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Ministry of Environment

Re: Fish Permit Application

This permit application can also be viewed online [at this link](#). A summary of sites to be potentially assessed is included as Tables [2](#) - [3](#), details of fish species potentially encountered is presented in Table [4](#) and an overview map displaying potential sample locations is included as Figure 1. A kml file of the sites is included as an attachment to the application and can also be downloaded [from here at this link](#). Please note that there is an extensive amount of information contained in the kml file (accessed by clicking on sites) including brief summaries of background reporting data (when available).

Brief description of project/activities

This work is a multi-year collaboration of many groups and an initiative of the Society for Ecosystem Restoration Northern BC. Funding for the project is through the Fish and Wildlife Compensation Program and the Provincial Fish Passage Technical Working Group. Al Irvine, R.P.Bio from New Graph Environment Ltd. is leading the fieldwork with field and office collaboration with teams from McLeod Lake Indian Band. Past reports are below:

- https://newgraphenvironment.github.io/Parsnip_Fish_Passage/
- https://newgraphenvironment.github.io/fish_passage_parsnip_2021_reporting/
- https://newgraphenvironment.github.io/fish_passage_peace_2022_reporting/
- https://newgraphenvironment.github.io/fish_passage_peace_2023_reporting/

Rationale

Rationale for sampling is to inform fish presence/absence, species composition/density, abundance estimates, movement, growth, and survival as part of habitat confirmations and effectiveness

monitoring related to fish passage restoration at barrier culverts. Habitat confirmation methodology information can be referenced in the above reports which builds on the [Fish Passage Technical Working Group Phase 2 protocol](#). Presence/absence of fish, species composition/abundance, distribution limits and fish movement can be useful for prioritizing which crossings are a best fit for fish passage restoration and inform follow up effectiveness monitoring.

Methodologies

Sampling is proposed at streams included in Tables [2](#) - [3](#) where we will be performing habitat confirmations and follow up site visits related to past habitat confirmations/fish passage remediations.

Sampling methodologies will be dependent on the site, fish species suspected, type of habitat encountered, risks to aquatic organisms potentially present and ongoing communications. Sampling methods may include minnowtrapping, electrofishing, and dipnetting upstream and downstream of current and past barrier culvert locations.

PIT Tagging

As part of this permit application we are proposing tagging. Our study plan is (when time allows and PIT tagging is expected to increase our state of knowledge about the subject system) to electrofish small sites both upstream and downstream of priority culvert “barrier” sites and insert biotag APT12 PIT tags into the body cavity of select fish captured over 60mm. Fish location (UTM), length and weight will also be collected. In addition to providing information on abundance upstream and downstream of potential culvert restoration sites, the study will also provide information for monitoring programs to document fish movement, growth and survival at sites over multi-year timeframes. Main objectives are to determine

1. if fish are moving into restored areas
2. if before any remediation is conducted - fish are moving through sites where stream crossing structures (culverts) likely cause connectivity issues
3. evaluate if productivity of the systems are increasing following bridge installation and/or if fish are moving upstream/downstream of where replaced/removed structures are located

As we wish to tag all fish over 60mm in each site sampled we would like to apply for a permit allowing a maximum of 600 fish with a maximum of 150 fish/stream. Although we are requesting a maximum of 150 fish/stream, we have listed 150 fish of each species per stream because we will not know the species composition of the sites until the sampling occurs.

In general, species likely to be tagged include rainbow trout, bull trout and burbot. The numbers of fish per stream are likely to be much less than 150 however we are requesting the maximum number of fish to be tagged to allow for flexibility in the field. In 2023 the maximum number of fish tagged at one site was less than 100 with a total of 2 burbot tagged.

