Dunn Lake Road

Environmental Overview Assessment

BC Ministry of Transportation and Infrastructure

October 2019

ESTSÉK' ENVIRONMENTAL SERVICES LLP

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Disclaimer

This report is rendered solely for the use of the Ministry of Transportation and Infrastructure (MOTI) in connection with the Dunn Lake Road Environmental Overview Assessment (the Project), and no person may rely on it for any other purpose without Estsék' Environmental Services LLP's (Estsék') prior written approval. Should a third party use this report without the approval of Estsék', they may not rely upon it. Estsék' accepts no responsibility for loss or damages suffered by any third party as a result of decisions made or actions taken based on this report.

- The objective of this report is to address the following scope requirements:
  - Provide a detailed environmental overview assessment for widening of Dunn Lake Road (from approximately kilometers 6 to15 and kilometers 17 to 18).
  - Provide mitigation strategies that focus on adhering to relevant Best Management Practices.
  - Provide recommendations to minimize impacts to terrestrial and aquatic resources within the Project Area.
- 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 client 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.

Executive Summary

Widening of approximately 10 km of Dunn Lake Road in Barriere, BC has been proposed by the Ministry of Transportation and Infrastructure (MOTI). An Environmental Overview Assessment including a desktop background review and field assessment was conducted for the approximately 12 ha total Project Area. The two areas (the Project Area) support terrestrial habitats that are utilized by a variety of bird and wildlife species, and aquatic habitats that support several species of fishes.

The Conservation Data Centre (CDC) lists 42 wildlife and 54 plant species-at-risk, as well as seven at-risk ecological communities with potential to occur in the Project Area. In addition, one known historic occurrence of an at-risk wildlife species, the American Badger (*Taxidea taxus*) has been documented to occur within the northern Project Area boundary. At-risk wildlife species that are considered to have a high potential of occurring in the Project Area based on nearby occurrences and suitable habitat availability include American Badger, Western Painted Turtle *(Chrysemys picta bellii),* and Great Basin Gopher Snake (*Pituophis catenifer deserticola*), although no at-risk wildlife species were observed during the field survey. Wildlife sweeps and nest searches should be performed within these habitats prior to construction within the Migratory Bird window.

Several occurrences of invasive plant species are documented within the Project Area. Species documented include spotted knapweed (*Centaurea maculosa*), oxeye daisy *(Leucanthemum vulgare)*, and sulphur cinquefoil (*Potentilla recta*). All these species were observed during the site visits. Prior to construction, site-specific surveys should be conducted for rare plant species, with Best Management Practices (BMPs) implemented during construction to reduce the spread and infestation of weeds within the Project Area.

A total of three watercourses and drainages occur within the Project Area and three more were located between the two Project Area. Also, the North Thompson River is just west of the Project Area. Varying levels of fish habitat quality were observed, and fish presence was confirmed in one stream. In most cases, habitat immediately upstream of Dunn Lake Road is limited due to steep gradients and only seasonal discharge.

Overall, the long-term effects of the proposed Project are mitigatable provided that BMPs are followed. Any residual cumulative effects of the proposed Project would be limited to the loss of vegetation and the potential foraging and nesting habitat associated with disturbed areas.

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1.0 Introduction

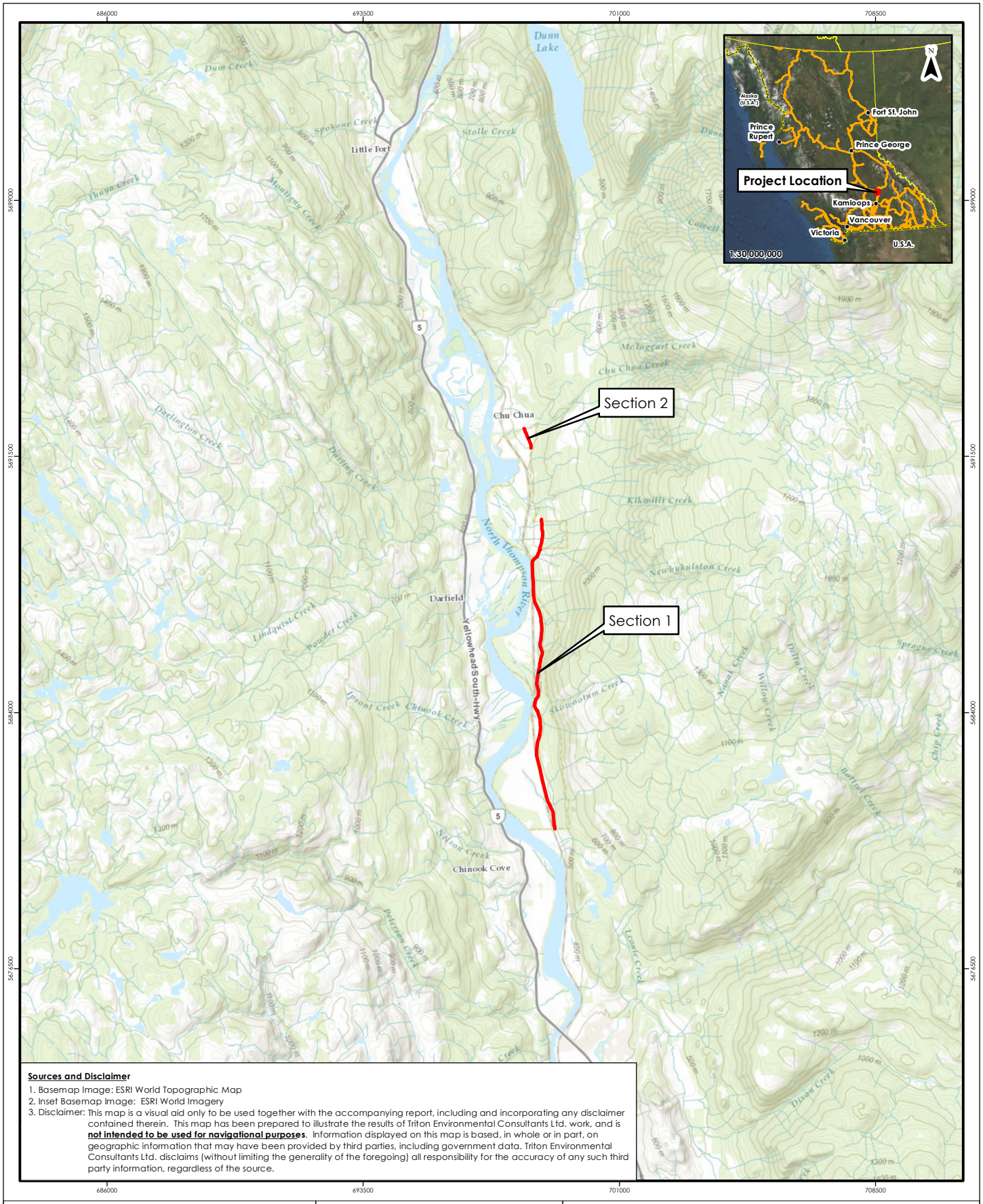
Estsék' Environmental Services LLP (Estsék') was retained by the Ministry of Transportation and Infrastructure (MOTI) to complete an Environmental Overview Assessment (EOA) for a 10 km long section of Dunn Lake Road located approximately 6 km north of Barriere, BC (the Project). The Project involves the widening and paving of the existing narrow, two-lane gravel road. The Project Area consists of 2 sections of Dunn Lake Road with an approximate 2 km between the sections that are not part of the project.

The EOA included a background literature review, Provincial database search, and a field survey. This report outlines the environmental constraints identified as a result of the EOA, and includes terrestrial (mammals, birds, amphibians, and plants) and aquatic resources and habitats associated with the Project Area. The report also provides key recommendations and mitigation strategies that should be implemented for the protection of these resources and habitats.

A Phase 1 Environmental Site Assessment was completed by Estsék' and submitted in February 2016 with a follow-up Phase 2 Environmental Site Assessment completed on several sites along Dunn Lake Road in 2017.

1.1 Project Area

The EOA Project Area encompasses an area of approximately 12 ha (Figure 1) within the Dunn Lake Road right-of-way between approximately kilometers 6 to15 and kilometers 17 to 18. The eastern and western limits are the right-of-way on each side of the existing roadway. BC Conservation Data Centre (CDC) data were considered within and adjacent to the Project Area in the constraints analysis. Field assessments were conducted in the Project Area on July 10, 12, 13, and 25, 2019 to identify existing environmental and habitat features.



Sources and Disclaimer

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Dunn Lake Road EOA

Figure 1 - Project Location

Kilometers
0 0.75 1.5 3 4.5 6

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Project No:	10232-03
Date:	Sep 25, 2019
Scale:	1:150,000
Map Projection:	UTM Zone 10 (NAD1983)

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The proposed Project Area is located in the Thompson Rivers Natural Resource District of the Thompson Nicola Resource Region and is within one biogeoclimatic ecosystem classification (BEC) zone: Interior Douglas-fir (IDF), subzone Very Dry Hot (xh), and variant Thompson (2) (Table 1).

