Site C Clean Energy Project

Peace River Fish Community Monitoring Program (Mon-2)

Task 2f – Beatton River Arctic Grayling Status Assessment

Construction Year 5 (2019)

Dustin Ford, RPBio
Golder Associates Ltd.

Gary Ash
Golder Associates Ltd.

Shawn Redden, RPBio
Golder Associates Ltd.

Brad Hildebrand
Golder Associates Ltd.

Demitria Burgoon, RPBio
Golder Associates Ltd.

31 December 2020

GOLDER

REPORT

Beatton River Arctic Grayling Status Assessment

2019 Investigations (Mon-2, Task 2f)

Submitted to:

Nich Burnett

BC Hydro
1111 West Georgia Street, 9th Floor
Vancouver, British Columbia, V6E 4G2
Canada

Submitted by:

Golder Associates Ltd.

201 Columbia Avenue Castlegar, British Columbia, V1N 1A8 Canada

+1 250 365 0344

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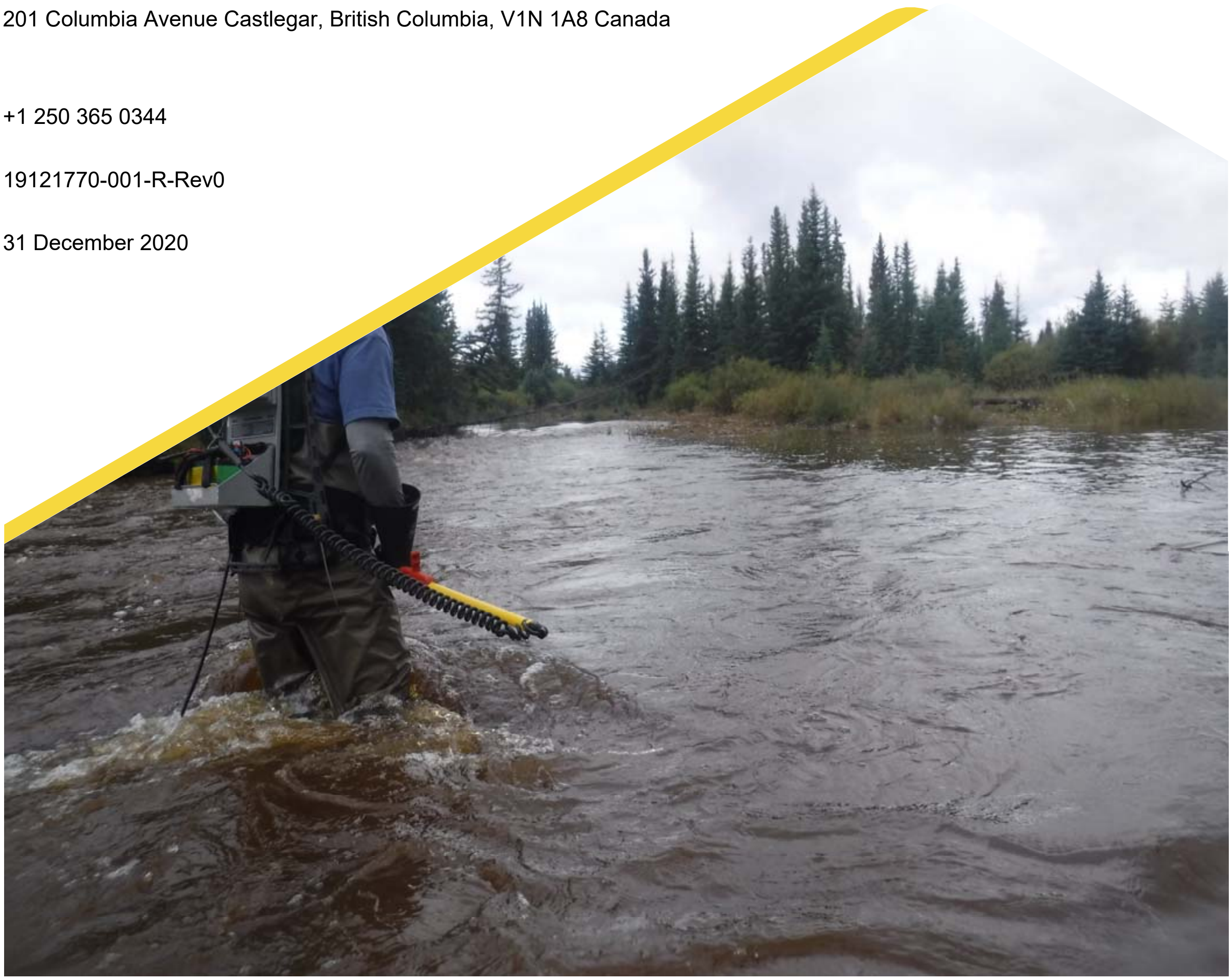

Cover Photo: Upstream view of index sample site BER-10-EF-16-08-19 on the Beatton River mainstem, 16 August 2019.

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Executive Summary

The Site C Clean Energy Project (the Project), including Project construction, reservoir filling, and operation, could affect fish and fish habitat via three key pathways: changes to fish habitat (including nutrient concentrations and lower trophic biota), changes to fish health and fish survival, and changes to fish movement. These pathways are examined in detail in Volume 2 of the Project's Environmental Impact Statement (EIS; BC Hydro 2013).

In accordance with Provincial Environmental Assessment Certificate Condition No. 7 and Federal Decision Statement Condition Nos. 8.4.3 and 8.4.4 for the Project, BC Hydro developed the Site C Fisheries and Aquatic Habitat Monitoring and Follow-up Program (FAHMFP). The Peace River Fish Community Monitoring Program (Mon-2) represents one component of the FAHMFP that monitors fish abundance, biomass, distribution, community composition, and population structure in the Peace River. The Beatton River Arctic Grayling Status Assessment (Task 2f; hereafter the Assessment) is one component of Mon-2 that aims to increase the current knowledge and understanding of the life history patterns of Arctic Grayling (*Thymallus arcticus*) in the Beatton River watershed.

BC Hydro does not anticipate the Project affecting Arctic Grayling populations in the upper reaches of the Beatton River (hereafter the Upper Beatton), as these populations are likely resident populations that are distinct from Arctic Grayling present in the Peace River mainstem.

The objective of the Assessment is to collect information on the age and size structure, growth, recruitment, and population abundance of Beatton River Arctic Grayling and make inter-year comparisons of these population characteristics where possible. Such information will help fill data gaps on Arctic Grayling in British Columbia and provide *Complementary Measures* for offsetting[1] through "*investments in data collection and scientific research related to maintaining or enhancing the productivity of commercial, recreational and Aboriginal fisheries*". The Assessment also compares data to metrics collected from Arctic Grayling populations elsewhere in the Peace River watershed (e.g., Moberly and the Peace rivers) and to select Arctic Grayling populations in other BC and Alberta watersheds.

Abundant spawning, rearing, and summer feeding habitats are present in the Upper Beatton, and data collected from radio telemetry and microsatellite DNA analyses support the presence of a resident population of Arctic Grayling in the Upper Beatton. Previous studies conducted in the Beatton River have documented Arctic Grayling spawning migrations into tributaries on an annual basis. After spawning, adult and juvenile Arctic Grayling migrate downstream to summer feeding habitats.

Data collected in the Upper Beatton during the Assessment support the findings of previous studies. Length-frequency distributions in 2018 and 2019 indicate that by late summer, use of Upper Beatton tributaries by Arctic Grayling is largely limited to age-0 and age-1 individuals. The majority of age-2 and older Arctic Grayling encountered during the 2018 and 2019 assessments were captured in the Upper Beatton mainstem, suggesting that by late summer, most older fish have moved downstream from tributary spawning habitats to mainstem habitats characterized by greater water depths and higher water velocities. The age-0 and age-1

[1] Available at http://www.dfo-mpo.gc.ca/pnw-ppe/offsetting-guide-compensation/index-eng.html

cohorts captured by backpack electrofishing in 2018 and 2019 indicated that recruitment and rearing is occurring in the Upper Beatton watershed. High variability in catch rates suggests varied recruitment success among tributaries.

Data collected in 2019 confirmed the presence of older age-classes (i.e., age-4 and age-5 individuals) in the Upper Beatton mainstem. Fulton's body condition factor and length-weight regression analyses in 2018 and 2019 indicated that body condition increased with body length for Arctic Grayling in the Upper Beatton. Differences in annual growth were recorded between 2018 and 2019; however, the non-linear growth rates calculated in 2019 are likely more representative of the population. Comparisons to other studies conducted under the FAHMFP suggested that fish in all age cohorts were smaller, grew more slowly, and had lower body condition in the Beatton River when compared to the Moberly River (Site C Reservoir Tributaries Fish Population Indexing Survey; Mon-1b Task 2c) and the Peace River (Peace River Large Fish Indexing Survey; Mon-2 Task 2a). However, mean lengths, size-at-age, and growth data from Arctic Grayling populations in major watersheds in the Omineca region were similar to Arctic Grayling caught in the Beatton River. Although some differences in life history metrics were identified when comparing the Beatton River Arctic Grayling population to some watersheds, data did not suggest that the Upper Beatton population is atypical for the species.

Common limiting factors for Arctic Grayling populations include habitat availability (specifically for rearing space for key life stages), aquatic productivity (availability of food resources at key life stages), parasitism and disease, species interaction (competition and predation), habitat degradation, and exploitation (Northcote 1993; Stamford et. al. 2017). Suitable spawning, rearing, and summer feeding habitats are common in the Upper Beatton (DES 1999 and 2001; AMEC and LGL 2009; Mainstream 2012). Land use related to industry (pipelines, mining, and logging), and the construction, improvement, and maintenance of roads can be linked to habitat degradation (Northcote 1993; Hagen et. al. 2019); however, the Upper Beatton experiences the least amount of anthropomorphic land use of the five regions of the Beatton River (Mainstem 2012).

Data collected from 2017 to 2019 represent the baseline, pre-Project state of the Beatton River Arctic Grayling population. While the FAHMFP will not test hypotheses specifically related to the Beatton River Arctic Grayling population, the Assessment will complement potential offsetting measures related to the Project and furthers BC Hydro's scientific research related to maintaining or enhancing the productivity of commercial, recreational, and Aboriginal fisheries in the Peace River watershed.

Acknowledgements

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BC Hydro

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

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Geraldine Davis	Technician

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

Dustin Ford, RPBio	Project Manager, Associate, Co-author
Shawn Redden, RPBio	Project Director, Associate
Brad Hildebrand, BSc	Fisheries Biologist, Co-author
Gary Ash, MSc	Project Advisor, Reviewer
David Roscoe, RPBio	Fisheries Biologist, Project Statistician
Demitria Burgoon, RPBio	Fisheries Biologist
Geoff Sawatzky	Biological Technician
James Goodier	GIS Analyst
Beth Thompson	Indigenous Relations
Carrie McAllister	Project Coordinator
Ron Giles	Warehouse Technician (Castlegar)
Devin Dickson	Warehouse Technician (Fort St. John)

LIST OF ACRONYMS AND ABBREVIATIONS

Acronym	Description
Assessment	Beatton River Arctic Grayling Status Assessment
CPUE	Catch-per-unit-effort
DELTs	Deformity, Erosion, Lesion, and Tumors
EAC	Environmental Assessment Certificate
EIS	Environmental Impact Statement
FAHMFP	Fisheries and Aquatic Habitat Monitoring and Follow-up Program
FDS	Federal Decision Statement
FDX	Full-Duplex
HDX	Half-Duplex
Mon-1b	Site C Reservoir Tributaries Fish Community and Spawning Monitoring Program
Mon-1b, Task 2c	Site C Reservoir Tributaries Fish Population Indexing Survey
Mon-2	Peace River Fish Community Monitoring Program
Mon-2, Task 2a	Peace River Large Fish Indexing Survey
Mon-2, Task 2f	Beatton River Arctic Grayling Status Assessment
PIT	Passive Integrated Transponder
Project	Site C Clean Energy Project

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FIGURES

APPENDICES

1.0 INTRODUCTION

1.1 Background

Potential effects of the Site C Clean Energy Project (the Project) on fish[2] and fish habitat[3] are described in Volume 2 of the Project's Environmental Impact Statement (EIS) as follows[4]:

> The Project has the potential to affect fish habitat in two ways. The Project may destroy fish habitat by placing a permanent physical structure on that habitat, or the Project may alter fish habitat by changing the physical or chemical characteristics of that habitat in such a way as to make it unusable by fish. Destruction or alteration of important habitats may be critical to the sustainability of a species population.
>
> The Project may affect fish health and survival. It may cause direct mortality of fish or indirect mortality of fish by changing system productivity, food resource type and abundance, and environmental conditions on which fish depend (e.g., water temperature).
>
> The Project may affect fish movement by physically blocking upstream and downstream migration of fish or by causing water velocities that exceed the swimming capabilities of fish, which results in hindered or blocked upstream migration of fish. Blocked or hindered fish movement has consequences to the species population. Fish may not be able to access important habitats in a timely manner or not at all (e.g., spawning habitats). Blocked fish movement may result in genetic fragmentation of the population.

Condition No. 7 of the Project's Provincial Environmental Assessment Certificate (EAC), Schedule B states the following:

> The EAC Holder must develop a Fisheries and Aquatic Habitat Monitoring and Follow-up Program [FAHMFP] 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 [Qualified Environmental Professional] or FLNRO [BC Ministry of Forests, Lands and Natural Resource Operations], to assess the need to adjust those measures to adequately mitigate the Project's effects.

Furthermore, the Project's Federal Decision Statement (FDS) states that a plan should be developed that addresses the following:

> Condition No. 8.4.3: an approach to monitor changes to fish and fish habitat baseline conditions in the Local Assessment Area (LAA); and
>
> Condition No. 8.4.4: 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.

The Beatton River Arctic Grayling Status Assessment (hereafter the Assessment) is designed to provide supporting data to address the EAC and FDS conditions detailed above. Specifically, the Assessment represents Task 2f of the Peace River Fish Community Monitoring Program (Mon-2) within the FAHMFP (BC Hydro 2015a). The Assessment aims to increase the current knowledge and understanding of the life history patterns of Arctic Grayling (*Thymallus arcticus*) in the Beatton River watershed.

BC Hydro submitted an application to Fisheries and Oceans Canada (DFO) for an authorization under Section 35(2)b of the *Fisheries Act* for several components of the Project associated with dam construction, reservoir preparation, and filling (BC Hydro 2015b, 2015c). Section 9.6 of the *Fisheries Act* Authorization

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[2] Fish includes fish abundance, biomass, composition, health, and survival.
[3] Fish habitat includes water quality, sediment quality, lower trophic levels (periphyton and benthic invertebrates), and physical habitat.
[4] EIS, Volume 2, Section 12.1.2 (BC Hydro 2013).

summarizes the expected impacts of the Project on Arctic Grayling in the Peace River Basin and outlines the need for additional data collection to help support the management of the species in the region. Briefly, the main effects of the Project on Arctic Grayling are as follows (BC Hydro 2015c):

- *A reduction in abundance caused by the loss of riverine habitat inundated by the reservoir*
- *A potential loss of the distinct group of Arctic Grayling that spawn in the Moberly River and rear in the Peace River because of changes in habitat and hindered fish movement*

Mainstream (2012) identifies the Beatton River as a potential recruitment source for the Peace River Arctic Grayling population. The Beatton River population is not anticipated to be affected by the Project and is genetically distinct from other populations in the Peace River watershed (Taylor and Yau 2012).

