

Al Irvine
New Graph Environment
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250-777-1518
Date: 2021-09-28

Safety Plan - 2021-041-nupqu-elk-fish-passage

The latest version of this pdf can be downloaded [here](#).

A zip file which includes kml (google earth) and gpx (garmin) files of the sites to be potentially assessed can be downloaded [here](#). Georeferenced pdf maps can be accessed and downloaded [here](#).

Accommodations

Al - Unit 415 - 1500 McDonald Avenue Fernie, BC - Contact - Mark
399hffib4khcd4ild7h41rgv6si@reply.airbnb.com

Kyle - Unit 210 - 1500 McDonald Avenue Fernie, BC. - Contact Nick
399hffibatpkclqtlfpc1yyc8zu@reply.airbnb.com

project_number	project_name
2021-041	nupqu-elk-fish-passage

Table 1: Crew members details and emergency contacts

name	email	phone	satellite	emerg_name	emerg_email	emerg_phone
Al Irvine	al@newgraphenvironment.com	250-777-1518	allanirvine75@inreach.garmin.com	Tara Stark	tara.stark@gmail.com	250-505-9854
Kyle Prince	kyle@livinglakescanada.ca	403-308-9702	Prince11@inreach.garmin.com	Jocelyn Bouchard	jjbouchard9@gmail.com	403-813-6590

Equipment Checklists

Personal Equipment Checklist	•
GPS	Ski poles
Sunscreen	water
Bugspray	food
Polarized glasses	gloves work
Bear Spray	glasses safety
phone/camera	headlamp
battery pack booster for phone	clinometer
Hat	field vest
first aid kit personal	note book
Waders	Extra clothes
Boots	rain gear

Crew Equipment Checklist	•
Hand saw	Measuring board
Linesman Gloves x 3	Scale
Backroads Mapbook	Permits
Locational maps	Fish ID book
Background Documents	Site Cards / Field Guide
radio road	Minnow Traps
Inreach	Catfood
Field Safety Plan	Flagging
first aid kit level 1	Laptop w/basecamp
First Aid binder stocked	GPS cable
Throw bags	Lazer level
polaski	Assessment cards fish passage
shovel	UAV
fire extinguisher backpack	Flow meter
fire extinguisher pressurized	ATV
Battery booster	bucket rigid x 2

Compressor 12V	bucket foldable
Rubber boots (no-slip soles)	clove oil kit w/ instructions
Oakton Multimeter	gloves leather
Backpack Electrofisher	sharpies
stop nets x 4	hand lens
salt blocks	ATV gas
loose salt	ATV lock
dip nets x 2	UAV battery charger
tape measure hand	wader disinfectant kit
tape measure eslon	GPS batteries
pilon x 2	ATV helmets

Nearest Hospitals



Elk Valley Hospital - 1501 5 Ave, Fernie, BC V0B 1M0 - 250-423-4453



Elkford Health Centre - Interior Health Authority - 212 Alpine Way, Elkford, BC V0B 1H0 - 250-865-2247

Field Plan

Field work methods will result in products feeding reporting formats such as the [2020 deliverables](#) and will generally follow procedures in:

- [fish passage assessments](#) (MoE 2011)
- [habitat confirmations](#) (Fish Passage Technical Working Group 2011).

Presence/absence of fish, species composition/density and distribution limits can be useful for prioritizing which crossings are a best fit for fish passage restoration and help inform follow up

monitoring so electrofishing and minnowtrapping may be conducted. Standard Fish and Fish Habitat Inventory Standard Field Form [site cards](#) are used to gather habitat data.

