Site C Clean Energy Project

Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program (Mon-1b)

Task 2c – Site C Reservoir Tributaries Fish Population Indexing Survey

Construction Year 6 (2020)

Dustin Ford, RPBio
Golder Associates Ltd.

Kevin Little, BSc
Golder Associates Ltd.

15 June 2020

2020 Annual Report

Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c)

Submitted to:

BC Hydro
1111 West Georgia St.
Vancouver, BC V6E 4G2

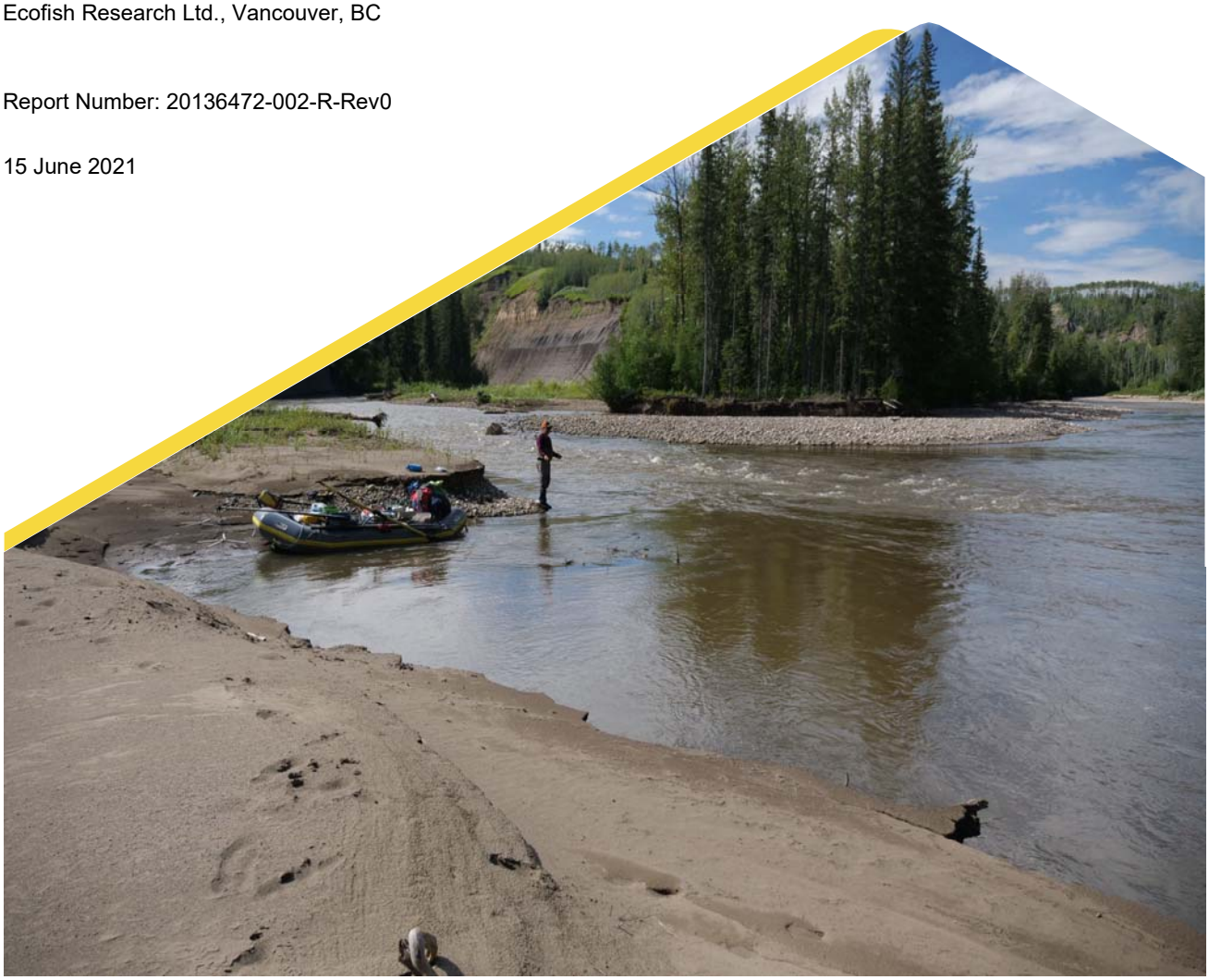
Prepared by:

Golder Associates Ltd.
Castlegar, BC

In association with:
Ecofish Research Ltd., Vancouver, BC

Report Number: 20136472-002-R-Rev0

15 June 2021



Distribution List

BC Hydro - 1 electronic copy

Golder Associates Ltd.- 1 electronic copy

Suggested Citation: Golder Associates Ltd. 2021. Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c) – 2020 investigations. Report prepared for BC Hydro, Vancouver, British Columbia. Golder Report No. 20136472: 44 pages + 3 appendices.

Executive Summary

In accordance with Provincial Environmental Assessment Certificate Condition No. 7[1] and Federal Decision Statement Condition Nos. 8.4.3[2] and 8.4.4[3] for BC Hydro's Site C Clean Energy Project (the Project), BC Hydro has developed the Site C Fisheries and Aquatic Habitat Monitoring and Follow-up Program (FAHMFP[4]). The Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program (Mon-1b) represents one component of the FAHMFP that is designed to monitor the responses, using before and after comparisons, of target Peace River fish populations to the construction and operation of the Project. Target species include Arctic Grayling (*Thymallus arcticus*), Bull Trout (*Salvelinus confluentus*), and Rainbow Trout (*Oncorhynchus mykiss*) because these species spend portions of their life cycle in Peace River tributaries and migrate past the Project to fulfill their life history requirements.

Under the Site C Reservoir Tributaries Fish Population Indexing Survey (Task 2c of Mon-1b), annual surveys are conducted to monitor target fish species, and in 2020, population assessments were conducted in the Moberly River for Arctic Grayling, the Chowade River and Cypress and Fiddes creeks for Bull Trout, and in Colt, Farrell, Kobes, and Maurice creeks for Rainbow Trout. Backpack electrofishing was the primary sampling method for all streams, except the Moberly River, where a combination of backpack electrofishing, small fish boat electroshocking, and angling was used. In 2020, field methods, target species, and sampled streams were identical to those employed in 2017, 2018, and 2019, with the addition of sampling for Rainbow Trout in Maurice Creek and implanting radio telemetry tags into immature Rainbow Trout in Farrell and Maurice creeks in 2020. Tissue and ageing structure samples were also collected from select species at some locations for genetic and microchemistry analyses in support of the FAHMFP; however, these samples were not analyzed as part of the current study.

The primary objective of the study was to monitor the above three species; however, a secondary objective for sampling in the Chowade River and Cypress Creek was to implant passive integrated transponder (PIT) tags into Bull Trout. Tagged Bull Trout will be monitored by PIT detector arrays installed in the Chowade River and Cypress Creek as part of the Peace River Bull Trout Spawning Assessment (Mon-1b, Task 2b). To increase the likelihood of deploying more PIT tags into Bull Trout, the upstream areas of these streams were specifically targeted as greater densities of immature Bull Trout were recorded in these areas during reconnaissance surveys conducted in 2016. Although multiple sites were sampled in the Chowade River and Cypress Creek, sampling in Fiddes Creek was limited to a section of the creek that was accessible by helicopter and assumed representative of Fiddes Creek.

[1] The EAC Holder must develop a Fisheries and Aquatic Habitat Monitoring and Follow-up Program to assess the effectiveness of measures to mitigate Project effects on healthy fish populations in the Peace River and tributaries, and, if recommended by a QEP or FLNR, to assess the need to adjust those measures to adequately mitigate the Project's effects.

[2] "The plan shall include: an approach to monitor changes to fish and fish habitat baseline conditions in the Local Assessment Area."

[3] "The plan shall include: an approach to monitor and evaluate the effectiveness of mitigation or offsetting measures and to verify the accuracy of the predictions made during the environmental assessment on fish and fish habitat."

[4] Site C Fisheries and Aquatic Habitat Monitoring and Follow-up Program available at https://www.sitecproject.com/document-library/environmental-management-plans-and-reports.

Key results from the 2020 survey are summarized as follows:

Tributaries Targeting Bull Trout (Chowade River, Cypress and Fiddes creeks)

- A total of 819 Bull Trout were captured in the Chowade River, and Cypress and Fiddes creeks combined. Of this total, 565 Bull Trout were implanted with PIT tags, representing the highest number of PIT tags deployed in these streams in one year as part of the Mon-1b, Task 2c study. Captured Bull Trout included Young-of-the-Year (YOY), immature, and adult life stages. Three of the Bull Trout captured in 2020 were previously encountered during the 2018 or 2019 studies. A comparison of catch rates of Bull Trout in the Chowade River and Cypress Creek indicated similar trends in both systems. Catch per unit effort (CPUE) for YOY Bull Trout declined from 2018 to 2020; whereas CPUE for immature Bull Trout increased over the same time period.
- In Fiddes Creek, CPUE for YOY Bull Trout declined from 2017 to 2020. CPUE for immature Bull Trout declined between 2017 and 2019; however, in 2020, CPUE for immature Bull Trout in Fiddes Creek increased from 2019 values.
- The trends in CPUE for YOY Bull Trout captured in Chowade River, and Cypress and Fiddes creeks are similar to trends in Bull Trout redd abundance estimates as measured by the FAHMFP's Peace River Bull Trout Spawning Assessment (Mon-1b, Task 2b).
- Consistent with results from 2017 to 2019, Arctic Grayling were not recorded in the Chowade River or in Cypress or Fiddes creeks, and Rainbow Trout were rarely recorded in the Chowade River (n = 2) and Cypress Creek (n = 7) and not recorded in Fiddes Creek (n = 0).

Tributaries Targeting Rainbow Trout (Colt, Farrell, Kobes, and Maurice creeks)

- A total of 395 Rainbow Trout were captured in Colt, Farrell, Kobes, and Maurice creeks combined. Of this total, 302 were implanted with PIT tags. In 2020, YOY Rainbow Trout were not captured. Captured Rainbow Trout included immature and adult life stages.
- Annual sampling since 2017 has identified the presence of YOY and immature life stages in Colt, Farrell, and Kobes creeks, indicating that these systems are used by Rainbow Trout for spawning and rearing.
- Whether Rainbow Trout from Farrell and Maurice creeks are a local resident population or are offspring of the Peace River Rainbow Trout population remains unknown. Since 2017, PIT tagged Rainbow Trout originally captured in Farrell or Maurice creeks have not been identified in the Peace River during the Peace River Large Fish Indexing Survey (Mon-2, Task 2a). Furthermore, Rainbow Trout originally tagged in the Peace River have not been identified in Farrell or Maurice creeks.
- In total, 38 radio telemetry tags were deployed into immature Rainbow Trout captured in Farrell (n =11) and Maurice (n = 27) creeks.
- In 2020, Arctic Grayling were not recorded in any of the tributaries targeting Rainbow Trout. Bull Trout were rarely recorded in Colt (n = 5) and Maurice creeks (n = 2) and were not recorded in Farrell or Kobes creeks.

Tributaries Targeting Arctic Grayling (Moberly River)

- A total of 134 Arctic Grayling were captured in the Moberly River. Of this total, 82 were implanted with PIT tags, representing the highest number of PIT tags deployed in each previous year of the Mon-1b, Task 2c study. Two Arctic Grayling captured and tagged during the 2020 survey were subsequently recaptured in different sites later in the survey. One adult Arctic Grayling captured during the 2020 survey was previously captured during both the 2018 and 2019 surveys. Captured Arctic Grayling included YOY, immature, and adult life stages.
- The majority of Arctic Grayling captured in 2020 were found in Sections 1A and 7. Locations with higher Arctic Grayling densities in 2020, were within two side channels with apparent groundwater upwelling at River Km 38.0 and 38.9 (Section 7). The abundance of Arctic Grayling within this short, braided area suggests that Arctic Grayling spawning may occur at or near this location.
- A total of four adult Bull Trout were captured in the Moberly River. One Bull Trout was captured at River Km 70.4, which represents the furthest upstream encounter of a Bull Trout as part of this study. Rainbow Trout were not captured in the Moberly River in 2020. Since 2016, only one Rainbow Trout has been captured in the Moberly River, indicating overall abundance of Rainbow Trout in the Moberly River is low and likely limited to individuals using the stream for feeding purposes.

Data collected from 2016 to 2020 represent baseline data associated with the Project. Data collected after river diversion, which occurred on 3 October 2020, will allow testing of the management hypotheses identified for Mon-1b, Task 2c.

ACKNOWLEDGEMENTS

The Site C Reservoir Tributary Fish Population Indexing Survey is funded by BC Hydro's Site C Clean Energy Project. Golder Associates Ltd. would like to thank the following individuals for their contributions to the program:

BC Hydro

Nich Burnett	Vancouver, BC	Dave Hunter	Vancouver, BC
Guy Martel	Vancouver, BC	Michael McArthur	Vancouver, BC
Brent Mossop	Vancouver, BC		

Blueberry River First Nations

Jane Calvert	Lands Manager
Geraldine Davis	Technician
Merli de Guzman	Director of Operations

The following employees of **Ecofish Research Ltd.** contributed to the collection of data in preparation of this report:

Todd Sherstone	Senior Field Biologist/Ecofish Project Manager
Steve Sharron	Field Technician
Leah Hull	Field Technician
Harlan Wright	Field Technician
Shannon Laurence	Field Technician

The following employees of ***GOLDER ASSOCIATES LTD.*** contributed to the collection of data and preparation of this report:

Dustin Ford	Project Manager/Coauthor	Natasha Audy	Biological Technician
Kevin Little	Biologist/Coauthor	Chris King	Biological Technician
Gary Ash	Senior Advisor	Geoff Sawatzky	Biological Technician
Shawn Redden	Project Director	James Goodier	GIS Technician
Beth Thompson	Indigenous Relations Lead	Mandy Hansen	GIS Technician
Paul Grutter	Senior Biologist	Carrie McAllister	Project Coordinator
Demitria Burgoon	Biologist	Laurie Ell	Office Administration
David Roscoe	Biologist	Lisa Huang	Office Administration
Josh Sutherby	Biologist	Danielle Press	Health and Safety
Sean Hollis	Biologist	Devin Dickson	Warehouse Manager

LIST OF ACRONYMS AND ABBREVIATIONS

Acronym	Description
BTIPM	Bull Trout Integrated Population Model
EAC	Environmental Assessment Certificate
EIS	Environmental Impact Statement
FAHMFP	Fisheries and Aquatic Habitat Monitoring and Follow-up Program
FDX	Full-Duplex
FIDQ	Fisheries Inventory Data Queries
FL	Fork Length
GMSMON-2	Peace River Fish Index
HDX	Half-Duplex
Mon-1b	Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program
Mon-2	Peace River Fish Community Monitoring Program
PCD	Peace Canyon Dam
PIT	Passive Integrated Transponder
Project	Site C Clean Energy Project
Task 2a	Peace River Large Fish Indexing Survey
Task 2b	Peace River Bull Trout Spawning Assessment
Task 2c	Site C Reservoir Tributaries Fish Population Indexing Survey
WLR	Water License Requirements

Table of Contents

TABLES

FIGURES

APPENDICES

APPENDIX A
Maps and UTM Locations

APPENDIX B
Catch and Effort Data

APPENDIX C
Habitat Data

1.0 INTRODUCTION

In accordance with Provincial Environmental Assessment Certificate (EAC) Condition No. 7[5] and Federal Decision Statement Condition Nos. 8.4.3[6] and 8.4.4[7] for BC Hydro's Site C Clean Energy Project (the Project), BC Hydro developed the Site C Fisheries and Aquatic Habitat Monitoring and Follow-up Program (FAHMFP[8]). The Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program (Mon-1b) represents one component of the FAHMFP that is designed to monitor Peace River fish populations that use tributaries in the future inundation zone of the Site C reservoir to fulfil portions of their life cycle. Most notably, these species include Arctic Grayling (*Thymallus arcticus*), Bull Trout (*Salvelinus confluentus*), and Rainbow Trout (*Oncorhynchus mykiss*). The Site C Reservoir Tributaries Fish Population Indexing Survey (Task 2c) is one component of Mon-1b that intends to monitor the populations of Arctic Grayling, Bull Trout, and Rainbow Trout that are known to spawn in Site C reservoir tributaries and how these populations are impacted by the construction and operation of the Project.

This report summarizes the 2020 findings of Task 2c. This is the fifth year of a multi-year study, and the results from 2020 (in addition to the data from the first four years of the study) will contribute to the baseline data prior to subsequent phases of Project construction (e.g., river diversion) and reservoir formation. These data will also help identify the most effective sampling locations and methods to employ during future study years. During 2016, reconnaissance surveys were conducted and consisted of a broad spatial scope within each of the sampled tributaries (Golder 2017). Effort in 2017 (Golder 2018) focused on key areas that were identified during the 2016 reconnaissance surveys. In 2018 (Golder 2019), 2019 (Golder 2020b), and 2020, methods refined in 2017 (Golder 2018) were largely repeated.

1.1 Bull Trout

A key uncertainty identified in the Project's Environmental Impact Statement (EIS) relates to the movement of Peace River Bull Trout during and after construction of the Project, which in turn, influences the number of spawning Bull Trout expected to be present in the Halfway River[9]. The Halfway River is known to be an important watershed for spawning by Peace River Bull Trout (Putt et al. 2021; AMEC and LGL 2008a, 2008b, 2010a, 2010b; BC MELP 2000; Burrows et al. 2001; Pattenden et al. 1991). The objective of the Peace River Bull Trout Spawning Assessment (Mon-1b, Task 2b) is to monitor Bull Trout spawner and redd abundance in select tributaries of the Halfway River watershed to monitor the population's response to the construction and operation of the Project (Putt et al. 2021). The abundance of adult Bull Trout in the Halfway River watershed, as monitored under Task 2b, may be influenced by changes in the abundance of immature Bull Trout in tributaries of the Halfway River and by changes in the abundance of the Halfway River's resident Bull Trout population. Therefore, Task 2c is designed, in part, to monitor immature Bull Trout abundance in Halfway River tributaries to test Hypothesis #3 within the Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program:

[5] The EAC Holder must develop a Fisheries and Aquatic Habitat Monitoring and Follow-up Program to assess the effectiveness of measures to mitigate Project effects on healthy fish populations in the Peace River and tributaries, and, if recommended by a QEP or FLNR, to assess the need to adjust those measures to adequately mitigate the Project's effects.

[6] The plan shall include: an approach to monitor changes to fish and fish habitat baseline conditions in the Local Assessment Area.

[7] The plan shall include: an approach to monitor and evaluate the effectiveness of mitigation or offsetting measures and to verify the accuracy of the predictions made during the environmental assessment on fish and fish habitat.

[8] Site C Fisheries and Aquatic Habitat Monitoring and Follow-up Program available at https://www.sitecproject.com/document-library/environmental-management-plans-and-reports.

[9] Site C Clean Energy Project Environmental Impact Statement, Volume 2, Appendix Q3.

H_3: Bull Trout juvenile abundance in the Halfway River will not decline relative to baseline estimates.

A program dedicated to monitoring immature Bull Trout abundance in the Halfway River watershed had not been implemented prior 2016, although incidental catches were noted during some studies (e.g., Mainstream 2009a, 2010, 2011a, 2013). Therefore, for the purposes of testing the above hypothesis, data collected during initial study years (i.e., 2016 through 2020) will serve as baseline data with which to compare against future study years.

The objective of the current study was to deploy passive integrated transponder (PIT) tags into captured immature Bull Trout. The data collected from PIT tagged immature Bull Trout will be incorporated (along with data from other FAHMFP studies) into the Bull Trout Integrated Population Model (BTIPM; ESSA et al. 2020) to evaluate juvenile-to-adult survival, generate population estimates, and monitor changes in the Halfway River Bull Trout population to address the above uncertainty. Furthermore, the movements of PIT tagged Bull Trout will be monitored using PIT detector arrays installed in the Chowade River and Cypress Creek (Appendix A, Figure A1) as a component of Mon-1b, Task 2b (Ramos-Espinoza et al. 2018–2019; Putt et al. 2020-2021). Having a thorough understanding of the movement patterns of both adult and immature Bull Trout in the study area will provide insight into this species' life history characteristics. Most notably, movement data will help confirm the presence or absence of resident populations, the timing of both pre- and post-spawn movements by adults, the residence time of immature life stages, the timing of downstream immature dispersal, and the extent of skip-spawning by adults.

The portions of the Chowade River and Cypress and Fiddes creeks that were sampled in 2020 were selected based on locations sampled in previous studies where catches of Bull Trout were greatest (Golder 2017, 2018, 2019, 2020) and sections previously identified as important for spawning Bull Trout (Euchner and Mainstream 2013). Sampling effort from 2017 to 2020 focused on the portions of each tributary where densities of immature Bull Trout were expected to be high and densities of adult, pre-spawning Bull Trout that would be sensitive to capture and handling were expected to be low.

1.2 Rainbow Trout

The Project's EIS identified uncertainties regarding the continued use of Maurice and Lynx creeks for spawning and rearing by Peace River Rainbow Trout populations. Sampling in Maurice Creek was not conducted under Task 2c from 2017 to 2019 due to site access limitations associated with sampling crew safety and security. Sampling in Lynx Creek was not conducted under Task 2c during any study year due to ongoing high turbidity levels[10] precluding fish sampling. Landslides in the Lynx Creek watershed have reduced the quality of Rainbow Trout spawning and rearing habitat through increased sediment deposition. Based on these factors, Lynx Creek was not considered as a candidate index stream for monitoring the long-term status of the Peace River Rainbow Trout population.

Prior to 2017, Farrell, Colt, and Kobes creeks were selected, in consultation with BC Hydro[11], as alternative tributaries to monitor local Rainbow Trout populations. The sites established in Farrell, Colt, and Kobes creeks in 2017 were replicated in 2018, 2019, and 2020.

[10] The source of the high turbidity in Lynx Creek has been associated with an upstream landslide in Brenot Creek, a tributary to Lynx Creek.: https://hudsonshope.ca/district-office/public-works/water-services/water-advisories/.

[11] BC Hydro also reviewed with the Project's Fisheries and Aquatic Habitat Mitigation and Monitoring Technical Committee the streams to sample for Rainbow Trout.

Farrell Creek is a tributary that flows into the Peace River approximately 23.5 km downstream of Peace Canyon Dam (PCD). Sampling in Farrell Creek provides data to test Hypothesis #3 from the Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program:

H_3: Rainbow Trout from Site C Reservoir will continue to spawn and rear in Maurice and Lynx creeks upstream of the Site C Reservoir inundation zone.

The presence of Young-of-the-Year (YOY) Rainbow Trout in Farrell Creek during summer surveys would be taken as confirmation that Rainbow Trout spawned in the system in the spring of the same year. The subsequent detection of Rainbow Trout that were initially tagged as immature or YOY in Farrell Creek under other components of the FAHMFP will help determine if Rainbow Trout from the Peace River spawn in Farrell Creek. The movement of radio-tagged immature Rainbow Trout from Farrell Creek into the Peace River would provide additional support for this hypothesis.

In 2020, sampling was conducted in Maurice Creek for the first time under the FAHMFP. Maurice Creek is a tributary that flows into the Peace River approximately 7 km downstream of PCD. Maurice Creek enters the Peace River from the south. Similar to Farrell Creek, the presence of YOY Rainbow Trout in Maurice Creek, and subsequent detection of PIT tagged immature Rainbow Trout from Maurice Creek, will provide confirmation that this system is used for spawning by the Peace River Rainbow Trout population.

Rainbow Trout populations in Kobes and Colt creeks were also assessed. Kobes Creek is a tributary to the Halfway River, flowing into the Halfway River at River Km 76, as measured upstream from the Halfway River's confluence with the Peace River. Colt Creek is a tributary to the Graham River, flowing into the Graham River at River Km 11.5, as measured upstream from the Graham River's confluence with the Halfway River. The Graham River flows into the Halfway River 90 km upstream from the Halfway River's confluence with the Peace River. Rainbow Trout data from Colt and Kobes creeks will be used to provide an index of relative Rainbow Trout abundance and to gather information regarding movements between sites and study years in the Halfway River watershed.

An additional objective in 2020 was the deployment of radio telemetry tags into immature Rainbow Trout (i.e., fish less than approximately 250 mm FL) captured in Farrell and Maurice Creeks to track their movements through the Site C Fish Movement Assessment (Mon-1b, Task 2d).

1.3 Arctic Grayling

The Project's EIS describes key uncertainties for the Peace River Arctic Grayling population upstream of the Project[12]. These include the species' ability to overwinter in the Moberly River and its response to the Project's creation of reservoir habitat. Annual sampling in the Moberly River under Task 2c between 2016 and 2020 was conducted to add to the existing baseline dataset (e.g., Mainstream 2013) to further describe the fish community located within and upstream of the Site C reservoir inundation zone and improve our understanding of the Moberly River Arctic Grayling population. The current study provides additional baseline data to test Hypothesis #5 from the Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program:

[12] Site C Clean Energy Project Environmental Impact Statement, Volume 2, Appendix Q3.

H_5: A self-sustained population of Arctic Grayling will remain in the Moberly River.

The presence of YOY Arctic Grayling in Moberly River during the summer surveys would be taken as confirmation that Arctic Grayling spawned in the system in the spring of the same year, and that a self-sustained population of Arctic Grayling remains in the Moberly River.

2.0 METHODS

The Site C Reservoir Tributary Fish Population Indexing Survey represents a before-after study design. Five years of data (2016 to 2020) have been collected prior to river diversion which occurred on 3 October 2020. An additional three years of data (2021 to 2023) are scheduled to be collected during river diversion and prior to reservoir filling and operation of the Project.

2.1 Study Area

The Task 2c study area includes tributaries that were previously identified as having key habitat for migratory Peace River Arctic Grayling, Bull Trout, and Rainbow Trout populations (Appendix A, Figures A1 to A10). Sections of each tributary that were sampled depended on sampling logistics and the species-specific hypotheses being tested. Results from the four previous years of the survey (2016 to 2019) were used to guide sample site selection, to focus on reaches and habitat types with higher densities of the target fish species. Target fish species within the tributaries sampled in 2020 are summarized in Table 1.

Table 1: Summary of target species by watershed for the Site C Reservoir Tributaries Fish Population Indexing Survey, 2020.

Species	Watershed							
	Chowade River	Cypress Creek	Fiddes Creek	Colt Creek	Farrell Creek	Kobes Creek	Maurice Creek	Moberly River
Arctic Grayling	-	-	-	o	o	o	-	x
Bull Trout	x	x	x	o	-	o	-	-
Rainbow Trout	o[b]	o	-	x	x	x	x	-

"x" denotes main target species for the tributary; "o" denotes secondary target species for the tributary.

River Km values presented in this report were based on the Government of Canada's CanVec series of hydrograph features[13]. For each tributary, the different line segments of the same stream were merged into a single line feature. River Km 0.0 (i.e., the tributary's confluence) was set at the lowest elevation of the line feature, and 1 km intervals were established along the line feature using the Create Station Points tool (ArcGIS© extension ET GeoWizards).

[13] Available for download at https://open.canada.ca/data/en/dataset/9d96e8c9-22fe-4ad2-b5e8-94a6991b744b.

2.1.1 Tributaries Targeting Bull Trout

Tributaries sampled in 2020 included the Chowade River and Cypress and Fiddes creeks (Table 1). Sampling in the Chowade River was conducted between River Km 39.3 and River Km 51.2, as measured upstream from the Chowade River's confluence with the Halfway River (Appendix A, Figure A4). For Cypress Creek, sampling was conducted between River Km 21.5 and River Km 41.9, as measured upstream from Cypress Creek's confluence with the Halfway River (Appendix A, Figure A3). All sampling in 2020 within Fiddes Creek was conducted between River Km 4.8 and River Km 11.9 as measured upstream from Fiddes Creek's confluence with the Halfway River (Appendix A, Figure A2).

UTMs of all site locations are provided in Appendix A, Table A1. Individual sites were selected based on aerial surveys conducted at the start of the field program, allowing crews to identify potentially suitable habitats that were close to safe landing locations.

2.1.1.1 PIT Detector Arrays on Tributaries Targeting Bull Trout

In addition to the identification of recaptured fish within and among study years, fish implanted with PIT tags as part of the current survey (Mon-1b, Task 2c) were also intended to be detected by the Chowade River and Cypress Creek PIT detector arrays installed as part of Mon-1b, Task 2b (Appendix A, Figure A1) (Putt et al. 2021). These arrays also detect fish captured and implanted with PIT tags deployed during surveys conducted as part of the Peace River Large Fish Indexing Survey (Mon-2, Task 2a; e.g., Golder and Gazey 2020), Offset Effectiveness Monitoring (Mon-2, Task 2d; e.g., Golder 2020a), the Fish Composition and Abundance Survey (Mon-2, Task 2b; Triton in prep.), and the operation of the Temporary Upstream Fish Passage Facility (BC Hydro 2021).

Summaries of fish movements based on PIT tag detections at the Chowade River and Cypress Creek PIT detector arrays are not presented in this report; however, raw detection data are provided in Putt et al. 2021.

2.1.2 Tributaries Targeting Rainbow Trout

Sample locations within Farrell Creek (Appendix A, Figure A7) were at locations previously established by Mainstream (2011a) and Golder (2018) to allow comparisons with historical data when possible. To maintain a consistent site-naming convention between tributaries within Task 2c, Mainstream Site FA03 was renamed FAC63.3, Site FA04 was renamed FAC65.7, and Site FA05 was renamed FAC102.1. UTMs of sample site locations are provided in Appendix A, Table A1.

Sample locations within Colt Creek (Appendix A, Figure A5) and Kobes Creek (Appendix A, Figure A6) were established in 2017 (Golder 2018) based on ease of access and the quality of fish habitat available (i.e., expected use by immature Rainbow Trout). These sample locations were replicated in 2018, 2019, and 2020. UTMs of sample site locations are provided in Appendix A, Table A1.

Sampling locations within Maurice Creek (Appendix A, Figure A8) were established prior to the 2020 survey. Eight sampling locations were assessed between River Km 0.6 and River Km 2.0 as measured upstream from Maurice Creek's confluence with the Peace River. The sample locations were selected based on the quality of fish habitat available. Four of the sites were established upstream of the expected inundation zone of the reservoir and four of the sites were established downstream of the expected inundation zone of the reservoir.

2.1.3 Moberly River

The Moberly River study area was defined as the portion of the Moberly River from the outlet of Moberly Lake (River Km 123 as measured upstream from the Moberly River's confluence with the Peace River) downstream to the Moberly River confluence (River Km 0.0; Appendix A, Figures A9 and A10).

Previous baseline studies (e.g., Mainstream 2011b) delineated river sections within the Moberly River; these section breaks were implemented in 2020 to maintain consistency with these baseline datasets (Appendix A, Table A2). The habitat classifications used by Mainstream (2011b) to delineate individual sections were as follows:

1) Irregular meanders; frequent riffle complexes interspersed with extended runs with some flats; and
2) Tortuous meanders dominated by low water velocities; flats with few riffle sections.

2.2 Study Period

In 2020, 30 days of sampling were conducted from late July to early August (all watersheds combined; Table 2). Previous studies had documented downstream migration of immature Bull Trout out of the Halfway River watershed in mid-August (R.L.&L. 1995); therefore, to facilitate capture of immature Bull Trout prior to the onset of their downstream migration, sampling in the Chowade River and Cypress Creek was conducted over 9 days between 22 July and 9 August. On 24 July, sampling in the Chowade River was attempted; however, due to low clouds and fog, the helicopter was not able to access the river. Sampling in the Chowade River and Cypress Creek occurred at approximately the same period as in 2019 (Golder 2020b). One day of sampling was conducted in Fiddes Creek on 27 July.

Farrell, Colt, Kobes, and Maurice creeks were sampled over nine days between 26 July and 13 August (Table 2).

The Moberly River was sampled over 12 days from 28 July to 8 August (Table 2). Rather than aligning with historical surveys conducted on the Moberly River (e.g., Mainstream 2011b; Golder 2017) or a specific calendar date, the 2020 survey aligned with appropriate flow conditions for the sampling methods to increase the likelihood of encountering Arctic Grayling.

Table 2: Sampling schedule by tributary for the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Tributary	Sample Dates	Number of Sampling Days
Chowade River	28 to 30 July; 9 August	4
Cypress Creek	22, 23, 25, and 31 July; 1 August	5
Fiddes Creek	27 July	1
Farrell Creek	26 July and 2 August	2
Colt Creek	4 and 5 August	2
Kobes Creek	3 and 13 August	2
Maurice Creek	6 and 7 August	2
Moberly River	28 July to 8 August	12

2.3 Discharge

Discharge data are not available for the Chowade River, or Colt, Cypress, Farrell, Fiddes, Kobes, or Maurice creeks. The Water Survey of Canada's Halfway River Above Graham River station (Station Number 07FA003)[14] is located approximately 0.5 km upstream of the Graham River's confluence with the Halfway River. Data from this station were considered representative of tributaries in the Halfway River drainage and the general region based on correlations of station data and Chowade River water surface elevation data collected by Putt et al. (2020).

Discharge data for the Moberly River are from the Water Survey of Canada's Moberly River station (Station Number 07FB008)[15], which is located approximately 2.5 km upstream of the North Monias Road bridge near River Km 45.0 (Appendix A; Figure A10).

Unless stated otherwise, discharge values are daily average values presented in cubic metres per second (m^3/s). Daily averages from 2020 were plotted with descriptive statistics (mean, minimum, and maximum) of daily average discharge from all historical years when data were available for the two gauging stations described above.

2.4 Fish Capture

2.4.1 Halfway River Watershed and Farrell and Maurice creeks

Backpack electrofishing was used to capture fish in the Chowade River and Colt, Cypress, Farrell, Fiddes, Kobes, and Maurice creeks. All sampling consisted of a single pass in open sites.

For the Chowade River and Cypress and Fiddes creeks, where Bull Trout were the primary target species, sites were located in wadeable areas where immature Bull Trout densities were expected to be high. These areas were generally located in side-channels or braided sections of the stream that had abundant physical cover, channel widths less than approximately 5 m, mean water depths less than approximately 0.6 m, and water velocities less than 1.0 m/s. Most sites in the Chowade River and Cypress and Fiddes creeks were dominated by gravel and cobble substrates that resulted in abundant interstitial habitat. Most (97%) of the sites sampled in 2020 contained large or small woody debris, and 80% of sites identified shallow water as a cover type. Within each site, sampling effort was also focused on areas where the capture of immature Bull Trout was expected to be greatest (e.g., crews focused additional effort around root wads or large boulders if they were present in a site). Backpack electrofishing sites ranged in length from approximately 25 to 350 m. Differences in water elevations and habitat suitability at specific locations between study years reduced the feasibility of repeatedly sampling the same locations year-over-year; however, in some situations, crews were able to sample the same locations as previous study years.

In Farrell, Colt, and Kobes creeks, where Rainbow Trout were the primary target species, the sites sampled in 2020 were also sampled in 2017, 2018, and 2019. Three of the four sites (FAC63.3, FAC65.7, and FAC102.1) situated on Farrell Creek were previously sampled by Mainstream (2011b). All sites on Farrell, Colt and Kobes creeks were in mainstem high quality habitats that were conducive for backpack electrofishing, and where

[14] https://wateroffice.ec.gc.ca/report/real_t2ime_e.html?stn=07FA003.

[15] https://wateroffice.ec.gc.ca/report/real_time_e.html?stn=07FB008.

Rainbow Trout densities were expected to be high. The sample sites on Maurice Creek were selected based on the quality of fish habitat available and were situated upstream and downstream of the expected reservoir inundation level.

Backpack electrofishing was conducted with one person operating the electrofisher and one person netting fish. Captured fish were netted and transferred to 20 L buckets filled with water positioned on the shoreline along the length of the site. Smith-Root™ Model 12, Model 12B, and LR24 backpack electrofishers (Smith-Root, Vancouver, WA, USA) were used, depending on the crew. Electrofisher settings were adjusted as needed to minimize injuries to fish while efficiently capturing the target size and species. Voltage ranged from 300 to 500 V, frequency was set at 60 Hz, and pulse width ranged from 4 to 6 ms.

Habitat variables recorded at each site in 2020 (Table 3) were consistent with previous study years (Golder 2020b) and baseline studies (e.g., Mainstream 2011b) and were primarily collected to identify differences in sampling conditions and habitat types sampled within and among study years.

The type and amount of instream cover for fish were qualitatively estimated at all sites. Water velocities were visually estimated and categorized at each site as low (less than 0.5 m/s), medium (0.5 to 1.0 m/s), or high (greater than 1.0 m/s). Where water depths were adequate, water clarity was estimated using a “Secchi Bar” that was manufactured based on the description provided by Mainstream and Gazey (2014). Mean and maximum sample depths were visually estimated at each site.

Table 3: Habitat variables recorded at each site sampled as part of the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Variable	Description
Date	The date the site was sampled
Time	The time the site was sampled
Air Temp	Air temperature at the time of sampling (to the nearest 1°C)
Water Temp	Water temperature at the time of sampling (to the nearest 0.1°C)
Conductivity	Water conductivity at the time of sampling (to the nearest 10 µS/cm)
Secchi Bar Depth	The Secchi Bar depth recorded at the time of sampling (to the nearest 0.1 m)
Cloud Cover	A categorical ranking of cloud cover (Clear = 0-10% cloud cover; Partly Cloudy = 10-50% cloud cover; Mostly Cloudy = 50-90% cloud cover; Overcast = 90-100% cloud cover)
Weather	A general description of the weather at the time of sampling (e.g., comments regarding wind, rain, smoke, or fog)
Electrofisher Model	The model of electrofisher used during sampling
Percent	The estimated duty cycle (as a percent) used during sampling
Amperes	The average amperes used during sampling
Mode	The mode (AC or DC) and frequency (in Hz) of current used during sampling
Volts	The voltage (V) used during sampling
Length Sampled	The length of shoreline sampled (to the nearest 1 m)
Time Sampled	The duration of electrofisher operation (to the nearest 1 second)
Mean Depth	The mean water depth sampled (to the nearest 0.1 m)
Maximum Depth	The maximum water depth sampled (to the nearest 0.1 m)
Effectiveness	A categorical ranking of sampling effectiveness (1 = good; 2 = moderately good; 3 = moderately poor; 4 = poor)
Instream Velocity	A categorical ranking of water velocity (High = greater than 1.0 m/s; Medium = 0.5 to 1.0 m/s; Low = less than 0.5 m/s)
Instream Cover	The type (i.e., Interstices; Woody Debris; Cutbank; Turbulence; Flooded Terrestrial Vegetation; Aquatic Vegetation; Shallow Water; Deep Water) and amount (as a percent) of available cover
Crew	The field crew that conducted the sampling
Sample Comments	Any additional comments regarding the sample site or sampling conditions

2.4.2 Moberly River

The study plan for the Moberly River survey consisted of crews travelling by inflatable boats down the length of the Moberly River from Moberly Lake to the river's confluence with the Peace River. The six-person team worked as three separate crews: an angling crew, a small fish boat electroshocking crew, and a backpack electrofishing crew. The survey started at Moberly Lake Provincial Park (River Km 123.0) and crews travelled downstream to the Moberly River's confluence (River Km 0.0) for an 11-day period while sampling Sections MR-S1A to MR-S10 (Appendix A, Table A2). Following the completion of the boat-based survey, a single day of sampling was conducted on 8 August at Moberly River sites within Sections MR-S1A and MR-S7 where high numbers of Arctic Grayling had been captured during the boat-based survey. During this single day of sampling a crew of four accessed the Moberly River using a helicopter and angling was the sample method used.

Small fish boat electroshocking was conducted out of a white-water-style raft (Avon™ 13 Pathmaker; 4 m long by 1.75 m wide; AVON Marine, Port Moody, BC, Canada). Sites were located in main channel habitats where water depths were deep enough and channel widths were wide enough to allow the crew to effectively maneuver the boat. The raft was equipped with a Smith-Root™ 2.5 Generated Powered Pulsator (GPP 2.5; Smith-Root, Vancouver, WA, USA) and a generator contained in a waterproof tub. The electroshocker was connected to a cathode array curtain placed on the bow of the raft and two anode pole arrays extended approximately 1.5 m in front of the raft. The anode poles were angled between 20° and 40° off either side of the bow. While sampling, a single crew member was positioned at the bow of the boat. This crew member netted stunned fish and transferred them to a water-filled holding tank positioned behind the bow but in front of the oarsman. The netter attempted to capture all stunned fish, but priority was given to Arctic Grayling if more than one species was observed at the same time. The oarsman sat in an elevated chair behind the holding tank and maneuvered the boat with oars braced in oar locks. Electroshocker settings were adjusted at each site, depending on local conditions and the size and species of fish observed, to minimize injury to fish. The electroshocker was operated at 30 Hz pulsed direct current (PDC) and the high output voltage range (50-1000 V) was selected during sampling. The output voltage and pulse width were adjusted by the operator using the Percent of Power control to attain the desired response in fish, which was galvanotaxis (forced swimming) without immediate tetany. The response typically corresponded to a Percent of Power between 30% and 50%. Habitat conditions, as summarized in Table 3, were recorded at each site. Small fish boat electroshocking sites ranged between 329 and 2660 m in length. The above methods were similar to those employed during the 2017 to 2019 surveys (Golder 2018, 2019, 2020b).

Backpack electrofishing was used in locations where water depths were shallow enough and water velocities were low enough to allow safe wading and efficient fish capture using this technique. These sites were often side channel or braided areas. Two different models of backpack electrofisher were used, a Smith-Root™ Model 12B and a Smith-Root™ Model LR24 (Smith-Root, Vancouver, WA, USA). Electrofisher settings were adjusted as needed to minimize injuries to fish while allowing efficient capture of the target size and species. Voltage ranged from 295 to 600 V, frequency ranged from 30 and 60 Hz, and pulse width ranged from 5 to 12 ms. Backpack electrofishing was conducted with one person operating the electrofisher and one person netting fish. Captured fish were netted and transferred to 20 L buckets of water set along the side of the sample site. Habitat conditions, as summarized in Table 3, were recorded at each site. Backpack electrofishing sites ranged in length from 22 to 312 m. The above methods were similar to those employed during the 2016 to 2019 surveys (Golder 2017, 2018, 2019, 2020b).

Angling occurred at sites where fish were observed feeding on the surface of the water or other habitats that looked suitable for Arctic Grayling (i.e., upstream/downstream of riffles, near tributary inflows, along eddy lines, and near submerged woody debris). Both spin-casting and fly-fishing equipment were used, and tackle (primarily

small spinners and dry flies) was selected to target Arctic Grayling. To potentially increase the catch of target species, angling also occurred opportunistically while the boats travelled between sites and any fish that were captured while in transit were processed at the site of capture. During each angling effort, total time spent angling was recorded and multiplied by the number of anglers to calculate total angling effort in hook-hours.

2.5 Fish Processing

All captured fish were identified to species, counted, weighed to the nearest 1 g, and measured for fork length (FL) to the nearest 1 mm. Total lengths (TL) were recorded for Burbot (*Lota lota*) and sculpin species to the nearest 1 mm. When catches of species other than Arctic Grayling, Bull Trout or Rainbow Trout exceeded 30 individuals per site, only the first 30 individuals of each species were measured; all other individuals were enumerated and released. Arctic Grayling, Burbot, Bull Trout, and Rainbow Trout in good condition following processing were implanted with half-duplex (HDX) PIT tags (ISO 11784/11785 compliant) (Oregon RFID, Portland, OR, USA). Tags were implanted within the left axial muscle below the dorsal fin origin and oriented parallel with the anteroposterior axis of the fish. Tagging criteria are summarized as follows:

- Fish between 80 and 199 mm FL received 12 mm long HDX PIT tags (12.0 mm x 2.12 mm HDX+).
- Fish between 200 and 299 mm FL received 23 mm long HDX PIT tags (23.0 mm x 3.65 mm HDX+).
- Fish greater than 300 mm FL received 32 mm long HDX PIT tags (32.0 mm x 3.65 mm HDX+).

After processing, all fish were released at the downstream end of their capture site.

Scale samples were collected from all captured Arctic Grayling and Rainbow Trout. Scales were collected from above the lateral line and posterior to the dorsal fin. The first leading fin ray of the left pectoral fin was collected from all Bull Trout longer than 120 mm FL. Scale and fin ray samples were stored in appropriately labelled coin envelopes.