The Assessment will collect information on the age and size structure, growth, and habitat use of Arctic Grayling in the Beatton River and make inter-year comparisons of these population attributes. The Beatton River Arctic Grayling population will be compared to the Moberly River Arctic Grayling population using data collected as part of the FAHMFP's Site C Reservoir Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c; Golder 2019a) and to the Peace River Arctic Grayling population using data collected as part of the FAHMFP's Peace River Large Fish Indexing Survey (Mon-2, Task 2a; Golder and Gazey 2020). Combined, data related to Arctic Grayling collected under the FAHMFP will help fill data gaps in Arctic Grayling biology in British Columbia (BCCF 2015) and provide *Complementary Measures* for offsetting[5] through "*investments in data collection and scientific research related to maintaining or enhancing the productivity of commercial, recreational and Aboriginal fisheries*" (BC Hydro 2015c).

BC Hydro's *Fisheries Act* Authorization for dam construction, reservoir preparation, and filling (BC Hydro 2015c) provides the following summary about monitoring Arctic Grayling in British Columbia:

> *Monitoring and assessment data are a key component of Arctic Grayling management because they are geographically widespread, targeted by anglers, vulnerable to harvest pressure, sensitive to environmental degradation, and have complex life history patterns. These threats have led to poorly documented declines in status in some regions. For example, a status assessment of Alberta Arctic Grayling indicated that 50% of populations have declined by over 90%, mostly during the 1950–1980 time period (ASRD 2005). Data on the basic biology, population status and habitat condition are key elements to inform management and prevent these declines and restore populations. The Monitoring Plan for the Site C Project will generate these types of data, including the four Measures of status provided by BC MOE (2011) for Arctic Grayling.*
>
> *The BC Conservation Framework provides information on management and data needs for Arctic Grayling (BCCF 2015). The highest priority for Arctic Grayling is Goal 2 [Prevent species and ecosystems from becoming at risk] and the recommended Actions depend on the collection and analysis of data. In addition to a direct need for monitoring trends, habitat protection and restoration depend on data that*

5 Available at https://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/policies-politiques-eng.html#_694.

identifies the locations and characteristics of critical habitat. Regulation of harvest requires estimates of sustainable harvest rates and abundance targets, which require data on current values and trends of indicators such as growth, survival and density.

Management plans for BC Arctic Grayling (Northcote 1993; Blackman 2001; Williamson and Zimmerman 2005; Ballard and Shrimpton 2009; PFWCP 2014) have consistently placed a high priority on research and monitoring to provide information on Arctic Grayling distribution, habitat use, demographic information, and interspecific interactions to inform management decisions.

BC Hydro (2015c) also outlines the benefits of the FAHMFP in helping guide the management of Arctic Grayling in the Peace River watershed through the BC Conservation Framework:

There are several aspects of the Site C Monitoring Plan that would assist management agencies in meeting 'Ecological Integrity and Sustainable Use' Objectives for Arctic Grayling in the lower Peace River Basin (BC MOE 2011). These include:

1. *Additional information on the genetic and demographic structure of Arctic Grayling within the LAA (Local Assessment Area) relative to other Arctic Grayling in the lower Peace*
2. *Assessment and ongoing monitoring of:*
    a. *Abundance, growth rates, age, and size distribution*
    b. *Habitat preferences and status by age and size class*
    c. *Threats to Arctic Grayling and their habitat*
    d. *Exploitation rates in recreational and First Nations fisheries*
    e. *Opportunities for habitat enhancement*
3. *Application of monitoring and assessment data to establish watershed-specific Targets for Arctic Grayling Conservation and Use Objectives*
4. *Planning and implementing Management Actions designed to meet Objectives including:*
    a. *Harvest regulation*
    b. *Habitat protection*
    c. *Habitat restoration*
5. *Monitoring the effectiveness of these Management Actions*

In addition to information already identified in the Monitoring Plan, additional data collection and evaluations of the status of Arctic Grayling within the Halfway and Beatton rivers are described here. Status assessment would involve collection of data on age and size structure for comparison with data from other systems (e.g., Ballard and Shrimpton 2009) as well as for a within-system time trend analysis. This type of data can be used to assess whether a population is subject to high adult mortality (younger than expected age distribution), poor growth conditions for adults (lower than expected length-at-age, condition, lipid concentration), or poor recruitment conditions (higher than expected lengths of mature adults combined with lower than expected juvenile length-at-age, condition, and lipid concentration).

The Assessment will help agencies address the objectives listed above by monitoring the Beatton River Arctic Grayling population in 2018 and 2019. Currently, additional assessments are scheduled to be completed every five years beginning in 2024. Information collected during these assessments will also support the management of fisheries within the Peace River watershed and could inform potential mitigation requirements associated with the Project.

1.2 Objectives, Management Questions, and Hypotheses

The overarching management question for the Peace River Fish Community Monitoring Program (Mon-2) is as follows:

1) How does the Project affect fish in the Peace River between the Project and the Many Islands in Alberta during the short (10 years after Project operations begin) and longer (30 years after Project operations begin) term?

The Beatton River Arctic Grayling Status Assessment is designed to address the following:

1) Assess the status of Arctic Grayling in the Upper Beatton River
2) If necessary, identify opportunities to enhance the status of this population to offset losses of Arctic Grayling values attributable to the Project

Information gathered by the Beatton River Arctic Grayling Status Assessment will test the following Mon-2 management hypothesis:

H_8: Use of the Upper Beatton River by resident Arctic Grayling does not change with the construction and operation of the Project.

2.0 METHODS

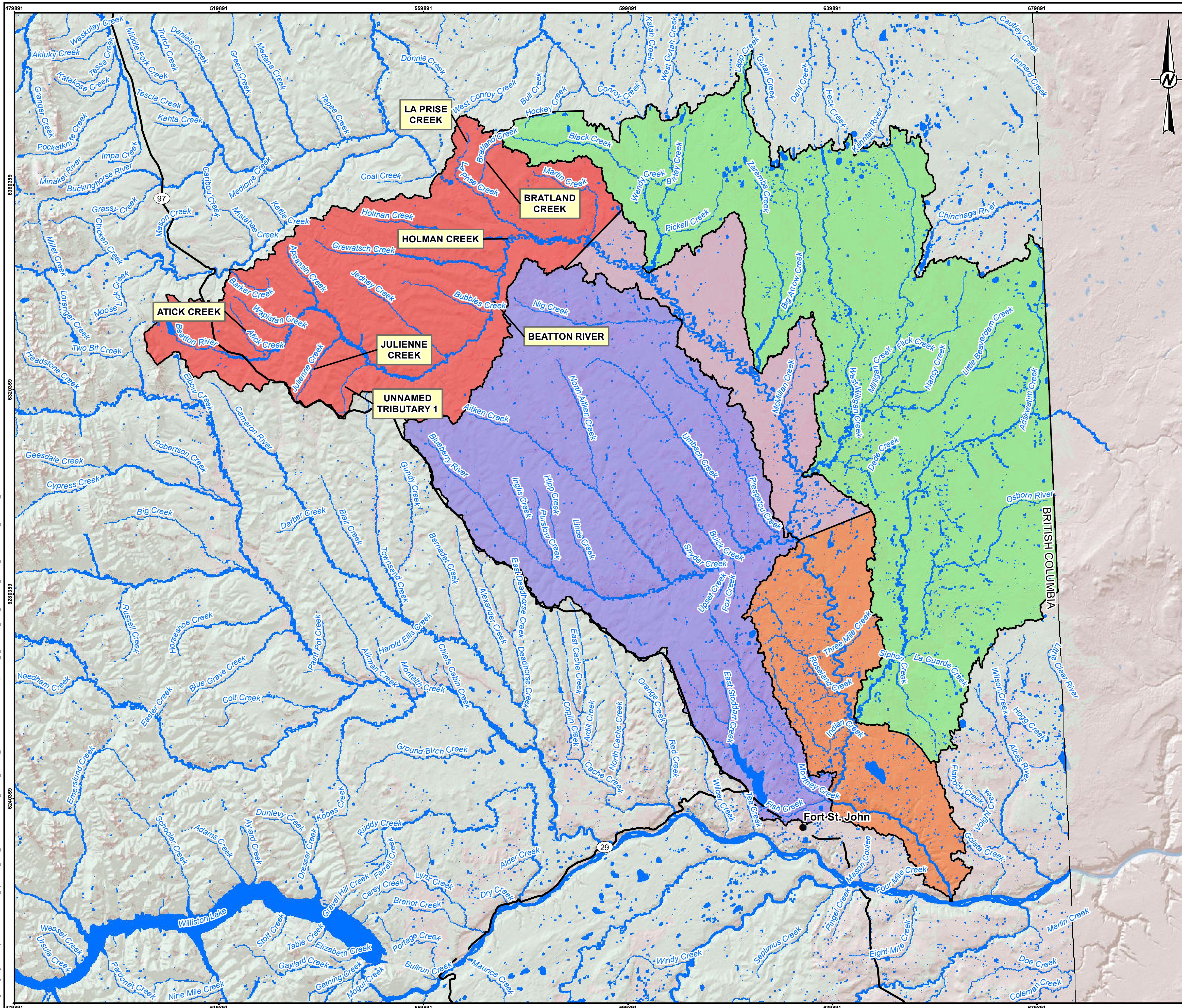
2.1 Study Area

The Beatton River watershed was divided into five regions by Mainstream (2011) (Figure 1). These regions are defined as follows:

1) The Lower Mainstem Region extends from the Beatton River's confluence with the Peace River (RiverKm [RKm] 0.0) upstream to the mouth of the Blueberry River (RKm 131).
2) The Middle Mainstem Region extends from the Blueberry River confluence (RKm 131) upstream to where the Mile 73/Beatton River Road crosses the Beatton River near RKm 295. This location represents the approximate transition between flatter low elevation areas and the foothills of the mountains.
3) The Upper Mainstem Region extends from the foothills (RKm 295) upstream to the headwaters (RKm 499 at the outlet of Lily Lake).
4) The East Inputs Region includes the Doig River, Milligan Creek, Big Arrow Creek, Black Creek, and their tributaries.
5) The West Inputs Region includes Montney Creek, the Blueberry River, Nig Creek, and their tributaries.

The study area for the Beatton River Arctic Grayling Status Assessment was limited to the Upper Mainstem Region, including several tributaries: La Prise, Bratland, Julienne, Holman, and Atick creeks, plus one unnamed tributary (Unnamed Tributary 1; Watershed Code: 233-791200). Collectively, these locations are hereafter referred to as the Upper Beatton River (Upper Beatton).

Locations of sites sampled in 2018 and 2019 are provided in Figure 2 (backpack electrofishing sites) and Figure 3 (angling sites; 2019 only), respectively.



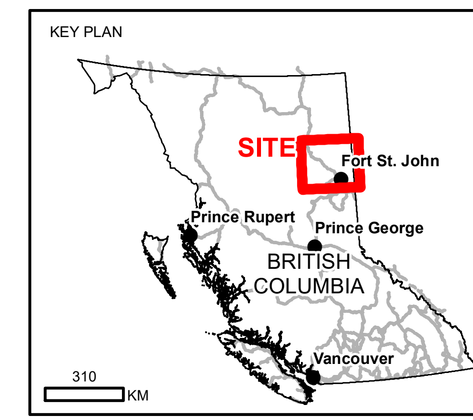
LEGEND

REGION NAME

- UPPER MAINSTEM (STUDY AREA)
- WEST INPUTS
- EAST INPUTS
- LOWER MAINSTEM
- MIDDLE MAINSTEM

BASEMAP FEATURE

- CITY
- HIGHWAY
- WATERCOURSE
- WATERBODY
- PROVINCIAL BOUNDARY
- WOODED AREA



0 15 30

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REFERENCES

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CLIENT
BC HYDRO

PROJECT
BEATTON RIVER ARCTIC GRAYLING STATUS ASSESSMENT
(Mon-2, Task 2f)

TITLE
BEATTON RIVER WATERSHED REGIONS AS DELINEATED BY MAINSTREAM (2011)

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-14
DESIGNED	BH
PREPARED	JG
REVIEWED	DF
APPROVED	SR

PROJECT NO.	CONTROL	REV.	FIGURE
19121770	2019	0	1

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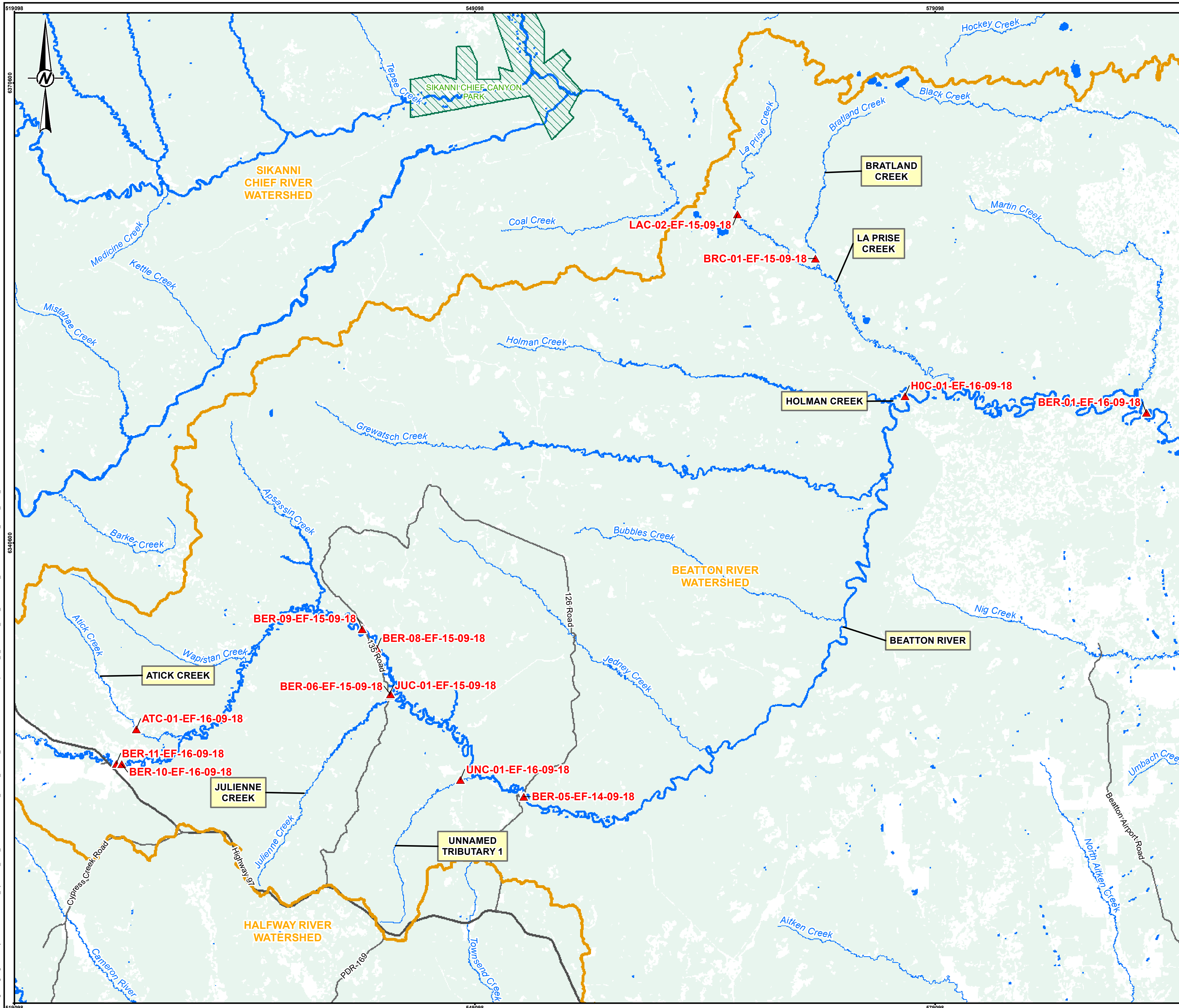