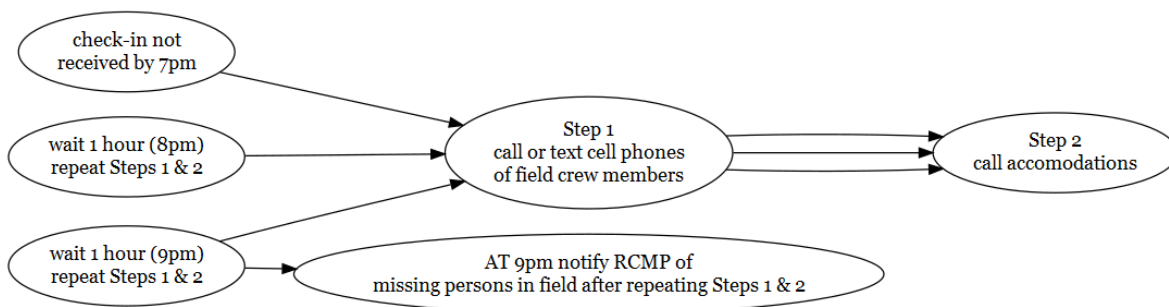
A summary of sites to be potentially assessed is included as Table [2](#) and an overview map of displaying potential sample locations is included as Figure 1.

Check In Procedures

Call, text or inreach Tara Stark (2505059854) each morning to share the plan for the day (i.e. name of roads and sites). Check in time is before 7 pm each evening although we regularly check in throughout the day (ex. at arrival to site, 1pm and 4pm) on the inreach or by text and report position/provide updates.

Procedures for Failed Check-In - for Check in person

Procedures are summarized in the following Figure. If phone call or inReach check-in is not received by 7pm send text to inreach units, call or text cell phones of field crew members. If no response please call accommodations then personal emergency contacts to see if they have heard anything. Wait 1 hour and text inreach, text or call cell phones and personal emergency contacts and accomodations again. Repeat after 2 hours (9 pm) - if no response then notify the RCMP of a missing persons in field.



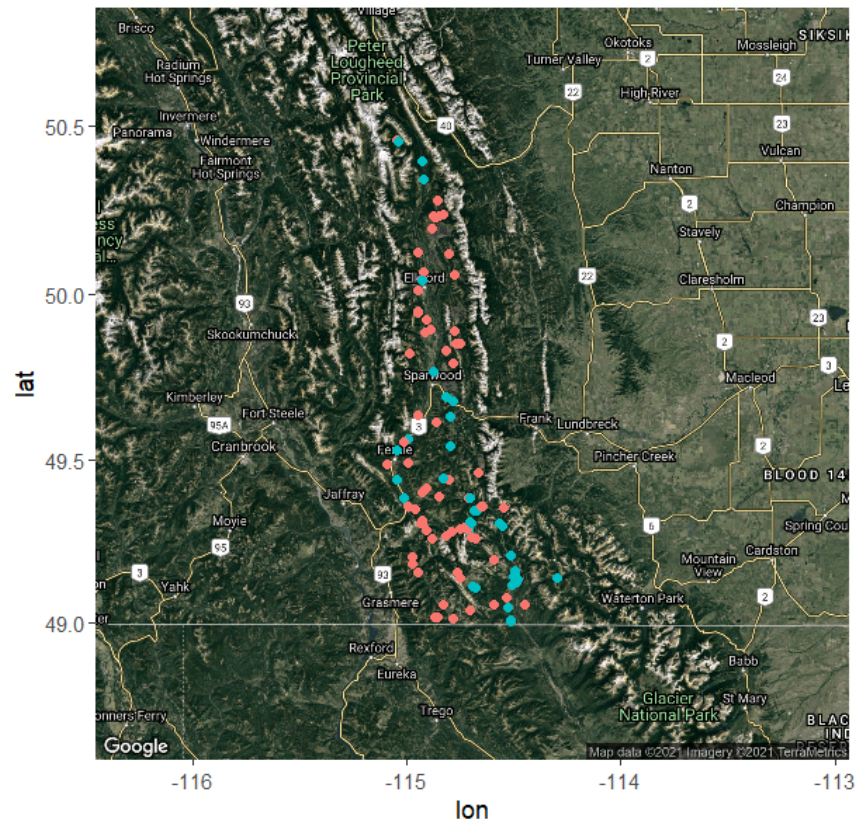


Figure 1. Map of potential sampling areas. High priority sites in red and moderate priority in green.