Small sections of fin tissue were collected from Arctic Grayling, Bull Trout and Rainbow Trout that the crew deemed large enough to not be adversely affected by the collection procedure. Tissue samples were also collected from rarely encountered species (e.g., Pearl Dace [*Margariscus margarita*]) and from Longnose Dace (*Rhinichthys cataractae*), Northern Redbelly Dace (*Phoxinus eos*), Redside Shiner (*Richardsonius balteatus*) and Slimy Sculpin (*Cottus cognatus*) in the Moberly River to support the Site C Small Fish Translocation Monitoring (Mon-15). Samples were preserved in 95% non-denatured ethyl alcohol and provided to BC Hydro. The samples were not analyzed as part of the current study.

Both otoliths and fin rays were collected from Rainbow Trout, Arctic Grayling, and Bull Trout that succumbed to sampling. A selection of these samples were submitted to BC Hydro for potential microchemistry analysis; however, the findings of these analyses are not presented in this report.

A selection of immature Rainbow Trout captured in Farrell and Maurice creeks were implanted with radio telemetry tags. All fish sampling and tagging data for radio tagged fish were provided to LGL Ltd. The telemetry tags will be monitored under the Site C Fish Movement Assessment (Mon-1b, Task 2d; e.g., Hatch et al. 2021).

2.6 Fish Ageing

All Rainbow Trout were aged by scale analysis. Scales were aged by counting the number of growth annuli present on the fish scale following methods outlined in Mackay et al. (1990) and RISC (1997). Scales were temporarily mounted between two slides and examined using a trinocular microscope equipped with a digital camera. If needed, several scales were examined and the highest quality scale was photographed using the integrated 3.1-megapixel digital macro camera and saved as a JPEG-type picture file. All scales were examined independently by two experienced individuals (i.e., “agers”) and ages assigned. For each scale sample, the agers had access to the species and the date of capture but no other information about the sampled fish (e.g., fork length or capture history). If the two assigned ages did not agree, a third ager assigned an age. If two out of three agers agreed on the age, then this age was used for analysis. If two out of three agers did not agree on an age, then the sample was not used for analysis purposes. Where possible, the scale age estimates were then cross-checked with age estimates assigned based on fork lengths and the separation of modes in length-frequency histograms of all fish captured in each stream.

During previous study years (Golder 2018, 2019, 2020b), age-0 Rainbow Trout ranged between approximately 30 and 50 mm FL and age-1 Rainbow Trout ranged between approximately 70 and 120 mm FL. In 2020, Rainbow Trout smaller than 50 mm were not captured, and only a single mode less than approximately 130 mm FL was evident in length-frequency data, depending on the stream. Based on results of previous study years, it was assumed that the single mode corresponded to the age-1 cohort and that age-0 fish were not encountered during the 2020 survey. Fish from Colt and Farrell creeks that were less than approximately 100 mm FL, fish from Kobes Creek that were less than 120 mm, and fish from Maurice Creek that were less than 135 mm FL were all assigned as age-1 based on their length. Fish larger than these cutoffs were aged using scale samples.

Bull Trout were aged based on fork lengths and the separation of modes in length-frequency histograms of all fish captured in each stream.

2.7 Data Analysis

All data collected during field surveys were entered and stored in a custom MS-Access© database that conforms to BC Hydro’s established Site C data standards. Data on field sheets were entered into an MS-Excel© spreadsheet, which were then verified by a second person before being uploaded to the database. Before data analysis, a Quality Control / Quality Assurance (QA/QC) review of the database was conducted to identify possible errors. The database QA/QC used histograms and bivariate plots to check the range and format of all variables. Once identified, outliers and erroneous data were reviewed and either corrected or removed from the database. Error screening and data proofing were conducted using both Excel® and the statistical environment R, v. 4.0.3 (R Core Team 2020). Data analyses and tabular data summaries were performed in R. Graphical plots were produced in R using the package ggplot2 (Wickham 2009).

Catch was summarized by sample method, species, life stage, watercourse, and section (where applicable) and presented in tabular format. Catch per unit effort (CPUE) for electrofishing was calculated by dividing the summed total number of fish in a tributary captured at all sites by the sum of effort at all sites. Sampling effort was measured in seconds of electrofisher operation, and CPUE was expressed as the number of fish per hour. Length of site was not used to represent sampling effort for CPUE because sampling in the Chowade River and Cypress Creek focused only on optimal habitats and the amount of habitat available and site length sampled was dependent on sampling conditions.

Length-frequency histograms were plotted for the three target species (Bull Trout, Rainbow Trout and Arctic Grayling) by tributary. Length-frequency histograms were also plotted for Burbot and Mountain Whitefish (*Prosopium williamsoni*) for the Moberly River.

Fish were assigned a life stage of YOY, immature, or adult based on their length. The maximum size of YOY was determined for each species based on the difference between the first and second modes in the species' length-frequency distribution. These assignments were corroborated with scale age data where applicable. The immature life stage included fish larger than the YOY group up to 249 mm FL. Fish larger than or equal to 250 mm FL were classified as adult for all species. Although some individuals larger than 250 mm FL for some species were likely not mature adults and some individuals smaller than 250 mm FL for some species were likely mature adults, 250 mm FL was used as a consistent cut-off to summarize data by length-class.

Backpack electrofishing was the only capture method used in the Halfway River watershed and Farrell and Maurice creeks and is more effective at capturing small-bodied fish than large-bodied fish. As such, incidental catches of adult Bull Trout and adult Rainbow Trout were not considered reliable indicators of adult abundance in these streams.

3.0 RESULTS

Sampling conducted in tributaries to the Peace and Halfway rivers in 2020 was initiated in late July when a gradual decrease in the hydrograph in each drainage was expected. Flows generally decreased within all systems throughout the sampling period and flows were considered adequate for sampling.

3.1 Tributaries Targeting Bull Trout

3.1.1 Halfway River Discharge and Temperature

An aerial reconnaissance of the study area in the Halfway River watershed and its tributaries was conducted on 21 July prior to the start of sampling. During the reconnaissance, the discharge in the Halfway River was approximately 65 m³/s and near the historical mean discharge level (69 m³/s; 1977-1995, 2012-2014) (Figure 1). Discharge remained near historical values until a heavy rain event on 24 July caused flows to increase. Discharge peaked on 25 July at approximately 108 m^3/s, then decreased continually for the remainder of the study period. Sampling was not conducted in the Halfway River watershed on 26 July, to allow water levels to decrease, and sampling was reinitiated on 27 July. Mean daily discharge in the Halfway River was below historical levels between 29 July and 9 August (range = 36 to 72 m^3/s). Average water temperatures at the time of sampling were lower in the Chowade River (7.4°C), compared to Cypress Creek (9.0°C) and Fiddes Creek (8.5 °C) (Appendix C, Table C1).

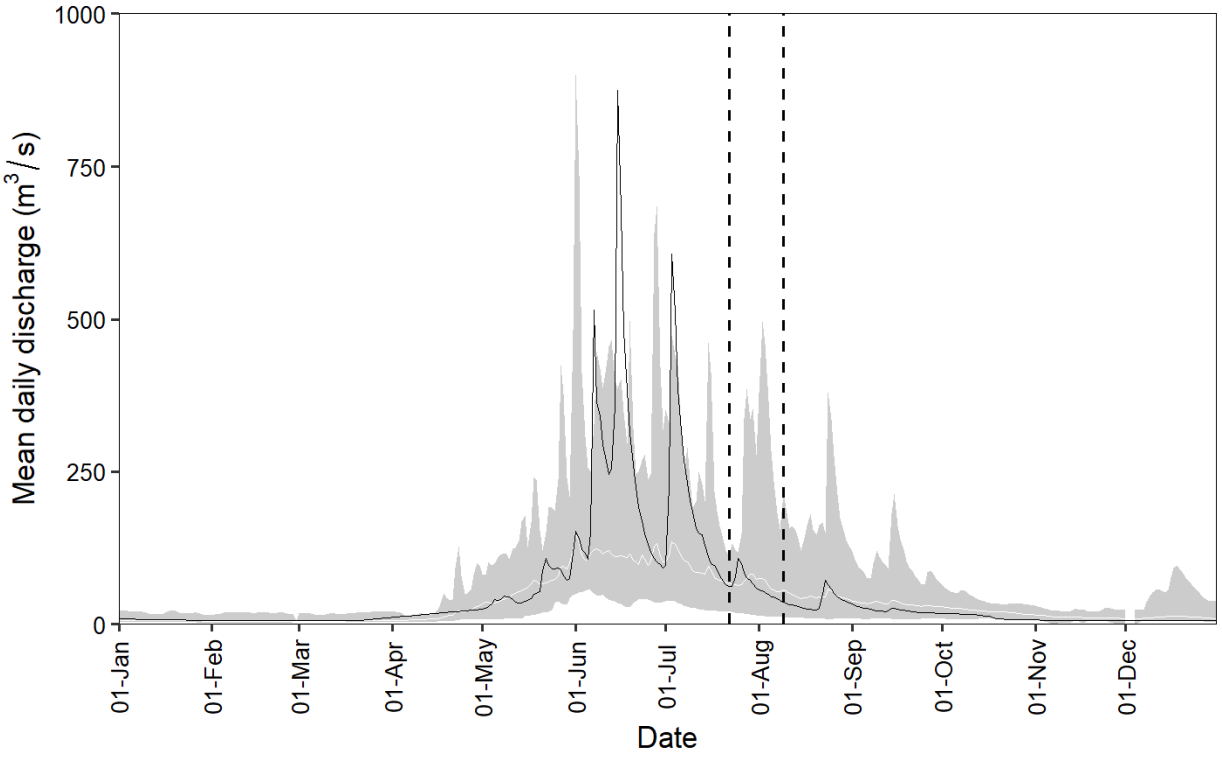


Figure 1: Mean daily discharge in the Halfway River above the Graham River (station 07FA003) in 2020 (black line). The white line shows the mean daily discharge and the grey ribbon shows the range from minimum to maximum from historical daily discharge data (1977–1995, 2012–2014, and 2018–2019). The vertical dashed lines represent the timing of 2020 study period.

3.1.2 Sample Effort

In total, 74 sites were surveyed in tributaries targeting Bull Trout, including 30 sites in the Chowade River, 38 sites in Cypress Creek, and 6 sites in Fiddes Creek. Approximately 28 hours of backpack electrofishing effort was conducted over 12,382 m of habitat (Table 4). A detailed summary of effort is provided in Appendix B, Table B1.

Table 4: Summary of backpack electrofishing effort employed to target Bull Trout in Halfway River tributaries during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Tributary	Number of Sites	Electrofishing Effort (s)	Electrofishing Effort (h)	Length of Survey (m)
Chowade River	30	43,013	11.9	5,183
Cypress Creek	38	48,097	13.4	6,249
Fiddes Creek	6	8,699	2.4	950
Total	**74**	**99,809**	**27.7**	**12,382**

3.1.3 Catch and Life History

Of the 819 Bull Trout captured in the Chowade River and Cypress and Fiddes creeks combined (Appendix B, Table B4), 565 (69%) were new captures that were implanted with PIT tags; three were recaptures that were tagged during a previous study year (Table 5). All remaining Bull Trout were not tagged because they were either incidental mortalities (*n* = 2), unhealthy (i.e., unlikely to survive the tagging process; *n* = 5), or too small to receive a PIT tag (i.e., less than 80 mm FL; *n* = 244).

Of the three recaptured Bull Trout, one was tagged in 2019 in Cypress Creek and recaptured in 2020 approximately 200 m upstream from its initial capture location. This fish measured 88 mm FL in 2019 (age-1) and measured 133 mm FL in 2020 (age-2). The two other recaptured Bull Trout were in Fiddes Creek. One of these fish was originally tagged in 2018 and recaptured in 2020 approximately 200 m upstream from its initial capture location. This individual measured 129 mm FL in 2018 (age-2) and measured 196 mm FL in 2020 (age-4). The second Bull Trout was originally tagged in 2019 and recaptured in 2020 approximately 2300 m downstream from its initial capture location. This fish measured 89 mm FL in 2019 (age-1) and measured 119 mm FL in 2020 (age-2).

Two adult Bull Trout were captured in the Chowade River, and one adult Bull Trout was captured in Cypress Creek. These fish were recorded and implanted with PIT tags; however, they were excluded from analyses. Adult Bull Trout were not recorded on Fiddes Creek.

Table 5: Number of fish caught and tagged by life stage, and corresponding CPUE (number of fish per hour), in the Chowade River and Cypress and Fiddes creeks recorded during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Species[a]	Life Stage[b]	Chowade River			Cypress Creek			Fiddes Creek			Total		
		# Caught	# Tagged	CPUE (#/h)	# Caught	# Tagged	CPUE (#/h)	# Caught	# Tagged	CPUE (#/h)	# Caught	# Tagged	CPUE (#/h)
Bull Trout	Adult	2	2	<1.0	1	1	<1.0	-	-	-	3	3	<1.0
	Immature	352	306	29.3	282	207	21.0	89	52	37.1	723	565	26.0
	YOY	67	-	5.6	25	-	1.9	1	-	<1.0	93	-	3.3
Rainbow Trout	Adult	2	2	<1.0	3	3	<1.0	-	-	-	5	5	<1.0
	Immature	-	-	-	3	3	<1.0	-	-	-	3	3	<1.0
	YOY	-	-	-	1	-	<1.0	-	-	-	1	-	<1.0

[a] Table excludes 50 Slimy Sculpin captured in the Chowade River and 59 Slimy Sculpin captured in Cypress Creek.
[b] Life stage was assigned based on fork length. Fish were classified as adult when longer than 249 mm FL, and immature when less than 250 mm FL but greater than the maximum size of YOY. The maximum size of YOY fish varied by species and location and was selected based on modes observed in length-frequency histograms and corroborated with length-at-age data when possible.

Bull Trout YOY (fish with fork lengths less than approximately 65 mm FL) were recorded in all three systems. The CPUE of YOY Bull Trout was higher in the Chowade River (5.6 fish/h) than in Cypress Creek (1.9 fish/h; Table 7). The CPUE of immature Bull Trout (fish with fork lengths larger than approximately 65 mm FL) was highest in Fiddes Creek (37.1 fish/h) followed by the Chowade River (29.3 fish/h) and Cypress Creek (21.0 fish/h).

Length-frequency histograms for Bull Trout (Figure 2) show a mode between approximately 30 and 60 mm FL and between approximately 70 and 110 mm FL, which correspond to the age-0 (YOY) and age-1 cohorts, respectively. These two modes were evident in all three of the sampled tributaries. A third mode from approximately 120 to 200 mm FL likely corresponds to age-2 and older fish. As a proportion of the total catch, Bull Trout larger than 120 mm FL were more common in Fiddes Creek and less common in the Chowade River and Cypress Creek.

Overall (all three streams combined), 99.7% of the Bull Trout captured in 2020 were less than 200 mm FL and when tagged, were implanted with a 12 mm PIT tag (n = 562). The three adult Bull Trout captured in 2020 were implanted with either a 23 mm PIT tag (n = 1) or a 32 mm PIT tag (n = 2).

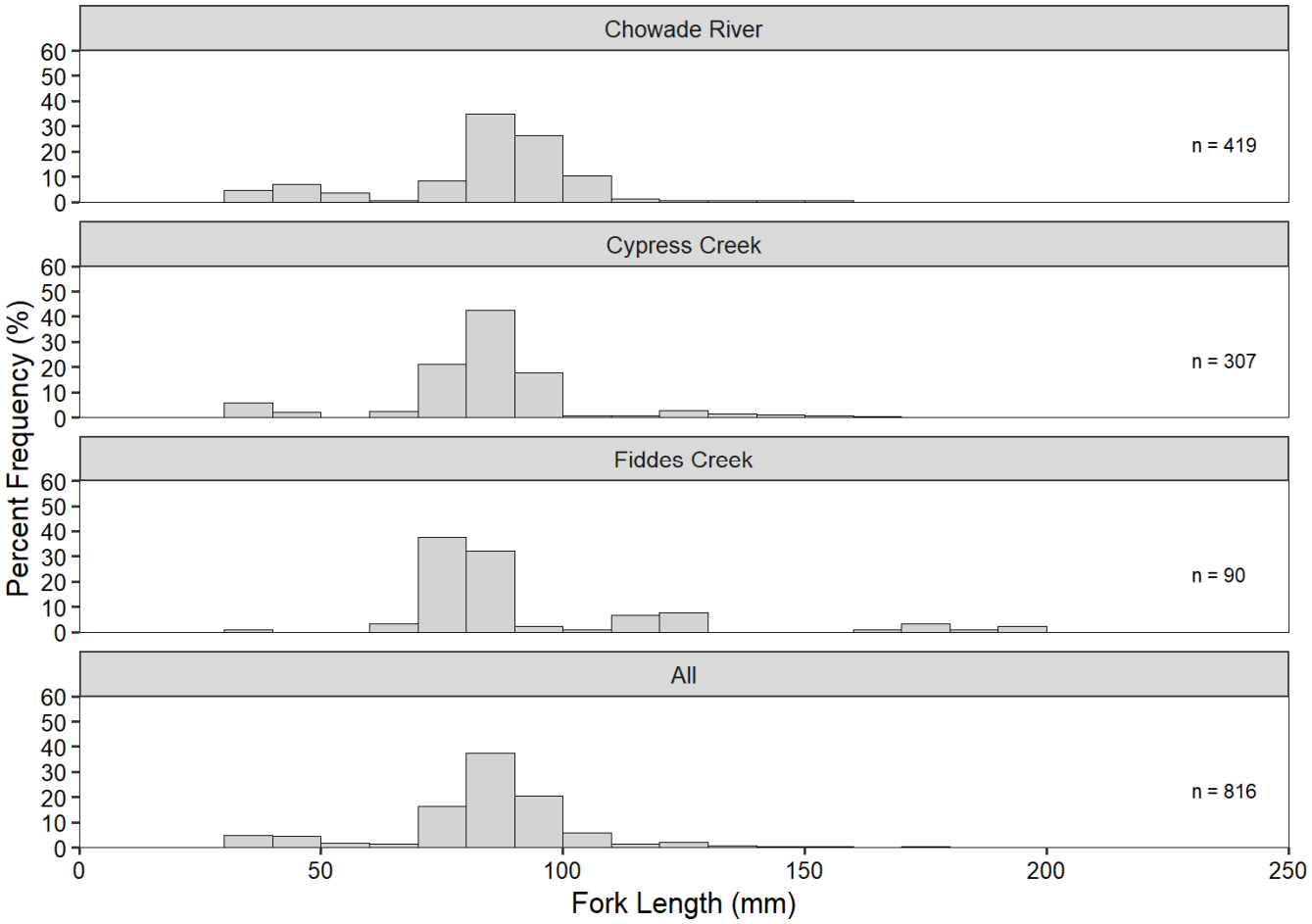


Figure 2: Length-frequency distribution for Bull Trout captured by backpack electrofishing in the Chowade River and Cypress and Fiddes creeks during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020. Analysis does not include the three adult (i.e., greater than 250 mm FL) Bull Trout captured in the Chowade River (two adults) and Cypress Creek (one adult).

In 2020, 816 Bull Trout were assigned ages based on their fork lengths (Figure 3 and Table 6). Age-1 comprised 84% of all Bull Trout captured. The low number of older Bull Trout in the catch was expected and can be attributed to two main reasons: 1) the study specifically targeted immature life stages through backpack electrofishing; and 2) based on the life history of Bull Trout, it is expected that most individuals migrate downstream and out of the study area by age-2 to age-3 [16].

[16] Site C Clean Energy Project Environmental Impact Statement, Volume 2, Appendix Q3.

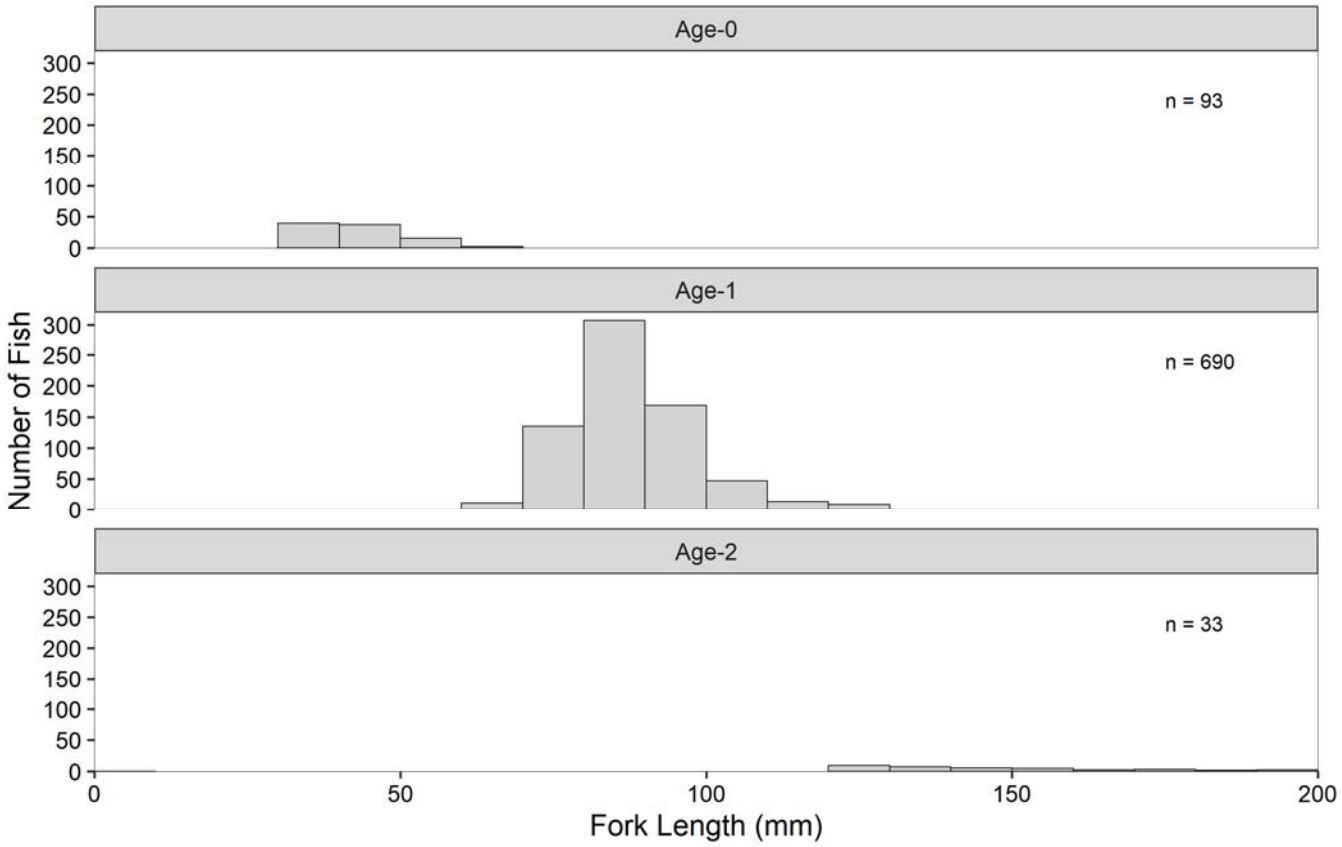


Figure 3: Length-frequency distribution by age class for Bull Trout captured in the Chowade River and Cypress and Fiddes creeks combined, during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Table 6: Descriptive statistics of fork length by age for Bull Trout captured in the Chowade River and Cypress and Fiddes creeks during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020. Ages were assigned based on the fish's fork length.

Age	Chowade River			Cypress Creek			Fiddes Creek		
	Average FL ± SD (mm)	Range (mm)	*n*	Average FL ± SD (mm)	Range (mm)	*n*	Average FL ± SD (mm)	Range (mm)	*n*
0	44 ± 7	32 - 64	67	35 ± 6	30 - 46	25	30	n/a	1
1	90 ± 9	70 - 123	345	84 ± 8	62 - 114	263	86 ± 16	66 - 129	82
2	144 ± 10	133 - 157	7	136 ± 12	121 - 167	19	180 ± 12	166 - 196	7

Two Rainbow Trout were captured in the Chowade River in 2020 (Table 6). One Rainbow Trout had a length of 284 mm FL and was age-3 based on its scales. The other Rainbow Trout captured in the Chowade River had a length of 370 mm FL. Scales were not collected from this individual. Both Rainbow Trout were implanted with PIT tags.

Seven Rainbow Trout were captured in Cypress Creek including YOY (*n* = 1), immature (*n* = 3), and adult (*n* = 3) life stages. The YOY had a length of 66 mm FL, the immature individuals had lengths that ranged between 125 to 203 mm FL, and the adult individuals had lengths that ranged between 325 to 410 mm FL. Scales were used to assign ages to six of the seven Rainbow Trout, and ages ranged between age-0 and age-5. PIT tags were implanted into all Rainbow Trout except the single YOY. Rainbow Trout were not captured in Fiddes Creek.

In 2020, captured non-target species included 50 Slimy Sculpin captured in the Chowade River and 59 Slimy Sculpin captured in Cypress Creek (Appendix B).

3.1.4 Interannual Comparison

A comparison of immature and YOY Bull Trout CPUE from 2017 to 2020 indicated similar trends in both the Chowade River and Cypress Creek (Figure 4). In both systems, CPUE for YOY Bull Trout was highest in 2018, then declined between 2018 and 2020. Alternatively, CPUE for immature Bull Trout was lowest in 2018 and increased between 2018 and 2020. In 2020, CPUE of immature Bull Trout in the Chowade River (29.5 fish/h) and Cypress Creek (21.1 fish/h) were higher than all previous years.

In Fiddes Creek, the CPUE recorded for YOY Bull Trout was relatively high in 2017 and 2018, followed by an absence of YOY in 2019, and only a single YOY captured in 2020 (Figure 4). CPUE recorded for immature Bull Trout in Fiddes Creek has consistently exceeded those recorded in the Chowade River and Cypress Creek. Over time, CPUE recorded for immature Bull Trout in Fiddes Creek declined from a high of 110.5 fish/h in 2017 to a low of 24.4 fish/h in 2019. The declining trend was reversed in 2020, when CPUE recorded for immature Bull Trout increased from the previous year's value to 36.8 fish/h.

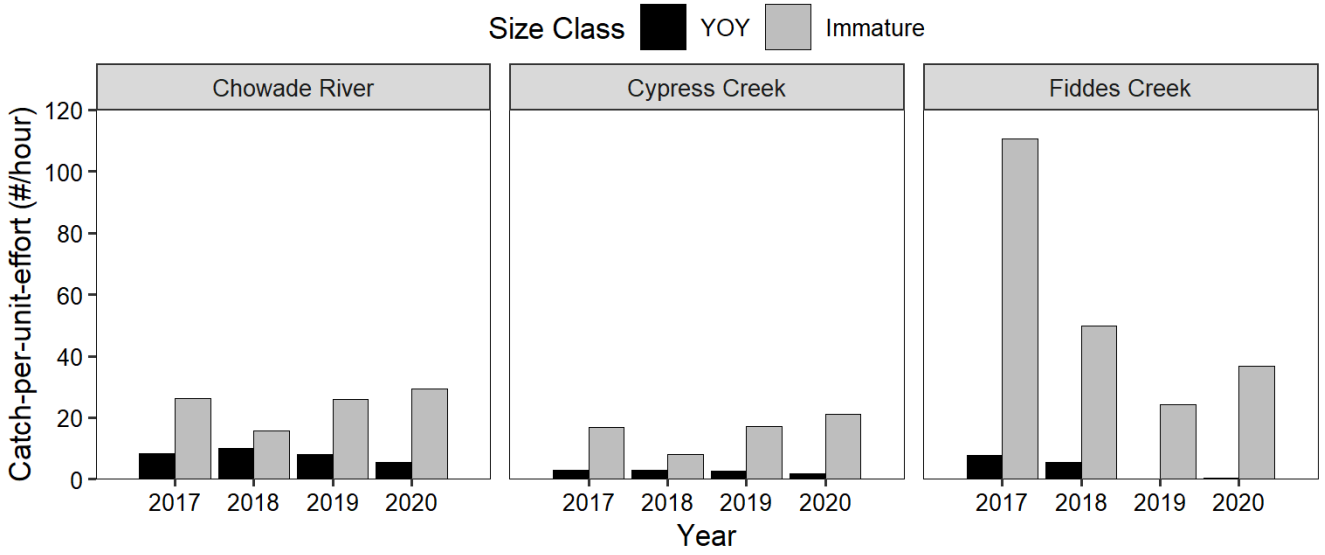


Figure 4: Interannual comparison of catch per unit effort (fish/h) for Bull Trout captured by backpack electrofishing in the Chowade River and Cypress and Fiddes creeks, during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2017–2020.

3.2 Tributaries Targeting Rainbow Trout

3.2.1 Sample Effort

In 2020, targeted sampling for Rainbow Trout was conducted at 30 index sites distributed between Colt Creek (8 sites), Farrell Creek (6 sites), Kobes Creek (8 sites), and Maurice Creek (8 sites). Approximately 17 hours of backpack electrofishing effort were conducted over 5825 m of habitat. A summary of backpack electrofishing effort by the number of sites surveyed, length of habitat sampled, and seconds of backpack electrofisher operation is provided for each tributary in Table 7 and in Appendix B, Table B1.

Table 7: Summary of backpack electrofishing effort employed in Colt, Farrell, Kobes, and Maurice creeks during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Stream	Number of Sites	Electrofishing Effort (s)	Electrofishing Effort (h)	Length of Survey (m)
Colt Creek	8	17,785	4.94	1,600
Farrell Creek	6	11,099	3.08	1,225
Kobes Creek	8	17,939	4.98	1,400
Maurice Creek	8	13,541	3.76	1,600
Total	**30**	**60,364**	**16.77**	**5,825**

3.2.2 Catch and Life History

The Rainbow Trout populations in Colt and Kobes creeks are suspected resident populations, while Farrell and Maurice creeks are suspected recruitment sources for the Peace River Rainbow Trout population (Mainstream 2012). Of the 395 Rainbow Trout captured in Colt, Farrell, Kobes, and Maurice creeks combined, 302 (76%) were implanted with PIT tags (Table 8 and Appendix B, Table B5). Of the total Rainbow Trout captured in 2020, there were no recaptures from a previous study year. Rainbow Trout that were not tagged were incidental mortalities (n = 9) or too small to receive a PIT tag (i.e., less than 80 mm FL; n = 84).

In 2020, YOY Rainbow Trout were not captured in any of the streams (Table 8). Similar to previous years, immature Rainbow Trout were the dominant size class captured in all streams. Adult Rainbow Trout were captured in Farrell and Maurice creeks.

Table 8: Number of fish caught and tagged in Colt, Farrell, Kobes, and Maurice creeks during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Species	Life Stage[a]	Colt Creek			Farrell Creek			Kobes Creek			Maurice Creek			Total		
		# Captured	# Tagged	CPUE (#/h)	# Captured	# Tagged	CPUE (#/h)	# Captured	# Tagged	CPUE (#/h)	# Captured	# Tagged	CPUE (#/h)	# Captured	# Tagged	CPUE (#/h)
Target Species																
Bull Trout	Adult	-	-	-	-	-	-	-	-	-	1	1	<1.0	1	1	<1.0
	Imm.	5	4	1.0	-	-	-	-	-	-	1	1	<1.0	6	5	<1.0
	YOY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rainbow Trout	Adult	-	-	-	1	1	<1.0	-	-	-	1	1	<1.0	2	2	<1.0
	Imm.	69	26	14.0	110	85	35.7	115	90	23.1	99	98	26.3	393	300	23.4
	YOY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Target Species																
Lake Chub	All	-	-	-	5	-	1.6	29	-	5.8	-	-	-	34	-	2.0
Largescale Sucker	All	-	-	-	8	-	2.6	8	-	1.6	-	-	-	16	-	<1.0
Longnose Dace	All	7	-	1.4	9	-	2.9	22	-	4.4	59	-	15.7	97	-	5.8
Longnose Sucker	All	9	-	1.8	3	-	<1.0	5	-	1.0	18	-	4.8	35	-	2.1
Mountain Whitefish	All	15	-	3.0	-	-	-	3	-	<1.0	-	-	-	18	-	1.1
Northern Pikeminnow	All	-	-	-	5	-	1.6	-	-	-	3	-	<1.0	8	-	<1.0
Peamouth	All	-	-	-	-	-	-	-	-	-	2	-	<1.0	2	-	<1.0
Redside Shiner	All	-	-	-	32	-	10.4	17	-	3.4	24	-	6.4	73	-	4.4
Slimy Sculpin	All	75	-	15.2	27	-	8.8	70	-	14.1	55	-	14.6	227	-	13.5
Sucker Species	All	-	-	-	-	-	-	4	-	<1.0	-	-	-	4	-	<1.0
Trout-perch	All	-	-	-	3	-	<1.0	-	-	-	-	-	-	3	-	<1.0

[a] Life stage was assigned based on fork length. Fish were classified as adult when longer than 249 mm FL, and immature when less than 250 mm FL and larger than the YOY maximum size. YOY maximum size was approximately 50 mm FL based on Rainbow Trout captured in previous sample years (Golder 2018, 2019, 2020b).

In previous years (2017 to 2019), a distinct mode of age-0 (YOY) Rainbow Trout were identified in length-frequency histograms occurring between approximately 30 and 50 mm (Golder 2018, 2019, 2020b). In 2020, this mode was not present in any of the streams sampled (Figure 5), suggesting YOY Rainbow Trout were not captured. Modes for age-1 Rainbow Trout were apparent in the length-frequency histograms. The length ranges of age-1 Rainbow Trout differed among streams, suggesting differing growth rates. In Colt Creek, age-1 Rainbow Trout were between approximately 50 and 100 mm FL. Comparatively, in Maurice Creek, the mode corresponding to age-1 Rainbow Trout was between approximately 80 and 130 mm FL. Length-frequency histograms were similar between Farrell and Kobes creeks, with age-1 Rainbow Trout corresponding to length between 60 and 120 mm FL.

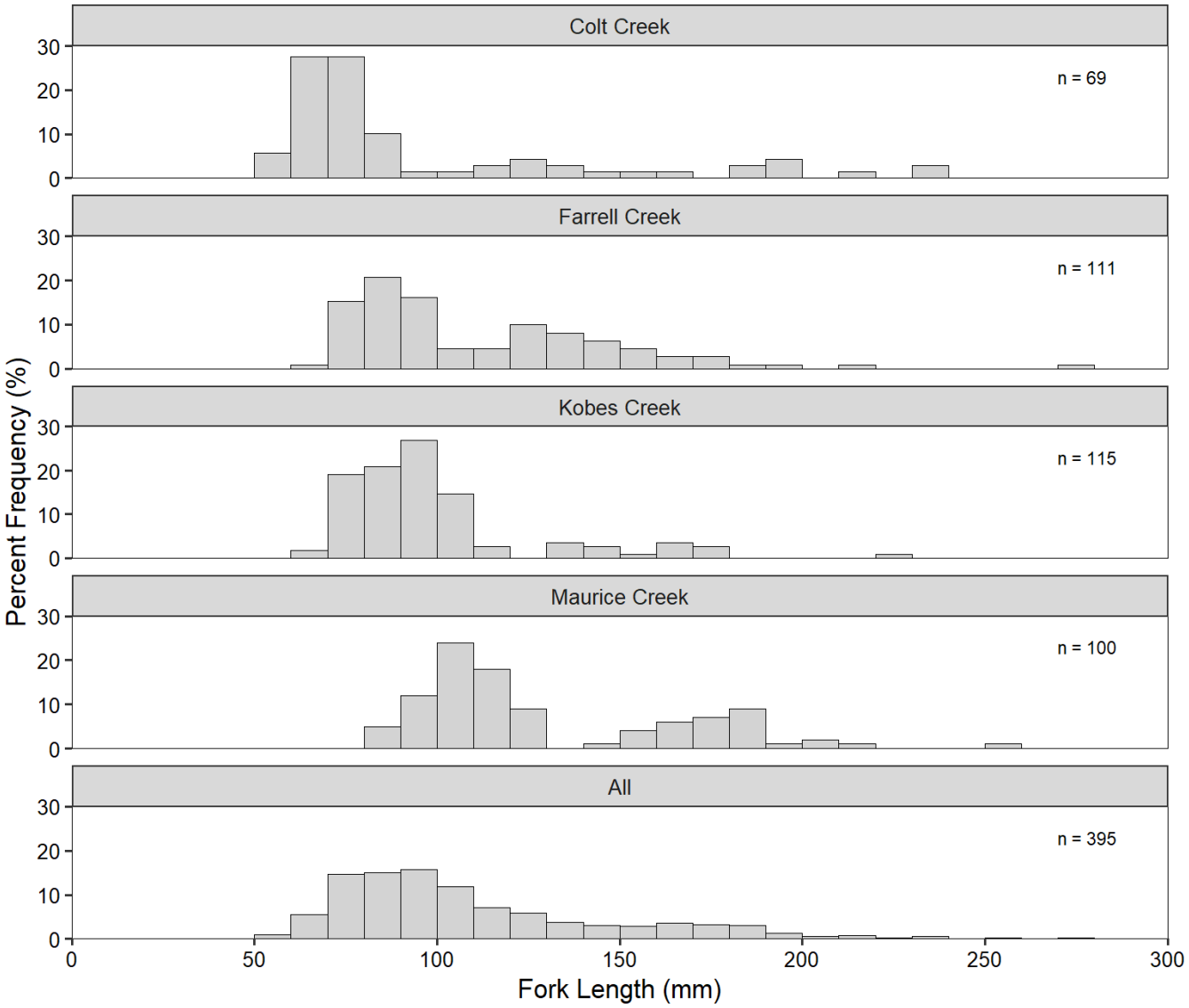


Figure 5: Length-frequency distribution for Rainbow Trout captured by backpack electrofishing in Colt, Farrell, Kobes, and Maurice creeks during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Ages were assigned to 366 of the 395 Rainbow Trout captured in 2020 (Table 9). These fish ranged in age from age-1 to age-4 and were included in all age-related analyses (Figure 5 and Figure 6). Annuli were not consistently visible on scales, which resulted in some fish being assigned to younger age-classes. Length data were used to correct these ages when possible. Given the apparent differing growth rates for Rainbow Trout among streams (Figure 5), overlap in length distribution were apparent for all age-classes (Figure 6); however, there was limited overlap in length distributions by age-class within individual streams (Table 10).

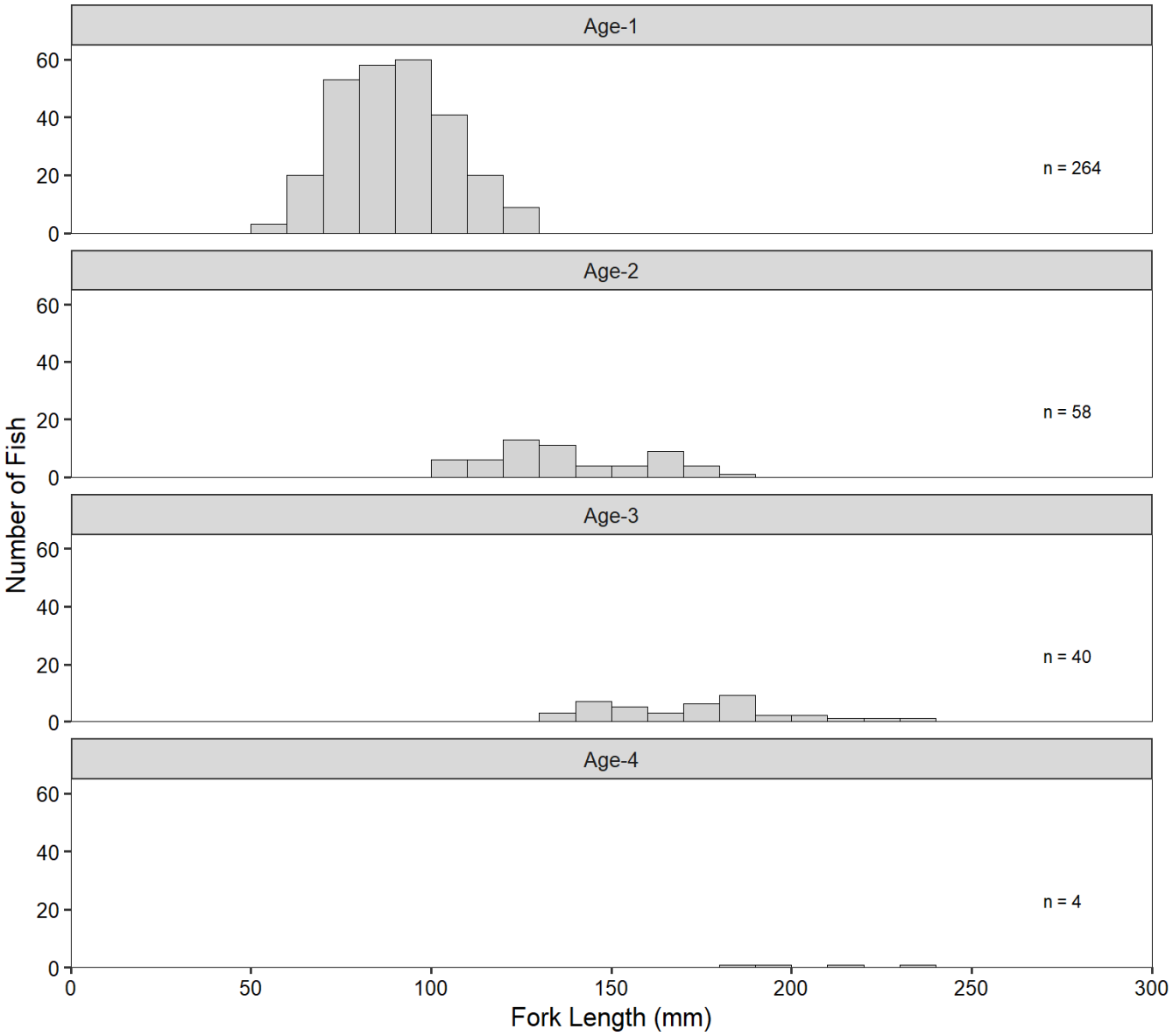


Figure 6: Length-frequency by age-class for Rainbow Trout captured in Colt, Farrell, Kobes, and Maurice creeks combined during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Table 9: Descriptive statistics of fork length by age for Rainbow Trout captured in Colt, Farrell, and Kobes creeks during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Age	Colt Creek			Farrell Creek			Kobes Creek			Maurice Creek		
	Mean FL ± SD	Range	*n*	Mean FL ± SD	Range	*n*	Mean FL ± SD	Range	*n*	Mean FL ± SD	Range	*n*
1	70 ± 9	54 - 89	42	85 ± 8	66 - 98	58	90 ± 11	66 - 116	98	106 ± 11	81 - 126	66
2	129 ± 17	105 - 156	8	125 ± 17	104 - 180	28	153 ± 16	130 - 177	15	161 ± 7	151 - 171	7
3	195 ± 23	167 - 232	6	149 ± 12	134 - 177	16	222	n/a	1	179 ± 15	148 – 205	17
4	231	n/a	1	198	n/a	1	-	-	-	201 ± 20	187 – 215	2

Five Bull Trout were captured in Colt Creek and had fork lengths between 138 and 180 mm. Two Bull Trout were captured in Maurice Creek and were 230 and 256 mm FL. All captured Bull Trout were implanted with PIT tags except for a single Bull Trout from Colt Creek that was not tagged because it was unhealthy. Bull Trout were not captured in Farrell or Kobes creeks.

In 2020, non-target fish species captured in Colt, Farrell, Kobes, and Maurice creeks, in declining order of abundance, included Slimy Sculpin (*n* = 227), Longnose Dace (*n* = 97), Redside Shiner (*n* = 73), Longnose Sucker (*Catostomus catostomus*; *n* = 35), Lake Chub (*Couesius plumbeus*; *n* = 34), Mountain Whitefish (*n* = 18), Largescale Sucker (*Catostomus macrocheilus*; *n* = 16), Northern Pikeminnow (*Ptychocheilus oregonensis*; *n* = 8), Trout-perch (*Percopsis omiscomaycus*, *n* = 3), and Peamouth (*Mylocheilus caurinus*, *n* = 2). Mountain Whitefish were the only non-target salmonid species encountered and were recorded in both Colt and Kobes creeks. Lengths of Mountain Whitefish ranged between 81 and 251 mm FL.