Table 1. Project Area administrative and physiographic setting

Classification	*Description*
Administrative Boundary	
Regional District	Thompson Nicola Regional District
Natural Resource Region	Thompson Nicola Natural Resource Region
Natural Resource District	Thompson Rivers Natural Resource District
Ministry of Environment Region	Thompson Nicola
Major Watershed	North Thompson River
Watershed Group	Lower North Thompson River
Ecosystem Classification	
Ecodomain	Dry
Ecodivision	Semi-arid Steppe Highlands
Ecoprovince	Southern Interior
Ecoregion	Thompson Okanagan Plateau
Ecosection	Northern Thompson Upland
Biogeoclimatic Ecosystem Classification (BEC) Zone	Interior Douglas-fir (IDF)
BEC subzone	Very Dry Hot (xh)
BEC Variant	Thompson (2)
Elevation Range (m)	390 to 420

Source: Province of British Columbia (2019)

The IDFxh2 zone is found at lower elevations of the Nicola and Lower Thompson watersheds between 400 and 1,200 m elevations. Mean annual precipitation ranges from 30 to 42 cm with snow depths rarely exceeding 50 cm. The IDFxh subzone's natural disturbance regime includes frequent wildfires. Substantial growing season moisture deficits are common in the IDF and frosts can occur at any time (Meidinger and Pojar 1991).

1.2 Proposed Works

The Project focuses on the widening and paving of the existing two-lane road for approximately 10 km. The works may involve road realignment, replacement of drainage structures, and upgrades to meet current road design standards and criteria.

2.0 Environmental Overview Assessment Methodology

2.1 Desktop Environmental Constraints Analysis

A desktop review of potential environmental constraints within the Project Area was performed using Provincial and Federal databases and mapping tools, as well as relevant literature and other data pertaining to environmentally sensitive features with the Project Area. The background review included searches for known occurrences of rare and/or endangered species and ecosystems within the Project Area, designated wildlife critical habitats, and for ecosystems, plants, and wildlife species-at-risk that have the potential to occur. Fisheries information was also reviewed and compiled for watercourses in the Project Area that may be affected by the proposed alignments. Databases utilized in the background review and constraints analysis:

- DataBC iMapBC Mapping Tool (Province of British Columbia 2019)
- BC Ministry of Environment and Climate Change Strategy (MOECCS) HabitatWizard Fisheries Information Data Queries (FIDQ) (MOECCS 2019)
- BC Conservation Data Centre (CDC) BC Species and Ecosystems Explorer (CDC 2019)
- British Columbia Invasive Alien Plant Program (IAPP) application (MFLNRORD 2019)

2.2 Field Assessment

Field assessments of the Project Area were conducted by an Estsék' biologist on July 10, 12, 13, and 25, 2019. A prior Phase 1 Environmental Site Assessment was completed by an Estsék' technician in January 2016. Vegetation along both sides of Dunn Lake Road (0 to 5 m from existing roadway) was surveyed for the presence of wildlife (mammals, birds, nests, stick nests, and cavity nests, and potential amphibian and reptile habitats), as well as other key features of interest, such as wildlife trees and wetlands. Incidental observations of vegetation, weed species, wildlife species, wildlife signs, and potential habitats were identified and documented as they were encountered. Fish sampling was completed in Newhykulston Creek. Representative photographs are included in Appendix 1.

2.3 Aquatic Resources

A desktop review was completed using HabitatWizard map data (CDC 2019) which identified three watercourses occurring in the Project's footprint. Three other watercourses were observed to be located between the two Project sections (Table 2). A query was made for available stream reports from Fresh Water Atlas (FWA) and Ecocat. Specific fish distribution information was not found.

Table 2. Gazetted watercourses mapped within the Project Area[1]

ID	*Watershed Code*	*UTM (10U)*	*Description*	*Source*
1	129-227200 (Skowootum Creek)	698623 5684044	3rd order stream located off Dunn Lake Road. Low gradient through Reach 1. High gradient (>30%) above Reach 2. Limited fish habitat throughout reaches.	HabitatWizard, FWA, Ecocat and Integrated Wood Services
2	129-241800 (Newhykulston Creek)	698752 5689098	2nd order stream located off DLR with connectivity to North Thompson River. Suspected to support anadromous fish below DLR crossing and resident non-anadromous above the DLR crossing.	HabitatWizard, FWA, Ecocat and Summit Environmental
3	N/A – Unnamed Creek	698767 5689214	Ephemeral NCD – iMap shows potential historic connectivity to Newhykulston Creek before it was dyked.	iMap, HabitatWizard and field review
Streams located between the two Project Sections				
4	129-251100 (Kikwilli Creek)	698600 5690158	2nd order stream located off DLR	HabitatWizard, FWA
5	N/A – Unnamed Creek	698606 5690463	NCD – no connectivity to North Thompson River	HabitatWizard, FWA
6	N/A – Unnamed Creek	698567 5690734	Small drainage - no connectivity to North Thompson River	HabitatWizard, FWA

[1]Referenced from Estsek' Environmental Site Assessment: Dunn Lake Road Widening Project, February 2016

2.4 Terrestrial Resources

2.4.1 Species-at-Risk

Federal and Provincial government agencies are working to identify and ensure the protection of species-at-risk in Canada. Federally, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the *Species at Risk Act* (SARA) assess and designate species-at-risk in Canada. Provincially, the *Wildlife Act* and the CDC protect and collect information on plants, animals, and ecosystems-at-risk in BC.

The BC Species and Ecosystems Explorer was used to perform a CDC background search for species with potential to occur in and around the Project Area (CDC 2019). Data BC's iMapBC mapping tool was used to search for known occurrences of species-at-risk within the Project Area, as well as designated critical habitats (Province of British Columbia 2019).

2.4.2 Species-at-Risk Known Occurrences and Critical Habitats

BC Conservation Data Centre (CDC) identified two mapped known occurrences of species-at-risk overlapping the Project area records: American Badger (Occurrence #86238) and a Secured CDC Occurrence (Figure 2).

American Badger (Occurrence #86238)

American Badger is Provincially Red-listed. Red-listed species are any species or ecosystem that is at risk of being lost (extirpated, endangered or threatened). This occurrence generally follows along the South Thompson River, east to Little Shuswap Lake and then south to approximately Shumway Lake. To the west, the occurrence roughly follows Kamloops Lake and Tranquille River to the Deadman River and north along the North Thompson River to Clearwater. It represents 350+ records of badger sightings, road kills, and burrows (CDC 2019).

Secured Occurrence

One Masked Occurrence was identified overlapping the Project Area. The BC CDC was contacted for information pertaining to this occurrence. The species involved falls under the 'Secured Occurrences Susceptible to Persecution' and the data given to Estsék' is not to be released, copied, mapped, or distributed further. The species is Red-listed and generally requires rock ledges high on steep cliffs. There are no rock ledges or steep cliffs within 1.5 km of the Project area. There is a low probability that the species will be impacted with the proposed road construction.

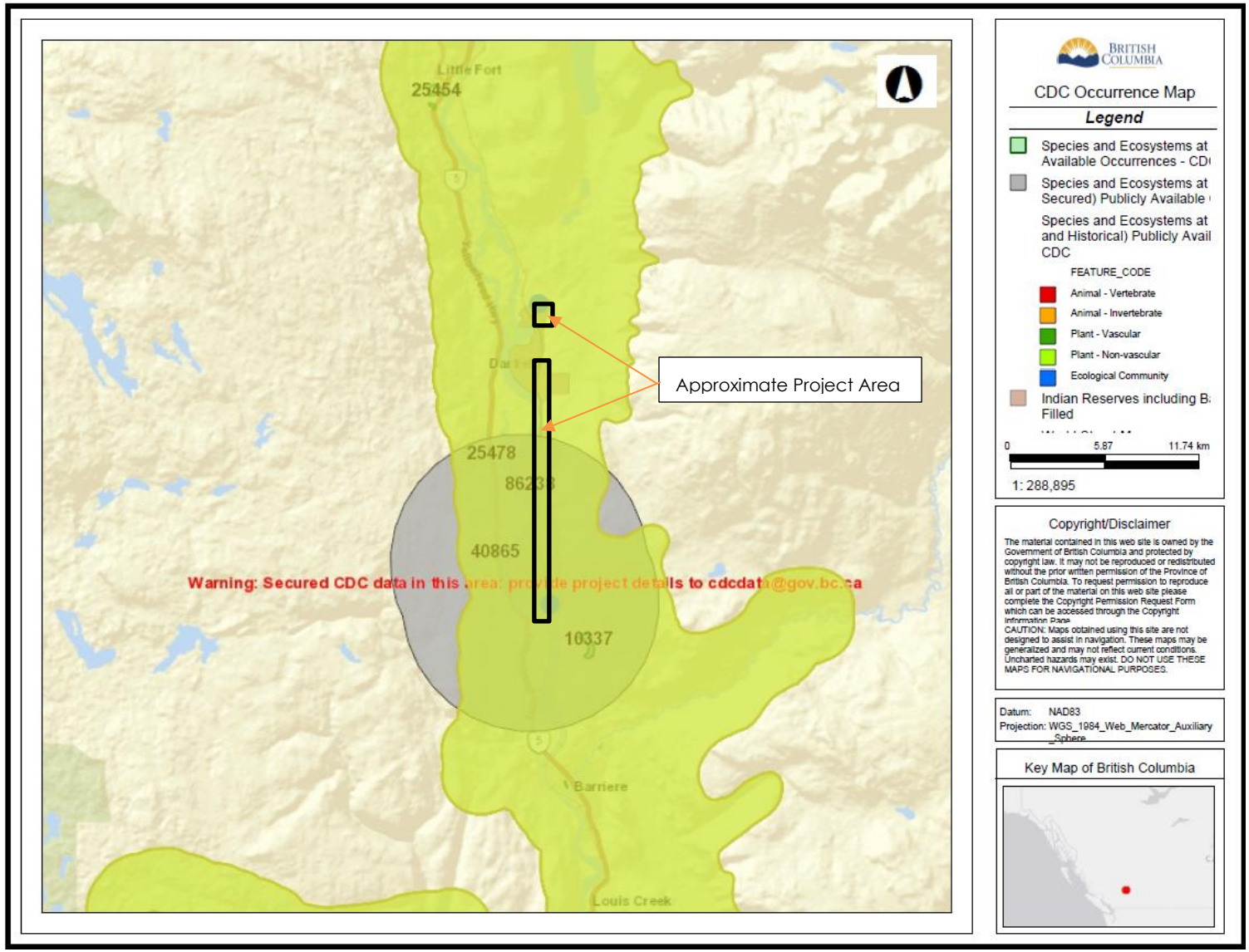

Figure 2. CDC occurrences within Project Area
Source: Province of British Columbia (2019)