LEGEND

▲ SAMPLE LOCATION (2018 AND 2019)

BASE MAP FEATURES

- HIGHWAY
- ROAD
- WATERBODY
- MAJOR WATERSHED
- PARK / PROTECTED AREA
- WOODED AREA

0 5 10

1:250,000 KILOMETRES

REFERENCES

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CLIENT
BC HYDRO

PROJECT
BEATTON RIVER ARCTIC GRAYLING STATUS ASSESSMENT
(Mon-2, Task 2f)

TITLE
LOCATION OF BACKPACK ELECTROFISHING INDEX SITES IN THE UPPER MAINSTEM REGION OF BEATTON RIVER, 2018 AND 2019

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-14
DESIGNED	BH
PREPARED	JG
REVIEWED	DF
APPROVED	SR

PROJECT NO.	CONTROL	REV.	FIGURE
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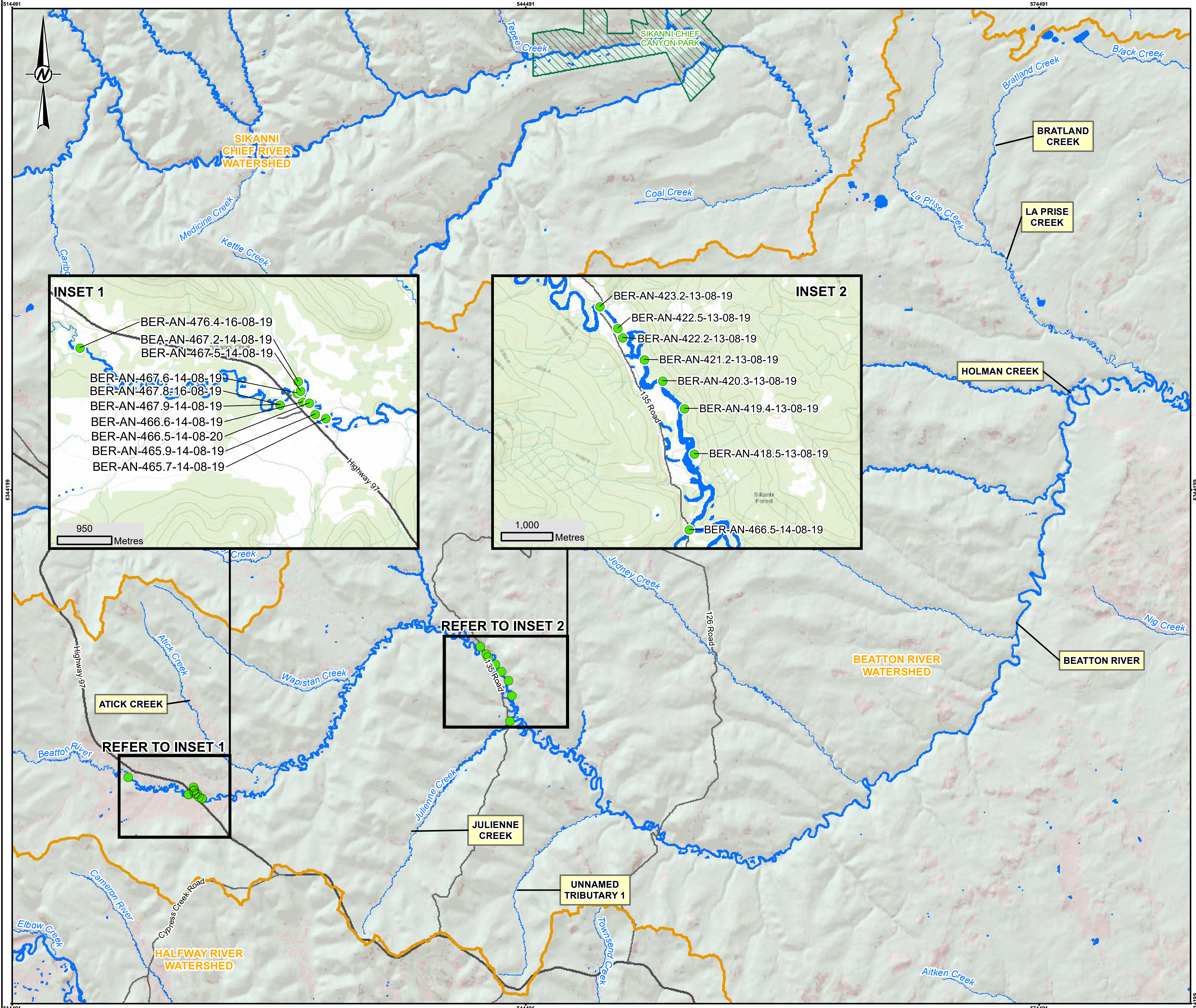

LEGEND

SAMPLING TYPE AND LOCATION (AUGUST 2019)

- ANGLING

BASE MAP FEATURES

- HIGHWAY
- ROAD
- WATERBODY
- MAJOR WATERSHED
- PARK / PROTECTED AREA
- WOODED AREA

0 5 10

1:225,000 KILOMETRES

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CLIENT
BC HYDRO

PROJECT
BEATTON RIVER ARCTIC GRAYLING STATUS ASSESSMENT
(Mon-2, Task 2f)

TITLE
LOCATION OF ANGLING SITES
IN THE UPPER MAINSTEM REGION OF THE BEATTON RIVER, 2020

CONSULTANT
GOLDER

YYYY-MM-DD	2020-12-14
DESIGNED	BH
PREPARED	JG
REVIEWED	DF
APPROVED	SR

PROJECT NO.	CONTROL	REV.	FIGURE
19121770	2019	0	3

2.2 Study Period

Field work for the Assessment was initially scheduled to commence in the fall of 2017; however, the survey was postponed by a year due to an oil spill at the upstream end of the study area immediately prior to the onset of sampling (Golder 2018)[6].

In 2018, field surveys were conducted from 14 to 16 September (Table 1). DES (2001) suggested that Arctic Grayling over-winter in the Beatton River mainstem. Low Arctic Grayling catches in Beatton River tributaries during the 2018 survey may have in part been due to the late timing of the survey; most Arctic Grayling may have migrated from the tributaries to the Beatton River mainstem by mid-September. To increase the likelihood of capturing Arctic Grayling prior to this downstream movement, the 2019 survey was conducted approximately one month earlier than the 2018 survey. In 2019, field surveys were conducted from 13 to 16 August (Table 1). Overall, three days of sampling were conducted in 2018 and four days of sampling were conducted in 2019.

Table 1: Sampling schedule by stream for the Beatton River Arctic Grayling Status Assessment (Mon-2, Task 2f), 2018 and 2019.

Stream	2018 Sample Dates	2019 Sample Dates
Beatton River	14–16 September	13, 14, and 16 August
Julienne Creek	15 September	13 August
La Prise Creek	15 September	15 August
Bratland Creek	15 September	16 August
Holman Creek	16 September	15 August
Atick Creek	16 September	16 August
Unnamed Tributary 1	16 September	16 August

2.3 Index Site Sampling

Index sampling primarily focused on sites that were documented to have moderate to high habitat suitability during the 2017 reconnaissance survey (i.e., low turbidity and riffle/run habitat containing coarse substrates; Golder 2018). Some index site locations differed slightly between the 2018 and 2019 study years due to conditions encountered at the time of sampling (e.g., differences in water levels, beaver activity). At each index site assessed in 2018 and 2019, Arctic Grayling were targeted using backpack electrofishing. Smith-Root™ Model 12 and Model 12B backpack electrofishers (Smith-Root, Vancouver, WA, USA) were used, depending on the crew and study year. Each survey crew consisted of two crew members: one crew member operated the backpack electrofisher and the second crew member netted stunned fish. During the survey, crews slowly worked their way upstream in wadeable areas following RISC (2001) protocols. All sampling consisted of a single pass in open sites. Site lengths ranged between 100 and 300 m. Within each site, crews focused effort on portions of the site with moderate to high Arctic Grayling habitat suitability (Golder 2018). Captured fish were transferred to 20 L buckets that were pre-positioned on shore along the length of the site. Electrofisher settings were adjusted as needed to minimize injuries to fish while allowing the efficient capture of the target size and species. Voltage ranged between 300 and 400 V, with the frequency set at 60 Hz. Pulse width ranged between 4 and 6 ms.

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[6] https://www2.gov.bc.ca/gov/content/environment/air-land-water/spills-environmental-emergencies/spill-incidents/industrial-vehicle-in-the-beatton-river

Electrofisher settings were consistent between the 2018 (Golder 2019b) and 2019 surveys and were consistent with backpack electrofishing surveys conducted under other components of the FAHMFP (e.g., Mon-1b, Task 2c; Golder 2019a).

Site habitat conditions, effort expended, backpack electrofisher settings, and the number and species of fish that were observed but avoided captured were recorded. Habitat variables recorded at each site (Table 2) were consistent between years and consistent with baseline studies (e.g., Mainstream 2011) and other FAHMFP components (e.g., Golder 2019a). Recorded variables were selected primarily to identify differences in sampling conditions and the types of habitats sampled within each study year, between study years, and across FAHMFP components (Appendix C, Table C1).

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

Table 2: Habitat variables recorded at each site sampled as part of the Beatton River Arctic Grayling Status Assessment (Mon-2, Task 2f), 2018 and 2019.

Variable	Description
Date	The date the site was sampled
Time	The time the site was sampled
Air Temp	Air temperature at the time of sampling (to the nearest 1°C)
Water Temp	Water temperature at the time of sampling (to the nearest 0.1°C)
Conductivity	Water conductivity at the time of sampling (to the nearest 10 µS/cm)
Secchi Bar Depth	The Secchi Bar depth recorded at the time of sampling (to the nearest 0.1 m)
Cloud Cover	A categorical ranking of cloud cover (Clear = 0-10% cloud cover; Partly Cloudy = 10-50% cloud cover; Mostly Cloudy = 50-90% cloud cover; Overcast = 90-100% cloud cover)
Weather	A general description of the weather at the time of sampling (e.g., comments regarding wind, rain, smoke, or fog)
Electrofisher Model	The model of electrofisher used during sampling
Percent	The estimated duty cycle (as a percent) used during sampling
Amperes	The average amperes used during sampling
Mode	The mode (AC or DC) and frequency (in Hz) of current used during sampling
Volts	The voltage (V) used during sampling
Length Sampled	The length of shoreline sampled (to the nearest 1 m)
Time Sampled	The duration of electrofisher operation (to the nearest 1 second)
Mean Depth	The mean water depth sampled (to the nearest 0.1 m)
Maximum Depth	The maximum water depth sampled (to the nearest 0.1 m)
Effectiveness	A categorical ranking of sampling effectiveness (1 = good; 2 = moderately good; 3 = moderately poor; 4 = poor)
Water Clarity	A categorical ranking of water clarity (High = greater than 3.0 m visibility; Medium = 1.0 to 3.0 m visibility; Low = less than 1 m visibility)
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 sample
Sample Comments	Any additional comments regarding the sample

2.4 Angling Survey

Adult Arctic Grayling (i.e., age-4 and older fish) were not captured during the 2018 survey (Golder 2019b). To increase the likelihood of encountered adult Arctic Grayling in 2019, an angling component was added in 2019 to specifically target this life stage. Angling effort focused on two different sections of the Beatton River mainstem. These locations were selected based on accessibility and hydraulic characteristics (i.e., adequate flow and low turbidity). The first section was situated between RKm 394.5 and RKm 423.0 (Figure 3) and was accessed by inflatable raft. The second section was situated between RKm 464.5 and RKm 476.5 (Figure 3) and was accessed by foot. Field crews also opportunistically angled for Arctic Grayling at the Julienne Creek's confluence with the Beatton River.

In Alberta, AEPACA (2015) noted declines in Arctic Grayling abundance near roads and other access points due to increased angling pressure associated with ease of access. For both of the sections angled in 2019, effort focused on areas between access points rather than the access points themselves. Between access points, field crews focused angling effort on habitats preferred by Arctic Grayling (i.e., low turbidity and riffle/run habitat containing coarse substrates; Golder 2018) and locations where fish were observed feeding on the surface of the water. Both spin-casting and fly-fishing equipment were used, and the crew selected the equipment that they deemed most appropriate for the conditions. The same habitat variables that were recorded at index sites were also recorded at angling sites (Table 2).

2.5 Fish Handling and Processing

Fish collected during sampling were kept in a large bucket until the site survey was complete. Fresh water was added to the bucket, as needed, to maintain oxygen levels and water temperatures at levels similar to the stream.

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 sculpin species to the nearest 1 mm. Arctic Grayling in good condition following processing were implanted with half-duplex (HDX) PIT tags (ISO 11784/11785 compliant) (Oregon RFID, Portland, OR, USA). Tags were implanted within the left axial muscle below the dorsal fin origin and oriented parallel with the anteroposterior axis of the fish. Tagging criteria are summarized as follows:

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

All tags and tag applicators were immersed in an antiseptic (Super Germiphene™) and rinsed with distilled water prior to insertion. Tag sizes were consistent with other monitoring programs, including the Peace River Large Fish Indexing Survey (Mon-2, Task 2a; Golder and Gazey 2019) and the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c; Golder 2019a). HDX tags were used for compatibility with other monitoring programs currently underway in the Peace River that require PIT tags to be detected by fixed arrays. PIT tags were read using a Datamars DataTracer FDX/HDX handheld reader (Oregon RFID, Portland, OR, USA).

Scale samples were collected from all captured Arctic Grayling. 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 a subsample of Arctic Grayling. Otoliths and fin rays were opportunistically collected from Arctic Grayling that succumbed to sampling. Scale, fin ray, and otoliths samples were stored in appropriately labelled coin envelopes.

Small sections of fin tissue were collected from select Arctic Grayling that the crew deemed large enough to not be adversely affected by the collection procedure (Table 3). Samples were preserved in 95% non-denatured ethyl alcohol and provided to BC Hydro for possible future genetic analyses. The samples were not analyzed as part of the current study.

For each captured fish, general notes were taken regarding the fish's health, and the severity of deformities, erosion, lesions, and tumor (DELT) were recorded based on the external anomalies' categories provided in Ohio EPA (1996). After processing, all fish were released at the downstream end of their capture site.

Table 3: Summary of genetic samples collected as part of the Beatton River Arctic Grayling Status Assessment, 2018 and 2019.

Stream	Number of Genetic Samples Collected	
	2018	2019
Beatton River	3	34
La Prise Creek	15	27
Bratland Creek	13	41
Unnamed Tributary 1	1	0
Total	32	102

2.6 Ageing

All Arctic Grayling were aged by scale analysis. Scales were aged by counting the number of growth annuli present on the fish scale following methods outlined in Mackay et al. (1990) and RISC (1997). Scales were temporarily mounted between two slides and examined using a trinocular microscope equipped with a digital camera. If needed, several scales were examined, and the highest quality scale was photographed using an integrated 3.1-megapixel digital macro camera (Leica EC3, Wetzlar, Germany) and saved as a JPEG-type picture file. All scale photos were examined independently by two experienced individuals, and ages were assigned. If the assigned ages differed between the two examiners, the sample was re-examined by a third examiner. If there was agreement between two of three examiners, then the consensus age was assigned to the fish. If there was not agreement between two of three examiners, then the fish was not assigned an age.

