Campbell River Project Water Use Plan

Upper Campbell, Lower Campbell and John Hart Reservoirs and Diversion Lakes Littoral versus Pelagic Fish Production Assessment Component 2

Implementation Year 2

Reference: JHTMON-5

Year 2 Annual Monitoring Report

Study Period: April 1, 2021 to March 31, 2022

Laich-Kwil-Tach Environmental Assessment Ltd. Partnership and Ecofish Research Ltd.

March 7, 2023

JHTMON-5: Littoral versus Pelagic Fish Production Assessment – Component 2

Year 2 Annual Monitoring Report




Prepared for:

BC Hydro Water Licence Requirements
6911 Southpoint Drive, 11th Floor
Burnaby, BC, V3N 4X8

March 7, 2023

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Title Page Photographs

Top left: Cutthroat Trout (*Oncorhynchus clarkii*) captured during gill netting on Lower Campbell Reservoir (August 31, 2021); top right: Collection jar of a Malaise net deployed at Lower Campbell Reservoir (May 19, 2021); bottom left: Malaise net, floating traps, and sticky traps deployed at Upper Quinsam Lake (May 21, 2021); bottom right: LKT technician processing benthic substrate samples at Lower Campbell Reservoir (May 26, 2021).

Published by Ecofish Research Ltd., 600 Comox Rd., Courtenay, BC, V9N 3P6

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Citation:

Suzanne, C., J. Kim, J. Abell, L. Hull, J. Braga, M. Hocking, and T. Hatfield. 2023. JHTMON 5 Littoral versus Pelagic Fish Production Assessment – Component 2. Year 2 Annual Monitoring Report. Consultant's report prepared for BC Hydro by Laich-Kwil Tach Environmental Assessment Ltd. Partnership and Ecofish Research Ltd., March 7, 2023.

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EXECUTIVE SUMMARY

Water Use Plans (WUPs) were developed for all of BC Hydro's hydroelectric facilities through a consultative process. As the Campbell River WUP process reached completion, several uncertainties remained regarding the effects of BC Hydro operations on aquatic resources. Monitoring programs were implemented to assess whether environmental benefits are being realized under the WUP operating regime, and to evaluate whether operations could be further improved.

The *Upper Campbell, Lower Campbell, John Hart Reservoirs and Diversion Lakes Littoral versus Pelagic Fish Production Assessment* (JHTMON-5) is one such Campbell River WUP monitoring program. JHTMON-5 is assessing the extent to which fish production in reservoirs and diversion lakes is driven by littoral (near shore) versus pelagic (open water) production, and how this relates to BC Hydro operations. JHTMON-5 has two components. Component 1 was completed in 2017 and involved studying food webs in 11 waterbodies (reservoirs and diversion lakes) to evaluate how littoral and pelagic food sources support fish. Component 2 commenced in 2020 and comprises fieldwork and analyses to address outstanding uncertainties that remained following Component 1, with a focus on evaluating links between riparian habitats and fish in reservoirs. This annual report describes work conducted in Year 2 (2021 fieldwork) of Component 2. The study objective, management questions, hypotheses and status are summarized in Table i.

The Campbell River WUP project area includes the Strathcona-Ladore-John Hart series of three hydropower facilities on the Campbell River system, as well as the Quinsam River Diversion that can divert a portion of the flow in the Quinsam River to Lower Campbell Reservoir. In addition to the Campbell and Quinsam rivers, the watershed includes three large reservoirs, four diversion lakes influenced by water diverted from the Quinsam River, and many tributaries and small lakes that are not affected by operations. During development of the Campbell River WUP, a Fish Technical Committee hypothesized that fish production in Upper and Lower Campbell reservoirs was negatively impacted by large fluctuations in water level that reduce littoral production. The Fish Technical Committee also hypothesized that reduced water residence time of the diversion lakes caused by BC Hydro diversion operations could negatively impact pelagic productivity by flushing plankton.

The JHTMON-5 monitoring program aims to address the following two management questions:

1. To what extent do stabilized reservoir levels, as affected by BC hydro operations, benefit fish populations?
2. What is the relationship between residence time (as affected by diversion rate) and lake productivity?

Component 1 of JHTMON-5 focused on both management questions, in addition to null hypotheses H_01 and H_02 (Table i). Notably, Component 1 showed that terrestrial (allochthonous) sources of carbon make a significant contribution to trout diets. This is contrary to the assumption made during the WUP development process when it was assumed that fish productivity was driven by carbon fixed within lakes by primary producers such as algae (autochthonous). Component 1 therefore showed that

the link between lentic fish production and primary production by aquatic plants in the Campbell River watershed is weaker than previously assumed. Based on the results of Component 1, the terms of reference for Component 2 were revised to better focus on the outstanding uncertainties. Broadly, Component 2 involves three research methods with substantial fieldwork components:

1. Quantifying how riparian inputs and benthic macroinvertebrates vary along shoreline transects;
2. Stable isotope analysis to quantify contribution of terrestrial carbon sources to fish; and
3. Fish abundance sampling across waterbodies and over time to test how drawdown affects fish production.

Additionally, water balance modelling (desk-based) will be undertaken in Year 3 to quantify how BC Hydro operations potentially affect water residence time in diversion lakes.

Fieldwork in Year 2 (2021) focussed on Management Question 1 (effect of drawdown on fish populations) and involved collecting further data to test $H_0$3 and $H_0$4 (Table i) based on recommendations made following trials in Year 1 (2020). Three waterbodies are sampled for this study: Upper Campbell Reservoir (highest magnitude of drawdown), Lower Campbell Reservoir (intermediate magnitude of drawdown), and Upper Quinsam Lake (control waterbody with the lowest magnitude of drawdown). Malaise nets and sticky traps were used to sample terrestrial (aerial) invertebrates to collect data to test $H_0$3, and floating (emergence) traps were used to collect data to test $H_0$4 (Table i) to better understand whether reservoir drawdown adversely affects fish production by increasing the distance between the shoreline and the riparian zone, which is a source of organic material and invertebrates (an important food source for resident salmonids). To further support analysis of $H_0$4, sediment organic matter content was also measured. At each waterbody, invertebrate sampling was completed in spring and late summer at three transects that were established in Year 1. Transects were aligned perpendicularly to the shoreline, thereby allowing data to be collected at varying distances from the riparian zone, and at sites that overlie benthic habitats inside and outside of the drawdown zone, i.e., at sites that periodically become dewatered and at sites that remain wetted, respectively. In addition, fish sampling was conducted in Year 2 during late summer to collect data to evaluate whether fish abundance or biomass varies in relation to drawdown magnitude, thereby testing $H_0$7 (Table i). Sampling was undertaken using overnight gill net sets at two to four sites per waterbody.

Invertebrate results so far showed no clear relationship between terrestrial invertebrate abundance/biomass and drawdown magnitude of the waterbodies (Figure 9), although there was a clear decrease in terrestrial invertebrate abundance with increasing distance from the riparian zone at all waterbodies, based on sticky trap results (Figure 11). Furthermore, there was no clear relationship between emergent invertebrate biomass and distance from riparian zone or waterbody drawdown regime (Figure 15), although species richness was higher inside the drawdown zone compared to outside the drawdown zone in each waterbody in Year 2. In addition, sediment sampling results showed no clear relationship between sediment organic matter content and distance from the riparian zone (Figure 24). However, the highest organic matter content was measured at samples collected relatively far (60 m) from the shoreline in all waterbodies, which likely reflects accumulation of organic-rich, fine-grained sediments in deeper offshore areas.

Fish sampling results to date showed no clear relationship between fish abundance/biomass and drawdown magnitude among waterbodies (Figure 23). Variability among sites within individual waterbodies was high, notably at Lower Campbell Reservoir and Upper Quinsam Lake.

Year 2 sampling activities will be repeated in Year 3 to augment the dataset that will be used for the final analysis. Final analysis to test the management hypotheses and address the management questions will be conducted following Year 3 (2022) sampling for Component 2 when data collection is complete.

Table i. Status of JHTMON-5 objective, management questions and hypotheses after completing Year 2 of Component 2.

Study Objectives	Management Questions	Management Hypotheses	Component 2 - Year 2 Status
Assess the extent to which trout production is driven by littoral versus pelagic production and evaluate how this relates to BC Hydro operations.	1. To what extent do stabilized reservoir levels, as affected by BC Hydro operations, benefit fish populations?	$H_0$1: The extent of littoral development in lakes, as governed by the magnitude and frequency of water level fluctuations, is not correlated with the ratio of littoral versus pelagic energy flows to reservoir fish populations.	This hypothesis was addressed in the first component of JHTMON-5, although this hypothesis will be re-evaluated on completion of Component 2. The text below is reproduced from Hocking *et al.* (2017) and summarizes the status at the end of Component 1. In the three reservoirs, the contribution of littoral energy sources to Cutthroat Trout diets declined with increasing drawdown. This implies an effect from water management and supports rejection of the null hypothesis $H_0$1 for Cutthroat Trout. For Rainbow Trout, the opposite trend was observed with greater contribution of littoral energy sources in Upper and Lower Campbell reservoirs compared to John Hart Reservoir. This implies that the effects of water management through drawdown will be reduced for Rainbow Trout compared to Cutthroat Trout. These conclusions are qualitative in nature due to the fact that only three reservoirs could be compared and that other reservoir factors may influence energy contributions to fish populations. When both species are present, Cutthroat Trout and Rainbow Trout occupy distinct ecological niches in the lakes and reservoirs of the Campbell River system. Cutthroat Trout are more dependent on littoral habitats while Rainbow Trout are more dependent on pelagic habitats. Cutthroat Trout strongly out-compete Rainbow Trout in the shallower lakes with limited pelagic zones (e.g., Snakehead Lake). A caveat is that terrestrial invertebrates are an important food source for both species, meaning that impacts to riparian vegetation from drawdown may adversely affect both species. Across all waterbodies, the contribution of littoral energy sources to Cutthroat Trout diets declines with increasing shallow (<6 m) littoral volume relative to total lake volume. This result is counterintuitive but likely reflects a combination of niche expansion by Cutthroat Trout in smaller lakes without Rainbow Trout and increased productivity of smaller and shallower lakes that is driven by terrestrial carbon sources and results in higher zooplankton biomass (a pelagic food source). The relative volume of shallow littoral habitat was not related to the contribution of littoral energy sources to Rainbow Trout diet. Zooplankton

			(a pelagic food source) makes a high contribution to Rainbow Trout diets, although this contribution is reduced when other pelagic species (e.g., Kokanee) are present.
		$H_0$3: Terrestrial invertebrate fall is not correlated with distance from the riparian zone.	Terrestrial invertebrate data have been collected in Year 1 (2020) and Year 2 (2021) of JHTMON-5 Component 2 using Malaise nets and sticky traps. Malaise net results show no clear relationship between terrestrial (aerial) invertebrate abundance/biomass and distance from the riparian zone. However, sticky trap results show that terrestrial invertebrate abundance decreased with increasing distance from the riparian zone at all three waterbodies. Sampling will be repeated in Year 3 and analysis will be undertaken to test this hypothesis following Year 3 sampling.
		$H_0$4: Organic material abundance and macroinvertebrate biomass in the littoral zone are not correlated with the magnitude of drawdown or distance from the riparian zone.	Emergent invertebrate data have been collected in Year 1 (2020) and Year 2 (2021) of JHTMON-5 Component 2 using floating traps. Results show no clear relationship between emergent invertebrate abundance/biomass and distance from riparian zone or waterbody drawdown magnitude. Floating trap sampling will be repeated in Year 3. Sediment organic matter content was measured in Year 2 (2021). Results show no clear relationship between sediment organic matter content and distance from the riparian zone. Analysis will be undertaken to test this hypothesis following Year 3 sampling.
		$H_0$5: Riparian sources of carbon do not make a biologically significant contribution to fish diets.	Data to address this hypothesis were collected in Year 2 of Component 2 of JHTMON-5 and this hypothesis will be tested following Year 3 sampling. Analysis to test this hypothesis will involve stable isotope analysis to seek to quantify the riparian contribution to carbon in fish tissues, based on the stable isotope signatures of riparian leaf litter and terrestrial invertebrates.
		$H_0$6: Nitrogen and carbon isotopic signatures in littoral periphyton, benthic invertebrates and fish are not correlated with the magnitude	Data to address this hypothesis were collected in Year 2 of Component 2 of JHTMON-5 and this hypothesis will be tested following Year 3 sampling. Analysis to test this hypothesis will involve stable isotope analysis to examine how isotopic signatures of littoral periphyton, invertebrate, and fish vary among waterbodies and in relation to drawdown magnitude and distance from the riparian zone.

		of drawdown or distance from the riparian zone.	
		H_07: Fish production is not correlated with drawdown magnitude.	Fish sampling was completed in Year 2 using gill nets. Results so far show no clear relationship between fish abundance or biomass and waterbody drawdown regime. Analysis will be undertaken to test this hypothesis following Year 3 sampling which will be combined with data collected in Component 1 of JHTMON-5, and data collected at Upper Campbell Reservoir as part of JHTMON-3. The latter analysis will involve evaluating whether interannual variability in reservoir drawdown affects relative fish abundance.
	2. What is the relationship between residence time (as affected by diversion rate) and lake productivity?	H_02: The extent of pelagic production in lakes, as governed by the average water residence time, is not correlated with the ratio of littoral versus pelagic energy flows to diversion lake fish populations.	This hypothesis was addressed in the first component of JHTMON-5, although this hypothesis will be re-evaluated on completion of Component 2. The text below is reproduced from Hocking *et al.* (2017) and summarizes the status at the end of Component 1. Across all waterbodies sampled, the pelagic energy flows to Cutthroat Trout increased with annual water residence time and with % shoal habitat in each waterbody. This suggests that Cutthroat Trout feed on zooplankton to a greater extent in shallow waterbodies with longer annual water residence times, which supports rejection of the null hypothesis H_02 and implies an effect of water management through diversion. The contributions of pelagic energy sources to Rainbow Trout diets were not influenced by any of the lake variables tested, including annual or seasonal water residence time, lake volume or % shoal habitat. This indicates that the null hypothesis H_02 should be retained for Rainbow Trout. An important caveat however is the reduced sample size in number of lakes where Rainbow Trout were sampled, which reduces the power to detect effects of water residence time. Lake productivity was also analyzed across all lakes and reservoirs sampled in JHTMON-5 using zooplankton biomass and Cutthroat Trout catch per-unit-effort (CPUE) and Rainbow Trout CPUE as response variables. Cutthroat Trout CPUE was positively predicted by annual water residence time and % shoal habitat, which suggests that water management through diversion may affect Cutthroat Trout abundance. For Rainbow Trout, only lake volume was an important predictor of CPUE, indicating that Rainbow Trout abundance decreases with decreasing lake size. Zooplankton biomass increased with %

			shoal habitat in each waterbody and not annual or seasonal water residence time, which may be driven by large terrestrial carbon inputs to zooplankton in smaller lakes. Scenarios of annual water residence time with water diversion were generated and simulated with the top statistical model predicting energy flows to Cutthroat Trout. Decreases in diversion post-WUP versus pre-WUP are predicted to have increased pelagic energy flows to Cutthroat Trout by a few percent. However, these pelagic energy flows may be influenced by terrestrial contributions to pelagic bacteria and ultimately incorporated into zooplankton production. The interaction between water residence time, trophic state and terrestrial contributions to pelagic productivity remains an uncertainty.
		$H_0$8: Changes to water residence time of lakes in the Quinsam River watershed do not have a biologically significant effect on trout production.	This hypothesis will be addressed in Year 3 by developing lake-specific assessments of the potential effect of changing water residence time on fish production. Assessments will be developed for the four lakes that are potentially affected by the Quinsam River Diversion. This task will involve developing relationships between BC Hydro's operations and water residence time, which will be evaluated in the context of other results and wider literature.

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1. INTRODUCTION

Water use planning exemplifies sustainable work in practice at BC Hydro. The goal is to provide a balance between the competing uses of water that include fish and wildlife, recreation, and power generation. Water Use Plans (WUPs) were developed for all of BC Hydro's hydroelectric facilities through a consultative process involving local stakeholders, government agencies and First Nations. WUPs are reviewed periodically and there may be monitoring to address outstanding management questions in the years following the implementation of a WUP.

As the Campbell River WUP (BC Hydro 2012) process reached completion, several uncertainties remained about the effects of BC Hydro operations on aquatic resources. A key question throughout the WUP process was "what limits fish abundance?" For example, are fish abundance and biomass in lakes limited by littoral (near shore) or pelagic (open water) sources of production? Answering this question is important to better understand how human activities in a watershed affect fisheries, and to effectively manage water uses to protect and enhance aquatic resources. To address this uncertainty, monitoring programs were designed to assess whether fish benefits are being realized under the WUP operating regime, and to evaluate whether fish production could be improved by modifying operations in the future.

In lakes and reservoirs, fish production is assumed to be proportional to the overall productivity of lower trophic levels such as invertebrates, but there is considerable uncertainty about the extent to which fish production is driven by littoral or pelagic production, and whether this is influenced by operations. BC Hydro affects reservoir littoral production through drawdown, and pelagic production through altering water residence time by manipulating inflows and outflows. The *Upper Campbell, Lower Campbell, John Hart Reservoirs and Diversion Lakes Littoral versus Pelagic Fish Production Assessment* (JHTMON-5) is one of several monitoring programs related to the Campbell River WUP. JHTMON-5 is designed to assess the extent to which fish production is driven by littoral versus pelagic production and evaluate how these drivers are influenced by BC Hydro operations. JHTMON-5 has two components. Component 1 has been completed (Hocking *et al.* 2017) and involved studying food webs in 11 waterbodies (reservoirs and diversion lakes) to evaluate how littoral and pelagic food sources support fish. Component 2 commenced in 2020 and comprises fieldwork and analysis to address outstanding uncertainties that remained following Component 1, with a focus on evaluating links between riparian habitats and fish in reservoirs. Further background to the study objectives is provided in Section 2.2.

This report presents outcomes from Year 2 of JHTMON-5 Component 2. This study builds on Component 1 of JHTMON-5, which yielded important results that led to revisions to the terms of reference (TOR) for Component 2 (BC Hydro 2019). Further background to the scope and objectives of JHTMON-5 Component 2 is provided in Section 2 below.

2. BACKGROUND

1.1. BC Hydro Infrastructure, Operations, and the Monitoring Context

2.1.1 Infrastructure

The Campbell River WUP project area includes the Strathcona-Ladore-John Hart series of three hydropower facilities on the Campbell River system, as well as the Quinsam River Diversion that can divert a portion of the flow in the Quinsam River to Lower Campbell Reservoir (Map 1). In addition to the Campbell and Quinsam rivers, the watershed includes three large reservoirs, four diversion lakes influenced by water diverted from the Quinsam River, and many tributaries and small lakes that are not directly affected by operations (Map 1). Further details of BC Hydro's Campbell River infrastructure and operations are provided in the Campbell River System WUP (BC Hydro 2012).

2.1.2 Reservoirs

Strathcona, Ladore and John Hart dams regulate reservoir water levels for Upper Campbell, Lower Campbell, and John Hart reservoirs respectively (Map 1). The operating water level range is greatest for Upper Campbell Reservoir (connected to Buttle Lake) and lowest for John Hart Reservoir. Specifically, the historical ranges in daily average water surface elevation are 11.0 m in Upper Campbell Reservoir, 4.3 m in Lower Campbell reservoir, and 0.6 m for John Hart Reservoir (BC Hydro 2012). During development of the Campbell River WUP, the Fish Technical Committee hypothesized that fish production in Upper and Lower Campbell reservoirs was negatively impacted by fluctuations in water level that reduced littoral production, e.g., by causing desiccation of rooted macrophyte communities that grow near the shoreline and support invertebrate communities. Stable reservoir levels were assumed to have a positive influence on fish production relative to fluctuating levels. Evaluation of reservoir operations during the WUP relied extensively on the Effective Littoral Zone (ELZ) Performance Measure (PM), with the assumption that increasing development of littoral plant communities would lead to increases in fish productivity. This PM assumes a strong link between littoral and fish production. JHTMON-5 is designed to test the assumption that improvements in littoral production lead to corresponding increases in fish production. This information will then be used to evaluate the influence of the Campbell River WUP on reservoir fish production, help refine reservoir-related PMs, and assess their relative importance for future WUP review processes. The understanding gained through the present monitoring program may also help guide the development of alternative management strategies for reservoir operations.

2.1.3 Diversion Lakes

The Quinsam Diversion diverts water through two lakes and into Lower Campbell Reservoir (Map 1). Among the diversion-affected lakes, there are two lakes that receive additional water diverted from the Upper Quinsam Lake watershed and thus have lower water residence time (Gooseneck and Snakehead lakes; "receiving lakes") and two lakes that have water diverted away from them and thus have increased water residence time (Middle Quinsam and Lower Quinsam lakes; "donor lakes"). During the WUP process, the Fish Technical Committee hypothesized that reductions to water residence time due to BC Hydro diversion operations could negatively impact pelagic productivity due to flushing pelagic organisms (plankton) from the system. This decline in pelagic productivity was hypothesized to potentially reduce fish production in these lakes. However, the hypothesis could not be tested during the WUP due to time and resource constraints. The Fish Technical Committee therefore assumed for decision-making purposes that there was limited impact, but recommended that this hypothesis be tested with a monitoring program.

Project Overview

Legend

Dam

Stream

MAP SHOULD NOT BE USED FOR LEGAL OR NAVIGATIONAL PURPOSES

0 1 2 3 4 5 6 7 km

Scale: 1:180,000

NO.	DATE	REVISION	BY
1	2022-02-28	1230_JHTMON5_ProjectOverview_4847_20220228	CGA
2			
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Date Saved: 2022-02-28
Coordinate System: NAD 1983 UTM Zone 10N

ECOFISH RESEARCH

Map 1

Path: M:\Projects-Active\1230_JHTMON\MXD\Overview\1230_JHTMON5_ProjectOverview_4847_20220228.mxd

2.2 Scope of JHTMON-5

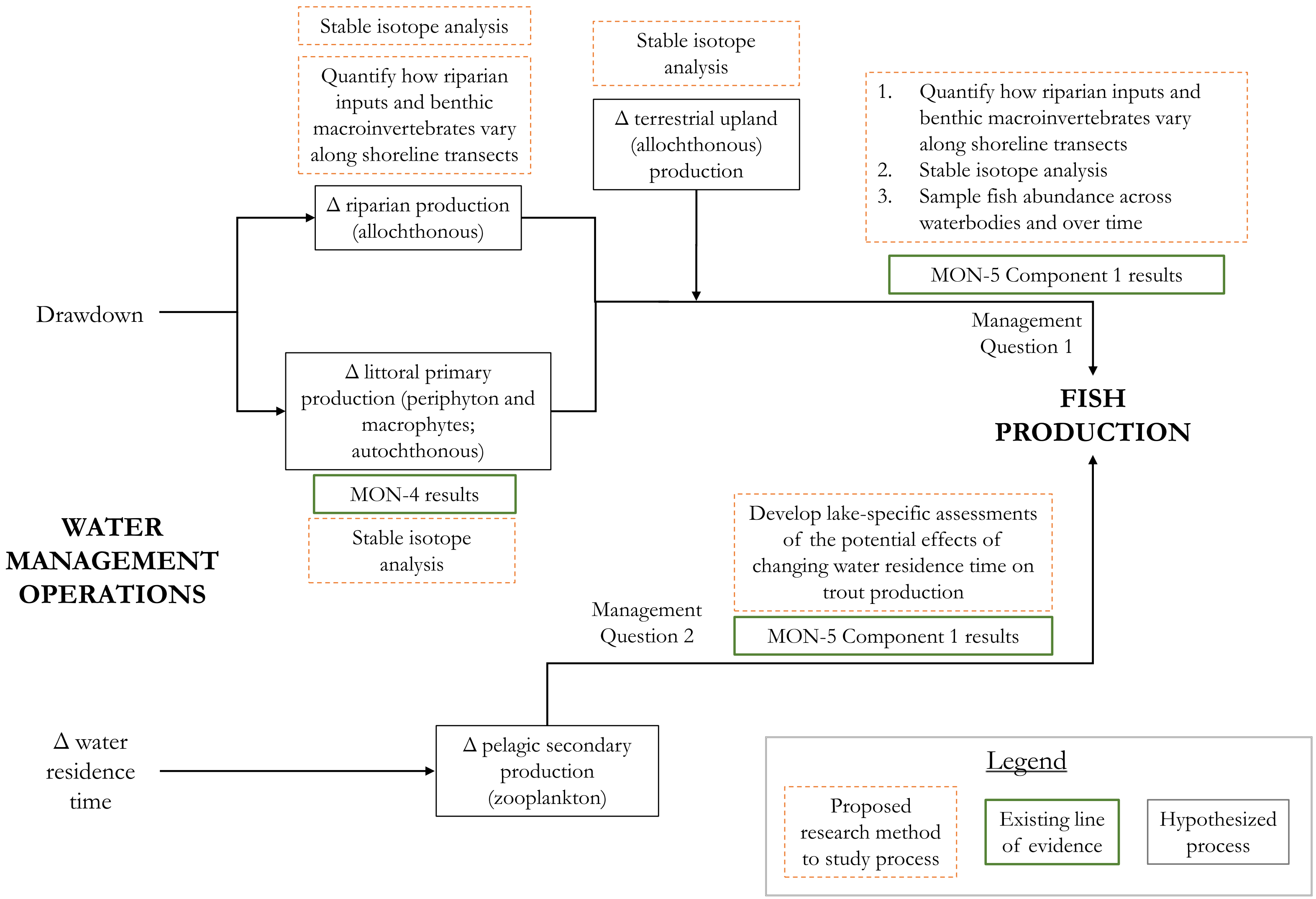
2.2.1 Overview

JHTMON-5 is scheduled for 10 years and has two components. Component 1 included stable isotope analysis (SIA) of food webs in reservoirs and diversion lakes and has been completed (Hocking *et al.* 2017). Component 2 commenced in 2020 and is scheduled to be completed after three years of fieldwork (2020, 2021, 2022). The results from these two components will be evaluated to address the two management questions listed in Section 2.2.2 that relate to the potential effects of reservoir drawdown (Management Question 1) and water residence time (Management Question 2) on fish production.

Component 2 will address outstanding uncertainties with the two JHTMON-5 management questions that remained following Component 1 (Section 2.2.3). Component 1 made important contributions to addressing both management questions. Following Component 1, the JHTMON-5 TOR (BC Hydro 2019) was revised substantially by changing the scope of Component 2 to ensure it focuses on the outstanding uncertainties.

This annual report describes work conducted in Year 2 (April 2021 to March 2022) of Component 2, which comprised invertebrate sampling, fish sampling, sediment sampling, and collecting samples for SIA. Results of all sampling and analysis are presented in this report, although conclusions have not been drawn here as data collection is ongoing. Results from Year 2 will ultimately be used to test hypotheses that relate to both management questions, following Year 3 (2022) data collection (Figure 1).

Figure 1. Effect pathway diagram to show the linkages between water management operations and fish production that are relevant to JHTMON-5. The diagram shows the study methods and existing information that will be used to address the management questions.



2.2.2 Management Questions and Hypotheses

The JHTMON-5 monitoring program (Component 1 and Component 2) will address the following two management questions:

1. To what extent do stabilized reservoir levels, as affected by BC Hydro operations, benefit fish populations?
2. What is the relationship between residence time (as affected by diversion rate) and lake productivity?

In addressing the questions, the monitoring program is designed to test the following null hypotheses ($H_0$1 and $H_0$2 were tested in Component 1; Hocking *et al.* 2017):

$H_0$1: The extent of littoral development in lakes, as governed by the magnitude and frequency of water level fluctuations, is not correlated with the ratio of littoral versus pelagic energy flows to reservoir fish populations;

$H_0$2: The extent of pelagic production in lakes, as governed by the average water residence time, is not correlated with the ratio of littoral versus pelagic energy flows to diversion lake fish populations;

$H_0$3: Terrestrial invertebrate fall is not correlated with distance from the riparian zone;

$H_0$4: Organic material abundance and macroinvertebrate biomass in the littoral zone are not correlated with the magnitude of drawdown or distance from the riparian zone;

$H_0$5: Riparian sources of carbon do not make a biologically significant contribution to fish diets;

$H_0$6: Nitrogen and carbon isotopic signatures in littoral periphyton, benthic invertebrates and fish are not correlated with the magnitude of drawdown or distance from the riparian zone;$H_0$7: Fish production is not correlated with drawdown magnitude; and

$H_0$8: Changes to water residence time of lakes in the Quinsam River watershed do not have a biologically significant effect on trout production.

2.2.3 Uncertainties Remaining After JHTMON-5 Component 1

Component 1 of JHTMON-5 focused on Management Questions 1 and 2, in addition to null hypotheses $H_0$1 and $H_0$2 (Section 2.2.2). Notably, Component 1 showed that terrestrial (allochthonous) sources of carbon make a significant contribution to trout diets. This is contrary to the assumption made during the WUP development process, when it was assumed that fish productivity was driven by carbon fixed within lentic waterbodies by primary producers such as algae (autochthonous). Component 1 therefore shifted understanding of the food webs of the lakes and reservoirs in the Campbell River watershed, showing that the link between fish production and primary production by aquatic plants was weaker than previously assumed. These results led to revising the JHTMON-5 TOR to better focus on the outstanding uncertainties (BC Hydro 2019).