2.4.3 Species-at-Risk Which May Occur In and Around the Project Area

2.4.3.1 Wildlife Species at Risk

Seventy Provincially Blue-listed (any species or ecosystem that is of special concern) and seven Provincially Red-listed at-risk wildlife species were identified that have the potential to occur in and around the Project Area. Of the Red- and Blue-listed species identified, 34 are also listed under SARA and/or COSEWIC as species that are Endangered, Threatened, or are species of Special Concern. An additional 11 species were identified that are Provincially Yellow-listed (thought to be secure in British Columbia) or unlisted Provincially but are listed under COSEWIC and SARA (Appendix 2).

2.4.3.2 Plant Species at Risk

Several Provincially-listed at-risk plant species were also identified during the desktop search. Five Red-listed and 17 Blue-listed species were found that have the potential to occur in and around the Project Area. Of these species, 4 are also listed under SARA and/or COSEWIC as species that are Endangered, Threatened, or are species of Special Concern. An additional species was identified as Provincially Yellow-listed (Appendix 3).

2.4.3.3 At-risk Ecological Communities Which May Occur In and Around Project Area

Nine Provincially Blue-listed and four Provincially Red-listed at-risk ecological communities were identified that have the potential to occur in and around the Project Area. An additional two communities were identified that are Provincially Yellow-listed (Appendix 4).

2.5 Invasive Plant Species

The Provincial Invasive Alien Plant Program (IAPP) application was searched for records of invasive plant occurrences in the Project Area. Six different sites were reported within or in proximity to the Project Area (Table 3, Figure 3, Appendix 5).

Table 3. Summary of invasive species reported in proximity to the Project Area

Site ID	*Common Name*	*Latin Name*	*Year Reported*
211323	spotted knapweed	*Centaurea maculosa*	2001
211319	spotted knapweed	*Centaurea maculosa*	2001
211317	spotted knapweed	*Centaurea maculosa*	2001
215622	oxeye daisy, sulphur cinquefoil, spotted knapweed	*Leucanthemum vulgare, Potentilla recta, Centaurea maculosa*	2006
211312	sulphur cinquefoil, spotted knapweed	*Potentilla recta, Centaurea maculosa*	2001
211311	sulphur cinquefoil, spotted knapweed	*Potentilla recta, Centaurea maculosa*	2001

Most occurrences and invasive plant sites documented consisted of spotted knapweed and sulphur cinquefoil. Additional documented weeds located along the Dunn Lake Road are listed in Table 4.

Table 4. Additional weed species documented within Project Area

Weed Species	***Latin Name***	***Significance***
Common tansy	*Tanacetum vulgare*	Regionally noxious
Hoary alyssum	*Berteroa incana*	Regionally noxious
Meadow hawkweed	*Hieracium caespitosum*	Invasive species
Queen Anne's lace	*Daucus carota*	Invasive species
Tall hawkweed	*Hieracium praealtum*	Invasive species
Oxeye daisy	*Leucanthemum vulgare*	Regionally noxious
Spotted knapweed	*Centaurea maculosa*	Provincially noxious
Sulphur cinquefoil	*Potentilla recta*	Regionally noxious

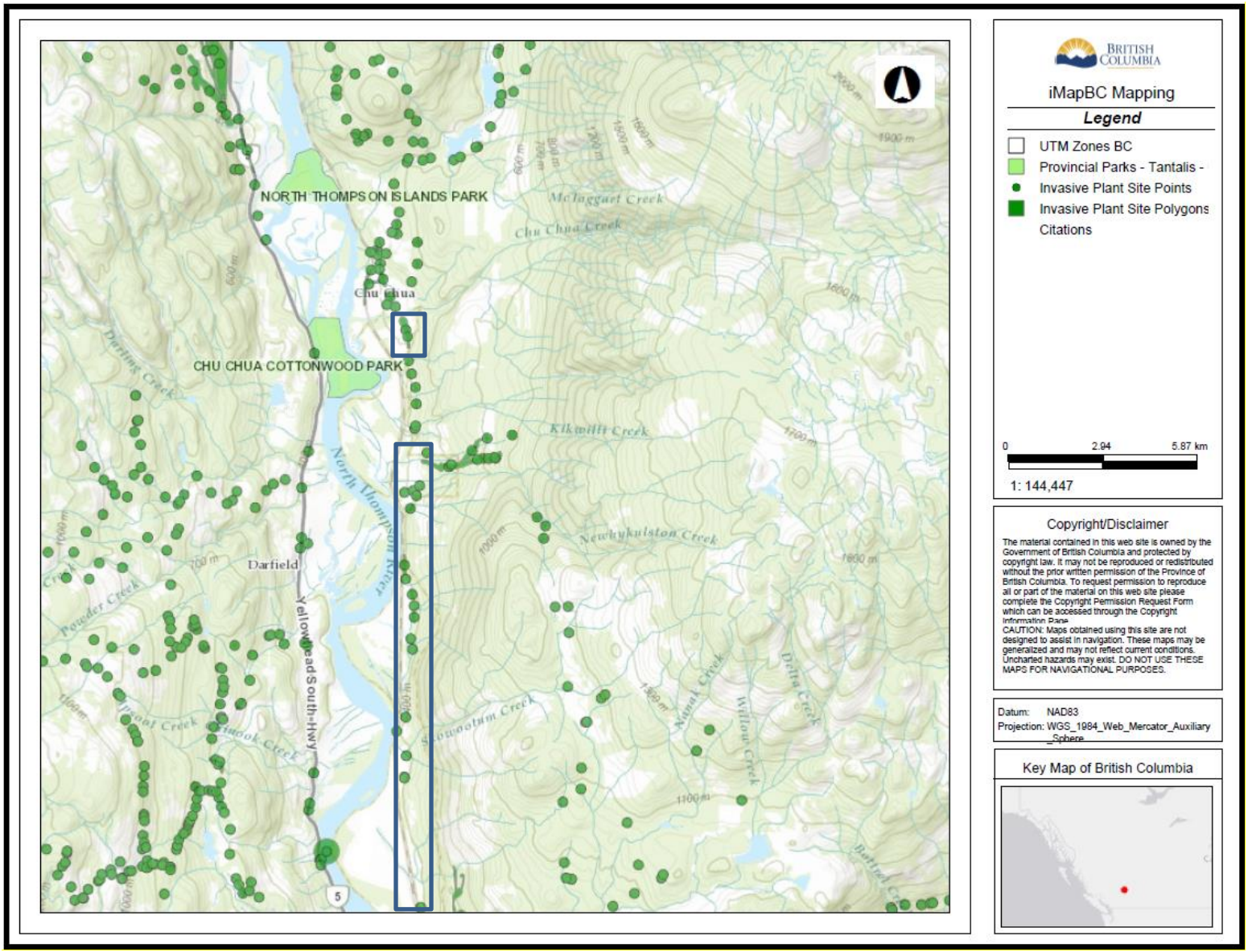

Figure 3. Invasive plant occurrences in and around the Project Area
Source: MFLNRORD (2019)

3.0 Field Assessment Results

Field assessments were conducted on July 10, 12, 13, and 25, 2019 to provide an overview of the Project and to identify areas of potential concern for aquatic and terrestrial values. The July 13 and 25 field visits were to conduct fish sampling in Newhykulston Creek. A map of areas of concern identified during the field assessment can be found in Figure 4.

3.1 Watercourses in Project Area

Three watercourses were identified to be within the Project Area during background information queries. During the July 2019 site visits, three additional watercourses were observed between the two Project sections (Tables 5 and 6). These watercourses included three creeks with watershed codes, two unnamed creeks with possible seasonal flows, and one dry, historic channel. Additionally, five wetland areas were observed during the site visits, ranging in size from a small manmade sump area alongside Dunn Lake Road to two large wetlands located between Dunn Lake Road and the railway tracks (Table 7). Water features of interest are outlined below.