3.2.3 Interannual Comparison

In 2020, YOY Rainbow Trout were not captured in Colt, Farrell, Kobes, or Maurice creeks. During previous years, CPUE for YOY Rainbow Trout has varied among creeks and among years; however, YOY CPUE values have been consistently lower than immature CPUE values (Figure 7). In 2020, the highest CPUE for immature Rainbow Trout was in Farrell Creek (35.7 fish/h) followed by Maurice Creek (26.3 fish/h), Kobes Creek (23.1 fish/h), and Colt Creek (14.0 fish/h). Between 2018 and 2020, year-over-year increases in immature Rainbow Trout CPUE have occurred in Colt, Farrell, and Kobes creeks.

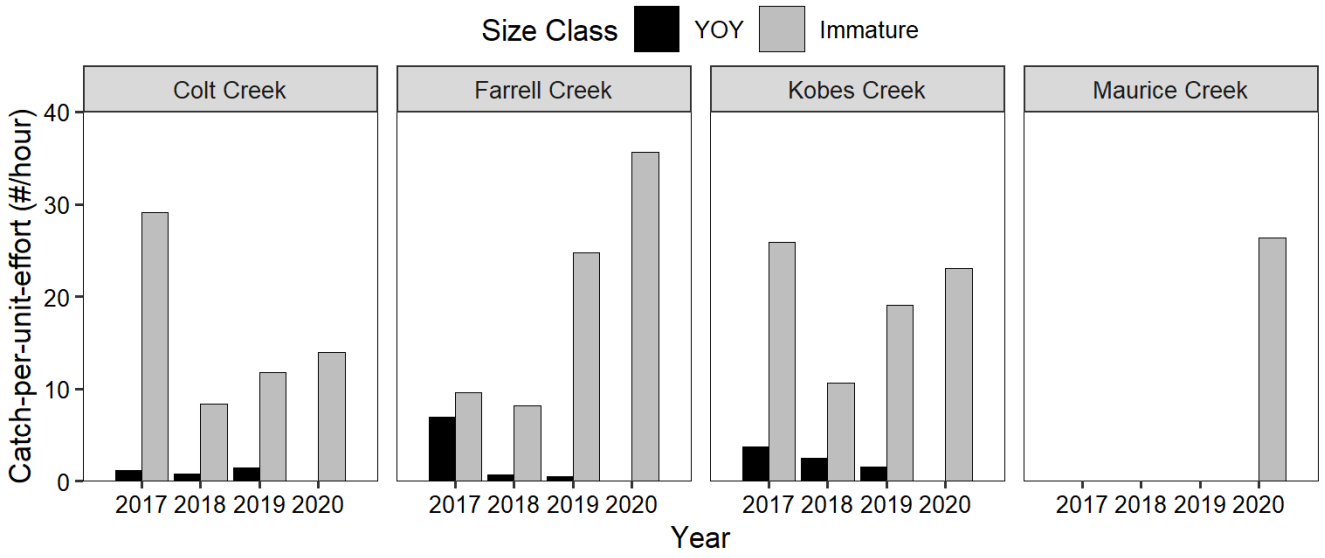


Figure 7: Interannual comparison of catch per unit effort (fish/h) for Rainbow Trout captured by backpack electrofishing in the Colt, Farrell, Kobes, and Maurice creeks during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2017–2020. Maurice Creek was not sampled prior to 2020.

3.3 Moberly River

3.3.1 Moberly River Discharge and Temperature

Based on historic mean monthly discharge values recorded between 2001 to 2019, Moberly River discharge typically decreases from June to September (Water Survey of Canada Station 07FB008; Figure 8). The timing of Moberly River sample effort differed from year to year as the study design was modified to target specific discharges. In 2020, sampling in Moberly River was conducted from 28 July to 8 August (approximately 1 week later than the 2019 study), and mean discharge was 11.6 m^3/s and ranged between 8.9 and 15.8 m^3/s (Figure 8). This discharge range was considered ideal for sampling since there was enough water for crews to float through shallow, riffle sections without having to portage, while levels were still low enough to limit overall fish habitat compared to earlier in the summer (i.e., it is assumed that higher flows would result in lower total catch).

During the 2020 study period, water temperatures in the Moberly River ranged between 10.2°C and 23.1°C (mean = 18.5°C) (Appendix C, Table C1). The colder water temperatures (i.e., 10.2°C) were recorded near location where groundwater upwelling was observed.

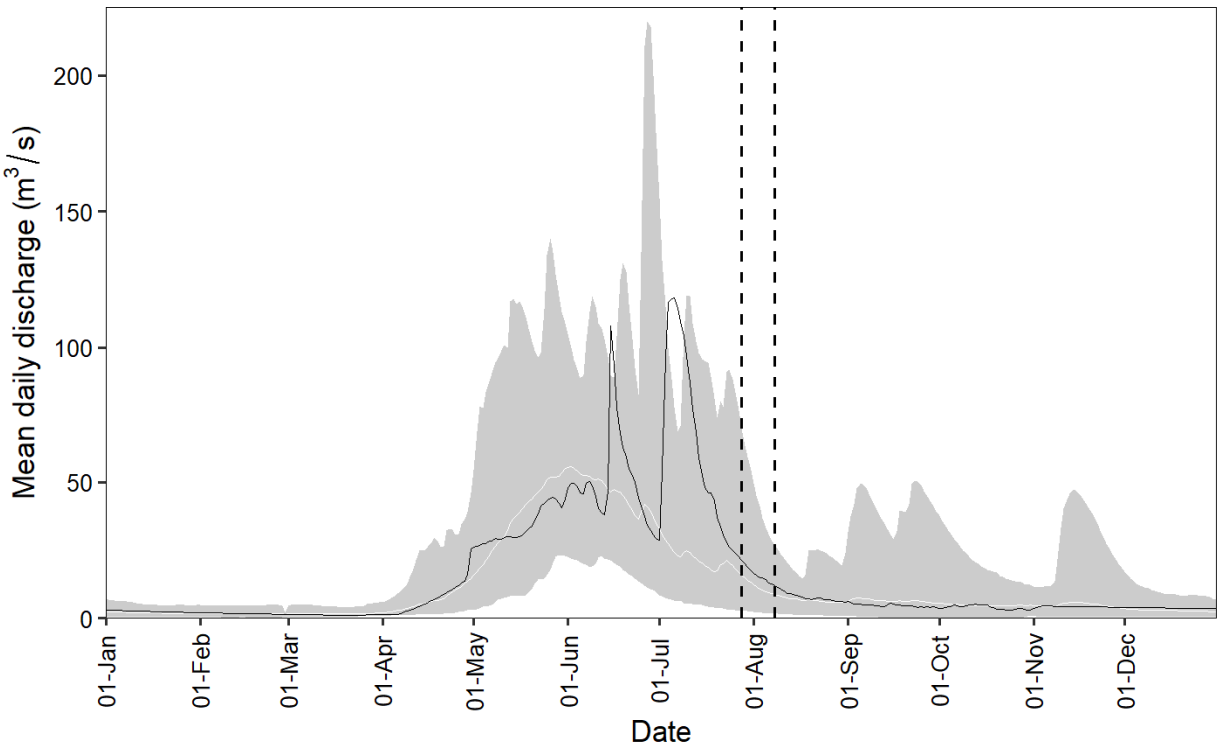


Figure 8: **Mean daily discharge in the Moberly River near Fort St. John (station 07FB008) in 2020 (black line). The white line shows the mean daily discharge and grey ribbon shows the range from minimum to maximum from historical daily discharge data from 2001 to 2019. Vertical dashed lines show the 2020 study period.**

3.3.2 Sample Effort

Sampling was conducted at 55 backpack electrofishing sites and 53 boat electrofishing sites over 11 sections of the Moberly River. In total, 44.5 angler-hours of angling effort was conducted in 80 angling sites (Table 10)[17]. Summaries of effort employed during the Moberly River survey by section and capture method are provided in Appendix B, Tables B1 to B3.

[17] To increase potential catch of target species, angling also occurred opportunistically while the boats were travelling between sites and any fish captured while in transit were processed at the location of capture. The level of effort in this opportunistic sampling is not included in the effort summaries below.

Table 10: Summary of sampling effort employed in the Moberly River by section during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Section	Backpack Electrofishing			Small Boat Electroshocking			Angling	
	Number of Sites	Effort (s)	Effort (m)	Number of Sites	Effort (s)	Effort (m)	Number of Sites	Effort (h)
MR-S1A	10	8,546	1,166	10	4,367	6,325	12	12.2
MR-S1	1	334	58	3	3,058	3,950	2	0.5
MR-S2	-	-	-	3	3,891	5,700	5	4.8
MR-S3	3	1,398	219	2	1,326	1,900	7	1.8
MR-S4	-	-	-	2	1,266	1,875	3	1.0
MR-S5	5	3,039	412	5	4,737	6,580	6	3.4
MR-S6	2	841	208	4	3,782	5,740	5	2.1
MR-S7	22	16,207	3,058	15	14,302	25,793	25	14.8
MR-S8	-	-	-	-	-	-	-	-
MR-S9	5	4,520	884	3	2,214	3,450	6	2.1
MR-S10	7	5,995	1,056	6	4,787	10,032	9	1.9
Total	55	40,880	7,061	53	43,730	71,345	80	44.5

3.3.3 Catch and Life History

In total, 134 Arctic Grayling were captured in the Moberly River in 2020. Life history and capture data are provided in Appendix B, Table B7. Section MR-S1A had the highest catch of Arctic Grayling and accounted for 48% of the total catch. The next highest catches, in declining order, were recorded in sections MR-S7 (36%), MR-S5 (4.5%), MR-S9 (3.7%), MR-S2 (3%), MR-S4 (2.2%), MR-S3 (1.5%), MR-S1 (less than 1%), and MR-S10 (less than 1%). Similar to 2019, angling (spin casting or fly fishing) captured the most Arctic Grayling (46%). The remaining Arctic Grayling were captured by backpack electrofishing (33%) and small fish boat electroshocking (20%).

Of the 134 Arctic Grayling captured in the Moberly River, 81 (60%) were new encounters that were implanted with PIT tags (Table 11), two were within-year recaptures, and one was a recapture that was originally tagged in 2018. All remaining Arctic Grayling were not tagged because they were either incidental mortalities (n = 10), they escaped before processing (n = 2), or they were too small to receive a PIT Tag (i.e., less than 80 mm FL; n = 38). Of the within-year recaptures, one was initially captured by angling at River Km 119.0 on 28 July 2020 then recaptured at the same location while angling on 8 August 2020. The second within-year recapture was initially captured by angling at River Km 116.8 on 29 July 2020 then recaptured at the same location on 8 August 2020.

The Arctic Grayling that was originally captured in 2018 was also recaptured in 2019. This fish measured 235 mm FL in 2018 (age-2), 278 mm FL in 2019 (age-3), and 294 mm FL in 2020 (age-4). Over the three years, the capture locations ranged from River Km 37.7 to 39.0.

Table 11: Number of FAHMFP indicator species fish caught and tagged in the Moberly River during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Species	Life Stage[a]	Angling			Backpack Electrofishing			Small Fish Boat Electroshocking			Total		
		# Caught	# Tagged	CPUE (#/h)	# Caught	# Tagged	CPUE (#/h)	# Caught	#Tagged	CPUE (#/h)	# Caught	# Tagged	CPUE (#/h)
Arctic Grayling	Adult	5	5	<1.0	6	6	<1.0	7	7	<1.0	18	16	<1.0
	Immature	49	42	1.1	8	8	<1.0	17	15	1.4	74	65	1.1
	YOY	-	-	-	39	-	2.4	3	-	<1.0	42	-	<1.0
Bull Trout	Adult	2	2	<1.0	-	-	-	2	2	<1.0	4	4	<1.0
Burbot	Adult	-	-	-	-	-	-	3	3	<1.0	3	3	<1.0
	Immature	-	-	-	36	36	3.2	8	8	<1.0	44	44	<1.0
	YOY	-	-	-	6	-	<1.0	1	-	<1.0	7	-	<1.0
Mountain Whitefish	Adult	1	-	<1.0	1	-	<1.0	318	-	26.2	320	-	4.7
	Immature	-	-	-	13	-	1.1	438	-	36.1	451	-	6.6
	YOY	-	-	-	51	-	4.5	13	-	1.1	64	-	<1.0
Northern Pike	Adult	-	-	-	1	1	<1.0	2	2	<1.0	3	3	<1.0
	Immature	-	-	-	5	2	<1.0	2	2	<1.0	7	4	<1.0
Walleye	Adult	-	-	-	-	-	-	1	1	<1.0	1	1	<1.0

[a] Life stage was assigned based on fork length. Fish were classified as adult when longer than 249 mm FL and immature when between approximately 60 and 250 mm FL. The maximum size of YOY fish varied by species and was selected based on modes observed in length-frequency histograms and corroborated with length-at-age data when possible.

In total, 4 Bull Trout were captured in the Moberly River. Three of these fish were new captures and were implanted with PIT Tags. One Bull Trout was a recapture that was originally tagged in 2019. In 2019 this fish was captured at River Km 37.9 and measured 325 mm FL, and in 2020, this fish was captured at River Km 39.0 and measured 387 mm FL. The furthest upstream that Bull Trout were capture in 2020 was River Km 70.4.

Non-target species comprised the majority of the Moberly River catch (all methods combined). Captured and observed species by section is presented in Appendix B, Table B6. A summary of catch by capture method for target species is provided in Table 11. Backpack electrofishing captured the highest number of YOY Arctic Grayling (*n* = 39), and angling captured the highest number of immature Arctic Grayling (*n* = 49). CPUE for immature Arctic Grayling was similar between the three methods (range = <1.0 to 1.4 fish/h). Small fish boat electroshocking caught more fish than all other methods for most species and life stages.

Arctic Grayling length-frequency data indicate that a wide range of size classes use the Moberly River (Figure 9) and suggests a mode representing YOY Arctic Grayling between 50-80 mm FL, age-1 fish between 130 and 200 mm FL, age-2 fish between approximately 210 and 280 mm FL, and age-3 and older fish beginning at approximately 290 mm FL. These length-at-age data are corroborated by inter-year mark-recapture data and scale-based age class assignments.

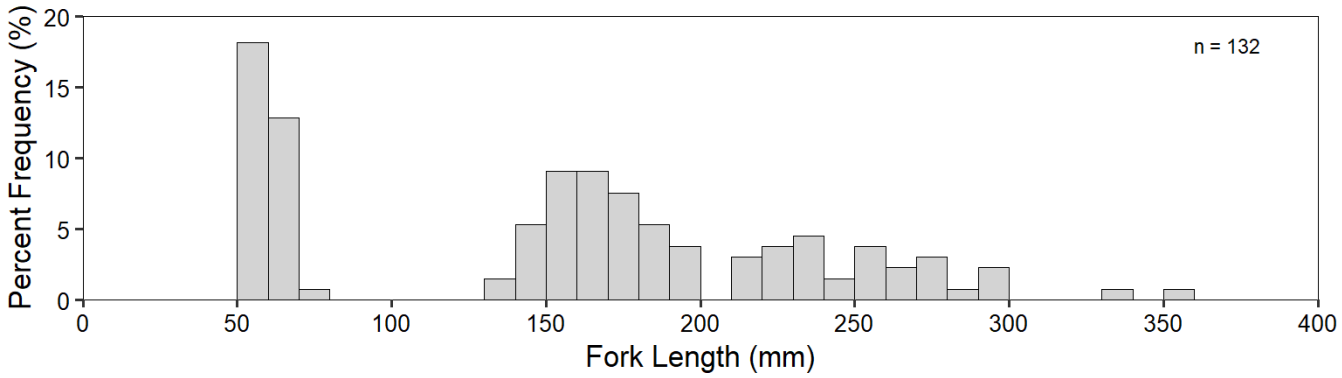


Figure 9: Length-frequency distribution for Arctic Grayling captured in the Moberly River (all capture methods combined) during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Ages were assigned to 129 of the 134 Arctic Grayling captured in 2020 and ranged from age-0 to age-5 (Figure 10 and Table 12). Age data supported the age assignments based on length-frequency modes detailed above. The majority (72%) of Arctic Grayling captured in 2020 were age-0 and age-1.

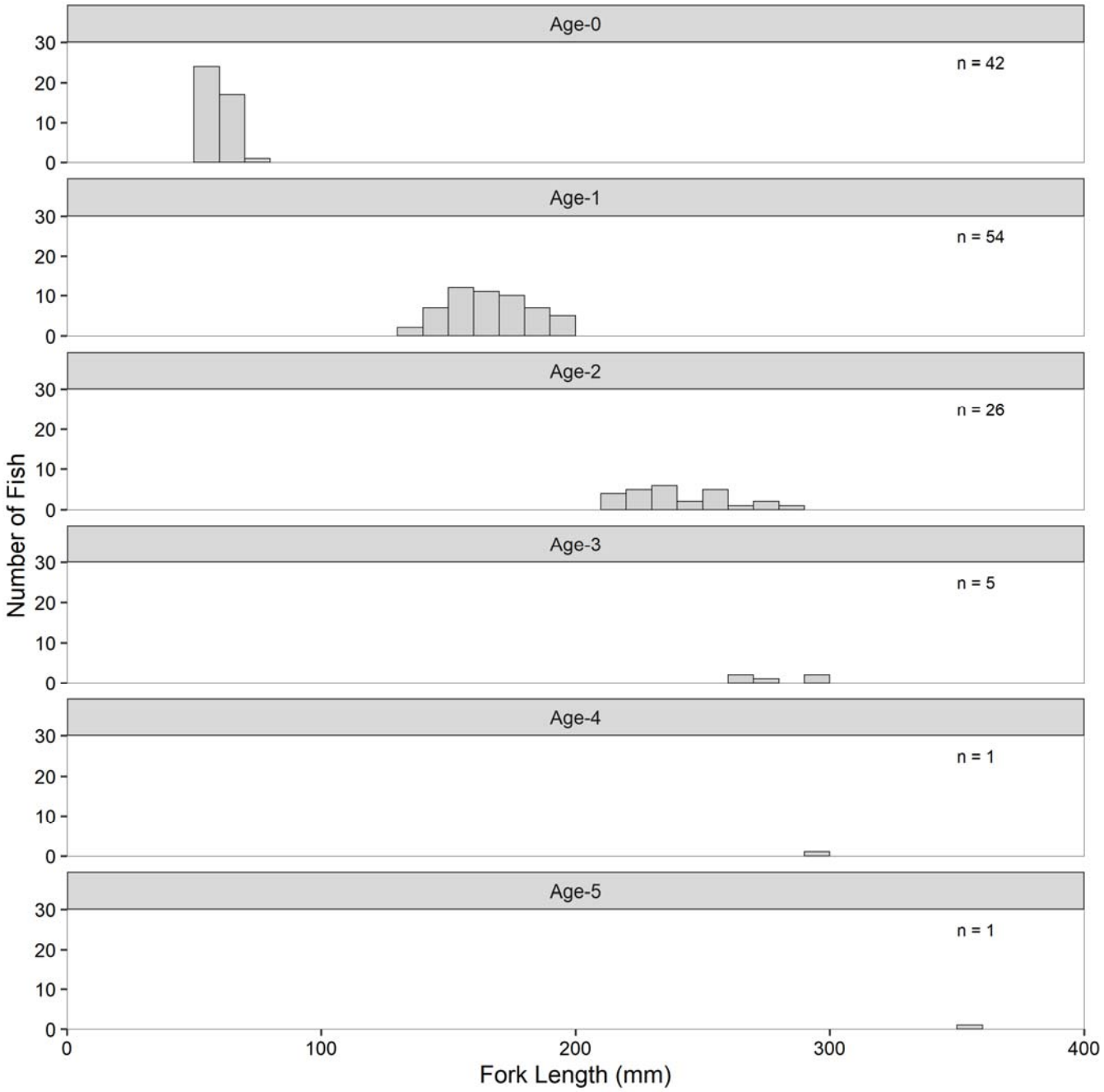


Figure 10: Length-frequency distribution by age class for Arctic Grayling captured in the Moberly River during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Table 12: Descriptive statistics of fork length and weight by age for Arctic Grayling captured in the Moberly River during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020. Ages were assigned based on scale samples.

Age	Fork Length			Weight		
	Average ± SD (mm)	Range (mm)	*n*	Average ± SD (g)	Range (g)	*n*
0	58 ± 5	50 – 70	42	2 ± 1	2 – 3	3
1	164 ± 16	131 – 194	54	54 ± 18	24 – 95	53
2	240 ± 19	212 – 280	26	169 ± 47	102 – 255	26
3	278 ± 16	260 – 298	5	293 ± 85	205 – 416	5
4	298	n/a	1	-	n/a	0
5	355	n/a	1	577	n/a	1

The length-frequency histogram for Burbot, a FAHMFP indicator species, suggests a mode representing age-0 fish from 40 to 70 mm TL and age-1 fish at approximately 150 mm TL (Figure 11). The dominant age-1 cohort observed in 2019 (range = 100 to 170 mm TL; Golder 2020b) are represented as age-2 fish in 2020 between approximately 170 and 250 mm TL.

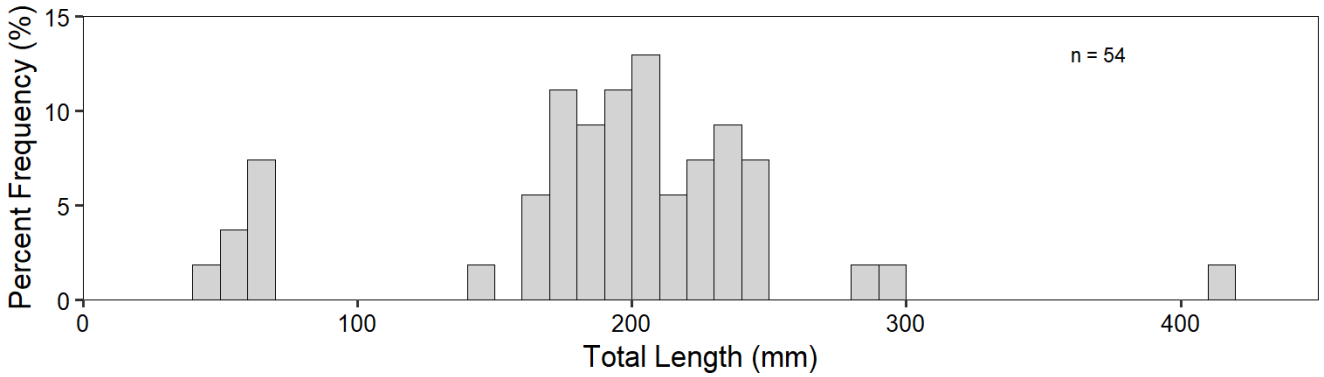


Figure 11: Length-frequency distribution for Burbot captured in the Moberly River (all capture methods combined) during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

The length-frequency histogram for Mountain Whitefish suggests a mode representing age-0 fish from 40 to 90 mm FL, age-1 fish from 100 to 160 mm FL, and age-2 and older fish starting at approximately 180 mm FL (Figure 12). The modes apparent for Mountain Whitefish captured in the Moberly River in 2020, align closely with previous years (Golder 2019, 2020b), suggesting similar annual growth rates.

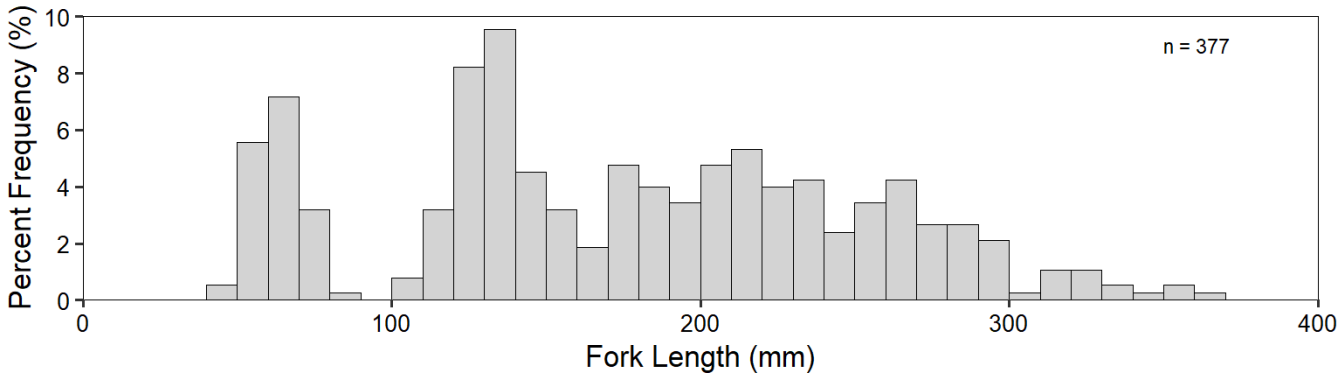


Figure 12: Length-frequency distribution for Mountain Whitefish captured in the Moberly River (all capture methods combined) during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

3.4 Radio Telemetry Tag Deployment

In 2020, 38 radio telemetry tags were implanted into Rainbow Trout captured in Farrell and Maurice creeks (Table 13). Tagged fish ranged between 134 and 256 mm FL in length. Of the 38 radio tags, 30 were model NTF-3-2 and 8 were model NTF-5-2. The radio telemetry tag weight divided by the fish's body weight, known as the tag burden, ranged from a minimum of 0.7% to a maximum of 2.0%, with a median of 1.1% (Figure 13).

Table 13: Summary of radio telemetry tags implanted as part of the Site C Reservoir Tributary Fish Population Indexing Survey, 2020.

Deployment Date	Farrell Creek	Maurice Creek
26-Jul	7	-
2-Aug	4	-
6-Aug	-	13
7-Aug	-	14
Total	**11**	**27**

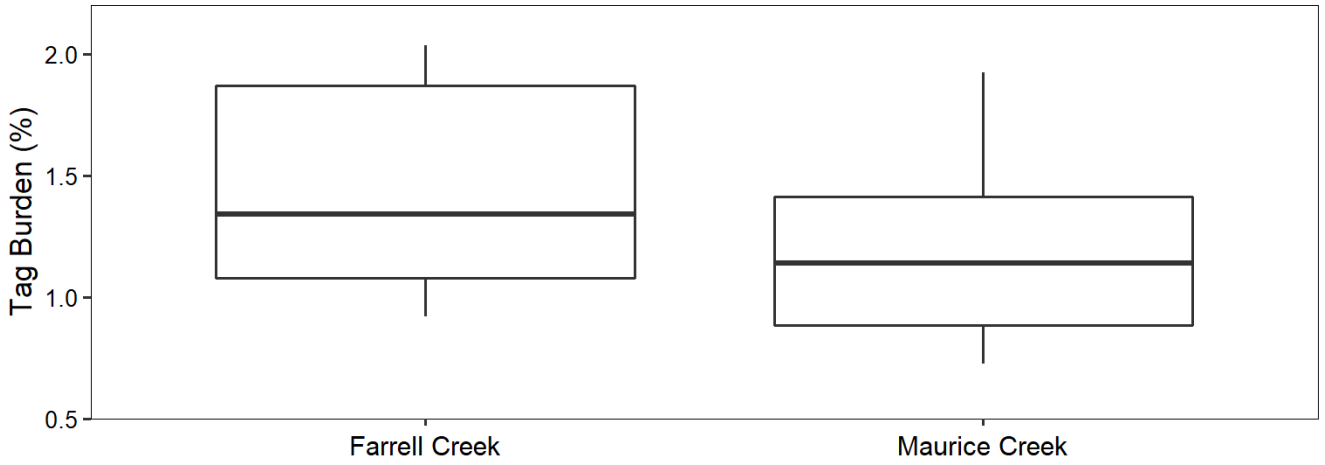


Figure 13: Tag burden as a percent of body weight for Rainbow Trout implanted with radio telemetry tags in Farrell and Maurice creeks in 2020. Horizontal line inside box represents the median, lower and upper bounds of boxes represent 25th and 75th percentiles, and whiskers (vertical lines) extend to the maximum/minimum value within 1.5 times the interquartile range.

3.5 Genetic and Microchemistry Tissue Sample Collection

Small pieces of fin tissue were collected from 119 Arctic Grayling, 167 Bull Trout and 143 Rainbow Trout (Table 14) in 2020. Tissue samples were also collected from Longnose Dace (*n* = 35), Redside Shiner (*n* = 28), Slimy Sculpin (*n* = 24), Northern Redbelly Dace (*n* = 2), and Northern Pearl Dace (*n* = 2) in support of the Site C Small Fish Translocation Monitoring Program (Mon-15). All tissue samples were preserved in 95% non-denatured ethyl alcohol and provided to BC Hydro.

Over the course of the 2020 study period, eight Arctic Grayling, two Bull Trout, and 15 Rainbow Trout succumbed to sampling. These fish were retained and hard structures (otoliths, scales, and/or fin rays) were collected from each fish (Table 15). Otoliths and fin rays were provided to BC Hydro for potential microchemistry analysis.

Table 14: Summary of genetic samples collected as part of the Site C Reservoir Tributary Fish Population Indexing Survey, 2020.

Location	Arctic Grayling	Bull Trout	Rainbow Trout
Chowade River	-	76	-
Cypress Creek	-	56	6
Fiddes Creek	-	25	-
Colt Creek	-	4	23
Kobes Creek	-	-	34
Farrell Creek	-	-	42
Maurice Creek	-	2	38
Moberly River	119	4	-
Total	**119**	**167**	**143**

Table 15: Summary of microchemistry samples collected as part of the Site C Reservoir Tributary Fish Population Indexing Survey, 2020.

Location	Arctic Grayling	Bull Trout	Rainbow Trout
Chowade River	-	1	-
Cypress Creek	-	1	-
Colt Creek	-	-	4
Kobes Creek	-	-	1
Farrell Creek	-	-	9
Maurice Creek	-	-	1
Moberly River	6	-	-
Total	**6**	**2**	**15**

4.0 DISCUSSION

The 2020 study was the fifth year of a multi-year monitoring program and represents the final year of baseline data to be collected prior to the river diversion phase of Project construction. The principal objective of the program is to collect data from Peace River fish populations that use tributaries situated within the future inundation zone of the Site C reservoir to fulfil portions of their life cycles. These data will be used to monitor population-level responses to the construction and operation of the Project. Similar to previous survey years, the secondary objective in 2020 was to deploy PIT tags into fish to allow their movements to be monitored by other components of the FAHMFP. In addition to PIT tags, radio telemetry tags were surgically implanted into select immature Rainbow Trout in 2020. The movements of these fish will also be monitored under other components of the FAHMFP.

4.1 Tributaries Targeting Bull Trout

The 2020 study design was developed to capture and tag immature Bull Trout in identified Halfway River tributaries. The study design was unchanged from 2017 to 2020 and is based on results of the 2016 reconnaissance study design (Golder 2017) and input by the Site C Fisheries and Aquatic Habitat Mitigation and Monitoring Technical Committee (BC Hydro 2017). The study design is intended to produce high catch rates of immature Bull Trout that are large enough (i.e., greater than 80 mm FL) to receive PIT tags. The mark-recapture data from PIT tagged Bull Trout will be incorporated into the BTIPM to generate population estimates and monitor changes in the Halfway River Bull Trout population.

As described in the FAHMFP, immature Bull Trout tagged as part of the current study that are subsequently encountered at the PIT detector arrays in the Chowade River and Cypress Creek will be considered offspring of a migratory Bull Trout population. Further, if these same tagged fish are recaptured in the Peace River while sampling for other components of the FAHMFP, they will be considered offspring of the Peace River Bull Trout population. Combined, this information will further BC Hydro's understanding of resident and migrant Bull Trout populations in Halfway River tributaries. The PIT detector arrays will also monitor the upstream migrations of these same fish in subsequent years when they return to the Halfway River watershed as adults to spawn. As such, these data will be used by the BTIPM to estimate juvenile to adult survival of Halfway River Bull Trout.

Although CPUE values are not required to address the management questions at this time, CPUE is valuable for providing a coarse estimate of Bull Trout abundance throughout four years of Mon-1b, Task 2c baseline studies within the Chowade River and Cypress and Fiddes Creeks. CPUE of immature Bull Trout in the Chowade River (29.3 fish/h) and Cypress Creek (21.0 fish/h) was higher in 2020 compared to 2017, 2018, and 2019 (range: 15.7 to 25.9 fish/h for Chowade River and 8.2 to 17.3 fish/h for Cypress Creek). This finding coincides with higher total catch of immature Bull Trout in these systems in 2020 (352 fish in the Chowade River and 282 fish in Cypress Creek) compared to 2017, 2018 and 2019 (range: 203 to 299 fish for the Chowade River and 139 to 221 fish for Cypress Creek). As a result, more immature Bull Trout were PIT tagged in these systems in 2020 than in any previous year of Mon-1b, Task 2c. Although CPUE of immature Bull Trout has increased within these systems since 2018, CPUE of YOY Bull Trout has exhibited a declining trend over the same period. The reduction in CPUE of YOY Bull Trout in the Chowade River and Cypress Creek correspond to a decline in Bull Trout redd abundance estimates for each year preceding the survey. Redd abundance estimates (modelled using a Gaussian AUC [GAUC] approach) in the Chowade River were 320 redds in 2017, 271 redds in 2018, and 213 redds in 2020, and redd abundance estimates in Cypress Creek were 90 redds in 2017, 53 redds in 2018, and 37 redds in 2019 (Putt et al. 2018, Ramos-Espinoza et al. 2019, Putt et al. 2020). Similarly, in Fiddes Creek,

low CPUE for YOY Bull Trout in 2019 and 2020 compared to 2017 and 2018 (Figure 4) corresponded to a year-over-year decline in redd abundance estimates from 2016 (*n* = 107 redds; Braun et al. 2017) to 2019 (*n* = 25 redds; Putt et al. 2020). The corresponding decline in YOY Bull Trout CPUE and redd abundance estimates in the Chowade River and Cypress and Fiddes creeks suggest a decline in the overall Bull Trout population within these systems. Additional data recorded in future studies will contribute to the correlative relationship between independent estimates of Bull Trout CPUE and redd abundance estimates.

In 2020, fork lengths were used to assign ages to all YOY and immature Bull Trout captured, with age-1 Bull Trout representing the largest cohort (n = 690), which was consistent with previous study years (Golder 2017, 2018, 2019, 2020b).

Bycatch of adult Bull Trout, which were not a target life stage for this study, was reduced substantially by conducting sampling in late July rather than in late August as was done during the 2016 reconnaissance study. In 2016, 25 adult Bull Trout were captured in the Chowade River and Cypress Creek combined (Golder 2017). In 2020, two adult Bull Trout were captured in the Chowade River and one adult Bull Trout was captured in Cypress Creek. Any modifications to the study design that reduce interactions with adult Bull Trout during their spawning or migration periods immediately prior to spawning will reduce the potential for negative effects of electrofishing on these fish.

The modifications to the study design, first implemented in 2017 (Golder 2018), were designed to increase the capture of immature Bull Trout by sampling the upper reaches of tributaries in high gradient habitats with low water temperatures preferred by Bull Trout (BC Hydro 2017). Incidental catches of other target species (i.e., Arctic Grayling and Rainbow Trout) occur during most study years; however, year to year changes in the catch rates of these species should not be considered indicative of changes to the overall populations within each tributary.

The continuation of consistent sampling methods, combined with systematic sampling efforts under similar flow conditions at select index sites, will provide more informative inter-year comparisons of CPUE and fish life history metrics during future study years.

4.2 Tributaries Targeting Rainbow Trout

Sampling in Farrell and Maurice creeks is intended to test the Mon-1b hypothesis regarding Peace River Rainbow Trout continuing to spawn and rear in tributaries of Site C reservoir upstream of the inundation zone. Sampling in Farrell Creek has been conducted annually for the past four years (2017 to 2020) and 2020 was the first year sampling was conducted in Maurice Creek under the FAHMFP. The presence of YOY and immature life stages of Rainbow Trout within Farrell Creek during most study years indicates that spawning and rearing occurs within this system. Similarly, the capture of 99 immature Rainbow Trout in Maurice Creek in 2020 indicates that this system is used for spawning and rearing.

Rainbow Trout encountered in Farrell and Maurice creeks may be individuals from a resident population within each tributary or the offspring of Peace River Rainbow Trout. Since 2017, a total of 327 Rainbow Trout have been tagged in Farrell and Maurice creeks. Of these, only one has been recaptured. This individual was originally tagged in Farrell Creek in 2017 at River Km 101.7 and was recaptured in Farrell Creek in 2018 at River Km 102.5. Rainbow Trout initially captured and tagged in Farrell and Maurice creek have never been recaptured in the Peace River mainstem. The recapture of tagged Rainbow Trout in the Peace River in subsequent study years, coupled with ongoing monitoring of radio tagged Rainbow Trout, and supporting information from Rainbow Trout

genetic analysis (Geraldes and Taylor 2020, 2021) and microchemistry analysis (Christensen 2020), will provide insight into movement patterns and insight regarding the use of Farrell and Maurice creeks for spawning and rearing by the Peace River Rainbow Trout population.

Sampling in Colt and Kobes creeks is intended to collect additional baseline data for Rainbow Trout within the Halfway River watershed. Data collected as part of these surveys will not be used to specifically test any hypotheses under the FAHMFP but will contribute to the regional Rainbow Trout dataset and contribute to BC Hydro's understanding of potential changes to Rainbow Trout populations in Peace River tributaries and the Site C reservoir. YOY Rainbow Trout were captured in both systems in 2017, 2018 and 2019, and immature Rainbow Trout were recorded in both tributaries in 2017, 2018, 2019, and 2020. These results indicate that Colt and Kobes creeks are used for spawning and rearing by this species. Adult Rainbow Trout were not recorded in either system during any study year, however the presence of YOY Rainbow Trout in early August should be viewed as evidence that mature spawning adults were present in the system the previous spring. The lack of adult Rainbow Trout in the catch from 2017 to 2020 could partially be due to the capture method used (backpack electrofishing only) and the timing of sampling, as adult Rainbow Trout may have moved downstream after spawning in the spring and prior to the initiation of sampling in July.

Within all tributaries targeting Rainbow Trout there have been notable trends in Rainbow Trout CPUE. CPUE for YOY in Colt Creek was low but generally consistent between 2017 and 2019; however, in Farrell and Kobes creeks, CPUE for YOY generally declined over the same period. In 2020, YOY were not captured in any of the tributaries targeting Rainbow Trout. Since total catch of YOY Rainbow Trout in previous years is typically low (n = 44 in 2017, n = 17 in 2018, and n = 14 in 2019, all creeks combined), the lack of YOY in 2020, may be due to chance rather than a reflection of a poor spawn year.

CPUE data for immature Rainbow Trout exhibit an opposing trend to YOY. In all creeks, CPUE for immature Rainbow Trout declined between 2017 and 2018; however, since 2018, CPUE has increased year over year. In 2020, CPUE for immature Rainbow Trout in Farrell Creek was higher than in any previous sample year, indicating a healthy population of rearing Rainbow Trout in recent years.

4.3 Moberly River

Sampling for Arctic Grayling in the Moberly River in 2020 supplemented baseline data collected from 2008 to 2011 (Mainstream 2009a, 2009b, 2010, 2011b, 2013) and 2016 to 2019 (Golder 2017, 2018, 2019, 2020b). In 2020, Arctic Grayling catch was higher, and more PIT tags were deployed into Arctic Grayling, than all previous study years. In total, 134 Arctic Grayling (18 adults, 74 immature, and 42 YOY) were captured and 81 of these individuals were PIT tagged. A total of 10 Arctic Grayling succumbed to sampling in 2020. The majority of Arctic Grayling mortalities were age-0 (*n* = 4) or age-1 (*n* = 5); both age classes being particularly vulnerable to the stresses of sampling due to their small size. It is possible that these mortalities were caused by either injury sustained during capture (i.e., swallowing hook during angling), or holding stress (e.g., water temperature differences between the stream and the holding bucket).

During the 2020 study period, Moberly River discharge and temperature were similar to the 2019 study period; however, sampling occurred approximately one week later in 2020 compared to 2019. Although temperature and flow conditions in the Moberly River during the 2019 and 2020 sampling programs were similar, there was a

notable difference in total catch of Arctic Grayling between years. Reason for the higher catch in 2020 are not known, but it may be reflective of an increase in the Arctic Grayling population or a successful spawn year in 2020.

Over the five study years, higher Arctic Grayling catches have generally occurred during years with higher water levels (see Golder [2020b] for a detailed summary). Arctic Grayling spawn in the spring and migrate downstream and out of the Moberly River over the summer as water levels decline (Mainstream 2012). Sampling the Moberly River prior to the decline in freshet flows may increase the possibility of capturing Arctic Grayling; however, the timing of freshet flows in the Moberly River is variable. Furthermore, the Moberly River valley is susceptible to rain events that can result in quick and substantial changes in Moberly River water levels. The Moberly River's incised channel, high bank instability, large volume of woody debris, and high-water turbidity levels reduces the feasibility of safely and effectively sampling this river at high water levels; therefore, sampling cannot commence until after water levels begin to decline. Due to the dynamic nature of the Moberly River's hydrograph between May and August, it will be difficult to consistently align sampling with ideal conditions or to consistent conditions across study years. During some study years, ideal water levels may not occur prior to the Arctic Grayling population migrating downstream and out of the study area.

In 2020, 84% of all Arctic Grayling captured were within Sections 1A and 7. These sections of the Moberly River have also dominated the total catch of Arctic Grayling in previous years (Golder 2019, 2020b) indicating that these sections provide preferred habitat for this species and should remain the focus for sampling effort in future years. In 2020, particularly high Arctic Grayling abundance was found in two side channels within Section 7 that appeared to be fed by groundwater. One side channel was located along the left downstream bank at River Km 38.0 and the other side channel was located along the right downstream bank at River Km 38.9. Backpack electrofishing and angling surveys at these locations resulting in the capture of 24 YOY and immature Arctic Grayling (i.e., 18% of the survey's total Arctic Grayling Catch). In addition, two adult Arctic Grayling were capture within the mainstem of the Moberly River just upstream of the two side channels at River Km 39.0. The high density of Arctic Grayling within this small area provides evidence that Arctic Grayling spawning likely occurs at or near these locations. This finding is further supported by radio telemetry data collected under the Site C Fish Movement Assessment (Hatch et al. 2021). During mobile tracking surveys along the Moberly River in 2020, adult Arctic Grayling were found to be widely dispersed; however, Section 7 had the highest percentage (39%) of Arctic Grayling detections (Hatch et al. 2021).

Four adult Bull Trout were captured in the Moberly River in 2020. Three were captured between River Km 37.9 and 39.0 within Section 7 (i.e., near the groundwater area mentioned above) and one was captured at River Km 70.4 within Section 4. At the time of capture, the water temperature of the Moberly River was approximately 20°C. Bull Trout are a cold-water species (Mainstream 2012) and typically prefer water temperatures below 15°C (McPhail 2007). A review of the BC Ministry of Environment's Fisheries Inventory Data Queries (FIDQ[18]) identified seven observations of Bull Trout in the Moberly River within the inundation zone of the Site C reservoir and one observation near River Km 44.0 (i.e., approximately 2 km upstream of the North Monias Road bridge). The FIDQ also noted Bull Trout observations in Moberly Lake and in the Moberly River upstream of Moberly Lake. During previous years of the program (2016 to 2019) small numbers of Bull Trout (n = 6) have been captured in Section 7 and Section 10 (Golder 2017, 2019, 2020b). The single Bull Trout captured in Section 4 in 2020, represents the furthest upstream that a Bull Trout has been recorded in the Moberly River.

[18] http://a100.gov.bc.ca/pub/fidq/viewSingleWaterbody.do.

One Bull Trout captured at River Km 39.0 on 3 August 2020 was previous captured on 23 July 2019 at River Km 37.9. During the year this fish was at-large, it grew from 325 to 387 mm FL.

Only one Rainbow Trout has been captured in the Moberly River under the FAHMFP (in 2017), indicating that use of the Moberly River by Rainbow Trout is low.