Key uncertainties that remained after Component 1 are listed below (Abell *et al.* 2018). Addressing these uncertainties will allow better understanding of how reservoir management affects fish production, thereby answering the management questions.

1. What are the main forms and sources of terrestrial (allochthonous) organic carbon that subsidize food webs in the study waterbodies?
2. What are the relative contributions to the study lakes of carbon fixed by aquatic plants (autochthonous) and carbon that originates from terrestrial sources?
3. How is carbon from terrestrial and aquatic sources processed in the study lakes to ultimately support fish production?
4. How do carbon forms, sources, fluxes and pathways vary among waterbodies? How do environmental factors and management operations affect this variation?

2.2.4 JHTMON-5 Component 2 Research Methods

To address outstanding uncertainties with the two JHTMON-5 management questions, Component 2 uses several research methods, in addition to lines of evidence based on the results of Component 1 and other WUP monitoring studies (Figure 1).

Uncertainties regarding Management Question 1 will be addressed by collecting data at Upper Campbell Reservoir, Lower Campbell Reservoir, and Upper Quinsam Lake (a control lake) using the following three research methods identified in the TOR (BC Hydro 2019).

1. Quantify how riparian inputs and benthic macroinvertebrates vary along shoreline transects;
2. Conduct SIA to quantify contribution of terrestrial carbon sources to fish; and
3. Sample fish abundance across waterbodies and over time to test how drawdown affects fish production.

Year 2 JHTMON-5 Component 2 focussed on the first and third research methods listed above associated with Management Question 1. Uncertainties regarding Management Question 2 will be addressed by developing lake-specific assessments of the potential effect of changing water residence time on fish production. As required by the TOR (BC Hydro 2019), these assessments will focus on the four diversion lakes that are subject to water residence changes due to operation of the Quinsam River Diversion, namely Gooseneck Lake, Beavertail Lake, Middle Quinsam Lake, and Lower Quinsam Lake.

2.2.5 Experimental Design

Drawdown causes the wetted edge of a reservoir to retreat from the zone of established riparian vegetation, e.g., shrubs and trees. It is hypothesized that this physical gap reduces inputs of terrestrial invertebrates to the littoral zone, which are an important component of the diets of Cutthroat Trout (*Oncorhynchus clarkii*), Rainbow Trout (*Oncorhynchus mykiss*) and Dolly Varden (*Salvelinus malma*) (McPhail 2007). Furthermore, drawdown may reduce littoral primary production, as well as the inputs and rate of processing of organic material (leaf litter and woody debris) in the littoral zone, thereby reducing production of macroinvertebrates that consume this material and contribute to fish production. To examine these hypothesized effects of drawdown, Component 2 includes measuring how aquatic macroinvertebrate biomass varies along transects placed perpendicular to the shoreline, with samples collected at varying distances from the riparian zone, as well as from locations within and outside the drawdown zone, i.e., at sites located in habitats that may become dewatered near-annually (within the drawdown zone), and at sites that stay wetted (outside the drawdown zone). Component 2 also includes fish sampling in the three study waterbodies.

The three waterbodies studied in Component 1 were selected to provide a contrast in drawdown magnitude (Table 1): Upper Campbell Reservoir (largest drawdown), Lower Campbell Reservoir (moderate drawdown), and one control lake (Upper Quinsam Lake). Upper Quinsam Lake was selected as a control lake because this waterbody is the most similar to the two reservoirs (i.e., large and unproductive), with an annual water residence time calculated by Hocking *et al.* (2017) of ~200 days, which is intermediate between the water residence time calculated for Upper Campbell Reservoir (~1 year) and Lower Campbell Reservoir (~1 month). It is recognized that water levels at Upper Quinsam Lake are managed via the Quinsam Storage Dam that impounds Wokas Lake, which is connected to Upper Quinsam Lake via a narrow channel; i.e., it is not a true control lake as water levels are managed. However, the annual water level range at Upper Quinsam Lake is smaller than in the reservoirs (Table 1) and the magnitude of water level fluctuations is expected to be similar to that of unregulated lakes in the region. For each waterbody, the elevation of the edge of the drawdown was estimated by reviewing water level records to identify the demarcation between benthic habitats that have not been exposed for several years, and those that are typically exposed on an annual or near-annual basis (Table 1).

In Year 1, fieldwork focused on collecting data and trialling of methods to test null hypotheses H_03 and H_04 (Section 2.2.2). H_03 (*terrestrial invertebrate fall is not correlated with distance from the riparian zone*) is illustrated conceptually in Figure 2; the hypothetical outcomes are conceptually similar for retaining or rejecting H_04 (*organic material abundance and macroinvertebrate biomass in the littoral zone are not correlated with the magnitude of drawdown or distance from the riparian zone*). In Year 2, fieldwork involved collecting further data to test H_03 and H_04 based on recommendations made following trials in Year 1 (Suzanne *et al.* 2021).

Floating traps were used in Year 1 (2020) and Year 2 (2021) to sample emergent invertebrates, i.e., aquatic insects that migrate vertically from the lakebed to the water surface as larvae. Floating traps were deployed along a transect that included sites within and outside the drawdown zone, with the assumption that the traps provide a representative sample of invertebrates that live in benthic substrate directly underneath the traps. The effort assigned to deploying floating traps in Year 2 was increased following completion of trials in Year 1, which showed that floating traps were a successful method to sample emergent invertebrates.

Aerial[1] (flying) invertebrate data were collected in Year 1 (2020) and Year 2 (2021) using sticky traps deployed at varying distances from the riparian zone at each waterbody. Year 1 trials demonstrated that sticky traps are an efficient way to collect quantitative data regarding terrestrial invertebrate abundance at multiple locations along a transect. Additionally, terrestrial invertebrate data were collected in Year 2 using Malaise nets deployed at each waterbody. Year 1 trials demonstrated that Malaise nets can complement the use of sticky traps because, unlike sticky traps, Malaise nets can be used to collect undamaged individuals that can be processed to determine taxonomic composition, biomass, and stable isotope content. Key invertebrate taxa identified in the three waterbodies, including typical life histories are summarized in Table 2. In Year 2, Malaise net samples were analyzed following sampling in spring when reservoir water levels were particularly low (Figure 3), which maximized the distance between the riparian zone and the shoreline (where Malaise traps were set). To further support analysis of $H_0$4, sediment organic matter was also measured in Year 2.

To support $H_0$5 and $H_0$6, additional samples were collected in Year 2 to support SIA that will be conducted after Year 3. The SIA will build on analysis undertaken in Component 1 and will use mixing models to quantify the relative contribution of riparian/terrestrial food sources to fish diets. The analysis will also evaluate whether stable isotope signatures of carbon sources vary depending on the magnitude of drawdown or distance from the riparian zone, which may indicate that water level fluctuations affect the food sources available to fish.

Fish sampling was conducted in Year 2 to collect data to test $H_0$7 (*fish production is not correlated with drawdown magnitude*). Specifically, gill net sampling was undertaken at the three study waterbodies to measure fish catch-per-unit-effort (CPUE) and biomass to evaluate whether CPUE and biomass vary along a gradient of drawdown magnitude. To maximize statistical power, data will be combined with data collected during Component 1 of JHTMON-5 (Hocking *et al.* 2017), and with data collected in Upper Campbell Reservoir for the *Upper and Lower Campbell Lake Fish Spawning Success Assessment* (JHTMON-3).

[1] "Aerial" is technically precise as this is the phase that was sampled using the two methods. However, we use the term "terrestrial invertebrates" in the remainder of the report as this is the term that is used in the TOR (BC Hydro 2019) and in Component 1, although we recognize that many of the species sampled include aquatic life stages.

Table 1. Summary of water level regime in the three study waterbodies.

Waterbody	Drawdown Range in Water Use Plan (BC Hydro 2012)	Assumed Elevation of Edge of Drawdown Zone[2]	Observed Range in Water Levels[3]
Upper Campbell Reservoir	8.5 m (El. 212.0 – 220.5 masl)	213.01 masl	~10 m since 2001. Rarely drops below El. 213.0 m. Level usually declines by ~2 m between June and September.
Lower Campbell Reservoir	4.3 m (El. 174.0 – 178.3 masl)	175.16 masl	Varies by 1.5 – 2 m in a typical year. Level usually declines by <1 m between June and September.
Upper Quinsam Lake	2.3 m[1]	362.61 masl	~4.5 m since 1997 but it does not tend to vary by >2.5 m during most years. Level usually declines by ~1 m between June and September.

[1] Based on information provided by BC Hydro that is presented in Craig and Kehler (2009).

[2] Assigned by reviewing water levels records for the period prior to sampling dates. Elevations for the reservoirs correspond to minima measured in 2019, which were the lowest elevations for >6 years. Prior to sampling, the elevation for Upper Quinsam Lake was the lowest value measured since October 2014 (although the elevation was subsequently reached in September 2021).

[3] Based on Water Survey of Canada data reviewed prior to Year 1 fieldwork.

Figure 2. Conceptual diagram of H_03 (a) H_03 accepted. (b) H_03 would be rejected if terrestrial invertebrate inputs to the littoral zone are negatively correlated with shoreline distance from the high-water mark/riparian zone (other relationships that would also result in rejection of H_03 are possible).

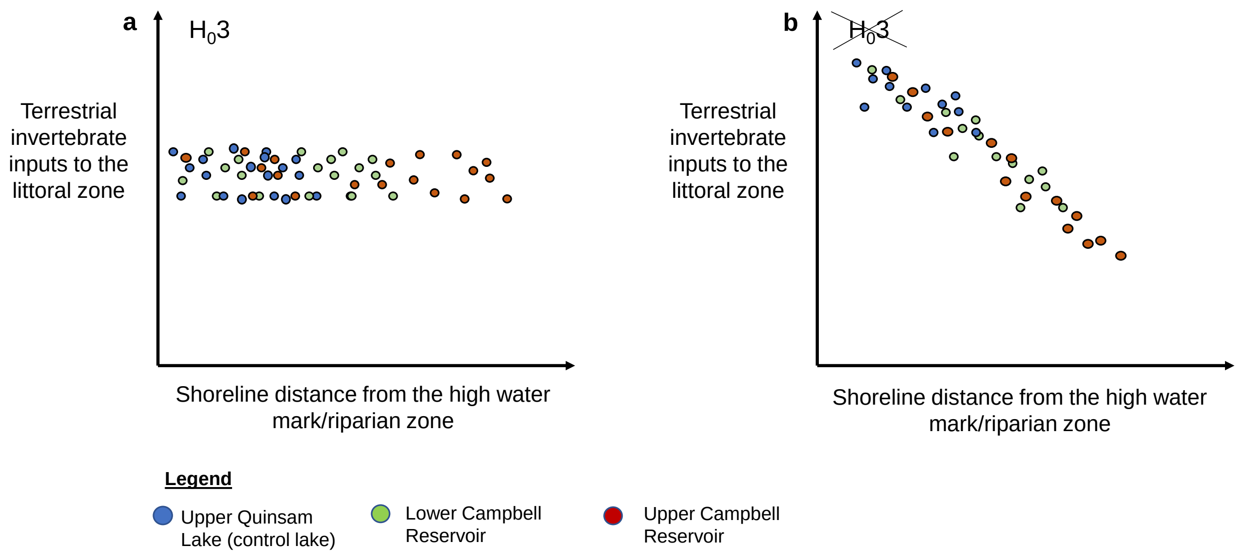
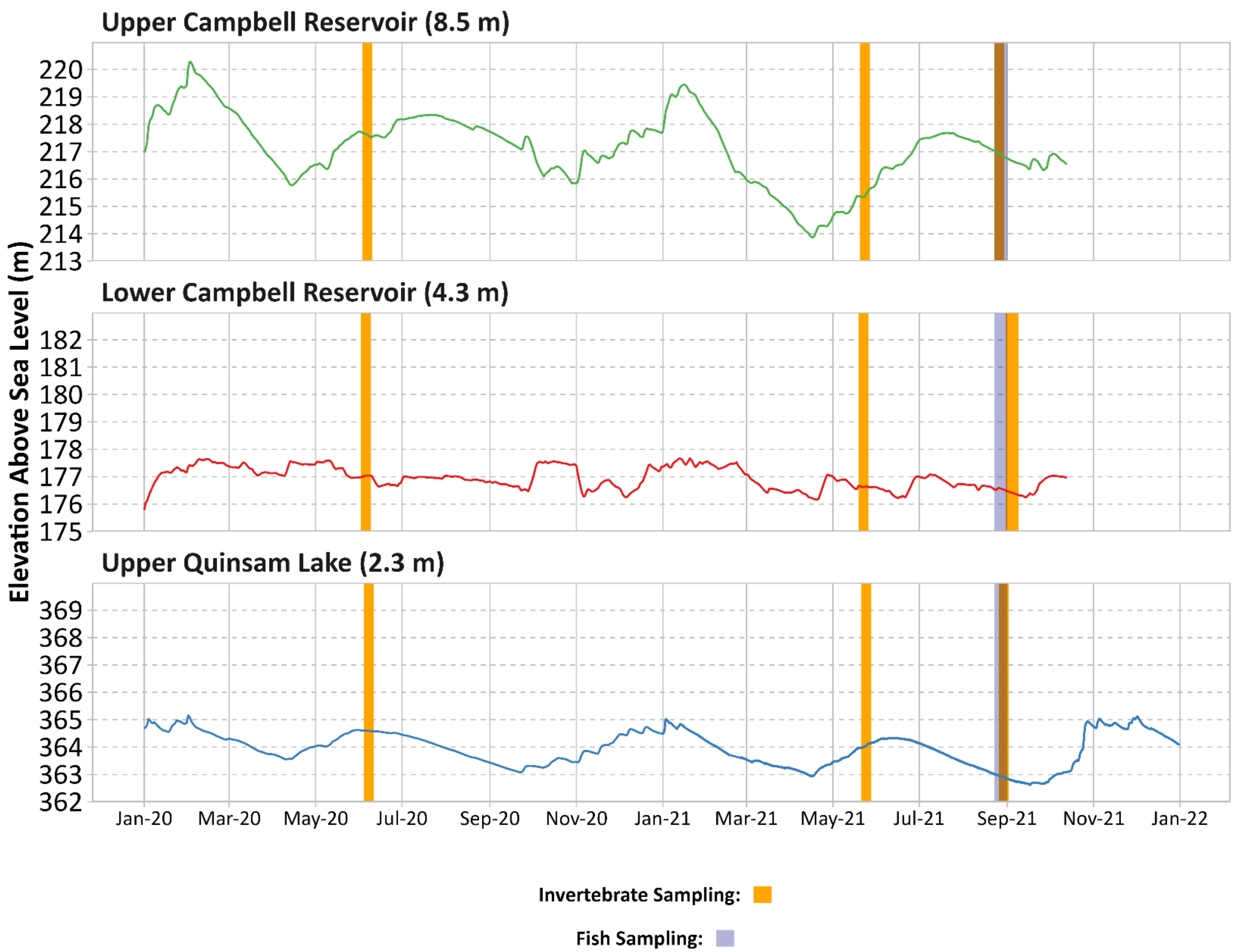


Table 2. Summary of key invertebrate taxa identified in the three water bodies, including typical life histories and habitats (Merritt and Cummins 1996).

Key Invertebrate Taxa	Typical Life Histories and Habitats
Araneae (spiders)	No larval stage; mostly found in terrestrial habitats but some have adapted to a semi-aquatic lifestyle
Coleoptera (beetles)	Aquatic larval stage; adults are aquatic, semi-aquatic or terrestrial
Diptera (true flies)	Aquatic larval stage; adults are semi-aquatic or terrestrial
Ephemeroptera (mayflies)	Aquatic larval stage; adults are semi-aquatic or terrestrial
Hemiptera (true bugs)	Aquatic larval stage; adults are aquatic, semi-aquatic or terrestrial
Hymenoptera (sawflies, wasps, bees, and ants)	Larvae and adults are mostly found in terrestrial habitats
Lepidoptera (butterflies, moths)	Larvae and adults are primarily terrestrial, but there are a few species with aquatic larvae
Neuroptera (lacewings, mantidflies, antlions)	Larvae and adults are primarily terrestrial, but there is one family that has an aquatic larval stage
Odonata (dragonflies, damselflies)	Aquatic larval stage; adults are semi-aquatic or terrestrial
Plecoptera (stoneflies)	Aquatic larval stage; adults are semi-aquatic or terrestrial
Trichoptera (caddisflies)	Aquatic larval stage; adults are semi-aquatic or terrestrial

Figure 3. Water levels in the three study waterbodies in relation to JHTMON-5 Component 2 sampling dates. Values in parentheses show historical drawdown ranges (see Table 1 for context to these values).



3. METHODS

3.1 Invertebrate Sampling

3.1.1 Terrestrial Invertebrates

Terrestrial invertebrates were sampled using Malaise nets, as used in Component 1 and Year 1 Component 2. Malaise nets were deployed on the shoreline at three transects at each waterbody during retrieval sampling dates in spring (May 2021) and late summer (August/September 2021) (Table 3). Traps were placed on the shoreline directly adjacent to the water, which meant that all traps were placed at the same location relative to the waterline but at varying distances from the riparian zone. At each transect, the distance between the trap and the riparian zone will therefore vary depending on the water levels at the time of sampling. Among waterbodies, there was expected to be a gradient in distance between the trap and the riparian zone, with distances greatest at Upper Campbell Reservoir (largest drawdown magnitude) during periods of annually low water levels. Sampling sites are shown on Map 2 to Map 4 (see 'TIV' sites). Transects were established in Year 1 (2020) following a set of general criteria outlined in Suzanne *et al.* (2021). Transects remained the same for 2021, with no new transects established in Year 2.

A Malaise net consists of a square-shaped tent (1.2 m long × 1.2 m wide × 2.1 m high) with openings at the side (Figure 4). Insects fly into the trap and climb upwards into a collecting jar. One Malaise net was deployed at each of the three transects at each waterbody for ~ 4.0 to 5.1 hours to collect a representative sample of terrestrial invertebrates that could potentially land on the waterbody and provide food for salmonids. To provide redundancy, Malaise nets were deployed on both sampling dates at each waterbody; however, as discussed in Section 3.1.3, only samples collected during the spring trip were analyzed. The approach of sampling during both trips but only processing samples from a single trip was taken to manage risk of not being able to collect a representative Malaise net sample: collecting Malaise net samples is relatively low effort but the taxonomic analysis is high effort. Furthermore, results of the Year 1 pilot study indicated that Malaise net sampling can be confounded by weather conditions, with capture rates lower during inclement weather (Suzanne *et al.* 2021). Accordingly, sampling was conducted on both trips, with a decision then made regarding which set of samples to process after considering weather conditions, water levels, and the timing of previous sampling. The duration and time of day of sampling was standardized as much as possible across the three waterbodies to directly compare results among waterbodies. The same three Malaise nets were used to capture terrestrial invertebrates at each lake. No chemical attractants or killing agents were used and samples were preserved using 95% ethanol.

Terrestrial invertebrates were also sampled using **sticky traps** at all three transects at each waterbody for a 6-day deployment period in spring and again in late summer 2021 (Table 3). Sticky traps are made of sticky card and are a simple and inexpensive way to catch flying insects (Anderson *et al.* 2013; Figure 5). Traps do not contain attractants; they passively sample invertebrates that fly onto the traps and become adhered. Sticky traps were trialled as a secondary method to sample terrestrial invertebrates during Year 1 and sampling effort was increased in Year 2 following successful use of the method in Year 1 (Suzanne *et al.* 2021). In Year 2, four to nine sticky traps were deployed at each transect, with one sticky trap consistently deployed adjacent to the riparian vegetation and one sticky trap consistently deployed over the waterbody 1.0 m from the shoreline. Both these traps were attached to bamboo canes at a standard height (1.5 m) above the ground or water. At least one further trap was then deployed approximately 10 m from the shoreline. At transects where floating traps were deployed (see Section 3.1.2), sticky traps were attached to floating traps to sample at distances further from shoreline (maximum distance = 60 m). Effort was taken to standardize the height of the traps above the water at 1.5 m, although the height was slightly lower (1.28–1.40 m) at some traps that were positioned in deeper water or attached to floating traps. At transects where floating traps were not deployed, sticky traps were only deployed in shallower areas that could be accessed by wading, or an additional floating trap was deployed solely for deploying a sticky trap in deeper areas. At each trap, the deployment time, trap height, water depth, and distance to the shoreline were recorded.

During retrieval, the abundance of terrestrial invertebrates on each sticky trap was tallied in the field. Insects were tallied based on size (length; mm) categories (bins). The following size bins were used: 0-5 mm, 5–10 mm, 10–15 mm. Invertebrate abundance was standardized by surface area of sticky trap (m^2) and by deployment duration (hours) to yield units of invertebrates/m^2/hour, also referred to as catch-per-unit-effort (CPUE).

In addition, riparian and littoral vegetation were recorded if present at each transect location. Trees, shrubs, forbs, and grasses were identified to the common species name where possible, and photos were collected along the shoreline to document relative abundance. If required, photos of plants were taken for subsequent identification in the office.

Table 3. Summary of Year 2 (2021) terrestrial invertebrate sampling sites.

Waterbody	Site ID	Deployment Date	Retrieval Date	Sampling Method	n	Distance from Riparian Zone (m)	UTM (NAD 83)		
							Zone	E (m)	N (m)
Upper Campbell Reservoir	UCR-TIV02	20-May-21	20-May-21	Malaise net	1	19.0	10U	309323	5527765
		30-Aug-21	30-Aug-21	Malaise net	1	9.2			
		20-May-21	27-May-21	Sticky traps	9	0, 6.3, 12.6, 20, 29, 39, 49, 59, 79			
		23-Aug-21	30-Aug-21	Sticky traps[1]	5	0, 9.2, 10.2, 19.2, 69.2			
	UCR-TIV03	20-May-21	20-May-21	Malaise net	1	19.6	10U	305609	5529535
		30-Aug-21	30-Aug-21	Malaise net	1	7.0			
		20-May-21	27-May-21	Sticky traps	9	0, 6.6, 13, 20.6, 29.6, 39.6, 49.6, 59.6, 79.6			
		23-Aug-21	30-Aug-21	Sticky traps[1]	4	0, 7, 8, 17			
	UCR-TIV04	20-May-21	20-May-21	Malaise net	1	23.1	10U	308567	5533702
		30-Aug-21	30-Aug-21	Malaise net	1	8.7			
		20-May-21	27-May-21	Sticky traps	9	0, 7.7, 15.4, 24.1, 34.1, 44.1, 54.1, 64.1, 84.1			
		23-Aug-21	30-Aug-21	Sticky traps[1]	4	0, 8.7, 9.7, 18.7			
Lower Campbell Reservoir	LCR-TIV03	19-May-21	19-May-21	Malaise net	1	5.4	10U	324321	5541298
		7-Sep-21	7-Sep-21	Malaise net	1	6.7			
		19-May-21	26-May-21	Sticky traps	7	0, 6.4, 15.4, 25.4, 35.4, 45.4, 65.4			
		31-Aug-21	7-Sep-21	Sticky traps[1]	5	0, 6.7, 7.7, 16.7, 66.7			
	LCR-TIV04	19-May-21	19-May-21	Malaise net	1	6.7	10U	326235	5543193
		7-Sep-21	7-Sep-21	Malaise net	1	7.3			
		19-May-21	26-May-21	Sticky traps	7	0, 7.7, 16.7, 26.7, 36.7, 46.7, 66.7			
		31-Aug-21	7-Sep-21	Sticky traps[1]	4	0, 7.27, 8.27, 17.27			
	LCR-TIV05	19-May-21	19-May-21	Malaise net	1	13.9	10U	323050	5545335
		7-Sep-21	7-Sep-21	Malaise net	1	18.7			
		19-May-21	26-May-21	Sticky traps	7	0, 14.9, 23.9, 33.9, 43.9, 53.9, 73.9			
		31-Aug-21	7-Sep-21	Sticky traps[1]	4	0, 18.65, 19.65, 28.65			
Upper Quinsam Lake	UPQ-TIV02	21-May-21	21-May-21	Malaise net	1	3.1	10U	316224	5527030
		2-Sep-21	2-Sep-21	Malaise net	1	40.4			
		21-May-21	28-May-21	Sticky traps	7	0, 4.1, 13.1, 23.1, 33.1, 43.1, 63.1			
		26-Aug-21	2-Sep-21	Sticky traps[1]	4	0, 40.4, 41.4, 50.4			
	UPQ-TIV03	21-May-21	21-May-21	Malaise net	1	5.8	10U	317031	5527684
		2-Sep-21	2-Sep-21	Malaise net	1	21.8			
		21-May-21	28-May-21	Sticky traps	7	0, 6.8, 16.8, 26.8, 36.8, 46.8, 66.8			
		26-Aug-21	2-Sep-21	Sticky traps[1]	5	0, 21.8, 22.8, 31.8, 81.8			
	UPQ-TIV04	21-May-21	21-May-21	Malaise net	1	1.7	10U	317347	5529996
		2-Sep-21	2-Sep-21	Malaise net	1	7.3			
		21-May-21	28-May-21	Sticky traps	7	0, 2.7, 11.7, 21.7, 31.7, 41.7, 61.7			
		26-Aug-21	2-Sep-21	Sticky traps[1]	4	0, 7.3, 8.3, 17.3			

[1] Due to fieldwork time constraints, sticky traps were not attached to floating traps during late summer 2021 sampling.

Figure 4. Malaise net deployed at Upper Quinsam Lake (UPQ-TIV03) on May 21, 2021.

Figure 5. Left: sticky traps deployed at Upper Quinsam Lake (UPQ-TIV04) on August 26, 2021; right: sticky trap retrieved at Lower Campbell Reservoir (LCR-TIV04) on May 26, 2021.

3.1.2 Emergent Invertebrates

Emergent invertebrates are aquatic life stages of insects such as chironomids and mayflies that migrate vertically from the lakebed to the water surface as larvae. Such insects can provide an important food source for salmonids. Emergent invertebrates were sampled at three transects in each waterbody using **floating traps**, which seal off a portion of the water surface to capture invertebrates that emerge from the underlying water. It was assumed that floating traps predominantly sample emerging invertebrates that spend part of their life cycle in the benthos immediately under or close to the trap.

Emergent invertebrates were sampled using six floating traps per transect (Figure 6) deployed for six days in spring (May) 2021 (Table 4). Floating traps comprise sampling containers attached to an inverted funnel or bucket that permit capture of emergent invertebrates that have an aerial life stage. Floating traps (Figure 6) were fabricated for this study following the design in Cadmus *et al.* (2016). Polypropylene bottles were used as sampling containers and no chemical attractants or killing agents were used in the containers. Mesh fabric attached to PVC tubes was used to create a pyramid-shaped funnel, with foam tubes ("pool noodles") used to provide added flotation. Traps were anchored to the bed using a single anchor system. Sampling sites are shown on Map 2 to Map 4 (see 'EIV' sites).

In Year 2, floating traps were deployed to achieve the following general criteria:

- Single traps were deployed at pre-determined distances perpendicular from shore along each transect;
- For the two reservoirs, traps were deployed to ensure that traps were placed within the drawdown zone and outside the drawdown zone, based on the reservoir surface elevations on the deployment date (Table 4) and the elevations shown in Table 1 that were assigned by reviewing historical water level data (WSC 2021). By "within" the drawdown zone, we mean that the traps were deployed over benthic habitats that dewater on an annual or near-annual basis, whereas traps "outside" the drawdown zone overlie benthic habitats that have not dewatered for at least multiple years;
- To the extent possible, the distances of the traps from the shoreline were standardized among waterbodies (Table 4); and
- Transects were selected with similar gradients (i.e., bed profiles) with the aim that traps were deployed over similar depths of water at each waterbody. However, when establishing sites, priority was given to standardizing the distances to the shoreline rather than depth, meaning there was variability in the water depth at sites located equivalent distances from the shore (see above).

This sampling design was intended to sample within areas inside and outside the drawdown zone at each waterbody. This design will support analysis to examine whether emergent invertebrate biomass varies along a gradient of distances from the riparian zone, as well between locations inside and outside of the drawdown zone. The sampling design used in Year 1 (2020) was revised in Year 2 (2021) to increase effort by increasing the number of distances that are sampled along the transect.

Following the 6-day deployment period, invertebrates were removed from the sampling containers and preserved in plastic invertebrate jars using 95% ethanol. A squeeze bottle containing ethanol was used to aid transfer of invertebrates to the jars. Invertebrates were enumerated in the laboratory (Section 3.1.3). Invertebrate biomass and abundance were standardized to comparable units (units/m^2/hour) based on the sampling duration and the area enclosed by each floating trap (0.33 m^2), to yield biomass-per-unit-effort (BPUE) and CPUE, respectively.

