Al Irvine
New Graph Environment Ltd.
al@newgraphenvironment
250-777-1518
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Safety Plan - 2025-077-sern-peace-fish-passage

The latest version of this pdf can be downloaded here.

This project has two primary goals. The first is to conduct fish passage (Phase 1) and habitat confirmation (Phase 2) assessments within the Nation River watershed group. The second goal is to implement baseline monitoring at previously assessed and/or remediated crossings in the Parsnip, Crooked, and Carp River watershed groups. Fieldwork will include electrofishing at permitted sites and collection of environmental DNA (eDNA) samples.

Field activities will be completed with support from crews from McLeod Lake Indian Band and other partner organizations. A summary of potential sites for fish passage assessments, habitat confirmation assessments, and electrofishing is provided in Table 7 and Figure 3. Google Earth (KML) and Garmin (GPX) files for the proposed sites are available for download here. Georeferenced pdf maps for select watershed groups can be accessed and downloaded here.

New Graph Environment Employee Information

Al Irvine
Vehicle: 2013 Toyota Tundra black w/flatdeck and yellow can-am quad
Accommodation: 3396 Rosia Road, Prince George, BC V2K 4Y5

Lucy Schick
Vehicle: 2006 Pontiac Vibe red
Accommodation: 3990 Larisa Court, Prince George, BC V2K 0B1

Crew Members

New Graph Employees Al Irvine and Lucy Schick will be joined by crews from McLeod Lake Indian Band. All crew member information and emergency contacts can be found below.

Table 1: Crew members details and emergency contacts

name	email	phone	satellite	emerg_name	emerg_email	emerg_phone
Allan Irvine	al@newgraphenvironment.com	250-777-1518	must be contacted by inreach first. Cannot cold call	Tara Stark	tara@newgraphenvironment.com	250-505-9854
Jillian Isadore	jillianmarie457@icloud.com	778-349-8471	–	Eugenia Isadore	–	250-644-0418
Bianca Prince	biancaprince@hotmail.com	250-730-1480	–	Nathan Prince	–	250-617-5930
John Demont	justjohndumont@icloud.com	250-720-9700	–	Nathan Prince	–	250-617-5930
Lucy Schick	lucy@newgraphenvironment.com	604-741-2032	807-790-9843	Sa Boothroyd	saboothroyd@gmail.com	604-740-7199

Equipment Checklists

PLEASE NOTE THAT EQUIPMENT CHECKLISTS ARE PROVIDED FOR THE OVERALL TEAM AND NOT ALL CREWS ARE REQUIRED TO HAVE ALL EQUIPMENT. ALTHOUGH ENCOURAGED FOR ALL ENVIRONMENTAL SCIENCE TECHNICIANS AND MONITORS TO HAVE THE PERSONAL EQUIPMENT NEW GRAPH ENVIRONMENT WILL HAVE ALL EQUIPMENT NECESSARY TO COMPLETE THE WORK.

MINIMUM REQUIREMENTS FOR EACH CREW MEMBER INCLUDES GOOD QUALITY AND APPROPRIATELY FITTING LIGHT WEIGHT WADERS AND SEPERATE WADING BOOTS (RUBBER SOLED), HAT, WATER AND A FOOD.

MINIMUM REQUIREMENTS FOR FIELD TRUCKS INCLUDE A QUALITY RADIO APPROPRIATE FOR FOREST SERVICE ROADS, OFF-ROAD CAPABLE TIRES IN GOOD CONDITION, SPARE TIRE, JACK, AND TOOLS.

Table 2: Personal Equipment Checklist - SEE NOTE ABOVE FOR MINIMUM REQUIREMENTS

Equipment	·	·	·
GPS	Suncreen	Bugspray	Polarized glasses
Bear Spray	phone/camera	battery pack booster for phone	Hat
first aid kit personal	Waders	Wading Boots (Rubber-soled only)	Ski poles
water	food	gloves work	headlamp
clinometer	field vest (surveyors)	note book	Extra clothes
rain gear	hand lens	range finder	–