Table 2: CWF - Potential sample locations.

id_xing	Stream	east	north	source	id_map	comments	sp_upstr
61504	Coal Creek	645312.9	5483687	cwf	082G.113	Bridge	{BT,CT,CT/RB,WCT}
197527	Crossing Creek	648724.3	5548196	cwf	082J.103	Dry last year. Lots of survey sites and no fish. Not likely of any value!	{EB}
1004600533	Chauncey Creek	656890.0	5554160	cwf	082J.103	Ford	{WCT}
1004600762	Fording River	651282.0	5562574	cwf	082J.103	Recently replaced multiplate?	{WCT}
1004601280	Harmer Trib	659427.0	5517583	cwf	082G.119	Ford (likely)	{WCT}
1004601704	Morrissey Creek	650166.0	5473852	cwf	082G.108	Ford	—
1004601984	Lodgepole trib	654301.7	5458678	cwf	082G.108	Could be a decent candidate if not dry	—
1004601993	Rabbit Creek	656655.0	5431721	cwf	082G.103	Ford (likely)	—
1004601995	Rabbit Creek	655890.2	5431860	cwf	082G.103	Ford (likely)	—
1004602163	Morrissey Creek	651609.1	5475661	cwf	082G.113	Above a huge falls	—
1004602359	Rabbit Creek	655618.0	5431721	cwf	082G.103	Ford (likely)	—
1004602514	Harmer Creek	659393.0	5517830	cwf	082G.119	Doubt there is a crossing. Dams ~500m upstream	{WCT}
1004602646	Wigwam trib	647364.0	5452095	cwf	082G.108	Looks like a tiny stream and suspect road is removed since the bridge across the Wigwam is not there	—
1004602949	Weigert Creek	647247.0	5534524	cwf	082G.123	Deactivated (could confirm with FLNR)	—
1004603334	Fording River	651460.9	5566706	cwf	082J.108	Ford - in the middle of the mines	{WCT}
1004603413	Henretta Creek	654825.0	5567436	cwf	082J.108	Ford - walk in	{WCT}
1004603432	Cadoma trib	639196.0	5591178	cwf	082J.113	Ford (likely). Elk Lakes Park. Waaay in there.	—
1004603480	Bean Creek	650539.0	5464640	cwf	082G.108	Bridge	—
1004603553	Bighorn Creek	663230.0	5447429	cwf	082G.104	Ford.	{DV}
1004603791	Lodgepole Trib	660586.0	5461227	cwf	082G.109	Ford (likely). Road appears overgrown.	{WCT}
1004603793	Lodgepole Creek	663619.0	5462235	cwf	082G.109	Ford (likely). Road appears overgrown.	{WCT}
1004604677	Henretta Creek	652123.3	5566424	cwf	082J.108	Fording mine. Massive looking structure.	{WCT}
1004604696	Henretta Creek	652346.1	5566461	cwf	082J.108	Ford. Stream is not mapped	

correctly. Not there. {WCT}

1004605216	Wigwam trib	647730.0	5449516	cwf	082G.103	Keen to check this out.	—
1004605338	Wigwam trib	658388.0	5436172	cwf	082G.103	Max 360m to steep gradients	—
1004605499	Bean trib	650057.1	5463543	cwf	082G.108	Keen	—
1004605937	Wigwam trib	662247.0	5431294	cwf	082G.104	Keen	—
1004606007	Weigert Creek	647156.3	5534676	cwf	082G.123	Removed (could confirm with FLNR)	—
1004606129	Wigwam trib	649481.2	5446732	cwf	082G.103	Keen. Drains snowshoe Lake	{BT,CT,RB,WCT}
1004606284	Fording River	652990.0	5571951	cwf	082J.108	Ford (likely). Need permission?	—
1004606347	Bean Creek	650414.6	5463819	cwf	082G.108	Keen	—
1004606370	Lodgepole Creek	664905.1	5462562	cwf	082G.109	Keen	{WCT}
1004606398	Lodgepole Creek	665796.1	5462152	cwf	082G.109	Keen	—
1004606411	Lodgepole Trib	658765.0	5459547	cwf	082G.108	Ford (likely).	{WCT}
1004606545	Cummings Creek	644862.0	5520738	cwf	082G.123	Keen. Need quad?	—
1004606926	Bighorn Creek	664112.2	5445241	cwf	082G.104	Keen	—
1004607022	McCool Creek	648168.1	5499879	cwf	082G.118	Ford (likely)	{WCT}
1004607449	Ewin Trib	659283.9	5547544	cwf	082J.104	Ford (likely)	—
1024706614	Henretta Creek	653180.2	5566732	cwf	082J.108	Ford	{WCT}
1024733953	Lodgepole Trib	652220.8	5461435	cwf	082G.108	Bridge	—
1024734790	Brûlé Creek	649910.2	5528007	cwf	082G.123	Ford (likely)	{RB,WCT}
1024735049	Weigert Creek	650009.9	5531958	cwf	082G.123	Ford (assessed last year)	—
1024735443	Abruzzi Creek	638867.1	5591423	cwf	082J.113	Ford (likely). Elk Lakes Park. Waaay in there.	{WCT}
1100001086	Harmer Creek	657050.7	5522119	cwf	082G.123	Harmer Creek Dam. Elkview operations.	{WCT}
1100002606	Boivin Creek	647275.1	5541987	cwf	082J.103	Dam. Elkford water intake?	—