Figure 6. Left: floating trap deployed at Lower Campbell Reservoir (LCR-EIV03) on May 26, 2021; right: floating traps deployed at varying distances from shoreline, and inside and outside the drawdown zone at Upper Campbell Reservoir (UCR-EIV02) on May 20, 2021.

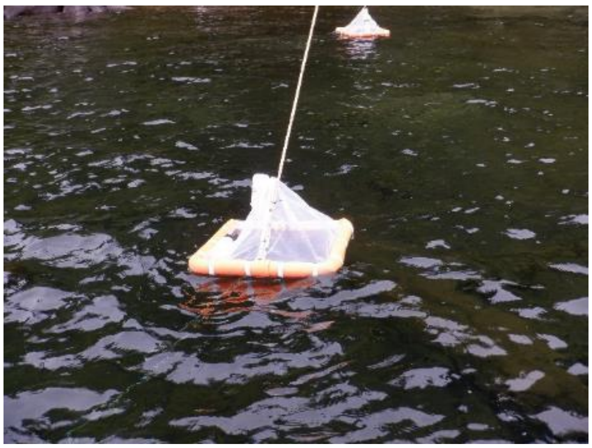



Table 4. Summary of Year 2 (2021) emergent invertebrate sampling sites.

Waterbody	Deployment Date	Retrieval Date	UTM (NAD 83; Zone 10U) E (m)	UTM (NAD 83; Zone 10U) N (m)	Water Elevation on Deployment Date (masl)[1]	Site ID	Depth (m)	Distance from Shoreline (m)	Distance from Riparian Zone (m)
Upper Campbell Reservoir	20-May-21	27-May-21	309337	5527825	215.37	UCR-EIV02	0.28	1	20.02
							1.50	10	29.02
							2.58	20	39.02
							3.32	30	49.02
							3.54	40	59.02
							6.18	60	79.02
						UCR-EIV03	0.10	1	20.57
							1.05	10	29.57
							2.85	20	39.57
							2.45	30	49.57
							2.29	40	59.57
							2.90	60	79.57
						UCR-EIV04	0.12	1	24.10
							0.53	10	34.10
							1.39	20	44.10
							2.62	30	54.10
							3.28	40	64.10
							5.53	60	84.10
Lower Campbell Reservoir	19-May-21	26-May-21	324376	5541328	176.66	LCR-EIV03	0.18	1	6.40
							0.90	10	15.40
							1.50	20	25.40
							1.95	30	35.40
							2.42	40	45.40
							3.12	60	65.40
						LCR-EIV04	0.14	1	7.70
							1.10	10	16.70
							2.38	20	26.70
							3.84	30	36.70
							5.02	40	46.70
							9.64	60	66.70
						LCR-EIV05	0.11	1	14.90
							0.35	10	23.90
							0.85	20	33.90
							1.67	30	43.90
							3.26	40	53.90
							7.24	60	73.90

[1] Data for the reservoirs were provided by BC Hydro. Value for Upper Quinsam Lake is from WSC (2021) for the "Wokas Lake Near Campbell River" station.

Table 4. Continued (2 of 2).

Waterbody	Deployment Date	Retrieval Date	UTM (NAD 83; Zone 10U) E (m)	UTM (NAD 83; Zone 10U) N (m)	Water Elevation on Deployment Date (masl)[1]	Site ID	Depth (m)	Distance from Shoreline (m)	Distance from Riparian Zone (m)
Upper Quinsam Lake	21-May-21	28-May-21	316196	5527107	363.99	UPQ-EIV02	0.14	1	4.11
							0.72	10	13.11
							0.66	20	23.11
							0.76	30	33.11
							1.15	40	43.11
							4.60	60	63.11
						UPQ-EIV03	0.18	1	6.84
							0.78	10	15.84
							1.25	20	25.84
							1.39	30	35.84
							1.62	40	45.84
							1.87	60	65.84
						UPQ-EIV04	0.23	1	2.70
							1.38	10	11.70
							3.88	20	21.70
							4.36	30	31.70
							4.84	40	41.70
							5.22	60	61.70

[1] Data for the reservoirs were provided by BC Hydro. Value for Upper Quinsam Lake is from WSC (2021) for the "Wokas Lake Near Campbell River" station.

3.1.3 Laboratory Methods

3.1.3.1 Taxonomic Identification

Invertebrate samples were identified to order, and, where possible, family. Invertebrate samples were enumerated by an Aquatic Scientist with Canadian Aquatic Biomonitoring Network (CABIN) Project Manager certification, supported by an LKT technician.

Terrestrial and emergent invertebrates collected from Malaise nets and floating traps, respectively, were counted and identified. As described in Section 3.1.1, Malaise net sampling was completed during both trips, with a decision then made regarding which set of samples to analyze. The Malaise net samples collected in spring (May) 2021 were processed because weather conditions were suitable, this timing is consistent with Year 1, and water levels in Upper Campbell Reservoir were (unusually) lower in spring than late summer, meaning there was a large contrast in sampling distance from the riparian zone among the three waterbodies (note that Malaise nets were consistently deployed on the shoreline). Late summer 2021 Malaise net samples have been stored and can be processed during a future year if required. As described in Section 3.1.1 above, the number of invertebrates collected on all sticky traps was recorded in the field.

Abundances of terrestrial and emergent invertebrates were standardized by dividing invertebrate sample abundance by either area sampled (m^2) and/or deployment duration (hours) depending on the sampling method. This standardization permitted direct comparison of data among sites and,

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potentially, with other studies. The biomass of terrestrial and aquatic invertebrates was estimated based on length-weight regressions using methods described below in Section 3.1.3.2.

3.1.3.2 Invertebrate Biomass Determination

The biomasses of adult aquatic and terrestrial invertebrates were estimated for each sample. Biomass (dry weight) of terrestrial and aquatic invertebrate taxa was determined using published relationships between body length and body mass for individual taxa (Hodar 1996, Sabo *et al.* 2002). Up to 25 length measurements per taxon were taken per sample of randomly selected individuals. This approach was chosen instead of methods that involve weighing or measuring displacement of bulk samples as these techniques are susceptible to error due to the presence of other material (e.g., seston) in samples. Briefly, the approach involved calculating a mean length that was representative of each identified taxon. These lengths were then used to estimate the biomass of invertebrates in each sample using established biomass–length relationships. Finally, total invertebrate biomass in each sample was standardized to a standard sampling duration (e.g., mg/hour), or sampling duration and area (mg/m^2/hour), to account for variability in the sampling duration or area (i.e., BPUE).

Body lengths of all taxa were measured using Vernier calipers to the nearest 0.01 mm. This method is less precise for measuring small invertebrates than using either an ocular micrometer or digital analysis software. However, accuracy and precision were deemed suitable for the study because the focus is on examining variability in biomass among the study waterbodies, which does not require highly accurate and precise measurements of the smallest taxa.

Taxon-specific mean body length (*L*) measurements were converted to dry biomass (*W*; mg) using relationships listed in Hodar (1996) and Sabo *et al.* (2002) for adult aquatic and terrestrial invertebrates.

W–L relationships followed the general power equation:

$$W = \alpha L^{\beta} \qquad (1)$$

where *W* is biomass (mg), *L* is mean body length (mm) and α and β are constants specific to each taxon. Relationships were converted to linear form by logarithmic transformation:

$$\ln W = \ln \alpha + \beta \cdot \overline{\ln L} \qquad (2)$$

where $\overline{\ln L}$ is calculated as the mean of the transformed length measurements in mm. Mean individual biomass for each taxon was then calculated following back transformation. Corrections were not made to reflect logarithmic transformation bias. The information necessary to estimate this (e.g., the residual mean square of the original regression) is not typically reported with published biomass–length relationships. McCauley (1984) estimates that failure to consider this source of bias may result in error of 2% to 11%, which was considered tolerable given that the objective was to primarily compare biomass estimates among waterbodies within the study, rather than with waterbodies elsewhere.

Estimates of the biomass of taxa in each sample were calculated as the product of total taxon abundance and taxon–specific mean biomass values (*W*). The sum of biomass for all taxa within a sample was calculated to determine the total sample biomass (mg). These estimates were then standardized by dividing the total biomass (mg) by either area sampled (m^2) and/or deployment duration (hours) depending on the sampling method to yield BPUE.

3.2 Fish Community

3.2.1 Field Methods

Fish sampling was undertaken in Year 2 at Upper Campbell and Lower Campbell reservoirs, and Upper Quinsam Lake. Sample sites within the study areas were selected to encompass a range of habitats (littoral and pelagic) throughout each waterbody and are presented in Map 2 to Map 4. Bathymetric maps were reviewed to identify sampling sites with depths, and site locations were confirmed by field crew before net deployment. Site locations included sites used in Component 1 for Lower Campbell Reservoir and Upper Quinsam Lake (Hocking *et al.* 2017). Upper Campbell Reservoir was sampled as part of JHTMON-3, which includes population index monitoring over ten years (Buren *et al.* 2021).

The objective of gill netting sampling was to index fish abundance and biomass by species to evaluate whether these metrics vary among the three waterbodies subject to differences in drawdown magnitude, thereby testing $H_0$7 (Section 2.2.5). Consistent with Component 1 and JHTMON-3, sampling was undertaken in late summer (between August 23 and September 1, 2021) (Table 5). Floating and sinking gill nets were used at most sites to target specific strata within the water column, although at UPQ-LKGN02 and LCR-LKGN02, instead of floating nets, sinking gill nets were suspended 10 m below the water surface. Sinking nets were used at these sites because they were both pelagic sites, and fish in pelagic areas were expected to make limited use of surface waters during the late summer sampling period, when surface waters were close to annual maxima.

We sought to maintain similar effort throughout the monitoring program, and thus we aimed to deploy 12 overnight RIC (1997) standard gill net sets in Upper Campbell Reservoir and Lower Campbell Reservoir. However, the catch limit of 150 Rainbow Trout specified in the provincial fish collection permits (NA21-624908 and NA21-617387) was exceeded and therefore effort was curtailed midway through the trip and no nets were deployed at sites UCR-LNKG07 or UCR-LNKG08, resulting in eight overnight net sets in Upper Campbell Reservoir (Table 5). Similarly, to avoid exceeding the catch limit of 150 Rainbow Trout, no nets were deployed at sites LCR-LKGN01, LCR-LKGN04, LCR-LKGN05, and LCR-LKGN06, resulting in four overnight nets sets in Lower Campbell Reservoir (Table 5). Paired nets were set at three sites in Upper Quinsam Lake (i.e., six overnight net sets), which was the target level of effort for this waterbody (smaller than the two reservoirs).

The catch and depth fished for each panel of each net was recorded. Nets were set perpendicular to shore with sinking nets set on the bed and floating nets set on the surface except when deployed mid lake. RIC (1997) standard gill nets were used (91.2-m-long) for all three waterbodies; the nets consist of six panels, each 15.2-m-long and of different mesh sizes (25 mm, 76 mm, 51 mm, 89 mm, 38 mm, and 64 mm) strung together to form a 91.2-m-long and 2.4-m-deep net.

When setting a net, the boat operator ensured the proper location and depth of the site using a GPS and depth sounder and positioned the net according to depth contours and wind conditions. The net was held in place with a net anchor at each end of the net. For suspended nets, additional floats and weights were required to hold the nets in place. Nets were set overnight with soak times of 18 to 21 hours. Floating lights were attached to each floating net to mark their location at night for boater safety. All fish captured during gill netting were identified to species, weighed, and measured to the nearest mm (fork length) in the field. Scales were collected from Rainbow Trout and Cutthroat Trout in case ageing analysis is required in the future.

Table 5. Sampling dates, site locations, and site conditions for Year 2 fish sampling surveys on Upper Campbell Reservoir, Lower Campbell Reservoir, and Upper Quinsam Lake, August 2021.

Waterbody	Site[1]	Sampling Date	UTM Zone	UTM Easting	UTM Northing	Set #	Net Position[1]	Net Depth Sampled (m)[2]	Water Temp. (°C)	Turbidity[3]	Estimated Visibility (m)
Lower Campbell Reservoir	LCR-LKGN02	31-Aug-21	10U	326112	5542580	1	SK	22.0 - 30.0	19.0	C	6
		31-Aug-21	10U	326112	5542580	2	SK	10.0 - 12.4 [4]	19.0	C	6
	LCR-LKGN03	31-Aug-21	10U	324420	5541275	1	SK	2.5 - 4.5	19.3	C	6
		31-Aug-21	10U	324420	5541275	2	FL	0 - 2.4	19.3	C	6
Upper Campbell Reservoir	UCR-LKGN01	23-Aug-21	10U	314096	5539930	1	SK	3.5 - 7.1	20.6	C	8
		23-Aug-21	10U	314096	5539930	2	FL	0 - 2.4	20.6	C	8
	UCR-LKGN02	23-Aug-21	10U	314629	5537246	1	SK	2.5 - 9.9	21.0	C	8
		23-Aug-21	10U	314629	5537246	2	FL	0 - 2.4	21.0	C	8
	UCR-LKGN04	24-Aug-21	10U	308638	5533904	1	SK	3.0 - 11.6	21.4	C	8
		24-Aug-21	10U	308638	5533904	2	FL	0 - 2.4	21.4	C	8
	UCR-LKGN06	24-Aug-21	10U	309419	5527967	1	SK	2.1 - 15.9	22.0	C	8
		24-Aug-21	10U	309419	5527967	2	FL	0 - 2.4	22.0	C	8
Upper Quinsam Lake	UPQ-LKGN01	26-Aug-21	10U	317098	5528861	1	SK	2.0 - 4.1	20.1	C	6
		26-Aug-21	10U	317098	5528861	2	FL	0 - 2.4	20.1	C	6
	UPQ-LKGN02	26-Aug-21	10U	316585	5528193	1	SK	15.3 - 19.5	20.2	C	6
		26-Aug-21	10U	316585	5528193	2	SK	10.0 - 12.4 [4]	20.2	C	6
	UPQ-LKGN03	26-Aug-21	10U	315022	5526847	1	SK	2.0 - 13.5	20.7	C	6
		26-Aug-21	10U	315022	5526847	2	FL	0 - 2.4	20.7	C	6

[1] SK - Sinking, FL - Floating. All nets were 91.2-m-long.

[2] Net depth sampled for sinking nets vary as bottom depths of the sampling locations vary over the length of the net (91.2 m).

[3] Water turbidity was clear at all sites with estimated visibility of 6–8 m.

[4] Net was supended at 10 m depth in the middle of the water column.

3.2.2 Data Analysis

3.2.2.1 Individual Fish Analysis

For Cutthroat Trout and Rainbow Trout, length-frequency histograms, weight-length relationships (based on regression analysis), and relative condition factor were analyzed. To overcome limitations due to the dependency of condition factor on fish length, the relative condition factor was calculated as:

$$Relative\ condition\ factor = \left(\frac{W}{\widehat{W}}\right)$$

where W is the weight of a fish in g, and $\hat{W}$ is the predicted body weight from a length-weight relationship (Le Cren 1951). If the relative condition factor is equal to 1, the fish is in average condition, if the value is below 1 the fish is in lower-than-average condition, and if the value is larger than 1 then the fish is in better-than-average condition.

3.2.2.2 Catch / Biomass Per Unit Effort

Catch per unit effort (CPUE) from gill netting, measured as fish caught per set-hour, was used as the metric of relative fish abundance. Biomass per unit effort (BPUE) from gill netting, measured as biomass (i.e., weight of fish caught) per set-hour, was also calculated. CPUE and BPUE were each calculated separately for Rainbow Trout and Cutthroat Trout. In addition, CPUE and BPUE for all trout combined were calculated based on combined data for Cutthroat Trout, Rainbow Trout, and Cutthroat Trout/Rainbow Trout hybrids.

Calculation of BPUE complements analysis of CPUE to evaluate the productivity of fisheries in each waterbody. BPUE was generally based on the weight of each fish that was directly measured during sampling. However, the weights of 14 Cutthroat Trout and 18 Rainbow Trout were not recorded because the individuals had been partially consumed by predators. Accordingly, the weights of these fish were estimated based on the fork length of each fish and applying weight-length relationships developed for each waterbody using the remaining data.

3.3 Sediment Sampling

Benthic substrate samples were collected for organic matter analysis at each transect to evaluate how organic matter content varies with increasing distance from the riparian zone, thereby supporting testing of $H_0$4. Samples were collected using a Ponar grab at each of the three transects in each waterbody during the spring (May) and/or late summer (August) 2021 sampling trips (Table 6). Sampling sites are shown on Map 2 to Map 4 (see 'BIV' sites). The Ponar grab was a 'Petite' model (Wildco, FL, USA) with an aperture of 152 mm × 152 mm. The Ponar grab was used to collect samples at 1 m, 10 m, and 60 m distances from the shoreline. The Ponar grab was deployed by wading or by boat, dependent on water depth. Samples collected using the Ponar grab were emptied into a clean tray (Figure 7). One Ponar grab was collected at each distance. Samples were discarded and sampling repeated if there was an issue with larger substrate preventing the Ponar grab from closing fully. Excess water was drained through a 500 µm screen. Substrate samples were placed in Ziploc bags and unpreserved.

Samples were submitted to a certified laboratory (ALS Environmental) to be analyzed for organic content based on loss on ignition (LOI). Due to insufficient sample material, there were four sediment samples that could not be analyzed for LOI (UCR-BIV05 [60 m], LCR-BIV03 (1 m), LCR-BIV04 (1 m and 60 m)). Additional observations were recorded from each sample which included: substrate composition (% silt, % sand, % gravel), a photograph of the sample, and the amount of organic carbon present on the bed at each site was collected by assigning a qualitative class (e.g., low, medium, high).

Table 6. Summary of Year 2 (2021) benthic substrate sampling sites.

Waterbody	Site ID	Sampling Date	UTM (NAD 83)		
			Zone	E (m)	N (m)
Upper Campbell Reservoir	UCR-BIV05	27-May-21	10U	309323	5527765
	UCR-BIV06	27-May-21	10U	305609	5529535
	UCR-BIV07	27-May-21/ 30-Aug-21[1]	10U	308567	5533702
Lower Campbell Reservoir	LCR-BIV03	26-May-21	10U	324321	5541298
	LCR-BIV04	26-May-21	10U	326235	5543193
	LCR-BIV05	26-May-21	10U	323050	5545335
Upper Quinsam Lake	UPQ-BIV02	28-May-21	10U	316224	5527030
	UPQ-BIV03	28-May-21	10U	317031	5527684
	UPQ-BIV04	28-May-21	10U	317347	5529996

[1] Ponar grab samples at 10 m and 60 m from shoreline could not be collected in May 2021 because it was too windy, and were therefore collected in August 2021

Figure 7. Substrate sample collected using a Ponar grab at Lower Campbell Reservoir (LCR-BIV04) on May 26, 2021.

3.4 Stable Isotope Analysis (SIA) Samples

Additional samples were collected in spring (May) and/or late summer (August/September) 2021 at each transect per waterbody for SIA (Table 7). Samples for SIA will be processed and analyzed following Year 3 (2022) sampling.

Samples of aquatic macrophytes and leaf litter were collected in the wadable shoreline areas near to the invertebrate sampling transects to represent autochthonous and allochthonous basal carbon sources, respectively. Small particulate organic matter was also collected at each transect location by deploying a Ponar grab 1 m from the shoreline and placing the contents in a clean tray. Water was decanted and the remaining contents were placed in one sample container.

Furthermore, periphyton was collected at every transect per waterbody in spring (May) 2021 (Table 7). Periphyton was obtained by scraping rocks from the wadable reservoir margins near each of the invertebrate sampling transects. For each sample, ten rocks were collected and individually hand scrubbed in a bucket, and each rock was measured along the B axis (second-longest length of the rock). Water was decanted and the remaining contents were placed in one sample jar per sample.

Table 7. Summary of stable isotope analysis samples collected in Year 2 (2021).

Waterbody	Site ID	Sampling Date	Sample Type[1]	UTM (NAD 83) Zone	E (m)	N (m)
Upper Campbell Reservoir	UCR-EIV02	27-May-21	SPOM, periphyton	10U	309337	5527825
		30-Aug-21	Leaf litter			
	UCR-EIV03	27-May-21	SPOM, periphyton	10U	305609	5529535
		30-Aug-21	Leaf litter, aquatic macrophyte			
	UCR-EIV04	27-May-21	SPOM, periphyton	10U	308567	5533702
		30-Aug-21	Leaf litter			
Lower Campbell Reservoir	LCR-EIV03	26-May-21	SPOM, periphyton	10U	324376	5541328
		7-Sep-21	Leaf litter, aquatic macrophyte			
	LCR-EIV04	26-May-21	SPOM, periphyton	10U	326235	5543193
		7-Sep-21	Leaf litter			
	LCR-EIV05	26-May-21	SPOM, periphyton	10U	323050	5545335
		7-Sep-21	Leaf litter			
Upper Quinsam Lake	UPQ-EIV02	28-May-21	SPOM, periphyton, leaf litter, aquatic macrophyte	10U	316196	5527107
		2-Sep-21	Leaf litter, aquatic macrophyte			
	UPQ-EIV03	28-May-21	SPOM, aquatic macrophyte, periphyton	10U	317031	5527684
		2-Sep-21	Leaf litter			
	UPQ-EIV04	28-May-21	SPOM, aquatic macrophyte, periphyton	10U	317347	5529996
		2-Sep-21	Leaf litter			

[1] SPOM= small particulate organic matter; Leaf litter= riparian leaf litter

4. RESULTS

4.1 Invertebrate Sampling

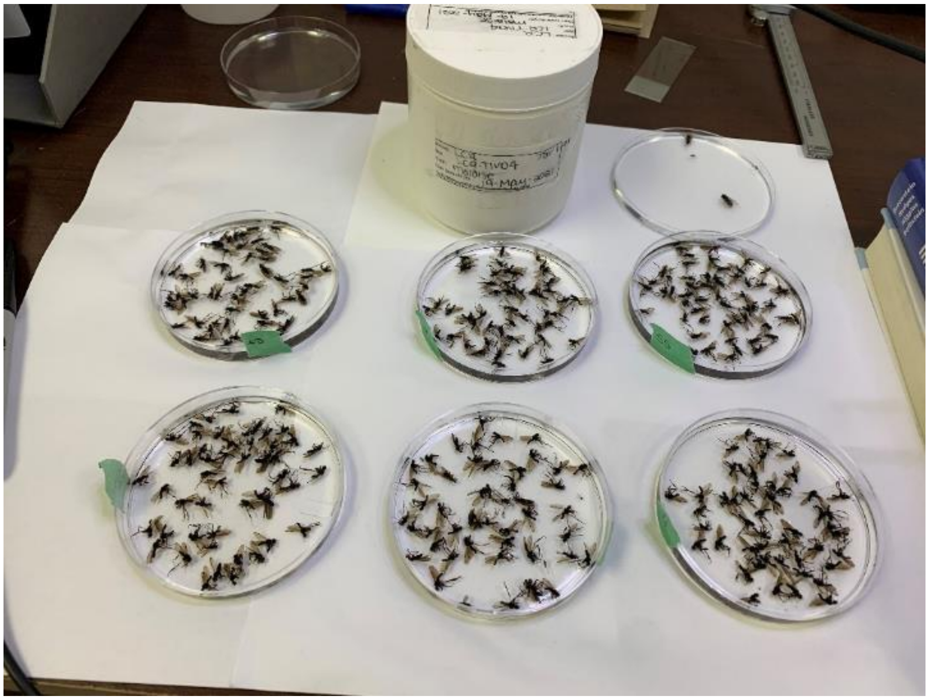
4.1.1 Terrestrial Invertebrates

4.1.1.1 Malaise Net

Abundance

The abundance (expressed as CPUE based on # of individuals captured/hour) of terrestrial invertebrates sampled using Malaise nets at each waterbody in spring (May) of Year 2 (2021) is summarized in Table 1 in Appendix B. In summary, average CPUE was highest for Lower Campbell Reservoir. CPUE values for Upper Campbell Reservoir and Upper Quinsam Lake were similar and lower than CPUE values for Lower Campbell Reservoir (Table 1 in Appendix B). Taxonomic richness at the order level was highest in Upper Quinsam Lake (seven taxa), intermediate at Upper Campbell Reservoir (five taxa), and lowest at Lower Campbell Reservoir (two taxa). Across all waterbodies, the most abundant order was Diptera (true flies): 95% of all individuals in Upper Campbell Reservoir, 99% in Lower Campbell Reservoir, and 88% at Upper Quinsam Lake (Table 1 in Appendix B). An example of terrestrial invertebrates collected in a Malaise net is shown in Figure 8.

Figure 8. Sample of terrestrial invertebrates collected in a Malaise net at LCR-TIV04 on May 19, 2021.



Biomass

A summary of data and relationships used to estimate the mean biomass of terrestrial invertebrate taxa sampled using Malaise nets at each waterbody in Year 2 (2021) is presented in Table 2 in Appendix B.

Total invertebrate biomass (expressed as BPUE based on biomass of invertebrates captured/hour) captured across using Malaise nets ranged from 7.02 mg/hour to 29.98 mg/hour in Upper Campbell Reservoir, from 15.30 mg/hour to 207.99 mg/hour in Lower Campbell Reservoir, and from 7.72 mg/hour to 21.34 mg/hour in Upper Quinsam Lake (Figure 9). In terms of biomass, Diptera was the dominant taxon at all transects in Upper Campbell Reservoir and Lower Campbell Reservoir, whereas the dominant taxa varied among transects at Upper Quinsam Lake (Figure 10).

At this interim stage, Malaise net results for both Year 1 (2020) and Year 2 (2021) show no clear relationship between invertebrate BPUE and distance from the riparian zone, based on small sample sizes (Figure 9).

Figure 9. Terrestrial invertebrate biomass-per-unit-effort (BPUE) sampled in each Malaise net (mg/hour) plotted against distance from the riparian zone (m) for all transects in each waterbody in Year 1 (2020) and Year 2 (2021).