Risks associated with project/activities and associated mitigation

Table 1: Risks and mitigation

Impact	Mitigation
High Voltage Injuries	Use the minimum effective voltage. Avoid contacting fish with the anode. Avoid electrofishing directly adjacent to metal culverts.
Disruption of Spawning	Avoid electrofishing during highest risk periods in likely spawning habitat.
Physical Stress on Fish	Quick/gentle handling and release of captured fish.
Injury from PIT Tagging Surgeries	Shallow insertion of tags and use of fresh sterile syringes every approximately 10 surgeries

Please note that the sampling will be completed before October 31 (end of August till mid-September however the end-date of the sampling period is listed as Dec 31 on the application to allow time outside of the busy field season for the data to be processed, QA'd and organized so that required reporting can be as informative as possible when submitted. An example of how we have been presenting results and methodologies from past assessments can be referenced [here at this link](#).

Please do not hesitate to contact me if you need more information or have any questions or concerns.



Al Irvine, R.P.Bio

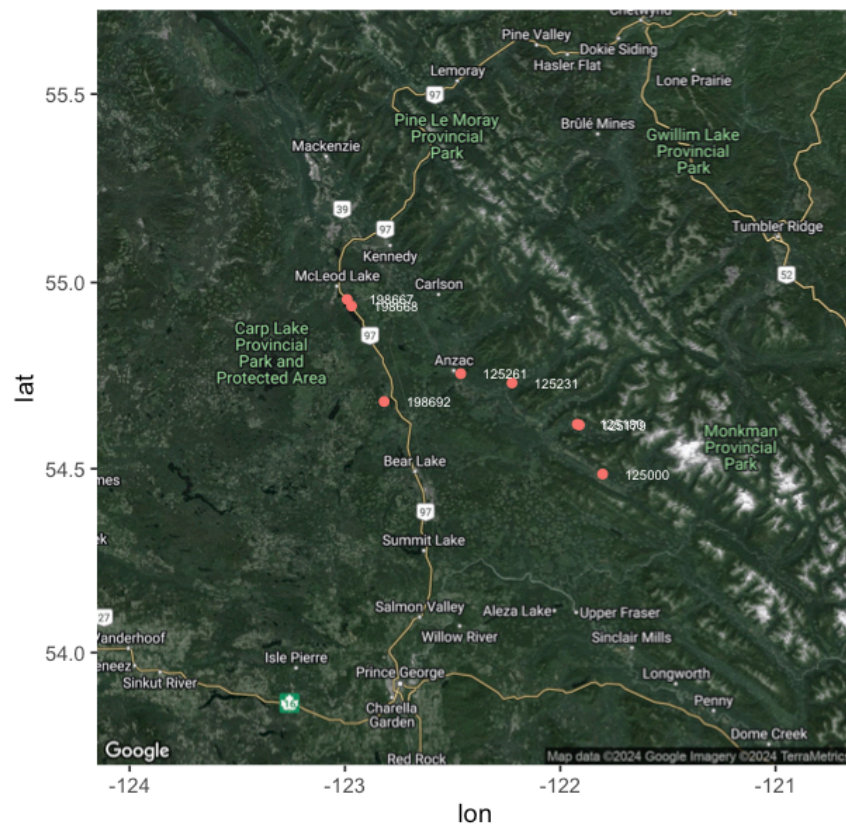


Figure 1: Location of potential sample sites.

Table 2: Potential sampling locations.

id	stream_name	wsc_code	utm_zone	utm_easting	utm_northing	watershed_group_code
125000	tributary to Parsnip River	236-738000-00000-00000-0000-000-000-000-000-000-000-000-000	10	577541	6038215	PARS
125179	Unnamed tributary to Missinka River	236-614900-20900-03300-0000-0000-000-000-000-000-000-000-000	10	570307	6052836	PARS
125180	tributary to Missinka River	236-614900-20900-00000-00000-0000-000-000-000-000-000-000-000	10	569664	6053048	PARS
125231	tributary to Table River	236-450800-15400-00000-0000-0000-000-000-000-000-000-000-000	10	549962	6065140	PARS
125261	Fern Creek	236-358400-00000-00000-0000-0000-000-000-000-000-000-000-000	10	534600	6067770	PARS
198667	Tsatchuka Creek	230-906800-65600-00000-0000-0000-000-000-000-000-000-000-000	10	500641	6089777	CARP
198668	Tributary to McLeod Lake	230-906800-71800-00000-0000-0000-000-000-000-000-000-000-000	10	501971	6087814	CARP

id	stream_name	wsc_code	utm_zone	utm_easting	utm_northing	watershed_group_code
198692	Tributary to Kerry Lake	230-906800-97600-22400-0000-0000-000-000-000-000-	10	511735	6059316	CRKD
		000				