Table 3: 2020_field_planning - Potential sample locations.

id_xing	Stream	east	north	source	id_map	comments	sp_upstr
50060	Harvey Creek	666579.3	5461445	2020_planning	082G.109	Harvey Lake is 1ha lake upstream ~230m upstream of the crossing.	—
50061	Fuel Creek	667651.2	5459223	2020_planning	082G.109	Large stream but dry during assessment. WCT known	

upstream and wetted at 50151

{WCT}

(ford) located 600m upstream.

50063	Kisoo Creek	668960.5	5458806	2020_planning	082G.109	Relatively large channel width. Good flow and hab value rated high.	–
50072	–	682784.9	5447731	2020_planning	082G.104	Small stream with good flow in photos. Assessment comments indicate good gravels. Very close to the mainstem of the Flathead.	–
50073	–	682180.0	5446356	2020_planning	082G.104	Fairly steep. comments indicate "WCT found upstream by Artech in 1995 according to Habitat Wizard"	–
50075	–	683797.4	5445297	2020_planning	082G.104	Smaller stream.	–
50081	–	681879.8	5443723	2020_planning	082G.104	Large stream. Potential barrier.	–
50084	–	680147.4	5439436	2020_planning	082G.104	Fish observed at outlet. Falls in FISS just downstream. Culvert appears passable to all life stages/species at time of survey but may be velocity barrier at higher flows.	–
50085	–	680488.4	5435930	2020_planning	082G.104	Larger channel width habitat rated as high value.	–
50086	–	680428.7	5435744	2020_planning	082G.104	Appears passable at most flows. Rocky mountain sculpin nearby and their swim speeds could be a consideration.	–
50090	–	681743.0	5430951	2020_planning	082G.104	If this is the mainstem, habitat upstream at bridge appears mod to high value.	–
50091	–	681610.6	5431531	2020_planning	082G.104	Good flow in photos. Smaller channel width. Not on mapped stream location	–
50100	–	669510.1	5442206	2020_planning	082G.104	Larger stream but fairly steep with relatively low habitat gain potential.	–
50101	–	669469.8	5442312	2020_planning	082G.104	Larger stream with good flow. Gradients model as >15 downstream so naturally occurring barriers are fairly likely.	–