In 2020, there was a greater diversity of non-target fish species recorded in the Moberly River compared to previous study years. A single Kokanee (*Oncorhynchus nerka*) was captured at River Km 50.7. In addition, Lake Whitefish, Northern Redbelly Dace and Pearl Dace were all captured in 2020 but have not previously been recorded while sampling the Moberly River in past study years. These species were captured in low numbers; therefore, their presence or absence in the catch in a particular study year is not likely indicative of a true change in species richness or diversity.

5.0 CLOSURE

We trust the information contained in this report is sufficiently detailed for your review purposes. Please do not hesitate to contact us should you have any questions or require clarification.

Golder Associates Ltd.

Kevin Little, BSc
Aquatic Biologist

Dustin Ford, BSc, RPBio
Associate, Senior Fisheries Biologist

KL/DF/cmc

https://golderassociates.sharepoint.com/sites/124588/project files/6 deliverables/2020_trib_indexing_draft/20136472-002-r-rev0-2020_trib_indexing 15jun_21.docx

6.0 LITERATURE CITED

AMEC and LGL (AMEC Earth & Environmental and LGL Limited). 2008a. Peace River fish and aquatics investigations - Peace River and tributary summer fish distribution, habitat assessment and radio telemetry studies 2006. Prepared for BC Hydro. 181 pages.

AMEC and LGL (AMEC Earth & Environmental and LGL Limited). 2008b. Peace River fisheries investigation - Peace River and Pine River radio telemetry study 2007. Prepared for BC Hydro. 148 pages.

AMEC and LGL (AMEC Earth & Environmental and LGL Limited). 2010a. Further analysis and assessment of the Ministry of Environment's Peace River Bull Trout and Arctic Grayling radio telemetry database 1996 to 1999. Prepared for BC Hydro. 48 pages.

AMEC and LGL (AMEC Earth & Environmental and LGL Limited). 2010b. Peace River fisheries investigation - Peace River and Pine River radio telemetry study 2009. Prepared for BC Hydro. 135 pages + appendices

BC Hydro. 2017. Evaluation of the effect of number of tags to detect trends in juvenile-to-adult survival for Bull Trout tagging in Halfway River tributaries. Inter-office memo. Memo written by Brent Mossop, Eric Parkinson, Brian Ma, and Eduardo Martins. Submitted to the Site C Fisheries and Aquatic Habitat Mitigation and Monitoring Technical Committee – Working Group for Tributary Sampling on 24 May 2017. 12 pages + appendices.

BC Hydro. 2021. Temporary Upstream Fish Passage Facility Operations Report. Reporting Period: October 1 to 31, 2020. 31 pages.

BC MELP (BC Ministry of Environment, Lands and Parks). 2000. Peace-Halfway watershed bull trout telemetry data. Ministry of Environment, Lands and Parks, Fort St. John, B.C. Unpublished data files.

Borgstrom R, Skaala O. 1993. Size-dependant Catchability of Brown Trout and Atlantic Salmon Parr by Electrofishing in a low Conductivity Stream. Nordic Journal of Freshwater Research. 16: 14-21.

Braun D, Harding J, Wilson LJ, Martin C, Chung M. 2017. Peace River Bull Trout Spawning Assessment – Bull Trout Redd Counts (Mon-1b, Task 2b). Report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC. InStream Fisheries Research, Vancouver, BC. 28 pages + 3 appendices.

Burrows J, Euchner T, Baccante N. 2001. Bull trout movement patterns: Halfway River and Peace River. Pages 153 to 157 in Brewin MK, Paul AJ, Monita M, editors. Bull Trout II Conference Proceedings. 2001. Trout Unlimited Canada, Calgary, AB.

Christensen, J. 2020. Site C Fish Otolith and Fin Ray Microchemistry Study. Report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC. 102 pages + 3 appendices.

ESSA (ESSA Technologies Ltd.), BC Hydro, and Golder Associates Ltd. 2020. Synthesis Review of the Fisheries and Aquatic Habitat Monitoring and Follow-Up Program (FAHMFP). Prepared for BC Hydro. 66 pages + 3 appendices.

Euchner and Mainstream (Euchner T and Mainstream Aquatics Ltd.). 2013. Site C Fisheries Study – Upper Halfway River watershed Bull Trout spawning survey – 2012. Prepared by T. Euchner, Diversified Environmental Services, Fort St. John, BC in association with Mainstream Aquatics Ltd., Edmonton, AB, for BC Hydro, Vancouver, BC. 48 pages.

Geraldes A, Taylor E. 2020. Site C Fish Genetics Study. 2019 Status Report for Bull trout, Arctic Grayling and Rainbow Trout. Report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC. 44 pages.

Geraldes A, Taylor E. 2021. Site C Fish Genetics Study. Report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC. 51 pages + 3 appendices.

Golder (Golder Associates Ltd.). 2017. Site C reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c) – 2016 investigations. Report prepared for BC Hydro, Vancouver, British Columbia. Golder Report No. 1650533: 28 pages + 3 appendices.

Golder (Golder Associates Ltd.). 2018. Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c) – 2017 investigations. Report prepared for BC Hydro, Vancouver, British Columbia. Golder Report No. 1650533: 38 pages + 3 appendices.

Golder (Golder Associates Ltd.). 2019. Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c) – 2018 investigations. Report prepared for BC Hydro, Vancouver, British Columbia. Golder Report No. 1650533: 49 pages + 3 appendices.

Golder (Golder Associates Ltd.). 2020a. Site C Clean Energy Project – Offset Effectiveness Monitoring. River Road Rock Spurs and Upper Site 109L – 2019 investigations. Report prepared for BC hydro, Vancouver, British Columbia. Golder Report No. 19121769F: 50 pages + 4 appendices.

Golder (Golder Associates Ltd.). 2020b. Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c) – 2019 investigations. Report Prepared for BC Hydro, Vancouver, British Columbia. Golder Report No. 19121765: 52 pages + 3 appendices.

Golder and Gazey (Golder Associates Ltd. and W.J. Gazey Research). 2020. Peace River Large Fish Indexing Survey - 2019 investigations. Report prepared for BC Hydro, Vancouver, British Columbia. Golder Report No. 19121769. 139 pages + 8 appendices.

Hatch K, Robichaud D, Fitzgerald C. 2021. Site C Fish Movement Assessment (Mon-1b, Task 2d) – 2020. Report prepared for BC hydro – Site C Clean Energy Project – Vancouver, BC. 57 pages + 4 appendices.

LGL (LGL Ltd.). 2020. Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program – Site C Fish Movement Assessment (Mon-1b, Task 2d). Report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC. 25 pages + 2 appendices.

Mackay WC, Ash GR, Norris HJ, editors. 1990. Fish ageing methods for Alberta. R.L. & L. Environmental Services Ltd. in association with Alberta Fish and Wildlife Division and University of Alberta, Edmonton. 113 pages.

Mainstream (Mainstream Aquatics Ltd.). 2009a. Site C fisheries studies – Baseline Peace River tributaries fish use assessments in spring and fall 2008. Prepared for B.C. Hydro. Report No. 08008BF: 64 pages. + appendices.

Mainstream (Mainstream Aquatics Ltd.). 2009b. Site C fisheries studies – Juvenile fish use and habitat inventory of Peace River tributaries in summer 2008. Prepared for B.C. Hydro. Report No. 08008CF: 78 pages + appendices.

Mainstream (Mainstream Aquatics Ltd.). 2010. Halfway River and Moberly River summer fish survey – 2009. Prepared for BC Hydro Engineering Services. Report No. 09008BF: 61 pages + plates + appendices.

Mainstream (Mainstream Aquatics Ltd.). 2011a. Site C Fisheries Studies – 2010 Coldwater Species Fish Survey. Prepared for B.C. Hydro, Site C, Corporate Affairs. Report No. 10015F: 34 pages + appendices.

Mainstream (Mainstream Aquatics Ltd.). 2011b. Site C Fisheries studies – 2010 Moberly River and Halfway River summer fish inventory. Report No. 10006F: 59 pages + plates + appendices.

Mainstream (Mainstream Aquatics Ltd.). 2012. Site C Clean Energy Project – fish and fish habitat technical data report. Prepared for BC Hydro Site C Project, Corporate Affairs Report No. 12002F: 239 pages.

Mainstream (Mainstream Aquatics Ltd.). 2013. Site C Fisheries studies – 2011 Moberly River and Halfway River summer fish inventory. Report No. 11006F: 51 pages + appendices.

Mainstream and Gazey (Mainstream Aquatics Ltd. and W.J. Gazey Research). 2014. Peace River Fish Index Project – 2013 studies. Prepared for B.C. Hydro. Report No. 13011F: 82 pages + appendices.

McPhail JD. 2007. The freshwater fishes of British Columbia. The University of Alberta Press. Edmonton, Alberta.

Pattenden R, McLeod C, Ash G, English K. 1991. Peace River Site C Hydro Development preconstruction fisheries studies. Fish movements and population status. 1990 studies. Report prepared for BC Hydro by R.L. & L. Environmental Services Ltd., Edmonton, Alberta, in association with K. English of LGL Ltd., Sidney, B.C. 121 pages + appendices.

Putt A, Ramos-Espinoza D, Braun DC, Wilson LJ, Martin C, Burnett NJ. 2018. Peace River Bull Trout spawning assessment - Bull Trout redds counts (Mon-1b, Task 2b). Report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC. 29 pages + 3 appendices.

Putt A, Ramos-Espinoza D, Wilson LJ, Middleton C, Buchanan J, Chung M, Martin C. 2020. Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program – 2019 Peace River Bull Trout Spawning Assessment (Mon-1b, Task 2b). Report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC. 46 pages + 4 appendices.

Putt A, Ramos-Espinoza D, Chung M. 2021. Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program – 2020 Peace River Bull Trout Spawning Assessment (Mon-1b, Task 2b). Report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC. 67 pages + 6 appendices.

R Core Team. 2020. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

R.L.& L. (R.L.& L. Environmental Services Ltd.). 1995. Fish migrations in the Chowade River, B.C. fall 1994. Prepared for Ministry of Environment, Lands and Parks, Fish and Wildlife Branch Fort St. John, B.C. March 1995. 35 pages + 4 appendices.

Ramos-Espinoza D, Burnett NJ, Buchanan J, Putt A. 2018. Peace River Bull Trout Spawning Assessment - Resistivity counter and passive integrated transponder arrays in the Chowade River and Cypress Creek (Mon-1b, Task 2b). Report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC. InStream Fisheries Research, Vancouver, BC. 65 pages.

Ramos-Espinoza D, Putt A, Wilson LJ, Martin C, Buchanan J, Lingard S, and Middleton C. 2019. Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program – Peace River Bull Trout Spawning Assessment (Mon-1b, Task 2b). Report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC. InStream Fisheries Research, Vancouver, BC. 96 pages + 5 appendices.

RISC (Resource Inventory Standards Committee). 1997. Fish collection methods and standards. B.C. Ministry of Environment, Lands and Parks, Fish Inventory Unit for the Aquatic Ecosystems Task Force, Resources Inventory Committee. Version 4.0. 58 pages (two subsequent errata).

Wickham H. 2009. ggplot2: elegant graphics for data analysis. Springer New York

APPENDIX A

Maps and UTM Locations

Table A1 Locations of sites sampled during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

River	Upstream River Km[a]	Site Name	Sample Method	Upstream UTM[b]			Downstream UTM[b]		
				Zone	Easting	Northing	Zone	Easting	Northing
Chowade River	51.2	CHR-EF-051.2-2020-07-30	Backpack Electrofishing	10V	492631	6284683	10V	492721	6284541
	51.1	CHR-EF-051.1-2020-07-29	Backpack Electrofishing	10V	492717	6284619	10V	492872	6284659
	51.1	CHR-EF-051.1-2020-07-30	Backpack Electrofishing	10V	492920	6284678	10V	492709	6284630
	51.0	CHR-EF-051.0-2020-07-29	Backpack Electrofishing	10V	492712	6284631	10V	492923	6284682
	50.0	CHR-EF-050.0-2020-08-09	Backpack Electrofishing	10V	493628	6284379	10V	493739	6284410
	49.9	CHR-EF-049.9-2020-08-09	Backpack Electrofishing	10V	493752	6284407	10V	493938	6284374
	49.8	CHR-EF-049.8-2020-08-09	Backpack Electrofishing	10V	493702	6284423	10V	493845	6284352
	49.7	CHR-EF-049.7-2020-08-09	Backpack Electrofishing	10V	493774	6284479	10V	493305	6284418
	49.6	CHR-EF-049.6-2020-07-30	Backpack Electrofishing	10V	494025	6284319	10V	494140	6284230
	49.5	CHR-EF-049.5-2020-07-30	Backpack Electrofishing	10V	494090	6284284	10V	494183	6284230
	49.4	CHR-EF-049.4-2020-07-30	Backpack Electrofishing	10V	494141	6284237	10V	494182	6284222
	49.3	CHR-EF-049.3-2020-07-30	Backpack Electrofishing	10V	494182	6284222	10V	494274	6284220
	48.7	CHR-EF-048.7-2020-07-29	Backpack Electrofishing	10V	494841	6284046	10V	494931	6384025
	48.6	CHR-EF-048.6-2020-07-29	Backpack Electrofishing	10V	494995	6284130	10V	495000	6284018
	48.4	CHR-EF-048.4-2020-07-29	Backpack Electrofishing	10V	494997	6284042	10V	495218	6284019
	46.6	CHR-EF-046.6-2020-07-28	Backpack Electrofishing	10V	496374	6283554	10V	496634	6283590
	46.4	CHR-EF-046.4-2020-07-28	Backpack Electrofishing	10V	496636	6283590	10V	496723	6283518
	46.3	CHR-EF-046.3-2020-07-28	Backpack Electrofishing	10V	496708	6283457	10V	496817	6283423
	45.0	CHR-EF-045.0-2020-07-29	Backpack Electrofishing	10V	497803	6284053	10V	498101	6284089
	45.0	CHR-EF-045.0-2020-08-09	Backpack Electrofishing	10V	497895	6283561	10V	498189	6283581
	44.9	CHR-EF-044.9-2020-08-09	Backpack Electrofishing	10V	497960	6283614	10V	498091	6283636
	44.4	CHR-EF-044.4-2020-07-29	Backpack Electrofishing	10V	498100	6284097	10V	498286	6284052
	44.2	CHR-EF-044.2-2020-07-28	Backpack Electrofishing	10V	498550	6283889	10V	498708	6283788
	43.9	CHR-EF-043.9-2020-07-28	Backpack Electrofishing	10V	498758	6283736	10V	498794	6283647
	43.8	CHR-EF-043.8-2020-07-28	Backpack Electrofishing	10V	498802	6283636	10V	498821	6283568
	43.7	CHR-EF-043.7-2020-07-28	Backpack Electrofishing	10V	498804	6283546	10V	498729	6283607
	39.6	CHR-EF-039.6-2020-07-30	Backpack Electrofishing	10V	501443	6282427	10V	501571	6282313
	39.5	CHR-EF-039.5-2020-07-28	Backpack Electrofishing	10V	501565	6282313	10V	501811	6282202
	39.5	CHR-EF-039.5-2020-07-30	Backpack Electrofishing	10V	501469	6282457	10V	501572	6282417
	39.3	CHR-EF-039.3-2020-07-28	Backpack Electrofishing	10V	501807	6282199	10V	501961	6282412
Colt Creek	30.4	COC-EF-030.4-2020-08-05	Backpack Electrofishing	10V	521150	6258241	10V	521236	6258388
	30.2	COC-EF-030.2-2020-08-05	Backpack Electrofishing	10V	521232	6258398	10V	521400	6258497
	29.0	COC-EF-029.0-2020-08-05	Backpack Electrofishing	10V	522229	6259004	10V	522341	6259126
	28.8	COC-EF-028.8-2020-08-05	Backpack Electrofishing	10V	522339	6259074	10V	522532	6259160
	14.1	COC-EF-014.1-2020-08-05	Backpack Electrofishing	10V	531640	6260256	10V	531804	6260318
	13.9	COC-EF-013.9-2020-08-05	Backpack Electrofishing	10V	531809	6260341	10V	532003	6260314
	3.2	COC-EF-003.2-2020-08-04	Backpack Electrofishing	10V	538022	6258680	10V	538247	6258627
	3.0	COC-EF-003.0-2020-08-04	Backpack Electrofishing	10V	538263	6258617	10V	538349	6258460
Cypress Creek	41.9	CYC-EF-041.9-2020-07-23	Backpack Electrofishing	10V	495299	6302314	10V	495198	6302382
	41.8	CYC-EF-041.8-2020-07-23	Backpack Electrofishing	10V	495303	6302273	10V	495180	6302402
	41.3	CYC-EF-041.3-2020-07-31	Backpack Electrofishing	10V	495263	6302463	10V	495614	6302558
	41.1	CYC-EF-041.1-2020-07-31	Backpack Electrofishing	10V	495609	6302549	10V	495764	6302655
	40.3	CYC-EF-040.3-2020-07-25	Backpack Electrofishing	10V	496001	6302965	10V	496170	6303044

[a] Upstream River Km of each site as measured upstream from the stream's confluence.

[b] NAD83.

continued…

Table A1 Continued.

River	Upstream River Km[a]	Site Name	Sample Method	Upstream UTM[b]			Downstream UTM[b]		
				Zone	Easting	Northing	Zone	Easting	Northing
Cypress Creek	40.0	CYC-EF-040.0-2020-07-25	Backpack Electrofishing	10V	496265	6303136	10V	496350	6303151
	39.8	CYC-EF-039.8-2020-07-25	Backpack Electrofishing	10V	496108	6303015	10V	496155	6303060
	38.6	CYC-EF-038.6-2020-07-25	Backpack Electrofishing	10V	497166	6303630	10V	497206	6303769
	38.5	CYC-EF-038.5-2020-07-25	Backpack Electrofishing	10V	497245	6303641	10V	497263	6303689
	37.7	CYC-EF-037.7-2020-07-23	Backpack Electrofishing	10V	497694	6303661	10V	497741	6303705
	37.0	CYC-EF-037.0-2020-07-23	Backpack Electrofishing	10V	497821	6303827	10V	497789	6303877
	35.8	CYC-EF-035.8-2020-07-31	Backpack Electrofishing	10V	498768	6303774	10V	498658	6303668
	35.7	CYC-EF-035.7-2020-07-31	Backpack Electrofishing	10V	498749	6303716	10V	498995	6303845
	34.7	CYC-EF-034.7-2020-07-31	Backpack Electrofishing	10V	499346	6303849	10V	499600	6304002
	34.5	CYC-EF-034.5-2020-07-31	Backpack Electrofishing	10V	499406	6303873	10V	499592	6304409
	32.8	CYC-EF-032.8-2020-07-23	Backpack Electrofishing	10V	500397	6304853	10V	639691	6235705
	32.7	CYC-EF-032.7-2020-07-23	Backpack Electrofishing	10V	500402	6304847	10V	500537	6304933
	32.6	CYC-EF-032.6-2020-07-23	Backpack Electrofishing	10V	500528	6304905	10V	500575	6304951
	30.7	CYC-EF-030.7-2020-07-22	Backpack Electrofishing	10V	501611	6305698	10V	501644	6305592
	30.6	CYC-EF-030.6-2020-07-22	Backpack Electrofishing	10V	501659	6305596	10V	501834	6305574
	29.2	CYC-EF-029.2-2020-07-22	Backpack Electrofishing	10V	502913	6305526	10V	503105	6305507
	29.2	CYC-EF-029.2-2020-08-01	Backpack Electrofishing	10V	503838	6305418	10V	504080	6305431
	29.1	CYC-EF-029.1-2020-07-22	Backpack Electrofishing	10V	503117	6305472	10V	503143	6305420
	29.1	CYC-EF-029.1-2020-08-01	Backpack Electrofishing	10V	503823	6305296	10V	503872	6305201
	27.3	CYC-EF-027.3-2020-08-01	Backpack Electrofishing	10V	504529	6305137	10V	504617	6305046
	27.2	CYC-EF-027.2-2020-08-01	Backpack Electrofishing	10V	504617	6305046	10V	504715	6305088
	27.1	CYC-EF-027.1-2020-08-01	Backpack Electrofishing	10V	504626	6305031	10V	504712	6305045
	26.2	CYC-EF-026.2-2020-08-01	Backpack Electrofishing	10V	505182	6304432	10V	505299	6304361
	26.1	CYC-EF-026.1-2020-08-01	Backpack Electrofishing	10V	505456	6304543	10V	505355	6304413
	25.0	CYC-EF-025.0-2020-07-25	Backpack Electrofishing	10V	506073	6304461	10V	506216	6304445
	24.7	CYC-EF-024.7-2020-07-25	Backpack Electrofishing	10V	506325	6304434	10V	506446	6304347
	22.9	CYC-EF-022.9-2020-07-25	Backpack Electrofishing	10V	507339	6303216	10V	507387	6303197
	22.8	CYC-EF-022.8-2020-07-25	Backpack Electrofishing	10V	507424	6303290	10V	507548	6303309
	22.7	CYC-EF-022.7-2020-07-25	Backpack Electrofishing	10V	507405	6303197	10V	507501	6303264
	22.6	CYC-EF-022.6-2020-07-25	Backpack Electrofishing	10V	507745	6303226	10V	508235	6303226
	21.9	CYC-EF-021.9-2020-07-25	Backpack Electrofishing	10V	508137	6303124	10V	508235	6302878
	21.6	CYC-EF-021.6-2020-07-25	Backpack Electrofishing	10V	508231	6302995	10V	508256	6302874
	21.5	CYC-EF-021.5-2020-07-25	Backpack Electrofishing	10V	508296	6303018	10V	508261	6302879
Farrell Creek	102.1	FAC-EF-102.1-2020-08-02	Backpack Electrofishing	10V	560887	6238222	10V	560988	6238340
	101.7	FAC-EF-101.7-2020-08-02	Backpack Electrofishing	10V	561071	6238249	10V	561046	6238132
	65.7	FAC-EF-065.7-2020-07-26	Backpack Electrofishing	10V	573202	6238268	10V	573010	6238384
	65.5	FAC-EF-065.5-2020-07-26	Backpack Electrofishing	10V	573010	6238384	10V	573010	6238446
	63.3	FAC-EF-063.3-2020-07-26	Backpack Electrofishing	10V	572209	6239771	10V	572379	6239982
	63.0	FAC-EF-063.0-2020-07-26	Backpack Electrofishing	10V	572396	6239990	10V	572553	6240018
Fiddes Creek	11.9	FIC-EF-011.9-2020-07-27	Backpack Electrofishing	10V	478222	6306777	10V	478161	6306575
	11.7	FIC-EF-011.7-2020-07-27	Backpack Electrofishing	10V	478200	6306781	10V	478303	6306869
	7.1	FIC-EF-007.1-2020-07-27	Backpack Electrofishing	10V	479699	6310887	10V	479593	6310839
	7.0	FIC-EF-007.0-2020-07-27	Backpack Electrofishing	10V	479673	6310880	10V	479828	6311010
	5.2	FIC-EF-005.2-2020-07-27	Backpack Electrofishing	10V	480363	6312393	10V	480320	6312559
	4.8	FIC-EF-004.8-2020-07-27	Backpack Electrofishing	10V	480316	6312547	10V	480291	6312642

[a] Upstream River Km of each site as measured upstream from the stream's confluence.
[b] NAD83.

continued…

Table A1 Continued.

River	Upstream River Km[a]	Site Name	Sample Method	Upstream UTM[b]			Downstream UTM[b]		
				Zone	Easting	Northing	Zone	Easting	Northing
Kobes Creek	55.5	KOC-EF-055.5-2020-08-13	Backpack Electrofishing	10V	544269	6243076	10V	544239	6243279
	55.3	KOC-EF-055.3-2020-08-13	Backpack Electrofishing	10V	544239	6243279	10V	543952	6243533
	46.9	KOC-EF-046.9-2020-08-13	Backpack Electrofishing	10V	543232	6248173	10V	543395	6248517
	46.7	KOC-EF-046.7-2020-08-13	Backpack Electrofishing	10V	543328	6248311	10V	543395	6248517
	40.6	KOC-EF-040.6-2020-08-03	Backpack Electrofishing	10V	543996	6252149	10V	544124	6252324
	40.2	KOC-EF-040.2-2020-08-03	Backpack Electrofishing	10V	544130	6252319	10V	544060	6252510
	11.7	KOC-EF-011.7-2020-08-03	Backpack Electrofishing	10V	555402	6256097	10V	555234	6256194
	11.5	KOC-EF-011.5-2020-08-03	Backpack Electrofishing	10V	555234	6256194	10V	555402	6256097
Maurice Creek	2.0	MAC-EF-002.0-2020-08-07	Backpack Electrofishing	10V	569537	6208611	10V	569371	6208688
	1.7	MAC-EF-001.7-2020-08-07	Backpack Electrofishing	10V	569414	6208777	10V	569403	6208992
	1.5	MAC-EF-001.5-2020-08-07	Backpack Electrofishing	10V	569378	6209005	10V	569207	6208982
	1.3	MAC-EF-001.3-2020-08-07	Backpack Electrofishing	10V	569211	6208984	10V	569062	6208870
	1.2	MAC-EF-001.2-2020-08-06	Backpack Electrofishing	10V	568927	6208922	10V	568761	6209005
	1.0	MAC-EF-001.0-2020-08-06	Backpack Electrofishing	10V	568767	6209001	10V	568572	6209048
	0.8	MAC-EF-000.8-2020-08-06	Backpack Electrofishing	10V	568564	6209037	10V	568376	6209070
	0.6	MAC-EF-000.6-2020-08-06	Backpack Electrofishing	10V	568365	6209059	10V	568190	6209122
Moberly River	119.5	MOR-ES-119.5-2020-07-28	Small Fish Boat Electroshocker	10U	587727	6189249	10U	588356	6189490
	119.5	MOR-AG-119.5-2020-07-28	Angling	10U	587906	6189345	10U	588003	6189389
	119	MOR-EF-119.0-2020-07-29	Backpack Electrofishing	10U	588371	6189484	10U	588464	6189459
	119	MOR-AG-119.0-2020-08-08	Angling	10U	588291	6189475	10U	588453	6189472
	119	MOR-EF-119.0-2020-08-08	Backpack Electrofishing	10U	588291	6189475	10U	688453	6189472
	119	MOR-AG-119.0-2020-07-28	Angling	10U	588285	6189497	10U	588364	6189492
	119	MOR-AG-119.0-2020-07-29	Angling	10U	588212	6189424	10U	588358	6189491
	118.9	MOR-ES-118.9-2020-07-29	Small Fish Boat Electroshocker	10U	588344	6189685	10U	588665	6189686
	118.6	MOR-AG-118.6-2020-07-29	Angling	10U	588565	6189926	10U	588562	6189993
	118.4	MOR-EF-118.4-2020-07-29	Backpack Electrofishing	10U	588664	6189702	10U	588634	6189783
	118.3	MOR-ES-118.3-2020-07-29	Small Fish Boat Electroshocker	10U	588665	6189686	10U	588523	6190564
	118.1	MOR-AG-118.1-2020-07-29	Angling	10U	588498	6190311	10U	588524	6190356
	117.7	MOR-ES-117.7-2020-07-29	Small Fish Boat Electroshocker	10U	588523	6190564	10U	588307	6190931
	117.5	MOR-EF-117.5-2020-07-29	Backpack Electrofishing	10U	588445	6190689	10U	588382	6190746
	117.4	MOR-AG-117.4-2020-07-29	Angling	10U	588358	6190821	10U	588320	6190917
	117.3	MOR-ES-117.3-2020-07-29	Small Fish Boat Electroshocker	10U	588307	6190931	10U	588487	6191181
	116.9	MOR-EF-116.9-2020-07-29	Backpack Electrofishing	10U	588477	6191163	10U	588496	6191193
	116.8	MOR-AG-116.8-2020-08-08	Angling	10U	588558	6191172	10U	588687	6191242
	116.8	MOR-EF-116.8-2020-08-08	Backpack Electrofishing	10U	588564	6191168	10U	588637	6191250
	116.8	MOR-AG-116.8-2020-07-29	Angling	10U	588655	6191199	10U	588680	6191228
	116.7	MOR-EF-116.7-2020-07-29	Backpack Electrofishing	10U	588517	6191248	10U	588781	6191264
	116.7	MOR-ES-116.7-2020-07-29	Small Fish Boat Electroshocker	10U	588658	6191198	10U	589117	6191400
	116.2	MOR-ES-116.2-2020-07-29	Small Fish Boat Electroshocker	10U	588658	6191198	10U	589344	6191923
	115.8	MOR-AG-115.8-2020-07-29	Angling	10U	589162	6191816	10U	589186	6191897
	115.8	MOR-EF-115.8-2020-07-29	Backpack Electrofishing	10U	589200	6191770	10U	589208	6191881
	115.5	MOR-ES-115.5-2020-07-29	Small Fish Boat Electroshocker	10U	589344	6191923	10U	589519	6192468
	114.9	MOR-ES-114.9-2020-07-29	Small Fish Boat Electroshocker	10U	589519	6192468	10U	589192	6193008
	114.5	MOR-AG-114.5-2020-07-29	Angling	10U	589230	6192785	10U	589211	6192938

[a] Upstream River Km of each site as measured upstream from the stream's confluence.

[b] NAD83.

continued…

Table A1 Continued.

River	Upstream River Km[a]	Site Name	Sample Method	Upstream UTM[b]			Downstream UTM[b]		
				Zone	Easting	Northing	Zone	Easting	Northing
Moberly River	114.5	MOR-EF-114.5-2020-07-29	Backpack Electrofishing	10U	589230	6192936	10U	589212	6192936
	114.5	MOR-AG-114.5-2020-08-08	Angling	10U	589241	6192766	10U	589219	6192925
	114.5	MOR-EF-114.5-2020-08-08	Backpack Electrofishing	10U	589242	6192802	10U	589221	6192872
	114.2	MOR-ES-114.2-2020-07-29	Small Fish Boat Electroshocker	10U	589192	6193008	10U	589151	6193938
	105.0	MOR-AG-105.0-2020-07-30	Angling	10U	590177	6198371	10U	590546	6198460
	105.0	MOR-ES-105.0-2020-07-30	Small Fish Boat Electroshocker	10U	590168	6198181	10U	590658	6198702
	103.9	MOR-ES-103.9-2020-07-30	Small Fish Boat Electroshocker	10U	590659	6198705	10U	590947	6199537
	102.9	MOR-AG-102.9-2020-07-30	Angling	10U	590614	6199193	10U	590546	6198460
	102.9	MOR-EF-102.9-2020-07-30	Backpack Electrofishing	10U	590633	6199195	10U	590671	6199146
	102.2	MOR-ES-102.2-2020-07-30	Small Fish Boat Electroshocker	10U	590955	6199537	10U	591257	6200268
	98.9	MOR-AG-098.9-2020-07-30	Angling	10U	591006	6201072	10U	590671	6200981
	95.1	MOR-AG-095.1-2020-07-30	Angling	10U	589167	6200575	10U	588675	6200684
	91.1	MOR-ES-091.1-2020-07-30	Small Fish Boat Electroshocker	10U	588278	6202672	10U	586580	6203220
	91.0	MOR-AG-091.0-2020-07-30	Angling	10U	588073	6202617	10U	588073	6202617
	88.9	MOR-AG-088.9-2020-07-30	Angling	10U	586498	6203371	10U	586491	6203418
	87.3	MOR-AG-087.3-2020-07-30	Angling	10U	587192	6203922	10U	587294	6203884
	87.3	MOR-ES-087.3-2020-07-30	Small Fish Boat Electroshocker	10U	587251	6203889	10U	589047	6204947
	84.1	MOR-ES-084.1-2020-07-31	Small Fish Boat Electroshocker	10U	589440	6205388	10U	589494	6206117
	84.0	MOR-AG-084.0-2020-07-30	Angling	10U	589425	6205378	10U	589399	6205382
	84.0	MOR-AG-084.0-2020-07-31	Angling	10U	589425	6205378	10U	589399	6205382
	83.6	MOR-EF-083.6-2020-07-31	Backpack Electrofishing	10U	589483	6205501	10U	589520	6205570
	83.0	MOR-EF-083.0-2020-07-31	Backpack Electrofishing	10U	589550	6205688	10U	589504	6205745
	82.5	MOR-EF-082.5-2020-07-31	Backpack Electrofishing	10U	589463	6206080	10U	589488	6206124
	82.3	MOR-AG-082.3-2020-07-31	Angling	10U	589454	6206097	10U	589487	6206133
	82.2	MOR-ES-082.2-2020-07-31	Small Fish Boat Electroshocker	10U	589670	6205975	10U	589814	6206456
	80.0	MOR-AG-080.0-2020-07-31	Angling	10U	589970	6206858	10U	589972	6206795
	79.8	MOR-AG-079.8-2020-07-31	Angling	10U	590079	6206978	10U	590091	6206998
	76.9	MOR-AG-076.9-2020-07-31	Angling	10V	590669	6208472	10V	590665	6208503
	72.9	MOR-ES-072.9-2020-07-31	Small Fish Boat Electroshocker	10V	590573	6211117	10V	590973	6210767
	72.5	MOR-AG-072.5-2020-07-31	Angling	10V	590842	6210990	10V	590981	6210776
	70.4	MOR-ES-070.4-2020-07-31	Small Fish Boat Electroshocker	10V	592088	6211170	10V	593128	6211635
	70.3	MOR-AG-070.3-2020-07-31	Angling	10V	592102	6211170	10V	592170	6211193
	68.4	MOR-AG-068.4-2020-07-31	Angling	10V	593727	6211394	10V	593732	6211337
	66.3	MOR-AG-066.3-2020-07-31	Angling	10V	593921	6211996	10V	593918	6212040
	65.7	MOR-ES-065.7-2020-07-31	Small Fish Boat Electroshocker	10V	594335	6212162	10V	594482	6211817
	59.0	MOR-ES-059.0-2020-07-31	Small Fish Boat Electroshocker	10V	596244	6214680	10V	596315	6215578
	58.2	MOR-EF-058.2-2020-08-01	Backpack Electrofishing	10V	596321	6215486	10V	596390	6215592
	58.0	MOR-AG-058.0-2020-08-01	Angling	10V	596346	6215596	10V	596346	6215596
	58.0	MOR-ES-058.0-2020-08-01	Small Fish Boat Electroshocker	10V	596393	6215611	10V	597919	6215216
	57.6	MOR-AG-057.6-2020-08-01	Angling	10V	596643	6215530	10V	596697	6215494
	56.9	MOR-EF-056.9-2020-08-01	Backpack Electrofishing	10V	597174	6215415	10V	597159	6215366
	56.2	MOR-EF-056.2-2020-08-01	Backpack Electrofishing	10V	597786	6215226	10V	597728	6215185
	56.1	MOR-ES-056.1-2020-08-01	Small Fish Boat Electroshocker	10V	596393	6215457	10V	598731	6215457
	56.0	MOR-AG-056.0-2020-08-01	Angling	10V	597690	6215172	10V	598028	6215278

[a] Upstream River Km of each site as measured upstream from the stream's confluence.

[b] NAD83.

continued…

Table A1 Continued.

River	Upstream River Km[a]	Site Name	Sample Method	Upstream UTM[b]			Downstream UTM[b]		
				Zone	Easting	Northing	Zone	Easting	Northing
Moberly River	55.0	MOR-ES-055.0-2020-08-01	Small Fish Boat Electroshocker	10V	598762	6215479	10V	598459	6214199
	54.3	MOR-EF-054.3-2020-08-01	Backpack Electrofishing	10V	598548	6215041	10V	598515	6214972
	53.5	MOR-ES-053.5-2020-08-01	Small Fish Boat Electroshocker	10V	598459	6214199	10V	599382	6214976
	53.4	MOR-EF-053.4-2020-08-01	Backpack Electrofishing	10V	598459	6214259	10V	598450	6214197
	53.3	MOR-AG-053.3-2020-08-01	Angling	10V	598496	6214570	10V	598527	6214492
	52.9	MOR-AG-052.9-2020-08-01	Angling	10V	598837	6214161	10V	598868	6214166
	52.2	MOR-AG-052.2-2020-08-01	Angling	10V	599066	6214653	10V	599043	6214713
	51.8	MOR-ES-051.8-2020-08-01	Small Fish Boat Electroshocker	10V	599382	6214976	10V	599221	6215784
	51.7	MOR-EF-051.7-2020-08-01	Backpack Electrofishing	10V	599437	6215011	10V	599526	6215079
	51.1	MOR-AG-051.1-2020-08-01	Angling	10V	599271	6215478	10V	599295	6215567
	50.7	MOR-ES-050.7-2020-08-01	Small Fish Boat Electroshocker	10V	599221	6215784	10V	599856	6216464
	50.4	MOR-AG-050.4-2020-08-01	Angling	10V	599249	6216003	10V	599332	6216079
	49.4	MOR-EF-049.4-2020-08-01	Backpack Electrofishing	10V	599767	6216556	10V	599840	6216507
	49.3	MOR-ES-049.3-2020-08-01	Small Fish Boat Electroshocker	10V	599856	6216464	10V	600993	6217140
	49.1	MOR-AG-049.1-2020-08-01	Angling	10V	600036	6216450	10V	600036	6216450
	48.7	MOR-AG-048.7-2020-08-01	Angling	10V	600335	6216462	10V	600383	6216521
	47.9	MOR-AG-047.9-2020-08-01	Angling	10V	601000	6212177	10V	601035	6217210
	47.6	MOR-ES-047.6-2020-08-01	Small Fish Boat Electroshocker	10V	600993	6217140	10V	601824	6217582
	46.0	MOR-ES-046.0-2020-08-02	Small Fish Boat Electroshocker	10V	601816	6217592	10V	603415	6217902
	44.8	MOR-EF-044.8-2020-08-02	Backpack Electrofishing	10V	602700	6217694	10V	602875	6217731
	44.5	MOR-AG-044.5-2020-08-02	Angling	10V	602860	6217909	10V	602887	6218014
	43.8	MOR-ES-043.8-2020-08-02	Small Fish Boat Electroshocker	10V	603415	6217899	10V	604401	6218636
	43.7	MOR-EF-043.7-2020-08-02	Backpack Electrofishing	10V	603460	6217991	10V	603450	6217926
	43.6	MOR-EF-043.6-2020-08-02	Backpack Electrofishing	10V	603497	6217952	10V	604337	6218412
	42.9	MOR-AG-042.9-2020-08-02	Angling	10V	604158	6218153	10V	604320	6218159
	42.6	MOR-EF-042.6-2020-08-02	Backpack Electrofishing	10V	604396	6298409	10V	604337	6298412
	42.2	MOR-ES-042.2-2020-08-02	Small Fish Boat Electroshocker	10V	604401	6218636	10V	605676	6219259
	42.0	MOR-AG-042.0-2020-08-02	Angling	10V	604473	6218727	10V	604514	6218735
	40.5	MOR-EF-040.5-2020-08-02	Backpack Electrofishing	10V	606144	6219750	10V	606193	6219712
	39.7	MOR-AG-039.7-2020-08-02	Angling	10V	606190	6220176	10V	606190	6220176
	39.0	MOR-ES-039.0-2020-08-03	Small Fish Boat Electroshocker	10V	606140	6219755	10V	606583	6221044
	38.9	MOR-EF-038.9-2020-08-03	Backpack Electrofishing	10V	606276	6220180	10V	606430	6220320
	38.9	MOR-AG-038.9-2020-08-03	Angling	10V	606389	6220331	10V	606439	6220331
	38.8	MOR-AG-038.8-2020-08-08	Angling	10V	606347	6220308	10V	606446	6220337
	38.8	MOR-EF-038.8-2020-08-03	Backpack Electrofishing	10V	606330	6220276	10V	606391	6220324
	38.8	MOR-EF-038.8-2020-08-08	Backpack Electrofishing	10V	606440	6220274	10V	606453	6220339
	38.0	MOR-EF-038.0-2020-08-03	Backpack Electrofishing	10V	606382	6220924	10V	606509	6221180
	37.9	MOR-EF-037.9-2020-08-03	Backpack Electrofishing	10V	606568	6220996	10V	606612	6221139
	37.9	MOR-AG-037.9-2020-08-03	Angling	10V	606522	6221174	10V	606522	6221174
	37.9	MOR-ES-037.9-2020-08-03	Small Fish Boat Electroshocker	10V	606583	6221044	10V	607047	6222562
	36.8	MOR-EF-036.8-2020-08-03	Backpack Electrofishing	10V	607073	6221722	10V	607025	6221893
	36.7	MOR-AG-036.7-2020-08-03	Angling	10V	606985	6221948	10V	606985	6221948
	35.7	MOR-ES-035.7-2020-08-03	Small Fish Boat Electroshocker	10V	607073	6222616	10V	607466	6223537
	35.4	MOR-AG-035.4-2020-08-03	Angling	10V	607338	6222683	10V	607421	6222772

[a] Upstream River Km of each site as measured upstream from the stream's confluence.

[b] NAD83.

continued...

Table A1 Continued.

River	Upstream River Km[a]	Site Name	Sample Method	Upstream UTM[b]			Downstream UTM[b]		
				Zone	Easting	Northing	Zone	Easting	Northing
Moberly River	34.1	MOR-AG-034.1-2020-08-03	Angling	10V	607703	6223202	10V	607703	6223202
	33.5	MOR-AG-033.5-2020-08-03	Angling	10V	607428	6223503	10V	607487	6223546
	33.4	MOR-ES-033.4-2020-08-03	Small Fish Boat Electroshocker	10V	607466	6223537	10V	608853	6223655
	31.5	MOR-ES-031.5-2020-08-04	Small Fish Boat Electroshocker	10V	608902	6224006	10V	609543	6224002
	31.4	MOR-EF-031.4-2020-08-04	Backpack Electrofishing	10V	608949	6223906	10V	608983	6223987
	30.9	MOR-AG-030.9-2020-08-04	Angling	10V	609191	6224373	10V	609191	6224373
	30.9	MOR-EF-030.9-2020-08-04	Backpack Electrofishing	10V	609090	6224333	10V	609134	6224420
	30.8	MOR-EF-030.8-2020-08-04	Backpack Electrofishing	10V	609179	6224338	10V	609199	6224331
	30.7	MOR-AG-030.7-2020-08-04	Angling	10V	609197	6224339	10V	609229	6224264
	30.2	MOR-ES-030.2-2020-08-04	Small Fish Boat Electroshocker	10V	609784	6224206	10V	610206	6224870
	30.0	MOR-AG-030.0-2020-08-04	Angling	10V	609687	6224087	10V	609816	6224212
	29.8	MOR-EF-029.8-2020-08-04	Backpack Electrofishing	10V	609685	6224082	10V	609574	6224322
	28.7	MOR-AG-028.7-2020-08-04	Angling	10V	610238	6224897	10V	610238	6224897
	28.7	MOR-EF-028.7-2020-08-04	Backpack Electrofishing	10V	610250	6224973	10V	610141	6224998
	28.7	MOR-ES-028.7-2020-08-04	Small Fish Boat Electroshocker	10V	610157	6225002	10V	610849	6226024
	28.6	MOR-AG-028.6-2020-08-04	Angling	10V	610018	6224985	10V	610018	6224985
	28.3	MOR-AG-028.3-2020-08-04	Angling	10V	609926	6224941	10V	609754	6224936
	27.0	MOR-AG-027.0-2020-08-04	Angling	10V	609946	6225284	10V	610041	6225201
	26.5	MOR-AG-026.5-2020-08-04	Angling	10V	610445	6225760	10V	610489	6225792
	26.0	MOR-ES-026.0-2020-08-04	Small Fish Boat Electroshocker	10V	616849	6226024	10V	611493	6226753
	25.7	MOR-EF-025.7-2020-08-04	Backpack Electrofishing	10V	611110	6226185	10V	611366	6226255
	24.9	MOR-AG-024.9-2020-08-04	Angling	10V	611431	6226808	10V	611497	6226702
	24.8	MOR-EF-024.8-2020-08-04	Backpack Electrofishing	10V	611566	6226633	10V	611459	6226765
	24.2	MOR-ES-024.2-2020-08-04	Small Fish Boat Electroshocker	10V	611787	6227009	10V	612754	6227284
	22.9	MOR-AG-022.9-2020-08-04	Angling	10V	612784	6227300	10V	612867	6227338
	22.4	MOR-EF-022.4-2020-08-05	Backpack Electrofishing	10V	613208	6227565	10V	613294	6227601
	22.3	MOR-EF-022.3-2020-08-05	Backpack Electrofishing	10V	613372	6227635	10V	613481	6227683
	22.3	MOR-ES-022.3-2020-08-05	Small Fish Boat Electroshocker	10V	613311	6227617	10V	614079	6227883
	22.0	MOR-AG-022.0-2020-08-05	Angling	10V	613442	6227694	10V	613651	6227753
	21.7	MOR-EF-021.7-2020-08-05	Backpack Electrofishing	10V	613582	6227752	10V	613734	6227771
	21.1	MOR-EF-021.1-2020-08-05	Backpack Electrofishing	10V	614241	6227953	10V	614376	6228016
	21.1	MOR-ES-021.1-2020-08-05	Small Fish Boat Electroshocker	10V	614241	6227865	10V	615561	6228415
	21.0	MOR-AG-021.0-2020-08-05	Angling	10V	614458	6227902	10V	614458	6227902
	20.7	MOR-AG-020.7-2020-08-05	Angling	10V	614536	6228012	10V	614829	6228034
	19.0	MOR-AG-019.0-2020-08-05	Angling	10V	615390	6228359	10V	615584	6228450
	18.2	MOR-ES-018.2-2020-08-05	Small Fish Boat Electroshocker	10V	616017	6228577	10V	616854	6229043
	17.3	MOR-AG-017.3-2020-08-05	Angling	10V	616393	6228918	10V	616412	6229054
	17.3	MOR-EF-017.3-2020-08-05	Backpack Electrofishing	10V	616291	6228808	10V	616421	6228991
	16.7	MOR-AG-016.7-2020-08-05	Angling	10V	616759	6229104	10V	616925	6229010
	16.7	MOR-ES-016.7-2020-08-05	Small Fish Boat Electroshocker	10V	616929	6229007	10V	617980	6228697
	16.2	MOR-EF-016.2-2020-08-05	Backpack Electrofishing	10V	616050	6228697	10V	617139	6228575
	14.9	MOR-AG-014.9-2020-08-16	Angling	10V	618267	6228861	10V	618363	6228848
	14.9	MOR-ES-014.9-2020-08-06	Small Fish Boat Electroshocker	10V	618117	6228753	10V	619218	6228655

[a] Upstream River Km of each site as measured upstream from the stream's confluence.

