

Al Irvine
New Graph Environment Ltd.
al@newgraphenvironment
250-777-1518
Date: 2024-08-09

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

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 Habitat Trust Conservation Foundation, Ministry of Transportation and Infrastructure 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 the Office of Wet'suwet'en (contact Julia Onderwater - Julia.Onderwater@wetsuweten.com or Dave Dewit - david.dewit@wetsuweten.com), Gitksan Watershed Authorities (contact Alicia Fernando - afernando@gitksanwatershed.com) and Gitksan Environmental Services (contact Chaz Ware - chaz.ware@gitksanbusiness.com). Past reports are below:

- https://www.newgraphenvironment.com/fish_passage_bulkley_2020_reporting/
- https://www.newgraphenvironment.com/fish_passage_skeena_2021_reporting/

- https://www.newgraphenvironment.com/fish_passage_bulkley_2022_reporting/
- https://www.newgraphenvironment.com/fish_passage_skeena_2022_reporting/
- https://www.newgraphenvironment.com/fish_passage_skeena_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.

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 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

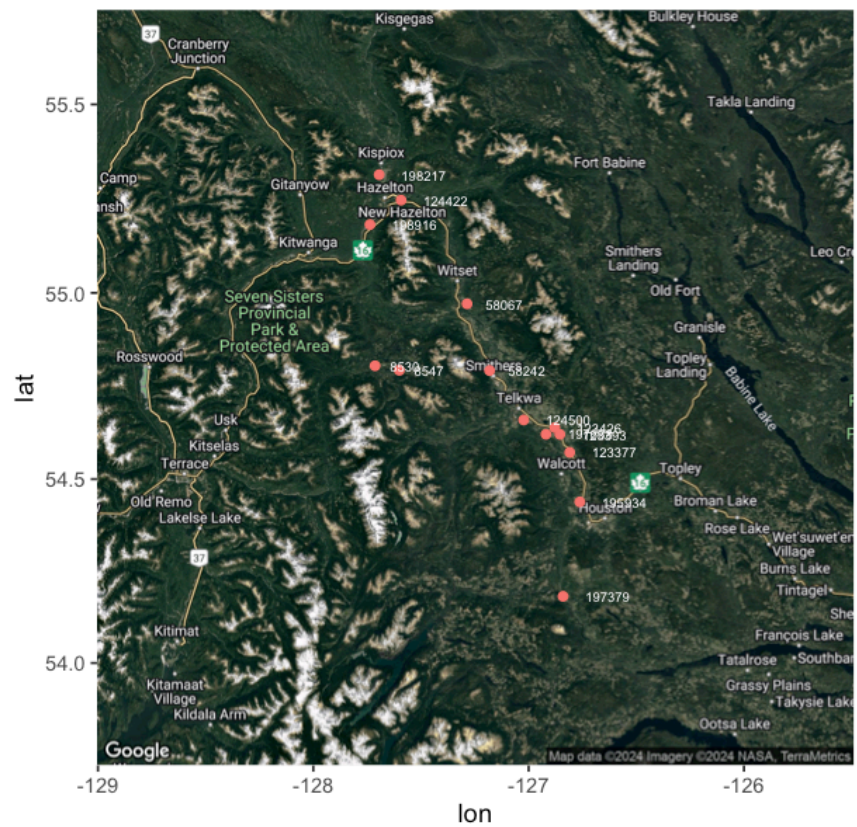


Figure 1: Location of potential sample sites.

Table 2: Potential sampling locations.

