required for new industrial customers. The Project is referred to as the “PNG Reactivate Capacity Project” (herein referred to as ‘the Project’ or ‘the ReCap Project’) which will involve several upgrades to the existing system, maintenance of existing infrastructure, and construction of new facilities.

### 1.1 Document Purpose

The purpose of this document is to provide a high-level environmental scoping of aquatic and terrestrial components and associated requirements for consideration during the planning, permitting, and development phases of the Project. This document was prepared as part of the requirements for a submission to the BC Utilities Commission (BCUC) for which PNG is seeking a Certificate of Public Convenience and Necessity (CPCN). This scoping report is intended to speak to environmental information not covered by other environmental assessments/reviews that have been prepared by PNG for the same project and may be included as part of this package (i.e., Prince Rupert Capacity Study – Constraint Analysis and Cost Estimate [Khtada 2018]).

This document is not intended to provide a comprehensive accounting of environmental components, all Project-level interactions/impacts, or detailed scoping of regulatory permits or approvals that may be required. It is expected that as Project plans develop and details become available, additional environmental study will be undertaken to identify and specifically characterize environmental components and further scope requirements and appropriate mitigation.

### 1.2 Proponent Contact Information

PNG is the proponent of the Project and the primary contact is:

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## 2.0 Project Description

### 2.1 Project Overview

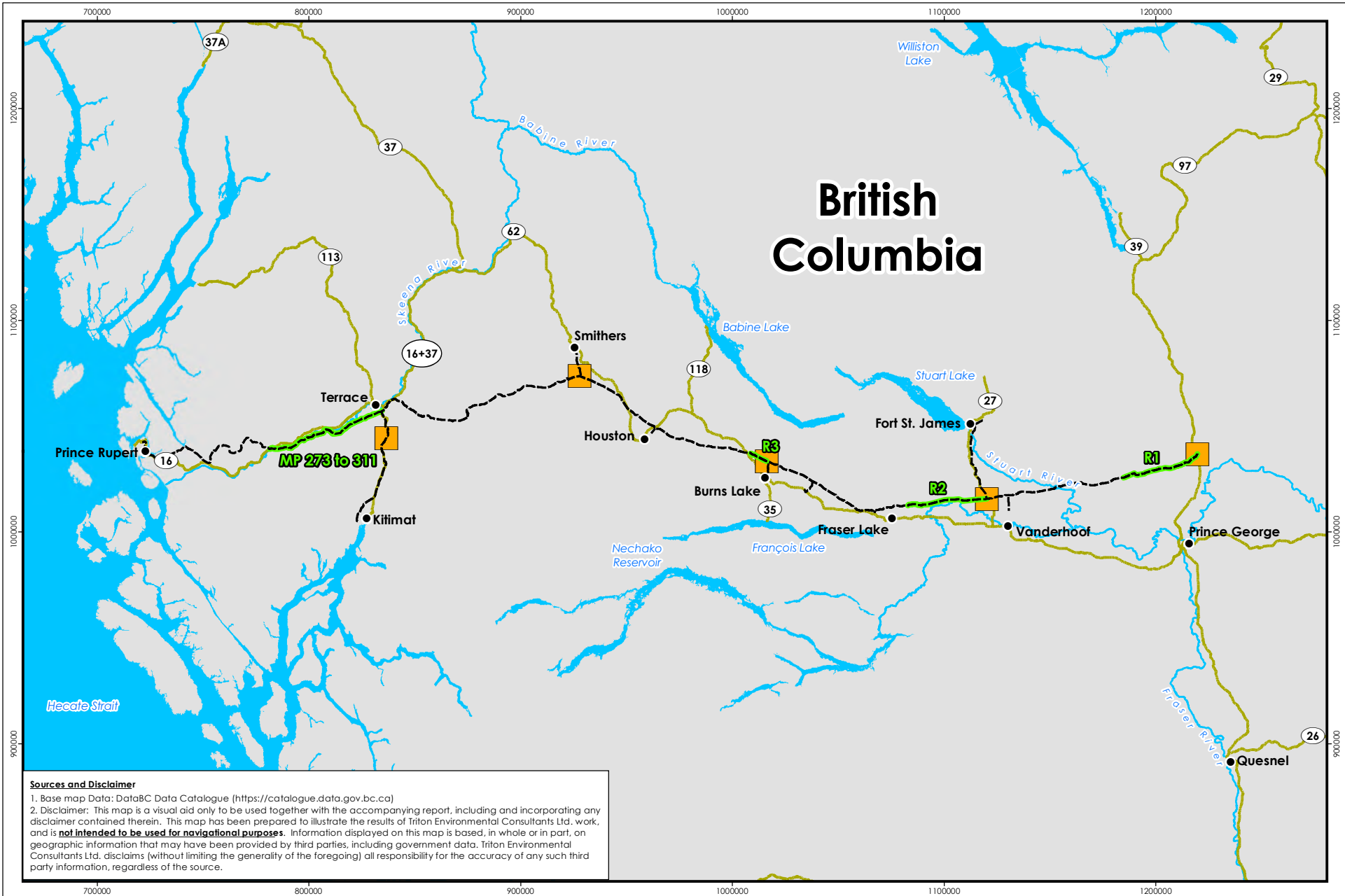
Since the mid-2000s, PNG's Western Transmission Gas Line has been operating at below capacity due to several large industrial customers going offline. With new industrial customers signing service agreements, PNG is looking to safely return the amount of natural gas transported through its system to previous levels by reactivating key system assets that were taken offline and by upgrading others. The Project would enable increased volumes of natural gas to enter the PNG system at Summit Lake and be transported to customer interconnections in Terrace, Port Edward, and Prince Rupert, BC.

The complete Project will consist of five main activities described below; however, this report focuses primarily on items 2 and 5.

1. Upgrades and reactivations at four existing compressor stations
2. Upgrades and reactivations of pipeline sections downstream of the existing compressor stations:
  - 10" Mainline, MP 0 to 24 commencing at R1 at Summit Lake Compressor Station
  - 10" Mainline, MP 67 to 91 commencing at R2 at Vanderhoof Compressor Station
  - 10" Mainline MP 137 to 141 commencing at R3 at Burns Lake Compressor Station
3. Constructing two new compressor stations, one in Terrace on PNG owned land within an industrial site south of the Northwest Regional Airport, and one in immediate proximity to PNG's Salvus Valve site at MP 311.5 near the Kasiks highway maintenance yard.
4. Construct several pipeline expansions and interconnections at new industrial customer locations:
  - Terrace Airport Industrial Park: a 4-inch extension measuring less than 0.5 km in length
  - Galloway Station area near Port Edward: a 6-inch extension for approximately 4 km in length
  - Zanardi Rapids area of Kaien Island near Prince Rupert: a 6-inch extension for approximately 4 km in length
  - An 8-inch expansion between Terrace Junction and R5 for approximately 5 km in length which will be a relocation of existing capacity to a lower population density area on existing PNG right of way (RoW).
5. Pipeline integrity maintenance between Terrace Junction and Salvus Valve at MP 311.5.

Figure 1 provides an overview of proposed Project activities along the Western Transmission Gas Line.





**Sources and Disclaimer**

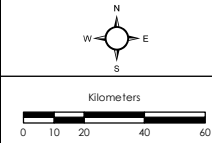
1. Base map Data: DataBC Data Catalogue (<https://catalogue.data.gov.bc.ca>)  
 2. Disclaimer: This map is a visual aid only to be used together with the accompanying report, including and incorporating any disclaimer contained therein. This map has been prepared to illustrate the results of Triton Environmental Consultants Ltd. work, and is **not intended to be used for navigational purposes**. Information displayed on this map is based, in whole or in part, on geographic information that may have been provided by third parties, including government data. Triton Environmental Consultants Ltd. disclaims (without limiting the generality of the foregoing) all responsibility for the accuracy of any such third party information, regardless of the source.

**PNG Reactivate Capacity Project**

**Figure 1 - Project Location**

**Legend**

- Existing and New Compressor Station
- Town
- Highway
- Upgrades and Pipeline Reactivations
- Western Transmission Gas Line
- Watercourse
- Waterbody



<b>Project No:</b>	8041
<b>Date:</b>	Jan 19, 2021
<b>Scale:</b>	1:2,500,000
<b>Map Projection:</b>	BC Environmental Albers (NAD 1983)



## **2.2 Project Activities**

Maintenance, construction, and upgrading of the various pipeline and compressor station facility infrastructure will require a broad range of activities across PNG's system. Some activities may be performed in-house, and some activities may be contracted to qualified suppliers and tradespeople. In all cases, heavy equipment including excavators, tracked personnel and pipe carriers, side booms, transport trucks, and service vehicles are expected to be utilized.