[b] NAD83.

continued...

Table A1 Concluded.

River	Upstream River Km[a]	Site Name	Sample Method	Upstream UTM[b]			Downstream UTM[b]		
				Zone	Easting	Northing	Zone	Easting	Northing
Moberly River	14.4	MOR-EF-014.4-2020-08-06	Backpack Electrofishing	10V	618454	6228875	10V	618586	6228865
	14.2	MOR-EF-014.2-2020-08-06	Backpack Electrofishing	10V	618596	6228811	10V	618739	6228768
	14.0	MOR-AG-014.0-2020-08-06	Angling	10V	618561	6228829	10V	618579	6228825
	13.7	MOR-EF-013.7-2020-08-06	Backpack Electrofishing	10V	619167	6228669	10V	619260	6228726
	13.7	MOR-ES-013.7-2020-08-06	Small Fish Boat Electroshocker	10V	619253	6228659	10V	620204	6228052
	13.5	MOR-AG-013.5-2020-08-06	Angling	10V	619200	6228649	10V	619244	6228692
	13.0	MOR-AG-013.0-2020-08-06	Angling	10V	619649	6228386	10V	619691	6228389
	12.4	MOR-EF-012.4-2020-08-06	Backpack Electrofishing	10V	620014	6228205	10V	620167	6228049
	12.3	MOR-ES-012.3-2020-08-06	Small Fish Boat Electroshocker	10V	620204	6228052	10V	622512	6228035
	12.0	MOR-AG-012.0-2020-08-06	Angling	10V	620275	6228025	10V	620454	6228045
	10.0	MOR-AG-010.0-2020-08-06	Angling	10V	622250	6228195	10V	622511	6228038
	9.8	MOR-EF-009.8-2020-08-06	Backpack Electrofishing	10V	622510	6228039	10V	622571	6228022
	9.7	MOR-ES-009.7-2020-08-06	Small Fish Boat Electroshocker	10V	622512	6228035	10V	623902	6227448
	8.7	MOR-EF-008.7-2020-08-06	Backpack Electrofishing	10V	622967	6227466	10V	623109	6227432
	8.6	MOR-AG-008.6-2020-08-06	Angling	10V	622932	6227500	10V	623001	6227461
	7.7	MOR-AG-007.7-2020-08-06	Angling	10V	623824	6227493	10V	623863	6227466
	7.5	MOR-ES-007.5-2020-08-06	Small Fish Boat Electroshocker	10V	623902	6227448	10V	625151	6227693
	6.7	MOR-EF-006.7-2020-08-06	Backpack Electrofishing	10V	624613	6227206	10V	624694	6227245
	6.0	MOR-AG-006.0-2020-08-06	Angling	10V	624986	6227627	10V	625060	6227659
	6.0	MOR-ES-006.0-2020-08-06	Small Fish Boat Electroshocker	10V	625151	6227693	10V	626224	6228356
	5.1	MOR-EF-005.1-2020-08-06	Backpack Electrofishing	10V	625714	6227955	10V	625774	6228049
	3.3	MOR-AG-003.3-2020-08-07	Angling	10V	626571	6228521	10V	626622	6228574
	3.3	MOR-ES-003.3-2020-08-07	Small Fish Boat Electroshocker	10V	626575	6228514	10V	627154	6229294
	2.8	MOR-EF-002.8-2020-08-07	Backpack Electrofishing	10V	626704	6228674	10V	626853	6228913
	2.7	MOR-AG-002.7-2020-08-07	Angling	10V	626857	6228920	10V	626861	6228932
	2.3	MOR-EF-002.3-2020-08-07	Backpack Electrofishing	10V	627043	6229212	10V	627015	6229163
	2.0	MOR-ES-002.0-2020-08-07	Small Fish Boat Electroshocker	10V	627154	6229294	10V	628007	6230037
	1.5	MOR-AG-001.5-2020-08-07	Angling	10V	627601	6229454	10V	627614	6229464
	1.1	MOR-AG-001.1-2020-08-07	Angling	10V	627775	6229594	10V	627732	6229779

[a] Upstream River Km of each site as measured upstream from the stream's confluence.

[b] NAD83.

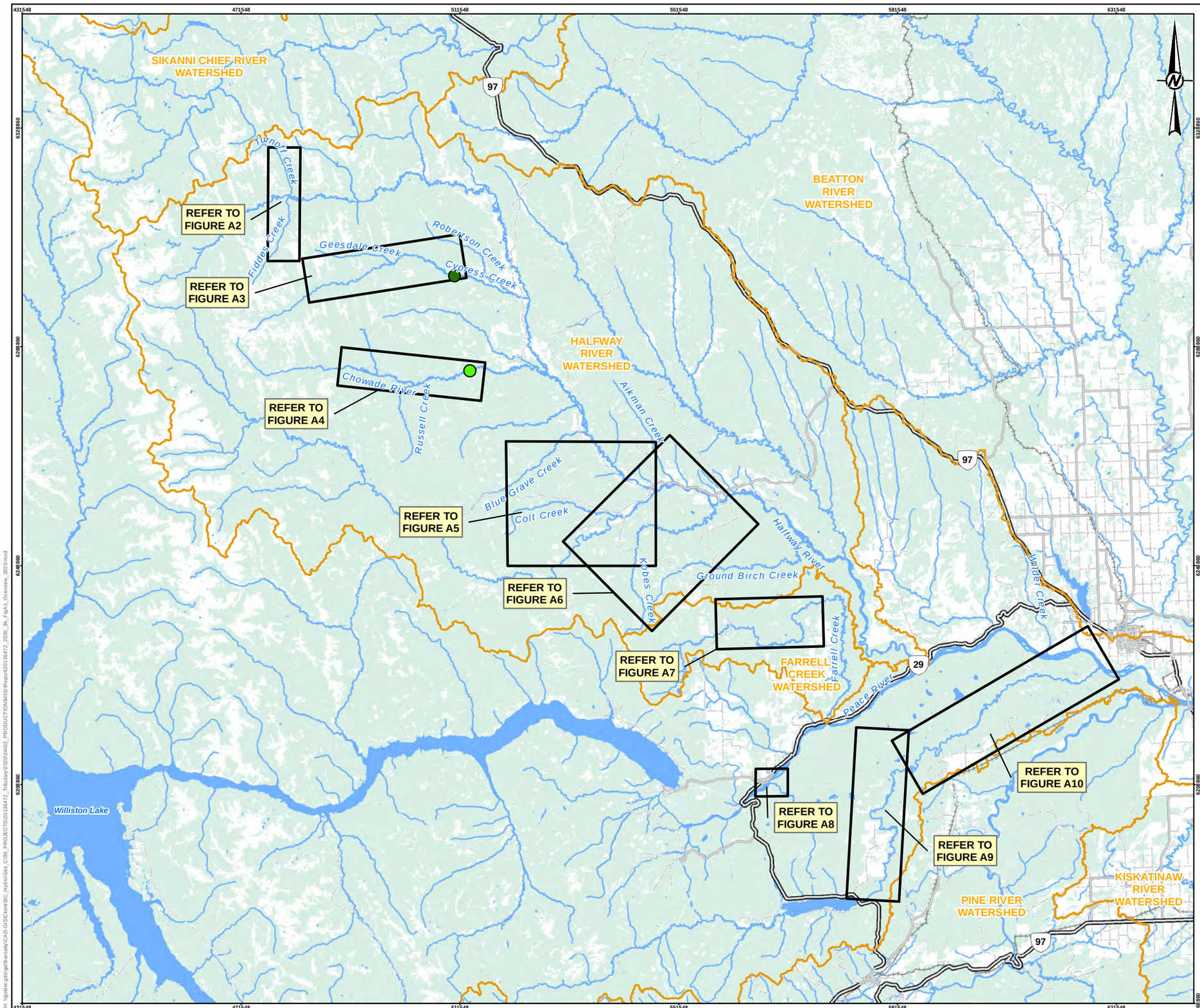
Table A2 Location information for Moberly River sections sampled during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

River	Section	Habitat Type[a]	Length (km)	River Km[b]	Upstream UTM[c]			River Km[b]	Downstream UTM[c]		
					Zone	Easting	Northing		Zone	Easting	Northing
Moberly River	MR-S1A	Irregular Meanders	5.9	119.6	10U	587890	6189345	113.8	10U	589439	6193416
	MR-S1	Tortuous Meanders	4.5	105.1	10U	590194	6198180	100.6	10U	591248	6200259
	MR-S2	Tortuous Meanders	16.5	100.6	10U	591248	6200259	84.1	10U	589031	6204822
	MR-S3	Tortuous Meanders	12.0	84.1	10U	589407	6205349	72.2	10V	591076	6210858
	MR-S4	Tortuous Meanders	11.3	72.2	10V	591076	6210858	60.9	10V	595402	6213268
	MR-S5	Tortuous Meanders	9.0	60.9	10V	595402	6213268	51.9	10V	599325	6214944
	MR-S6	Tortuous Meanders	4.3	51.9	10V	599325	6214944	47.6	10V	600924	6217136
	MR-S7	Irregular meandering; Braided; Frequently Confined	18.2	47.6	10V	600924	6217136	29.5	10V	609657	6224625
	MR-S8	Irregular meandering; Braided; Frequently Confined	11.4	29.5	10V	609657	6224625	18.0	10V	616182	6228657
	MR-S9	Irregular meandering; Braided; Frequently Confined	5.4	18.0	10V	616182	6228657	12.6	10V	619999	6228240
	MR-S10	Irregular meandering; Braided; Frequently Confined	12.6	12.6	10V	619999	6228240	0.0	10V	628556	6230023

[a] Habitat types and section breaks for the Moberly River were established by Mainstream (2011b).

[b] River Km as measured upstream from the Moberly River confluence with the Peace River.

[c] NAD83.



LEGEND

- CHOWADE RIVER PIT DETECTOR ARRAY
- CYPRESS CREEK PIT DETECTOR ARRAY
- MAJOR WATERSHED

BASEMAP FEATURE

- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- RAILWAY
- WATERBODY
- RESIDENTIAL AREA
- WOODED AREA

0 15 30

1:700,000 KILOMETRES

REFERENCES

1. ROAD, WATERCOURSE AND WATERBODY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
2. WATERSHED DATA OBTAINED FROM THE GOVERNMENT OF BRITISH COLUMBIA
3. BASEDATA SOURCES: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESR I JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY.

COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N

CLIENT
BC HYDRO

PROJECT
SITE C RESERVOIR TRIBUTARIES FISH POPULATION INDEXING SURVEY (Mon-1b, Task 2c)

TITLE
OVERVIEW OF THE SITE C RESERVOIR TRIBUTARIES FISH POPULATION INDEXING SURVEY (Mon-1b, Task 2c) STUDY AREA, 2020

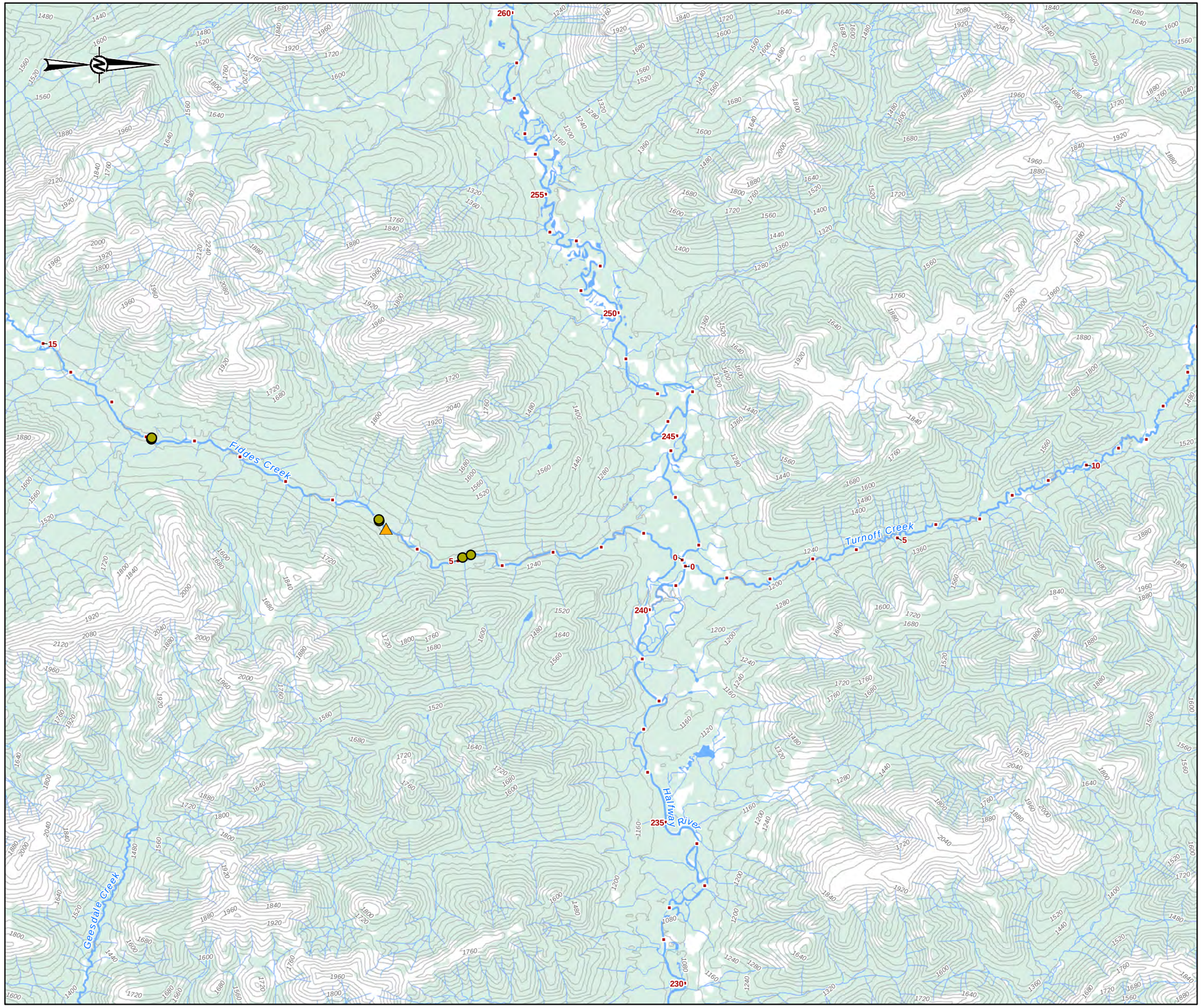
CONSULTANT
GOLDER

YYYY-MM-DD	2021-03-18
DESIGNED	KL
PREPARED	MH
REVIEWED	
APPROVED	

PROJECT NO.	CONTROL	REV.	FIGURE
20136472	2020/3A	A	**A1**

PATH: \\golder.gds\gal\burnaby\CAD-GIS\Client\BC_Hydro\Site_C\09_PROJECTS\20136472_Tributary\2020\3A\02_PRODUCTION\MXD\Report\20136472_2020_3A_Fig1A_Overview_2020.mxd

0 25mm



LEGEND

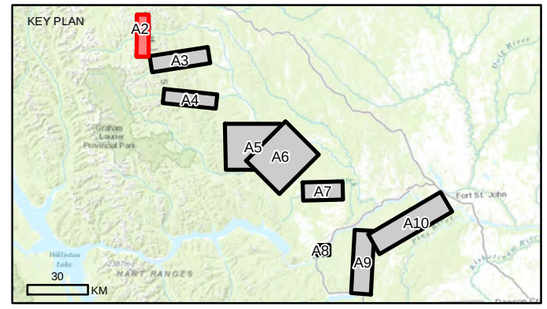
- RIVER KILOMETRE POSTS

UPSTREAM EXTENT OF EACH SAMPLE SITE

- BACKPACK ELECTROFISHING
- TEMPERATURE LOGGER

BASEMAP FEATURE

- CONTOUR (100m)
- WATERCOURSE
- WATERBODY
- WOODED AREA



0 1,300 2,600

1:70,000 METRES

REFERENCES

1. ROAD, WATERCOURSE AND WATERBODY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
2. WATERSHED DATA OBTAINED FROM THE GOVERNMENT OF BRITISH COLUMBIA
3. BASEDATA SOURCES: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESR I JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY.

COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N

CLIENT
BC HYDRO

PROJECT
SITE C RESERVOIR TRIBUTARIES FISH POPULATION INDEXING SURVEY (Mon-1b, Task 2c)

TITLE
OVERVIEW OF THE SITE C RESERVOIR TRIBUTARIES FISH POPULATI0N INDEXING SURVEY (Mon-1b, Task 2c), FIDDES CREEK STUDY AREA, 2020.

CONSULTANT
GOLDER

YYYY-MM-DD	2021-03-22
DESIGNED	KL
PREPARED	MH
REVIEWED	
APPROVED	

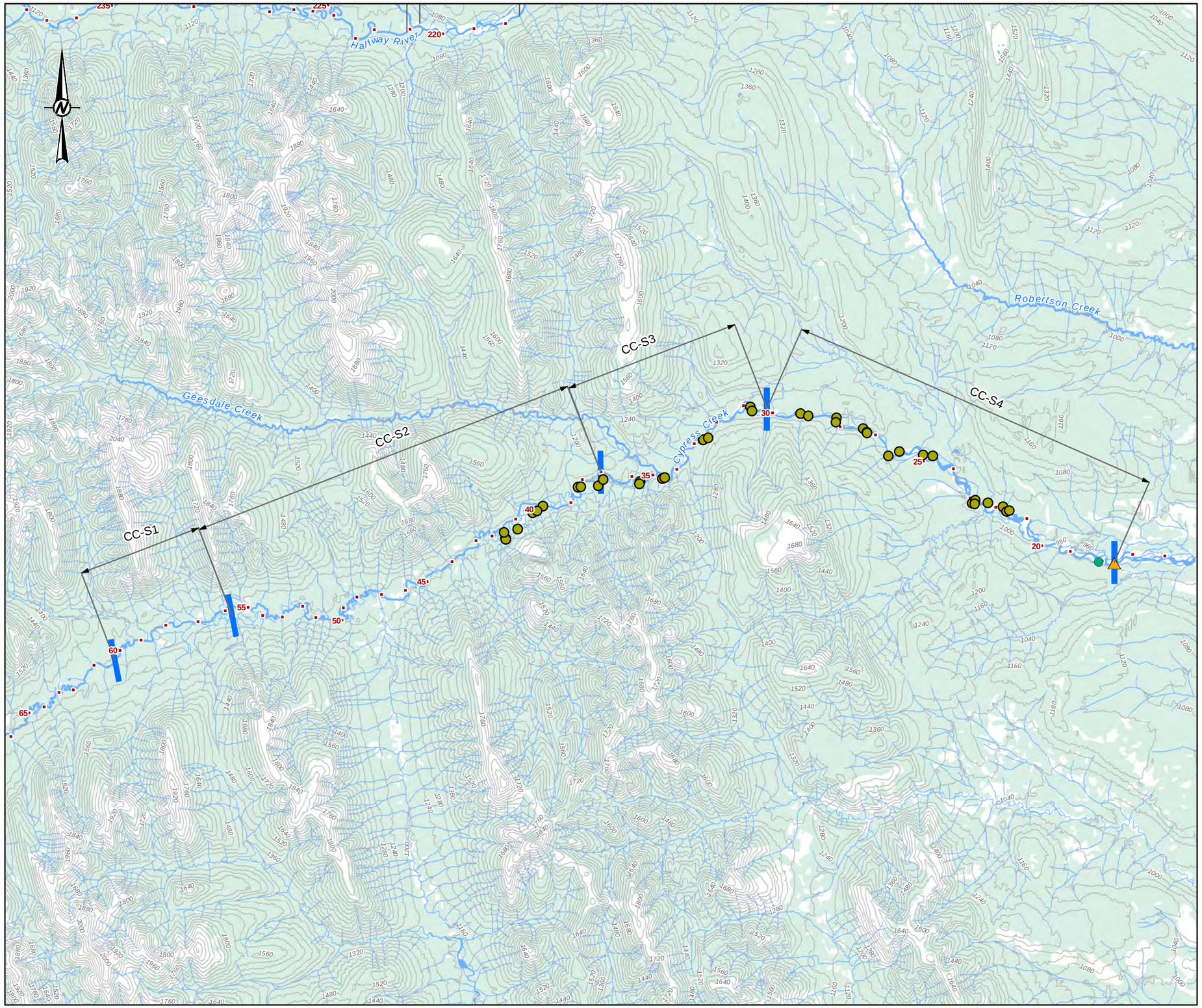
PROJECT NO.	CONTROL	REV.	FIGURE
20136472	2020/3A	A	**A2**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

0

PATH: \\golder.gds\jal\burnaby\CAD-GIS\Client\BC_Hydro\Site_C\99_PROJECTS\20\136472_TributaryY2020\3A\02_PRODUCTION\MXD\Report\20136472_2020_3A_FigA2_A5toA8_siteplans_2020.mxd



LEGEND

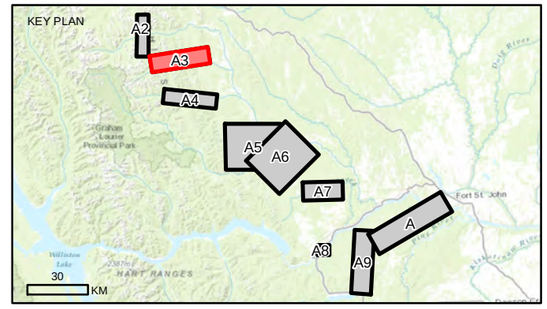
- CHOWADE RIVER PIT DETECTOR ARRAY
- CYPRESS CREEK PIT DETECTOR ARRAY
- RIVER KILOMETRE POSTS

UPSTREAM EXTENT OF EACH SAMPLE SITE

- BACKPACK ELECTROFISHING
- TEMPERATURE LOGGER
- SECTION BREAK

BASEMAP FEATURE

- CONTOUR (20 m)
- WATERCOURSE
- WATERBODY
- WOODED AREA



0 2,000 4,000

1:100,000 METRES

REFERENCES

1. ROAD, WATERCOURSE AND WATERBODY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
2. WATERSHED DATA OBTAINED FROM THE GOVERNMENT OF BRITISH COLUMBIA
3. BASEDATA SOURCES: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESR I JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY.
COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N

CLIENT
BC HYDRO

PROJECT
SITE C RESERVOIR TRIBUTARIES FISH POPULATION INDEXING SURVEY
(Mon-1b, Task 2c)

TITLE
OVERVIEW OF THE SITE C RESERVOIR TRIBUTARIES FISH POPULATI0N INDEXING SURVEY (Mon-1b, Task 2c) CYPRESS CREEK STUDY AREA, 2020.

CONSULTANT
GOLDER

YYYY-MM-DD	2021-03-22
DESIGNED	KL
PREPARED	MH
REVIEWED	
APPROVED	

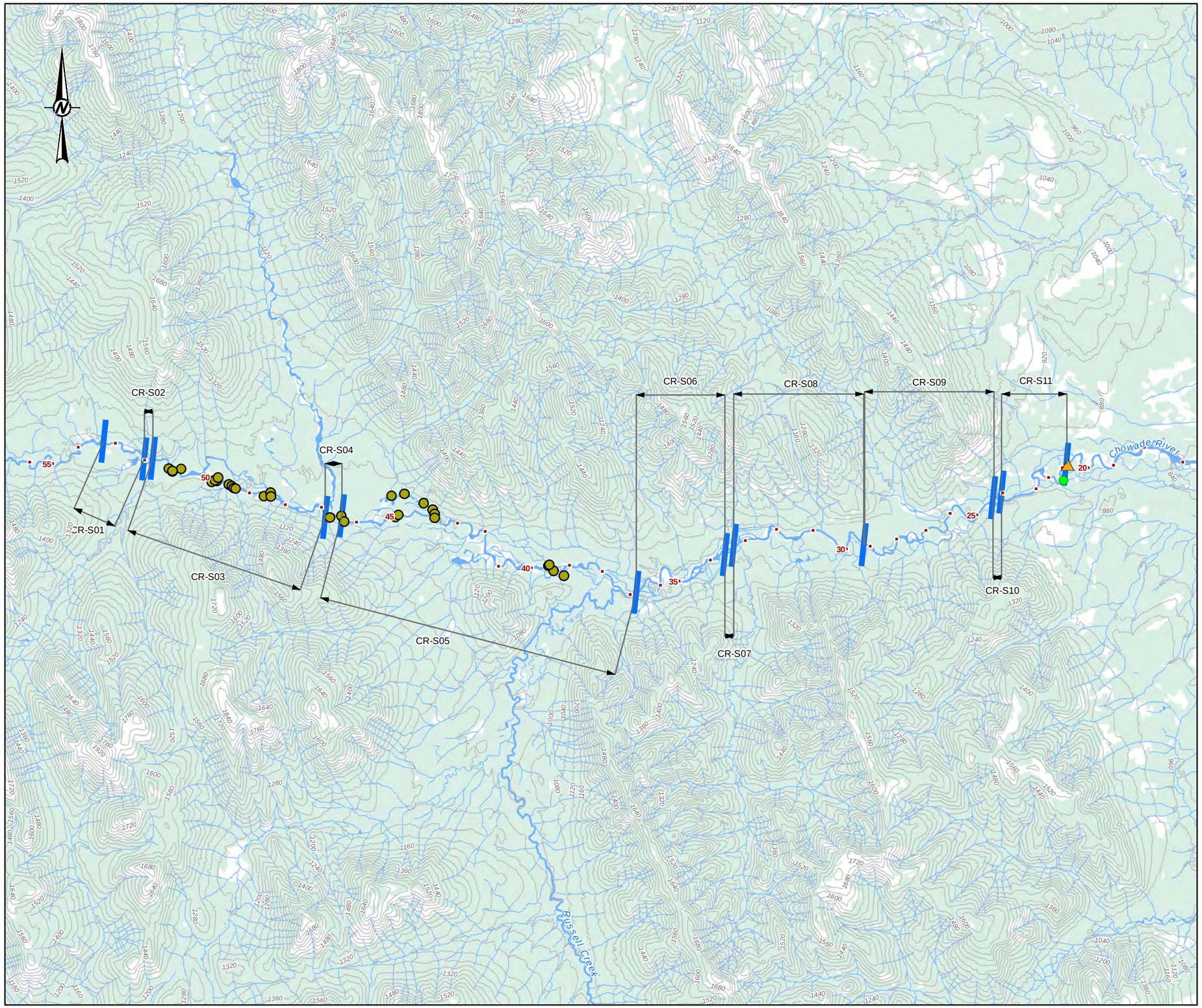
PROJECT NO.	CONTROL	REV.	FIGURE
20136472	2020/3A	A	**A3**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

25mm

0

PATH: \\golder.gds\gal\burnaby\CAD-GIS\Client\BC_Hydro\Site_C\9b_PROJECTS\20136472_Tributary\2020\3A\02_PRODUCTION\MXD\Report\20136472_2020_3A_Fig3-A4_stegmans_2020.mxd



LEGEND

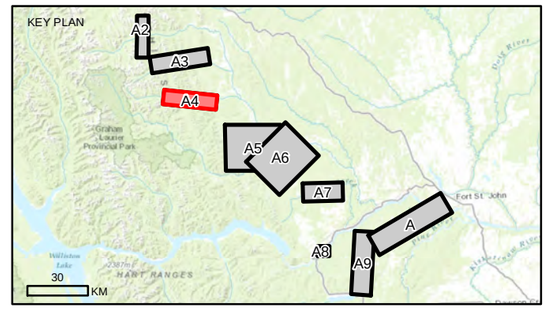
- CHOWADE RIVER PIT DETECTOR ARRAY
- CYPRESS CREEK PIT DETECTOR ARRAY
- RIVER KILOMETRE POSTS

UPSTREAM EXTENT OF EACH SAMPLE SITE

- BACKPACK ELECTROFISHING
- TEMPERATURE LOGGER
- SECTION BREAK

BASEMAP FEATURE

- CONTOUR (20 m)
- WATERCOURSE
- WATERBODY
- WOODED AREA



0 1,750 3,500

1:90,000 METRES

REFERENCES

1. ROAD, WATERCOURSE AND WATERBODY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
2. WATERSHED DATA OBTAINED FROM THE GOVERNMENT OF BRITISH COLUMBIA
3. BASEDATA SOURCES: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESR I JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY.

COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N

CLIENT
BC HYDRO

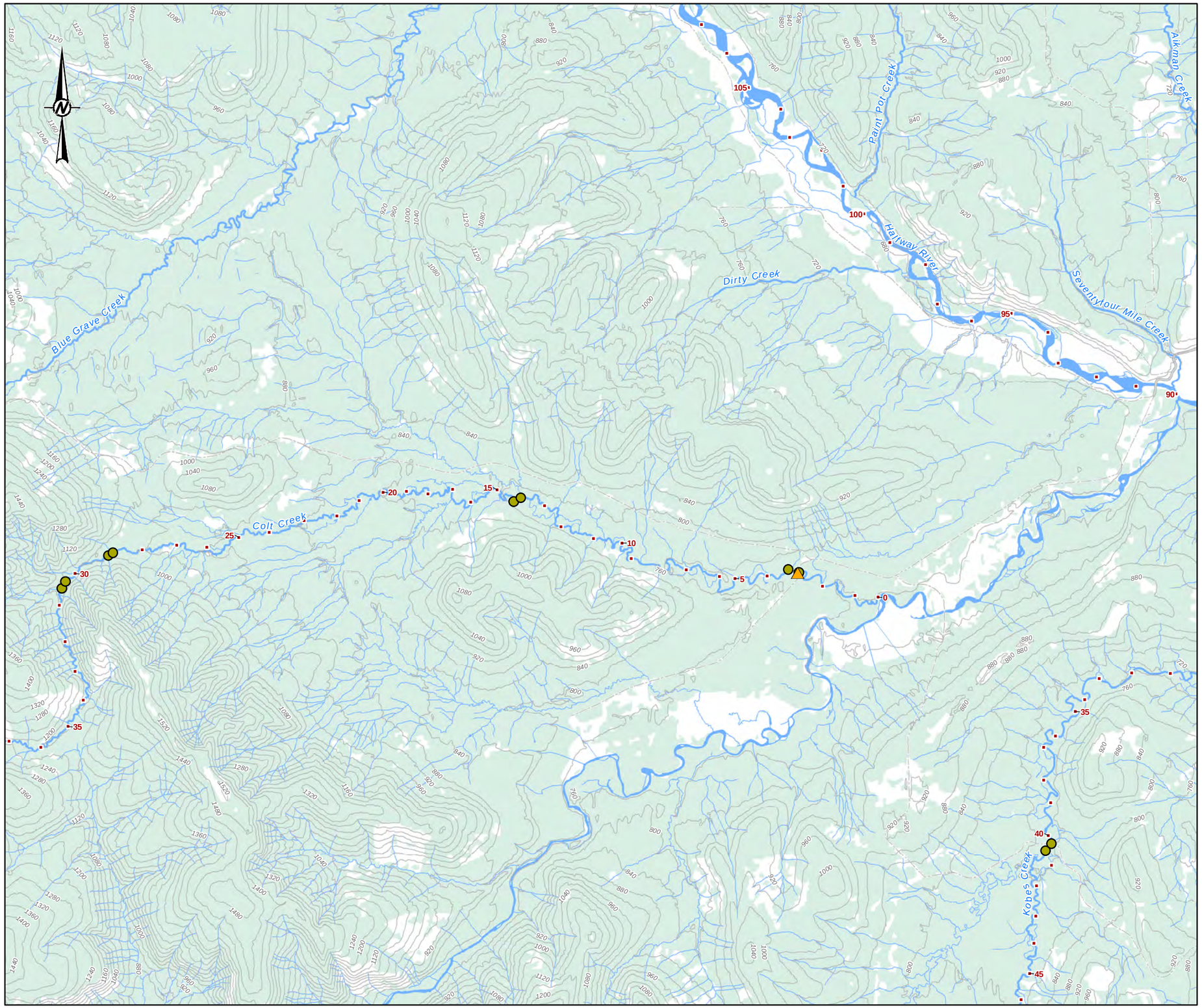
PROJECT
SITE C RESERVOIR TRIBUTARIES FISH POPULATION INDEXING SURVEY (Mon-1b, Task 2c)

TITLE
OVERVIEW OF THE SITE C RESERVOIR TRIBUTARIES FISH POPULATI0N INDEXING SURVEY (Mon-1b, Task 2c) CHOWADE RIVER STUDY AREA, 2020.

CONSULTANT
GOLDER

YYYY-MM-DD	2021-03-22
DESIGNED	KL
PREPARED	MH
REVIEWED	
APPROVED	

PROJECT NO.	CONTROL	REV.	FIGURE
20136472	2020/3A	A	**A4**



LEGEND

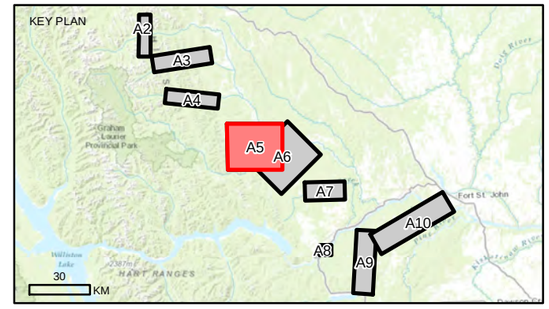
- RIVER KILOMETRE POSTS

UPSTREAM EXTENT OF EACH SAMPLE SITE

- BACKPACK ELECTROFISHING
- TEMPERATURE LOGGER

BASEMAP FEATURE

- CONTOUR (100m)
- MAJOR ROAD
- LOCAL ROAD
- WATERCOURSE
- WATERBODY
- WOODED AREA



0 1,750 3,500

1:90,000 METRES

REFERENCES

1. ROAD, WATERCOURSE AND WATERBODY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
2. WATERSHED DATA OBTAINED FROM THE GOVERNMENT OF BRITISH COLUMBIA
3. BASEDATA SOURCES: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESR I JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY.

COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N

CLIENT
BC HYDRO

PROJECT
SITE C RESERVOIR TRIBUTARIES FISH POPULATION INDEXING SURVEY (Mon-1b, Task 2c)

TITLE
OVERVIEW OF THE SITE C RESERVOIR TRIBUTARIES FISH POPULATI0N INDEXING SURVEY (Mon-1b, Task 2c) COLT CREEK STUDY AREA, 2020.

CONSULTANT
GOLDER

YYYY-MM-DD	2021-03-22
DESIGNED	KL
PREPARED	MH
REVIEWED	
APPROVED	

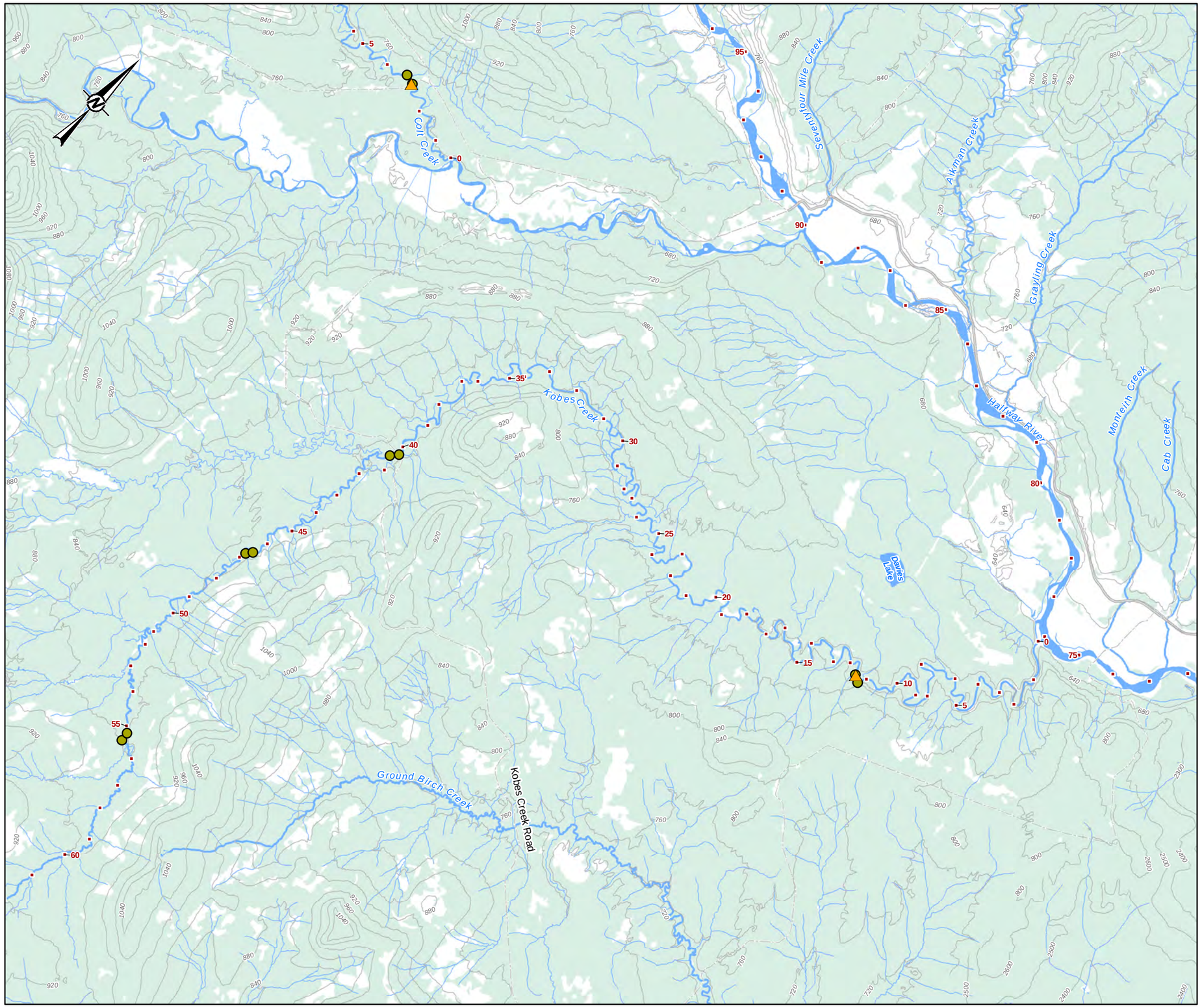
PROJECT NO.	CONTROL	REV.	FIGURE
20136472	2020/3A	A	**A5**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

25mm

0

PATH: \\golder.gds\gal\burnaby\CAD-GIS\Client\BC_Hydro\Site_C\99_PROJECTS\20136472_Tributary\2020\3A\02_PRODUCTION\MXD\Report\20136472_2020_3A_FigA2_A5toA8_sitestarts_2020.mxd



LEGEND

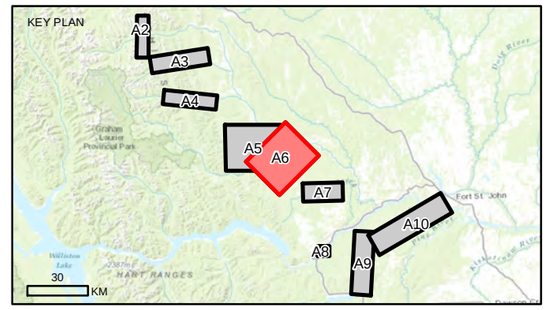
- RIVER KILOMETRE POSTS

UPSTREAM EXTENT OF EACH SAMPLE SITE

- BACKPACK ELECTROFISHING
- TEMPERATURE LOGGER

BASEMAP FEATURE

- CONTOUR (100m)
- MAJOR ROAD
- LOCAL ROAD
- WATERCOURSE
- WATERBODY
- WOODED AREA



0 1,750 3,500

1:90,000 METRES

REFERENCES

1. ROAD, WATERCOURSE AND WATERBODY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
2. WATERSHED DATA OBTAINED FROM THE GOVERNMENT OF BRITISH COLUMBIA
3. BASEDATA SOURCES: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESR I JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY.
COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N

CLIENT
BC HYDRO

PROJECT
SITE C RESERVOIR TRIBUTARIES FISH POPULATION INDEXING SURVEY
(Mon-1b, Task 2c)

TITLE
OVERVIEW OF THE SITE C RESERVOIR TRIBUTARIES FISH POPULATI0N INDEXING SURVEY (Mon-1b, Task 2c) KOBES CREEK STUDY AREA, 2020.

