Site C Clean Energy Project

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

Construction Year 10 (2024)

Demitria Burgoon, RPBio
WSP Canada Inc.

Dustin Ford, RPBio
WSP Canada Inc.

28 March 2024

REPORT

2024 Annual Report

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

Submitted to:

BC Hydro
333 Dunsmuir St, 13th floor
Vancouver, BC V6B 5R3

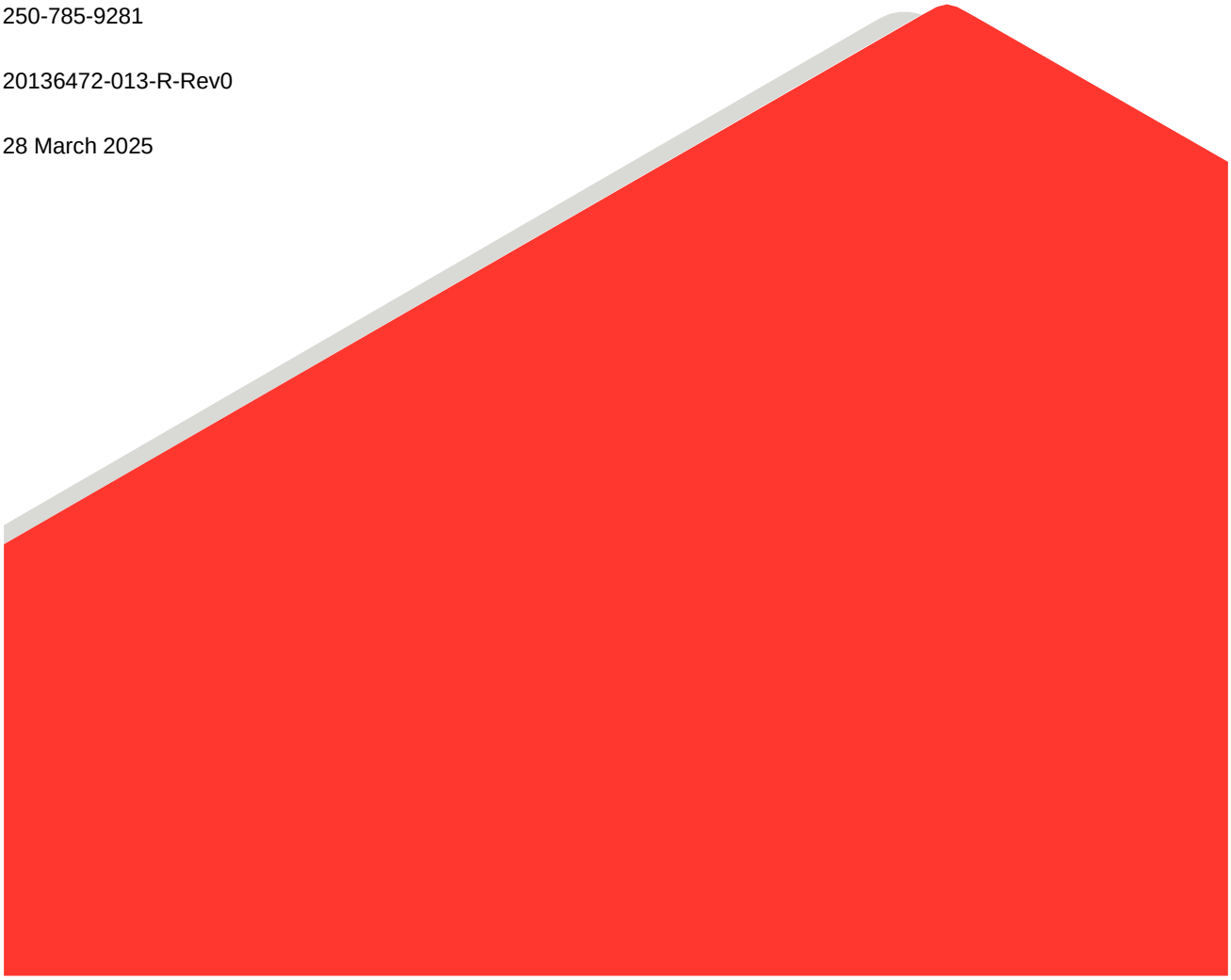
Submitted by:

WSP Canada Inc.
10803 91st Ave Unit A
Fort St. John, BC
V1J 6L3 Canada

250-785-9281

20136472-013-R-Rev0

28 March 2025



Distribution List

BC Hydro - 1 electronic copy

WSP Canada Inc. - 1 electronic copy

Suggested Citation: WSP Canada Inc. 2025. Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c) – 2024 investigations - Draft. Report prepared for BC Hydro, Vancouver, British Columbia. WSP Report No. 20136472-013-R-Rev0: 47 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 2024, 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. Sampling conducted in 2024 represents the fourth year of sampling after the commencement of the river diversion phase of Project construction (3 October 2020).

Backpack electrofishing was the primary sampling method for all streams, except the Moberly River, where a combination of backpack electrofishing and angling was used. Field methods, target species, and sampled streams were consistent from 2020 to 2024, with the exception of small fish boat electroshocking in the Moberly River. In 2024, small fish boat electroshocking was not conducted in the Moberly River due to low water levels.

Tissue and ageing structure samples were collected from select species and locations for potential 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 are 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. For Fiddes Creek, only portions of the stream that were readily accessible by helicopter were sampled. These locations were assumed to be representative of the overall stream.

[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 2024 survey are summarized as follows:

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

- A total of 832 Bull Trout were captured in the Chowade River, and Cypress and Fiddes creeks combined. Of this total, 563 Bull Trout were implanted with PIT tags. Captured Bull Trout included young-of-the-year (YOY) and immature life stages.
- Three immature Bull Trout that were initially captured and tagged in 2023 were recaptured during the 2024 survey. Each of these Bull Trout were recaptured within 200 m of their original capture location.
- When comparing Bull Trout catch rates in the Chowade River and Cypress and Fiddes creeks among years, catch per unit effort (CPUE) for YOY and immature Bull Trout from 2017 to 2024 CPUE varied year to year. In Fiddes Creek, the CPUE recorded for YOY Bull Trout in 2024 decreased from the highest CPUE recorded in 2023.
- Overall, the findings of 2024 indicate that Bull Trout successfully spawned within these systems in 2023, based on the presence of YOY in 2024, and recruitment to the immature Bull Trout population was strong in recent years for all three streams.
- Consistent with results from 2017 to 2023, Arctic Grayling were not recorded in the Chowade River or in Cypress or Fiddes creeks in 2024. Eight immature Rainbow Trout were recorded in the Chowade River and six Rainbow Trout (one adult and five immature) were recorded in Cypress Creek. One adult Rainbow Trout was recorded in Fiddes creeks.
- Two Bull Trout that were originally captured and tagged in the Chowade River during earlier study years of the Site C Reservoir Tributaries Fish Population Indexing Survey were recaptured in the Peace River in 2024. One immature Bull Trout originally captured and tagged in 2022 was recaptured in the Peace River near River Km 111.0 (as measured downstream from W.A.C. Bennett Dam) during the Peace River Large Fish Indexing Survey (Mon-2, Task 2a). One adult Bull Trout originally captured and tagged in Chowade River in 2020 was subsequently recaptured in the Peace River five times during various Peace River fisheries studies. All five of these encounters were downstream of the Project.

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

- A total of 270 Rainbow Trout were captured in Colt, Farrell, Kobes, and Maurice creeks combined. Of this total, 145 were implanted with PIT tags. No Rainbow Trout were recaptured in 2024.
- Two Bull Trout recaptured in Maurice Creek in 2024 were originally captured and tagged in 2023 (one in Maurice Creek as part of the current study and one in the Peace River upstream of the Maurice Creek confluence as part of Mon-2, Task 2a).
- In 2024, YOY Rainbow Trout were not captured in any of the tributaries sampled, suggesting low recruitment. This finding is consistent with previous years (2017 to 2023) where total catch of YOY Rainbow Trout in all tributaries was low and ranged between 0 and 29 individuals per year (all tributaries combined). The low total catch rate for YOY may also be more an artefact of the capture method and survey timing.
- There was a decrease in CPUE for immature Rainbow Trout in all tributaries between 2023 and 2024, with substantial decreases observed in Farrell and Kobes creeks.

- It is unknown whether Rainbow Trout from Farrell and Maurice creeks are a local resident population or are offspring of the Peace River Rainbow Trout population. One immature Rainbow Trout was captured and PIT-tagged in Maurice Creek in 2023. This Rainbow Trout was recaptured in the Peace River near River Km 107.0 in 2024 during Mon-2, Task 2a. Rainbow Trout originally PIT-tagged in the Peace River have not been detected in Farrell or Maurice creeks. However, radio tagged adult Rainbow Trout have been detected in Farrell Creek as far upstream as 117 km, and in Maurice Creek as far upstream as 1.9 km. These movements were detected as part of the Site C Fish Movement Assessment (Mon-1b, Task 2d) and indicate use of these systems by the Peace River Rainbow Trout population.

Tributaries Targeting Arctic Grayling (Moberly River)

- A total of seven Arctic Grayling were captured in the Moberly River in 2024. Of these seven fish, two were implanted with PIT tags. Captured Arctic Grayling included YOY and immature life stages (i.e., adult Arctic Grayling were not encountered during the 2024 survey).
- The majority of Arctic Grayling captured in 2024 were found in Section MR-S7. The habitat in this section of the Moberly River includes irregular meandering channels that were highly braided, with multiple side channels. There was evidence of groundwater upwelling within some of these side channels.

ACKNOWLEDGEMENTS

We acknowledge this research was conducted on the traditional territory of Treaty 8 First Nations of Dunne Zaa, Cree, and Tse'khene cultural descent.

The Site C Reservoir Tributaries Fish Population Indexing Survey is funded by BC Hydro's Site C Clean Energy Project. WSP Canada Inc. would like to thank the following individuals for their contributions to the program:

BC Hydro

Nich Burnett	Vancouver, BC
Dave Hunter	Vancouver, BC
Brent Mossop	Vancouver, BC

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
Aaron Burkell	Field Technician
Mike Marquardson	Field Technician
Carly Walters	Field Technician

The following employees of ***WSP Canada Inc.*** contributed to the collection of data and preparation of this report:

Demitria Burgoon	Project Manager/Author
Dustin Ford	Project Director/Editor
Beth Thompson	Indigenous Relations Lead
Tammy Huang	Biologist
Kevin Little	Biologist
Riley Jellicoe	Biologist
David Roscoe	Biologist
Josh Sutherby	Biologist
Geraldine Davis	Biological Technician
Natasha Audy	Biological Technician
Tristin Vandermeulen	Biological Technician
Chris King	Biological Technician
Geoff Sawatzky	Biological Technician
Mandy Hansen	GIS Technician
Jamie Goodier	GIS Technician
Carrie McAllister	Project Coordinator
Laurie Ell	Office Administration
Neiel Johnson	Warehouse Manager
Mike Braeuer	Warehouse Manager

LIST OF ACRONYMS AND ABBREVATIONS

Acronym	Description
BTIPM	Bull Trout Integrated Population Model
CPUE	Catch per unit effort
EAC	Environmental Assessment Certificate
EIS	Environmental Impact Statement
FAHMFP	Fisheries and Aquatic Habitat Monitoring and Follow-up Program
FL	Fork Length
HDX	Half-Duplex
Mon-1b	Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program
Mon-2	Peace River Fish Community Monitoring Program
Mon-15	Site C Small Fish Translocation 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
Task 2d	Site C Fish Movement Assessment
TUF	Temporary Upstream Fish Passage Facility
YOY	Young-of-the-year

Table of Contents

TABLES

FIGURES

APPENDICES

1.0 INTRODUCTION

In accordance with Provincial Environmental Assessment Certificate (EAC) Condition No. 7 and Federal Decision Statement Condition Nos. 8.4.3 and 8.4.4 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). 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 2024 findings of Task 2c.

This is the ninth year of a multi-year study, and the data collected in 2024 represents the fourth year of sampling conducted after the Project entered the river diversion phase of construction, which commenced on 3 October 2020. After this date, the entire flow of the Peace River was diverted through two tunnels routed along the left bank (as viewed facing downstream) of the Peace River, to allow for further construction activities associated with the Project. The diversion tunnels allow for downstream fish movement, but do not allow for upstream movement due to high water velocities within the tunnels. During river diversion, upstream fish movement was facilitated by the temporary upstream fish passage facility (TUF), which operates from 1 April to 31 October of each year (McMillen and BC Hydro 2021).

During Task 2c's 2016 survey, reconnaissance surveys were conducted that consisted of a broad spatial scope within each of the sampled tributaries (Golder 2017). During the 2017 to 2024 surveys (Golder 2018, 2019, 2020a, 2021a, 2022a; WSP 2023a, WSP 2024a), methods were similar and focused on key areas that were identified during the 2016 reconnaissance surveys.

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[5]. The Halfway River is known to be an important watershed for spawning by Peace River Bull Trout (Geraldes and Taylor 2024; Putt et al. 2024; 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. 2024). 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:

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

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

A program dedicated to monitoring immature Bull Trout abundance in the Halfway River watershed had not been implemented prior to 2016, although incidental catches were noted during some studies (e.g., Mainstream 2009a, 2010, 2011a, 2013). The current year (2024) represented the fourth year of the study since the onset of river diversion associated with the Project. The current year is the third year in which the young-of-the-year (YOY) Bull Trout captured during the study could have been the offspring of adult Bull Trout that migrated into the Halfway River watershed after river diversion had started.

An objective of the 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 components of the FAHMFP) into the Bull Trout Integrated Population Model (BTIPM; ESSA et al. 2020) to evaluate juvenile-to-adult survival and to generate population abundance estimates. The outputs from the BTIPM will be used to monitor changes in the Halfway River Bull Trout population over time and 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, 2022, 2023, 2024; Putt et al. in prep.). 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 2024 were selected based on locations sampled in previous years where catches of Bull Trout were high (Golder 2017, 2018, 2019, 2020a, 2021a, 2022a; WSP 2023a, WSP 2024a) and sections previously identified as important for spawning Bull Trout (Euchner and Mainstream 2013). Sampling effort from 2017 to 2024 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[6] 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[7], as alternative tributaries to monitor local Rainbow Trout populations. The sites established in Farrell, Colt, and Kobes creeks in 2017 were replicated from 2018 to 2024. In 2020, sampling was conducted in Maurice Creek for the first time under the FAHMFP. Sampling in Maurice Creek was repeated at the same locations from 2021 to 2024.

[6] 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/.

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

Farrell and Maurice creeks both flow directly into the Peace River. Farrell Creek flows into the Peace River approximately 23.5 km downstream of Peace Canyon Dam (PCD) and Maurice Creek flows into the Peace River approximately 7 km downstream of PCD. Sampling in Farrell and Maurice creeks 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 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. Furthermore, the subsequent detection of Rainbow Trout, that were initially tagged as YOY or immature fish in Farrell or Maurice creeks, in the Peace River mainstem will provide confirmation that these systems are used for spawning by the Peace River Rainbow Trout population.

Rainbow Trout populations in Kobes and Colt creeks were also assessed in 2024. 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 between study years in the Halfway River watershed.

1.3 Arctic Grayling

The Project's EIS describes key uncertainties for the Peace River Arctic Grayling population upstream of the Project[8]. 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 2024 was conducted to add to the existing dataset (e.g., Mainstream 2013) to further describe the fish community located within and upstream of the Site C reservoir inundation zone and improve understanding of the Moberly River Arctic Grayling population. Collected data will be used to test Hypothesis #5 from the Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program:

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

To test the above hypothesis, the presence of YOY Arctic Grayling in the 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.

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

2.0 METHODS

2.1 Study Area

The Task 2c study area includes tributaries that were previously identified as having key habitats for migratory Peace River Bull Trout, Rainbow Trout, and Arctic Grayling populations (Appendix A, Figures A1 to A10). The sections of each tributary that were sampled depended on sampling logistics and the species-specific hypotheses being tested. Results from the previous eight years of the survey (2016 to 2023) were used to guide sample site selection with a focus on reaches and habitat types with higher densities of the target fish species. Target fish species within the tributaries sampled in 2024 are summarized in Table 1.

Table 1: Summary of target species by watershed for the Site C Reservoir Tributaries Fish Population Indexing Survey, 2024.

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

[a] "x" denotes main target species for the tributary; "o" denotes secondary target species for the tributary; "-" denotes not a target species for the tributary.

River Km values presented in this report were generated by WSP in 2021 based on the most applicable vector data available from the following sources: Altalis[9], BC Freshwater Atlas[10], and CanVEC[11]. 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).

2.1.1 Tributaries Targeting Bull Trout

Tributaries sampled in 2024 included the Chowade River and Cypress and Fiddes creeks (Table 1). Sampling in the Chowade River was conducted between River Km 27.5 and River Km 49.5, 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 28.9 and River Km 37.4, as measured upstream from Cypress Creek's confluence with the Halfway River (Appendix A, Figure A3). Sampling in 2024 within Fiddes Creek was conducted between River Km 7.3 and River Km 12.2 as measured upstream from Fiddes Creek's confluence with the Halfway River (Appendix A, Figure A2).

UTMs of sample site locations in the Chowade River, and Cypress and Fiddes creeks are provided in Appendix A, Table A1. Individual sites were identified during an aerial survey conducted at the start of the field program. This survey allowed the crew to identify sites within potentially suitable immature Bull Trout habitat that were close to safe landing locations.

[9] Available for download at https://www.altalis.com/.

[10] Available for download at https://www2.gov.bc.ca/gov/content/data/geographic-data-services/topographic-data/freshwater.

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

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. in progress). These arrays were also intended to detect fish captured and implanted with PIT tags deployed during the following components of the FAHMFP:

- Peace River Large Fish Indexing Survey (Mon-2, Task 2a; e.g., WSP 2024b)
- Site C TDG Monitoring Program (Mon-11; e.g., WSP in progress)
- Offset Effectiveness Monitoring (Mon-2, Task 2d; e.g., WSP 2024c)
- Fish Composition and Abundance Survey (Mon-2, Task 2b; Triton 2021)
- Operation of the temporary upstream fish passage facility (McMillen and BC Hydro 2021)
- Site C Contingent Boat Electroshocking (WSP 2025)

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, these data are provided under Mon-1b, Task 2b (e.g., Putt et al. in progress).

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.

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). Sampling was conducted at the same locations in Colt and Kobes creeks each year from 2018 to 2024.

Sample locations within Maurice Creek (Appendix A, Figure A8) were established during the 2020 survey (Golder 2021a). Eight sample 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. Sampling was conducted at the same sites in Maurice Creek from 2020 to 2024.

UTMs of sample site locations in Farrell, Colt, Kobes, and Maurice creeks are provided in Appendix A, Table A1.

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 2024 to maintain consistency with these baseline datasets (Appendix A, Table A2). Mainstreams delineations did not assign the portion of the river between River Km 112 and 105 to a specific section; this portion of the river has been termed Section MR-S1B for the current study (Appendix A, Figure A9).

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.

UTMs of sample site locations in the Moberly River are provided in Appendix A, Table A1.

2.2 Study Period

In 2024, 23 days of sampling were conducted between mid-June and the beginning of August (all watersheds combined; Table 2). Previous studies had documented a 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 5 days between 27 July and 2 August. One day of sampling was conducted in Fiddes Creek on 1 August. The 2024 study periods for the Chowade River and Cypress and Fiddes creeks surveys were similar to the timing of the 2016 to 2023 study periods.

Farrell, Colt, Kobes, and Maurice creeks were sampled over seven days between 19 and 24 June and 10 July (Table 2). Sampling in these streams was conducted earlier in 2024 compared to the 2016 to 2022 surveys, and similar to the timing of the 2023 survey. The 2024 survey was conducted earlier than normal to ensure the survey was conducted under optimal environmental conditions (i.e., ideal water levels and water temperatures). These conditions were present in the study area earlier than normal in 2023 and 2024 due to a low snowpack and unseasonably warm weather in both study years.

The Moberly River was sampled over nine days between 7 and 11 June and 20 and 23 July (Table 2). Rather than aligning with historical surveys conducted on the Moberly River (e.g., Mainstream 2011b; Golder 2017, 2018, 2019, 2020a, 2021a, 2022a) or a specific calendar date, the 2024 survey was conducted similar to the 2023 survey (WSP 2024a) and aligned with appropriate flow conditions for the sampling methods to increase the likelihood of encountering Arctic Grayling. Based on the results of previous study years, Moberly River discharges between 15 and 17 m^3/s are preferred.

Table 2: Sampling schedule by tributary for the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2024.

Target Species	Tributary	Sample Dates	Number of Sampling Days
Bull Trout	Chowade River	26 and 27 July; 2 August	3
	Cypress Creek	29 and 30 July; 2 August	3
	Fiddes Creek	1 August	1
Rainbow Trout	Farrell Creek	22 June and 10 July	2
	Colt Creek	23 and 24 June	2
	Kobes Creek	21 and 22 June	2
	Maurice Creek	19 and 20 June	2
Arctic Grayling	Moberly River	7 - 11 June and 20 - 23 July	9

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)[12] 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. (in progress).

Discharge data for the Moberly River are from the Water Survey of Canada's Moberly River station (Station Number 07FB008)[13], 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 2024 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 Temperature

Continuous water temperature data were collected at the Chowade and Moberly rivers and at Colt, Cypress, Farrell, Fiddes, Kobes, and Maurice creeks. Between two and four HOBO UTBI-001 TidbiT v2 Water Temperature Data Loggers (Onset Computer Corp., Bourne, Massachusetts, USA) were installed in each stream beginning in 2019 (Table 3). Two temperature data loggers were installed in 2020 in Maurice Creek and an additional two temperature loggers were installed in this stream in 2023 (Table 3). Multiple loggers were deployed in each tributary for redundancy. Loggers were deployed in locations with sufficient water depth and secured to the shore via steel cable. The loggers were secured in perforated PVC housings attached to a weight (i.e., concrete blocks or steel rail plates). Each logger was set to record every

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

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

15 minutes. During the 2024 study period, the loggers were retrieved and downloaded, the integrity of each station was assessed for wear and maintenance was conducted, if required, before the loggers were redeployed. Locations of the temperature loggers are provided in Appendix A; Table A3.

Temperature data were cleaned and data from multiple temperature loggers were compared to each other to identify outliers. Time periods where the loggers recorded temperatures below 0.0°C were removed from the dataset and not presented in the figures as it was assumed that the logger was either out of water or encased in ice during these periods. Data from multiple temperature logger were presented together if a single logger did not provide a full dataset.

Table 3: Temperature logger by tributary for the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon 1b, Task 2c), 2024.

Tributary	Download Date	Temperature Logger Number	Battery Level (%)	Comments
Maurice Creek	20 June	21418950	93	Left bank (as viewed facing downstream) tied to a white spruce tree stump
		21733314	100	Right bank tied to white spruce tree
		21764083	93	Left bank tied to a birch tree stump
		21418911	93	Left bank tied to white spruce tree stump
Kobes Creek	21 June	10930722	73	Left bank upstream of bridge
		20562512	93	Right bank upstream of bridge
		21087156	100	Right bank downstream of bridge
		21087157	93	Right bank downstream of bridge
Farrell Creek	10 July	20615716	100	Left bank downstream of bridge tied to white spruce tree
		20655128	100	Right bank upstream bridge tied to boulder
		21065262	100	Right bank downstream of bridge tied to white spruce tree
Colt Creek	23 June	20615749	100	Right bank at bridge
		20823376	100	Right bank upstream of bridge
		21065263	86	Right bank upstream of bridge
		21087158	93	Right bank upstream of bridge
Moberly River	11 June	21733703	100	Left bank downstream of bridge
		21418934	100	Left bank downstream of bridge
Fiddes Creek	1 August	20615751	100	Left bank tied to white spruce tree
		20562511	86	Left bank tied to white spruce tree
Chowade River	2 August	20615748	100	Right bank downstream of bridge tied to alder tree
		21065253	95	Added 2-Aug-24; original tidbit missing; Right bank downstream of bridge tied to boulder
		20615714	100	Right bank downstream of bridge
Cypress Creek	2 August	20562503	79	Right bank tied to alder tree
		20655127	100	Right bank downstream of bridge
		21764091	93	Right bank downstream of bridge

2.5 Fish Capture

2.5.1 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 typically located in side-channels or braided sections of the stream that had abundant physical cover, channel widths less than approximately 3 m, mean water depths less than 0.3 m, and water velocities less than 1.0 m/s. Most sites in the Chowade River and Cypress and Fiddes creeks were dominated by cobble and gravel substrates providing abundant interstitial habitat. 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 90 to 400 m. Differences in water elevations and habitat suitability at specific locations among 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 2024 were also sampled in study years 2017 to 2023. 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 Rainbow Trout densities were expected to be high. The sites sampled on Maurice Creek in 2024 were also sampled in 2020 to 2023. These sites 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. Electrofishing occurred with each crew walking in an upstream direction. Captured fish were netted and transferred to 20 L water-filled buckets equipped with battery-operated aerators (Marine Metal, Clearwater, Florida, USA). Smith-Root™ Model 12 and Model 12B backpack electrofishers (Smith-Root, Vancouver, WA, USA) were used, depending on availability. Electrofisher settings were adjusted as needed to minimize injuries to fish while efficiently capturing the target size and species. Voltage ranged from 300 to 700 V, frequency was set at 60 Hz, and pulse width was 6 ms.

Habitat variables recorded at each site in 2024 (Table 4) were consistent with previous study years (Golder 2017, 2018, 2019, 2020a, 2021a, 2022a; WSP 2023a, 2024a) 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). Most sites (80%) had low turbidity at the time of sampling and Secchi depths were greater than the maximum water depths encountered. Mean and maximum sample depths were visually estimated at each site.

Table 4: Habitat variables recorded at each site sampled as part of the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2024.

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)
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

2.5.2 Moberly River

The 2024 Moberly River sampling program differed from previous years as inflatable boats were not used to navigate the river between sampling locations. Instead, the sampling program was limited to a crew of four that accessed the river each day by helicopter. One, two-person crew targeted adult and immature Arctic Grayling by sampling within the mainstem of the Moberly River, while a second two-person crew targeted YOY and immature Arctic Grayling by sampling primarily shallow side channel habitat. The crew targeting YOY and immature Arctic Grayling collected fish using a backpack electrofisher and the crew targeting adult and immature Arctic Grayling used a combination of backpack electrofishing and angling. Over the nine-day survey, sampling was conducted in Sections MR-S1A, MR-S1B, MR-S1, MR-S3 and MR-S7 (Appendix A,

Table A2). Since 2021, sampling in Section MR-S7 has been prioritized due to higher Arctic Grayling catches in this section. Crews identified groundwater-fed side channels in this section during the 2020 survey (Golder 2021a), which increased suitable rearing habitat for YOY Arctic Grayling.

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. Electrofishing was conducted using a Smith-Root™ Model LR24 (Smith-Root, Vancouver, Washington, USA), and settings were adjusted as needed to minimize injuries to fish while allowing efficient capture of the target size and species. Voltage ranged from 300 to 600 V, frequency was 60 or 70 Hz, and pulse width was 6 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 equipped with aerators and set along the side of the sample site. Habitat conditions, as summarized in Table 4, were recorded at each site. Backpack electrofishing sites ranged in length from 39 to 252 m. The above methods were similar to those employed during the 2016 to 2022 surveys (Golder 2017, 2018, 2019, 2020a, 2021a, 2022a; WSP 2023a, WSP 2024a).

Angling occurred at sites where fish were previously observed or in 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, nymphs, and dry flies) was selected to target Arctic Grayling. During each angling effort, total time spent angling was recorded and multiplied by the number of anglers to calculate total angling effort in angler-minutes. Angling effort per site ranged from 20 to 285 angler-minutes.

2.6 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, Rainbow Trout, and Northern Pike (*Esox Lucius*) in good condition following processing were implanted with half-duplex (HDX) PIT tags (ISO 11784/11785 compliant) (Oregon RFID, Portland, Oregon, 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 119 mm FL received 12 mm long HDX PIT tags (12.0 mm x 2.12 mm HDX+)
- Fish between 120 and 199 mm FL received 14 mm long HDX PIT tags (14.0 mm x 3.00 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 caudal fin tissue were collected for DNA analysis 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 collected from Longnose Dace (*Rhinichthys cataractae*) captured in all tributaries and from Redside Shiner (*Richardsonius balteatus*), and Slimy Sculpin (*Cottus cognatus*) captured in the Moberly River. Samples from these small-bodied fish species were collected to support the Site C Small Fish

Translocation Monitoring Program (Mon-15) (Geraldes and Taylor 2020, 2021, 2022, 2023, 2024; Geraldes and Taylor in prep.). 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.

Fin rays (and otoliths from individuals that succumbed to sampling) were collected from a subset of Rainbow Trout, Arctic Grayling, and Bull Trout. These samples were submitted to BC Hydro for potential future analysis and are not discussed further in this report.

2.7 Fish Ageing

All Rainbow Trout and Arctic Grayling were aged by scale analysis. Scales were aged by counting the number of growth annuli present on the 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 microscope's 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 excluded from analysis.

For Rainbow Trout, agers were commonly unable to recognize the first annulus in age-1 fish, based on a cross-check against modes in length-frequency histograms. This result was consistent for Farrell, Colt, Kobes, and Maurice creeks. As a result, the scale age estimates for these systems were generally one year younger than length-frequency histograms indicated. To rectify this discrepancy, the scale age estimates from these streams were increased by one for all fish originally estimated as age-0. For inter-year recaptured fish, the number of years that a fish was at-large between encounters was used to inform age class assignments.

Bull Trout were aged based on fork lengths and the separation of modes in length-frequency histograms of all fish captured in each stream. This methodology was first implemented during the 2020 study year (Golder 2021a).

2.8 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. 4.1.2 (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 stream 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 for the Moberly River.

Fish were assigned a life stage of YOY, immature, or adult based on their length. The maximum length for the YOY class 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 target 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 2024 was initiated mid-June when a gradual decrease in the hydrograph in each drainage was expected. This sampling was conducted similar to the sampling period in 2023 which was earlier than all previous years for the Moberly River and Maurice, Farrell, Colt, and Kobes creeks. Sampling in the Chowade River and Cypress and Fiddes creeks aligned with previous years and was initiated mid-July. Flows generally decreased within all systems throughout the sampling period and were considered adequate for sampling.

3.1 Halfway River Discharge and Temperature

An aerial reconnaissance of the study area in the Halfway River watershed and its tributaries was conducted on the morning of 25 July prior to the start of sampling. During the reconnaissance survey and the start of sampling, discharge for the Halfway River was 51.6 m³/s and approximately 15% below the historical mean discharge level for this day of the year (61.0 m³/s; 1977-1995, 2012-2014, and 2018-2023) (Figure 1). Flows decreased through the sampling period. On the last day of sampling, discharge in the Halfway River was 26.7 m³/s. Flows were below the historical average (range = 61.0 to 70.2 m³/s) each day of the July study period (25 July to 2 August).