Table 3: Crew Equipment Checklist - SEE NOTE ABOVE FOR MINIMUM REQUIREMENTS

Crew Equipment Checklist	·	·	·
glasses safety	Oakton Multimeter	Hand saw	Backpack Electrofisher
stop nets x 4	salt blocks	loose salt	dip nets x 2
Linesman Gloves x 3	tape measure hand	tape measure eslon	pilon x 2
Measuring board	Scale	Permits	Backroads Mapbook
Locational maps	Fish ID book	Background Documents	radio handheld
Satelite communicator	Field Safety Plan	first aid kit level 1	First Aid binder stocked
Site Cards / Field Guide	Minnow Traps	Catfood	Flagging
Laptop w/basecamp	GPS cable	Lazer level	Assessment cards fish passage
UAV radio	UAV	UAV landing pad	UAV GC tape
UAV safety plan (when required)	UAV registration	UAV license	UAV radio license
UAV backpack	Flow meter	ATV	Throw bags
polaski	shovel	fire extinguisher backpack	fire extinguisher pressurized

Crew Equipment Checklist	•	•	•
bucket rigid x 2	bucket foldable	clove oil kit w/ instructions	gloves leather
hard hat	steel toed boots	sharpies	ATV gas
ATV lock	UAV battery charger	wader disinfectant kit	GPS batteries
ATV helmets	Battery booster	Compressor 12V	Rubber boots (no-slip soles)
Small BT Speaker (for bears)	large backpack	–	–

Table 4: eDNA Equipment Checklist - SEE NOTE ABOVE FOR MINIMUM REQUIREMENTS

eDNA Equipment Checklist	•	•	•
field vest (surveyors)	note book	GPS	eDNA sampler
Car adaptor for charging eDNA batteries	Aluminium filter membrane housings x10	Filters	Extra hose
Nalgene bottles	Bleach Decontamination Bottle	Rinse bottle	Forceps/tweezers
95% ethanol	Colman cooler	Ice	Silica beads
Coin envelopes	Ziploc snack bags -medium	Ziploc snack bags -large	Nitrile gloves
3 jars/bowl/cups	–	–	–

Table 5: CABIN Equipment Checklist - SEE NOTE ABOVE FOR MINIMUM REQUIREMENTS

CABIN Equipment Checklist	•	•	•
clinometer	field vest (surveyors)	note book	GPS
phone/camera	Waders	Wading Boots (Rubber-soled only)	Turbidity Meter LaMotte 2020e
bucket rigid x 2	sharpies	wader disinfectant kit	GPS batteries
Colman cooler	Ice	Ziploc snack bags -medium	CABIN field sheets
clipboard	Gloves (rubber, neoprene)	Inside bottle waterproof label - use waterproof paper	Duct tape and tool kit
Densiometer	Velocity metre OR Meter stick	Measuring Tape	15 or 30cm ruler
Hand Level	Calculator	Tent pegs	CABIN Benthic Kick Net
Sieve	White tray	Squeeze Bottles	Spoon/tweezers
Bucket	Cabin sample jars	Formalin	–

Table 6: Truck Equipment Checklist - SEE NOTE ABOVE FOR MINIMUM REQUIREMENTS

Equipment	·	·	·
Hand saw	radio truck	Satelite communicator	first aid kit level 1
polaski	shovel	fire extinguisher backpack	truck tow rope
truck/car jack	Battery booster	Compressor 12V	pilon x 2
Tow strap	cloth or paper towel	–	–

Nearest Hospitals

Figure 1: University Hospital of Northern British Columbia - 1475 Edmonton St., Prince George, BC V2M 1S2 - 250-565-2000

Emergency Response Plan

New Graph Environment's detailed emergency response procedures can be found here. These procedures should be reviewed and an emergency response plan should be completed for each job site. Our Emergency Responce Plan template can be downloaded here.

Driving

We will be driving on forest service roads where it is essential to exercise caution and adhere strictly to all radio use protocols to ensure our safety. Proper communication on these roads helps prevent accidents by keeping everyone informed about vehicle movements and road conditions. Please review the resource road safety and radio use sections of our Health and Safety plan so that everyone stays safe.