Only Skowootum Creek and Newhykulston Creek have been classified as fish bearing (Table 6). The remaining watercourses either did not connect to fish bearing watercourses, were non-classified drainages or are historic stream channels (pers. comm. J. Dorey).

3.1.1 Skowootum Creek

Skowootum Creek has very low value to resident or anadromous fish that could potentially enter the watercourse. Potential fish presence would be seasonal and opportunistic, as rearing values were poor and no spawning or overwintering habitat was present. This stream is high energy with increasing gradient (>17%) approximately 100 m upstream of Dunn Lake Road. The Dunn Lake Road centerline would be situated in a lower gradient reach of this watercourse where the channel fans out and is subject to dewatering for most of the season. Skowootum Creek was dry during the July 2019 site visit.

3.1.2 Newhykulston Creek

Fish sampling was completed in Newhykulston Creek on July 13 and 26. Newhykulston Creek was classified as a fish bearing stream (S2) with Coho Salmon *(Oncorhynchus kisutch)* juveniles present up to the Dunn Lake Road crossing. Additionally, Rainbow Trout *(Oncorhynchus mykiss)* were caught upstream of the Dunn Lake Road crossing on July 26, 2019. At the crossing there is an 1,800 mm culvert with a vertical outlet drop of 1.2 m that prevents upstream migration of fish.

The average channel and wetted widths were 7.0 m and 3.1 m with an average gradient of 6%. Above the existing crossing, spawning habitat was poor as there were limited pockets of suitable substrate. Rearing habitat was poor due to lack of deep pool development and significant instream cover. Cover consisted primarily of boulder riffles

and some SWD. Dominant and sub-dominant bed materials were cobbles and boulders with small pockets of gravels. No overwintering habitat was observed throughout the assessment area. Suspected overwintering habitat upstream of the Project Area likely supports resident Rainbow Trout and could potentially offer additional overwintering habitat to Coho juveniles if the access at Dunn Lake Road were to be improved.

Photo 1. Upstream view of Skowootum Creek from Dunn Lake Road

Photo 2. Upstream view of Newhykulston Creek from Dunn Lake Road

694400 696400 698400 700400 702400

5692250 5691250 5689250 5687250 5685250 5683250 5681250 5679250

Chu Chua Creek
Chu Chua Creek
Northern Limit Section 2
Southern Limit Section 2
Kikwilli Creek
Darling Creek
Northing Limit Section 1
ID#3 Unnamed Creek
Unnamed Creek
Darlington Creek
Lindquist Creek
Newhykulston Creek
Wetland area
ID#2 Newhykulston Creek
Mineral lick
5
TA snag/Northern flicker
TA snag
ID#1 Skowootum Creek
Frog Pond
Burrow
Ipsoot Creek
Stick Nest
Skowootum Creek
Chinook Creek
Man-made sump
Wetland area
Historical American badger burrow
Columbian ground squirrels
Nanak Creek
North Thompson River
Wetland area
Wildlife snags and trail
Southern Limit Section 1
Nelson Creek
Loonie Creek

Legend

- Project Limits
- Sites
- Dunn Lake Road
- Watercourse
- Waterbody
- Wetland

694400 696400 698400 700400 702400

Dunn Lake Road EOA

Field Map

Sources and Disclaimer

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Project No:	10232-03
Date:	Sep 25, 2019
Scale:	1:40,000
Map Projection:	UTM Zone 10 (NAD 1983)

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Table 5. Watercourses located during field assessments, July 2019

ID	*Watershed Code*	*UTM (10U)*	*Channel Width (m)*	*Fish Observed*	*Comments*
1	129-227200 (Skowootum Creek)	698616 5684037	4.2	None	**Fish bearing** High energy with increasing gradient (>17%) approximately 100 m upstream of Dunn Lake Road. The Dunn Lake Road centerline would be situated in a lower gradient reach of this watercourse where the channel fans out and is subject to dewatering for most of the season. Dry at time of site visit.
2	129-241800 (Newhykulston Creek)	698732 5689087	7	Yes	**Fish bearing** Classified as a fish-bearing stream (S2) with Coho juveniles present up to the Dunn Lake Road crossing. Anecdotal information from Simpcw First Nation also indicated the presence of Rainbow Trout upstream of the Dunn Lake Road crossing. At the crossing there is an 1,800 mm culvert that has a vertical outlet drop of 1.2 m that prevents upstream migration of fish. Cover consisted primarily of boulder riffles and some small woody debris (SWD). Dominant and sub-dominant bed materials were cobbles and boulders with small pockets of gravels. No overwintering habitat was observed at assessment area. Suspected overwintering habitat upstream of the Project Area likely supports resident Rainbow Trout and could offer additional overwintering habitat to Coho juveniles if the access at Dunn Lake Road was improved.
3	N/A – Unnamed Creek	698767 5689214	N/A	None	**Non-classified drainage** Historic stream channel. No evidence of recent scour. Highly vegetated.
Creeks between the two Project Sections					
4	129-251100 (Kikwilli Creek)	698600 5690158	0.9	None	**NCD below ROW – S6 above ROW** Possible, intermittent connectivity to North Thompson River. No fish data available. Seasonal flow.
5	N/A – Unnamed Creek	698607 5690167	1.3	None	**S6 – non-fish bearing** Seasonal flow. Narrow and highly vegetated.

6	N/A – Unnamed Creek	698565 5690742	>1	None	**Non-classified drainage** Seasonal flow. Appears to be from springs along cut bank. Travels along roadway ditch until culvert crossing.

Table 6. Stream characteristics

ID	Stream Classification	Fish Sampling Results	Fish Habitat Potential			Substrate		Connectivity to Fish Bearing
			Rearing	Spawning	Migration	Dominant	Subdominant	
1	S3	Not sampled	Poor	Nil	Poor	Cobble	Boulder	Intermittent
2	S2	MT – Juvenile Coho Salmon captured Rainbow Trout captured above culvert at Dunn Lake Road	Poor	Poor	Good	Cobble	Boulder	Intermittent
3	NCD	Not sampled	Nil	Nil	Nil	N/A	N/A	Nil
Watercourses between the two Project Sections								
4	NCD below ROW – S6 above ROW	Not sampled	Poor	Poor	Poor	Gravel	Cobble	No – goes subsurface
5	S6	Not sampled	Poor	Poor	Poor	Gravel	Fines	No – goes subsurface
6	NCD	Not sampled	Poor	Poor	Poor	Fines	Gravel	No – goes subsurface

Table 7. Additional water features located during field assessments, July 10 and 12, 2019

Site	*UTM (10U)*	*Approximate size (m²)*	*Wildlife observed*	*Comments*
A	698904E 5681407N	400	No	Wetland area with open water. Approximately 20 m wide by 20 m long. Well established hydro-phytic plants. No culvert located under Dunn Lake Road.
B	698703E 5683552N	600	No	Wetland area on east side of Dunn Lake Road. Water present all year. Connects to culvert that flows into manmade sump on west side of road.
C	698686E 5683630N	150	No	Manmade sump area for livestock watering. Wetland plants and algae. Historical occurrence of Western Painted Turtle (pers. comm. Shelly Loring)
D	698365E 5684412N	5000	Waterfowl, Birds, and amphibians	Frog Pond Large wetland between Dunn Lake Road and railway tracks. Observed: Mallard duck and young, Red-winged Blackbird, Kingfisher, Pacific Chorus Frog Historical occurrence of Western Painted Turtle (pers. comm. Shelly Loring)
E	698572E 5688561N	2000	Birds	Narrow wetland area along west side of road. Approximately 175 m in length. Observed: Red-winged Blackbird, Northern Flicker Wildlife trees and snags bordering area

3.1.3 Manmade Sump Wetland

A small, manmade sump area has resulted in a wetland pond. It contains a ring of sedges and cattails as well as large amounts of algae in the open water. There is historical information of Western Painted Turtles within the pond and crossing Dunn Lake Road in this area, although no turtles have been recently spotted (pers. comm. Shelly Loring 2019).

Photo 3. West view of manmade sump wetland

3.1.4 Frog Pond

The large wetland north of the old sawmill site is locally known as Frog Pond. The wetland is bordered by Dunn Lake Road to the east and the railway tracks to the west. The approximate size of the area is 5 ha. There is historical information of Western Painted Turtles within the wetland, although no turtles have been recently spotted (pers. comm. Shelly Loring 2019). A high number of songbirds as well as waterfowl and woodpecker activity were noted in this area. Also, Pacific Chorus Frogs *(Pseudacris regilla)* were heard calling during daylight hours, and it is likely that more amphibians use this area.

Photo 4. West view of Frog Pond

3.2 Wildlife Observations within Project Area

Limited wildlife and wildlife signs were observed during the site visit, likely as a result of the proximity to the existing roadway. No species-at-risk, including the American Badger or the masked occurrence species, were observed. Several Red-tailed Hawks *(Buteo jamaicensis)* were sighted flying over the Project Area, and one stick nest and several trees and snags with cavities were located. Many songbirds, waterfowl, and hummingbirds were observed during the survey. Columbian Ground Squirrels *(Urocitellus columbianus)* and burrows were observed within the baseball park area.

One burrow was observed in a silt wall north of the mill site and a well used mineral lick was observed on the east side of the road, north of the transfer station. No recent activity at these two sites was observed. A complete list of wildlife observations can be found in Table 8.