### **2.2.1 Existing Compressor Stations**

Proposed work at existing compressor stations will be performed within the existing facility footprint and as such no assessment of potential effects on environmental resources is proposed for Project activities that are exclusively related to compressor station upgrades. Should additional footprint be required to construct the necessary infrastructure at any existing station, environmental reviews will be conducted within the additional footprint area.

### **2.2.2 Pipeline Integrity, Upgrade, and Reactivation Activities**

The pipeline segments that will receive upgrades and reactivations are routed through north-central BC through a diverse range of landscape types that vary greatly in accessibility, elevation, local topography, biophysical conditions, and habitat types. Access constraints exist such as major river crossings, wetlands, and steep topography which will need to be evaluated during the planning phase of the Project. The RoW will be accessed using existing road infrastructure wherever possible, and once access points to the RoW have been established, crews will travel along the RoW to feature locations or segments requiring reactivation work.

The exact set of activities has yet to be determined at each location. Maintenance and integrity works will involve exposing the pipeline at the feature location, stockpiling material, and conducting pipeline inspections (which may include visual, sonic, radiation, or other non-destructive methods). Based on the results of the inspections, maintenance and repair may include restoration of protective coatings (sandblasting to remove old coating, and hand application of new coatings), installation of protective pipeline sleeves, or cut-out/replacement of pipeline sections that are beyond useful service life. In some circumstances, the pipeline may be realigned or lowered to mitigate future risk. Upon completion of maintenance, the pipeline is backfilled and restoration measures, such as seeding, planting, soil contouring or amending, and installation of erosion and sediment control features is completed. Work may also involve access improvements or enhancements to serve PNG's operational needs into the future.

### **2.2.3 Pipeline Expansions and Customer Interconnections**

Pipeline expansion work will involve topsoil stripping and storage, material excavation and stockpiling, pipeline stringing, bending, welding, inspecting, pressure testing, lowering, backfilling, and site restoration. Expansion work will occur on lands upon which PNG currently has or will obtain tenure and work will be performed in accordance with applicable safety and environmental construction standards.

## 3.0 Project Setting

Project setting is described for each pipeline segment (shown in Figure 1).

### 3.1 Physiography

#### 3.1.1 Downstream of R1

This segment is 38.9 km and extends from the Summit Lake compressor station at the point-of-commencement (PoC) to 800 m east of the Hoodoo Lakes FSR crossing. The route traverses the Fraser Basin, an area of low relief that lies below the adjacent Nechako Plateau, with disorganized drainage, and many lakes and wetlands in depressions with poorly drained substrates. Drumlins and eskers are widespread (Holland 1976).

#### 3.1.2 Downstream of R2

R2 extends from the compressor station at Highway 27 for 38.5 km west to the northeast end of Fraser Lake. This segment also crosses the western extent of the Fraser Basin. Within the Fraser Basin, this segment crosses portions of the Nechako Plain, characterized by extensive lacustrine soils varved clay deposits associated with glacial lake deposits (Holland 1976). The Nechako River is incised into the plateau, and the terrain generally slopes to the south along the pipeline RoW providing more regular drainage patterns.

#### 3.1.3 Downstream of R3

R3 extends from the compressor station at Babine Lake Road west for 8.6 km to northeast of Wet'suwet'en Village at the head of Decker Lake. This short section sits on the Nechako Plateau, near the western extent of the Fraser River watershed. The Nechako Plateau features rolling terrain and generally low relief, though glaciation carved large depressions and channels now occupied by small to very large lakes, including Decker Lake near the Project area, and Babine Lake to the Northeast (Holland 1976). This section traverses elevations from approximately 750 to 920 m.

#### 3.1.4 Terrace Junction to Salvus (MP 273 to 311)

This segment spans 62.3 km from the Kitimat Branch just east of the Highway 37 crossing west to the Salvus Maintenance Yard just east of the mouth of the Kasiks River. The initial 2.6 km falls within the municipal boundary of the City of Terrace. The route follows the south bank of the Skeena River before crossing the Skeena River near the Salvus Maintenance yard, where the PNG pipeline RoW continues north along the Kasiks River. The Skeena River bisects the Kitimat Ranges of the Coast Mountains, providing a major low-elevation corridor through the rugged mountain range. The Kitimat Ranges are primarily granitic and near surface or exposed bedrock is common (Holland 1976). This pipeline segment is routed through the Gitnadoix River Provincial Park and the Skeena River Ecological Reserve.

### 3.2 Aquatic Resources

There are 202 mapped watercourses across all sections, including river crossings and watercourses containing critical fish habitat. Historical fisheries information is relatively plentiful, though field

surveys will be required to confirm classifications where data is lacking, and to identify unmapped watercourses where ground disturbance or new access construction is planned.

### 3.2.1 Downstream of R1

This segment spans the Arctic – Pacific Watershed divide north of Prince George, BC. The PoC and the initial 9.1 km is within the Crooked River watershed which eventually drains into the Williston Lake Reservoir via the Pack River. The Williston Reservoir is at the head of the Peace River, within the Mackenzie River watershed that drains into the Beaufort Sea (Arctic Ocean). Watercourses within this section are primarily low-gradient systems, and all are tributary to Summit Lake, a 13.4 km<sup>2</sup> lake supporting several sport and coarse fish species and a rural cottage community. There are seven mapped stream crossings in this section; named streams include Miller, Thorps, and Echo Creek. There are no mapped wetland crossings, but wetlands including open bogs and fens, as well as forested swamps are prevalent in the area and crossings of unmapped wetlands and wet areas are anticipated. Of the fish species known to occur in Summit Lake, Rainbow Trout (*Oncorhynchus mykiss*) and Burbot (*Lota lota*) are the game fish species most likely to be encountered. Coarse fish species are also prevalent in the watersheds, including blue-listed Brassy Minnow (*Hybognathus hankinsoni*).

The remaining 29.8 km is within the lower Salmon River watershed, which is a tributary to the upper Fraser River, which drains into the Strait of Georgia (Pacific Ocean). There are 31 mapped watercourse crossings in this section, including three separate crossings of the Salmon River mainstem as well as mapped side channels. Like the adjacent Crooked River watershed, the area has low relief and features disorganized low gradient streams with a high proportion of wetland areas. The Project intersects two mapped wetland areas but is immediately adjacent to several others. The Salmon River supports anadromous Chinook (*Oncorhynchus tshawytscha*), and sporadically Pink (*O. gorbuscha*) Salmon, and Kokanee (*O. nerka*) are also present in the watershed. Sport fish species include Rainbow Trout, Burbot, and Mountain Whitefish (*Prosopium williamsoni*). Bull Trout (*Salvelinus confluentus*) are known to occur but are not widespread and the Salmon River does not offer high-value habitat for this species. A host of coarse fish species, including blue-listed Brassy Minnow are also present.

### 3.2.2 Downstream of R2

This segment falls within the Nechako River watershed in central BC. All the watercourse crossings are in small to medium sized tributary watersheds to the north bank of the Nechako River mainstem, except the westernmost 8.4 km, which are tributaries to Fraser Lake and the Nautley River (which discharges to the Nechako River). The area features subdued relief with a lower proportion of wetland areas compared to the R1 section. Small, non-fish bearing ephemeral streams and drainages are common, though larger streams support Rainbow Trout and coarse fish species, and the lowermost reaches may support juvenile Chinook and Mountain Whitefish. There are 83 mapped watercourse crossings, mostly 1st and 2nd order streams but including Tatsutnai, Nine Mile, Kluk, Halsey, Trankle, and Redmond Creek mainstems. The Project intersects four mapped wetlands, though occurrences of small pothole wetlands and wet areas are likely.

### 3.2.3 Downstream of R3

This short segment is within the Endako River watershed, which discharges into the Nechako River via Fraser Lake and the Nautley River. All the watersheds crossed in this segment are tributary to the northeast shore of Decker Lake. There are 10 watercourse crossings, including Decker Creek and Powder House Creek. The Project does not intersect the mapped boundaries of any wetland areas but is immediately adjacent to several. The area has rolling terrain, and streams have moderate gradients and potential habitat for Rainbow Trout and coarse fish species.

### 3.2.4 MP 273 to 311

This segment extends from Terrace along the south side of the Skeena River, and crosses Alwyn Creek, Lakelse River, Whitebottom Creek, Dasque Creek, Gitnadoix River, and the Skeena River before the Point of Termination (PoT) for the Project near the Salvus Maintenance yard. There are 71 mapped watercourse crossings, which include the Skeena River mainstem and eight mapped side channels. The streams that bisect the RoW along vehicle accessible segments via the Whitebottom and Dasque FSRs are notorious for torrenting flows that during high rain events result in frequent avulsions and bedload transport.