Field Plan

Fieldwork will focus on baseline monitoring in the Parsnip, Crooked, and Carp River watershed groups, and fish passage (Phase 1) and habitat confirmation (Phase 2) assessments in the Nation River watershed group. Activities will include electrofishing at permitted sites and the collection of environmental DNA (eDNA) samples. Crews from McLeod Lake Indian Band and other partners will support the fieldwork.

Fieldwork methods will result in products feeding reporting formats such as our 2024 and 2023 reports. We generally follow procedures in:

- fish passage assessments (Ministry of Environment 2011)
- habitat confirmations (Fish Passage Technical Working Group 2011).

Information on fish presence/absence, species composition, density, and distribution limits is useful for prioritizing crossings for fish passage restoration and informing follow-up monitoring. To support this, electrofishing, minnow trapping, and eDNA sampling may be conducted where appropriate.

Standard Fish and Fish Habitat Inventory Field Forms (site cards) are used to collect habitat data. The field guide for completing these forms is available here.

Passive Integrated Transponder (PIT) tagging equipment is available and may be used to mark fish captured at electrofishing sites. Tagging can support long-term monitoring by providing data on population size and fish movement upstream and downstream of crossings. An overview of the tagging process is available here. To anesthetize fish prior to PIT tagging, we use a clove oil solution at 0.1mL/L (1:10,000), which provides effective sedation with minimal residual effects (Fernandes et al. 2017). The solution is prepared by dissolving clove oil in ethyl alcohol at a 1:9 ratio before mixing into water (Fernandes et al. 2017).

Digital field forms are used to collected data, utilizing Mergin Maps, which syncs with QGIS and supports offline use. Instructions for setting up Mergin Maps and using the digital field forms can be found in the Fish Passage Guidebook. Users should send their Mergin usernames to enable project sharing and form access.

A field guide to freshwater fish identification, such as *Field Key to the Freshwater Fishes of British Columbia* by McPhail and Carveth (1993), can be useful during fieldwork. It is available for download here.

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 7pm 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 Figure 2. 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 accommodations

again. Repeat after 2 hours (9 pm) - if no response then notify the RCMP of a missing persons in field.