3.2.1 Stick Nest

A small stick nest was observed approximately 3m high within a dense Douglas-fir tree. No birds were observed using the nest at the time of the field survey. The nest size (~ 30cm diameter) and position on the tree would rule out raptor species.

3.2.2 Mammal Burrow

A mammal burrow was observed on the east side of Dunn Lake Road, approximately 400 m north of the old mill site. The burrow does not appear to be in the upside down 'D' shape of an American Badger burrow and did not have deep tunnels from the entrance. It did not appear to be recently used, with no fresh tracks leading to it.

Photo 5. View of mammal burrow from Dunn Lake Road

3.2.3 Mineral Licks

Natural mineral licks are common, and they provide essential elements such as phosphorus and the biometals (sodium, calcium, iron, zinc, and trace elements) required in the springtime for bone, muscle, and other growth in deer and other wildlife. Such licks are especially important in ecosystems with poor general availability of nutrients. Harsh weather exposes salty mineral deposits that draw animals to the needed nutrients.

The mineral lick was observed on the east side of Dunn Lake Road within 10 m of the road's right-of-way. Evidence of wildlife tracks and trails was observed in and around the immediate area.

Photo 6. View of mineral lick from Dunn Lake Road

Table 8. Additional wildlife and wildlife feature observations

Number	*UTM (10U)*	*Wildlife Observed*	*Comments*
i	699121E 5680620N	Wildlife snags	Douglas-fir tree on east side of road
		Wildlife trail	Approximately 7 m from right-of-way
ii	698595E 5682716N	American Badger	Historical and 2019 sightings of American badger denning in agricultural field.
iii	698807E 5981906N	Columbia Ground Squirrel	Burrows and animals in baseball field (east side of road)
iv	698523E 5684301N	Small stick nest – unknown species	Approximately 3 m on Douglas-fir tree 2.5 m from road right-of-way Approximately 30cm diameter
v	698626E 5684728N	Burrowing into silt wall	Possible badger burrow Not recently used
vi	698613E 5685132N	Trembling aspen snags with holes	Approximately 3 m from right-of-way West side of road
vii	698651E 5685318N	New holes in snags	Approximately 2 to 3 m from right-of-way
		Northern Flicker on aspen	West side of road
viii	698452E 5688161N	Mineral lick	Approximately 2 m from right-of-way East side of road No new evidence of wildlife use Well used wildlife trails
Wildlife feature observed between the two Project Sections			
ix	698414E 5691702N	Mature Douglas-fir with broken top and new cavities	Approximately 4 m from right-of-way New cavities in top half of tree

3.3 Plant Observations in Project Area

Dominant tree species in the area consisted of Douglas-fir *(Pseudotsuga menziesii)*, ponderosa pine *(Pinus ponderosa),* and trembling aspen *(Populus tremuloides)*. Common snowberry *(Symphoricarpos albus),* rose species *(Rosa* sp.*)* and alders *(Alnus* sp.*)* were the leading shrub vegetation. Invasive species were observed throughout the Project Area. In addition, small wetlands predominantly containing sedge and rush species and horsetail were noted adjacent to the western edge of the roadway, primarily between the road and the railway. A complete list of plant species observed within the Project Area can be found in Appendix 6.

3.3.1 Weed Species

Numerous weed species were observed in the Project Area. Large areas of diffuse knapweed *(Centaurea diffusa)* and spotted knapweed (*Centaurea maculosa)* were recorded in urbanized areas within the Project Area. Other invasive and noxious weeds observed are listed in Table 8. It should be noted that both hoary alyssum *(Berteroa incana)* and sulphur cinquefoil *(Potentilla recta)* were also observed within most of the Project Area. These species are highly invasive and hoary alyssum is toxic to horses.

Table 9. Invasive and noxious weeds observed in Project Area

Common Name	***Scientific Name***
Black medic	*Medicago lupulina*
Broad-leaved plantain	*Plantago major*
Meadow hawkweed	Invasive species
Pineapple weed	*Matricaria discoidea*
Tall hawkweed	Invasive species
Provincially Noxious Weed	
Canada thistle	*Cirsium arvense*
Diffuse knapweed	*Centaurea diffusa*
Spotted knapweed	*Centaurea maculosa*
Regionally Noxious Weed	
Burdock	*Arctium minus*
Common tansy	Regionally noxious
Cleavers	*Galium aparine*
Hoary alyssum	*Berteroa incana*
Oxeye daisy	*Leucanthemum vulgare*
Sulphur cinquefoil	*Potentilla recta*

3.3.2 Wildlife Trees

Wildlife trees are of high value to birds and mammals. They provide food, nesting sites, roosting and denning sites, as well as hunting and display perches. Numerous wildlife trees were observed in the Project Area consisting of mostly trembling aspen snags, as well as

mature Douglas-fir and ponderosa pine trees with cavities and nests. Most of the wildlife trees were located on the west side of Dunn Lake Road close to the wetland areas.

Photographs 7 and 8. Wildlife trees within Project Area

3.4 Ecological Communities at Risk

Three ecological communities at risk were identified during the site visits. Two of these communities are listed under the Forest Realm and one is under the Floodplain Realm. Table 10 outlines the ecological communities at risk observed.

Table 10. Ecological communities at risk observed in Project Area

English Name	*Scientific Name*	*BC List*	*Ecosystem Group*	*Condition of Ecosystem Group*
Douglas-fir - ponderosa pine / bluebunch wheatgrass	*Pseudotsuga menziesii - Pinus ponderosa / Pseudoroegneria spicata*	Blue	Forest: Coniferous - dry	Sections of competent ecosystem group in non-disturbed areas (northern sections of Project Area). Overall community's condition is **poor – moderate** due to high amounts of disturbance in Project Area.
common snowberry - prairie rose	*Symphoricarpos albus - Rosa woodsii*	Blue	Flood: Fringe Flood Class	Sections of competent ecosystem group in less-disturbed areas typically through middle section of Project Area. Overall community's condition is **moderate**.

western redcedar - Douglas-fir / red-osier dogwood	*Thuja plicata - Pseudotsuga menziesii / Cornus stolonifera*	Blue	Forest: Coniferous - moist/wet	Limited competent ecosystem group in non-disturbed areas. Small areas of dogwood observed. Overall community's condition is **poor** due to high amounts of disturbance in Project Area.

4.0 Site-Specific Recommendations and Mitigation

Site-specific recommendations and mitigation will depend on seasonal timing of construction activities. Should construction occur outside of the appropriate timing windows (Table 11), required permits and authorizations, as well as resource-specific mitigation measures, may include the following:

Fish and Fish Habitat

- Fish salvage operations will require a Scientific Fish Collection permit from the BC Ministry of Forests, Lands, Natural Resource Operations and Rural Development (MFLNRORD).
- Notification and/or Authorization for Changes In and About a Stream under Section 11 of the *Water Sustainability Act* will be required for works at watercourse crossings.
- Perform instream works within least risk timing widow for fish (Table 11).
- A Project-specific sediment and erosion control plan will be required to ensure works do not result in the introduction of deleterious substances to the streams and watercourse present throughout the Project Area.
- Construct fish passable culverts in areas where fish have been identified and where site conditions warrant. Fish passable culvert specifications should be in accordance with details set forth in the *Fish-stream Crossing Guidebook* (MFLNRO 2012):
    - Embedded closed-bottom structures should be installed as per the project design and should approximate the slope of the stream.
    - For cylindrical embedded culverts, the embedment should make up at least 40% of the culvert diameter (MFLNRO 2012).
    - For box culverts, the embedment depth should be at least 20% of the vertical rise of the arch (MFLNRO 2011).
- Ensure disposal sites are set back 30 m from the top of bank of ditches and watercourses, and from wetlands.
- Efforts should be made to do any necessary road widening away from the wetland areas identified in Section 3.1.

Birds

- Migratory bird nest searches should be completed prior to construction (general) if works that include clearing and/or grubbing are to occur inside migratory bird breeding season (see Table 11).
- Establish buffer zones and monitoring programs around raptor nests following guidelines set forth in *Guidelines for Raptor Conservation During Urban and Rural Land Development in British Columbia* (Province of BC 2013).

Amphibians and Reptiles

- Amphibian and reptile searches, salvage, and possible isolation fencing may be required, depending on location and seasonal timing; these should be conducted according to guidelines set forth in *Guidelines for Amphibian and Reptile Conservation During Urban and Rural Land Development in British Columbia* (Province of BC 2014).
- If needed, amphibian salvage will require a General Wildlife Permit (MFLNRORD).
- Efforts should be made to do any necessary road widening away from the wetland areas identified in Section 3.1.

Bats

- Inspect all potential roost sites including bridges, buildings, cliffs, and snags for day roosting bats.
- Identify and monitor any potential maternity roosts.
- Identify any known bat hibernacula near the Project Area.