50102	–	668217.8	5442479	2020_planning	082G.104	Good flow but very steep then extremely steep upstream.	–
50152	–	638002.9	5483401	2020_field	082G.113	–	–
50181	–	648276.6	5468171	2020_field	082G.108	–	–
50185	–	645679.3	5469020	2020_field	082G.108	–	–
50240	–	659199.0	5499658	2020_planning	082G.119	Comments indicate partially embedded and backwatered. Other comments indicate good candidate for bridge.	–
50261	–	669029.6	5481120	2020_field	082G.114	–	–
50273	Robert Creek	657671.1	5506277	2020_planning	082G.118	Dry channel. Small stream.	–
62120	–	676693.1	5464482	2020_planning	082G.109	Small potential habitat gain but assessment comments indicate good rearing habitat and good potential fix candidate.	–
62265	–	647692.6	5578674	2020_planning	082J.108	Splits upstream and gets very steep. Grainger indicates "Good potential for fix. Rearing habitat upstream."	–
62423	Grave Creek	660493.7	5524263	2020_field	082G.124	–	{RB,WCT}
62425	Grave Creek	661478.0	5524388	2020_field	082G.124	–	{WCT}
62426	Grave Creek	661662.7	5524440	2020_field	082G.124	–	{WCT}
197533	Brûlé Creek	651625.5	5528887	2020_field	082G.123	–	{BT,DV,RB,WCT}
197534	Weigert Creek	650147.8	5532049	2020_field	082G.123	–	–
197542	Hartley Creek	643536.7	5490723	2020_field	082G.113	–	{DV,EB,WCT}
197555	–	646737.2	5554528	2020_field	082J.103	–	–
197559	Brûlé Creek	651512.4	5528837	2020_field	082G.123	–	{RB,WCT}
1004600156	–	641368.8	5487802	2020_planning	082G.113	Industrial area with stream splitting 3 ways just upstream.	{EB,LSU,SP,WCT}
1004600264	–	666528.9	5472653	2020_planning	082G.109	WCT upstream with modelled low gradient habitat. Smaller watershed though.	{WCT}
1004600267	–	666187.7	5472563	2020_planning	082G.109	Mottled Sculpin upstream.	{BT,CBA}
1004600621	Quail Creek	645057.0	5492118	2020_planning	082G.113	Private agricultural land. Very low gradient so suspect passable at most flows.	–
1004601149	–	659817.1	5528849	2020_planning	082G.124	WCT upstream.	{WCT}

1004601582	–	641508.0	5477910	2020_planning	082G.113	Stream splits with numerous crossings upstream.	–
1004601687	–	670843.0	5469802	2020_planning	082G.109	Large amount of lower grade habitat modelled upstream. Survey site from Kokanee 2001 (http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=29) upstream 600m.	–
1004602098	–	657221.1	5479085	2020_planning	082G.113	Crossing appears to be likely located 40m to north-east. Interior Reforestation sample site just upstream. No ecocat report link.	–
1004602218	–	654343.0	5497892	2020_planning	082G.118	Large amount of potential habitat but suspect deactivated road. Review before surveying.	{WCT}
1004602564	–	667163.0	5464077	2020_planning	082G.109	Steeper habitat upstream.	–
1004602620	–	680897.0	5453543	2020_planning	082G.109	Kokanee 2001 (http://a100.gov.bc.ca/pub/acat/public/viewReport.do?reportId=29) report resident fish population does not have access to Flathead river at FISS site downstream.	–
1004602726	Flanders Brook	697247.9	5446252	2020_planning	082G.105	Seems like road may be deactivated in aerial imagery. Recommend checking with local foresters.	–
1004602869	Couldrey Creek	667844.0	5434398	2020_planning	082G.104	Suspect deactivation from review of aerial imagery. Large potential habitat gain.	–
1004603040	–	648387.0	5545039	2020_planning	082J.103	Private land.	{EB,WCT}
1004603477	Burnham Creek	675878.1	5436608	2020_planning	082G.104	Large watershed with WCT know upstream. Good candidate.	{WCT}
1004603597	–	675469.0	5451829	2020_planning	082G.104	Step-pool system. Relatively larger watershed. BT close by.	–
1004603725	Pollock Creek	678149.9	5469459	2020_planning	082G.109	Large stream.	{BT,WCT}
1004603904	–	668900.0	5468357	2020_planning	082G.109	Decent amount of habitat upstream in 5-8% slope class. Road may be overgrown and/or deactivated by	

appearance of google

–

satellite imagery.

