Site C Clean Energy Project

Offset Effectiveness Monitoring of Site 108R – Year 1 (2020)

Peace River Fish Community Monitoring Program (Mon-2, Task 2d)
Peace River Physical Habitat Monitoring Program (Mon-3, Task 2c)

Construction Year 6 (2020)

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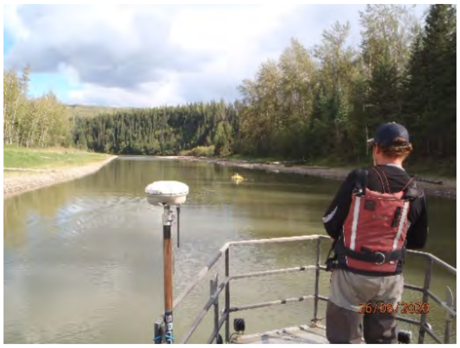
In association with Golder Associates

July 23, 2021

Site C Clean Energy Project

Offset Effectiveness Monitoring of Site 108R – Year 1



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EXECUTIVE SUMMARY

Background and Objectives

Fish and fish habitat are valued components of the Peace River that are considered important by BC Hydro, Indigenous Nations, the public, the scientific community, and government agencies. The Site C Clean Energy Project (the Project), including Project construction, reservoir filling, and operation, could affect fish and fish habitat via three key pathways: changes to fish habitat (including nutrient concentrations and lower trophic level biota), changes to fish health and fish survival, and changes to fish movement (Golder 2020).

This report represents a summary of Offset Effectiveness Monitoring (OEM) in 2020, during the first year after the construction of habitat offset channels for Site 108R. The monitoring was specified under Task 2d of the Mon-2 Peace River Fish Community Monitoring Program and Task 2c of the Mon-3 Peace River Physical Habitat Monitoring Program, components of the Fish and Aquatic Habitat Monitoring and Follow up Program (FAHMFP; BC Hydro 2015a).

BC Hydro committed to Offsetting Plans under its two applications to Fisheries and Oceans Canada (DFO) for *Fisheries Act* Authorizations (FAAs) under Section 35(2) of the *Fisheries Act* (DFO 2015: 15-HPAC-00170 for Site Preparation, DFO 2016; 15-HPAC-01160 for Dam Construction, Reservoir Preparation and Filling. The Offsetting Plans specify offsetting construction in several locations including Site 108R, and monitoring was specified to ensure design objectives are met.

Site 108R was designed to:

- Increase the quantity and quality of permanently wetted habitat to support primary and secondary production as food production for fish and provide rearing, feeding, and overwintering habitats for fish;
- Reduce fish stranding; and
- Increase the complexity and variability of fish habitat to support the variety of life stages of local fish populations.

The design features were completed specifically to increase the rearing and feeding habitat available for Arctic Grayling *(Thymallus arcticus)*, Mountain Whitefish *(Prosopium williamsoni)*, and Rainbow Trout *(Oncorhynchus mykiss)* by including the following features in the design (reproduced from Northwest Hydraulic Consultants (NHC) 2016):

- Provide stable, wetted aquatic habitat for a range of operational flows;
- Optimize habitat suitability in terms of depths and velocities for the expected fish community;
- Design channel sections and profiles to provide a range of hydraulic habitat types for cover, feeding, and holding; and

- Provide predominantly gravel-cobble channel substrate suitable for rearing, feeding, and benthic production.

The construction at Site 108R occurred between 2018 and 2020. Channels and waterbodies existing within 108R were modified, and new habitat was constructed to meet the specifications of the design plan. The following specific construction activities were completed:

- Two side channels were constructed that linked the Peace to an existing backwater (West and East Side Channels);
- An additional channel (South Side Channel Spur Extension) was constructed that provides low velocity habitat;
- Sections of the backwater were enlarged and deepened (once construction was complete the western portion was known as the Backwater channel, and the eastern portion as the South Side Channel);
- The Main Channel Bar was modified to provide, substrate depressions, and permanently wetted habitat; and
- As-built surveys were completed by NHC during May 2020 (Blezy and Chilibeck 2020).

The Offsetting Plans specified that effectiveness monitoring at Site 108R would be undertaken following completion to verify that:

- The offsets have been implemented as designed and approved;
- The offsets maintain their design and purpose over time; and
- The offsets are biologically effective (i.e., support ongoing productivity).

Offset environmental monitoring of indicator fish species is referenced in the Site C FAHMFP (BC Hydro 2015a). The indicator species specified are Arctic Grayling, Bull Trout *(Salvelinus confluentus)*, Mountain Whitefish, Rainbow Trout, and Walleye *(Sander vitreus)*, though Burbot *(Lota lota)* and Goldeye *(Hiodon alosoides)*[1] are also included as species of interest (BC Hydro 2015a; DFO 2016).

This report describes the first year of monitoring conducted in late summer and fall 2020. This report covers effectiveness monitoring of physical habitat attributes and fish use of the offsetting habitat.

Physical Habitat

The objective of the OEM for physical habitat is to ensure that the offset areas maintain their structure and function over time. The areas will be evaluated for changes to fish habitat suitability by measuring

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[1] The species listed are the indicator species listed in the FAHMFP (BC Hydro 2015a), whereas design at Site 108R was specifically completed to provide habitat for Arctic Grayling, Mountain Whitefish, and Rainbow Trout.

changes in water depths, water velocities, substrate sizes, areas of habitat enhanced, and the type and spatial arrangement of habitats.

Physical habitat sampling during Year 1 was conducted over two sampling periods intended to target different flow conditions in the Peace River. The crew surveyed water depth, riverbed elevation, and flow velocity along lateral transects and longitudinal profiles in each of the constructed channels within Site 108R, and along the recontoured Main Channel Bar. Data were collected using an Acoustic Doppler Current Profiler (ADCP) and Global Positioning System (GPS) unit carried by a remotely operated boat. Additionally, channel substrate composition and the integrity of large woody debris habitat structures were visually assessed.

The depth/velocity transects were processed to calculate summaries of hydraulic parameters for each transect (wetted width, average water depth, average water velocity, maximum depth). A model was used to calculate weighted usable width (WUW), a measure of habitat quantity, by applying habitat suitability indices to field measurements of hydraulic variables. WUA (weighted usable area) was also calculated by multiplying each transect WUW by the associated channel length. WUA was calculated for juvenile and adult life stages of Mountain Whitefish and Rainbow Trout, and for juvenile Bull Trout.

Longitudinal bed profiles were compared with bed elevations within the design (NHC 2019) to assess whether the constructed habitats remained in place. Bed profiles in the Main Channel Bar, Backwater and South Side Channel Spur Extension matched the design, while the East and West Side Channels showed discrepancies. The as-built survey completed in May 2020 (Blezy and Chilibeck 2020) was also reviewed to determine if the discrepancies were a result of construction field-fitting, or erosion and sediment transport. The survey results show that the discrepancies between as-built and design are substantial smaller than between as-built and the longitudinal surveys of this study. This suggests that discrepancies between design and longitudinal surveys resulted primarily from erosion/aggradation processes enabled by high flows, although minor deviations from the design to accommodate field fit during construction may also have contributed.

Habitat diversity is provided by the range and variable combinations of depth, velocity, and substrate composition within the offset channels. The offset habitats are functioning as intended by providing habitat for indicator species that were predicted to occupy the offset areas (i.e., Arctic Grayling, Mountain Whitefish, and Rainbow Trout) (BC Hydro 2015a). During the August trip, WUA for juvenile Mountain Whitefish was 17,112 m^2 at high flows (2,139 m^3/s) and 21,163 m^2 at lower flows (932 m^3/s). WUA for adult Mountain Whitefish was 40,609 m^2 at high flows (2,139 m^3/s) and 46,588 m^2 at lower flows (932 m^3/s). WUA for Rainbow Trout (juveniles and adults) was 22,609 m^2 at high flows (2,139 m^3/s) and 31,895 m^2 at lower flows (932 m^3/s).

Moderate habitat suitability for juvenile Mountain Whitefish was observed in the slower velocity habitats (Backwater Channel and South Side Channel Spur Extension). Moderate to high suitability was observed for adult Mountain Whitefish in all offset habitats (excluding the Main Channel Bar).

Moderate suitability was observed for Rainbow Trout (juveniles and adults). The East and West Side Channels offered the greatest suitability, particularly under lower flows (i.e., 932 m^3/s).

The condition of large woody debris (LWD) structures, substrates, channel profiles, and vegetation was assessed visually at low flow conditions on October 2, 2020, when Peace River discharge was low (390 m^3/s). Visual assessments of the functionality of the offset areas were conducted at higher flow ranges when the physical habitat transects were measured and fish abundance was sampled. Underwater viewing of stream substrate and submerged habitat features was not feasible in 2020 due to high turbidity. Aquatic vegetation was not visible within the channels, including low velocity closed channels with fine substrate where aquatic macrophytes would typically colonize.

The condition of LWD structures, substrates, and channel profiles were compared to design criteria and geometry (Chilibeck 2016; NHC 2019). The offset areas were found to be functioning as intended and were structurally intact; however, discrepancies are apparent between the design and the longitudinal bed profiles. The discrepancies include channel bed grade changes in the East and West Side Channels and recent erosion along the river right bank of the lower portion of the West Side Channel. Gravel and cobble dominated the higher velocity channels which were designed to provide permanent flow and offer habitat suitable for a wide range of salmonid species and life stages. Submerged root wads and debris catcher pilings were intact and may provide additional cover and habitat complexity for fish if additional woody debris is recruited. Bank erosion and channel widening was observed in the West Side Channel, and to a lesser degree in the East Side Channel. Further monitoring will be required to confirm that channels continue to function as intended.

Fish Use

Fish use monitoring of Site 108R was based on a sample design that targeted several indicator species outlined in the BC Hydro Site C FAHMFP (BC Hydro 2015a). Sample methods within Site 108R used large boat electrofishing for deeper sections and small boat or backpack electrofishing for shallower sections. Minnow/hoop traps and beach seines were also employed. Data were also collected on non-indicator species (e.g., suckers, Northern Pike, sculpins, dace, shiners). Methods were consistent with past monitoring conducted during the 2009-2011 Peace River Fish and Fish Habitat Assessments (Mainstream 2012 and Large Fish Indexing Surveys (Mon-2, Task 2a; Golder and Gazey 2019).

Site 108R was sampled for fish presence over a two-month period that began approximately four months after construction was completed. The results indicate colonization by both indicator and non-indicator species. Using boat electrofishing, all indicator species were found to be present within site 108R, with Mountain Whitefish the most abundant. Overall, non-indicator species made up a larger portion of the catch than indicator species. While electrofishing (small and large boat, and backpack) was generally effective at capturing the indicator species, less success was had with minnow/hoop traps and beach seines.

Small boat electrofishing was used in all areas (East and West Side Channels, South Side Channel and Spur Extension and the Backwater Channel) of Site 108R except the Main Channel Bar. The highest small boat electrofishing CPUE was measured in the West Side Channel followed by the South Side Channel Spur Extension. The lowest CPUE was in the Backwater Channel. Large boat electrofishing was conducted in the Main Channel Bar and had the highest CPUE of any area with any method. Further comparisons of habitat utilization among species and areas within Site 108R will be possible after more years of sampling have been completed. These results demonstrate that the offsetting habitat is providing fish habitat for a variety of species and life stages as intended in the offset design (BC Hydro 2015a).

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1. INTRODUCTION AND BACKROUND

Fish and fish habitat are valued components of the Peace River that are considered important by BC Hydro, Indigenous Nations, the public, the scientific community, and government agencies. The Site C Clean Energy Project (the Project), including Project construction, reservoir filling, and operation, could affect fish and fish habitat via three key pathways: changes to fish habitat (including nutrient concentrations and lower trophic level biota), changes to fish health and fish survival, and changes to fish movement. These paths are examined in Volume 2 of the Project's Environmental Impact Statement (EIS)[2].

This report represents a summary of Offset Effectiveness Monitoring (OEM) in 2020, during the first year after construction of habitat offset channels for Site 108R. The monitoring was specified under Task 2d of the Mon-2 Peace River Fish Community Monitoring Program and Task 2c of the Mon-3 Peace River Physical Habitat Monitoring Program, components of the Site C Fish and Aquatic Habitat Monitoring and Follow up Program (FAHMFP; BC Hydro 2015a).

BC Hydro committed to Offsetting Plans under its two applications to Fisheries and Oceans Canada (DFO) for *Fisheries Act* Authorizations (FAAs) under Section 35(2) of the *Fisheries Act* (DFO 2015: 15-HPAC-00170, DFO 2016; 15-HPAC-01160) for several components of the Project including: 1) Site Preparation, and 2) Dam Construction, Reservoir Preparation and Filling. The Offsetting Plans included improvements at Site 108R. A component of the Site 108R, described as the Backwater Channel[3], supports the Site Preparation Offsetting Plan and the remainder of Site 108R falls under the Dam Construction, Reservoir Preparation and Filling Offsetting Plan (BC Hydro 2015b, BC Hydro 2015c).

The offsetting measures were designed to:

- Increase the quantity and quality of available, permanently wetted habitat to support primary and secondary production as food production for fish, and to provide rearing, feeding, and overwintering habitat for fish;
- Reduce fish stranding; and
- Increase the complexity and variability of fish habitat to support a variety of life stages for local fish populations.

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[2] Available for download at: http://www.ceaa-acee.gc.ca/050/document-eng.cfm?document=85328.

[3] Referred to as "Side Channel Site 108R" in BC Hydro Fisheries Act Application for Authorization - Site Preparation (BC Hydro 2015b)

The designs of the offsets are described in the Project's Fisheries and Aquatic Habitat Management Plan [4](BC Hydro 2015a). Offsetting activities fall under two separate FAA's granted to BC Hydro. The FAA application for Site Preparation (BC Hydro 2015b) provides the following summary with regards to the construction of the Backwater Channel at Site 108R (Map 1):

- Approximately half (1 km) the length of the Backwater/South Side Channels was deepened by excavation to create a backwater effect from the Peace River over a range of operational flows, ensuring that wetted habitat is maintained. The existing habitat in this section of the side channel was shallow, low gradient, and low velocity, with fine sediments and aquatic vegetation. Channel contouring increased depth and wetted area and was planned to increase overall habitat suitability. The offsetting provides 3.66 ha of stable wetted side channel habitat and increases habitat suitability through enhanced cover and feeding areas for fish. Habitat complexity was increased by providing habitat features preferred by fish in a backwater habitat.

The second FAA application submitted by BC Hydro was for Dam Construction, Reservoir Preparation, and Filling (BC Hydro 2015c), which provides the following summary with regards to the construction of Site 108R:

- Overall, approximately 40 ha of area at Site 108R will be enhanced for the purposes of increasing permanently wetted area, habitat quality, and reducing stranding risk. Approximately 15 ha will be excavated to ensure that wetted habitat is maintained over a range of operational flows. An additional 25 ha of Site 108R will be filled to reduce the risk of stranding associated with the dewatering of shallow water areas.

- The design includes opening two ephemeral side channels (referred to on the design drawings as West and East Side Channel; NHC 2016). These channels were designed to follow relic side channel alignments. The channel inlets, outlets, and slopes were designed to maintain continuous wetted habitat for a range of water levels. Material from the side channel excavations were side cast in the fill areas, which included depressed areas and inlets to other ephemeral side channels that pose a dewatering risk. Grade control structures that consisted of a layer of cobble material were included at the inlets and outlets of the side channels. Local bank protection works were also included along the fill slopes in areas where velocities were anticipated to be high.

- Finally, the Main Channel Bar at the downstream end of the island was lowered. Excavated material was placed in select locations to allow for the development of riparian vegetation. Habitat was enhanced with depressions that were excavated into the lowered bar to increase hydraulic complexity. The depressions were 10 to 20 m in width and 26 to 74 m in length, and varied in depth from 1.5 to 2.0 m deeper than the adjacent bed.

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[4] Available for download at: https://www.sitecproject.com/sites/default/files/Fisheries_and_Aquatic_Habitat_Management_Plan.pdf

- In summary, the offsetting habitat at Site 108R will provide approximately 3.0 km of stable, high quality, wetted side channel habitat as well as enhancements to mainstem bars that are expected to provide fish with habitat for rearing, overwintering, and feeding purposes.

The Site 108R channels were designed to remain wetted through the normal range of Site C operational flows which range from a minimum of 390 m^3/s to a maximum of 2,060 m^3/s. Peace River overtopping of constructed channel banks to the adjacent areas will occur at flows greater than approximately 2,000 m^3/s which is predicted to occur approximately 8% of the time (Chilibeck 2016).

Several Site 108R design updates occurred following submission of the FAA Application for Dam Construction, Reservoir Preparation and Filling. In accordance with FAA condition 5.3, these changes, and final design drawings were provided to DFO 60 days prior to the start of offset construction.

Updates to the design were made based on additional site investigations and review, and refinement of modelling and drafting. These updates were expected to provide benefits to habitat function and result in benefits to fish. The updates relative to the design in the application were as follows:

- Flow complexity and meander in the West Side Channel was achieved by constructing a sinuous channel (new feature) rather than constructed islands (feature in existing design concepts that is replaced by the sinuous channel). This design reduces potential navigation risks[5] and also facilitates natural movement of woody debris.

- The portion of the works in the Peace River at the downstream end of the site was renamed the 'Main Channel Bar'.

- Channel complexing has been achieved using engineered log jams at point bars and embayments, rather than placement of woody debris. These larger engineered log jams are expected to be more effective channel complexing features.

- The orientation of inlets to the West and East Side Channels were reconfigured to a more sweeping alignment. This orientation mimics the entrances of natural side channels along the Peace River, improves hydraulics, reduces potential bank erosion, and facilitates woody debris transport.

- The 'fill' areas were refined to balance 'cut' and 'fill' so that no additional materials needed to be imported.

- Excavation and fill were limited in areas with fine-textured sediment that were expected to mobilize naturally as flow into the channel was increased.

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[5] Navigation Protection Act Approval (2017-500079) requires that: "Fish habitat complexes cannot fully obstruct the West, East and South Side Channel Spur Extensions and access for small boats must be maintained. "

Construction of offsetting habitat at Site 108R began in 2018 and was completed in May 2020 (Blezy and Chilibeck 2020). A field fit design addition during construction included an approximately 0.5 km backwater channel between the West and East Side Channels, which is described in this report as the South Side Channel Spur Extension.

Condition 5.1.1 of the Site Preparation FAA and Conditions 6.3 and 6.4 of the Dam Construction FAA state that the Proponent shall provide an annual effectiveness monitoring report to DFO. This report documents the results of monitoring for the Site 108R Backwater Channel (Site Preparation FAA) and for the remainder of Site 108R (Dam Construction FAA) in accordance with this condition.

The first of three years of OEM monitoring for offset area Site 108R, supporting both the Site Preparation and Dam Construction FAAs, took place between August and October 2020. The results of the monitoring are the focus of this report (DFO 2015, DFO 2016).

Site C 108R Overview Map

Legend

● Hydrometric Station

═ Site C Dam

MAP SHOULD NOT BE USED FOR LEGAL OR NAVIGATIONAL PURPOSES

0 0.5 1 km

Scale: 1:40,000

NO.	DATE	REVISION	BY
1	2021-04-28	1200_STC_ProjectOverview_4055_20210112	
2			
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Date Saved: 2021-04-28
Coordinate System: NAD 1983 UTM Zone 10N

ECOFISH RESEARCH

Map 1

Path: M:\Projects-Active\1200_SiteC\MXD\Overview\1200_STC_ProjectOverview_4055_20210112.mxd

2. MANAGEMENT QUESTIONS AND OBJECTIVES

2.1.1. Management Questions

The FAHMFP states that the objective of Offset Effectiveness Monitoring is to determine the biological effectiveness of the offsets (i.e., to support ongoing productivity) by monitoring fish abundance and community composition at both a site (i.e., 100's m) and reach-scale (i.e., 10's km) (BC Hydro 2015a). Data were specifically collected as part of this study to summarize the effectiveness of the offset areas at a site-scale. Reach-scale monitoring will be collectively achieved with several tasks specified within the Site C FAHMFP. Furthermore, the offset areas are not expected to have an immediate reach-scale effect; therefore, summaries of the reach-scale effectiveness of the offset areas will be provided during future study years under the Site C FAHMFP.

Site-scale offset effectiveness monitoring as detailed in this report includes activities conducted under two different components of the Site C FAHMFP: the Peace River Physical Habitat Monitoring Program (Mon-3) and the Peace River Fish Community Monitoring Program (Mon-2).

Effectiveness monitoring is intended to provide answers to the following management questions listed in the applications for the Site Preparation and Dam Construction FAAs (BC Hydro 2015b, BC Hydro 2015c):

- Are the offsets implemented as designed and approved?
- Do the offsets maintain their design and purpose over time?
- Are the offsets biologically effective (i.e., support ongoing productivity)?

The second question is addressed by testing Hypothesis #3 of Mon-3 (BC Hydro 2015a):

> *H_3*: Site C offset habitat areas in the Peace River maintain their design and purpose over time.

The third question pertaining to biological effectiveness is addressed by testing Hypothesis #6 of Mon-2 (BC Hydro 2015a):

> *H_6*: Indicator fish species will use the Site C offset habitat areas in the Peace River between the Project and the Many Islands area in Alberta for rearing, feeding, and/or spawning.

Detailed objectives for the fish sampling and physical habitat components as they pertain to these management questions and associated study hypotheses are provided below.

2.1.2. Physical Habitat

The objective of the OEM for physical habitat is to monitor the constructed offset habitats to assess their structure and function over time. Channel morphology surveys can assess the condition of habitat restoration features. Ongoing topographic surveys can determine if the physical characteristics of the offsetting channels are changing over time, which entails surveying channel transects and longitudinal profiles and comparing observations to the design drawings (NHC 2019). These surveys augment the as-built surveys completed by NHC during May 2020 (Blezy and Chilibeck 2020).

As part of the OEM, the functionality of the channels is also being evaluated by assessing the habitat suitability by measuring variability in water depths, water velocities, and substrate sizes over time. Using these data, Weighted Useable Area (WUA) is calculated for adult and juvenile Rainbow Trout *(Oncorhynchus mykiss)*, Mountain Whitefish *(Prosopium williamsoni)*, and juvenile Bull Trout *(Salvelinus confluentus)*. Although, Arctic Grayling *(Thymallus arcticus)* are expected to use the channels, WUA calculations were not required under the Site C FAHMFP. WUA results from Rainbow Trout, Bull Tout, and Mountain Whitefish will inform the OEM of the Peace River Fish Community Monitoring Program (Mon-2, Task 2d) and be used to identify linkages between fish habitat and fish use (BC Hydro 2015a)[6].

2.1.3. Fish Sampling

The objective of the OEM fish sampling task is to determine the biological effectiveness (i.e., to support ongoing productivity) of the offsets by monitoring fish abundance and community composition. The fish sampling task (Mon 2, Task 2d) is designed to provide site-scale monitoring of the offsets. This sampling targets monitoring of all available fish species and life stages within the offset channels to evaluate post construction fish use. Large boat electrofishing was conducted within offset areas under the Large Fish Indexing Surveys (Mon-2, Task 2a; Golder and Gazey 2019) and during the FAHFMP Peace River Fish Composition and Abundance Survey (Mon-2, Task 2b), and is included in this report as both tasks measured fish use within Site 108R.

The sampling specified under OEM monitoring for Site 108R (Mon 2, Task 2d) was designed to target the fish community in Site 108R and focused on several species identified as indicator species in the Site C FAHMP, including Arctic Grayling, Bull Trout, Burbot *(Lota lota)*, Goldeye *(Hiodon alosoides)*, Mountain Whitefish, Rainbow Trout and Walleye *(Sander vitreus)*[7]. Of the indicator species, Arctic Grayling, Mountain Whitefish and Rainbow Trout were expected to utilize the offset habitat within Site 108R for feeding and rearing, as well as, Walleye for feeding (BC Hydro 2015a, BC Hydro. 2015c) and habitat use by these species is examined. After three years of monitoring, results of both the fish and physical habitat components will be analyzed, and the findings will be reviewed (BC Hydro 2015a).

3. METHODS

3.1. Physical Habitat Sampling

3.1.1. Site Selection

Physical habitat sampling during Year 1 was conducted during two sampling periods from August 25 - 27 and September 5 - 6, 2020. The sampling periods were intended to target different

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[6] WUA is not required for Bull Trout as part of the FAHMFP (BC Hydro 2015a); however, Bull Trout were captured during the study and habitat suitability indices are available, so WUA was calculated.

[7] The Site 108R offset areas were not predicted to yield measurable improvements to habitats preferred by Bull Trout, Burbot, Goldeye (BC Hydro 2015a).

flow conditions in the Peace River. During the high flow trip in August the Peace River discharge was approximately 2,150 m^3/s. By early September discharge had decreased to approximately 930 m^3/s. The crew surveyed water depth, riverbed elevation, and flow velocity along lateral transects and longitudinal profiles in the South, East and West Side Channels, the South Side Channel Spur Extension, the Backwater Channel and along the recontoured Main Channel Bar on the river right of the Peace River (Map 2).

Transect locations were selected to represent each habitat feature type, based on design drawings provided by NHC (Blezy and Chilibeck 2020). Sites were selected to provide an even distribution of habitat features including pools, riffles and channel depressions. They did not overlap precisely with the existing hydraulic design modelling transects because the previous cross sections did not run perpendicular to the final channel design. Sites were also placed near the inlets to channels with direct connection to the Peace River (i.e., West Side Channel and East Side Channel).

There were 26 transects selected, eight of which were in the West Side Channel, five in the East Side Channel, four in the South Side Channel Spur Extension, five in the Backwater Channel, and four through the recontoured Main Channel Bar in the mainstem of the Peace River. Transects were divided into 15 high priority and 11 low priority sites. The high priority sites were deemed critical for the analyses of this study, while the low priority sites would provide additional information if field time permitted. In August and September of 2020, data were collected and analyzed for all 15 high priority transects. A few of the low priority transects were recorded for both flow conditions sampled, although they were excluded from the analysis. The low priority transects may be useful during the Year 2 or 3 analysis to aid in interpretation of results.

In addition to lateral transects, the crew also recorded water depth, riverbed elevation, and velocity along longitudinal profiles in each of the five channels, as well as along the Main Channel Bar. These profiles follow the approximate location of the thalweg in each channel.

3.1.2. Field Data Collection

Water depths, riverbed elevation, and flow velocities along lateral transects and longitudinal profiles within Site 108R were measured using an Acoustic Doppler Current Profiler (ADCP) and Global Positioning System (GPS) unit carried by a remotely operated Teledyne Z-Boat 1800RP. The ADCP unit was a Teledyne RiverRay operating at 600 kHz, with a velocity profiling range of 0.4 m to 60 m and a depth sensing range of 0.4 m to 100 m. The GPS was a Trimble R10 GNSS. This unit recorded horizontal and vertical position with differential GPS (accuracy of 2 m to 10 m) during the August trip, and with real-time kinematic (RTK) GPS (accuracy 0.05 m to 1.00 m) during the September trip. RTK GPS was not available in August due to equipment issues. However, the accuracy of the differential GPS was sufficient for the purpose of associated analysis herein. Both instruments were mounted to a Teledyne Z-Boat. This remotely operated boat also carried equipment that enabled the crew to transmit ADCP and GPS data through a wireless connection to a field laptop, which processed the data through Teledyne's WinRiverII real-time discharge data collection software. In addition to data collection on water, the crew also used the RTK GPS unit mounted to a surveying rod to capture points-of-interest on the banks (e.g., water surface elevations, benchmarks). All the ground points were collected with a RTK GPS at a high degree of accuracy (less than 0.05 m vertically and horizontally) during both rounds of measurements.

The RTK GPS was also used to survey rebar pins, which were installed on each side of the transects in the side channels, and on the river right/south bank of the Main Channel Bar. These pins helped to align the ADCP boat along the transects. Each high priority transect was surveyed for a minimum of two replicates during both rounds of data collection. All transects were surveyed from wetted edge on river left to wetted edge on river right, except for the Main Channel Bar. Here, a survey past mid-channel was not required because constructed bed features only extended part way into the channel. At moderate to low velocities the Z-Boat was powerful enough to maintain position across the transect by remote control. For transects with high velocity a jet boat was required to move the Z-Boat in a maintained position along a straight track perpendicular to the main flow direction. Surveys of longitudinal bed elevation profiles were conducted by driving the Z-Boat with ADCP and GPS along the estimated location of the thalweg in each channel and along the Main Channel Bar (Map 2).

During the 2020 trips, detailed surveys of riverbed elevation were focused on the wetted section of each transect. The topography of the dry channel sections was not recorded in detail, as this information was not required for the analysis of instream habitat conditions. The crew surveyed the wetted edge and pin location on both banks using the handheld RTK GPS. From these additional points and site photographs the general bank shape was derived.

In addition to the ADCP surveys, visual assessments were conducted of channel substrate composition and the integrity of large woody debris (LWD) habitat structures installed in the West Side Channel, East Side Channel, South Side Channel Spur Extension, and in the deep pools in the Backwater Channel. The visibility was limited due to high turbidity of the water column, preventing successful substrate assessments in the center of the channels. Substrate classifications were largely derived from photographic assessments of dewatered areas during fish sampling on October 2, 2020, when the Peace River discharge was particularly low (390 m^3/s), and portions of the channel bed were visible from shore. Additionally, substrate information was taken from approved design drawings provided by NHC (Blezy and Chilibeck 2020). Underwater video surveys were not attempted due to insufficient underwater visibility.

3.1.3. Data Processing

Transect data were processed to summarize hydraulic parameters and habitat quantity for each channel. Linear cross-sections of water depth and velocity were derived from the ADCP measurements. The ADCP data were exported from WinRiverII and mapped to discrete stations that were equally spaced at 0.5 m increments. The stations at the right and left wetted edges were assigned a water depth of 0 m and water velocity of 0 m/s. Water depth and velocity at each of the mid-channel wetted stations were estimated by calculating the average ADCP water depth and depth averaged velocity over the 0.5 m increments. If the raw data were deemed erroneous, the depth or velocity value was interpolated linearly based on data from the two nearest stations with valid data. Stations between the wetted edges and the first valid ADCP point were also interpolated linearly (where water on the channel edge was too shallow for the ADCP). These and other data issues (e.g., removal of erroneous velocity spikes), are summarized in Table 1.

The final depth and velocity transects were processed to calculate hydraulic parameter summaries for each transect (wetted width, average water depth, average water velocity, maximum depth). Hydraulic summaries were also generated for each channel; average depth and velocity were calculated across all the transects within a channel, and total wetted area was estimated by assuming that each transect represents a specific length of the channel (Table 2). The transect lengths were determined using the longitudinal profiles, which were partitioned into two habitat types (shallow and deep). For the partitioning, the water depth along the longitudinal profile was compared to the average water depth of the channel. Sections of the profile were defined as shallow if the water depth was less than the average depth. A profile section was considered deep if the water depth was greater than the average depth. For each transect, it was determined if it represented a deep or shallow section of the channel. The transect length was then calculated by dividing the overall length of shallow/deep sections by the number of associated transects.

A model was used to calculate weighted usable width (WUW), a measure of habitat quantity, by applying habitat suitability indices (Figure 1) to the transect water depth and velocity data. WUW was calculated as:

$$WUW_{dv} = \Sigma_i^n \left(W_i{*}D_i{*}V_i\right)$$

where W_i is the width of computational cell *i* on the transect, D_i is the suitability of depth at cell *i*, V_i is the suitability of velocity at cell *i*. WUW was calculated for Bull Trout (EMA 1994), Mountain Whitefish (Bovee 1978), and Rainbow Trout (Ptolemy 2001, using steelhead criteria as a proxy).

Weighted usable area (WUA) for each trip (i.e., flow condition) was calculated by multiplying each transect by the associated channel length (Table 2).

Table 1. Summary of data processing notes.

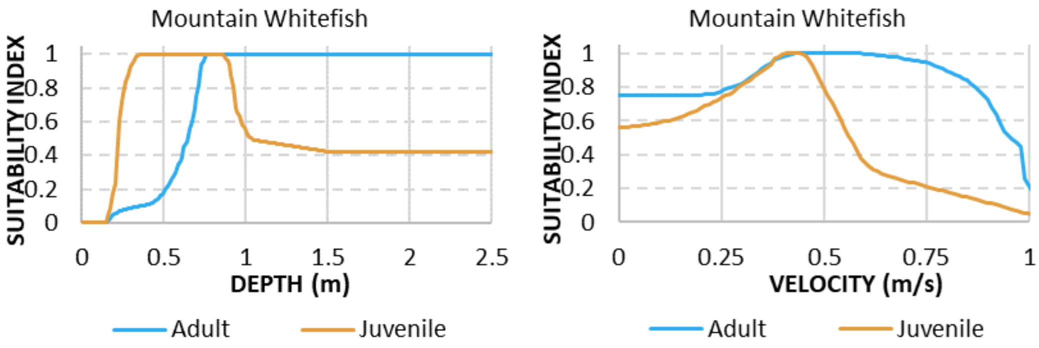
Transect	Date	Issue
GME01	September 6, 2020	Interpolated linearly over erroneous velocities, created because water depth was too shallow for ADCP.
GME02	September 6, 2020	Removed erroneous spikes from velocity profile. Spikes were artefacts from high turbidity in eddy line.
GME03	September 6, 2020	Removed erroneous spikes from velocity profile. Spikes were artefacts from high turbidity in eddy line.
GMW05	September 6, 2020	Removed erroneous spikes from velocity profile. Spikes were artefacts from high turbidity in eddy line.
GMW08	September 6, 2020	Interpolated linearly over erroneous velocities, created because water depth was too shallow for ADCP.
GMW08	August 27, 2020	Interpolated velocity and bed profile on river right, because ADCP was not able to access this section of transect due to debris.

Table 2. Channel transect location, habitat type, and channel length (determined from habitat type, used to calculate wetted area and weighted usable area).