CONSULTANT

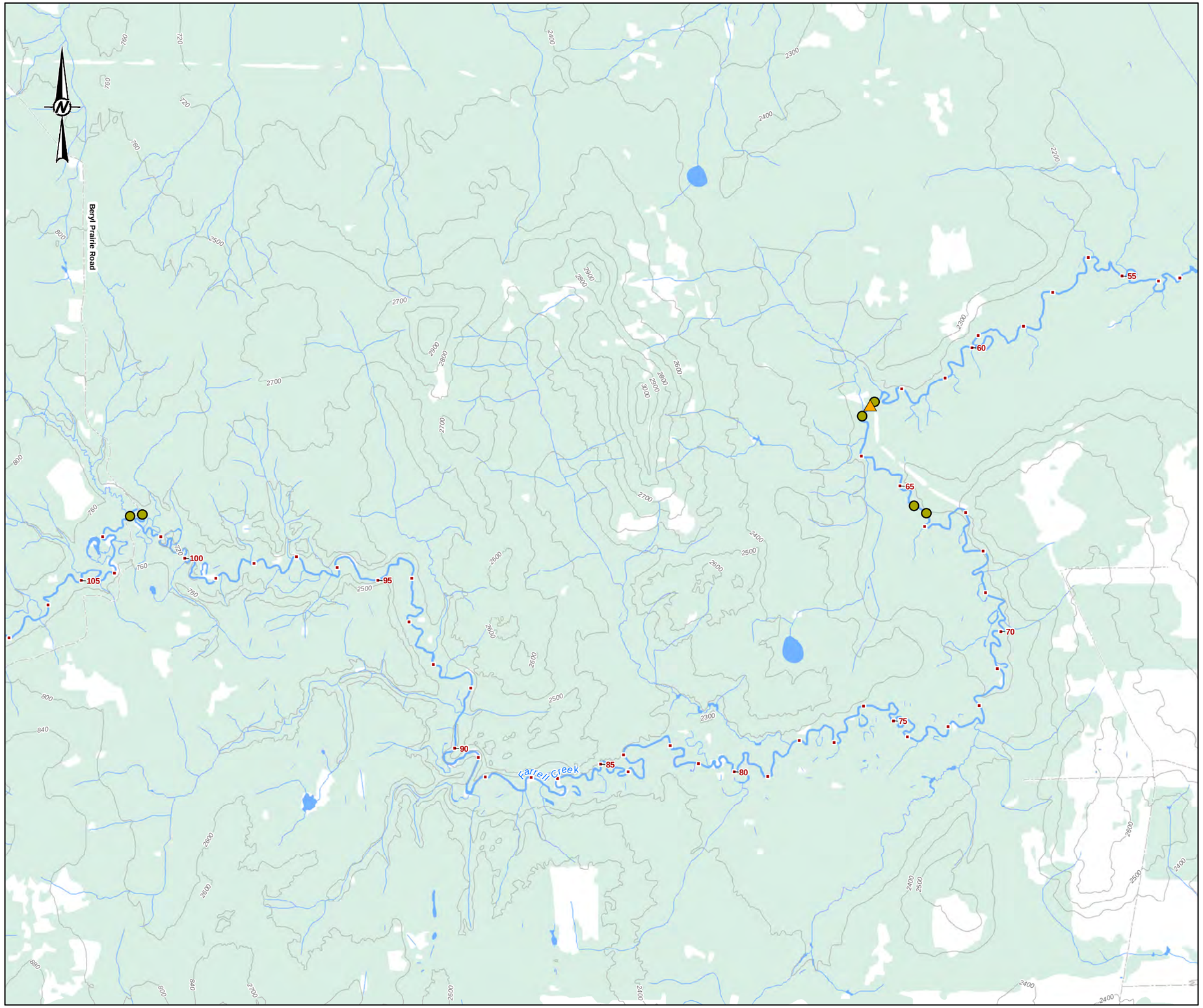
GOLDER

YYYY-MM-DD	2021-03-22
DESIGNED	KL
PREPARED	MH
REVIEWED	
APPROVED	

PROJECT NO.	CONTROL	REV.	FIGURE
20136472	2020/3A	A	**A6**

PATH: \\golder.gds\gal\burnaby\CAD-GIS\Client\BC_Hydro\Site_C\99_PROJECTS\20136472_Tributary\2020\3A02_PRODUCTION\MXD\Report\20136472_2020_3A_FigA2_A5toA8_siteplans_2020.mxd

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B



LEGEND

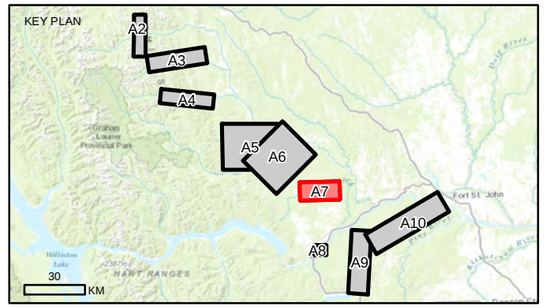
- RIVER KILOMETRE POSTS

UPSTREAM EXTENT OF EACH SAMPLE SITE

- BACKPACK ELECTROFISHING
- TEMPERATURE LOGGER

BASEMAP FEATURE

- CONTOUR (100m)
- LOCAL ROAD
- WATERCOURSE
- WATERBODY
- WOODED AREA



0 1,100 2,200

1:60,000 METRES

REFERENCES

1. ROAD, WATERCOURSE AND WATERBODY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
2. WATERSHED DATA OBTAINED FROM THE GOVERNMENT OF BRITISH COLUMBIA
3. BASEDATA SOURCES: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESR I JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY.

COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N

CLIENT
BC HYDRO

PROJECT
SITE C RESERVOIR TRIBUTARIES FISH POPULATION INDEXING SURVEY
(Mon-1b, Task 2c)

TITLE
OVERVIEW OF THE SITE C RESERVOIR TRIBUTARIES FISH POPULATI0N INDEXING SURVEY (Mon-1b, Task 2c) FARRELL CREEK STUDY AREA, 2020.

CONSULTANT

GOLDER

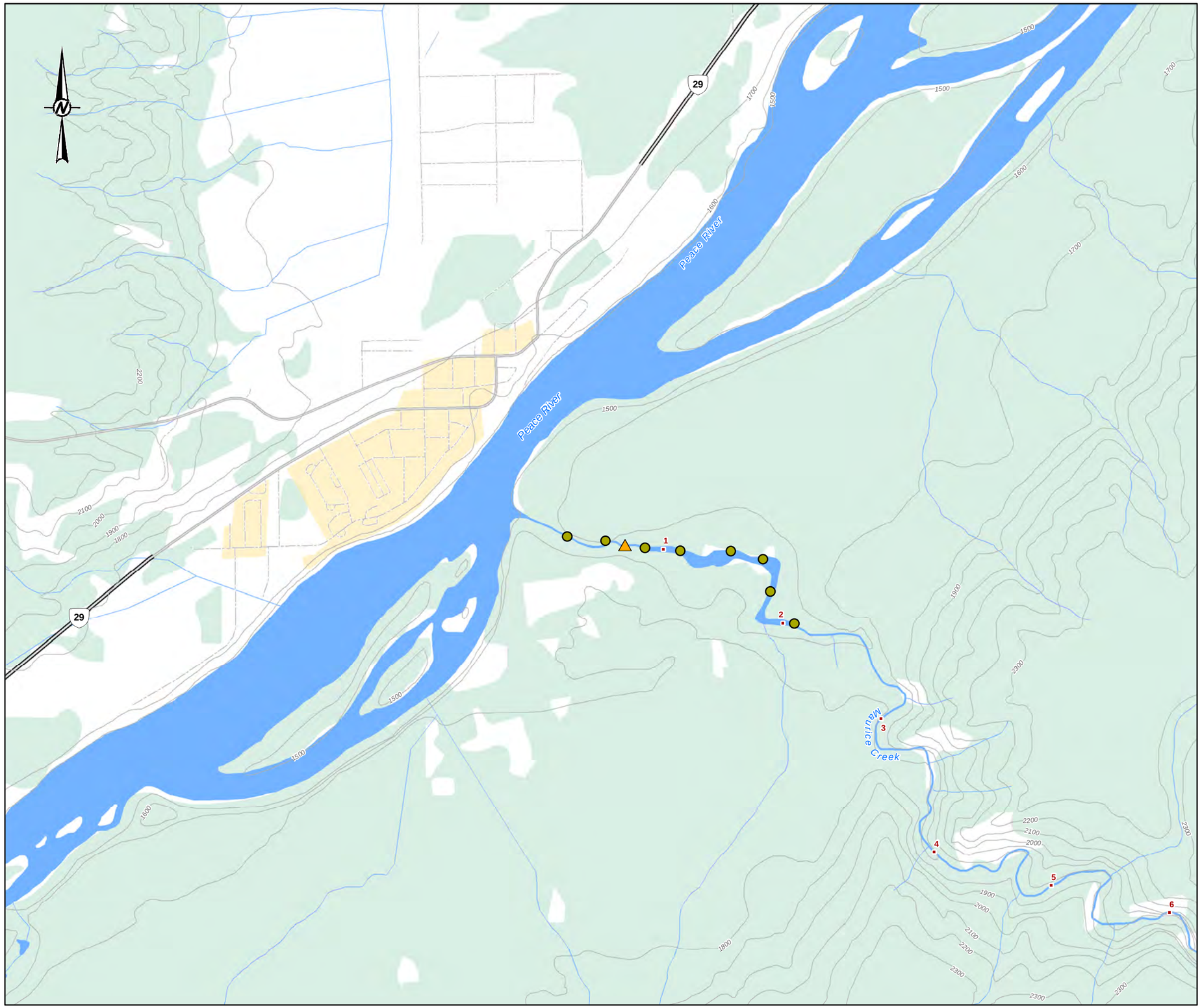
YYYY-MM-DD	2021-03-22
DESIGNED	KL
PREPARED	MH
REVIEWED	
APPROVED	

PROJECT NO.	CONTROL	REV.	FIGURE
20136472	2020/3A	A	**A7**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25mm

PATH: \\golder.gds\gal\burnaby\CAD-GIS\Client\BC_Hydro\Site_C\99_PROJECTS\20136472_Tributary\2020\3A02_PRODUCTION\MXD Report\20136472_2020_ 3A_Fig A-7_A3toA8 _sitepfams_2020.mxd



LEGEND

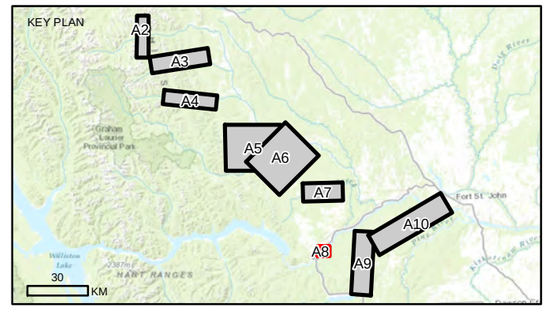
- RIVER KILOMETRE POSTS

UPSTREAM EXTENT OF EACH SAMPLE SITE

- BACKPACK ELECTROFISHING
- TEMPERATURE LOGGER

BASEMAP FEATURE

- CONTOUR (100m)
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- WATERCOURSE
- WATERBODY
- WOODED AREA



0 400 800

1:20,000 METRES

REFERENCES

1. ROAD, WATERCOURSE AND WATERBODY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
2. WATERSHED DATA OBTAINED FROM THE GOVERNMENT OF BRITISH COLUMBIA
3. BASEDATA SOURCES: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESR I JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY.
COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N

CLIENT
BC HYDRO

PROJECT
SITE C RESERVOIR TRIBUTARIES FISH POPULATION INDEXING SURVEY
(Mon-1b, Task 2c)

TITLE
OVERVIEW OF THE SITE C RESERVOIR TRIBUTARIES FISH POPULATI0N INDEXING SURVEY (Mon-1b, Task 2c) MAURICE CREEK STUDY AREA, 2020.

CONSULTANT
GOLDER

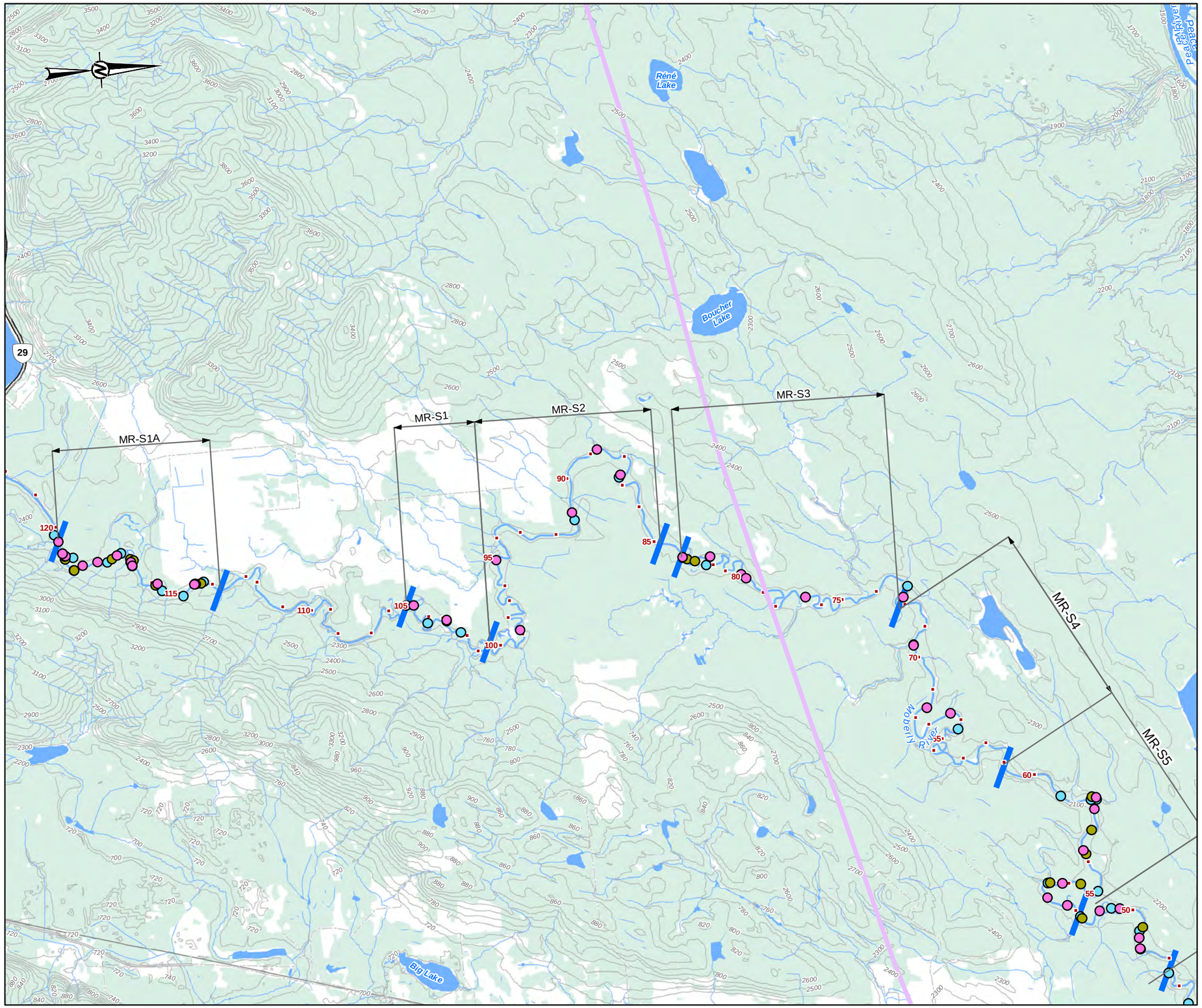
YYYY-MM-DD	2021-03-22
DESIGNED	KL
PREPARED	MH
REVIEWED	
APPROVED	

PROJECT NO.	CONTROL	REV.	FIGURE
20136472	2020/3A	A	**A8**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

0 25mm

PATH: \\golder.gds\gal\burnaby\CAD-GIS\Client\BC_Hydro\Site_C\99_PROJECTS\20136472_Tributary\2020\3A\02_PRODUCTION\MXD\Report\20136472_2020_3A_Fig\A2_A5toA8_siteplans_2020.mxd



LEGEND

- RIVER KILOMETRE POSTS

UPSTREAM EXTENT OF EACH SAMPLE SITE

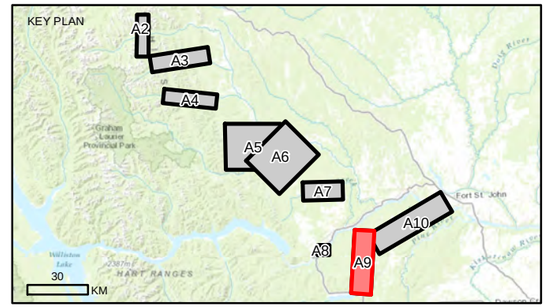
- ANGLING
- BACKPACK ELECTROFISHING
- SMALL FISH BOAT ELECTROFISHING
- SECTION BREAK

BASEMAP FEATURE

- CONTOUR (20 m)
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- WATERCOURSE
- WATERBODY
- WOODED AREA

TRANSMISSION LINE RIGHT OF WAY (ROW)

- BC HYDRO EXISTING ROW



0 2,000 4,000

1:100,000 METRES

REFERENCES

1. ROAD, WATERCOURSE AND WATERBODY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
2. WATERSHED DATA OBTAINED FROM THE GOVERNMENT OF BRITISH COLUMBIA
3. BASEDATA SOURCES: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESR I JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY.
4. ROW PROVIDED BY BCHYDRO, DATED 2017-07-13.

COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N

CLIENT
BC HYDRO

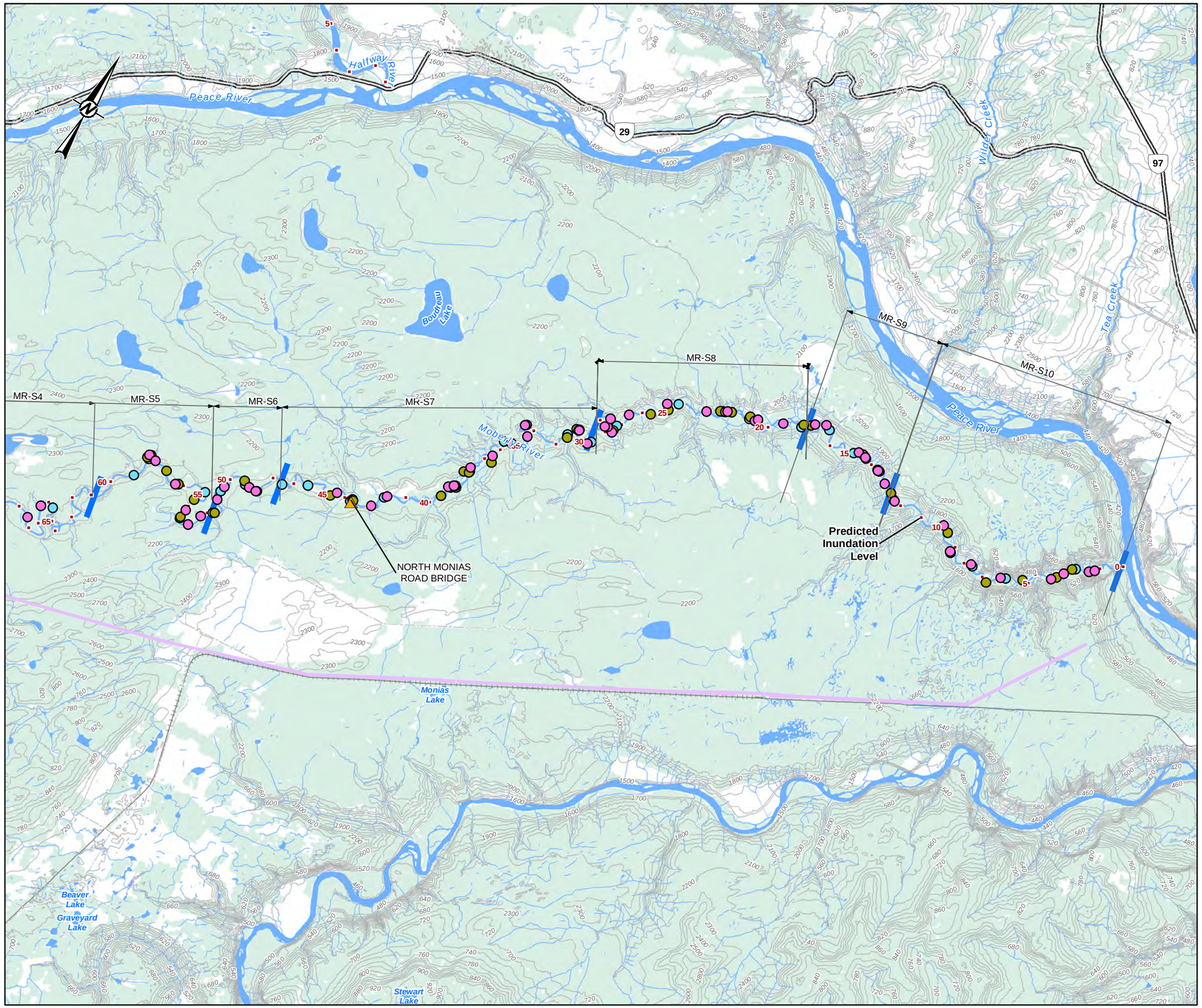
PROJECT
SITE C RESERVOIR TRIBUTARIES FISH POPULATION INDEXING SURVEY (Mon-1b, Task 2c)

TITLE
OVERVIEW OF THE SITE C RESERVOIR TRIBUTARIES FISH POPULATI0N INDEXING SURVEY (Mon-1b, Task 2c) MOBERLY RIVER STUDY AREA, 2020.

CONSULTANT
GOLDER

YYYY-MM-DD	2021-03-22
DESIGNED	KL
PREPARED	MH
REVIEWED	
APPROVED	

PROJECT NO.	CONTROL	REV.	FIGURE
20136472	2020/3A	A	**A9**



LEGEND

- RIVER KILOMETRE POSTS

UPSTREAM EXTENT OF EACH SAMPLE SITE

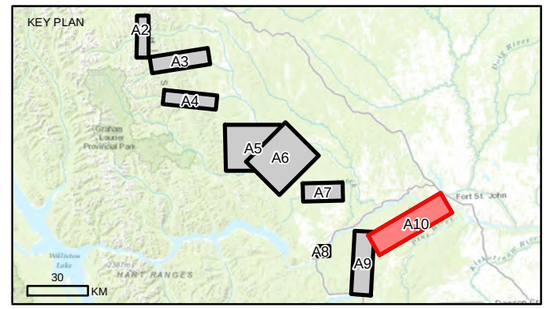
- ANGLING
- BACKPACK ELECTROFISHING
- SMALL FISH BOAT ELECTROFISHING
- TEMPERATURE LOGGER
- SECTION BREAK

BASEMAP FEATURE

- CONTOUR (20 m)
- HIGHWAY
- MAJOR ROAD
- LOCAL ROAD
- WATERCOURSE
- WATERBODY
- WOODED AREA

TRANSMISSION LINE RIGHT OF WAY (ROW)

- BC HYDRO EXISTING ROW



0 2,750 5,500

1:140,000 METRES

REFERENCES

1. ROAD, WATERCOURSE AND WATERBODY DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
2. WATERSHED DATA OBTAINED FROM THE GOVERNMENT OF BRITISH COLUMBIA
3. BASEDATA SOURCES: ESRI, HERE, DELORME, INTERMAP, INCREMENT P CORP., GEBCO, USGS, FAO, NPS, NRCAN, GEOBASE, IGN, KADASTER NL, ORDNANCE SURVEY, ESR I JAPAN, METI, ESRI CHINA (HONG KONG), SWISSTOPO, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY.
4. ROW PROVIDED BY BCHYDRO, DATED 2017-07-13.

COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N

CLIENT
BC HYDRO

PROJECT
SITE C RESERVOIR TRIBUTARIES FISH POPULATION INDEXING SURVEY
(Mon-1b, Task 2c)

TITLE
OVERVIEW OF THE SITE C RESERVOIR TRIBUTARIES FISH POPULATI0N INDEXING SURVEY (Mon-1b, Task 2c) MOBERLY RIVER STUDY AREA, 2020.

CONSULTANT
GOLDER

YYYY-MM-DD	2021-03-22
DESIGNED	KL
PREPARED	MH
REVIEWED	
APPROVED	

PROJECT NO.	CONTROL	REV.	FIGURE
20136472	2020/3A	A	**A10**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

0 25mm

PATH: \\golder.gds\gal\burnaby\CAD-GIS\Client\BC_Hydro\Site_C\99_PROJECTS\20136472_Tributary\2020\3A\02_PRODUCTION\MXD\Report\20136472_2020_3A_Fig\A10_siteplan's_2020.mxd

APPENDIX B

Catch and Effort Data

Table B1 **Summary of backpack electrofishing sites sampled during the Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.**

River	Section[a]	River Km[b]	Site Name	Sample Date	Sample Length (m)	Sample Time (s)
Chowade River		51.2	CHR-EF-051.2-2020-07-30	30-Jul-2020	260	2109
		51.1	CHR-EF-051.1-2020-07-29	29-Jul-2020	130	610
		51.1	CHR-EF-051.1-2020-07-30	30-Jul-2020	180	1805
		51.0	CHR-EF-051.0-2020-07-29	29-Jul-2020	246	1330
		50.0	CHR-EF-050.0-2020-08-09	9-Aug-2020	100	1332
		49.9	CHR-EF-049.9-2020-08-09	9-Aug-2020	200	1441
		49.8	CHR-EF-049.8-2020-08-09	9-Aug-2020	160	1164
		49.7	CHR-EF-049.7-2020-08-09	9-Aug-2020	100	2068
		49.6	CHR-EF-049.6-2020-07-30	30-Jul-2020	148	1291
		49.5	CHR-EF-049.5-2020-07-30	30-Jul-2020	105	1225
		49.4	CHR-EF-049.4-2020-07-30	30-Jul-2020	25	278
		49.3	CHR-EF-049.3-2020-07-30	30-Jul-2020	150	2140
		48.7	CHR-EF-048.7-2020-07-29	29-Jul-2020	110	760
		48.6	CHR-EF-048.6-2020-07-29	29-Jul-2020	145	1470
		48.4	CHR-EF-048.4-2020-07-29	29-Jul-2020	250	952
		46.6	CHR-EF-046.6-2020-07-28	28-Jul-2020	275	1298
		46.4	CHR-EF-046.4-2020-07-28	28-Jul-2020	85	413
		46.3	CHR-EF-046.3-2020-07-28	28-Jul-2020	110	928
		45.0	CHR-EF-045.0-2020-07-29	29-Jul-2020	300	2202
		45.0	CHR-EF-045.0-2020-08-09	9-Aug-2020	200	1456
		44.9	CHR-EF-044.9-2020-08-09	9-Aug-2020	260	1750
		44.4	CHR-EF-044.4-2020-07-29	29-Jul-2020	200	2035
		44.2	CHR-EF-044.2-2020-07-28	28-Jul-2020	215	1279
		43.9	CHR-EF-043.9-2020-07-28	28-Jul-2020	143	1049
		43.8	CHR-EF-043.8-2020-07-28	28-Jul-2020	100	1075
		43.7	CHR-EF-043.7-2020-07-28	28-Jul-2020	125	1165
		39.6	CHR-EF-039.6-2020-07-30	30-Jul-2020	170	2341
		39.5	CHR-EF-039.5-2020-07-28	28-Jul-2020	300	3005
		39.5	CHR-EF-039.5-2020-07-30	30-Jul-2020	111	999
		39.3	CHR-EF-039.3-2020-07-28	28-Jul-2020	280	2043
Chowade River Total					**5,183**	**43,013**
Cypress Creek		41.9	CYC-EF-041.9-2020-07-23	23-Jul-2020	130	520
		41.8	CYC-EF-041.8-2020-07-23	23-Jul-2020	200	1079
		41.3	CYC-EF-041.3-2020-07-31	31-Jul-2020	350	1455
		41.1	CYC-EF-041.1-2020-07-31	31-Jul-2020	200	2085
		40.3	CYC-EF-040.3-2020-07-25	25-Jul-2020	250	1402
		40.0	CYC-EF-040.0-2020-07-25	25-Jul-2020	70	401

[a] only applicable to Moberly River sites.

[b] as measured upstream from the stream's confluence.

…continued.

Table B1 Continued.

River	Section[a]	River Km[b]	Site Name	Sample Date	Sample Length (m)	Sample Time (s)
Cypress Creek		39.8	CYC-EF-039.8-2020-07-25	25-Jul-2020	86	290
		38.6	CYC-EF-038.6-2020-07-25	25-Jul-2020	171	653
		38.5	CYC-EF-038.5-2020-07-25	25-Jul-2020	200	811
		37.7	CYC-EF-037.7-2020-07-23	23-Jul-2020	140	1064
		37.0	CYC-EF-037.0-2020-07-23	23-Jul-2020	100	989
		35.8	CYC-EF-035.8-2020-07-31	31-Jul-2020	175	1344
		35.7	CYC-EF-035.7-2020-07-31	31-Jul-2020	200	1670
		34.7	CYC-EF-034.7-2020-07-31	31-Jul-2020	290	3248
		34.5	CYC-EF-034.5-2020-07-31	31-Jul-2020	260	2555
		32.8	CYC-EF-032.8-2020-07-23	23-Jul-2020	150	1748
		32.7	CYC-EF-032.7-2020-07-23	23-Jul-2020	150	1077
		32.6	CYC-EF-032.6-2020-07-23	23-Jul-2020	70	916
		30.7	CYC-EF-030.7-2020-07-22	22-Jul-2020	150	1626
		30.6	CYC-EF-030.6-2020-07-22	22-Jul-2020	200	2232
		29.2	CYC-EF-029.2-2020-07-22	22-Jul-2020	120	1921
		29.2	CYC-EF-029.2-2020-08-01	1-Aug-2020	210	2455
		29.1	CYC-EF-029.1-2020-07-22	22-Jul-2020	250	1160
		29.1	CYC-EF-029.1-2020-08-01	1-Aug-2020	150	2269
		27.3	CYC-EF-027.3-2020-08-01	1-Aug-2020	100	398
		27.2	CYC-EF-027.2-2020-08-01	1-Aug-2020	90	1002
		27.1	CYC-EF-027.1-2020-08-01	1-Aug-2020	82	890
		26.2	CYC-EF-026.2-2020-08-01	1-Aug-2020	100	2451
		26.1	CYC-EF-026.1-2020-08-01	1-Aug-2020	195	2265
		25.0	CYC-EF-025.0-2020-07-25	25-Jul-2020	140	667
		24.7	CYC-EF-024.7-2020-07-25	25-Jul-2020	150	526
		22.9	CYC-EF-022.9-2020-07-25	25-Jul-2020	150	394
		22.8	CYC-EF-022.8-2020-07-25	25-Jul-2020	125	266
		22.7	CYC-EF-022.7-2020-07-25	25-Jul-2020	70	505
		22.6	CYC-EF-022.6-2020-07-25	25-Jul-2020	335	1,355
		21.9	CYC-EF-021.9-2020-07-25	25-Jul-2020	240	979
		21.6	CYC-EF-021.6-2020-07-25	25-Jul-2020	100	496
		21.5	CYC-EF-021.5-2020-07-25	25-Jul-2020	100	933
Cypress Creek Total					**6,249**	**48,097**
Fiddes Creek		11.9	FIC-EF-011.9-2020-07-27	27-Jul-2020	200	1805
		11.7	FIC-EF-011.7-2020-07-27	27-Jul-2020	140	1138
		7.1	FIC-EF-007.1-2020-07-27	27-Jul-2020	100	1417
		7.0	FIC-EF-007.0-2020-07-27	27-Jul-2020	200	1495

[a] only applicable to Moberly River sites.

[b] as measured upstream from the stream's confluence.

…continued.

Table B1 Continued.

River	Section[a]	River Km[b]	Site Name	Sample Date	Sample Length (m)	Sample Time (s)
Fiddes Creek		5.2	FIC-EF-005.2-2020-07-27	27-Jul-2020	170	1232
		4.8	FIC-EF-004.8-2020-07-27	27-Jul-2020	140	1612
Fiddes Creek Total					**950**	**8,699**
Colt Creek		30.4	COC-EF-030.4-2020-08-05	5-Aug-2020	200	2285
		30.2	COC-EF-030.2-2020-08-05	5-Aug-2020	200	3159
		29.0	COC-EF-029.0-2020-08-05	5-Aug-2020	200	2354
		28.8	COC-EF-028.8-2020-08-05	5-Aug-2020	200	2507
		14.1	COC-EF-014.1-2020-08-05	5-Aug-2020	200	1600
		13.9	COC-EF-013.9-2020-08-05	5-Aug-2020	200	1943
		3.2	COC-EF-003.2-2020-08-04	4-Aug-2020	200	1489
		3.0	COC-EF-003.0-2020-08-04	4-Aug-2020	200	2448
Colt Creek Total					**1,600**	**17,785**
Farrell Creek		102.1	FAC-EF-102.1-2020-08-02	2-Aug-2020	150	2083
		101.7	FAC-EF-101.7-2020-08-02	2-Aug-2020	190	1743
		65.7	FAC-EF-065.7-2020-07-26	26-Jul-2020	235	1087
		65.5	FAC-EF-065.5-2020-07-26	26-Jul-2020	200	1772
		63.3	FAC-EF-063.3-2020-07-26	26-Jul-2020	200	2005
		63.0	FAC-EF-063.0-2020-07-26	26-Jul-2020	250	2409
Farrell Creek Total					**1,225**	**11,099**
Kobes Creek		55.5	KOC-EF-055.5-2020-08-13	13-Aug-2020	200	1841
		55.3	KOC-EF-055.3-2020-08-13	13-Aug-2020	200	3268
		46.9	KOC-EF-046.9-2020-08-13	13-Aug-2020	200	2353
		46.7	KOC-EF-046.7-2020-08-13	13-Aug-2020	200	2139
		40.6	KOC-EF-040.6-2020-08-03	3-Aug-2020	200	2324
		40.2	KOC-EF-040.2-2020-08-03	3-Aug-2020	200	1950
		11.7	KOC-EF-011.7-2020-08-03	3-Aug-2020	100	2489
		11.5	KOC-EF-011.5-2020-08-03	3-Aug-2020	100	1575
Kobes Creek Total					**1,400**	**17,939**
Maurice Creek		2.0	MAC-EF-002.0-2020-08-07	7-Aug-2020	200	1050
		1.7	MAC-EF-001.7-2020-08-07	7-Aug-2020	200	2467
		1.5	MAC-EF-001.5-2020-08-07	7-Aug-2020	200	1408
		1.3	MAC-EF-001.3-2020-08-07	7-Aug-2020	200	1446
		1.2	MAC-EF-001.2-2020-08-06	6-Aug-2020	200	1350
		1.0	MAC-EF-001.0-2020-08-06	6-Aug-2020	200	2221
		0.8	MAC-EF-000.8-2020-08-06	6-Aug-2020	200	1450
		0.6	MAC-EF-000.6-2020-08-06	6-Aug-2020	200	2149
Maurice Creek Total					**1,600**	**13,541**
Moberly River	MR-S1A	119	MOR-EF-119.0-2020-07-29	29-Jul-2020	92	522
	MR-S1A	119	MOR-EF-119.0-2020-08-08	8-Aug-2020	153	294

[a] only applicable to Moberly River sites.

[b] as measured upstream from the stream's confluence.

…continued.

Table B1 Continued.

River	Section[a]	River Km[b]	Site Name	Sample Date	Sample Length (m)	Sample Time (s)
Moberly River	MR-S1A	118.4	MOR-EF-118.4-2020-07-29	29-Jul-2020	84	769
	MR-S1A	117.5	MOR-EF-117.5-2020-07-29	29-Jul-2020	82	582
	MR-S1A	116.9	MOR-EF-116.9-2020-07-29	29-Jul-2020	52	533
	MR-S1A	116.8	MOR-EF-116.8-2020-08-08	8-Aug-2020	110	1434
	MR-S1A	116.7	MOR-EF-116.7-2020-07-29	29-Jul-2020	264	962
	MR-S1A	115.8	MOR-EF-115.8-2020-07-29	29-Jul-2020	105	557
	MR-S1A	114.5	MOR-EF-114.5-2020-07-29	29-Jul-2020	151	1492
	MR-S1A	114.5	MOR-EF-114.5-2020-08-08	8-Aug-2020	73	1401
	MR-S1	102.9	MOR-EF-102.9-2020-07-30	30-Jul-2020	58	334
	MR-S3	83.6	MOR-EF-083.6-2020-07-31	31-Jul-2020	70	462
	MR-S3	83.0	MOR-EF-083.0-2020-07-31	31-Jul-2020	75	528
	MR-S3	82.5	MOR-EF-082.5-2020-07-31	31-Jul-2020	74	408
	MR-S5	58.2	MOR-EF-058.2-2020-08-01	1-Aug-2020	126	939
	MR-S5	56.9	MOR-EF-056.9-2020-08-01	1-Aug-2020	62	619
	MR-S5	56.2	MOR-EF-056.2-2020-08-01	1-Aug-2020	72	559
	MR-S5	54.3	MOR-EF-054.3-2020-08-01	1-Aug-2020	79	624
	MR-S5	53.4	MOR-EF-053.4-2020-08-01	1-Aug-2020	73	298
	MR-S6	51.7	MOR-EF-051.7-2020-08-01	1-Aug-2020	110	351
	MR-S6	49.4	MOR-EF-049.4-2020-08-01	1-Aug-2020	98	490
	MR-S7	44.8	MOR-EF-044.8-2020-08-02	2-Aug-2020	154	934
	MR-S7	43.7	MOR-EF-043.7-2020-08-02	2-Aug-2020	66	255
	MR-S7	43.6	MOR-EF-043.6-2020-08-02	2-Aug-2020	150	955
	MR-S7	42.6	MOR-EF-042.6-2020-08-02	2-Aug-2020	70	163
	MR-S7	40.5	MOR-EF-040.5-2020-08-02	2-Aug-2020	60	379
	MR-S7	38.9	MOR-EF-038.9-2020-08-03	3-Aug-2020	300	1046
	MR-S7	38.8	MOR-EF-038.8-2020-08-03	3-Aug-2020	86	233
	MR-S7	38.8	MOR-EF-038.8-2020-08-08	8-Aug-2020	73	482
	MR-S7	38.0	MOR-EF-038.0-2020-08-03	3-Aug-2020	300	1715
	MR-S7	37.9	MOR-EF-037.9-2020-08-03	3-Aug-2020	153	387
	MR-S7	36.8	MOR-EF-036.8-2020-08-03	3-Aug-2020	200	894
	MR-S7	31.4	MOR-EF-031.4-2020-08-04	4-Aug-2020	88	519
	MR-S7	30.9	MOR-EF-030.9-2020-08-04	4-Aug-2020	78	557
	MR-S7	30.8	MOR-EF-030.8-2020-08-04	4-Aug-2020	22	231
	MR-S7	29.8	MOR-EF-029.8-2020-08-04	4-Aug-2020	258	1335
	MR-S7	28.7	MOR-EF-028.7-2020-08-04	4-Aug-2020	100	845
	MR-S7	25.7	MOR-EF-025.7-2020-08-04	4-Aug-2020	246	1135
	MR-S7	24.8	MOR-EF-024.8-2020-08-04	4-Aug-2020	170	434

[a] only applicable to Moberly River sites.

[b] as measured upstream from the stream's confluence.

…continued.

Table B1 Concluded.

River	Section[a]	River Km[b]	Site Name	Sample Date	Sample Length (m)	Sample Time (s)
Moberly River	MR-S7	22.4	MOR-EF-022.4-2020-08-05	5-Aug-2020	90	1315
	MR-S7	22.3	MOR-EF-022.3-2020-08-05	5-Aug-2020	101	473
	MR-S7	21.7	MOR-EF-021.7-2020-08-05	5-Aug-2020	143	1411
	MR-S7	21.1	MOR-EF-021.1-2020-08-05	5-Aug-2020	150	509
	MR-S9	17.3	MOR-EF-017.3-2020-08-05	5-Aug-2020	186	381
	MR-S9	16.2	MOR-EF-016.2-2020-08-05	5-Aug-2020	312	1306
	MR-S9	14.4	MOR-EF-014.4-2020-08-06	6-Aug-2020	126	991
	MR-S9	14.2	MOR-EF-014.2-2020-08-06	6-Aug-2020	152	947
	MR-S9	13.7	MOR-EF-013.7-2020-08-06	6-Aug-2020	108	895
	MR-S10	12.4	MOR-EF-012.4-2020-08-06	6-Aug-2020	236	1695
	MR-S10	9.8	MOR-EF-009.8-2020-08-06	6-Aug-2020	64	335
	MR-S10	8.7	MOR-EF-008.7-2020-08-06	6-Aug-2020	260	1248
	MR-S10	6.7	MOR-EF-006.7-2020-08-06	6-Aug-2020	87	403
	MR-S10	5.1	MOR-EF-005.1-2020-08-06	6-Aug-2020	108	693
	MR-S10	2.8	MOR-EF-002.8-2020-08-07	7-Aug-2020	238	1242
	MR-S10	2.3	MOR-EF-002.3-2020-08-07	7-Aug-2020	63	379
Moberly River Total					**7,061**	**40,880**
Grand Total					**25,268**	**201,053**

[a] only applicable to Moberly River sites.

[b] as measured upstream from the stream's confluence.

Table B2 Summary of angling sites sampled in the Moberly River during the Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

River	Section	River Km[a]	Site Name	Sample Date	Number of Rods	Time (min)	Angler-Minutes
Moberly River	MR-S1A	119.5	MOR-AG-119.5-2020-07-28	28-Jul-2020	2	9	18
	MR-S1A	119.0	MOR-AG-119.0-2020-08-08	8-Aug-2020	2	85	50
	MR-S1A	119.0	MOR-AG-119.0-2020-07-28	28-Jul-2020	2	20	40
	MR-S1A	119.0	MOR-AG-119.0-2020-07-29	29-Jul-2020	2	42	57
	MR-S1A	118.6	MOR-AG-118.6-2020-07-29	29-Jul-2020	2	33	66
	MR-S1A	118.1	MOR-AG-118.1-2020-07-29	29-Jul-2020	2	5	10
	MR-S1A	117.4	MOR-AG-117.4-2020-07-29	29-Jul-2020	2	10	20
	MR-S1A	116.8	MOR-AG-116.8-2020-08-08	8-Aug-2020	5	225	225
	MR-S1A	116.8	MOR-AG-116.8-2020-07-29	29-Jul-2020	1	10	10
	MR-S1A	115.8	MOR-AG-115.8-2020-07-29	29-Jul-2020	2	18	20
	MR-S1A	114.5	MOR-AG-114.5-2020-07-29	29-Jul-2020	2	40	80
	MR-S1A	114.5	MOR-AG-114.5-2020-08-08	8-Aug-2020	5	87	135
	MR-S1	105.0	MOR-AG-105.0-2020-07-30	30-Jul-2020	2	26	13
	MR-S1	102.9	MOR-AG-102.9-2020-07-30	30-Jul-2020	2	7	14
	MR-S2	98.9	MOR-AG-098.9-2020-07-30	30-Jul-2020	1	13	13
	MR-S2	95.1	MOR-AG-095.1-2020-07-30	30-Jul-2020	1	17	17
	MR-S2	91.0	MOR-AG-091.0-2020-07-30	30-Jul-2020	2	9	18
	MR-S2	88.9	MOR-AG-088.9-2020-07-30	30-Jul-2020	2	21	42
	MR-S2	87.3	MOR-AG-087.3-2020-07-30	30-Jul-2020	4	50	200
	MR-S3	84.0	MOR-AG-084.0-2020-07-30	30-Jul-2020	1	2	2
	MR-S3	84.0	MOR-AG-084.0-2020-07-31	31-Jul-2020	1	4	4
	MR-S3	82.3	MOR-AG-082.3-2020-07-31	31-Jul-2020	1	9	9
	MR-S3	80.0	MOR-AG-080.0-2020-07-31	31-Jul-2020	2	10	20
	MR-S3	79.8	MOR-AG-079.8-2020-07-31	31-Jul-2020	2	13	26
	MR-S3	76.9	MOR-AG-076.9-2020-07-31	31-Jul-2020	2	10	20
	MR-S3	72.5	MOR-AG-072.5-2020-07-31	31-Jul-2020	1	25	25
	MR-S4	70.3	MOR-AG-070.3-2020-07-31	31-Jul-2020	2	12	24
	MR-S4	68.4	MOR-AG-068.4-2020-07-31	31-Jul-2020	2	9	18
	MR-S4	66.3	MOR-AG-066.3-2020-07-31	31-Jul-2020	2	10	20
	MR-S5	58.0	MOR-AG-058.0-2020-08-01	1-Aug-2020	1	16	16
	MR-S5	57.6	MOR-AG-057.6-2020-08-01	1-Aug-2020	2	13	20
	MR-S5	56.0	MOR-AG-056.0-2020-08-01	1-Aug-2020	2	21	31
	MR-S5	53.3	MOR-AG-053.3-2020-08-01	1-Aug-2020	2	26	52
	MR-S5	52.9	MOR-AG-052.9-2020-08-01	1-Aug-2020	2	26	52
	MR-S5	52.2	MOR-AG-052.2-2020-08-01	1-Aug-2020	2	15	30
	MR-S6	51.1	MOR-AG-051.1-2020-08-01	1-Aug-2020	2	10	20
	MR-S6	50.4	MOR-AG-050.4-2020-08-01	1-Aug-2020	2	14	28
	MR-S6	49.1	MOR-AG-049.1-2020-08-01	1-Aug-2020	2	21	42

…continued.