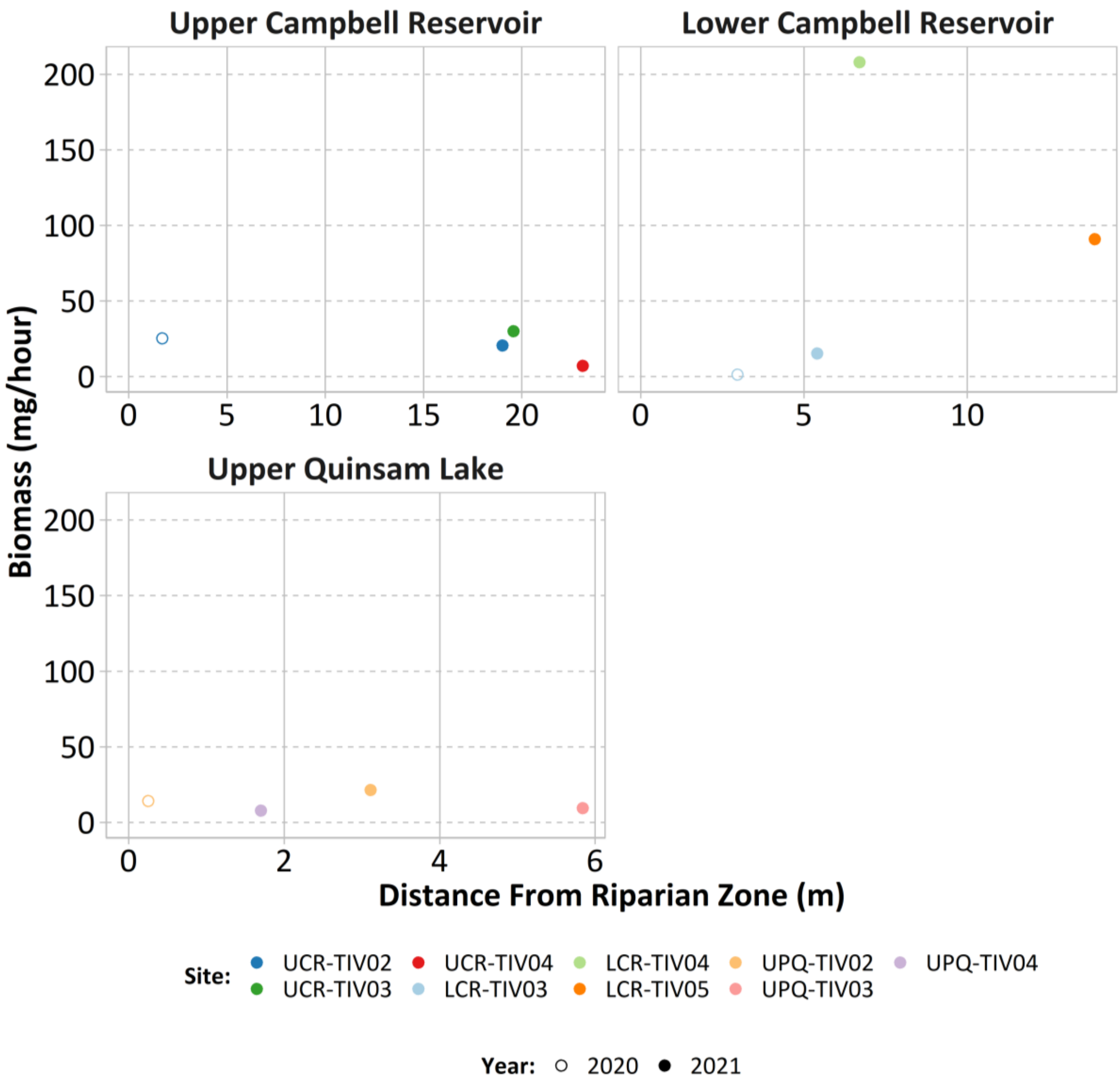
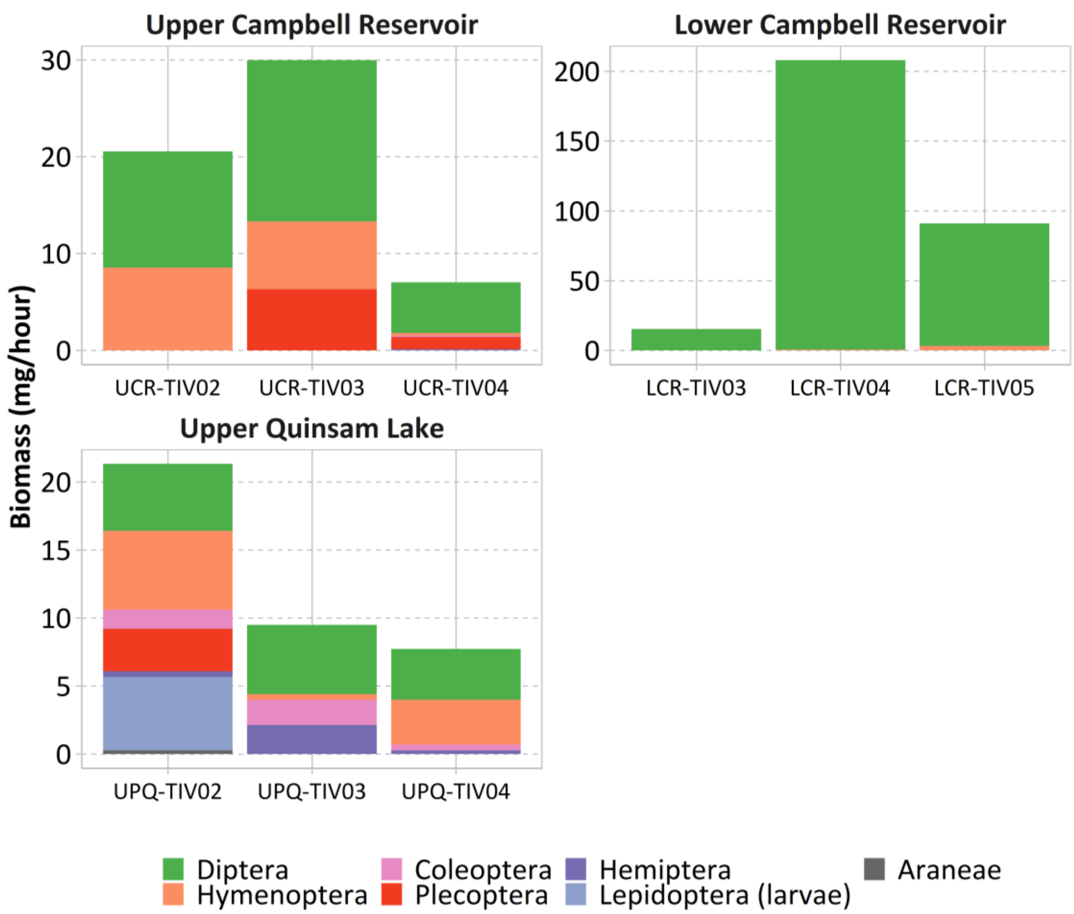


Figure 10. Relative contribution of taxa to biomass-per-unit-effort (BPUE) sampled in each Malaise net (mg/hour) for all transects in each waterbody in Year 2 (2021). All traps were placed adjacent to the water, at varying distances from the riparian zone (Table 3).



4.1.1.2 Sticky Traps

Consistent with Year 1 (2020), invertebrate abundance on sticky traps (CPUE; invertebrates/m^2/hour) in Year 2 (2021) decreased with increasing distance from the riparian zone across all transects in each waterbody (Figure 11). There were no clear differences in sticky trap CPUE among the three waterbodies (Figure 11) although, compared to Upper Campbell Reservoir (Figure 12), sticky trap CPUE values closer (0–20 m) to the riparian zone were generally higher in Lower Campbell Reservoir (Figure 13) and Upper Quinsam Lake (Figure 14), although there were no clear differences among waterbodies in sticky trap CPUE at distances of >20 m from the riparian zone. The total CPUE of invertebrates in the 10–15 mm category (largest bin) was highest at Upper Quinsam Lake, with invertebrates this large not recorded on most traps deployed at Upper Campbell Reservoir.

Figure 11. Sticky trap invertebrate catch-per-unit-effort (CPUE; invertebrates/m^2/hr) plotted against distance from the riparian zone (m) for all transects in each waterbody in Year 1 (2020) and Year 2 (2021).

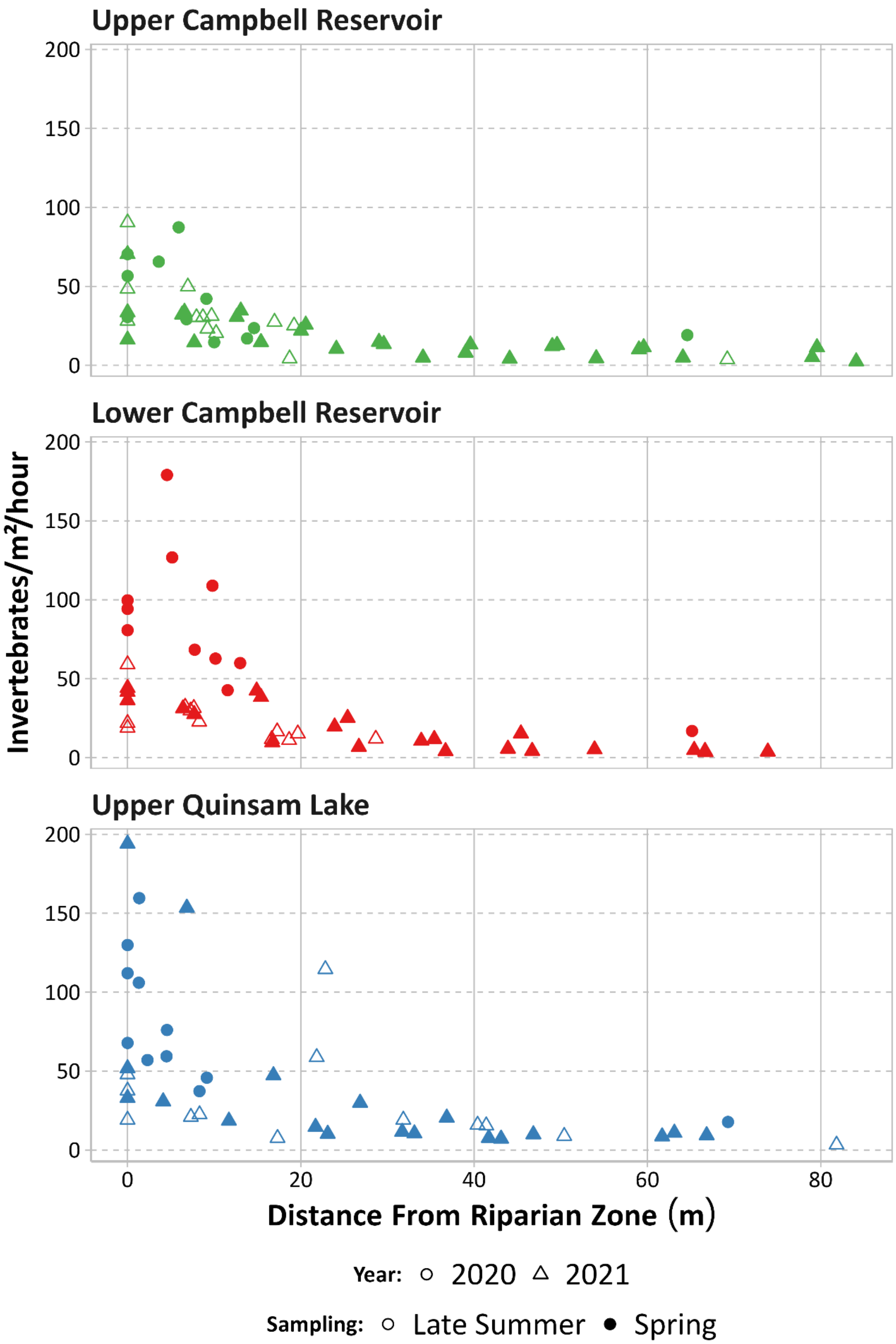


Figure 12. Sticky trap invertebrate catch-per-unit-effort (CPUE; invertebrates/m^2/hr) plotted against distance from the riparian zone (m) for each transect on Upper Campbell Reservoir in Year 1 (2020) and Year 2 (2021). The "All data" panel shows the total count of invertebrates on sticky traps. Results are shown separately for invertebrates grouped into the following length (mm) categories: 0–5 mm, 5-10 mm, 10–15 mm.

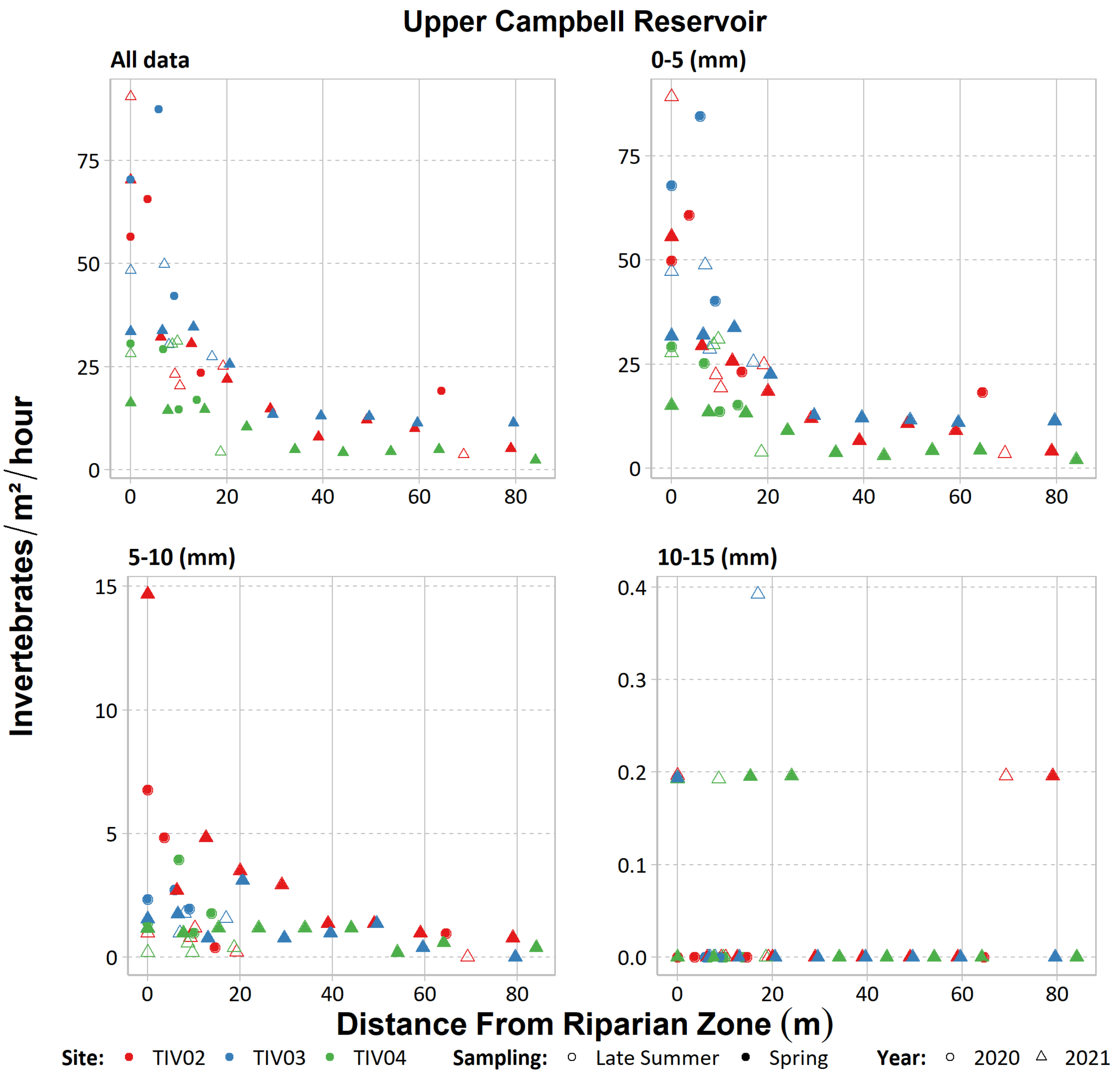


Figure 13. Sticky trap invertebrate catch-per-unit-effort (CPUE; invertebrates/m^2/hr) plotted against distance from the riparian zone (m) for each transect on Lower Campbell Reservoir in Year 1 (2020) and Year 2 (2021). The "All data" plot shows the total count of invertebrates on sticky traps. Results are shown separately for invertebrates grouped into the following length (mm) categories: 0–5 mm, 5-10 mm, 10–15 mm.

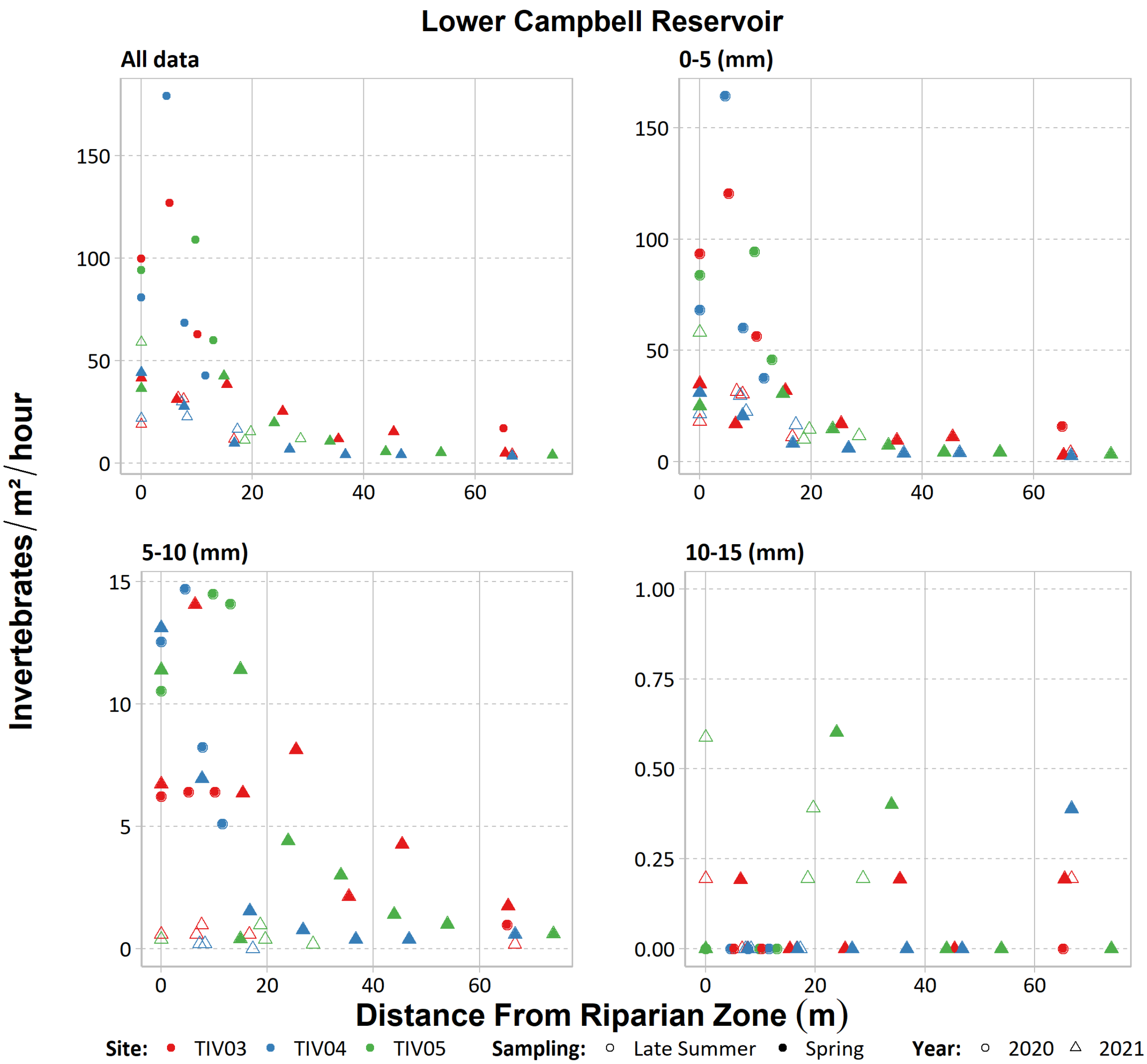
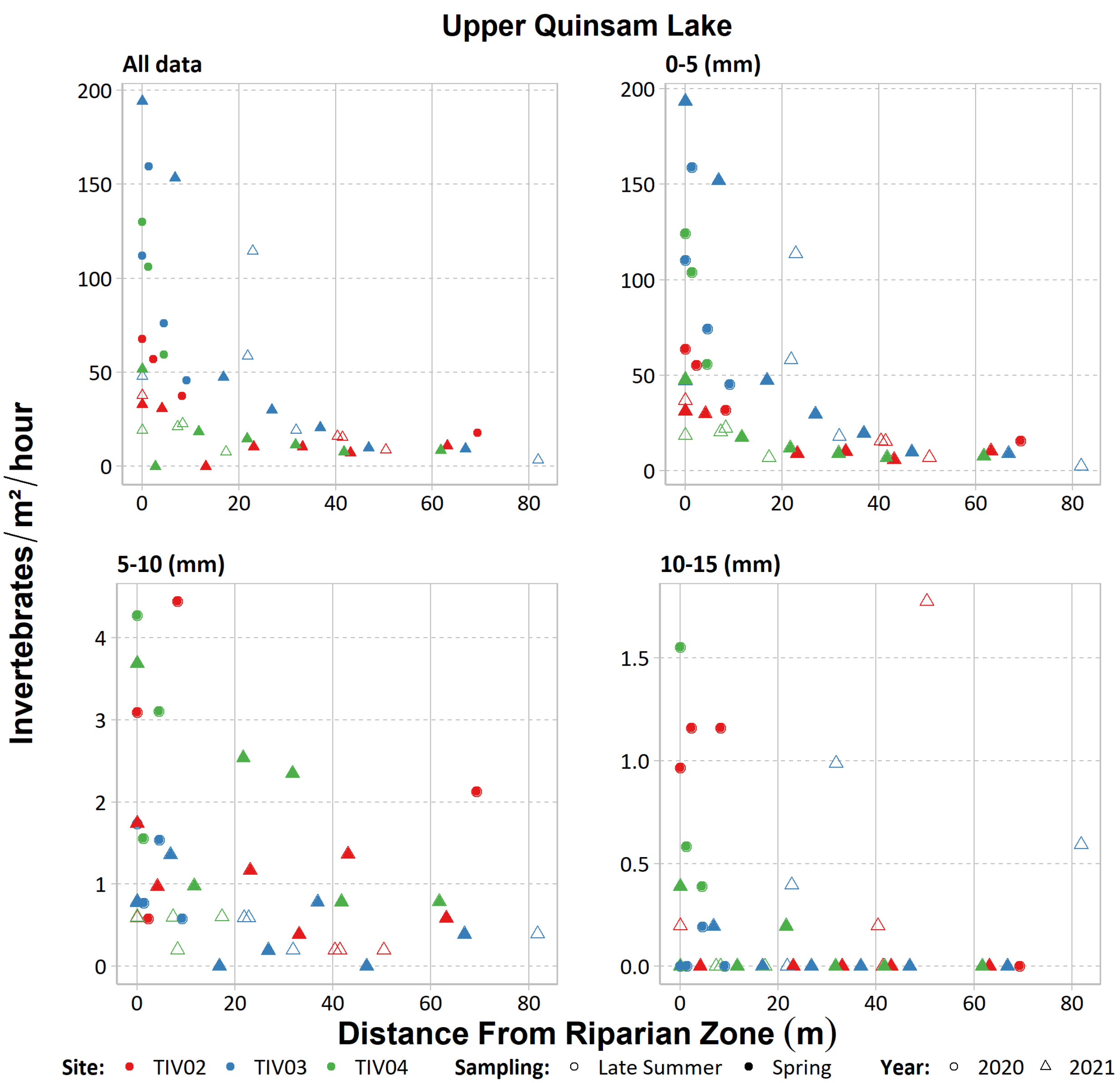


Figure 14. Sticky trap invertebrate catch-per-unit-effort (CPUE; invertebrates/m^2/hr) plotted against distance from the riparian zone (m) for each transect on Upper Quinsam Lake in Year 1 (2020) and Year 2 (2021). The "All data" plot shows the total count of invertebrates on sticky traps. Results are shown separately for invertebrates grouped into the following length (mm) categories: 0–5 mm, 5-10 mm, 10–15 mm.



4.1.2 Emergent Invertebrates

4.1.2.1 Abundance

The abundance (CPUE) of emergent invertebrates sampled from floating traps for all transects in each waterbody in Year 2 (2021) is summarized in Table 3 in Appendix B. Eighteen traps were deployed at each waterbody; however, data could not be collected for four traps at Upper Quinsam Lake and one trap at Lower Campbell Reservoir due to loss of sample bottles or holes in the floating trap mesh resulting in little to no sample.

Average floating trap CPUE was highest for Lower Campbell Reservoir (1.56 individuals/m^2/hour), followed by Upper Quinsam Lake (0.85 individuals/m^2/hour), then Upper Campbell Reservoir (0.63 individuals/m^2/hour; Table 3 in Appendix B). Across all waterbodies, the most abundant order was Diptera (true flies), accounting for 96% of floating trap CPUE in Upper Campbell Reservoir, 99% in Lower Campbell Reservoir, and 86% at Upper Quinsam Lake (Table 3 in Appendix B). Differences among sites, including differences in relation to proximity to the riparian zone and the drawdown zone, are considered further in Section 4.1.2.2 below in relation to biomass.

4.1.2.2 Biomass

A summary of data and relationships used to estimate the mean biomass of emergent invertebrate taxa sampled from floating traps for all transects in each waterbody in Year 2 (2021) is presented in Table 4 in Appendix B.

Total invertebrate biomass (BPUE) ranged from 0.01 mg/m^2/hour to 0.72 mg/m^2/hour in Upper Campbell Reservoir, from 0.03 mg/m^2/hour to 22.71 mg/m^2/hour in Lower Campbell Reservoir, and from 0.04 mg/m^2/hour to 5.25 mg/m^2/hour in Upper Quinsam Lake (Figure 15).

In Lower Campbell Reservoir, the highest BPUE recorded (22.71 mg/m^2/hour) was inside the drawdown zone, whereas in Upper Campbell Reservoir and Upper Quinsam Lake[2], the highest BPUE recorded in Year 2 was outside the drawdown zone (0.72 mg/m^2/hour and 5.25 mg/m^2/hour, respectively); however, there was no consistent difference between sites inside and outside of the drawdown zone across transects and years (Figure 15). Similarly, there was no clear relationship between emergent invertebrate biomass per floating trap (mg/m^2/hour) and distance from riparian zone or waterbody drawdown regime.

In terms of biomass, Diptera was the dominant taxon across all transects in Upper Campbell Reservoir (Figure 16) and Lower Campbell Reservoir (Figure 17), whereas the dominant taxa were variable among transects at Upper Quinsam Lake (Figure 18).

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[2] There is no prescribed drawdown zone for Upper Quinsam Lake (control lake); however, inspection of historical water level data (WSC 2021) indicates that the nearshore floating traps (underlying water depth = 0.28–1.38 m) were positioned over benthic habitats that have periodically dewater, based on water elevations within the past six years.

Invertebrate taxonomic richness at the order level was higher in Upper Quinsam Lake (eight taxa identified) than in Upper Campbell Reservoir and Lower Campbell Reservoir, where only six and five taxa were identified, respectively. Across all transects at all waterbodies, taxonomic richness was higher inside the drawdown zone (10 taxa) than outside the drawdown zone (seven taxa).

Figure 15. Emergent invertebrate biomass-per-unit-effort (BPUE) sampled in each floating trap ($mg/m^2/hour$) plotted against distance from the riparian zone (m) for all transects in each waterbody in Year 1 (2020) and Year 2 (2021). Sites inside and outside of the drawdown zone are distinguished. Note variable ranges on y-axes.

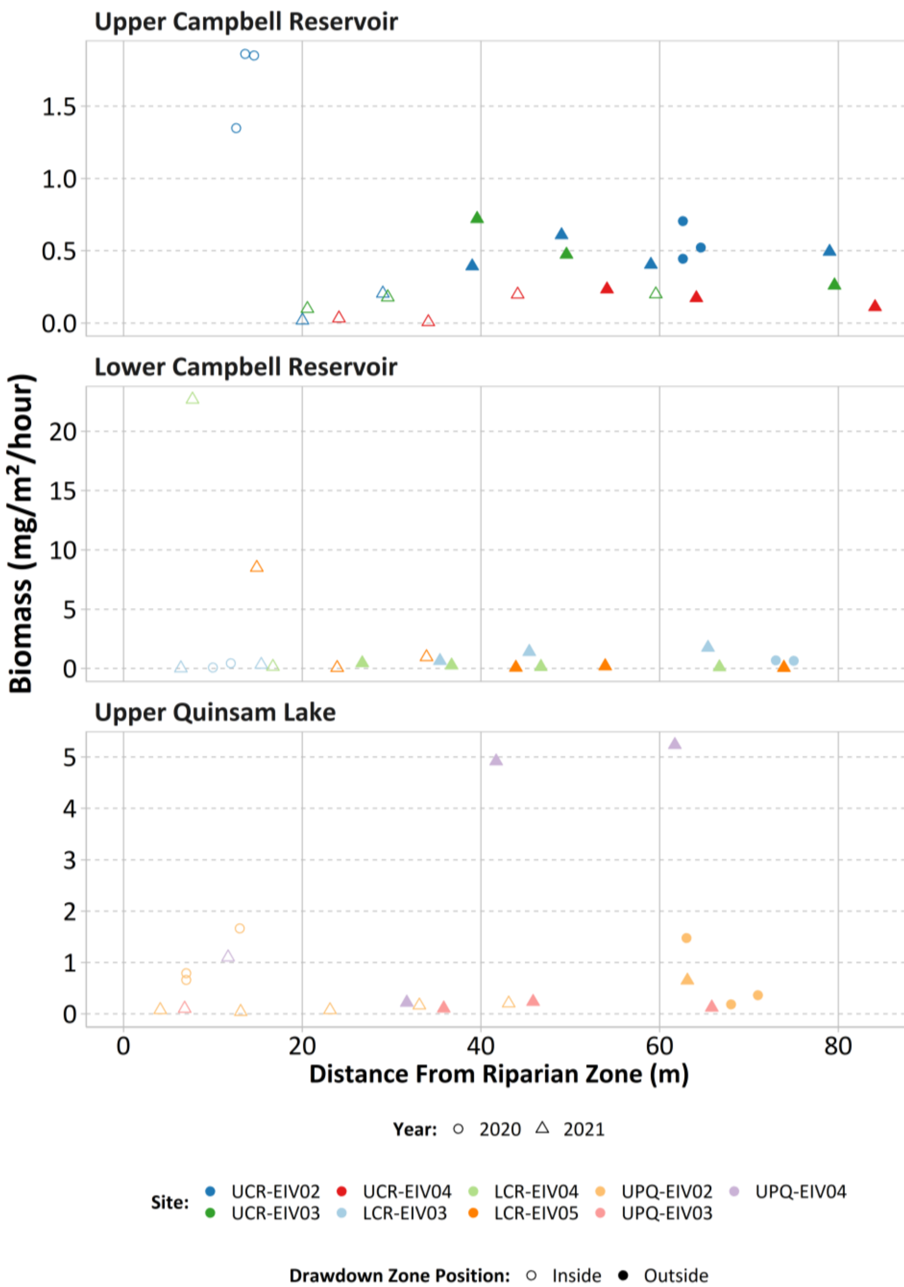

Figure 16. Relative contribution of taxa to biomass-per-unit-effort (BPUE; mg/m^2/hour) in floating traps for each transect on Upper Campbell Reservoir in Year 2 (2021).