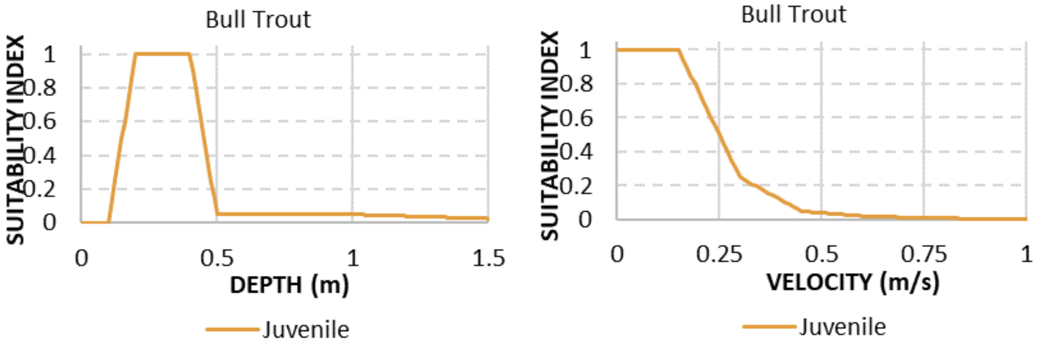
Waterbody	Transect	Habitat Type	Channel Length (m)
Backwater Channel	GMB02	Shallow	606
	GMB03	Deep	121
	GMB05	Deep	121
East Side Channel	GME01	Shallow	139
	GME02	Deep	449
	GME03	Shallow	139
Main Channel Bar	GMP02	Shallow	234
	GMP04	Shallow	234
South Side Channel	GMS02	Shallow	224
Spur Extension	GMS03	Deep	131
	GMS04	Deep	131
West Side Channel	GMW01	Deep	228
	GMW02	Deep	228
	GMW05	Shallow	251
	GMW08	Shallow	251

Figure 1. **Habitat suitability indices used to calculate weighted usable width (WUW) and weighted usable area (WUA) for a) Mountain Whitefish, b) Bull Trout, and c) Rainbow Trout.**

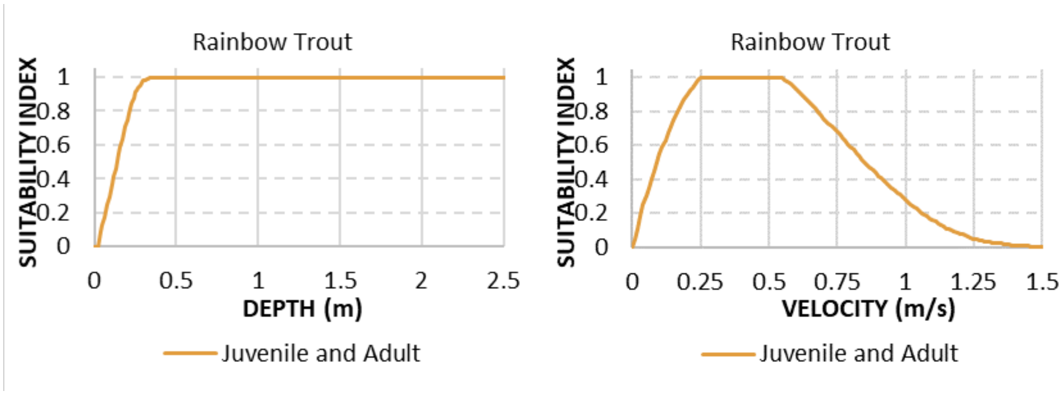
a) Mountain Whitefish



b) Bull Trout



c) Rainbow Trout



3.2. Fish Sampling

Fish sampling during Year 1 was conducted over three 2-day sampling periods between mid-August and October 2020. Fish sampling was conducted using several methods to effectively sample different habitat types, with methods consistent with historical sampling (Mainstream 2010, 2011, 2013). Methods used were small boat electrofishing, backpack electrofishing, minnow trapping, hoop trapping, gill netting, and beach seining, as described below. Large fish boat electrofishing was completed by Golder and local First Nation technicians at Site 108R in conjunction with the Peace River Large Fish Indexing Survey (Mon-2, Task 2a; Golder and Gazey 2019). Triton Environmental Consultants (Triton) also conducted fish use surveys within Site 108R in mid-September as part of the FAHFMP Peace River Fish Composition and Abundance Survey (Mon-2, Task 2b). These additional fish survey data are also described within this report.

3.2.1. Small Fish Boat Electrofishing

A total of 14 small boat electrofishing sites were established and sampled within the South Side Channel Spur Extension, West Side Channel, East Side Channel, Backwater Channel and South Side Channel in 2020 (Map 3). Site selection ensured adequate spatial representation, and sites were located in habitats where water depths were greater than 0.4 m and wetted widths were greater than 6 m to allow the crew to effectively maneuver the boat. The specific locations of the sites were determined at the time of the survey based on flow and water depth.

Small fish boat electrofishing was used to sample fish in deeper areas of stream margins during periods of higher flows and took place between August 23 and October 2, 2020. Sampling was conducted using an 18’ aluminum hulled Gator jet boat equipped with a generator powered electrofisher (Generator Pulser 2.5). The electrofishing unit consisted of a cathode array curtain placed on the bow and two anode pole arrays extending approximately 1.5 m in front of the bow angled between 20° and 40° off either side of the boat. Electrofisher settings and protocols followed industry standards and were consistent with those used by Golder and Ecofish while conducting the FAHMFP Site C Reservoir Tributaries Fish Population Indexing Survey from 2016 to 2019 (Mon-1b, Task 2c; Golder and Gazey, 2017, 2019; Table 3).

Sampling was conducted travelling in a downstream direction. The boat operator used the jet engine to maneuver the boat to follow the shoreline while avoiding instream hazards such as large woody debris. Two crew members were positioned at the bow of the boat to net stunned fish and transfer them to a water-filled holding tank. The netters attempted to capture all stunned fish and noted the approximate number and species of all missed fish. Captured fish were processed according to the methods in Section 3.2.7. Once processed the recovered fish were returned to the stream in approximately the same location as captured.

Table 3. **Habitat variables and boat electrofisher settings recorded at each small fish boat electrofishing site during each sample session in 2020.**

Variable	Description
Date	The date the site was sampled
Time	The time the site was sampled
Water Temp	Water temperature at the time of sampling (to the nearest 0.1°C)
Conductivity	Water conductivity at the time of sampling (to the nearest 10 μS/cm)
Secchi Bar Depth	The Secchi Bar depth recorded at the time of sampling (to the nearest 0.1 m)
Cloud Cover	A categorical ranking of cloud cover (Clear = 0-10% cloud cover; Partly Cloudy = 10-50% cloud cover; Mostly Cloudy = 50-90% cloud cover; Overcast = 90-100% cloud
Boat Model	The model of boat used during sampling
Range	The range of voltage used during sampling (high or low)
Percent	The estimated duty cycle (as a percentage) used during sampling
Amperes	The average amperes used during sampling
Mode	The mode (AC or DC) and frequency (in Hz) of current used during sampling
Length Sampled	The length of shoreline sampled (to the nearest 1 m)
Time Sampled	The duration of electroshocker operation (to the nearest 1 second)
Mean Depth	The mean water depth sampled (to the nearest 0.1 m)
Maximum Depth	The maximum water depth sampled (to the nearest 0.1 m)

3.2.2. Large Fish Boat Electrofishing

Large fish boat electrofishing was carried out at three locations within Site 108R between August 26 and September 23, 2020 as part of Mon-2, Task 2a. The three sites (OEM-USC, OEM-DSC and OEM-MS; Map 3) were sampled four times using an 18' Smith-Root Heavy Duty Series electrofishing jet-boat equipped with a high-power Generator Powered Pulsator (GPP 5.0) electrofisher (Smith-Root Inc.; Ford pers. comm 2021; Golder and Gazey 2019). Sampling was conducted in habitats greater than approximately 1 m deep and approximately 1-3 m off the bank. The electrofishing procedure consisted of maneuvering the boat downstream along the shoreline of each sample site. Two crew members, positioned at the bow of each boat, netted stunned fish, while the third individual operated the boat and electrofishing unit. Netters attempted to capture all stunned fish one at a time (to avoid having multiple fish in a net simultaneously) and all captured fish were immediately placed into 175 L onboard live-wells equipped with freshwater pumps (Golder and Gazey 2019). Fish that were positively identified but avoided capture were enumerated and recorded as "observed" (Golder and Gazey 2019). Both the effort (seconds of electrofisher operation) and length of shoreline sampled (m) were recorded for each sample (Golder and Gazey 2019).

3.2.3. Backpack Electrofishing

Field crews sampled five backpack electrofishing sites (three newly established) during Year 1 sampling (Map 3). Sites were selected to ensure adequate spatial representation with a minimum of one site approximately 100-m-long established in each side channel where appropriate. Backpack electrofishing was primarily used during low flow periods (September and October) in wadeable areas where the water was too shallow for boat electrofishing (<0.5 m depth).

Backpack electrofishing was completed using a Smith-Root Inc. (12-B or LR-24) backpack electrofisher using techniques consistent with those detailed in Mon-1b, Task 2c (Golder 2018 - 2020). Sites were accessed either by boat or hiking on five dates between August 23 and October 2, 2020. A single pass was conducted at each site. The electrofishing unit operator waded upstream along the side-channel margin at each site, while a single netter attempted to capture all stunned fish.

Stunned fish were netted and transferred to a holding tank until they were processed according to methods in Section 3.2.7. After recovery from processing, fish were returned to the stream in the approximate location of capture.

3.2.4. Minnow Trapping

Eleven minnow trap locations were sampled within the West Side Channel, East Side Channel, and South Side Channel Spur Extension (Map 3). Minnow trap sites were accessed via boat or on foot during multiple sampling dates in August, September, and October 2020. Minnow traps had standard dimensions of 40 cm in length, 20 cm in diameter, with ~2 cm openings and 3- or 6-mm mesh size. Minnow traps were deployed in moderately deep (0.5 to 1.5 m) areas in habitats with large woody debris that could not be effectively sampled using other techniques such as electrofishing.

If conditions were more suitable for hoop traps (i.e., deeper water, midstream anchor point), then hoop traps were used instead of minnow traps. Hoop traps are preferred over minnow traps to sample small fish in deeper water (up to 3 m deep) where woody debris structures such as debris catcher pilings are available to tie off the traps. Hoop traps were deployed at five sites within the West Side Channel, East Side Channel and Backwater Channel (Map 3). Hoop traps were 1.5-m-long, with a 0.35-m-diameter opening, and a mesh size of approximately 6 mm. Both minnow traps and hoop traps were baited with canned sardines and deployed overnight, with a target soak time of ~24 hours. All fish captured during trapping were processed according to methods in Section 3.2.7.

3.2.5. Gill Netting

Gill net surveys were conducted at a site in the South Side Channel of Site 108R (PCR-GN0501; Map 3) previously sampled in 2009, 2010, and 2011 (Mainstream 2010, 2011, 2013) and by Triton as part of OEM in Year 1. Additionally, two newly established sites were sampled in 2020, one in the South Side Channel (PCR-OCGN01), and one in the Backwater Channel (PCR-OCGN02) in Year 1 (Map 3).

Gill net sites were accessed via boat in August and September 2020. Submerged small mesh nylon gill nets were set in deep water areas (1 to 3 m water depth) in the South Side Channel and Backwater Channel. The gill net specifications and set method were consistent to those used in past studies (e.g., Mainstream 2011). The net panel dimensions were 15.2 m by 2.4 m with stretched mesh sizes of 1.9 cm, 3.8 cm, 6.4 cm, and 8.9 cm. The gill nets were set and checked at least every two hours while crews were on site conducting other surveys. Gill nets were not left to fish overnight or deployed unless crews were working in the immediate area. Captured fish were transferred to a holding tank and processed according to methods in Section 3.2.7.

3.2.6. Beach Seining

Beach seining was conducted at five sites in September 2020 by Triton (LeRuez pers. comm. 2021) (Map 3). Sites with low velocity and moderate depths that were not effectively sampled by backpack electrofishing were selected as beach seining sites (Mainstream 2011). The sites were within the South and South Spur Extension Channels, where the habitat was most appropriate for beach seining. Three hauls were done at each site on each sampling date, with each haul covering a target area of approximately 100 m^2. Captured fish were transferred to a holding tank and processed according to methods in Section 3.2.7.

3.2.7. Data Collection and Fish Processing

Variables measured at each site during each fish sample session included the date and time, weather, geodetic location, photographs, sample method settings and specifications, and sampling effort (i.e., electrofishing seconds, minnow trap soak time, length, width, and depth sampled). All captured fish were identified to species, measured for fork length, and weighed. A subset of select species ((Arctic Grayling, Bull Trout, Mountain Whitefish, Rainbow Trout, Walleye, suckers (*Catostomus* sp.), Northern Pike (*Esox lucius*), kokanee (*O. nerka*)) were photographed and sampled for aging structures (fin rays for Bull Trout and Walleye, scales for other species).

All fish captured that were in good health and greater than 200 mm fork length, and that were not already HDX PIT tagged, were implanted with an HDX PIT tag using methods consistent with other Site C FAHFMP studies (e.g., Golder and Gazey 2019). All fish were scanned for the presence of PIT tags that may have been implanted during previous OEM sampling, or other programs. These data will be provided to other components of the Site C FAHMFP as necessary, most notably the Peace River Fish Composition and Abundance Survey (Mon-2, Task 2b).

In 2020, various biological samples from select fish were collected for potential analysis. These included tissue samples for genetic analyses, and hard structure samples (i.e., fin rays or otoliths) for aging and microchemistry analysis. Genetic samples were collected from all Arctic Grayling, Bull Trout, Goldeye, and Rainbow Trout captured during OEM. When requested, up to 20 genetic samples were collected from small-bodied fish (e.g., Redside Shiner (*Richardsonius balteatus*), Longnose Dace (*Rhinichthys cataractae*), Prickly Sculpin (*Cottus asper*), and Slimy Sculpin (*C. cognatus*) which are infrequently captured during the Indexing Survey. All samples were provided to Golder for BC Hydro and will be used to further characterize Peace River fish populations for other components of the Site C FAHMFP. The analysis and interpretation of these samples is not discussed in this report.

3.3. Fish Use Data Analysis

Catch, effort, species, and fish condition were used to quantify fish use of Site 108R. Data were collected by Ecofish, Golder, and Triton, and each respective company carried out quality assurance on the data after they were collected. Golder and Triton forwarded their respective datasets to Ecofish (Ford pers. comm. 2021, LeRuez pers. comm. 2021). Once all data had been received, they were compiled and secured into a single database. Once finalized, all data will be uploaded to the BC Hydro Extranet site.

Data collected at Site 108R in 2020 are meant to provide information on the effectiveness of constructed offset habitat within the site. Ideally values would be available in the same locations from the years immediately prior to construction (similar to Upper Site 109L); however, Site 108R has been augmented with created habitat (East, and West Side Channels, South Side Channel Spur Extension) or modified habitat (Backwater and South Side Channel, Main Channel Bar); therefore, direct before/after comparisons are not possible. In addition, much of the fish habitat constructed was not expected to be fully utilized in Year 1. Therefore, comparisons to historical datasets have not been made in this report; however, in future years it may be possible to make comparisons between areas of Site 108R that feature both past and present data.

The offset areas (West Side Channel, South Side Channel, East Side Channel, South Side Channel Spur Extension, Backwater Channel, and Main Channel Bar; Map 3) were assessed individually and cumulatively. This was intended to support assessment of whether these specific areas of Site 108R, and whether the site as a whole, function effectively as offsetting habitat.

3.3.1. Catch and Effort Tables

Data were summarized for each sampling method (small fish boat electrofishing, large fish boat electrofishing, backpack electrofishing, gill netting, minnow/hoop trapping and beach seining). Gillnetting, trapping, and beach seining results were not included in this report because no indicator species were captured using these methods; catch results for these methods are available in Appendix D. Physical habitat variables that may affect catch are presented along with effort for each method; descriptions of the variables measured at each site are provided in Table 3. Catch results for indicator species by area are presented in Section 4.2. A breakdown of catch results for all species by site and size class are presented in Appendix D. Size classes are consistent with past reporting (e.g., Golder 2020).

3.3.2. Length-Weight Relationship and Condition Factor

Length-weight relationship (LWR) and relative condition factor (K_r)[8] are two key parameters used in fisheries research and were calculated to use as indicators of general fish health. The LWR is the relationship between length and weight for a given species and can be used to estimate patterns of growth within populations, and whether growth varied by year. Fulton's condition factor was previously used for OEM reporting (Golder 2020), but relative condition factor provides a more accurate assessment of condition factor when considering a variety of species with different growth patterns. To overcome limitations of dependencies of the condition factor on fish length, the relative condition factor (K_r) was calculated as:

$$K_r = \left({}^{W}\!/_{\widehat{W}}\right)$$

where W is the weight of the fish in g, and $\widehat{W}$ is the predicted body weight given its length based on a modelled length-weight relationship (Le Cren 1951). More specifically, K_r is based on the ratio of measured weight to the weight predicted from a log-transformed linear regression of length and weight data. If K_r is equal to 1, the fish is in average relative condition relative to all measured fish in the sample, if K_r is below 1 the fish is in lower-than-average relative condition, and if K_r is larger than 1 then the fish is in better than average relative condition.

3.3.3. Length Frequency Histograms

Length frequency histograms are used to assess whether the size structure of a population has changed over time. Histograms were generated for all species though in some cases insufficient numbers were present to draw conclusions about population size structure.

3.3.4. Diversity Methods

Diversity profiles plot the relationship between diversity (expressed as effective numbers of species) and q (parameter that determines the sensitivity of the index to rare species)

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[8] Fulton's condition factor has previously been reported, relative condition factor was recalculated on historical data.

(Leinster and Cobbold 2012). They therefore provide an effective way to compare diversity based on whether rarity or evenness in abundance is prioritized, rather than single estimates like species richness. Diversity profiles have previously been used under other components of the FAHFMP (e.g., Golder 2020). We combined the fish abundance data from all surveys and sites. Because there is currently only one year of data post offset construction, we did not derive confidence intervals. All recorded fish species were included except where identification was not to the species level. Suckers and other non-indicator species (e.g., Northern Pike, sculpins, cyprinids, etc.) were grouped together with a similarity of 1, while all indicator species were given a similarity of 0, as outlined in Ma *et al.* (2015). We used the diversity function in the package vegan (Oksanen *et al.* 2020) in the program R (R Core Team 2020) to calculate effective numbers of species for values of q from zero to five (as q increases more emphasis is placed on evenness in number of individuals per species), which is consistent with the method used to assess diversity in offset monitoring at Site 109L (Golder 2020).

4. RESULTS

4.1. Physical Habitat Sampling

4.1.1. Channel Hydraulics

Characteristics of channel hydraulics were calculated from the ADCP and GPS measurements. Width, depth, velocity, and flow at each transect, along with discharge in the Peace River as measured at the Peace River above Pine River Water Survey Canada hydrometric gauge (WSC gauge 07FA004) are summarized in Table 4. Plots of velocity and bed profiles are presented in Figure 2(a-e) and Appendix E.

Flows in the Peace River during the August 26 – 27 sampling were high at approximately 2,130 - 2,160 m^3/s, while they were lower at approximately 930 – 945 m^3/s on September 5 – 6. To put this into context, we calculated the cumulative distribution function (CDF) of Peace River flows, using daily discharge data (2013 – 2020) from the WSC gauge at the Peace River Above Pine River (07FA004; ECWO 2020). The CDF is plotted in

Figure **3**, along with the average Peace River flows during the August and September surveys. The CDF indicates the 25th percentile (843 cm^3/s), median (1,220 cm^3/s), 75th percentile (1,500 cm^3/s) and 90th percentile flows (1,750 cm^3/s). Average flows during the August (2,140 cm^3/s) and September (931 cm^3/s) surveys correspond to the 98th percentile and 31st percentile respectively. The average daily flows for the Peace River from 2013 to 2020 are shown in Figure 4.

The wetted widths were greater in August during high flows compared to those in September when Peace River flows were lower Figure 2. The Main Channel Bar is an exception, where transects were surveyed to mid-channel, because constructed bed features only extended part way into the channel (see Figure 2c), and wetted width did not vary by date. Depth and velocity of each transect generally decreased between August and September due to declining Peace River flow; however, the decrease in velocity was minimal for the Backwater Channel and the South Side Channel Spur Extension, as flows in September and August were close to 0 m^3/s due to negligible inflows to these closed channels.

The sample plots of velocity and bed profiles (Figure 2) reflect the trends summarized in Table 4, i.e., decrease in velocity, depth, and width with decreasing Peace River flow between August and September.

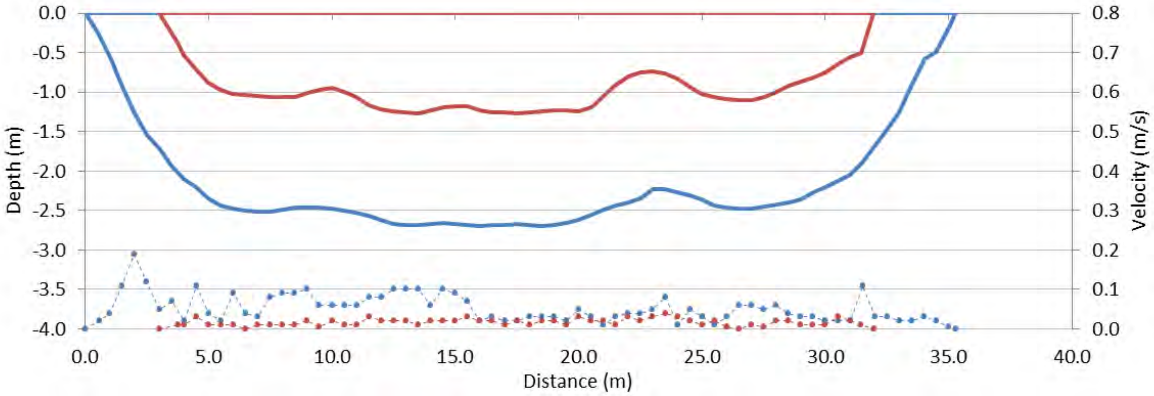
Table 4. Summary of hydraulic parameters for transects at Peace River Site 108R channels generated from data collected over two periods in 2020: August 25-27, and September 5-6.

Channel	Date	Transect	Transect Discharge (m^3/s)	Peace River Discharge	Wetted Width (m)	Average Depth (m)	Average Velocity (m/s)	Maximum Depth (m)
Backwater Channel	27-Aug	GMB02	0.0	2130.0	35.3	2.2	0.1	2.7
		GMB03	0.0	2130.0	37.3	2.4	0.0	3.3
		GMB05	0.0	2130.0	36.5	2.5	0.0	3.4
	27-Aug Average		**0.0**	**2130.0**	**36.4**	**2.4**	**0.0**	**3.1**
	6-Sep	GMB02	0.0	930.0	29.0	1.0	0.0	1.3
		GMB03	0.0	930.0	28.3	1.5	0.0	1.9
		GMB05	0.0	930.0	30.1	1.5	0.0	1.9
	06-Sep Average		**0.0**	**930.0**	**29.1**	**1.3**	**0.0**	**1.7**
East Side Channel	26-Aug	GME01	62.4	2150.0	24.4	1.6	1.9	2.1
		GME02	62.4	2150.0	25.2	2.1	1.2	3.4
		GME03	62.4	2150.0	32.6	1.6	1.3	3.0
	26-Aug Average		**62.4**	**2150.0**	**27.4**	**1.8**	**1.5**	**2.9**
	6-Sep	GME01	10.7	930.0	14.5	0.4	1.4	0.6
		GME02	10.7	930.0	15.9	1.2	0.5	1.8
		GME03	10.7	930.0	15.3	1.0	0.7	1.4
	06-Sep Average		**10.7**	**930.0**	**15.3**	**0.9**	**0.8**	**1.3**
Main Channel Bar	27-Aug	GMP02	2130.0	2130.0	89.2	3.7	2.3	4.9
		GMP04	2130.0	2130.0	106.5	3.8	2.0	5.4
	27-Aug Average		**2130.0**	**2130.0**	**97.8**	**3.8**	**2.2**	**5.1**
	5-Sep	GMP02	930.0	930.0	95.4	2.5	1.5	3.4
		GMP04	930.0	930.0	107.1	2.5	1.1	4.0
	05-Sep Average		**930.0**	**930.0**	**101.2**	**2.5**	**1.3**	**3.7**
Channel Spur Extension	26-Aug	GMS02	0.3	2160.0	23.5	1.9	0.0	3.0
		GMS03	0.3	2160.0	24.7	2.1	0.0	3.3
		GMS04	0.3	2150.0	23.0	2.1	0.0	3.2
	26-Aug Average		**0.3**	**2156.7**	**23.7**	**2.1**	**0.0**	**3.2**
	5-Sep	GMS02	0.2	945.0	15.0	1.1	0.0	1.5
		GMS03	0.2	940.0	16.2	1.3	0.0	1.8
		GMS04	0.2	930.0	15.8	1.2	0.0	1.6
	05-Sep Average		**0.2**	**938.3**	**15.6**	**1.2**	**0.0**	**1.7**
West Side Channel	27-Aug	GMW01	86.6	2130.0	34.6	2.6	1.0	3.5
		GMW02	86.6	2130.0	24.2	2.3	1.6	3.3
		GMW05	86.6	2130.0	31.0	1.9	1.6	2.8
		GMW08	86.6	2130.0	35.7	1.2	2.0	1.8
	27-Aug Average		**86.6**	**2130.0**	**31.4**	**2.0**	**1.6**	**2.9**
	6-Sep	GMW01	23.0	930.0	28.1	1.8	0.5	2.2
		GMW02	23.0	930.0	21.0	1.4	0.9	2.1
		GMW05	23.0	930.0	25.6	1.1	0.8	1.8
		GMW08	23.0	930.0	23.3	0.6	1.4	0.9
	06-Sep Average		**23.0**	**930.0**	**24.5**	**1.2**	**0.9**	**1.8**

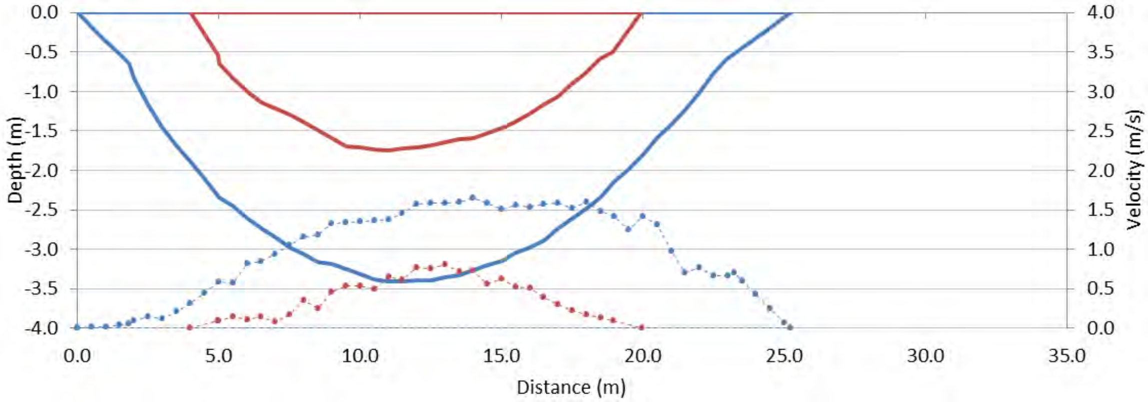
Main Channel Bar values correspond to partial measurement in Peace River mainstem

Figure 2. Water depth (solid lines) and velocity profiles (dotted lines) from August (blue) and September (red) measurements of transects in the Backwater Channel (a), East Side Channel (b), Main Channel Bar (c), South Side Channel Spur Extension (d), and West Side Channel (e).

a) GMB02



b) GME02



c) GMP02

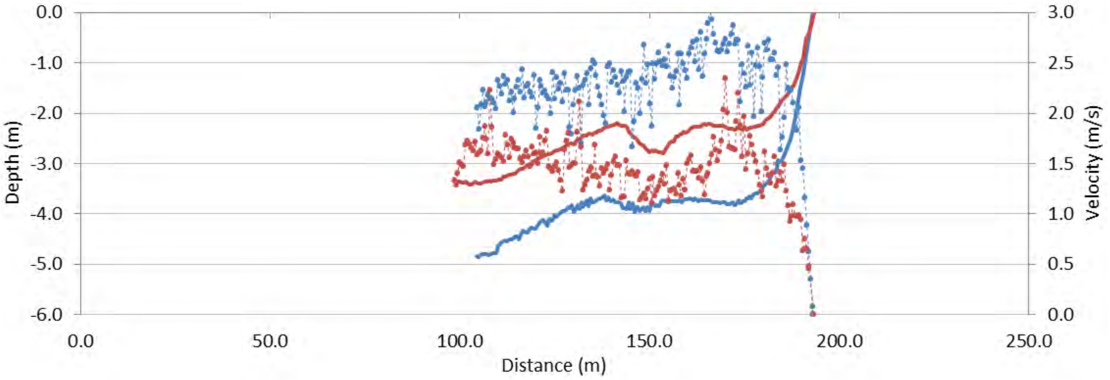
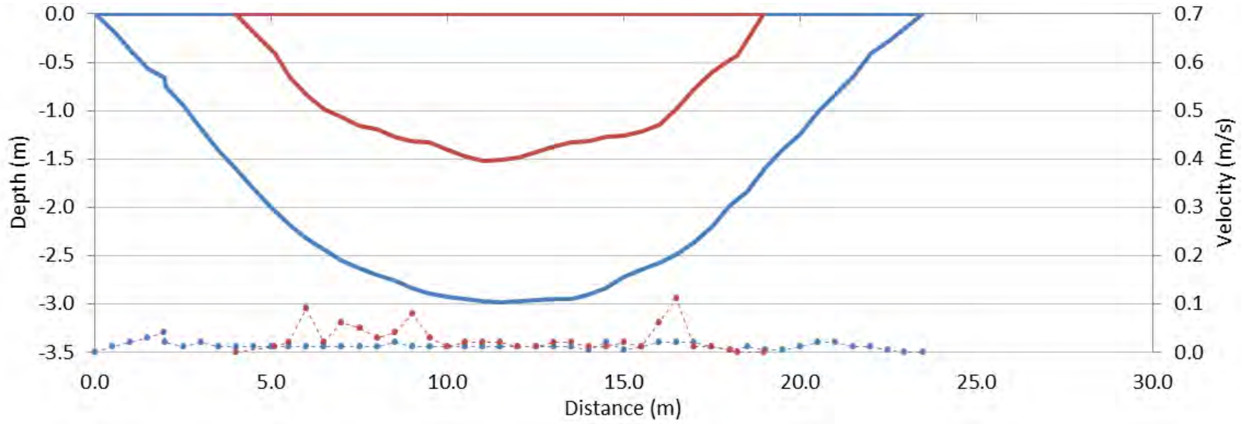


Figure 2. Continued.

d) GMS02



e) GMW01

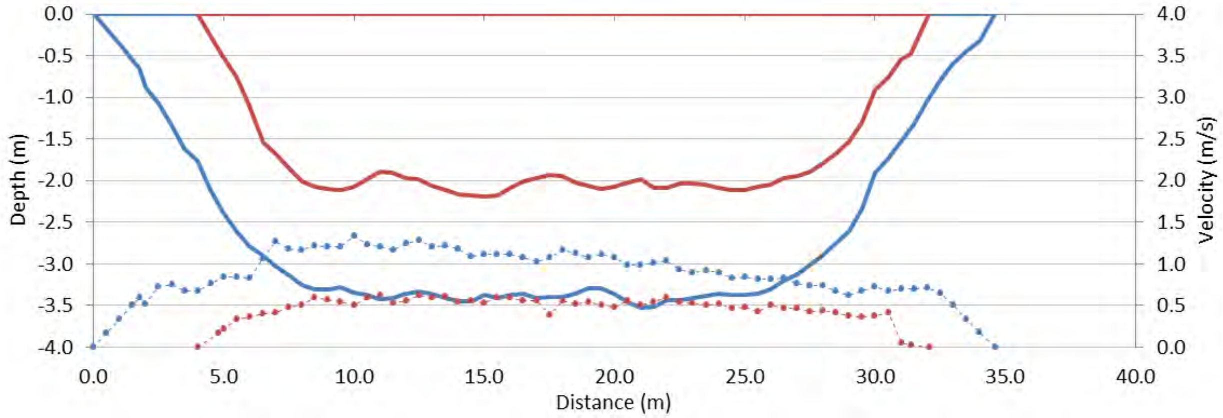


Figure 3. **Cumulative distribution function for the Peace River flows, using daily discharge data from 2013 to 2020 as measured at the Peace River above Pine River WSC gauge (07FA004), with reference to August and September 2020 surveys.**

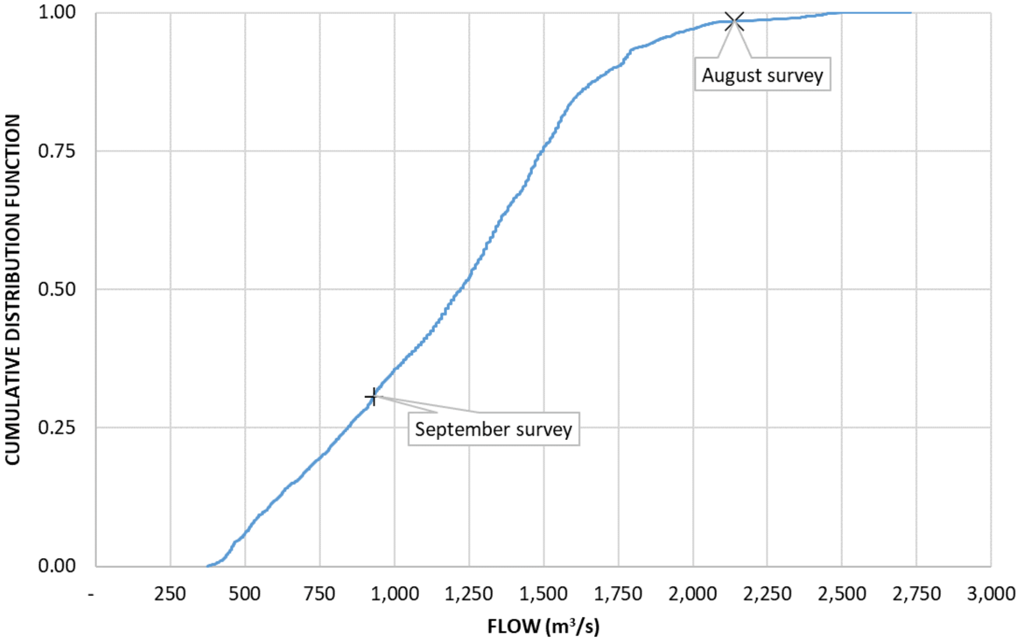
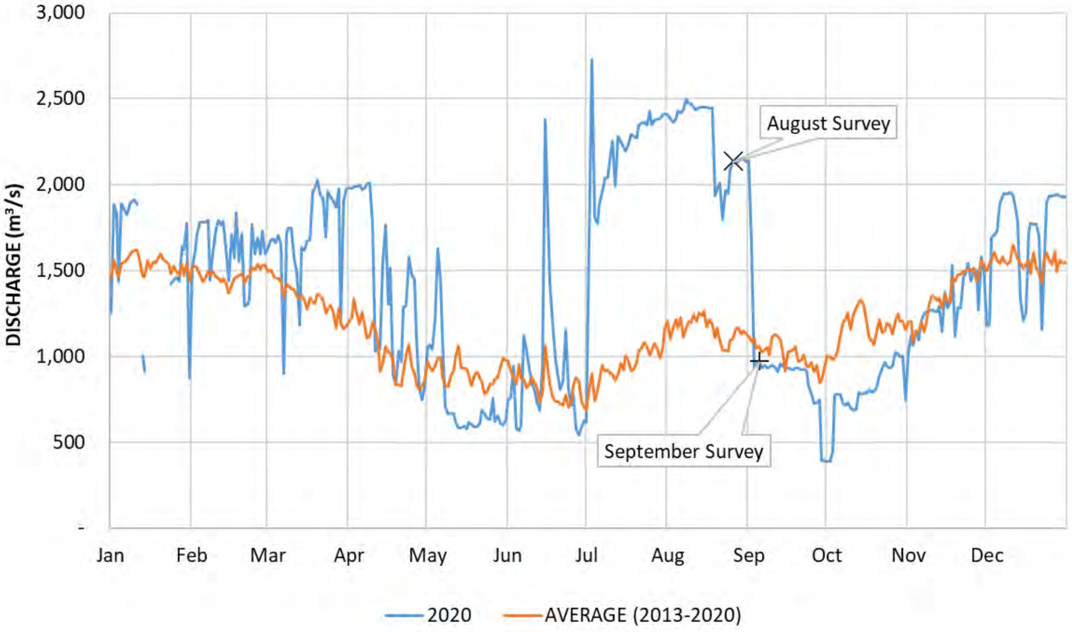


Figure 4. **Average Daily flows for the Peace River, from 2013 to 2020 as measured at the Peace River above Pine River WSC gauge (07FA004).**



4.1.2. Longitudinal Bed Profiles

The longitudinal bed profiles for each channel are plotted in Figure 5, along with NHC (2019) design elevations, the NHC as-built survey (Blezy and Chilibeck 2020), the transect locations, and the water surface elevations. Note that profiles were not collected during the September trip for the Backwater Channel and the West Side Channel due to time constraints. In general, the profiles for the Backwater Channel and the South Side Channel Spur Extension match well with NHC's design and the as-built survey, while the East Channel and West Side Channel exhibit larger discrepancies between the bed profile and the NHC design and as-built surveys, as discussed below.