[a] As measured upstream from the Moberly River's confluence with the Peace River.

Table B2 Continued.

River	Section	River Km[a]	Site Name	Sample Date	Number of Rods	Time (min)	Angler-Minutes
Moberly River	MR-S6	48.7	MOR-AG-048.7-2020-08-01	1-Aug-2020	2	10	20
	MR-S6	47.9	MOR-AG-047.9-2020-08-01	1-Aug-2020	2	8	16
	MR-S7	44.5	MOR-AG-044.5-2020-08-02	2-Aug-2020	2	17	34
	MR-S7	42.9	MOR-AG-042.9-2020-08-02	2-Aug-2020	2	15	30
	MR-S7	42.0	MOR-AG-042.0-2020-08-02	2-Aug-2020	2	8	16
	MR-S7	39.7	MOR-AG-039.7-2020-08-02	2-Aug-2020	2	42	84
	MR-S7	38.9	MOR-AG-038.9-2020-08-03	3-Aug-2020	1	81	81
	MR-S7	38.8	MOR-AG-038.8-2020-08-08	8-Aug-2020	2	58	116
	MR-S7	37.9	MOR-AG-037.9-2020-08-03	3-Aug-2020	2	40	80
	MR-S7	36.7	MOR-AG-036.7-2020-08-03	3-Aug-2020	1	8	8
	MR-S7	35.4	MOR-AG-035.4-2020-08-03	3-Aug-2020	2	14	28
	MR-S7	34.1	MOR-AG-034.1-2020-08-03	3-Aug-2020	2	14	28
	MR-S7	33.5	MOR-AG-033.5-2020-08-03	3-Aug-2020	1	16	16
	MR-S7	30.9	MOR-AG-030.9-2020-08-04	4-Aug-2020	1	12	12
	MR-S7	30.7	MOR-AG-030.7-2020-08-04	4-Aug-2020	1	26	26
	MR-S7	30.0	MOR-AG-030.0-2020-08-04	4-Aug-2020	2	12	24
	MR-S7	28.7	MOR-AG-028.7-2020-08-04	4-Aug-2020	1	1	1
	MR-S7	28.6	MOR-AG-028.6-2020-08-04	4-Aug-2020	2	16	32
	MR-S7	28.3	MOR-AG-028.3-2020-08-04	4-Aug-2020	2	20	40
	MR-S7	27.0	MOR-AG-027.0-2020-08-04	4-Aug-2020	2	7	14
	MR-S7	26.5	MOR-AG-026.5-2020-08-04	4-Aug-2020	2	8	16
	MR-S7	24.9	MOR-AG-024.9-2020-08-04	4-Aug-2020	2	43	86
	MR-S7	22.9	MOR-AG-022.9-2020-08-04	4-Aug-2020	1	16	16
	MR-S7	22.0	MOR-AG-022.0-2020-08-05	5-Aug-2020	1	17	17
	MR-S7	21.0	MOR-AG-021.0-2020-08-05	5-Aug-2020	1	14	14
	MR-S7	20.7	MOR-AG-020.7-2020-08-05	5-Aug-2020	2	44	44
	MR-S7	19.0	MOR-AG-019.0-2020-08-05	5-Aug-2020	1	22	22
	MR-S9	17.3	MOR-AG-017.3-2020-08-05	5-Aug-2020	2	20	40
	MR-S9	16.7	MOR-AG-016.7-2020-08-05	5-Aug-2020	2	10	20
	MR-S9	14.9	MOR-AG-014.9-2020-08-16	6-Aug-2020	2	10	20
	MR-S9	14.0	MOR-AG-014.0-2020-08-06	6-Aug-2020	2	7	14
	MR-S9	13.5	MOR-AG-013.5-2020-08-06	6-Aug-2020	2	9	18
	MR-S9	13.0	MOR-AG-013.0-2020-08-06	6-Aug-2020	2	8	16
	MR-S10	12.0	MOR-AG-012.0-2020-08-06	6-Aug-2020	1	37	37
	MR-S10	10.0	MOR-AG-010.0-2020-08-06	6-Aug-2020	1	35	17
	MR-S10	8.6	MOR-AG-008.6-2020-08-06	6-Aug-2020	1	6	6

…continued.

[a] As measured upstream from the Moberly River's confluence with the Peace River.

Table B2 Concluded.

River	Section	River Km[a]	Site Name	Sample Date	Number of Rods	Time (min)	Angler-Minutes
Moberly River	MR-S10	7.7	MOR-AG-007.7-2020-08-06	6-Aug-2020	1	7	7
	MR-S10	6.0	MOR-AG-006.0-2020-08-06	6-Aug-2020	1	5	5
	MR-S10	3.3	MOR-AG-003.3-2020-08-07	7-Aug-2020	1	9	9
	MR-S10	2.7	MOR-AG-002.7-2020-08-07	7-Aug-2020	2	5	10
	MR-S10	1.5	MOR-AG-001.5-2020-08-07	7-Aug-2020	1	7	7
	MR-S10	1.1	MOR-AG-001.1-2020-08-07	7-Aug-2020	1	16	16
Total							**2,670**

[a] As measured upstream from the Moberly River's confluence with the Peace River.

Table B3 **Summary of small fish boat electroshocking sites sampled during the Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.**

River	Section	River Km[a]	Site Name	Sample Date	Sample Length (m)	Sample Time (s)
Moberly River	MR-S1A	119.5	MOR-ES-119.5-2020-07-28	28-Jul-2020	750	475
	MR-S1A	118.9	MOR-ES-118.9-2020-07-29	29-Jul-2020	455	234
	MR-S1A	118.3	MOR-ES-118.3-2020-07-29	29-Jul-2020	600	441
	MR-S1A	117.7	MOR-ES-117.7-2020-07-29	29-Jul-2020	500	282
	MR-S1A	117.3	MOR-ES-117.3-2020-07-29	29-Jul-2020	329	226
	MR-S1A	116.7	MOR-ES-116.7-2020-07-29	29-Jul-2020	503	441
	MR-S1A	116.2	MOR-ES-116.2-2020-07-29	29-Jul-2020	805	582
	MR-S1A	115.5	MOR-ES-115.5-2020-07-29	29-Jul-2020	613	474
	MR-S1A	114.9	MOR-ES-114.9-2020-07-29	29-Jul-2020	690	456
	MR-S1A	114.2	MOR-ES-114.2-2020-07-29	29-Jul-2020	1080	756
	MR-S1	105.0	MOR-ES-105.0-2020-07-30	30-Jul-2020	1250	1097
	MR-S1	103.9	MOR-ES-103.9-2020-07-30	30-Jul-2020	1200	1205
	MR-S1	102.2	MOR-ES-102.2-2020-07-30	30-Jul-2020	1500	756
	MR-S2	91.1	MOR-ES-091.1-2020-07-30	30-Jul-2020	2160	1475
	MR-S2	87.3	MOR-ES-087.3-2020-07-30	30-Jul-2020	2500	1717
	MR-S2	84.1	MOR-ES-084.1-2020-07-31	31-Jul-2020	1040	699
	MR-S3	82.2	MOR-ES-082.2-2020-07-31	31-Jul-2020	1300	914
	MR-S3	72.9	MOR-ES-072.9-2020-07-31	31-Jul-2020	600	412
	MR-S4	70.4	MOR-ES-070.4-2020-07-31	31-Jul-2020	1240	840
	MR-S4	65.7	MOR-ES-065.7-2020-07-31	31-Jul-2020	635	426
	MR-S5	59.0	MOR-ES-059.0-2020-07-31	31-Jul-2020	1000	607
	MR-S5	58.0	MOR-ES-058.0-2020-08-01	1-Aug-2020	1600	1344
	MR-S5	56.1	MOR-ES-056.1-2020-08-01	1-Aug-2020	900	650
	MR-S5	55.0	MOR-ES-055.0-2020-08-01	1-Aug-2020	1400	1074
	MR-S5	53.5	MOR-ES-053.5-2020-08-01	1-Aug-2020	1680	1062
	MR-S6	51.8	MOR-ES-051.8-2020-08-01	1-Aug-2020	1100	883
	MR-S6	50.7	MOR-ES-050.7-2020-08-01	1-Aug-2020	1350	889
	MR-S6	49.3	MOR-ES-049.3-2020-08-01	1-Aug-2020	1690	1066
	MR-S6	47.6	MOR-ES-047.6-2020-08-01	1-Aug-2020	1600	944
	MR-S7	46.0	MOR-ES-046.0-2020-08-02	2-Aug-2020	2600	1585
	MR-S7	43.8	MOR-ES-043.8-2020-08-02	2-Aug-2020	1500	1223
	MR-S7	42.2	MOR-ES-042.2-2020-08-02	2-Aug-2020	1900	1067
	MR-S7	39.0	MOR-ES-039.0-2020-08-03	3-Aug-2020	1600	595
	MR-S7	37.9	MOR-ES-037.9-2020-08-03	3-Aug-2020	2290	1248
	MR-S7	35.7	MOR-ES-035.7-2020-08-03	3-Aug-2020	2400	1402
	MR-S7	33.4	MOR-ES-033.4-2020-08-03	3-Aug-2020	1530	928
	MR-S7	31.5	MOR-ES-031.5-2020-08-04	4-Aug-2020	1240	789

…continued.

[a] As measured upstream from the Moberly River's confluence with the Peace River.

Table B3 Concluded.

River	Section	River Km[a]	Site Name	Sample Date	Sample Length (m)	Sample Time (s)
Moberly River	MR-S7	30.2	MOR-ES-030.2-2020-08-04	4-Aug-2020	1250	731
	MR-S7	28.7	MOR-ES-028.7-2020-08-04	4-Aug-2020	2610	1432
	MR-S7	26.0	MOR-ES-026.0-2020-08-04	4-Aug-2020	1290	675
	MR-S7	24.2	MOR-ES-024.2-2020-08-04	4-Aug-2020	1650	739
	MR-S7	22.3	MOR-ES-022.3-2020-08-05	5-Aug-2020	878	527
	MR-S7	21.1	MOR-ES-021.1-2020-08-05	5-Aug-2020	1705	719
	MR-S7	18.2	MOR-ES-018.2-2020-08-05	5-Aug-2020	1350	642
	MR-S9	16.7	MOR-ES-016.7-2020-08-05	5-Aug-2020	1090	796
	MR-S9	14.9	MOR-ES-014.9-2020-08-06	6-Aug-2020	1230	823
	MR-S9	13.7	MOR-ES-013.7-2020-08-06	6-Aug-2020	1130	595
	MR-S10	12.3	MOR-ES-012.3-2020-08-06	6-Aug-2020	2660	1566
	MR-S10	9.7	MOR-ES-009.7-2020-08-06	6-Aug-2020	2030	709
	MR-S10	7.5	MOR-ES-007.5-2020-08-06	6-Aug-2020	1500	733
	MR-S10	6.0	MOR-ES-006.0-2020-08-06	6-Aug-2020	1487	523
	MR-S10	3.3	MOR-ES-003.3-2020-08-07	7-Aug-2020	985	562
	MR-S10	2.0	MOR-ES-002.0-2020-08-07	7-Aug-2020	1370	694
Moberly River Total					**71,345**	**43,730**

[a] As measured upstream from the Moberly River's confluence with the Peace River.

Table B4 Number of fish caught and observed by backpack electrofishing and their frequency of occurrence in the Chowade River and Cypress and Fiddes creeks during the Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Species	Life Stage	River						All Rivers	
		Chowade River		Cypress Creek		Fiddes Creek			
		n	%[a]	n	%[a]	n	%[a]	n	%[a]
Target Species									
Arctic Grayling	Adult								
	Immature								
	YOY								
All Arctic Grayling		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0.0**
Bull Trout	Adult	2	<1	1	<1			3	<1
	Immature	352	74.4	282	75.4	89	98.9	723	77.2
	YOY	67	14.2	25	6.7	1	1.1	93	9.9
All Bull Trout		**421**	**89.0**	**308**	**82.4**	**90**	**100.0**	**819**	**87.4**
Rainbow Trout	Adult	2	<1	3	0.8			5	0.5
	Immature			3	0.8			3	<1
	YOY			1	<1			1	<1
All Rainbow Trout		**2**	**<1**	**7**	**1.9**	**0**	**0.0**	**9**	**1.0**
Target Species Subtotal		**423**	**89.4**	**315**	**84.2**	**90**	**100.0**	**828**	**88.4**
Non-Target Species									
Slimy Sculpin	All	50	10.6	59	15.8			109	11.6
Non-Target Species Subtotal		**50**	**10.6**	**59**	**15.8**	**0**	**0.0**	**109**	**11.6**
All species		**473**	**100.0**	**374**	**100.0**	**90**	**100.0**	**937**	**100.0**

[a] Percent composition of the total catch.

Table B5 Number of fish caught and observed by backpack electrofishing and their frequency of occurrence in Colt, Farrell, and Kobes creeks during the Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

Species	Life Stage	River								All Rivers	
		Colt Creek		Farrell Creek		Kobes Creek		Maurice Creek			
		n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]
Target Species											
Arctic Grayling	Adult										
	Immature										
	YOY										
All Arctic Grayling		**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**	**0**	**0.0**
Bull Trout	Adult							1	<1	1	<1
	Immature	5	2.8					1	<1	6	0.7
	YOY										
All Bull Trout		**5**	**2.8**	**0**	**0.0**	**0**	**0.0**	**2**	**2.8**	**7**	**0.8**
Rainbow Trout	Adult			1	<1			1	<1	2	<1
	Immature	69	38.3	110	54.2	115	42.1	99	37.6	393	42.8
	YOY										
All Rainbow Trout		**69**	**38.3**	**111**	**54.7**	**115**	**42.1**	**100**	**38.0**	**395**	**43.0**
Target Species Subtotal		**74**	**41.1**	**111**	**54.7**	**115**	**42.1**	**102**	**38.8**	**402**	**43.7**
Non-Target Species											
Lake Chub	All			5	2.5	29	10.6			34	3.7
Largescale Sucker	All			8	3.9	8	2.9			16	1.7
Longnose Dace	All	7	3.9	9	4.4	22	8.1	59	22.4	97	10.6
Longnose Sucker	All	9	5.0	3	1.5	5	1.8	18	6.8	35	3.8
Mountain Whitefish	All	15	8.3			3	1.1			18	2.0
Northern Pikeminnow	All			5	2.5			3	1.1	8	0.9
Peamouth Chub	All							2	0.8	2	<1
Redside Shiner	All			32	15.8	17	6.2	24	9.1	73	7.9
Slimy Sculpin	All	75	41.7	27	13.3	70	25.6	55	20.9	227	24.7
Sucker Unidentified	All					4	1.5			4	<1
Trout-perch	All			3	1.5					3	<1
Non-Target Species Subtotal		**106**	**58.9**	**92**	**45.3**	**158**	**57.9**	**161**	**61.2**	**517**	**56.3**
All species		**180**	**100.0**	**203**	**100.0**	**273**	**100.0**	**263**	**100.0**	**919**	**100.0**

[a] Percent composition of the total catch.

Table B6 **Number of fish caught and observed and their frequency of occurrence for all sample methods combined in sampled sections of the Moberly River during the Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.**

Species	Section																				All Sections	
	1A		1		2		3		4		5		6		7		8		9		10			
	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]
Arctic Grayling	87	3.5	1	<1	4	1.9	2	2.3	3	2.6	7	2.0	1	<1	53	2.5			5		1	<1	164	2.4
Bull Trout									1	0.9					5	<1							6	<1
Burbot	10	<1			2	0.9					6	1.7	5	1.3	29	1.4			4	1.3	12	2.8	68	1.0
Finescale Dace															2	<1							2	<1
Flathead Chub																					2	<1	2	<1
Kokanee													7	1.8									7	<1
Lake Chub															154	7.3			41	12.9	24	5.5	219	3.3
Lake Whitefish	1	<1																					1	<1
Largescale Sucker	5	<1			1	<1			1	0.9	1	<1	1	<1	66	3.1			29	9.1	158	36.2	262	3.9
Longnose Dace	1099	43.9	3	1.5	13	6.0	4	4.5	2	1.7	62	17.3	11	2.9	520	24.7			132	41.6	81	18.6	1927	28.6
Longnose Sucker	68	2.7	8	3.9	34	15.8	14	15.9	19	16.2	65	18.2	239	62.7	324	15.4			55	17.4	76	17.4	902	13.4
Mountain Whitefish	920	36.7	144	70.6	108	50.2	45	51.1	70	59.8	146	40.8	54	14.2	319	15.1			11	3.5	2	<1	1819	27.0
Northern Pike	5	<1	1	<1	2	0.9					1	<1			3	<1							12	<1
Northern Pikeminnow	10	<1											11	2.9	32	1.5			11	3.5	41	9.4	105	1.6
Northern Redbelly Dace															2	<1							2	<1
Pearl Dace															2	<1							2	<1
Prickly Sculpin	1	<1																					1	<1
Redside Shiner	144	5.7	22	10.8	18	8.4	9	10.2	1	0.9	10	2.8	20	5.2	186	8.8			18	5.7	30	6.9	458	6.8
Sculpin Unidentified	8	<1													29	1.4					2	<1	39	0.6
Slimy Sculpin	42	1.7	3	1.5	1	<1	7	8.0			17	4.7	8	2.1	156	7.4			1	<1	2	<1	237	3.5
Sucker Unidentified	98	3.9	16	7.8	29	13.5	3	3.4	19	16.2	39	10.9	23	6.0	223	10.6			10	3.2	3	0.7	463	6.9
Trout-perch					1	<1	1	1.1			2	0.6											4	<1
Walleye																					1	<1	1	<1
White Sucker	7	<1	6	2.9	2	0.9	3	3.4	1	0.9	2	0.6	1	<1	2	<1					1	<1	25	<1
All species	**2505**	**37.2**	**204**	**3.0**	**215**	**3.2**	**88**	**1.3**	**117**	**1.7**	**358**	**5.3**	**381**	**5.7**	**2107**	**31.3**	**0**	**0.0**	**317**	**4.7**	**436**	**6.5**	**6728**	**100.0**

[a] Percent composition of the total catch.

Table B7 **Capture and life history information for Arctic Grayling caught in the Moberly River during Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.**

Capture Date	Method	Section	River km[a]	Fork Length (mm)	Weight (g)	Age	Tagged
28-Jul-2020	Angling	1A	119.0	153	43	1	Yes
28-Jul-2020	Angling	1A	119.0	160	49	1	Yes
29-Jul-2020	Angling	1A	114.5	240	214	2	Yes
29-Jul-2020	Angling	1A	114.5	219	102	2	Yes
29-Jul-2020	Angling	1A	117.4	164	63	1	Yes
29-Jul-2020	Angling	1A	117.4	160	55	1	Yes
29-Jul-2020	Angling	1A	117.4	161	45	1	Yes
29-Jul-2020	Angling	1A	117.4	153	39	1	Yes
29-Jul-2020	Angling	1A	117.4	152	39	1	Yes
29-Jul-2020	Backpack Electrofishing	1A	114.5	274	234	2	Yes [b]
29-Jul-2020	Backpack Electrofishing	1A	114.5	193	95	1	Yes
29-Jul-2020	Backpack Electrofishing	1A	114.5	251	191	2	Yes
29-Jul-2020	Small Fish Boat Electroshocker	1A	118.9	230	133	2	Yes
29-Jul-2020	Small Fish Boat Electroshocker	1A	118.3	280	255	2	Yes
29-Jul-2020	Small Fish Boat Electroshocker	1A	117.7	272	249	2	Yes
29-Jul-2020	Small Fish Boat Electroshocker	1A	117.7	249	182	2	Yes
29-Jul-2020	Small Fish Boat Electroshocker	1A	117.7	233	151	2	Yes
29-Jul-2020	Small Fish Boat Electroshocker	1A	117.7	161	56	1	Yes
29-Jul-2020	Small Fish Boat Electroshocker	1A	117.7	172	66	1	Yes
29-Jul-2020	Small Fish Boat Electroshocker	1A	117.3	355	577	5	Yes
29-Jul-2020	Small Fish Boat Electroshocker	1A	117.3	290	333	3	Yes
29-Jul-2020	Small Fish Boat Electroshocker	1A	116.7	298	416	3	Yes
29-Jul-2020	Small Fish Boat Electroshocker	1A	116.7	146	39	1	No
29-Jul-2020	Small Fish Boat Electroshocker	1A	116.2	224	125	2	Yes
29-Jul-2020	Small Fish Boat Electroshocker	1A	114.9	218	124	2	Yes
29-Jul-2020	Angling	1A	116.8	-	-	-	No [c]
29-Jul-2020	Angling	1A	116.8	227	146	2	Yes
29-Jul-2020	Angling	1A	116.8	212	108	2	Yes
29-Jul-2020	Angling	1A	116.8	174	61	1	Yes
29-Jul-2020	Angling	1A	116.8	259	223	2	Yes
29-Jul-2020	Angling	1A	116.8	236	160	2	Yes
29-Jul-2020	Angling	1A	116.8	238	174	2	Yes
29-Jul-2020	Angling	1A	116.8	180	69	1	Yes
29-Jul-2020	Angling	1A	119.0	163	46	1	Yes
29-Jul-2020	Angling	1A	119.0	155	41	1	Yes
29-Jul-2020	Angling	1A	118.6	164	56	1	Yes

[a]River Km values for the Moberly River are measured upstream from the Moberly River's confluence with the Peace River.

continued…

[b] Fish was tagged, but resulted in mortality due to sampling.

c Fish captured but escaped before processing.

Table B7 Continued.

Capture Date	Method	Section	River km[a]	Fork Length (mm)	Weight (g)	Age	Tagged
29-Jul-2020	Angling	1A	118.1	173	65	1	Yes
29-Jul-2020	Angling	1A	118.1	158	46	1	Yes
30-Jul-2020	Angling	2	87.3	171	61	1	Yes
30-Jul-2020	Angling	2	87.3	235	150	2	Yes
30-Jul-2020	Angling	2	87.3	170	56	1	No
30-Jul-2020	Angling	2	87.3	142	32	1	No
30-Jul-2020	Angling	3	84.0	153	40	1	No
30-Jul-2020	Small Fish Boat Electroshocker	1	105.0	190	84	1	Yes
31-Jul-2020	Angling	3	84.0	163	47	1	Yes
31-Jul-2020	Angling	4	66.3	145	39	1	Yes
31-Jul-2020	Small Fish Boat Electroshocker	4	70.4	175	61	1	Yes
31-Jul-2020	Small Fish Boat Electroshocker	4	70.4	166	51	1	No
31-Jul-2020	Small Fish Boat Electroshocker	5	59.0	185	75	1	Yes
01-Aug-2020	Angling	5	56.0	154	37	1	Yes
01-Aug-2020	Angling	5	52.9	143	37	1	No
01-Aug-2020	Small Fish Boat Electroshocker	5	55.0	153	38	1	Yes
01-Aug-2020	Small Fish Boat Electroshocker	5	55.0	162	44	1	Yes
01-Aug-2020	Small Fish Boat Electroshocker	5	55.0	172	58	1	Yes
02-Aug-2020	Backpack Electrofishing	7	44.8	64	3	0	No
02-Aug-2020	Backpack Electrofishing	7	40.5	63	-	0	No
02-Aug-2020	Angling	7	39.7	-	-	-	No[b]
02-Aug-2020	Angling	7	39.7	143	35	1	Yes
02-Aug-2020	Angling	7	39.7	150	24	1	Yes
03-Aug-2020	Backpack Electrofishing	7	38.9	59	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.9	62	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.9	57	-	0	No
03-Aug-2020	Backpack Electrofishing	7	37.9	55	-	0	No
03-Aug-2020	Angling	7	38.9	132	24	1	Yes
03-Aug-2020	Angling	7	38.9	131	30	1	Yes
03-Aug-2020	Angling	7	38.9	145	31	1	Yes
03-Aug-2020	Angling	7	38.9	155	40	1	Yes
03-Aug-2020	Backpack Electrofishing	7	38.0	61	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.0	57	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.0	56	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.0	58	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.0	62	-	0	No

[a]River Km values for the Moberly River are measured upstream from the Moberly River's confluence with the Peace River.

continued…

[b] Fish captured but escaped before processing.

Table B7 Continued.

Capture Date	Method	Section	River km[a]	Fork Length (mm)	Weight (g)	Age	Tagged
03-Aug-2020	Backpack Electrofishing	7	38.0	60	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.0	60	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.0	58	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.0	60	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.0	57	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.0	63	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.0	68	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.0	70	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.0	58	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.0	53	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.0	62	-	0	No
03-Aug-2020	Backpack Electrofishing	7	38.0	67	-	0	No
03-Aug-2020	Backpack Electrofishing	7	36.8	58	-	0	No
03-Aug-2020	Backpack Electrofishing	7	36.8	61	-	0	No
03-Aug-2020	Backpack Electrofishing	7	36.8	55	-	0	No
03-Aug-2020	Backpack Electrofishing	7	36.8	66	-	0	No
03-Aug-2020	Backpack Electrofishing	7	36.8	51	-	0	No
03-Aug-2020	Backpack Electrofishing	7	36.8	59	-	0	No
03-Aug-2020	Small Fish Boat Electroshocker	7	39.0	294	-	4	No
03-Aug-2020	Small Fish Boat Electroshocker	7	39.0	265	205	3	Yes
04-Aug-2020	Backpack Electrofishing	7	30.9	50	-	0	No
04-Aug-2020	Backpack Electrofishing	7	30.9	56	-	0	No
04-Aug-2020	Backpack Electrofishing	7	30.8	156	-	1	Yes
04-Aug-2020	Small Fish Boat Electroshocker	7	31.5	162	54	1	Yes
04-Aug-2020	Small Fish Boat Electroshocker	7	28.7	52	-	0	No
05-Aug-2020	Backpack Electrofishing	7	21.7	60	-	0	No
05-Aug-2020	Backpack Electrofishing	7	21.7	58	-	0	No
05-Aug-2020	Backpack Electrofishing	9	16.2	63	-	0	No
05-Aug-2020	Backpack Electrofishing	9	16.2	61	-	0	No
05-Aug-2020	Small Fish Boat Electroshocker	7	21.1	52	2	0	No
05-Aug-2020	Small Fish Boat Electroshocker	7	21.1	54	2	0	No
05-Aug-2020	Small Fish Boat Electroshocker	7	21.1	143	24	1	Yes
06-Aug-2020	Backpack Electrofishing	9	14.4	54	-	0	No
06-Aug-2020	Backpack Electrofishing	9	14.2	57	-	0	No
06-Aug-2020	Backpack Electrofishing	9	14.2	53	-	0	No
07-Aug-2020	Backpack Electrofishing	10	2.8	54	-	0	No

[a]River Km values for the Moberly River are measured upstream from the Moberly River's confluence with the Peace River.

continued…

Table B7 Concluded.

Capture Date	Method	Section	River km[a]	Fork Length (mm)	Weight (g)	Age	Tagged
08-Aug-2020	Angling	1A	119.0	163	45	1	No
08-Aug-2020	Angling	1A	119.0	159	42	1	Yes
08-Aug-2020	Angling	1A	116.8	250	166	2	Yes
08-Aug-2020	Angling	1A	116.8	172	61	1	Yes
08-Aug-2020	Angling	1A	116.8	276	282	3	Yes
08-Aug-2020	Angling	1A	116.8	184	76	1	Yes
08-Aug-2020	Angling	1A	116.8	170	52	1	Yes
08-Aug-2020	Angling	1A	116.8	192	82	1	Yes
08-Aug-2020	Angling	1A	116.8	186	81	1	Yes
08-Aug-2020	Angling	1A	116.8	332	496	-	Yes
08-Aug-2020	Angling	1A	116.8	260	230	3	No
08-Aug-2020	Angling	1A	116.8	275	270	-	Yes
08-Aug-2020	Angling	1A	116.8	256	221	2	Yes
08-Aug-2020	Angling	1A	116.8	220	116	2	Yes
08-Aug-2020	Angling	1A	116.8	234	165	2	Yes
08-Aug-2020	Angling	1A	116.8	217	109	2	Yes
08-Aug-2020	Angling	1A	116.8	255	234	2	Yes
08-Aug-2020	Angling	1A	116.8	224	139	2	Yes
08-Aug-2020	Angling	1A	114.5	260	209	2	Yes
08-Aug-2020	Angling	1A	114.5	194	86	1	Yes
08-Aug-2020	Angling	1A	114.5	224	123	2	Yes
08-Aug-2020	Angling	1A	114.5	183	82	1	Yes
08-Aug-2020	Angling	1A	114.5	183	80	1	Yes
08-Aug-2020	Angling	1A	114.5	179	72	1	Yes
08-Aug-2020	Backpack Electrofishing	1A	116.8	180	73	1	Yes
08-Aug-2020	Backpack Electrofishing	1A	116.8	191	87	1	Yes

[a]River Km values for the Moberly River are measured upstream from the Moberly River's confluence with the Peace River.

APPENDIX C

Habitat Data

Table C1 Habitat variables measured during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2020.

River	River Km	Site Name	Sample Date	Water Temp. (°C)	Water Cond. (µS/cm)	Secchi Depth (m)	Instream Velocity[a]	Mean Water Depth (m)	Maximum Water Depth (m)	Substrate		Cover Type - Percent of Available Cover (%)									
										Dominant	Sub-dominant	Interstices	Large Woody Debris	Small Woody Debris	Cutbank	Turbulence	Terrestrial Vegetation	Aquatic Vegetation	Shallow Water	Deep Water	Turbid Water
Chowade River	51.2	CHR-EF-051.2-2020-07-30	30-Jul-2020	8.3	370	to bottom	Low	0.20	0.40	Cobble	Gravel	70	2	2	1	1		4	20		
	51.1	CHR-EF-051.1-2020-07-29	29-Jul-2020	7.1	330	-	Low	0.15	0.20	Cobble	Gravel	10	3	2			35	30	20		
	51.1	CHR-EF-051.1-2020-07-30	30-Jul-2020	8.2	360	-	Low	0.15	0.40	Cobble	Gravel	30	5	5	5	15			40		
	51.0	CHR-EF-051.0-2020-07-29	29-Jul-2020	7.6	350	to bottom	Medium	0.20	0.55	Cobble	Gravel	40	5	5	5	20	5	10	5	5	
	50.0	CHR-EF-050.0-2020-08-09	9-Aug-2020	7.1	360	to bottom	Medium	0.10	0.50	Cobble	Boulder	37	1	1		1		20	40		
	49.9	CHR-EF-049.9-2020-08-09	9-Aug-2020	7.0	370	-	Low	0.15	0.60	Cobble	Gravel	10	15	40	10		10	10		5	
	49.8	CHR-EF-049.8-2020-08-09	9-Aug-2020	7.1	360	-	Medium	0.25	0.70	Cobble	Gravel	25	10	20			15	20		10	
	49.7	CHR-EF-049.7-2020-08-09	9-Aug-2020	7.1	360	to bottom	Low	0.30	0.90	Gravel	Cobble	60	1	1	1			2	25	10	
	49.6	CHR-EF-049.6-2020-07-30	30-Jul-2020	6.7	360	-	Low	0.20	0.90	Cobble	Gravel	30	10	10	10	10		20		10	
	49.5	CHR-EF-049.5-2020-07-30	30-Jul-2020	6.6	360	-	Low	0.20	0.65	Cobble	Gravel	40	5	5	5	25			20		
	49.4	CHR-EF-049.4-2020-07-30	30-Jul-2020	7.7	370	to bottom	Low	0.10	0.20	Cobble	Gravel	50						25	25		
	49.3	CHR-EF-049.3-2020-07-30	30-Jul-2020	7.7	370	to bottom	Medium	0.30	0.50	Cobble	Gravel	45	1	2	1			25	25	1	
	48.7	CHR-EF-048.7-2020-07-29	29-Jul-2020	6.2	360	to bottom	Low	0.20	0.55	Gravel	Sand	40	5	5	10	5	10	10	5	10	
	48.6	CHR-EF-048.6-2020-07-29	29-Jul-2020	6.5	310	to bottom	Low	0.40	0.75	Organics	Sand	10	40	25		5				20	
	48.4	CHR-EF-048.4-2020-07-29	29-Jul-2020	7.4	370	-	Low	0.30	0.45	Cobble	Gravel	40	4	2	4		5	5	40		
	46.6	CHR-EF-046.6-2020-07-28	28-Jul-2020	6.6	360	to bottom	Medium	0.25	0.60	Cobble	Gravel	40	5	5	5	10	5	5		25	
	46.4	CHR-EF-046.4-2020-07-28	28-Jul-2020	6.6	360	to bottom	Low	0.20	0.30	Cobble	Gravel	10	10	10				20	50		
	46.3	CHR-EF-046.3-2020-07-28	28-Jul-2020	6.6	360	to bottom	High	0.30	0.40	Cobble	Gravel	75	3	2		20					
	45.0	CHR-EF-045.0-2020-07-29	29-Jul-2020	5.0	390	to bottom	Low	0.20	0.30	Cobble	Gravel	33	1	1				33	32		
	45.0	CHR-EF-045.0-2020-08-09	9-Aug-2020	6.6	390	to bottom	Low	0.40	0.80	Cobble	Gravel	55	3	2	5			5	25	5	
	44.9	CHR-EF-044.9-2020-08-09	9-Aug-2020	6.6	380	-	Low	0.15	0.50	Cobble	Gravel	30	10	15	10	10	10	10		5	
	44.4	CHR-EF-044.4-2020-07-29	29-Jul-2020	5.4	380	to bottom	Low	0.30	0.70	Cobble	Gravel	35	5	5	5	10	5	25	5	5	
	44.2	CHR-EF-044.2-2020-07-28	28-Jul-2020	9.4	350	to bottom	Medium	0.20	0.70	Cobble	Silt	40	5	5	5	10	5	10	10	10	

…continued.

[a] A categorical ranking of water velocity (high = greater than 1.0 m/s; medium = 0.5 to 1.0 m/s; low = less than 0.5 m/s)

Table C1 Continued.

River	River Km	Site Name	Sample Date	Water Temp. (°C)	Water Cond. (µS/cm)	Secchi Depth (m)	Instream Velocity[a]	Mean Water Depth (m)	Maximum Water Depth (m)	Substrate		Cover Type - Percent of Available Cover (%)								
										Dominant	Sub-dominant	Interstices	Large Woody Debris	Small Woody Debris	Cutbank	Turbulence	Terrestrial Vegetation	Aquatic Vegetation	Shallow Water	Deep Water	Turbid Water
Chowade River	43.9	CHR-EF-043.9-2020-07-28	28-Jul-2020	9.4	350	to bottom	Medium	0.30	0.65	Cobble	Sand	20	25	15	5	5	10	5	5	10	
	43.8	CHR-EF-043.8-2020-07-28	28-Jul-2020	9.4	350	-	Medium	0.20	0.35	Sand	Silt		28	70			2				
	43.7	CHR-EF-043.7-2020-07-28	28-Jul-2020	9.4	350	-	Medium	0.30	0.40	Cobble	Gravel	41	10	10	1		1	2	35		
	39.6	CHR-EF-039.6-2020-07-30	30-Jul-2020	7.7	370	-	Low	0.30	0.45	Cobble	Sand	4	30	20	1				45		
	39.5	CHR-EF-039.5-2020-07-28	28-Jul-2020	9.4	360	to bottom	Low	0.20	0.40	Cobble	Gravel	55	5	5	5		1	2	26	1	
	39.5	CHR-EF-039.5-2020-07-30	30-Jul-2020	6.6	360	-	Medium	0.30	0.65	Gravel	Silt	20	30	30						20	
	39.3	CHR-EF-039.3-2020-07-28	28-Jul-2020	9.4	360	to bottom	Low	0.20	0.60	Cobble	Gravel	40	10	5	5	5	10	5	10	10	
Cypress Creek	41.9	CYC-EF-041.9-2020-07-23	23-Jul-2020	7.2	400	to bottom	Medium	0.35	0.90	Cobble	Gravel	5	45	15	5	5	5	5	5	10	
	41.8	CYC-EF-041.8-2020-07-23	23-Jul-2020	7.5	400	to bottom	Low	0.40	1.00	Silt	Cobble	70	3	2	5				10	10	
	41.3	CYC-EF-041.3-2020-07-31	31-Jul-2020	9.1	390	-	Low	0.22	0.80	Cobble	Silt	30	15	25	10	2		3		15	
	41.1	CYC-EF-041.1-2020-07-31	31-Jul-2020	9.1	390	to bottom	Medium	0.00	0.90	Sand	Cobble	24	15	3	5	1	1	1	20	30	
	40.3	CYC-EF-040.3-2020-07-25	25-Jul-2020	8.6	370	to bottom	Medium	0.40	1.00	Cobble	Gravel	50	7	3	4		1		5	30	
	40.0	CYC-EF-040.0-2020-07-25	25-Jul-2020	8.6	370	to bottom	Medium	0.25	0.60	Cobble	Gravel	50	10	10		5		5	10	10	
	39.8	CYC-EF-039.8-2020-07-25	25-Jul-2020	8.6	370	to bottom	Medium	0.15	0.35	Cobble	Organics	40	5	5	5	5	5	25	5	5	
	38.6	CYC-EF-038.6-2020-07-25	25-Jul-2020	9.0	380	to bottom	Low	0.35	0.55	Gravel	Organics	20	5	10	15	5	20	10	5	10	
	38.5	CYC-EF-038.5-2020-07-25	25-Jul-2020	9.0	380	to bottom	Medium	0.30	0.60	Cobble	Gravel	75	3	2	5				10	5	
	37.7	CYC-EF-037.7-2020-07-23	23-Jul-2020	7.4	390	0.25	Medium	0.25	0.70	Cobble	Gravel	40	15	10	5	5	5	5	10	5	
	37.0	CYC-EF-037.0-2020-07-23	23-Jul-2020	7.4	390	0.1	-	0.50	1.00	Sand	Gravel	5	40	40	2		5		5	3	
	35.8	CYC-EF-035.8-2020-07-31	31-Jul-2020	9.9	400	-	Low	0.20	0.55	Gravel	Cobble	35	5	10	5	5			20	20	
	35.7	CYC-EF-035.7-2020-07-31	31-Jul-2020	9.9	400	to bottom	Medium	0.30	0.50	Cobble	Gravel	60	3	2	5	1	1		23	5	
	34.7	CYC-EF-034.7-2020-07-31	31-Jul-2020	8.1	420	to bottom	Medium	0.30	0.60	Cobble	Sand	70	2	2	1	1	1	2	20	1	
	34.5	CYC-EF-034.5-2020-07-31	31-Jul-2020	7.2	270	-	Low	0.25	0.80	Cobble	Silt	15	20	30	10	10		5		10	
	32.8	CYC-EF-032.8-2020-07-23	23-Jul-2020	7.8	380	to bottom	Medium	0.30	0.60	Cobble	Gravel	65	3	2	5	3	1	1	20		

…continued.

[a] A categorical ranking of water velocity (high = greater than 1.0 m/s; medium = 0.5 to 1.0 m/s; low = less than 0.5 m/s)

Table C1 Continued.

River	River Km	Site Name	Sample Date	Water Temp. (°C)	Water Cond. (µS/cm)	Secchi Depth (m)	Instream Velocity[a]	Mean Water Depth (m)	Maximum Water Depth (m)	Substrate		Cover Type - Percent of Available Cover (%)								
										Dominant	Sub-dominant	Interstices	Large Woody Debris	Small Woody Debris	Cutbank	Turbulence	Terrestrial Vegetation	Aquatic Vegetation	Shallow Water	Deep Water	Turbid Water
Cypress Creek	32.7	CYC-EF-032.7-2020-07-23	23-Jul-2020	7.8	380	to bottom	Medium	0.20	0.40	Gravel	Cobble	55	10	5		5		5	5	15	
	32.6	CYC-EF-032.6-2020-07-23	23-Jul-2020	7.9	380	to bottom	Medium	0.25	0.50	Cobble	Sand	40	15	5	5			5	15	15	
	30.7	CYC-EF-030.7-2020-07-22	22-Jul-2020	8.4	380	to bottom	Low	0.20	0.45	Cobble	Gravel	65	3	2	3	10	2	5	5	5	
	30.6	CYC-EF-030.6-2020-07-22	22-Jul-2020	8.4	380	to bottom	Low	0.20	0.30	Cobble	Gravel	50	2	3	1		2	2	40		
	29.2	CYC-EF-029.2-2020-07-22	22-Jul-2020	7.7	380	to bottom	Medium	0.20	0.50	Cobble	Gravel	60	2	2	2	2	1	1	30		
	29.2	CYC-EF-029.2-2020-08-01	1-Aug-2020	12.6	360	-	Low	0.10	0.40	Cobble	Gravel	40	5	15	10	5		10	15		
	29.1	CYC-EF-029.1-2020-07-22	22-Jul-2020	7.7	380	to bottom	Medium	0.25	0.45	Gravel	Sand	55	5	10	5	5	5	5	5	5	
	29.1	CYC-EF-029.1-2020-08-01	1-Aug-2020	12.6	360	to bottom	Medium	0.30	0.50	Cobble	Gravel	50	15	15	1	5	1		12	1	
	27.3	CYC-EF-027.3-2020-08-01	1-Aug-2020	11.9	380	to bottom	Medium	0.20	0.30	Boulder	Silt	90							10		
	27.2	CYC-EF-027.2-2020-08-01	1-Aug-2020	12.7	380	to bottom	Low	0.20	0.30	Cobble	Gravel	70	5	5					20		
	27.1	CYC-EF-027.1-2020-08-01	1-Aug-2020	12.7	380	-	Low	0.10	0.40	Cobble	Gravel	20	25	15		10			20	10	
	26.2	CYC-EF-026.2-2020-08-01	1-Aug-2020	9.6	370	to bottom	Medium	0.30	0.50	Cobble	Gravel	40	5	5		20			30		
	26.1	CYC-EF-026.1-2020-08-01	1-Aug-2020	9.7	370	-	Low	0.28	0.80	Silt	Cobble	3	30	30	3		25	3		6	
	25.0	CYC-EF-025.0-2020-07-25	25-Jul-2020	10.5	360	to bottom	Medium	0.35	0.75	Cobble	Gravel	40	10	10	10	10	10			10	
	24.7	CYC-EF-024.7-2020-07-25	25-Jul-2020	10.5	360	to bottom	-	0.40	0.90	Cobble	Sand	45	3	2	8	10	2		10	20	
	22.9	CYC-EF-022.9-2020-07-25	25-Jul-2020	8.8	360	to bottom	Medium	0.20	0.50	Cobble	Gravel	40	3	2					53	2	
	22.8	CYC-EF-022.8-2020-07-25	25-Jul-2020	8.8	360	to bottom	Low	0.20	0.30	Gravel	Sand	40	3	2	10		5		40		
	22.7	CYC-EF-022.7-2020-07-25	25-Jul-2020	8.8	360	to bottom	Low	0.30	0.40	Cobble	Gravel	50	2	1			2		45		
	22.6	CYC-EF-022.6-2020-07-25	25-Jul-2020	8.8	360	to bottom	Low	0.10	0.40	Cobble	Gravel	50	5	5		5	5	10	15	5	
	21.9	CYC-EF-021.9-2020-07-25	25-Jul-2020	7.7	340	to bottom	Medium	0.25	0.60	Cobble	Organics	35	10	5	5	10	5	10	10	10	
	21.6	CYC-EF-021.6-2020-07-25	25-Jul-2020	7.7	340	to bottom	Low	0.20	0.40	Cobble	Gravel	60	3	2	5		5		25		
	21.5	CYC-EF-021.5-2020-07-25	25-Jul-2020	7.7	340	to bottom	Medium	0.50	1.00	Cobble	Sand	10	30	30	10					20	
Fiddes Creek	11.9	FIC-EF-011.9-2020-07-27	27-Jul-2020	10.4	400	to bottom	Medium	0.20	0.50	Cobble	Gravel	55	1	1	1	2			39	1	
	11.7	FIC-EF-011.7-2020-07-27	27-Jul-2020	10.4	400	to bottom	Medium	0.25	0.75	Cobble	Gravel	40		5	5	25	5	5	5	10	
	7.1	FIC-EF-007.1-2020-07-27	27-Jul-2020	8.3	370	to bottom	Medium	0.25	0.70	Cobble	Gravel	55	10	5	2	10	3	5	5	5	

[a] A categorical ranking of water velocity (high = greater than 1.0 m/s; medium = 0.5 to 1.0 m/s; low = less than 0.5 m/s)

…continued.

