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Ministry of Water, Land and Resource Stewardship
and
Fisheries and Oceans Canada

Re: Scientific Fish Collection Permit Application

Please note that permitting to Fisheries and Oceans Canada is requested for inventory purposes only. PIT tagging is NOT proposed for salmon species. PIT tagging is proposed to the Provincial Ministry of Water, Land and Resource Stewardship (WLRS) for provincial jurisdiction species only to monitor fish movement and growth over multiple years.

This permit application can also be viewed online at this link. A summary of sites to be potentially assessed (including historic fish presence information available in FISS) is included as Tables 2 - 3. Details of fish species known within each watershed 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. 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 Society for Ecosystem Restoration Northern BC, the Ministry of Transportation and Infrastructure (MoTI) 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 throughout the study area. These sites were selected from 177 sites assessed for fish passage in the 2023 field season or through

past effectiveness monitoring work for MoTi. Although incomplete at time of permit application, background reporting for 177 sites assessed for fish passage in the 2023 field season can be viewed below:

- https://www.newgraphenvironment.com/fish_passage_fraser_2023_reporting/

Rationale for sampling

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 baseline as well as follow up effectiveness monitoring.

Methodologies

Sampling methodologies will be dependent on the site, fish species suspected, type of habitat encountered, risks to aquatic organisms potentially present (Table 1) and ongoing communications. Sampling methods may include minnowtrapping, electrofishing, and dipnetting upstream and downstream of current and past barrier culvert locations.

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.

PIT Tagging

As part of this permit application we are proposing tagging for provincial jurisdiction species only. PIT tagging is not proposed for salmon species. 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 biomark 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

Dependent on how relevant tracking information would be to inform restoration actions, we may wish to tag select fish over 60mm in each site sampled. We would like to apply for a permit allowing a maximum of 600 fish tagged 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, only salmonid and burbot species will be tagged with likely species present being rainbow trout, bull trout, and burbot. Based on past assessments in the same and similiar systems in the region, the number of fish tagged per stream are very likely to be much less than 150 however we are requesting the maximum number of fish to be tagged to facilitate permit application procedures and allow for flexibility in the field based on actual sampling results.

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
Mortality in traps due to predation and starvation	Ensure all traps set are retrieved within 24 hours.

Please note that the sampling will be completed before October 31 (end of August till early October) 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 in reports above.

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

Al Irvine, R.P.Bio

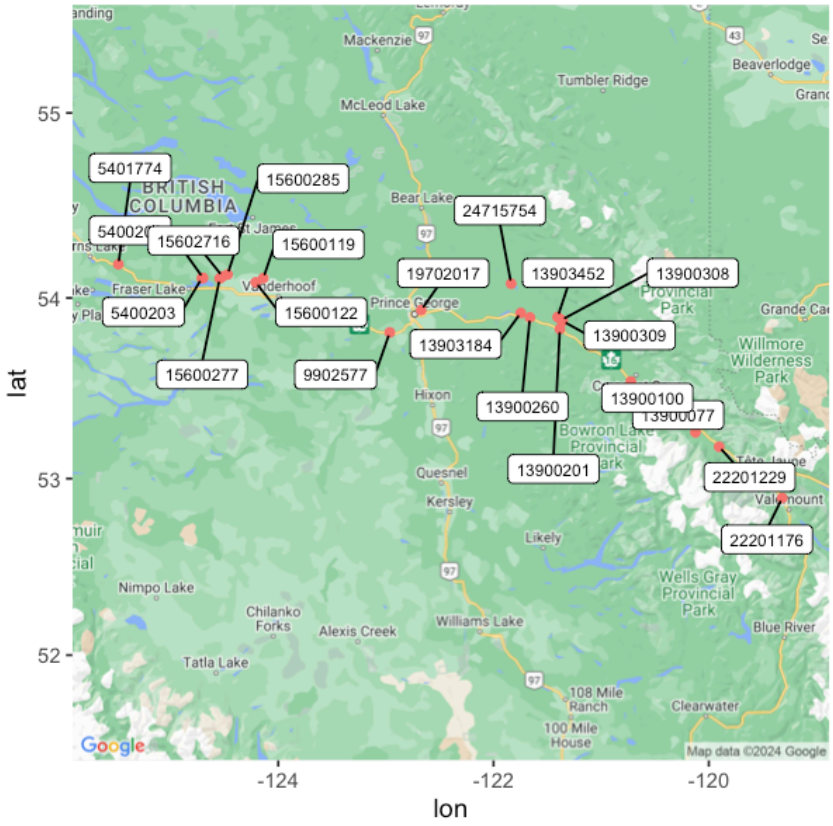

Figure 1: Location of potential sample sites.