For the East Channel (Figure 5a), the most notable discrepancies were found at the inlet, where the surveyed bed elevation was up to 1.5 m higher than the design (NHC 2019). The as-built elevation (Blezy and Chilibeck 2020) was substantially closer to the design elevation, but also showed that accumulation had occurred in the months between construction completion (between September and December 2019) and the as-built survey in May 2020. Changes in mainstem bed profiles at the head of the East Channel between August and September 2020 also show that the 1.5 m accumulation had been reduced to 1 m and shifted downstream by approximately 1 m between the two surveys. This shift was mostly caused by sediment transport, while minor discrepancies occurred due to misalignment of profile tracks between surveys. The pattern of riffles and pools was found to have shifted relative to the design, and sediment transport in riffle-pool sequences resulted in less residual pool depth (relative difference in elevation between the downstream riffle crests and pool bottoms).

In the Backwater Channel (Figure 5b), the longitudinal profile generally agreed with the as-built survey (Blezy and Chilibeck 2020). The largest discrepancies between the bed profiles and NHC design (NHC 2019) occurred at the outlet. Field observations showed that a sand deposit was present at the downstream extent, which led to an increase in bed elevation of up to 1 m compared to the NHC design. This increase was present during the August bed profile survey, as well as during the earlier as-built survey in May, showing that this deposit had either begun to form by the time of the survey in May or was a design discrepancy. Other discrepancies occurred within the depressions, possibly because the longitudinal track did not follow the centre of the thalweg, or because of sediment transport processes.

The West Side Channel's bed profile shows large discrepancies compared to NHC's design (NHC 2019) and as-built survey (Blezy and Chilibeck 2020; Figure 5c). The head of the channel remained similar, but the riffles aggraded substantially with an increased aggradation in the downstream direction. The largest aggradation was a 3 m increase in bed elevation between the as-built survey and the August bed profile measurement. The residual pool depth remained similar or greater compared to the design, and indicate the intended hydraulic variability was still present. Low flow monitoring will be required to confirm that the aggradation has not reduced function in terms of maintaining flow at low flows. During the October 2, 2020 site visit, the channel was observed flowing at the design flow of 390 m^3/s (Peace River discharge) and had moderate depth in the pools. The high flows during July and August described above likely caused the aggradation and erosion of construction material.

The shape of the bed profile in the South Side Channel Spur Extension (Figure 5d) matches well with NHC's design (NHC 2019), however, the overall elevation was higher by around 0.5 m on average at the time of the NHC as-built survey (Blezy and Chilibeck 2020). Additional aggradation averaging approximately 20-30 cm occurred between the as-built and August, 2020 survey. The large spike in the bed profile downstream of transect GMS04 could be due to the boulder cluster habitat complexes. The longitudinal survey omitted the upper portion of the channel, and this portion should be surveyed fully in future years.

The bed profiles from August and September at the Main Channel Bar (Figure 5e) match well with the intended design and as-built survey results from May. All profiles clearly show the sequence of constructed depressions. There are discrepancies of up to 0.5 m in elevations between the August/September profiles and the as-built/design profiles for depressions 4 to 7. These discrepancies could stem from a) the ADCP track not passing through centre of depressions and thus not capturing the deepest parts, and b) sediment transport due to high flows. Furthermore, there is a difference between the August and the September profiles at the downstream end, which was caused by the ADCP track following closer to the bank during high flows in August, thus recording a shallower area. The hydraulic complexity and associated habitat function that was intended by the depressions appears to be achieved based on the velocity distribution shown in Figure 6. A more thorough assessment of functionality of these depressions will be completed during Year 3 once they have had time to equilibrate with the background geomorphic processes of mainstem Peace River.

Figure 5. **Plots of longitudinal bed profiles and water surface elevation, along with NHC's bed design and location of transects for East Channel (a), Backwater Channel (b), West Channel (c), South Channel (d), and Main Channel (e). All surveys were completed during 2020, with month indicated in legend.**

a) East Channel

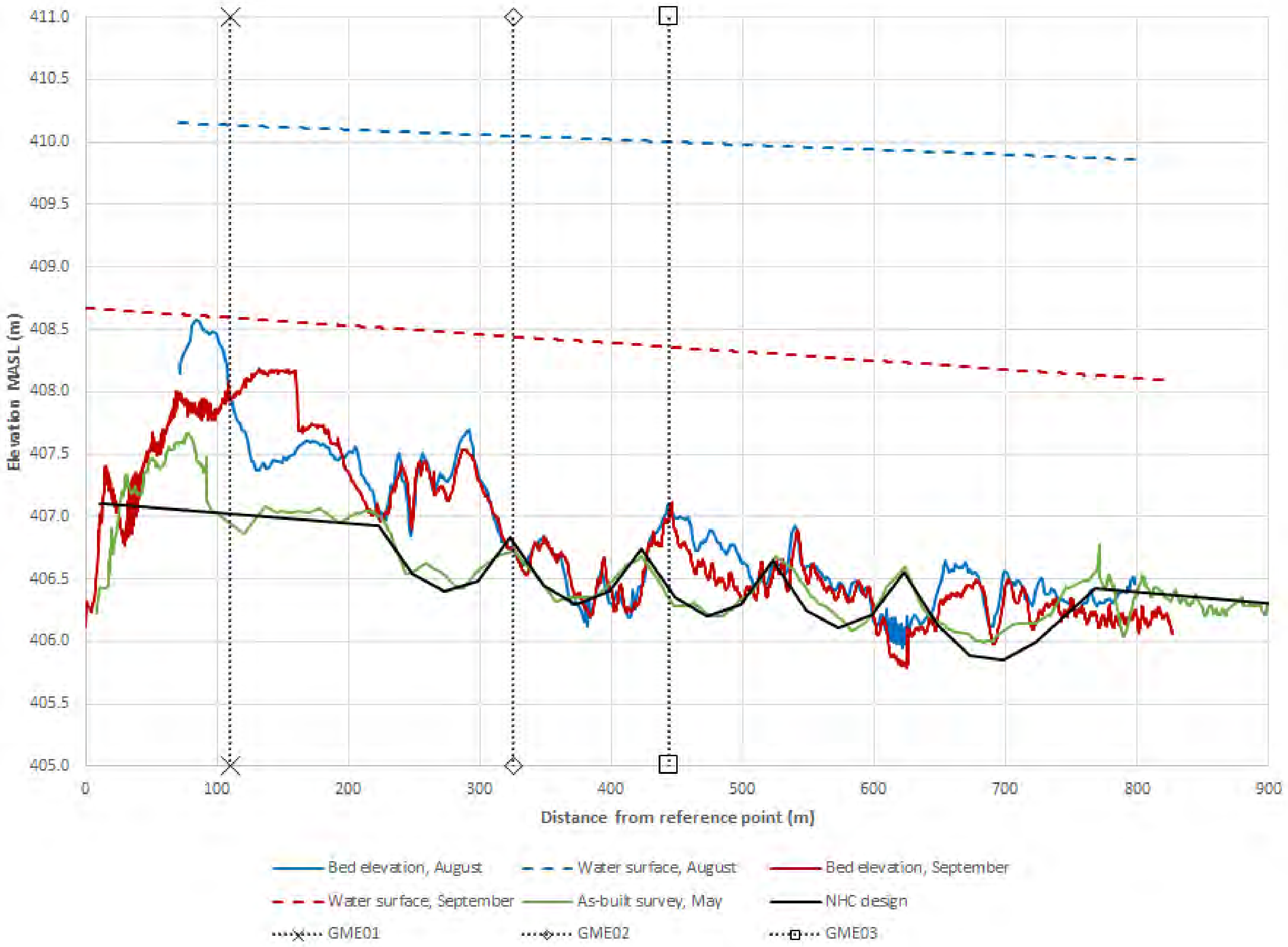


Figure 5. Continued.

b) Backwater Channel

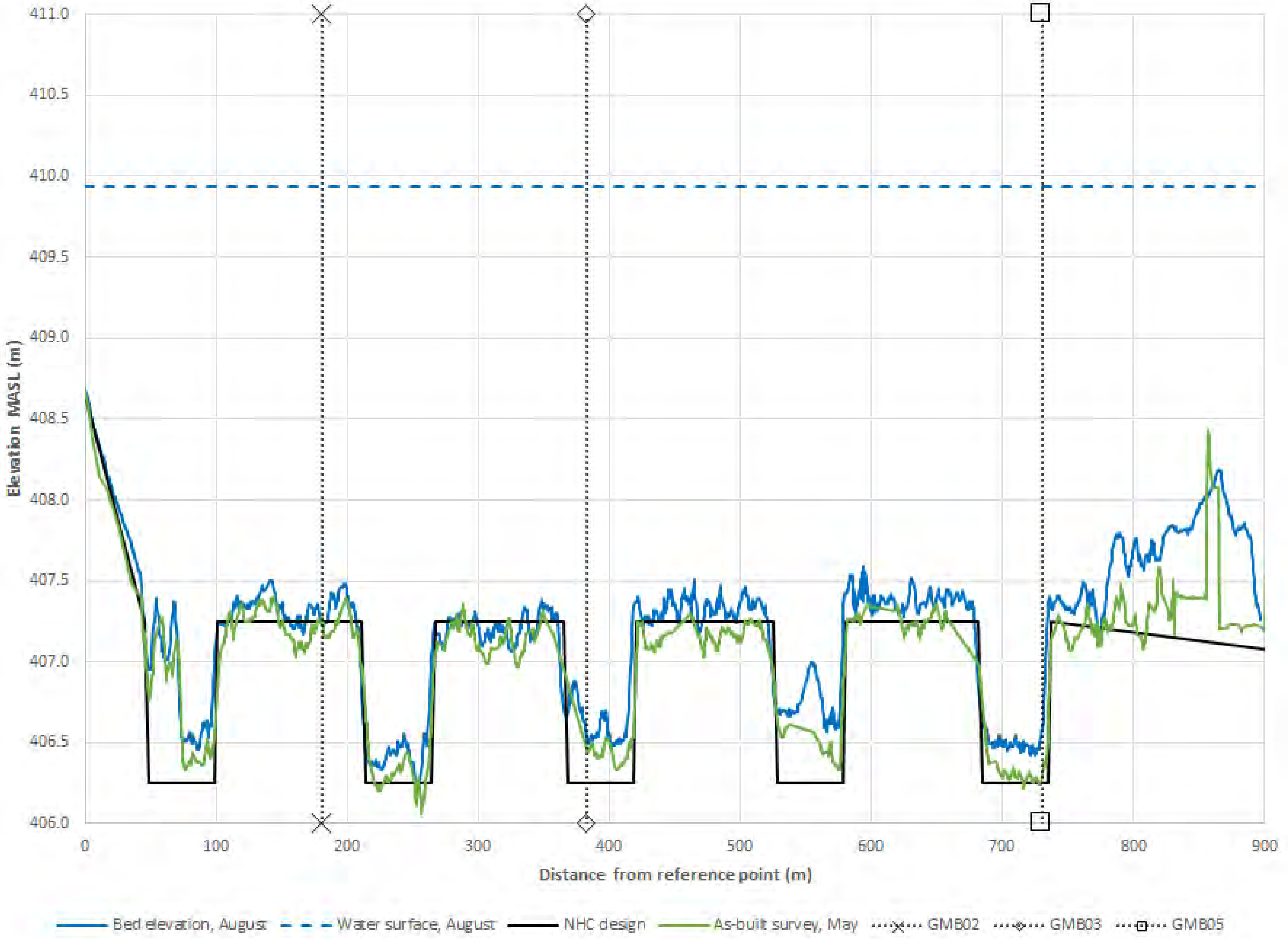


Figure 5. Continued.

c) West Channel

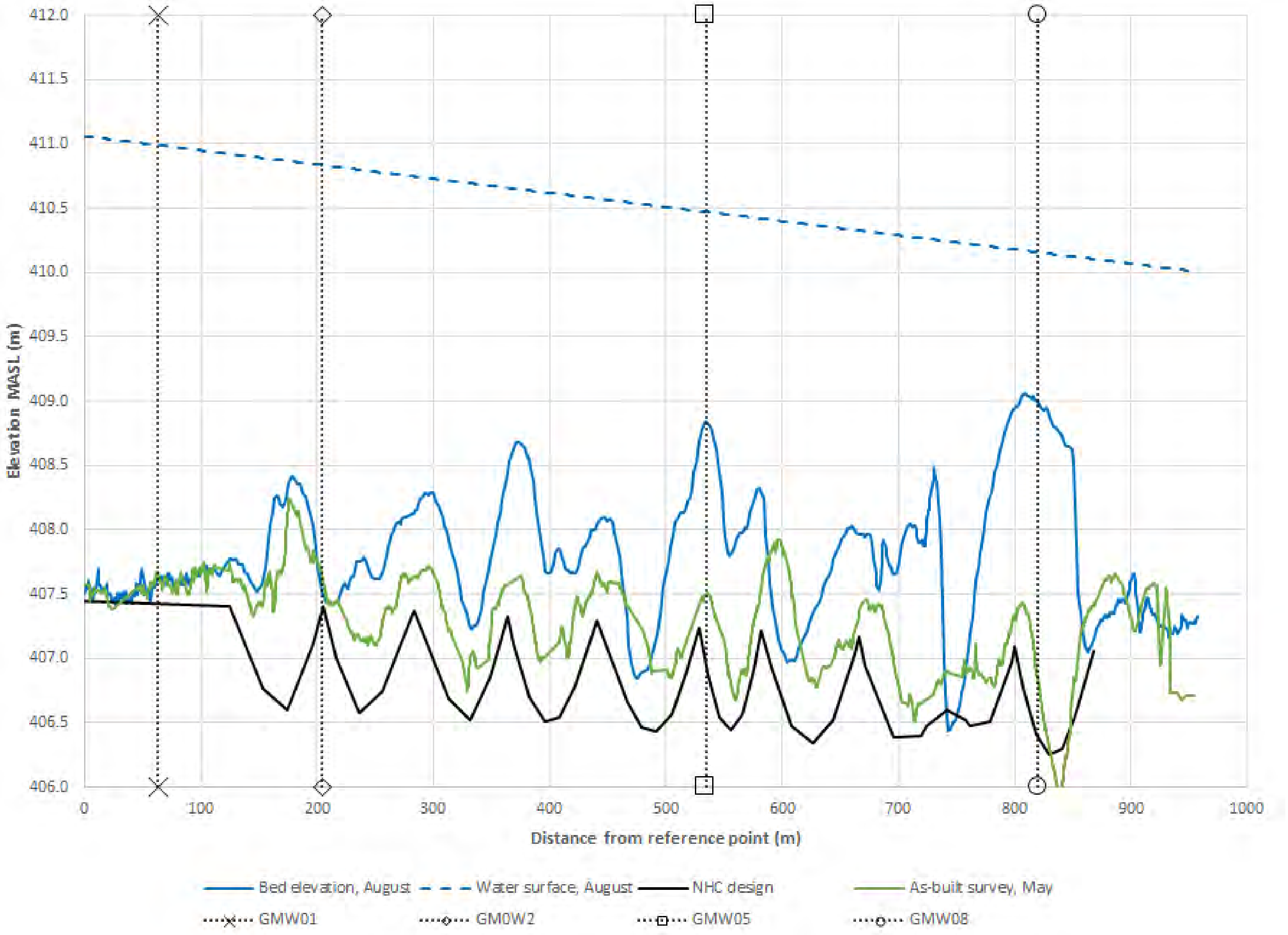


Figure 5. Continued.

d) South Channel

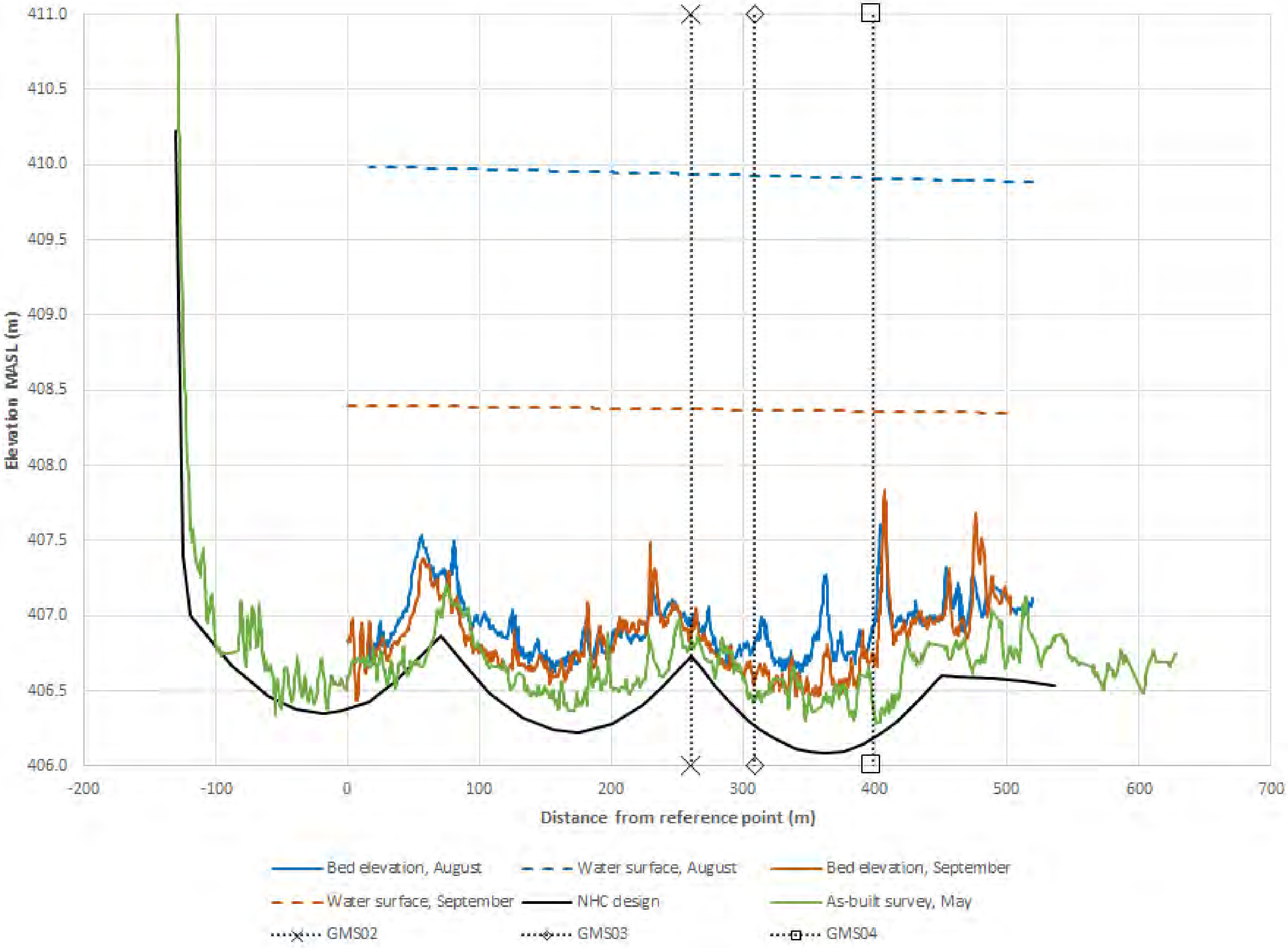


Figure 5. Continued.

e) Main Channel Bar

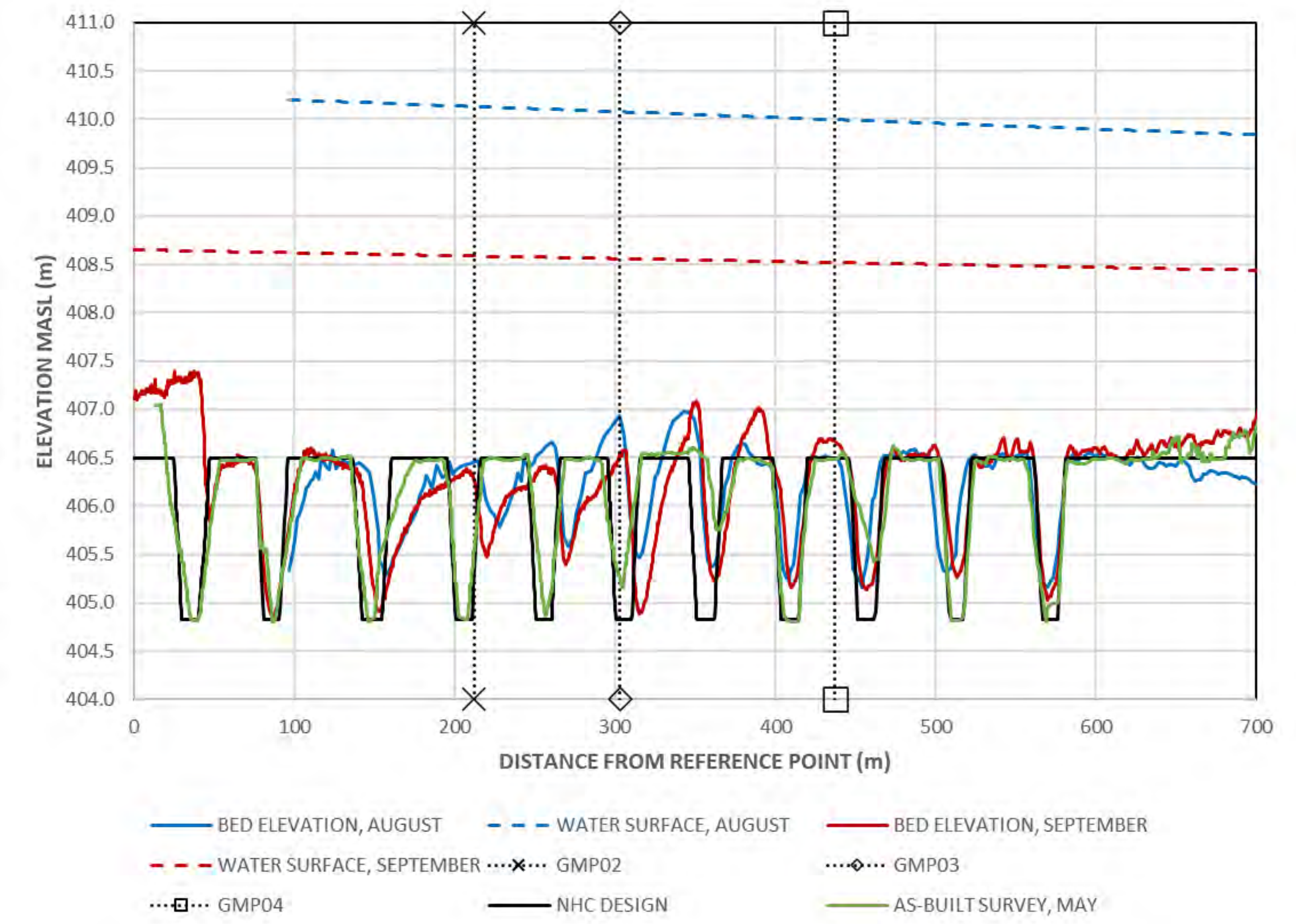
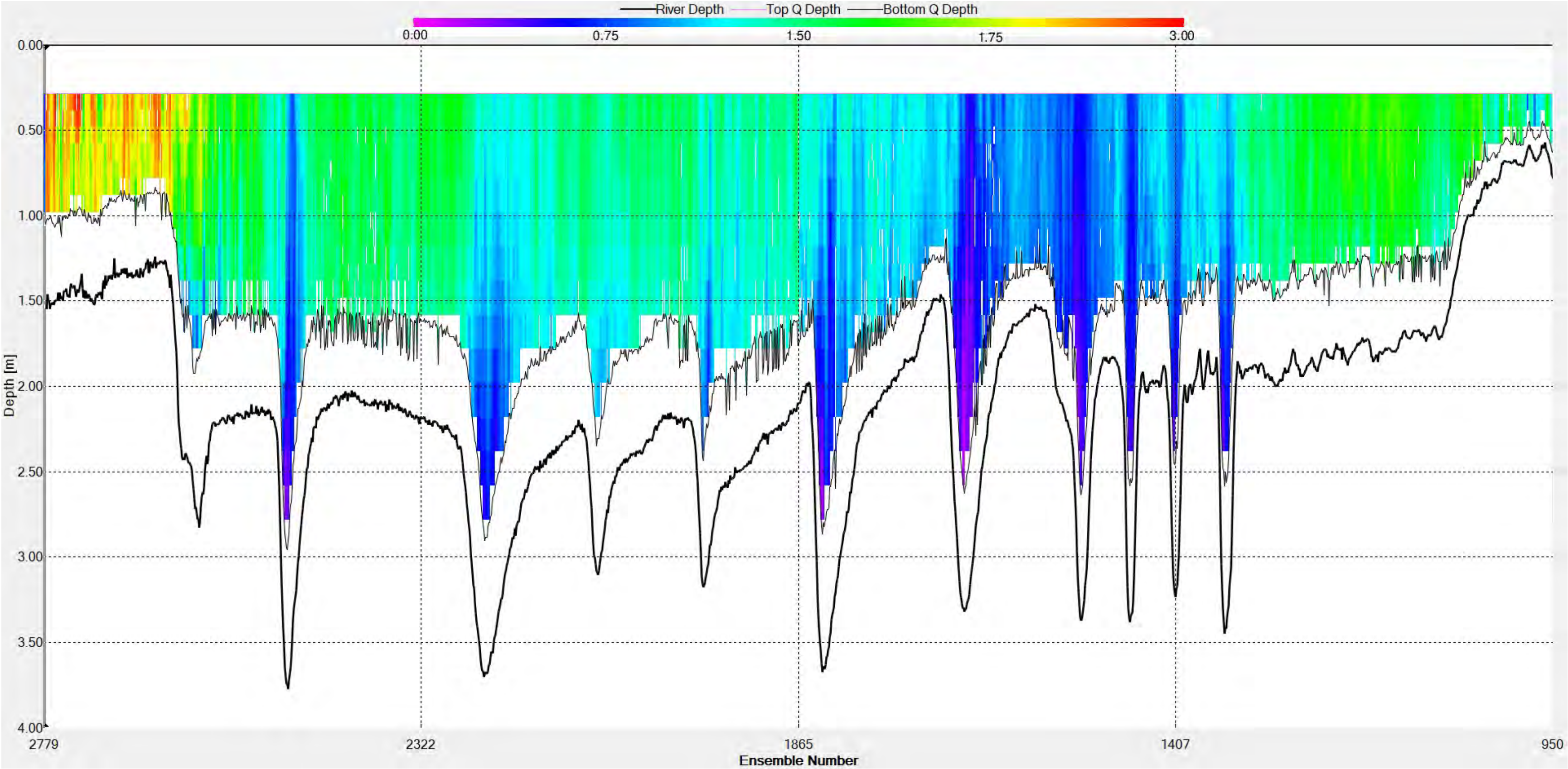


Figure 6. Plot of bed and velocity profile along Main Channel Bar on September 5, 2020 during moderate Peace River flows (~930 m^3/s).



4.1.3. Physical Habitat

The Site 108R offset habitat is expected to be used by Arctic Grayling, Mountain Whitefish, and Rainbow Trout for feeding and rearing, as well as, Walleye for feeding (BC Hydro 2015c). Bull Trout are an indicator species, and although the offset design does not target this species, they are included in the habitat suitability analysis. The species assessed for habitat suitability were specified in the FAHMFP (Mountain Whitefish, and Rainbow Trout; BC Hydro 2015a). Habitat suitability for Arctic Grayling is not provided based on no available habitat suitability indices and Walleye habitat suitability will be provided in future years of OEM reporting. Habitat suitability was summarized for Bull Trout because they are listed as an indicator species in the FAHMFP and were found occupying Site 108R during data collection. Weighted usable widths (WUW) are summarized by transect in Table 5. Weighted usable area (WUA) is summarized for each channel (and the overall Site 108R area) in by species for each survey period (i.e., August and September 2020, when Peace River flows were ~2,139 m^3/s and ~932 m^3/s, respectively; Table 6). The corresponding results are described in the following sections.

4.1.3.1. Bull Trout

High utilization by Bull Trout is not expected in Site 108R offset habitats (BC Hydro 2015c), although they are an indicator species, and habitat suitability criteria are only available for the juvenile life stage. WUA and percent available habitat for juvenile Bull Trout was similar during both survey trips at 4,358 m^2 and 3% of the 137,062 m^2 wetted area, respectively in August, and 4,332 m^2 and 4% of the 114,350 m^2 wetted area, respectively in September.

4.1.3.2. Mountain Whitefish

WUA and percent available habitat for juvenile Mountain Whitefish during the August survey was 17,112 m^2 and 12% of the 137,062 m^2 wetted area, respectively, with the greatest percent in the Backwater Channel and South Side Channel Spur Extension (27% and 28%, respectively; Table 6). During the September survey, WUA and percent available habitat for juvenile Mountain Whitefish was 21,163 m^2 and 19% of the 114,350 m^2 wetted area, respectively. In contrast to August results, usability was between 23% and 34% in all offset areas, with the exception of the Main Channel Bar, which was only 3% usable (Table 6).

WUA and percent available habitat for adult Mountain Whitefish during August surveys was 40,609 m^2 and 30% of the 137,062 m^2 wetted area, respectively, with the highest usabilities observed in the Backwater Channel and South Side Channel Spur Extension (70% and 64%, respectively). During the September surveys, WUA and percent available habitat for adult Mountain Whitefish was 46,588 m^2 and 41% of the 114,350 m^2 wetted area, respectively. Similar to results for juveniles, percent habitat usability was moderately high in all offset areas for adult Mountain Whitefish (i.e., 48% to 69%), except in the Main Channel Bar (13%).

4.1.3.3. Rainbow Trout

WUA and percent available habitat for Rainbow Trout (juveniles and adults) during the August surveys was 22,609 m² and 16% of the 137,062 m² wetted area, respectively. Percent usable habitat was similar in the Backwater, East and West Side Channels (25 to 28%) and comparatively low in the Main Channel Bar and South Side Channel Spur Extension (3% and 7% respectively). During the September survey, WUA and percent available habitat for Rainbow Trout was 31,895 m^2 and 28% of the 114,350 m² wetted area, respectively. Similar to August results, percent usable habitat was highest in the East and West Side Channels (68% and 56%, respectively), and lower in the other offset areas (10% to 16%).