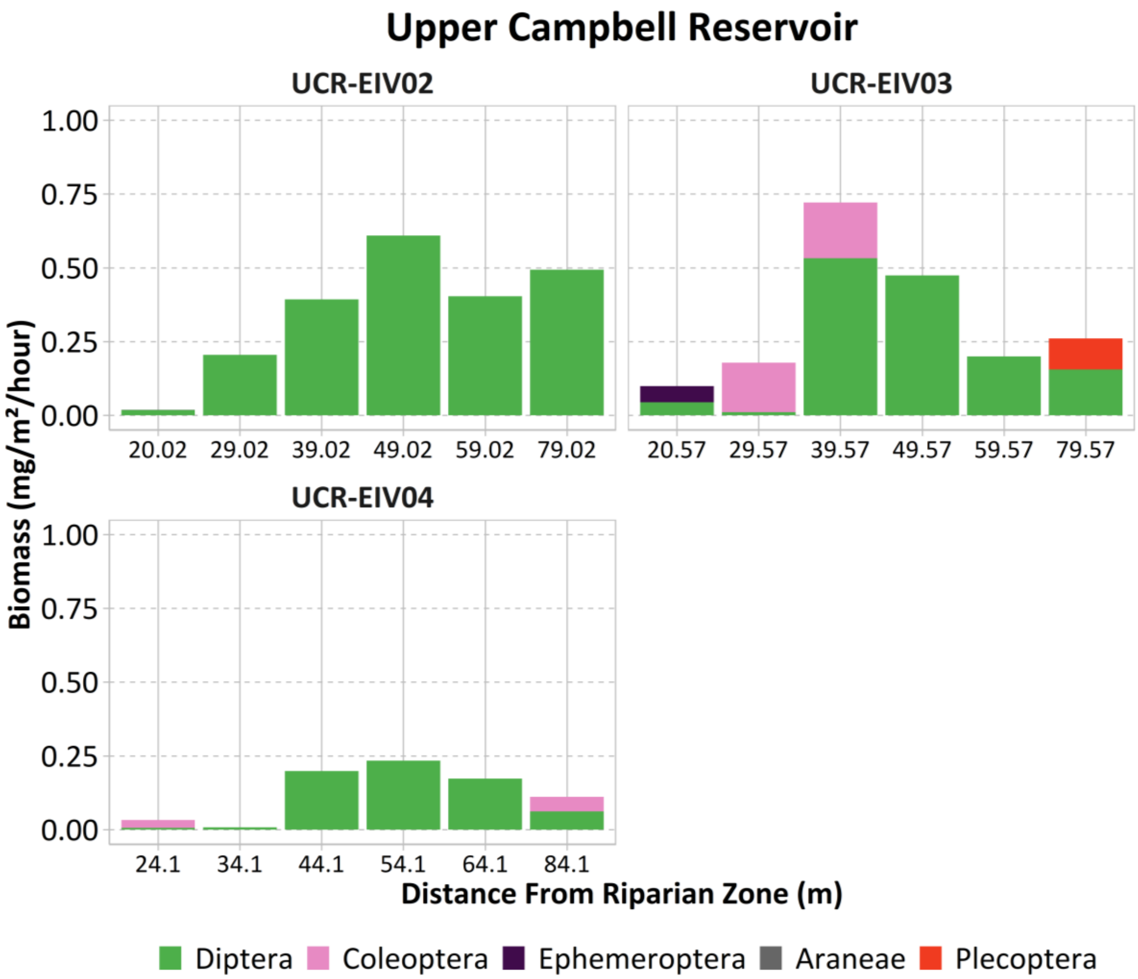

Figure 17. Relative contribution of taxa to biomass-per-unit-effort (BPUE; mg/m²/hour) in floating traps for each transect on Lower Campbell Reservoir in Year 2 (2021).

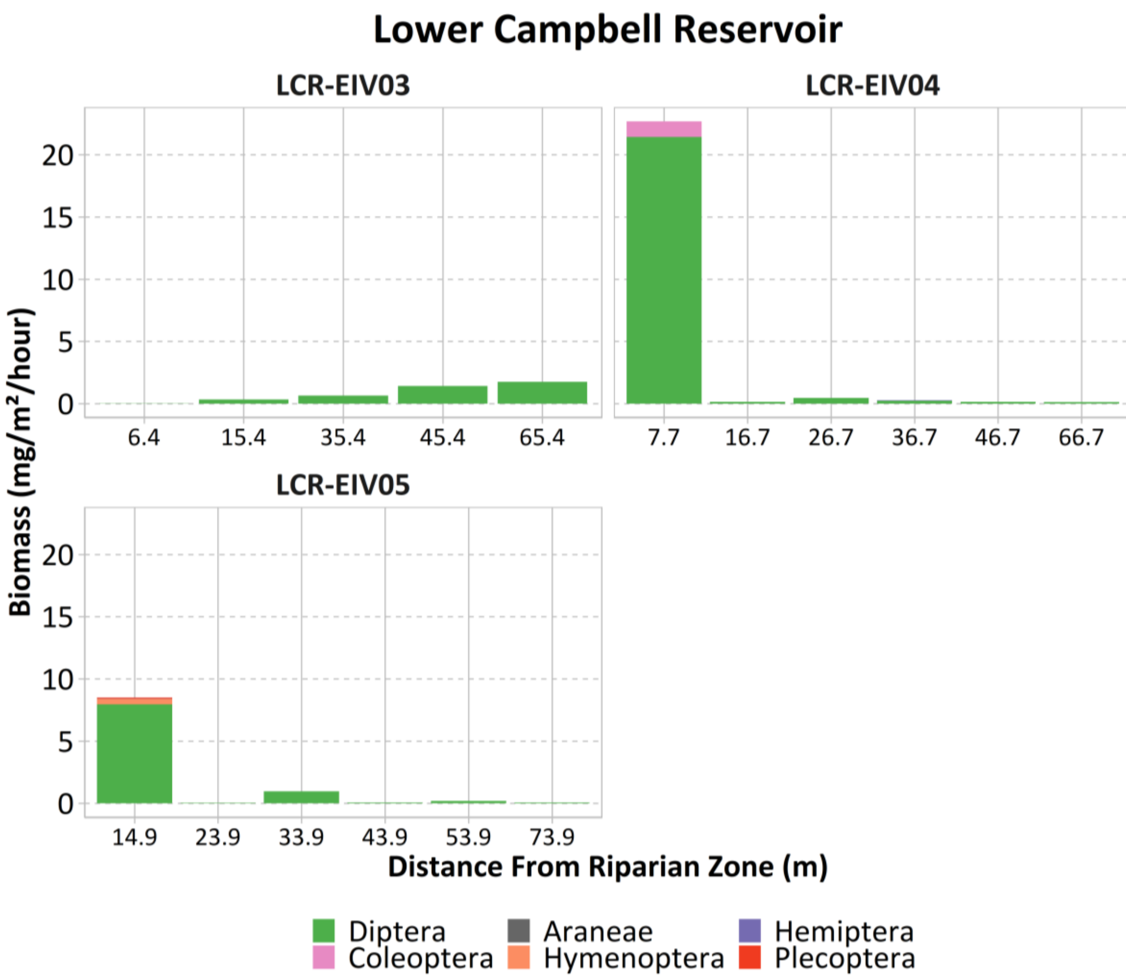

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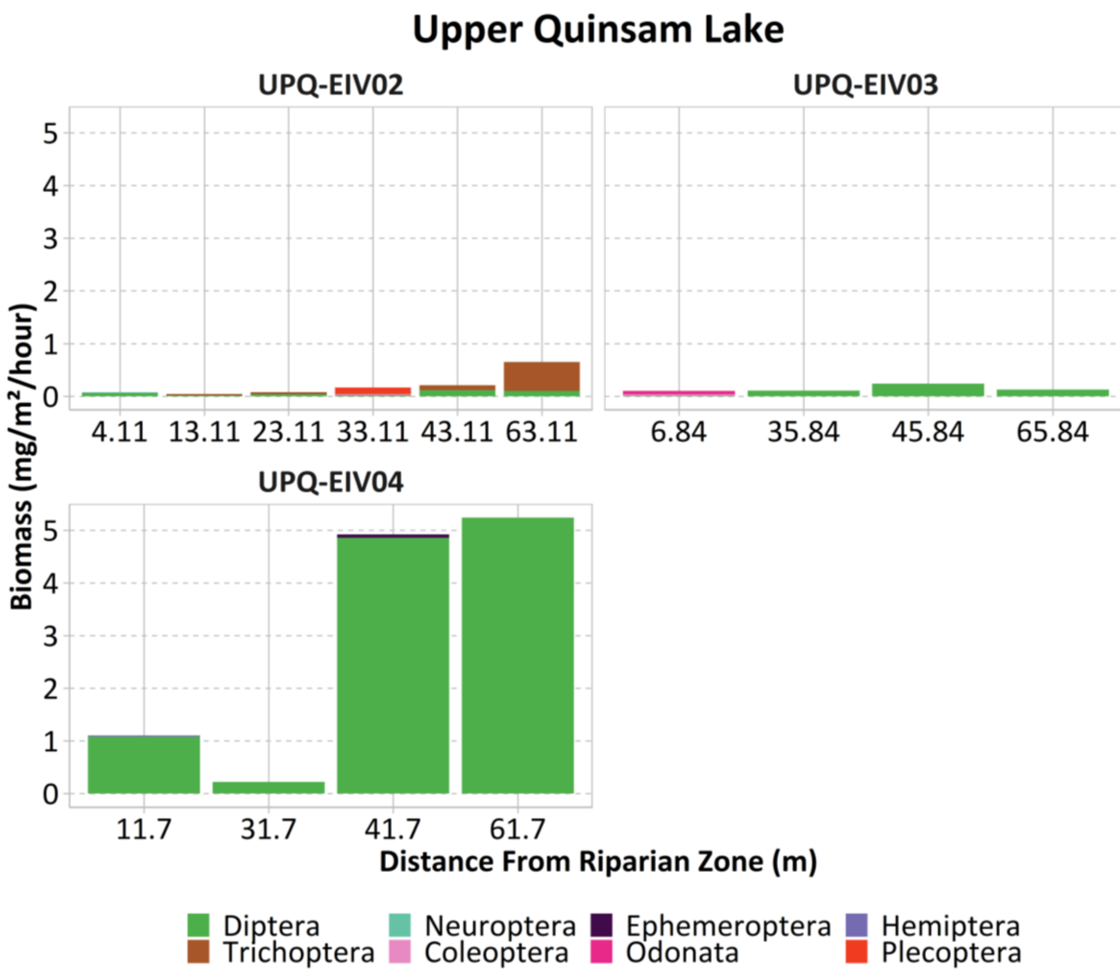
Figure 18. **Relative contribution of taxa to biomass-per-unit-effort (BPUE; mg/m²/hour) in floating traps for each transect on Upper Quinsam Lake in Year 2 (2021).**



4.2 Fish Community

4.2.1 Individual Fish Analysis

A total of 122 Cutthroat Trout were captured during gill netting surveys in Upper Campbell Reservoir, Lower Campbell Reservoir, and Upper Quinsam Lake. Cutthroat Trout fork length ranged from 130 mm to 408 mm (Figure 19). The relative condition factor of Cutthroat Trout was generally highest in the Upper Campbell Reservoir (Figure 20). The weight of Cutthroat Trout caught in the three waterbodies followed an isometric growth curve; i.e., the exponent of the length-weight relationship was 3, indicating there is no significant change in relative body length, depth, and width as fish grow longer (Figure 21).

A total of 300 Rainbow Trout were captured during gill netting surveys in Lower Campbell Reservoir and Upper Campbell Reservoir; Rainbow Trout fork length ranged from 91 mm to 327 mm (Figure 19). No Rainbow Trout were captured in Upper Quinsam Lake. The relative condition factor of Rainbow Trout was higher in Upper Campbell Reservoir than Lower Campbell Reservoir (Figure 20). The weight of Rainbow Trout caught in the two waterbodies followed an allometric growth curve with an exponent of 2.8 (Figure 21), indicating that fish tend to become slightly thinner (less body depth and/or width) as they become longer. This analysis of Rainbow Trout was based on combining data for the two waterbodies, although visual inspection of Figure 21b suggests there is a divergence of the length-weight relationship for larger fish (fork length > ~250 mm) collected from the two waterbodies.

Figure 19. Length frequency histogram of a) Cutthroat Trout and b) Rainbow Trout captured from Upper Campbell Reservoir, Lower Campbell Reservoir, and Upper Quinsam Lake, August 2021.

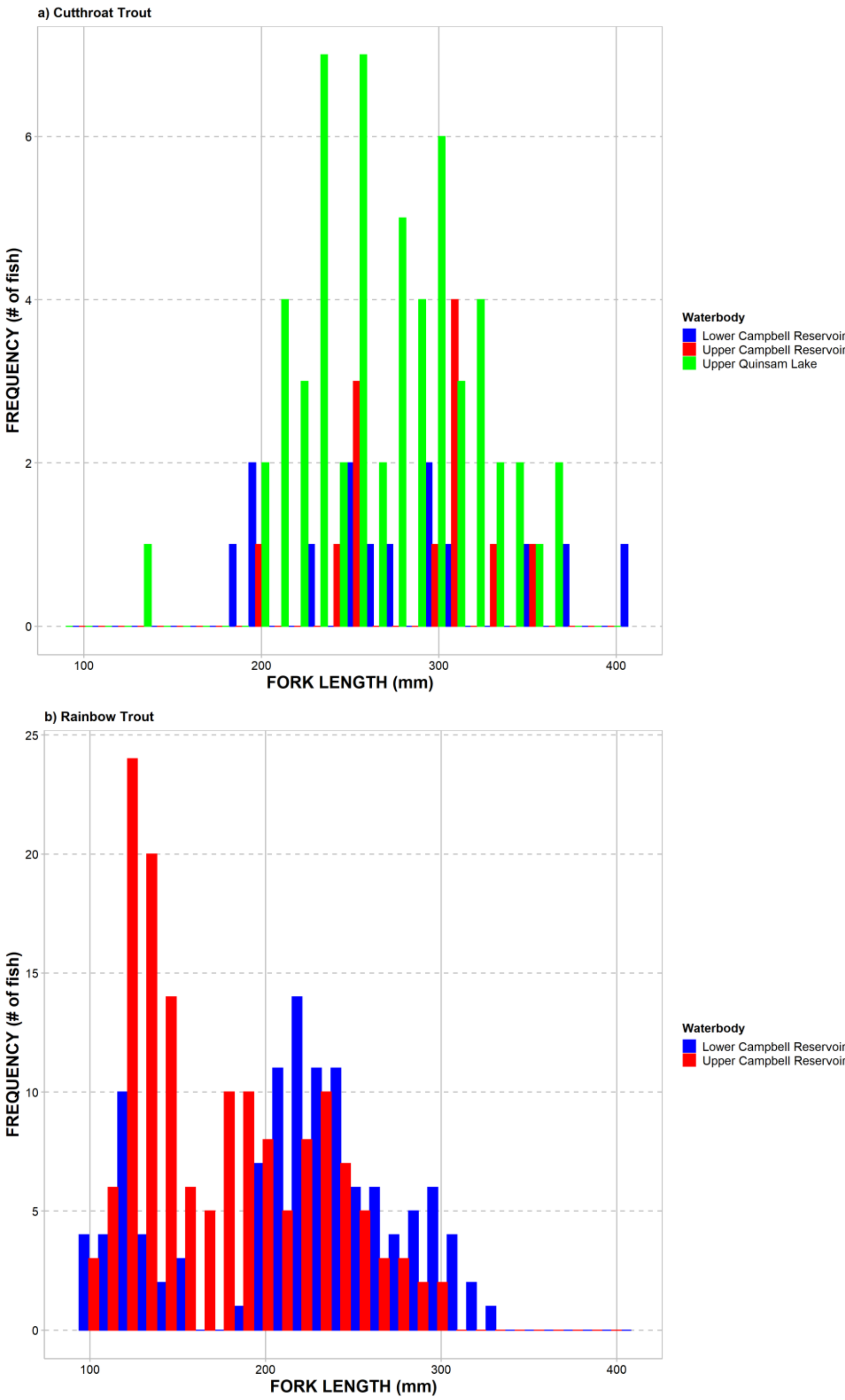


Figure 20. Relative condition factor of Cutthroat Trout (CT) and Rainbow Trout (RB) captured from Upper Campbell Reservoir, Lower Campbell Reservoir, and Upper Quinsam Lake, August 2021.

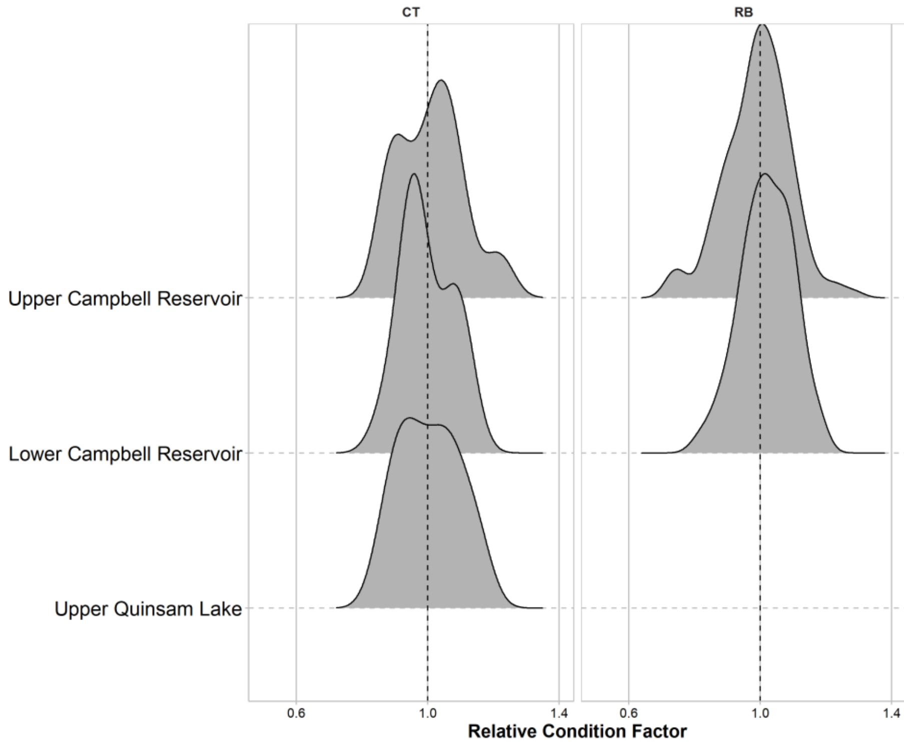
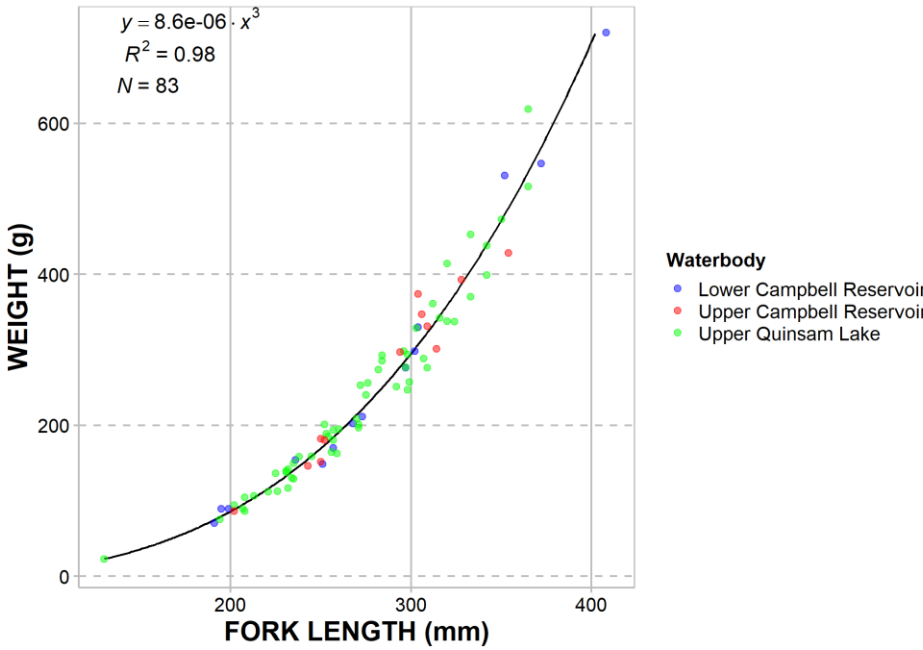
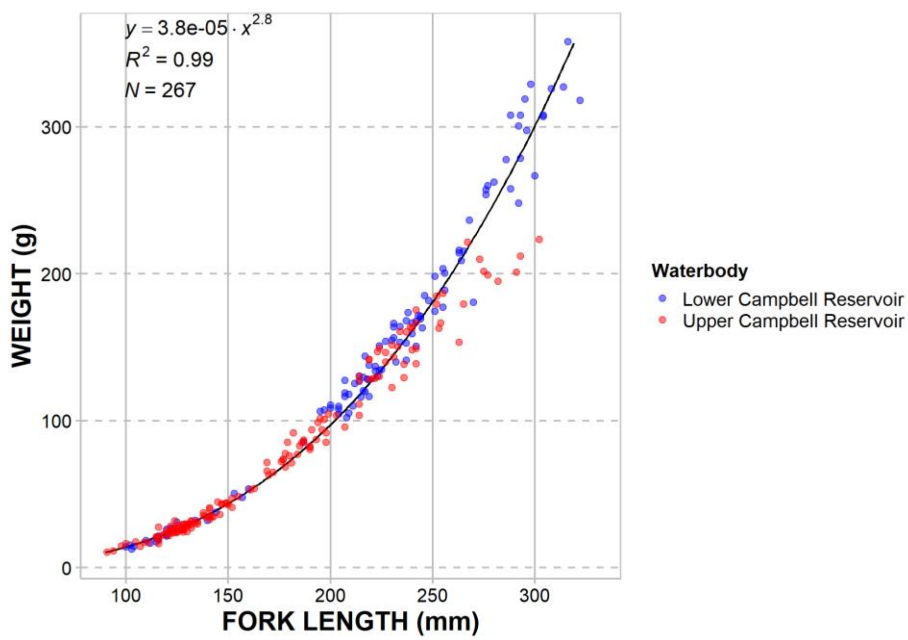


Figure 21. Length-weight relationships for a) Cutthroat Trout, and b) Rainbow Trout captured from Upper Campbell Reservoir, Lower Campbell Reservoir, and Upper Quinsam Lake, August 2021.

a)



b)



4.2.2 Catch / Biomass Per Unit Effort

Fish sampling from the nine gill net monitoring sites captured a total of 122 Cutthroat Trout, 300 Rainbow Trout, one Dolly Varden, five Sculpin, four Cutthroat Trout/Rainbow Trout hybrids, one Coho Salmon (*Oncorhynchus kisutch*), and two Kokanee (*Oncorhynchus nerka*) (Table 8). Representative photographs and raw data collected during gillnet surveys are presented in Appendix A.

The average CPUE of Cutthroat Trout was highest in Upper Quinsam Lake (0.51 fish/net hour), followed by Lower Campbell Reservoir (0.37 fish/net hour), and Upper Campbell Reservoir (0.15 fish/net hour; Table 8; Figure 22). However, variability among sites within individual waterbodies was high, notably at Lower Campbell Reservoir and Upper Quinsam Lake (Figure 22). Highest CPUE for Cutthroat Trout was recorded at site UPQ-LKGN03, followed by LCR-LKGN03 and UPQ-LKGN02; CPUE at these sites (>0.6 fish/net hour) was over double the CPUE measured at the remaining sites. The cause of this spatial variability is uncertain, e.g., these three sites include littoral sites (UPQ-LKGN03 and LCR-LKGN03) as well as a pelagic site (UPQ-LKGN02).

The average BPUE (biomass) of Cutthroat Trout was highest in Lower Campbell Reservoir (128.1 g of fish/net hour), followed by Upper Quinsam Lake (118.0 g of fish/net hour), and Upper Campbell Reservoir (50.5 g of fish/net hour; Figure 23). Trends in BPUE closely matched those for CPUE; the highest BPUE for Cutthroat Trout was observed at site LCR-LGKN03, followed by UPQ-LKGN02, and UPQ-LKGN03, with BPUE exceeding or approximating 150 g of fish/net hour at each of those three sites. BPUE values at other sites were similar and ranged from 41 g to 63 g of fish/net hour (Figure 23).

The average CPUE of Rainbow Trout in Lower Campbell Reservoir (1.42 fish/net hour) was higher than in Upper Campbell Reservoir (1.07 fish/net hour; Table 8; Figure 22). However, although the average CPUE was highest in Lower Campbell Reservoir, Rainbow Trout CPUE was highest overall at site UCR-LKGN06, followed by LCR-LKGN03, with values at both sites >1.50 fish/net hour. Both sampling sites were in nearshore littoral habitat in each waterbody. Similarly, the average BPUE of Rainbow Trout in Lower Campbell Reservoir (206.1 g of fish/net hour) was higher than in Upper Campbell Reservoir (81.6 g of fish/net hour; Figure 23).

Based on all trout combined, the average CPUE was highest in Lower Campbell Reservoir (1.80 fish/net hour), followed by Upper Campbell Reservoir (1.25 fish/net hour), and Upper Quinsam Lake (0.51 fish/net hour; Figure 22).

Based on all trout combined, the average BPUE was highest for Lower Campbell Reservoir (336.6 g of fish/net hour), followed by Upper Campbell Reservoir (135.8 g of fish/net hour), and Upper Quinsam Lake (118.0 g of fish/net hour; Figure 23).

Catches and associated biomass of other (non-priority) species were much lower than those for trout species (Table 8). A single Coho Salmon was observed in Upper Quinsam Lake, which is in the non-anadromous portion of the Quinsam River watershed; the fish was therefore presumably introduced via the Coho Salmon out-planting activities undertaken by the Quinsam River Hatchery.

Table 8. Summary of gill net survey effort, catch statistics, and catch-per-unit-effort (CPUE) from the Lower Campbell Reservoir, Upper Campbell Reservoir, and Upper Quinsam Lake, August 2021.

Site	Sampling Date	# of Sets	Gill Netting Effort (hrs)	Gill Net Catch (# of Fish)[1] CT	RB	DV	CC	CT/RB	CO	KO	Gill Net CPUE (# of Fish / net hr)[1] CT	RB	DV	CC	CT/RB	CO	KO
LCR-LKGN02	31-Aug-21	2	45.9	4	47	0	0	0	0	0	0.087	1.024	0.000	0.000	0.000	0	0
LCR-LKGN03	31-Aug-21	2	45.8	30	83	1	1	1	0	0	0.654	1.811	0.022	0.022	0.022	0	0
	Subtotal	**4**	**91.8**	**34**	**130**	**1**	**1**	**1**	**0**	**0**							
	Average		**45.9**	**17.0**	**65.0**	**0.5**	**0.5**	**0.5**	**0.0**	**0.0**	**0.371**	**1.417**	**0.011**	**0.011**	**0.011**	**0**	**0**
UCR-LKGN01	23-Aug-21	2	42.47	9	21	0	0	0	0	0	0.212	0.494	0	0	0	0	0
UCR-LKGN02	23-Aug-21	2	42.31	5	41	0	0	0	0	0	0.118	0.969	0	0	0	0	0
UCR-LKGN04	24-Aug-21	2	39.3	5	12	0	1	2	0	0	0.127	0.305	0	0.025	0.051	0	0
UCR-LKGN06	24-Aug-21	2	38.09	6	96	0	0	1	0	0	0.158	2.520	0	0	0.026	0	0
	Subtotal	**8**	**162.17**	**25**	**170**	**0**	**1**	**3**	**0**	**0**							
	Average		**40.5**	**6.3**	**42.5**	**0.0**	**0.3**	**0.8**	**0.0**	**0.0**	**0.154**	**1.072**	**0**	**0.006**	**0.019**	**0**	**0**
UPQ-LKGN01	26-Aug-21	2	41.9	9	0	0	1	0	1	0	0.215	0	0	0.024	0	0.024	0
UPQ-LKGN02	26-Aug-21	2	41.2	26	0	0	0	0	0	0	0.632	0	0	0	0	0	0
UPQ-LKGN03	26-Aug-21	2	40.3	28	0	0	2	0	0	2	0.694	0	0	0.050	0	0	0.050
	Subtotal	**6**	**123.4**	**63**	**0**	**0**	**3**	**0**	**1**	**2**							
	Average		**41.1**	**21.0**	**0.0**	**0.0**	**1.0**	**0.0**	**0.3**	**0.7**	**0.514**	**0**	**0**	**0.024**	**0**	**0.008**	**0.017**
	Total	**18**	**377**	**122**	**300**	**1**	**5**	**4**	**1**	**2**							
	Average		**41.9**	**13.6**	**33.3**	**0.1**	**0.6**	**0.4**	**0.1**	**0.2**	**0.322**	**0.792**	**0.002**	**0.013**	**0.011**	**0.003**	**0.006**
	SD		**2.7**	**11.0**	**36.4**	**0.3**	**0.7**	**0.7**	**0.3**	**0.7**	**0.257**	**0.889**	**0.007**	**0.018**	**0.018**	**0.008**	**0.017**

[1] CT = Cutthroat Trout, RB = Rainbow Trout, DV = Dolly Varden, CC = unidentified Sculpin species, CT/RB = hybrid of Cutthroat Trout and Rainbow Trout, CO = Coho Salmon, KO = Kokanee

Figure 22. Catch-per-unit-effort (CPUE; fish / hour) of a) all Cutthroat Trout, b) all Rainbow Trout, and c) all trout combined from Lower Campbell Reservoir, Upper Campbell Reservoir, and Upper Quinsam Lake, August 2021.