Mammals

- Consider mammal crossing structures during design.
- Efforts should be made to do any road widening away from the identified mineral lick and the mammal burrow identified in Section 3.2

Vegetation

- Best Management Practices (BMPs) should be applied for reducing spread of invasive species.
- A pre-construction inventory of invasive plant species should be conducted to provide a baseline for post-construction weed monitoring.
- Efforts to control the spread of knapweed should consist of minimizing soil disturbance near areas of infestation, removing plants before flowering (early spring), and hand pulling. It is imperative to ensure removal of the entire plant while minimizing seed dispersal (ISC 2014). Overall, limiting disturbance and re-establishing native vegetation quickly following disturbance can minimize the risk of these invasive species. Site use and conditions should be considered prior to the use of herbicides (ISC 2019). BMPs for reducing the spread of invasive plant species should be undertaken during construction activities in affected areas.
- Site-specific surveys for rare and endangered plant species should be conducted during the growing season prior to construction by:
    - Generate a potential rare plant list utilizing BC CDC Species and Ecosystems at risk, BC CDC iMap and consulting online databases and regional experts;
    - Gather information on potential rare plants (i.e. descriptions, illustrations and photographs);

  - Determine the timing and frequency of surveys required (i.e. early and late growing season);
  - Perform a 'Intuitive Meander Survey' concentrating on habitats or areas known to associate with rare plants; and
  - Reporting any rare and endangered species that may be identified for protection, including spatial information if additional field visits are required.

- Mitigation requirements if rare and endangered plants are found within the Project Area should be developed on a site-specific basis in consultation with appropriate resource agencies. Some mitigation measures include:
  - Avoiding the impact altogether;
  - Minimizing impacts by limiting degree or magnitude of construction; and/or
  - Rectifying the impact by repairing, rehabilitating or restoring the impacted environment.

  The use of more than one measure may be necessary depending upon the factors that make the plant species rare.

Table 11. Least risk windows for fish and wildlife potentially occurring within the Project Area[1].

Group	Sub-group	January				February				March				April				May				June				July				August				September				October				November				December			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Migratory Birds	General																																															
Raptors	General																																															
	Masked Occurrence																																															
Mammals	American Badger																																															
Fish	Rainbow Trout																																														
	Coho Salmon																																															

Legend:

= Least Risk (Preferred) Timing window

= Moderate Risk (Caution) Window, Additional mitigation and or monitoring may be recommended

= High Risk (Critical) Window; Additional mitigation measures will be required

1. Red indicates the highest risk period to fish and wildlife, yellow indicates some moderate risk exists, and green indicates the least risk to fish and wildlife species.

5.0 Closure

Overall, the long-term effects of the proposed Project are considered to be mitigable provided that BMPs are followed. Any residual cumulative effects of the proposed Project would be limited to the loss of vegetation and the potential foraging and nesting habitat associated with disturbed areas.

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APPENDIX 1

SITE PHOTOGRAPHS

Photograph 1. North view of Project starting point, July 10, 2019

Photograph 2. North view of Project Area at Km 7, July 10, 2019

Photograph 3. View of Columbian Ground Squirrel in baseball field, July 10, 2019

Photograph 4. North view of Simpcw Resources Group entrance, July 10, 2019

Photograph 5. West view of sawmill site entrance, July 10, 2019

Photograph 6. View of vegetation on west side of Dunn Lake Road, July 10, 2019

Photograph 7. West view of North Thompson River from Dunn Lake Road, July 12, 2019

Photograph 8. North view of mature black cottonwood trees, July 12, 2019

Photograph 9. South view of north end of Project, July 12, 2019

APPENDIX 2

WILDLIFE SPECIES AT RISK IN PROJECT AREA

English Name	*Scientific Name*	*BC List*	*COSEWIC*	*SARA*
Amphibians				
Western Toad	*Anaxyrus boreas*	Yellow	Special Concern	Special Concern
Great Basin Spadefoot	*Spea intermontana*	Blue	Threatened	1-T (Jun 2003)
Birds				
Northern Goshawk, *atricapillus* subspecies	*Accipiter gentilis atricapillus*	Blue	Not at risk	
White-throated Swift	*Aeronautes saxatalis*	Blue		
Sandhill Crane	*Antigone canadensis*	Yellow	Not at risk	
Great Blue Heron, *herodias* subspecies	*Ardea herodias herodias*	Blue		
Short-eared Owl	*Asio flammeus*	Blue	Special Concern	Special Concern
Burrowing Owl	*Athene cunicularia*	Red	Endangered	Endangered
Swainson's Hawk	*Buteo swainsoni*	Red		
Canyon Wren	*Catherpes mexicanus*	Blue	Not at risk	
Lark Sparrow	*Chondestes grammacus*	Blue		
Common Nighthawk	*Chordeiles minor*	Yellow	Special Concern	Threatened
Evening Grosbeak	*Coccothraustes vespertinus*	Yellow	Special Concern	
Olive-sided Flycatcher	*Contopus cooperi*	Blue	Special Concern	Threatened
Black Swift	*Cypseloides niger*	Blue	Endangered	
Bobolink	*Dolichonyx oryzivorus*	Blue	Threatened	Threatened
Horned Lark, *merrilli* subspecies	*Eremophila alpestris merrilli*	Blue		
Prairie Falcon	*Falco mexicanus*	Red	Not at risk	
Peregrine Falcon	*Falco peregrinus*	No Status	Special Concern	Special Concern
Peregrine Falcon, *anatum* subspecies	*Falco peregrinus anatum*	Red	Not at risk	Special Concern
Barn Swallow	*Hirundo rustica*	Blue	Threatened	Threatened
Western Screech-Owl	*Megascops kennicottii*	No Status	Threatened	Threatened
Western Screech-Owl, *macfarlanei* subspecies	*Megascops kennicottii macfarlanei*	Blue	Threatened	Threatened
Lewis's Woodpecker	*Melanerpes lewis*	Blue	Threatened	Threatened
Long-billed Curlew	*Numenius americanus*	Blue	Special Concern	Special Concern
Sage Thrasher	*Oreoscoptes montanus*	Red	Endangered	Endangered
Eared Grebe	*Podiceps nigricollis*	Blue		
Flammulated Owl	*Psiloscops flammeolus*	Blue	Special Concern	Special Concern

English Name	***Scientific Name***	***BC List***	***COSEWIC***	***SARA***
American Avocet	*Recurvirostra americana*	Blue		
Williamson's Sapsucker	*Sphyrapicus thyroideus*	Blue	Endangered	Endangered
Williamson's Sapsucker, *thyroideus* subspecies	*Sphyrapicus thyroideus thyroideus*	No Status	Endangered	Endangered
Sharp-tailed Grouse, *columbianus* subspecies	*Tympanuchus phasianellus columbianus*	Blue		
Bivalves				
Herrington Fingernailclam	*Sphaerium occidentale*	Blue		
Striated Fingernailclam	*Sphaerium striatinum*	Blue		
Gastropods				
Golden Fossaria	*Galba obrussa*	Blue		
Star Gyro	*Gyraulus crista*	Blue		
Pale Jumping-slug	*Hemphillia camelus*	Blue		
Magnum Mantleslug	*Magnipelta mycophaga*	Blue	Special Concern	Special Concern
Sunset Physa	*Physella virginea*	Blue		
Umbilicate Sprite	*Promenetus umbilicatellus*	Blue		
Widelip Pondsnail	*Stagnicola traski*	Blue		
Insects				
Hairy-necked Tiger Beetle	*Cicindela hirticollis*	Blue		
Eastern Tailed Blue	*Cupido comyntas*	Blue		
Monarch	*Danaus plexippus*	Blue	Endangered	Special Concern
Alkali Bluet	*Enallagma clausum*	Blue		
Nevada Skipper	*Hesperia nevada*	Blue		
Sinuous Snaketail	*Ophiogomphus occidentis*	Blue		
Common Sootywing	*Pholisora catullus*	Blue		
California Hairstreak	*Satyrium californica*	Blue		
Olive Clubtail	*Stylurus olivaceus*	Red	Endangered	Endangered
Mammals				
Townsend's Big-eared Bat	*Corynorhinus townsendii*	Blue		
Spotted Bat	*Euderma maculatum*	Blue	Special Concern	Special Concern
Wolverine	*Gulo gulo*	No Status	Special Concern	Special Concern

English Name	***Scientific Name***	***BC List***	***COSEWIC***	***SARA***
Wolverine, *luscus* subspecies	*Gulo gulo luscus*	Blue	Special Concern	Special Concern
Western Small-footed Myotis	*Myotis ciliolabrum*	Blue		
Little Brown Myotis	*Myotis lucifugus*	Yellow	Endangered	Endangered
Fringed Myotis	*Myotis thysanodes*	Blue	Data Deficient	3 (Mar 2005)
Bighorn Sheep	*Ovis canadensis*	Blue		
Fisher	*Pekania pennanti*	Blue		
Columbia Plateau Pocket Mouse	*Perognathus parvus*	Blue		
American Badger	*Taxidea taxus*	Red	Endangered	Endangered
Grizzly Bear	*Ursus arctos*	Blue	Special Concern	Special Concern
Ray-finned Fishes				
White Sturgeon	*Acipenser transmontanus*	No Status	Endangered/ Threatened	
Mountain Sucker	*Catostomus platyrhynchus*	Blue	Special Concern	Special Concern
Bull Trout	*Salvelinus confluentus*	Blue	Special Concern	
Reptiles				
Northern Rubber Boa	*Charina bottae*	Yellow	Special Concern	Special Concern
North American Racer	*Coluber constrictor*	Blue	Threatened	Special Concern
Western Rattlesnake	*Crotalus oreganus*	Blue	Threatened	Threatened
Gopher Snake	*Pituophis catenifer*	No Status		Threatened
Gopher Snake, *deserticola* subspecies	*Pituophis catenifer deserticola*	Blue	Threatened	Threatened
Turtles				
Painted Turtle	*Chrysemys picta*	No Status	Endangered/ Special Concern	Endangered/ Special Concern
Painted Turtle - Intermountain - Rocky Mountain Population	*Chrysemys picta* pop. 2	Blue	Special Concern	Special Concern
Search Criteria: Animals AND Forest Districts: Kamloops Forest District (DKA) (Restricted to Red, Blue, and Legally designated species) AND MOE Regions:3- Thompson (Restricted to Red, Blue, and Legally designated species) AND Regional Districts: Thompson-Nicola (TNRD)				