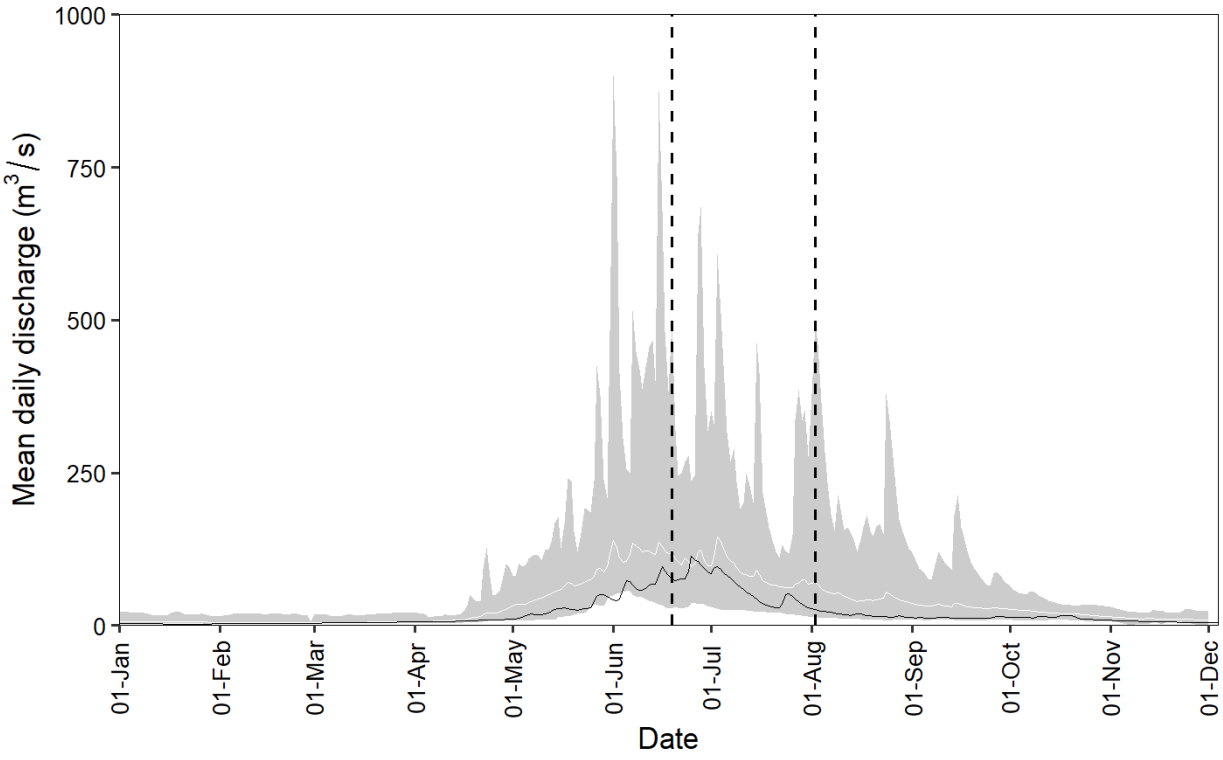


Figure 1: Mean daily discharge for the Halfway River above the Graham River (station 07FA003) in 2024 (black line). The white line shows the mean daily discharge, and the grey ribbon shows the range of minimum to maximum from historical daily discharge data (1977–1995, 2012–2014, and 2018–2023). The vertical dashed lines represent the timing of 2024 study period.

Average water temperatures at the time of sampling were colder in Fiddes Creek than in Cypress Creek and the Chowade River (Figure 2; Appendix C, Table C1). The temperature loggers are deployed year-round, but when the tributaries freeze the loggers are encased in ice from early December to mid-April of each year. Data during these periods have been excluded from Figure 2 because they were considered unreliable.

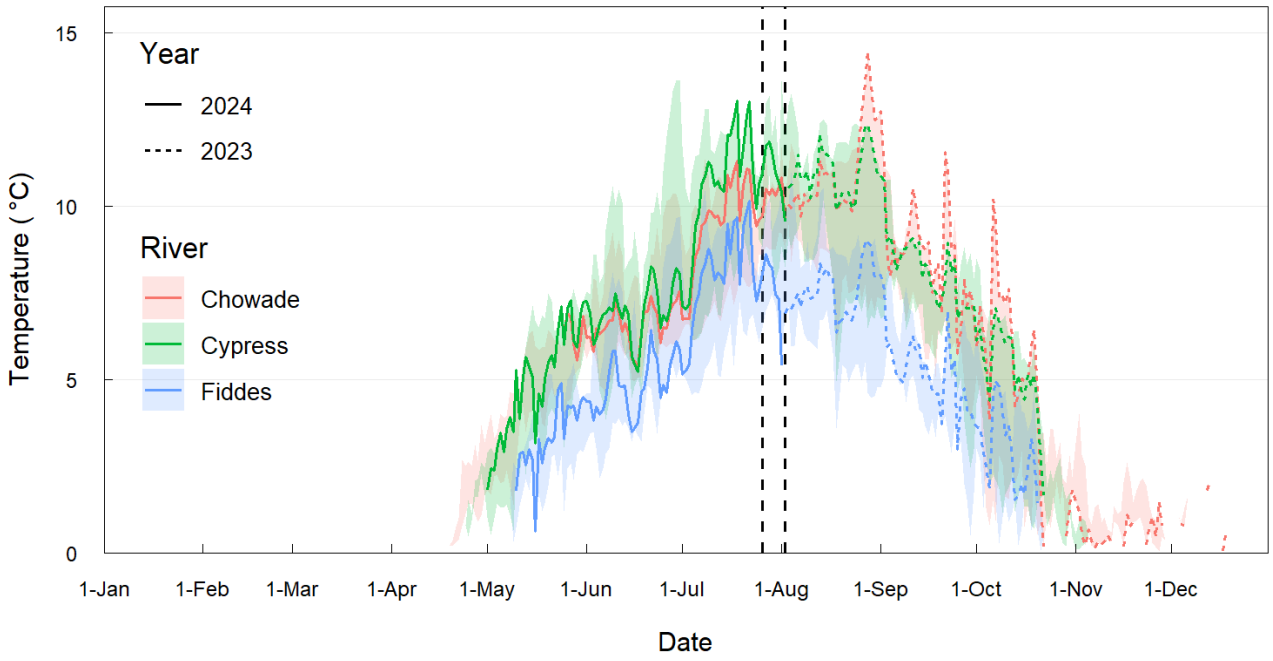


Figure 2: Mean daily water temperature in the Chowade River and Cypress and Fiddes creeks (dark colored lines/dots). The colored ribbons shows the range of minimum to maximum from historical daily temperature data (2019-2023). The vertical dashed lines represent the timing of the 2024 study period.

3.1.1 Halfway River Watershed and Farrell and Maurice Creeks Temperature

Average water temperatures at the time of sampling were colder in Colt Creek than in Farrell, Kobes, and Maurice creeks (Figure 3; Appendix C, Table C1). The temperature loggers are deployed year-round, but when the tributaries freeze the loggers are encased in ice from early December to mid-April of each year. Data during these periods have been excluded from Figure 3 because they were considered unreliable.

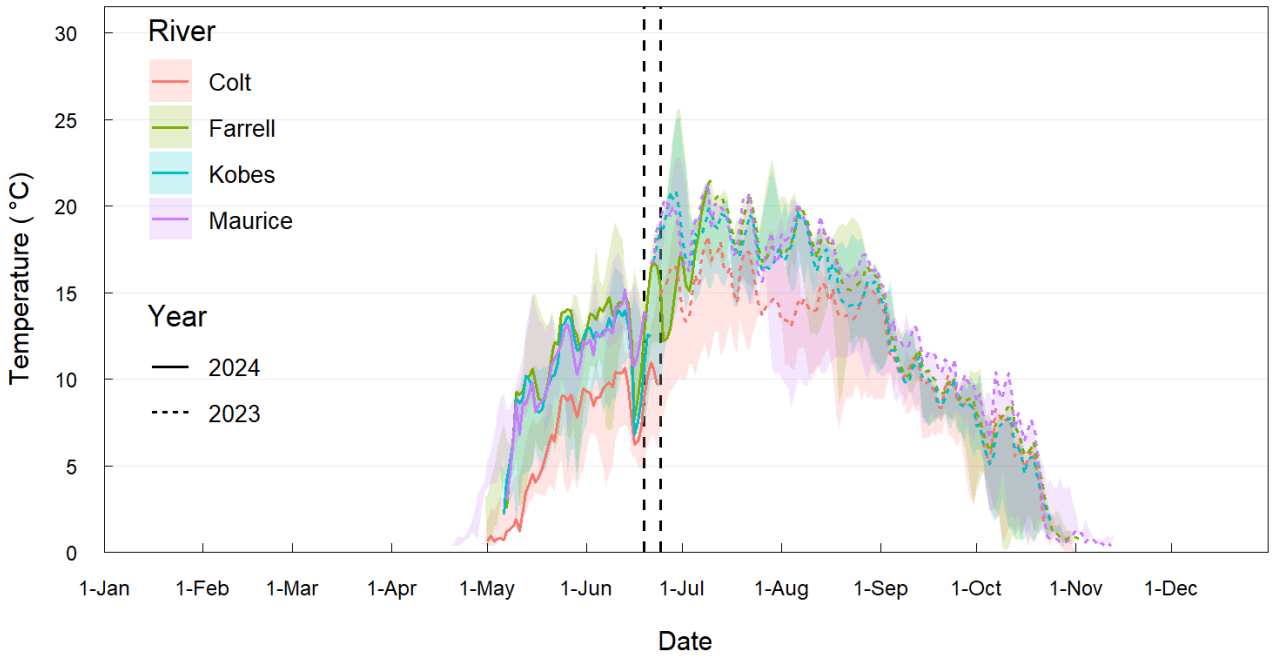


Figure 3: Mean daily water temperature in the Colt, Farrell, Kobes and Maurice creeks (dark colored lines/dots). The colored ribbons shows the range of minimum to maximum from historical daily temperature data (2019-2023). The vertical dashed lines represent the timing of the 2024 study period, not including the one day of sampling in Farrell Creek that was conducted on 10 July.

3.2 Tributaries Targeting Bull Trout

3.2.1 Sample Effort

In total, 38 sites were surveyed in tributaries targeting Bull Trout. These included 17 sites in the Chowade River, 17 sites in Cypress Creek, and 4 sites in Fiddes Creek. Approximately 18.4 hours of backpack electrofishing effort was conducted over 7,625 m of habitat (Table 5). A detailed summary of effort is provided in Appendix B, Table B1.

Table 5: 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), 2024.

Tributary	Number of Sites	Electrofishing Effort (s)	Electrofishing Effort (h)	Length of Survey (m)
Chowade River	17	27,742	7.7	3,435
Cypress Creek	17	28,467	7.9	3,390
Fiddes Creek	4	10,089	2.8	800
Total	38	66,298	18.4	7,625

3.2.2 Catch and Life History

Of the 832 Bull Trout captured in the Chowade River and Cypress and Fiddes creeks combined (Appendix B, Table B3), 563 fish (67.7%) were implanted with new PIT tags. Three Bull Trout captured in 2024 were recaptures that were originally tagged in 2023 (i.e., 566 unique tags were implanted or encountered in 2024). All remaining Bull Trout (*n* = 266) were not tagged because they were either too small to receive a PIT tag (i.e., less than 80 mm FL; *n* = 262), incidental mortalities (*n* = 1), or unhealthy (i.e., unlikely to survive the tagging process; *n* = 3) (Table 6).

Table 6: 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), 2024.

Species	Life Stage[a]	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	Immature	231	210	30.0	219	211	27.7	168	143	60.0	652	566	35.4
	YOY	140	-	18.2	64	-	8.1	10	-	3.6	180	-	9.8
Mountain Whitefish	Adult	1	-	<1.0	-	-	-	-	-	-	1	-	<1.0
	Immature	3	-	<1.0	-	-	-	-	-	-	3	-	<1.0
Rainbow Trout	Adult	-	-	-	1	1	<1.0	1	1	<1.0	2	2	<1.0
	Immature	8	5	1.0	5	3	<1.0	-	-	-	13	10	<1.0
Slimy Sculpin	All	174	-	22.6	260	-	32.9	-	-	-	434	-	23.6
Sculpin Unidentified	All	63	-	8.2	-	-	-	-	-	-	63	-	3.4

[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 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.

Three immature Bull Trout that were originally captured and tagged in 2023 were recaptured in 2024. One Bull Trout was recaptured in each tributary (Chowade River, Cypress and Fiddes creeks) and each were recaptured within 200 m of their original capture site (Table 7).

Table 7: Details of recaptured Bull Trout from the Chowade River, and Cypress and Fiddes creeks during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2024.

Stream	PIT Tag Number	Original Capture Details				Recapture Details			
		Date	River Km	Fork Length (mm)	Age	Date	River Km	Fork Length (mm)	Age
Chowade River	900226001405542	18-Jul-23	44.4	87	1	28-Jul-24	44.4	142	2
Cypress Creek	900226001406258	22-Jul-23	37.1	94	1	30-Jul-24	37.1	145	2
Fiddes Creek	900226001406216	23-Jul-23	7.3	80	1	1-Aug-24	7.5	130	2

Bull Trout YOY (fish with fork lengths less than approximately 55 mm FL) were recorded in all three systems. For the three streams surveyed, the CPUE of YOY Bull Trout was highest in the Chowade River (18.2 fish/h) (Table 6). The CPUE of immature Bull Trout (fish with fork lengths larger than approximately 55 mm FL) was highest in Fiddes Creek (60.0 fish/h) where it was almost double the CPUE of the other two tributaries (Chowade River = 30.0 fish/h; and, Cypress Creek = 27.7 fish/h).

Length-frequency histograms for Bull Trout (Figure 4) show a mode between approximately 25 and 55 mm FL, which corresponds to the age-0 (YOY) cohort, and between approximately 65 and 120 mm FL, which corresponds to the age-1 cohort. These two modes were evident in all three of the sampled tributaries. A third mode from approximately 125 to 200 mm FL likely corresponds to age-2 and older fish. The length-frequency histograms indicate that age-1 and age-2 Bull Trout are generally similar in size in Cypress Creek and the Chowade River and larger than age-1 and age-2 Bull Trout in Fiddes Creek (Table 8). This apparent growth difference coincides with warmer annual water temperatures in Cypress Creek and the Chowade River compared to Fiddes Creek (Figure 2). Consistent with previous study years (e.g., WSP 2024a), Bull Trout larger than 125 mm FL (i.e., likely age-2 and age-3 individuals) were more abundant in Fiddes Creek than in the Chowade River and Cypress Creek (Figure 4).

All Bull Trout captured and tagged in 2024 were less than 200 mm FL and were implanted with either a 12 mm PIT tag (n = 461) or a 14 mm PIT tag (n = 100).

In 2024, 766 of the 832 Bull Trout encountered (92%) were assigned ages based on their fork lengths (Figure 5 and Table 8). Age-1 fish comprised 66% of all assigned Bull Trout ages. 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[14].

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

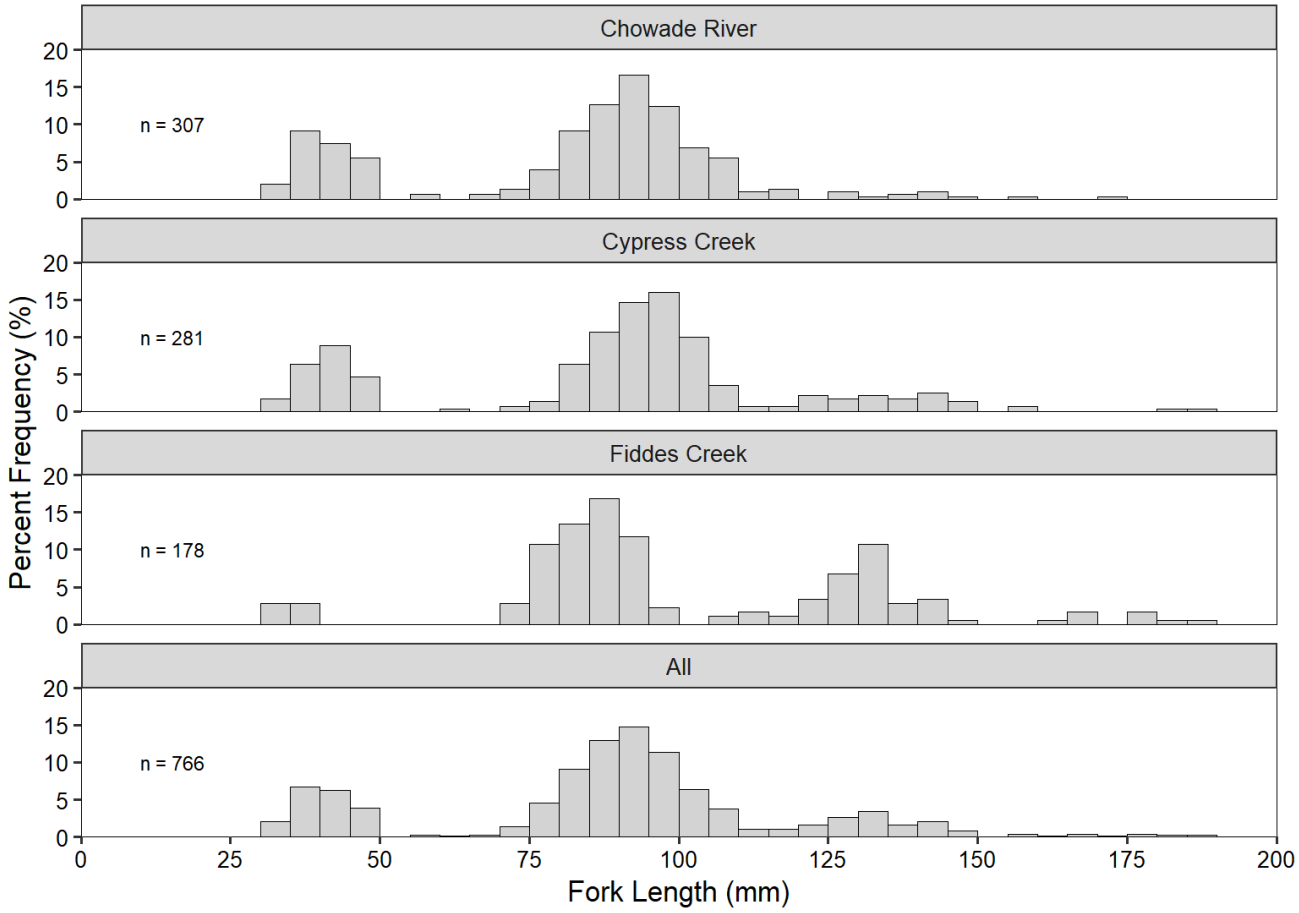


Figure 4: Length-frequency distribution for Bull Trout captured by backpack electrofishing in the Chowade River and Cypress and Fiddes creeks during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2024.

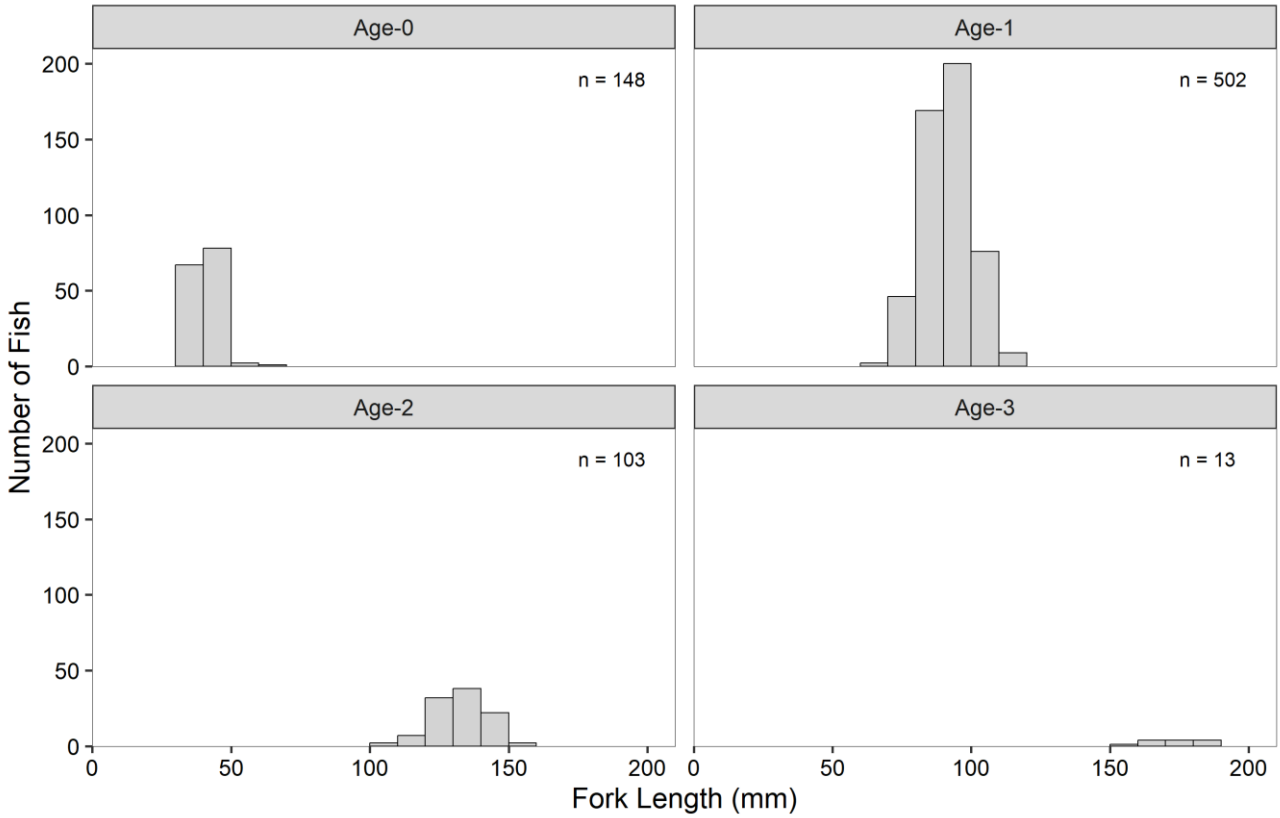


Figure 5: Length-frequency distribution by age class for Bull Trout captured in the Chowade River and Cypress and Fiddes creeks combined, during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2024.

Table 8: 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), 2024. Ages were assigned based on fork length.

Age	Chowade River			Cypress Creek			Fiddes Creek		
	Average Fork Length ± Standard Deviation (mm)	Range (mm)	*n*	Average Fork Length ± Standard Deviation (mm)	Range (mm)	*n*	Average Fork Length ± Standard Deviation (mm)	Range (mm)	*n*
0	41 ± 5	33 - 59	76	41 ± 5	33 - 62	62	34 ± 2	30 - 37	10
1	92 ± 9	69 - 115	218	94 ± 8	74 - 115	181	84 ± 6	73 - 97	103
2	139 ± 10	119 - 155	12	134 ± 10	117 - 155	35	129 ± 9	108 - 149	56
3	173	173 - 173	1	175 ± 15	158 - 187	3	174 ± 9	161 - 189	9

Rainbow Trout (*n* = 15) were captured in the Chowade River and Cypress and Fiddes creek and Mountain Whitefish (*n* = 4) were captured in the Chowade River (Appendix B, Table B3). Captured non-target species included 434 Slimy Sculpin and 63 sculpin that were not identified to species (Appendix B, Table B3).

Non-target species were only captured in the Chowade River and Cypress Creek; non-target species were not encountered in Fiddes Creek in 2024.

3.2.2.1 Summary of Subsequent Site C FAHMFP Encounters

On 23 July 2022, a Bull Trout was captured in the Chowade River at River Km 50.5. At that time, it had a fork length of 85 mm, weighed 7 g, and was implanted with a PIT tag (tag number: 900226001222328). It was subsequently recaptured on 1 October 2024 downstream of the Peace River Construction Bridge on the right-downstream-bank near River Km 111 (as measured downstream from WAC Bennett Dam) during the Mon-11 sampling program (WSP in prep). At that time, it had a fork length of 247 mm and weighed 163 g. Over the approximately 3 years between capture and recapture, this fish travelled a minimum of 220 km and grew 162 mm. At some point during the three years that this fish was at large it passed through the Project's diversion tunnels.

An adult Bull Trout was initially tagged during the Task 2c sampling program on 9 August 2020 in the Chowade River at approximately River Km 50.0. At the time of this encounter, it had a fork length of 604 mm, weighed 1688 g, and was implanted with a PIT tag (tag number: 900230000209418). It was subsequently recaptured four times, as summarized below:

1) On 18 September 2021, this Bull Trout was recaptured in the Pine River near the Peace River confluence during the Task 2a sampling program (Golder 2022b). At this time, this fish had a fork length of 601 mm and weighed 2002 g. A radio tag was implanted into this fish during this encounter (tag code: 241; tag frequency: 149.400 Hz).

2) On 6 July 2022, this Bull Trout was recaptured at the Project's temporary upstream fish passage facility. At the time of this encounter, this fish had a fork length of 625 mm and weighed 2017 g (BC Hydro 2022d). It was transported upstream to the Halfway River fish release location.

3) On 26 August 2023, this Bull Trout was recaptured during the Task 2a sampling program in the Peace River downstream of the Peace River Construction Bridge on the right-downstream-bank near River Km 108 (WSP 2024b). At this time, this fish had a fork length of 659 mm and weighed 2843 g.

4) On 26 June 2024, this Bull Trout was recaptured during the Contingency Boat Electroshocking Program and transported upstream to the Peace River Release Location near River KM 103.0 (WSP 2025). At the time of this encounter, this fish had a fork length of 671 mm and weighed 3007 g.

3.2.3 Interannual Comparison

A comparison of YOY and immature Bull Trout CPUE from 2017 to 2024 indicated similar trends in both the Chowade River and Cypress Creek (Figure 6). CPUE for YOY Bull Trout varied by year. In the Chowade River, CPUE was highest in 2018 and lowest in 2017, while in Cypress Creek, CPUE was highest in 2023 and lowest in 2019.

Similarly, the CPUE for immature Bull Trout in the Chowade River and Cypress Creek varied by year. In the Chowade River, CPUE was highest in 2024 and the lowest in 2023, while in Cypress Creek, CPUE was the highest in 2022 and the lowest in 2018. The CPUE for immature Bull Trout in Cypress Creek increased year-over-year until 2023. In 2024, the CPUE for immature Bull Trout in Cypress Creek (27.7 fish/h) was lower than the previous three years.

In Fiddes Creek, the CPUE recorded in 2024 for YOY Bull Trout (3.6 fish/h) and immature Bull Trout (60.0 fish/h) were within the range of historical CPUE values recorded for this stream and these life stages (Figure 6). During all previous sample years, CPUE for YOY Bull Trout has been lower than CPUE for immature Bull Trout in Fiddes Creek.

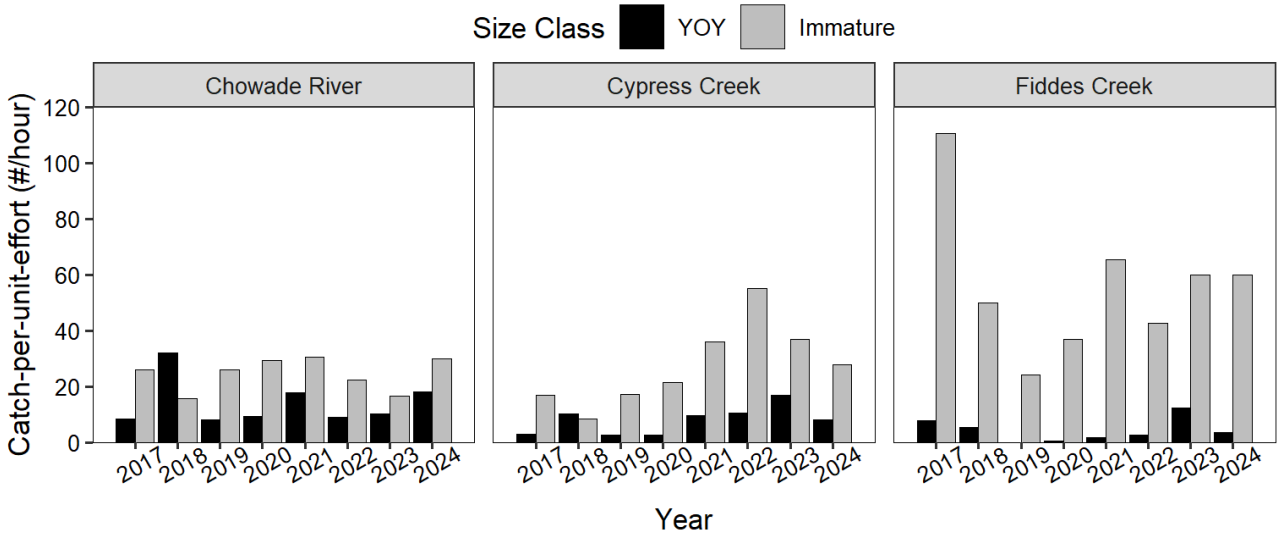


Figure 6: Interannual comparison of catch per unit effort (fish/h) for Bull Trout captured by backpack electrofishing in the Chowade River and Cypress and Fiddes creeks, during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2017–2024.

3.3 Tributaries Targeting Rainbow Trout

3.3.1 Sample Effort

In 2024, targeted sampling for Rainbow Trout was conducted in Colt Creek (8 sites), Farrell Creek (6 sites), Kobes Creek (8 sites), and Maurice Creek (8 sites). Approximately 14.8 hours of backpack electrofishing effort were conducted over 6,285 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 9 and in Appendix B, Table B1.

Table 9: 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), 2024.

Stream	Number of Sites	Electrofishing Effort (s)	Electrofishing Effort (h)	Length of Survey (m)
Colt Creek	8	12,585	3.5	1,665
Farrell Creek	6	10,231	2.8	1,250
Kobes Creek	8	14,981	4.2	1,600
Maurice Creek	8	15,427	4.3	1,770
Total	30	53,224	14.8	6,285

3.3.2 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 2012a). Of the 270 Rainbow Trout captured in Colt, Farrell, Kobes, and Maurice creeks combined, 145 fish (53.7 %) were implanted with PIT tags (Table 10; Appendix B, Table B4). Rainbow Trout that were not tagged (*n* = 125) were either too small to receive a PIT tag (i.e., less than 80 mm FL; *n* = 110), incidental mortalities (*n* = 11), or were unhealthy and unlikely to survive the tagging process (*n* = 4).

Table 10: 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), 2024.