Table 5. **Weighted usable width (WUW) for transects at Peace River [including discharge at Peace River Above Pine (WSC 07FA004)] Site 108R channel for a) Bull Trout, b) Mountain Whitefish, and c) Rainbow Trout.**

a) Bull Trout

Channel	Date	Transect	Discharge (m^3/s)	Juvenile WUW (m)
Backwater Channel	27-Aug	GMB02	2,130.0	1.4
		GMB03	2,130.0	2.1
		GMB05	2,130.0	2.2
	27-Aug Average		**2,130.0**	**1.9**
	06-Sep	GMB02	930.0	2.2
		GMB03	930.0	1.0
		GMB05	930.0	1.7
	06-Sep Average		**930.0**	**1.6**
East Side Channel	26-Aug	GME01	2,150.0	0.9
		GME02	2,150.0	1.4
		GME03	2,150.0	2.5
	26-Aug Average		**2,150.0**	**1.6**
	06-Sep	GME01	930.0	0.2
		GME02	930.0	0.3
		GME03	930.0	1.1
	06-Sep Average		**930.0**	**0.5**
Main Channel Bar	27-Aug	GMP02	2,130.0	0.1
		GMP04	2,130.0	0.0
	27-Aug Average		**2,130.0**	**0.1**
	05-Sep	GMP02	930.0	0.1
		GMP04	930.0	0.9
	05-Sep Average		**930.0**	**0.5**
South Side Channel Spur Extension	26-Aug	GMS02	2,160.0	2.4
		GMS03	2,160.0	2.1
		GMS04	2,150.0	2.9
	26-Aug Average		**2,156.7**	**2.5**
	05-Sep	GMS02	945.0	2.4
		GMS03	940.0	0.9
		GMS04	930.0	1.9
	05-Sep Average		**938.3**	**1.7**
West Side Channel	27-Aug	GMW01	2,130.0	1.4
		GMW02	2,130.0	0.3
		GMW05	2,130.0	0.7
		GMW08	2,130.0	0.3
	27-Aug Average		**2,130.0**	**0.7**
	06-Sep	GMW01	930.0	1.1
		GMW02	930.0	2.0
		GMW05	930.0	1.5
		GMW08	930.0	0.7
	06-Sep Average		**930.0**	**1.3**

Table 5. Continued.

b) Mountain Whitefish

Channel	Date	Transect	Discharge (m³/s)	Juvenile WUW (m)	Adult Rearing WUW (m)
Backwater Channel	27-Aug	GMB02	2,130.0	9.3	24.7
		GMB03	2,130.0	10.2	26.4
		GMB05	2,130.0	10.0	25.4
	27-Aug Average		**2,130.0**	**9.9**	**25.5**
	06-Sep	GMB02	930.0	10.6	19.9
		GMB03	930.0	8.2	19.7
		GMB05	930.0	8.7	21.1
	06-Sep Average		**930.0**	**9.2**	**20.2**
East Side Channel	26-Aug	GME01	2,150.0	1.2	2.1
		GME02	2,150.0	3.1	6.7
		GME03	2,150.0	6.8	5.5
	26-Aug Average		**2,150.0**	**3.7**	**4.7**
	06-Sep	GME01	930.0	1.1	0.4
		GME02	930.0	5.5	12.3
		GME03	930.0	4.2	12.0
	06-Sep Average		**930.0**	**3.6**	**8.2**
Main Channel Bar	27-Aug	GMP02	2,130.0	0.7	0.6
		GMP04	2,130.0	2.1	6.3
	27-Aug Average		**2,130.0**	**1.4**	**3.5**
	05-Sep	GMP02	930.0	2.0	3.0
		GMP04	930.0	4.8	24.0
	05-Sep Average		**930.0**	**3.4**	**13.5**
South Side Channel Spur Extension	26-Aug	GMS02	2,160.0	6.5	15.0
		GMS03	2,160.0	6.8	16.3
		GMS04	2,150.0	6.4	14.6
	26-Aug Average		**2,156.7**	**6.6**	**15.3**
	05-Sep	GMS02	945.0	5.3	9.2
		GMS03	940.0	5.4	10.3
		GMS04	930.0	5.2	10.1
	05-Sep Average		**938.3**	**5.3**	**9.9**
West Side Channel	27-Aug	GMW01	2,130.0	3.9	14.7
		GMW02	2,130.0	3.0	6.6
		GMW05	2,130.0	2.8	4.8
		GMW08	2,130.0	1.5	1.0
	27-Aug Average		**2,130.0**	**2.8**	**6.8**
	06-Sep	GMW01	930.0	9.8	25.6
		GMW02	930.0	4.1	9.7
		GMW05	930.0	4.3	8.9
		GMW08	930.0	4.4	4.0
	06-Sep Average		**930.0**	**5.6**	**12.0**

Table 5. Continued.

c) Rainbow Trout

Channel	Date	Transect	Discharge (m³/s)	Juvenile and Adult WUW (m)
Backwater Channel	27-Aug	GMB02	2,130.0	10.3
		GMB03	2,130.0	4.5
		GMB05	2,130.0	4.1
	27-Aug Average		**2,130.0**	**6.3**
	06-Sep	GMB02	930.0	2.6
		GMB03	930.0	2.5
		GMB05	930.0	4.1
	06-Sep Average		**930.0**	**3.1**
East Side Channel	26-Aug	GME01	2,150.0	2.6
		GME02	2,150.0	7.5
		GME03	2,150.0	11.6
	26-Aug Average		**2,150.0**	**7.3**
	06-Sep	GME01	930.0	3.3
		GME02	930.0	12.5
		GME03	930.0	11.6
	06-Sep Average		**930.0**	**9.2**
Main Channel Bar	27-Aug	GMP02	2,130.0	1.3
		GMP04	2,130.0	5.5
	27-Aug Average		**2,130.0**	**3.4**
	05-Sep	GMP02	930.0	5.5
		GMP04	930.0	26.7
	05-Sep Average		**930.0**	**16.1**
South Side Channel Spur Extension	26-Aug	GMS02	2,160.0	1.4
		GMS03	2,160.0	1.1
		GMS04	2,150.0	2.4
	26-Aug Average		**2,156.7**	**1.7**
	05-Sep	GMS02	945.0	2.3
		GMS03	940.0	2.7
		GMS04	930.0	2.4
	05-Sep Average		**938.3**	**2.5**
West Side Channel	27-Aug	GMW01	2,130.0	15.1
		GMW02	2,130.0	7.5
		GMW05	2,130.0	6.5
		GMW08	2,130.0	3.2
	27-Aug Average		**2,130.0**	**8.1**
	06-Sep	GMW01	930.0	26.5
		GMW02	930.0	9.0
		GMW05	930.0	12.4
		GMW08	930.0	7.6
	06-Sep Average		**930.0**	**13.9**

Table 6. Weighted usable area (WUA) in Peace River Site 108R channel for a) Bull Trout, b) Mountain Whitefish, and c) Rainbow Trout.

a) Bull Trout

Criteria	Month	Channel	Peace River Discharge (m^3/s)	WUA (m^2)	Wetted Area (m^2)	Usability (%)
Bull Trout Juveniles	Aug	East Side Channel	2,150	1,104	19,245	6%
		West Side Channel	2,130	654	30,130	2%
		Main Channel Bar	2,130	24	45,870	0%
		South Side Channel Spur Extension	2,157	1,199	11,485	10%
		Backwater Channel	2,130	1,376	30,332	5%
	Aug Total		**2,139**	**4,358**	**137,062**	**3%**
	Sep	East Side Channel	930	313	11,313	3%
		West Side Channel	930	1,239	23,444	5%
		Main Channel Bar	930	220	47,452	0%
		South Side Channel Spur Extension	938	886	7,526	12%
		Backwater Channel	930	1,674	24,615	7%
	Sep Total		**932**	**4,332**	**114,350**	**4%**

b) Mountain Whitefish

Criteria	Month	Channel	Peace River Discharge (m^3/s)	WUA (m^2)	Wetted Area (m^2)	Usability (%)
Mountain Whitefish Adult	Aug	East Side Channel	2,150	4,040	19,245	21%
		West Side Channel	2,130	6,299	30,130	21%
		Main Channel Bar	2,130	1,622	45,870	4%
		South Side Channel Spur Extension	2,157	7,380	11,485	64%
		Backwater Channel	2,130	21,269	30,332	70%
	Aug Total		**2,139**	**40,609**	**137,062**	**30%**
	Sep	East Side Channel	930	7,233	11,313	64%
		West Side Channel	930	11,272	23,444	48%
		Main Channel Bar	930	6,341	47,452	13%
		South Side Channel Spur Extension	938	4,715	7,526	63%
		Backwater Channel	930	17,026	24,615	69%
	Sep Total		**932**	**46,588**	**114,350**	**41%**
Mountain Whitefish Juvenile	Aug	East Side Channel	2,150	2,503	19,245	13%
		West Side Channel	2,130	2,669	30,130	9%
		Main Channel Bar	2,130	656	45,870	1%
		South Side Channel Spur Extension	2,157	3,175	11,485	28%
		Backwater Channel	2,130	8,109	30,332	27%
	Aug Total		**2,139**	**17,112**	**137,062**	**12%**
	Sep	East Side Channel	930	3,205	11,313	28%
		West Side Channel	930	5,341	23,444	23%
		Main Channel Bar	930	1,592	47,452	3%
		South Side Channel Spur Extension	938	2,562	7,526	34%
		Backwater Channel	930	8,464	24,615	34%
	Sep Total		**932**	**21,163**	**114,350**	**19%**

Table 6. Continued.

c) Rainbow Trout

Criteria	Month	Channel	Peace River Discharge (m³/s)	WUA (m²)	Wetted Area (m²)	Usability (%)
Rainbow Trout Juvenile and Adult	Aug	East Side Channel	2,150	5,365	19,245	28%
		West Side Channel	2,130	7,603	30,130	25%
		Main Channel Bar	2,130	1,584	45,870	3%
		South Side Channel Spur Extension	2,157	793	11,485	7%
		Backwater Channel	2,130	7,264	30,332	24%
	Aug Total		**2,139**	**22,609**	**137,062**	**16%**
	Sep	East Side Channel	930	7,699	11,313	68%
		West Side Channel	930	13,094	23,444	56%
		Main Channel Bar	930	7,539	47,452	16%
		South Side Channel Spur Extension	938	1,180	7,526	16%
		Backwater Channel	930	2,382	24,615	10%
	Sep Total		**932**	**31,895**	**114,350**	**28%**

4.1.4. Substrate and Channel Morphology

The condition of LWD structures, substrates, channel profiles, and vegetation were assessed visually at low flow conditions on October 2, 2020, when Peace River flows were low (390 m^3/s) (Appendix C). Visual assessments of the functionality of the offset areas were also completed at higher flow ranges during the physical habitat transects and fish sampling. As previously discussed, underwater videography of stream substrate and submerged habitat features was not feasible in 2020 due to poor visibility (Section 3.2.1). As such, the substrate condition at the Main Channel Bar was not assessed. Aquatic vegetation was not visible within the channels, although channel construction was not fully completed until May 2020 (Blezy and Chilibeck 2020).

Stream substrate within the South Side Channel Spur Extension was primarily fines, gravels, and cobbles. At low flows, submerged boulder clusters were visible, and were covered with a thin layer of fines which may limit cover to small fish within interstitial spaces among boulders. LWD habitat structures and debris catcher pilings are not present within this closed channel (NHC 2019). Colonization by aquatic macrophytes is expected to occur over time.

Stream substrate within the East Side Channel was predominantly small cobble and large gravel. Buried root wads are structurally intact and provide good instream cover and refuge from high flows. The structures were partially dewatered under low flows (392 m^3/s), but still offered some cover for fish. The vertical debris catcher pilings were intact and will provide increased cover over time as additional woody debris begins to accumulate. The pilings and buried root wads that provide protection on both banks at the inlet to the channel (NHC 2019) were also intact. Sloughing and erosion was apparent along the banks of the East Side Channel. This may result in gradual channel widening as wave action causes gravels and cobbles to slough into the river.

Physical habitat characteristics of the West Side Channel were similar to that of the East Side Channel, although stream substrate was slightly larger and dominated by large cobble. Buried root wads provide good cover and refuge from high flows, and the debris catcher pilings are intact and should accumulate additional woody debris over time. There was some evidence of bank erosion and sloughing of gravels and cobbles throughout the channel from boat-related wave action and winter ice flow which is causing some channel widening. Some gravel and cobble fill at the base of the debris catcher pilings that are positioned near the edge of the channel may have sloughed away, although the trunks were anchored and there is no obvious evidence of reduced structural integrity. There is potential stranding risk and obvious erosion on the right bank within the lower portion of the channel, upstream of the confluence with the South Side Channel (Figure 7). At high flows the thalweg is close to a steep bank, and there is evidence of recent erosion and one tree had fallen into the channel. This has caused the bankfull width and bed elevation to increase, with formation of an isolated pool that poses some risk to fish stranding at low flows (~390 m^3/s). There is also evidence of newly deposited gravel and cobble in the South Side Channel, downstream of the West Side Channel confluence. The channel protection offered by the debris catcher pilings and buried LWD at the inlet to the channel were intact. The channel is intact and functioning as described in the original design (Chilibeck 2016; NHC 2019), with the exception of the bank erosion and aggradation that is most apparent in the lower portion of the channel.

The low velocity Backwater Channel had a high percentage of fines with mostly gravel and cobble substrates exposed along the banks. The substate in deep portions of the thalweg was not visually assessed, although the mid-depth areas that become visible at low flows showed a high percentage of fines. There was minor evidence of bank erosion and sloughing, although the bank profile generally matched the design (Chilibeck 2016; NHC 2019).

Figure 7. Recent bank erosion and aggradation on river right at the downstream end of the West Side Channel on October 2, 2020 (discharge of 390 m^3/s).

4.2. Fish Use in 2020

4.2.1. Small Fish Boat Electrofishing

Small fish boat electrofishing was conducted from August 23 to October 1, 2020. A total of 7,279 m of linear habitat was electrofished over 19,213 seconds of electrofishing effort during that period (Table 7). During low flows it was not possible to access all sites with the boat electrofisher, due to insufficient water depth. Effort was applied proportionally to the areas of Site 108R that had the greatest areas of fish habitat at the time of sampling; the South Side Channel and the Backwater Channel were the largest areas, followed by the West Side Channel, East Side Channel and South Side Channel Spur Extension (the South Side Channel Spur Extension and Backwater Channels were too shallow for boat electrofishing in October 2020 and were not sampled).

There was large variation in average daily discharge within the Peace River among electrofishing survey dates (both boat and backpack electrofishing), ranging from 2,134 m^3/s in August and remaining high into September, then dropping down to 392 m^3/s in October. Conductivity and water temperatures were within guidelines during all electrofishing surveys (160 – 310 µS/cm and 5 ºC to 20°C) across all dates (Table 7). Water visibility was <0.5 m on all but a few occasions; however, these conditions are typical of large turbid rivers like the Peace River.

A total of 360 fish were captured during small fish boat electrofishing surveys in 2020 for a total CPUE of 0.97 fish/minute (Table 8)[9]. Of the indicator species, Mountain Whitefish had the highest yield (115 individuals; 0.36 fish/min), followed by Bull Trout (9 individuals; 0.03 fish/min), Arctic Grayling (7 individuals; 0.02 fish/min), Walleye (7 individuals; 0.02 fish/min) Burbot (2 individuals; 0.01 fish/min), and Goldeye (1 individual; <0.00 fish/min). Non-indicator species had a combined total CPUE of 0.68 fish/min (For a detailed breakdown of species captures by site see Appendix D).

The highest catch rate during small fish boat electrofishing was in the newly created West Side Channel (115 individuals; 1.93 fish/min; Table 8) followed by the South Side Channel (105 individuals; 1.06 fish/min), the East Side Channel (63 individuals; 1.04 fish/min) the South Side Channel Spur Extension (42 individuals; 1.29 fish/min) and the Backwater Channel (35 individuals; 0.51 fish/min). Indicator species were represented in all the areas except for the South Side Channel Spur Extension where the catch was entirely non-indicator species (Appendix D).

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[9] Note that electrofishing effort is presented in seconds, but effort within CPUE is presented in minutes, to allow for a more intuitive presentation of results.

Table 7. Summary of site conditions and sampling effort during small fish boat electrofishing surveys in Site 108R offset habitat, August – October 2020.

Area	Site	Date	Average Discharge	Electofisher Model	Cloud Cover[1]	Surface Visibility	Water Visibility	Water Temp (°C)	Conductivity (µS/cm)	Settings				Mean Depth (m)	Max Depth (m)	Length (m)	Effort (seconds)
										Range	Percent	Amperes	Mode				
Backwater Channel	PCR-OCES03	23-Aug-2020	1,895	Gpp 2.5	Partly cloudy	High	0.1	12.0	200	High	40	n/c	DC	1.0	1.5	200	890
		6-Sep-2020	938	Gpp 2.5	Overcast	Medium	0.5	12.8	290	High	19	n/c	DC	n/c	n/c	290	900
	PCR-OCES04	23-Aug-2020	1,895	Gpp 2.5	Partly cloudy	Medium	0.2	12.1	200	High	40	n/c	DC	1.2	2.0	200	920
		6-Sep-2020	938	Gpp 2.5	Overcast	High	0.5	12.8	290	High	41	n/c	DC	n/c	n/c	290	900
	PCR-SB07	27-Sep-2020	729	Gpp 2.5	Partly cloudy	Medium	1.2	9.5	909	High	11	3	DC	n/c	n/c	909	500
															Area Total	**1,889**	**4,110**
East Side Channel	PCR-OCES07	23-Aug-2020	1,895	Gpp 2.5	Partly cloudy	Medium	0.2	12.3	240	High	40	n/c	DC	n/c	n/c	240	650
		5-Sep-2020	946	Gpp 5.0	Partly cloudy	High	n/c	13.9	-	High	30	3	DC	0.6	0.7	180	650
		1-Oct-2020	395	Gpp 5.0	Clear	High	0.4	10.2	210	High	40	2	DC	0.6	1.2	210	500
	PCR-OCES08	23-Aug-2020	1,895	Gpp 2.5	Partly cloudy	Medium	0.2	13.4	220	High	40	n/c	DC	1.2	1.6	220	660
		5-Sep-2020	946	Gpp 5.0	Clear	High	n/c	13.9	180	High	20	3	DC	0.9	1.5	180	660
		1-Oct-2020	395	Gpp 5.0	Clear	High	0.4	10.2	210	High	40	2	DC	0.7	1.3	210	500
															Area Total	**1,240**	**3,620**
South Side Channel	PCR-OCES01	23-Aug-2020	1,895	Gpp 2.5	Clear	High	0.2	12.0	200	High	38	n/c	DC	1.0	1.5	200	510
		6-Sep-2020	938	Gpp 2.5	Overcast	Medium	0.6	12.8	290	High	25	3	DC	n/c	n/c	290	800
	PCR-OCES02	23-Aug-2020	1,895	Gpp 2.5	Partly cloudy	n/c	0.2	12.0	200	High	40	n/c	DC	n/c	n/c	200	671
		1-Oct-2020	395	Gpp 5.0	Clear	High	n/c	10.6	210	High	40	2	DC	0.4	0.7	210	1,300
	PCR-OCES09	24-Aug-2020	1,935	Gpp 2.5	Overcast	Low	0.2	11.2	180	High	40	n/c	DC	1.0	1.5	180	390
		5-Sep-2020	946	Gpp 5.0	Partly cloudy	High	n/c	13.8	240	High	30	3	DC	0.9	1.2	240	390
	PCR-OCES10	24-Aug-2020	1,935	Gpp 2.5	Overcast	Low	0.2	13.5	180	High	45	n/c	DC	n/c	n/c	180	420
		6-Sep-2020	938	Gpp 2.5	Partly cloudy	Medium	0.6	12.8	290	High	42	n/c	DC	n/c	n/c	290	502
	PCR-OCES11	24-Aug-2020	1,935	Gpp 2.5	Overcast	Medium	0.2	13.5	180	High	45	n/c	DC	n/c	n/c	180	480
		5-Sep-2020	946	Gpp 5.0	Clear	n/c	n/c	14.4	190	High	20	3	DC	0.7	1.0	190	480
															Area Total	**2,160**	**5,943**
West Side Channel	PCR-OCES12	24-Aug-2020	1,935	Gpp 2.5	Partly cloudy	Medium	0.2	12.3	200	High	45	n/c	DC	n/c	n/c	200	470
		5-Sep-2020	946	Gpp 5.0	Mostly cloudy	Medium	0.6	13.7	210	High	30	6	DC	n/c	n/c	210	470
		1-Oct-2020	395	Gpp 5.0	Clear	High	0.2	10.6	210	High	40	2	DC	0.7	2.3	210	830
	PCR-OCES13	24-Aug-2020	1,935	Gpp 2.5	Partly cloudy	High	0.2	12.3	200	High	45	n/c	DC	n/c	n/c	200	490
		5-Sep-2020	946	Gpp 5.0	Mostly cloudy	Medium	0.6	13.7	210	High	n/c	6	DC	n/c	n/c	210	490
		1-Oct-2020	395	Gpp 5.0	Clear	High	0.2	10.6	210	High	n/c	n/c	DC	0.7	2.2	210	830
															Area Total	**1,240**	**3,580**
South Side Channel Spur Extension	PCR-OCES05	23-Aug-2020	1,895	Gpp 2.5	Partly cloudy	High	0.2	12.2	200	High	40	n/c	DC	1.2	1.9	200	650
		5-Sep-2020	946	Gpp 5.0	Clear	High	n/c	9.2	310	High	30	3	DC	0.9	1.3	310	650
	PCR-OCES06	23-Aug-2020	1,895	Gpp 2.5	Partly cloudy	High	0.2	13.8	240	High	40	n/c	DC	n/c	n/c	240	660
															Area Total	**750**	**1,960**
															Grand Total	**7,279**	**19,213**

[1] Clear = <10% cloud; Partly Cloudy = 10-50% cloud, Mostly Cloudy = 50-90% cloud; Overcast = >90% cloud, n/c = not collected

Table 8. Summary of fish captured by small fish boat electrofishing in 2020; Main Channel Bar was not sampled with small fish boat electrofishing.

Area[1]	Species[2]															
	Arctic Grayling		Bull Trout		Burbot		Goldeye		Mountain Whitefish		Walleye		Non-Indicator Species		All Species	
	Catch	CPUE[3]	Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE	Catch	CPUE
Backwater Channel	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.01	34	0.50	35	0.51
East Side Channel	5	0.08	2	0.03	0	0.00	0	0.00	37	0.61	1	0.02	18	0.30	63	1.04
South Side Channel	0	0.00	1	0.01	1	0.01	0	0.00	25	0.25	2	0.02	76	0.77	105	1.06
West Side Channel	2	0.03	6	0.10	1	0.02	1	0.02	53	0.89	3	0.05	49	0.82	115	1.93
South Side Channel Spur Extension	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	42	1.29	43	1.32
Total[4]	**7**	**0.02**	**9**	**0.03**	**2**	**0.01**	**1**	**0.00**	**115**	**0.36**	7	**0.02**	**219**	**0.68**	**361**	**1.13**

[1] Only areas sampled are shown

[2] Only species captured are shown

[3] CPUE = Catch Per Unit Effort (fish per minute)

[4] Total CPUE (per species) was calculated as total catch/total effort

4.2.2. Large Fish Boat Electrofishing

Large fish boat electrofishing was conducted within three areas of Site 108R (East Side Channel, West Side Channel and the Main Channel Bar area of the mainstem of the Peace River). Sampling was carried out on four occasions from late August to late September 2020 (Table 9). During this time, daily average discharge in the Peace River declined from ~2,000 m^3/s at the time sampling was initiated, to ~1,000 m^3/s during the later sampling dates. In total 9,990 m of habitat were large fish boat electrofished in 2020, which resulted in 5,940 seconds of effort.

Large boat electrofishing yielded a total of 216 fish captured (Table 10). Of the indicator species, Mountain Whitefish were the most numerous (99 individuals; 1.00 fish/min) followed by Bull Trout (10 individuals; 0.10 fish/min), Walleye (2 individuals; 0.02 fish/min), Rainbow Trout (1 individual; 0.01 fish/min), and Burbot (1 individual; 0.1 fish/min) (Table 10). Non-Indicator had a total CPUE of 1.04 fish/min (For a detailed breakdown of catch by species see Appendix D).

The Main Channel Bar yielded the highest capture of the three areas sampled during large boat electrofishing (96 fish captured; 3.33 fish/min) compared to the newly created West Side Channel and East Side Channel which yielded fewer fish (62; 1.68 fish/min and 58; 1.75 fish/min respectively; Table 10). Multiple indicator species were captured in all the areas sampled.

Table 9. Summary of site conditions and sampling effort during large fish boat electrofishing surveys in the Peace River in August and September 2020.

Area	Site	Date	Daily Average Discharge (m^3/s)[1]	Time (hh:mm)	Water Temp (°C)	Air Temp (°C)	Conductivity (µS/cm)	Measured Visibility (m)	Cloud Cover[2]	Model	Settings				Site Length (m)	Effort (seconds)
											Range	Percent	Amperes	Mode		
East Side Channel	OEM-DSC	26-Aug-2020	2,134	16:05	20.0	12.8	180	0.4	Mostly cloudy	SR-18H (Cas)	High	14	3.5	30DC	760	465
		2-Sep-2020	2,108	16:23	17.0	13.4	160	0.5	Clear	SR-18H (Cas)	High	19	4.0	30DC	760	428
		13-Sep-2020	929	15:10	5.0	10.2	180	0.6	Overcast	SR-18H (Cas)	High	14	3.5	30DC	710	495
		23-Sep-2020	926	12:03	8.0	10.8	190	1.0	Overcast	SR-18H (Cas)	High	19	4.0	30DC	760	602
														Area Effort	**2,990**	**1,990**
West Side Channel	OEM-USC	26-Aug-2020	2,134	15:30	20.0	12.7	180	0.4	Partly cloudy	SR-18H (Cas)	High	14	3.5	30DC	1,010	541
		2-Sep-2020	2,108	16:47	17.0	13.4	160	0.5	Clear	SR-18H (Cas)	High	18	4.0	30DC	1,010	485
		13-Sep-2020	929	14:26	5.0	10.4	180	0.6	Overcast	SR-18H (Cas)	High	13	3.5	30DC	1,010	627
		23-Sep-2020	926	17:42	12.0	11.1	190	0.3	n/c	SR-18H (Cas)	High	18	4.0	30DC	1,010	567
														Area Effort	**4,040**	**2,220**
Main Channel Bar	OEM-MS	26-Aug-2020	2,134	17:05	20.0	12.8	180	0.4	Overcast	SR-18H (Cas)	High	14	3.5	30DC	740	352
		2-Sep-2020	2,108	12:36	18.0	12.8	160	0.5	Clear	SR-18H (Cas)	High	19	4.0	30DC	740	399
		13-Sep-2020	929	13:13	5.0	10.6	180	0.6	Overcast	SR-18H (Cas)	High	14	3.5	30DC	740	551
		23-Sep-2020	926	13:59	10.0	10.8	190	1.1	Overcast	SR-18H (Cas)	High	16	4.0	30DC	740	428
														Area Effort	**2,960**	**1,730**
														Total Effort	**9,990**	**5,940**

[1] Measured at the PAP WSC gauge in the Peace River mainstem

[2] Clear = <10% cloud; Partly Cloudy = 10-50% cloud, Mostly Cloudy = 50-90% cloud; Overcast = >90% cloud, n/c = not collected

Table 10. **Summary of fish captured through large fish boat electrofishing in 2020; only the East Side Channel, West Side Channel and the Main Channel Bar were sampled.**

Area [1]	Species [2]													
	Bull Trout		Burbot		Mountain Whitefish		Rainbow Trout		Walleye		Non-Indicator Species		All Species	
	Catch	CPUE [3]	Catch	CPUE[3]	Catch	CPUE[3]	Catch	CPUE[3]	Catch	CPUE[3]	Catch	CPUE[3]	Catch	CPUE[3]
East Side Channel	1	0.03	0	0.00	26	0.78	0	0.00	0	0.00	31	0.93	58	1.75
West Side Channel	3	0.08	0	0.00	26	0.70	0	0.00	0	0.00	33	0.89	62	1.68
Main Channel Bar	6	0.21	1	0.03	47	1.63	1	0.03	2	0.07	39	1.35	96	3.33
Total [4]	**10**	**0.10**	**1**	**0.01**	**99**	**1.00**	**1**	**0.01**	**2**	**0.02**	**103**	**1.04**	**216**	**2.18**

[1] Only areas sampled are shown

[2] Only species captured are shown

[3] CPUE = Catch Per Unit Effort (fish per minute)

[4] Total CPUE (per species) was calculated as total catch/total effort

4.2.3. Backpack Electrofishing

Backpack electrofishing was carried out to a limited extent in 2020. Generally, the conditions in Site 108R were more appropriate for boat electrofishing (deep water, soft mud bottom). In total 4,589 seconds of backpack electrofishing were carried out across 582 m of shoreline (Table 11). Most of this effort was targeted in the East and West Side Channels (1,838 seconds and 2,037 seconds respectively), with an additional 714 seconds conducted in the South Side Channel.

Backpack electrofishing yielded a total capture of 140 fish (for a detailed breakdown of catch by species see Table 8 in Appendix D). The most fish were caught in the East Side Channel (78 individuals; 2.55 fish/min) followed by the West Side Channel (59 individuals; 1.74 fish/min) and the South Side Channel (3 individuals; 0.25 fish/min;

Table 12). Few indicator species were captured during backpack electrofishing with only five Mountain Whitefish (0.07 fish/min) and three Burbot (0.04 fish/min) caught across all sites.

Table 11. Summary of site conditions and sampling effort during backpack electrofishing surveys in the Peace River in August - October 2020.

Area	Site	Date	Daily Avergae Discharge (m^3/s)	Water Temp (°C)	Conductivity (µS/cm)	Estimated Visibility (m)	EF Model	Settings			Site Length (m)	Effort (seconds)
								Volts	Frequency (Hz)	Duty Cycle		
East Side Channel	PCR-OCEF03	2-Oct-2020	392	10.9	200	0.2	12B	300	60	4	150	1,389
	PCR-BP03	27-Sep-2020	729	9.8	225	1.0	12B	300	60	n/c	100	449
										Area Total	**250**	**1,838**
South Side Channel	PCR-OCEF01	23-Aug-2020	1,895	13.0	200	0.1	LR24	300	60	36	100	714
										Area Total	**100**	**714**
West Side Channel	PCR-OCEF02	5-Sep-2020	946	13.7	210	n/c	LR24	300	30	12	30	859
		1-Oct-2020	395	11.2	200	0.2	12B	300	60	n/c	102	510
	PCR-BP01	27-Sep-2020	729	10.1	218	1.1	12B	300	60	n/c	100	668
										Area Total	**232**	**2,037**
										Grand Total	**582**	**4,589**

Table 12. Summary of indicator species captured by backpack electrofishing in 2020. Areas or species with zero captures were removed from the table.

Area [1]	Species [2]							
	Burbot		Mountain Whitefish		Non-Indicator Species		All Species	
	Catch	CPUE [3]	Catch	CPUE	Catch	CPUE	Catch	CPUE
East Side Channel	0	0.00	4	0.13	74	2.42	78	2.55
South Side Channel	1	0.08	0	0.00	2	0.17	3	0.25
West Side Channel	2	0.06	1	0.03	56	1.65	59	1.74
Total [4]	**3**	**0.04**	**5**	**0.07**	**132**	**1.73**	**140**	**1.83**

[1] Only areas sampled are shown

[2] Only species captured are shown

[3] CPUE = Catch Per Unit Effort (fish per minute)

[4] Total CPUE (per species) was calculated as total catch/total effort

4.2.4. Minnow and Hoop Trapping, Gillnetting and Beach Seining

In total 1,218.3 hours of trapping with minnow and hoop traps were completed between late August and early October. The trapping was concentrated in the newly created offset habitat (West, South and East Side Channels). A total of five fish were captured (all in minnow traps); two Burbot (one captured in each of the East and West Side Channels), a Prickly Sculpin (East Side Channel), a Longnose Sculpin (South Side Channel Spur Extension) and a Slimy Sculpin (West Side Channel). For a detailed breakdown of effort and catch by species see Tables 1 and 4 in Appendix D.

In total, eight gill net sets were made between late August and early September (for a detailed breakdown of effort and catch by species see Tables 3 and 6 in Appendix D). A total of 11.2 hours of gillnetting was conducted, with each set ranging between 1.1 and 2.4 hours. Between all sets, a total of five fish were captured, none of which were indicator species. Two Northern Pike and one Longnose Sucker were captured in the Backwater Channel, one Longnose Sucker was captured in the East Side Channel, and one Northern Pike was captured in the South Side Channel.

Beach seining was conducted at several locations in late September where conditions and habitat were appropriate (for a detailed breakdown of effort and catch by species see Tables 2 and 5 in Appendix D). In total 1,315 m^2 of habitat were seined in the South Side Channel (1,050 m^2) and the South Side Channel Spur Extension (265 m^2). Between all beach seines a total of 60 fish were captured, though none were indicator species. The most common species captured was Slimy Sculpin (20 individuals). Most of the catch was located in the South Side Channel (56 individuals) compared to the South Side Channel Spur Extension (four individuals).

4.3. Individual Fish Metrics

4.3.1. Length-Weight Relationships, Condition Factor, and Diversity

Length weight relationship (Figure 8) was only calculated for Mountain Whitefish as too few individuals of the other indicator species were captured to calculate these variables. The length frequency relationship appears to show two size classes, one centered around 100 mm and one around 300 mm. Figures are not presented for condition factor or diversity because there are no comparisons available for the first year of monitoring. Comparison of results by year will be conducted after another year of sampling.

4.3.2. Length Frequency

Length frequency histograms were generated for fish caught using electrofishing (backpack, and small fish and large fish boat electrofishing combined; Figure 9 and Figure 10). Mountain Whitefish was the only indicator species with sufficient catch to infer size classes from the length frequency histogram. Similar to LWR two size classes appear visible (Figure 9); however, scale age analysis was not conducted as part of OEM monitoring, therefore determining the age size classes is not possible.