Major watercourse crossings and side channels are migration corridors for all 5 species of Pacific salmon, Steelhead, and Eulachon (*Thaleichthys pacificus*) and rearing habitat for Coastal Cutthroat Trout (*O. clarkii clarkii*), Dolly Varden (*Salvelinus malma*), Bull Trout, Mountain Whitefish, and coarse fish species including sculpins (*Cottus* spp.), suckers (*Catostomus* spp.), Threespine Stickleback (*Gasterosteus aculeatus*), and Lampreys (*Entosphenus* and *Lampetra* spp.). Some of these crossings are likely to support spawning as well. Smaller watercourse crossings provide rearing habitat for juvenile salmonids.

## 3.3 **Rare and Endangered Aquatic Species**

Aquatic species with the potential to occur in the Prince George, Stuart-Nechako, Nadina, and Coast Mountains Natural Resource Districts (the districts in which the relevant pipeline sections occur) are included in Table 1. Many of the species are unlikely to be present in the Project area based on known home ranges and habitat affinities. Table 1 was generated using the BC Species and Ecosystems Explorer (BCSEE) utility (BC CDC 2020) however no further assessment of the possibility of occurrence has been completed.

**Table 1** Aquatic Species at Risk with the potential to occur (CDC 2020)<sup>1</sup>

Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC <sup>a</sup>	SARA <sup>b</sup> Status	Relevant Sections <sup>c</sup>
<i>Acipenser medirostris</i>	Green Sturgeon	ray-finned fishes	Blue			SC	SC	MP 273
<i>Acipenser transmontanus</i> pop. 5	White Sturgeon (Upper Fraser River Population)	ray-finned fishes	Red			E / T	E	R1, R2
<i>Acroloxus coloradensis</i>	Rocky Mountain Capshell	gastropods	Blue			NAR		R1, R2, R3, MP 273
<i>Entosphenus macrostomus</i>	Cowichan Lake Lamprey	Lampreys	Red			T	T	n/a (does not occur in Project watersheds)
<i>Galba bulimoides</i>	Prairie Fossaria	gastropods	Blue					MP 273
<i>Galba dalli</i>	Dusky Fossaria	gastropods	Blue					R1, R2, R3, MP 273
<i>Galba obrussa</i>	Golden Fossaria	gastropods	Blue					R1, R2, R3, MP 273
<i>Galba parva</i>	Pygmy Fossaria	gastropods	Blue					R1, R2, R3, MP 273
<i>Gasterosteus aculeatus</i> pop. 1	Charlotte Unarmoured Threespine Stickleback	ray-finned fishes	Red			SC	SC	n/a (does not occur in Project watersheds)
<i>Gasterosteus</i> sp. 1	Giant Threespine Stickleback	ray-finned fishes	Red			SC	SC	n/a (does not occur in Project watersheds)
<i>Gasterosteus</i> sp. 18	Misty Lake "Lake" Stickleback	ray-finned fishes	Red			E	E	n/a (does not occur in Project watersheds)

<sup>1</sup> Conservation status definitions, including "Red" and "Blue" listings designated by the CDC are included in Appendix 1

Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC <sup>a</sup>	SARA <sup>b</sup> Status	Relevant Sections <sup>c</sup>
<i>Gasterosteus</i> sp. 19	Misty Lake "Stream" Stickleback	ray-finned fishes	Red			E	E	n/a (does not occur in Project watersheds)
<i>Gyraulus crista</i>	Star Gyro	gastropods	Blue					R1, R2, R3, MP 273
<i>Haliotis kamtschatkana</i>	Northern Abalone	gastropods	Red			E	E	n/a (does not occur in Project watersheds)
<i>Hybognathus hankinsoni</i>	Brassy Minnow	ray-finned fishes	Blue					R1 R2
<i>Lymnaea atkaensis</i>	Frigid Lymnaea	gastropods	Blue					R1, R2, R3, MP 273
<i>Musculium partumeium</i>	Swamp Fingernailclam	bivalves	Blue					MP 273
<i>Musculium transversum</i>	Long Fingernailclam	bivalves	Blue					MP 273
<i>Oncorhynchus clarkii</i>	Cutthroat Trout, <i>clarkii</i> subspecies	ray-finned fishes	Blue					n/a (does not occur in Project watersheds)
<i>Physella propinqua</i>	Rocky Mountain Physa	gastropods	Blue					R1, R2, R3, MP 273
<i>Physella virginea</i>	Sunset Physa	gastropods	Blue					R1, R2, R3, MP 273
<i>Pisidium fallax</i>	River Peaclam	bivalves	Blue					R1, R2, R3
<i>Salvelinus confluentus</i>	Bull Trout	ray-finned fishes	Blue	Yes		SC		R1, R2, R3, MP 273
<i>Sphaerium occidentale</i>	Herrington Fingernailclam	bivalves	Blue					R1, R2, R3, MP 273
<i>Sphaerium striatinum</i>	Striated Fingernailclam	bivalves	Blue					R1, R2, R3, MP 273
<i>Stagnicola caperata</i>	Wrinkled Marshsnail	gastropods	Blue					MP 273
<i>Stagnicola traski</i>	Widelip Pondsnaail	gastropods	Blue					R1, R2, R3, MP 273

Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC <sup>a</sup>	SARA <sup>b</sup> Status	Relevant Sections <sup>c</sup>
<i>Stenodus leucichthys</i>	Inconnu	ray-finned fishes	Blue					n/a (does not occur in Project watersheds)
<i>Stygobromus quatsinensis</i>	Quatsino Cave Amphipod	malacostracans	Blue	Yes				n/a (does not occur in Project watersheds)
<i>Thaleichthys pacificus</i>	Eulachon	ray-finned fishes	Blue			E / T		MP 273
<i>Valvata tricarinata</i>	Threeridge Valvata	gastropods	Red					R1, R2, R3, MP 273

<sup>a</sup> Committee on the Status of Endangered Wildlife in Canada

<sup>b</sup> Federal Species at Risk Act

<sup>c</sup> R1 = downstream of R1, R2 = downstream of R2, R3 = downstream of R3, and MP 273 = MP 273 to 311.



### 3.4 Terrestrial Resources

#### 3.4.1 Ecosystems

##### 3.4.1.1 Downstream of R1

The entire segment falls within the Mossvale variant of the moist-cool Sub-boreal Spruce (SBSmk1) biogeoclimatic ecosystem classification (BEC) subzone, which occupies the broad plateau on the Fraser Basin and Nechako Plain north and west of Prince George. It has relatively long, snowy winters and moist, cool summers (DeLong et al 1993). Climax forests are typically dominated by hybrid white spruce (*Picea x albertiana*), and Rocky Mountain Douglas-fir (*Pseudotsuga menziesii* var. *glauca*) occurs on warm aspects with coarse substrate. Lodgepole pine (*Pinus contorta* var. *latifolia*) is widespread on seral sites and poorer sites, and black spruce is widespread in forested wetland areas and col-air drainage pockets (DeLong et al 1993).

Of 15 ecological communities listed as present in the SBSmk1 by the Conservation Data Centre (CDC), four are blue-listed (Table 2). Three of the units are wetlands, and one is an upland site series with suberic moisture owing to high amounts of coarse fragment content and mature Douglas-fir canopy layer (DeLong et al 1993).

**Table 2** Blue-listed ecosystems in the SBSmk1 (CDC 2020)

Scientific Name	English Name	BEC Unit
<i>Pseudotsuga menziesii</i> - <i>Picea engelmannii</i> x <i>glauca</i> / <i>Ptilium crista-castrensis</i>	Douglas-fir - hybrid white spruce / knight's plume	SBSmk1/04
<i>Picea engelmannii</i> x <i>glauca</i> / <i>Equisetum</i> spp. / <i>Mnium</i> spp.	hybrid white spruce / horsetails / leafy mosses	SBSmk1/09 SBSmk1/Ws07
<i>Carex limosa</i> - <i>Menyanthes trifoliata</i> / <i>Sphagnum</i> spp.	shore sedge - buckbean / peat-mosses	SBSmk1/Wb13
<i>Carex lasiocarpa</i> / <i>Drepanocladus aduncus</i>	slender sedge / common hook-moss	SBSmk1/Wf05

##### 3.4.1.2 Downstream of R2

This segment intersects the Stuart variant of the dry-warm SBS BEC subzone (SBSdw3), and the dry-cool subzone (SBSdk). Both have relatively low winter snowpack, and diverse climax canopy species. Although both occupy similar elevation ranges (750-1100 m), the SBSdk occurs at higher elevations on average and has a cooler climate (DeLong et al 1993; Banner et al 1993). Of 36 ecosystems listed as occurring within the two subzones, 19 are blue-listed and 3 are red listed (Table 3).