Table 2: Potential sampling locations.

id	stream_name	wsc_code	utm_zone	utm_easting	utm_northing	watershed_group_code
5400202	Tributary to Fraser Lake	180-374000-33800-00000-0000-0000-000-000-000-000-000-000	10	388986	5997007	FRAN
5400203	Scotch Creek	180-374000-36600-00000-0000-0000-000-000-000-000-000-000	10	388277	5996946	FRAN
5401774	Sheraton Creek	180-374000-95200-01900-6160-0000-000-000-000-000-000-000	10	337849	6006826	FRAN
9902577	Beaverley Creek	180-069000-07200-00000-0000-0000-000-000-000-000-000-000	10	502369	5962508	LCHL
13900077	Hankins Creek	100-842800-00000-00000-0000-0000-000-000-000-000-000-000	10	691820	5904863	MORK
13900100	Snowshoe Creek	100-770300-00000-00000-0000-0000-000-000-000-000-000-000	10	650785	5934862	MORK
13900201	Driscoll Creek	100-698700-00000-00000-0000-0000-000-000-000-000-000-000	10	606373	5965783	MORK
13900260	Tributary to Sugarbowl Creek	100-683800-01900-12800-0000-0000-000-000-000-000-000-000	10	587920	5972459	MORK
13900308	Tributary to Fraser River	100-705400-00000-00000-0000-0000-000-000-000-000-000-000	10	607112	5971290	MORK
13900309	Tributary to Fraser River	100-706300-00000-00000-0000-0000-000-000-000-000-000-000	10	608028	5970651	MORK
13903184	Kenneth Creek	100-683800-00000-00000-0000-0000-000-000-000-000-000-000	10	582280	5975076	MORK
13903452	Tributary to Fraser River	–	10	604850	5973075	MORK
15600119	Clear Creek	180-296000-00000-00000-0000-0000-000-000-000-000-000-000	10	425559	5996140	NECR
15600122	Redmond Creek	180-305100-00000-00000-0000-0000-000-000-000-000-000-000	10	420920	5993688	NECR
15600277	Tributary to Nechako River	180-364700-00000-00000-0000-0000-000-000-000-000-000-000	10	399102	5996464	NECR
15600285	Nine Mile Creek	180-350800-00000-00000-0000-0000-000-000-000-000-000-000	10	403917	5998779	NECR
15602716	Tatsutnai Creek	180-360100-00000-00000-0000-0000-000-000-000-000-000-000	10	400817	5997662	NECR
19702017	Bittner Creek	100-572700-00000-00000-0000-0000-000-000-000-000-000-000	10	521562	5976182	TABR

id	stream_name	wsc_code	utm_zone	utm_easting	utm_northing	watershed_group_code
22201176	Teepee Creek	100-907400-42800-00000-0000-0000-000-000-000-000-000-000	11	344030	5862738	UFRA
22201229	Holliday Creek	100-864700-00000-00000-0000-0000-000-000-000-000-000-000	11	305966	5896003	UFRA
24715754	Tributary to Fraser River	100-654700-00000-00000-0000-0000-000-000-000-000-000-000	10	576133	5992812	MORK

Table 3: Potential sample site details

id	stream_name	sp_upstr	fish_tags
5400202	Tributary to Fraser Lake	–	150
5400203	Scotch Creek	–	150
5401774	Sheraton Creek	RB	150
9902577	Beaverley Creek	BB;CAS;CBC;CH;CSU;DV;KO;LNC;LSU;MW;NSC;PCC;RB;RSC;SU	150
13900077	Hankins Creek	–	150
13900100	Snowshoe Creek	EB;LKC;RB;RSC;ST	150
13900201	Driscoll Creek	CCG;RB	150
13900260	Tributary to Sugarbowl Creek	–	150
13900308	Tributary to Fraser River	–	150
13900309	Tributary to Fraser River	–	150
13903184	Kenneth Creek	BT;CC;CCG;CH;LSU;RB	150
13903452	Tributary to Fraser River	–	150
15600119	Clear Creek	LKC;LSU	150
15600122	Redmond Creek	–	150
15600277	Tributary to Nechako River	SP	150
15600285	Nine Mile Creek	RB	150
15602716	Tatsutnai Creek	RB	150
19702017	Bittner Creek	CCG;CH;CSU;LSU;RB;RSC;SP;SU;WSU	150
22201176	Teepee Creek	SA	150
22201229	Holliday Creek	–	150
24715754	Tributary to Fraser River	RB	150

Table 4: Fish species recorded in the Fisheries Information Summary System within the freshwater atlas watershed group areas where the potential sample sites are located.