Figure 8. **Length-weight relationship for Mountain Whitefish captured within Site 108R in 2020.**

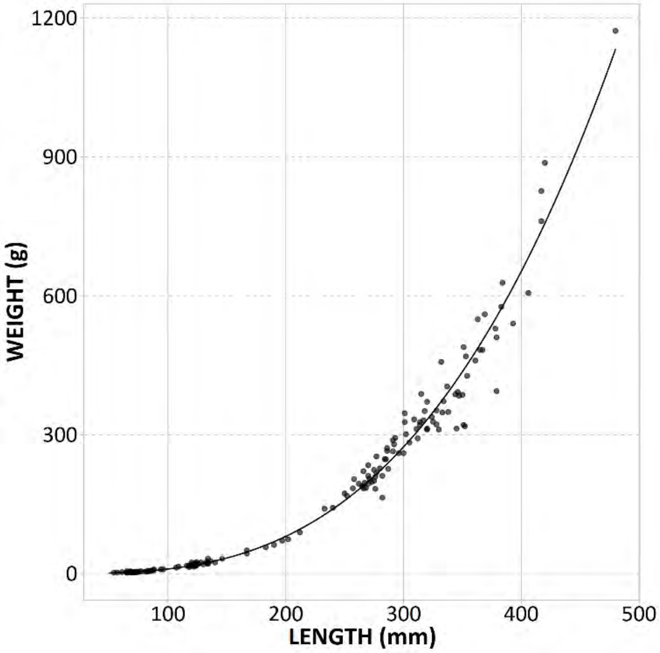


Figure 9. **Length frequency histogram for Mountain Whitefish captured within Site 108R in 2020.**

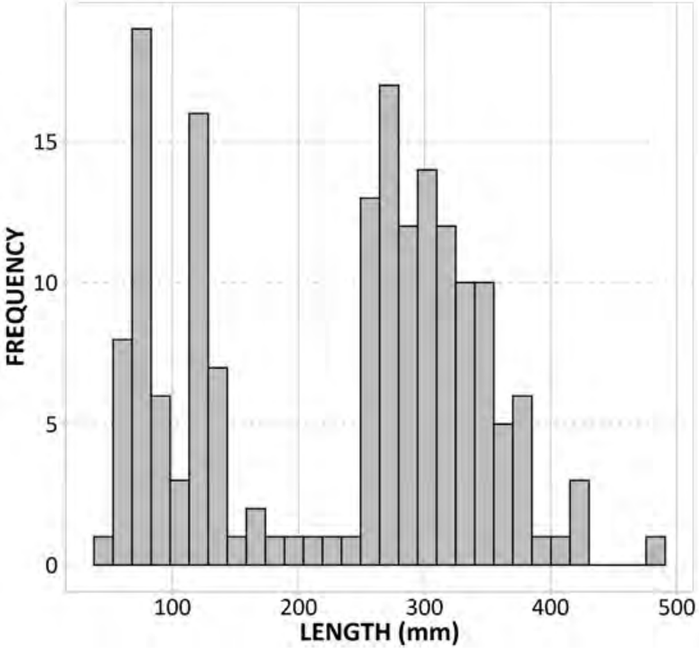
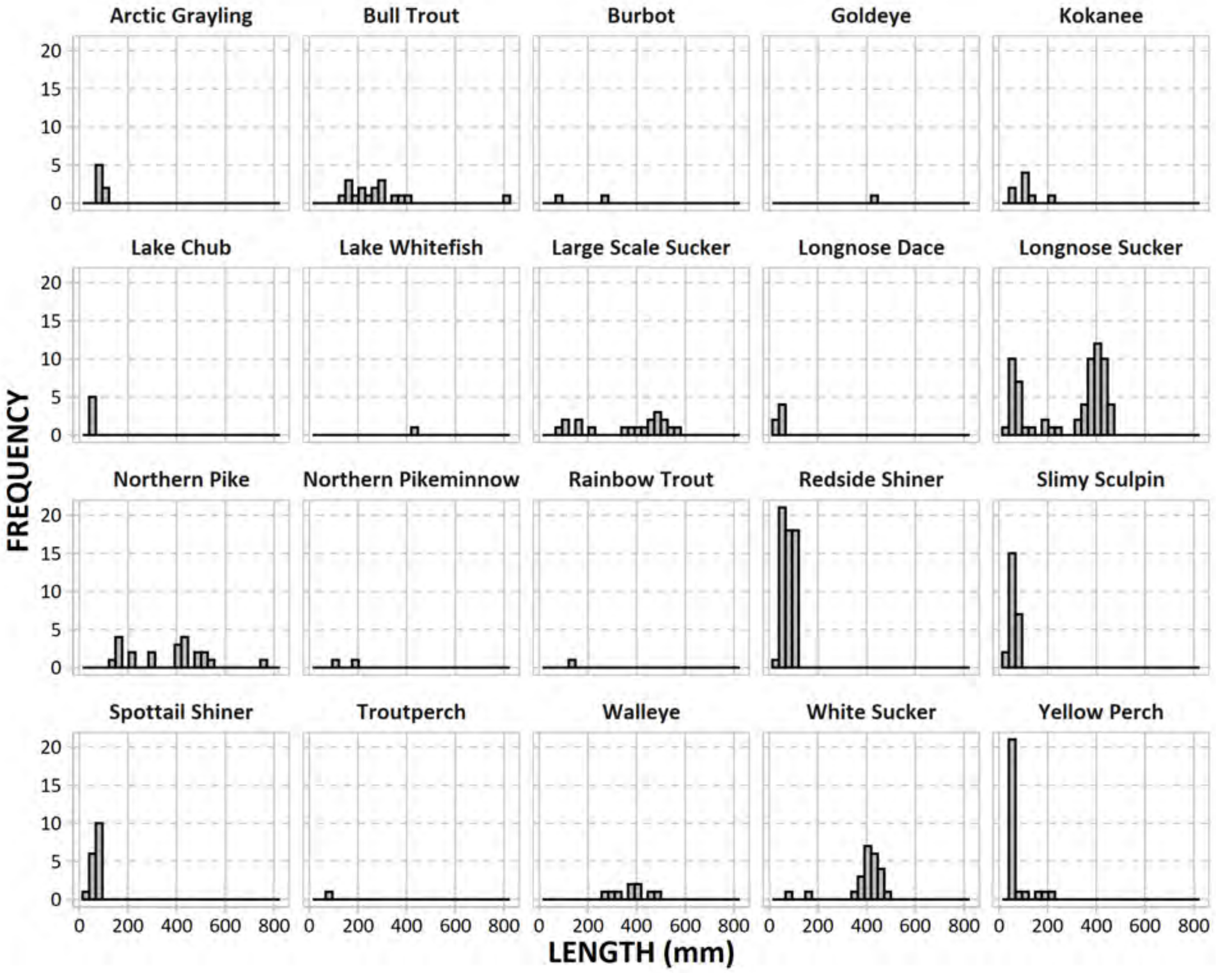


Figure 10. Length frequency histograms for all species captured in Site 108R in 2020 (Mountain Whitefish displayed separately).



5. DISCUSSION

5.1. Physical Habitat Sampling

5.1.1. Longitudinal Bed Profiles

The comparison of longitudinal bed profiles with design bed elevation values provided by NHC (2019) and NHC's as-built surveys (Blezy and Chilibeck 2020) shows large discrepancies for the East and West Channel, while the Backwater Channel and the South Channel matched the design more closely (Figure 5). These discrepancies could result from various reasons: geomorphic processes (erosion, aggradation) caused by high flows, discrepancies in the exact alignment of the profiles, and/or the as-built bed elevations differing from the NHC design due to field fits and construction inaccuracies. Changes in bed profile due to geomorphic processes at high flows (2,500 m^3/s) in the East and West Channel were also predicted by NHC's morphodynamic modelling (Chilibeck, 2016), assuming easily erodible substrate may be shifted (D_{50} = 10 mm). A short-term peak flow occurred on July 4, 2020, after the as-built survey in May 2020, when Peace River discharge exceeded 2,800 m^3/s for multiple hours. Another period with discharge greater than 2,400 m^3/s occurred from August 8 to August 19. These high flows were likely responsible for transporting sediment within the channels and to the mouth of the East Channel. Differences in profile elevation compared to those surveyed for the as-built surveys in May 2020 (Blezy and Chilibeck 2020) indicate aggradation. There was also some evidence of profile misalignment based on waypoint tracks from the ADCP and apparent shifts in thalweg location. Discrepancies between August and September profiles were less, comparatively, and were more likely due to misalignment of surveys, given that flows were lower between the two surveys.

5.1.2. Physical Habitat

Habitat diversity is provided by a range of depths, velocities, and substrate compositions within the offset channels. In general, the offset habitats are providing habitat for indicator species that are expected to occupy the offset areas (i.e., Mountain Whitefish and Rainbow Trout).

WUA calculations were conducted for Mountain Whitefish (juvenile and adult), Rainbow Trout (juvenile and adult), and for Bull Trout (juvenile) based on depth and velocity. The highest habitat usability for juvenile Mountain Whitefish was observed in the slower velocity habitats (Backwater Channel and South Side Channel Spur Extension). Moderate usability was observed for adult Mountain Whitefish in all offset channels (excluding the Main Channel Bar). The East and West Side Channels provided moderately high suitability for Mountain Whitefish spawning at medium flows (932 m^3/s), although this habitat was not designed for this species/life stage. Moderate WUA was observed for Rainbow Trout (juveniles and adults). The East and West Side Channels offered the highest WUA, particularly under moderate flows (i.e., 932 m^3/s). High utilization by Bull Trout is not expected in Site 108R offset habitats (BC Hydro 2015c) and this is reflected in the WUA analysis, with low habitat usability for juveniles.

5.1.3. Substrate and Channel Morphology

The offset areas are generally morphologically stable aside from some bank sloughing and aggradation that was predicted (Chilibeck 2016). Bank erosion and aggradation was apparent in the lower portion of the West Side Channel, which will require further monitoring to assess fish stranding potential and risk to channel function. Aquatic vegetation was not observed during the fall 2020 assessments, particularly in the fine substrate and low velocity habitats within closed channels where it is expected (i.e., South Side Channel Spur Extension and Backwater Channel) (Mainstream 2012). Gravel and cobbles dominated the higher velocity channels that were designed to provide permanent flow and offer habitat suitable for a wide range of salmonid species and life stages. Submerged root wads and debris catcher pilings were intact and may provide additional cover and habitat complexity for fish as new woody debris is recruited. Channel widening may continue as the banks continue to slough, particularly in the East and West Side Channels, and this will require further monitoring to ensure that the bank profile remains sloped and self-draining, and the channels maintain adequate depth at the minimum design flow of 390 m^3/s (Chilibeck 2016).

5.2. Fish Use

Fish use data were collected at Site 108R in 2020 as part of the Mon-2 Peace River Fish Community Monitoring Program to provide information on the effectiveness of constructed habitat within the site. This monitoring represents post-construction Year 1 data collected as part of the three-year OEM program.

Site 108R was sampled for fish presence across a two-month period that began approximately four months after construction was completed. The results indicate that colonization by both indicator and non-indicator species has begun. The method with the highest number of fish captured was small boat electrofishing. Using this method all indicator species were found to be present within site 108R, with Mountain Whitefish the most prevalent. Overall, non-indicator species made up a larger portion of the catch than indicator species. While large boat electrofishing and backpack electrofishing were also effective at capturing the indicator species, less success was had with minnow/hoop traps and beach seines.

Small boat electrofishing was used in all areas of Site 108R (East and West Side Channels, South Side Channel and Spur Extension, and the Backwater Channel) except the Main Channel Bar. The highest small boat electrofishing CPUE was measured in the West Side Channel followed by the South Side Channel Spur Extension. The lowest CPUE was in the Backwater Channel. Large boat electrofishing was only carried out in the Main Channel Bar, and the East and West Side Channels. Each of these areas yielded high CPUEs when compared with the small boat electrofishing, and the Main Channel Bar had the overall highest CPUE of any sampling method in any area of Site 108R. Further comparisons of habitat utilization among species and areas within Site 108R will be possible after more years of sampling have been completed.

In Upper Site 109L (across the Peace mainstem from Site 108R) the monitoring in post-construction Year 1 saw a reduced abundance among indicator species, but after three years of monitoring abundance in all areas had rebounded to pre-construction levels (Golder 2020). Results for the Upper 109L Site (Golder 2020) suggest that fish abundance at Site 108R is likely to increase in subsequent years as natural sediment accumulates, and macrophytes and other constituents of the ecosystem become established.

An additional source of uncertainty that should be accounted for in future comparisons of results were flows in the Peace River during the 2020 sampling period. During the first sampling trip in late summer the discharge of the Peace River was still at a level representative of freshet, and field crews reported high water velocity through the East and West Side Channels. The high flow may have reduced sampling effectiveness during this period. This should be considered when making comparisons with data from this period in future years.

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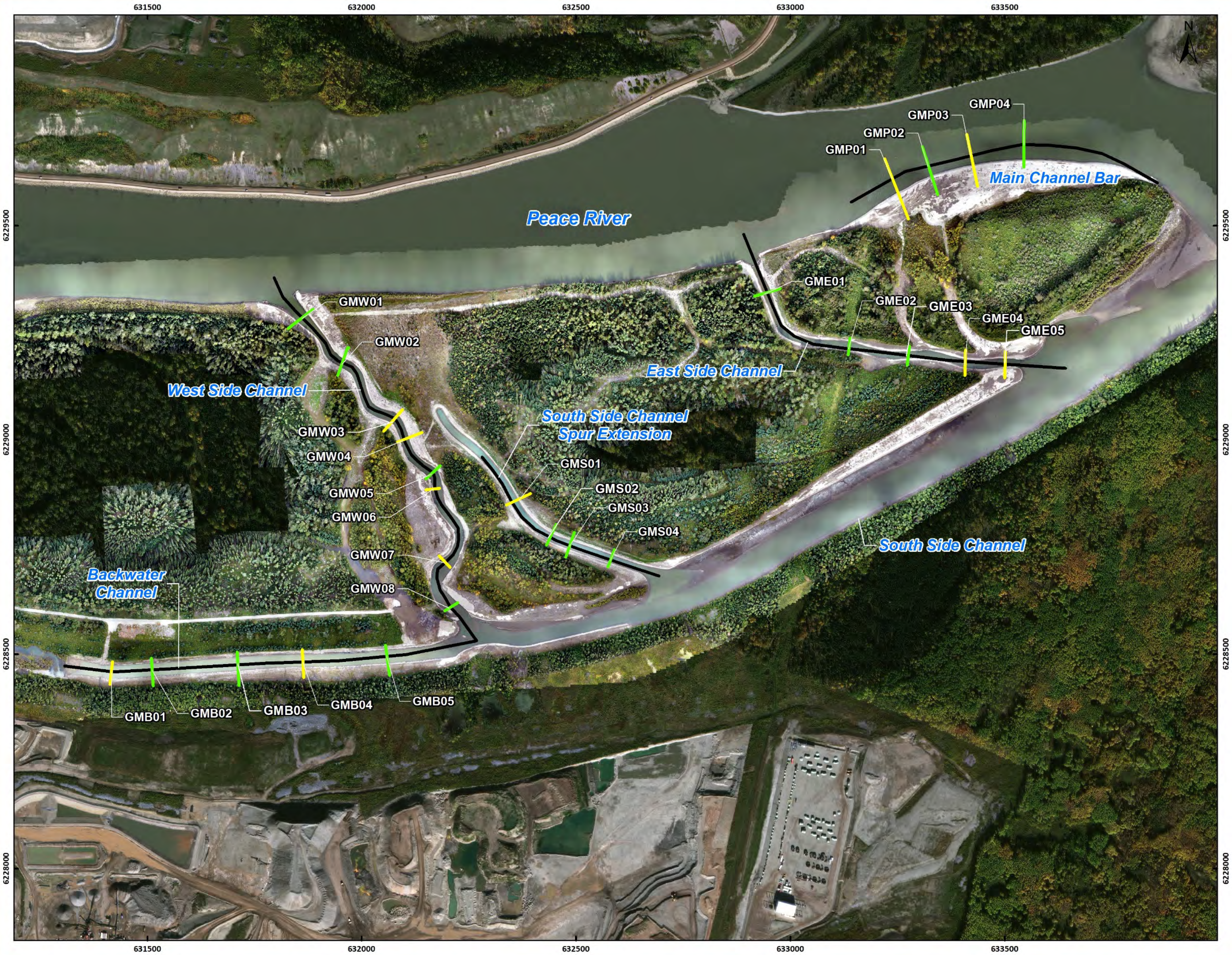
PROJECT MAPS



SITE C OFFSET EFFECTIVENESS MONITORING

Site 108R
Physical Habitat Sampling

Legend

🟩 High Priority Transects
🟨 Low Priority Transects
━ Longitudinal Survey

MAP SHOULD NOT BE USED FOR LEGAL OR NAVIGATIONAL PURPOSES

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Scale: 1:8,500

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3			
4			
5			

Date Saved: 2021-04-28
Coordinate System: NAD 1983 UTM Zone 10N

ECOFISH RESEARCH

Map 2

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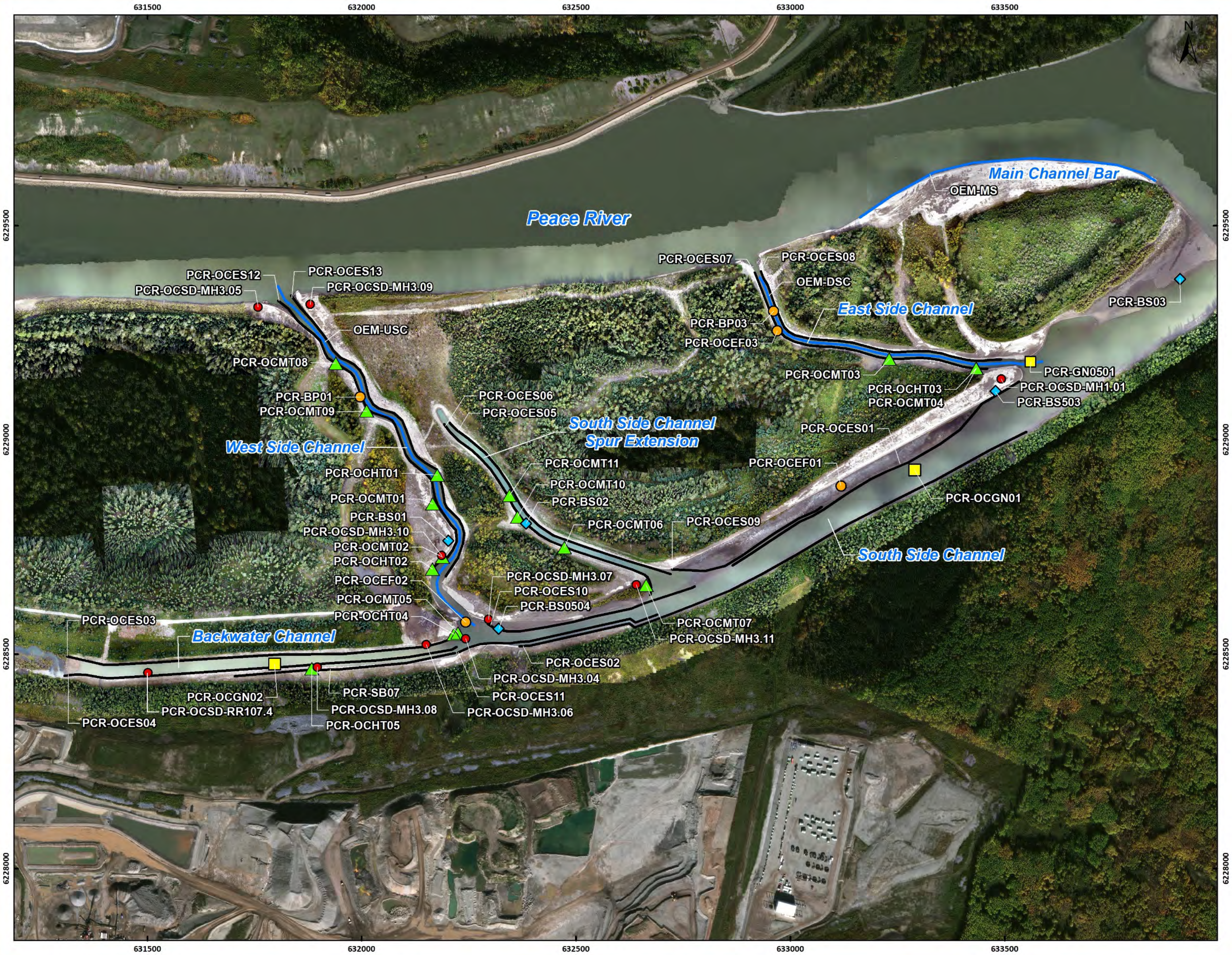

SITE C OFFSET EFFECTIVENESS MONITORING

Site 108R
Fish Sampling

Legend

Fish Sampling

- ▲ Minnow Traps (MT, HT)
- 🟨 Gill Netting (GN)
- ● Electrofishing (EF, BP)
- ● Stranding Site (SD)
- ◆ Beach Seine (BS)
- — Small Boat Electrofishing (SB, ES)
- — Large Boat Electrofishing (OEM)

MAP SHOULD NOT BE USED FOR LEGAL OR NAVIGATIONAL PURPOSES

0 50 100 200 300 400 m

Scale: 1:8,500

NO.	DATE	REVISION	BY
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3			
4			
5			

Date Saved: 2021-04-28
Coordinate System: NAD 1983 UTM Zone 10N

ECOFISH RESEARCH

Map 3

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23/08/2020

6. FISH SPECIES CAUGHT

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06/09/2020

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26/08/2020

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Figure 29. **Representative substrate of the south bank in the western end of the channel on October 2, 2020 (392 m^3/s).**

Figure 30. Representative substrate of the western end of the channel on October 2, 2020 (392 m^3/s).

Figure 31. Looking east in the western end of the channel on October 2, 2020 (392 m^3/s).

Appendix D. General Fish Use Data

LIST OF TABLES

Table 1. Summary of site conditions and sampling effort from minnow trap and hoop trap sampling in the Peace River in August - October 2020.

Area	Site^1	Trap #	Date Set	Time Set (hh:mm)	Date Pulled	Time Pulled (hh:mm)	Daily Average Discharge (m^3/s)	Depth (m)	Effort (Hours)
Backwater Channel	PCR-OCHT05	1	23-Aug-2020	14:03	24-Aug-2020	11:27	1,895	0.6	21.4
		1	5-Sep-2020	15:56	6-Sep-2020	15:55	946	1.0	24.0
								Area Total	**45.4**
East Side Channel	PCR-OCHT03	1	23-Aug-2020	14:49	24-Aug-2020	12:46	1,895	0.4	22.0
	PCR-OCMT03	1	23-Aug-2020	14:43	24-Aug-2020	12:46	1,895	0.5	22.1
		2		14:44		12:46	1,895	0.5	22.0
	PCR-OCMT04	1	23-Aug-2020	14:48	24-Aug-2020	12:30	1,895	0.5	21.7
		2		14:47		12:30	1,895	0.5	21.7
		1	5-Sep-2020	15:05	6-Sep-2020	16:19	946	1.0	25.2
		2		15:07		16:20	946	1.0	25.2
		3		15:05		16:20	946	1.0	25.3
		4		15:06		16:21	946	1.0	25.3
		5		15:13		16:22	946	1.0	25.2
								Area Total	**235.6**
West Side Channel	PCR-OCHT01	1	23-Aug-2020	13:35	24-Aug-2020	10:24	1,895	1.0	20.8
		1	5-Sep-2020	15:19	6-Sep-2020	17:18	946	1.0	26.0
	PCR-OCHT02	1	23-Aug-2020	13:50	24-Aug-2020	10:46	1,895	0.7	20.9
		2		14:12		10:50	1,895	0.6	20.6
		1	5-Sep-2020	15:34	6-Sep-2020	16:50	946	0.8	25.3
	PCR-OCHT04	1	23-Aug-2020	14:00	24-Aug-2020	11:11	1,895	0.5	21.2
		1	5-Sep-2020	13:35	6-Sep-2020	16:01	946	1.0	26.4
	PCR-OCMT01	1	23-Aug-2020	13:39	24-Aug-2020	10:38	1,895	0.7	21.0
		2		13:42		10:38	1,895	0.3	20.9
		1	5-Sep-2020	15:23	6-Sep-2020	18:06	946	0.8	26.7
		2		15:25		18:06	946	1.5	26.7
		1	1-Oct-2020	14:00	2-Oct-2020	14:43	395	0.4	24.7
	PCR-OCMT02	1	23-Aug-2020	13:47	24-Aug-2020	10:45	1,895	0.4	21.0
		1	5-Sep-2020	15:32	6-Sep-2020	16:44	946	1.2	25.2
		2		15:34		16:44	946	1.2	25.2
		1	1-Oct-2020	14:13	2-Oct-2020	15:05	395	0.4	24.9
		2		14:13		15:05	395	0.4	24.9
	PCR-OCMT05	1	23-Aug-2020	14:15	24-Aug-2020	11:11	1,895	0.5	20.9
		2		14:17		11:12	1,895	0.7	20.9
		1	5-Sep-2020	13:26	6-Sep-2020	16:07	946	0.8	26.7
		2		13:30		16:07	946	1.0	26.6
		1	1-Oct-2020	14:44	2-Oct-2020	14:26	395	0.3	23.7
		2		14:44		14:26	395	0.4	23.7
	PCR-OCMT08	1	1-Oct-2020	13:41	2-Oct-2020	14:53	395	0.7	25.2
		1		13:50		14:36	395	0.5	24.8
								Area Total	**594.9**
South Side Channel Spur Extension	PCR-OCMT06	1	23-Aug-2020	14:25	24-Aug-2020	12:14	1,895	0.4	21.8
		2		14:25		12:14	1,895	0.7	21.8
		1	5-Sep-2020	16:48	6-Sep-2020	13:18	946	1.2	20.5
		2		16:49		13:19	946	0.5	20.5
		3		16:51		13:19	946	0.9	20.5
	PCR-OCMT07	1		14:30		12:06	1,895	0.5	21.6
		2	23-Aug-2020	14:30	24-Aug-2020	12:06	1,895	0.5	21.6
		1		16:08		13:21	946	0.8	21.2
		2	5-Sep-2020	16:10	6-Sep-2020	13:21	946	1.0	21.2
		3		16:10		13:21	946	1.0	21.2
		1	1-Oct-2020	16:33	2-Oct-2020	14:11	395	0.5	21.6
		2		16:33		14:11	395	0.5	21.6
	PCR-OCMT10	1	1-Oct-2020	16:08	2-Oct-2020	13:56	395	0.4	21.8
		2		16:08		13:56	395	0.6	21.8
	PCR-OCMT11	1	1-Oct-2020	16:11	2-Oct-2020	14:04	395	0.7	21.9
		2		16:11		14:04	395	0.7	21.9
								Area Total	**342.5**
								Grand-Total	**1218.3**

[1] Sites ending in "MT" refers to minnow traps, "HT" refers to hoop traps.

Table 2. Summary of site conditions and sampling effort from beach seine sampling in the Peace River in September 2020.

Area	Site	Date	Average Daily Discharge (m^3/s)	Water Temp. (°C)	Estimated Visibility (m)	Haul #	Time In (hh:mm)	Time Out (hh:mm)	Site Length (m)	Site Area (m^2)
South Side Channel	PCR-BS01	27-Sep-2020	729	10.1	1.1	1	14:38	14:43	25	100
			729	10.1	1.1	2	15:01	15:04	25	100
			729	10.1	1.1	3	15:07	15:08	10	25
	PCR-BS03	28-Sep-2020	733	9.8	1.2	1	11:41	11:43	25	75
			733	9.8	1.2	2	11:45	11:47	25	75
			733	9.8	1.2	3	11:50	11:53	25	75
	PCR-BS0504	27-Sep-2020	729	10.1	1.1	1	11:46	11:49	25	100
			729	10.1	1.1	2	12:03	12:05	25	100
			729	10.1	1.1	3	12:05	12:07	25	100
	PCR-BS503	28-Sep-2020	733	9.8	1.2	1	10:02	10:04	25	100
			733	9.8	1.2	2	10:06	10:08	25	100
			733	9.8	1.2	3	10:11	10:13	25	100
								Area Total	**285**	**1,050**
South Side Channel Spur Extension	PCR-BS02	27-Sep-2020	729	10.1	1.1	1	15:55	15:59	75	150
			729	10.1	1.1	2	16:00	16:02	25	65
			729	10.1	1.1	3	16:03	16:04	25	50
								Area Total	**125**	**265**
								Grand Total	**410**	**1,315**

Table 3. **Summary of site conditions and sampling effort from gillnet sampling in the Peace River in August - September 2020.**

Area	Site	Daily Average Discharge (m^3/s)	Depth (m)	Date	Time Set (hh:mm)	Time Pulled (hh:mm)	Effort (Hours)[1]
Backwater Channel	PCR-OCGN02	1,895	2.5	23-Aug-2020	15:43	16:49	1.1
		1,935	3.0	24-Aug-2020	11:55	13:11	1.3
		946	1.0	5-Sep-2020	14:27	15:52	1.4
		938	1.5	6-Sep-2020	12:33	14:40	2.1
East Side Channel	PCR-GN0501	733	n/c	28-Sep-2020	09:24	10:57	1.6
South Side Channel	PCR-OCGN01	1,895	2.0	23-Aug-2020	13:04	15:07	2.1
		1,935	2.1	24-Aug-2020	10:09	11:48	1.7
		938	1.3	6-Sep-2020	09:51	12:15	2.4
						Total	**11.2**

[1] All gillnet sets were conducted with a net composed of 38 mm, 64 mm, and 89 mm panels

Table 4. Summary of fish capture from minnow trap and hoop trap sampling in the Peace River in August - September 2020.

Area	Site	Method[1]	Date	Trap #	Species	Size Class (mm)	Number Captured
Backwater Channel	PCR-OCHT05	HT	23-Aug-20	1	No Fish Captured		
			5-Sep-20	1	No Fish Captured		
						Area Total	**0**
East Side Channel	PCR-OCHT03	HT	23-Aug-20	1	No Fish Captured		
		MT	23-Aug-20	1	No Fish Captured		
				2	No Fish Captured		
	PCR-OCMT04	MT	23-Aug-20	1	No Fish Captured		
				2	Burbot	≤150	1
			5-Sep-20	1	No Fish Captured		
				2	No Fish Captured		
				3	No Fish Captured		
				4	No Fish Captured		
				5	Prickly Sculpin	-	1
						Area Total	**2**
West Side Channel	PCR-OCHT01	HT	23-Aug-20	1	No Fish Captured		
			5-Sep-20	1	No Fish Captured		
	PCR-OCHT02	HT	23-Aug-20	1	No Fish Captured		
				2	No Fish Captured		
			5-Sep-20	1	No Fish Captured		
	PCR-OCHT04	HT	23-Aug-20	1	No Fish Captured		
			5-Sep-20	1	No Fish Captured		
	PCR-OCMT01	MT	23-Aug-20	1	No Fish Captured		
				2	No Fish Captured		
			5-Sep-20	1	No Fish Captured		
				2	No Fish Captured		
			1-Oct-20	1	Slimy Sculpin		
	PCR-OCMT02	MT	23-Aug-20	1	No Fish Captured	n/c	1
			5-Sep-20	1	No Fish Captured		
				2	Burbot		
			1-Oct-20	1	No Fish Captured		
				2	No Fish Captured		
	PCR-OCMT05	MT	23-Aug-20	1	No Fish Captured		
				2	No Fish Captured		
			5-Sep-20	1	No Fish Captured		
				2	No Fish Captured		
			1-Oct-20	1	No Fish Captured		
				2	No Fish Captured		
	PCR-OCMT08	MT	1-Oct-20	1	No Fish Captured		
	PCR-OCMT09	MT	1-Oct-20	1	No Fish Captured		
						Area Total	**1**
South Side Channel Spur Extension	PCR-OCMT06	MT	23-Aug-20	1	No Fish Captured		
				2	No Fish Captured		
			5-Sep-20	1	No Fish Captured	-	1
				2	No Fish Captured		
				3	No Fish Captured		
	PCR-OCMT07	MT	23-Aug-20	1	No Fish Captured	n/c	1
				2	No Fish Captured		
			5-Sep-20	1	No Fish Captured		
				2	No Fish Captured		
				3	No Fish Captured		
			1-Oct-20	1	No Fish Captured		
				2	No Fish Captured		
	PCR-OCMT10	MT	1-Oct-20	1	Longnose Sucker		
				2	No Fish Captured		
	PCR-OCMT11	MT	1-Oct-20	1	No Fish Captured		
				2	No Fish Captured		
						Area Total	**2**
						Grand-Total	**5**

[1] HT = Hoop Trap, MT = Minnow Trap

Table 5. Summary of fish capture from beach seine sampling in the Peace River in September 2020.

Area	Site	Date	Species	Size Class (mm)	Number Captured
South Side Channel	PCR-BS01	27-Sep-2020	No Fish Captured		
			Redside Shiner	≤150	1
	PCR-BS03	28-Sep-2020	Prickly Sculpin	-	1
			Slimy Sculpin	-	8
			Slimy Sculpin	-	3
			Longnose Dace	-	7
			Longnose Dace	-	4
			Cyprinid spp.	≤150	2
			White Sucker	≤150	3
	PCR-BS0504	27-Sep-2020	No Fish Captured	≤150	-
			Spottail Shiner	-	2
	PCR-BS503	28-Sep-2020	Prickly Sculpin	-	2
			Slimy Sculpin	-	9
			Lake Chub	≤150	6
			Longnose Dace	-	1
			Spoonhead Sculpin	-	2
			Spottail Shiner	-	3
			White Sucker	≤150	2
				Area Total	**56**
South Side Channel Spur Extension	PCR-BS02	27-Sep-2020	Slimy Sculpin	-	1
			Large Scale Sucker	≤150	1
			No Fish Captured	-	-
			Spottail Shiner	-	2
				Area Total	**4**
				Grand Total	**60**

Table 6. Summary of fish capture from gill net sampling in the Peace River in August - September 2020.

Area	Site	Date	Species Code	Species	Size Class (mm)	Number Captured
Backwater Channel	PCR-OCGN02	23-Aug-2020	LSU	Longnose Sucker	≥300	1
		24-Aug-2020	NP	Northern Pike	200-299	1
		5-Sep-2020	NFC	No Fish Captured	-	-
		6-Sep-2020	NP	Northern Pike	200-299	1
		28-Sep-2020	NFC	No Fish Captured	-	-
					Area Total	**3**
East Side Channel	PCR-GN0501	28-Sep-2020	LSU	Longnose Sucker	≥300	1
					Area Total	**1**
South Side Channel	PCR-OCGN01	23-Aug-2020	NFC	No Fish Captured	-	-
		24-Aug-2020	NFC	No Fish Captured	-	-
		6-Sep-2020	NP	Northern Pike	≥300	1
					Area Total	**1**
					Grand Total	**5**

Table 7. Summary of fish capture from small boat electrofishing sampling in the Peace River in August - September 2020.

Area	Site	Date	Species	Size Class (mm)	Number Captured
Backwater Channel	PCR-OCES03	23-Aug-2020	Large Scale Sucker	≥300	1
			Longnose Sucker	≤150	1
			Redside Shiner	-	3
			Spottail Shiner	-	1
		6-Sep-2020	Lake Chub	≤150	2
			Redside Shiner	-	3
			Spottail Shiner	-	1
			Yellow Perch	200-299	1
	PCR-OCES04	23-Aug-2020	Large Scale Sucker	≥300	1
			Northern Pike	≥300	1
			Redside Shiner	-	4
			Spottail Shiner	-	3
			Walleye	≥300	1
			White Sucker	≥300	3
			Yellow Perch	≤150	1
		6-Sep-2020	Northern Pike	≥300	1
			White Sucker	≥300	2
				Site Total	**30**
Backwater Channel	PCR-SB07	27-Sep-2020	Kokanee	≤150	1
			Northern Pike	151-199	1
			Northern Pike	-	1
			White Sucker	≥300	1
			Lake Whitefish	≥300	1
				Site Total	**5**
				Area Total	**35**

Table 7. Continued (2 of 5).

Area	Site	Date	Species	Size Class (mm)	Number Captured
East Side Channel	PCR-OCES07	23-Aug-2020	Arctic Grayling	≤150	2
			Longnose Dace	-	1
			Mountain Whitefish	≤150	4
			Mountain Whitefish	151-199	1
			Mountain Whitefish	200-299	3
		5-Sep-2020	Arctic Grayling	≤150	1
			Longnose Dace	-	1
			Longnose Sucker	≥300	1
			Mountain Whitefish	≥300	3
			Mountain Whitefish	200-299	3
			Northern Pike	151-199	2
		1-Oct-2020	Northern Pike	≥300	2
			White Sucker	≥300	3
				Site Total	**27**
East Side Channel	PCR-OCES08	23-Aug-2020	Bull Trout	≤150	1
			Slimy Sculpin	-	1
			Arctic Grayling	≤150	1
			Mountain Whitefish	≤150	10
			Mountain Whitefish	≥300	2
			Mountain Whitefish	200-299	1
		5-Sep-2020	Bull Trout	≥300	1
			Arctic Grayling	≤150	1
			Mountain Whitefish	≤150	1
			Mountain Whitefish	≥300	6
			Mountain Whitefish	200-299	1
			Northern Pike	≥300	1
			Walleye	≥300	1
		1-Oct-2020	Slimy Sculpin	-	1
			Mountain Whitefish	≤150	2
			Redside Shiner	-	1
			White Sucker	≥300	4
				Site Total	**36**
				Area Total	**63**
South Side Channel	PCR-OCES01	23-Aug-2020	Lake Chub	≤150	1
			Longnose Sucker	≤150	1
			Longnose Sucker	≥300	3
			Mountain Whitefish	≤150	1
			Redside Shiner	-	1
			Spottail Shiner	-	2
			Walleye	≥300	1
			White Sucker	≤150	2
			White Sucker	≥300	1
			Yellow Perch	≤150	1
		6-Sep-2020	Mountain Whitefish	≤150	1
			Mountain Whitefish	-	1
			Sucker spp.	-	1
				Site Total	**17**
South Side Channel	PCR-OCES02	23-Aug-2020	Kokanee	≤150	1
			White Sucker	≥300	2
		1-Oct-2020	Slimy Sculpin	-	2
			Mountain Whitefish	200-299	1
			Troutperch	≤150	1
			White Sucker	≥300	1
				Site Total	**8**

Table 7. Continued (3 of 5).