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	-	-	-	-	-	-	-	-	-	2	2	<1.0	2	2	<1.0
	Imm.	2	2	<1.0	-	-	-	-	-	-	1	1	<1.0	3	3	<1.0
Rainbow Trout	Adult	-	-	-	-	-	-	-	-	-	1	1	<1.0	1	1	<1.0
	Imm.	39	28	11.2	35	29	12.3	2	2	<1.0	193	85	45.0	269	144	18.2
Non-Target Species																
Lake Chub	All	-	-	-	91	-	32.0	53	-	12.7	-	-	-	144	-	4.3
Largescale Sucker	All	-	-	-	25	-	8.8	-	-	-	18	-	4.2	43	-	1.3
Longnose Dace	All	6	-	1.7	22	-	7.7	10	-	2.4	233	-	54.4	271	-	18.2
Longnose Sucker	All	3	-	<1.0	27	-	9.5	16	-	3.8	194	-	45.3	240	-	7.2
Mountain	All	1	-	<1.0	-	-	-	-	-	-	-	-	-	1	-	<1.0
Northern Pikeminnow	All	-	-	-	17	-	6.0	-	-	-	1	-	<1.0	18	-	<1.0
Peamouth	All	-	-	-	-	-	-	-	-	<1.0	2	-	<1.0	2		<1.0
Prickly Sculpin	All	-	-	-	22	-	7.7	1	-	<1.0	20	-	4.7	43	-	1.3
Redside Shiner	All	-	-	-	93	-	32.7	14	-	3.4	-	-	-	107	-	3.2
Slimy Sculpin	All	204	-	58.4	59	-	20.8	42	-	10.1	33	-	7.7	338	-	10.2
Trout-perch	All	-	-	-	14	-	4.9	-	-	-	-	-	-	14	-	<1.0
White Sucker	All	-	-	-	1	-	<1.0	-	-	-		-	-	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 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, 2020a, 2021a, 2022a; WSP 2023a, 2024a).

In 2024, as in previous years, immature Rainbow Trout were the dominant size class, accounting for 99.6% of all Rainbow Trout captured (Table 10). One adult Rainbow Trout was captured in Maurice Creek. YOY Rainbow Trout were not captured or observed in 2024 in any of the sampled streams.

Previously tagged Rainbow Trout were not encountered in any of the tributaries in 2024.

Two previously tagged Bull Trout were captured in Maurice Creek. One was captured on 20 June 2024 at River Km 2.0. This fish was originally tagged on 17 June 2023 in the same location. At the time of its initial capture, it had a fork length of 244 mm and weighed 159 g. At the time of capture in 2024, it had a fork length of 332 mm weighed and 446 g. During the year that it was at-large, it grew 88 mm in length and gained 287 g of weight. The second previously tagged Bull Trout was captured on 19 June 2024 at River Km 1.0. This fish was originally tagged in the Peace River on 6 September 2023 during Mon-2, Task 2a (WSP 2024b) at a site directly upstream of the Maurice Creek confluence. At the time of its initial capture, it had a fork length of 355 mm and weighed 458 g. A radio tag was implanted into this fish during this encounter. No radio detection or movement data was collected or reported in this summary report but is summarized under the Site C Movement Assessment (Mon-1b, task 2d). At the time of its 2024 capture, this fish had a fork length of 362 mm and weighed 606 g; the radio tag antenna and the incision location were inspected and appeared in good condition. During the year that this fish was at-large, it grew 7 mm in length and gained 148 g of weight.

For 2024, length-frequency histograms for Rainbow Trout (Figure 7) did not show a mode that corresponded to age-0 fish (YOY). Their omission from the catch may have been due the earlier study period (these tributaries were sampled approximately 1.5 months earlier than previous years), as YOY Rainbow Trout may not have moved into the same rearing habitat as the immature Rainbow Trout or may have still been too small to recruit to the backpack electrofisher.

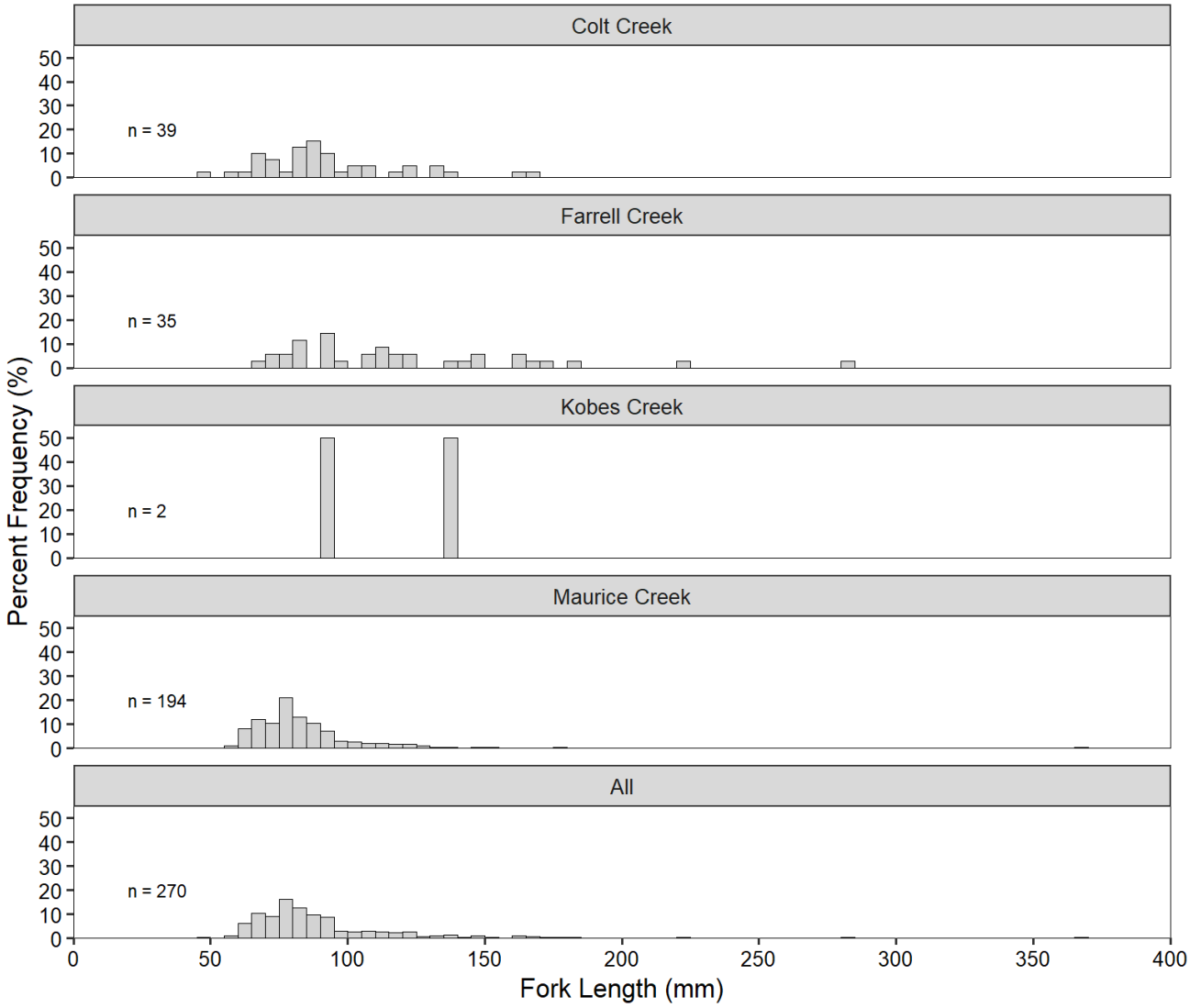


Figure 7: Length-frequency distribution for Rainbow Trout captured by backpack electrofishing in Colt, Farrell, Kobes, and Maurice creeks during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2024.

Modes for immature Rainbow Trout were apparent in the length-frequency histograms and showed similar growth rates between streams. Colt, Farrell, and Maurice creeks had similar length age-1 Rainbow Trout, ranging from approximately 48 and 108 mm FL and the one age-1 Rainbow Trout was captured in Kobes Creek had a fork length of 95 mm (Figure 7).

The average fork length of age-1 and age-2 Rainbow Trout captured in 2024 in Maurice Creek was slightly smaller than the fork length of Rainbow Trout in the other three tributaries. This could be attributed to colder average water temperature in Maurice Creek in 2024 compared to the other three tributaries (Figure 3).

Ages were assigned to 270 Rainbow Trout captured in 2024 (Table 11). These fish ranged in age from age-1 to age-5 and were included in all age-related analyses (Figure 8 and Table 11). Rainbow Trout age data from 2017 to 2024, in all tributaries showed individual growth rates resulted in overlapping distributions among age classes older than age-0 (Figure 9).

Table 11: Descriptive statistics of fork length by age for Rainbow Trout captured in Colt, Farrell, Kobes, and Maurice creeks during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2024.

Age	Colt Creek			Farrell Creek			Kobes Creek			Maurice Creek		
	Mean Fork Length ± Standard Deviation	Range	*n*	Mean Fork Length ± Standard Deviation	Range	*n*	Mean Fork Length ± Standard Deviation	Range	n	Mean Fork Length ± Standard Deviation	Range	*n*
1	82 ± 14	48–108	31	83 ± 8	67–95	15	91 ± NA	91–91	1	77 ± 10	56–100	168
2	127 ± 9	117–139	6	123 ± 15	105–147	13	139 ± NA	139–139	1	118 ± 14	101–151	24
3	165 ± 1	164–166	2	170 ± 8	164–183	5	-	-	-	176	–	1
4	-	-	-	221	–	1	-	-	-	-	–	-
5	-	-	-	280	–	1	-	-	-	368	–	1

Two Bull Trout were captured in Colt Creek with fork lengths of 152 and 191 mm. Three Bull Trout were captured in Maurice Creek with fork lengths ranging between 145 and 277 mm. Two Bull Trout were captured in Kobes Creek with fork lengths ranging between 159 and 362 mm. All captured Bull Trout that did not have a PIT tag at their time of capture were implanted with one. Bull Trout were not captured in Farrell or Kobes creeks.

Mountain Whitefish were the only non-target salmonid species encountered. A single individual was captured in Colt Creek that had a fork length of 146 mm.

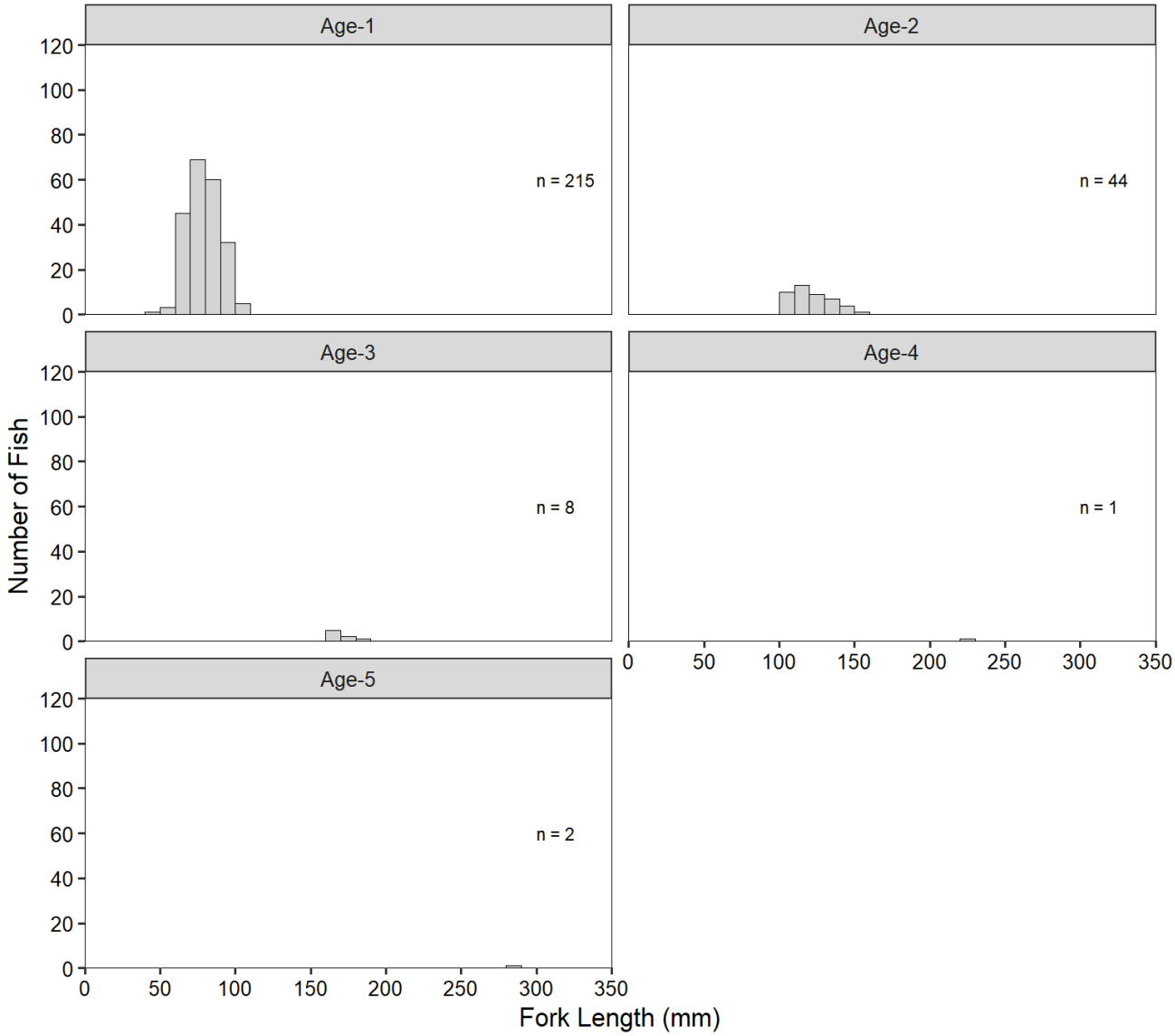


Figure 8: Length-frequency by age-class for Rainbow Trout captured in Colt, Farrell, Kobes, and Maurice creeks combined during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2024.

Figure 9: Length-frequency by age-class for Rainbow Trout captured in Colt, Farrell, Kobes, and Maurice creeks during the Site C Reservoir Tributaries Fish Population Indexing Survey captured in 2017 to 2024 (Mon-1b, Task 2c).

In 2024, non-target fish species captured in Colt, Farrell, Kobes, and Maurice creeks, in declining order of abundance, included Slimy Sculpin (*n* = 338), Longnose Dace (*n* = 271), Longnose Sucker (*Catostomus catostomus; n* = 240), Lake Chub (*Couesius plumbeus*; *n* = 144), Redside Shiner (*n* = 107), Largescale Sucker (*Catostomus macrocheilus; n* = 44), Prickly Sculpin (*Cottus asper; n* = 43), Northern Pikeminnow (*Ptychocheilus oregonensis; n* = 18), Trout-perch (*Percopsis omiscomaycus; n* = 14), Peamouth (*Mylocheilus caurinus; n* = 2), and Mountain Whitefish (*n* = 1).

3.3.2.1 Summary of Subsequent Site C FAHMFP Encounters

On 17 June 2023, a Rainbow Trout was captured in Maurice Creek at River Km 1.8. At that time, it had a fork length of 95 mm, weighed 9 g, and was implanted with a PIT tag (tag number: 900226001405474). It was subsequently recaptured on 16 November 2024 downstream of the Peace River Construction Bridge on the right downstream bank near River Km 107 during the Mon-11 sampling program (WSP in prep). At that time, time of recapture, it had a fork length of 265 mm. Over the approximately 1.5 years between capture and recapture, this fish travelled a minimum of 85 km and grew 170 mm. Between capture and recapture, this fish transited either the Project's diversion tunnels or the Project's spillway.

3.3.3 Interannual Comparison

In 2024, YOY Rainbow Trout were not captured at any of the sites in Colt, Farrell, Kobes, and Maurice creeks. Even though YOY Rainbow Trout were not captured in 2024, successful recruitment in past years can be assumed based on the presence of immature Rainbow Trout. YOY Rainbow Trout have been inconsistently recorded in some streams. For example, only a single YOY Rainbow Trout has been captured in Maurice Creek since sampling began in 2020 and only a single YOY Rainbow Trout has been captured in Farrell Creek since 2019.

CPUE for immature Rainbow Trout decreased year-over-year in Farrell, Kobes, and Maurice creeks between 2020 and 2022 and there was a substantial increase in CPUE in 2023 in each of these streams. In 2024 there was a substantial decrease in CPUE in 2024 for all streams except Maurice Creek (Figure 9).

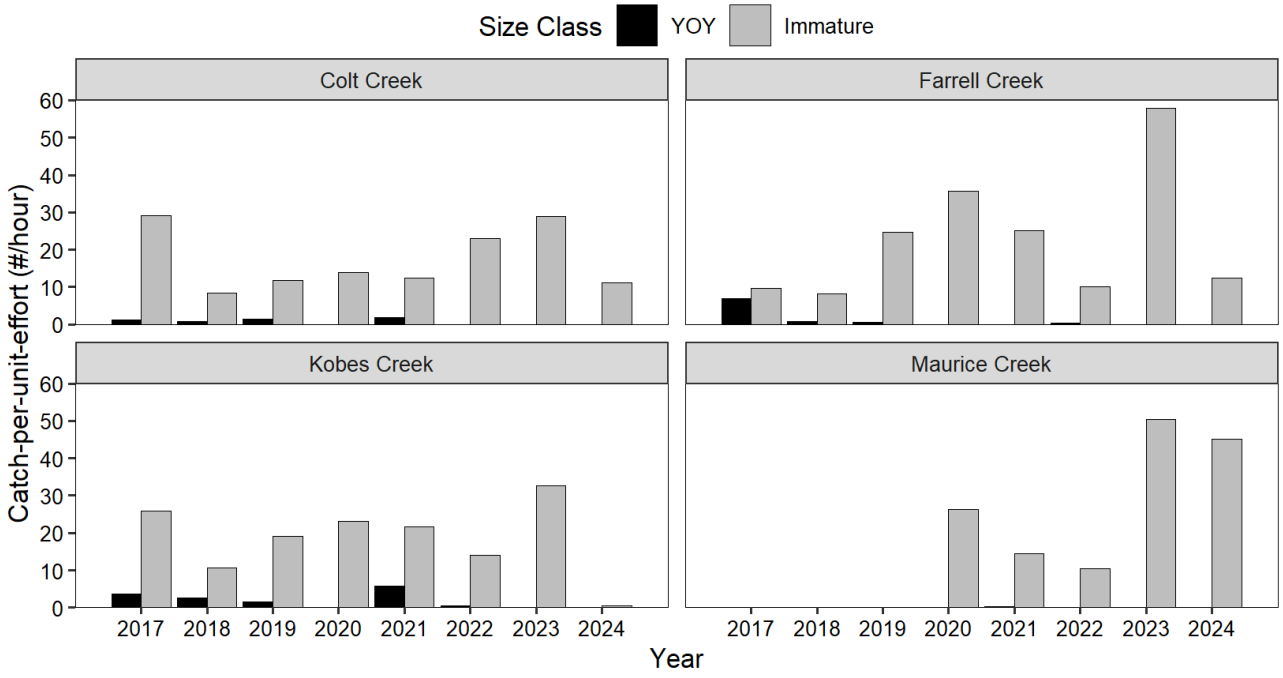


Figure 9: Interannual comparison of catch per unit effort (fish/h) for Rainbow Trout captured by backpack electrofishing in Colt, Farrell, Kobes, and Maurice creeks during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2017–2024. Maurice Creek was not sampled prior to 2020.

3.4 Moberly River

3.4.1 Moberly River Discharge and Temperature

Moberly River discharge typically decreases from June to September (Water Survey of Canada Station 07FB008; Figure 10). In 2024, sampling in the Moberly River was conducted during two separate surveys. The first survey was conducted from 9 to 11 June and the second session was conducted from 20 to 23 July. The 2024 sampling period was similar to the 2023 sampling period, both of which were approximately one month earlier than the 2022 sampling period. During the 2024 sampling period, Moberly River discharge was below the historical mean discharge, with a mean discharge of 15.3 m^3/s during the first survey and a mean discharge of 6.3 m^3/s during the second survey. Over the 9-day sampling period, discharge in the Moberly River ranged between a high of 15.7 m^3/s and a low of 5.9 m^3/s, and generally declined over the sampling period (Figure 10).

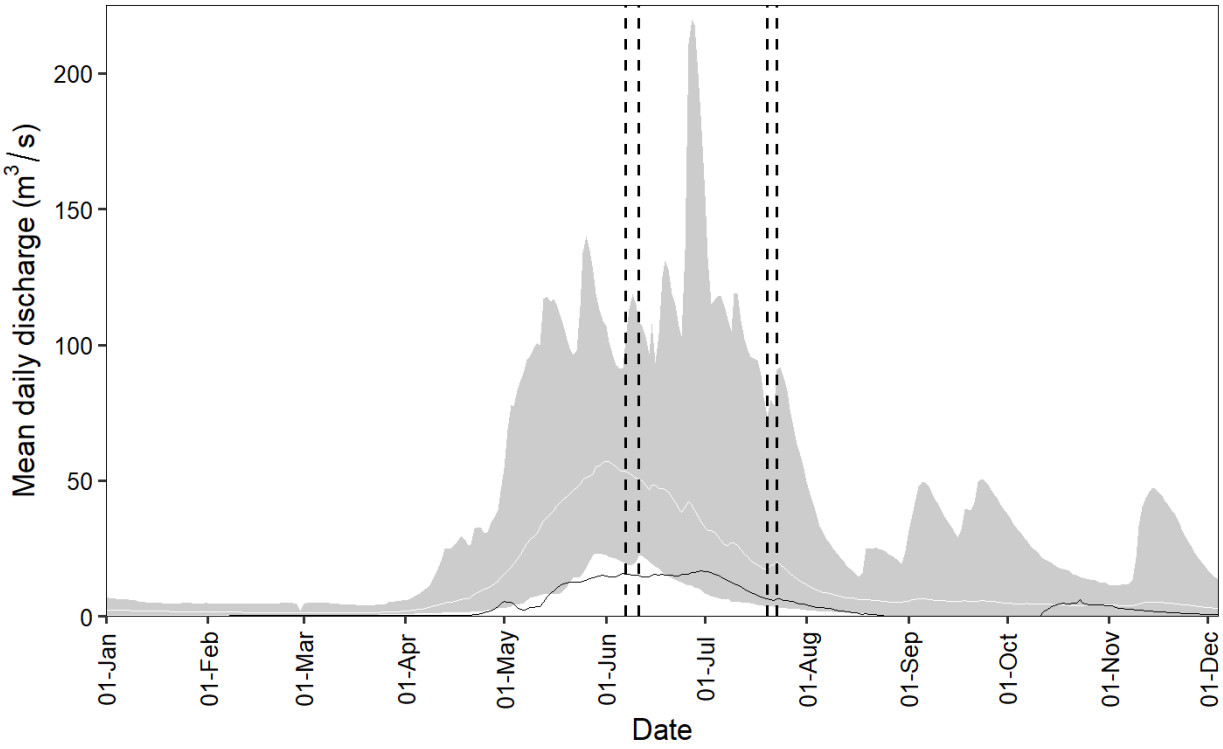


Figure 10: Mean daily discharge in the Moberly River near Fort St. John (station 07FB008) in 2024 (black line). The white line shows the mean daily discharge and grey ribbon shows the range from minimum to maximum from historical daily discharge data from 2001 to 2023. Vertical dashed lines show the start and end dates of the two surveys conducted in 2024.

In 2024 water temperatures were warmer in the Moberly River than the historical mean (2019 to 2023) (Figure 11). The temperature loggers were downloaded during the first of the surveys in 2024. As such, water temperatures over the remainder of the 2024 study period are unavailable. Spot measurements of water temperature taken by field crews in 2024 ranged between 6.9°C and 15.8°C (mean = 13.0°C) during the first survey and between 10.2°C and 26.7°C (mean = 20.5°C) during the second survey (Appendix C, Table C1). The coldest water temperatures (i.e., 6.9°C) were recorded near locations where groundwater upwelling was observed at MOR-EF-36.3-2024-06-10 (Appendix C; Table C1)

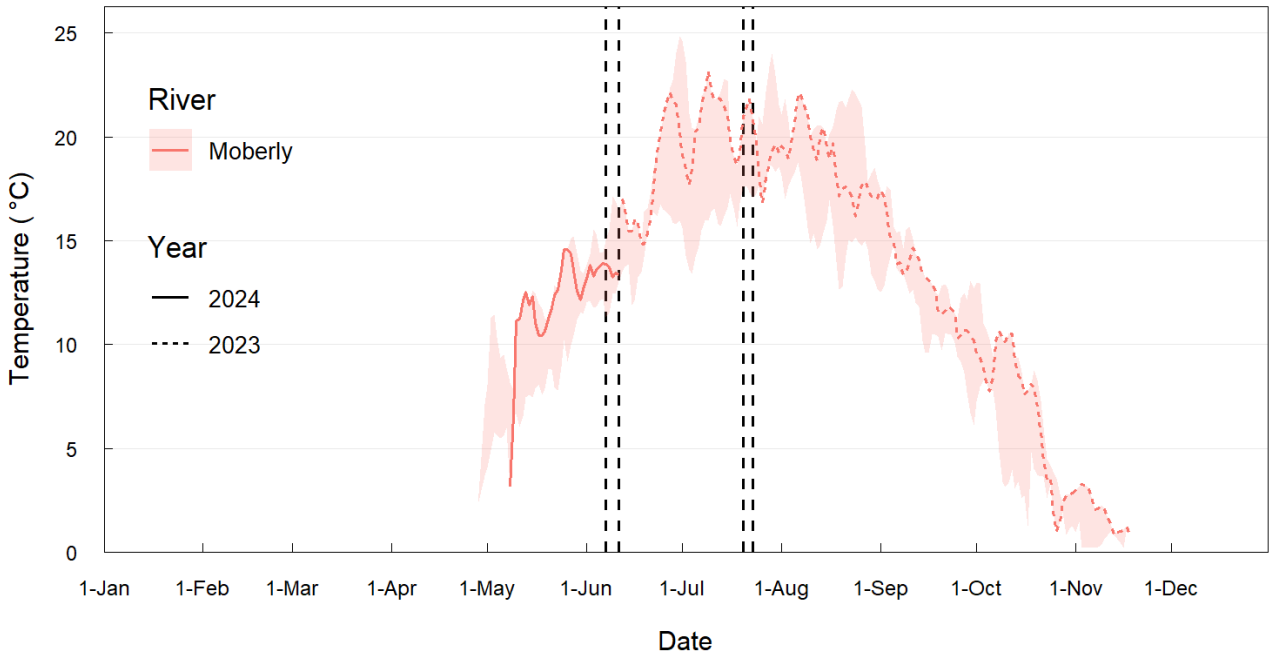


Figure 11: Mean daily water temperature in the Moberly River near the North Monias Road Bridge in 2024 (black line). The white line shows the mean daily water temperature and the grey ribbon shows the range from minimum to maximum from historical daily water temperature data from 2019 to 2023. Vertical dashed lines show the start and end dates of the two 2024 surveys.

3.4.2 Sample Effort

Sampling was conducted at 42 backpack electrofishing sites over 5 sections of the Moberly River. In total, 77.7 hours of angling effort was conducted at 43 angling sites (Table 12). Summaries of effort employed during the Moberly River survey by section and capture method are provided in Appendix B, Tables B1 to B2.

Table 12: 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), 2024.

Section	Backpack Electrofishing			Angling	
	Number of Sites	Effort (s)	Effort (m)	Number of Sites	Effort (h)
MR-S1A	13	11,792	1,363	14	27.3
MR-S1B	7	3,519	445	4	12.3
MR-S1	2	1,511	93	2	2.7
MR-S3	1	775	150	1	2.5
MR-S7	19	16,583	2,533	22	32.9
Total	42	34,180	4,584	43	77.7

3.4.3 Catch and Life History

In total, seven Arctic Grayling were captured in the Moberly River in 2024. Life history and capture data are provided in Table 13. These seven fish included four YOY and one immature Arctic Grayling that were captured in Section MR-S7, one YOY Arctic Grayling that was captured in Section MR-S1A, and one

immature Arctic Grayling that was captured in MR-S1. Four unidentified YOY fish (13 mm FL) were captured in MR-S7 on 11 June 2024 and a positive identification was not possible due to their small size. One of these four unidentified fish succumbed to sampling and was provided to the Mon-11 study team for potential DNA analysis. The results of that analysis were not available at the time of writing this report.

Table 13: 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), 2024.

Capture Date	Site Name	Section	River Km	Fork Length (mm)	Weight (g)	Age	Tagged
21-Jul	MOR-EF-114.5-2024-07-21	MR-S1A	114.5	56	3	0	
23-Jul	MOR-EF-101.5-2024-07-23	MR-S1	101.5	80	5	0	Yes
23-Jul	MOR-EF-38.2B-2024-07-23	MR-S7	38.2	164	65	1	Yes
23-Jul	MOR-EF-38.2B-2024-07-23	MR-S7	38.2	60	2	0	
23-Jul	MOR-EF-38.2B-2024-07-23	MR-S7	38.2	54	3	0	
23-Jul	MOR-EF-38.2B-2024-07-23	MR-S7	38.2	68	4	0	
23-Jul	MOR-EF-38.2B-2024-07-23	MR-S7	38.2	63	3	0	

In 2024, backpack electrofishing was the most effective capture method for Arctic Grayling, accounting for 100% of the catch. Five of the Arctic Grayling captured by backpack electrofishing were classified as YOY and two were classified as immature.

Two of the Arctic Grayling captured in the Moberly River, were implanted with PIT tags (Table 13). The remaining Arctic Grayling were not tagged because they were too small to receive a PIT Tag (i.e., less than 80 mm FL; *n* = 5).

CPUE for immature Arctic Grayling and for the other FAHMFP indicator species was very low during the 2024 study period (<1 fish/h). Indicator species fish were not captured by angling and very low numbers were captured by backpack electrofishing (Table 14).

Table 13: 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), 2024.

Species	Life Stage[a]	# Caught	# Tagged	CPUE (#/h)	# Caught	# Tagged	CPUE (#/h)
Arctic Grayling	Immature	1	1	<1.0	1	1	<1.0
	YOY	6	1	<1.0	6	1	<1.0
Burbot	Immature	7	6	<1.0	7	6	<1.0
	YOY	1	-	<1.0	1	-	<1.0
Mountain Whitefish	YOY	1	-	<1.0	1	-	<1.0
Northern Pike[b]	Immature	5	5	<1.0	5	5	<1.0
	YOY	7	6	<1.0	7	6	<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.
[b] Not a FAHMFP indicator species but included because they are a species that are considered culturally and recreationally significant.

Non-target species comprised the majority of the Moberly River catch. Captured species by section are presented in Appendix B, Table B5. All fish were captured by backpack electrofishing except for five Redside Shiner caught by angling.

The total catch of Arctic Grayling has varied annually since Task 2c was first implemented in 2016. When total catch is visually compared to sample timing, Moberly River discharge, and water temperature values, relationships are not apparent (Table 14), suggesting variable abundance and catch efficiency.

