Elk River Fish Passage

Al Irvine, R.P.Bio.

2020-12-14

Contents

```
## Reading layer `hab_wshds_ltree' from data source `C:\Users\allan\OneDrive\New_Graph\
## Simple feature collection with 7 features and 2 fields
## geometry type:  POLYGON
## dimension:      XY
## bbox:           xmin: 1778770 ymin: 541240.2 xmax: 1806472 ymax: 631526.5
## projected CRS:  NAD83 / BC Albers
## Reading layer `hab_wshds_ltree_up1' from data source `C:\Users\allan\OneDrive\New_Gr
## Simple feature collection with 6 features and 2 fields
## geometry type:  MULTIPOLYGON
## dimension:      XY
## bbox:           xmin: 1779095 ymin: 542126.3 xmax: 1802742 ymax: 631526.5
## projected CRS:  NAD83 / BC Albers
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Executive Summary

Chapter 1

Introduction

New Graph Environment was retained by the Canadian Wildlife Federation in the fall of 2020 to conduct fish passage assessments of stream crossings within the Elk River watershed upstream of the Elko Dam near Elko, BC. The work was carried out in accordance with the BC Ministry of Environment: Field Assessment for Determining Fish Passage at Closed Bottom Structures, 4th Edition (BC Ministry of Environment, 2011) and Fish Passage Strategic Approach: Protocol for Prioritizing Sites for Fish Passage Remediation: 4th Edition (Fish Passage Technical Working Group, 2014).

The health and viability of freshwater fish populations can depend on access to tributary and off channel areas which provide refuge during high flows, opportunities for foraging, overwintering habitat, spawning habitat and summer rearing habitat (Bramblett et al., 2002; Swales and Levings, 1989). Culverts can present barriers to fish migration due to increased water velocity, turbulence, a vertical drop at the culvert outlet and/or maintenance issues (Slaney et al., 1997). Reconnection of fragmented habitats is a management action that can generate some of the highest ecological returns on economic investments relative to other habitat restoration techniques (Saldi-Caromile et al., 2004).

Chapter 2

Background

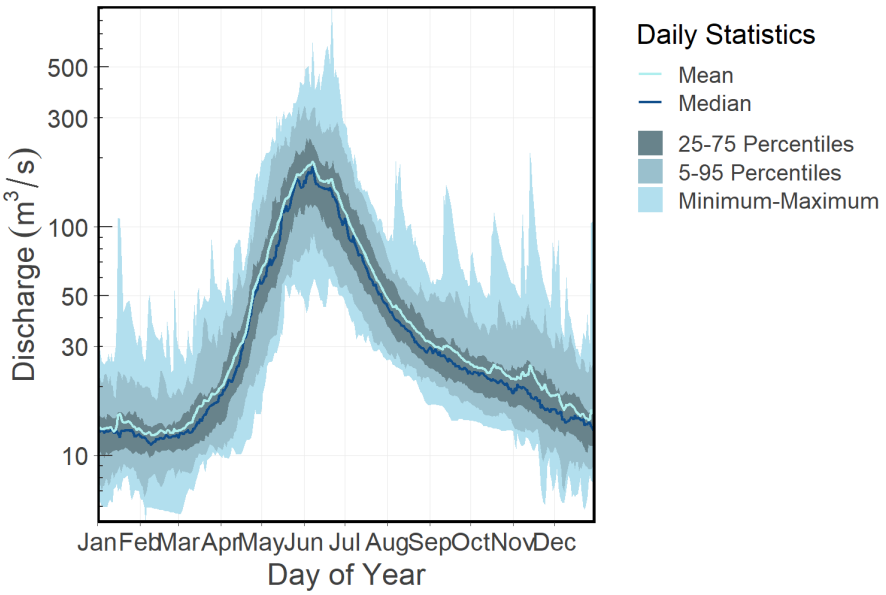
As a result of high-level direction from the provincial government, a Fish Passage Strategic Approach protocol has been developed for British Columbia to ensure that the greatest opportunities for restoration of fish passage are pursued. A Fish Passage Technical Working Group has been formed to coordinate the protocol and data is continuously amalgamated within the Provincial Steam Crossing Inventory System (PSCIS). The strategic approach protocol involves a four-phase process as described in Fish Passage Technical Working Group (2014) :

- Phase 1: Fish Passage Assessment – Fish stream crossings within watersheds with high fish values are assessed to determine barrier status of structures and document a general assessment of adjacent habitat quality and quantity.
- Phase 2: Habitat Confirmation – Assessments of crossings prioritized for follow up in Phase 1 studies are conducted to confirm quality and quantity of habitat upstream and down as well as to scope for other potential nearby barriers that could affect the practicality of remediation.
- Phase 3: Design – Site plans and designs are drawn for priority crossings where high value fish habitat has been confirmed.
- Phase 4: Remediation – Reconnection of isolated habitats through replacement, rehabilitation or removal of prioritized crossing structure barriers.

The scope of 2020/2021 project activities reported on in this document includes planning for and implementation of the first phase of fish passage assessment in the Elk River watershed upstream of the Elko Dam.

2.1 Project Location

The project was focused within the upper Elk River watershed upstream of the Elko Dam located at Elko, BC.



2.2 Fisheries

Chapter 3

Methods

3.1 Planning

We produced detailed maps of the project area identifying all locations where 1:20,000 scale TRIM map streams where intersected with roads. To determine target field sites we reviewed background habitat confirmation reports from (Masse Environmental Consultants Ltd., 2015)

which crossings on fish habitat with significant quantities of fish habitat upstream had not yet been assessed, we used the Fish Habitat Model to the estimate the quantity and quality of fish habitat potentially upstream of crossings. Using the criteria below we screen previously cross reference modelled crossing locations with sites already within the Provincial Stream Crossing Summary System. Target crossings were identified as previously unnassessed crossings on streams with likely significant quantities of fish habitat upstream.

3.2 Fish Passage Assessments

In the field, crossings surveyed included closed bottom structures (CBS), open bottom structures (OBS) and crossings considered "other" (fords, weirs, etc.). Six digit numerical crossing identifiers were generated for each crossings modeled. Crossings identified in the field that had no corresponding GIS generated ID were given unique identifiers beginning with the date in YYYYMMDD format appended with an identifier between 1 and 10 (ex. 2020091601). Photos were taken at surveyed crossings and when possible included images of the road, crossing inlet, crossing outlet, crossing barrel, channel downstream and channel upstream of the crossing and any relevant features. Additionally, the following information was recorded for all surveyed crossings: date of inspection, crossing

Table 3.1: Habitat value criteria (Fish Passage Technical Working Group, 2011).

Habitat Value	Fish Habitat Criteria
High	The presence of high value spawning or rearing habitat (e.g., locations with abundance of suitably sized gravels, deep pools, undercut banks, or stable debris) which are critical to the fish population.
Medium	Important migration corridor. Presence of suitable spawning habitat. Habitat with moderate rearing potential for the fish species present.
Low	No suitable spawning habitat, and habitat with low rearing potential (e.g., locations without deep pools, undercut banks, or stable debris, and with little or no suitably sized spawning gravels for the fish species present).

reference, crew member initials, Universal Transverse Mercator (UTM) coordinates, stream name, road name and kilometer, road tenure information, crossing type, crossing subtype, culvert diameter or span for OBS, culvert length or width for OBS. A more detailed "full assessment" was completed for all closed bottom structures.

Full assessments also included the following parameters: presence/absence of continuous culvert embedment (yes/no), average depth of embedment, whether or not the culvert bed resembled the native stream bed, presence of and percentage backwatering, fill depth, outlet drop, outlet pool depth, inlet drop, culvert slope, average downstream channel width, stream slope, presence/absence of beaver activity, presence/absence of fish at time of survey, type of valley fill, and a habitat value rating. Habitat value ratings were based on channel morphology, flow characteristics (perennial, intermittent, ephemeral), fish migration patterns, the presence/absence of deep pools, un-embedded boulders, substrate, woody debris, undercut banks, aquatic vegetation and overhanging riparian vegetation (Table 3.1). For crossings determined to be potential barriers or barriers based on the data (see section 2.3.2), a culvert fix and recommended diameter/span was proposed.

All field data collected including photos were uploaded to the Provincial Stream Crossing Inventory System (PSCIS).

3.3 Barrier Scoreing

Fish passage potential was determined for each stream crossing identified as a closed bottom structure on fish bearing and potentially fish bearing stream reaches. The combined scores from five criteria: depth and degree to which the structure is embedded, outlet drop, stream width ratio, culvert slope, and culvert length were used to screen whether each culvert was a likely barrier

Table 3.2: Fish Barrier Scoring (Fish Passage Technical Working Group 2011).