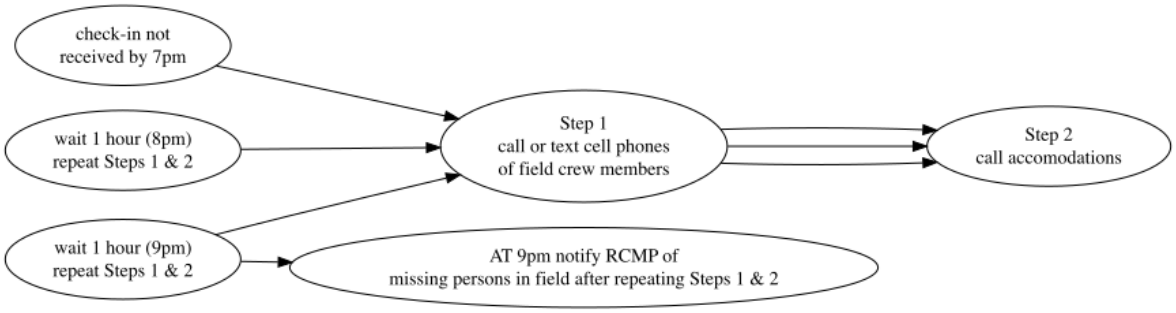

Figure 2: Procedures for failed check-in

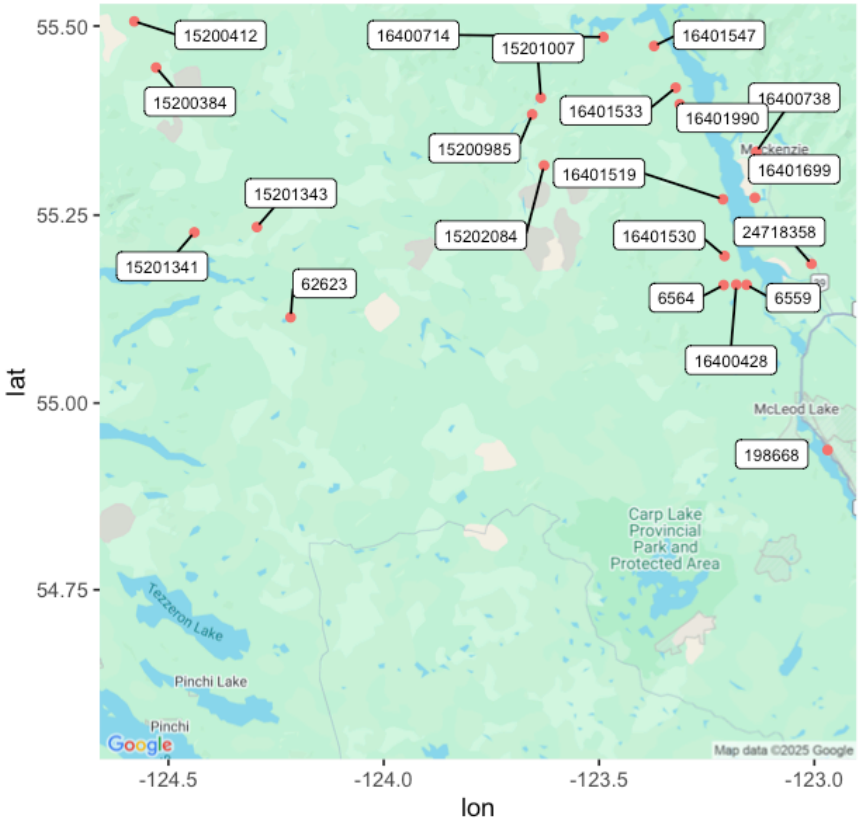

Figure 3: Map of potential sampling areas.

Table 7: Potential Phase 1 assessment, Phase 2 assessment, and Electrofishing Locations

id	stream_name	utm_zone	utm_easting	utm_northing	watershed_group_code	pscis_assessment_comment
6559	–	10	489968	6112333	PARA	beaver dam 30 m u/s of culvert, trout observed in outlet pool, deep fill over culvert 10m est, rusty waterline inside culvert is at about 70% of D - undersized, large plunge pool, reco
6564	–	10	486579	6112299	PARA	–
62623	Suschona Creek	10	422422	6108185	NATR	Only good rearing habitat available, water murky. Pipe rusted; some flow undrneath.
125000	Tributary To Parsnip River	10	577541	6038215	PARS	High priority candidate for restoration. Good habitat. Surveyed upstream continuosly for 350 m to beaver influenced wetland area where walking became difficult. Then stream was visited again upstream at 1.6 km upstream from crossing then again at approximately 2.5 km upstream of crossing. Undercut banks provide areas of deep cover ad Large woody debris is scattered througout. Overhanging vegetationalso provides cover througout. Pools observed were somewhat shallow but were preseetevery 20 - 30 m or so. Minnowtrapping conducted upstream and downstream of crossing. Electrofishing conducted downstream of the crossing. No fish captured upstream of the culvert. First beaver dam located approximately 330m upstream of the culvert.
125179	Unnamed Tributary To Missinka River	10	570307	6052836	PARS	High priority candidate for restoration with habitat for rearing and overwintering upstream. Surveyed upstream for 520 m with no barriers to fish passage present. Bull trout and rainbow recorded upstream. Some deep pools for overwintering and rearing. Large woody debris and undercut banks throughout. Sections of gravel suitable for spawning. Good flow. Surveyed downstream for 360 m. No barriers observed and none likely downstream of surveyed section due to gradients. Abundant large woody debris and gravels suitable for spawning.
125180	Tributary To Missinka River	10	569665	6053046	PARS	Two pipes each at 1.2m in diameter, with one showing an inlet drop. Both pipes are embedded, except for 1 m at the inlet of one pipe, allowing them to function as embedded culverts, resulting in a low priority for replacement. The habitat is high quality, featuring deep pools and gravels. Rainbow trout ranging from 40-140 mm were captured during sampling.. 12:26:48