APPENDIX 3

PLANT SPECIES AT RISK IN PROJECT AREA

English Name	*Scientific Name*	*BC List*	*COSEWIC*	*SARA*
Nonvascular Plant				
Columbian carpet moss	*Bryoerythrophyllum columbianum*	Blue	Special Concern	Special Concern
	Bryum gemmiparum	Blue		
	Coscinodon cribrosus	Red		
	Encalypta intermedia	Blue		
	Encalypta spathulata	Blue		
	Funaria muhlenbergii	Blue		
	Hygroamblystegium fluviatile	Blue		
alkaline wing-nerved moss	*Pterygoneurum kozlovii*	Blue	Threatened	Threatened
	Schistidium heterophyllum	Blue		
	Tortula obtusifolia	Blue		
Vascular Plant				
Mexican mosquito fern	*Azolla mexicana*	Blue	Threatened	Threatened
cut-leaved water-parsnip	*Berula erecta*	Blue		
low hawksbeard	*Crepis modocensis* ssp. *modocensis*	Red		
giant helleborine	*Epipactis gigantea*	Yellow	Not at risk	3
sulphur lupine	*Lupinus sulphureus*	Blue		
hairy water-clover	*Marsilea vestita*	Blue		
needle-leaved navarretia	*Navarretia intertexta*	Blue		
near navarretia	*Navarretia propinqua*	Blue		
scarlet gaura	*Oenothera suffrutescens*	Red		
satinflower	*Olsynium douglasii* var. *inflatum*	Red		
whitebark pine	*Pinus albicaulis*	Blue	Endangered	Endangered
mutton grass	*Poa fendleriana* ssp. *fendleriana*	Red		
peach-leaf willow	*Salix amygdaloides*	Blue		

Search Criteria: Plants
AND Forest Districts: Kamloops Forest District (DKA) (Restricted to Red, Blue, and Legally designated species)
AND MOE Regions:3- Thompson (Restricted to Red, Blue, and Legally designated species)
AND Regional Districts: Thompson-Nicola (TNRD)
AND BGC Zone:
Sort Order: Scientific Name Ascending

APPENDIX 4

ECOLOGICAL COMMUNITIES AT RISK IN PROJECT AREA

English Name	***Scientific Name***	***BC List***	***Ecosystem Group***
seacoast bulrush Alkali Marsh	*Bolboschoenus maritimus* var. *paludosus* Alkali Marsh	Red	Mineral Wetland Group: Marsh Wetland Class (Wm)
alkali saltgrass - foxtail barley	*Distichlis spicata - Hordeum jubatum*	Blue	Grassland Group (G): Alkaline/ Saline Meadow Class (Ga)
rough fescue - (bluebunch wheatgrass) - yarrow - clad lichens	*Festuca campestris - (Pseudoroegneria spicata) - Achillea borealis - Cladonia* spp.	Red	Grassland Group (G): Grassland Class (Gg)
Idaho fescue - bluebunch wheatgrass - silky lupine - junegrass	*Festuca idahoensis - Pseudoroegneria spicata - Lupinus sericeus - Koeleria macrantha*	Red	Grassland Group (G): Grassland Class (Gg)
hybrid white spruce / horsetails	*Picea engelmannii* x *glauca / Equisetum* spp.	Yellow	Flood Group (F): Highbench Flood; Terrestrial Realm - Forest: Coniferous - moist/wet
bluebunch wheatgrass - junegrass	*Pseudoroegneria spicata - Koeleria macrantha*	Blue	Grassland Group (G): Grassland Class (Gg)
Douglas-fir / pinegrass / red-stemmed feathermoss	*Pseudotsuga menziesii / Calamagrostis rubescens / Pleurozium schreberi*	Yellow	Forest: Coniferous - dry; Terrestrial Realm - Forest: Coniferous - mesic
Douglas-fir - ponderosa pine / pinegrass	*Pseudotsuga menziesii - Pinus ponderosa / Calamagrostis rubescens*	Blue	Forest: Coniferous - dry; Terrestrial Realm - Forest: Coniferous - mesic
Douglas-fir - ponderosa pine / bluebunch wheatgrass	*Pseudotsuga menziesii - Pinus ponderosa / Pseudoroegneria spicata*	Blue	Forest: Coniferous - dry
Douglas-fir - ponderosa pine / bluebunch wheatgrass - pinegrass	*Pseudotsuga menziesii - Pinus ponderosa / Pseudoroegneria spicata - Calamagrostis rubescens*	Blue	Forest: Coniferous - dry
Nuttall's alkaligrass - foxtail barley	*Puccinellia nuttalliana - Hordeum jubatum*	Red	Grassland Group (G): Alkaline/ Saline Meadow Class (Ga)
hard-stemmed bulrush Deep Marsh	*Schoenoplectus acutus* Deep Marsh	Blue	Wetland Realm - Mineral Wetland Group: Marsh Wetland Class (Wm)
common snowberry - prairie rose	*Symphoricarpos albus - Rosa woodsii*	Blue	Flood Group (F): Fringe Flood Class (Ff)
western redcedar - Douglas-fir / red-osier dogwood	*Thuja plicata - Pseudotsuga menziesii / Cornus stolonifera*	Blue	Forest: Coniferous - moist/wet
common cattail marsh	*Typha latifolia* Marsh	Blue	Mineral Wetland Group: Marsh Wetland Class (Wm)

Search Criteria:

Ecosystem Realm-Groups: Flood Group (F) OR Forest OR Grassland Group (G) OR Hydrogenic Group (H) OR Rock Group (R) OR Subalpine Shrub Group (S) OR Mineral Wetland Group OR Peatland Group OR Estuarine Realm OR Alpine Group (A) OR Beach Group (B)

AND Forest Districts: Kamloops Forest District (DKA) (Restricted to Red, Blue, and Legally designated species)

AND MOE Regions:3- Thompson (Restricted to Red, Blue, and Legally designated species)

AND Regional Districts: Thompson-Nicola (TNRD)

AND BGC Zone:

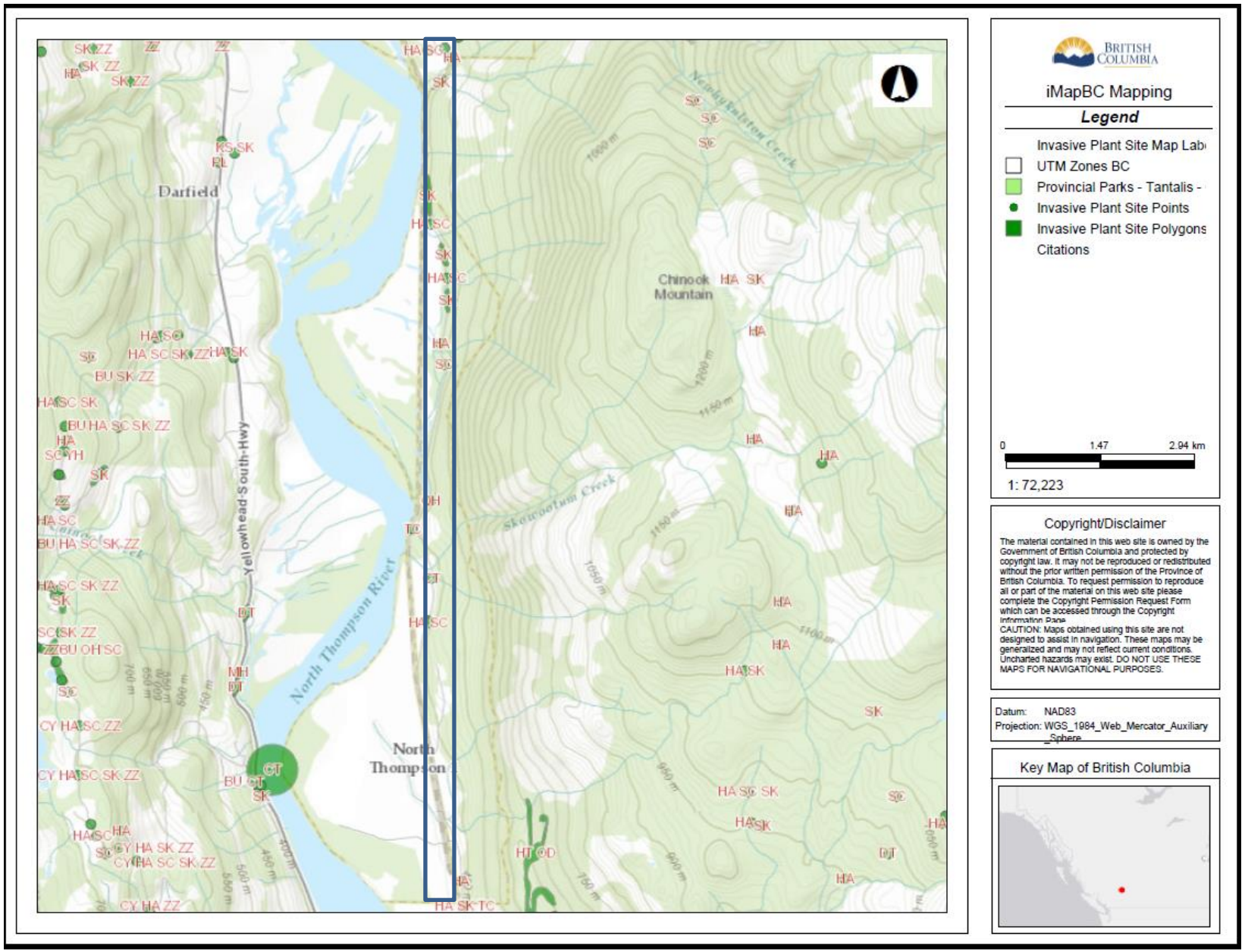
AND BGC Zone, Subzone, Variant, Phase: IDFxh2