1004603908	McLatchie Creek	667049.0	5464485	2020_planning	082G.109	Steeper habitat upstream.	–
1004604006	Gardner Creek	647065.1	5584911	2020_planning	082J.108	Primarily wetland type habitat upstream.	{BSU,BT,DV,LSU,MW,WCT}
1004605451	Nettie Creek	686581.3	5436976	2020_planning	082G.104	Phase 1 required. WCT known upstream. Connected to Proctor Lake which has recorded RB. Large potential habitat gain.	{CC,WCT}
1004605458	–	686473.0	5437250	2020_planning	082G.104	First order watershed.	–
1004606501	–	668124.2	5468514	2020_planning	082G.109	Steeper stream.	–
1004606506	–	670699.0	5469925	2020_planning	082G.109	Extensive low gradient and wetland habitat upstream.	–
1004606597	–	683097.0	5444416	2020_planning	082G.104	Stream splits to multiple channels just upstream with relatively small - low elevation watershed.	–
1004606751	Whiting Creek	652940.4	5515013	2020_planning	082G.118	Railway. Appears potentially backwatered.	–
1004606800	–	644278.7	5471741	2020_planning	082G.108	Large railway crossing structures in aerial photo. Suspect passable.	–
1004606821	Erickson Creek	659887.7	5505156	2020_planning	082G.119	Immediately adjacent to mine	{BT,DV,EB,WCT}
1004607003	–	659238.0	5489723	2020_planning	082G.114	Appears to be PSCIS 50225.	–
1004607273	Packhorse Creek	677870.1	5463568	2020_planning	082G.109	Road looks overgrown in aerial imagery. Suspect ford.	{WCT}
1004607406	–	659304.0	5478557	2020_planning	082G.113	WCT upsstream. Large habitat gain before next potential barrier.	{WCT}
1004607464	–	682774.0	5448438	2020_planning	082G.104	Culvert documented in	

FISS. Survey sites upstream of
crossing.

{WCT}

1004607567	—	655995.0	5472834	2020_planning	082G.108	Fish upstream and down.	{TR}
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Also - this is email from Betty

1. Crossing Creek has been removed from the habitat confirmation list due to low quality habitat.
2. Brule Creek 1024734790 has been verified to not exist and has been removed from the list.
3. PSCIS crossings 62181 and 62182 on Dry Creek have been added for reassessment. These have had a habitat confirmation, but at the time the crossing was embedded and considered to be likely passable. This was 9 years ago, so they need to be reassessed.
4. Hartley Creek dam immediately upstream of PSCIS crossing 197542 has been added to the list. Requires assessment to determine passability by fish; however, a habitat confirmation has already been completed on the road crossing immediately downstream, so no habitat confirmation required.
5. Dam 2606 remains on the list. This dam is likely not impeding fish passage, as it was supposedly built as a side channel that has since filled in and become disconnected from the main channel. Just need to verify that this is the case.

SCHEDULE A – LIST OF BARRIERS FOR ASSESSMENT

Table 1. Barrier assessment locations and description.

aggregated_crossings_id	modelled_crossing_id	Waterbody	Road Surface Type	Zone 11 Easting	Northing	Comments
1024735443	24735443	Abruzzi Creek	rough	5591423	638867	
1004603480	4603480	Bean Creek	loose	5464640	650539	
1004606347	4606347	Bean Creek	loose	5463819	650415	
1004605499	4605499	Trib to Bean Creek	paved	5463543	650057	
1004603553	4603553	Bighorn Creek	loose	5447429	663230	Probably deactivated but not certain
1004606926	4606926	Bighorn Creek	rough	5445241	664112	
1004600533	4600533	Chauncey Creek	rough	5554160	656890	
61504	24706507	Coal Creek	loose	5483687	645313	Previously assessed in PSCIS (ID 61504). Needs reassessment. comments from PSCIS: "Old concrete from old bridge in streambed. Creates somewhat of a barrier." Reassess for pass-ability using professional judgment/analysis, since it doesn't fit the provincial protocol.
1004606545	4606545	Cummings Creek	loose	5520738	644862	
62181	62181	Dry Creek	Rail	656409	5544755	Habitat confirmations completed by Masse in 2013 (PSCIS ID 62181) but culverts scored as passable. Reassess now that culverts have aged.
62182	62182	Dry Creek	Paved	656391	5544771	Habitat confirmations completed by Masse in 2013 (PSCIS ID 62182) but culverts scored as passable. Reassess now that culverts have aged.
1004600762	4600762	Fording River	loose	5562574	651282	
1004603334	4603334	Fording River	loose	5566706	651461	
1004606284	4606284	Fording River	loose	5571951	652990	
1004602514	4602514	Harmer Creek	rough	5517830	659393	
1004601280	4601280	Trib to Harmer Creek	Over-grown	5517583	659427	
1004603413	4603413	Henretta Creek	rough	5567436	654825	
1004604677	4604677	Henretta Creek	loose	5566424	652123	
1004604696	4604696	Henretta Creek	rough	5566461	652346	