Risk	Embedded	Value	Outlet Drop (cm)	Value	SWR	Value	Slope (%)	Value	Length (m)	Value
LOW	>30cm or >20% of diameter and continuous	0	<15	0	<1.0	0	<1	0	<15	0
MOD	<30cm or 20% of diameter but continuous	5	15-30	5	1.0-1.3	3	1-3	5	15-30	3
HIGH	No embedment or discontinuous	10	>30	10	>1.3	6	>3	10	>30	6

Table 3.3: Fish Barrier Scoring Results (Fish Passage Technical Working Group 2011).

Cumlative Score	Result
0-14	passable
15-19	potential barrier
>20	barrier

to some fish species and life stages (Table 3.2, Table 3.3. These criteria were developed based on data obtained from various studies and reflect an estimation for the passage of a juvenile salmon or small resident rainbow trout (Clarkin et al., 2005, ; Bell, 1991; Thompson, 2013).

3.4 Cost Benefit Analysis

A cost benefit analysis was conducted for each crossing considered a barrier based on the amount of potential habitat to be made available by remediating fish passage at the site and an estimate of associated costs.

3.5 Habitat Gain Index

The habitat gain index is the quantity of modelled habitat upstream of the subject crossing and represents an estimate of habitat gained with remediation of fish passage at the crossing. For this project we set the threshold between fish and non-fish habitat at a gradient of 20% representing the gradient limit accessible to downstream populations. A "net" value for the index used meaning that if there is a documented PSCIS barrier crossing upstream of the subject crossing or a modelled unassessed crossing the amount of habitat is totaled to that point.

Potential options to remediate fish passage included: removal of the structure, backwatering

Cost estimates for structure replacement were generated based on the channel width, slope of the culvert, depth of fill and the road type. Base costs for installation of bridges and embedded culverts were estimated based on interviews with Phil MacDonald, Engineering Specialist FLNR - Kootenay and Steve Page,

Area Engineer - FLNR - Northern Engineering Group. Costs for installation of bridges on forest service roads was estimated at $12.5K/m and assumes that the road can be closed during construction. For streams with channel widths <2m embedded culverts can be effective with installation costs estimated at $25k

Chapter 4

Results

4.1 Phase 1

A total of XXX assessments were conducted between xxx and xxxxxxxxxx. Site details and photos are presented in

The analysis phase is summarized in Table 4.1 [test][test]

4.2 Phase 2

Raw results are included in digital format as Attachment 2 and summarized in Tables 4.2 - 4.4

Table 4.1: Modelled upstream habitat estimate and cost benefit.

External ID	Stream	Road	Stream Width (m)	Priority	Fix	Cost Est ($K)	Habitat Upstream (m)	Cost Benefit (m / $K)	Cost Benefit (m2 / $K)
4600026	Tributary to Elk River	Dicken Rd	2.20	low	OBS	250	225	0.9	1.0
4600028	Bean Creek	Dicken Rd	2.00	mod	OBS	250	404	1.6	1.6
4600037	Dalzell Creek	Driveway	2.50	low	OBS	750	264	0.4	0.4
4600038	Dalzell Creek	Driveway	1.20	low	SS-CBS	150	1294	8.6	5.2
4600039	Dalzell Creek	Lower Elk Valley Road	3.80	low	OBS	750	206	0.3	0.5
4600069	Weigart Creek	Highway 43	4.30	high	OBS	2500	1206	0.5	1.0
4600070	Brule Creek	Highway 43	6.10	high	OBS	3050	763	0.3	0.8
4600080	Tributary to Elk River	Cokato Road	2.10	low	OBS	250	748	3.0	3.1
4600084	Littlemoor Creek	Lower Elk Valley Road	1.00	low	SS-CBS	150	145	1.0	0.5
4600090	Tributary to Elk River	Lower Elk Valley Road	0.00	low	SS-CBS	150	620	4.1	0.0
4600092	North Littlemoor Creek	Lower Elk Valley Road	1.50	low	SS-CBS	150	635	4.2	3.2
4600102	Tributary to Elk River	McGivern Road	0.50	low	SS-CBS	25	471	18.8	4.7
4600130	Tributary to Elk River	Cokato Road	0.65	low	SS-CBS	50	94	1.9	0.6
4600134	Tributary	Fernie	1.40	low	SS-	25	58	2.3	1.6

Table 4.2: Overview of habitat confirmation sites.

Site	Stream	Road	Tenure	UTM (11U)	Fish Species	Habitat Gain (km)	Habitat Value	Priority	Comments
50155	Tributary to Lizard Creek	Island Lake Lodge Road	MoTi recreation	635113 5484261	NA	NA	Medium	moderate	NA
50159	Tributary to Lizard Creek	Island Lake Lodge Road	MoTi recreation	633320 5484601	NA	NA	Medium	high	NA
50185	Tributary to Morrisey Creek	River Rd	FLNR 5466	645683 5469025	NA	NA	High	moderate	NA
62423	Tributary to Grave Creek	Grave Creek FSR	Unknown	660508 5524239	NA	NA	Low	low	NA
62425	Grave Creek	Spur	Canfor R08362	661486 5524426	NA	NA	Medium	moderate	NA
62426	Grave Creek	Spur	Canfor R08362	661611 5524460	NA	NA	Medium	moderate	NA
62516	Tributary to Lizard Creek	Island Lake Lodge Road	MoTi recreation	636123 5484087	NA	NA	Medium	moderate	Fry observed upstream and downstream
197533	Brule Creek	Busato Rd	MoTi local	651626 5528888	NA	0	High	high	Deactivate
197555	Tributary to Elk River	Elk River FSR	FLNR 0103	646735 5554534	BT	NA	High	moderate	NA
197559	Brule Creek	Highway 43	MoTi highway	651516 5528829	BT, WCT	NA	Medium	moderate	NA

Table 4.3: Summary of Phase 2 fish passage assessments.

PSCIS ID	Embedded	Outlet Drop (m)	Diameter (m)	SWR	Slope (%)	Length (m)	Score	Result
50155	No	0.22	0.9	2.5	2.6	11	26	Barrier
50159	No	1.60	0.8	3.1	8.0	12	36	Barrier
50185	No	0.00	2.2	2.0	3.4	17	29	Barrier
62423	No	0.18	0.9	1.6	0.5	12	21	Barrier
62425	No	0.47	1.2	3.1	7.5	12	36	Barrier
62426	No	0.25	1.2	2.9	5.0	12	31	Barrier
62516	No	0.49	1.2	2.1	5.0	11	36	Barrier
197533	No	0.70	3.3	2.2	4.0	20	39	Barrier
197555	No	1.48	1.5	2.3	3.5	49	42	Barrier
197559	Yes	0.00	2.5	2.4	2.5	35	22	Barrier

Table 4.4: Summary of habitat details.

Site	Location	Length Surveyed (m)	Channel Width (m)	Wetted Width (m)	Pool Depth (m)	Gradient (%)	Total Cover	Habitat Value
50155	upstream	700	2.2	1.6	0.3	10.5	abundant	high
50155	downstream	100	2.2	1.9	-	4.3	moderate	medium
50159	upstream	400	3.0	2.6	0.4	11.2	moderate	-
50159	downstream	150	2.5	2.3	0.2	8.8	moderate	-
50185	upstream	740	4.0	2.8	0.4	6.2	moderate	-
50185	downstream	255	4.3	2.7	0.4	4.2	moderate	-
62423	downstream	30	1.3	-	-	4.0	moderate	-
62423	upstream	725	1.2	0.8	0.2	4.4	moderate	-
62425	upstream	170	3.5	2.1	0.3	5.0	moderate	-
62425	downstream	75	3.7	1.8	0.3	7.5	moderate	-
62426	upstream	650	3.9	1.6	0.4	11.9	moderate	-
62516	upstream	730	2.0	1.3	0.3	7.6	moderate	-
62516	downstream	630	2.5	1.4	0.4	2.7	moderate	-
197533	upstream	125	5.5	3.8	-	1.5	moderate	-
197533	downstream	400	7.4	4.1	-	1.9	moderate	-
197555	upstream	675	5.9	3.8	0.4	5.9	abundant	-
197555	downstream	700	3.6	3.1	0.4	3.6	moderate	-
197559	upstream	980	7.7	2.3	0.6	3.5	moderate	-

Chapter 5

Conclusion

Appendix - Site Assessment Data and Photos

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-23	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.65
External ID	4600008	Length (m)	11
Crew	AI, KP	Embedded	Yes
UTM Zone	11	Depth Embedded (m)	0.1
Easting	640268	Resemble Channel	Yes
Northing	5481377	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Robinson Road	Fill Depth (m)	1.2
Road Tenure	MoTi local	Outlet Drop (m)	0
Channel Width (m)	1.2	Outlet Pool Depth (m)	0
Stream Slope (%)	0.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	0.5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Dry mostly vegetated channel. Not likely fish habitat.