Table C1 Continued.

River	River Km	Site Name	Sample Date	Water Temp. (°C)	Water Cond. (µS/cm)	Secchi Depth (m)	Instream Velocity[a]	Mean Water Depth (m)	Maximum Water Depth (m)	Substrate		Cover Type - Percent of Available Cover (%)								
										Dominant	Sub-dominant	Interstices	Large Woody Debris	Small Woody Debris	Cutbank	Turbulence	Terrestrial Vegetation	Aquatic Vegetation	Shallow Water	Deep Water	Turbid Water
Fiddes Creek	7.0	FIC-EF-007.0-2020-07-27	27-Jul-2020	8.4	360	-	High	0.25	0.40	Cobble	Boulder	45	2		5	41	2			5	
	5.2	FIC-EF-005.2-2020-07-27	27-Jul-2020	6.6	390	to bottom	High	0.20	0.30	Cobble	Boulder	55	1	1	1	20			21	1	
	4.8	FIC-EF-004.8-2020-07-27	27-Jul-2020	6.6	390	to bottom	Medium	0.25	0.45	Cobble	Gravel	45	5	5	5	10	5	10	5	10	
Colt Creek	30.4	COC-EF-030.4-2020-08-05	5-Aug-2020	8.0	250	to bottom	High	-	-	Cobble	Sand	83	1	1	5	4	4		1	1	
	30.2	COC-EF-030.2-2020-08-05	5-Aug-2020	8.0	250	to bottom	High	0.15	0.60	Cobble	Boulder	60	10	10		15				5	
	29.0	COC-EF-029.0-2020-08-05	5-Aug-2020	8.0	250	to bottom	High	0.30	-	Cobble	Boulder	50	7	8	5	10	5		5	10	
	28.8	COC-EF-028.8-2020-08-05	5-Aug-2020	10.0	250	to bottom	Low	0.15	0.60	Cobble	Boulder	45	15	15		15				10	
	14.1	COC-EF-014.1-2020-08-05	5-Aug-2020	10.4	240	-	Low	0.30	0.80	Cobble	Gravel	65	1	2	5	1	1		15	10	
	13.9	COC-EF-013.9-2020-08-05	5-Aug-2020	10.1	240	-	Low	0.20	0.80	Cobble	Gravel	40	10	10	5	10	5			20	
	3.2	COC-EF-003.2-2020-08-04	4-Aug-2020	13.1	270	to bottom	Medium	0.40	0.80	Cobble	Gravel	65	2	5	5	2	1		15	5	
	3	COC-EF-003.0-2020-08-04	4-Aug-2020	13.1	240	-	Low	0.25	0.90	Cobble	Silt	22	10	22	5	10	10			21	
Farrell Creek	102.1	FAC-EF-102.1-2020-08-02	2-Aug-2020	18.8	290	1	Low	0.40	0.90	Sand	Gravel	40	5	5	15		5		10	20	
	101.7	FAC-EF-101.7-2020-08-02	2-Aug-2020	18.9	290	-	Low	0.25	0.65	Sand	Gravel	30	20	15						20	15
	65.7	FAC-EF-065.7-2020-07-26	26-Jul-2020	19.0	330	-	Low	0.50	1.30	Sand	Gravel	70	10	10					5	5	
	65.5	FAC-EF-065.5-2020-07-26	26-Jul-2020	19.0	330	0.05	Low	0.70	1.50	Sand	Gravel	30	5	5	5		5		5	45	
	63.3	FAC-EF-063.3-2020-07-26	26-Jul-2020	15.1	350	0.05	Low	0.40	1.10	Cobble	Sand	80	3	2					5	5	5
	63.0	FAC-EF-063.0-2020-07-26	26-Jul-2020	15.1	350	-	Low	0.20	0.60	Gravel	Sand	80	10		1				3	4	2
Kobes Creek	55.5	KOC-EF-055.5-2020-08-13	13-Aug-2020	10.4	90	to bottom	Low	0.3	0.6	Cobble	Gravel	40	5	5	5		5		35	5	
	55.3	KOC-EF-055.3-2020-08-13	13-Aug-2020	10.4	90	to bottom	Low	0.3	0.5	Gravel	Cobble	40	5	5	15		5		30		
	46.9	KOC-EF-046.9-2020-08-13	13-Aug-2020	13.7	120	to bottom	-	0.4	0.9	Cobble	Gravel	40	5	5	5		5		30	10	
	46.7	KOC-EF-046.7-2020-08-13	13-Aug-2020	13.7	120	to bottom	Low	0.3	0.5	Cobble	Gravel	45	2	5	1		1		45	1	
	40.6	KOC-EF-040.6-2020-08-03	3-Aug-2020	14.9	120	to bottom	Low	0.5	1	Cobble	Sand	55	1	2	5		1		5	30	1
	40.2	KOC-EF-040.2-2020-08-03	3-Aug-2020	14.9	120	-	Low	0.4	0.9	Cobble	Silt	12	20	20			5	5		35	3
	11.7	KOC-EF-011.7-2020-08-03	3-Aug-2020	17.6	160	0.3	Low	0.4	0.7	Sand	Boulder	85	1	1			1		1	10	1
	11.5	KOC-EF-011.5-2020-08-03	3-Aug-2020	17.6	160	-	Low	0.5	0.9	Silt	Cobble	10		10				20		60	

…continued.

[a] A categorical ranking of water velocity (high = greater than 1.0 m/s; medium = 0.5 to 1.0 m/s; low = less than 0.5 m/s)

Table C1 Continued.

River	River Km	Site Name	Sample Date	Water Temp. (°C)	Water Cond. (µS/cm)	Secchi Depth (m)	Instream Velocity[a]	Mean Water Depth (m)	Maximum Water Depth (m)	Substrate		Cover Type - Percent of Available Cover (%)									
										Dominant	Sub-dominant	Interstices	Large Woody Debris	Small Woody Debris	Cutbank	Turbulence	Terrestrial Vegetation	Aquatic Vegetation	Shallow Water	Deep Water	Turbid Water
Maurice Creek	2	MAC-EF-002.0-2020-08-07	7-Aug-2020	18.0	370	-	Low	0.20	0.70	Cobble	Sand	45	10	10	5					10	20
	1.7	MAC-EF-001.7-2020-08-07	7-Aug-2020	18.0	370	0.2	Medium	0.45	0.60	Cobble	Sand	40	15	10					10	15	10
	1.5	MAC-EF-001.5-2020-08-07	7-Aug-2020	16.0	370	-	Medium	0.20	0.70	Cobble	Gravel	40	7	18	5					10	20
	1.3	MAC-EF-001.3-2020-08-07	7-Aug-2020	16.3	370	0.2	Medium	0.40	0.70	Cobble	Gravel	55							10		35
	1.2	MAC-EF-001.2-2020-08-06	6-Aug-2020	18.3	370	-	Medium	0.25	0.80	Bedrock	Cobble	30								30	40
	1	MAC-EF-001.0-2020-08-06	6-Aug-2020	18.3	370	-	High	0.40	0.90	Bedrock	Boulder	40							20	10	30
	0.8	MAC-EF-000.8-2020-08-06	6-Aug-2020	16.0	370	-	Low	0.25	0.70	Bedrock	Boulder	65		5						10	20
	0.6	MAC-EF-000.6-2020-08-06	6-Aug-2020	15.4	370	-	Low	0.30	0.50	Bedrock	Cobble	79	1	1					13	5	1
Moberly River	119.5	MOR-ES-119.5-2020-07-28	28-Jul-2020	19.0	160	1.0	Medium	0.70	1.40	Cobble	Boulder	30	20	20	10						20
	119.5	MOR-AG-119.5-2020-07-28	28-Jul-2020	19.6	170	0.7	Medium	0.30	0.90	Cobble	Gravel	25	5				10			40	20
	119	MOR-EF-119.0-2020-07-29	29-Jul-2020	16.6	170	0.8	Medium	0.25	0.40	Gravel	Cobble	60	10	5			5				20
	119	MOR-AG-119.0-2020-08-08	8-Aug-2020	14.0	180	1.0	Medium	0.40	1.30	Gravel	Cobble	70	5							15	10
	119	MOR-EF-119.0-2020-08-08	8-Aug-2020	14.0	180	1.0	Medium	0.25	0.60	Gravel	Cobble	65	20						10		5
	119	MOR-AG-119.0-2020-07-28	28-Jul-2020	19.6	170	0.7	Medium	0.40	0.70	Gravel	Cobble	25	40	30							5
	119	MOR-AG-119.0-2020-07-29	29-Jul-2020	16.6	170	0.8	Medium	0.40	0.80	Gravel	Cobble	10	70	20							
	118.9	MOR-ES-118.9-2020-07-29	29-Jul-2020	16.4	160	0.7	Medium	0.50	1.50	Cobble	Boulder	20	20		20		20			10	10
	118.6	MOR-AG-118.6-2020-07-29	29-Jul-2020	16.7	-	0.8	Low	0.20	0.50	Gravel	Cobble	100									
	118.4	MOR-EF-118.4-2020-07-29	29-Jul-2020	16.6	170	0.8	Medium	0.25	0.55	Cobble	Gravel	80	5						5		10
	118.3	MOR-ES-118.3-2020-07-29	29-Jul-2020	16.4	160	0.7	Medium	1.00	1.50	Cobble	Boulder	20	10		30		10			10	20
	118.1	MOR-AG-118.1-2020-07-29	29-Jul-2020	17.0	-	0.8	Low	0.30	0.90	Gravel	Cobble	100									
	117.7	MOR-ES-117.7-2020-07-29	29-Jul-2020	16.4	160	0.7	Medium	0.50	1.00	Cobble	Boulder	20	10		30		20			10	10
	117.5	MOR-EF-117.5-2020-07-29	29-Jul-2020	16.6	170	0.8	Medium	0.20	0.60	Gravel	Cobble	50	25				5				20
	117.4	MOR-AG-117.4-2020-07-29	29-Jul-2020	17.0	-	0.8	Low	0.00	0.00	Cobble	Gravel	90		10							
	117.3	MOR-ES-117.3-2020-07-29	29-Jul-2020	17.7	160	0.7		0.50	1.50	Gravel	Cobble	20	20		50					10	
	116.9	MOR-EF-116.9-2020-07-29	29-Jul-2020	16.6	170	0.8	Low	0.20	0.50	Gravel	Cobble	80	10								10
	116.8	MOR-AG-116.8-2020-08-08	8-Aug-2020	14.0	180	1.0	Medium	0.60	2.20	Gravel	Silt	20	20				5		5	40	10

…continued.

[a] A categorical ranking of water velocity (high = greater than 1.0 m/s; medium = 0.5 to 1.0 m/s; low = less than 0.5 m/s)

Table C1 Continued.

River	River Km	Site Name	Sample Date	Water Temp. (°C)	Water Cond. (µS/cm)	Secchi Depth (m)	Instream Velocity[a]	Mean Water Depth (m)	Maximum Water Depth (m)	Substrate		Cover Type - Percent of Available Cover (%)									
										Dominant	Sub-dominant	Interstices	Large Woody Debris	Small Woody Debris	Cutbank	Turbulence	Terrestrial Vegetation	Aquatic Vegetation	Shallow Water	Deep Water	Turbid Water
Moberly River	116.8	MOR-EF-116.8-2020-08-08	8-Aug-2020	15.0	180	1.0	Low	0.20	0.75	Gravel	-	60	20						10		10
	116.8	MOR-AG-116.8-2020-07-29	29-Jul-2020	17.0	170	0.8	Low	0.60	1.50	Gravel	Cobble	90		10							
	116.7	MOR-EF-116.7-2020-07-29	29-Jul-2020	16.6	170	0.8	Low	0.40	0.70	Silt	Gravel	65	15		5		5		5		5
	116.7	MOR-ES-116.7-2020-07-29	29-Jul-2020	18.6	170	1.0	Medium	0.80	1.50	Cobble	Gravel	15	40		15					15	15
	116.2	MOR-ES-116.2-2020-07-29	29-Jul-2020	18.6	170	1.0	Medium	0.80	2.00	Gravel	Cobble	10	30		20		10			30	
	115.8	MOR-AG-115.8-2020-07-29	29-Jul-2020	16.0	170	0.8	Low	0.60	1.50	Cobble	Gravel	100									
	115.8	MOR-EF-115.8-2020-07-29	29-Jul-2020	16.6	170	0.8	Low	0.30	0.60	Silt	Gravel	65	20				5				10
	115.5	MOR-ES-115.5-2020-07-29	29-Jul-2020	18.6	170	1.0	Low	1.20	2.00	Gravel	Sand		20		10		20		10	40	
	114.9	MOR-ES-114.9-2020-07-29	29-Jul-2020	18.6	170	0.7	Medium	0.70	1.40	Gravel	Cobble	20	20		10				10	10	30
	114.5	MOR-AG-114.5-2020-07-29	29-Jul-2020	17.0	170	0.8	Medium	0.40	1.20	Cobble	Gravel	100									
	114.5	MOR-EF-114.5-2020-07-29	29-Jul-2020	17.0	170	0.8	Medium	0.40	0.80	Gravel	Silt	30	30	10	5					5	20
	114.5	MOR-AG-114.5-2020-08-08	8-Aug-2020	18.0	180	1.0	Medium	0.50	0.85	Gravel	Silt	35	5				5		10	30	15
	114.5	MOR-EF-114.5-2020-08-08	8-Aug-2020	18.0	180	1.0	Medium	0.25	0.75	Gravel	Silt	45	25				5		10	5	10
	114.2	MOR-ES-114.2-2020-07-29	29-Jul-2020	18.6	170	0.7	High	1.00	2.00	Cobble	Boulder	30	20		10		10			10	20
	105.0	MOR-AG-105.0-2020-07-30	30-Jul-2020	18.0	170	-	-	0.40	0.80	Gravel	Silt	30								70	
	105.0	MOR-ES-105.0-2020-07-30	30-Jul-2020	17.5	170	0.7	Low	1.00	2.00	Silt	Gravel				80					10	10
	103.9	MOR-ES-103.9-2020-07-30	30-Jul-2020	17.5	170	0.7	Low	1.50	2.00	Silt	Gravel	10			30					50	10
	102.9	MOR-AG-102.9-2020-07-30	30-Jul-2020	18.0	-	0.4	Low	1.00	3.00	-	-	20	5	5						70	
	102.9	MOR-EF-102.9-2020-07-30	30-Jul-2020	18.0	170	0.4	Medium	0.25	0.50	Gravel	Silt	65	20							10	5
	102.2	MOR-ES-102.2-2020-07-30	30-Jul-2020	17.5	170	0.7	Low	2.00	2.00	Silt	Gravel	5			40					50	5
	98.9	MOR-AG-098.9-2020-07-30	30-Jul-2020	18.5	-	0.3	Low	1.50	2.50	Sand	Gravel	10	10	10						70	
	95.1	MOR-AG-095.1-2020-07-30	30-Jul-2020	18.5	-	0.4	Low	1.40	4.00	Sand	Silt	10	5	5						80	
	91.1	MOR-ES-091.1-2020-07-30	30-Jul-2020	19.0	170	0.5	Medium	0.70	1.50	Cobble	Sand	20	30		10					20	20
	91.0	MOR-AG-091.0-2020-07-30	30-Jul-2020	18.5	-	0.4	Low	0.40	0.60	Gravel	Silt	80	20								
	88.9	MOR-AG-088.9-2020-07-30	30-Jul-2020	18.5	-	0.4	Low	0.60	1.20	Gravel	Cobble	20								80	
	87.3	MOR-AG-087.3-2020-07-30	30-Jul-2020	18.5	-	0.4	Low	0.00	0.00	Cobble	Gravel	80		20							

…continued.

[a] A categorical ranking of water velocity (high = greater than 1.0 m/s; medium = 0.5 to 1.0 m/s; low = less than 0.5 m/s)

Table C1 Continued.

River	River Km	Site Name	Sample Date	Water Temp. (°C)	Water Cond. (µS/cm)	Secchi Depth (m)	Instream Velocity[a]	Mean Water Depth (m)	Maximum Water Depth (m)	Substrate		Cover Type - Percent of Available Cover (%)									
										Dominant	Sub-dominant	Interstices	Large Woody Debris	Small Woody Debris	Cutbank	Turbulence	Terrestrial Vegetation	Aquatic Vegetation	Shallow Water	Deep Water	Turbid Water
Moberly River	87.3	MOR-ES-087.3-2020-07-30	30-Jul-2020	19.0	170	0.60	Medium	0.60	1.70	Gravel	Sand	20	30		10					20	20
	84.1	MOR-ES-084.1-2020-07-31	31-Jul-2020	18.9	180	0.40	Medium	0.50	1.50	Sand	Gravel				15				80	5	
	84.0	MOR-AG-084.0-2020-07-30	30-Jul-2020	18.3	-	0.50	Low	0.20	0.30	Gravel	Cobble	100									
	84.0	MOR-AG-084.0-2020-07-31	31-Jul-2020	18.0	-	0.50	Low	0.30	0.40	Gravel	Cobble	100									
	83.6	MOR-EF-083.6-2020-07-31	31-Jul-2020	19.2	170	0.25	Medium	0.25	0.50	Gravel	Silt	85	10								5
	83.0	MOR-EF-083.0-2020-07-31	31-Jul-2020	19.1	170	0.25	Medium	0.30	0.60	Gravel	Silt	85	5								10
	82.5	MOR-EF-082.5-2020-07-31	31-Jul-2020	19.1	170	0.25	Medium	0.25	0.50	Silt	Gravel	80	5				5				10
	82.3	MOR-AG-082.3-2020-07-31	31-Jul-2020	18.5	-	0.50	Low	1.30	2.50	Gravel	Sand		5	5						90	
	82.2	MOR-ES-082.2-2020-07-31	31-Jul-2020	18.9	180	0.40	Medium	1.00	2.00	Sand	Cobble				30				10	50	10
	80.0	MOR-AG-080.0-2020-07-31	31-Jul-2020	18.0	-	0.50	Low	0.30	0.40	Gravel	Silt	100									
	79.8	MOR-AG-079.8-2020-07-31	31-Jul-2020	19.0	-	0.50	Medium	0.30	0.50	Gravel	Sand	80		15					5		
	76.9	MOR-AG-076.9-2020-07-31	31-Jul-2020	19.0	-	0.50	Low	0.30	0.50	Gravel	Sand	80	20								
	72.9	MOR-ES-072.9-2020-07-31	31-Jul-2020	18.9	180	0.40	Low	1.00	2.00	Sand	Gravel	10			10				10	65	5
	72.5	MOR-AG-072.5-2020-07-31	31-Jul-2020	19.0	-	0.50	Low	1.00	3.00	Gravel	Cobble	50	5	5						40	
	70.4	MOR-ES-070.4-2020-07-31	31-Jul-2020	19.9	170	0.40	Medium	0.70	1.40	Gravel	Boulder	40	20								40
	70.3	MOR-AG-070.3-2020-07-31	31-Jul-2020	19.0	-	0.50	Low	1.10	6.50	Cobble	Gravel	100									
	68.4	MOR-AG-068.4-2020-07-31	31-Jul-2020	19.0	-	0.50	Low	0.50	0.60	Cobble	Gravel	80		20							
	66.3	MOR-AG-066.3-2020-07-31	31-Jul-2020	19.0	-	0.50	Low	0.30	0.50	Cobble	Gravel	100									
	65.7	MOR-ES-065.7-2020-07-31	31-Jul-2020	21.0	170	0.40	Medium	0.60	1.50	Gravel	Sand	30							20	30	20
	59.0	MOR-ES-059.0-2020-07-31	31-Jul-2020	21.3	180	0.40	Medium	0.40	0.70	Boulder	Gravel	40									60
	58.2	MOR-EF-058.2-2020-08-01	1-Aug-2020	19.6	180	0.30	Medium	0.25	0.40	Gravel	Silt	90									10
	58.0	MOR-AG-058.0-2020-08-01	1-Aug-2020	19.3	-	0.50	Low	0.30	0.90	Gravel	Sand	100									
	58.0	MOR-ES-058.0-2020-08-01	1-Aug-2020	19.4	180	0.35	Medium	0.40	1.00	Cobble	Boulder	10	10						60		20
	57.6	MOR-AG-057.6-2020-08-01	1-Aug-2020	19.3	-	0.50	Low	0.30	0.90	Cobble	Gravel	100									
	56.9	MOR-EF-056.9-2020-08-01	1-Aug-2020	19.6	180	0.30	Medium	0.35	0.60	Cobble	Gravel	60									40
	56.2	MOR-EF-056.2-2020-08-01	1-Aug-2020	19.6	180	0.30	Medium	0.30	0.50	Cobble	Gravel	80									20

…continued.

[a] A categorical ranking of water velocity (high = greater than 1.0 m/s; medium = 0.5 to 1.0 m/s; low = less than 0.5 m/s)

Table C1 Continued.

River	River Km	Site Name	Sample Date	Water Temp. (°C)	Water Cond. (µS/cm)	Secchi Depth (m)	Instream Velocity[a]	Mean Water Depth (m)	Maximum Water Depth (m)	Substrate		Cover Type - Percent of Available Cover (%)									
										Dominant	Sub-dominant	Interstices	Large Woody Debris	Small Woody Debris	Cutbank	Turbulence	Terrestrial Vegetation	Aquatic Vegetation	Shallow Water	Deep Water	Turbid Water
Moberly River	56.1	MOR-ES-056.1-2020-08-01	1-Aug-2020	19.4	180	0.35	Medium	0.50	1.00	Cobble	Gravel	20	5		10				60	5	
	56.0	MOR-AG-056.0-2020-08-01	1-Aug-2020	19.3	-	0.40	Low	0.30	0.60	Cobble	Gravel	100									
	55.0	MOR-ES-055.0-2020-08-01	1-Aug-2020	20.3	180	0.35	Medium	0.30	0.50	Cobble	Gravel	10							80		10
	54.3	MOR-EF-054.3-2020-08-01	1-Aug-2020	19.6	180	0.30	Medium	0.35	0.60	Gravel	Silt	95									5
	53.5	MOR-ES-053.5-2020-08-01	1-Aug-2020	20.3	180	0.35	-	0.40	1.20	Cobble	Gravel	30	10							30	30
	53.4	MOR-EF-053.4-2020-08-01	1-Aug-2020	20.8	170	0.30	Medium	0.35	0.60	Silt	Gravel	80	15								5
	53.3	MOR-AG-053.3-2020-08-01	1-Aug-2020	19.3	-	0.50	-	0.50	0.70	Cobble	Gravel	30		70							
	52.9	MOR-AG-052.9-2020-08-01	1-Aug-2020	19.3	-	0.40	Low	0.50	0.70	Cobble	Gravel	100									
	52.2	MOR-AG-052.2-2020-08-01	1-Aug-2020	20.5	-	0.40	Low	0.30	0.50	Gravel	Sand	100									
	51.8	MOR-ES-051.8-2020-08-01	1-Aug-2020	21.1	170	0.35	Medium	0.65	1.30	Cobble	Gravel	30	10							30	30
	51.7	MOR-EF-051.7-2020-08-01	1-Aug-2020	19.8	170	0.30	Low	0.25	0.40	Silt	Gravel	55	40								5
	51.1	MOR-AG-051.1-2020-08-01	1-Aug-2020	20.5	-	0.40	Low	0.40	0.90	Gravel	Sand	100									
	50.7	MOR-ES-050.7-2020-08-01	1-Aug-2020	21.1	170	0.40	Medium	0.60	1.20	Cobble	Gravel	30							10	40	20
	50.4	MOR-AG-050.4-2020-08-01	1-Aug-2020	20.5	-	0.50	Low	0.30	0.70	Gravel	Cobble	100									
	49.4	MOR-EF-049.4-2020-08-01	1-Aug-2020	20.8	170	0.30	Medium	0.00	0.00	Cobble	Boulder	70	25								5
	49.3	MOR-ES-049.3-2020-08-01	1-Aug-2020	21.8	160	0.35	Medium	0.60	1.10	Gravel	Cobble	20								40	40
	49.1	MOR-AG-049.1-2020-08-01	1-Aug-2020	21.0	-	0.50	-	0.40	0.80	Gravel	Sand	100									
	48.7	MOR-AG-048.7-2020-08-01	1-Aug-2020	21.0	-	0.40	Low	0.00	0.00	Cobble	Gravel	10		90							
	47.9	MOR-AG-047.9-2020-08-01	1-Aug-2020	20.8	-	0.50	-	0.50	1.10	Cobble	Gravel	100									
	47.6	MOR-ES-047.6-2020-08-01	1-Aug-2020	21.8	160	0.35	Medium	0.40	1.10	Cobble	Gravel	10								20	70
	46.0	MOR-ES-046.0-2020-08-02	2-Aug-2020	20.2	180	0.35	Medium	0.50	1.50	Cobble	Gravel				20		10		70		
	44.8	MOR-EF-044.8-2020-08-02	2-Aug-2020	20.2	170	0.30	Low	0.25	0.40	Silt	Gravel	80	15								5
	44.5	MOR-AG-044.5-2020-08-02	2-Aug-2020	19.5	-	0.50	Low	0.50	1.00	Cobble	Gravel	100									
	43.8	MOR-ES-043.8-2020-08-02	2-Aug-2020	22.1	170	0.35	Medium	0.40	1.20	Cobble	Gravel	10			10				10	40	30
	43.7	MOR-EF-043.7-2020-08-02	2-Aug-2020	20.8	130	0.20	Low	0.15	0.30	Gravel	Silt	80			5		15				
	43.6	MOR-EF-043.6-2020-08-02	2-Aug-2020	20.8	170	0.20	Low	0.20	0.35	Gravel	Silt	65	25								10

…continued.

[a] A categorical ranking of water velocity (high = greater than 1.0 m/s; medium = 0.5 to 1.0 m/s; low = less than 0.5 m/s)

Table C1 Continued.

River	River Km	Site Name	Sample Date	Water Temp. (°C)	Water Cond. (µS/cm)	Secchi Depth (m)	Instream Velocity[a]	Mean Water Depth (m)	Maximum Water Depth (m)	Substrate		Cover Type - Percent of Available Cover (%)									
										Dominant	Sub-dominant	Interstices	Large Woody Debris	Small Woody Debris	Cutbank	Turbulence	Terrestrial Vegetation	Aquatic Vegetation	Shallow Water	Deep Water	Turbid Water
Moberly River	42.9	MOR-AG-042.9-2020-08-02	2-Aug-2020	20.0	170	-	-	0.40	0.70	Cobble	Gravel	10		90							
	42.6	MOR-EF-042.6-2020-08-02	2-Aug-2020	20.8	170	0.25	Medium	0.20	0.30	Gravel	Cobble	85									15
	42.2	MOR-ES-042.2-2020-08-02	2-Aug-2020	22.1	170	0.35	Medium	0.60	1.10	Cobble	Gravel	30	20							20	30
	42.0	MOR-AG-042.0-2020-08-02	2-Aug-2020	20.5	170	0.50	Low	0.80	1.40	Cobble	Gravel	50								50	
	40.5	MOR-EF-040.5-2020-08-02	2-Aug-2020	23.1	180	0.20	Medium	0.20	0.50	Cobble	Gravel	80	5				5				10
	39.7	MOR-AG-039.7-2020-08-02	2-Aug-2020	23.0	170	0.40	Medium	0.50	1.80	Cobble	Gravel	55	15	5						15	10
	39.0	MOR-ES-039.0-2020-08-03	3-Aug-2020	19.4	190	0.50	Medium	0.60	1.20	Gravel	Cobble		5							30	65
	38.9	MOR-EF-038.9-2020-08-03	3-Aug-2020	10.2	320	0.10	Low	0.10	0.65	Gravel	Silt	55	25				15				5
	38.9	MOR-AG-038.9-2020-08-03	3-Aug-2020	17.0	-	-	Low	0.40	0.90	Gravel	Cobble									30	70
	38.8	MOR-AG-038.8-2020-08-08	8-Aug-2020	14.5	260	0.80	Medium	0.60	1.50	Gravel	Silt	65							5	20	10
	38.8	MOR-EF-038.8-2020-08-03	3-Aug-2020	20.1	210	0.25	Low	0.25	0.40	Gravel	Silt	85					10				5
	38.8	MOR-EF-038.8-2020-08-08	8-Aug-2020	14.5	260	0.80	Medium	0.30	0.75	Gravel	Silt	40	5						5	40	10
	38	MOR-EF-038.0-2020-08-03	3-Aug-2020	14.3	200	0.30	Low	0.20	1.00	Gravel	Cobble	70	10				5				15
	37.9	MOR-EF-037.9-2020-08-03	3-Aug-2020	19.4	190	to bottom	Low	0.25	0.80	Gravel	Silt	50	5	5	5		10				25
	37.9	MOR-AG-037.9-2020-08-03	3-Aug-2020	-	-	0.60	Low	1.10	1.60	Cobble	Gravel	10	1						10	39	40
	37.9	MOR-ES-037.9-2020-08-03	3-Aug-2020	20.0	180	0.40	Medium	0.80	1.20	Gravel	Cobble	10	20							20	50
	36.8	MOR-EF-036.8-2020-08-03	3-Aug-2020	18.8	320	0.30	Low	0.15	0.80	Gravel	Cobble	70	10				5				15
	36.7	MOR-AG-036.7-2020-08-03	3-Aug-2020	19.0	-	0.60	Low	1.70	3.00	Cobble	Gravel	95		5							
	35.7	MOR-ES-035.7-2020-08-03	3-Aug-2020	20.0	180	0.40	Medium	0.70	1.20	Gravel	Cobble	20	10				10			20	40
	35.4	MOR-AG-035.4-2020-08-03	3-Aug-2020	19.8	-	0.50	Low	0.30	0.50	Cobble	Gravel	70							30		
	34.1	MOR-AG-034.1-2020-08-03	3-Aug-2020	-	-	-	-	0.00	0.00	Cobble	Gravel	Not Recorded									
	33.5	MOR-AG-033.5-2020-08-03	3-Aug-2020	-	-	-	-	0.00	0.00	Cobble	Sand	Not Recorded									
	33.4	MOR-ES-033.4-2020-08-03	3-Aug-2020	20.0	180	0.40	Medium	0.70	1.20	Gravel	Cobble	20	5				5			10	60
	31.5	MOR-ES-031.5-2020-08-04	4-Aug-2020	18.5	180	0.30	Medium	0.45	1.30	Cobble	Gravel	20	20	10						20	30
	31.4	MOR-EF-031.4-2020-08-04	4-Aug-2020	14.0	180	0.05	Low	0.05	0.65	Gravel	Sand	50								30	20
	30.9	MOR-AG-030.9-2020-08-04	4-Aug-2020	18.0	-	0.40	Low	1.00	2.20	Gravel	Sand									100	

…continued.

[a] A categorical ranking of water velocity (high = greater than 1.0 m/s; medium = 0.5 to 1.0 m/s; low = less than 0.5 m/s)

Table C1 Continued.

River	River Km	Site Name	Sample Date	Water Temp. (°C)	Water Cond. (µS/cm)	Secchi Depth (m)	Instream Velocity[a]	Mean Water Depth (m)	Maximum Water Depth (m)	Substrate		Cover Type - Percent of Available Cover (%)								
										Dominant	Sub-dominant	Interstices	Large Woody Debris	Small Woody Debris	Cutbank	Turbulence	Terrestrial Vegetation	Aquatic Vegetation	Shallow Water	Deep Water	Turbid Water
Moberly River	30.9	MOR-EF-030.9-2020-08-04	4-Aug-2020	18.5	180	0.80	Low	0.20	0.60	Silt	Gravel	40	10	10			10				30
	30.8	MOR-EF-030.8-2020-08-04	4-Aug-2020	18.5	180	0.30	Medium	0.40	0.70	Cobble	Gravel	60									40
	30.7	MOR-AG-030.7-2020-08-04	4-Aug-2020	19.0	-	0.40	Low	0.40	0.90	Gravel	Cobble	80							20		
	30.2	MOR-ES-030.2-2020-08-04	4-Aug-2020	18.4	180	0.25	-	0.45	1.10	Gravel	Cobble				10					20	70
	30	MOR-AG-030.0-2020-08-04	4-Aug-2020	-	-	-	-	0.00	0.00	-	-	Not Recorded									
	29.8	MOR-EF-029.8-2020-08-04	4-Aug-2020	18.5	180	0.40	Medium	0.30	0.70	Gravel	Silt	25	5				10				60
	28.7	MOR-AG-028.7-2020-08-04	4-Aug-2020	-	-	-	-	0.00	0.00	-	-	Not Recorded									
	28.7	MOR-EF-028.7-2020-08-04	4-Aug-2020	18.5	180	0.15	Low	0.30	0.50	Gravel	Cobble	70					10		20		
	28.7	MOR-ES-028.7-2020-08-04	4-Aug-2020	18.5	180	0.20	High	0.45	1.00	Cobble	Boulder	50									50
	28.6	MOR-AG-028.6-2020-08-04	4-Aug-2020	19.0	-	-	-	0.00	0.00	Cobble	Boulder	Not Recorded									
	28.3	MOR-AG-028.3-2020-08-04	4-Aug-2020	20.0	-	-	-	0.00	0.00	Cobble	Sand	Not Recorded									
	27	MOR-AG-027.0-2020-08-04	4-Aug-2020	-	-	-	-	0.00	0.00	Cobble	Gravel	Not Recorded									
	26.5	MOR-AG-026.5-2020-08-04	4-Aug-2020	19.0	-	-	-	0.00	0.00	Gravel	Cobble	Not Recorded									
	26	MOR-ES-026.0-2020-08-04	4-Aug-2020	18.5	180	0.20	Medium	0.45	1.00	Cobble	Gravel	40								20	40
	25.7	MOR-EF-025.7-2020-08-04	4-Aug-2020	18.5	180	0.50	Low	0.30	0.70	Gravel	Silt	30		5			10			5	50
	24.9	MOR-AG-024.9-2020-08-04	4-Aug-2020	19.0	-	0.40	Low	0.20	0.50	Cobble	Gravel	20		80							
	24.8	MOR-EF-024.8-2020-08-04	4-Aug-2020	18.5	180	0.20	Medium	0.35	1.00	Gravel	Cobble	10	10				10			70	
	24.2	MOR-ES-024.2-2020-08-04	4-Aug-2020	18.5	170	0.20	Medium	0.50	1.20	Cobble	Gravel		50							50	
	22.9	MOR-AG-022.9-2020-08-04	4-Aug-2020	19.0	-	0.40	Low	0.30	0.80	Gravel	Cobble	75	5						20		
	22.4	MOR-EF-022.4-2020-08-05	5-Aug-2020	17.3	200	0.40	Medium	0.30	0.80	Gravel	Silt	10	20							20	50
	22.3	MOR-EF-022.3-2020-08-05	5-Aug-2020	18.3	200	0.25	Low	0.30	0.50	Gravel	Silt	45	40				5				10
	22.3	MOR-ES-022.3-2020-08-05	5-Aug-2020	18.0	180	0.30	Medium	0.35	1.10	Gravel	Cobble	10	20						10	40	20
	22	MOR-AG-022.0-2020-08-05	5-Aug-2020	19.0	-	0.30	Low	0.40	0.80	Cobble	Gravel	100									
	21.7	MOR-EF-021.7-2020-08-05	5-Aug-2020	19.1	200	0.25	Medium	0.35	0.90	Gravel	Silt	30	10	10			5			5	40
	21.1	MOR-EF-021.1-2020-08-05	5-Aug-2020	18.5	180	0.30	Low	0.15	0.30	Gravel	Cobble	35	15						30		20
	21.1	MOR-ES-021.1-2020-08-05	5-Aug-2020	18.5	180	0.30	Medium	0.45	1.00	Gravel	Cobble	20	30							20	30

…continued.

[a] A categorical ranking of water velocity (high = greater than 1.0 m/s; medium = 0.5 to 1.0 m/s; low = less than 0.5 m/s)

Table C1 Continued.

River	River Km	Site Name	Sample Date	Water Temp. (°C)	Water Cond. (µS/cm)	Secchi Depth (m)	Instream Velocity[a]	Mean Water Depth (m)	Maximum Water Depth (m)	Substrate		Cover Type - Percent of Available Cover (%)								
										Dominant	Sub-dominant	Interstices	Large Woody Debris	Small Woody Debris	Cutbank	Turbulence	Terrestrial Vegetation	Aquatic Vegetation	Shallow Water	Deep Water	Turbid Water
Moberly River	21	MOR-AG-021.0-2020-08-05	5-Aug-2020	19.0	-	0.30	Low	0.40	1.00	Gravel	Cobble	65		5							30
	20.7	MOR-AG-020.7-2020-08-05	5-Aug-2020	19.0	-	0.30	Low	0.30	0.70	Cobble	Gravel	68		2					30		
	19	MOR-AG-019.0-2020-08-05	5-Aug-2020	-	-	0.40	Low	0.40	0.90	Gravel	Cobble	70							30		
	18.2	MOR-ES-018.2-2020-08-05	5-Aug-2020	18.5	180	0.30	Medium	0.40	1.30	Cobble	Gravel	20	20							20	40
	17.3	MOR-AG-017.3-2020-08-05	5-Aug-2020	20.0	-	0.50	Low	0.45	1.20	Gravel	Cobble	70							10	20	
	17.3	MOR-EF-017.3-2020-08-05	5-Aug-2020	21.5	200	0.30	Medium	0.40	0.90	Gravel	Silt	25			5		10			10	50
	16.7	MOR-AG-016.7-2020-08-05	5-Aug-2020	21.0	-	0.40	Low	0.50	1.10	Gravel	Cobble	100									
	16.7	MOR-ES-016.7-2020-08-05	5-Aug-2020	21.6	210	0.30	Medium	0.50	1.00	Cobble	Gravel	20	20							40	20
	16.2	MOR-EF-016.2-2020-08-05	5-Aug-2020	21.5	200	0.30	Medium	0.50	0.80	Gravel	Silt	23	5	5	2		20			5	40
	14.9	MOR-AG-014.9-2020-08-16	6-Aug-2020	13.0	-	0.50	Low	0.40	0.70	Cobble	Gravel	80	10	10							
	14.9	MOR-ES-014.9-2020-08-06	6-Aug-2020	18.0	-	0.30	Medium	0.50	1.00	Gravel	Cobble	10	20		10				10	30	20
	14.4	MOR-EF-014.4-2020-08-06	6-Aug-2020	18.4	210	0.30	Medium	0.30	0.60	Gravel	Silt	20								10	70
	14.2	MOR-EF-014.2-2020-08-06	6-Aug-2020	18.5	210	0.30	Medium	0.30	0.70	Gravel	Silt	15	10	5						20	50
	14	MOR-AG-014.0-2020-08-06	6-Aug-2020	13.0	-	0.50	Low	0.40	0.60	Cobble	Gravel	90		10							
	13.7	MOR-EF-013.7-2020-08-06	6-Aug-2020	18.0	210	0.30	Low	0.25	0.60	Gravel	Sand	20	10							30	40
	13.7	MOR-ES-013.7-2020-08-06	6-Aug-2020	18.5	210	0.30		0.50	1.00	Cobble	Boulder	30	20							20	30
	13.5	MOR-AG-013.5-2020-08-06	6-Aug-2020	13.0	-	0.50	Low	0.40	0.70	Cobble	Gravel	95		5							
	13	MOR-AG-013.0-2020-08-06	6-Aug-2020	17.5	-	0.40	Low	0.40	1.00	Gravel	Cobble	70							30		
	12.4	MOR-EF-012.4-2020-08-06	6-Aug-2020	18.5	210	0.30	Medium	0.30	0.60	Gravel	Silt	20	5				20			5	50
	12.3	MOR-ES-012.3-2020-08-06	6-Aug-2020	18.5	210	0.30	Medium	0.45	0.70	Cobble	Gravel	30	10	10					20		30
	12	MOR-AG-012.0-2020-08-06	6-Aug-2020	17.0	-	0.40	Low	0.40	0.60	Cobble	Boulder	100									
	10	MOR-AG-010.0-2020-08-06	6-Aug-2020	17.5	-	0.10	Medium	0.50	1.10	Gravel	Sand								40	60	
	9.8	MOR-EF-009.8-2020-08-06	6-Aug-2020	18.5	210	0.30	Medium	0.50	1.00	Silt	Gravel	10	20	10							60
	9.7	MOR-ES-009.7-2020-08-06	6-Aug-2020	19.0	210	0.20	Medium	0.45	0.80	Cobble	Gravel	20	10						10	30	30
	8.7	MOR-EF-008.7-2020-08-06	6-Aug-2020	18.5	210	0.30	Medium	0.40	0.80	Silt	Gravel	20	10	5							65
	8.6	MOR-AG-008.6-2020-08-06	6-Aug-2020	17.0	-	0.15	Low	0.00	0.00	Cobble	Gravel	80		20							

…continued.

[a] A categorical ranking of water velocity (high = greater than 1.0 m/s; medium = 0.5 to 1.0 m/s; low = less than 0.5 m/s)

Table C1 Concluded.

River	River Km	Site Name	Sample Date	Water Temp. (°C)	Water Cond. (µS/cm)	Secchi Depth (m)	Instream Velocity[a]	Mean Water Depth (m)	Maximum Water Depth (m)	Substrate		Cover Type - Percent of Available Cover (%)								
										Dominant	Sub-dominant	Interstices	Large Woody Debris	Small Woody Debris	Cutbank	Turbulence	Terrestrial Vegetation	Aquatic Vegetation	Shallow Water	Deep Water	Turbid Water
Moberly River	7.7	MOR-AG-007.7-2020-08-06	6-Aug-2020	17.8	-	0.15	Medium	0.60	1.10	Cobble	Gravel		20							40	40
	7.5	MOR-ES-007.5-2020-08-06	6-Aug-2020	19.0	210	0.20	Medium	0.40	0.75	Cobble	Gravel	25	10						20	20	25
	6.7	MOR-EF-006.7-2020-08-06	6-Aug-2020	20.7	220	0.20	Low	0.40	0.80	Silt	Gravel	20								80	
	6	MOR-AG-006.0-2020-08-06	6-Aug-2020	18.0	-	0.15	Medium	0.00	0.00	Gravel	Cobble	50							50		
	6	MOR-ES-006.0-2020-08-06	6-Aug-2020	19.0	210	0.20	Medium	0.50	0.70	Cobble	Gravel	20	20						20	20	20
	5.1	MOR-EF-005.1-2020-08-06	6-Aug-2020	20.5	210	0.20	Medium	0.00	0.00	Gravel	Silt	10	10								80
	3.3	MOR-AG-003.3-2020-08-07	7-Aug-2020	16.0	-	0.20	Low	0.50	1.40	Cobble	Gravel	40							10	50	
	3.3	MOR-ES-003.3-2020-08-07	7-Aug-2020	16.0	220	0.15	Medium	0.40	0.70	Gravel	Cobble	20							10	40	30
	2.8	MOR-EF-002.8-2020-08-07	7-Aug-2020	16.5	220	0.25	Medium	0.40	0.80	Gravel	Silt	30	10	5						5	50
	2.7	MOR-AG-002.7-2020-08-07	7-Aug-2020	16.0	-	0.20	Low	0.50	0.90	Cobble	Gravel								50	40	10
	2.3	MOR-EF-002.3-2020-08-07	7-Aug-2020	16.5	220	0.30	Medium	0.00	0.00	-	-	30	10							10	50
	2	MOR-ES-002.0-2020-08-07	7-Aug-2020	16.0	220	0.15	Medium	0.45	0.70	Gravel	Cobble	30	10	10						30	20
	1.5	MOR-AG-001.5-2020-08-07	7-Aug-2020	16.0	-	0.20	Low	0.50	1.00	Cobble	Gravel	100									
	1.1	MOR-AG-001.1-2020-08-07	7-Aug-2020	16.0	-	0.20	Low	0.40	0.60	Cobble	Gravel	34							33	33	

[a] A categorical ranking of water velocity (high = greater than 1.0 m/s; medium = 0.5 to 1.0 m/s; low = less than 0.5 m/s)

golder.com