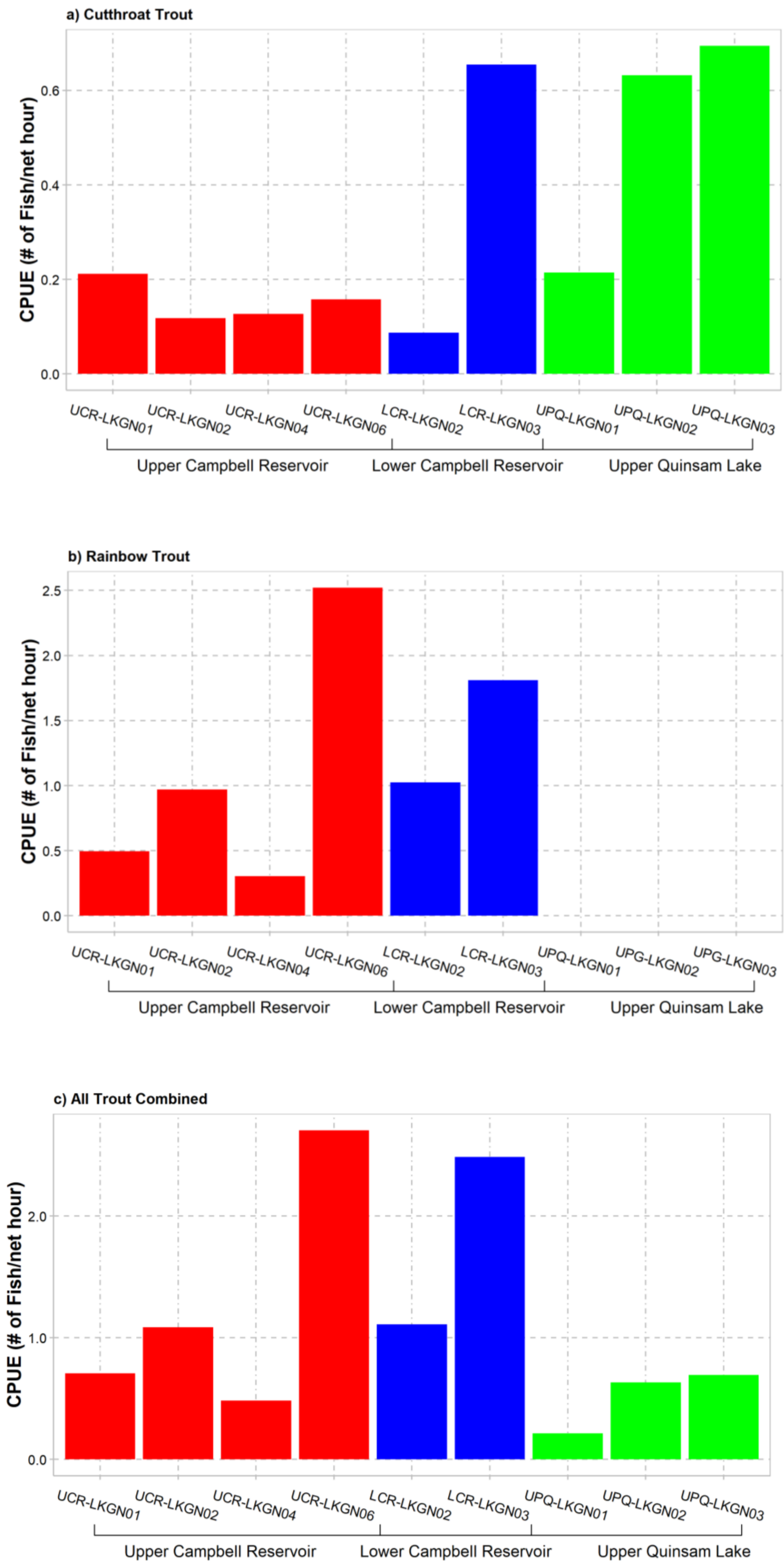
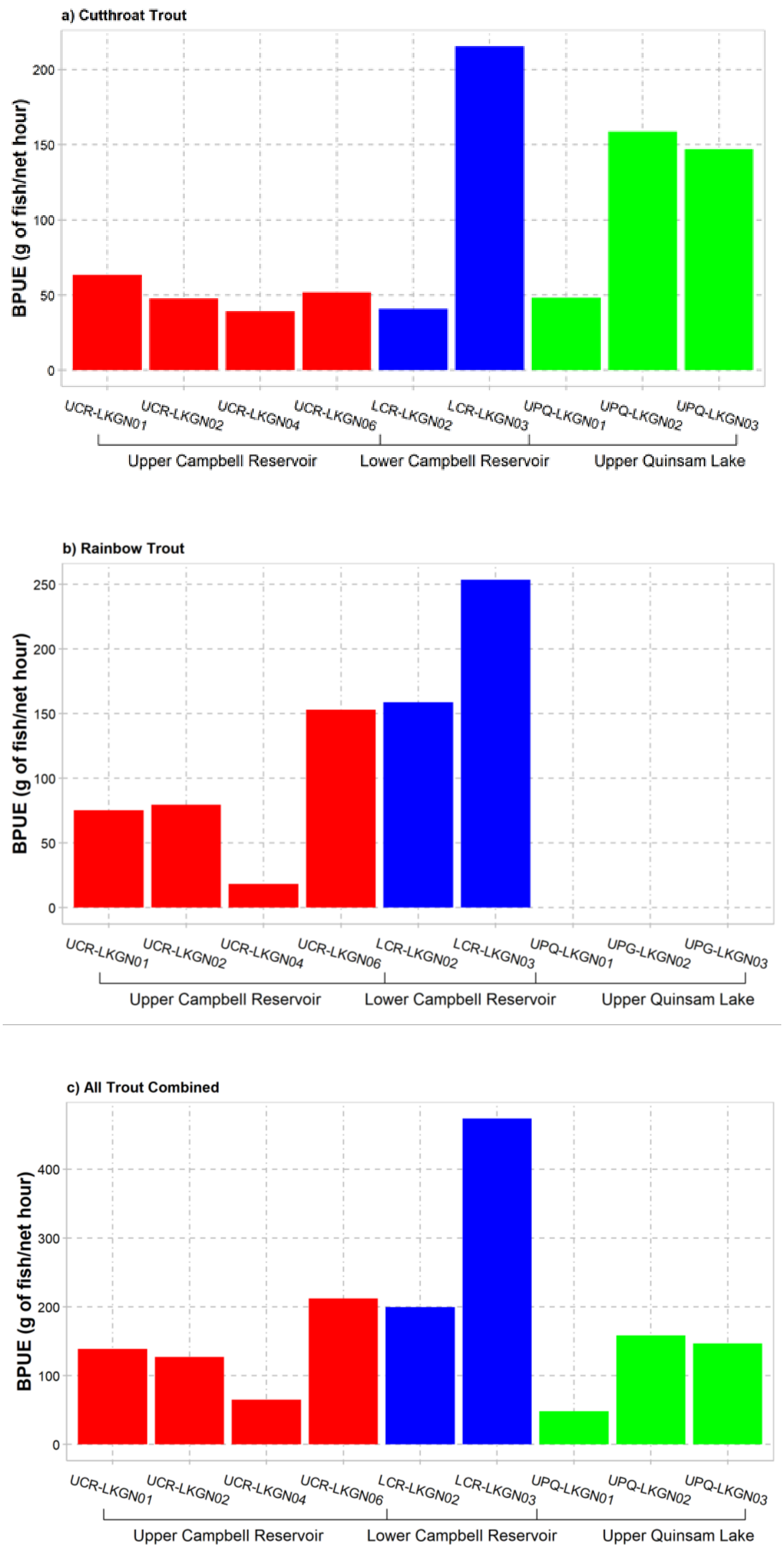


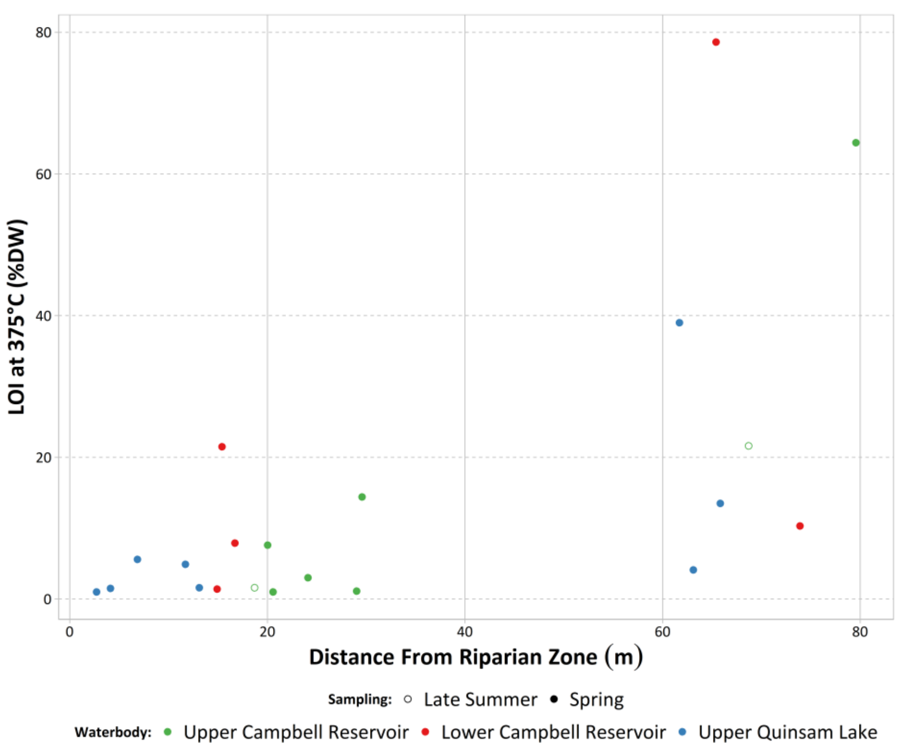
Figure 23. Biomass-per-unit-effort (BPUE; g of fish/net hour) of a) all Cutthroat Trout, b) all Rainbow Trout, and c) all trout combined from Lower Campbell Reservoir, Upper Campbell Reservoir, and Upper Quinsam Lake, August 2021. Biomasses included the estimated weights of 14 Cutthroat Trout and 18 Rainbow Trout based on the length-weight relationship (N =122, 303, 426).



4.3 Sediment Sampling

Sediment organic matter content ranged from 1.0% to 78.6% (Figure 24). The highest value was measured in Lower Campbell Reservoir (LCR-BIV03) at 65.4 m from the riparian zone, and the lowest value was measured in Upper Quinsam Lake (UPQ-BIV04) at 2.7 m from the riparian zone and in Upper Campbell Reservoir (UCR-BIV06) at 20.57 m from the riparian zone (Figure 24). Visual inspection of Figure 24 suggests a weak positive relationship between sediment organic matter content and distance from the riparian zone; however, this weak relationship is predominantly driven by one measurement from each waterbody collected at 60 m from shoreline (>60 m from the riparian zone). Substrate composition of samples showed that a higher percentage of fine sediments were observed at samples collected at 60 m from shoreline, and fine-grained sediments are associated with higher organic matter (Hedges and Keil 1995).

Figure 24. Sediment organic matter (measured as loss on ignition (LOI)) measured in Year 2 (2021) plotted against distance from the riparian zone (m) for all transects in each waterbody.



4.4 Stable Isotope Analysis (SIA) Samples

Basal carbon sources and fish samples collected in Year 2 (2021) for SIA are summarized in Table 5 of Appendix B. In summary, one sample each of riparian leaf litter, littoral periphyton, and small particulate organic material was collected at every transect in Lower Campbell Reservoir, Upper Campbell Reservoir, and Upper Quinsam Lake. Collection of aquatic macrophytes was attempted at every transect but aquatic macrophytes were not found at two transects in both Lower Campbell Reservoir and Upper Campbell Reservoir (Table 5 in Appendix B). Fin clips of Rainbow Trout for SIA were collected at every transect in Lower Campbell Reservoir and Upper Campbell Reservoir, and fin clips of Cutthroat Trout were collected at every transect on all three waterbodies. Single fin clips of Dolly Varden (Lower Campbell Reservoir), Coho Salmon (Upper Quinsam Lake), and Kokanee (Upper Quinsam Lake) were also collected for SIA. In addition, terrestrial and emergent invertebrates collected to test H_03 and H_04 will also be processed for SIA following Year 3. Following sampling in Year 3 (2022), SIA will be conducted to improve understanding of terrestrial carbon sources and processing that is relevant to fish production, and results will be used to test H_05 and H_06.

5. SUMMARY

5.1 JHTMON-5 Status

JHTMON-5 is ongoing and analysis to test the management hypotheses and address the management questions will be completed following Year 3 (2022) sampling for Component 2. For each hypothesis, this section summarizes the status of data collection to date, describes key results, and discusses plans to test the hypothesis following Year 3 data collection. Null hypotheses are described in full in Section 2.2.2 and paraphrased in the subheadings below.

5.2 *H_01*: Littoral Development is Not Correlated with Ratio of Littoral versus Pelagic Energy Flows to Reservoir Fish Populations

H_01 was considered in the first component of JHTMON-5. As described in detail in Hocking *et al.* (2017), results of Component 1 showed that the contribution of littoral energy sources to Cutthroat Trout declined with increasing drawdown magnitude, whereas the opposite trend was observed for Rainbow Trout. Several uncertainties remained after Component 1 (Hocking *et al.* 2017; Abell *et al.* 2018) and H_01 will be re-evaluated with additional data collected during JHTMON-5 Component 2 following the final year (Year 3) of sampling.

5.3 *H_02*: Pelagic Production, As Governed by Water Residence Time, is Not Correlated with the Ratio of Littoral versus Pelagic Energy Flows to Diversion Lake Fish Populations

H_02 was considered in the first component of JHTMON-5, which showed that pelagic contributions to Cutthroat Trout diets increased with annual water residence time, whereas no such relationship was found for Rainbow Trout (Hocking *et al.* 2017). Several uncertainties remained after Component 1 (Hocking *et al.* 2017; Abell *et al.* 2018) that will be addressed in Component 2 using updated SIA using additional stable isotope samples collected during Component 2. Desk-based analysis to support H_08 (Section 5.9) will also address uncertainty regarding how changes to water residence time due to BC Hydro's operations potentially affect fish production.

5.4 H_03: Terrestrial Invertebrate Fall is Not Correlated with Distance from Riparian Zone

Terrestrial invertebrate data have been collected for two years (2020 and 2021) of JHTMON-5 Component 2 using Malaise nets and sticky traps on Upper Campbell Reservoir, Lower Campbell Reservoir, and Upper Quinsam Lake. Malaise net results show no clear relationship between terrestrial invertebrate biomass and distance from riparian zone. It should be noted that the Malaise nets were further from the riparian zone in Year 2 than Year 1 due to the unusually low water levels during the spring sampling trip (Figure 3). This feature reflected low precipitation in spring 2021 and was advantageous from an experimental design perspective as it resulted in data that corresponded to a wide environmental gradient (riparian distance).

In comparison, sticky trap results show that terrestrial invertebrate abundance decreased with increasing distance from the riparian zone across all transects in each waterbody (Figure 11), although there were no clear differences in this relationship among the three waterbodies, based on visual inspection of results. Sticky trap results to date suggest that H_03 will be rejected in the final analysis; however, this will be tested following the final year (Year 3) of Component 2 sampling.

5.5 H_04: Organic Material and Macroinvertebrate Biomass in Littoral Zone are Not Correlated with Drawdown Magnitude or Distance from Riparian Zone

Emergent invertebrate data have been collected for two years (2020 and 2021) of JHTMON-5 Component 2 using floating traps on Upper Campbell Reservoir, Lower Campbell Reservoir, and Upper Quinsam Lake. Floating traps were used in Year 2 (2021) following successful completion of trials in Year 1 (2020), which supported a decision to rely on floating traps to collect invertebrate data to test this hypothesis, rather than using benthic macroinvertebrate data collected using a grab sampler, as originally planned (Suzanne *et al.* 2021). Floating trap results to date do not show a clear relationship between emergent invertebrate biomass and either distance from riparian zone or waterbody drawdown regime (Figure 15). These results contrast with the findings of Sinclair (1965), who found higher abundance of emerging invertebrates at sites outside of the drawdown zone compared to within the drawdown zone at Lower Campbell and Buttle reservoirs. Detailed analysis of these data will be conducted following the final year (Year 3) of Component 2 sampling.

Benthic sediment data do not show any relationship between sediment organic matter content and distance from the riparian zone (Figure 24). However, the highest organic matter content was measured at samples collected at 60 m from the shoreline in all waterbodies, which is likely associated with a higher percentage of organic-rich fine-grained sediments at these locations, which accumulate in deeper offshore areas due to sediment transport (focusing) processes. SIA undertaken following Year 3 will provide further insight into carbon cycling in the waterbodies.

5.6 *$H_0$5*: Riparian Carbon Sources Do Not Make Significant Contributions to Fish Diets

Additional stable isotope samples to address $H_0$5 were collected in Year 2 (Section 4.4) and $H_0$5 will be tested following the final year (Year 3) of Component 2 sampling. $H_0$5 will be tested by quantifying the contribution of carbon from riparian sources to fish tissues, based on the stable isotope signatures of riparian leaf litter and terrestrial invertebrates. This analysis will involve use of SIA mixing models to quantify the contributions of basal carbon sources (e.g., riparian leaf litter vs. aquatic macrophytes vs. algae) to invertebrate groups. Successfully testing $H_0$5 will be contingent on being able to distinguish the riparian basal carbon signature.

5.7 *$H_0$6*: Nitrogen and Carbon Isotopes are Not Correlated with Drawdown Magnitude or Distance from Riparian Zone

Additional stable isotope samples to address $H_0$6 were collected in Year 2 (Section 4.4) and $H_0$6 will be tested following the final year (Year 3) of Component 2 sampling. Testing $H_0$6 will involve examining how isotopic signatures of littoral periphyton, invertebrate, and fish vary among waterbodies, and in relation to drawdown magnitude and distance from the riparian zone. Identification of relationships would indicate that these two factors (which can both be influenced by BC Hydro operations) affect energy fluxes in lentic food webs. Further evaluation may then be required to evaluate the biological significance and management implications of the results.

5.8 *$H_0$7*: Fish Production is Not Correlated with Drawdown Magnitude

Fish community data were collected in Year 2 using gill nets at Upper Campbell Reservoir, Lower Campbell Reservoir, and Upper Quinsam Lake (Section 4.2). Gill net results to date show no clear relationship between fish abundance/biomass and drawdown magnitude among waterbodies. The biomass of Cutthroat Trout was relatively high in Upper Quinsam Lake (low drawdown magnitude) and relatively low in Upper Campbell Reservoir (high drawdown magnitude) (Figure 23); however, based on data collected to date, this relationship was weak and variability among sites within individual waterbodies was high.

Gill net sampling will be repeated in Year 3. $H_0$7 will then be tested using all data collected during Component 2, applicable data collected during Component 1, and historical data collected at Upper Campbell Reservoir as part of JHTMON-3. The latter analysis will involve evaluating whether interannual variability in reservoir drawdown affects relative fish abundance.

5.9 *$H_0$8*: Water Residence Time of Lakes Does Not have Significant Effect on Trout Production.

Following the final year (Year 3) of Component 2 sampling, $H_0$8 will be tested using a desk-based exercise that will involve analysis of data collected by the Water Survey of Canada, data collected as part of other tasks, and consideration of the wider literature on the relationship between water residence time and pelagic production. As part of this task, relationships between BC Hydro's operations and water residence time will be developed to better evaluate how operations affect flushing in lentic waterbodies in the Campbell River watershed.

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PROJECT MAPS

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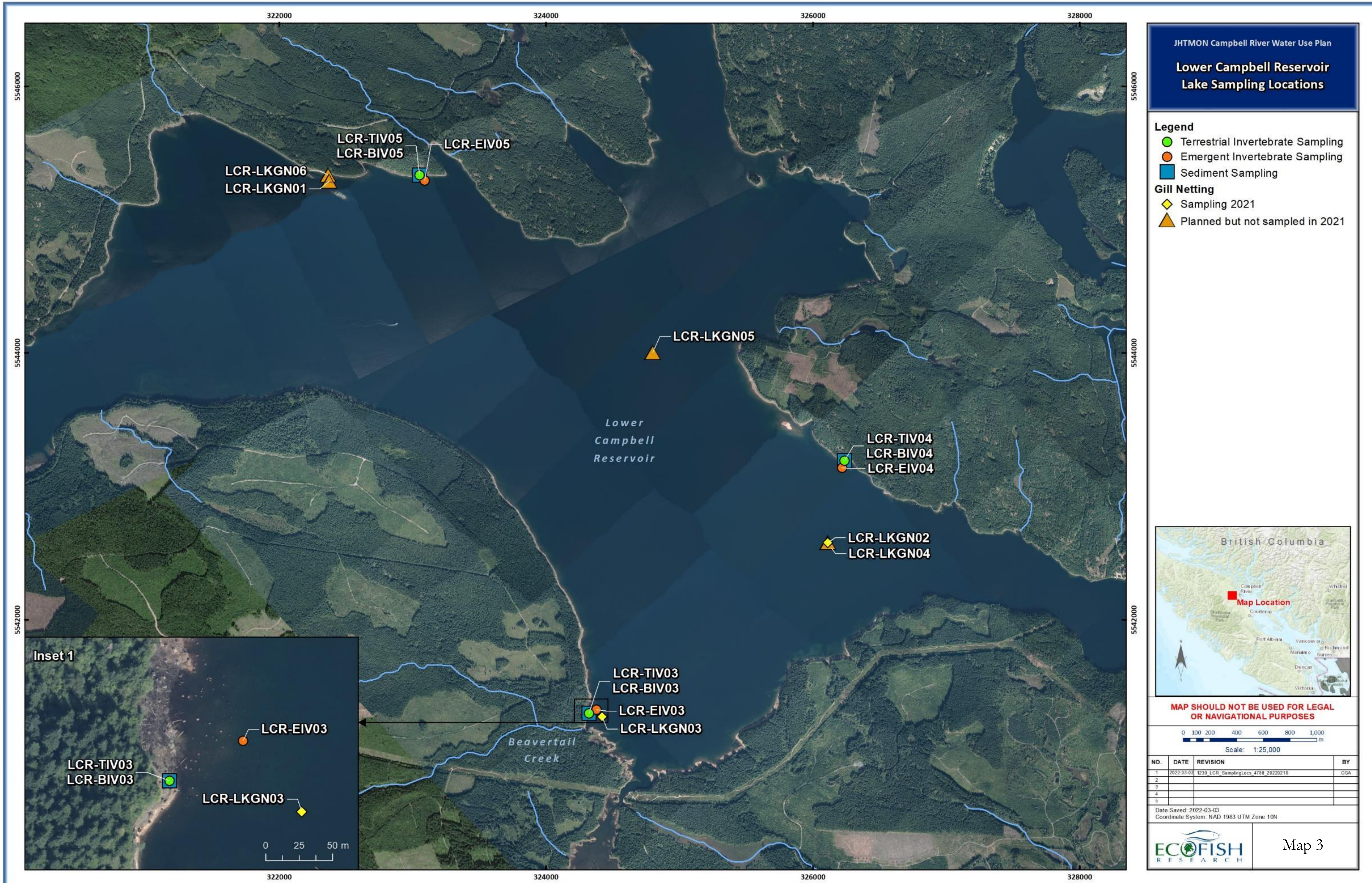

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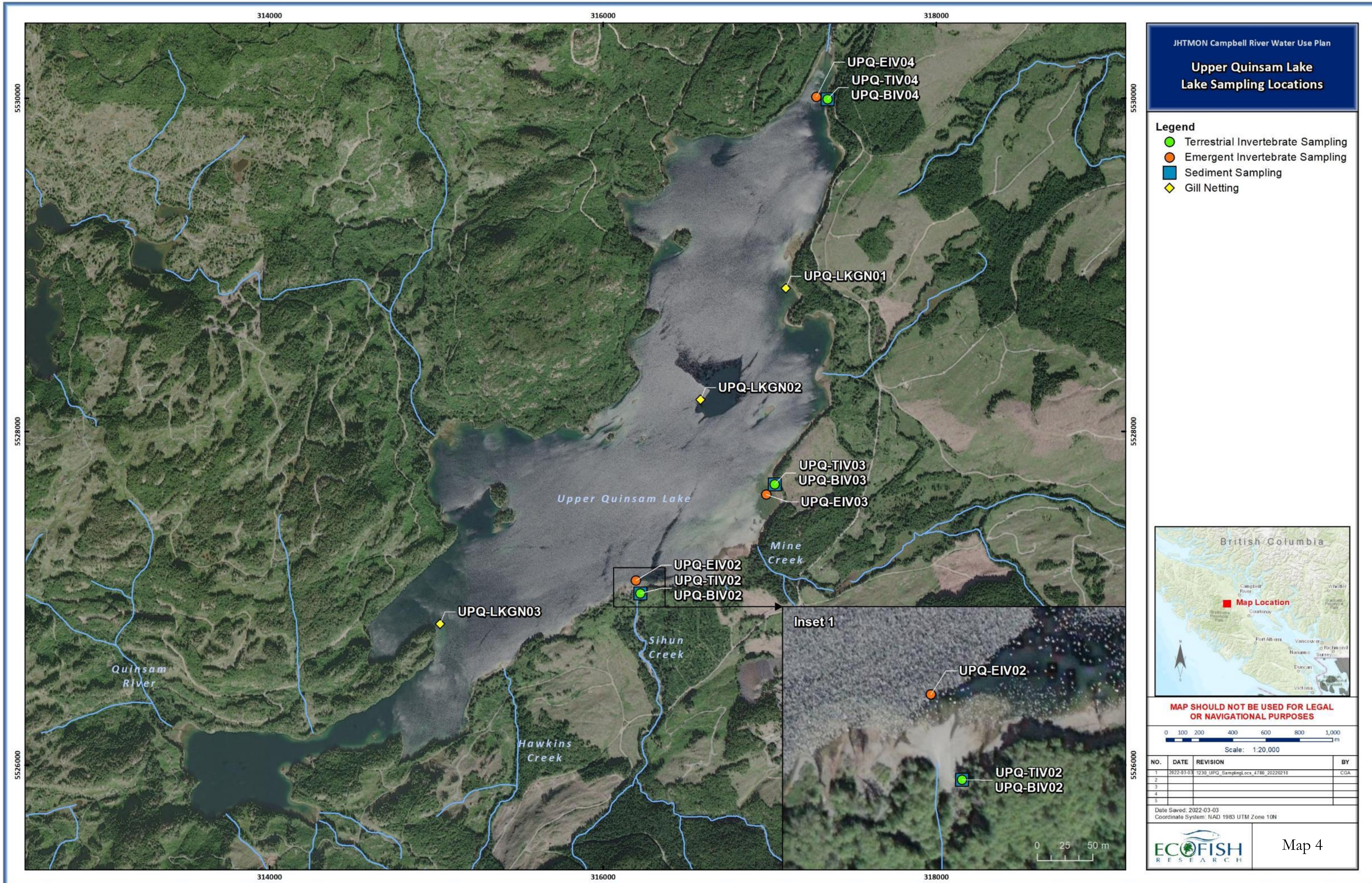

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APPENDICES

Appendix A. Gill Net Capture Data and Representative Photographs, 2021

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Table 1. Raw fish data from gill net sampling in Year 2 (2021).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	295	319	1.24	F	M	SC	1				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB/CT	265	217.8	1.17	F	M	SC	2				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	134	32.3	1.34	M	I	SC	3				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	128	26.8	1.28		I	SC	4				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	100	14.3	1.43		I	SC	5				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	125	30.8	1.58		I	SC	6				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	116	21.6	1.38		I	SC	7				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	128	25.9	1.24		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	127	25.5	1.24		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	124	25.4	1.33		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	102	15.5	1.46		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	103	12.7	1.16		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	116	18.9	1.21		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	120	21.5	1.24		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	116	20.3	1.3		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	123	26.4	1.42		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	110	18.3	1.37		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	122	27	1.49		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	115	19.9	1.31		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	120	26	1.5		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	104	14.6	1.3		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	123	23.1	1.24		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	120										
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	125										
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	110										
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	RB	95										
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	1	CC	93	8.9	1.11								
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	CT	321	348	1.05	F	M	SC	28				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	CT	392	644	1.07	M	M	SC	29				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	CT	273	211.3	1.04	F	M	SC	30				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	CT	346	482	1.16	F	M	SC	31				