Photos:
4600008![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-24	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.6
External ID	4600026	Length (m)	22
Crew	AI, MF, DN	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	642911	Resemble Channel	No
Northing	5490630	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Dicken Rd	Fill Depth (m)	2
Road Tenure	MoTi collector	Outlet Drop (m)	1.3
Channel Width (m)	2.2	Outlet Pool Depth (m)	0.3
Stream Slope (%)	3	Inlet Drop	No
Beaver Activity	No	Slope (%)	1.5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Stream dry at time of survey. Children's fort in upstream channel indicating that flows are likely very minimal year round.

Photos:
4600026![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-24	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.95
External ID	4600028	Length (m)	14
Crew	AI, MF, DN	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	642559	Resemble Channel	No
Northing	5490377	Backwatered	No
Stream	Bean Creek	Percent Backwatered	NA
Road	Dicken Rd	Fill Depth (m)	1.2
Road Tenure	MoTi collector	Outlet Drop (m)	0.57
Channel Width (m)	2	Outlet Pool Depth (m)	0.22
Stream Slope (%)	5	Inlet Drop	No
Beaver Activity	No	Slope (%)	5.5
Habitat Value	High	Valley Fill	Deep Fill

Comments: Multiple fish observed in outlet pool (~190mm). Some gravels suitable for spawning located upstream.

Photos:
4600028![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-17	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.75
External ID	4600037	Length (m)	6
Crew	AI, KP	Embedded	Yes
UTM Zone	11	Depth Embedded (m)	0.1
Easting	651867	Resemble Channel	Yes
Northing	5522741	Backwatered	No
Stream	Dalzell Creek	Percent Backwatered	NA
Road	Driveway	Fill Depth (m)	0.3
Road Tenure	private	Outlet Drop (m)	0
Channel Width (m)	2.5	Outlet Pool Depth (m)	0
Stream Slope (%)	1.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	2
Habitat Value	Medium	Valley Fill	Deep Fill

Comments: Embedded culvert on private driveway. EB known upstream. Culvert does not appear likely to be significantly impacting upstream fish passage for juvenile or adult WCT at time of survey.

Photos:
4600037![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-17	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.75
External ID	4600038	Length (m)	12
Crew	AI, KP	Embedded	Yes
UTM Zone	11	Depth Embedded (m)	0.18
Easting	651917	Resemble Channel	Yes
Northing	5522888	Backwatered	No
Stream	Dalzell Creek	Percent Backwatered	NA
Road	Driveway	Fill Depth (m)	0.3
Road Tenure	private	Outlet Drop (m)	0
Channel Width (m)	1.2	Outlet Pool Depth (m)	0
Stream Slope (%)	1.5	Inlet Drop	Yes
Beaver Activity	No	Slope (%)	2
Habitat Value	Medium	Valley Fill	Deep Fill

Comments: Culvert collapsing in the middle. Private resdience driveway. Wetland type habitat upstream. Culvert does not appear likely to be significantly impacting upstream fish passage for juvenile or adult WCT at time of survey.

Photos:
4600038![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-17	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.45
External ID	4600039	Length (m)	16
Crew	KP, AI	Embedded	Yes
UTM Zone	11	Depth Embedded (m)	0.07
Easting	651833	Resemble Channel	Yes
Northing	5522544	Backwatered	No
Stream	Dalzell Creek	Percent Backwatered	NA
Road	Lower Elk Valley Road	Fill Depth (m)	1
Road Tenure	MoTi arterial	Outlet Drop (m)	0
Channel Width (m)	3.8	Outlet Pool Depth (m)	0.07
Stream Slope (%)	1	Inlet Drop	No
Beaver Activity	No	Slope (%)	3.5
Habitat Value	Medium	Valley Fill	Deep Fill

Comments: Three barrels (.45m each). Two of the three have water flowing through them. Upstream and downstream channel widens out, slow flow through vegetated channel. Highly manipulated banks. Deep fine substrate on both sides of crossing. Upstream resembles a wetland. Crossing does not appear likely to be significantly impacting upstream fish passage for juvenile or adult WCT at time of survey.

Photos:

4600039![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-17	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.9
External ID	4600040	Length (m)	22
Crew	AI, KP	Embedded	Yes
UTM Zone	11	Depth Embedded (m)	0.3
Easting	652004	Resemble Channel	Yes
Northing	5522330	Backwatered	No
Stream	Dalzell Creek	Percent Backwatered	NA
Road	Airport Road	Fill Depth (m)	0.5
Road Tenure	MoTi local	Outlet Drop (m)	0
Channel Width (m)	5	Outlet Pool Depth (m)	0
Stream Slope (%)	0	Inlet Drop	No
Beaver Activity	No	Slope (%)	2.5
Habitat Value	Medium	Valley Fill	Deep Fill

Comments: Fenced private land upstream and downstream. Wetland area downstream. Culvert does not appear likely to be significantly impacting upstream fish passage for juvenile or adult WCT at time of survey.

Photos:
4600040![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-17	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	3.2
External ID	4600069	Length (m)	18
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	650144	Resemble Channel	No
Northing	5532055	Backwatered	No
Stream	Weigart Creek	Percent Backwatered	NA
Road	Highway 43	Fill Depth (m)	1.3
Road Tenure	MoTi highway	Outlet Drop (m)	0.15
Channel Width (m)	4.3	Outlet Pool Depth (m)	0.6
Stream Slope (%)	2	Inlet Drop	Yes
Beaver Activity	No	Slope (%)	3.4
Habitat Value	High	Valley Fill	Deep Fill

Comments: Large stream with good flow. Flows currently mostly through south culvert which has slightly higher outlet drop. Similar elevation outlets so added together for width. Lazer level used for culvert slope. Cobble/boulder substrate. Boulder cover.

Photos:
4600069![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-17	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	2.5
External ID	4600070	Length (m)	35
Crew	KP, AI	Embedded	Yes
UTM Zone	11	Depth Embedded (m)	0.05
Easting	651516	Resemble Channel	Yes
Northing	5528829	Backwatered	No
Stream	Brule Creek	Percent Backwatered	NA
Road	Highway 43	Fill Depth (m)	3
Road Tenure	MoTi highway	Outlet Drop (m)	0
Channel Width (m)	6.1	Outlet Pool Depth (m)	1.7
Stream Slope (%)	1.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	2.5
Habitat Value	Medium	Valley Fill	Deep Fill

Comments: Dewatered upstream of highway for 600m. Deep pool present downstream fed subsurface from northside of culvert. Approximately 9 WCT in outlet pool. Four fish ~300mm and 5 fish ~200 mm. High confidence that the larger fish were WCT as easy to recognize spotted backs from bank.
Photos:
4600070![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-23	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.75
External ID	4600077	Length (m)	20
Crew	AI, KP	Embedded	Yes
UTM Zone	11	Depth Embedded (m)	0.1
Easting	639864	Resemble Channel	Yes
Northing	5483627	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Mt Mclean Road	Fill Depth (m)	4
Road Tenure	Fernie local	Outlet Drop (m)	0
Channel Width (m)	2.7	Outlet Pool Depth (m)	0
Stream Slope (%)	0.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	0.5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Dry channel. Culvert is embedded.
Photos:
4600077![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-23	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	1.1
External ID	4600080	Length (m)	43
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	640568	Resemble Channel	No
Northing	5481516	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Cokato Road	Fill Depth (m)	2
Road Tenure	MoTi local	Outlet Drop (m)	0
Channel Width (m)	2.1	Outlet Pool Depth (m)	0
Stream Slope (%)	3.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	4
Habitat Value	Low	Valley Fill	Deep Fill

Comments: 2 barrels, 0.90 and 1.1m. Debris rack on inlet. Stream dry at time of survey.

Photos:
4600080![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-17	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.6
External ID	4600084	Length (m)	22
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	651532	Resemble Channel	No
Northing	5521052	Backwatered	No
Stream	Littlemoor Creek	Percent Backwatered	NA
Road	Lower Elk Valley Road	Fill Depth (m)	0.8
Road Tenure	MoTi arterial	Outlet Drop (m)	0.2
Channel Width (m)	1	Outlet Pool Depth (m)	0.15
Stream Slope (%)	0.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	3
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Flows through fenced private land upstream and downstream. Inlet has quite a bit of debris on it. Upstream is much steeper than downstream with gradient estimated at 12%. Small stream with good flow.