2.7 Data Analysis

2.7.1 Data Compilation and Validation

In the field, data were recorded on customized field forms. These datasheets were entered into spreadsheets, and the digital data were verified and checked by a second person before being imported into the Beatton River Arctic Grayling Status Assessment Database. The database contains several integrated features to ensure that data are entered correctly, consistently, and completely. Various input validation rules programmed into the database checked each entry to verify that the data met specific criteria for that particular field. As an example, all species codes were checked upon import against a list of accepted species codes that were saved as a reference table in the database (e.g., Rainbow Trout would have to be entered as “RB”; the database would not accept “RT”). Quality Assurance/Quality Control (QA/QC) was conducted on the database before analyses. QA/QC included, as examples, checks of tag numbers for consistency and accuracy, checks of data ranges, visual inspection of histograms and bivariate plots, and removal of age-length and length-weight outliers, where applicable.

2.7.2 Catch and Life History Data

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 and angling was calculated by dividing the summed total number of fish captured by the sum of effort at each site. Sampling effort was measured in seconds of electrofisher operation and hook-hours of angling, 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 focused on optimal habitats and the entire site length was not always sampled.

Length-frequencies and age-frequencies were calculated using the statistical environment R, v. 3.6.1 (R Core Team 2019). Length-frequency and age-frequency histograms were plotted for each year by stream and for all streams combined.

Fulton’s body condition factor (*K*; Murphy and Willis 1996) was calculated as follows:

$$K = (\frac{W_t}{L^3}) \times 100{,}000$$

where W_t was a fish’s weight (g) and *L* was a fish’s fork length (mm). Body condition by age-class was summarized using descriptive statistics (mean, standard deviation, minimum, and maximum). The length-weight relationship was used as an indicator of body condition and was analyzed using linear regression. Study year (2018 or 2019) was included in the regressions to assess differences in weight given length between years. The response variable was the natural logarithm of weight and the predictor variables were the natural logarithm of fork length, year (categorical variable), and the interaction between year and the natural logarithm of length. The interaction term was interpreted as the difference in the length-weight relationship between years. The full model, including the interaction term, was tested against two simplified models using an F-test: 1) additive effects of year and the natural logarithm of length with no interaction; and 2) a model with only the natural logarithm of length as a predictor and no year effect. Estimates of model parameters, a and b, are presented on the back-transformed scale for the equation:

$$W_t = a \times L^b$$

To describe growth of Arctic Grayling, length-at-age data were used to fit three-parameter von Bertalanffy models as follows:

$$L(t) = L_\infty (1 - e^{-K(t-t0)})$$

where L_∞ is the asymptotic length, *K* is the rate at which the fish approaches the asymptotic size (i.e., growth rate coefficient), and *t0* is the theoretical time when a fish has length zero, and *t* is the fish’s age. Non-parametric bootstrapping was used to calculate 95% confidence intervals (CIs) for von Bertalanffy model parameters.

The 2018 and 2019 study years were combined for the von Bertalanffy model due to the limited number of age-3 and older Arctic Grayling in 2018.

Life history metrics for fish captured during the 2019 survey were compared to FAHMFP datasets from the Peace River (Mon-2, Task 2a; Golder and Gazey 2020) and Moberly River (Mon-1b, Task 2c; Golder 2020). These comparisons included the following: length-frequency, age-frequency, von Bertalanffy growth curves, Fulton's body condition factor, and length-weight regressions. For the Peace River dataset, within-year recaptures were excluded from analyses. For the Moberly River, fish from all capture methods were combined for analyses. These capture methods included angling, small fish boat electroshocking, and backpack electrofishing.

3.0 RESULTS

This report summarizes all pre-operation background data collected under Mon2 Task 2f for Upper Beatton Arctic Grayling populations, therefore 2018 and 2019 results are discussed and compared where reasonable.

3.1 Physical Parameters

During the three-day sampling period in September 2018, water temperatures ranged from 2.5°C in Bratland Creek on 15 September to 5.7°C in the unnamed tributary on 16 September. Conductivity was highest in the unnamed tributary, at 420 µS/cm on 16 September, while La Prise and Atick creeks had the lowest conductivity, at 70 µS/cm on 15 and 16 September. Instream velocity ranged from less than 0.5 m/s to approximately 1.0 m/s over the course of the 2018 survey and was highest in the mainstem of the Beatton River. The amount and type of available cover varied among sites, with small woody debris, substrate interstitial spaces, and deep water being the most common cover type encountered.

During the four-day sampling period in August 2019, water temperatures ranged from 9.1°C in Atick Creek on 16 August to 16.1°C in Julienne Creek on 13 August. Conductivity was lowest in Atick Creek, at 60 µS/cm on 16 August, whereas conductivity values of 170 µS/cm were recorded in Holman and Bratland creeks on 15-16 August. These were the highest values recorded during the Assessment. In-stream velocity ranged from less than 0.5 m/s to greater than 1.0 m/s and was highest in the Beatton River mainstem. The amount and type of available cover varied among sites, with substrate interstitial spaces, turbulence, shallow water, and deep water being the most common cover type encountered. Detailed summaries of sample effort and habitat data by year are provided in Appendix A.

Discharge for the Beatton River is recorded at Water Survey of Canada gauging station #07FC001, near its confluence with the Peace River. This gauge is approximately 300 km downstream of the study area, and numerous tributaries flow into the Beatton River between the gauge and the study area (Figure 1). The data recorded at the gauging station were not considered representative of the conditions in the study area and are not presented in this report.

3.2 Index Site Sampling

In 2018, 18,497 seconds (5.14 hours) of backpack electrofishing were expended at 13 index sites. In total, 390 fish comprising 11 species were captured in 2018 (Table 4). During the 2019 survey, 17,026 seconds (4.73 hours) of backpack electrofishing were expended at 11 index sites. In total, 485 fish comprising 10 species were captured in 2019 (Table 4). Additional effort and life history information is provided in Appendix A.

In total, 32 Arctic Grayling were captured in four of the 13 index sites sampled in 2018. These 32 Arctic Grayling were recorded in La Prise and Bratland creeks, Unnamed Tributary 1, and in the Beaton River mainstem (Table 5). Of the 32 captured Arctic Grayling, 11 were implanted with PIT tags. The remaining 21 Arctic Grayling were too small to receive a PIT tag (i.e., they were less than 80 mm FL). Tagged Arctic Grayling were not recaptured during the 2018 survey.

During the 2018 survey, the CPUE by site for Arctic Grayling was similar at Unnamed Tributary 1 (CPUE = 6.75 fish/h) and the Beatton River #10 (CPUE = 6.98 fish/h) index sites. CPUE was higher at the La Prise Creek index site (CPUE = 17.17 fish/h) and highest at the Bratland Creek index site (CPUE = 44.59 fish/h; Table 5).

Table 4: Number of fish caught by backpack electrofishing and their frequency of occurrence during the Beatton River Arctic Grayling Status Assessment, 2018 and 2019.

Species	Scientific Name	2018		2019	
		n[a]	%[b]	n[a]	%[b]
Arctic Grayling	*Thymallus arcticus*	32	8.2	124	25.6
Brook Stickleback	*Culaea inconstans*	2	0.5	14	2.9
Flathead Chub	*Platygobio gracilis*	1	0.3	0	0.0
Lake Chub	*Couesius plumbeus*	213	54.6	205	42.3
Longnose Dace	*Rhinichthys cataractae*	9	2.3	43	8.8
Redside Shiner	*Richardsonius balteatus*	25	6.4	12	2.5
Trout-perch	*Percopsis omiscomaycus*	49	12.6	42	8.7
Largescale Sucker	*Catostomus macrocheilus*	1	0.3	1	0.2
Longnose Sucker	*Catostomus catostomus*	29	7.4	22	4.5
White Sucker	*Catostomus commersonii*	22	5.6	21	4.3
Spoonhead Sculpin	*Cottus ricei*	7[c]	1.8	1	0.2

[a] Number of individuals captured.
[b] Percent of the total catch.
[c] One sculpin was too small to properly identify to species but was assumed to be a Spoonhead Sculpin.

Table 5: Summary of effort, Arctic Grayling catch, catch-per-unit-effort (CPUE), and number of fish tagged during backpack electrofishing surveys conducted as part of the 2018 Beatton River Arctic Grayling Status Assessment.

Date	Stream	Site Name	Site Length (m)	Effort (s)	Number Caught	Number PIT Tagged	CPUE (fish/h)
14-Sep-18	Beatton River	BER-05-EF-14-09-18	311	3,356	0	0	0.00
15-Sep-18	La Prise Creek	LAC-02-EF-15-09-18	196	2,725	13	3	17.17
15-Sep-18	Bratland Creek	BRC-01-EF-15-09-18	113	1,211	15	5	44.59
15-Sep-18	Julienne Creek	JUC-01-EF-15-09-18	140	487	0	0	0.00
15-Sep-18	Beatton River	BER-06-EF-15-09-18	290	1,599	0	0	0.00
15-Sep-18	Beatton River	BER-08-EF-15-09-18	220	911	0	0	0.00
15-Sep-18	Beatton River	BER-09-EF-15-09-18	250	1,555	0	0	0.00
16-Sep-18	Beatton River	BER-01-EF-16-09-18	150	1,262	0	0	0.00
16-Sep-18	Holman Creek	HOC-01-EF-16-09-18	100	1,531	0	0	0.00
16-Sep-18	Unnamed Tributary 1	UNC-01-EF-16-09-18	250	533	1	0	6.75
16-Sep-18	Beatton River	BER-10-EF-16-09-18	260	1,547	3	3	6.98
16-Sep-18	Beatton River	BER-11-EF-16-09-18	250	1,300	0	0	0.00
16-Sep-18	Atick Creek	ATC-01-EF-16-09-18	125	480	0	0	0.00
Totals			**2,655**	**18,497**	**32**	**11**	**6.23**

In 2019, 124 Arctic Grayling were captured in five of 11 index sites sampled. These five sites were in La Prise Creek (two sites), Bratland Creek, Atick Creek, and in the Beatton River mainstem (Table 6). In the Beatton River mainstem, BER-10-EF was the only site where Arctic Grayling were captured during both study years (Table 5 and Table 6). While beaver dams are generally considered beneficial to fish habitat (e.g., Kemp et a. 2011) they can affect the distribution of Arctic Grayling within a watershed (Wuttig 2002). In 2018, the presence of beaver dams in the vicinity of the La Prise Creek site altered water depths and velocities at the site, which reduced sampling efficiency. In 2019, fewer beaver dams were present in La Prise Creek, which allowed field crews to establish and sample an additional site (LAC-02A-EF) in La Prise Creek. Of the 124 Arctic Grayling captured in 2019, 17 were implanted with PIT tags. The remaining 107 Arctic Grayling were too small to receive a PIT tag. Tagged Arctic Grayling were not recaptured during the 2019 survey.

During the 2019 survey, the highest CPUE by site was recorded in La Prise Creek (CPUE = 124.91 fish/h) and the lowest CPUE where Arctic Grayling were captured was recorded in Atick Creek (CPUE = 2.95 fish/h; Table 6). Similar to 2018, CPUE in 2019 was high in La Prise and Bratland creeks; however, CPUE was substantially higher in both streams in 2019 relative to 2018. Overall (all sites combined) CPUE was approximately 2.8 times higher in 2019 (CPUE = 17.17 fish/h; Table 6) than in 2018 (CPUE = 6.23 fish/h; Table 5). For comparison, backpack electrofishing catch rates for Arctic Grayling in the Moberly River ranged between 0.08 fish/h and 6.88 fish/h (average CPUE = 2.03 fish/h) over four years of sampling conducted between 2016 and 2019 as part of the FAHMFP (Golder 2020).

Table 6: Summary of effort, Arctic Grayling catch, catch-per-unit-effort (CPUE), and number of fish tagged during backpack electrofishing surveys conducted as part of the 2019 Beatton River Arctic Grayling Status Assessment.

Date	Stream	Site Name	Site Length (m)	Effort (s)	Number Caught	Number PIT Tagged	CPUE (fish/h)
13-Aug-19	Beatton River	BER-08-EF-13-08-19	200	1,644	0	0	0.00
13-Aug-19	Beatton River	BER-09-EF-13-08-19	235	1,940	0	0	0.00
13-Aug-19	Julienne Creek	JUC-01-EF-13-08-19	100	2,136	0	0	0.00
15-Aug-19	La Prise Creek	LAC-02-EF-15-08-19	260	1,268	44	8	124.91
15-Aug-19	La Prise Creek	LAC-02A-EF-15-08-19	220	1,598	27	2	60.83
15-Aug-19	Holman Creek	HOC-1-EF-15-08-19	100	1,172	0	0	0.00
16-Aug-19	Atick Creek	ATC-01-EF-16-08-19	130	1,221	1	0	2.95
16-Aug-19	Unnamed Tributary 1	UNC-01-EF-16-08-19	210	2,147	0	0	0.00
16-Aug-19	Bratland Creek	BRC-01-EF-16-08-19	230	2,015	50	7	89.33
16-Aug-19	Beatton River	BER-10-EF-16-08-19	260	962	2	0	7.48
16-Aug-19	Beatton River	BER-11-EF-16-08-19	250	923	0	0	0.00
Totals			**2,195**	**17,026**	**124**	**17**	**17.17**

3.3 Angling Survey

The 2019 angling survey was conducted in the Beatton River mainstem and Julienne Creek. All of the 32 Arctic Grayling captured during the survey were captured in the Beatton River (i.e., Arctic Grayling were not captured in Julienne Creek; Table 7). One adult Arctic Grayling was found dead upon arrival to Site BER-AN-467.5-14-08-19 (fork length = 264 mm, age-4) Due to its condition, only fork length and ageing structures were collected. This individual was not included CPUE calculations.

Of the 32 Arctic Grayling captured during the 2019 angling survey, 31 were implanted with PIT tags (one Arctic Grayling succumbed to sampling). Overall angling CPUE was 1.04 fish/h over 30.77 hours of angling (Table 7). For comparison, angling catch rates for Arctic Grayling in the Moberly River ranged between 0.01 and 0.44 fish/h (average CPUE = 0.17 fish/h) over three years of sampling conducted between 2017 and 2019 as part of the FAHMFP (Golder 2020).

Table 7: Summary of effort, Arctic Grayling catch, catch-per-unit-effort (CPUE), and number of fish tagged during angling surveys conducted as part of the Beatton River Arctic Grayling Status Assessment, August 2019.

Date	Stream	Number of Sites Sampled	Effort (h)	Number Caught	Number PIT Tagged	CPUE (fish/h)
13-Aug-19	Beatton River	8	6.32	3	3	0.47
13-Aug-19	Julienne Creek	1	0.90	0	0	0.00
14-Aug-19	Beatton River	10	16.87	24	23	1.42
16-Aug-19	Beatton River	2	6.67	5	5	0.75
Totals		**21**	**30.77**	**32**	**31**	**1.04**

3.4 Life History

For all streams combined, data indicate larger age-0 fish in 2018 compared to 2019 (Figure 4). This result is likely related to the later 2018 study period (i.e., individuals captured in 2018 were approximately one month older than individuals captured in 2019). Differences in fish sizes in each cohort older than age-0 between 2018 and 2019 were less evident, and analyses were hampered by low catches in 2018 (n = 32) relative to 2019 (n = 157; Figure 4).