[1]NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Table 1. Continued (2 of 16).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	CT	236	154.1	1.17	M	I	SC	32				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	CT	336			F	M	SC	33				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	CT	235			F	I	SC	34				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	CT	295				UNK	SC	35				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	CT	275				UNK	SC	36				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	CT	260				UNK	SC	37				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	CT	265				UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	CT	295				UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	DV	244	156.7	1.08	F	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	RB	300	266.6	0.99	F	M	SC	41				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	RB	314	327	1.06	F	M	SC	42				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	RB	276	257.3	1.22	M	M	SC	43				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	RB	244	169.4	1.17	F	M	SC	44				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	RB	225	134.8	1.18	M	I	SC	45				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	RB	283	275.7	1.22	F	M	SC	46				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	RB	238	170.5	1.26	M	M	SC	47				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	RB	258			F	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	RB	240										
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	RB	240			F	I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	3	CT	220	120.6	1.13			SC	51				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	6	RB	308	326	1.12	M	M	SC	52				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	6	CT	412			M	M	SC	53				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	6	CT	392	681	1.13	M	M	SC	54				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	6	RB	268	236.3	1.23	M	I	SC	55				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	5	CT	268	202.2	1.05	F	M	SC	56				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	5	CT	251	148.8	0.94	M	I	SC	57				
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	5	CT	199	89.3	1.13	M	I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	5	RB	153	50.4	1.41		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	5	RB	214	130.3	1.33	M	I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	5	RB	140				I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	5	RB	270	180.6	0.92	M	M						

[1]NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Table 1. Continued (3 of 16).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	5	RB	245			M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	5	RB	235										
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	5	RB	160	53.5	1.31		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	5	RB	304	308	1.1	F	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	2	RB	197	107.4	1.4		I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	2	RB	316	358	1.13	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	2	CT	352	531	1.22	F	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	2	CT	394	678	1.11	F	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	2	CT	390	687	1.16	F	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	2	CT	400			F	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	2	CT	390	564	0.95	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	2	CT	352	444	1.02	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	2	CT	380										
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	SK	1	4	NFC											
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	2	NFC											
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	4	NFC											
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	3	RB	223	130.2	1.17		UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	3	RB	219	127.8	1.22	F	I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	3	RB	286	277.6	1.19	F	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	3	RB	251	174.3	1.1		UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	3	RB	216	120.5	1.2								
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	3	CT	302	298.3	1.08	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	3	RB	292	247.9	1	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	3	RB	200	108.5	1.36		UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	3	RB	288	308	1.29	F	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	3	RB	234	153.3	1.2	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	3	RB	218	128.2	1.24	M	I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	3	RB	255	203.4	1.23	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	3	RB	255	177.3	1.07	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	3	RB	256	200.3	1.19		UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	1	RB	144	37.7	1.26		UNK						

[1] NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Table 1. Continued (4 of 16).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	1	RB	140	32.1	1.17		UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	1	RB	120	22.3	1.29		UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	1	RB	112	16.7	1.19		UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	1	RB	115	17.5	1.15		UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	1	RB	280	262.3	1.19	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	5	CT	191	70.3	1.01		UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	5	CT	195	89.1	1.2	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	5	CT	257	169.8	1		UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	5	RB	264	209	1.14		UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	5	RB	157	47.6	1.23		UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	5	RB	231	166.2	1.35	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	5	RB	292	300.6	1.21	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	5	RB	215	116.2	1.17		UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	5	RB	243	171.7	1.2	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	5	RB	240	166.4	1.2		UNK						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	5	RB	216	129.7	1.29	F	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	5	RB	265	215.4	1.16	F	I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	6	CT	287	268.7	1.14	F	I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	6	RB	217	144	1.41	F	I						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	6	RB	322	318	0.95	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	6	RB	288	257.8	1.08	F	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	6	RB	296	297.5	1.15	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	6	RB	298	329	1.24	F	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	6	RB	293	308	1.22	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	6	RB	327	365	1.04	M	M						
Lower Campbell Reservoir	LCR-LKGN03	2021-08-31	FL	2	6	RB	244	171.1	1.18	M	I						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	1	4	CT	304	330	1.17	F	M	SC	1				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	1	3	CT	297	276	1.05	M	I	SC	2				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	1	2	CT	372	547	1.06	F	M	SC	3				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	1	1	NFC											
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	1	5	NFC											

[1]NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Table 1. Continued (5 of 16).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	1	6	NFC											
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	6	RB	263	216	1.19	M	I	SC	1				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	6	RB	293	278.6	1.11	F	M	SC	2				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	219	116.5	1.11	F	M	SC	3				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	224	150.8	1.34	M	M	SC	4				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	222	133.8	1.22	F	I	SC	5				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	248	181.7	1.19	M	M	SC	6				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	232	139.9	1.12	M	I	SC	7				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	CT	408	720	1.06	M	M	SC	8				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	238	173.5	1.29	F	M	SC	9				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	245	163.3	1.11	F	M	SC	10				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	212	125.3	1.32	F	I	SC	11				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	242	150.6	1.06	F	M	SC	12				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	195	106.3	1.43	M	I	SC	13				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	240	159.3	1.15	M	M	SC	14				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	256	188.8	1.13	M	M	SC	15				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	207	119	1.34	M	M	SC	16				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	263	214.2	1.18	M	M	SC	17				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	217	119.7	1.17	M	I	SC	18				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	234	164.2	1.28	M	M	SC	19				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	277	260	1.22	M	M	SC	20				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	209	117.9	1.29	M	I	SC	21				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	204	109.8	1.29	M	I	SC	22				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	224	134	1.19	F	M	SC	23				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	204	104.6	1.23	M	I						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	187	85.2	1.3	M	I						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	5	RB	251	198.4	1.25	F	M						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	214	126.8	1.29	M	M	SC	27				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	276	253.8	1.21	F	M	SC	28				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	237	152.9	1.15	F	M	SC	29				
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	237	141.1	1.06	F	M	SC	30				

[1]NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Table 1. Continued (6 of 16).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	219	137.7	1.31	F	I						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	204	107.8	1.27	F	I						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	246	185.2	1.24	M	M						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	207	116.4	1.31	M	M						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	211	110.1	1.17	F	I						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	248			M	M						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	200	110.5	1.38	M	M						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	231	156.4	1.27	M	M						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	208	102	1.13	F	M						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	207	127.5	1.44	M	M						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	222	137	1.25	M	M						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	237	168.1	1.26	M	M						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	227	153.9	1.32	F	M						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	242	167.7	1.18	M	M						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	230	154.5	1.27	M	I						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	209	105	1.15	F	M						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	231	163.7	1.33	M	M						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	3	RB	304	307	1.09	M	M						
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	1	NFC											
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	2	NFC											
Lower Campbell Reservoir	LCR-LKGN02	2021-08-31	SK	2	4	NFC											
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	FL	2	2	NFC											
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	FL	2	4	NFC											
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	FL	2	6	NFC											
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	FL	2	1	CT	130	22.8	1.04		UNK	SC	1				
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	FL	2	3	CT	307	288.5	1	M	M	SC	2				
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	FL	2	3	CT	296	298	1.15	M	M	SC	3				
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	FL	2	3	CT	235	149.8	1.15	M	I	SC	4				
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	FL	2	5	CT	275	240.5	1.16	M	M	SC	5				
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	FL	2	5	CT	276	256.2	1.22	M	M	SC	6				
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	1	NFC											

[1]NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Table 1. Continued (7 of 16).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	4	NFC											
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	5	CT	333	370	1	M	M	SC	1				
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	5	CT	225	136.2	1.2	M	I	SC	2				
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	5	CT	249	148.3	0.96	F	M	SC	3				
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	5	CT	199	94.7	1.2	M	I	SC	4				
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	2	CT	312	361	1.19	M	M						
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	2	KO	191	91.2	1.31		I	SC	6			FC	6
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	6	CT	303	329	1.18	F	M						
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	6	CT	324	316	0.93	F	M						
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	KO	192	100.6	1.42	F	I	SC	9			FC	9
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CT	155				UNK	SC	10				
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CC	173	64.6	1.25								
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CC	115	16.9	1.11								
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CT	252	201.2	1.26	F	I						
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CT	308	333	1.14	M	M						
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CT	298	294.1	1.11	F	M						
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CT	292	251.1	1.01	F	M						
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CT	299	257.3	0.96	M	M						
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CT	270	208.2	1.06	F	I						
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CT	194	75.5	1.03		UNK						
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CT	271	201	1.01	F	M						
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CT	253	189.1	1.17	M	M						
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CT	226				UNK						
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CT	272	252.8	1.26	F	M						
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CT	254	185.3	1.13								
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CT	232	142	1.14	M	I						
Upper Quinsam Lake	UPQ-LKGN03	2021-08-26	SK	1	3	CT	260	195.3	1.11	M	I						
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	6	CT	365	516	1.06	M	M	SC	1				
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	3	CT	342	399	1	M	M	SC	2				
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	3	CT	309	276	0.94	M	M	SC	3				
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	3	CT	298	247	0.93	M	M						

[1]NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Table 1. Continued (8 of 16).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	3	CT	238	158.5	1.18	M	I	SC	5				
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	3	CT	231	139.6	1.13		UNK	SC	6				
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	3	CT	234	130.3	1.02	M	I	SC					
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	5	CT	213	106.5	1.1	M	I	SC	8				
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	5	CT	231	137.9	1.12	M	M	SC	9				
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	5	CT	208	104.9	1.17	M	I	SC	10				
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	5	CT	235	129.3	1	F	I	SC					
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	5	CT	245	158.7	1.08	M	I	SC					
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	5	CT	221	111.7	1.03	M	M	SC					
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	5	CT	320	338	1.03	F	M	SC	14			FC	14
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	1	NFC											
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	2	NFC											
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	2	4	NFC											
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	1	3	CT	350	473	1.1	M	M	SC	1				
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	1	3	CT	297	277	1.06	F	M						
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	1	2	CT	365	619	1.27	M	M						
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	1	2	CT	333	453	1.23	M	M						
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	1	6	CT	320	414	1.26	M	M						
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	1	5	CT	342	438	1.09	M	M						
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	1	5	CT	324	337	0.99	M	M						
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	1	5	CT	259	162.9	0.94	M	I						
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	1	5	CT	226	112.6	0.98	M	I						
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	1	5	CT	207	89.3	1.01	M	I						
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	1	5	CT	208	86.2	0.96	M	I						
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	1	5	CT	232	116.6	0.93	F	I						
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	1	4	NFC											
Upper Quinsam Lake	UPQ-LKGN02	2021-08-26	SK	1	1	NFC											
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	FL	2	1	NFC											
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	FL	2	2	NFC											
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	FL	2	4	NFC											
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	FL	2	5	NFC											

[1]NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Table 1. Continued (9 of 16).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	FL	2	6	CT	316	342	1.08	M	M	SC	1				
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	SK	1	4	NFC											
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	SK	1	1	CO	90	11.9	1.63		UNK	SC	1			FC	1
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	SK	1	5	CT	202	94.3	1.14	M	I	SC	2				
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	SK	1	5	CT	271	196.6	0.99	F	M	SC	3				
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	SK	1	5	CT	256	164.5	0.98	M	I	SC	4				
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	SK	1	5	CC	148										
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	SK	1	3	CT	257	193.7	1.14	M	M	SC	6				
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	SK	1	3	CT	284	292.5	1.28	M	M	SC	7				
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	SK	1	6	CT	284	285.6	1.25	F	M	SC	8				
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	SK	1	6	CT	282	273.7	1.22	F	M	SC	9				
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	FL	2	3	CT	257	180.4	1.06	M	M	SC	2				
Upper Quinsam Lake	UPQ-LKGN01	2021-08-26	SK	1	2	NFC											
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	4	NFC											
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	3	RB	233	144	1.14	M	M	SC	1				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	3	CT	338	422	1.09	F	M	SC	2	OT	2		
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	1	RB	141	32.7	1.17		I	SC	3				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	1	RB	131	29.7	1.32		I	SC	4				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	1	RB	128	30.8	1.47		I	SC	5				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	6	CT	297	323	1.23	F	M	SC	6	OT	6		
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	6	CT	304	374	1.33	F	M	SC	7	OT	7		
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	2	CT	252	180.3	1.13	F	I	SC	8				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	2	CT	356	527	1.17	M	M	SC	9	OT	9		
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	2	RB	231	143.3	1.16	F	M	SC	10				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	2	RB	273	209.8	1.03	M	M	SC	11	OT	11		
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	2	RB	248	153	1	F	M	SC	12				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	2	RB	230	151.6	1.25	M	I	SC	13				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	2	RB	216	120.3	1.19	M	I	SC	14				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	2	RB	137	26.5	1.03		I						
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	5	RB	172	64.8	1.27		I	SC	16				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	5	RB	224	129.6	1.15		I	SC	17				

[1]NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Table 1. Continued (10 of 16).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	5	RB	178	68.6	1.22		I	SC	18				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	5	RB	176	72.1	1.32		I	SC	19				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	5	RB	214	111.1	1.13	F	M	SC	20				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	5	CT	250	151.9	0.97	F	I	SC	21				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	5	RB	182	91.7	1.52	F	I	SC	22				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	5	RB	190	80.4	1.17	M	I	SC	23				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	5	RB	198	85.3	1.1	M	I						
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	5	RB	224	149.3	1.33	F	M						
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	5	RB	219	141.8	1.35		UNK	SC	26				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	5	RB	234	160.7	1.25		UNK	SC	27				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	SK	1	5	RB/CT	296	275.9	1.06	M	I	SC	28	OT	28	FC	28
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	2	NFC											
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	4	NFC											
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	6	NFC											
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	147	43.3	1.36		UNK	SC	1				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	131	29.7	1.32			SC	2				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	142	34.7	1.21			SC	3				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	135	31.2	1.27								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	132	29	1.26								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	132	31.5	1.37								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	115	21	1.38			SC	7				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	129	29.8	1.39								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	149	44.2	1.34								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	152	40.9	1.16			SC	10				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	139	34.6	1.29			SC	11				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	122	25	1.38								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	116	18.6	1.19								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	120	25.1	1.45								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	132	32	1.39								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	150	43	1.27			SC	16				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	130	29.7	1.35								

[1]NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Table 1. Continued (11 of 16).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	122	28.1	1.55			SC	18				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	116	21	1.35								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	128	29.5	1.41								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	119	22.7	1.35								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	116	27.5	1.76								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	125	24.3	1.24								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	143	34.5	1.18			SC	24				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	128	25.9	1.24								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	130	24.5	1.12								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	115	21	1.38								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	125	26.4	1.35								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	111	17.2	1.26								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	138	37.5	1.43			SC	30				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	107	14.5	1.18								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	125	23.8	1.22								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	132	27	1.17								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	116	16.4	1.05								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	130	28.4	1.29			SC	35				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	100	16.2	1.62			SC	36				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	134	30.2	1.26								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	138	35.6	1.35								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	126	27.7	1.38								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	128	24.1	1.15								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	121	23.8	1.34								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	109	17.2	1.33								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	111										
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	123										
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	94	11.4	1.37								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	123	26.1	1.4								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	116										
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	127	25.5	1.24								

[1]NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Table 1. Continued (12 of 16).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	126	28.7	1.43			SC	49				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	138	29.4	1.12								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	124	27	1.42			SC	51				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	141	35	1.25								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	135	29.8	1.21			SC	53				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	147	43.5	1.37			SC	54				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	124										
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	124	24	1.26								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	1	RB	121	21.9	1.24								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	5	RB	167										
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	5	RB	171	75.5	1.51								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	5	RB	194	93.7	1.28								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	5	RB	141	40.7	1.45								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	5	RB	164										
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	5	RB	214	130.5	1.33	M	M	SC	63				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	5	RB	195	101.4	1.37			SC	64				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	5	RB	222	129	1.18	M	M						
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	3	RB	219	127.9	1.22								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	3	RB	214	127	1.3								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	3	RB	170	63.1	1.28								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	3	RB	227	146.5	1.25								
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	3	RB	237	160.5	1.21	F	M	SC	70				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	3	RB	236	138.3	1.05	F	M	SC	71				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	3	RB	233	150.2	1.19	F	M	SC	72				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	3	RB	227	140	1.2	F	I	SC	73				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	3	RB	223	147	1.33	M	I	SC	74				
Upper Campbell Reservoir	UCR-LKGN06	2021-08-24	FL	2	3	RB	268	168.7	0.88	F	M	SC	75	OT	75		
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	SK	1	4	NFC											
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	SK	1	6	CT	345	501	1.22	M	M	SC	1	OT	1		
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	SK	1	6	CT	335				UNK	SC	2	OT	2		
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	SK	1	6	CT	210	96	1.04	M	I	SC	3				

[1]NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Table 1. Continued (13 of 16).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	SK	1	5	RB	240	148.3	1.07		UNK	SC	4				
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	SK	1	5	CT	202	86.5	1.05	M	I	SC	5				
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	SK	1	5	CC	126	20.6	1.03								
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	SK	1	3	RB/CT	230	130.5	1.07	M	I	SC	7			FC	7
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	SK	1	3	RB/CT	249	164.4	1.06	M	I	SC	8			FC	8
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	SK	1	2	CT	361	530	1.13	F	M	SC	9	OT	9		
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	SK	1	1	RB	123	23.7	1.27		I	SC	10				
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	SK	1	1	RB	91	10.5	1.39		I	SC	11				
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	SK	1	1	RB	129	26.7	1.24		I	SC	12				
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	SK	1	1	RB	128	26.8	1.28		I	SC	13				
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	FL	2	2	NFC											
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	FL	2	4	NFC											
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	FL	2	6	NFC											
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	FL	2	1	RB	122	25.7	1.42		I	SC	1				
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	FL	2	1	RB	124	31.9	1.67		I	SC	2				
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	FL	2	1	RB	141	34.6	1.23		I	SC	3				
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	FL	2	1	RB	138	35.4	1.35		I	SC	4				
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	FL	2	5	RB	145	44.8	1.47		I	SC	5				
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	FL	2	3	RB	242	138.7	0.98	M	I	SC	6				
Upper Campbell Reservoir	UCR-LKGN04	2021-08-24	FL	2	3	RB	242	175.4	1.24	F	M	SC	7				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	2	NFC											
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	4	NFC											
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	6	NFC											
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	214	103.6	1.06	F	M	SC	1				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	203	103.7	1.24	M	M	SC	2				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	169	65.8	1.36	M	I	SC	3				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	181	71.3	1.2	M	I	SC	4				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	191	93.8	1.35	M	I	SC	5				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	180	76.1	1.3	F	I	SC	6				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	186	84.9	1.32	M	M	SC	7				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	230	122.5	1.01		UNK	SC	8				

[1]NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Table 1. Continued (14 of 16).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	190	82.6	1.2		UNK	SC	9				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	187	85.9	1.31	F	I	SC	10				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	193	87	1.21		UNK	SC	11				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	177	73.4	1.32	M	I	SC	12				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	190	81.9	1.19	M	M	SC	13				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	199	104.6	1.33	M	M	SC	14				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	184	77	1.24		UNK	SC	15				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	169	71.5	1.48	M	I	SC	16				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	149	43.7	1.32		UNK	SC	17				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	178	77.7	1.38		UNK	SC	18				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	179	85.3	1.49		UNK	SC	19				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	187	86.7	1.33	F	M	SC	20				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	5	RB	224	130.2	1.16	M	M	SC	21				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	1	RB	118	22	1.34		I	SC	22				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	1	RB	141	39.8	1.42		I	SC	23				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	1	RB	155	48.5	1.3		I	SC	24				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	1	RB	146	36	1.16		I	SC	25				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	1	RB	128	29.2	1.39		I	SC	26				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	1	RB	122	24	1.32		I	SC	27				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	1	RB	112	17.8	1.27		I	SC	28				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	1	RB	98	14.7	1.56		I	SC	29				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	1	RB	105	17.6	1.52		I	SC	30				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	1	RB	96	11.8	1.33		I						
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	3	RB	253	162.9	1.01	F	M	SC	32				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	3	RB	282	194.8	0.87	M	M	SC	33	OT	33		
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	3	RB	265	179.2	0.96		UNK	SC	34	OT	34		
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	3	RB	254	166.5	1.02		UNK	SC	35				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	SK	1	3	RB	197	100.8	1.32	M	I	SC	36				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	FL	2	1	NFC											
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	FL	2	2	NFC											
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	FL	2	4	NFC											

[1]NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Table 1. Continued (15 of 16).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	FL	2	6	CT	340	447	1.14	F	M	SC	1	OT	1		
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	FL	2	6	CT	374	593	1.13	M	M	SC	2	OT	2		
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	FL	2	3	CT	306	347	1.21	F	M	SC	3	OT	3		
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	FL	2	5	CT	309	331	1.12	F	M	SC	4	OT	4		
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	FL	2	5	CT	294	297	1.17	F	I	SC	5	OT	5		
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	FL	2	5	RB	219	141.5	1.35		UNK	SC	6				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	FL	2	5	RB	194	98.7	1.35		UNK	SC	7				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	FL	2	5	RB	196	93.9	1.25		UNK	SC	8				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	FL	2	5	RB	185	82.8	1.31		UNK	SC	9				
Upper Campbell Reservoir	UCR-LKGN02	2021-08-23	FL	2	5	RB	177	73.8	1.33		UNK	SC	10				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	1	NFC											
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	2	NFC											
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	4	NFC											
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	6	CT	328	393	1.11	F	M	SC	1	OT	1		
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	6	CT	324	344	1.01	F	M	SC	2	OT	2		
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	6	CT	360			F	M			OT	3		
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	3	CT	314	301	0.97	F	M	SC	4	OT	4		
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	3	CT	331	377	1.04	F	M	SC	5	OT	5		
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	3	CT	243	146	1.02	F	I	SC	6				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	3	CT	354	428	0.96	F	M	SC	7	OT	7		
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	3	CT	250	181.9	1.16	F	I	SC	8				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	3	RB	267	221.5	1.16	M	M	SC	9	OT	9		
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	3	RB	242	166.9	1.18	F	M	SC	10				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	3	RB	207	95.7	1.08	M	I	SC	11				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	3	RB	255	186.6	1.13	F	M	SC	12				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	5	CT	230	116.3	0.96	M	I	SC	13				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	5	RB	161	52.8	1.27	M	I	SC	14				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	5	RB	152	47.1	1.34	M	I	SC	15				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	5	RB	263	153.3	0.84	F	M	SC	16	OT	16		
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	5	RB	252	184.7	1.15	M	M	SC	17				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	SK	1	5	RB	239	163.7	1.2			SC	18				

[1]NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Table 1. Continued (16 of 16).

Waterbody	Waypoint/Site Name	Date	Net Type	Set #	Panel #	Species [1]	Measured Length (mm)	Weight (g)	K	Sex	Sexual Maturity (I, M, UNK)	Age Sample (Type 1)	Age Sample Number 1	Age Sample (Type 2)	Age Sample Number 2	DNA Sample Type	DNA Sample Number
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	1	NFC											
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	2	NFC											
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	4	NFC											
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	6	NFC											
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	3	RB	291	201	0.82	F	M	SC	1	OT	1		
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	3	RB	302	223.4	0.81		UNK	SC	2	OT	2		
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	3	RB	293	212	0.84	F	M	SC	3	OT	3		
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	3	RB	277	199.2	0.94	F	M	SC	4	OT	4		
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	3	RB	275	201.6	0.97	F	M	SC	5	OT	5		
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	3	RB	240	162.9	1.18	F	M	SC	6				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	3	RB	221	128.6	1.19	M	I	SC	7				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	3	RB	252	179.3	1.12	M	M	SC	8				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	3	RB	242	149	1.05		UNK	SC	9				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	5	RB	236	129.4	0.98		UNK	SC	10				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	5	RB	198	91.8	1.18	F	I	SC	11				
Upper Campbell Reservoir	UCR-LKGN01	2021-08-23	FL	2	5	RB	163	53.9	1.24		I	SC	12				

[1]NFC-No Fish Caught, RB- Rainbow Trout, CT-Cutthroat Trout, DV-Dolly Varden, CO-Coho, KO-Kokanee, CC-Sculpin

Figure 1. Example of typical gill net gear deployment location (LCR-LKGN02) during 2021 gill net surveys.

Figure 2. 297 mm Cutthroat Trout captured at LCR-LKGN02 on August 31, 2021.

Figure 3. 408 mm Cutthroat Trout captured at LCR-LKGN02 on August 31, 2021.

Figure 4. 187 mm Rainbow Trout captured at LCR-LKGN02 on August 31, 2021.

Figure 5. 298 mm Rainbow Trout captured at LCR-LKGN02 on August 31, 2021.

Figure 6. Example of typical gill net gear deployment location (LCR-LKGN03) during 2021 gill net surveys.

Figure 7. 100 mm Rainbow Trout captured at LCR-LKGN03 on August 31, 2021.

Figure 8. 153 mm Rainbow Trout captured at LCR-LKGN03 on August 31, 2021.

Figure 9. 295 mm Rainbow Trout captured at LCR-LKGN03 on August 31, 2021.

Figure 10. 265 mm Rainbow/Cutthroat Trout captured at LCR-LKGN03 on August 31, 2021.

Figure 11. 273 mm Cutthroat Trout captured at LCR-LKGN03 on August 31, 2021.

Figure 12. 398 mm Cutthroat Trout captured at LCR-LKGN03 on August 31, 2021.

Figure 13. 244 mm Dolly Varden captured at LCR-LKGN03 on August 31, 2021.

Figure 14. 93 mm Sculpin captured at LCR-LKGN03 on August 31, 2021.

Figure 15. Example of typical gill net gear deployment location (UCR-LKGN01) during 2021 gill net surveys.

Figure 16. 163 mm Rainbow Trout captured at UCR-LKGN01 on August 23, 2021.

Figure 17. 293 mm Rainbow Trout captured at UCR-LKGN01 on August 23, 2021.

Figure 18. 230 mm Cutthroat Trout captured at UCR-LKGN01 on August 23, 2021.

Figure 19. 328 mm Cutthroat Trout captured at UCR-LKGN01 on August 23, 2021.

Figure 20. Example of typical gill net gear deployment location (UCR-LKGN02) during 2021 gill net surveys.

Figure 21. 96 mm Rainbow Trout captured at UCR-LKGN02 on August 23, 2021.

Figure 22. 155 mm Rainbow Trout captured at UCR-LKGN02 on August 23, 2021.

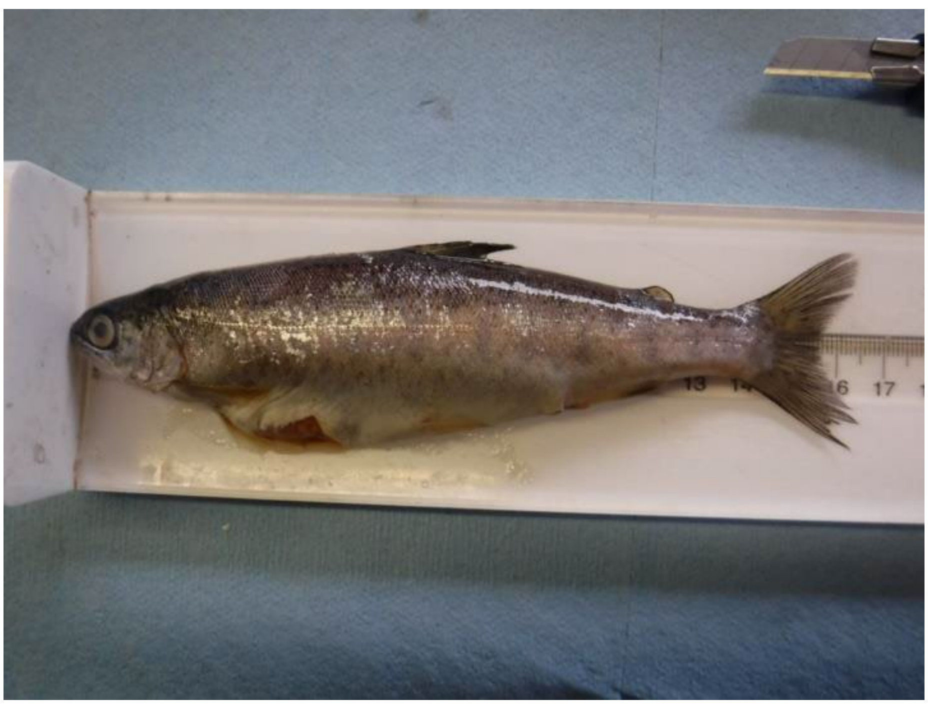

Figure 23. 252 mm Rainbow Trout captured at UCR-LKGN02 on August 23, 2021.