id	stream_name	utm_zone	utm_easting	utm_northing	watershed_group_code	pscis_assessment_comment
125231	Tributary To Table River	10	549962	6065137	PARS	Culvert replaced with Bridge by C4 in the summer of 2024 with environmental oversight and engineering from DWB. Very nicely designed structure that fits the stream channel well. Minimal rock placement within areas likely to be within the natural channel with not constricting the channel. It is recommended that future projects incorporate vegetated riprap and reinstall the vegetation removed from the construction footprint within the same area.. 15:35:51
125261	Fern Creek	10	534601	6067771	PARS	Reassessed as part of a baseline assessment before hopeful future replacement. Fish sampling was conducted in a 75-meter stretch downstream and a 50-meter stretch upstream of the culvert, and fish 60 mm or greater were tagged with PIT tags. There are baffles made of metal in the culvert and ¬æ of the pipe is embedded with streambed material. The outlet of the pipe sits on a large pile of rip rap creating a 30 cm cascade that occurs approximately a meter after the outlet of the pipe. There are two overflow pipes each at 0.9 m in diameter. . 15:58:48
125749	Unnamed Tributary To Airline Creek	10	374238	6102796	NATR	RB observed u/s. Rhab - G, Shab - G, Ohab - G. Outlet blocked by 200kg boulders apparently to prevent scour. Silt fences placed at road crown do not function - road surface erodes to stream.
125755	Glaucers Creek	10	359563	6116606	NATR	RB observed throughout. Pipe with baffles. Rhab - G, Shab - L, Ohab - G. Documented BB, RB, CSU, LSU, NSC, RSC.
198668	Tributary To Mcleod Lake	10	501971	6087814	CARP	Abundant gravels, suitable for spawning upstream. Although flows are minimal, the streams does still have water. Models as having over 3 km of habitat upstream below 5%. Although no fish are recorded as present upstream it seems highly likely that this would be a fish bearing stream. Outlet drop is 80cm. Steep section of pipe at the inlet recorded as inlet drop. Ministry of Transportation chris_culvert_id: 1996852. 13:40:04
15200034	–	10	357257	6160917	NATR	–
15200384	–	10	403312	6145393	NATR	–
15200412	Gillis Creek	10	400259	6152248	NATR	–
15200939	Nation River	10	325553	6152065	NATR	–
15200985	–	10	458491	6137652	NATR	–
15201007	–	10	459777	6140085	NATR	–
15201341	–	10	408422	6121011	NATR	–
15201343	–	10	417680	6121619	NATR	–
15201728	–	10	330395	6149308	NATR	–

id	stream_name	utm_zone	utm_easting	utm_northing	watershed_group_code	pscis_assessment_comment
15201740	Fish Creek	10	355086	6123605	NATR	–
15201834	–	10	362065	6124875	NATR	–
15202084	–	10	460163	6130113	NATR	–
15202950	–	10	361739	6134520	NATR	–
15203146	–	10	334061	6150367	NATR	–
16400428	–	10	488458	6112359	PARA	–
16400714	–	10	469038	6148922	PARA	–
16400738	–	10	491471	6131967	PARA	–
16401519	–	10	486512	6124976	PARA	–
16401530	–	10	486724	6116602	PARA	–
16401533	Dastaiga Creek	10	479617	6141422	PARA	–
16401545	Blackwater Creek	10	456256	6156862	PARA	–
16401547	–	10	476480	6147560	PARA	–
16401699	Gagnon Creek	10	491234	6125187	PARA	–
16401990	–	10	480206	6138995	PARA	–
24718358	Buth Creek	10	499574	6115412	PARA	–

References

Fernandes, I. M., Y. F. Bastos, D. S. Barreto, L. S. Lourenço, and J. M. Penha. 2017. “The Efficacy of Clove Oil as an Anaesthetic and in Euthanasia Procedure for Small-Sized Tropical Fishes.”*Brazilian Journal of Biology = Revista Brasleira De Biologia* 77 (3): 444–50. https://doi.org/10.1590/1519-6984.15015.

Fish Passage Technical Working Group. 2011. “A Checklist for Fish Habitat Confirmation Prior to the Rehabilitation Fo 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.

McPhail, J. D., and R Carveth. 1993. “Field Key to the Freshwater Fishes of British Columbia.”https://www2.gov.bc.ca/assets/gov/environment/natural-resource-stewardship/nr-laws-policy/risc/field_key_to_freshwater_fishes_of_bc_field_size_water_resistant_version.pdf.

Ministry of Environment. 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.