Photos:
4600084![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-17	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.45
External ID	4600090	Length (m)	18
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	651814	Resemble Channel	No
Northing	5519652	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Lower Elk Valley Road	Fill Depth (m)	1
Road Tenure	MoTi arterial	Outlet Drop (m)	0
Channel Width (m)	0	Outlet Pool Depth (m)	0
Stream Slope (%)	0	Inlet Drop	No
Beaver Activity	No	Slope (%)	1.5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: No visible channel. Not likely fish habitat.
Agricultural area.
Photos:
4600090![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-17	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.8
External ID	4600092	Length (m)	18
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	651701	Resemble Channel	No
Northing	5521881	Backwatered	No
Stream	North Littlemoor Creek	Percent Backwatered	NA
Road	Lower Elk Valley Road	Fill Depth (m)	0.6
Road Tenure	MoTi arterial	Outlet Drop (m)	0
Channel Width (m)	1.5	Outlet Pool Depth (m)	0
Stream Slope (%)	2.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	3
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Stream slope estimated due to fenced private land.
Photos:
4600092![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-23	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.5
External ID	4600102	Length (m)	16
Crew	AI, Kp	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	640306	Resemble Channel	No
Northing	5481672	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	McGiverin Road	Fill Depth (m)	1
Road Tenure	MoTi local	Outlet Drop (m)	0
Channel Width (m)	0.5	Outlet Pool Depth (m)	0
Stream Slope (%)	0	Inlet Drop	No
Beaver Activity	No	Slope (%)	1
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Vegetated channel. Not likely fish habitat.
Photos:
4600102![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-23	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	1.2
External ID	4600130	Length (m)	22
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	640037	Resemble Channel	No
Northing	5483655	Backwatered	Yes
Stream	Tributary to Elk River	Percent Backwatered	20
Road	Cokato Road	Fill Depth (m)	8
Road Tenure	Fernie collector	Outlet Drop (m)	0
Channel Width (m)	0.65	Outlet Pool Depth (m)	0
Stream Slope (%)	9	Inlet Drop	Yes
Beaver Activity	No	Slope (%)	9
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Very low flow at time of survey and 0.5m inlet drop
from debris. Very steep culvert, possibly 2 sections with further
upstream section being much steeper.
Photos:
4600130![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-24	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.9
External ID	4600134	Length (m)	48
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	638639	Resemble Channel	No
Northing	5480681	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Fernie ski hill	Fill Depth (m)	3
Road Tenure	unclassified	Outlet Drop (m)	0.09
Channel Width (m)	1.4	Outlet Pool Depth (m)	0.22
Stream Slope (%)	5	Inlet Drop	No
Beaver Activity	No	Slope (%)	9
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Debris guard on inlet. Unable to see through the culvert to other end. Highly manipulated banks, drains large parking area and ski hill. Steep with placed rocks (rip rap) in spots upstream. Stream goes under large turn around, paved area. Culvert likely >1 piece with slight angle. Armoured banks downstream, lots of sediment (sand) form pavement and parking area.
Photos:
4600134![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-18	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.9
External ID	4600140	Length (m)	22
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	651110	Resemble Channel	No
Northing	5515356	Backwatered	No
Stream	Whiting Creek	Percent Backwatered	NA
Road	Highway 43	Fill Depth (m)	3
Road Tenure	MoTi arterial	Outlet Drop (m)	0.18
Channel Width (m)	0.6	Outlet Pool Depth (m)	0
Stream Slope (%)	2	Inlet Drop	No
Beaver Activity	No	Slope (%)	1.5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: No access up or downstream due to fenced private land. Stream slope estimated. Water pipe intake at the outlet.
Photos:
4600140![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-24	Crossing Sub Type	Pipe Arch
PSCIS ID	NA	Diameter (m)	4
External ID	4600157	Length (m)	44
Crew	AI, MF, DN	Embedded	NA
UTM Zone	11	Depth Embedded (m)	NA
Easting	643565	Resemble Channel	NA
Northing	5490325	Backwatered	NA
Stream	Hartley Creek	Percent Backwatered	NA
Road	Highway 3	Fill Depth (m)	NA
Road Tenure	MoTi highway	Outlet Drop (m)	NA
Channel Width (m)	NA	Outlet Pool Depth (m)	NA
Stream Slope (%)	NA	Inlet Drop	NA
Beaver Activity	No	Slope (%)	NA
Habitat Value	NA	Valley Fill	NA

Comments: This crossing is very full of debris and has been recently dredges. Less than 30cm freeboard from top of aggraded gravels at inlet and top of pipe arch. Newly installed overflow pipe (0.55 diameter) on left bank.

Photos:
4600157![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-24	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	1.8
External ID	4600158	Length (m)	30
Crew	AI, MF, DN	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	642739	Resemble Channel	No
Northing	5489444	Backwatered	No
Stream	Bean Creek	Percent Backwatered	NA
Road	Highway 3	Fill Depth (m)	1.5
Road Tenure	MoTi highway	Outlet Drop (m)	0.17
Channel Width (m)	3.2	Outlet Pool Depth (m)	0.24
Stream Slope (%)	0.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	1
Habitat Value	Medium	Valley Fill	Deep Fill

Comments: Fish observed at upstream crossing on Bean Rd. Grate on inlet may prevent passage off adult fish. Fill depth estimated from photos.

Photos:
4600158![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-24	Crossing Sub Type	Round Culv
PSCIS ID	NA	Diameter (m)	1
External ID	4600169	Length (m)	36
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	638850	Resemble Channel	No
Northing	5480833	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Highline Drive (Fernie ski hill)	Fill Depth (m)	6
Road Tenure	MoTi local	Outlet Drop (m)	0.2
Channel Width (m)	2.3	Outlet Pool Depth (m)	0.25
Stream Slope (%)	11.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	13
Habitat Value	Medium	Valley Fill	Deep Fill

Comments: Very recent heavy rains, 2 side channels for ski hill drainage infrastructure giving significant flow contributions just upstream of crossing, one of which is especially turbid (from large parking lot). Culvert not baffled, very steep. A lot of fill on paved access to condos. Old metal collar of culvert ripped off and in outlet pool.
Photos:
4600169![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-18	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.6
External ID	4600181	Length (m)	73
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	652322	Resemble Channel	No
Northing	5527529	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Line creek mine road	Fill Depth (m)	3.5
Road Tenure	MoTi local	Outlet Drop (m)	0
Channel Width (m)	0.5	Outlet Pool Depth (m)	0
Stream Slope (%)	2	Inlet Drop	No
Beaver Activity	No	Slope (%)	2
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Dry at time of survey, no channel present, area vegetated grassland. Two culverts, 0.60m in diameter. Top culvert 0.5m higher than the lower.
Photos:
4600181![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-17	Crossing Sub Type	Oval Culvert
PSCIS ID	NA	Diameter (m)	3.3
External ID	4600183	Length (m)	20
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	651626	Resemble Channel	No
Northing	5528888	Backwatered	No
Stream	Brule Creek	Percent Backwatered	NA
Road	Busato Road	Fill Depth (m)	1
Road Tenure	MoTi local	Outlet Drop (m)	0.7
Channel Width (m)	7.1	Outlet Pool Depth (m)	1.5
Stream Slope (%)	2	Inlet Drop	Yes
Beaver Activity	No	Slope (%)	4
Habitat Value	High	Valley Fill	Deep Fill

Comments: Large stream with good flow at this crossing. Culvert inlet is damaged and there is a large outlet drop. Upstream of highway the stream is subsurface for ~600m.
Photos:
4600183![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-18	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.6
External ID	4600184	Length (m)	30
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	650954	Resemble Channel	No
Northing	5522199	Backwatered	No
Stream	North Littlemoor Creek	Percent Backwatered	NA
Road	Highway 43	Fill Depth (m)	4
Road Tenure	MoTi highway	Outlet Drop (m)	0.65
Channel Width (m)	1.6	Outlet Pool Depth (m)	0.55
Stream Slope (%)	5	Inlet Drop	No
Beaver Activity	No	Slope (%)	8
Habitat Value	Medium	Valley Fill	Deep Fill

Comments: Small stream with good flow, EB known upstream. Fenced private land upstream and downstream. Stream measurements estimated due to fenced private land. Large outlet drop.
Photos:
4600184![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-18	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.9
External ID	4600185	Length (m)	40
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	651002	Resemble Channel	No
Northing	5521022	Backwatered	No
Stream	Littlemoor Creek	Percent Backwatered	NA
Road	Highway 43	Fill Depth (m)	5
Road Tenure	MoTi highway	Outlet Drop (m)	0.3
Channel Width (m)	1.2	Outlet Pool Depth (m)	0.55
Stream Slope (%)	3.5	Inlet Drop	Yes
Beaver Activity	No	Slope (%)	5
Habitat Value	Medium	Valley Fill	Deep Fill

Comments: Culvert has extension with corner, small stream with good flow. WCT and EB documented upstream. Gravels present suitable for WCT and EB spawning.