**Table 3** Red- and Blue-listed ecosystems in the SBSdw3 and SBSdk (CDC 2020).

Scientific Name	English Name	BEC Unit
<i>Alnus incana</i> / <i>Cornus sericea</i> / <i>Athyrium filix-femina</i>	mountain alder / red-osier dogwood / lady fern	SBSdk/FI02
<i>Amelanchier alnifolia</i> / <i>Elymus trachycaulus</i>	saskatoon / slender wheatgrass	SBSdk/81
<i>Betula nana</i> / <i>Carex aquatilis</i>	scrub birch / water sedge	SBSmk1/Wb13
<i>Carex lasiocarpa</i> / <i>Drepanocladus aduncus</i>	slender sedge / common hook- moss	SBSmk1/Wf05
<i>Carex limosa</i> - <i>Menyanthes trifoliata</i> / <i>Drepanocladus</i> spp.	shore sedge - buckbean / hook- mosses	SBSdk/Wf08
<i>Eleocharis palustris</i> Herbaceous Vegetation	common spike-rush Herbaceous Vegetation	SBSdk/Wm04
<i>Equisetum fluviatile</i> - <i>Carex utriculata</i>	swamp horsetail - beaked sedge	SBSdw3/Wm02
<i>Larix laricina</i> / <i>Betula pumila</i> / <i>Calamagrostis canadensis</i> - <i>Carex spp.</i> / <i>Sphagnum</i> spp.	tamarack / low birch / bluejoint reedgrass - sedges / peat-mosses	n/a
<i>Menyanthes trifoliata</i> - <i>Carex lasiocarpa</i>	buckbean - slender sedge	SBSdk/Wf06
<i>Picea engelmannii</i> x <i>glauca</i> / <i>Equisetum</i> spp. / <i>Mnium</i> spp.	hybrid white spruce / horsetails / leafy mosses	SBSdk/07 SBSdk/Ws07 SBSdw3/09 SBSdw3/Ws07
<i>Picea engelmannii</i> x <i>glauca</i> / <i>Spiraea douglasii</i> - <i>Rosa acicularis</i>	hybrid white spruce / hardhack - prickly rose	SBSdw2/06
<i>Picea mariana</i> / <i>Gaultheria hispidula</i> / <i>Sphagnum</i> spp.	black spruce / creeping- snowberry / peat-mosses	SBSdk/09 SBSdk/Wb01
<i>Pinus contorta</i> / <i>Juniperus communis</i> / <i>Oryzopsis asperifolia</i>	lodgepole pine / common juniper / rough-leaved ricegrass	SBSdk/02
<i>Pinus contorta</i> - <i>Picea mariana</i> / <i>Pleurozium schreberi</i>	lodgepole pine - black spruce / red-stemmed feathermoss	SBSdw3/05
<i>Poa secunda</i> ssp. <i>secunda</i> - <i>Elymus trachycaulus</i>	Sandberg's bluegrass - slender wheatgrass	SBSdk/82
<i>Pseudotsuga menziesii</i> - <i>Pinus contorta</i> / <i>Cladonia</i> spp.	Douglas-fir - lodgepole pine / clad lichens	SBSdw3/02
<i>Pseudotsuga menziesii</i> / <i>Pleurozium schreberi</i> - <i>Hylocomium splendens</i>	Douglas-fir / red-stemmed feathermoss - step moss	SBSdk/04
<i>Salix bebbiana</i> / <i>Calamagrostis canadensis</i>	Bebb's willow / bluejoint reedgrass	SBSdk/Ws03
<i>Salix drummondiana</i> / <i>Calamagrostis canadensis</i>	Drummond's willow / bluejoint reedgrass	SBSdk/FI05 SBSdw3/FI05
<i>Salix maccalliana</i> / <i>Carex utriculata</i>	MacCalla's willow / beaked sedge	SBSdk/Ws05

<i>Scheuchzeria palustris</i> / <i>Sphagnum</i> spp.	scheuchzeria / peat-mosses	SBSdw3/Wb12
<i>Trichophorum cespitosum</i> / <i>Campyllum stellatum</i>	tufted clubrush / golden star-moss	SBSdk/Wf11

### 3.4.1.3 Downstream of R3

This segment also falls within the dry-cool SBS BEC zone (SBSdk). There are 15 listed ecosystems of the 24 that are known to occur in this subzone (Table 3).

### 3.4.1.4 MP 273 to 311

This segment falls within two subzone variants of the Coastal Western Hemlock BEC zone. Eastern portions are within the submontane variant of the wet subarctic subzone (CWHws1), and the westernmost 14 km are within the submontane variant of the very wet maritime subzone (CWHvm1). Of the 30 ecosystems listed by the CDC as potentially occurring in these two subzones, there are five red-listed and 16 blue-listed ecological communities (Table 4).

**Table 4** Red- and blue-listed ecosystems in the CWHvm1 and CWHws1 (CDC 2020)

Scientific Name	English Name	BEC Unit
<i>Abies amabilis</i> - <i>Picea sitchensis</i> / <i>Oplopanax horridus</i>	sitchensis / <i>Oplopanax horridus</i> amabilis fir - Sitka spruce / devil's club	CWHvm1/08 CWHvm2/08
<i>Abies amabilis</i> - <i>Thuja plicata</i> / <i>Gymnocarpium dryopteris</i>	amabilis fir - western redcedar / oak fern	CWHws1/04
<i>Abies amabilis</i> - <i>Thuja plicata</i> / <i>Oplopanax horridus</i> Moist Subarctic	amabilis fir - western redcedar / devil's club Moist Subarctic	CWHws1/06
<i>Abies amabilis</i> - <i>Thuja plicata</i> / <i>Rubus spectabilis</i> Very Wet Maritime	amabilis fir - western redcedar / salmonberry Very Wet Maritime	CWHvm1/07
<i>Abies amabilis</i> - <i>Thuja plicata</i> / <i>Tiarella trifoliata</i> Very Wet Maritime	amabilis fir - western redcedar / three-leaved foamflower Very Wet Maritime	CWHvm1/05
<i>Carex limosa</i> - <i>Menyanthes</i> <i>trifoliata</i> / <i>Sphagnum</i> spp.	shore sedge - buckbean / peat- mosses	CWHws1/Wb13
<i>Carex sitchensis</i> / <i>Sphagnum</i> spp.	Sitka sedge / peat-mosses	CWHvm1/Wf51
<i>Leymus mollis</i> ssp. <i>mollis</i> - <i>Lathyrus</i> <i>japonicus</i>	dune wildrye - beach pea	n/a
<i>Menyanthes trifoliata</i> - <i>Carex</i> <i>lasiocarpa</i>	buckbean - slender sedge	CWHws1/Wf06
<i>Picea sitchensis</i> / <i>Rubus</i> <i>spectabilis</i> Very Wet Maritime	Sitka spruce / salmonberry Very Wet Maritime	CWHvm1/09
<i>Picea sitchensis</i> / <i>Rubus</i> <i>spectabilis</i> Wet Subarctic 1	Sitka spruce / salmonberry Wet Subarctic 1	CWHws1/07

<i>Pinus contorta</i> / <i>Arctostaphylos uva-ursi</i>	lodgepole pine / kinnikinnick	CWHws1/02
<i>Populus trichocarpa</i> - <i>Alnus rubra</i> / <i>Rubus spectabilis</i>	black cottonwood - red alder / salmonberry	CWHvm1/10 CWHws1/08
<i>Populus trichocarpa</i> / <i>Salix sitchensis</i>	black cottonwood / Sitka willow	CWHvm1/11 CWHws/09
<i>Rhododendron groenlandicum</i> / <i>Kalmia microphylla</i> / <i>Sphagnum</i> spp.	Labrador-tea / western bog-laurel / peat-mosses	CWHvm1/Wb50
<i>Salix sitchensis</i> / <i>Carex sitchensis</i>	Sitka willow / Sitka sedge	CWHvm1/Ws06
<i>Thuja plicata</i> - <i>Picea sitchensis</i> / <i>Lysichiton americanus</i>	western redcedar - Sitka spruce / skunk cabbage	CWHvm1/14 CWHvm1/Ws54 CWHws1/11 CWHws1/Ws54
<i>Thuja plicata</i> - <i>Tsuga heterophylla</i> / <i>Polystichum munitum</i>	western redcedar - western hemlock / sword fern	CWHvm1/04
<i>Tsuga heterophylla</i> - <i>Abies amabilis</i> / <i>Struthiopteris spicant</i>	western hemlock - amabilis fir / deer fern	CWHvm1/06
<i>Tsuga heterophylla</i> - <i>Pinus contorta</i> / <i>Pleurozium schreberi</i>	western hemlock - lodgepole pine / red-stemmed feathermoss	CWHws1/03
<i>Tsuga heterophylla</i> - <i>Thuja plicata</i> / <i>Gaultheria shallon</i> Very Wet Maritime	western hemlock - western redcedar / salal Very Wet Maritime	CWHvm1/03

### 3.4.2 Wildlife

Terrestrial wildlife species at risk with the potential to occur within the SBS and CWH BEC Zones in the Prince George, Stuart-Nechako, Nadina, and Coast Mountains Natural Resource Districts are included in Table 1. Many of the species are unlikely to be present in the Project area based on known home ranges and habitat affinities. Species lists were derived directly from the BC Conservation Data Centre (CDC), and no additional interpretation on species presence (for example, based on available habitat types) has been undertaken.