In 2019, the 35 Arctic Grayling encountered (including the one adult mortality found by angling crew) in the Beatton River mainstem ranged between 61 and 271 mm FL, corresponding to the age-0 to age-5 cohorts (Figure 4 and Figure 5); however, the catch was dominated by age-2 and older individuals (74%). Age-0 (5%) and age-1 (21%) fish were less common. Arctic Grayling captured in Beatton River tributaries (i.e., Bratland, La Prise, and Atick creeks and Unnamed Tributary 1 [*n* = 122]) were typically smaller (ranging between 47 and 222 mm FL) and dominated by age-0 individuals (66%). Arctic Grayling older than age-3 were not recorded in Beatton River tributaries.

For all streams combined, in 2019, age-1 fish exhibited a wider range of fork lengths (92 to 165 mm; *n* = 49) compared to 2018 fish (96 to 129 mm; *n* = 4) (Table 8). The low number of age-1 fish captured in 2018 confounds this result (Figure 4 and Figure 5). All age-classes of Arctic Grayling were recorded in the Beatton River mainstem in 2019. In 2018, only three Arctic Grayling were recorded in the Beatton River mainstem and all three were larger than 230 mm FL and likely adults (age-2 and age-3). Overall, the majority of fish captured during both study years were age-0 (53% of the total Arctic Grayling catch).

Both age-class (Table 8) and length-frequency data (Figure 4) indicated that both juvenile and adult life stages were present in the study area during both study years. Overall, mean length, mean weight, and mean body condition values for age-0 fish were lower in 2019 than in 2018 (Table 8), likely due to the 2019 survey being conducted approximately one month earlier than the 2018 survey.

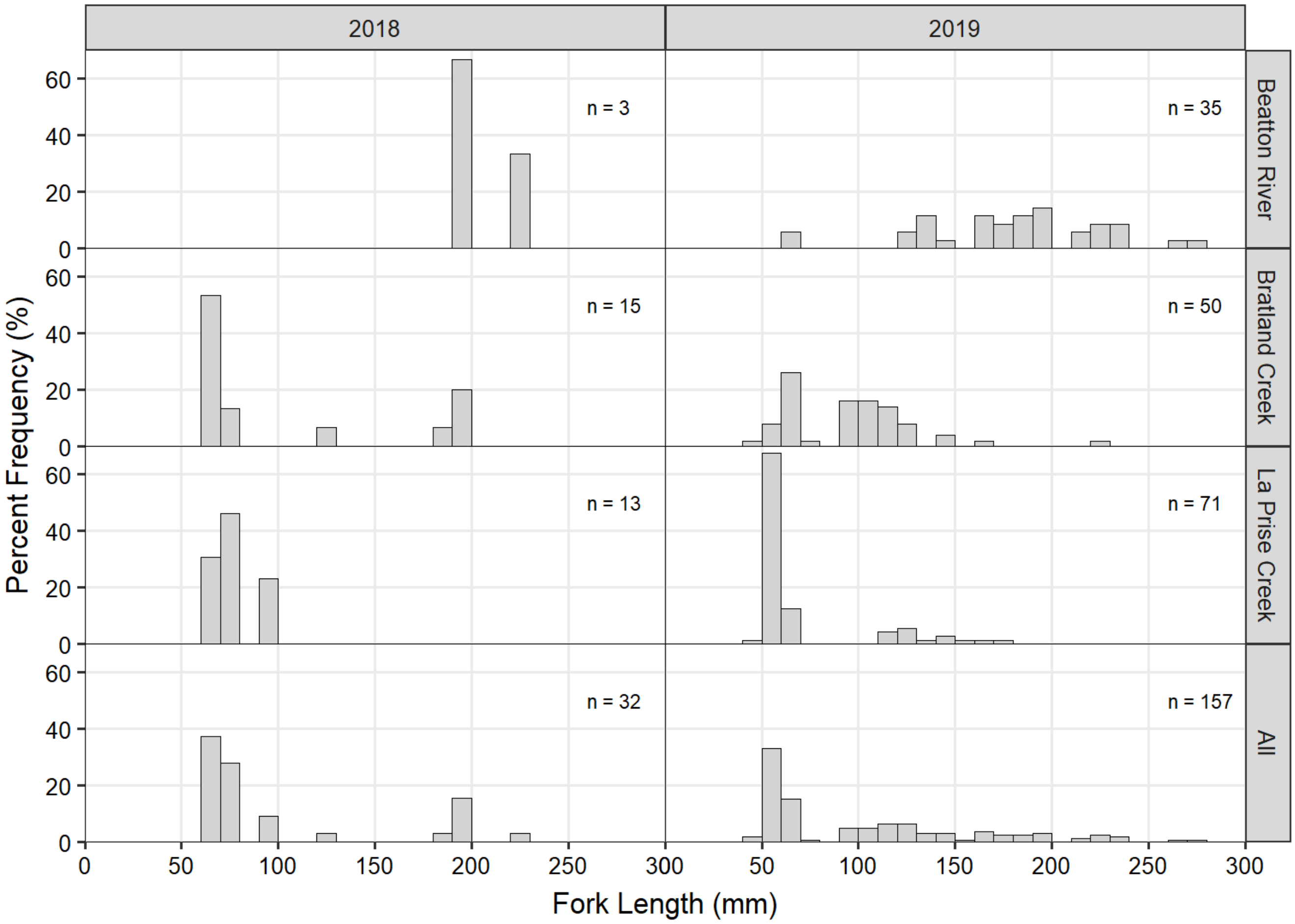

Figure 4: Length-frequency distribution for Arctic Grayling captured in the Upper Beatton River study area during the Beatton River Arctic Grayling Status Assessment (Mon-2, Task 2f), 2018 and 2019. Panels for Unnamed Tributary 1 (2018) and Atick Creek (2019) are not shown because only a single Arctic Grayling was captured in each of these two streams; these two fish are included in the combined panels.

Length-weight regression was used to assess body condition and make comparisons between study years. In the full regression model, the interaction between year and the natural logarithm of length was not statistically significant ($F_{1,183}$ = 0.65, P = 0.4), which suggests that the length-weight relationship did not differ between years (Figure 6). In the additive model that did not include an interaction term, the effect of year (i.e., the regression intercept) was significant ($F_{1,184}$ = 5.1, P = 0.03), suggesting a difference in weight-at-length between years. The model suggested greater weight-at-length in 2018 than in 2019. The significant difference between years was attributed to the low number of large Artic Grayling (greater than 180 mm FL) captured in both study years. Overall, results do not suggest a large, biologically meaningful difference in weight-at-length of Arctic Grayling between 2018 and 2019 (Figure 6).

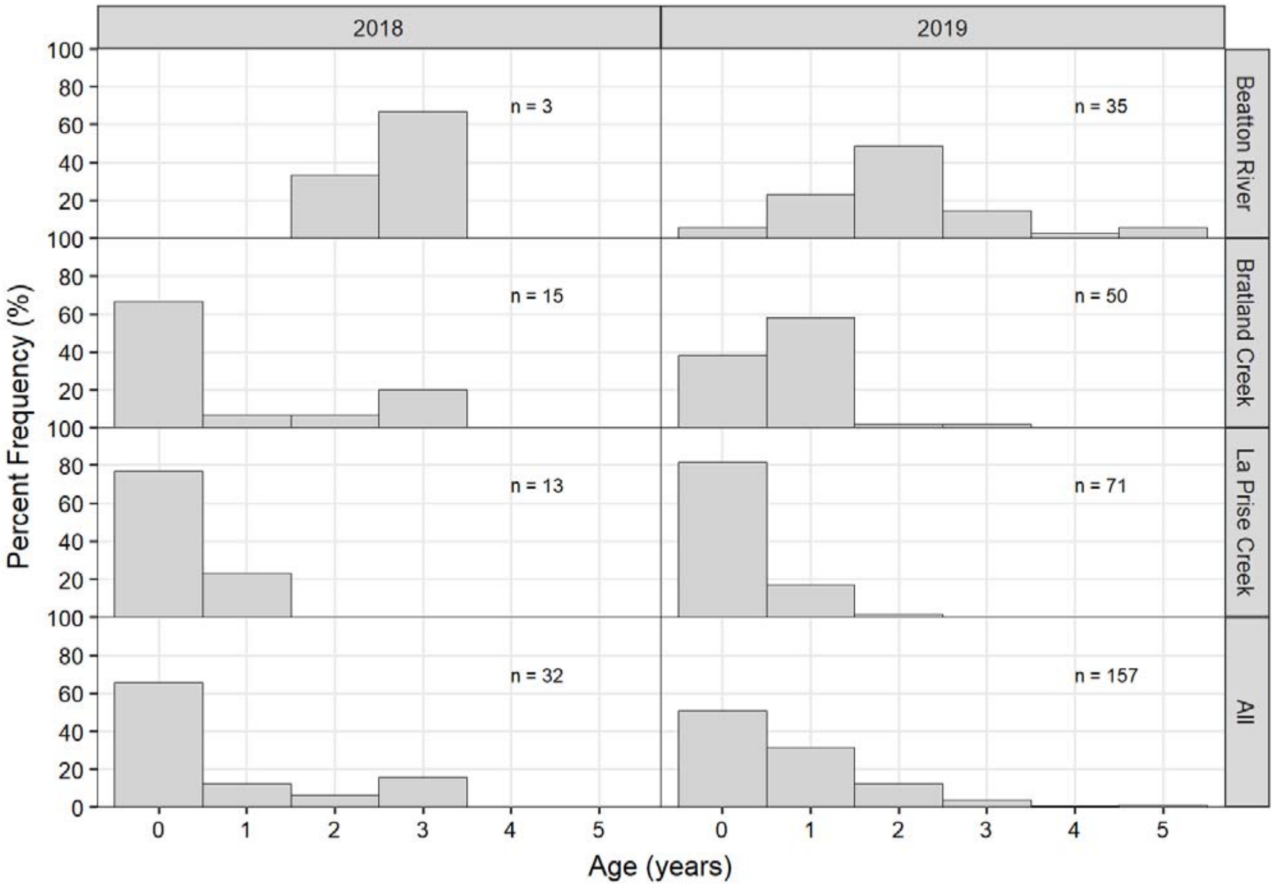

Figure 5: Age-frequency distribution for Arctic Grayling captured in the Upper Beatton River study area during the Beatton River Arctic Grayling Status Assessment (Mon-2, Task 2f), 2018 and 2019. Panels for Unnamed Tributary 1 (2018) and Atick Creek (2019) are not shown because only a single Arctic Grayling was captured in each of these two streams; these two fish are included in the combined panels.

Table 8: Descriptive statistics of fork length, body weight, and body condition by age for Arctic Grayling captured in the Upper Beatton River study area (all streams combined) during the Beatton River Arctic Grayling Status Assessment (Mon-2, Task 2f), 2018 and 2019.

Study Year	Age	Fork Length (mm)			Weight (g)			Fulton's Condition Factor (K)		
		Mean ± SD	Range	n[a]	Mean ± SD	Range	n[a]	Mean ± SD	Range	n[a]
2018	0	68 ± 5	63 – 77	21	3 ± 1	2 – 5	21	0.88 ± 0.18	0.58 – 1.23	21
	1	105 ± 16	96 – 129	4	12 ± 5	9 – 19	4	1.03 ± 0.11	0.89 – 1.13	4
	2	186 ± 8	180 – 191	2	71 ± 19	57 – 84	2	1.09 ± 0.16	0.98 – 1.21	2
	3	202 ± 13	191 – 224	5	89 ± 27	70 – 135	5	1.06 ± 0.12	0.93 – 1.20	5
2019	0	57 ± 5	47 – 71	77	1 ± 1	1 – 4	77	0.76 ± 0.22	0.46 – 1.33	77
	1	119 ± 18	92 – 163	48	17 ± 9	7 – 46	48	0.94 ± 0.12	0.52 – 1.17	48
	2	184 ± 14	161 – 215	19	65 ± 17	38 – 105	19	1.03 ± 0.07	0.91 – 1.13	19
	3	227 ± 7	220 – 236	6	116 ± 28	74 – 149	6	0.98 ± 0.17	0.68 – 1.13	6
	4	264 ± 0	–	1	–	–	0	–	–	0
	5	271 ± 0	–	1	192 ± 0	–	1	0.96 ± 0.00	–	1

[a] Number of fish sampled.

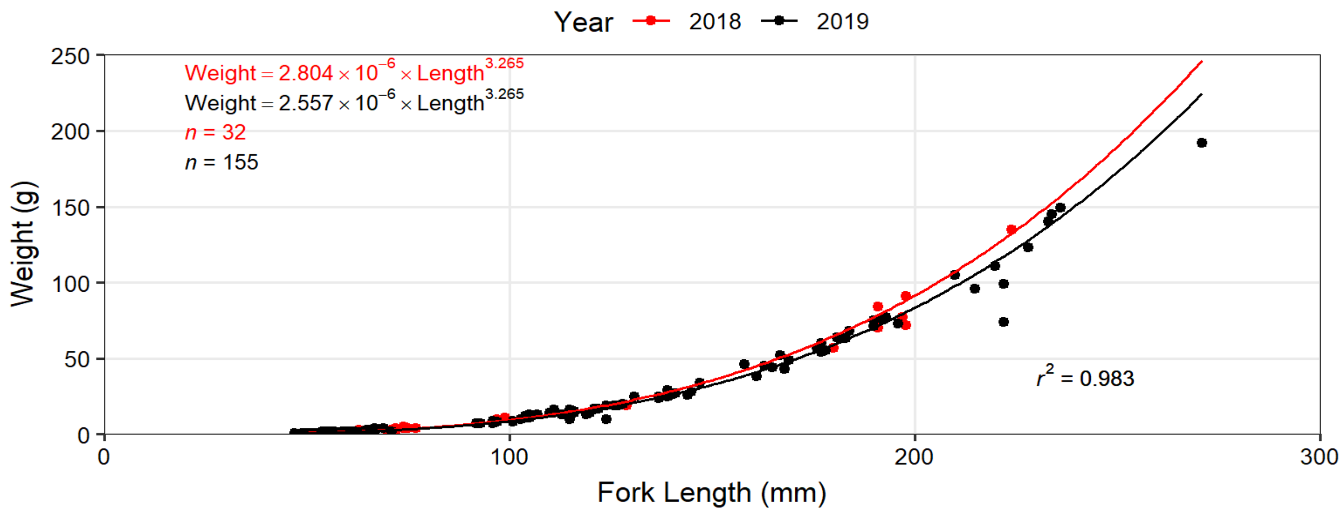

Figure 6: Length-weight regression for Arctic Grayling captured in the Upper Beatton River study area (all streams combined) during the Beatton River Arctic Grayling Status Assessment (Mon-2, Task 2f), 2018 and 2019. The selected regression model indicated equal slopes of the length-weight relationships but different intercepts between years.

The estimated growth coefficient, K, in the von Bertalanffy growth curve for both study years combined was 0.23 (CI: 0.17 – 0.30) and the estimated mean asymptotic size was 372 mm FL (CI: 319 – 456 mm FL). Growth curves were not calculated for each individual study year due to the low number of older fish (age-4 or older) in the catch. Raw data from 2018 and 2019 did not suggest substantial differences in length-at-age between the two study years (Figure 7).