Photos:
4600185![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-18	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.8
External ID	4600186	Length (m)	22
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	651051	Resemble Channel	No
Northing	5519343	Backwatered	No
Stream	Hollow Creek	Percent Backwatered	NA
Road	Highway 43	Fill Depth (m)	0.8
Road Tenure	MoTi highway	Outlet Drop (m)	0.46
Channel Width (m)	1.1	Outlet Pool Depth (m)	0.36
Stream Slope (%)	2	Inlet Drop	No
Beaver Activity	No	Slope (%)	4
Habitat Value	Low	Valley Fill	Deep Fill

Comments: No access up or downstream due to fenced private land. Stream slope estimated.
Photos:
4600186![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-23	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	1.2
External ID	4600316	Length (m)	12
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	641167	Resemble Channel	No
Northing	5479429	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Cokato Road	Fill Depth (m)	0.5
Road Tenure	MoTi local	Outlet Drop (m)	0
Channel Width (m)	4.1	Outlet Pool Depth (m)	0
Stream Slope (%)	4	Inlet Drop	No
Beaver Activity	No	Slope (%)	2.5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Stream dry at time of survey. Three barrels, 1.2m in diameter. All three very similar elevation, all perched .2-.50m above substrate.
Photos:
4600316![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-17	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.6
External ID	4600329	Length (m)	12
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	652325	Resemble Channel	Yes
Northing	5515789	Backwatered	No
Stream	Tributary to Whiting Creek	Percent Backwatered	NA
Road	Lower Elk Valley Road	Fill Depth (m)	1
Road Tenure	MoTi arterial	Outlet Drop (m)	0
Channel Width (m)	0.5	Outlet Pool Depth (m)	0
Stream Slope (%)	0	Inlet Drop	No
Beaver Activity	No	Slope (%)	1
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Whiting creek appeared to not be present through agricultural field downstream. This appeared to be only channel present for Whiting crossing this road although the main Whiting channel is present upstream. Dry, heavily vegetated channel downstream. Defined channel upstream but seems unlikely to be fish bearing.
Photos:
4600329![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-24	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	1.2
External ID	4600332	Length (m)	25
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	639511	Resemble Channel	No
Northing	5481114	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Highway 3	Fill Depth (m)	2.3
Road Tenure	MoTi highway	Outlet Drop (m)	0
Channel Width (m)	3.3	Outlet Pool Depth (m)	0.5
Stream Slope (%)	4	Inlet Drop	Yes
Beaver Activity	No	Slope (%)	1.5
Habitat Value	Medium	Valley Fill	Deep Fill

Comments: Fry observed at outlet pool. Inlet of active pipe mostly plugged with debris. Overflow pipe is 0.8m outlet drop with fry/juveniles stranded in outlet pool. Flows out of Fernie Ski Hill Road development area.
Photos:
4600332![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-18	Crossing Sub Type	Oval Culvert
PSCIS ID	NA	Diameter (m)	2.6
External ID	4600367	Length (m)	20
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	643534	Resemble Channel	No
Northing	5490723	Backwatered	No
Stream	Hartley Creek	Percent Backwatered	NA
Road	Dicken Road	Fill Depth (m)	0.4
Road Tenure	MoTi collector	Outlet Drop (m)	0.4
Channel Width (m)	3.5	Outlet Pool Depth (m)	0.8
Stream Slope (%)	1	Inlet Drop	No
Beaver Activity	No	Slope (%)	2
Habitat Value	High	Valley Fill	Deep Fill

Comments: Laser level used for culvert slope. WCT spawning system. See Management Plan for the Westslope Cutthroat Trout (Oncorhynchus clarkii lewisi) in British Columbia 2014 http://a100.gov.bc.ca/pub/eirs/finishDownloadDocument.do?subdocumentId=9781
Photos:
4600367![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-20	Crossing Sub Type	Ford
PSCIS ID	NA	Diameter (m)	NA
External ID	4601129	Length (m)	NA
Crew	KP, AI	Embedded	NA
UTM Zone	11	Depth Embedded (m)	NA
Easting	661062	Resemble Channel	NA
Northing	5524446	Backwatered	NA
Stream	Grave Creek	Percent Backwatered	NA
Road	NA	Fill Depth (m)	NA
Road Tenure	unclassified	Outlet Drop (m)	NA
Channel Width (m)	NA	Outlet Pool Depth (m)	NA
Stream Slope (%)	NA	Inlet Drop	NA
Beaver Activity	No	Slope (%)	NA
Habitat Value	NA	Valley Fill	NA

Comments: Deactivated road. Ford.
Photos:
4601129![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-18	Crossing Sub Type	Ford
PSCIS ID	NA	Diameter (m)	NA
External ID	4601205	Length (m)	NA
Crew	AI, KP	Embedded	NA
UTM Zone	11	Depth Embedded (m)	NA
Easting	650917	Resemble Channel	NA
Northing	5528513	Backwatered	NA
Stream	Brule Creek	Percent Backwatered	NA
Road	Private	Fill Depth (m)	NA
Road Tenure	private	Outlet Drop (m)	NA
Channel Width (m)	NA	Outlet Pool Depth (m)	NA
Stream Slope (%)	NA	Inlet Drop	NA
Beaver Activity	No	Slope (%)	NA
Habitat Value	NA	Valley Fill	NA

Comments: Pulled crossing, no issues, is now a ford.
Photos:
4601205![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-24	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.9
External ID	4601556	Length (m)	14
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	638522	Resemble Channel	No
Northing	5480616	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Fernie ski hill	Fill Depth (m)	1.2
Road Tenure	unclassified	Outlet Drop (m)	0
Channel Width (m)	1.3	Outlet Pool Depth (m)	0.2
Stream Slope (%)	8	Inlet Drop	Yes
Beaver Activity	No	Slope (%)	9
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Stream gradient immediately upstream of crossing is near 20%. Crossing is last of a series within close proximity to each other. The crossing downstream of this one is near 100m long. Likely more crossings upstream on ski hill infrastructure and access roads. Recent heavy rains.
Photos:
4601556![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-23	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	1.5
External ID	4601594	Length (m)	22
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	641090	Resemble Channel	No
Northing	5479392	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Railway	Fill Depth (m)	2
Road Tenure	Canadian Pacific	Outlet Drop (m)	0
Channel Width (m)	2.7	Outlet Pool Depth (m)	0
Stream Slope (%)	2.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	1.5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Stream dry at time of survey. 2 barrels (0.80 and 1.5m in diameter), similar heights but 1.5m slightly lower. Smaller barrel inlet damaged.
Photos:
4601594![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-24	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	1.2
External ID	4601639	Length (m)	99
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	638630	Resemble Channel	No
Northing	5480655	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Fernie ski hill	Fill Depth (m)	2.5
Road Tenure	unclassified	Outlet Drop (m)	0.73
Channel Width (m)	1.5	Outlet Pool Depth (m)	0.65
Stream Slope (%)	6	Inlet Drop	Yes
Beaver Activity	No	Slope (%)	11
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Huge crossing through the ski hill parking lot and lodge area. Largeoutlet drop and pool, extremely long culvert (close to 100m) tied in with other drainage infrastructure at the base of the Fernie ski hill. Inlet drop about .15m.

Photos:
4601639![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-20	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.9
External ID	4602270	Length (m)	14
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	655441	Resemble Channel	No
Northing	5524175	Backwatered	No
Stream	Tributary to Grave Creek	Percent Backwatered	NA
Road	NA	Fill Depth (m)	2
Road Tenure	unclassified	Outlet Drop (m)	0
Channel Width (m)	1.5	Outlet Pool Depth (m)	0
Stream Slope (%)	3	Inlet Drop	Yes
Beaver Activity	No	Slope (%)	4
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Inlet clogged with debris 3/4 of way up. Upstream area is wetland/pond.

Photos:
4602270![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-18	Crossing Sub Type	Ford
PSCIS ID	NA	Diameter (m)	NA
External ID	4602276	Length (m)	NA
Crew	AI	Embedded	NA
UTM Zone	11	Depth Embedded (m)	NA
Easting	649758	Resemble Channel	NA
Northing	5527935	Backwatered	NA
Stream	Brule Creek	Percent Backwatered	NA
Road	Spur	Fill Depth (m)	NA
Road Tenure	unclassified	Outlet Drop (m)	NA
Channel Width (m)	NA	Outlet Pool Depth (m)	NA
Stream Slope (%)	NA	Inlet Drop	NA
Beaver Activity	No	Slope (%)	NA
Habitat Value	NA	Valley Fill	NA

Comments: Deactivated. Ford. no issues.