Table 14: Number of Arctic Grayling captured in the Moberly River (total and YOY) during each study year of the Site C Reservoir Tributaries Fish Population Indexing Survey in relation to mean river discharge and mean and maximum water temperature values recorded at the time of sampling.

Study Year	Sample Period	Mean Discharge (m^3/s)	Mean Water Temperature (ºC)	Maximum Water Temperature (ºC)	Total Arctic Grayling Catch (# of fish)	Total YOY Arctic Grayling Catch (# of fish)
2016	8 – 18 Sep	35.1	13.2	14.9	105	87
2017	30 Aug – 8 Sep	1.1	15.8	18.8	2	0
2018	13 – 31 Aug	10.9	17.9	20.4	8	4
2019	22 Jul – 2 Aug	11.1	18.4	23.4	36	4
2020	28 Jul – 8 Aug	11.6	18.5	23.1	134	42
2021	21 – 30 Jul	7.0	17.6	23.6	42	24
2022	25 Jul – 4 Aug	10.0	19.9	25.6	29	4
2023	25 Jun – 5 Jul	10.3	18.6	23.7	70	51
2024	7 – 11 Jun	15.3	13.5	15.4	0	0
	20 – 23 Jul	6.3	21.9	23.0	7	6

Although the total numbers captured were low, Arctic Grayling length-frequency data from 2024 indicate that a range of size classes use the Moberly River (Figure 12). Two modes were apparent in the length-frequency data, with age-0 Arctic Grayling occurring between 50 and 90 mm FL and one age-1 individual that measured between 164 mm FL. Arctic Grayling larger than 200 mm FL (i.e., age-2 or older individuals) were not captured in 2024.

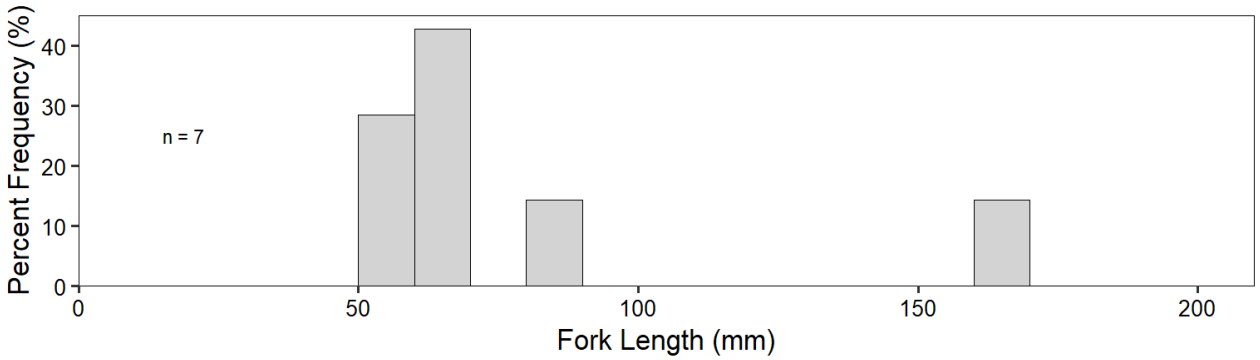


Figure 12: Length-frequency distribution for Arctic Grayling captured in the Moberly River during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2024.

Ages were assigned to the seven Arctic Grayling captured in 2024 and ages assigned were either age-0 or age-1 (Figure 13 and Table 15). Age data supported the age assignments based on length-frequency modes detailed above and aligned with inter-year mark-recapture data. The majority (86%) of Arctic Grayling captured in 2024 were age-0.

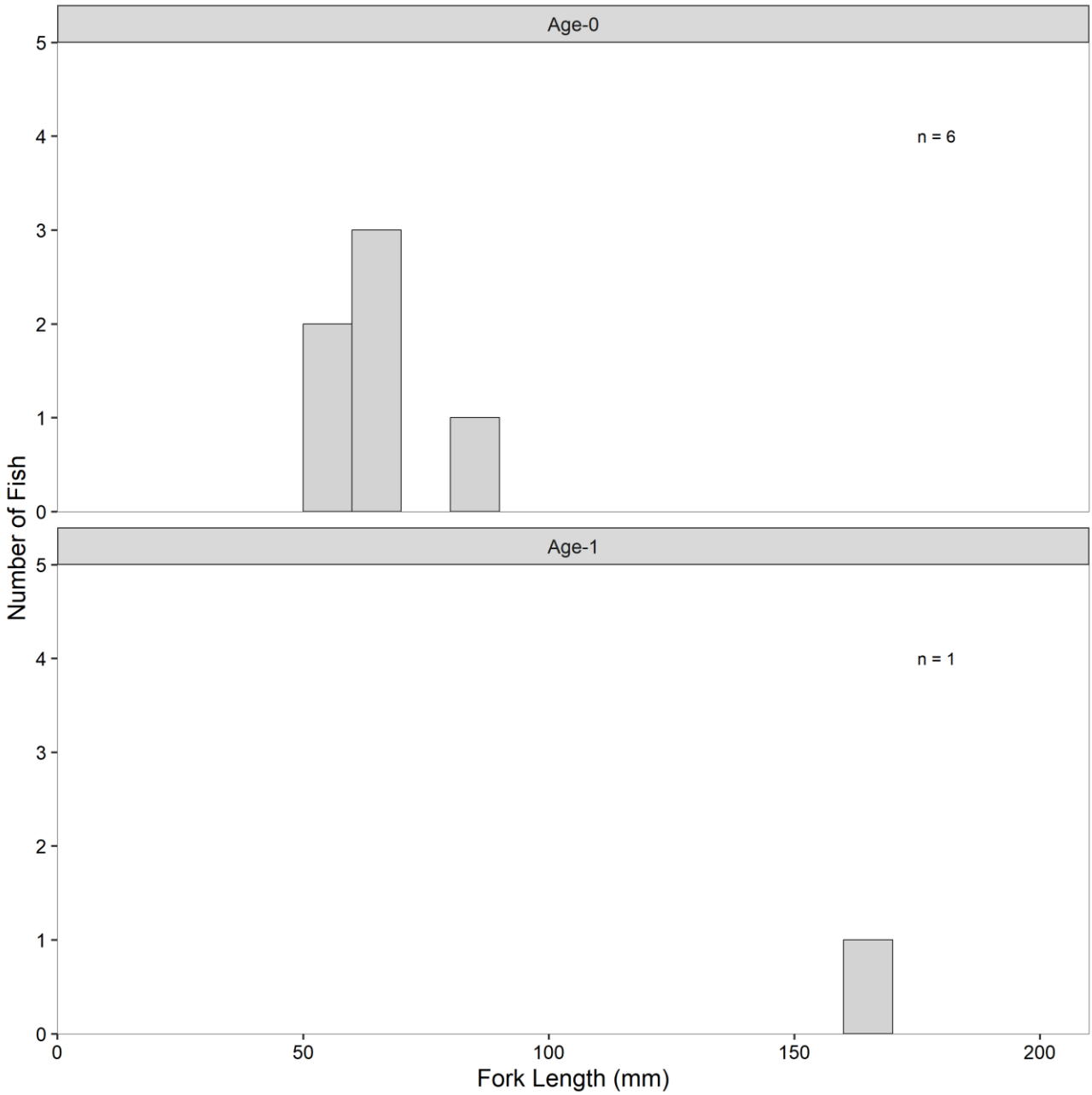


Figure 13: Length-frequency distribution by age class for Arctic Grayling captured in the Moberly River during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2024.

Table 15: 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), 2024. Ages were assigned based on scale samples.

Age	Fork Length			Weight		
	Average ± Standard Deviation (mm)	Range (mm)	*n*	Average ± Standard Deviation (g)	Range (g)	*n*
0	64 ± 10	54 – 80	6	3 ± 1	2 – 5	6
1	164	–	1	65	–	1

The length-frequency histogram for Burbot, a FAHMFP indicator species, suggests a mode representing age-0 individuals from approximately 40 to 50 mm TL, age-1 individuals from approximately 120 to 180 mm TL, and age-2 and older fish starting at approximately 240 mm TL (Figure 14).

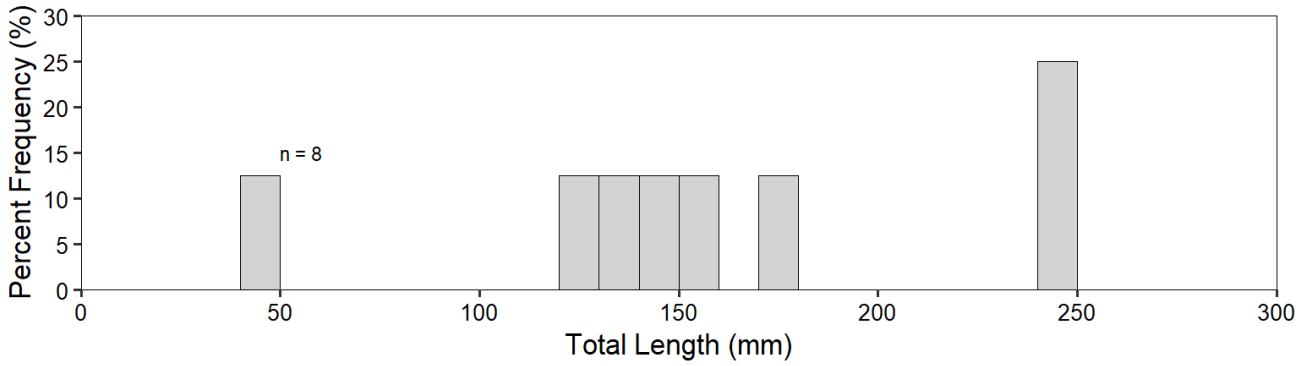


Figure 14: Length-frequency distribution for Burbot captured in the Moberly River during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2024.

One YOY Mountain Whitefish was captured and was classified as age-0 fish (70 mm FL).

3.4.4 Interannual Comparison

In 2024, YOY and immature Arctic Grayling were only captured in the Moberly River during backpack electrofishing surveys. During most study years, backpack electrofishing was the most effective method for capturing YOY fish and small fish boat electroshocking, backpack electrofishing and angling were effective at capturing immature Arctic Grayling. In 2024, small fish boat electrofishing was not conducted and angling was unsuccessful at capturing Arctic Grayling. The catch rates for YOY Arctic Grayling captured by backpack electrofishing decreased substantially between 2023 and 2024 (Figure 15). The presence of YOY Arctic Grayling in the Moberly River each year between 2018 and 2024 indicates successful Arctic Grayling spawning and recruitment for each of these years.

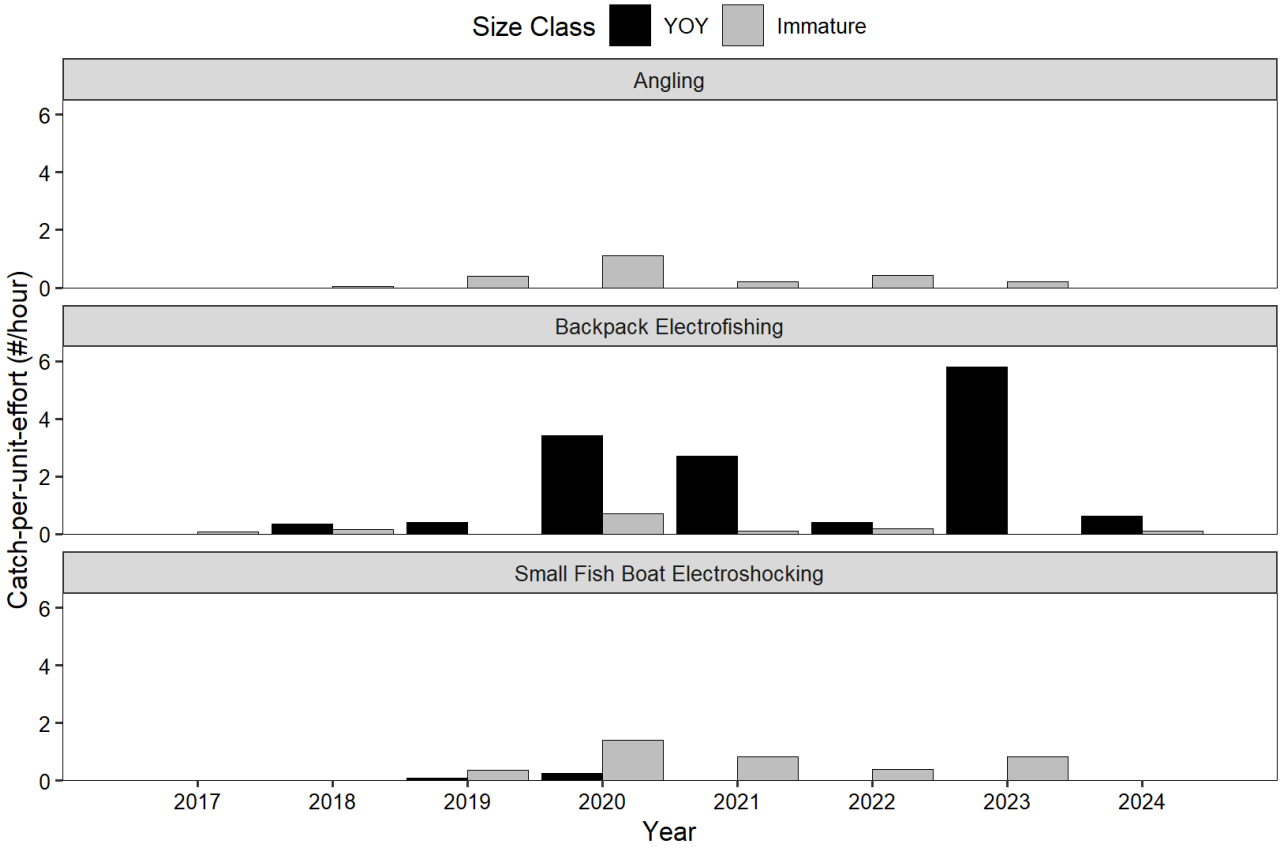


Figure 15: Interannual comparison of catch per unit effort (fish/h) for Arctic Grayling captured by angling and backpack electrofishing (small fish boat electroshocking was not conducted in 2024) in the Moberly River during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2017–2024.

3.5 Tissue Sample Collection

In 2024, small pieces of fin tissue for DNA analysis were collected from seven Arctic Grayling, 534 Bull Trout, 94 Longnose Dace, 158 Rainbow Trout, five Redside Shiner, 38 Slimy Sculpin and one unidentified fish (Table 16). When possible, fin tissue samples were collected from Longnose Dace from each of the streams sampled during the 2024 surveys (Table 17) for DNA analysis 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. The results of these analysis are not presented in this report.

Table 16: Summary of genetic samples collected as part of the Site C Reservoir Tributaries Fish Population Indexing Survey, 2024.

Location	Arctic Grayling	Bull Trout	Rainbow Trout	Longnose Dace	Redside Shiner	Slimy Sculpin
Chowade River	-	191	5	-	-	-
Cypress Creek	-	208	5	-	-	-
Fiddes Creek	-	133	1	-	-	-
Colt Creek	-	2	28	4	-	-
Kobes Creek	-	-	2	6	-	-
Farrell Creek	-	-	31	13	-	-
Maurice Creek	-	-	86	29	-	-
Moberly River	8a	-	-	42	5	38
Total	8	534	158	94	5	38

[a]One YOY fish, that was preliminarily identified in the field as an Arctic Grayling, was included for DNA analysis.

During the 2024 study period, fin rays (and otoliths if individuals succumbed to sampling) were collected from target species for potential future analysis (e.g., genetics, microchemistry, ageing). In 2024, fin rays and/or otoliths were collected from 106 Bull Trout and 12 Rainbow Trout (Table 17). Fin rays and otoliths were provided to BC Hydro. The results of these analysis are not presented in this report.

Table 17: Summary of microchemistry samples collected as part of the Site C Reservoir Tributaries Fish Population Indexing Survey, 2024.

Location	Bull Trout Finray	Bull Trout Otoliths	Rainbow Trout Otoliths
Chowade River	11	-	-
Cypress Creek	34	2	1
Fiddes Creek	53	3	-
Colt Creek	2	-	-
Kobes Creek	-	-	-
Farrell Creek	-	-	2
Maurice Creek	1	-	9
Moberly River	-	-	-
Total	0	106	12

4.0 DISCUSSION

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. The 2024 study was the ninth year of a multi-year monitoring program and represents the fourth year of data collected after the river diversion phase of Project construction, which occurred on 3 October 2020. Four years of data have been collected post-river diversion; however, analyses intended to answer the management questions of Task 2c were not conducted during the present study. Like previous survey years, a secondary objective in 2024 was to deploy PIT tags into target species to allow their movements to be monitored by other components of the FAHMFP.

4.1 Tributaries Targeting Bull Trout

The 2024 study design was developed to capture and tag immature Bull Trout in identified Halfway River tributaries. The study design was unchanged from 2017 to 2024 and is based on the 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 (ESSA et al. 2020) to generate population abundance estimates to monitor changes in the Halfway River Bull Trout population.

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, or encountered in the Peace River mainstem under other components of the FAHMFP (see Section 3.2.2.1), will be taken as evidence that those fish are the offspring of a migratory 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 (ESSA et al. 2020) to estimate juvenile to adult survival of Halfway River Bull Trout.

In 2024, 832 Bull Trout were captured in the Chowade River and Cypress and Fiddes creeks, and 566 individuals were implanted with PIT tags. In 2024, 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 = 502), which was consistent with previous study years (Golder 2017, 2018, 2019, 2020a, 2021a, 2022a; WSP 2023a; WSP 2024a).

CPUE values among years were compared to provide a coarse assessment of Bull Trout abundance in the Chowade River and Cypress and Fiddes creeks. In 2024 in the Chowade River, the CPUE for YOY Bull Trout was similar to the CPUE recorded in 2023. In 2024, the CPUE for immature Bull Trout in the Chowade River was the highest recorded since sampling started.

In Cypress Creek, the CPUE for immature Bull Trout increased year-over-year between 2018 and 2022 but decreased in 2023 and again in 2024. In Cypress Creek, CPUE for YOY Bull Trout increased between 2019 and 2023 but showed a decrease in 2024.

The Bull Trout assemblage in Fiddes Creek differs from that of the Chowade River and Cypress Creek. In Fiddes Creek, there is a greater abundance of age-2 and older fish (i.e., fish greater than approximately 100 mm FL), compared to the Chowade River and Cypress Creek, which may indicate a resident Bull Trout population in Fiddes Creek (Putt et al. 2024). Alternatively, migration downstream may occur later compared to other systems. The CPUE for immature Bull Trout in Fiddes Creek increased year-over-year between 2019

and 2021 with a slight decrease in 2022, followed by increases in 2023 and 2024. Although the CPUE for YOY Bull Trout in Fiddes Creek is low compared to the Chowade River and Cypress Creek, the CPUE for immature Bull Trout in Fiddes Creek was higher than in the Chowade River and Cypress Creek during most study years. These results suggest successful recruitment in recent years despite low YOY catch in previous years (i.e. *n* = 0 in 2019, *n* = 1 in 2020, *n* = 4 in 2021, and *n* = 10 in 2022).

In all tributaries, the captured number of YOY Bull Trout may be influenced by the limitations of the sampling method. Capturing YOY Bull Trout using backpack electrofishing is challenging, as the effectiveness of backpack electrofishing is reduced due to the small size of YOY fish (e.g., larger bodied fish cross a greater potential gradient along the electrical current between the anode and the cathode and as a result, galvanotaxis is more effectively induced). For example, in Cypress Creek in 2024, the difference in observed YOY Bull Trout (*n* = 397) compared to the captured YOY Bull Trout (*n* = 64.) supported this evidence. Both the observed and captured YOY Bull Trout numbers provide evidence of successful recruitment within these tributaries in recent years.

YOY Bull Trout captured in 2022 through 2024 are the offspring of the 2021 through 2023 spawning populations, respectively. If these spawning populations were from the Peace River, these fish would have migrated from the Peace River into the spawning tributaries after the onset of river diversion.

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 the Site C reservoir upstream of the inundation zone. Sampling in Farrell Creek has been conducted annually for the past eight years (2017 to 2024) and sampling in Maurice Creek has been conducted annually for the past five years (2020 to 2024). The presence of YOY Rainbow Trout varied by year in Farrell Creek, with no YOY recorded in 2020, 2021, 2023 and 2024, and only a single YOY was captured in 2022. These results suggest multiple years of low recruitment in Farrell Creek; however, the limitations of the sampling method in collecting YOY fish, as described in Section 4.1, need to be considered. Further, growing conditions relative to the timing of the survey may influence YOY catch rates, as recently hatched Rainbow Trout need enough time to grow to a length large enough to be susceptible to capture before the survey is conducted. A late hatch or poor growing conditions (e.g., cooler water temperatures) prior to the survey may reduce YOY catch during the late spring to early summer survey. YOY have consistently comprised a small proportion of the total Rainbow Trout catch for all creeks and years (range = 0% to 42%).

Rainbow Trout encountered in Farrell Creek may be individuals from a resident population or the offspring of Peace River or Halfway River Rainbow Trout. The existence of a resident Rainbow Trout population stream these tributaries cannot be ruled out at this time; however, additional genetic characterization will provide more insight (Geraldes A. & Taylor E. 2023).

Tributary use that corresponds with spawning activity (e.g., tributary entrance in April-May and exit behaviour in June-July; Mainstream 2012b) and radio telemetry data provides some insight into the use of Farrell and Maurice creeks by the Peace River Rainbow Trout population (Hatch et al. 2021, 2022; LGL 2020). To date, radio tagged adult Rainbow Trout have been detected 1.0 to 1.7 km up Maurice Creek during the suspected spawning season and 31.7 to 95.5 km up Farrell Creek during the suspected spawning season.

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.

In 2024, Rainbow Trout catch in Kobes Creek was the lowest recorded since the start of sampling. As an example, in one site (KOC-EF-055.5), only two Rainbow Trout were captured in 2024, compared to an annual average Rainbow Trout catch of 32 fish for this site (range = 9 to 58 fish). The number of other species captured also decreased substantially between 2023 and 2024 for this stream. This decrease may be attributed to several years of low water (based on field observations by the crew) coupled with increased beaver activity. Beaver dams can hinder fish passage (e.g., Lokteff et al. 2013), and multiple complete or partial beaver dams were observed across Kobes Creek during mobile tracking flights conducted in September 2024 as part of Mon-1b, Task 2d (LGL in prep.). Although only anecdotal data, more beaver dams appeared to be present in 2024 than during previous study years. It is possible that low flows during freshet were not effective in removing or disrupting beaver dams, creating complete or partial fish barriers that have hindered upstream pre-spawning migrations by Peace River Rainbow Trout over the last few study years.

4.3 Moberly River

In 2024, 7 Arctic Grayling were captured in the Moberly River, with the YOY cohort representing the highest proportion of the catch (86%; *n* = 6). The presence of YOY fish in the summer of 2024 provides evidence that Arctic Grayling spawned in the Moberly River in the spring of 2024.

The present study year was the fourth year of sampling for Arctic Grayling in the Moberly River since the onset of river diversion associated with the Project. As a result of river diversion, Arctic Grayling within the Peace River downstream of the Project cannot migrate upstream into the Moberly River to spawn without assisted transport from the operation of the TUF (e.g., BC Hydro 2024a) or the activities of Site C Contingent Boat Electroshocking (e.g., WSP 2024d

McPhail (2007) states that Arctic Grayling spawn in northern British Columbia between early and late May. Radio telemetry data indicate that adult Arctic Grayling migrate into the Moberly River as early as mid-March and migrate out of the Moberly River as late as mid-June (Hatch et al. 2022, 2023). In 2024, fish transport activities at the Project commenced on 1 April, and between 10 April and 31 May, 39 adult Arctic Grayling were transported from downstream of the Project to the Project forebay release location (BC Hydro 2024a, 2024b and WSP 2024d). An additional 12 Arctic Grayling were transported upstream between 1 June and 12 August (BC Hydro 2024c, 2024d, 2024e and WSP 2024d). Of these 41 Arctic Grayling moved upstream of the Project, 40 were implanted with radio tags to support Mon-1b, Task 2d movement studies (Hatch et al. in progress). Radio tagged adult Arctic Grayling from the Peace River were recorded in the Moberly River during mobile tracking flights in 2024 (Hatch et al. in progress).

The number of Arctic Grayling captured in 2024 (n = 7) was the second lowest number of Arctic Grayling captured since the start of sampling. The lowest number captured was in 2017 (n = 2; Table 14).

During previous study years, Sections MR-S1, MR-S1A, MR-S1B, and MR-S7 contributed the most to the Arctic Grayling catch, accounting for 75% of the total Arctic Grayling catch. Based on these results, crews deployed more effort in these sections in 2024. As described in Golder 2021a, these sections of the Moberly River are highly braided with multiple side channels, and evidence of groundwater upwelling is visible within side channels.

The findings of the 2024 study program provide evidence that suitable rearing habitat for YOY and immature Arctic Grayling is present in multiple sections of the Moberly River. Different sections of the river may provide more suitable habitat for Arctic Grayling from year to year, depending on water levels and physical changes (e.g., debris buildup, channel scouring, water temperature).

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.

WSP Canada Inc.

Demitria Burgoon, RPBio
Senior Fisheries Biologist

Dustin Ford, RPBio
Senior Fisheries Biologist

DB/DF/cmc

https://wsponline.sharepoint.com/sites/gld-124588/project files/6 deliverables/2024_trib_indexing_final/20136472-013-r-rev0-2024_trib_index 28mar_25.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. 2024a. Temporary Upstream Fish Passage Operations Report. Reporting Period: April 1 to 30, 2024. Report prepared by BC Hydro. Submitted May 21, 2024: 17 pages.

BC Hydro. 2024b. Temporary Upstream Fish Passage Operations Report. Reporting Period: May 1 to 31, 2024. Report prepared for BC Hydro. Submitted June 17, 2024. 19 pages

BC Hydro. 2024c. Temporary Upstream Fish Passage Operations Report. Reporting Period: June 1 to 30, 2024. Report prepared for BC Hydro. Submitted July 10, 2024. 18 pages.

BC Hydro. 2024d. Temporary Upstream Fish Passage Operations Report. Reporting Period: July 1 to 31, 2024. Report prepared for BC Hydro. Submitted August 7, 2024. 18 pages.

BC Hydro. 2024e. Temporary Upstream Fish Passage Operations Report. Reporting Period: August 1 to 31, 2024. Report prepared for BC Hydro. Submitted September 10, 2024. 18 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.

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.

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. 2020 Status Report for Bull Trout, Arctic Grayling and Rainbow Trout. Report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC. 51 pages.

Geraldes A, Taylor E. 2022. Site C Fish Genetics Study. 2021 Status Report for Bull Trout, Arctic Grayling and Rainbow Trout. Report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC. 55 pages + 3 appendices.

Geraldes A, Taylor E. 2023. Site C Fish Genetics Study. 2023 Status Report for Bull Trout, Arctic Grayling Rainbow Trout, and Longnose Dace. Report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC. 71 pages + 4 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 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 (Golder Associates Ltd.). 2020b. 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.). 2021a. 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.

Golder (Golder Associates Ltd.). 2021b. Peace River Large Fish Indexing Survey – 2020 Investigations. Report prepared for BC Hydro, Vancouver, British Columbia. Golder Report No. 20136470-015. 98 pages + 6 appendices.

Golder (Golder Associates Ltd.). 2022a. Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c) – 2021 investigations. Report prepared for BC Hydro, Vancouver, British Columbia. Golder Report No. 20136472: 45 pages + 3 appendices.

Golder (Golder Associates Ltd.). 2022b. Peace River Large Fish Indexing Survey – 2021 Investigations. Report prepared for BC Hydro, Vancouver, British Columbia. Golder Report No. 20136470-023. 100 pages + 6 appendices.

Golder (Golder Associated Ltd.). 2022c. Peace River and Site C Reservoir Water and Sediment Quality Monitoring Program (Mon8/9) – Water Temperature Monitoring (Task 2b) – 2021. Report prepared for BC Hydro, Vancouver, British Columbia. Golder Report No. 19121767: 35 pages + 2 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.

Hatch K, Robichaud D, Cox B, Crawford S. 2022. Site C Fish Movement Assessment (Mon-1b, Task 2d) – 2021. Report prepared for BC hydro – Site C Clean Energy Project – Vancouver, BC. 62 pages + 5 appendices.

Hatch K, Robichaud D, Cox B, Crawford S. 2023. Site C Clean Energy Project – Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program (Mon-1b) Task 2a – Peace River Arctic Grayling and Bull Trout Movement Assessment; and Task 2d – Site C Fish Movement Assessment – Construction Year 8 (2022). Report for BC Hydro, Vancouver BC.

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.

Lokteff RL, Roper BB. 2013. Do beaver dams impede the movement of trout? Transactions of the American Fisheries Society. 142: 1114-1125, 2013. ISSN: 0002-8487. 12 pages.

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.

McMillen LLC & BC Hydro. 2021. Site C Clean Energy Project – Temporary Upstream Fish Passage Facility – Manual of Operational Parameters and Procedures – Rev 2 February 2021. Submitted to BC Hydro. 39 pages + 1 appendix.

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.). 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.). 2012a. 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 Aquatics Ltd. 2012b. Site C Clean Energy Project EIS Volume 2 Appendix O. Fish and Fish Habitat Technical Data Report. Report for BC Hydro, Vancouver BC. Report No. 12002F.

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, 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.

Putt A, Ramos-Espinoza D, Chung M. 2022. Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program – 2021 Peace River Bull Trout Spawning Assessment (Mon-1b, Task 2b). report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC. 69 pages + 6 appendices.

Putt A, Ramos-Espinoza D, Chung M. 2023. Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program – 2022 Peace River Bull Trout Spawning Assessment (Mon-1b, Task 2b). Report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC, 66 pages and 5 appendices.

Putt, D. Ramos-Espinoza, and M. Chung. 2024. Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program – 2023 Peace River Bull Trout Spawning Assessment (Mon-1b, Task 2b). Report prepared for BC Hydro – Site C Clean Energy Project – Vancouver, BC, 63 pages and 5 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).

Triton (Triton Environmental Consultants Ltd.) 2021. Peace River Fish Composition and Abundance Survey Mon-2, Task 2b – Construction Year 6 (2020) Annual Report. Report prepared for BC Hydro, Vancouver, British Columbia. Report No. 10584/P5047: 107 pages + 6 appendices.

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

WSP (WSP Canada Inc.). 2023a. Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c) – 2022 investigations. Report prepared for BC Hydro, Vancouver, British Columbia. WSP Report No. 20136472: 41 pages + 3 appendices.

WSP (WSP Canada Inc.). 2024a. Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c) – 2023 investigations - Report prepared for BC Hydro, Vancouver, British Columbia. WSP Report No. 20136472: 43 pages + 3 appendices.