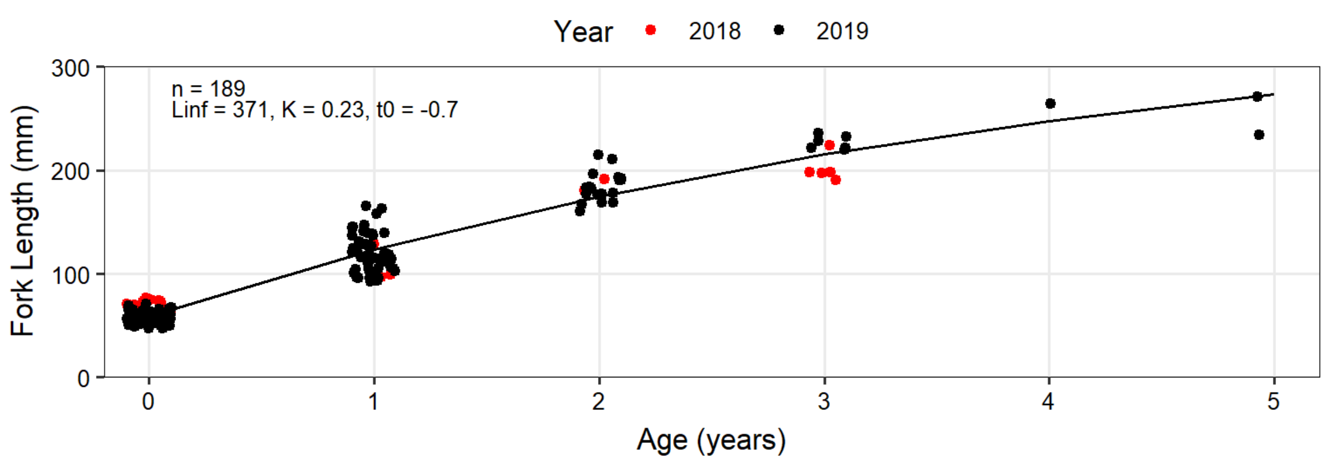

Figure 7: von Bertalanffy growth curve for Arctic Grayling captured in the Upper Beatton River study area (all streams combined) during the Beatton River Arctic Grayling Status Assessment (Mon-2, Task 2f), 2018 and 2019. A single growth curve was calculated for the 2018 and 2019 study years combined.

3.5 Peace River Intra-Watershed Comparisons

In 2018 and 2019, overall CPUEs for angling and backpack electrofishing surveys were higher in the Beatton River in comparison to CPUEs observed in the Moberly River during the Site C Reservoir Tributaries Fish Population Indexing Survey (Mon-1b, Task 2c: Table 9; Golder 2020). Overall, Arctic Grayling CPUE was higher in the Upper Beatton than in the Moberly River during all study years for all capture methods (Table 9).

Table 9: Summary of catch-per-unit-effort (CPUE) during backpack electrofishing surveys and angling in the Moberly and Upper Beatton Rivers, 2018 and 2019.

Study Year	Sample Method	Stream	Overall CPUE (fish/h)
2018	Backpack Electrofishing	Upper Beatton	6.23
		Moberly River	0.56
	Angling	Moberly River	0.04
2019	Backpack Electrofishing	Upper Beatton	17.17
		Moberly River	0.53
	Angling	Upper Beatton	1.04
		Moberly River	0.44

For each age cohort, fork lengths of Arctic Grayling captured in 2019 in the Upper Beatton River study area were smaller when compared to the Moberly and Peace rivers (Figure 8 and Figure 9). For instance, age-0 fish ranged from 47 to 71 mm FL in the Upper Beatton River study area (*n* = 77), ranged from 62 to 92 mm FL in the Moberly River (*n* = 4), and ranged from 90 to 130 mm FL in the Peace River (*n* = 25; Figure 8). Age-4 and age-5 fish in the Upper Beatton River study area ranged from 264 to 271 mm FL (*n* = 2) in comparison to 278 to 391 mm FL in the Moberly and Peace Rivers (*n* = 17; Figure 8 and Figure 9).

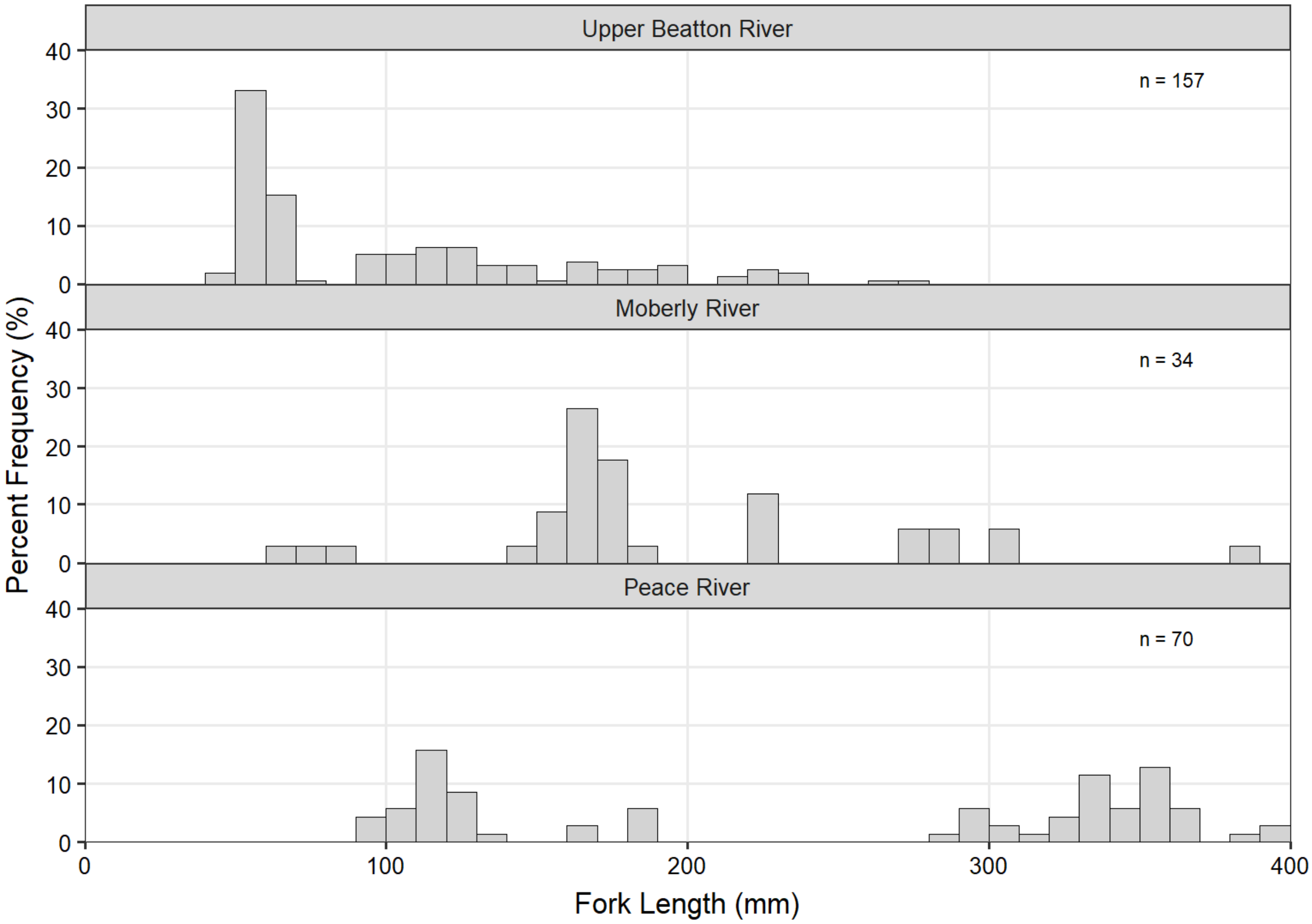

Figure 8: Length-frequency by watershed for Arctic Grayling captured during various Site C FAHFMP studies, 2019. Beatton River data were collected under the Beatton River Arctic Grayling Status Assessment (Mon-2, Task 2f), Moberly River data were collected under the Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c), and Peace River data were collected under the Peace River Large Fish Indexing Survey (Mon-2, Task 2a). Note: different sampling methods, with different fish size selectivity, were used in each study.

For the Moberly and Peace river watersheds, the abundance of each Arctic Grayling age cohort was more variable when compared to the Upper Beatton River (Figure 9). In the Upper Beatton and Peace rivers, age-0 to age-5 Arctic Grayling were captured, with the age-0 cohort making up the largest portion of the catch in both rivers (Figure 9). Conversely, age-5 fish were not captured in the Moberly River, and the age-1 cohort made up the largest portion of the 2019 catch (Figure 9).

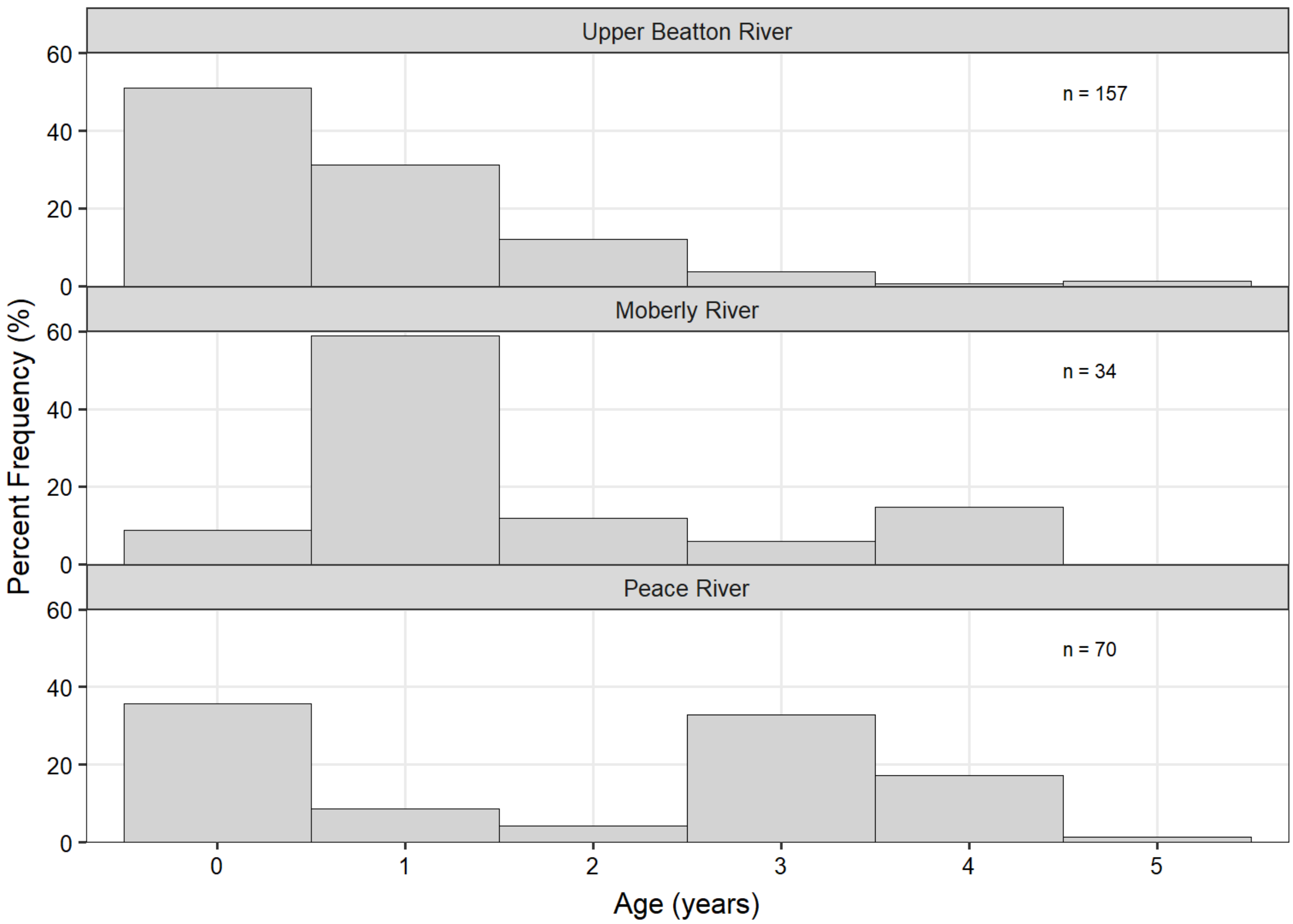

Figure 9: Age-frequency distribution for Arctic Grayling captured during various Site C FAHFMP studies, 2019. Beatton River data were collected under the Beatton River Arctic Grayling Status Assessment (Mon-2, Task 2f), Moberly River data were collected under the Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c), and Peace River data were collected under the Peace River Large Fish Indexing Survey (Mon-2, Task 2a).

Data from 2019 from all three systems suggest a typical maximum life expectancy of age-5 for Arctic Grayling in the Peace River watershed (Figure 9). This result is supported by 19 years of continuous sampling in the Peace River mainstem, which has only recorded four Arctic Grayling older than age-5 (three were age-6 and one was age-7; Golder and Gazey 2019).

Length-weight regression was used to compare body condition between the Beatton, Moberly, and Peace rivers (Figure 10). When viewed separately (top panel in Figure 10), differences in length-weight regressions between rivers were difficult to distinguish. For this reason, the regression slopes were also expressed as a log-log relationship (bottom panel in Figure 10).