Photos:
4602276![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-24	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	1.2
External ID	4602349	Length (m)	10
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	638525	Resemble Channel	No
Northing	5481496	Backwatered	Yes
Stream	Tributary to Elk River	Percent Backwatered	20
Road	Fernie Nordic Trail	Fill Depth (m)	1.5
Road Tenure	unclassified	Outlet Drop (m)	0
Channel Width (m)	2	Outlet Pool Depth (m)	2
Stream Slope (%)	7	Inlet Drop	No
Beaver Activity	No	Slope (%)	3.5
Habitat Value	Medium	Valley Fill	Deep Fill

Comments: Outlet pool appears dredged, very deep, approximately
2m and 7-8m long. Nice stream, good flow.
Photos:
4602349![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-20	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.6
External ID	4602533	Length (m)	8
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	661172	Resemble Channel	No
Northing	5524451	Backwatered	No
Stream	Grave Creek	Percent Backwatered	NA
Road	NA	Fill Depth (m)	0.35
Road Tenure	unclassified	Outlet Drop (m)	0
Channel Width (m)	0.1	Outlet Pool Depth (m)	0
Stream Slope (%)	1	Inlet Drop	No
Beaver Activity	No	Slope (%)	4
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Stream dry at time of survey, channel not visible for about 40 downstream. Water and channel appear about 65m downstream of crossing. Upstream side of crossing inlet not visible, covered by road fill or deep organic debris. Channel upstream non-existent and dry. This system (labelled as Grave creek on the map) must be a side channel or remnant channel.
Photos:
4602533![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-23	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.6
External ID	4603265	Length (m)	13
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	640287	Resemble Channel	No
Northing	5481650	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Railway	Fill Depth (m)	3
Road Tenure	Canadian Pacific	Outlet Drop (m)	0
Channel Width (m)	0.5	Outlet Pool Depth (m)	0
Stream Slope (%)	0	Inlet Drop	No
Beaver Activity	No	Slope (%)	0.5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Dry vegetated channel. Not likely fish habitat.
Photos:
4603265![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-23	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	1.2
External ID	4603291	Length (m)	13
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	640891	Resemble Channel	No
Northing	5480517	Backwatered	No
Stream	Cokato Creek	Percent Backwatered	NA
Road	Cokato Road	Fill Depth (m)	0.5
Road Tenure	MoTi local	Outlet Drop (m)	0
Channel Width (m)	4.5	Outlet Pool Depth (m)	0
Stream Slope (%)	4	Inlet Drop	No
Beaver Activity	No	Slope (%)	4
Habitat Value	Low	Valley Fill	Deep Fill

Comments: 3 large barrels (all 1.2m), very perched 0.7-1.3m above substrate. Stream dry at time of survey. Debris rack on upstream side of culvert. Note there is a slope change at the inlet of structure, much steeper short section possibly from damage.
Photos:
4603291![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/r

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-18	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.8
External ID	4604198	Length (m)	9
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	647819	Resemble Channel	No
Northing	5498551	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Hadner FSR	Fill Depth (m)	1
Road Tenure	FLNR 6946	Outlet Drop (m)	0.6
Channel Width (m)	2.9	Outlet Pool Depth (m)	0.3
Stream Slope (%)	19	Inlet Drop	Yes
Beaver Activity	No	Slope (%)	6
Habitat Value	Medium	Valley Fill	Deep Fill

Comments: Steep stream with good flow. FISS sample site 2593 near crossing location. Suspect too steep to be fish bearing.
Photos:
4604198![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/r

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-24	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.9
External ID	4604455	Length (m)	16
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	638669	Resemble Channel	No
Northing	5480601	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Fernie ski hill	Fill Depth (m)	2
Road Tenure	unclassified	Outlet Drop (m)	0.15
Channel Width (m)	1.5	Outlet Pool Depth (m)	0.2
Stream Slope (%)	9	Inlet Drop	Yes
Beaver Activity	No	Slope (%)	7
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Inlet drop about .40m, significant and looks like
increased barrier. Crossing is Fernie ski hill gravel road.
urrently high and turbid due to heavy rain.
Photos:
4604455![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-16	Crossing Sub Type	Pipe Arch
PSCIS ID	NA	Diameter (m)	2.5
External ID	4605636	Length (m)	14
Crew	KP, AI	Embedded	NA
UTM Zone	11	Depth Embedded (m)	NA
Easting	644148	Resemble Channel	NA
Northing	5564425	Backwatered	NA
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Elk River FSR	Fill Depth (m)	NA
Road Tenure	FLNR 0103	Outlet Drop (m)	NA
Channel Width (m)	NA	Outlet Pool Depth (m)	NA
Stream Slope (%)	NA	Inlet Drop	NA
Beaver Activity	No	Slope (%)	NA
Habitat Value	NA	Valley Fill	NA

Comments: Appears passable.
Photos:
4605636![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-16	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.9
External ID	4605649	Length (m)	17
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	645873	Resemble Channel	No
Northing	5556758	Backwatered	Yes
Stream	Tributary to Elk River	Percent Backwatered	100
Road	Elk River FSR	Fill Depth (m)	1.5
Road Tenure	FLNR 0103	Outlet Drop (m)	0
Channel Width (m)	1	Outlet Pool Depth (m)	0.6
Stream Slope (%)	2.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	0.5
Habitat Value	Medium	Valley Fill	Deep Fill

Comments: Low, slow flow. Culvert completely backwatered.
Photos:
4605649![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-16	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.9
External ID	4605653	Length (m)	11
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	644666	Resemble Channel	No
Northing	5564940	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Elk River FSR	Fill Depth (m)	0.4
Road Tenure	FLNR 0103	Outlet Drop (m)	0
Channel Width (m)	2.5	Outlet Pool Depth (m)	0.2
Stream Slope (%)	2	Inlet Drop	No
Beaver Activity	No	Slope (%)	3.2
Habitat Value	Medium	Valley Fill	Deep Fill

Comments: Good habitat, habitat assessment (FHAP) conducted in 2016 (Masse Environmental Consultants Ltd.) for proposed coal mine EA (Bingay). Electrofished U/S and D/S, see provincial records and data submission file at http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=52717 . Culvert does not appear to be barrier to any species at any life stage at time of survey. Could be barrier to small fish at high flows. EB and WCT recrded upstream.
Photos:
4605653![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-16	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.6
External ID	4605675	Length (m)	10
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	645225	Resemble Channel	No
Northing	5567096	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Elk River FSR	Fill Depth (m)	0.5
Road Tenure	NA	Outlet Drop (m)	0
Channel Width (m)	2	Outlet Pool Depth (m)	0.05
Stream Slope (%)	0.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	2.5
Habitat Value	Medium	Valley Fill	Deep Fill

Comments: Culvert slope estimate. Stream dredged upstream to remove sediments. Flows are slow through culvert and unlikely barrier for fry/parr for much of year. Crossing 4606244 is on deactivated spur upstream so very likely a ford, about 300m upstream same thing for 4604099.

Photos:
4605675![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-16	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	1.5
External ID	4605697	Length (m)	2
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	648722	Resemble Channel	No
Northing	5548198	Backwatered	No
Stream	Crossing Creek	Percent Backwatered	NA
Road	Elk River FSR	Fill Depth (m)	1
Road Tenure	FLNR 0103	Outlet Drop (m)	0
Channel Width (m)	2.5	Outlet Pool Depth (m)	0
Stream Slope (%)	3.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Dry channel at time of survey, channel transitions to grass flats about 60 meters downstream.

Photos:
4605697![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-16	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.35
External ID	4605705	Length (m)	15
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	643733	Resemble Channel	No
Northing	5560586	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Elk River FSR	Fill Depth (m)	1.2
Road Tenure	Unknown	Outlet Drop (m)	2.15
Channel Width (m)	1	Outlet Pool Depth (m)	0.4
Stream Slope (%)	0.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	2.5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Stream not located where mapped. Unlikely fish bearing.
Flows into forest floor downstream of culvert.
Photos:
4605705![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-16	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.6
External ID	4605707	Length (m)	11
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	643981	Resemble Channel	No
Northing	5561132	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Elk River FSR	Fill Depth (m)	0.4
Road Tenure	FLNR 0103	Outlet Drop (m)	0
Channel Width (m)	2.3	Outlet Pool Depth (m)	0
Stream Slope (%)	1	Inlet Drop	No
Beaver Activity	No	Slope (%)	1.5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Stream dry at time of survey. Vegetated channel, loaded
with sediment. Inlet of culvert damaged, partly bent. Inlet and
outlet area dredged. Not likely fish habitat.
Photos:
4605707![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-16	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.6
External ID	4605708	Length (m)	10
Crew	AI, KP	Embedded	Yes
UTM Zone	11	Depth Embedded (m)	0.1
Easting	643611	Resemble Channel	Yes
Northing	5559835	Backwatered	No
Stream	Tributary to Lowe Creek	Percent Backwatered	NA
Road	Elk River FSR	Fill Depth (m)	0.5
Road Tenure	FLNR 0103	Outlet Drop (m)	0
Channel Width (m)	1.1	Outlet Pool Depth (m)	0
Stream Slope (%)	3.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	1.5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Channelized downstream due to dredging for about 30m.