id	stream_name	wsc_code	utm_zone	utm_easting	utm_northing	watershed_group_code
123377	Thompson Creek	460-517700-00000-00000-0000-000-000-000-000-000-000-000	9	641633	6049398	BULK
123393	Lemieux Creek	460-487900-11100-00000-0000-0000-000-000-000-000-000-000	9	638502	6054711	BULK
123426	Robin Creek	460-487900-00000-00000-0000-0000-000-000-000-000-000-000	9	636935	6056693	BULK
124422	Tributary to Waterfall Creek	460-007300-39470-00000-0000-0000-000-000-000-000-000-000	9	589500	6123161	BULK
124500	Helps Creek	460-437000-00000-00000-0000-0000-000-000-000-000-000-000	9	627541	6058702	BULK
195934	Stock Creek	460-589500-30000-00000-0000-0000-000-000-000-000-000-000	9	645134	6034600	BULK
197379	Tributary to Owen Creek	460-600600-23900-13000-0000-0000-000-000-000-000-000-000	9	640960	6005930	MORR
197668	Coffin Creek	460-472700-00000-00000-0000-0000-000-000-000-000-000-000	9	634342	6054605	BULK
198217	Tributary to Skeena River	400-448500-00000-00000-0000-0000-000-000-000-000-000-000	9	582875	6130541	KISP
198916	Gershwin Creek	400-415300-00000-00000-0000-0000-000-000-000-000-000-000	9	580429	6115770	KISP
58067	Tributary to Gramophone Creek	460-223800-00000-00000-0000-0000-000-000-000-000-000-000	9	609726	6092894	BULK
58242	Kathlyn Creek	460-345400-00000-00000-0000-0000-000-000-000-000-000-000	9	616947	6073197	BULK
8530	Sandstone Creek	440-767000-00000-00000-0000-0000-000-000-000-000-000-000	9	582713	6073870	ZYMO
8547	Copper	440-847000-00000-00000-0000-0000-000-000-000-000-000-000	9	589980	6072661	ZYMO

Table 3: Potential sample site details

id	stream_name	sp_upstr	fish_tags
123377	Thompson Creek	CT;DV;RB	150
123393	Lemieux Creek	CT;DV;LNC;NSC;RB;SU	150
123426	Robin Creek	BT;CT;RB;TR	150
124422	Tributary to Waterfall Creek	CO;DV	150
124500	Helps Creek	CT;DV;LNC;LSU;RB	150
195934	Stock Creek	CT;KO;LSU;RB	150
197379	Tributary to Owen Creek	CO;RB	150
197668	Coffin Creek	CSU;CT;DV;LSU;MW;RB;RSC	150
198217	Tributary to Skeena River	–	150
198916	Gershwin Creek	CT;DV	150
58067	Tributary to Gramophone Creek	RB;ST	150
58242	Kathlyn Creek	BB;CAS;CC;CO;CT;DV;L;LNC;LSU;MW;NSC;OS;PCC;PK;RB;RSC;SA;ST;SU;WF;WSU	150
8530	Sandstone Creek	CT;DV;RB	150
8547	Copper	–	150

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

Scientific Name	Species Name	BC List	COSEWIC	Bulkley	Kispiox	Morice	Zymoetz
Catostomus catostomus	Longnose Sucker	Yellow	–	Yes	Yes	Yes	Yes
Catostomus commersonii	White Sucker	Yellow	–	Yes	Yes	Yes	–
Catostomus macrocheilus	Largescale Sucker	Yellow	–	Yes	Yes	Yes	Yes
Chrosomus eos	Northern Redbelly Dace	Yellow	–	Yes	–	–	–
Coregonus clupeaformis	Lake Whitefish	Yellow	–	Yes	Yes	Yes	–
Coregonus sardinella	Least Cisco	Blue	–	–	–	–	–
Cottus aleuticus	Coastrange Sculpin (formerly Aleutian Sculpin)	Yellow	–	Yes	Yes	Yes	–
Cottus asper	Prickly Sculpin	Yellow	–	Yes	Yes	Yes	Yes
Cottus cognatus	Slimy Sculpin	Yellow	–	–	Yes	–	–
Couesius plumbeus	Lake Chub	Yellow	DD	Yes	Yes	Yes	–
Entosphenus tridentatus	Pacific Lamprey	Yellow	–	Yes	–	Yes	–
Gasterosteus aculeatus	Threespine Stickleback	Yellow	–	–	Yes	–	–
Hybognathus hankinsoni	Brassy Minnow	No Status	–	Yes	–	–	–