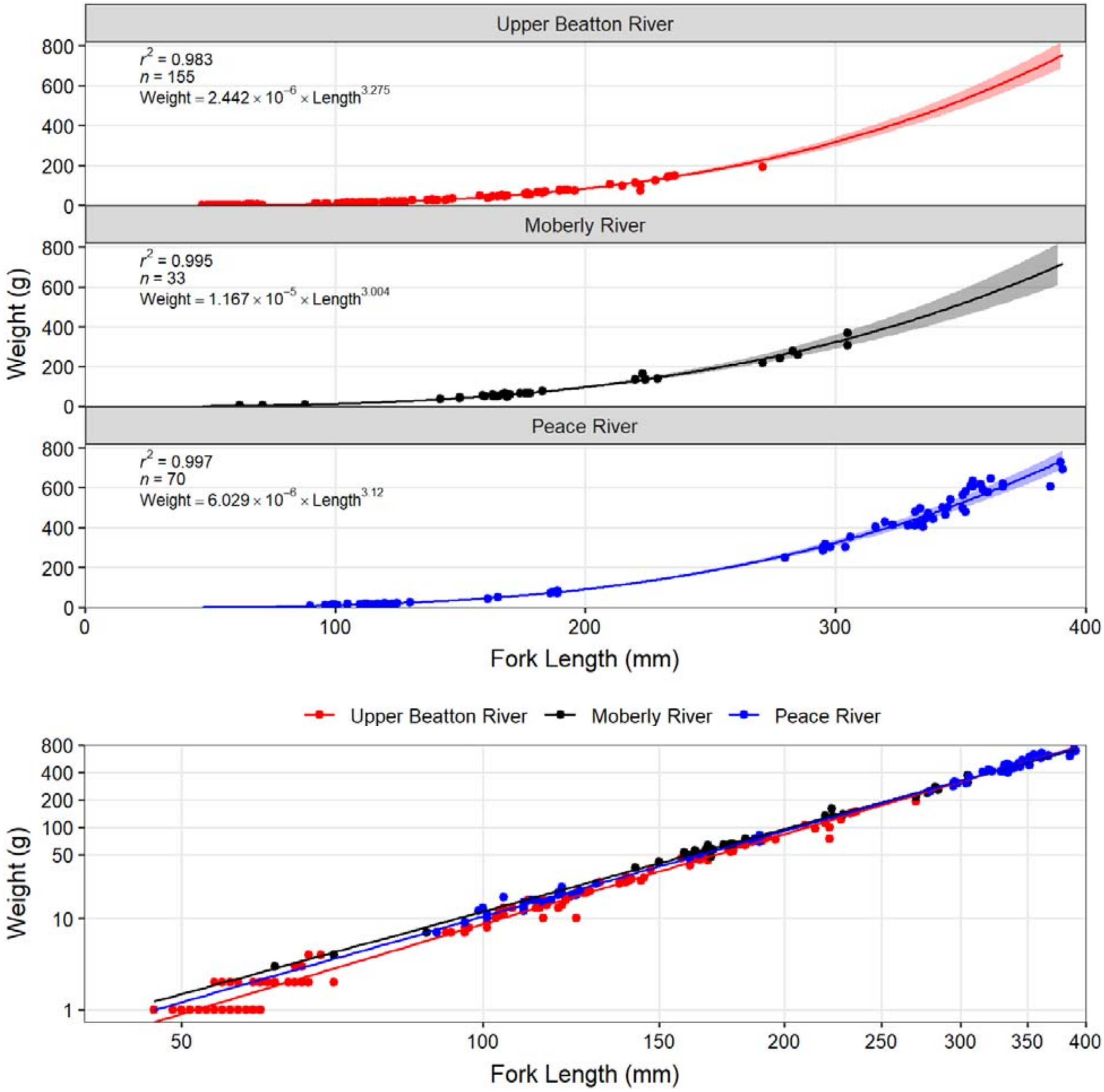

Figure 10: Length-weight regressions for Arctic Grayling captured during various Site C FAHFMP studies, 2019. Beatton River data were collected under the Beatton River Arctic Grayling Status Assessment (Mon-2, Task 2f), Moberly River data were collected under the Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c), and Peace River data were collected under the Peace River Large Fish Indexing Survey (Mon-2, Task 2a). The top panels show the regressions on the back-transformed (exponentiated) scale in the original units of length and weight. The bottom panel shows the linear relationship on the log-log scale. Points are raw data, lines are the predicted values from the linear regression, and the ribbons around the lines represent 95% confidence interval.

The slope of the relationship between the logarithm of length and the logarithm of weight differed significantly among rivers ($F_{2,252} = 7.9$; $P < 0.001$). The regression slope (parameter b) did not differ significantly between the Peace (3.12; CI: 3.04–3.20) and Moberly rivers (3.00; CI: 2.83–3.17), but was significantly different for the Upper Beatton River study area (3.28; CI: 3.2–3.33). This difference was attributed to lower predicted weight-at-length for juvenile Arctic Grayling (i.e., fish between approximately 50 to 250 mm FL) in the Upper Beatton River study area (Table 10). Specifically, the predicted weight of a 100 mm FL Arctic Grayling was 9 g in the Upper Beatton, 12 g in the Moberly River, and 10 g in the Peace River (Table 10). The difference in predicted weight increased with length, as a 215 mm FL Arctic Grayling in the Upper Beatton River study area had a predicted weight of 106 g, while an equivalent fish in the Moberly River had a predicted weight of 119 g and an equivalent fish in the Peace River had a predicted weight of 114 g (Table 10).

Table 10: Predicted weight at length for Arctic Grayling in the Upper Beatton River study area and the Moberly and Peace rivers, 2019. Beatton River data were collected under the Beatton River Arctic Grayling Status Assessment (Mon-2, Task 2f), Moberly River data were collected under the Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c), and Peace River data were collected under the Peace River Large Fish Indexing Survey (Mon-2, Task 2a).

Fork Length (mm)	Predicted Weight (g)		
	Upper Beatton	Moberly River	Peace River
100	9	12	10
215	106	119	114

Greater body condition was noted in the Moberly River (mean values of 1.13 to 1.26, depending on the age; Table 11) and Peace River (mean values of 1.07 to 1.25; Table 12) compared to the Upper Beatton River study area (mean values of 0.77 to 1.05; Table 8).

Table 11: Descriptive statistics of fork length, body weight, and body condition by age for Arctic Grayling captured in the Moberly River in 2019. Moberly River data were collected under the Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c).

Age	Fork Length (mm)			Weight (g)			Fulton's Condition Factor (K)		
	Mean ± SD	Range	*n*[a]	Mean ± SD	Range	*n*[a]	Mean ± SD	Range	*n*[a]
0	74 ± 13	62 – 88	3	5 ± 2	3 – 7	3	1.13 ± 0.12	1.03 – 1.26	3
1	166 ± 10	142 – 183	20	56 ± 10	36 – 75	20	1.21 ± 0.08	0.97 – 1.33	20
2	224 ± 4	220 – 229	4	141 ± 14	132 – 161	4	1.26 ± 0.14	1.15 – 1.45	4
3	277 ± 8	271 – 283	2	247 ± 44	216 – 278	2	1.16 ± 0.10	1.09 – 1.23	2
4	311 ± 41	278 – 380	5	294 ± 58	240 – 369	4	1.16 ± 0.10	1.09 – 1.30	4

[a] Number of fish sampled.

Table 12: Descriptive statistics of fork length, body weight, and body condition by age for Arctic Grayling captured in the Peace River between 20 August and 15 October 2019. Peace River data were collected under the Peace River Large Fish Indexing Survey (Mon-2, Task 2a).

Age	Fork Length (mm)			Weight (g)			Fulton's Condition Factor (K)		
	Mean ± SD	Range	*n*[a]	Mean ± SD	Range	*n*[a]	Mean ± SD	Range	*n*[a]
0	112 ± 10	90 – 130	25	15 ± 4	7 – 24	25	1.07 ± 0.13	0.90 – 1.47	25
1	180 ± 13	161 – 189	6	65 ± 15	44 – 81	6	1.10 ± 0.06	1.04 – 1.20	6
2	319 ± 19	298 – 335	3	373 ± 61	303 – 413	3	1.15 ± 0.08	1.07 – 1.23	3
3	336 ± 23	295 – 386	23	466 ± 102	283 – 621	23	1.22 ± 0.09	1.05 – 1.35	23
4	347 ± 29	280 – 390	12	538 ± 138	247 – 729	12	1.25 ± 0.10	1.10 – 1.41	12
5	391 ± 0	391 – 391	1	692 ± 0	692 – 692	1	1.16 ± 0.00	1.16 – 1.16	1

[a] Number of fish sampled.

Length-at-age data and the von Bertalanffy growth curve suggest slower growth and smaller length-at-ages in the Upper Beatton River study area in comparison to the Peace and Moberly rivers (Figure 11). The von Bertalanffy growth coefficient, K, was greater in the Peace River (K = 0.40) and the Moberly River (K = 0.33) than in the Upper Beatton River study area (K = 0.24). For age-2 Arctic Grayling, predicted length was 177 mm FL in the Upper Beatton River study area, 230 mm FL in the Moberly River, and 282 mm in the Peace River. The estimated asymptotic length (Linf) was also greatest in the Peace River (422 mm FL) and lowest in the Upper Beatton River study area (369 mm FL; Figure 11).

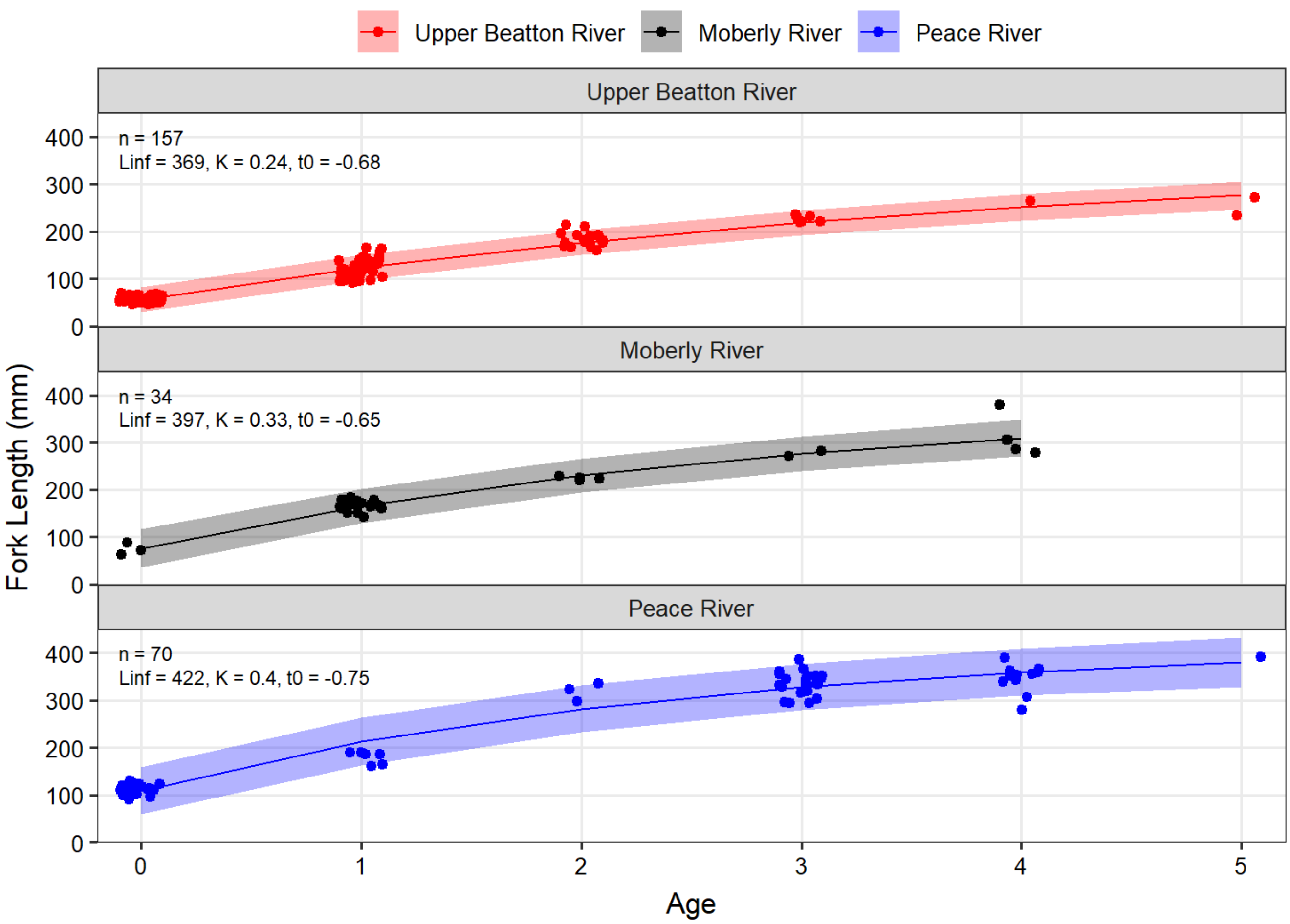

Figure 11: von Bertalanffy growth curve for Arctic Grayling captured during various Site C FAHFMP studies, 2019. Beatton River data were collected under the Beatton River Arctic Grayling Status Assessment (Mon-2, Task 2f), Moberly River data were collected under the Site C Reservoir Tributary Fish Population Indexing Survey (Mon-1b, Task 2c), and Peace River data were collected under the Peace River Large Fish Indexing Survey (Mon-2, Task 2a). Points are the raw data, lines are the predicted values, and the ribbons around the lines represents 95% confidence interval.

3.6 Inter-Watershed Comparisons

Differences in time of year, site characteristics, crew experience, and sampling equipment employed, among other factors, can influence Arctic Grayling catch rates. As such, inter-watershed comparisons of Arctic Grayling CPUE values were limited and should be interpreted with caution. CPUE values recorded in the Upper Beatton were similar to values recorded in other watersheds known to contain Arctic Grayling (e.g., an average of 1.01 fish/h in the Tar River in northern Alberta; range 0 to 15.34 fish/h; Golder 2007).

Life history data of Arctic Grayling captured during the Assessment were compared to data collected in other watersheds in BC and Alberta where possible. Results should be interpreted with caution as conclusions are based mainly on summaries compiled from multiple studies or are based on visual comparisons of figures presented in historical reports. For some comparisons, sample timing, capture methods, and ageing methodologies were unknown. Further, complete data were not available for each dataset, hindering detailed or consistent comparisons among datasets.

Mean fork length data from the Upper Beatton River study area were compared to two separate datasets in the BC Ministry of Environment's Fisheries Inventory Data Queries database (FIDQs)[7]: the Beatton River watershed in its entirety, and the Peace River Forestry District (Table 13). The Peace River Forestry District includes the BC portion of the Peace River watershed downstream of approximately WAC Bennett Dam and upper portions of the Sikanni Chief River and Prophet River watersheds. For all ages (age-0 to age-5), Arctic Grayling captured during the 2018 and 2019 assessments were of similar size to other Arctic Grayling captured in the Beatton River watershed, but were substantially smaller than Arctic Grayling captured throughout the Peace River Forestry District. The ranges of lengths recorded for each age-class in the Peace River Forest District were very wide, and the ranges overlapped with ranges recorded during the Assessment (Table 13).

Table 13: Descriptive statistics of fork length data by age for Arctic Grayling. Data were queried from the Ministry of Environment's Fisheries Inventory Data Query database (FIDQs).

Age	Peace River Forest District			Historical Beatton River Data			Beatton River Arctic Grayling Status Assessment - 2018			Beatton River Arctic Grayling Status Assessment - 2019		
	n[a]	Mean	Range	*n*[a]	Mean	Range	*n*[a]	Mean	Range	*n*[a]	Mean	Range
0	62	92	47 – 154	17	83	65 – 92	21	68	63 – 77	80	57	47 – 71
1	230	189	117 – 242	10	119	96 – 140	4	105	96 – 129	49	120	92 – 165
2	141	260	125 – 320	19	180	146 – 223	2	186	108 – 191	19	184	161 – 215
3	176	321	181 – 379	5	210	184 – 254	5	202	191 – 224	6	227	220 – 236
4	49	345	239 – 411	–	–	–	–	–	–	1	264	–
5	12	341	261 – 404	–	–	–	–	–	–	2	253	234 – 271
6	1	300	–	–	–	–	–	–	–	–	–	–
7	2	374	354 – 394	–	–	–	–	–	–	–	–	–

[a] Number of fish sampled.

Length-weight regressions of Arctic Grayling in the Upper Beatton River were compared to several watersheds in the Omineca Region of BC using data summarized by Ballard and Shrimpton (2009) (Table 14). Best-fit lines for length-weight regressions were used to calculate predicted weights at length (100 mm FL and 215 mm FL) to identify differences in growth between watersheds. In the Upper Beatton River, the predicted weight of a 100 mm FL Arctic Grayling was 9 g, which was slightly lower than the predicted weights in compared watersheds (10–12 g; Table 14). The predicted weight of a 215 mm FL Arctic Grayling in the Upper Beatton River was similar to predicted values in the Ingenika and Omineca watersheds, was higher than predicted values for the Parsnip River watershed, and was lower than predicted values in the Nation River watershed (Table 14).

[7] http://a100.gov.bc.ca/pub/fidq/viewWatershedDictionary.do

Table 14: Length-weight regression and predicted weight at length values for select watersheds in the Omineca Region (data adapted from Ballard and Shrimpton 2009) and the Upper Beatton River (2019).