aggregated_crossings_id	modelled_crossing_id	Waterbody	Road Surface Type	Zone 11 Easting	Northing	Comments
1024706614	24706614	Henretta Creek	loose	5566732	653180	May be a bridge
1004603793	4603793	Lodgepole Creek	rough	5462235	663619	
1004606370	4606370	Lodgepole Creek	paved	5462562	664905	
1004606398	4606398	Lodgepole Creek	paved	5462152	665796	
1004601984	4601984	Trib to Lodgepole Creek	rough	5458678	654302	
1004603791	4603791	Trib to Lodgepole Creek	rough	5461227	660586	
1004606411	4606411	Trib to Lodgepole Creek	rough	5459547	658765	
1024733953	24733953	Trib to Lodgepole Creek	Sea-sonal	5461435	652221	Might be a bridge
1004607022	4607022	McCool Creek	loose	5499879	648168	
1004601704	4601704	Morrissey Creek	rough	5473852	650166	
1004602163	4602163	Morrissey Creek	rough	5475661	651609	
1004601993	4601993	Rabbit Creek	rough	5431721	656655	
1004601995	4601995	Rabbit Creek	rough	5431860	655890	
1004602359	4602359	Rabbit Creek	rough	5431721	655618	
1004603432	4603432	Trib to Cadorna Creek	rough	5591178	639196	
1004607449	4607449	Trib to Ewin Creek	rough	5547544	659284	
1004602646	4602646	Trib to Wigwam River	loose	5452095	647364	
1004605216	4605216	Trib to Wigwam River	loose	5449516	647730	
1004605338	4605338	Trib to Wigwam River	loose	5436172	658388	
1004605937	4605937	Trib to Wigwam River	loose	5431294	662247	
1004606129	4606129	Trib to Wigwam River	loose	5446732	649481	
1004602949	4602949	Weigert Creek	loose	5534524	647247	
1004606007	4606007	Weigert Creek	loose	5534676	647156	
1024735049	24735049	Weigert Creek	Sea-sonal	5531958	650010	

TABLE 2. Dam locations and descriptions.

aggregated _crossings_id	dam _id	Waterbody	Water License No.	Water License Holder	(Zone 11) Easting	Northing	Comments
1100002606	n/a	Boivin Creek	C059359	District of Elkford	647275	5541987	Dam designed as side channel and not part of main flow of creek. Verify that it does not block mainstem flows.
1100001086	n/a	Harmer Creek	C040628	Teck Coal Elkview Ops	657051	5522119	
n/a	2348	Hartley Creek	F010679	Ricky and Sheri Hutchin- son	643521	5490697	0.3 m dam immediately upstream of PSCIS crossing 197542. Assess whether dam is passable to fish. No habitat confirmation required.

References

- Fish Passage Technical Working Group. 2011. "A Checklist for Fish Habitat Confirmation Prior to the Rehabilitation of a Stream Crossing." <https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/land-based-investment/forests-for-tomorrow/checklist-for-fish-habitat-confirmation-201112.pdf>.
- MoE. 2011. "Field Assessment for Determining Fish Passage Status of Closed Bottom Structures." BC Ministry of Environment (MoE). <https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/land-based-investment/forests-for-tomorrow/field-assessment-for-determining-fish-passage-status-of-cbs.pdf>.