Area	Site	Date	Species	Size Class (mm)	Number Captured
South Side Channel	PCR-OCES09	24-Aug-2020	Large Scale Sucker	≤150	1
			Large Scale Sucker	151-199	1
			Kokanee	≤150	1
			Yellow Perch	≤150	1
		5-Sep-2020	Kokanee	≤150	1
			Longnose Sucker	≥300	1
				Site Total	**6**
South Side Channel	PCR-OCES10	24-Aug-2020	Slimy Sculpin	-	1
			Kokanee	≤150	1
			Kokanee	200-299	1
			Longnose Sucker	≤150	6
			Mountain Whitefish	≤150	11
			Mountain Whitefish	200-299	1
			Walleye	≥300	1
			Yellow Perch	≤150	1
		6-Sep-2020	Bull Trout	151-199	1
			Large Scale Sucker	≥300	1
			Kokanee	≤150	2
			Kokanee	-	2
			Longnose Sucker	≤150	2
			Mountain Whitefish	≤150	1
			Mountain Whitefish	-	1
			Redside Shiner	-	1
			Spottail Shiner	-	4
			Sucker spp.	-	3
			White Sucker	≥300	2
			Yellow Perch	≤150	10
			Yellow Perch	-	5
				Site Total	**58**
South Side Channel	PCR-OCES11	24-Aug-2020	Longnose Sucker	≤150	1
			Mountain Whitefish	200-299	1
		5-Sep-2020	Burbot	200-299	1
			Sculpin spp.	≤150	2
			Slimy Sculpin	-	1
			Mountain Whitefish	≥300	4
			Mountain Whitefish	200-299	2
			Northern Pike	≥300	1
			Northern Pike	151-199	1
			Northern Pikeminnow	≤150	1
			Yellow Perch	151-199	1
				Site Total	**16**
				Area Total	**105**

Table 7. Continued (4 of 5).

Area	Site	Date	Species	Size Class (mm)	Number Captured
West Side Channel	PCR-OCES12	24-Aug-2020	Large Scale Sucker	≥300	1
			Longnose Sucker	≥300	1
			Mountain Whitefish	-	2
		5-Sep-2020	Bull Trout	151-199	1
			Bull Trout	200-299	1
			Mountain Whitefish	-	1
			Mountain Whitefish	-	3
			Mountain Whitefish	200-299	2
			Northern Pike	≥300	6
			Redside Shiner	≤150	5
			Sucker spp.	200-299	1
			Yellow Perch	≤150	1
			Yellow Perch	151-199	1
			Goldeye	≥300	1
		1-Oct-2020	Burbot	≤150	1
			Bull Trout	≥300	2
			Slimy Sculpin	≤150	5
			Large Scale Sucker	-	2
			Longnose Sucker	≤150	1
			Longnose Sucker	≥300	1
			Mountain Whitefish	≤150	8
			Mountain Whitefish	≥300	4
			Mountain Whitefish	200-299	6
			Northern Pike	≤150	1
			Northern Pike	-	1
			Redside Shiner	≤150	2
			Walleye	≥300	1
				Site Total	**5**
	PCR-OCES13	24-Aug-2020	Slimy Sculpin	≤150	1
		24-Aug-2020	Large Scale Sucker	151-199	1
		24-Aug-2020	Longnose Dace	≤150	2
		24-Aug-2020	Mountain Whitefish	≤150	6
		24-Aug-2020	Mountain Whitefish	≥300	1
		24-Aug-2020	Mountain Whitefish	151-199	1
		24-Aug-2020	Mountain Whitefish	-	2
		24-Aug-2020	Redside Shiner	≤150	1

Table 7. Continued (5 of 5).

Area	Site	Date	Species	Size Class (mm)	Number Captured
West Side Channel	PCR-OCES13	24-Aug-2020	Walleye	-	1
		5-Sep-2020	Bull Trout	≥300	1
			Bull Trout	-	1
			Slimy Sculpin	≤150	2
			Arctic Grayling	≤150	1
			Lake Chub	≤150	1
			Longnose Dace	≤150	2
			Mountain Whitefish	-	2
			Mountain Whitefish	200-299	2
			Redside Shiner	≤150	3
			Spottail Shiner	≤150	2
			Walleye	-	1
		1-Oct-2020	Slimy Sculpin	≤150	2
			Arctic Grayling	≤150	1
			Longnose Sucker	≤150	1
			Longnose Sucker	≥300	1
			Mountain Whitefish	≤150	6
			Mountain Whitefish	-	4
			Mountain Whitefish	-	3
			Northern Pike	≥300	1
				Site Total	**53**
				Area Total	**58**
South Side Channel Spur Extension	PCR-OCES05	23-Aug-2020	Longnose Sucker	-	6
			Northern Pike	200-299	1
			Redside Shiner	≤150	2
		5-Sep-2020	No Fish Captured	-	-
				Site Total	9
	PCR-OCES06	23-Aug-2020	Lake Chub	≤150	1
			Redside Shiner	≤150	21
			Spottail Shiner	≤150	3
			Yellow Perch	≤150	8
				Site Total	**33**
				Area Total	**42**
				108R Grand-Total	**303**

Table 8. Summary of fish capture from backpack electrofishing sampling in the Peace River in August - September 2020.

Area	Site	Date	Species	Size Class (mm)	Number Captured
East Side Channel	PCR-OCEF03	2-Oct-2020	Slimy Sculpin	-	45
			Lake Chub	≤150	1
			Longnose Dace	-	2
			Longnose Sucker	≤150	3
			Mountain Whitefish	≤150	2
			Mountain Whitefish	151-199	1
			Mountain Whitefish	200-299	1
			Redside Shiner	-	1
			Troutperch	≤150	1
	PCR-BP03	27-Sep-2020	Sculpin spp.	-	1
			Slimy Sculpin	-	20
				Area Total	**78**
South Side Channel	PCR-OCEF01	23-Aug-2020	Burbot	≤150	1
			Longnose Sucker	≤150	2
				Area Total	**3**
West Side Channel	PCR-OCEF02	5-Sep-2020	Slimy Sculpin	-	2
			Longnose Dace	-	4
			Longnose Dace	-	1
			Longnose Sucker	≤150	3
			Redside Shiner	-	1
			Spottail Shiner	-	2
			Yellow Perch	≤150	2
		1-Oct-2020	Burbot	≤150	2
			Sculpin spp.	-	8
			Slimy Sculpin	-	6
			Lake Chub	≤150	1
			Longnose Sucker	≤150	2
			Mountain Whitefish	≤150	1
	PCR-BP01	27-Sep-2020	Slimy Sculpin	-	19
			Lake Chub	≤150	2
			Longnose Dace	-	1
			Longnose Sucker	≤150	2
				Area Total	**59**
				Grand Total	**140**

Table 9. Summary of fish capture from large boat electrofishing sampling in the Peace River in August - September 2020.

Area	Site [1]	Date	Species	Size Class (mm)	Number Captured
East Side Channel	OEM-DSC	26-Aug-2020	Sculpin spp.	-	1
			Longnose Sucker	≤150	1
			Longnose Sucker	≥300	2
			Mountain Whitefish	≤150	3
			Mountain Whitefish	151-199	1
			Mountain Whitefish	200-299	3
		2-Sep-2020	Longnose Sucker	≥300	2
			Mountain Whitefish	≤150	4
			Mountain Whitefish	≥300	2
		13-Sep-2020	Slimy Sculpin	-	5
			Mountain Whitefish	≤150	2
			Mountain Whitefish	≥300	1
			Sucker spp.	≤150	1
			White Sucker	≥300	1
		23-Sep-2020	Bull Trout	151-199	1
			Large Scale Sucker	≥300	3
			Longnose Sucker	≥300	5
			Mountain Whitefish	≤150	8
			Mountain Whitefish	≥300	1
			Mountain Whitefish	200-299	1
			Northern Pike	≥300	2
			Redside Shiner	-	2
			Sucker spp.	≤150	4
			White Sucker	≥300	2
				Area Total	**58**

[1] OEM sites had data collected by Golder Associates

Table 9. Continued (2 of 3).

Area	Site [1]	Date	Species	Size Class (mm)	Number Captured
West Side Channel	OEM-USC	26-Aug-2020	Slimy Sculpin	≤150	1
			Large Scale Sucker	≥300	1
			Mountain Whitefish	≤150	2
			Mountain Whitefish	≥300	1
			Redside Shiner	≤150	1
			Sucker spp.	≤150	1
		2-Sep-2020	Sculpin spp.	≤150	1
			Large Scale Sucker	≥300	2
			Longnose Sucker	≥300	1
			Mountain Whitefish	-	2
			Mountain Whitefish	≥300	2
			Redside Shiner	≤150	2
			Sucker spp.	≤150	2
		13-Sep-2020	Bull Trout	≤150	1
			Bull Trout	-	2
			Large Scale Sucker	≥300	1
			Longnose Sucker	≥300	2
			Mountain Whitefish	≤150	7
			Mountain Whitefish	≥300	3
			Mountain Whitefish	151-199	1
			Mountain Whitefish	-	2
			Redside Shiner	≤150	2
			Spottail Shiner	-	1
			Sucker spp.	≤150	1
			Yellow Perch	≤150	1
		23-Sep-2020	Sculpin spp.	≤150	1
			Slimy Sculpin	≤150	1
			Large Scale Sucker	≥300	1
			Longnose Sucker	≥300	6
			Mountain Whitefish	-	4
			Mountain Whitefish	≥300	1
			Mountain Whitefish	200-299	1
			Sucker spp.	≤150	4
				Area Total	**62**

[1] OEM sites had data collected by Golder Associates

Table 9. Continued (3 of 3).

Area	Site [1]	Date	Species	Size Class (mm)	Number Captured
Main Channel Bar	OEM-MS	26-Aug-2020	Large Scale Sucker	200-299	1
			Longnose Sucker	≥300	7
			Longnose Sucker	151-199	1
			Longnose Sucker	200-299	2
			Mountain Whitefish	≤150	4
			Mountain Whitefish	≥300	2
			Mountain Whitefish	-	2
			Sucker spp.	≤150	4
		2-Sep-2020	Bull Trout	200-299	1
			Sculpin spp.	≤150	1
			Longnose Sucker	≥300	1
			Longnose Sucker	200-299	1
			Mountain Whitefish	-	5
			Mountain Whitefish	200-299	1
			Redside Shiner	≤150	4
			Sucker spp.	≤150	2
		13-Sep-2020	Burbot	≤150	1
			Bull Trout	-	1
			Bull Trout	≥300	1
			Bull Trout	200-299	2
			Slimy Sculpin	≤150	1
			Large Scale Sucker	≥300	1
			Longnose Dace	≤150	1
			Longnose Sucker	≥300	5
			Mountain Whitefish	≤150	3
			Mountain Whitefish	≥300	11
			Mountain Whitefish	200-299	3
			Northern Pikeminnow	-	1
			Rainbow Trout	-	1
			Redside Shiner	≤150	1
			Sucker spp.	≤150	1
			Walleye	-	1
		23-Sep-2020	Bull Trout	-	1
			Longnose Sucker	≥300	3
			Mountain Whitefish	≤150	2
			Mountain Whitefish	≥300	9
			Mountain Whitefish	200-299	5
			Sucker spp.	≤150	1
			Walleye	≥300	1
				Area Total	**96**
				Grand Total	**216**

[1] OEM sites had data collected by Golder Associates

Table 10. Summary of fish capture data, morphometric measurements and tagging information of all fish captured during sampling in 2020.

Site Name	Date	Fish ID	Species	Length (mm)	Weight (g)	Condition (K)	Tag 1 Number	Tag 2 Number	Sample Number [1]
PCR-OCES13	1/Oct/20	193292	Northern Pike	766			900230000260082		
PCR-OCES13	1/Oct/20	193293	Mountain Whitefish	314			900230000260120		
PCR-OCES13	1/Oct/20	193294	Longnose Sucker	351	583	1.348	900230000260179		
PCR-OCES13	1/Oct/20	193295	Mountain Whitefish	365	483	0.993	900230000260083		
PCR-OCES13	1/Oct/20	193296	Mountain Whitefish	320	311	0.949	900230000260172		
PCR-OCES13	1/Oct/20	193297	Mountain Whitefish	265	189	1.016	900728000465720		
PCR-OCES13	1/Oct/20	193298	Mountain Whitefish	74	4	0.987			
PCR-OCES13	1/Oct/20	193299	Mountain Whitefish	88	9	1.321			
PCR-OCES13	1/Oct/20	193300	Mountain Whitefish	83	5	0.874			
PCR-OCES13	1/Oct/20	193301	Mountain Whitefish	94	9	1.084			
PCR-OCES13	1/Oct/20	193302	Mountain Whitefish	88	7	1.027			
PCR-OCES13	1/Oct/20	193303	Slimy Sculpin	76	6	1.367			
PCR-OCES13	1/Oct/20	193304	Slimy Sculpin	56	3	1.708			
PCR-OCES13	1/Oct/20	193305	Arctic Grayling	99	13	1.340			5316
PCR-OCES13	1/Oct/20	193306	Mountain Whitefish	212	89	0.934	900228000465383		
PCR-OCES13	1/Oct/20	193307	Mountain Whitefish	42	26	35.093			
PCR-OCES13	1/Oct/20	193308	Mountain Whitefish	267	196	1.030	900228000465968		
PCR-OCES13	1/Oct/20	193309	Mountain Whitefish	344	387	0.951	900230000260089		
PCR-OCES13	1/Oct/20	193310	Longnose Sucker	71					
PCR-OCES13	1/Oct/20	198106	Unknown	225	133	1.168			
PCR-OCES12	1/Oct/20	193271	Bull Trout	809			900228000635600		
PCR-OCES12	1/Oct/20	193272	Bull Trout	404	1769	2.683	900230000260134		5317
PCR-OCES12	1/Oct/20	193273	Mountain Whitefish	305	1766	6.224	900230000260038	965000000282049	
PCR-OCES12	1/Oct/20	193274	Mountain Whitefish	251	508	3.212	900228000465086		
PCR-OCES12	1/Oct/20	193275	Mountain Whitefish	302	301	1.093			
PCR-OCES12	1/Oct/20	193276	Mountain Whitefish	379			900230000260170	981098104936195	
PCR-OCES12	1/Oct/20	193277	Mountain Whitefish	262	194	1.079	900228000465475		
PCR-OCES12	1/Oct/20	193278	Walleye	480	139	0.126	900230000079346		
PCR-OCES12	1/Oct/20	193279	Mountain Whitefish	384	628	1.109	965000000111354	900230000260110	
PCR-OCES12	1/Oct/20	193280	Mountain Whitefish	292	279	1.121			
PCR-OCES12	1/Oct/20	193281	Mountain Whitefish	277	253	1.190	900228000465664		
PCR-OCES12	1/Oct/20	193328	Mountain Whitefish	250	173	1.107	900228000465157		
PCR-OCES12	1/Oct/20	193329	Mountain Whitefish	270	211	1.072	900228000465316		
PCR-OCES12	1/Oct/20	193327	Longnose Sucker	443	1015	1.167	900230000260114		
PCR-OCES12	1/Oct/20	193330	Mountain Whitefish	133	26	1.105			
PCR-OCES12	1/Oct/20	193331	Mountain Whitefish	72	3	0.804			
PCR-OCES12	1/Oct/20	193332	Redside Shiner	95	11	1.283			
PCR-OCES12	1/Oct/20	193333	Slimy Sculpin	62	2	0.839			
PCR-OCES12	1/Oct/20	193334	Longnose Sucker	146	35	1.125			
PCR-OCES12	1/Oct/20	193335	Mountain Whitefish	76	4	0.911			
PCR-OCES12	1/Oct/20	193336	Mountain Whitefish	80	4	0.781			
PCR-OCES12	1/Oct/20	193337	Mountain Whitefish	96	9	1.017			
PCR-OCES12	1/Oct/20	193338	Mountain Whitefish	74	3	0.740			
PCR-OCES12	1/Oct/20	193339	Mountain Whitefish	85	5	0.814			
PCR-OCES12	1/Oct/20	193340	Redside Shiner	94	10	1.204			
PCR-OCES12	1/Oct/20	193341	Burbot	92	5	0.642			
PCR-OCES12	1/Oct/20	193342	Northern Pike	142	25	0.873			
PCR-OCES12	1/Oct/20	193343	Large Scale Sucker	97	10	1.096			
PCR-OCES12	1/Oct/20	193344	Large Scale Sucker	70	3	0.875			
PCR-OCES12	1/Oct/20	193345	Slimy Sculpin	43	1	1.258			
PCR-OCES12	1/Oct/20	193346	Northern Pike	210	70	0.756	900228000465397		
PCR-OCES12	1/Oct/20	193347	Mountain Whitefish	133	22	0.935			
PCR-OCES12	1/Oct/20	193348	Slimy Sculpin	56	2	1.139			
PCR-OCES12	1/Oct/20	193349	Slimy Sculpin	44	1	1.174			
PCR-OCES12	1/Oct/20	193350	Slimy Sculpin	64	3	1.144			
PCR-OCES02	1/Oct/20	193351	Slimy Sculpin	47	1	0.963			
PCR-OCES02	1/Oct/20	193267	White Sucker	390	764	1.288	900230000260101		
PCR-OCES02	1/Oct/20	193268	Mountain Whitefish	257	184	1.084	900228000465994		
PCR-OCES02	1/Oct/20	193269	Troutperch	79	6	1.217			

[1] DNA sample type = Fin Clip

Table 10. Continued (2 of 14).

Site Name	Date	Fish ID	Species	Length (mm)	Weight (g)	Condition (K)	Tag 1 Number	Tag 2 Number	Sample Number [1]
PCR-OCES02	1/Oct/20	193270	Slimy Sculpin	75	4	0.948			
PCR-OCES07	1/Oct/20	193262	Northern Pike	426	555	0.718	900230000260050		
PCR-OCES07	1/Oct/20	193263	Northern Pike	424	481	0.631	900230000260079		
PCR-OCES07	1/Oct/20	193264	White Sucker	374	742	1.418	900230000260024		
PCR-OCES07	1/Oct/20	193265	White Sucker	408	1024	1.508	900230000260145		
PCR-OCES07	1/Oct/20	193266	White Sucker	355	707	1.580	900230000260160		
PCR-OCES08	1/Oct/20	193254	White Sucker	394	852	1.393	900230000260167		
PCR-OCES08	1/Oct/20	193255	White Sucker	396	844	1.359	900230000030056		
PCR-OCES08	1/Oct/20	193256	White Sucker	394	845	1.382	900230000206823		
PCR-OCES08	1/Oct/20	193257	White Sucker	420	1069	1.443	900230000260093		
PCR-OCES08	1/Oct/20	193258	Redside Shiner	81	5	0.941			
PCR-OCES08	1/Oct/20	193259	Mountain Whitefish	84	6	1.012			
PCR-OCES08	1/Oct/20	193260	Mountain Whitefish	83	5	0.874			
PCR-OCES08	1/Oct/20	193261	Slimy Sculpin	68	3	0.954			
PCR-OCEF03	2/Oct/20	193056	Mountain Whitefish	202	74	0.898	00-228000464654		
PCR-OCEF03	2/Oct/20	193057	Mountain Whitefish	197	71	0.929	00-226000162237		
PCR-OCEF03	2/Oct/20	193058	Slimy Sculpin	71	4	1.118			
PCR-OCEF03	2/Oct/20	193059	Slimy Sculpin	46	1	1.027			
PCR-OCEF03	2/Oct/20	193060	Slimy Sculpin	79	5	1.014			
PCR-OCEF03	2/Oct/20	193061	Slimy Sculpin	67	4	1.330			
PCR-OCEF03	2/Oct/20	193062	Slimy Sculpin	71	4	1.118			
PCR-OCEF03	2/Oct/20	193063	Slimy Sculpin	44	<1				
PCR-OCEF03	2/Oct/20	193064	Slimy Sculpin	67	3	0.997			
PCR-OCEF03	2/Oct/20	193065	Slimy Sculpin	66	2	0.696			
PCR-OCEF03	2/Oct/20	193066	Slimy Sculpin	80	4	0.781			
PCR-OCEF03	2/Oct/20	193067	Slimy Sculpin	55	1	0.601			
PCR-OCEF03	2/Oct/20	193068	Slimy Sculpin	73	3	0.771			
PCR-OCEF03	2/Oct/20	193069	Slimy Sculpin	74	4	0.987			
PCR-OCEF03	2/Oct/20	193070	Slimy Sculpin	47	<1				
PCR-OCEF03	2/Oct/20	193071	Slimy Sculpin	39	<1				
PCR-OCEF03	2/Oct/20	193072	Slimy Sculpin	65	2	0.728			
PCR-OCEF03	2/Oct/20	193073	Slimy Sculpin	39	<1				
PCR-OCEF03	2/Oct/20	193074	Slimy Sculpin	52	1	0.711			
PCR-OCEF03	2/Oct/20	193075	Slimy Sculpin	49	<1				
PCR-OCEF03	2/Oct/20	193076	Slimy Sculpin	61	3	1.322			
PCR-OCEF03	2/Oct/20	193077	Slimy Sculpin	81	4	0.753			
PCR-OCEF03	2/Oct/20	193078	Slimy Sculpin	46	<1				
PCR-OCEF03	2/Oct/20	193079	Slimy Sculpin	65	3	1.092			
PCR-OCEF03	2/Oct/20	193080	Slimy Sculpin	60	1	0.463			
PCR-OCEF03	2/Oct/20	193081	Slimy Sculpin	35	<1				
PCR-OCEF03	2/Oct/20	193082	Slimy Sculpin	50	<1				
PCR-OCEF03	2/Oct/20	193083	Slimy Sculpin	41	<1				
PCR-OCEF03	2/Oct/20	193084	Slimy Sculpin	33	<1				
PCR-OCEF03	2/Oct/20	193085	Slimy Sculpin	48	<1				
PCR-OCEF03	2/Oct/20	193086	Slimy Sculpin	31	<1				
PCR-OCEF03	2/Oct/20	193087	Slimy Sculpin	37	<1				
PCR-OCEF03	2/Oct/20	193088	Longnose Sucker	51	<1				
PCR-OCEF03	2/Oct/20	193089	Slimy Sculpin	42	<1				
PCR-OCEF03	2/Oct/20	193090	Slimy Sculpin	48	<1				
PCR-OCEF03	2/Oct/20	193091	Slimy Sculpin	70	3	0.875			
PCR-OCEF03	2/Oct/20	193092	Mountain Whitefish	86	6	0.943			
PCR-OCEF03	2/Oct/20	193093	Redside Shiner	63	3	1.200			
PCR-OCEF03	2/Oct/20	193094	Slimy Sculpin	44	<1				
PCR-OCEF03	2/Oct/20	193095	Mountain Whitefish	70	3	0.875			
PCR-OCEF03	2/Oct/20	193096	Troutperch	47	<1				
PCR-OCEF03	2/Oct/20	193097	Longnose Sucker	85	6	0.977			
PCR-OCEF03	2/Oct/20	193098	Slimy Sculpin	29	<1				
PCR-OCEF03	2/Oct/20	193099	Longnose Dace	78	5	1.054			069
PCR-OCEF03	2/Oct/20	193100	Lake Chub	62	1	0.420			
PCR-OCEF03	2/Oct/20	193101	Longnose Sucker	58	1	0.513			
PCR-OCEF03	2/Oct/20	193102	Longnose Dace	47	<1				
PCR-OCEF03	2/Oct/20	193103	Slimy Sculpin	58	<1				
PCR-OCEF03	2/Oct/20	193104	Slimy Sculpin	40	<1				
PCR-OCEF03	2/Oct/20	193105	Slimy Sculpin	26	<1				
PCR-OCEF03	2/Oct/20	193106	Slimy Sculpin	61	1	0.441			

[1] DNA sample type = Fin Clip

Table 10. Continued (3 of 14).

Site Name	Date	Fish ID	Species	Length (mm)	Weight (g)	Condition (K)	Tag 1 Number	Tag 2 Number	Sample Number [1]
PCR-OCEF03	2/Oct/20	193107	Slimy Sculpin	53	1	0.672			
PCR-OCEF03	2/Oct/20	193108	Slimy Sculpin	23	<1				
PCR-OCEF03	2/Oct/20	193109	Slimy Sculpin	30	<1				
PCR-OCEF03	2/Oct/20	193110	Slimy Sculpin	63	2	0.800			
PCR-OCEF03	2/Oct/20	193111	Slimy Sculpin	49	<1				
PCR-OCEF03	2/Oct/20	193112	Slimy Sculpin	41	<1				
PCR-OCEF02	1/Oct/20	192957	Mountain Whitefish	139					
PCR-OCEF02	1/Oct/20	192961	Burbot	86					
PCR-OCEF02	1/Oct/20	192962	Burbot	88					
PCR-OCEF02	1/Oct/20	192964	Slimy Sculpin	71					
PCR-OCEF02	1/Oct/20	192965	Sculpin spp.	n/c					
PCR-OCEF02	1/Oct/20	192966	Sculpin spp.	n/c					
PCR-OCEF02	1/Oct/20	192967	Sculpin spp.	n/c					
PCR-OCEF02	1/Oct/20	192968	Sculpin spp.	n/c					
PCR-OCEF02	1/Oct/20	192969	Sculpin spp.	n/c					
PCR-OCEF02	1/Oct/20	192970	Sculpin spp.	n/c					
PCR-OCEF02	1/Oct/20	192971	Sculpin spp.	n/c					
PCR-OCEF02	1/Oct/20	192972	Sculpin spp.	n/c					
PCR-OCEF02	1/Oct/20	192976	Longnose Sucker	48					
PCR-OCEF02	1/Oct/20	192977	Slimy Sculpin	37					
PCR-OCEF02	1/Oct/20	192978	Slimy Sculpin	66					
PCR-OCEF02	1/Oct/20	192979	Longnose Sucker	56					
PCR-OCEF02	1/Oct/20	192980	Slimy Sculpin	31					
PCR-OCEF02	1/Oct/20	192981	Slimy Sculpin	43					
PCR-OCEF02	1/Oct/20	192982	Lake Chub	52					
PCR-OCEF02	1/Oct/20	198105	Slimy Sculpin	31					
PCR-OCMT08	1/Oct/20	192915	No Fish Captured	n/c					
PCR-OCMT09	1/Oct/20	192916	No Fish Captured	n/c					
PCR-OCMT01	1/Oct/20	192917	Slimy Sculpin	40					
PCR-OCMT02	1/Oct/20	192918	No Fish Captured	n/c					
PCR-OCMT02	1/Oct/20	192919	No Fish Captured	n/c					
PCR-OCMT05	1/Oct/20	192920	No Fish Captured	n/c					
PCR-OCMT05	1/Oct/20	192921	No Fish Captured	n/c					
PCR-OCMT10	1/Oct/20	192922	Longnose Sucker	60					
PCR-OCMT10	1/Oct/20	192923	No Fish Captured	n/c					
PCR-OCMT11	1/Oct/20	192924	No Fish Captured	n/c					
PCR-OCMT11	1/Oct/20	192925	No Fish Captured	n/c					
PCR-OCMT07	1/Oct/20	192926	No Fish Captured	n/c					
PCR-OCMT07	1/Oct/20	192927	No Fish Captured	n/c					
PCR-OCMT05	23/Aug/20	198119	No Fish Captured	n/c					
PCR-OCHT05	23/Aug/20	192429	No Fish Captured	n/c					
PCR-OCMT05	23/Aug/20	192430	No Fish Captured	n/c					
PCR-OCMT06	23/Aug/20	192436	No Fish Captured	n/c					
PCR-OCMT07	23/Aug/20	192433	No Fish Captured	n/c					
PCR-OCMT07	23/Aug/20	192434	No Fish Captured	n/c					
PCR-OCMT06	23/Aug/20	192435	No Fish Captured	n/c					
PCR-OCHT04	23/Aug/20	192428	No Fish Captured	n/c					
PCR-OCEF01	23/Aug/20	192408	Burbot	83					
PCR-OCEF01	23/Aug/20	192409	Longnose Sucker	77					
PCR-OCEF01	23/Aug/20	192410	Longnose Sucker	43					
PCR-OCGN02	23/Aug/20	192411	Longnose Sucker	423	933	1.233	900230000204022		
PCR-OCGN02	23/Aug/20	192412	Northern Pike	232	113	0.905	900226001617752		
PCR-OCMT04	23/Aug/20	192413	Burbot	83					
PCR-OCMT04	23/Aug/20	192414	No Fish Captured	n/c					
PCR-OCMT03	23/Aug/20	192415	No Fish Captured	n/c					
PCR-OCMT03	23/Aug/20	192416	No Fish Captured	n/c					
PCR-OCHT03	23/Aug/20	192417	No Fish Captured	n/c					
PCR-OCGN01	23/Aug/20	192270	No Fish Captured	n/c					
PCR-OCHT01	23/Aug/20	192271	No Fish Captured	n/c					
PCR-OCMT01	23/Aug/20	192272	No Fish Captured	n/c					
PCR-OCMT01	23/Aug/20	192273	No Fish Captured	n/c					
PCR-OCMT02	23/Aug/20	192274	No Fish Captured	n/c					

[1] DNA sample type = Fin Clip

Table 10. Continued (4 of 14).

Site Name	Date	Fish ID	Species	Length (mm)	Weight (g)	Condition (K)	Tag 1 Number	Tag 2 Number	Sample Number [1]
PCR-OCHT02	23/Aug/20	192275	No Fish Captured	n/c					
PCR-OCHT02	23/Aug/20	192276	No Fish Captured	n/c					
PCR-OCGN02	24/Aug/20	192070	No Fish Captured	n/c					
PCR-OCGN01	24/Aug/20	192071	No Fish Captured	n/c					
PCR-OCEF02	5/Sep/20	191520	Yellow Perch	68	4				
PCR-OCEF02	5/Sep/20	191541	Yellow Perch	66	3				
PCR-OCEF02	5/Sep/20	191542	Slimy Sculpin	58	1				
PCR-OCEF02	5/Sep/20	191543	Spottail Shiner	64	1				
PCR-OCEF02	5/Sep/20	191544	Slimy Sculpin	50	1				
PCR-OCEF02	5/Sep/20	191545	Redside Shiner	49	1				
PCR-OCEF02	5/Sep/20	191546	Longnose Dace	41					
PCR-OCEF02	5/Sep/20	191547	Longnose Sucker	77	4				
PCR-OCEF02	5/Sep/20	191548	Longnose Sucker	55	2				
PCR-OCEF02	5/Sep/20	191549	Longnose Dace	45					
PCR-OCEF02	5/Sep/20	191550	Longnose Sucker	50	1				
PCR-OCEF02	5/Sep/20	191551	Longnose Dace	51`	1				
PCR-OCEF02	5/Sep/20	191552	Longnose Dace	39					
PCR-OCEF02	5/Sep/20	191553	Longnose Dace	41					
PCR-OCEF02	5/Sep/20	191554	Spottail Shiner	29					
PCR-OCES12	5/Sep/20	189465	Mountain Whitefish	300					
PCR-OCES12	5/Sep/20	189466	Mountain Whitefish	250					
PCR-OCES12	5/Sep/20	189467	Mountain Whitefish	250					
PCR-OCES12	5/Sep/20	189468	Sucker spp.	250					
PCR-OCES12	5/Sep/20	189469	Redside Shiner	100					
PCR-OCES12	5/Sep/20	189470	Redside Shiner	100					
PCR-OCES12	5/Sep/20	189471	Redside Shiner	100					
PCR-OCES12	5/Sep/20	189472	Redside Shiner	100					
PCR-OCES07	5/Sep/20	189473	Mountain Whitefish	300					
PCR-OCES07	5/Sep/20	189474	Mountain Whitefish	250					
PCR-OCES07	5/Sep/20	189475	Mountain Whitefish	250					
PCR-OCES07	5/Sep/20	189476	Mountain Whitefish	250					
PCR-OCES08	5/Sep/20	189477	Bull Trout	300					
PCR-OCES08	5/Sep/20	189478	Northern Pike	300					
PCR-OCES08	5/Sep/20	189479	Mountain Whitefish	100					
PCR-OCES08	5/Sep/20	189480	Mountain Whitefish	250					
PCR-OCES08	5/Sep/20	189481	Mountain Whitefish	300					
PCR-OCES08	5/Sep/20	189482	Mountain Whitefish	300					
PCR-OCES08	5/Sep/20	189483	Mountain Whitefish	300					
PCR-OCES11	5/Sep/20	189485	Mountain Whitefish	250					
PCR-OCES11	5/Sep/20	189486	Mountain Whitefish	300					
PCR-OCES11	5/Sep/20	189487	Northern Pike	300					
PCR-OCES11	5/Sep/20	189488	Northern Pikeminnow	100					
PCR-OCES11	5/Sep/20	189489	Sculpin spp.	100					
PCR-OCES11	5/Sep/20	189490	Sculpin spp.	100					
PCR-OCES07	5/Sep/20	189506	Mountain Whitefish	378	529	0.979	900230000204039		
PCR-OCES07	5/Sep/20	189507	Longnose Sucker	370	740	1.461	900230000204137		
PCR-OCES07	5/Sep/20	189508	Mountain Whitefish	329			900230000204085		
PCR-OCES07	5/Sep/20	189509	Longnose Dace	66	3	1.043			
PCR-OCES07	5/Sep/20	189510	Arctic Grayling	90	7	0.960			5314
PCR-OCES07	5/Sep/20	189511	Northern Pike	167	30	0.644	900226001617999		
PCR-OCES07	5/Sep/20	189512	Northern Pike	160	53	1.294			
PCR-OCES08	5/Sep/20	189513	Walleye	385	657	1.151	900230000204006		
PCR-OCES08	5/Sep/20	189514	Mountain Whitefish	332	457	1.249	900230000211029		
PCR-OCES08	5/Sep/20	189515	Mountain Whitefish	347	384	0.919	900230000204124		
PCR-OCES08	5/Sep/20	189516	Mountain Whitefish	330	311	0.865	981098106068701		
PCR-OCES08	5/Sep/20	189517	Arctic Grayling	94	16	1.926			5315
PCR-OCES11	5/Sep/20	189518	Mountain Whitefish	417	761	1.049	900230000204075		
PCR-OCES11	5/Sep/20	189519	Yellow Perch	154	52	1.424			
PCR-OCES11	5/Sep/20	189520	Slimy Sculpin	61	2	0.881			
PCR-OCES11	5/Sep/20	189521	Northern Pike	174	55	1.044			
PCR-OCES11	5/Sep/20	189522	Mountain Whitefish	417	826	1.139	900230000204003		
PCR-OCES11	5/Sep/20	189523	Mountain Whitefish	351	489	1.131	900230000204133		

[1] DNA sample type = Fin Clip

Table 10. Continued (5 of 14).