Scientific Name	Species Name	BC List	COSEWIC	Bulkley	Kispiox	Morice	Zymoetz
<i>Lota lota</i>	Burbot	Yellow	–	Yes	Yes	Yes	Yes
<i>Mylocheilus caurinus</i>	Peamouth Chub	Yellow	–	Yes	Yes	Yes	Yes
<i>Oncorhynchus clarkii</i>	Cutthroat Trout	No Status	–	Yes	Yes	Yes	Yes
<i>Oncorhynchus clarkii</i>	Cutthroat Trout (Anadromous)	No Status	–	Yes	Yes	–	Yes
<i>Oncorhynchus clarkii clarkii</i>	Coastal Cutthroat Trout	Blue	–	Yes	Yes	Yes	Yes
<i>Oncorhynchus clarkii lewisi</i>	Westslope (Yellowstone) Cutthroat Trout	Blue	SC (Nov 2016)	–	Yes	–	–
<i>Oncorhynchus gorbuscha</i>	Pink Salmon	Not Reviewed	–	Yes	Yes	Yes	Yes
<i>Oncorhynchus keta</i>	Chum Salmon	Not Reviewed	–	Yes	Yes	Yes	Yes
<i>Oncorhynchus kisutch</i>	Coho Salmon	Not Reviewed	–	Yes	Yes	Yes	Yes
<i>Oncorhynchus mykiss</i>	Rainbow Trout	Yellow	–	Yes	Yes	Yes	Yes
<i>Oncorhynchus mykiss</i>	Steelhead	Yellow	–	Yes	Yes	Yes	Yes
<i>Oncorhynchus mykiss</i>	Steelhead (Summer-run)	Yellow	–	Yes	–	Yes	–
<i>Oncorhynchus mykiss</i>	Steelhead (Winter-run)	Yellow	–	–	Yes	–	Yes
<i>Oncorhynchus nerka</i>	Kokanee	Not Reviewed	–	Yes	Yes	Yes	Yes
<i>Oncorhynchus nerka</i>	Sockeye Salmon	Not Reviewed	–	Yes	Yes	Yes	Yes
<i>Oncorhynchus tshawytscha</i>	Chinook Salmon	Not Reviewed	E/T/SC/DD/NAR (Nov 2020)	Yes	Yes	Yes	Yes
<i>Prosopium coulterii</i>	Pygmy Whitefish	Yellow	NAR (Nov 2016)	Yes	Yes	Yes	–
<i>Prosopium coulterii</i> pop. 3	Giant Pygmy Whitefish	Yellow	NAR (Nov 2016)	Yes	–	–	–
<i>Prosopium cylindraceum</i>	Round Whitefish	Yellow	–	–	–	–	–
<i>Prosopium williamsoni</i>	Mountain Whitefish	Yellow	–	Yes	Yes	Yes	Yes
<i>Ptychocheilus oregonensis</i>	Northern Pikeminnow	Yellow	–	Yes	Yes	Yes	Yes
<i>Pungitius pungitius</i>	Ninespine Stickleback	Unknown	–	Yes	–	–	–
<i>Rhinichthys cataractae</i>	Longnose Dace	Yellow	–	Yes	Yes	Yes	Yes
<i>Rhinichthys falcatus</i>	Leopard Dace	Yellow	NAR (May 1990)	–	–	Yes	–
<i>Richardsonius balteatus</i>	Redside Shiner	Yellow	–	Yes	Yes	Yes	Yes
<i>Salvelinus confluentus</i>	Bull Trout	Blue	SC (Nov 2012)	Yes	Yes	Yes	Yes
<i>Salvelinus fontinalis</i>	Brook Trout	Exotic	–	Yes	–	Yes	–
<i>Salvelinus malma</i>	Dolly Varden	Yellow	–	Yes	Yes	Yes	Yes
<i>Salvelinus namaycush</i>	Lake Trout	Yellow	–	Yes	Yes	Yes	–
–	All Salmon	–	–	–	Yes	–	–
–	Arctic Char	–	–	–	–	Yes	–
–	Chub (General)	–	–	–	Yes	–	–
–	Cutthroat/Rainbow cross	–	–	Yes	Yes	–	–

Scientific Name	Species Name	BC List	COSEWIC	Bulkley	Kispiox	Morice	Zymoetz
–	Dace (General)	–	–	–	–	Yes	–
–	Lamprey (General)	–	–	Yes	Yes	Yes	–
–	Minnow (General)	–	–	Yes	Yes	Yes	–
–	Mottled Sculpin	–	–	Yes	–	–	–
–	Salmon (General)	–	–	Yes	Yes	Yes	Yes
–	Sculpin (General)	–	–	Yes	Yes	Yes	Yes
–	Squanga	–	–	–	Yes	–	–
–	Stickleback (General)	–	–	–	Yes	–	–
–	Sucker (General)	–	–	Yes	Yes	Yes	Yes
–	Verified DV BT hybrid	–	–	–	–	–	–
–	Whitefish (General)	–	–	Yes	Yes	Yes	Yes