Small stream, substrate primarily fines but some gravel present.
Photos:
4605708![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-16	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	1.5
External ID	4605732	Length (m)	49
Crew	KP, AI	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	646735	Resemble Channel	No
Northing	5554534	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Elk River FSR	Fill Depth (m)	8
Road Tenure	FLNR 0103	Outlet Drop (m)	1.48
Channel Width (m)	3.5	Outlet Pool Depth (m)	1.3
Stream Slope (%)	1.5	Inlet Drop	Yes
Beaver Activity	No	Slope (%)	3.5
Habitat Value	High	Valley Fill	Deep Fill

Comments: Large perched culvert. High value habitat. Habitat
confirmation and sampling conducted.
Photos:
4605732![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-16	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	1.2
External ID	4605733	Length (m)	10
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	647191	Resemble Channel	No
Northing	5552693	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Elk River FSR	Fill Depth (m)	1
Road Tenure	FLNR 0103	Outlet Drop (m)	0.3
Channel Width (m)	3.1	Outlet Pool Depth (m)	0.6
Stream Slope (%)	2	Inlet Drop	No
Beaver Activity	No	Slope (%)	1
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Freshly dredged. Dry, Dredging may extend well down channel. See photo from about 130m downstream.

Photos:

4605733![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/r

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-16	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	1.5
External ID	4605742	Length (m)	15
Crew	KP, AI	Embedded	Yes
UTM Zone	11	Depth Embedded (m)	0.12
Easting	643578	Resemble Channel	Yes
Northing	5560087	Backwatered	No
Stream	Lowe Creek	Percent Backwatered	NA
Road	Elk River FSR	Fill Depth (m)	0.3
Road Tenure	FLNR 0103	Outlet Drop (m)	0
Channel Width (m)	2.5	Outlet Pool Depth (m)	0.2
Stream Slope (%)	3.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	1.5
Habitat Value	High	Valley Fill	Deep Fill

Comments: Upstream past dredging natural channel 2.5m wide. Downstream below dredging extremely braided, original channel difficult to track. Channel widths >10m at times with substrate on top of banks and in bases of trees. Channel dredged upstream and downstream approximately 75m on each. Habitat assessment (FHAP) conducted in 2016 (Masse Environmental Consultants Ltd.) for proposed coal mine EA (Bingay). Electrofished D/S, see provincial records and data submission file at http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=52717 .

Photos:
4605742![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-16	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.4
External ID	4606669	Length (m)	10
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	646462	Resemble Channel	No
Northing	5554360	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Spur from Elk River FSR	Fill Depth (m)	1
Road Tenure	Canfor R08473	Outlet Drop (m)	0
Channel Width (m)	1	Outlet Pool Depth (m)	0
Stream Slope (%)	0.5	Inlet Drop	No
Beaver Activity	No	Slope (%)	2
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Plan in place to deactivate entire network here (personal communication with local machinery operator). Dry, vegetated channel. Likely non-fish bearing.
Photos:
4606669![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-23	Crossing Sub Type	Concrete Box
PSCIS ID	NA	Diameter (m)	1.2
External ID	4606807	Length (m)	9
Crew	KP, AI	Embedded	Yes
UTM Zone	11	Depth Embedded (m)	0.09
Easting	639952	Resemble Channel	No
Northing	5483636	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Railway	Fill Depth (m)	6
Road Tenure	Canadian Pacific	Outlet Drop (m)	0
Channel Width (m)	1.5	Outlet Pool Depth (m)	0
Stream Slope (%)	30	Inlet Drop	No
Beaver Activity	No	Slope (%)	1.5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Concrete arch, >30% downstream of culvert for 10m likely from railway fill. Dry downstream with stagnant pools upstream.
Photos:
4606807![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/m

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-16	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.4
External ID	4606835	Length (m)	10
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	644829	Resemble Channel	No
Northing	5559116	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Spur from Elk River FSR	Fill Depth (m)	1
Road Tenure	Canfor R08370	Outlet Drop (m)	0.3
Channel Width (m)	1	Outlet Pool Depth (m)	0
Stream Slope (%)	3	Inlet Drop	No
Beaver Activity	No	Slope (%)	2.5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Road is deactivated downstream so no crossings below (4607172, 4606929). Dry vegetated channel. Not likely fish bearing at this location.

Photos: 4606835![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-18	Crossing Sub Type	Bridge
PSCIS ID	NA	Diameter (m)	4
External ID	4607023	Length (m)	18
Crew	AI, KP	Embedded	NA
UTM Zone	11	Depth Embedded (m)	NA
Easting	648041	Resemble Channel	NA
Northing	5499983	Backwatered	NA
Stream	McCool Creek	Percent Backwatered	NA
Road	NA	Fill Depth (m)	NA
Road Tenure	Canfor R08477	Outlet Drop (m)	NA
Channel Width (m)	NA	Outlet Pool Depth (m)	NA
Stream Slope (%)	NA	Inlet Drop	NA
Beaver Activity	No	Slope (%)	NA
Habitat Value	NA	Valley Fill	NA

Comments: Bridge.

Photos: 4607023![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/data/

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-18	Crossing Sub Type	Bridge
PSCIS ID	NA	Diameter (m)	4
External ID	2020091801	Length (m)	18
Crew	AI, KP	Embedded	NA
UTM Zone	11	Depth Embedded (m)	NA
Easting	648381	Resemble Channel	NA
Northing	5499536	Backwatered	NA
Stream	McCool Creek	Percent Backwatered	NA
Road	Hadner FSR	Fill Depth (m)	NA
Road Tenure	FLNR 6946	Outlet Drop (m)	NA
Channel Width (m)	NA	Outlet Pool Depth (m)	NA
Stream Slope (%)	NA	Inlet Drop	NA
Beaver Activity	No	Slope (%)	NA
Habitat Value	NA	Valley Fill	NA

Comments: Bridge.
Photos:
2020091801![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/ra

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-22	Crossing Sub Type	Bridge
PSCIS ID	NA	Diameter (m)	1.2
External ID	2020092201	Length (m)	12
Crew	AI, KP	Embedded	NA
UTM Zone	11	Depth Embedded (m)	NA
Easting	634969	Resemble Channel	NA
Northing	5484828	Backwatered	NA
Stream	Tributary to Lizard Creek	Percent Backwatered	NA
Road	Lazy Lizard Lower	Fill Depth (m)	NA
Road Tenure	Unknown	Outlet Drop (m)	NA
Channel Width (m)	NA	Outlet Pool Depth (m)	NA
Stream Slope (%)	NA	Inlet Drop	NA
Beaver Activity	No	Slope (%)	NA
Habitat Value	NA	Valley Fill	NA

Comments: Bike trail.
Photos:
2020092201![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/ra

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-23	Crossing Sub Type	Bridge
PSCIS ID	NA	Diameter (m)	1.2
External ID	2020092301	Length (m)	8
Crew	AI, KP	Embedded	NA
UTM Zone	11	Depth Embedded (m)	NA
Easting	636474	Resemble Channel	NA
Northing	5483873	Backwatered	NA
Stream	Tributary to Lizard Creek	Percent Backwatered	NA
Road	Trail	Fill Depth (m)	NA
Road Tenure	Unknown	Outlet Drop (m)	NA
Channel Width (m)	NA	Outlet Pool Depth (m)	NA
Stream Slope (%)	NA	Inlet Drop	NA
Beaver Activity	No	Slope (%)	NA
Habitat Value	NA	Valley Fill	NA

Comments: Trail. Stream has been diverted to beside the road.
Photos:
2020092301![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/da

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-23	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.6
External ID	2020092302	Length (m)	14
Crew	AI, KP	Embedded	Yes
UTM Zone	11	Depth Embedded (m)	0.03
Easting	640218	Resemble Channel	Yes
Northing	5481065	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Hill Road	Fill Depth (m)	1.2
Road Tenure	Unknown	Outlet Drop (m)	0
Channel Width (m)	1.5	Outlet Pool Depth (m)	0
Stream Slope (%)	0	Inlet Drop	No
Beaver Activity	No	Slope (%)	0.5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Dry vegetated channel. Not likely fish habitat.