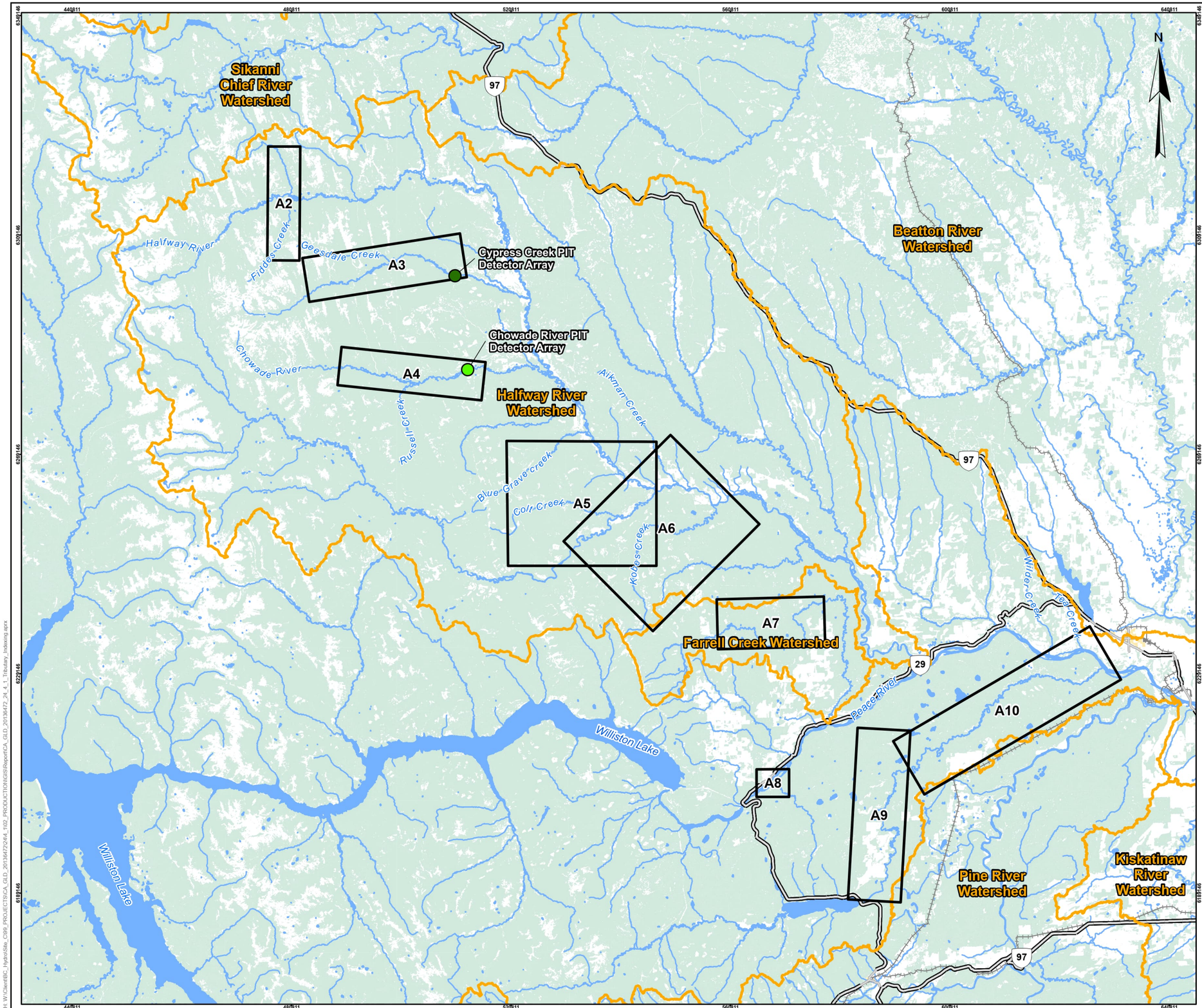
WSP (WSP Canada Inc.). 2024b. Peace River Large Fish Indexing Survey – 2023 Investigations. Report prepared for BC Hydro, Vancouver, British Columbia. WSP Report No. 20136470-051-R-Rev0. 120 pages + 9 appendices.

WSP (WSP Canada Inc.). 2024c. Site C Clean Energy Project – Offset Effectiveness Monitoring– 2023 investigations. Report prepared for BC Hydro, Vancouver, British Columbia. WSP Report No. 20136470-048-R-Rev0: 34 pages + 3 appendices.

WSP (WSP Canada Inc.). 2025. Summary of Site C Contingent Boat Electroshocking Activities – 2024. Technical Memorandum Prepared for BC Hydro, Vancouver, British Columbia.

APPENDIX A

Maps and UTM Locations



N

LEGEND

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

BASEMAP FEATURE

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

0 15 30

1:700,000 KILOMETRES

REFERENCES

1. BASEDATA CONTAINS INFORMATION LICENCED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
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, 2024

CONSULTANT

wsp

YYYY-MM-DD	2025-03-27
DESIGNED	DB
PREPARED	MH|KS
REVIEWED	DF
APPROVED	DF

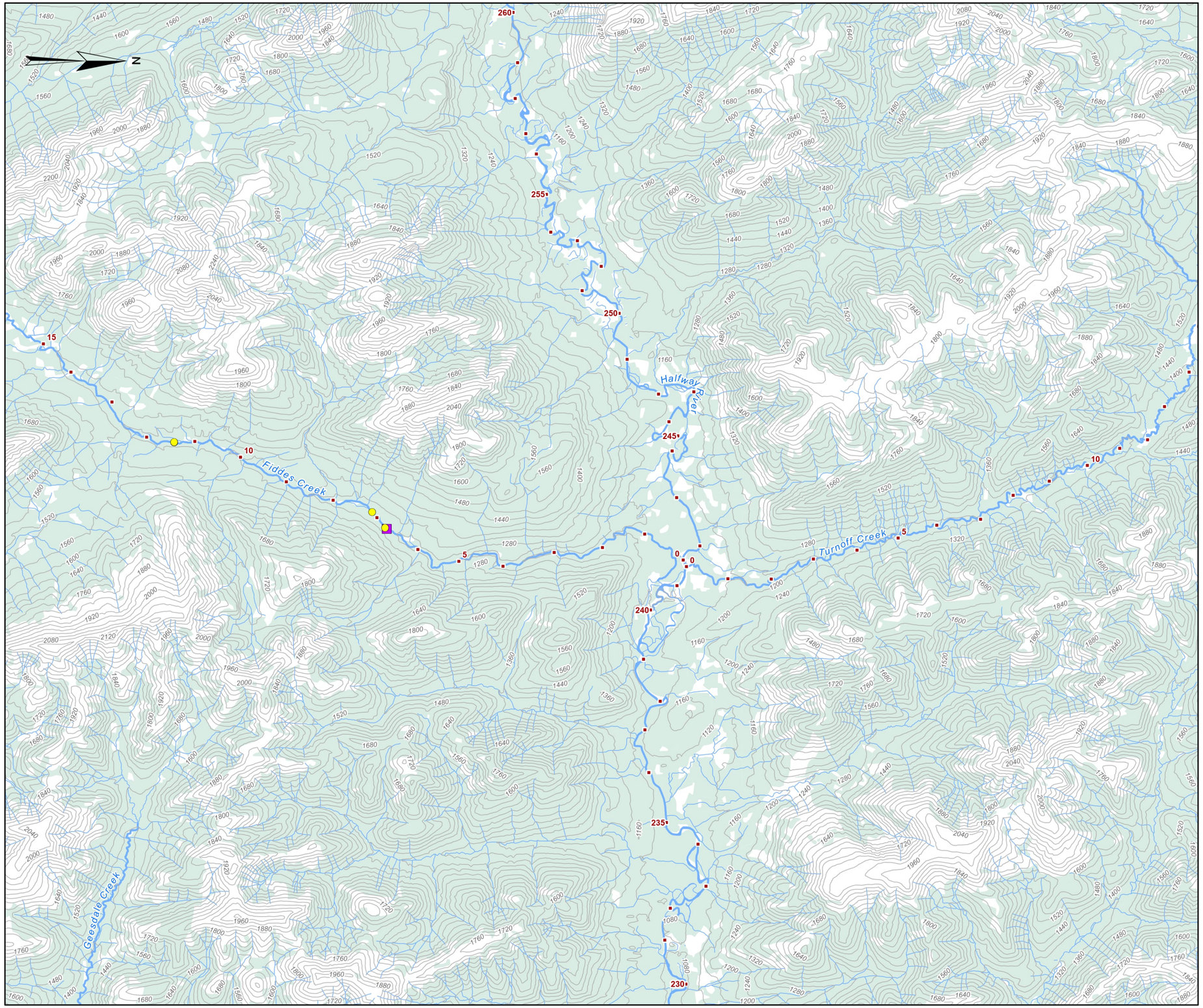
PROJECT NO.	CONTROL	REV.	FIGURE
CA-GLD-20136472	24//4.1	0	**A1**

PATH: W:\Client\BC_Hydro\Site_C\99_PROJECTS\CA_GLD_20136472\244_1\02_PRODUCTION\GIS\Report\CA_GLD_20136472_24_4_1_Tributary_Indexing.aprx

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

25mm

0



LEGEND

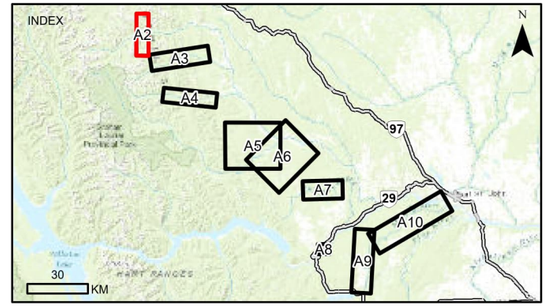
- RIVER KILOMETRE POSTS
- TEMPERATURE LOGGER LOCATION

UPSTREAM EXTENT OF EACH SAMPLE SITE

- BACKPACK ELECTROFISHING

BASEMAP FEATURE

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



0 1,000 2,000

1:70,000 METRES

REFERENCES

1. BASEDATA CONTAINS INFORMATION LICENCED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
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, 2024

CONSULTANT

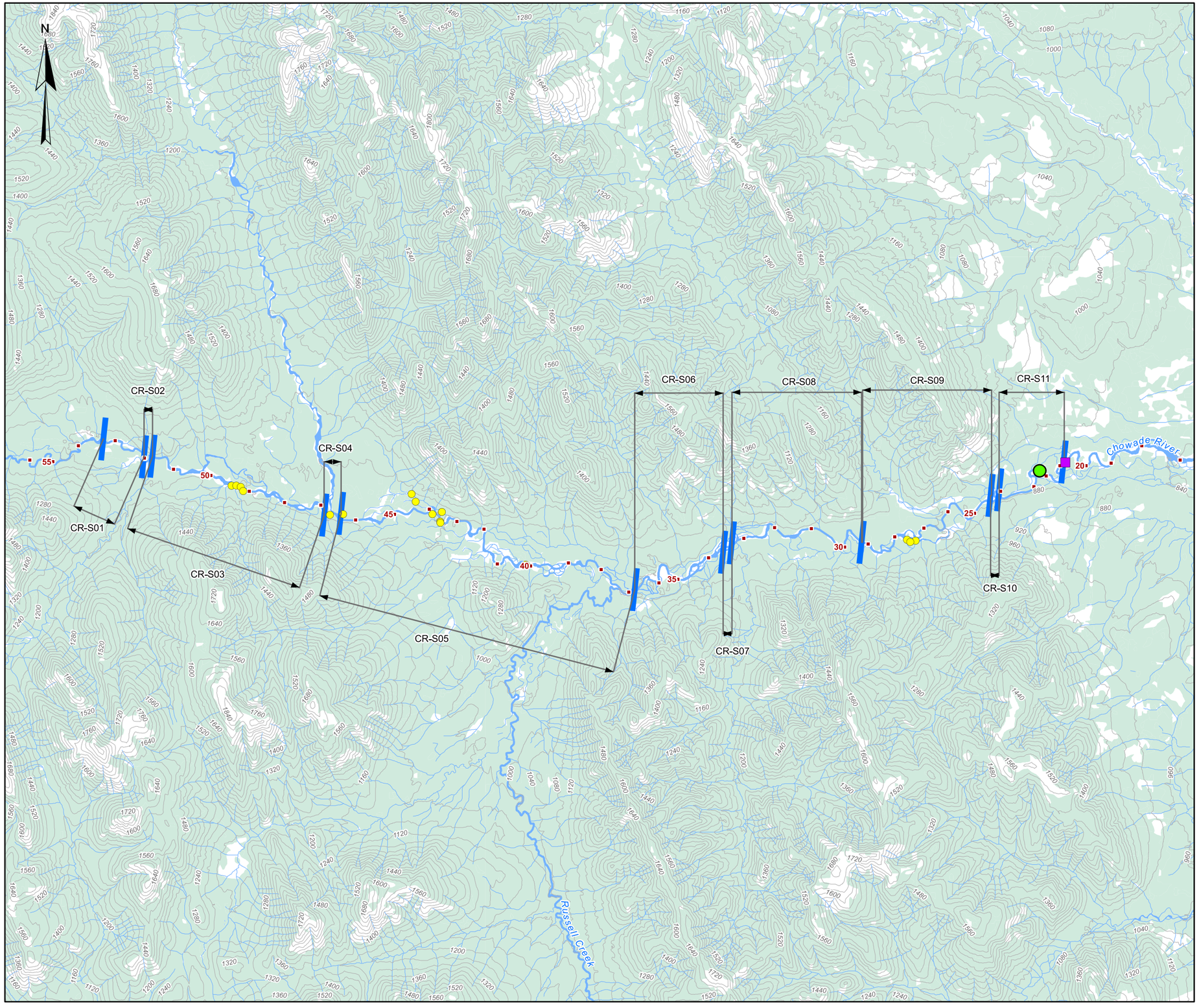
YYYY-MM-DD	2025-03-27
DESIGNED	DB
PREPARED	JG/CD/MH|KS
REVIEWED	DF
APPROVED	DF

PROJECT NO.	CONTROL	REV.	FIGURE
CA-GLD-20136472	24/4.1	0	**A2**

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

0 25mm

PATH: W:\Client\BC_Hydro\Site_C\99_PROJECTS\CA_GLD_20136472\2464_1\02_PRODUCTION\GIS\Report\CA_GLD_20136472_24_4_1_Tributary_Indexing.aprx



LEGEND

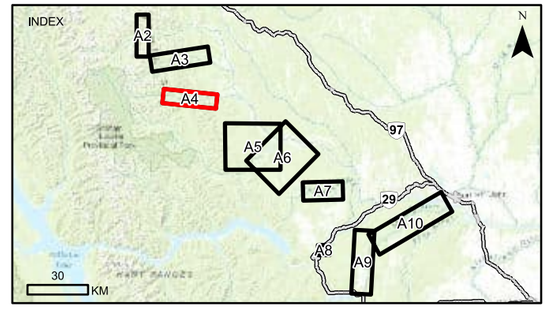
- RIVER KILOMETRE POSTS
- TEMPERATURE LOGGER LOCATION

UPSTREAM EXTENT OF EACH SAMPLE SITE

- BACKPACK ELECTROFISHING
- CHOWADE RIVER PIT DETECTOR ARRAY
- SECTION BREAK

BASEMAP FEATURE

- CONTOUR (20 M)
- WATERCOURSE
- WOODED AREA



0 2,000 4,000

1:90,000 METRES

REFERENCES

1. 1. BASEDATA CONTAINS INFORMATION LICENCED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
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, 2024

CONSULTANT

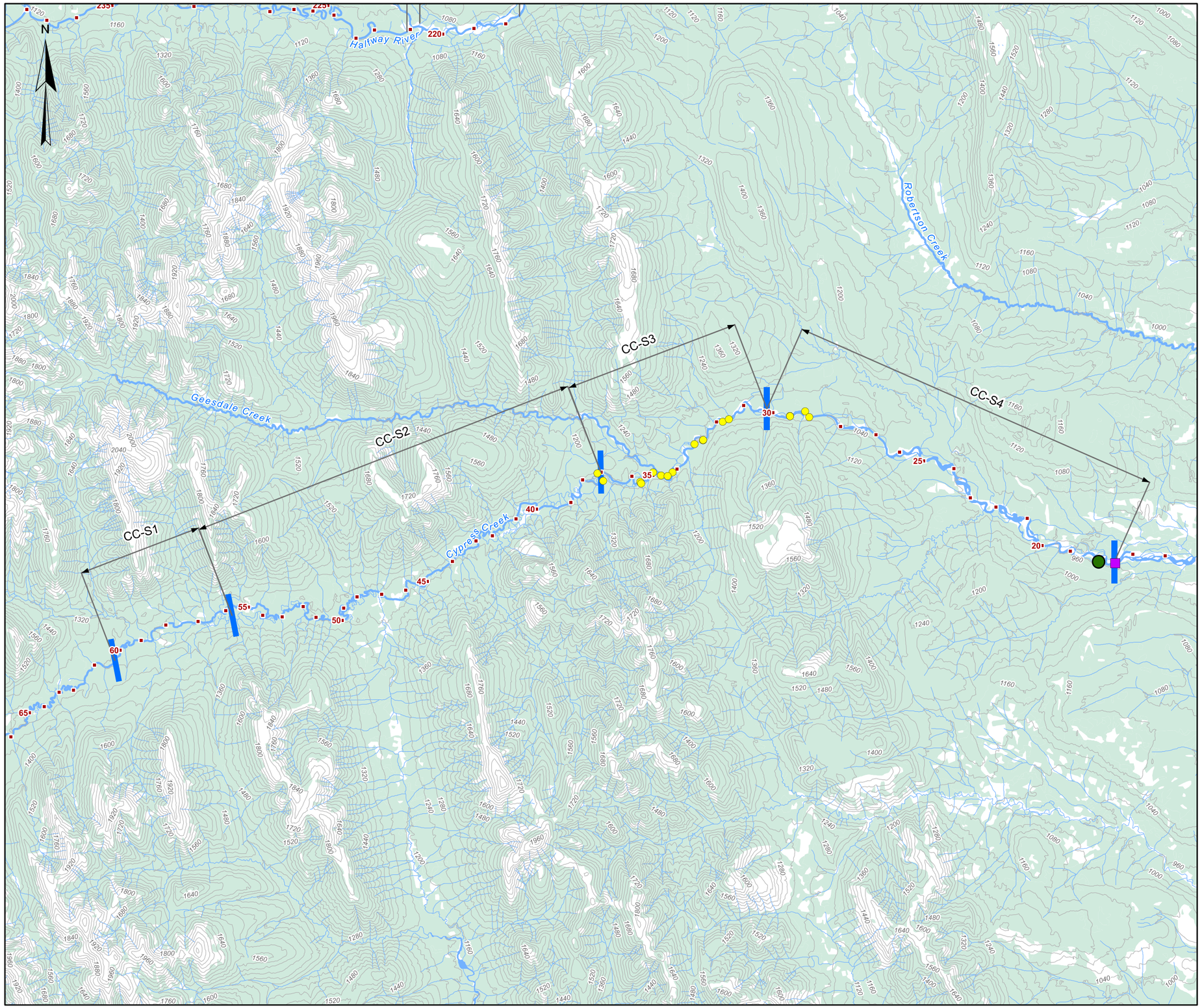
YYYY-MM-DD	2025-03-27
DESIGNED	KL
PREPARED	JG/CD/MH|KS
REVIEWED	DF
APPROVED	DF

PROJECT NO.	CONTROL	REV.	FIGURE
CA-GLD-20136472	24/4.1	0	**A4**

PATH: W:\Client\BC_Hydro\Site_C\09_PROJECTS\CA_GLD_20136472\24/4_1\02_PRODUCTION\GIS\Report\CA_GLD_20136472_24_4_1_Tributary_Indexing.aprx

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

0 25mm



LEGEND

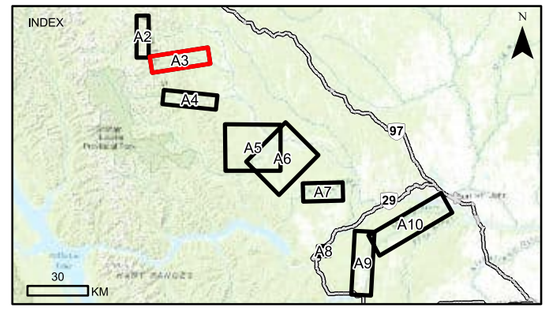
- RIVER KILOMETRE POSTS
- TEMPERATURE LOGGER LOCATION

UPSTREAM EXTENT OF EACH SAMPLE SITE

- BACKPACK ELECTROFISHING
- CYPRESS CREEK PIT DETECTOR ARRAY
- SECTION BREAK

BASEMAP FEATURE

- CONTOUR (20 M)
- WATERCOURSE
- WOODED AREA



0 2,000 4,000

1:100,000 METRES

REFERENCES

1. 1, BASEDATA CONTAINS INFORMATION LICENCED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
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, 2024

CONSULTANT

YYYY-MM-DD	2025-03-27
DESIGNED	KL
PREPARED	JG/CD/MH|KS
REVIEWED	DF
APPROVED	DF

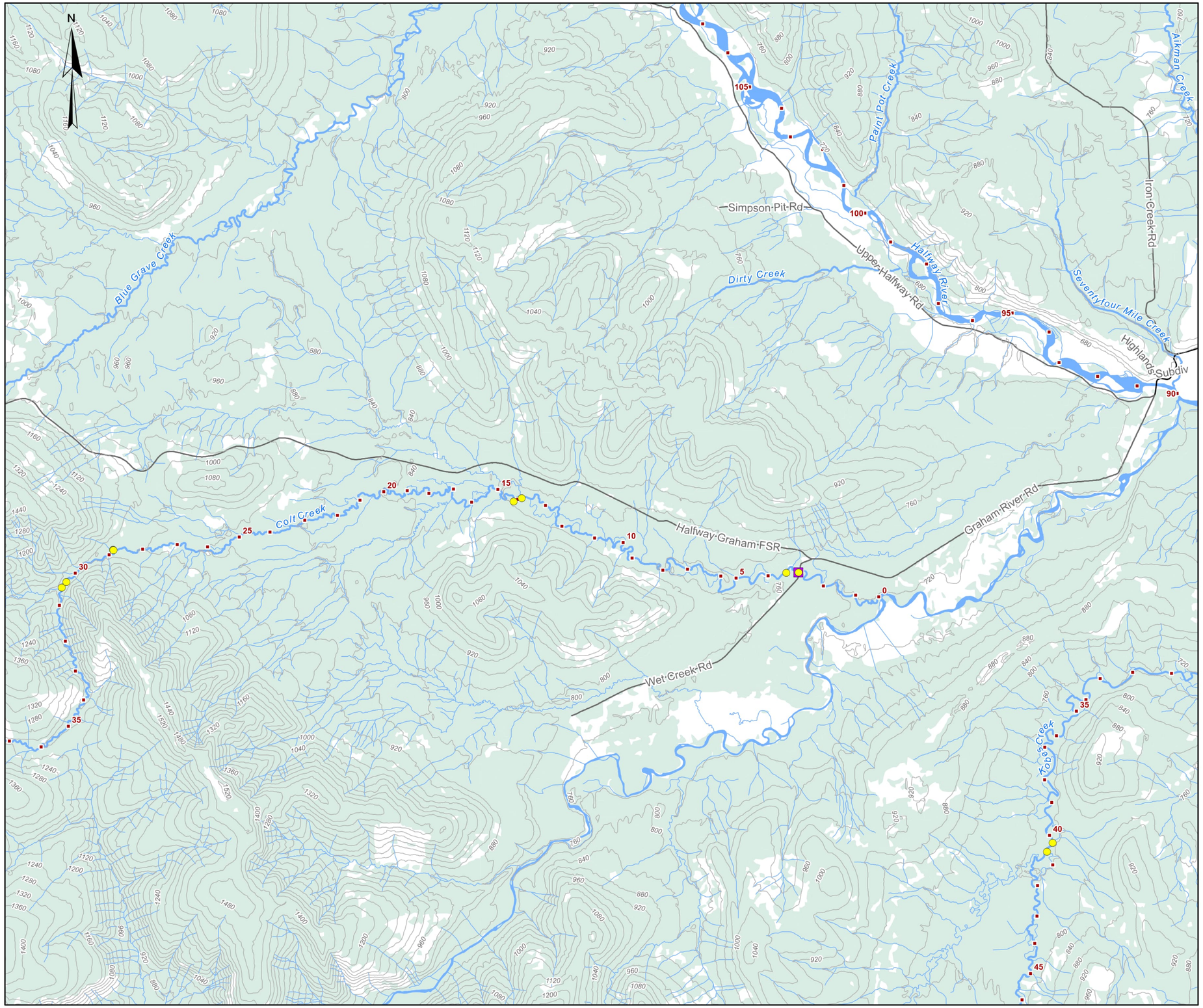
PROJECT NO.	CONTROL	REV.	FIGURE
CA-GLD-20136472	24/4.1	0	**A3**

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

25mm

0

PATH: W:\Client\BC_Hydro\Site_C\80_PROJECTS\CA_GLD_20136472\2464_1102_PRODUCTION\GIS\Report\CA_GLD_20136472_24.4_1_Tributary_Indexing.aprx



LEGEND

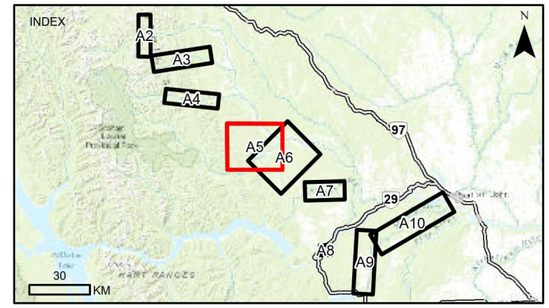
- RIVER KILOMETRE POSTS
- TEMPERATURE LOGGER LOCATION

UPSTREAM EXTENT OF EACH SAMPLE SITE

- BACKPACK ELECTROFISHING

BASEMAP FEATURE

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



0 2,500 5,000

1:90,000 METRES

REFERENCES

1. BASEDATA CONTAINS INFORMATION LICENCED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
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, 2024

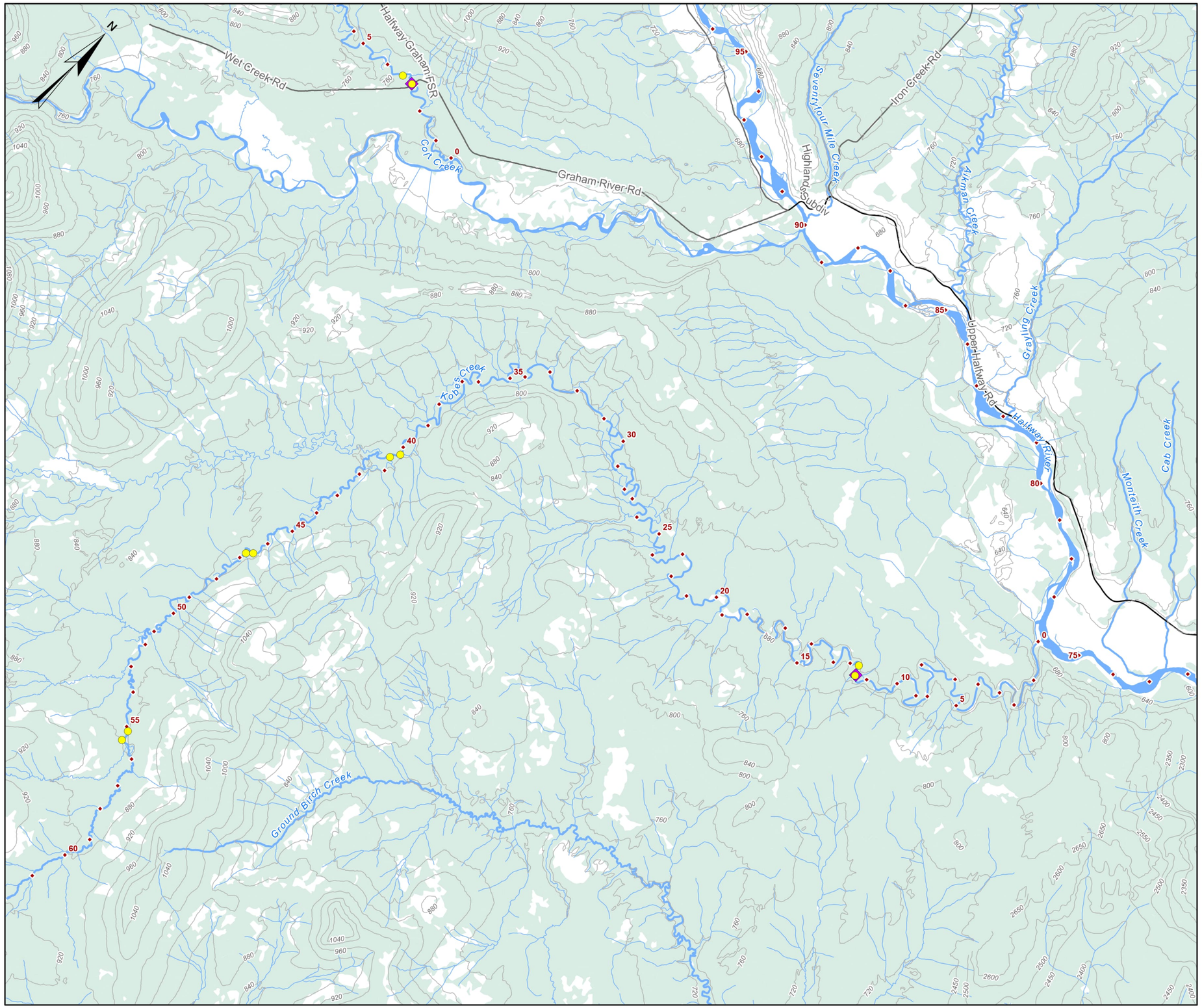
CONSULTANT

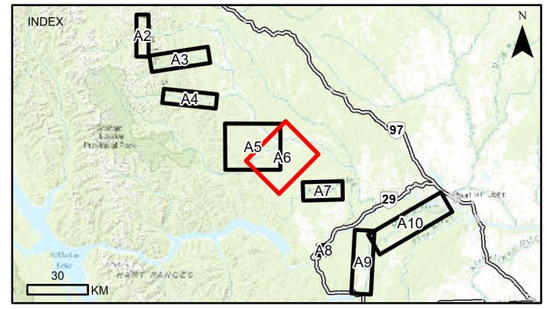
YYYY-MM-DD	2025-03-27
DESIGNED	DB
PREPARED	JG/CD/MH|KS
REVIEWED	DF
APPROVED	DF

PROJECT NO.	CONTROL	REV.	FIGURE
CA-GLD-20136472	24/4.1	0	**A5**

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

PATH: W:\Client\BC_Hydro\Site_C\99_PROJECTS\CA_GLD_20136472\2444_1102_PRODUCTION\GIS\Report\CA_GLD_20136472_24.4.1_Tributary_Indexing.aprx