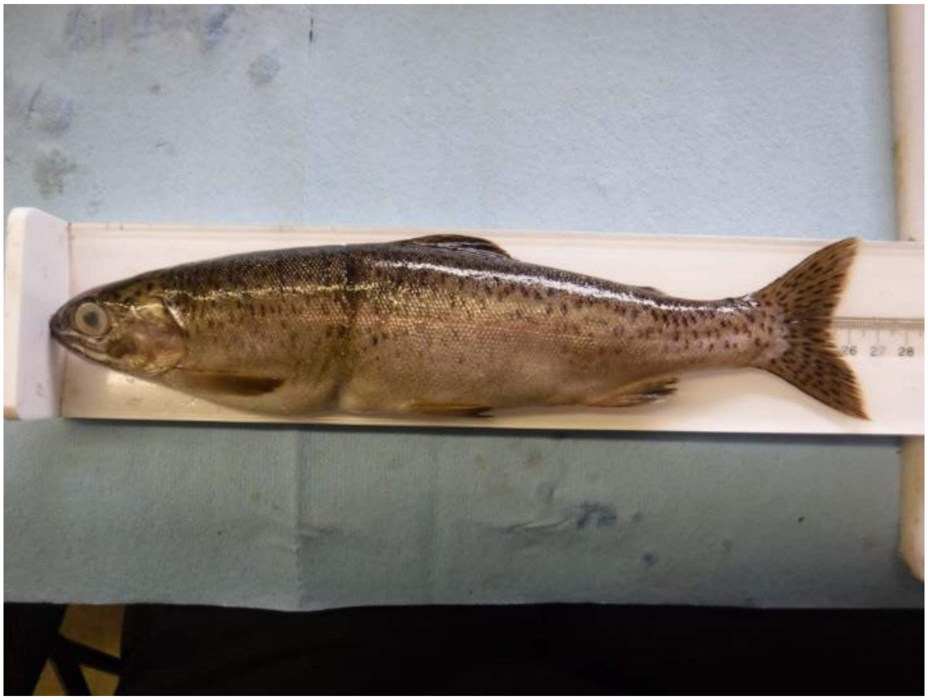

Figure 24. 294 mm Cutthroat Trout captured at UCR-LKGN02 on August 23, 2021.

Figure 25. 376 mm Cutthroat Trout captured at UCR-LKGN02 on August 23, 2021.

Figure 26. Example of typical gill net gear deployment location (UCR-LKGN04) during 2021 gill net surveys.

Figure 27. 90 mm Rainbow Trout captured at UCR-LKGN04 on August 24, 2021.

Figure 28. 141 mm Rainbow Trout captured at UCR-LKGN04 on August 24, 2021.

Figure 29. 242 mm Rainbow Trout captured at UCR-LKGN04 on August 24, 2021.

Figure 30. 202 mm Cutthroat Trout captured at UCR-LKGN04 on August 24, 2021.

Figure 31. 345 mm Cutthroat Trout captured at UCR-LKGN04 on August 24, 2021.

Figure 32. 230 mm Rainbow/Cutthroat Trout captured at UCR-LKGN04 on August 24, 2021.

Figure 33. 126 mm Sculpin captured at UCR-LKGN04 on August 24, 2021.

Figure 34. Example of typical gill net gear deployment location (UCR-LKGN06) during 2021 gill net surveys.

Figure 35. 115 mm Rainbow Trout captured at UCR-LKGN06 on August 24, 2021.

Figure 36. 150 mm Rainbow Trout captured at UCR-LKGN06 on August 24, 2021.

Figure 37. 268 mm Rainbow Trout captured at UCR-LKGN06 on August 24, 2021.

Figure 38. 297 mm Cutthroat Trout captured at UCR-LKGN06 on August 24, 2021.

Figure 39. 296 mm Rainbow/Cutthroat Trout captured at UCR-LKGN06 on August 24, 2021.

Figure 40. Example of typical gill net gear deployment location (UPQ-LKGN01) during 2021 gill net surveys.

Figure 41. 202 mm Cutthroat Trout captured at UPQ-LKGN01 on August 26, 2021.

Figure 42. 316 mm Cutthroat Trout captured at UPQ-LKGN01 on August 26, 2021.

Figure 43. 90 mm Coho captured at UPQ-LKGN01 on August 26, 2021.

Figure 44. 148 mm Sculpin captured at UPQ-LKGN01 on August 26, 2021.

Figure 45. Example of typical gill net gear deployment location (UPQ-LKGN02) during 2021 gill net surveys.

Figure 46. 365 mm Cutthroat Trout captured at UPQ-LKGN02 on August 26, 2021.

Figure 47. 207 mm Cutthroat Trout captured at UPQ-LKGN02 on August 26, 2021.

Figure 48. Example of typical gill net gear deployment location (UPQ-LKGN03) during 2021 gill net surveys.

Figure 49. 130 mm Cutthroat Trout captured at UPQ-LKGN03 on August 26, 2021.

Figure 50. 225 mm Cutthroat Trout captured at UPQ-LKGN03 on August 26, 2021.

Figure 51. 333 mm Cutthroat Trout captured at UPQ-LKGN03 on August 26, 2021.

Figure 52. 192 mm Kokanee captured at UPQ-LKGN03 on August 26, 2021.

Figure 53. 173 mm Sculpin captured at UPQ-LKGN03 on August 26, 2021.

Appendix B. Invertebrate Analysis Results and Summary of Stable Isotope Analysis Samples, 2021

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Table 1. Terrestrial invertebrate catch-per-unit-effort (CPUE) sampled using Malaise nets in Year 2 (2021).

Waterbody	Site ID	Deployment Duration (hh:mm)	CPUE (# of individuals/hour)							Total CPUE
			Araneae	Coleoptera	Diptera	Hemiptera	Hymenoptera	Lepidoptera (larvae)	Plecoptera	
Upper	UCR-TIV02	4:03	0	0	13.09	0	0.25	0	0	13.33
Campbell	UCR-TIV03	4:04	0	0	39.59	0	0.25	0	0.49	40.33
Reservoir	UCR-TIV04	5:11	0	0.39	10.42	0.39	0.19	0	0.39	11.77
Average Relative Abundance (%)[1]:			**0**	**1.09**	**94.95**	**1.09**	**1.37**	**0**	**1.50**	**Average: 21.81**
Lower	LCR-TIV03	4:26	0	0	16.69	0	0	0	0	16.69
Campbell	LCR-TIV04	4:49	0	0	64.78	0	0.21	0	0	64.98
Reservoir	LCR-TIV05	5:02	0	0	27.42	0	0.40	0	0	27.81
Average Relative Abundance (%)[1]:			**0**	**0**	**99.42**	**0**	**0.58**	**0**	**0**	**Average: 36.50**
Upper	UPQ-TIV02	4:54	0.41	0.61	14.08	0.61	1.22	0.20	0.20	17.35
Quinsam	UPQ-TIV03	5:03	0	0.99	16.04	0.79	0.20	0	0	18.02
Lake	UPQ-TIV04	4:08	0	0.48	28.55	0.24	1.45	0	0	30.73
Average Relative Abundance (%)[1]:			**0.78**	**3.53**	**87.70**	**2.90**	**4.29**	**0.39**	**0.39**	**Average: 22.03**

[1] Average relative abundance (%) for each waterbody was calculated by dividing the abundance of each taxa at a site by total abundance and then calculating the average across sites and multiplying by 100%.

Table 2. Summary of data and relationships used to estimate the mean biomass of terrestrial invertebrate taxa sampled from Malaise nets in Year 2 (2021).

Sample: Waterbody	Date	Site ID	Taxon	# of individuals measured	Mean Length (mm)	Std. Dev. (mm)	Biomass (W) ~ Length (L) relationship[1]	Estimated Mean Biomass (mg)
Diptera								
Upper Campbell Reservoir	20-May-21	UCR-TIV02	Diptera	25	4.47	2.22	$\ln W = -3.22 + 2.26 \cdot \ln L$	48.52
		UCR-TIV03		25	3.04	1.28		67.73
		UCR-TIV04		25	3.35	1.59		27.12
Lower Campbell Reservoir	19-May-21	LCR-TIV03	Diptera	25	4.51	2.09	$\ln W = -3.22 + 2.26 \cdot \ln L$	67.82
		LCR-TIV04		25	7.01	0.50		999.43
		LCR-TIV05		25	6.99	0.68		442.06
Upper Quinsam Lake	21-May-21	UPQ-TIV02	Diptera	25	2.84	1.31	$\ln W = -3.22 + 2.26 \cdot \ln L$	24.14
		UPQ-TIV03		25	3.06	2.23		25.71
		UPQ-TIV04		25	2.23	1.85		15.46
Other taxa								
Upper Campbell Reservoir	20-May-21	UCR-TIV02	Hymenoptera	1	14.07	-	$\ln W = -0.58 + 1.56 \cdot \ln L$	34.64
		UCR-TIV03	Hymenoptera	1	12.43	-	$\ln W = -0.58 + 1.56 \cdot \ln L$	28.55
			Plecoptera	2	10.05	0.60	$\ln W = -1.35 + 1.69 \cdot \ln L$	25.62
		UCR-TIV04	Coleoptera	2	2.36	0.45	$\ln W = -3.22 + 2.64 \cdot \ln L$	0.75
			Hemiptera[2]	2	2.54	0.06	$\ln W = -2.21 + 1.79 \cdot \ln L$	0.67
			Hymenoptera	1	1.84	-	$\ln W = -0.58 + 1.56 \cdot \ln L$	1.45
			Plecoptera	2	4.42	0.31	$\ln W = -1.35 + 1.69 \cdot \ln L$	6.40
Lower Campbell Reservoir	19-May-21	LCR-TIV04	Hymenoptera	1	2.53	-	$\ln W = -0.58 + 1.56 \cdot \ln L$	2.38
		LCR-TIV05	Hymenoptera	2	6.96	6.14	$\ln W = -0.58 + 1.56 \cdot \ln L$	15.74

"-" indicates insufficient sample size to perform calculation

[1] Biomass of invertebrate taxa was determined using published relationships between body length and body mass for individual taxa (Hodar 1996, Sabo *et al.* 2002)

[2] Terrestial composite model was applied for Hemiptera because data were lacking for order-level regressions

Table 2. Continued (2 of 2).

Sample			Taxon	# of individuals measured	Mean Length (mm)	Std. Dev. (mm)	Biomass (W) ~ Length (L) relationship[1]	Estimated Mean Biomass (mg)
Waterbody	**Date**	**Site ID**						
Other taxa								
Upper Quinsam Lake	21-May-21	UPQ-TIV02	Araneae	2	2.57	0.26	$\ln W = -3.00 + 2.74 \cdot \ln L$	1.31
			Coleoptera	3	4.71	0.90	$\ln W = -3.22 + 2.64 \cdot \ln L$	6.92
			Hemiptera[2]	3	3.14	0.38	$\ln W = -2.21 + 1.79 \cdot \ln L$	2.03
			Hymenoptera	6	5.42	5.39	$\ln W = -0.58 + 1.56 \cdot \ln L$	28.39
			Lepidoptera (larvae)	1	20.64	-	$\ln W = -4.51 + 2.57 \cdot \ln L$	26.39
			Plecoptera	1	11.17	-	$\ln W = -1.35 + 1.69 \cdot \ln L$	15.35
		UPQ-TIV03	Coleoptera	5	4.44	1.25	$\ln W = -3.22 + 2.64 \cdot \ln L$	9.39
			Hemiptera[2]	4	6.28	2.57	$\ln W = -2.21 + 1.79 \cdot \ln L$	10.71
			Hymenoptera	1	2.35	-	$\ln W = -0.58 + 1.56 \cdot \ln L$	2.12
		UPQ-TIV04	Coleoptera	2	3.24	0.35	$\ln W = -3.22 + 2.64 \cdot \ln L$	1.77
			Hemiptera[2]	1	3.56	-	$\ln W = -2.21 + 1.79 \cdot \ln L$	1.07
			Hymenoptera	6	3.74	4.90	$\ln W = -0.58 + 1.56 \cdot \ln L$	13.60

"-" indicates insufficient sample size to perform calculation

[1] Biomass of invertebrate taxa was determined using published relationships between body length and body mass for individual taxa (Hodar 1996, Sabo *et al.* 2002)

[2] Terrestial composite model was applied for Hemiptera because data were lacking for order-level regressions

Table 3. Emergent invertebrate catch-per-unit-effort (CPUE) sampled from floating traps in Year 2 (2021).

Waterbody	Site ID	Distance from Riparian Zone (m)	Inside/Outside Drawdown Zone	Deployment Duration (hours)	CPUE (# of individuals/m^2/hour)										Total CPUE
					Araneae	Diptera	Coleoptera	Ephemeroptera	Hemiptera	Hymenoptera	Neuroptera	Odonata	Plecoptera	Trichoptera	
Upper Campbell Reservoir	UCR-EIV02	20.02	Inside	166	0.02	0.20	0	0	0	0	0	0	0	0	0.22
		29.02	Inside	165	0	0.51	0	0	0	0	0	0	0	0	0.51
		39.02	Outside	165	0	1.08	0	0	0	0	0	0	0	0	1.08
		49.02	Outside	165	0	1.74	0	0	0	0	0	0	0	0	1.74
		59.02	Outside	165	0	0.99	0	0	0	0	0	0	0	0	0.99
		79.02	Outside	164	0	0.96	0	0	0	0	0	0	0	0	0.96
	UCR-EIV03	20.57	Inside	166	0	0.26	0	0.02	0	0	0	0	0	0	0.27
		29.57	Inside	165	0	0.06	0.02	0	0	0	0	0	0	0	0.07
		39.57	Outside	165	0	1.25	0.02	0	0	0	0	0	0	0	1.27
		49.57	Outside	165	0	0.97	0	0	0	0	0	0	0	0	0.97
		59.57	Inside	164	0	0.81	0	0	0	0	0	0	0	0	0.81
		79.57	Outside	164	0	0.37	0	0	0	0	0	0	0.02	0	0.39
	UCR-EIV04	24.10	Inside	164	0	0.07	0.02	0	0	0	0	0	0	0	0.09
		34.10	Inside	164	0	0.20	0	0	0	0	0	0	0	0	0.20
		44.10	Inside	164	0	0.72	0	0	0	0	0	0	0	0	0.72
		54.10	Outside	167	0	0.85	0	0	0	0	0	0	0	0	0.85
		64.10	Outside	163	0	0.65	0	0	0	0	0	0	0	0	0.65
		84.10	Outside	163	0	0.24	0.02	0	0	0	0	0	0	0	0.26
Average Relative Abundance (%)[1]:					**0.46**	**95.92**	**2.98**	**0.37**	**0**	**0**	**0**	**0**	**0.26**	**0**	**Average: 0.67**
Lower Campbell Reservoir	LCR-EIV03	6.40	Inside	167	0	0.18	0	0	0	0	0	0	0	0	0.18
		15.40	Inside	167	0	0.58	0	0	0	0	0	0	0	0	0.58
		25.40	-	-	-	-	-	-	-	-	-	-	-	-	-
		35.40	Outside	166	0	1.48	0	0	0	0	0	0	0	0	1.48
		45.40	Outside	166	0	2.39	0	0	0	0	0	0	0	0	2.39
		65.40	Outside	166	0	2.67	0	0	0	0	0	0	0	0	2.67
	LCR-EIV04	7.70	Inside	167	0	6.50	0.02	0	0	0	0	0	0	0	6.51
		16.70	Inside	166	0	0.42	0	0	0	0	0	0	0	0	0.42
		26.70	Outside	166	0	1.28	0	0	0	0	0	0	0	0	1.28
		36.70	Outside	166	0	0.51	0	0	0.02	0	0	0	0	0	0.53
		46.70	Outside	166	0	0.47	0	0	0	0	0	0	0	0	0.47
		66.70	Outside	165	0	0.28	0	0	0	0	0	0	0	0	0.28
	LCR-EIV05	14.90	Inside	161	0	4.97	0	0	0.02	0.06	0	0	0.02	0	5.06
		23.90	Inside	160	0	0.25	0	0	0	0	0	0	0	0	0.25
		33.90	Inside	160	0	2.65	0	0	0	0	0	0	0	0	2.65
		43.90	Outside	160	0.02	0.59	0	0	0	0	0	0	0	0	0.61
		53.90	Outside	160	0	0.72	0	0	0	0	0	0	0	0	0.72
		73.90	Outside	159	0	0.44	0	0	0	0	0	0	0	0	0.44
Average Relative Abundance (%)[1]:					**0.18**	**99.49**	**0.02**	**0**	**0.22**	**0.07**	**0**	**0**	**0.02**	**0**	**Average: 1.56**

"-" indicates that data were unable to be collected from this sample

[1] Average relative abundance (%) for each waterbody was calculated by dividing the abundance of each taxa collected in a trap by total abundance and then calculating the average across traps and multiplying by 100%

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Table 3. Continued (2 of 2).

Waterbody	Site ID	Distance from Riparian Zone (m)	Inside/Outside Drawdown Zone	Deployment Duration (hours)	CPUE (# of individuals/m²/hour)										Total CPUE
					Araneae	Diptera	Coleoptera	Ephemeroptera	Hemiptera	Hymenoptera	Neuroptera	Odonata	Plecoptera	Trichoptera	
Upper Quinsam Lake	UPQ-EIV02	4.11	Inside	166	0	0.20	0	0	0	0	0.02	0	0	0	0.22
		13.11	Inside	166	0	0.09	0	0	0	0	0	0	0	0.16	0.26
		23.11	Inside	166	0	0.07	0	0	0	0	0	0	0	0.04	0.11
		33.11	Inside	165	0	0.06	0.02	0	0	0	0	0	0.02	0	0.09
		43.11	Inside	165	0	0.39	0	0	0	0	0	0	0	0.02	0.40
		63.11	Outside	165	0	0.26	0	0	0	0	0	0	0	0.06	0.31
	UPQ-EIV03	6.84	Inside	166	0	0.18	0.02	0	0	0	0	0.02	0	0.04	0.26
		15.84	-	-	-	-	-	-	-	-	-	-	-	-	-
		25.84	-	-	-	-	-	-	-	-	-	-	-	-	-
		35.84	Outside	165	0	0.50	0	0	0	0	0	0	0	0	0.50
		45.84	Outside	165	0	0.72	0	0	0	0	0	0	0	0	0.72
		65.84	Outside	165	0	0.44	0	0	0	0	0	0	0	0	0.44
	UPQ-EIV04	2.70	-	-	-	-	-	-	-	-	-	-	-	-	-
		11.70	Inside	165	0	2.61	0	0	0.02	0	0	0	0	0	2.63
		21.70	-	-	-	-	-	-	-	-	-	-	-	-	-
		31.70	Outside	164	0	0.76	0	0	0	0	0	0	0	0	0.76
		41.70	Outside	164	0	2.62	0	0.02	0	0	0	0	0	0	2.64
		61.70	Outside	164	0	2.53	0	0	0	0	0	0	0	0	2.53
Average Relative Abundance (%)[1]:					**0**	**85.85**	**1.94**	**0.05**	**0.05**	**0**	**0.60**	**0.51**	**1.43**	**9.58**	**Average: 0.85**

"-" indicates that data were unable to be collected from this sample

[1] Average relative abundance (%) for each waterbody was calculated by dividing the abundance of each taxa collected in a trap by total abundance and then calculating the average across traps and multiplying by 100%

Table 4. Summary of data and relationships used to estimate the mean biomass of emergent invertebrate taxa sampled from floating traps in Year 2 (2021).

Sample				Taxon	# of individuals measured	Mean Length (mm)	Std. Dev. (mm)	Biomass (W) ~ Length (L) relationship[1]	Estimated Mean Biomass (mg)
Waterbody	Collection Date	Site ID	Distance from Riparian Zone (m)						
Diptera									
Upper Campbell Reservoir	27-May-21	UCR-EIV02	20.0	Diptera	11	1.54	0.58	$\ln W = -3.22 + 2.26 \cdot \ln L$	1.01
			29.0		25	2.87	0.82		11.22
			39.0		25	2.79	1.12		21.48
			49.0		25	2.72	0.95		33.25
			59.0		25	2.86	0.70		22.02
			79.0		25	3.28	1.18		26.87
		UCR-EIV03	20.6	Diptera	14	2.09	0.81	$\ln W = -3.22 + 2.26 \cdot \ln L$	2.46
			29.6		3	2.58	1.68		0.59
			39.6		25	2.99	1.12		29.02
			49.6		25	3.12	0.88		25.80
			59.6		25	2.32	0.63		10.89
			79.6		20	2.98	1.06		8.46
		UCR-EIV04	24.1	Diptera	4	1.61	0.80	$\ln W = -3.22 + 2.26 \cdot \ln L$	0.36
			34.1		11	1.22	0.97		0.43
			44.1		25	2.44	0.71		10.76
			54.1		25	2.42	0.63		12.90
			64.1		25	2.57	1.34		9.37
			84.1		13	2.42	0.81		3.32
Lower Campbell Reservoir	26-May-21	LCR-EIV03	6.4	Diptera	10	1.97	0.85	$\ln W = -3.22 + 2.26 \cdot \ln L$	1.48
			15.4		25	3.26	0.53		17.93
			35.4		25	2.96	0.70		35.46
			45.4		25	3.45	1.27		77.24
			65.4		25	3.51	0.64		96.09
		LCR-EIV04	7.7	Diptera	25	7.10	0.93	$\ln W = -3.22 + 2.26 \cdot \ln L$	1182.22
			16.7		23	3.06	1.76		8.30
			26.7		25	2.88	1.30		24.73
			36.7		25	4.18	3.30		12.42
			46.7		25	3.08	2.40		7.70
			66.7		15	3.76	2.86		6.34
		LCR-EIV05	14.9	Diptera	25	5.53	2.14	$\ln W = -3.22 + 2.26 \cdot \ln L$	422.87
			23.9		13	2.82	2.14		3.07
			33.9		25	2.73	0.65		50.99
			43.9		25	2.04	1.65		3.44
			53.9		25	2.43	0.66		10.51
			73.9		23	2.04	0.80		3.73

"-" indicates insufficient sample size to perform calculation

[1] Biomass of invertebrate taxa was determined using published relationships between body length and body mass for individual taxa (Hodar 1996, Sabo *et al.* 2002)

[2] Terrestrial composite model was applied for Hemiptera because data were lacking for order-level regressions

Table 4. Continued (2 of 3).

Sample				Taxon	# of individuals measured	Mean Length (mm)	Std. Dev. (mm)	Biomass (W) ~ Length (L) relationship[1]	Estimated Mean Biomass (mg)
Waterbody	Collection Date	Site ID	Distance from Riparian Zone (m)						
Diptera									
Upper Quinsam Lake	28-May-21	UPQ-EIV02	4.1	Diptera	11	3.40	2.74	$\ln W = -3.22 + 2.26 \cdot \ln L$	3.05
			13.1		5	2.54	2.63		0.65
			23.1		4	3.83	2.76		1.97
			33.1		3	2.97	1.89		1.06
			43.1		21	2.77	1.48		6.33
			63.1		14	2.88	0.90		5.42
		UPQ-EIV03	6.8	Diptera	10	1.22	0.98	$\ln W = -3.22 + 2.26 \cdot \ln L$	0.35
			35.8		25	2.24	0.79		5.94
			45.8		25	2.59	0.50		12.89
			65.8		24	2.46	0.56		6.85
		UPQ-EIV04	11.7	Diptera	25	2.91	0.77	$\ln W = -3.22 + 2.26 \cdot \ln L$	58.97
			31.7		25	2.58	1.12		12.02
			41.7		25	5.58	1.06		263.88
			61.7		25	5.77	0.62		284.16
Other taxa									
Upper Campbell Reservoir	27-May-21	UCR-EIV02	20.0	Araneae	1	1.00	-	$\ln W = -3.00 + 2.74 \cdot \ln L$	0.05
		UCR-EIV03	20.6	Ephemeroptera	1	8.58	-	$\ln W = -4.27 + 2.49 \cdot \ln L$	2.95
			29.6	Coleoptera	1	7.84	-	$\ln W = -3.22 + 2.64 \cdot \ln L$	9.18
			39.6	Coleoptera	1	8.20	-	$\ln W = -3.22 + 2.64 \cdot \ln L$	10.32
			79.6	Plecoptera	1	6.23	-	$\ln W = -1.35 + 1.69 \cdot \ln L$	5.72
		UCR-EIV04	24.1	Coleoptera	1	3.88	-	$\ln W = -3.22 + 2.64 \cdot \ln L$	1.43
			84.1	Coleoptera	1	4.92	-	$\ln W = -3.22 + 2.64 \cdot \ln L$	2.68

"-" indicates insufficient sample size to perform calculation

[1] Biomass of invertebrate taxa was determined using published relationships between body length and body mass for individual taxa (Hodar 1996, Sabo *et al.* 2002)

[2] Terrestrial composite model was applied for Hemiptera because data were lacking for order-level regressions

Table 4. Continued (3 of 3).

Sample				Taxon	# of individuals measured	Mean Length (mm)	Std. Dev. (mm)	Biomass (W) ~ Length (L) relationship[1]	Estimated Mean Biomass (mg)
Waterbody	Collection Date	Site ID	Distance from Riparian Zone (m)						
Other taxa									
Lower Campbell Reservoir	26-May-21	LCR-EIV04	7.7	Coleoptera	1	16.84	-	$\ln W = -3.22 + 2.64 \cdot \ln L$	69.12
			36.7	Hemiptera[2]	1	5.16	-	$\ln W = -2.21 + 1.79 \cdot \ln L$	2.08
		LCR-EIV05	14.9	Hemiptera[2]	1	2.33	-	$\ln W = -2.21 + 1.79 \cdot \ln L$	0.50
			14.9	Plecoptera	1	5.69	-	$\ln W = -1.35 + 1.69 \cdot \ln L$	4.91
			14.9	Hymenoptera	3	5.97	2.59	$\ln W = -0.58 + 1.56 \cdot \ln L$	24.00
			43.9	Araneae	1	2.40	-	$\ln W = -3.00 + 2.74 \cdot \ln L$	0.55
Upper Quinsam Lake	28-May-21	UPQ-EIV02	4.1	Neuroptera	1	5.84	-	$\ln W = -2.51 + 1.53 \cdot \ln L$	1.21
			13.1	Trichoptera	9	2.76	0.15	$\ln W = -4.61 + 2.90 \cdot \ln L$	1.69
			23.1	Trichoptera	2	6.03	4.71	$\ln W = -4.61 + 2.90 \cdot \ln L$	2.16
			33.1	Coleoptera	1	3.85	-	$\ln W = -3.22 + 2.64 \cdot \ln L$	1.40
			33.1	Plecoptera	1	6.84	-	$\ln W = -1.35 + 1.69 \cdot \ln L$	6.70
			43.1	Trichoptera	1	8.51	-	$\ln W = -4.61 + 2.90 \cdot \ln L$	4.98
			63.1	Trichoptera	3	10.95	1.93	$\ln W = -4.61 + 2.90 \cdot \ln L$	30.04
		UPQ-EIV03	6.8	Trichoptera	2	1.97	0.34	$\ln W = -4.61 + 2.90 \cdot \ln L$	0.14
			6.8	Coleoptera	1	3.98	-	$\ln W = -3.22 + 2.64 \cdot \ln L$	1.53
			6.8	Odonata	1	31.80	-	$\ln W = 0.82 + 0.14 \cdot \ln L$	3.68
		UPQ-EIV04	11.7	Hemiptera[2]	1	3.80	-	$\ln W = -2.21 + 1.79 \cdot \ln L$	1.20
			41.7	Ephemeroptera	1	8.90	-	$\ln W = -4.27 + 2.49 \cdot \ln L$	3.24

"-" indicates insufficient sample size to perform calculation

[1] Biomass of invertebrate taxa was determined using published relationships between body length and body mass for individual taxa (Hodar 1996, Sabo *et al.* 2002)

[2] Terrestrial composite model was applied for Hemiptera because data were lacking for order-level regressions

Table 5. Summary of samples for stable isotope analysis collected in Year 2 (2021).

Stable Isotope Samples 2021	Number of Samples									
	Lower Campbell Reservoir			Upper Campbell Reservoir				Upper Quinsam Lake		
	LCR-TIV03	**LCR-TIV04**	**LCR-TIV05**	**UCR-TIV02**	**UCR-TIV03**	**UCR-TIV04**		**UPQ-TIV02**	**UPQ-TIV03**	**UPQ-TIV04**
Riparian Leaf Litter	1	1	1	1	1	1		1	1	1
Littoral Periphyton	1	1	1	1	1	1		1	1	1
Small Particulate Organic Material	1	1	1	1	1	1		1	1	1
Aquatic Macrophyte	1				1			1	1	1
	LCR-LKGN02	**LCR-LKGN03**		**UCR-LKGN01**	**UCR-LKGN02**	**UCR-LKGN04**	**UCR-LKGN06**	**UPQ-LKGN01**	**UPQ-LKGN02**	**UPQ-LKGN03**
Fin clips - Rainbow Trout	26	15		5	10	6	6			
Fin clips - Cutthroat Trout	4	15		5	5	5	5	9	10	11
Fin clips - Rainbow Trout/Cutthroat Trout		1				2				
Fin clips - Dolly Varden		1								
Fin clips - Kokanee										2
Fin clips - Coho								1		

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