**Table 5.** Wildlife Species at Risk with the potential to occur (CDC 2020)

Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC	SARA Status	Relevant Sections
<i>Accipiter gentilis atricapillus</i>	Northern Goshawk, <i>atricapillus</i> subspecies	birds	Blue			NAR		R1, R2, R3, MP 273
<i>Accipiter gentilis laingi</i>	Northern Goshawk, <i>laingi</i> subspecies	birds	Red	Y		T	T	MP 273
<i>Acroloxus coloradensis</i>	Rocky Mountain Capshell	gastropods	Blue			NAR		R1, R2, R3, MP 273
<i>Aechmophorus occidentalis</i>	Western Grebe	birds	Red			SC	SC	R1, R2, R3, MP 273
<i>Aegolius acadicus brooksi</i>	Northern Saw-whet Owl, <i>brooksi</i> subspecies	birds	Blue	Y		T	T	MP 273
<i>Aeronautes saxatalis</i>	White-throated Swift	birds	Blue					R1, R2, R3
<i>Agriades optilete</i>	Cranberry Blue	insects	Blue					R2, MP 273
<i>Ammospiza nelsoni</i>	Nelson's Sparrow	birds	Red	Y		NAR		R1, R2
<i>Anaxyrus boreas</i>	Western Toad	amphibians	Yellow			SC	SC	R1, R2, R3, MP 273
<i>Aneides vagrans</i>	Wandering Salamander	amphibians	Blue			SC	SC	R3, MP 273
<i>Aplodontia rufa</i>	Mountain Beaver	mammals	Yellow			SC	SC	MP 273
<i>Ardea herodias fannini</i>	Great Blue Heron, <i>fannini</i> subspecies	birds	Blue	Y		SC	SC	MP 273
<i>Ardea herodias</i>	Great Blue Heron,	birds	Blue	Y				R1, R2, R3 MP 273

Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC	SARA Status	Relevant Sections
	herodias subspecies							
<i>Argia vivida</i>	Vivid Dancer	insects	Blue			SC	SC	R1
<i>Ascaphus truei</i>	Coastal Tailed Frog	amphibians	Yellow	Y		SC	SC	MP 273
<i>Asio flammeus</i>	Short-eared Owl	birds	Blue	Y		SC	SC	R1, R2, R3, MP 273
<i>Bartramia longicauda</i>	Upland Sandpiper	birds	Red					R1, R2, R3, MP 273
<i>Boloria astarte distincta</i>	Astarte Fritillary, distincta subspecies	insects	Blue					R2, MP 273
<i>Boloria epithore sigridae</i>	Western Meadow Fritillary, sigridae subspecies	insects	Blue					R1, R2, R3, MP 273
<i>Botaurus lentiginosus</i>	American Bittern	birds	Blue					R1, R2, R3, MP 273
<i>Brachyramphus marmoratus</i>	Marbled Murrelet	birds	Blue	Y		T	T	MP 273
<i>Branta bernicla</i>	Brant	birds	Blue					MP 273
<i>Branta canadensis occidentalis</i>	Canada Goose, occidentalis subspecies	birds	Red					MP 273
<i>Buteo lagopus</i>	Rough-legged Hawk	birds	Blue			NAR		R1, R2, R3, MP 273
<i>Buteo platypterus</i>	Broad-winged Hawk	birds	Blue					R1, R2, R3
<i>Buteo swainsoni</i>	Swainson's Hawk	birds	Red					R1, R2, R3, MP 273

Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC	SARA Status	Relevant Sections
<i>Butorides virescens</i>	Green Heron	birds	Blue					R1
<i>Calcarius pictus</i>	Smith's Longspur	birds	Blue					R1, R2, R3 MP 273
<i>Calidris canutus</i>	Red Knot	birds	Red			E / T	T / E	MP 273
<i>Cardellina canadensis</i>	Canada Warbler	birds	Blue			T	T	R1, R2
<i>Carychium occidentale</i>	Western Thorn	gastropods	Blue					R3, MP 273
<i>Cervus elaphus roosevelti</i>	Roosevelt Elk	mammals	Blue					R3, MP 273
<i>Charina bottae</i>	Northern Rubber Boa	reptiles	Yellow			SC	SC	
<i>Chlosyne hoffmanni</i>	Hoffman's Checkerspot	insects	Red					R1
<i>Chondestes grammacus</i>	Lark Sparrow	birds	Blue					R1, R2, R3, MP 273
<i>Chordeiles minor</i>	Common Nighthawk	birds	Yellow			SC	T	R1, R2, R3, MP 273
<i>Cicindela hirticollis</i>	Hairy-necked Tiger Beetle	insects	Blue					R1, R2, R3, MP 273
<i>Clangula hyemalis</i>	Long-tailed Duck	birds	Blue					R1, R2, R3, MP 273
<i>Coccothraustes vespertinus</i>	Evening Grosbeak	birds	Yellow			SC	SC	R1, R2, R3, MP 273
<i>Coccyzus americanus</i>	Yellow-billed Cuckoo	birds	Red					R1
<i>Colias gigantea</i>	Giant Sulphur, <i>gigantea</i> subspecies	insects	Blue					R2, MP 273
<i>Contopus cooperi</i>	Olive-sided Flycatcher	birds	Blue			SC	T	R1, R2, R3, MP 273

Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC	SARA Status	Relevant Sections
<i>Corynorhinus townsendii</i>	Townsend's Big-eared Bat	mammals	Blue					R1
<i>Cyanocitta stelleri carlottae</i>	Steller's Jay, carlottae subspecies	birds	Blue					MP 273
<i>Cypseloides niger</i>	Black Swift	birds	Blue			E	E	R1, R2, R3, MP 273
<i>Danaus plexippus</i>	Monarch	insects	Red			E	SC	R1
<i>Dolichonyx oryzivorus</i>	Bobolink	birds	Blue			T	T	R1, R2, R3
<i>Enallagma clausum</i>	Alkali Bluet	insects	Blue					R1, R2, R3
<i>Epargyreus clarus</i>	Silver-spotted Skipper	insects	Blue					R1
<i>Erynnis afranius</i>	Afranius Duskywing	insects	Red					R2, R3, MP 273
<i>Erythemis collocata</i>	Western Pondhawk	insects	Blue					R1
<i>Euchloe ausonides ogilvia</i>	Large Marble, ogilvia subspecies	insects	Blue					R1, R2, R3, MP 273
<i>Eumetopias jubatus</i>	Steller Sea Lion	mammals	Blue			SC	SC	R3, MP 273
<i>Euphagus carolinus</i>	Rusty Blackbird	birds	Blue			SC	SC	R1, R2, R3, MP 273
<i>Falco mexicanus</i>	Prairie Falcon	birds	Red	Y		NAR		R1, R2, R3
<i>Falco peregrinus</i>	Peregrine Falcon	birds	No Status			SC	SC	R1, R2, R3, MP 273
<i>Falco peregrinus anatum</i>	Peregrine Falcon, anatum subspecies	birds	Red			NAR	SC	R1, R2, R3, MP 273



Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC	SARA Status	Relevant Sections
<i>Falco peregrinus pealei</i>	Peregrine Falcon, pealei subspecies	birds	Blue			SC	SC	MP 273
<i>Falco rusticolus</i>	Gyrfalcon	birds	Blue			NAR		R1, R2, R3, MP 273
<i>Fratercula cirrhata</i>	Tufted Puffin	birds	Blue					MP 273
<i>Fratercula corniculata</i>	Horned Puffin	birds	Red					MP 273
<i>Fulmarus glacialis</i>	Northern Fulmar	birds	Red					MP 273
<i>Glaucidium gnoma swarthi</i>	Northern Pygmy-owl, swarthi subspecies	birds	Blue	Y				MP 273
<i>Gulo</i>	Wolverine	mammals	No Status			SC	SC	R1, R2, R3, MP 273
<i>Gulo luscus</i>	Wolverine, luscus subspecies	mammals	Blue	Y		SC	SC	R1, R2, R3, MP 273
<i>Gulo vancouverensis</i>	Wolverine, vancouverensis subspecies	mammals	Red	Y		SC	SC	R3, MP 273
<i>Hemphillia camelus</i>	Pale Jumping-slug	gastropods	Blue					R1
<i>Hirundo rustica</i>	Barn Swallow	birds	Blue			T	T	R1, R2, R3, MP 273
<i>Hydroprogne caspia</i>	Caspian Tern	birds	Blue			NAR		R1, R2, R3, MP 273
<i>Icteria virens</i>	Yellow-breasted Chat	birds	Red	Y		E	E	R1, R2, R3
<i>Icterus galbula</i>	Baltimore Oriole	birds	Blue					R1

Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC	SARA Status	Relevant Sections
<i>Larus californicus</i>	California Gull	birds	Blue					R1, R2, R3, MP 273
<i>Limnodromus griseus</i>	Short-billed Dowitcher	birds	Blue					MP 273
<i>Limosa haemastica</i>	Hudsonian Godwit	birds	Red			T		MP 273
<i>Megascops kennicottii</i>	Western Screech-Owl	birds	No Status			T	T	MP 273
<i>Megascops kennicottii</i>	Western Screech-Owl, kennicottii subspecies	birds	Blue			T	T	MP 273
<i>Melanerpes lewis</i>	Lewis's Woodpecker	birds	Blue	Y		T	T	R1, R2, R3, MP 273
<i>Melanitta americana</i>	Black Scoter	birds	Blue					MP 273
<i>Melanitta perspicillata</i>	Surf Scoter	birds	Blue					R1, R2, R3, MP 273
<i>Microtus townsendii cowani</i>	Townsend's Vole, cowani subspecies	mammals	Red					R3, MP 273
<i>Mustela erminea anguinae</i>	Ermine, anguinae subspecies	mammals	Blue					R3, MP 273
<i>Mustela erminea haidarum</i>	Ermine, haidarum subspecies	mammals	Red			T	T	MP 273
<i>Myotis lucifugus</i>	Little Brown Myotis	mammals	Yellow			E	E	R1, R2, R3, MP 273
<i>Myotis septentrionalis</i>	Northern Myotis	mammals	Blue			E	E	R1, R2, R3, MP 273
<i>Numenius americanus</i>	Long-billed Curlew	birds	Blue	Y		SC	SC	R1, R2, R3, MP 273
<i>Nycticorax</i>	Black-crowned Night-heron	birds	Red					R1

Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC	SARA Status	Relevant Sections
<i>Oeneis jutta alaskensis</i>	Jutta Arctic, alaskensis subspecies	insects	Blue					R2, MP 273
<i>Oeneis jutta chermocki</i>	Jutta Arctic, chermocki subspecies	insects	Blue					R1, R2, R3
<i>Ophiogomphus occidentis</i>	Sinuous Snaketail	insects	Blue					R1, R2, R3
<i>Oporornis agilis</i>	Connecticut Warbler	birds	Blue	Y				R1, R2
<i>Oreamnos americanus</i>	Mountain Goat	mammals	Blue					R1, R2, R3, MP 273
<i>Oreoscoptes montanus</i>	Sage Thrasher	birds	Red	Y		E	E	MP 273
<i>Papilio machaon hudsonianus</i>	Old World Swallowtail, hudsonianus subspecies	insects	Red					R1
<i>Parnassius clodius claudianus</i>	Clodius Parnassian, claudianus subspecies	insects	Blue					R3, MP 273
<i>Parnassius phoebus</i>	Phoebus Parnassian	insects	Red					R2, MP 273
<i>Patagioenas fasciata</i>	Band-tailed Pigeon	birds	Blue			SC	SC	R1, R2, R3, MP 273
<i>Pekania pennanti</i>	Fisher	mammals	No Status	Y				
<i>Pelecanus erythrorhynchos</i>	American White Pelican	birds	Red	Y	E	NAR		R1, R2, R3, MP 273
<i>Phalacrocorax auritus</i>	Double-crested Cormorant	birds	Blue			NAR		R1, R2, R3, MP 273
<i>Phalaropus lobatus</i>	Red-necked Phalarope	birds	Blue			SC		R1, R2, R3, MP 273

Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC	SARA Status	Relevant Sections
<i>Pieris marginalis guppyi</i>	Margined White, guppyi subspecies	insects	Blue					R2, MP 273
<i>Pinicola enucleator carlottae</i>	Pine Grosbeak, carlottae subspecies	birds	Blue					MP 273
<i>Pituophis catenifer</i>	Gopher Snake	reptiles	No Status				Extinct / T	
<i>Planorbula campestris</i>	Meadow Rams-horn	gastropods	Blue					R1, R2, R3
<i>Pluvialis dominica</i>	American Golden-Plover	birds	Blue					R1, R2, R3, MP 273
<i>Podiceps nigricollis</i>	Eared Grebe	birds	Blue					R1, R2, R3, MP 273
<i>Polites draco</i>	Draco Skipper	insects	Blue					R2, MP 273
<i>Pontia sisymbrii beringiensis</i>	Spring White, beringiensis subspecies	insects	Red					R1, R2, R3, MP 273
<i>Pristiloma johnsoni</i>	Broadwhorl Tightcoil	gastropods	Blue					R3, MP 273
<i>Progne subis</i>	Purple Martin	birds	Blue					MP 273
<i>Ptychoramphus aleuticus</i>	Cassin's Auklet	birds	Red	Y		SC	SC	MP 273
<i>Rana aurora</i>	Northern Red-legged Frog	amphibians	Blue	Y		SC	SC	R3, MP 273
<i>Rangifer tarandus pop. 15</i>	Caribou (Northern Mountain Population)	mammals	Blue	Y		SC	SC	R1, R2, R3, MP 273
<i>Recurvirostra americana</i>	American Avocet	birds	Blue					R1, R2, R3

Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC	SARA Status	Relevant Sections
<i>Setophaga castanea</i>	Bay-breasted Warbler	birds	Red	Y				R1, R2, R3 MP 273
<i>Setophaga tigrina</i>	Cape May Warbler	birds	Blue	Y				R1, R2, R3
<i>Setophaga virens</i>	Black-throated Green Warbler	birds	Blue	Y				R1, R2, R3
<i>Somatochlora forcipata</i>	Forcipate Emerald	insects	Blue					R1, R2, R3, MP 273
<i>Somatochlora kennedyi</i>	Kennedy's Emerald	insects	Blue					R1, R2, R3, MP 273
<i>Sorex navigator brooksi</i>	Western Water Shrew, brooksi subspecies	mammals	Blue	Y				R3, MP 273
<i>Speyeria zerene bremnerii</i>	Zerene Fritillary, bremnerii subspecies	insects	Red					R3, MP 273
<i>Staalaa gwaii</i>	Haida Gwaii Slug	gastropods	Red			SC	SC	R3, MP 273
<i>Sterna forsteri</i>	Forster's Tern	birds	Red			Data Deficient		R1
<i>Synthliboramphus antiquus</i>	Ancient Murrelet	birds	Blue	Y		SC	SC	MP 273
<i>Tanypteryx hageni</i>	Black Petaltail	insects	Blue					R3, MP 273
<i>Tringa incana</i>	Wandering Tattler	birds	Blue					R1, R2, R3 MP 273
<i>Troglodytes hiemalis</i>	Winter Wren	birds	Blue					R1, R2, R3, MP 273
<i>Tympanuchus phasianellus columbianus</i>	Sharp-tailed Grouse, columbianus subspecies	birds	Blue	Y				R1, R2, R3

Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC	SARA Status	Relevant Sections
<i>Tyto alba</i>	Barn Owl	birds	Red			T	T	not known to occur in Project area
<i>Uria aalge</i>	Common Murre	birds	Red					MP 273
<i>Uria lomvia</i>	Thick-billed Murre	birds	Red					MP 273
<i>Ursus arctos</i>	Grizzly Bear	mammals	Blue	Y		SC	SC	R1, R2, R3, MP 273

### 3.4.3 Vegetation

Vegetation and lichen species with the potential to occur within the SBS and CWH BEC Zones in the Prince George, Stuart-Nechako, Nadina, and Coast Mountains Natural Resource Districts are included in Table 6. Many of the species are unlikely to be present in the Project area based on known home ranges and habitat affinities. Species lists were derived directly from the BC Conservation Data Centre (CDC), and no additional interpretation on species presence (for example, based on available habitat types) has been undertaken.