LEGEND

- RIVER KILOMETRE POSTS
- TEMPERATURE LOGGER LOCATION

UPSTREAM EXTENT OF EACH SAMPLE SITE

- BACKPACK ELECTROFISHING

BASEMAP FEATURE

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

0 2,500 5,000

1:90,000 METRES

REFERENCES

1. BASEDATA CONTAINS INFORMATION LICENCED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
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, 2024

CONSULTANT
wsp

YYYY-MM-DD	2025-03-27
DESIGNED	DB
PREPARED	JG/CD/MH|KS
REVIEWED	DF
APPROVED	DF

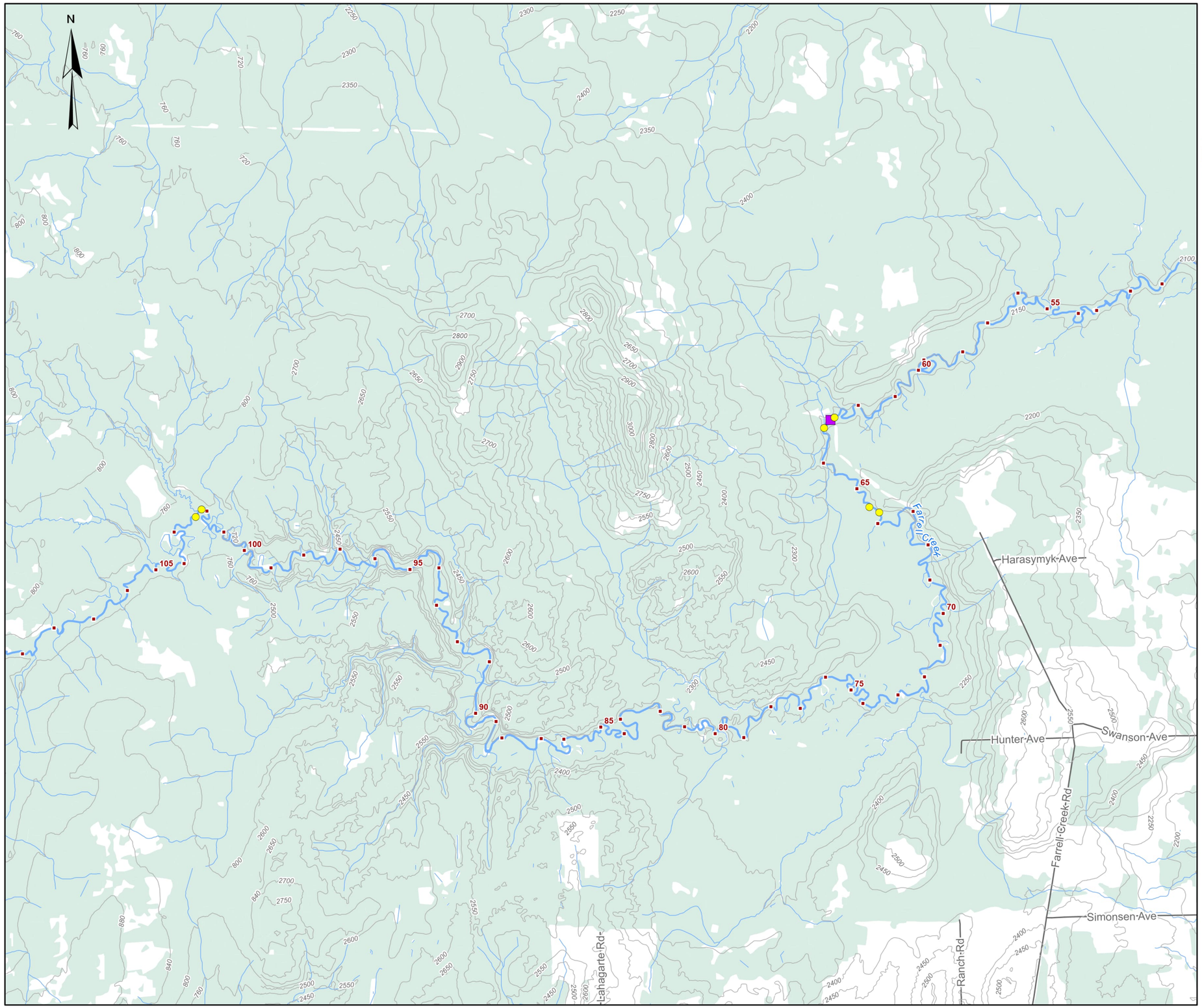
PROJECT NO.	CONTROL	REV.	FIGURE
CA-GLD-20136472	24/4.1	0	**A6**

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

25mm

0

PATH: W:\Clients\BC_Hydro\Site_C\99_PROJECTS\CA_GLD_20136472\244_1\02_PRODUCTION\GIS\Report\CA_GLD_20136472_24_4_1_Tributary_Indexing.aprx



LEGEND

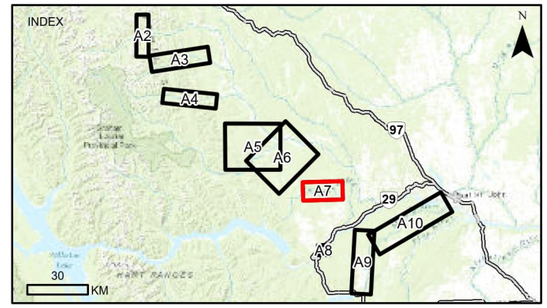
- RIVER KILOMETRE POSTS
- TEMPERATURE LOGGER LOCATION

UPSTREAM EXTENT OF EACH SAMPLE SITE

- BACKPACK ELECTROFISHING

BASEMAP FEATURE

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



0 1,000 2,000

1:70,000 METRES

REFERENCES

1. BASEDATA CONTAINS INFORMATION LICENCED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
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, 2024

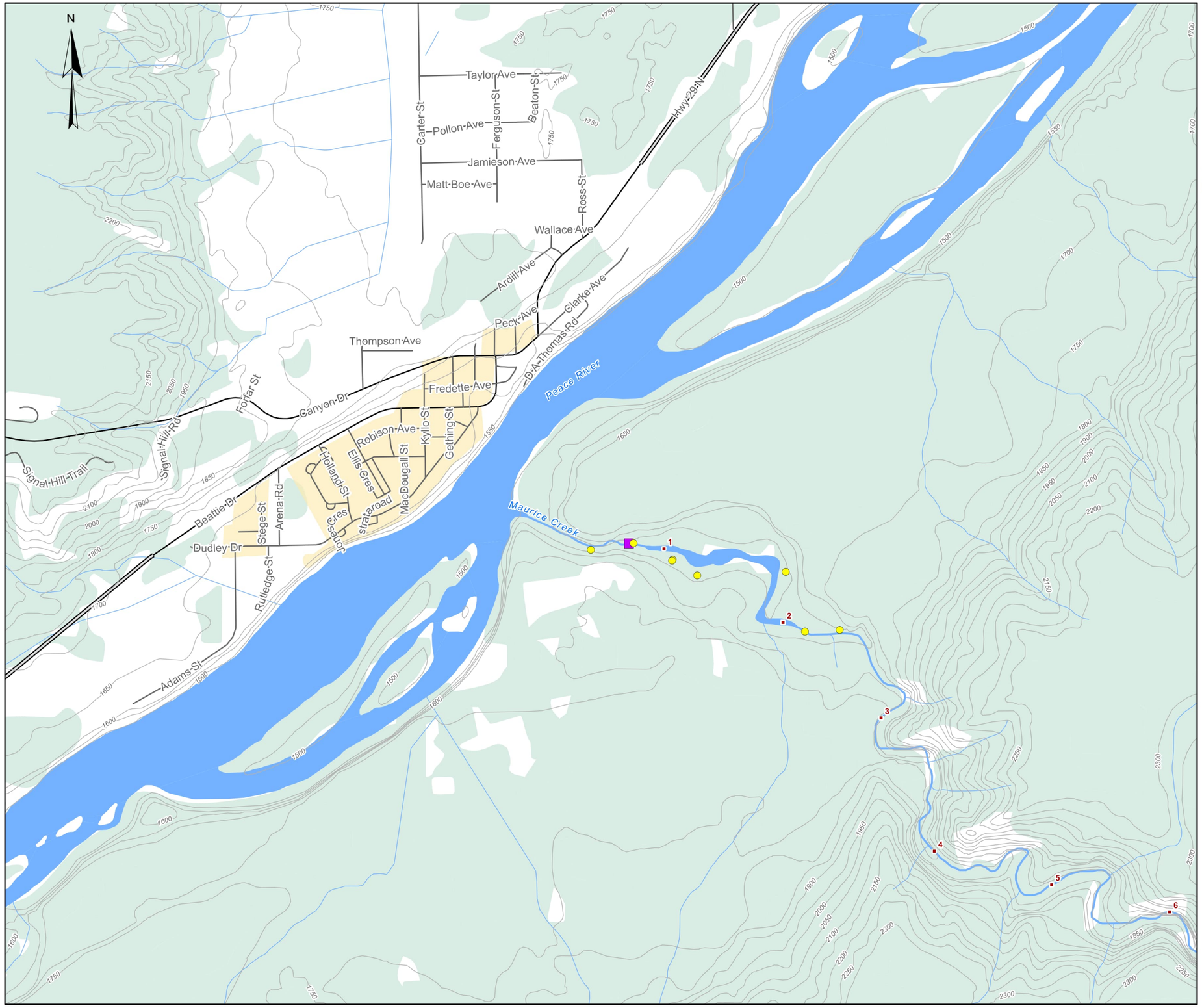
CONSULTANT

YYYY-MM-DD	2025-03-27
DESIGNED	DB
PREPARED	JG/CD/MH|KS
REVIEWED	DF
APPROVED	DF

PROJECT NO.	CONTROL	REV.	FIGURE
CA-GLD-20136472	24/4.1	0	**A7**

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

PATH: W:\Client\BC_Hydro\Site_C\99_PROJECTS\CA_GLD_20136472\2444_1102_PRODUCTION\GIS\Report\CA_GLD_20136472_24_4_1_Tributary_Indexing.aprx



LEGEND

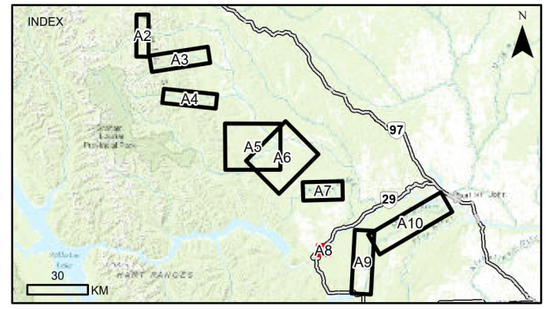
- RIVER KILOMETRE POSTS
- TEMPERATURE LOGGER LOCATION

UPSTREAM EXTENT OF EACH SAMPLE SITE

- BACKPACK ELECTROFISHING

BASEMAP FEATURE

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



0 570 1,140

1:20,000 METRES

REFERENCES

1. BASEDATA CONTAINS INFORMATION LICENCED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
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, 2024

CONSULTANT

wsp

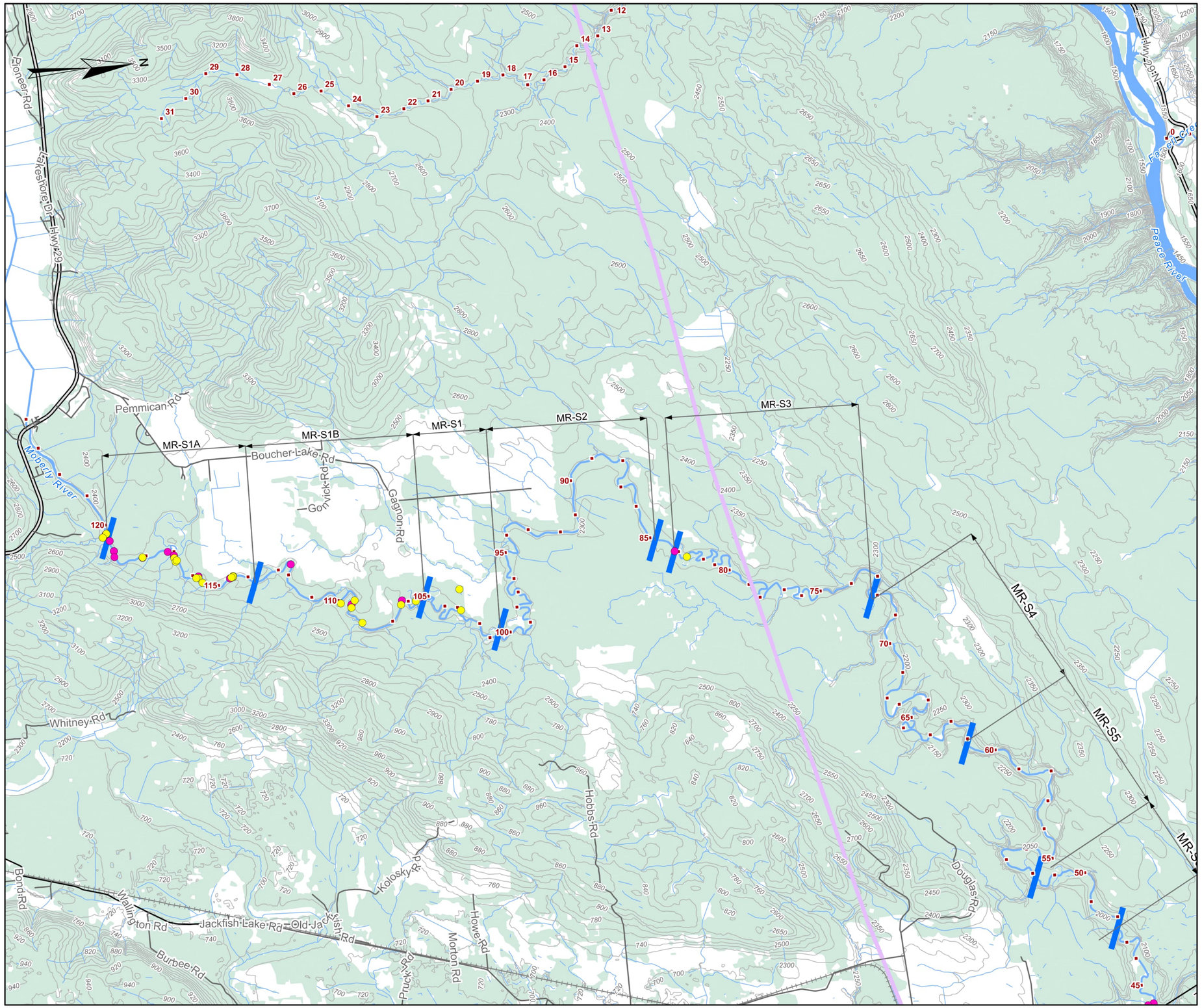
YYYY-MM-DD	2025-03-27
DESIGNED	DB
PREPARED	JG/CD/MH|KS
REVIEWED	DF
APPROVED	DF

PROJECT NO.	CONTROL	REV.	FIGURE
CA-GLD-20136472	24/4.1	0	**A8**

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

0 25mm

PATH: W:\Client\BC_Hydro\Site_C99_PROJECTS\CA_GLD_20136472\2444_1102_PRODUCTION\GIS\Report\CA_GLD_20136472_24_4.1_Tributary_Indexing.aprx



LEGEND

- RIVER KILOMETRE POSTS

UPSTREAM EXTENT OF EACH SAMPLE SITE

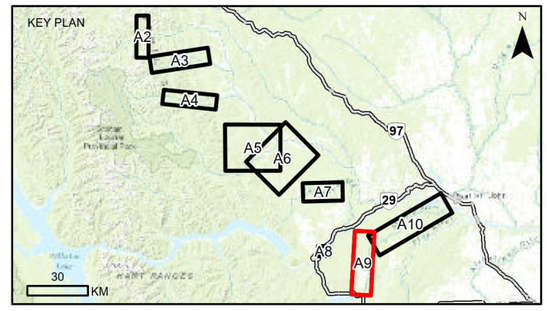
- ANGLING
- BACKPACK ELECTROFISHING
- SECTION BREAK

BASEMAP FEATURE

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

TRANSMISSION LINE RIGHT OF WAY (ROW)

- BC HYDRO EXISTING ROW



0 2,000 4,000

1:110,000 METRES

REFERENCES

1. BASE DATA CONTAINS INFORMATION LICENCED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
2. 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, 2024

CONSULTANT

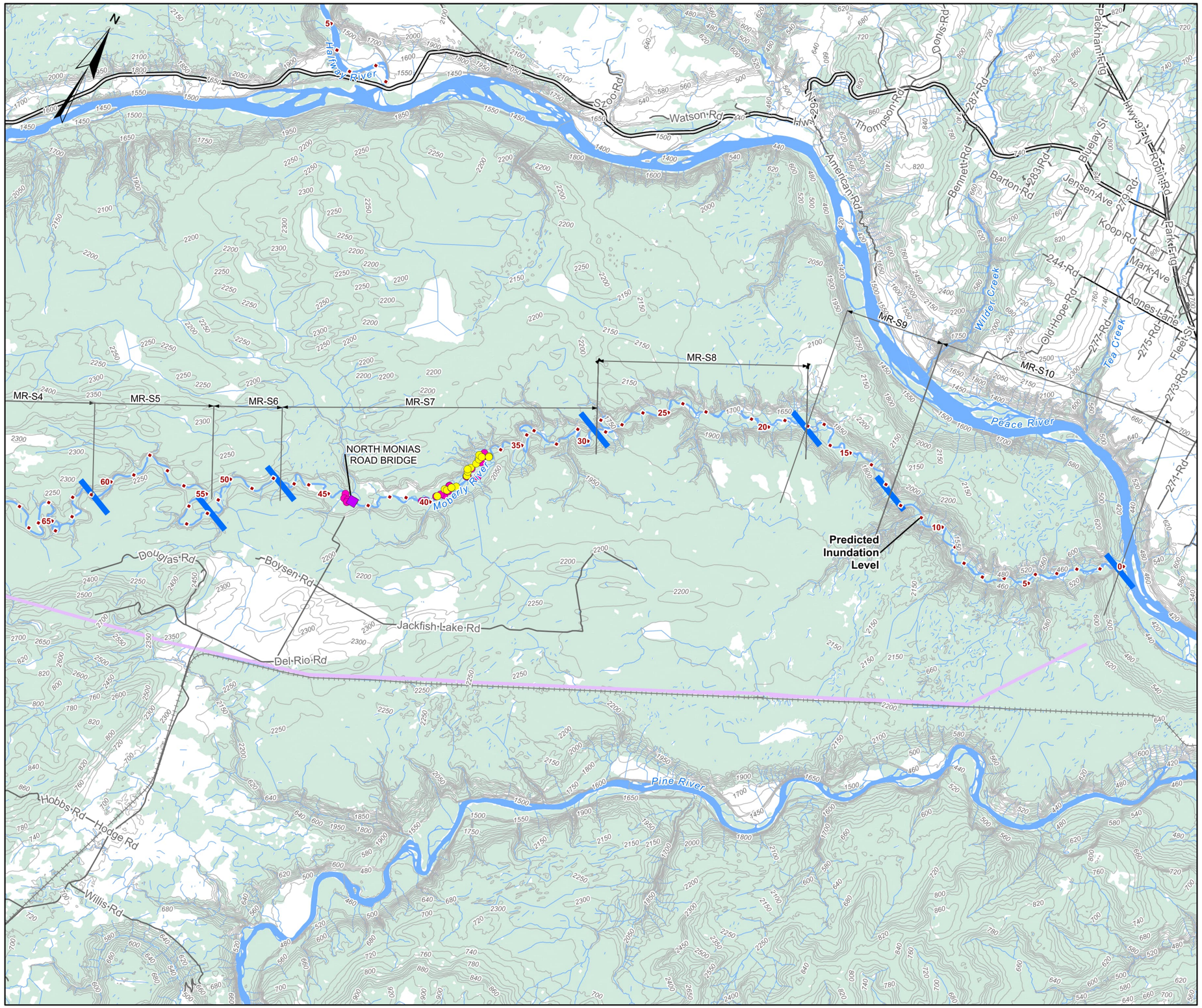
YYYY-MM-DD	2025-03-27
DESIGNED	DB
PREPARED	JG\CD\MH\KS
REVIEWED	DF
APPROVED	DF

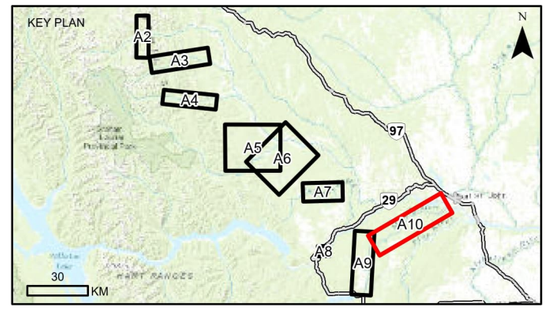
PROJECT NO.	CONTROL	REV.	FIGURE
CA-GLD-20136472	24/4.1	0	**A9**

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

0 25mm

PATH: W:\Client\BC_Hydro\Site_C\99_PROJECTS\CA_GLD_20136472\244_I102_PRODUCTION\GIS\Report\CA_GLD_20136472_24_4_1_Tributary_Indexing.aprx





LEGEND

- RIVER KILOMETRE POSTS

UPSTREAM EXTENT OF EACH SAMPLE SITE

- ANGLING
- BACKPACK ELECTROFISHING
- TEMPERATURE LOGGER LOCATION
- SECTION BREAK

BASEMAP FEATURE

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

TRANSMISSION LINE RIGHT OF WAY (ROW)

- BC HYDRO EXISTING ROW

0 2,500 5,000

1:140,000 METRES

REFERENCES

1. BASE DATA CONTAINS INFORMATION LICENCED UNDER THE OPEN GOVERNMENT LICENCE – BRITISH COLUMBIA
2. 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, 2024

CONSULTANT
wsp

YYYY-MM-DD	2025-03-27
DESIGNED	DB
PREPARED	JG\CD\MH\KS
REVIEWED	DF
APPROVED	DF

PROJECT NO.	CONTROL	REV.	FIGURE
CA-GLD-20136472	24/4.1	0	**A10**

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

25mm

0

PATH: W:\Client\BC_Hydro\Site_C\99_PROJECTS\CA_GLD_20136472\244_1\02_PRODUCTION\GIS\Report\CA_GLD_20136472_24_4_1_Tributary_Indexing.aprx

Table A1 Locations of sites sampled during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2024.

River	Upstream River Km[a]	Site Name	Sample Method	Upstream UTM[b]			Downstream UTM[b]		
				Zone	Easting	Northing	Zone	Easting	Northing
Chowade River	49.5	CHR-EF-049.5-2024-07-28	Backpack Electrofishing	10V	494096	6284250	10V	494296	6284206
	49.4	CHR-EF-049.4-2024-07-28	Backpack Electrofishing	10V	494207	6284251	10V	494111	6284277
	49.2	CHR-EF-049.2-2024-07-28	Backpack Electrofishing	10V	494310	6284221	10V	494565	6284132
	49.0	CHR-EF-049.0-2024-07-28	Backpack Electrofishing	10V	494366	6284125	10V	494495	6284055
	46.6	CHR-EF-046.6-2024-08-02	Backpack Electrofishing	10V	496387	6283571	10V	496631	6283593
	46.3	CHR-EF-046.3-2024-08-02	Backpack Electrofishing	10V	496694	6283585	10V	496905	6283440
	44.6	CHR-EF-044.6-2024-07-28	Backpack Electrofishing	10V	498286	6284056	10V	498374	6283881
	44.4	CHR-EF-044.4-2024-07-28	Backpack Electrofishing	10V	498381	6283878	10V	498697	6283782
	43.7	CHR-EF-043.7A-2024-07-27	Backpack Electrofishing	10V	498953	6283414	10V	498839	6283609
	43.7	CHR-EF-043.7-2024-07-27	Backpack Electrofishing	10V	498771	6283587	10V	498897	6283387
	43.5	CHR-EF-043.5-2024-07-27	Backpack Electrofishing	10V	498992	6283638	10V	499164	6283543
	43.4	CHR-EF-043.4-2024-07-27	Backpack Electrofishing	10V	498958	6283386	10V	499101	6283340
	40.2	CHR-EF-040.2-2024-07-27	Backpack Electrofishing	10V	500941	6282412	10V	501045	6282459
	40.1	CHR-EF-040.1-2024-07-27	Backpack Electrofishing	10V	500962	6282396	10V	501105	6282340
	27.8	CHR-EF-027.8-2024-07-25	Backpack Electrofishing	10V	509819	6282992	10V	509920	6282976
	27.7	CHR-EF-027.7-2024-07-25	Backpack Electrofishing	10V	510019	6282970	10V	509944	6282821
	27.6	CHR-EF-027.6-2024-07-25	Backpack Electrofishing	10V	509894	6282940	10V	509986	6282979
Colt Creek	30.4	COC-EF-030.4-2024-06-24	Backpack Electrofishing	10V	521144	6258255	10V	521235	6258391
	30.2	COC-EF-030.2-2024-06-24	Backpack Electrofishing	10V	521249	6258388	10V	521402	6258487
	29.0	COC-EF-029.0-2024-06-24	Backpack Electrofishing	10V	522332	6259132	10V	522233	6258999
	28.8	COC-EF-028.8-2024-06-24	Backpack Electrofishing	10V	522341	6259124	10V	522527	6259159
	14.3	COC-EF-014.3-2024-06-23	Backpack Electrofishing	10V	531623	6260255	10V	531802	6260333
	14.1	COC-EF-014.1-2024-06-23	Backpack Electrofishing	10V	531810	6260333	10V	532021	6260304
	3.2	COC-EF-003.2-2024-06-23	Backpack Electrofishing	10V	537957	6258599	10V	538626	6258621
	3.0	COC-EF-003.0-2024-06-23	Backpack Electrofishing	10V	538243	6258612	10V	538397	6258417
Cypress Creek	37.4	CYC-EF-037.4-2024-07-30	Backpack Electrofishing	10V	497811	6303793	10V	497767	6303893
	37.1	CYC-EF-037.1-2024-07-30	Backpack Electrofishing	10V	497666	6303988	10V	497870	6303986
	35.4	CYC-EF-035.4-2024-07-30	Backpack Electrofishing	10V	498769	6303766	10V	498924	6303824
	35.3	CYC-EF-035.3-2024-07-30	Backpack Electrofishing	10V	498794	6303726	10V	498992	6303836
	34.9	CYC-EF-034.9-2024-07-30	Backpack Electrofishing	10V	499101	6304012	10V	499285	6303933
	34.7	CYC-EF-034.7-2024-07-30	Backpack Electrofishing	10V	499306	6303933	10V	499438	6303809
	34.5	CYC-EF-034.5-2024-07-29	Backpack Electrofishing	10V	499603	6304015	10V	499426	6303803
	34.4	CYC-EF-034.4-2024-07-29	Backpack Electrofishing	10V	499476	6303918	10V	499592	6304070
	33.0	CYC-EF-033.0-2024-08-02	Backpack Electrofishing	10V	500168	6304741	10V	500346	6304851
	32.9	CYC-EF-032.9-2024-08-02	Backpack Electrofishing	10V	500388	6304840	10V	500557	6304941
	32.8	CYC-EF-032.8-2024-08-02	Backpack Electrofishing	10V	500391	6304849	10V	500542	6304946
	31.9	CYC-EF-031.9-2024-07-29	Backpack Electrofishing	10V	500895	6305319	10V	501053	6305378
	31.7	CYC-EF-031.7-2024-07-29	Backpack Electrofishing	10V	501055	6305383	10V	501212	6305485
	29.6	CYC-EF-029.6-2024-08-02	Backpack Electrofishing	10V	502631	6305467	10V	502832	6305507
	29.5	CYC-EF-029.5-2024-08-02	Backpack Electrofishing	10V	502633	6305460	10V	502836	6305493
	29.3	CYC-EF-029.3-2024-07-29	Backpack Electrofishing	10V	503022	6305587	10V	503107	6305498
	29.1	CYC-EF-029.1-2024-07-29	Backpack Electrofishing	10V	503128	6305437	10V	503321	6305460
Farrell Creek	102.1	FAC-EF-102.1-2024-07-10	Backpack Electrofishing	10V	560851	6238187	10V	560962	6238321
	101.7	FAC-EF-101.7-2024-07-10	Backpack Electrofishing	10V	560957	6238322	10V	561084	6238155