Site Name	Date	Fish ID	Species	Length (mm)	Weight (g)	Condition (K)	Tag 1 Number	Tag 2 Number	Sample Number [1]
PCR-OCES11	5/Sep/20	189524	Mountain Whitefish	252	168	1.050	900228000404624		
PCR-OCES11	5/Sep/20	189525	Burbot	282	100	0.446	900228000404671		
PCR-OCES12	5/Sep/20	189526	Goldeye	420	865	1.168	900230000204144		5308
PCR-OCES12	5/Sep/20	189527	Mountain Whitefish	480	1172	1.060	981098104933958	900230000204013	
PCR-OCES12	5/Sep/20	189528	Mountain Whitefish	301	346	1.269	900230000204108		
PCR-OCES12	5/Sep/20	189529	Mountain Whitefish	68	5	1.590			
PCR-OCES12	5/Sep/20	189530	Bull Trout	155	33	0.886	900226001617964		5309
PCR-OCES12	5/Sep/20	189531	Bull Trout	205	123	1.428	900228000464558		5310
PCR-OCES12	5/Sep/20	189532	Redside Shiner	90	70	9.602			
PCR-OCES12	5/Sep/20	189533	Yellow Perch	191	101	1.450	900226001617766		
PCR-OCES12	5/Sep/20	189534	Yellow Perch	51	2	1.508			
PCR-OCES12	5/Sep/20	189535	Northern Pike	520	1039	0.739	900230000204153		
PCR-OCES12	5/Sep/20	189536	Northern Pike	550	991	0.596	900230000204088		
PCR-OCES12	5/Sep/20	189537	Northern Pike	396	517	0.833	900230000204079		
PCR-OCES12	5/Sep/20	189538	Northern Pike	435	603	0.733	900230000204067		
PCR-OCES12	5/Sep/20	189539	Northern Pike	502	909	0.719	900230000204152		
PCR-OCES12	5/Sep/20	189540	Northern Pike	410	441	0.640	900230000204034		
PCR-OCES13	5/Sep/20	189541	Mountain Whitefish	420	887	1.197	900230000204075		
PCR-OCES13	5/Sep/20	189542	Mountain Whitefish	354	427	0.963	900230000204004		
PCR-OCES13	5/Sep/20	189543	Walleye	388	617	1.056	900230000208201		
PCR-OCES13	5/Sep/20	189544	Bull Trout	392	699	1.160	900230000204088		5311
PCR-OCES13	5/Sep/20	189545	Mountain Whitefish	258	204	1.188	900228000464560		
PCR-OCES13	5/Sep/20	189546	Arctic Grayling	96	9	1.017			5312
PCR-OCES13	5/Sep/20	189547	Mountain Whitefish	266	184	0.978	900228000464757		
PCR-OCES13	5/Sep/20	189548	Spottail Shiner	76	6	1.367			
PCR-OCES13	5/Sep/20	189549	Redside Shiner	91	6	0.796			
PCR-OCES13	5/Sep/20	189550	Redside Shiner	65	3	1.092			
PCR-OCES13	5/Sep/20	189551	Bull Trout	152	36	1.025	900226001617907		5313
PCR-OCES13	5/Sep/20	189552	Lake Chub	61	3	1.322			
PCR-OCES13	5/Sep/20	189553	Redside Shiner	65	4	1.457			
PCR-OCES13	5/Sep/20	189554	Longnose Dace	65	2	0.728			
PCR-OCES13	5/Sep/20	189555	Spottail Shiner	64	2	0.763			
PCR-OCES13	5/Sep/20	189556	Slimy Sculpin	72					
PCR-OCES13	5/Sep/20	189557	Longnose Dace	35					
PCR-OCES13	5/Sep/20	189558	Slimy Sculpin	50					
PCR-OCES09	5/Sep/20	189559	Kokanee	41	6	8.706			
PCR-OCES09	5/Sep/20	189560	Longnose Sucker	442	1287	1.490	900230000204015		
PCR-OCES05	5/Sep/20	198118	No Fish Captured	n/c					
PCR-OCES01	6/Sep/20	187760	Mountain Whitefish	70	2	0.583			
PCR-OCES03	6/Sep/20	187761	Yellow Perch	205	132	1.532			
PCR-OCES03	6/Sep/20	187762	Redside Shiner	65	5	1.821			
PCR-OCES03	6/Sep/20	187763	Redside Shiner	41	1	1.451			
PCR-OCES03	6/Sep/20	187764	Lake Chub	55	1	0.601			
PCR-OCES03	6/Sep/20	187765	Spottail Shiner	48	1	0.904			
PCR-OCES03	6/Sep/20	187766	Lake Chub	57	1	0.540			
PCR-OCES03	6/Sep/20	187767	Redside Shiner	61	3	1.322			
PCR-OCES04	6/Sep/20	187768	White Sucker	382	742	1.331	900230000204089		
PCR-OCES04	6/Sep/20	187769	White Sucker	410	947	1.374	900230000204031		
PCR-OCES04	6/Sep/20	187770	Northern Pike	419	491	0.667	900230000204078		
PCR-OCES10	6/Sep/20	187771	White Sucker	435	1025	1.245	900230000204141		
PCR-OCES10	6/Sep/20	187772	White Sucker	442	1194	1.383	900230000204036		
PCR-OCES10	6/Sep/20	187773	Large Scale Sucker	485	1415	1.240	981098104942017		
PCR-OCES10	6/Sep/20	187774	Spottail Shiner	78	5	1.054			
PCR-OCES10	6/Sep/20	187775	Spottail Shiner	51					
PCR-OCES10	6/Sep/20	187776	Bull Trout	152	34	0.968	900226001617907		
PCR-OCES10	6/Sep/20	187777	Kokanee	119	16	0.949			
PCR-OCES10	6/Sep/20	187778	Spottail Shiner	53					
PCR-OCES10	6/Sep/20	187779	Kokanee	64					
PCR-OCES10	6/Sep/20	187780	Yellow Perch	55					
PCR-OCES10	6/Sep/20	187781	Redside Shiner	45					
PCR-OCES10	6/Sep/20	187782	Spottail Shiner	85	7	1.140			
PCR-OCES10	6/Sep/20	187783	Yellow Perch	65					

[1] DNA sample type = Fin Clip

Table 10. Continued (6 of 14).

Site Name	Date	Fish ID	Species	Length (mm)	Weight (g)	Condition (K)	Tag 1 Number	Tag 2 Number	Sample Number [1]
PCR-OCES10	6/Sep/20	187784	Yellow Perch	52					
PCR-OCES10	6/Sep/20	187785	Yellow Perch	55					
PCR-OCES10	6/Sep/20	187786	Yellow Perch	49					
PCR-OCES10	6/Sep/20	187787	Yellow Perch	67					
PCR-OCES10	6/Sep/20	187788	Yellow Perch	64					
PCR-OCES10	6/Sep/20	187789	Yellow Perch	54					
PCR-OCES10	6/Sep/20	187790	Yellow Perch	55					
PCR-OCES10	6/Sep/20	187791	Yellow Perch	47					
PCR-OCES10	6/Sep/20	187792	Mountain Whitefish	65					
PCR-OCES10	6/Sep/20	187793	Longnose Sucker	55					
PCR-OCES10	6/Sep/20	187794	Longnose Sucker	42					
PCR-OCES01	6/Sep/20	189462	Sucker spp.	n/c					
PCR-OCES01	6/Sep/20	189463	Unknown	n/c					
PCR-OCES01	6/Sep/20	189464	Mountain Whitefish	n/c					
PCR-OCES10	6/Sep/20	198107	Sucker spp.	n/c					
PCR-OCES10	6/Sep/20	198108	Sucker spp.	n/c					
PCR-OCES10	6/Sep/20	198109	Sucker spp.	n/c					
PCR-OCES10	6/Sep/20	198110	Mountain Whitefish	n/c					
PCR-OCES10	6/Sep/20	198111	Kokanee	n/c					
PCR-OCES10	6/Sep/20	198112	Kokanee	n/c					
PCR-OCES10	6/Sep/20	198113	Yellow Perch	n/c					
PCR-OCES10	6/Sep/20	198114	Yellow Perch	n/c					
PCR-OCES10	6/Sep/20	198115	Yellow Perch	n/c					
PCR-OCES10	6/Sep/20	198116	Yellow Perch	n/c					
PCR-OCES10	6/Sep/20	198117	Yellow Perch	n/c					
PCR-OCGN01	6/Sep/20	187758	Northern Pike	488	855	0.736	900230000204072		
PCR-OCGN02	6/Sep/20	187759	No Fish Captured	n/c					
PCR-OCGN02	5/Sep/20	187757	Northern Pike	275	142	0.683	900226001617977		
PCR-OCMT05	5/Sep/20	187736	No Fish Captured	n/c					
PCR-OCMT05	5/Sep/20	187737	No Fish Captured	n/c					
PCR-OCHT04	5/Sep/20	187738	No Fish Captured	n/c					
PCR-OCMT04	5/Sep/20	187739	No Fish Captured	n/c					
PCR-OCMT04	5/Sep/20	187740	No Fish Captured	n/c					
PCR-OCMT04	5/Sep/20	187741	No Fish Captured	n/c					
PCR-OCMT04	5/Sep/20	187742	No Fish Captured	n/c					
PCR-OCMT04	5/Sep/20	187743	Prickly Sculpin	91					
PCR-OCHT01	5/Sep/20	187744	No Fish Captured	n/c					
PCR-OCMT01	5/Sep/20	187745	No Fish Captured	n/c					
PCR-OCMT01	5/Sep/20	187746	No Fish Captured	n/c					
PCR-OCMT02	5/Sep/20	187747	No Fish Captured	n/c					
PCR-OCMT02	5/Sep/20	187748	Burbot	72					
PCR-OCHT02	5/Sep/20	187749	No Fish Captured	n/c					
PCR-OCHT05	5/Sep/20	187750	No Fish Captured	n/c					
PCR-OCMT07	5/Sep/20	187751	No Fish Captured	n/c					
PCR-OCMT07	5/Sep/20	187752	No Fish Captured	n/c					
PCR-OCMT07	5/Sep/20	187753	No Fish Captured	n/c					
PCR-OCMT06	5/Sep/20	187754	No Fish Captured	n/c					
PCR-OCMT06	5/Sep/20	187755	No Fish Captured	n/c					
PCR-OCMT06	5/Sep/20	187756	No Fish Captured	n/c					
PCR-OCES08	23/Aug/20	191751	Mountain Whitefish	312	292	0.961	900230000204070		
PCR-OCES08	23/Aug/20	191752	Mountain Whitefish	406	606	0.906	900320000204160		
PCR-OCES08	23/Aug/20	191753	Mountain Whitefish	291	264	1.071	900229000464549		
PCR-OCES08	23/Aug/20	191754	Mountain Whitefish	120	20	1.157			
PCR-OCES08	23/Aug/20	191755	Mountain Whitefish	76	9	2.050			
PCR-OCES08	23/Aug/20	191756	Mountain Whitefish	123	22	1.182	900226001617888		
PCR-OCES08	23/Aug/20	191757	Mountain Whitefish	65	2	0.728			
PCR-OCES08	23/Aug/20	191758	Mountain Whitefish	118	14	0.852			
PCR-OCES08	23/Aug/20	191759	Mountain Whitefish	72	4	1.072			
PCR-OCES08	23/Aug/20	191760	Arctic Grayling	80	2	0.391			5404
PCR-OCES08	23/Aug/20	191761	Mountain Whitefish	122	15	0.826	900226001617861		
PCR-OCES08	23/Aug/20	191762	Mountain Whitefish	68	3	0.954			
PCR-OCES08	23/Aug/20	191763	Mountain Whitefish	109	15	1.158			

[1] DNA sample type = Fin Clip

Table 10. Continued (7 of 14).

Site Name	Date	Fish ID	Species	Length (mm)	Weight (g)	Condition (K)	Tag 1 Number	Tag 2 Number	Sample Number [1]
PCR-OCES08	23/Aug/20	191764	Mountain Whitefish	61	3	1.322			
PCR-OCES08	23/Aug/20	191765	Bull Trout	147	34	1.070	900226001617823		5405
PCR-OCES08	23/Aug/20	191766	Slimy Sculpin	35					
PCR-OCES07	23/Aug/20	191725	Mountain Whitefish	291	288	1.169	900230000204151		
PCR-OCES07	23/Aug/20	191726	Mountain Whitefish	286	265	1.133	900228000464568		
PCR-OCES07	23/Aug/20	191727	Mountain Whitefish	275	200	0.962	900228000464626		
PCR-OCES07	23/Aug/20	191728	Mountain Whitefish	190	62	0.904	900228000464654		
PCR-OCES07	23/Aug/20	191729	Mountain Whitefish	120	24	1.389	900226001617976		
PCR-OCES07	23/Aug/20	191730	Mountain Whitefish	124	25	1.311	900226001617848		
PCR-OCES07	23/Aug/20	191731	Arctic Grayling	85	9	1.465			5402
PCR-OCES07	23/Aug/20	191732	Arctic Grayling	83	8	1.399			5403
PCR-OCES07	23/Aug/20	191733	Mountain Whitefish	136	27	1.073	900226001617961		
PCR-OCES07	23/Aug/20	191734	Longnose Dace	51	3	2.262			
PCR-OCES07	23/Aug/20	191735	Mountain Whitefish	134	32	1.330	900226001617968		
PCR-OCES06	23/Aug/20	191672	Redside Shiner	101					
PCR-OCES06	23/Aug/20	191671	Spottail Shiner	81	6	1.129			5406
PCR-OCES06	23/Aug/20	191673	Spottail Shiner	57					5407
PCR-OCES06	23/Aug/20	191674	Redside Shiner	51					
PCR-OCES06	23/Aug/20	191675	Redside Shiner	88					
PCR-OCES06	23/Aug/20	191676	Redside Shiner	53					
PCR-OCES06	23/Aug/20	191677	Redside Shiner	46					
PCR-OCES06	23/Aug/20	191678	Redside Shiner	102					
PCR-OCES06	23/Aug/20	191679	Spottail Shiner	81					
PCR-OCES06	23/Aug/20	191680	Redside Shiner	73					
PCR-OCES06	23/Aug/20	191681	Redside Shiner	75					
PCR-OCES06	23/Aug/20	191682	Redside Shiner	92					
PCR-OCES06	23/Aug/20	191683	Lake Chub	61					
PCR-OCES06	23/Aug/20	191684	Redside Shiner	89					
PCR-OCES06	23/Aug/20	191685	Redside Shiner	44					
PCR-OCES06	23/Aug/20	191686	Redside Shiner	93					
PCR-OCES06	23/Aug/20	191687	Redside Shiner	44					
PCR-OCES06	23/Aug/20	191688	Yellow Perch	50					
PCR-OCES06	23/Aug/20	191689	Yellow Perch	50					
PCR-OCES06	23/Aug/20	191690	Redside Shiner	103					
PCR-OCES06	23/Aug/20	191691	Yellow Perch	44					
PCR-OCES06	23/Aug/20	191692	Yellow Perch	56					
PCR-OCES06	23/Aug/20	191693	Yellow Perch	48					
PCR-OCES06	23/Aug/20	191694	Redside Shiner	43					
PCR-OCES06	23/Aug/20	191695	Redside Shiner	97					
PCR-OCES06	23/Aug/20	191696	Yellow Perch	45					
PCR-OCES06	23/Aug/20	191697	Yellow Perch	47					
PCR-OCES06	23/Aug/20	191698	Redside Shiner	75					
PCR-OCES06	23/Aug/20	191699	Redside Shiner	47					
PCR-OCES06	23/Aug/20	191700	Redside Shiner	45					
PCR-OCES06	23/Aug/20	191701	Redside Shiner	81					
PCR-OCES06	23/Aug/20	191702	Redside Shiner	87					
PCR-OCES06	23/Aug/20	191703	Yellow Perch	58					
PCR-OCES05	23/Aug/20	191660	Northern Pike	215	61	0.614	900228000464754		
PCR-OCES05	23/Aug/20	191661	Longnose Sucker	45					
PCR-OCES05	23/Aug/20	191662	Longnose Sucker	79					
PCR-OCES05	23/Aug/20	191663	Longnose Sucker	48					
PCR-OCES05	23/Aug/20	191664	Redside Shiner	98					
PCR-OCES05	23/Aug/20	191665	Longnose Sucker	50					
PCR-OCES05	23/Aug/20	191666	Longnose Sucker	37					
PCR-OCES05	23/Aug/20	191667	Longnose Sucker	47					
PCR-OCES05	23/Aug/20	191668	Redside Shiner	40					
PCR-OCES04	23/Aug/20	191634	Walleye	454	1303	1.392	900230000204001		
PCR-OCES04	23/Aug/20	191635	White Sucker	477	1533	1.412	900230000204122		
PCR-OCES04	23/Aug/20	191636	White Sucker	448	1406	1.564	900230000204099		
PCR-OCES04	23/Aug/20	191637	White Sucker	440	1159	1.361	900230000204068		
PCR-OCES04	23/Aug/20	191638	Large Scale Sucker	465	1260	1.253	900230000204009		
PCR-OCES04	23/Aug/20	191639	Northern Pike	485	858	0.752	900230000204072		

[1] DNA sample type = Fin Clip

Table 10. Continued (8 of 14).

Site Name	Date	Fish ID	Species	Length (mm)	Weight (g)	Condition (K)	Tag 1 Number	Tag 2 Number	Sample Number[1]
PCR-OCES04	23/Aug/20	191640	Spottail Shiner	74	3	0.740			
PCR-OCES04	23/Aug/20	191641	Redside Shiner	86	2	0.314			
PCR-OCES04	23/Aug/20	191642	Spottail Shiner	85	2	0.326			
PCR-OCES04	23/Aug/20	191643	Redside Shiner	93	3	0.373			
PCR-OCES04	23/Aug/20	191644	Spottail Shiner	62	1	0.420			
PCR-OCES04	23/Aug/20	191645	Redside Shiner	50					
PCR-OCES04	23/Aug/20	191646	Redside Shiner	109	13	1.004			
PCR-OCES04	23/Aug/20	191647	Yellow Perch	42					
PCR-OCES03	23/Aug/20	191620	Large Scale Sucker	500	1623	1.298	900230000204052		
PCR-OCES03	23/Aug/20	191621	Redside Shiner	93	11	1.368			
PCR-OCES03	23/Aug/20	191622	Longnose Sucker	59	2	0.974			
PCR-OCES03	23/Aug/20	191623	Spottail Shiner	92	6	0.771			
PCR-OCES03	23/Aug/20	191624	Redside Shiner	61	4	1.762			
PCR-OCES03	23/Aug/20	191625	Redside Shiner	50	4	3.200			
PCR-OCES01	23/Aug/20	187722	Longnose Sucker	455	1163	1.235	900230000204012		
PCR-OCES01	23/Aug/20	187723	Longnose Sucker	442	1064	1.232	900230000204152		
PCR-OCES01	23/Aug/20	187724	White Sucker	423	966	1.276	900230000204162		
PCR-OCES01	23/Aug/20	187725	Longnose Sucker	410	898	1.303	900230000204113		
PCR-OCES01	23/Aug/20	187726	Walleye	409	779	1.139	900230000204008		
PCR-OCES01	23/Aug/20	187727	White Sucker	149	44	1.330			
PCR-OCES01	23/Aug/20	187728	Yellow Perch	102	16	1.508			
PCR-OCES01	23/Aug/20	187729	Spottail Shiner	86	7	1.101			
PCR-OCES01	23/Aug/20	187730	Mountain Whitefish	67	3	0.997			
PCR-OCES01	23/Aug/20	187731	Lake Chub	55	2	1.202			
PCR-OCES01	23/Aug/20	187732	Longnose Sucker	79	6	1.217			
PCR-OCES01	23/Aug/20	187733	Redside Shiner	103	10	0.915			
PCR-OCES01	23/Aug/20	187734	White Sucker	68	5	1.590			
PCR-OCES01	23/Aug/20	187735	Spottail Shiner	76	6	1.367			
PCR-OCES02	23/Aug/20	191606	White Sucker	455	1217	1.292	900230000204083		
PCR-OCES02	23/Aug/20	191607	White Sucker	416	1120	1.556	900230000204119		
PCR-OCES02	23/Aug/20	191608	Kokanee	109	11	0.849			
PCR-OCES13	24/Aug/20	192705	Mountain Whitefish	65	5	1.821			
PCR-OCES13	24/Aug/20	192706	Mountain Whitefish	82	4	0.725			
PCR-OCES13	24/Aug/20	192707	Mountain Whitefish	54	2	1.270			
PCR-OCES13	24/Aug/20	192708	Mountain Whitefish	287	226	0.956	900228000464555		
PCR-OCES13	24/Aug/20	192709	Mountain Whitefish	65	2	0.728			
PCR-OCES13	24/Aug/20	192710	Mountain Whitefish	325	328	0.955	900230000204114		
PCR-OCES13	24/Aug/20	192711	Mountain Whitefish	57	2	1.080			
PCR-OCES13	24/Aug/20	192712	Mountain Whitefish	167	43	0.923	900226001617948		
PCR-OCES13	24/Aug/20	192713	Mountain Whitefish	124	17	0.892	900226001617883		
PCR-OCES13	24/Aug/20	192714	Large Scale Sucker	173	66	1.275	900226001617954		
PCR-OCES13	24/Aug/20	192715	Longnose Dace	36					
PCR-OCES13	24/Aug/20	192716	Walleye	322	392	1.174	900228000368816		
PCR-OCES13	24/Aug/20	192717	Mountain Whitefish	293	293	1.165	900230000204038		
PCR-OCES13	24/Aug/20	192718	Redside Shiner	96	13	1.469			
PCR-OCES13	24/Aug/20	192719	Slimy Sculpin	52	3	2.134			
PCR-OCES13	24/Aug/20	192720	Longnose Dace	45					
PCR-OCES12	24/Aug/20	192701	Large Scale Sucker	435	977	1.187	900230000204112		
PCR-OCES12	24/Aug/20	192702	Longnose Sucker	426	987	1.277	900230000204116		
PCR-OCES12	24/Aug/20	192703	Mountain Whitefish	124	18	0.944	900226001617915		
PCR-OCES12	24/Aug/20	192704	Mountain Whitefish	130	20	0.910	900226001617881		
PCR-OCES11	24/Aug/20	192699	Mountain Whitefish	265	188	1.010	900228000464640		
PCR-OCES11	24/Aug/20	192700	Longnose Sucker	83	7	1.224			
PCR-OCES10	24/Aug/20	192676	Kokanee	218	117	1.129	900226001617932		
PCR-OCES10	24/Aug/20	192677	Mountain Whitefish	273	198	0.973	900228000464532		
PCR-OCES10	24/Aug/20	192678	Mountain Whitefish	118	17	1.035	900226001617930		
PCR-OCES10	24/Aug/20	192679	Walleye	310	305	1.024	900230000204100		
PCR-OCES10	24/Aug/20	192680	Mountain Whitefish	72	3	0.804			
PCR-OCES10	24/Aug/20	192681	Mountain Whitefish	69	3	0.913			
PCR-OCES10	24/Aug/20	192682	Mountain Whitefish	140	24	0.875			
PCR-OCES10	24/Aug/20	192683	Mountain Whitefish	73	3	0.771			
PCR-OCES10	24/Aug/20	192684	Mountain Whitefish	126	21	1.050	900226001617794		

[1] DNA sample type = Fin Clip

Table 10. Continued (9 of 14).

Site Name	Date	Fish ID	Species	Length (mm)	Weight (g)	Condition (K)	Tag 1 Number	Tag 2 Number	Sample Number [1]
PCR-OCES10	24/Aug/20	192685	Mountain Whitefish	83	6	1.049			
PCR-OCES10	24/Aug/20	192686	Mountain Whitefish	134	21	0.873	900226001617926		
PCR-OCES10	24/Aug/20	192687	Mountain Whitefish	71	3	0.838			
PCR-OCES10	24/Aug/20	192688	Kokanee	120	15	0.868	900226001617813		
PCR-OCES10	24/Aug/20	192689	Longnose Sucker	70	3	0.875			
PCR-OCES10	24/Aug/20	192690	Longnose Sucker	49					
PCR-OCES10	24/Aug/20	192691	Longnose Sucker	58	3	1.538			
PCR-OCES10	24/Aug/20	192692	Longnose Sucker	76	5	1.139			
PCR-OCES10	24/Aug/20	192693	Mountain Whitefish	77	5	1.095			
PCR-OCES10	24/Aug/20	192694	Longnose Sucker	79	6	1.217			
PCR-OCES10	24/Aug/20	192695	Mountain Whitefish	107	13	1.061			
PCR-OCES10	24/Aug/20	192696	Yellow Perch	49	2	1.700			
PCR-OCES10	24/Aug/20	192697	Longnose Sucker	55	2	1.202			
PCR-OCES10	24/Aug/20	192698	Slimy Sculpin	25					
PCR-OCES09	24/Aug/20	192672	Large Scale Sucker	172	68	1.336	900226001617925		
PCR-OCES09	24/Aug/20	192673	Kokanee	106	15	1.259			
PCR-OCES09	24/Aug/20	192674	Yellow Perch	69	2	0.609			
PCR-OCES09	24/Aug/20	192675	Large Scale Sucker	98	11	1.169			
PCR-BS0504	27/Sep/20		Spottail Shiner	21	0.1				
PCR-BS0504	27/Sep/20		Spottail Shiner	23	0.1				
PCR-BP01	27/Sep/20		Slimy Sculpin	85	8.4				
PCR-BP01	27/Sep/20		Slimy Sculpin	59	2.2				
PCR-BP01	27/Sep/20		Slimy Sculpin	67	3.3				
PCR-BP01	27/Sep/20		Slimy Sculpin	66	2.4				
PCR-BP01	27/Sep/20		Slimy Sculpin	46	0.7				
PCR-BP01	27/Sep/20		Slimy Sculpin	49	1.5				
PCR-BP01	27/Sep/20		Slimy Sculpin	52	1.6				
PCR-BP01	27/Sep/20		Longnose Sucker	60	2				
PCR-BP01	27/Sep/20		Longnose Dace	35	0.5				
PCR-BP01	27/Sep/20		Longnose Sucker	84	6.9				
PCR-BP01	27/Sep/20		Slimy Sculpin	50	1.3				
PCR-BP01	27/Sep/20		Slimy Sculpin	41	0.5				
PCR-BP01	27/Sep/20		Slimy Sculpin	37	0.7				
PCR-BP01	27/Sep/20		Slimy Sculpin	62	1.2				
PCR-BP01	27/Sep/20		Lake Chub	64	1.3				
PCR-BP01	27/Sep/20		Slimy Sculpin	46	1.3				
PCR-BP01	27/Sep/20		Slimy Sculpin	46	1.1				
PCR-BP01	27/Sep/20		Slimy Sculpin	36	0.4				
PCR-BP01	27/Sep/20		Slimy Sculpin	40	0.5				
PCR-BP01	27/Sep/20		Slimy Sculpin	21	0.1				
PCR-BP01	27/Sep/20		Slimy Sculpin	55	1.5				
PCR-BP01	27/Sep/20		Slimy Sculpin	25	0.4				
PCR-BP01	27/Sep/20		Slimy Sculpin	37	0.2				
PCR-BP01	27/Sep/20		Lake Chub	49	1.3				
PCR-BS01	27/Sep/20		Redside Shiner	49	1.3				
PCR-BS01	27/Sep/20		No Fish Captured	n/c					
PCR-BS01	27/Sep/20		No Fish Captured	n/c					
PCR-BS02	27/Sep/20		Large Scale Sucker	40	0.9				
PCR-BS02	27/Sep/20		Slimy Sculpin	37	0.4				
PCR-BS02	27/Sep/20		Spottail Shiner	31	0.4				
PCR-BS02	27/Sep/20		Spottail Shiner	30	0.3				
PCR-BS02	27/Sep/20		No Fish Captured	n/c					
PCR-BP03	27/Sep/20		Slimy Sculpin	25	0.3				
PCR-BP03	27/Sep/20		Slimy Sculpin	30	0.2				
PCR-BP03	27/Sep/20		Slimy Sculpin	42	0.4				
PCR-BP03	27/Sep/20		Slimy Sculpin	53	1.8				
PCR-BP03	27/Sep/20		Slimy Sculpin	61	1.9				
PCR-BP03	27/Sep/20		Slimy Sculpin	29	0.2				
PCR-BP03	27/Sep/20		Sculpin spp.	31	0.4				
PCR-BP03	27/Sep/20		Slimy Sculpin	33	0.6				
PCR-BP03	27/Sep/20		Slimy Sculpin	51	1.4				
PCR-BP03	27/Sep/20		Slimy Sculpin	29	0.3				

[1] DNA sample type = Fin Clip

Table 10. Continued (10 of 14).

Site Name	Date	Fish ID	Species	Length (mm)	Weight (g)	Condition (K)	Tag 1 Number	Tag 2 Number	Sample Number [1]
PCR-BP03	27/Sep/20		Slimy Sculpin	36	0.5				
PCR-BP03	27/Sep/20		Slimy Sculpin	23	0.2				
PCR-BS0504	27/Sep/20		No Fish Captured	40					
PCR-BP03	27/Sep/20		Slimy Sculpin	40					
PCR-BP03	27/Sep/20		Slimy Sculpin	40					
PCR-BP03	27/Sep/20		Slimy Sculpin	40					
PCR-BP03	27/Sep/20		Slimy Sculpin	40					
PCR-BP03	27/Sep/20		Slimy Sculpin	40					
PCR-BP03	27/Sep/20		Slimy Sculpin	40					
PCR-BP03	27/Sep/20		Slimy Sculpin	40					
PCR-BP03	27/Sep/20		Slimy Sculpin	40					
PCR-BP03	27/Sep/20		Slimy Sculpin	40					
PCR-SB07	27/Sep/20		Northern Pike	n/c					
PCR-SB07	27/Sep/20		Lake Whitefish	424	834				
PCR-SB07	27/Sep/20		White Sucker	451	1334				
PCR-SB07	27/Sep/20		Northern Pike	170	30				
PCR-SB07	27/Sep/20		Kokanee	130	22				
PCR-BS503	28/Sep/20		White Sucker	41	0.4				
PCR-BS503	28/Sep/20		Lake Chub	30	0.3				
PCR-BS503	28/Sep/20		Spottail Shiner	19	0.1				
PCR-BS503	28/Sep/20		Slimy Sculpin	22					
PCR-BS503	28/Sep/20		Lake Chub	20					
PCR-BS503	28/Sep/20		Prickly Sculpin	23	0.3				
PCR-BS503	28/Sep/20		Spottail Shiner	21	0.2				
PCR-BS503	28/Sep/20		Spoonhead Sculpin	35	0.4				
PCR-BS503	28/Sep/20		Spoonhead Sculpin	25					
PCR-BS503	28/Sep/20		Slimy Sculpin	25					
PCR-BS503	28/Sep/20		Slimy Sculpin	23					
PCR-BS503	28/Sep/20		Slimy Sculpin	31					
PCR-BS503	28/Sep/20		Prickly Sculpin	20					
PCR-BS503	28/Sep/20		Slimy Sculpin	20					
PCR-BS503	28/Sep/20		Slimy Sculpin	22					
PCR-BS503	28/Sep/20		White Sucker	21					
PCR-BS503	28/Sep/20		Slimy Sculpin	22					
PCR-BS503	28/Sep/20		Lake Chub	18					
PCR-BS503	28/Sep/20		Lake Chub	23					
PCR-BS503	28/Sep/20		Longnose Dace	23					
PCR-BS503	28/Sep/20		Lake Chub	18					
PCR-BS503	28/Sep/20		Spottail Shiner	29					
PCR-BS503	28/Sep/20		Lake Chub	17					
PCR-BS503	28/Sep/20		Slimy Sculpin	30	0.3				
PCR-BS503	28/Sep/20		Slimy Sculpin	23					
PCR-BS03	28/Sep/20		Longnose Dace	20					
PCR-BS03	28/Sep/20		Longnose Dace	20					
PCR-BS03	28/Sep/20		Longnose Dace	19					
PCR-BS03	28/Sep/20		Longnose Dace	20					
PCR-BS03	28/Sep/20		Slimy Sculpin	27					
PCR-BS03	28/Sep/20		Longnose Dace	25					
PCR-BS03	28/Sep/20		Slimy Sculpin	27					
PCR-BS03	28/Sep/20		Slimy Sculpin	22					
PCR-BS03	28/Sep/20		Longnose Dace	23					
PCR-BS03	28/Sep/20		Longnose Dace	n/c					
PCR-BS03	28/Sep/20		Longnose Dace	n/c					
PCR-BS03	28/Sep/20		Longnose Dace	n/c					
PCR-BS03	28/Sep/20		Longnose Dace	n/c					
PCR-BS03	28/Sep/20		Slimy Sculpin	n/c					
PCR-BS03	28/Sep/20		Slimy Sculpin	n/c					
PCR-BS03	28/Sep/20		Slimy Sculpin	n/c					
PCR-BS03	28/Sep/20		White Sucker	56	4				
PCR-BS03	28/Sep/20		Longnose Dace	15					
PCR-BS03	28/Sep/20		Slimy Sculpin	21					
PCR-BS03	28/Sep/20		Slimy Sculpin	20					

[1] DNA sample type = Fin Clip

Table 10. Continued (11 of 14).