Table 3: Potential sample site details

id	stream_name	sp_upstr	fish_tags
125000	tributary to Parsnip River	–	150
125179	Unnamed tributary to Missinka River	BT;RB	150
125180	tributary to Missinka River	RB	150
125231	tributary to Table River	RB	150
125261	Fern Creek	BB;C;CBC;DC;DV;LSU;RB;RSC;SU	150
198667	Tsatchuka Creek	CCG;RB	150
198668	Tributary to McLeod Lake	–	150
198692	Tributary to Kerry Lake	–	150

Table 4: Fish species recorded within subject streams in the Fisheries Information Summary System.

Scientific Name	Species Name	Species Code	BC List	Provincial FRPA	COSEWIC	SARA
Catostomus catostomus	Longnose Sucker	LSU	Yellow	–	–	–
Catostomus commersonii	White Sucker	WSU	Yellow	–	–	–
Catostomus macrocheilus	Largescale Sucker	CSU	Yellow	–	–	–
Coregonus clupeaformis	Lake Whitefish	LW	Yellow	–	–	–
Cottus aleuticus	Coastrange Sculpin (formerly Aleutian Sculpin)	CAL	Yellow	–	–	–
Cottus asper	Prickly Sculpin	CAS	Yellow	–	–	–
Cottus cognatus	Slimy Sculpin	CCG	Yellow	–	–	–
Cottus hubbsi	Mottled Sculpin	CBA	Blue	–	SC (Nov 2010)	1-SC (Jun 2003)
Couesius plumbeus	Lake Chub	LKC	Yellow	–	DD	–
Lota lota	Burbot	BB	Yellow	–	–	–
Mylocheilus caurinus	Peamouth Chub	PCC	Yellow	–	–	–
Oncorhynchus mykiss	Rainbow Trout	RB	Yellow	–	–	–
Oncorhynchus nerka	Kokanee	KO	Yellow	–	–	–
Osmerus dentex	Rainbow Smelt	RSM	Unknown	–	–	–

Scientific Name	Species Name	Species Code	BC List	Provincial FRPA	COSEWIC	SARA
<i>Prosopium cylindraceum</i>	Round Whitefish	RW	Yellow	–	–	–
<i>Prosopium williamsoni</i>	Mountain Whitefish	MW	Yellow	–	–	–
<i>Ptychocheilus oregonensis</i>	Northern Pikeminnow	NSC	Yellow	–	–	–
<i>Rhinichthys cataractae</i>	Longnose Dace	LNC	Yellow	–	–	–
<i>Richardsonius balteatus</i>	Redside Shiner	RSC	Yellow	–	–	–
<i>Salvelinus confluentus</i>	Bull Trout	BT	Blue	Y (Jun 2006)	SC (Nov 2012)	–
<i>Salvelinus fontinalis</i>	Brook Trout	EB	Exotic	–	–	–
<i>Salvelinus malma</i>	Dolly Varden	DV	Yellow	–	–	–
<i>Salvelinus namaycush</i>	Lake Trout	LT	Yellow	–	–	–
<i>Thymallus arcticus</i>	Arctic Grayling	GR	Yellow	–	–	–
–	Chub (General)	CBC	–	–	–	–
–	Dace (General)	DC	–	–	–	–
–	Minnow (General)	C	–	–	–	–
–	Sculpin (General)	CC	–	–	–	–
–	Sucker (General)	SU	–	–	–	–
–	Whitefish (General)	WF	–	–	–	–