[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
Farrell Creek	65.7	FAC-EF-065.7-2024-07-10	Backpack Electrofishing	10V	573200	6238269	10V	573023	6282398
	65.5	FAC-EF-065.5-2024-07-10	Backpack Electrofishing	10V	573022	6238365	10V	572910	6281808
	63.3	FAC-EF-063.3-2024-06-22	Backpack Electrofishing	10V	572204	6239792	10V	572388	6281813
	63.0	FAC-EF-063.0-2024-06-22	Backpack Electrofishing	10V	572392	6239984	10V	572506	6281923
Fiddes Creek	12.2	FIC-EF-012.2-2024-08-01	Backpack Electrofishing	10V	478274	6307180	10V	478244	6282051
	12.0	FIC-EF-012.0-2024-08-01	Backpack Electrofishing	10V	478269	6307178	10V	478260	6282046
	7.7	FIC-EF-007.7-2024-08-01	Backpack Electrofishing	10V	479531	6310750	10V	479645	6282046
	7.5	FIC-EF-007.5-2024-08-01	Backpack Electrofishing	10V	479814	6310983	10V	479648	6282888
Kobes Creek	55.5	KOC-EF-055.5-2024-06-21	Backpack Electrofishing	10V	544249	6243086	10V	544215	6282982
	55.3	KOC-EF-055.3-2024-06-21	Backpack Electrofishing	10V	544203	6243327	10V	544055	6282982
	46.8	KOC-EF-046.8-2024-06-22	Backpack Electrofishing	10V	543217	6248187	10V	543334	6283139
	46.5	KOC-EF-046.5-2024-06-22	Backpack Electrofishing	10V	543339	6248305	10V	543396	6283320
	40.4	KOC-EF-040.4-2024-06-22	Backpack Electrofishing	10V	544004	6252129	10V	544123	6283212
	40.2	KOC-EF-040.2-2024-06-22	Backpack Electrofishing	10V	544135	6252337	10V	544056	6283277
	11.7	KOC-EF-011.7-2024-06-21	Backpack Electrofishing	10V	555132	6256409	10V	555197	6258385
	11.5	KOC-EF-011.5-2024-06-21	Backpack Electrofishing	10V	555233	6256183	10V	555434	6258481
Maurice Creek	2.0	MAC-EF-002.0-2024-06-20	Backpack Electrofishing	10V	569771	6208576	10V	569157	6259132
	1.8	MAC-EF-001.8-2024-06-20	Backpack Electrofishing	10V	569592	6208567	10V	569437	6259154
	1.5	MAC-EF-001.5-2024-06-20	Backpack Electrofishing	10V	569493	6208875	10V	569364	6260336
	1.3	MAC-EF-001.3-2024-06-20	Backpack Electrofishing	10V	568907	6208938	10V	569157	6260304
	1.2	MAC-EF-001.2-2024-06-19	Backpack Electrofishing	10V	569034	6208856	10V	568896	6258619
	1.0	MAC-EF-001.0-2024-06-19	Backpack Electrofishing	10V	568904	6208933	10V	568705	6258431
	0.8	MAC-EF-000.8-2024-06-19	Backpack Electrofishing	10V	568705	6209023	10V	568514	6302948
	0.6	MAC-EF-000.6-2024-06-19	Backpack Electrofishing	10V	568485	6208988	10V	634195	6303018
Moberly River	118.3	MOR-EF-118.3-2024-06-07	Backpack Electrofishing	10U	587765	6189305	10U	587834	6303060
	118.2	MOR-AN-118.2-2024-07-21	Angling	10U	587978	6189386	10U	588091	6303048
	118.2	MOR-AN-118.2-2024-07-21	Angling	10U	587789	6189284	10U	587884	6303994
	118.2	MOR-EF-118.2-2024-06-07	Backpack Electrofishing	10U	587869	6189196	10U	587820	6304040
	118.2	MOR-AN-118.2-2024-06-07	Angling	10U	587784	6189286	10U	588063	6303952
	117.8	MOR-AN-117.8-2024-07-21	Angling	10U	588275	6189485	10U	588427	6303867
	117.8	MOR-AN-117.8-2024-06-07	Angling	10U	588275	6189485	10U	588427	6303879
	117.7	MOR-AN-117.7-2024-07-21	Angling	10U	588439	6189488	10U	588505	6303817
	116.7	MOR-EF-116.7-2024-06-07	Backpack Electrofishing	10U	588504	6190283	10U	588526	6304050
	116.7	MOR-AN-116.7-2024-06-07	Angling	10U	588517	6190282	10U	588516	6304012
	115.9	MOR-AN-115.9-2024-06-08	Angling	10U	588394	6191007	10U	588477	6304815
	115.6	MOR-AN-115.6-2024-07-21	Angling	10U	588512	6191174	10U	588771	6304930
	115.6	MOR-AN-115.6-2024-06-08	Angling	10U	588512	6191174	10U	588771	6305673
	115.5	MOR-EF-115.5-2024-06-07	Backpack Electrofishing	10U	588586	6191180	10U	588643	6305667
	115.4	MOR-EF-115.4A-2024-06-08	Backpack Electrofishing	10U	588692	6191212	10U	588779	6305600
	115.4	MOR-EF-115.4B-2024-06-08	Backpack Electrofishing	10U	588652	6191247	10U	588687	6305550
	114.5	MOR-EF-114.5-2024-07-21	Backpack Electrofishing	10V	589204	6191824	10V	589237	6305570
	114.5	MOR-AN-114.5-2024-07-21	Angling	10U	589155	6191827	10U	589294	6305638
	114.5	MOR-EF-114.5-2024-06-08	Backpack Electrofishing	10U	589198	6191763	10U	589207	6305445
	114.5	MOR-AN-114.5-2024-06-08	Angling	10U	589155	6191827	10U	589243	6305514
	114.1	MOR-EF-114.1-2024-07-21	Backpack Electrofishing	10U	589337	6191928	10U	589394	6305490

[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	113.2	MOR-EF-113.2 -2024-07-21_B	Backpack Electrofishing	10U	589209	6192811	10U	589227	6192904
	113.2	MOR-EF-113.2 -2024-07-21_A	Backpack Electrofishing	10U	589244	6192803	10U	589239	6192915
	113.2	MOR-AN-113.2-2024-07-21	Angling	10U	589272	6192716	10U	589209	6192956
	113.2	MOR-AN-113.2-2024-06-08	Angling	10U	589272	6192716	10U	589209	6192956
	113.1	MOR-EF-113.1B-2024-06-08	Backpack Electrofishing	10U	589224	6192805	10U	589237	6192921
	113.1	MOR-EF-113.1A-2024-06-08	Backpack Electrofishing	10U	589245	6192760	10U	589239	6192918
	111.0	MOR-AN-111-2024-06-09	Angling	10U	588991	6194464	10U	589048	6194477
	108.5	MOR-EF-108.5-2024-06-08	Backpack Electrofishing	10U	590194	6195804	10U	590136	6195811
	107.7	MOR-EF-107.7-2024-06-09	Backpack Electrofishing	10U	590138	6196200	10U	590180	6196143
	107.6	MOR-AN-107.6-2024-07-23	Angling	10U	590270	6196095	10U	590433	6196053
	107.5	MOR-AN-107.5-2024-06-09	Angling	10U	590244	6196107	10U	590452	6195990
	107.4	MOR-EF-107.4-2024-07-23	Backpack Electrofishing	10U	590337	6196096	10U	590392	6196088
	106.8	MOR-EF-106.8-2024-06-09	Backpack Electrofishing	10U	590791	6196374	10U	590877	6196341
	105.0	MOR-EF-105.0-2024-06-09	Backpack Electrofishing	10U	590354	6197504	10U	590280	6197504
	104.9	MOR-AN-104.9-2024-06-09	Angling	10U	590231	6197538	10U	590322	6197680
	104.3	MOR-EF-104.3-2024-06-09	Backpack Electrofishing	10U	590278	6197931	10U	590247	6197960
	104.1	MOR-EF-104.1-2024-07-23	Backpack Electrofishing	10U	590143	6198051	10U	590178	6198067
	103.8	MOR-AN-103.8-2024-07-23	Angling	10U	590177	6198071	10U	590192	6198174
	103.0	MOR-AN-103.0-2024-07-23	Angling	10U	509582	6198499	10U	509616	6198554
	101.5	MOR-EF-101.5-2024-07-23	Backpack Electrofishing	10U	590629	6199189	10U	590660	6199149
	101.5	MOR-EF-101.5-2024-06-09	Backpack Electrofishing	10U	590034	6199186	10U	590659	6199150
	83.0	MOR-AN-83.0-2024-07-23	Angling	10U	589381	6205355	10U	589534	6205552
	82.5	MOR-EF-82.5-2024-07-23	Backpack Electrofishing	10U	589560	6205689	10U	589484	6205769
	43.2	MOR-AN-43.2-2024-07-20	Angling	10V	603124	6218032	10V	603167	6217930
	43.0	MOR-AN-43.0-2024-07-20	Angling	10V	603168	6217872	10V	603212	6217807
	42.8	MOR-AN-42.8-2024-07-20	Angling	10V	603306	6217902	10V	603425	6217904
	42.7	MOR-EF-42.7-2024-06-11	Backpack Electrofishing	10V	603493	6217948	10V	603625	6218016
	42.6	MOR-EF-42.6-2024-07-20	Backpack Electrofishing	10V	603521	6217973	10V	603631	6218013
	42.6	MOR-AN-42.6-2024-07-20	Angling	10V	603315	6217806	10V	603302	6217856
	39.7	MOR-AN-39.7-2024-06-11	Angling	10V	605632	6219232	10V	605732	6219307
	39.6	MOR-AN-39.6-2024-07-22	Angling	10V	605619	6219222	10V	605677	6219293
	39.6	MOR-AN-39.6-2024-06-11	Angling	10V	605732	6219307	10V	605903	6219350
	38.8	MOR-EF-38.8-2024-06-10	Backpack Electrofishing	10V	606007	6219670	10V	606054	6219775
	38.7	MOR-AN-38.7-2024-07-23	Angling	10V	606202	6219825	10V	606253	6220065
	38.7	MOR-AN-38.7-2024-06-11	Angling	10V	605977	6219637	10V	606076	6219781
	38.6	MOR-AN-38.6-2024-06-11	Angling	10V	606076	6219781	10V	606225	6219891
	38.3	MOR-AN-38.3-2024-06-10	Angling	10V	606251	6220021	10V	606261	6220050
	38.2	MOR-EF-38.2B-2024-07-23	Backpack Electrofishing	10V	606108	6220019	10V	606171	6220204

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

continued…

[b] NAD83.

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	38.2	MOR-EF-38.2A-2024-07-23	Backpack Electrofishing	10V	606196	6226196	10V	606180	6220148
	38.1	MOR-AN-38.1-2024-07-22	Angling	10V	606187	6220215	10V	606561	6220503
	38.0	MOR-EF-38.0-2024-06-10	Backpack Electrofishing	10V	606288	6220184	10V	606450	6220322
	38.0	MOR-AN-38.0-2024-06-10	Angling	10V	606197	6220209	10V	606257	6220240
	37.9	MOR-EF-37.9B-2024-07-22	Backpack Electrofishing	10V	606415	6220316	10V	606467	6220331
	37.9	MOR-EF-37.9A-2024-07-22	Backpack Electrofishing	10V	606286	6220194	10V	606447	6220321
	37.5	MOR-EF-37.5-2024-07-24	Backpack Electrofishing	10V	606538	6220845	10V	606499	6220986
	37.2	MOR-AN-37.2-2024-07-22	Angling	10V	606591	6220838	10V	606551	6221159
	37.2	MOR-EF-37.2-2024-06-10	Backpack Electrofishing	10V	606540	6220855	10V	606512	6220918
	37.2	MOR-AN-37.2-2024-06-10	Angling	10V	606542	6220817	10V	606553	6221002
	37.1	MOR-EF-37.1-2024-06-10	Backpack Electrofishing	10V	606500	6220985	10V	606465	6221099
	37.0	MOR-EF-37.0-2024-07-22	Backpack Electrofishing	10V	606517	6221170	10V	606498	6220988
	37.0	MOR-EF-37.0-2024-06-10	Backpack Electrofishing	10V	606443	6221063	10V	606471	6221109
	37.0	MOR-AN-37.0-2024-06-10 B	Angling	10V	606555	6221155			
	37.0	MOR-AN-37.0-2024-06-10	Angling	10V	606892	6221020	10V	606608	6221129
	36.5	MOR-EF-36.3-2024-07-22	Backpack Electrofishing	10V	606610	6221582	10V	606524	6221720
	36.5	MOR-EF-36.5-2024-06-10	Backpack Electrofishing	10V	606605	6221397	10V	606646	6221562
	36.3	MOR-EF-36.3-2024-06-10	Backpack Electrofishing	10V	606611	6221586	10V	606585	6221814
	36.3	MOR-AN-36.3-2024-06-10	Angling	10V	606655	6221595	10V	606563	6221696
	36.2	MOR-EF-36.2-2024-07-21	Backpack Electrofishing	10V	606538	6221723	10V	606537	6221756
	36.2	MOR-AN-36.2-2024-07-22	Angling	10V	606552	6221715	10V	606812	6221885
	36.2	MOR-EF-36.2-2024-06-11	Backpack Electrofishing	10V	606657	6221702	10V	606636	6221763
	36.2	MOR-AN-36.2-2024-06-10	Angling	10V	606662	6221874	10V	606853	6221874
	36.1	MOR-AN-36.1-2024-06-10 B	Angling	10V	606728	6221529	10V	607024	6221901
	36.1	MOR-AN-36.1-2024-06-10	Angling	10V	606571	6221715	10V	606603	6221874
	35.9	MOR-EF-35.9B-2024-06-11	Backpack Electrofishing	10V	606864	6221866	10V	606908	6221874
	35.9	MOR-EF-35.9A-2024-06-11	Backpack Electrofishing	10V	606875	6221843	10V	606966	6221935

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

[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), 2024.

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	5.8	118.2	10U	587890	6189345	112.4	10U	589439	6193416
	MR-S1B	Irregular Meanders	8.5	112.4	10U	589439	6193416	103.9	10U	590194	6198180
	MR-S1	Tortuous Meanders	4.3	103.9	10U	590194	6198180	99.6	10U	591248	6200259
	MR-S3	Tortuous Meanders	11.6	83.1	10U	589407	6205349	71.4	10V	591076	6210858
	MR-S7	Irregular meandering; Braided; Frequently Confined	18.4	46.7	10V	600924	6217136	28.2	10V	609657	6224625

[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.

Table A1 Locations of temperature loggers deployed during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2024.

River	UTM		
	Zone	Easting	Northing
Chowade River	10V	513503	6284788
Colt Creek	10V	538236	6258610
Cypress Creek	10V	511008	6301673
Farrell Creek	10V	572316	6239946
Fiddes Creek	10V	479814	6310983
Kobes Creek	10V	555239	6256203
Maurice Creek	10V	568651	6209019
Moberly River	10V	603474	6217942

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), 2024.**

River	Section[a]	River Km[b]	Site Name	Sample Date	Sample Length (m)	Sample Time (s)
Chowade River		49.5	CHR-EF-049.5-2024-07-28	28-Jul-24	200	1572
		49.4	CHR-EF-049.4-2024-07-28	28-Jul-24	150	790
		49.2	CHR-EF-049.2-2024-07-28	28-Jul-24	175	1440
		49.0	CHR-EF-049.0-2024-07-28	28-Jul-24	150	869
		46.6	CHR-EF-046.6-2024-08-02	02-Aug-24	220	1487
		46.3	CHR-EF-046.3-2024-08-02	02-Aug-24	400	2215
		44.6	CHR-EF-044.6-2024-07-28	28-Jul-24	200	2514
		44.4	CHR-EF-044.4-2024-07-28	28-Jul-24	330	2689
		43.7	CHR-EF-043.7A-2024-07-27	27-Jul-24	200	1686
		43.7	CHR-EF-043.7-2024-07-27	27-Jul-24	230	2584
		43.5	CHR-EF-043.5-2024-07-27	27-Jul-24	200	2419
		43.4	CHR-EF-043.4-2024-07-27	27-Jul-24	200	1894
		40.2	CHR-EF-040.2-2024-07-27	27-Jul-24	200	1420
		40.1	CHR-EF-040.1-2024-07-27	27-Jul-24	200	922
		27.8	CHR-EF-027.8-2024-07-25	25-Jul-24	90	1137
		27.7	CHR-EF-027.7-2024-07-25	25-Jul-24	200	1276
		27.6	CHR-EF-027.6-2024-07-25	25-Jul-24	90	828
Chowade River Total					**3,435**	**27,742**
Colt Creek		30.4	COC-EF-030.4-2024-06-24	24-Jun-24	200	1158
		30.2	COC-EF-030.2-2024-06-24	24-Jun-24	200	1416
		29.0	COC-EF-029.0-2024-06-24	24-Jun-24	200	1146
		28.8	COC-EF-028.8-2024-06-24	24-Jun-24	200	954
		14.3	COC-EF-014.3-2024-06-23	23-Jun-24	200	1887
		14.1	COC-EF-014.1-2024-06-23	23-Jun-24	215	1356
		3.2	COC-EF-003.2-2024-06-23	23-Jun-24	200	3167
		3.0	COC-EF-003.0-2024-06-23	23-Jun-24	250	1501
Colt Creek Total					**1,665**	**12,585**
Cypress Creek		37.4	CYC-EF-037.4-2024-07-30	30-Jul-24	100	1512
		37.1	CYC-EF-037.1-2024-07-30	30-Jul-24	200	2253
		35.4	CYC-EF-035.4-2024-07-30	30-Jul-24	200	1638
		35.3	CYC-EF-035.3-2024-07-30	30-Jul-24	240	1,067
		34.9	CYC-EF-034.9-2024-07-30	30-Jul-24	200	1387
		34.7	CYC-EF-034.7-2024-07-30	30-Jul-24	200	1561
		34.5	CYC-EF-034.5-2024-07-29	29-Jul-24	300	2508
		34.4	CYC-EF-034.4-2024-07-29	29-Jul-24	200	1415
		33.0	CYC-EF-033.0-2024-08-02	02-Aug-24	200	2,101
		32.9	CYC-EF-032.9-2024-08-02	02-Aug-24	200	1839
		32.8	CYC-EF-032.8-2024-08-02	02-Aug-24	200	1301
		31.9	CYC-EF-031.9-2024-07-29	29-Jul-24	200	2076

[a] only applicable to Moberly River sites.

…continued.

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

Table B1 Continued.

River	Section[a]	River Km[b]	Site Name	Sample Date	Sample Length (m)	Sample Time (s)
Cypress Creek		31.7	CYC-EF-031.7-2024-07-29	29-Jul-2024	200	1416
		29.6	CYC-EF-029.6-2024-08-02	2-Aug-2024	200	1098
		29.5	CYC-EF-029.5-2024-08-02	2-Aug-2024	200	1682
		29.3	CYC-EF-029.3-2024-07-29	29-Jul-2024	150	1925
		29.1	CYC-EF-029.1-2024-07-29	29-Jul-2024	200	1688
Cypress Creek Total					**3,390**	**28,467**
Farrel Creek		102.1	FAC-EF-102.1-2024-07-10	10-Jul-2024	200	891
		101.7	FAC-EF-101.7-2024-07-10	10-Jul-2024	250	1458
		65.7	FAC-EF-065.7-2024-07-10	10-Jul-2024	200	2093
		65.5	FAC-EF-065.5-2024-07-10	10-Jul-2024	200	1,323
		63.3	FAC-EF-063.3-2024-06-22	22-Jun-2024	200	2900
		63.0	FAC-EF-063.0-2024-06-22	22-Jun-2024	200	1566
Farrell Creek Total					**1,250**	**10,231**
Fiddes Creek		12.2	FIC-EF-012.2-2024-08-01	1-Aug-2024	200	2127
		12.0	FIC-EF-012.0-2024-08-01	1-Aug-2024	200	2450
		7.7	FIC-EF-007.7-2024-08-01	1-Aug-2024	200	3212
		7.5	FIC-EF-007.5-2024-08-01	1-Aug-2024	200	2300
Fiddes Creek Total					**800**	**10,089**
Kobes Creek		55.5	KOC-EF-055.5-2024-06-21	21-Jun-24	200	2478
		55.3	KOC-EF-055.3-2024-06-21	21-Jun-24	200	1166
		46.8	KOC-EF-046.8-2024-06-22	22-Jun-24	200	3743
		46.5	KOC-EF-046.5-2024-06-22	22-Jun-24	200	1619
		40.4	KOC-EF-040.4-2024-06-22	22-Jun-24	200	1283
		40.2	KOC-EF-040.2-2024-06-22	22-Jun-24	200	964
		11.7	KOC-EF-011.7-2024-06-21	21-Jun-24	200	1923
		11.5	KOC-EF-011.5-2024-06-21	21-Jun-24	200	1805
Kobes Creek Total					**1,600**	**14,981**
Maurice Creek		2.0	MAC-EF-002.0-2024-06-20	20-Jun-2024	200	2249
		1.8	MAC-EF-001.8-2024-06-20	20-Jun-2024	400	1129
		1.5	MAC-EF-001.5-2024-06-20	20-Jun-2024	200	2027
		1.3	MAC-EF-001.3-2024-06-20	20-Jun-2024	200	2494
		1.2	MAC-EF-001.2-2024-06-19	19-Jun-2024	170	2430
		1.0	MAC-EF-001.0-2024-06-19	19-Jun-2024	200	866
		0.8	MAC-EF-000.8-2024-06-19	19-Jun-2024	200	1912
		0.6	MAC-EF-000.6-2024-06-19	19-Jun-2024	200	2320
Maurice Creek Total					**1,770**	**15,427**

[a] only applicable to Moberly River sites.

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

…continued.

Table B1 Continued.

River	Section[a]	River Km[b]	Site Name	Sample Date	Sample Length (m)	Sample Time (s)
Moberly River	MR-S1A	118.3	MOR-EF-118.3-2024-06-07	7-Jun-2024	78	646
	MR-S1A	118.2	MOR-EF-118.2-2024-06-07	7-Jun-2024	100	553
	MR-S1A	116.7	MOR-EF-116.7-2024-06-07	7-Jun-2024	90	1068
	MR-S1A	115.5	MOR-EF-115.5-2024-06-07	7-Jun-2024	76	1068
	MR-S1A	115.4	MOR-EF-115.4A-2024-06-08	8-Jun-2024	94	1047
	MR-S1A	115.4	MOR-EF-115.4B-2024-06-08	8-Jun-2024	39	339
	MR-S1A	114.5	MOR-EF-114.5-2024-07-21	21-Jul-2024	150	915
	MR-S1A	114.5	MOR-EF-114.5-2024-06-08	8-Jun-2024	115	1064
	MR-S1A	114.1	MOR-EF-114.1-2024-07-21	21-Jul-2024	89	447
	MR-S1A	113.2	MOR-EF-113.2 -2024-07-21_B	21-Jul-2024	85	587
	MR-S1A	113.2	MOR-EF-113.2 -2024-07-21_A	21-Jul-2024	163	1932
	MR-S1A	113.1	MOR-EF-113.1B-2024-06-08	8-Jun-2024	124	963
	MR-S1A	113.1	MOR-EF-113.1A-2024-06-08	8-Jun-2024	160	1163
	MR-S1B	108.5	MOR-EF-108.5-2024-06-08	8-Jun-2024	62	622
	MR-S1B	107.7	MOR-EF-107.7-2024-06-09	9-Jun-2024	67	560
	MR-S1B	107.4	MOR-EF-107.4-2024-07-23	23-Jul-2024	60	402
	MR-S1B	106.8	MOR-EF-106.8-2024-06-09	9-Jun-2024	92	661
	MR-S1B	105.0	MOR-EF-105.0-2024-06-09	9-Jun-2024	72	653
	MR-S1B	104.3	MOR-EF-104.3-2024-06-09	9-Jun-2024	42	441
	MR-S1B	104.1	MOR-EF-104.1-2024-07-23	23-Jul-2024	50	180
	MR-S1	101.5	MOR-EF-101.5-2024-07-23	23-Jul-2024	50	1141
	MR-S1	101.5	MOR-EF-101.5-2024-06-09	9-Jun-2024	43	370
	MR-S3	82.5	MOR-EF-82.5-2024-07-23	23-Jul-2024	150	775
	MR-S7	42.7	MOR-EF-42.7-2024-06-11	11-Jun-2024	149	1036
	MR-S7	38.8	MOR-EF-38.8-2024-06-10	10-Jun-2024	115	1033
	MR-S7	38.2	MOR-EF-38.2B-2024-07-23	23-Jul-2024	200	2083
	MR-S7	38.2	MOR-EF-38.2A-2024-07-23	23-Jul-2024	100	767
	MR-S7	38.0	MOR-EF-38.0-2024-06-10	10-Jun-2024	252	1050
	MR-S7	37.9	MOR-EF-37.9B-2024-07-22	22-Jul-2024	65	382
	MR-S7	37.9	MOR-EF-37.9A-2024-07-22	22-Jul-2024	206	750
	MR-S7	37.5	MOR-EF-37.5-2024-07-24	22-Jul-2024	140	884
	MR-S7	37.2	MOR-EF-37.2-2024-06-10	10-Jun-2024	68	705
	MR-S7	37.1	MOR-EF-37.1-2024-06-10	10-Jun-2024	104	751
	MR-S7	37.0	MOR-EF-37.0-2024-07-22	22-Jul-2024	185	1342

[a] only applicable to Moberly River sites.

…continued.

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

Table B1 Concluded.

River	Section[a]	River Km[b]	Site Name	Sample Date	Sample Length (m)	Sample Time (s)
Moberly River	MR-S7	37.0	MOR-EF-37.0-2024-06-10	10-Jun-2024	56	405
	MR-S7	36.5	MOR-EF-36.3-2024-07-22	22-Jul-2024	175	891
	MR-S7	36.5	MOR-EF-36.5-2024-06-10	10-Jun-2024	168	1,090
	MR-S7	36.3	MOR-EF-36.3-2024-06-10	10-Jun-2024	229	586
	MR-S7	36.2	MOR-EF-36.2-2024-07-21	21-Jul-2024	65	649
	MR-S7	36.2	MOR-EF-36.2-2024-06-11	11-Jun-2024	64	746
	MR-S7	35.9	MOR-EF-35.9B-2024-06-11	11-Jun-2024	43	634
	MR-S7	35.9	MOR-EF-35.9A-2024-06-11	11-Jun-2024	149	799
Moberly River Total					**4,584**	**34,180**

[a] only applicable to Moberly River sites.

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

...concluded.

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), 2024.

River	Section	River Km[a]	Site Name	Sample Date	Number of Rods	Angler-Minutes
Moberly River	1A	118.2	MOR-AN-118.2-2024-07-21	21-Jul-2024	2	60
	1A	118.2	MOR-AN-118.2-2024-07-21	21-Jul-2024	4	240
	1A	118.2	MOR-AN-118.2-2024-06-07	7-Jun-2024	3	285
	1A	117.8	MOR-AN-117.8-2024-07-21	21-Jul-2024	2	60
	1A	117.8	MOR-AN-117.8-2024-06-07	7-Jun-2024	2	120
	1A	117.7	MOR-AN-117.7-2024-07-21	21-Jul-2024	2	30
	1A	116.7	MOR-AN-116.7-2024-06-07	7-Jun-2024	2	90
	1A	115.9	MOR-AN-115.9-2024-06-08	8-Jun-2024	2	80
	1A	115.6	MOR-AN-115.6-2024-07-21	21-Jul-2024	2	120
	1A	115.6	MOR-AN-115.6-2024-06-08	8-Jun-2024	2	120
	1A	114.5	MOR-AN-114.5-2024-07-21	21-Jul-2024	2	100
	1A	114.5	MOR-AN-114.5-2024-06-08	8-Jun-2024	2	90
	1A	113.2	MOR-AN-113.2-2024-07-21	21-Jul-2024	2	120
	1A	113.2	MOR-AN-113.2-2024-06-08	8-Jun-2024	2	120
	1B	111.0	MOR-AN-111-2024-06-09	9-Jun-2024	3	180
	1B	107.6	MOR-AN-107.6-2024-07-23	23-Jul-2024	2	90
	1B	107.5	MOR-AN-107.5-2024-06-09	9-Jun-2024	3	270
	1B	104.9	MOR-AN-104.9-2024-06-09	9-Jun-2024	3	200
	1	103.8	MOR-AN-103.8-2024-07-23	23-Jul-2024	2	40
	1	103.0	MOR-AN-103.0-2024-07-23	23-Jul-2024	2	120
	3	83.0	MOR-AN-83.0-2024-07-23	23-Jul-2024	2	150
	7	43.2	MOR-AN-43.2-2024-07-20	20-Jul-2024	3	90
	7	43.0	MOR-AN-43.0-2024-07-20	20-Jul-2024	2	30
	7	42.8	MOR-AN-42.8-2024-07-20	20-Jul-2024	4	120
	7	42.6	MOR-AN-42.6-2024-07-20	20-Jul-2024	2	60
	7	39.7	MOR-AN-39.7-2024-06-11	11-Jun-2024	2	60
	7	39.6	MOR-AN-39.6-2024-07-22	22-Jul-2024	2	40
	7	39.6	MOR-AN-39.6-2024-06-11	11-Jun-2024	2	60
	7	38.7	MOR-AN-38.7-2024-07-23	23-Jul-2024	2	180
	7	38.7	MOR-AN-38.7-2024-06-11	11-Jun-2024	2	60
	7	38.6	MOR-AN-38.6-2024-06-11	11-Jun-2024	2	60
	7	38.3	MOR-AN-38.3-2024-06-10	10-Jun-2024	3	45
	7	38.1	MOR-AN-38.1-2024-07-22	22-Jul-2024	2	180
	7	38.0	MOR-AN-38.0-2024-06-10	10-Jun-2024	2	40
	7	37.2	MOR-AN-37.2-2024-07-22	22-Jul-2024	2	120
	7	37.2	MOR-AN-37.2-2024-06-10	10-Jun-2024	2	90
	7	37.0	MOR-AN-37.0-2024-06-10 B	10-Jun-2024	2	180
	7	37.0	MOR-AN-37.0-2024-06-10	10-Jun-2024	1	45

…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	Angler-Minutes
Moberly River	MR-S7	36.3	MOR-AN-36.3-2024-06-10	10-Jun-2024	3	75
	MR-S7	36.2	MOR-AN-36.2-2024-07-22	22-Jul-2024	2	180
	MR-S7	36.2	MOR-AN-36.2-2024-06-10	10-Jun-2024	2	120
	MR-S7	36.1	MOR-AN-36.1-2024-06-10 B	10-Jun-2024	2	120
	MR-S7	36.1	MOR-AN-36.1-2024-06-10	10-Jun-2024	1	20
Total						**4,660**

…concluded.

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

Table B3 Number of fish captured 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), 2024.

Species	Life Stage	River						All Rivers	
		Chowade River		Cypress Creek		Fiddes Creek			
		n	%[a]	n	%[a]	n	%[a]	n	%[a]
Target Species									
Bull Trout	Immature	265	42.7	219	39.9	168	93.9	652	48.4
	YOY	106	17.1	64	11.7	10	5.6	180	13.4
Rainbow Trout	Adult			1	<1	1	<1	2	<1
	Immature	8	1.3	5	0.9			13	1.0
All Bull Trout		**371**	**59.8**	**283**	**51.5**	**178**	**99.4**	**832**	**61.7**
All Rainbow Trout		**8**	**1.3**	**6**	**1.1**	**1**	**0.6**	**15**	**1.1**
Target Species Subtotal		**379**	**61.1**	**289**	**52.6**	**179**	**100.0**	**847**	**62.8**
Non-Target Species									
Mountain Whitefish	Adult	1	<1					1	<1
Mountain Whitefish	Immature	3	<1					3	<1
Slimy Sculpin	All	174	28.1	260	47.4			434	32.2
Sculpin Unidentified	All	63	10.2					63	4.7
Non-Target Species Subtotal		**241**	**38.9**	**260**	**47.4**	**0**	**0.0**	**501**	**37.2**
All species		**620**	**100.0**	**549**	**100.0**	**179**	**100.0**	**1,348**	**100.0**

[a] Percent composition of the total catch.

Table B4 Number of fish caught by backpack electrofishing and their frequency of occurrence in Colt, Farrell, Kobes, and Maurice creeks during the Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c), 2024.

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											
	Adult							2	<1	2	<1
Bull Trout	Immature	2	0.8					1	<1	3	<1
All Bull Trout		**2**	**0.0**	**0**	**0.0**	**0**	**0.0**	**3**	**0.0**	**5**	**<1**
Rainbow Trout	Adult							1	<1	1	<1
	Immature	39	15.3	35	8.6	2	1.4	193	27.7	269	18.0
All Rainbow Trout		**39**	**15.3**	**35**	**0.0**	**2**	**0.0**	**194**	**2.8**	**270**	**18.0**
Target Species Subtotal		**41**	**16.1**	**35**	**8.6**	**2**	**1.4**	**197**	**28.2**	**275**	**18.4**
Non-Target Species											
Lake Chub	All			91	22.4	53	38.4			144	9.6
Largescale Sucker	All			25	6.2			18	2.6	43	2.9
Longnose Dace	All	6	2.4	22	5.4	10	7.2	233	33.4	271	18.1
Longnose Sucker	All	3	1.2	27	6.7	16	11.6	194	27.8	240	16.0
Mountain Whitefish	All	1	<1							1	<1
Northern Pikeminnow	All			17	4.2			1	<1	18	1.2
Peamouth	All							2	<1	2	<1
Prickly Sculpin	All			22	5.4	1	0.7	20	2.9	43	2.9
Redside Shiner	All			93	22.9	14	10.1			107	7.1
Slimy Sculpin	All	204	80.0	59	14.5	42	30.4	33	4.7	338	22.6
Trout-perch	All			14	3.4					14	0.9
White Sucker	All			1	<1					1	<1
Non-Target Species Subtotal		**214**	**83.9**	**371**	**91.4**	**136**	**98.6**	**501**	**71.8**	**1222**	**81.6**
All species		**255**	**100.0**	**406**	**100.0**	**138**	**100.0**	**698**	**100.0**	**1,497**	**100.0**

[a] Percent composition of the total catch.