Site Name	Date	Fish ID	Species	Length (mm)	Weight (g)	Condition (K)	Tag 1 Number	Tag 2 Number	Sample Number [1]
PCR-BS03	28/Sep/20		Cyprinid spp.	16					
PCR-BS03	28/Sep/20		Slimy Sculpin	22					
PCR-BS03	28/Sep/20		Cyprinid spp.	17					
PCR-BS03	28/Sep/20		White Sucker	35					
PCR-BS03	28/Sep/20		Prickly Sculpin	20					
PCR-BS03	28/Sep/20		Slimy Sculpin	22					
PCR-BS03	28/Sep/20		Slimy Sculpin	24					
PCR-BS03	28/Sep/20		White Sucker	31					
PCR-GN0501	28/Sep/20		Longnose Sucker	445			982126057511854		
OEM-DSC	26/Aug/20		Mountain Whitefish	285	247		900228000680157		
OEM-DSC	26/Aug/20		Longnose Sucker	390	686		900230000209020		
OEM-DSC	26/Aug/20		Longnose Sucker	415	905		900230000209838		
OEM-DSC	26/Aug/20		Mountain Whitefish	183	57		900226001622010		
OEM-DSC	26/Aug/20		Mountain Whitefish	240	142		900228000681079		
OEM-DSC	26/Aug/20		Longnose Sucker	105	10				
OEM-DSC	26/Aug/20		Mountain Whitefish	0	0				
OEM-DSC	26/Aug/20		Sculpin spp.	0	0				
OEM-DSC	26/Aug/20		Mountain Whitefish	0	0				
OEM-DSC	26/Aug/20		Mountain Whitefish	0	0				
OEM-DSC	26/Aug/20		Mountain Whitefish	268	185		900228000438269		
OEM-DSC	2/Sep/20		Mountain Whitefish	393	540		900230000209322		
OEM-DSC	2/Sep/20		Mountain Whitefish	0	0				
OEM-DSC	2/Sep/20		Mountain Whitefish	0	0				
OEM-DSC	2/Sep/20		Mountain Whitefish	120	17				
OEM-DSC	2/Sep/20		Mountain Whitefish	120	17				
OEM-DSC	2/Sep/20		Longnose Sucker	400	759		900230000207637		
OEM-DSC	2/Sep/20		Mountain Whitefish	318	351		900230000207214		
OEM-DSC	2/Sep/20		Longnose Sucker	470	1315		900230000209692		
OEM-DSC	13/Sep/20		Slimy Sculpin	66	4				
OEM-DSC	13/Sep/20		Mountain Whitefish	314	327		900230000205864		
OEM-DSC	13/Sep/20		Mountain Whitefish	0	0				
OEM-DSC	13/Sep/20		Sucker spp.	0	0				
OEM-DSC	13/Sep/20		Mountain Whitefish	0	0				
OEM-DSC	13/Sep/20		Slimy Sculpin	65	4				
OEM-DSC	13/Sep/20		Slimy Sculpin	62	4				
OEM-DSC	13/Sep/20		White Sucker	401	783		900230000204857		
OEM-DSC	13/Sep/20		Slimy Sculpin	79	5				
OEM-DSC	13/Sep/20		Slimy Sculpin	63	3				
OEM-DSC	23/Sep/20		Mountain Whitefish	0	0				
OEM-DSC	23/Sep/20		Bull Trout	185	54		900226001617967		
OEM-DSC	23/Sep/20		Northern Pike	443	590		900230000204773		
OEM-DSC	23/Sep/20		Northern Pike	490	800		900230000204310		
OEM-DSC	23/Sep/20		Mountain Whitefish	0	0				
OEM-DSC	23/Sep/20		Mountain Whitefish	0	0				
OEM-DSC	23/Sep/20		Mountain Whitefish	0	0				
OEM-DSC	23/Sep/20		Mountain Whitefish	0	0				
OEM-DSC	23/Sep/20		Mountain Whitefish	0	0				
OEM-DSC	23/Sep/20		Mountain Whitefish	0	0				
OEM-DSC	23/Sep/20		Sucker spp.	0	0				
OEM-DSC	23/Sep/20		Sucker spp.	0	0				
OEM-DSC	23/Sep/20		Large Scale Sucker	454	1158		900230000204812		
OEM-DSC	23/Sep/20		Sucker spp.	0	0				
OEM-DSC	23/Sep/20		White Sucker	450	1431		900230000205988		
OEM-DSC	23/Sep/20		Redside Shiner	55	2				
OEM-DSC	23/Sep/20		Sucker spp.	0	0				
OEM-DSC	23/Sep/20		Redside Shiner	64	3				
OEM-DSC	23/Sep/20		Mountain Whitefish	128	24				
OEM-DSC	23/Sep/20		Mountain Whitefish	346	392		900230000268834		
OEM-DSC	23/Sep/20		White Sucker	445	1184		900230000205177		
OEM-DSC	23/Sep/20		Large Scale Sucker	523	1687		900230000205402		
OEM-DSC	23/Sep/20		Longnose Sucker	456	1277		900230000204055		
OEM-DSC	23/Sep/20		Longnose Sucker	377	1447				

[1] DNA sample type = Fin Clip

Table 10. Continued (12 of 14).

Site Name	Date	Fish ID	Species	Length (mm)	Weight (g)	Condition (K)	Tag 1 Number	Tag 2 Number	Sample Number [1]
OEM-DSC	23/Sep/20		Longnose Sucker	405	862		900230000204362		
OEM-DSC	23/Sep/20		Longnose Sucker	428	1147		900228000465138		
OEM-DSC	23/Sep/20		Large Scale Sucker	415	888		900230000204843		
OEM-DSC	23/Sep/20		Longnose Sucker	449	1144		900230000204603		
OEM-DSC	23/Sep/20		Mountain Whitefish	270	194				
OEM-MS	26/Aug/20		Longnose Sucker	178	62				
OEM-MS	26/Aug/20		Mountain Whitefish	277	218		900228000635932		
OEM-MS	26/Aug/20		Mountain Whitefish	305	283		900230000209632		
OEM-MS	26/Aug/20		Mountain Whitefish	116	17				
OEM-MS	26/Aug/20		Mountain Whitefish	0	0				
OEM-MS	26/Aug/20		Sucker spp.	0	0				
OEM-MS	26/Aug/20		Sucker spp.	0	0				
OEM-MS	26/Aug/20		Mountain Whitefish	0	0				
OEM-MS	26/Aug/20		Longnose Sucker	209	111		900228000680468		
OEM-MS	26/Aug/20		Sucker spp.	0	0				
OEM-MS	26/Aug/20		Mountain Whitefish	0	0				
OEM-MS	26/Aug/20		Mountain Whitefish	351	321		900230000208828		
OEM-MS	26/Aug/20		Longnose Sucker	200	97		900228000679317		
OEM-MS	26/Aug/20		Sucker spp.	0	0				
OEM-MS	26/Aug/20		Mountain Whitefish	282	164		900228000679078		
OEM-MS	26/Aug/20		Longnose Sucker	429	1063		900230000209732		
OEM-MS	26/Aug/20		Longnose Sucker	385	778		900230000079626		
OEM-MS	26/Aug/20		Longnose Sucker	372	734		900230000209425		
OEM-MS	26/Aug/20		Longnose Sucker	335	523		900230000208899		
OEM-MS	26/Aug/20		Longnose Sucker	398	785		900230000209892		
OEM-MS	26/Aug/20		Longnose Sucker	400	745		900230000209800		
OEM-MS	26/Aug/20		Longnose Sucker	352	522		900230000209880		
OEM-MS	26/Aug/20		Large Scale Sucker	208	106		900228000681064		
OEM-MS	2/Sep/20		Redside Shiner	103	20				
OEM-MS	2/Sep/20		Mountain Whitefish	0	0				
OEM-MS	2/Sep/20		Sucker spp.	0	0				
OEM-MS	2/Sep/20		Mountain Whitefish	0	0				
OEM-MS	2/Sep/20		Mountain Whitefish	0	0				
OEM-MS	2/Sep/20		Mountain Whitefish	0	0				
OEM-MS	2/Sep/20		Mountain Whitefish	0	0				
OEM-MS	2/Sep/20		Sucker spp.	0	0				
OEM-MS	2/Sep/20		Redside Shiner	90	13				
OEM-MS	2/Sep/20		Redside Shiner	94	9				
OEM-MS	2/Sep/20		Mountain Whitefish	276	209		900228000464398		
OEM-MS	2/Sep/20		Longnose Sucker	245	164		900228000464364		
OEM-MS	2/Sep/20		Redside Shiner	120	16				
OEM-MS	2/Sep/20		Longnose Sucker	438	976		900230000209867		
OEM-MS	2/Sep/20		Bull Trout	296	240		900228000439785		
OEM-MS	2/Sep/20		Sculpin spp.	0	0				
OEM-MS	13/Sep/20		Mountain Whitefish	320	371		900230000209096		
OEM-MS	13/Sep/20		Mountain Whitefish	361	460		900230000205217		
OEM-MS	13/Sep/20		Mountain Whitefish	314	321		900230000205242		
OEM-MS	13/Sep/20		Mountain Whitefish	317	331		900230000205662		
OEM-MS	13/Sep/20		Mountain Whitefish	383	576		900230000205716		
OEM-MS	13/Sep/20		Longnose Sucker	376	679		900230000205173		
OEM-MS	13/Sep/20		Longnose Sucker	405	719		981098104934887		
OEM-MS	13/Sep/20		Walleye	277	548		900230000205203		
OEM-MS	13/Sep/20		Mountain Whitefish	338	349		900026000055400		
OEM-MS	13/Sep/20		Redside Shiner	97	10				
OEM-MS	13/Sep/20		Northern Pikeminnow	192	77				
OEM-MS	13/Sep/20		Bull Trout	340	397		900230000205338		
OEM-MS	13/Sep/20		Mountain Whitefish	233	140		900228000464397		
OEM-MS	13/Sep/20		Sucker spp.	0	0				
OEM-MS	13/Sep/20		Mountain Whitefish	0	0				
OEM-MS	13/Sep/20		Bull Trout	0	0				
OEM-MS	13/Sep/20		Mountain Whitefish	0	0				
OEM-MS	13/Sep/20		Mountain Whitefish	0	0				

[1] DNA sample type = Fin Clip

Table 10. Continued (13 of 14).

Site Name	Date	Fish ID	Species	Length (mm)	Weight (g)	Condition (K)	Tag 1 Number	Tag 2 Number	Sample Number [1]
OEM-MS	13/Sep/20		Longnose Dace	0	0				
OEM-MS	13/Sep/20		Bull Trout	295	237		900228000439785		
OEM-MS	13/Sep/20		Bull Trout	215	101		900228000464511		
OEM-MS	13/Sep/20		Slimy Sculpin	79	6				
OEM-MS	13/Sep/20		Rainbow Trout	145	33		900226001617764		
OEM-MS	13/Sep/20		Mountain Whitefish	276	183		900228000464477		
OEM-MS	13/Sep/20		Burbot	0	0				
OEM-MS	13/Sep/20		Mountain Whitefish	352	318		965000000067105		
OEM-MS	13/Sep/20		Mountain Whitefish	328	352		900230000076733		
OEM-MS	13/Sep/20		Mountain Whitefish	333	348		900228000587852		
OEM-MS	13/Sep/20		Large Scale Sucker	342	499		900230000205074		
OEM-MS	13/Sep/20		Longnose Sucker	387	757		981098104935988		
OEM-MS	13/Sep/20		Mountain Whitefish	280	227		900228000464164		
OEM-MS	13/Sep/20		Mountain Whitefish	363	549		900230000205367		
OEM-MS	13/Sep/20		Longnose Sucker	376	788		900230000205420		
OEM-MS	13/Sep/20		Mountain Whitefish	337	404		900230000205885		
OEM-MS	13/Sep/20		Longnose Sucker	415	806		900230000205468		
OEM-MS	23/Sep/20		Mountain Whitefish	0	0				
OEM-MS	23/Sep/20		Mountain Whitefish	270	234		900228000465619		
OEM-MS	23/Sep/20		Longnose Sucker	393	737		900230000204929		
OEM-MS	23/Sep/20		Longnose Sucker	445	1089		900230000204436		
OEM-MS	23/Sep/20		Longnose Sucker	364	592		900230000205034		
OEM-MS	23/Sep/20		Bull Trout	265	160		900228000465318		
OEM-MS	23/Sep/20		Mountain Whitefish	0	0				
OEM-MS	23/Sep/20		Mountain Whitefish	324	338		900230000204272		
OEM-MS	23/Sep/20		Sucker spp.	0	0				
OEM-MS	23/Sep/20		Mountain Whitefish	309	333		900230000204519		
OEM-MS	23/Sep/20		Walleye	406	697		900230000205145		
OEM-MS	23/Sep/20		Mountain Whitefish	379	510		900230000205607		
OEM-MS	23/Sep/20		Mountain Whitefish	353	469		900230000204620		
OEM-MS	23/Sep/20		Mountain Whitefish	369	560		900230000204462		
OEM-MS	23/Sep/20		Mountain Whitefish	296	260		900228000465426		
OEM-MS	23/Sep/20		Mountain Whitefish	320	313		900230000057018		
OEM-MS	23/Sep/20		Mountain Whitefish	379	394		900230000077363		
OEM-MS	23/Sep/20		Mountain Whitefish	282	211		900228000681207		
OEM-MS	23/Sep/20		Mountain Whitefish	300	260		900230000204889		
OEM-MS	23/Sep/20		Mountain Whitefish	275	224		900228000635597		
OEM-MS	23/Sep/20		Mountain Whitefish	345	313		900230000076412		
OEM-MS	23/Sep/20		Mountain Whitefish	266	221		900228000635852		
OEM-USC	26/Aug/20		Large Scale Sucker	560	2223		900230000209443		
OEM-USC	26/Aug/20		Sucker spp.	0	0				
OEM-USC	26/Aug/20		Mountain Whitefish	0	0				
OEM-USC	26/Aug/20		Redside Shiner	102	15				
OEM-USC	26/Aug/20		Slimy Sculpin	67	0				
OEM-USC	26/Aug/20		Mountain Whitefish	123	17				
OEM-USC	26/Aug/20		Mountain Whitefish	311	312		900026000147525		
OEM-USC	2/Sep/20		Mountain Whitefish	328	322		900228000587795		
OEM-USC	2/Sep/20		Sucker spp.	0	0				
OEM-USC	2/Sep/20		Sucker spp.	0	0				
OEM-USC	2/Sep/20		Sculpin spp.	0	0				
OEM-USC	2/Sep/20		Mountain Whitefish	0	0				
OEM-USC	2/Sep/20		Redside Shiner	0	0				
OEM-USC	2/Sep/20		Longnose Sucker	401	811		900230000209793		
OEM-USC	2/Sep/20		Redside Shiner	107	22				
OEM-USC	2/Sep/20		Large Scale Sucker	546	2004		900230000207431		
OEM-USC	2/Sep/20		Large Scale Sucker	483	1485		900230000209935		
OEM-USC	2/Sep/20		Mountain Whitefish	367	483		900230000211165		
OEM-USC	2/Sep/20		Mountain Whitefish	0	0				
OEM-USC	13/Sep/20		Mountain Whitefish	286	271		900228000464121		
OEM-USC	13/Sep/20		Bull Trout	255	162		900228000464434		
OEM-USC	13/Sep/20		Bull Trout	264	188		900228000464367		
OEM-USC	13/Sep/20		Mountain Whitefish	0	0				

[1] DNA sample type = Fin Clip

Table 10. Continued (14 of 14).

Site Name	Date	Fish ID	Species	Length (mm)	Weight (g)	Condition (K)	Tag 1 Number	Tag 2 Number	Sample Number [1]
OEM-USC	13/Sep/20		Yellow Perch	0	0				
OEM-USC	13/Sep/20		Mountain Whitefish	284	247		900228000464141		
OEM-USC	13/Sep/20		Mountain Whitefish	0	0				
OEM-USC	13/Sep/20		Bull Trout	0	0				
OEM-USC	13/Sep/20		Mountain Whitefish	0	0				
OEM-USC	13/Sep/20		Sucker spp.	0	0				
OEM-USC	13/Sep/20		Mountain Whitefish	0	0				
OEM-USC	13/Sep/20		Longnose Sucker	434	939		900230000205505		
OEM-USC	13/Sep/20		Mountain Whitefish	0	0				
OEM-USC	13/Sep/20		Mountain Whitefish	124	20				
OEM-USC	13/Sep/20		Longnose Sucker	407	846		900230000205218		
OEM-USC	13/Sep/20		Redside Shiner	45	3				
OEM-USC	13/Sep/20		Redside Shiner	56	2				
OEM-USC	13/Sep/20		Mountain Whitefish	167	50		900226001617957		
OEM-USC	13/Sep/20		Large Scale Sucker	383	812		900230000205051		
OEM-USC	13/Sep/20		Mountain Whitefish	334	372		900230000205364		
OEM-USC	13/Sep/20		Mountain Whitefish	301	327		900230000204108		
OEM-USC	13/Sep/20		Mountain Whitefish	350	386		900230000205638		
OEM-USC	13/Sep/20		Mountain Whitefish	146	32				
OEM-USC	13/Sep/20		Spottail Shiner	34	0				
OEM-USC	23/Sep/20		Mountain Whitefish	315	388		900230000205610		
OEM-USC	23/Sep/20		Sculpin spp.	0	0				
OEM-USC	23/Sep/20		Sucker spp.	0	0				
OEM-USC	23/Sep/20		Mountain Whitefish	0	0				
OEM-USC	23/Sep/20		Mountain Whitefish	0	0				
OEM-USC	23/Sep/20		Sucker spp.	0	0				
OEM-USC	23/Sep/20		Mountain Whitefish	0	0				
OEM-USC	23/Sep/20		Sucker spp.	0	0				
OEM-USC	23/Sep/20		Mountain Whitefish	0	0				
OEM-USC	23/Sep/20		Slimy Sculpin	88	8				
OEM-USC	23/Sep/20		Longnose Sucker	428	900		900230000207964		
OEM-USC	23/Sep/20		Longnose Sucker	415	801		900230000204780		
OEM-USC	23/Sep/20		Large Scale Sucker	523	1780		900230000205676		
OEM-USC	23/Sep/20		Longnose Sucker	364	546		900230000205672		
OEM-USC	23/Sep/20		Longnose Sucker	388	647		900230000204427		
OEM-USC	23/Sep/20		Longnose Sucker	382	680		900230000204218		
OEM-USC	23/Sep/20		Longnose Sucker	313	317		900230000204364		
OEM-USC	23/Sep/20		Sucker spp.	0	0				
OEM-USC	23/Sep/20		Mountain Whitefish	271	205		900228000465587		

[1] DNA sample type = Fin Clip

Appendix E. Transect Profiles.

LIST OF FIGURES

Figure 1. Water depth (solid lines) and velocity profiles (dashed lines) from August (blue) and September (red) measurement for transect profile GMB03.

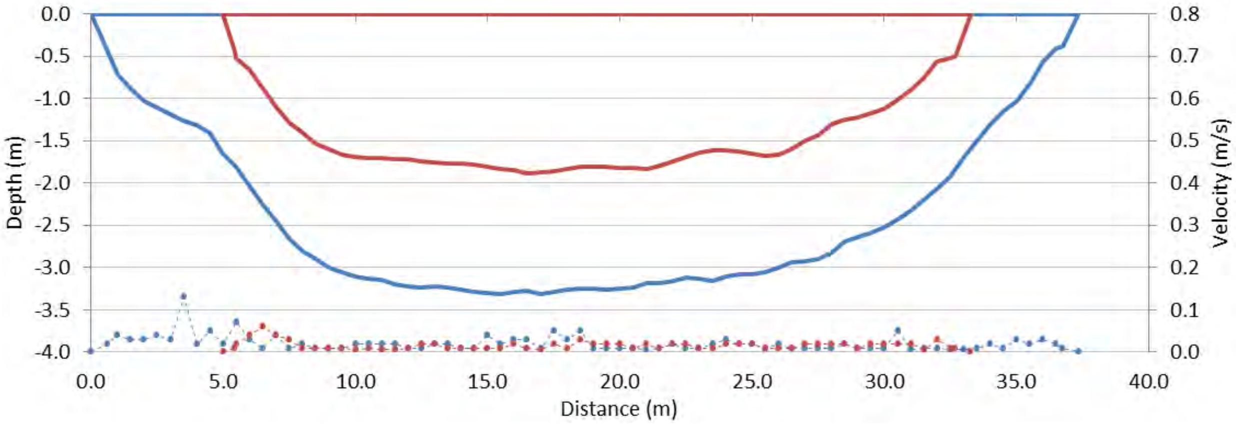

Figure 2. Water depth (solid lines) and velocity profiles (dashed lines) from August (blue) and September (red) measurement for transect profile GMB05.

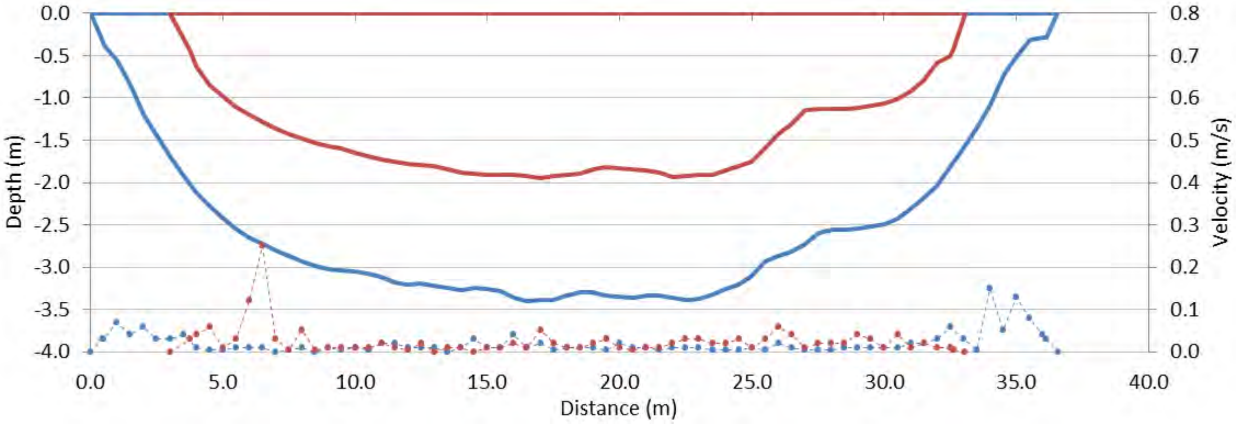

Figure 3. Water depth (solid lines) and velocity profiles (dashed lines) from August (blue) and September (red) measurement for transect profile GME01.

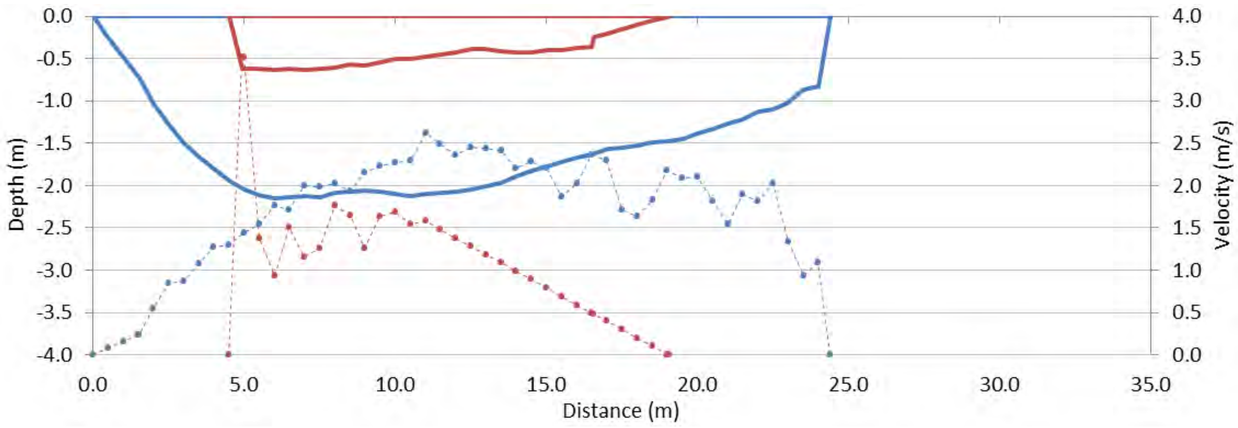

Figure 4. Water depth (solid lines) and velocity profiles (dashed lines) from August (blue) and September (red) measurement for transect profile GME03.

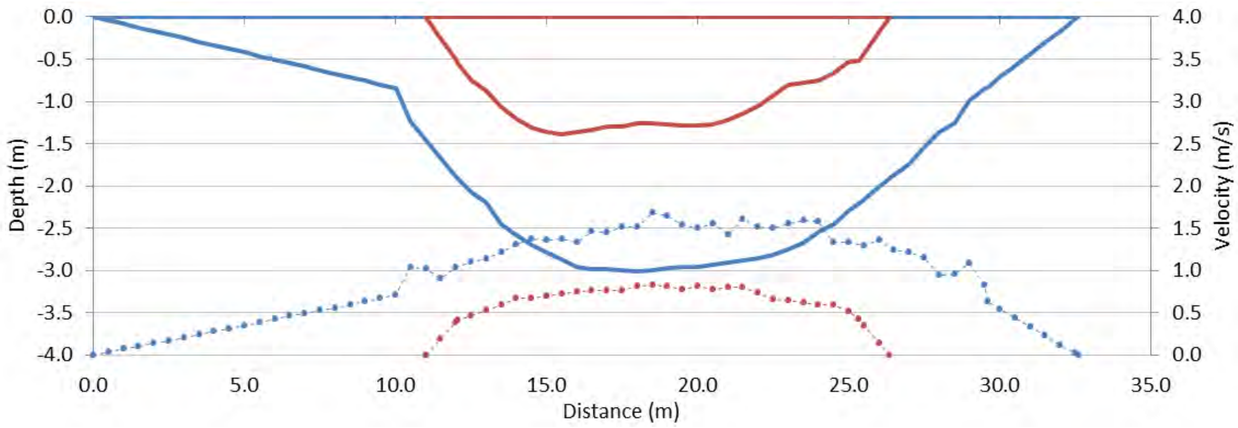

Figure 5. Water depth (solid lines) and velocity profiles (dashed lines) from August (blue) and September (red) measurement for transect profile GMP04.

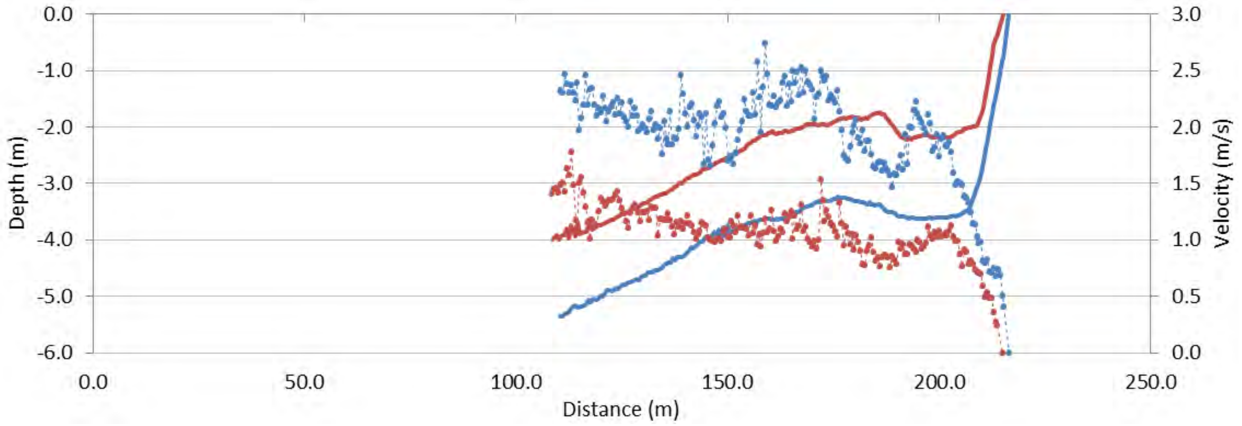

Figure 6. Water depth (solid lines) and velocity profiles (dashed lines) from August (blue) and September (red) measurement for transect profile GMS03.

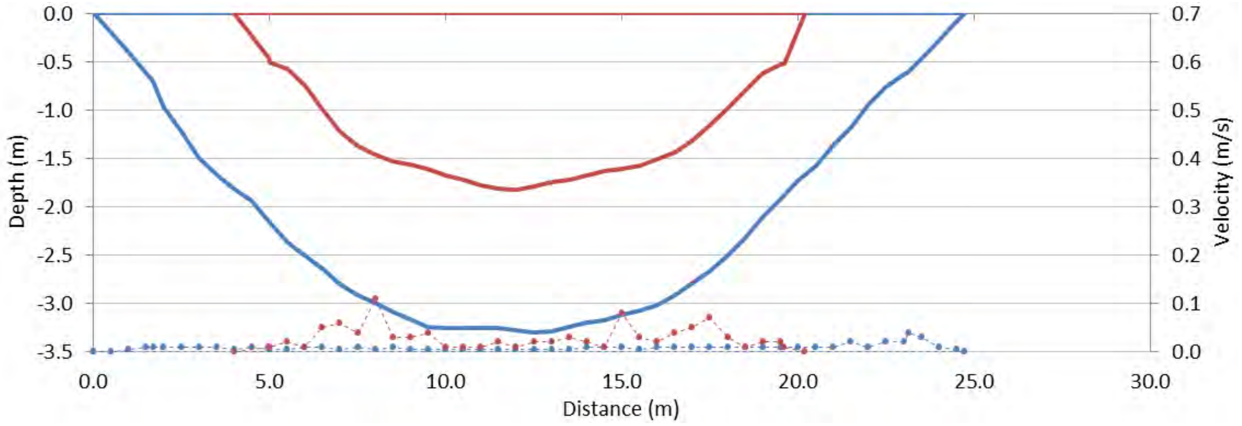

Figure 7. Water depth (solid lines) and velocity profiles (dashed lines) from August (blue) and September (red) measurement for transect profile GMS04.

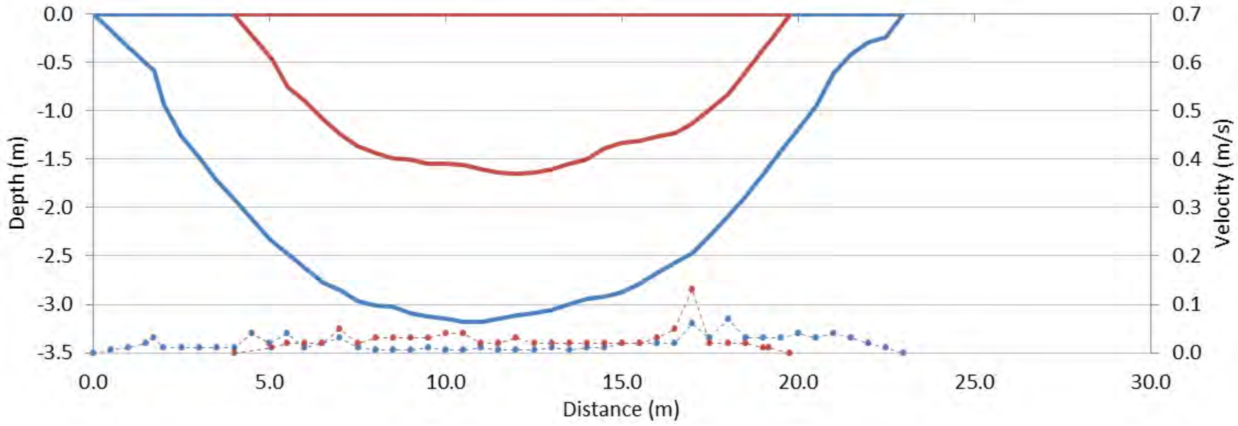

Figure 8. Water depth (solid lines) and velocity profiles (dashed lines) from August (blue) and September (red) measurement for transect profile GMW02.

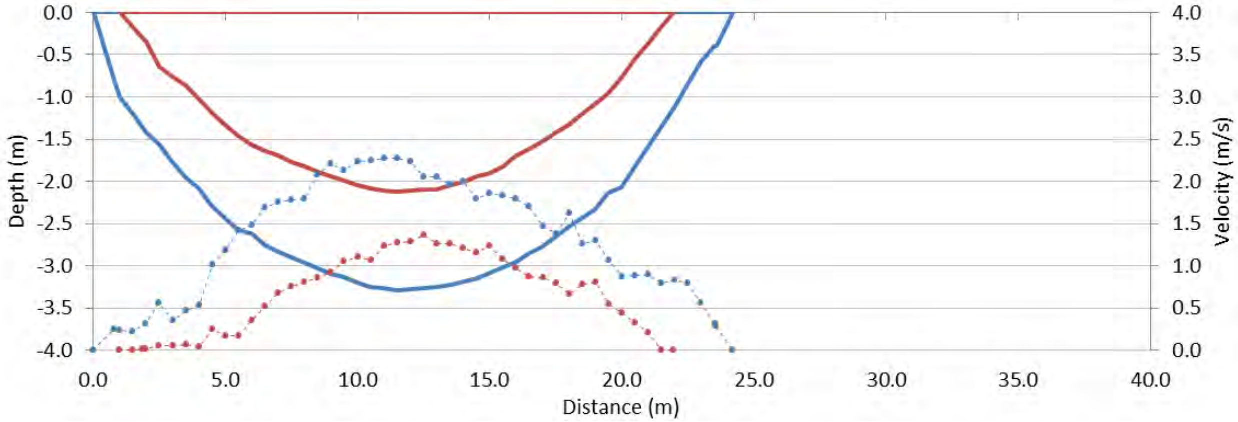

Figure 9. Water depth (solid lines) and velocity profiles (dashed lines) from August (blue) and September (red) measurement for transect profile GMW05.

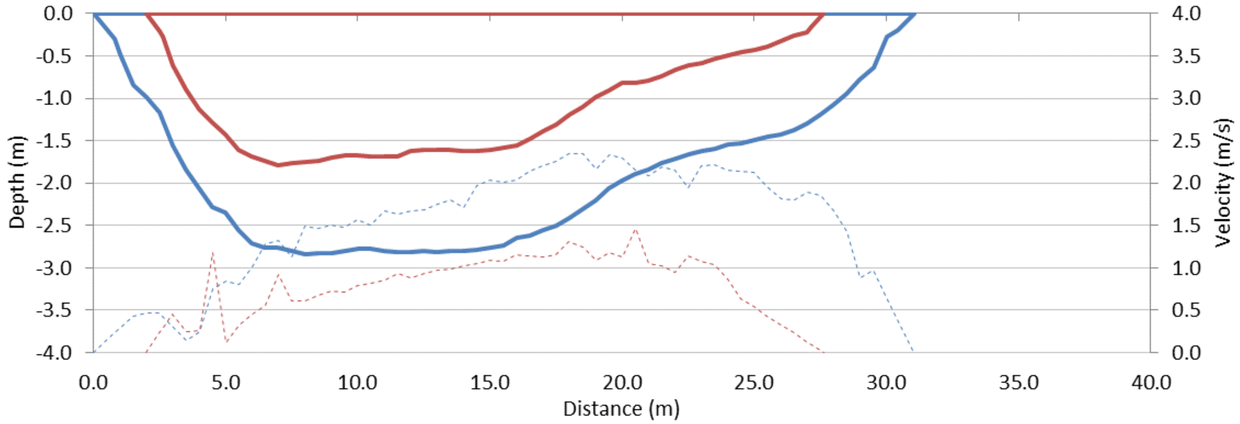

Figure 10. Water depth (solid lines) and velocity profiles (dashed lines) from August (blue) and September (red) measurement for transect profile GMW08.