Scientific Name	Species Name	Species Code	BC List	COSEWIC	SARA	Francois Lake	Lower Chilako	Nechako	Upper Fraser
Acipenser transmontanus	White Sturgeon	WSG	No Status	E/T (Nov 2012)	1-E	Yes	Yes	Yes	–
Carassius auratus	Goldfish	GC	Exotic	–	–	–	Yes	–	–
Catostomus bondi	Northern Mountain Sucker	MSU	Blue	T (Dec 2022)	–	–	Yes	–	–
Catostomus catostomus	Longnose Sucker	LSU	Yellow	–	–	Yes	Yes	Yes	Yes
Catostomus columbianus	Bridgelip Sucker	BSU	Yellow	–	–	Yes	–	Yes	–

Scientific Name	Species Name	Species Code	BC List	COSEWIC	SARA	Francois Lake	Lower Chilako	Nechako	Upper Fraser
Catostomus macrocheilus	Largescale Sucker	CSU	Yellow	–	–	Yes	Yes	Yes	–
Chrosomus neogaeus	Finescale Dace	FDC	Yellow	–	–	Yes	–	–	–
Coregonus clupeaformis	Lake Whitefish	LW	Yellow	–	–	Yes	Yes	Yes	–
Cottus asper	Prickly Sculpin	CAS	Yellow	–	–	Yes	Yes	Yes	–
Cottus cognatus	Slimy Sculpin	CCG	Yellow	–	–	Yes	Yes	Yes	Yes
Cottus ricei	Spoonhead Sculpin	CRI	Yellow	NAR (May 1989)	–	Yes	–	–	Yes
Couesius plumbeus	Lake Chub	LKC	Yellow	DD	–	Yes	Yes	Yes	Yes
Cyprinus carpio	Carp	CP	Exotic	–	–	Yes	–	–	–
Hybognathus hankinsoni	Brassy Minnow	BMC	No Status	–	–	Yes	Yes	Yes	–
Lota lota	Burbot	BB	Yellow	–	–	Yes	Yes	Yes	Yes
Micropterus salmoides	Largemouth Bass	LMB	Exotic	–	–	–	–	Yes	–
Mylocheilus caurinus	Peamouth Chub	PCC	Yellow	–	–	Yes	Yes	Yes	–
Oncorhynchus clarkii	Cutthroat Trout	CT	No Status	–	–	Yes	–	–	–
Oncorhynchus gorbuscha	Pink Salmon	PK	Not Reviewed	–	–	–	Yes	–	–
Oncorhynchus kisutch	Coho Salmon	CO	Not Reviewed	–	–	Yes	Yes	Yes	–
Oncorhynchus mykiss	Rainbow Trout	RB	Yellow	–	–	Yes	Yes	Yes	Yes
Oncorhynchus nerka	Kokanee	KO	Not Reviewed	–	–	Yes	Yes	Yes	Yes
Oncorhynchus nerka	Sockeye Salmon	SK	Not Reviewed	–	–	Yes	Yes	Yes	Yes
Oncorhynchus tshawytscha	Chinook Salmon	CH	Not Reviewed	E/T/SC/DD/NAR (Nov 2020)	–	Yes	Yes	Yes	Yes
Prosopium coulterii	Pygmy Whitefish	PW	Yellow	NAR (Nov 2016)	–	–	Yes	Yes	Yes
Prosopium williamsoni	Mountain Whitefish	MW	Yellow	–	–	Yes	Yes	Yes	Yes
Ptychocheilus oregonensis	Northern Pikeminnow	NSC	Yellow	–	–	Yes	Yes	Yes	–
Rhinichthys cataractae	Longnose Dace	LNC	Yellow	–	–	Yes	Yes	Yes	Yes
Rhinichthys falcatus	Leopard Dace	LDC	Yellow	NAR (May 1990)	–	Yes	Yes	Yes	–
Richardsonius balteatus	Redside Shiner	RSC	Yellow	–	–	Yes	Yes	Yes	–
Salvelinus confluentus	Anadromous Bull								

Scientific Name	Species Name	Species Code	BC List	COSEWIC	SARA	Francois Lake	Lower Chilako	Nechako	Upper Fraser
Trout	ABT	Blue	SC (Nov 2012)	–	–	–	Yes	–	
Salvelinus confluentus pop. 26	Bull Trout	BT	Blue	NAR (Nov 2012)	–	Yes	Yes	Yes	Yes
Salvelinus fontinalis	Brook Trout	EB	Exotic	–	–	Yes	Yes	Yes	Yes
Salvelinus malma	Dolly Varden	DV	Yellow	–	–	Yes	Yes	Yes	Yes
Salvelinus namaycush	Lake Trout	LT	Yellow	–	–	Yes	Yes	Yes	Yes
–	All Salmon	AO	–	–	–	–	Yes	–	–
–	Char, General	SLV	–	–	–	–	–	–	Yes
–	Chub (General)	CBC	–	–	–	Yes	Yes	Yes	–
–	Dace (General)	DC	–	–	–	Yes	Yes	Yes	–
–	Minnow (General)	C	–	–	–	Yes	Yes	Yes	–
–	Northern Pearl Dace	PDC	–	–	–	Yes	–	–	–
–	Salmon (General)	SA	–	–	–	–	Yes	–	Yes
–	Sculpin (General)	CC	–	–	–	Yes	Yes	Yes	Yes
–	Sucker (General)	SU	–	–	–	Yes	Yes	Yes	Yes
–	Whitefish (General)	WF	–	–	–	Yes	Yes	Yes	Yes