**Table 6** Plants and Lichen Species at Risk with the potential to occur (CDC 2020)

Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC	SARA Status	Relevant Sections <sup>c</sup>
<i>Abronia latifolia</i>	yellow sand-verbena	dicots	Blue					MP 273
<i>Acorus americanus</i>	American sweet-flag	monocots	Blue					R1, R2, R3
<i>Acrosyphus sphaerophoroides</i>	mountain crab-eye	lichen	Red			SC	SC	R3, MP 273
<i>Alectoria imshaugii</i>	spiny witch's hair	lichen	Blue					MP 273
<i>Arctanthemum arcticum</i> ssp. <i>arcticum</i>	arctic daisy	dicots	Red					R3, MP 273
<i>Arctopoa eminentis</i>	eminent bluegrass	monocots	Red					R3, MP 273
<i>Bartramia halleriana</i>	Haller's apple moss	bryophyte	Red			T	T	R1
<i>Bidens amplissima</i>	Vancouver Island beggarticks	dicots	Blue			SC	SC	R3, MP 273
<i>Brotherella roellii</i>	Roell's brotherella	bryophyte	Red			E	E	R3, MP 273
<i>Bryocaulon pseudosatanum</i>	pacific pretzel	lichen	Blue					R3, MP 273
<i>Bryoria carlottae</i>	languid horsehair	lichen	Blue					MP 273
<i>Bryoria cervinula</i>	spiny horsehair	lichen	Blue					MP 273
<i>Calystegia soldanella</i>	beach bindweed	dicots	Blue					MP 273
<i>Carex mackenziei</i>	Mackenzie's sedge	monocots	Blue					R3, MP 273



Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC	SARA Status	Relevant Sections <sup>c</sup>
<i>Catolechia wahlenbergii</i>	tundra lemon	lichen	Blue					MP 273
<i>Cladonia decorticata</i>	strip-tease pixie	lichen	Blue					R1
<i>Claytonia cordifolia</i>	heart-leaved springbeauty	dicots	Blue					R1
<i>Collema flaccidum</i>	flaking tarpaper	lichen	Red					MP 273
<i>Daltonia splachnoides</i>	Dalton's moss	bryophyte	Red			E		MP 273
<i>Dermatocarpon intestiniforme</i>	quilted stippleback	lichen	Blue					R2, R3, MP 273
<i>Drosera linearis</i>	slender-leaf sundew	dicots	Blue					R1
<i>Eleocharis nitida</i>	slender spike-rush	monocots	Blue					R1
<i>Erioderma solediatum</i>	vole felt	lichen	Blue					MP 273
<i>Fissidens pauperculus</i>	poor pocket moss	bryophyte	Red			E	E	R3, MP 273
<i>Fuscopannaria ahneri</i>	corrugated crackers	lichen	Blue					R1, R2, R3, MP 273
<i>Glehnia littoralis</i> ssp. <i>leiocarpa</i>	American glehnia	lichen	Blue					MP 273
<i>Hippuris tetraphylla</i>	four-leaved mare's-tail	dicots	Blue					R3, MP 273
<i>Hypogymnia heterophylla</i>	seaside bone	lichen	Red			T	T	R1
<i>Hypotrachyna revoluta</i>	granulating loop	lichen	Blue					MP 273
<i>Isoetes truncata</i> x	truncated quillwort	quillworts	Red					R1, R2, R3
<i>Lathyrus littoralis</i>	silky beach pea	dicots	Red			T		MP 273

Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC	SARA Status	Relevant Sections <sup>c</sup>
<i>Leptogium californicum</i>	midlife vinyl	lichen	Blue					R3, MP 273
<i>Leptogium cyanescens</i>	blue-blue vinyl	lichen	Red					R1, MP 273
<i>Leptogium polycarpum</i>	peacock vinyl	lichen	Yellow			SC	SC	MP 273
<i>Lobaria retigera</i>	smoker's lung	lichen	Blue			T		R1, R2, R3, MP 273
<i>Montia chamissoi</i>	Chamisso's montia	dicots	Blue					R3, MP 273
<i>Nephroma isidiosum</i>	pebbled paw	lichen	Blue					R1, R2, R3, MP 273
<i>Nephroma occultum</i>	cryptic paw	lichen	Blue			T	SC	R1, R2, R3, MP 273
<i>Nymphaea leibergii</i>	small white waterlily	dicots	Red					R1, R2
<i>Nymphaea tetragona</i>	pygmy waterlily	dicots	Blue					R1, MP 273
<i>Oxypolis occidentalis</i>	western cowbane	dicots	Blue					MP 273
<i>Oxytropis campestris</i> var. <i>davisii</i>	Davis' locoweed	dicots	Blue					R1
<i>Pannaria rubiginosa</i>	considerable gingerbread	lichen	Red					MP 273
<i>Parmotrema crinitum</i>	snuff ruffle	lichen	Blue					MP 273
<i>Pilophorus robustus</i>	octopus' matchstick	lichen	Blue					MP 273
<i>Pinus albicaulis</i>	whitebark pine	conifers	Blue			E	E	R1, R2, R3, MP 273
<i>Platanthera ephemerantha</i>	white-lip rein orchid	monocots	Blue					MP 273

Scientific Name	English Name	Class (English)	BC List	Identified Wildlife under Forest and Range Practices Act	Wildlife Act	COSEWIC	SARA Status	Relevant Sections <sup>c</sup>
<i>Polystichum setigerum</i>	Alaska holly fern	ferns	Blue					R3, MP 273
<i>Pseudocyphellaria rainierensis</i>	oldgrowth specklebelly	lichen	Blue			SC	SC	R3, MP 273
<i>Sclerophora peronella</i>	frosted glass-whiskers	lichen	Red			Data Deficient		R3 MP 273
<i>Seligeria careyana</i>	Carey's small limestone moss	bryophyte	Red			E		MP 273
<i>Symphyotrichum ascendens</i>	long-leaved aster	dicots	Blue					R1
<i>Taraxia breviflora</i>	short-flowered evening-primrose	dicots	Red					R1, R2, R3
<i>Trichostomum recurvifolium</i>	drooping-leaved beard-moss	bryophyte	Blue			E		MP 273
<i>Zygodon gracilis</i>	slender yoke-moss	bryophyte	Red			E		MP 273

## 4.0 Potential Project Impacts and Regulatory Considerations

The following provides a brief overview of potential biophysical effects, as they are currently understood, that may arise from construction and operation of the Project. These issues, and others that are identified through further study and engagement, will be addressed in the environmental assessment.

### 4.1 Effects Scoping

PNG will develop a list of Environmental Components (ECs) with 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 ECs and associated indicators provide useful categories upon which to evaluate potential impacts of the proposed Project and to inform the baseline data collection and analysis.

#### 4.1.1 Ecological Communities

In general, the Project has the potential to affect ecological communities where new clearing is required off-RoW to facilitate temporary workspaces and laydown areas, or new access routes. Listed ecological communities do not necessarily contain rare or endangered vegetation or are rare themselves (though they can be). Communities can be listed because few mature, pristine examples remain intact or they are highly fragmented by past activities (typically agriculture, silviculture, rural and urban development, or hydroelectric impoundments which have large footprints within a regional landscape), because they are sensitive to disturbance (e.g., ecosystems with very wet or very dry soils which will be difficult to revegetate if cleared), or because they provide disproportionately high habitat values for flora and fauna compared to their availability (e.g., many wetland and floodplain types). Terrestrial ecosystem surveys will be performed prior to off-RoW clearing in non-disturbed areas. Disturbed areas, such as cutblocks, may contain biogeoclimatic ecosystem classification site series equivalent to listed ecological communities, but they would not be mature, functional examples of the species assemblage and structural stage that best represent the community. Mitigation strategies for listed ecological communities, which may include avoidance, retention of specific habitat attributes, or reclamation measures, will be detailed in an environmental management plan.

#### 4.1.2 Terrestrial Species

Plant and wildlife species may be affected by modification of habitats, disturbance and displacement from home ranges, direct harm by interactions with crew or equipment, or indirect harm by allowing invasive species to become established or otherwise increasing competition. The potential for the species listed in Section 3 to occur specifically within the areas to be affected by Project activities will be evaluated in the Environmental Assessment phase, when specific areas of disturbance are better known and potential impacts can be determined based on proposed construction activities. For those species that may occur, additional qualitative analysis will be conducted to determine if the Project has the potential to cause adverse effects. Surveys for critical habitat elements, such as dens, microhabitat types, mineral licks, breeding areas,

overwintering areas, etc. may be conducted for some species in areas where disturbance will occur, where local habitat management is practical. Surveys for wide-ranging species that use varying habitat types (such as Moose or Grizzly Bear) are not proposed, though mitigation to reduce the potential for adverse effects will be included in an EMP. If surveys document the presence of rare or endangered species or habitats, site- or species-specific management plans may be required.