Photos:
2020092302![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/raw/master/da

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-23	Crossing Sub Type	Round Culvert
PSCIS ID	NA	Diameter (m)	0.6
External ID	2020092303	Length (m)	15
Crew	AI, KP	Embedded	No
UTM Zone	11	Depth Embedded (m)	NA
Easting	640227	Resemble Channel	No
Northing	5481028	Backwatered	No
Stream	Tributary to Elk River	Percent Backwatered	NA
Road	Driveway	Fill Depth (m)	1
Road Tenure	Unknown	Outlet Drop (m)	0
Channel Width (m)	1.5	Outlet Pool Depth (m)	0
Stream Slope (%)	2	Inlet Drop	No
Beaver Activity	No	Slope (%)	0.5
Habitat Value	Low	Valley Fill	Deep Fill

Comments: Dry, mostly vegetated channel. Not likely fish habitat.
Two pipes, one buried by fill. Inlet elevated resulting in small
are of wetland vegetation upstream.
Photos:
2020092303![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/ra

Location and Stream Data	-	Crossing Characteristics	–
Date	2020-09-23	Crossing Sub Type	Bridge
PSCIS ID	NA	Diameter (m)	1.2
External ID	2020092310	Length (m)	14
Crew	KP, AI	Embedded	NA
UTM Zone	11	Depth Embedded (m)	NA
Easting	636029	Resemble Channel	NA
Northing	5484419	Backwatered	NA
Stream	Tributary to Lizard Creek	Percent Backwatered	NA
Road	Lazy Lizard Lower	Fill Depth (m)	NA
Road Tenure	Unknown	Outlet Drop (m)	NA
Channel Width (m)	NA	Outlet Pool Depth (m)	NA
Stream Slope (%)	NA	Inlet Drop	NA
Beaver Activity	No	Slope (%)	NA
Habitat Value	NA	Valley Fill	NA

Comments: Nice wooden pedestrian/bike bridge for recreational use.
Photos:
2020092310![](https://github.com/NewGraphEnvironment/fish_passage_elk_2020_reporting_cwf/ra

Appendix - Crossing 50155

Island Lake Lodge Road - Tributary to Lizard Creek

Site Location

Crossing 50155 is located on a tributary to Lizard Creek, approximately 75m upstream from the confluence with Lizard Creek. The stream is located approximately 100m east of the location where it is mapped on the freshwater atlas stream layer. Island Lake Lodge Road is an extension of Mt.Fernie Park Road with access to Highway 3 located within Fernie city limits. The are is a popular recreational destination for hikers and mountain bikers. Island Lake Lodge is a year round tourist destination providing accomodations, guided hiking and backcountry catskiing for clients.

Background

At the crossing location, the stream is 2nd order with a watershed area upstream of the road of approximately 1.8km^2. The elevation of the watershed ranges from a maximum of 1945m to 1080m at the culvert. One 12m long bridge (PSCIS 197543) is located upstream of the subject crossing approximately 575m on the Lazy Lizard bike trail and another 7m long bridge structure is located downstream also on a recreational trail. A search of provincial records yielded no fisheries information for the stream (MoE, 2020b). Downstream, Lizard Creek supports westslope cutthroat trout, bull trout, mountain whitefish, brook trout, longnose sucker and longnose dace (MoE, 2020a).

PSCIS stream crossing 50155 was ranked as a high priority for follow up with habitat confirmation due to the large size of the stream relative to other tributary streams in the watershed, the previously rated high value habitat and because it was prioritized for follow up by VAST Resource Solutions Inc. (2013). The habitat confirmation was completed on September 22, 2020. A map of the watershed including areas surveyed is provided in Attachment 1 – Map 082G.113.

Stream Characteristics at Crossing

At the time of the survey, the un-embedded and non-backwatered 0.9m diameter crossing was considered a barrier to upstream fish passage with a pipe length of 11m, a culvert slope of 2.6%, a stream width ratio of 2.5 an outlet drop of 0.22m (Table **??**. Water temperature was 9°C, pH was 7.7 and conductivity was 480uS/cm.

Stream Characteristics Downstream

The stream was surveyed downstream from the culvert for 100m to Lizard Creek. Overall, total cover amount was rated as moderate with undercut banks dominant. Cover was also present as small woody debris, large woody debris, and overhanging vegetation (Figures **??**). The average channel width was 2.2m, the average wetted width was 1.9m and the average gradient was 4.3%. Habitat value was rated as medium with good potential for fry/juvenile salmonid rearing but a lack of deep pools for adult overwintering and rearing.

Stream Characteristics Upstream

The stream was surveyed upstream from the culvert for 700m. Overall, total cover amount was rated as abundant with deep pools dominant. Cover was also present as small woody debris, large woody debris, boulders, undercut banks, and overhanging vegetation (Figure 5.2). The average channel width was 2.2m, the average wetted width was 1.6m and the average gradient was 10.5%. There were frequent areas of gravels suitable for resident westslope cutthrout trout spawning. Frequent pools to 40cm deep were present and associated with small and large woody debris. Habitat value was rated as high for fry and juvenile westslope cutthrout rearing.

Fish Sampling

To assess potential impacts of the culvert on fish densities in the stream we electrofished upstream and downstream of the crossing. Three sites were sampled upstream and one site was sampled downstream. A total of 42 westslope cutthrout trout and 4 eastern brook trout were captured upstream with 28 westslope cutthrout trout and 2 eastern brook trout captured downstream. Raw results are included in digital format as Attachment 2 and summarized in Tables 5.1 - 5.2 and Figure 5.1.

Table 5.1: Electrofishing sites for PSCIS crossing 50155.

Site	Location	Width (m)	Length (m)	Area (m2)	Effort (s)	Effort (s/m2)
19	Downstream	1.7	40	68	200	2.9
18	Upstream	1.6	25	40	117	2.9
33	Upstream	1.6	13	21	61	2.9
34	Upstream	1.6	45	72	154	2.1

Table 5.2: Westslope cuthrout trout densities (fish/100m2) for PSCIS crossing 50155.

Site	Location	Fry	Parr	Juvenile	Adult
19	Downstream	35.3	4.4	-	1.5
18	Upstream	15	12.5	-	-
33	Upstream	23.8	9.5	9.5	-
34	Upstream	23.6	5.6	-	1.4

Conclusion

There is an estimated NAkm of mainstem habitat upstream of crossing 50155 with habitat in the areas surveyed upstream of the crossing rated as high value for fry and juvenile salmonid rearing. Although it could be partially attributed to the lower gradient habitat downstream and the proximity to the Lizard Creek mainstem, fish sampling results indicated that the crossing is potentially negatively impacting habitat capacity upstream of the crossing as higher densities of westslope cutthrout trout were captured downstream of the crossing than above. It is unclear whether the road is part of the Island Lake Recreational tenure or solely the responsiblity of the Ministry of Forests, Lands, Natural Resource Operations & Rural Development. The crossing was ranked as a moderate priority for proceeding to design for an open bottomed replacement structure.

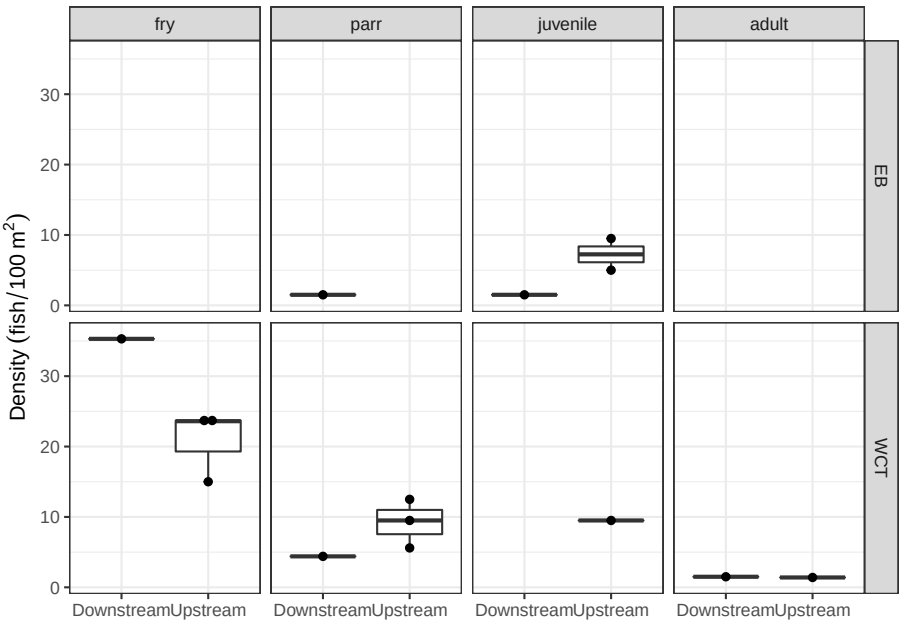


Figure 5.1: Fish densities (fish/100m2) for PSCIS crossing 50155.

Figure 5.2: Typical habitat upstream of PSCIS crossing 50155.

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