AND Ecosections: NTU

Sort Order: Scientific Name Ascending

APPENDIX 5

INVASIVE AND/OR NOXIOUS WEEDS DOCUMENTED IN PROJECT AREA


Darfield
Yellowhead South Hwy
North Thompson River
North Thompson
Chinook Mountain
Skeetootum Creek
Meadowtalon Creek
iMapBC Mapping
Legend
Invasive Plant Site Map Lab
UTM Zones BC
Provincial Parks - Tantalis -
Invasive Plant Site Points
Invasive Plant Site Polygons
Citations
0
1.47
2.94 km
1: 72,223
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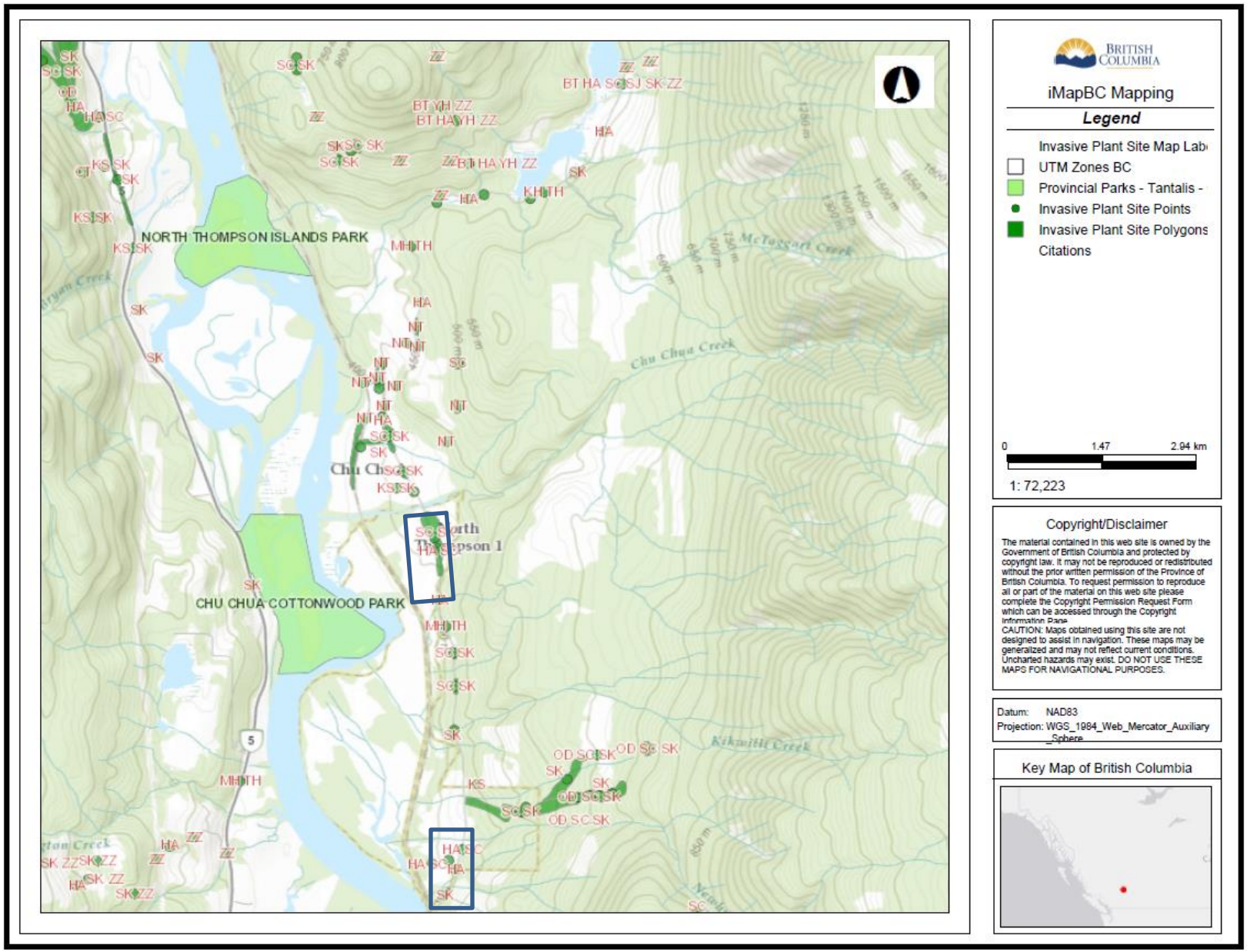
Datum: NAD83
Projection: WGS_1984_Web_Mercator_Auxiliary_Sphere
Key Map of British Columbia


NORTH THOMPSON ISLANDS PARK
CHU CHUA COTTONWOOD PARK
Chu Chua Creek
McTaggart Creek
Kikwilli Creek
iMapBC Mapping
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APPENDIX 6

PLANT SPECIES OBSERVED IN PROJECT AREA

Common Name	***Scientific Name***
Tree	
Alder sp.	*Alnus* sp.
Apple	*Malus* sp.
Black cottonwood	*Populus trichocarpa*
Douglas-fir	*Pseudotsuga menziesii*
Paper birch	*Betula papyrifera*
Ponderosa pine	*Pinus ponderosa*
Trembling aspen	*Populus tremuloides*
Weeping willow	*Salix babylonica*
Western redcedar	*Thuja plicata*
Wolf willow	*Elaeagnus commutata*
Shrub	
Black current	*Ribes hudsonianum*
Black hawthorn	*Crataegus douglasii*
Choke cherry	*Prunus virginiana*
Common juniper	*Juniperus communis*
Common snowberry	*Symphoricarpos albus*
Kinnikinnick	*Arctostaphylos uva-ursi*
Oregon grape	*Berberis nervosa*
Prickly rose	*Rosa acicularis*
Red-osier dogwood	*Cornus sericea*
Saskatoon	*Amelanchier alnifolia*
Thimbleberry	*Rubus parviflorus*
Herbaceous species	
Alfalfa	*Medicago sativa*
Clover sp.	*Trifolium sp.*
Common dandelion	*Taraxacum officinale*
Devil's club	*Oplopanaz horridus*
English-bluebell	*Hyacinthoides non-scripta*
Evening primrose	*Oenothera biennis*
False Solomon's-seal	*Maianthemum racemosum*
Fireweed	*Chamaenerion angustifolium*
Great mullein	*Verbascum thapsus*
Heart-leaved arnica	*Arnica cordifolia*
Poison ivy	*Toxicodendron rydbergii*
Vetch sp.	*Astrogalus* sp.
Watercress	*Nasturtium officinale*
Wild strawberry	*Fragaria virginiana*
Yarrow	*Achillea millefolium*
Yellow salsify	*Tragopogon dubius*
Grasses	
Bluebunch wheatgrass	*Pseudoroegneria spicata*
Fescue sp.	*Festuca* sp.
Orchard grass	*Dactylis glomerata*

Common Name	***Scientific Name***
Moss	
Star moss	*Tortula ruralis*
Cattail and ferns	
Cattail	*Typha latifolia*
Common horsetail	*Equisetum arvense*
Deer fern	*Struthiopteris spicanta*
Great bulrush	*Scirpoides holoschoenus*
Invasive Weed	
Black medic	*Medicago lupulina*
Broad-leaved plantain	*Plantago major*
Meadow hawkweed	Invasive species
Pineapple weed	*Matricaria discoidea*
Tall hawkweed	Invasive species
Provincially Noxious Weed	
Canada thistle	*Cirsium arvense*
Diffuse knapweed	*Centaurea diffusa*
Spotted knapweed	*Centaurea maculosa*
Regionally Noxious Weed	
Burdock	*Arctium minus*
Common tansy	Regionally noxious
Cleavers	*Galium aparine*
Hoary alyssum	*Berteroa incana*
Oxeye daisy	*Leucanthemum vulgare*
Sulphur cinquefoil	*Potentilla recta*