Table B5 **Number of fish captured 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), 2024.**

Species	Section										All Sections	
	1A		1B		1		3		7			
	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]	n	%[a]
Arctic Grayling	1	<1			1	7.7			5	1.4	7	1.0
Burbot	4	1.9			1	7.7			3	0.8	8	1.2
Lake Chub	1	<1							4	1.1	5	0.7
Largescale Sucker	4	1.9	1	1.0	4	30.8	2	33.3	3	0.8	14	2.0
Longnose Dace	81	38.0	64	61.0			2	33.3	135	37.7	282	40.6
Longnose Sucker	64	30.0	13	12.4	2	15.4	1	16.7	79	22.1	159	22.9
Mountain Whitefish									1	<1	1	<1
Northern Pike	8	3.8	1	1.0	3	23.1					12	1.7
Redside Shiner	32	15.0	18	17.1					5	1.4	55	7.9
Slimy Sculpin	18	8.5	8	7.6	2	15.4	1	16.7	119	33.2	148	21.3
Unidentifed									4	1.1	4	0.6
All species	**213**	**30.6**	**105**	**15.1**	**13**	**1.9**	**6**	**0.9**	**358**	**51.5**	**695**	**100.0**

[a] Percent composition of the total catch.

Table B6 **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), 2024.**

Capture Date	Site Name	Section	River km[a]	Fork Length (mm)	Weight (g)	Age	Tagged
23-Jul-2024	MOR-EF-38.2B-2024-07-23	MR-S7	38.2	63	3	0	
23-Jul-2024	MOR-EF-38.2B-2024-07-23	MR-S7	38.2	68	4	0	
23-Jul-2024	MOR-EF-38.2B-2024-07-23	MR-S7	38.2	54	3	0	
23-Jul-2024	MOR-EF-38.2B-2024-07-23	MR-S7	38.2	60	2	0	
23-Jul-2024	MOR-EF-38.2B-2024-07-23	MR-S7	38.2	164	65	1	Yes
23-Jul-2024	MOR-EF-101.5-2024-07-23	MR-S1	101.5	80	5	0	Yes
21-Jul-2024	MOR-EF-114.5-2024-07-21	MR-S1A	114.5	56	3	0	

APPENDIX C

Habitat Data

Table C1 Habitat variables measured during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c), 2024.

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	27.6	CHR-EF-027.6-2024-07-25	25-Jul-24	9.5	420	To bottom	Low	0.50	1.10	sand	gravel	10	20	50	5	5	5			5	
	27.7	CHR-EF-027.7-2024-07-25	25-Jul-24	9.5	420	To bottom	Medium	0.20	1.00	cobble	sand	54	20	10	1	2	1		10	2	
	27.8	CHR-EF-027.8-2024-07-25	25-Jul-24	9.5	420	To bottom	Low	0.30	0.90	sand	cobble	30	30	10	10			10		10	
	40.1	CHR-EF-040.1-2024-07-27	27-Jul-24	6.9	390	To bottom	High	0.60	1.30	gravel	sand	60	5	15	2	2	10		1	5	
	40.2	CHR-EF-040.2-2024-07-27	27-Jul-24	6.9	390	To bottom	Low	0.35	0.80	gravel	cobble	25	30	30	5			10			
	43.4	CHR-EF-043.4-2024-07-27	27-Jul-24	8.4	390	To bottom	Low	0.30	1.10	gravel	sand	5	45	40					5	5	
	43.5	CHR-EF-043.5-2024-07-27	27-Jul-24	8.4	390	To bottom	Low	0.40	1.00	cobble	sand	20	40	20	2		10	8			
	43.7	CHR-EF-043.7A-2024-07-27	27-Jul-24	8.4	390	To bottom	Low	0.30	0.80	sand	gravel	10	64	20	2	2	2				
	43.7	CHR-EF-043.7-2024-07-27	27-Jul-24	8.4	390	To bottom	Medium	0.70	1.20	cobble	sand	20	20	10	5		5	5	25	10	
	44.4	CHR-EF-044.4-2024-07-28	28-Jul-24	6.1	430	To bottom	Low	0.20	1.00	cobble	gravel	30	10	10	10		1	2	35	2	
	44.6	CHR-EF-044.6-2024-07-28	28-Jul-24	6.1	430	To bottom	Medium	0.30	1.30	cobble	sand	68	10	10	1	1	5	1	2	2	
	46.3	CHR-EF-046.3-2024-08-02	2-Aug-24	5.9	410	To bottom	Medium	0.30	0.90	cobble	gravel	67	15	10	2	4				2	
	46.6	CHR-EF-046.6-2024-08-02	2-Aug-24	5.9	410	To bottom	Medium	0.30	0.70	gravel	boulder	55	10	10	5	5	3	2	5	5	
	49.0	CHR-EF-049.0-2024-07-28	28-Jul-24	7.7	390	To bottom	High	0.50	1.00	boulder	cobble	40	10	15	5	15	5	5		5	
	49.2	CHR-EF-049.2-2024-07-28	28-Jul-24	7.7	390	To bottom	Low	0.20	0.50	gravel	cobble	40	5	15	2		8	5	25		
	49.4	CHR-EF-049.4-2024-07-28	28-Jul-24	7.7	380	To bottom	Medium	0.30	0.50	cobble	gravel	45	5	5	10		2	3	30		
	49.5	CHR-EF-049.5-2024-07-28	28-Jul-24	7.7	390	To bottom	High	0.30	1.20	gravel	sand	60	10	10	1	2	2	5	5	5	
Colt Creek	3.0	COC-EF-003.0-2024-06-23	23-Jun-24	9.9	260	1.0	Medium	0.40	1.50	cobble	sand	29	5	15	5	2	5		5	5	29
	3.2	COC-EF-003.2-2024-06-23	23-Jun-24	9.9	260	0.5	Medium	0.45	1.00	cobble	boulder	30	25	10	3	10	5	2		10	5
	14.1	COC-EF-014.1-2024-06-23	23-Jun-24	9.1	270	1.5	Medium	0.60	1.60	cobble	sand	20		6	4	4		1	5	40	20
	14.3	COC-EF-014.3-2024-06-23	23-Jun-24	9.1	270	1.5	Medium	0.30	1.00	cobble	gravel	25	20	40	2		3			10	
	28.8	COC-EF-028.8-2024-06-24	24-Jun-24	4.2	270	To bottom	High	0.30	0.80	cobble	boulder	35	15	20		30					
	29.0	COC-EF-029.0-2024-06-24	24-Jun-24	4.2	270		High	0.60	1.20	boulder	cobble	60	2	2	3	21	1		1	10	
	30.2	COC-EF-030.2-2024-06-24	24-Jun-24	4.1	270	To bottom	High	0.40	1.00	cobble	boulder	61	5	10	2	10	2		5	5	
	30.4	COC-EF-030.4-2024-06-24	24-Jun-24	4.1	270	To bottom	High	0.50	1.00	boulder	cobble	55	1	2	2	35	1		1	3	
Cypress Creek	29.1	CYC-EF-029.1-2024-07-29	29-Jul-24	9.3	420	To bottom	High	0.30	1.20	boulder	sand	71	5	5	2	2	3	10	1	1	
	29.3	CYC-EF-029.3-2024-07-29	29-Jul-24	9.3	420	To bottom	Medium	0.20	0.50	cobble	boulder	60	1	1		1		1	35	1	
	29.5	CYC-EF-029.5-2024-08-02	2-Aug-24	11.7	420	To bottom	Medium	0.30	0.90	cobble	gravel	60	3	2	1	1	1		30	2	
	29.6	CYC-EF-029.6-2024-08-02	2-Aug-24	11.7	420	To bottom	Medium	0.20	0.60	cobble	boulder	35	15	10	5	20	7	3	5		
	31.7	CYC-EF-031.7-2024-07-29	29-Jul-24	10.7	420	To bottom	High	0.30	1.00	cobble	sand	57	10	10	1	5	5	10	1	1	
	31.9	CYC-EF-031.9-2024-07-29	29-Jul-24	10.7	420	To bottom	High	0.60	1.10	cobble	boulder	70	5	10	1	1	1	10		2	
	32.8	CYC-EF-032.8-2024-08-02	2-Aug-24	9.4	430	To bottom	Low	0.15	0.30	cobble	gravel	49	2	3	1		5	10	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
Cypress Creek	32.9	CYC-EF-032.9-2024-08-02	2-Aug-24	9.4	430	To bottom	High	0.30	0.70	cobble	boulder	65	5	5	5	5			10	5	
	33.0	CYC-EF-033.0-2024-08-02	2-Aug-24	9.4	430	To bottom	Medium	0.30	1.10	gravel	cobble	55	15	5	2	1	5	10	5	2	
	34.4	CYC-EF-034.4-2024-07-29	29-Jul-24	12.6	450	To bottom	Medium	0.50	1.00	cobble	boulder	15	10	20	5	5	3	15	1	26	
	34.5	CYC-EF-034.5-2024-07-29	29-Jul-24	12.6	450	To bottom	Medium	0.30	0.60	cobble	boulder	60	3	2	1	1	1	1	30	1	
	34.7	CYC-EF-034.7-2024-07-30	30-Jul-24	10.1	470	To bottom	Medium	0.60	1.30	cobble	gravel	50	3	5	10	2	1	1	8	20	
	34.9	CYC-EF-034.9-2024-07-30	30-Jul-24	10.1	470	To bottom	Medium	0.30	0.90	cobble	boulder	40	15	15	2	10	3	3	7	5	
	35.3	CYC-EF-035.3-2024-07-30	30-Jul-24	12.1	450	To bottom	Medium	0.20	0.80	gravel	sand	56	10	10	10	1	5	5	2	1	
	35.4	CYC-EF-035.4-2024-07-30	30-Jul-24	12.1	450	To bottom	Medium	0.50	1.00	gravel	cobble	60	5	5	4	2	1	1	21	1	
	37.1	CYC-EF-037.1-2024-07-30	30-Jul-24	9.7	450	To bottom	Medium	0.30	0.80	cobble	boulder	75	5	5	2	5	1	5	1	1	
	37.4	CYC-EF-037.4-2024-07-30	30-Jul-24	9.7	450	To bottom	Medium	0.20	0.90	cobble	gravel	40	15	15			1	2	25	2	
Farrell Creek	63.0	FAC-EF-063.0-2024-06-22	22-Jun-24	17.4	320	0.1	Medium	0.55	1.30	cobble	sand	10	15	5	2	10	3			30	25
	63.3	FAC-EF-063.3-2024-06-22	22-Jun-24	17.4	320	1.0	Medium	0.60	1.00	cobble	gravel	45	2	3					20	20	10
	65.5	FAC-EF-065.5-2024-07-10	10-Jul-24	19.8	410	1.0	Low	0.70	1.50	sand	gravel	1	1	5	1	1	1	2	1	17	70
	65.7	FAC-EF-065.7-2024-07-10	10-Jul-24	19.8	410	1.3	Low	0.50	1.50	sand	silt	1	30	30	1		1	1	20	16	
	101.7	FAC-EF-101.7-2024-07-10	10-Jul-24	20.3	350	1.3	Low	0.30	1.30	silt	gravel	10	20	10	2	1	2	1	19	5	30
	102.1	FAC-EF-102.1-2024-07-10	10-Jul-24	20.3	350	1.3	Low	0.75	1.60	silt	sand	3	25	2	1		5	1	2	61	
Fiddes Creek	7.5	FIC-EF-007.5-2024-08-01	1-Aug-24	5.2	460	To bottom	Medium	0.40	0.80	boulder	cobble	46	10	10	2	7	2	3	3	17	
	7.7	FIC-EF-007.7-2024-08-01	1-Aug-24	5.2	460	To bottom	High	0.10	0.50	cobble	boulder	55	5	2	5	5	1	1	25	1	
	12.0	FIC-EF-012.0-2024-08-01	1-Aug-24	9.2	480	To bottom	Medium	0.20	1.00	cobble	boulder	86	1	3	1	2	2	2	2	1	
	12.2	FIC-EF-012.2-2024-08-01	1-Aug-24	9.2	480	To bottom	Medium	0.20	0.50	cobble	boulder	50	5	5	10	5	5		20		
Kobes Creek	11.5	KOC-EF-011.5-2024-06-21	21-Jun-24	12.9	140	0.3	Low	0.65	1.10	sand	cobble	10	5			5	5			40	35
	11.7	KOC-EF-011.7-2024-06-21	21-Jun-24	13.3	130	0.3	Low	0.75	2.00	sand	boulder	70	5	1		2	2		5	10	5
	40.2	KOC-EF-040.2-2024-06-22	22-Jun-24	9.6	120	>1.0	Medium	0.50	1.40	cobble	sand	48	15	10	1	5	2	4		15	
	40.4	KOC-EF-040.4-2024-06-22	22-Jun-24	9.6	120	>1.0	Medium	0.90	1.00	cobble	gravel	40	5	5	2		1		7	40	
	46.5	KOC-EF-046.5-2024-06-22	22-Jun-24	10.7	100	To bottom	Medium	0.25	1.10	cobble	boulder	64	15	5	1		4	6		5	
	46.8	KOC-EF-046.8-2024-06-22	22-Jun-24	10.5	100	To bottom	Medium	0.50	1.00	cobble	gravel	48	5	10	5		2		10	20	
	55.3	KOC-EF-055.3-2024-06-21	21-Jun-24	12.3	80	To bottom	Medium	0.30	1.00	cobble	gravel	25	20	10	10	10		5		20	
	55.5	KOC-EF-055.5-2024-06-21	21-Jun-24	12.3	80	To bottom	Medium	0.50	0.60	cobble	gravel	30	15	15	3	1	1		30	5	
Maurice Creek	0.6	MAC-EF-000.6-2024-06-19	19-Jun-24	12.3	330	0.5	Medium	0.50	1.00	bedrock	cobble	50	2	3		5			10	10	20
	0.8	MAC-EF-000.8-2024-06-19	19-Jun-24	12.3	330	0.5	Medium	0.50	1.10	bedrock	cobble	19		1		15				5	60
	1.0	MAC-EF-001.0-2024-06-19	19-Jun-24	17.3	350	0.5	Medium	0.30	0.75	bedrock	boulder	8	1	1		25			5	10	50
	1.2	MAC-EF-001.2-2024-06-19	19-Jun-24	16.9	340	0.5	Medium	0.40	0.70	boulder	bedrock	61	1	1	1	2	1		4	1	28
	1.3	MAC-EF-001.3-2024-06-20	20-Jun-24	13.2	350	To bottom	Medium	0.50	1.50	cobble	gravel	74	10	2	1	3	1	1	2	5	1
	1.5	MAC-EF-001.5-2024-06-20	20-Jun-24	12.9	340	To bottom	Medium	0.30	0.80	cobble	boulder	30	5			30					35
	1.8	MAC-EF-001.8-2024-06-20	20-Jun-24	17.8	330	To bottom	Medium	0.30	1.10	cobble	silt	15	20	10	5	15	1				34
	2.0	MAC-EF-002.0-2024-06-20	20-Jun-24	16.3	340		Medium	0.50	1.75	boulder	bedrock	86	1	1		5			1	5	1

…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	35.9	MOR-EF-35.9B-2024-06-11	11-Jun-2024	12.5	250	>1.0	Medium	0.15	0.60	cobble	gravel	80	5	5					10		
	35.9	MOR-EF-35.9A-2024-06-11	11-Jun-2024	10.9	320	>1.0	Low	0.30	1.00	gravel	cobble	10	15	60					10	5	
	36.1	MOR-AN-36.1-2024-06-10 B	10-Jun-2024	14.6	210	0.6	Low	0.40	1.60	gravel	silt	20	10	15	5		15			25	10
	36.1	MOR-AN-36.1-2024-06-10	10-Jun-2024	12.5	210	1.0	Medium	0.30	1.50	gravel	cobble	20	10							10	60
	36.2	MOR-EF-36.2-2024-07-21	21-Jul-2024	22.3	230	0.8	Low	0.40	1.00	sand	silt	5	40	10						40	5
	36.2	MOR-AN-36.2-2024-07-22	22-Jul-2024	20.2	230	1.8	Low	0.40	1.30	cobble	sand	25	5	10			5		45	10	
	36.2	MOR-EF-36.2-2024-06-11	11-Jun-2024	14.3	210	0.7	Medium	0.20	1.10	gravel	cobble	25	10	25	5	10	5		10	10	
	36.2	MOR-AN-36.2-2024-06-10	10-Jun-2024	14.2	220	0.7	Medium	0.40	1.30	cobble	gravel	10	5	5		20	5			25	30
	36.3	MOR-EF-36.3-2024-06-10	10-Jun-2024	6.9	400	>1	Low	0.10	0.25	silt	gravel		10	50		5	20	5	10		
	36.3	MOR-AN-36.3-2024-06-10	10-Jun-2024	12.5	210	1.0	Medium	0.40	1.20	gravel	cobble	10								20	70
	36.5	MOR-EF-36.3-2024-07-22	22-Jul-2024	10.2	380	To bottom	Low	0.10	0.40	sand	silt	15	5	32	5		5	5	33		
	36.5	MOR-EF-36.5-2024-06-10	10-Jun-2024	13.5	210	0.8	Medium	0.25	0.50	gravel	cobble	40		10		10			20	10	10
	37.0	MOR-EF-37.0-2024-07-22	22-Jul-2024	18.8	270	To bottom		0.25	0.45	cobble	silt	16	16	16	16	5	16	5	5	5	
	37.0	MOR-EF-37.0-2024-06-10	10-Jun-2024	11.5	390	0.6	Low	0.35	0.60	silt	gravel			60				10		20	10
	37.0	MOR-AN-37.0-2024-06-10 B	10-Jun-2024	13.1	210	0.8	Medium	0.60	1.60	gravel	cobble					10				20	70
	37.0	MOR-AN-37.0-2024-06-10	10-Jun-2024	14.6	210	0.8	Medium	0.80	2.00	cobble	gravel	5	20	10			15			30	20
	37.1	MOR-EF-37.1-2024-06-10	10-Jun-2024	14.2	210	0.8	Low	0.25	0.50	cobble	gravel	20		20	20	10	10			10	10
	37.2	MOR-AN-37.2-2024-07-22	22-Jul-2024	22.0	230	1.8	Low	0.70	2.00	gravel	sand	30				10				60	
	37.2	MOR-EF-37.2-2024-06-10	10-Jun-2024	14.2	210	0.8	Medium	0.20	0.40	gravel	silt	10	10	30		10	30				10
	37.2	MOR-AN-37.2-2024-06-10	10-Jun-2024	14.6	210	0.8	Medium	0.60	1.20	cobble	gravel	15	10	5		5			15	30	20
	37.5	MOR-EF-37.5-2024-07-24	22-Jul-2024	22.7	220	1.0		0.3	0.9	cobble	silt	45	5	10	10	5	10	5	5	5	
	37.9	MOR-EF-37.9B-2024-07-22	22-Jul-2024	23.0	220	<1.0	Medium	0.35	0.9	cobble	gravel	45	10	5		10			15	15	
	37.9	MOR-EF-37.9A-2024-07-22	22-Jul-2024	10.3	370		Low			cobble	silt	20	5	10	10	5	10	15	10	15	
	38.0	MOR-EF-38.0-2024-06-10	10-Jun-2024	9.2	370	>1.0	Low	0.2	0.9	gravel	silt	25	10	50	5		5	5			
	38.0	MOR-AN-38.0-2024-06-10	10-Jun-2024	15.4	210	0.8	Medium	0.9	2.5	sand	gravel		5	5		15				40	35
	38.1	MOR-AN-38.1-2024-07-22	22-Jul-2024	22.5	260	1.8	Low	0.5	1.4	cobble	sand	30	5						20	45	
	38.2	MOR-EF-38.2B-2024-07-23	23-Jul-2024	10.9	340	To bottom	Low	0.25	0.6	gravel	cobble	30	10	10	5		10	20	5	10	
	38.2	MOR-EF-38.2A-2024-07-23	23-Jul-2024	10.7	350	0.7	Low	0.3	1	cobble	sand	15	15	10	5		10	10	5	30	
	38.3	MOR-AN-38.3-2024-06-10	10-Jun-2024	15.4	210	0.8	Medium	0.6	2.5	gravel	sand	5	10			15				40	30
	38.6	MOR-AN-38.6-2024-06-11	11-Jun-2024	14.6	200	0.6	Medium	0.6	1.2	cobble	gravel		20	15		15				20	30
	38.7	MOR-AN-38.7-2024-07-23	23-Jul-2024	22.0	270	0.2	Low	0.40	2.00	cobble	gravel		5	5						30	60
	38.7	MOR-AN-38.7-2024-06-11	11-Jun-2024	14.6	200	0.6	Medium	0.60	1.20	cobble	gravel	15	5	5		25				20	30
	38.8	MOR-EF-38.8-2024-06-10	10-Jun-2024	15.7	200	>1.0	Low	0.10	0.40	gravel	cobble	80	5	5					10		
	39.6	MOR-AN-39.6-2024-07-22	22-Jul-2024	22.0	260	1.7	Low	0.40	1.30	gravel	cobble	20	5	10		5			10	50	
	39.6	MOR-AN-39.6-2024-06-11	11-Jun-2024	15.4	200	0.6	Medium	0.50	1.60	gravel	cobble	20				30			10	20	20
	39.7	MOR-AN-39.7-2024-06-11	11-Jun-2024	15.4	200	0.6	Medium	0.80	1.40	cobble	gravel	10	5	10		15				20	40

…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	42.6	MOR-EF-42.6-2024-07-20	20-Jul-2024	24.0	350	To bottom	Low			cobble	gravel	50	5	15	5		10	5		10	
	42.6	MOR-AN-42.6-2024-07-20	20-Jul-2024	23.0	250	0.9	Low	0.60	1.00	cobble	gravel	10	10	10						60	10
	42.7	MOR-EF-42.7-2024-06-11	11-Jun-2024	15.8	200	0.8	Medium	0.20	0.90	cobble	gravel	55	5	5	5				15	10	5
	42.8	MOR-AN-42.8-2024-07-20	20-Jul-2024	23.0	250	0.9	Low	0.30	1.20	gravel	cobble	15	5						15	50	15
	43	MOR-AN-43.0-2024-07-20	20-Jul-2024	22.5	250	0.9	Low	0.40	1.30	gravel	cobble	22		23						45	10
	43.2	MOR-AN-43.2-2024-07-20	20-Jul-2024	23.0	250	0.9	Low	0.50	1.60	gravel	sand	20	10							70	
	82.5	MOR-EF-82.5-2024-07-23	23-Jul-2024	20.0	200	0.3	Low	0.35	1.00	cobble	sand	20	10	10	5	5	10	5	10	12	13
	83.0	MOR-AN-83.0-2024-07-23	23-Jul-2024	20.0	270	0.4	Low	0.40	1.30	gravel	sand	10	10							20	60
	101.5	MOR-EF-101.5-2024-07-23	23-Jul-2024	18.8	190	0.3	Low	0.35	0.95	gravel	sand	15	5	20	10		10	5		15	20
	101.5	MOR-EF-101.5-2024-06-09	9-Jun-2024	12.3	200	>1.0	Low	0.40	1.00	gravel	sand			30	50					20	
	103.0	MOR-AN-103.0-2024-07-23	23-Jul-2024	20.0	270	0.2	Low	0.40	1.20	sand	silt			10						20	70
	103.8	MOR-AN-103.8-2024-07-23	23-Jul-2024	19.5	270	0.2	Low	0.70	1.00	sand	silt			10						20	70
	104.1	MOR-EF-104.1-2024-07-23	23-Jul-2024	16.2	270	To bottom	Low	0.15	0.65	sand	silt		10	15			10	5	15	20	25
	104.3	MOR-EF-104.3-2024-06-09	9-Jun-2024	12.0	200	>1.0	Low	0.35	0.60	silt	gravel		25	25	20	10	5		10	5	
	104.9	MOR-AN-104.9-2024-06-09	9-Jun-2024	11.7	200	3.0	Medium	1.30	3.50	cobble	sand		15	10			5			70	
	105.0	MOR-EF-105.0-2024-06-09	9-Jun-2024	12.2	200	>1.0	Low	0.3	1.2	silt	gravel	40		20		10	10		10	10	
	106.8	MOR-EF-106.8-2024-06-09	9-Jun-2024	11.8	200	>1.0	Low	0.15	0.80	gravel	silt	60	5	10		5			15	5	
	107.4	MOR-EF-107.4-2024-07-23	23-Jul-2024	16.8	340	To bottom	Low	0.30	0.50	gravel	silt	40	5	10	10		10	5		10	10
	107.5	MOR-AN-107.5-2024-06-09	9-Jun-2024	12.0	200	3.0	Medium	1.00	2.30	gravel	cobble	20	5		5		5		10	55	
	107.6	MOR-AN-107.6-2024-07-23	23-Jul-2024	19.5		0.2		0.50	1.00	cobble	sand		10	5			5			40	40
	107.7	MOR-EF-107.7-2024-06-09	9-Jun-2024	11.7	200	>1.0	Medium	0.20	0.45	gravel	cobble	40		10		40			10		
	108.5	MOR-EF-108.5-2024-06-08	8-Jun-2024	13.1	200	>1.0	Low	0.15	0.45	cobble	gravel	70		10		10			10		
	111.0	MOR-AN-111-2024-06-09	9-Jun-2024	11.1	200	3.0	Medium	1.00	2.50	gravel	sand	25		5						70	
	113.1	MOR-EF-113.1B-2024-06-08	8-Jun-2024	12.8	200	>1.0	Medium	0.35	0.90	gravel	cobble	30		10	20	10	10			20	
	113.1	MOR-EF-113.1A-2024-06-08	8-Jun-2024	12.8	200	>1.0	Medium	0.30	1.00	gravel	boulder	20	5	25	10	10	5		5	20	
	113.2	MOR-EF-113.2 -2024-07-21_B	21-Jul-2024	23.0	200	To bottom	Low	0.40	0.80	sand	gravel	10	20	20	10	5	10	5	10	10	
	113.2	MOR-EF-113.2 -2024-07-21_A	21-Jul-2024	24.3	200	To bottom	Low	0.40	0.75	gravel	sand	15	30	15	10	5	5	5	5	10	
	113.2	MOR-AN-113.2-2024-07-21	21-Jul-2024	23.0	170	2.0	Low	0.80	1.40	gravel	cobble	20	15	10					25	30	
	113.2	MOR-AN-113.2-2024-06-08	8-Jun-2024	12.5	200	3.0	Medium	0.70	2.00	gravel	cobble	5	25				5		20	45	
	114.1	MOR-EF-114.1-2024-07-21	21-Jul-2024	26.7	200	To bottom	Low	0.25	0.50	sand	gravel	15	15	30	10		5	5	5	10	5
	114.5	MOR-EF-114.5-2024-07-21	21-Jul-2024	20.3	240	0.8	Low	0.30	0.90	silt	sand	5	5	10	5		5	5	10	40	15
	114.5	MOR-AN-114.5-2024-07-21	21-Jul-2024	23.0	160	2.0	Low	0.40	1.10	gravel	cobble	25	20	5					10	40	
	114.5	MOR-EF-114.5-2024-06-08	8-Jun-2024	12.9	200	>1.0	Low	0.20	0.50	silt	gravel	5	25	50	5			5	5	5	
	114.5	MOR-AN-114.5-2024-06-08	8-Jun-2024	12.8	200	3.0	Medium	0.70	2.50	gravel	cobble		15	10			5			65	5
	115.4	MOR-EF-115.4A-2024-06-08	8-Jun-2024	12.5	200	>1.0	Low	0.15	0.40	gravel	silt	5	5	50		5			5	10	20
	115.4	MOR-EF-115.4B-2024-06-08	8-Jun-2024	12.7	200	>1.0	Low	0.15	0.30	gravel	silt	20	25	25				20	5		5
	115.5	MOR-EF-115.5-2024-06-07	7-Jun-2024	14.5	200	>1.0	Medium	0.15	0.50	gravel	sand	20	25	25		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 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	115.6	MOR-AN-115.6-2024-07-21	21-Jul-2024	23.0	160	2.0	Low	0.50	2.00	cobble	gravel	15	30			10				45	
	115.6	MOR-AN-115.6-2024-06-08	8-Jun-2024	12.2	200	5.0	Medium	2.00	5.00	cobble	gravel		30							60	10
	115.9	MOR-AN-115.9-2024-06-08	8-Jun-2024	11.6	230	5.0	Medium	0.50	2.00	cobble	gravel	5	5	5						85	
	116.7	MOR-EF-116.7-2024-06-07	7-Jun-2024	14.2	200	To bottom	Low	0.25	0.45	gravel	cobble	60		20					20		
	116.7	MOR-AN-116.7-2024-06-07	7-Jun-2024	13.9	170	5.0	Medium	0.80	1.20	cobble	gravel	25								75	
	117.7	MOR-AN-117.7-2024-07-21	21-Jul-2024	23.0	160	2.0	Low	0.40	1.00	cobble	gravel	30							60	10	
	117.8	MOR-AN-117.8-2024-07-21	21-Jul-2024	22.3		2.0	Low	0.50	1.80	gravel	cobble	25				10			10	55	
	117.8	MOR-AN-117.8-2024-06-07	7-Jun-2024	13.8	170	5.0		1.20	2.50	cobble	gravel	15								85	
	118.2	MOR-AN-118.2-2024-07-21	21-Jul-2024	22.5	250	2.0		0.50	2.50	sand	cobble	10	5	20			5		10	50	
	118.2	MOR-AN-118.2-2024-07-21	21-Jul-2024	22.3	250	2.0		0.40	2.00	cobble	gravel	25	5	5		15			30	20	
	118.2	MOR-EF-118.2-2024-06-07	7-Jun-2024	9.2	430	To bottom	Low	0.10	0.40	gravel	cobble	30	30	10		20			10		
	118.2	MOR-AN-118.2-2024-06-07	7-Jun-2024	12.8	200	5.0	Medium	1.00	2.50	cobble	gravel		15		5	20			10	50	
	118.3	MOR-EF-118.3-2024-06-07	7-Jun-2024	13.5	200	To bottom	Medium	0.30	0.60	cobble	gravel	25	25		5			5		30	10

…concluded.

[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)

wsp.com