#### 4.1.3 Aquatics

There are 202 mapped stream crossings across all segments, as well as many unmapped stream and wetland crossings. Mapped stream crossings by section are included in Table 7.

**Table 7** Mapped stream crossings in each section.

Section	Length	# mapped crossings	% of Project Total	Mapped crossing density
Downstream of R1	38.9 km	38	19%	1.0/km
Downstream of R2	38.5 km	83	41%	2.2/km
Downstream of R3	8.6 km	10	5%	1.2/km
MP 273 to 311	62.3 km	71	35%	1.1/km

Any work activity or modification of a stream channel below the high-water mark (HWM) will require a Section 11 Change Approval under the *Water Sustainability Act* (WSA). The definition of a “stream” under the WSA includes other landscape features defined by the presence of freshwater, including wetlands (other than bogs), ephemeral stream channels and gullies, lakes and ponds, springs, etc. For all streams potentially affected, the fish-bearing status will be determined by reviewing historical data and/or conducting field surveys. Stream classifications will be assigned based on guidance in the *Environmental Protection and Management Guideline* (EPMG; OGC 2018). Fish habitat quality will be evaluated for all streams determined to be fish-bearing. Existing guidelines, such as the EPMG, and industry best-management practices (such as isolating areas of instream work from flow and fish, conducting fish salvages, and monitoring water quality) are anticipated to be effective in mitigation potential effects to fish and fish habitat at most crossing locations and areas of instream work. Fish and fish habitat are also protected under the federal *Fisheries Act*; if intensive disturbance, displacement for long periods of time, or habitat modifications are necessary, site-specific investigations and applications for authorization under the *Fisheries Act* from Fisheries and Oceans Canada (DFO) may be required.

## 4.2 **Administrative Considerations**

### 4.2.1 Formal Environmental Assessment Designation

Based on the *Regulations Designating Physical Activities* under the *Canadian Environmental Assessment Act*, the Project specifications (storage capacities, new pipeline construction length, etc.) are not likely to trigger a formal assessment. Similarly, the Project specifications are not likely to meet thresholds in the *Reviewable Projects Regulation* under the *BC Environmental Assessment Act* and no formal review through the BC Environmental Assessment Office is likely to be required.

#### 4.2.2 Navigable Waters

Navigable waters (i.e., any body of water that can be used for vessel transport at any time of year) are protected under the *Canadian Navigable Water Act* (CNWA). Works meeting the assessment criteria of the Minor Works Order under the CNWA may proceed without an application for approval if they comply with terms and conditions within the Order. Pipelines buried under the bed of a navigable water that are installed using a trenched method are considered minor works provided that the channel width at the crossing location is less than 50 m and the construction of the crossing is completed within 2 weeks. Additional measures listed in the Minor Works Order must be implemented during trenched construction on a navigable water (e.g., signage, allowing safe passage through the work site). It is anticipated that most crossings for this Project will be compliant with the Minor Works order and additional permits and reviews will not be required. There are 3 crossings of the Salmon River in R1 which likely exceed 50 m and may not fall within the scope of the Minor Works Order, as well as crossings of the Lakelse and Gitnadoix Rivers in MP 273 to 311. The Skeena River is a scheduled water under the CNWA, and any works that may affect navigation at this crossing location would likely need to be referred to the Navigation Protection Program (Transport Canada).

#### 4.2.3 Ungulate Winter Range

The pipeline between Terrace Junction and Salvus runs through Ungulate Winter Range (UWR) polygon 6-009 for Moose established under ministerial order by the *Government Actions Regulation*. Management objectives and Planning and Operational Measures (POMs) have been adapted by the BC OGC from General Wildlife Measures. Activities within UWR 6-009 will be required to consider a mitigation strategy to protect the viability and quality of moose overwintering habitat along this portion of the route.

#### 4.2.4 Old Growth Management Areas

The pipeline near the Gitnadoix crossing passes through an Old Growth Management Area (OGMA). POMs have been developed for work inside an OGMA which will be carefully considered during the planning phase of the Project and incorporated, where possible, into environmental management plans. If adherence to POMs will not be possible due to operational constraints, a mitigation strategy will be developed specific to the OGMA that will be submitted for regulatory approval prior to work.

#### 4.2.5 Wildlife Tree Retention Area

The pipeline in various segments is either routed through or immediately adjacent to designated Wildlife Tree Retention Areas (WTRA). A mitigation strategy will be developed for the Project where potential impacts to WTRAs is possible. It is expected that through proper pre-field planning and assessment, impacts to WTRAs can be minimized.

#### 4.2.6 Parks and Protected Areas

The pipeline passes through the Gitnadoix River Provincial Park and the Skeena River Ecological Reserve both of which are designated by the Province (BC Parks) and subject to specific land-use objectives and permitting processes. A review will be completed of existing agreements with BC

Parks and if required PNG will seek additional regulatory engagement as necessary to operate within these areas.

## 5.0 Conclusion

The proposed PNG Reactivate Capacity Project includes upgrades and maintenance to existing infrastructure. Part of these upgrades include reactivation of 10-inch pipeline loops from MP 0 to 24 (R1), MP 67-91 (R2), MP 137 to 141 (R3) and pipeline maintenance and integrity investigations between MP 273 to 311, which are the focus of this report. This scoping report highlights environmental components for consideration during the Project planning phase based on the potential for specific management requirements, permitting requirements, or the need for other actions to allow the Project to be executed in compliance with environmental legislation, guidelines, and best management practices.

The Project spans varied terrain, but generally encounters low relief rolling terrain within the Fraser Basin and Nechako Plateau in the central interior on R1 to R3. Drainage is poor in R1 and wetlands occur frequently. Drainage improves with increasing relief on R2 and R3, though small ephemeral drainages are abundant in R2 associated with historical gullying on the valley wall of the Nechako River. The MP 273 to 311 section follows the lower Skeena River and features several large watercourse crossings, steep terrain, and frequent bedrock exposures.

Approvals under the *Water Sustainability Act* will be submitted to the BC OGC wherever disturbance (works, machinery access, water withdrawals, etc.) will occur below the high-water mark of any watercourse or waterbody. It is anticipated that industry best management practices can be implemented which will mitigate potential impacts to fish and fish habitat at most watercourses. Construction plans will be reviewed and assessed for compliance with existing Codes of Practice, and to determine if the *Measures to Protect Fish and Fish Habitat* (DFO 2020) can be followed. Where construction activities will not be compliant with these measures, alternative mitigation will be devised and referred to DFO for review. The Skeena River is a scheduled waterway under the CNWA and permitting will be required for any activity that has the potential to interfere with navigation. Several other watercourses within the Project area, including the Salmon River, Lakelse River, and Gitnadoix River are considered navigable.

Based on known home ranges and habitat affinities, most applicable rare and endangered aquatic species identified by the BC CDC are unlikely to be present within the Project footprint. However, Brassy Minnow have a high likelihood of occurring in streams in R1 and moderate to low potential in R2. Eulachon occur in the lower Skeena River mainstem within the MP 273 to 311 section and may utilize side channels and off channel areas that are intersected by the pipeline route. Several rare and endangered aquatic invertebrate species have limited range and habitat information, and their potential to occur is unknown.

There are 47 red or blue-listed ecosystems that occur within the biogeoclimatic ecosystem classification (BEC) subzones that comprise the Project area. However, most Project activities will occur on the existing, cleared pipeline RoW and existing access will be used wherever possible. As such, there is limited potential to adversely affect mature, pristine examples of listed ecosystems. Surveys to determine ecosystem classification will be conducted where new, off-RoW clearing may be required (e.g., temporary workspaces or new access routes). Mitigation measures will be devised and submitted to the BC OGC where listed ecosystems or ecosystems listed as high-priority wildlife under the *EPMR* are encountered.



Similarly, a host of plant and wildlife species are known to occur within the biogeoclimatic ecosystem classification zones and Natural Resource Districts which comprise the Project area. Many species are unlikely to occur in or near the Project area based on known home ranges and habitat affinities. However, species tolerant of disturbed habitats, species associated with edge and early seral areas, and those with large, wide ranging territories may use the habitats available within the Project area. Species-specific analysis will be conducted when the footprint of Project disturbance, timing, and construction methods are developed to inform the potential for negative interactions with listed species. Species or habitat surveys may be conducted to verify presence or appropriate habitat conditions in areas where disturbance is proposed, and mitigation measures will be developed and submitted to the BC OGC where listed species or species listed as high-priority wildlife under the *EPMR* are encountered.

Ungulate winter range, old growth management areas, wildlife tree retention areas, and provincial parks are encountered within the Project area. Specific management actions are required when operating in these areas, and some activities may be restricted.

## 6.0 References

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