Watershed	Drainage Area (km^2)[a]	Number of Measurements	Equation of Best-fit Line[b]	Predicted Weight (g) at 100 mm FL	Predicted Weight (g) at 215 mm FL
Parsnip River	4,900	2356	log(W) = -5.08 + 3.038	10	101
Omineca River	5,490	594	log(W) = -5.11 + 3.066	11	110
Nation River	4,350	185	log(W) = -4.93 + 3.007	12	121
Ingenika River	4,200	96	log(W) = -4.96 + 2.996	11	107
Upper Beatton River	2,700	155	$W = 2.442 \times 10^{-6} \times L$	9	106

[a] Data from Obedkoff 2000.

[b] Methods for length-weight regressions were not detailed in Ballard and Shrimpton 2009; logarithm base 10 was assumed.

Von Bertalanffy growth curves from the Upper Beatton River were also compared to watersheds in the Omineca Region with available analogous analyses (Table 15 and Figure 12) (Ballard and Shrimpton 2009). The estimated asymptotic length (Linf) in the Upper Beatton River was lower than all compared watersheds, and the growth coefficient (K) for Arctic Grayling in the Upper Beatton River was similar to the Parsnip River and Omineca River watersheds (Table 15). Although growth rates were similar between watersheds for younger age-classes (i.e., age-0 and age-1), growth rates slowed more with age in the Upper Beatton River compared to other watersheds (Figure 12). This finding should be interpreted with caution due to the low number of age-3 and older fish recorded in the Upper Beatton River in 2019 (n = 9).

Table 15: Summary of von Bertalanffy growth coefficients for Arctic Grayling in the Upper Beatton River (2019) and select watersheds in the Omineca region of BC (data adapted from Ballard and Shrimpton 2009).

Watershed	Drainage Area (km^2)[a]	Number of Measurements	Linf (mm)	K
Parsnip River	4,900	1226	441	0.25
Omineca River	5,490	309	464	0.23
Finlay River	16,000	203	409	0.37
Upper Beatton River	2,700	157	369	0.24

[a] Data from Obedkoff 2000.

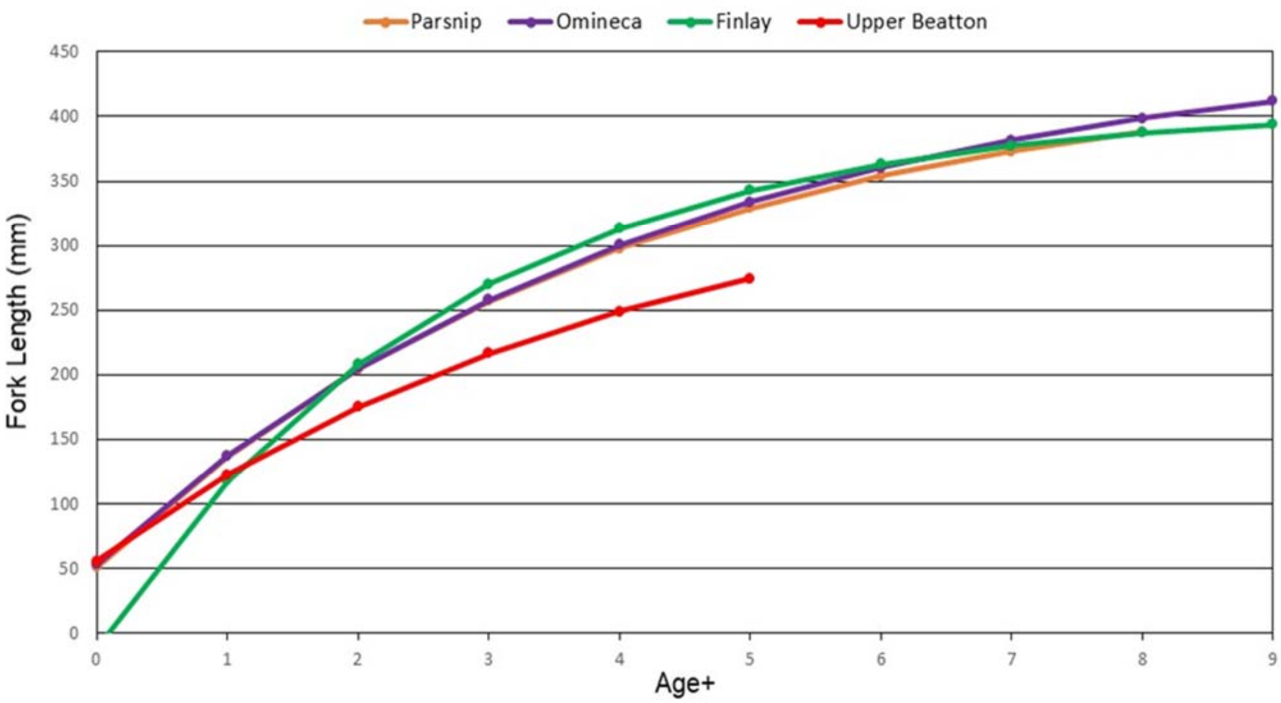

Figure 12: Von Bertalanffy growth curves for Arctic Grayling captured in the Upper Beatton River in 2019 (*n* = 157) and select watersheds in the Omineca Region of BC (Parsnip: *n* = 1218, Omineca: *n* = 309, and Finlay: *n* = 203; data adapted from Ballard and Shrimpton 2009).

Growth and length-at-age data for Arctic Grayling suggest that growth in age-0 to age-2 fish was greater in the Little Smoky River (AEPACA 2015) in comparison to the Upper Beatton River, whereas the growth of age-3 and older individuals was similar between the two watersheds. The Little Smoky River is a tributary to the Smokey River, which flows into the Peace River approximately 246 km downstream of the Beatton River's confluence with the Peace River. AEPACA (2015) did not provide raw data or von Bertalanffy parameter values. As such, the analysis was limited to visual comparisons of the growth curves for the Upper Beatton River (Figure 7) and the Little Smoky River (presented in Figure 13; courtesy of AEPACA 2015).

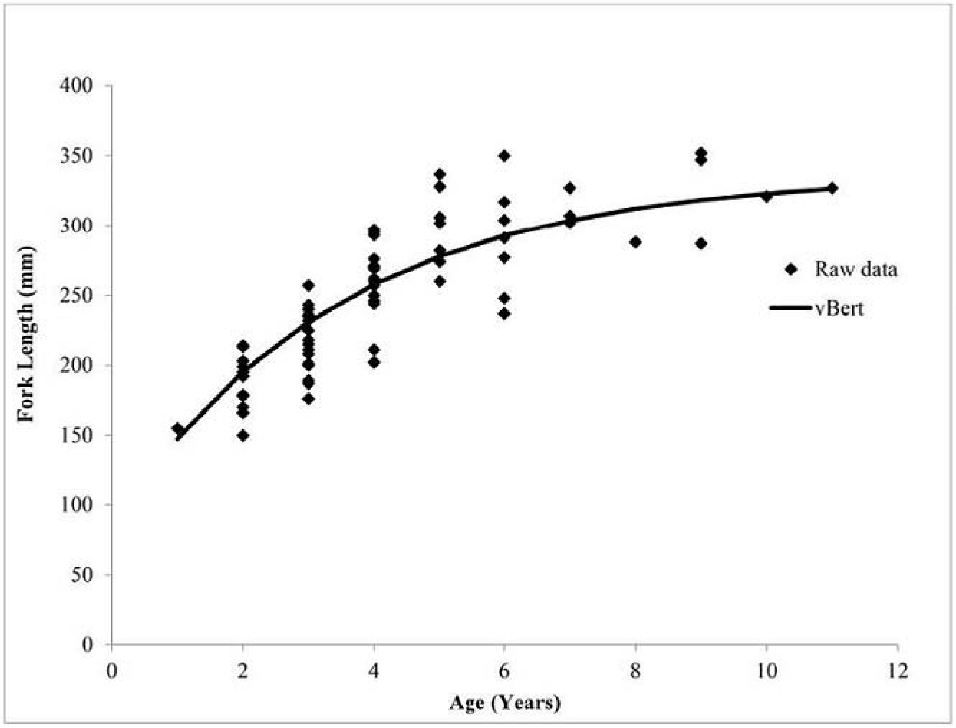

Figure 13: Von Bertalanffy growth curve for Arctic Grayling captured in the Little Smoky River, 2007. Figure reproduced from AEPACA 2015.

4.0 DISCUSSION

The primary objectives of the Assessment are as follows:

- Fill data gaps on Arctic Grayling in British Columbia (BCCF 2015);
- Provide *Complementary Measures* for offsetting through “*investments in data collection and scientific research related to maintaining or enhancing the productivity of commercial, recreational and Aboriginal fisheries*” (BC Hydro 2015); and,
- Help guide the management of Arctic Grayling in the Peace River Basin through the BC Conservation Framework.

These objectives were supported by comparing Arctic Grayling catch and life history data collected during the 2018 and 2019 assessments to Arctic Grayling data collected as part of other FAHMFP studies (i.e., the Moberly River [e.g., Golder 2019] and the Peace River [Golder and Gazey 2019]). Comparisons were also made to Arctic Grayling populations situated in watersheds that will not be affected by the construction or operation of the Project (e.g., major tributaries to Williston Reservoir and select watersheds in Alberta).

4.1 Status of Arctic Grayling in the Upper Beatton

A literature review conducted in 2017 (Golder 2018) found that the Upper Beatton River could support a substantial resident population of Arctic Grayling (i.e., Arctic Grayling that do not leave the Beatton River drainage) due to the high abundance of suitable spawning, rearing, and summer feeding habitats present in the area (DES 1999, 2001; AMEC and LGL 2009; Mainstream 2012). Telemetry survey results (AMEC and LGL 2009, 2010) and microsatellite DNA analyses (Taylor and Yau) provide further evidence that Upper Beatton River contains a resident population of Arctic Grayling.

Arctic Grayling in the Upper Beatton River appear to overwinter in the Beatton River mainstem, migrate into tributaries to spawn and feed in the spring, and migrate back downstream to the Beatton River mainstem over summer to continue feeding. This downstream migration over the summer is likely in response to declining water levels and increasing water temperatures. This life history pattern is supported by numerous studies and is consistent with other studied Arctic Grayling populations (e.g., AMEC 2008; AMEC and LGL 2008, 2009; DES 1997; Ford et. al. 1995; Mainstream 2010; McPhail 2007; P&E 2002; Scott and Crossman 1973; Stantec 2012). Based on previous studies, Arctic Grayling in the Upper Beatton River are expected to spend their first summer in their natal stream (Earthtone and Mainstream 2013) and that non-spawning related migrations into smaller tributaries may occur to seek refugia from high turbidity levels (DES 1997).

Length-frequency distributions in 2018 and 2019 indicate that by late summer, Upper Beatton River tributaries are mainly used by age-0 and age-1 Arctic Grayling, and that most age-2 to age-5 individuals reside in the Beatton River mainstem. These results suggest that tributaries are used for spawning and juvenile rearing, whereas the mainstem is used primarily for feeding and overwintering. The high variability in catch rates among sampled tributaries suggests that recruitment may be limited to a small number of streams but there are not obvious habitat differences among occupied and unoccupied tributaries.

Comparisons to data collected during other Site C FAHMFP components and other watersheds indicate that Arctic Grayling in the Upper Beatton River are typically smaller, grow slower, and have lower body condition across most age-classes. Arctic Grayling in the Upper Beatton River study area likely complete their entire life cycle in a much smaller drainage area than the comparison watersheds, and the smaller sizes observed in the study area are likely a reflection of overall lower productivity in the study area. Although the sizes observed in the Upper Beatton River were generally lower, they were within the range of values recorded in other systems for most parameters and should not be considered as evidence of atypical values for the species.

Overall, CPUEs during sampling in the Upper Beatton were substantially higher in comparison to CPUEs documented in the Moberly River. Differences in CPUEs, as well as the variability in abundance of each Arctic Grayling age cohort in each of the Peace River watersheds, is likely a reflection of the differences in life history patterns between the populations and the relative sizes of the assessed areas, and could also be related to the different sample methods employed in each watershed. Even though the spatial scope of the Upper Beatton River study area is small relative to the other two study areas, it is believed that Arctic Grayling can complete their entire life histories within the perimeter of the study area and therefore, all life stages of Arctic Grayling are available to capture. Arctic Grayling assessed in the Moberly and Peace rivers likely represent separate components of the same population and the abundance of each age cohort in each system is, in part, related to the timing of migrations and movements between the two rivers.

Catch rates for older Arctic Grayling (age-3 to age-5) were low in the Upper Beatton River. These lower catch rates are likely related to the study design. During both study years, the assessments were conducted after freshet flows declined. This was done to increase overall sampling effectiveness as follows:

- Water clarity is generally higher after freshet flows, increasing fish observability.
- Lower water velocities and lower water depths allowed more varied habitats to be safely sampled.
- Fish are concentrated in a lower volume of water.
- Sampling later provides more time for age-0 fish to grow to a size more conducive to capture.

Sampling after freshet flows in 2018 and 2019 may have increased the catch of immature Arctic Grayling, but likely resulted in lower catch rates for adult Arctic Grayling. During both study years, the bulk of the adult Arctic Grayling population likely migrated downstream with the declining hydrograph to occupy deeper waters, making them less available to capture by backpack electrofishing during the assessment. Assessing both immature and adult life stages of Arctic Grayling during a single field assessment, or with a single capture method, will likely result in poor catch rates for one of the life stages.

The timing of freshet flows in the Upper Beatton River is variable, and the area is susceptible to heavy rain events over the summer that result in quick and substantial changes to water levels and turbidity levels. During future study years, the irregular timing of ideal sampling conditions in the Upper Beatton River will influence Arctic Grayling catch rates and hinder comparisons among study years.

4.2 Limiting Factors to Arctic Grayling

Stamford et. al. (2017) and Northcote (1993) provide in-depth summaries of typical limiting factors to Arctic Grayling populations. The key limiting factors for Arctic Grayling populations described include habitat availability (specifically for rearing space for key life stages), aquatic productivity (availability of food resources at key life stages), parasitism and disease, species interactions (competition and predation), habitat degradation, and exploitation. Land use related to industry (e.g., pipelines, mining, and logging), and the construction, improvement, and maintenance of roads can be linked to habitat degradation (Northcote 1993 and Hagen et. al. 2019); however, the Upper Beatton River experiences the least amount of anthropomorphic land use of the five regions of the Beatton River (Mainstem 2012). Currently, aquatic productivity, parasitism and disease, species interaction, and exploitation are data gaps in the Upper Beatton River.

The Beatton River drainage is extensive in its entirety; however, the drainage for the Upper Beatton River is substantially smaller in comparison to the Moberly and Peace rivers, and the comparison watersheds in the Omineca Region. The lower drainage area likely results in lower productivity and food resources in the Upper Beatton River for the resident Arctic Grayling population to utilize, which could be a factor limiting size-at-age and growth. Previous studies indicate that substantial migration occurs for Arctic Grayling between the Peace and Moberly rivers (Mainstem 2012). Access to more productive habitats in the Peace River likely results in faster growth and larger size-at-age values for these populations. Arctic Grayling are vulnerable to angling overharvest, and older age cohorts can be rapidly depleted even under low to moderate angling pressure (Northcote 1993; Stamford et. al. 2017; ASRD 2005). Typically, angling takes the largest fish from a population (Stamford et.

al. 2017). This is exacerbated by current BC angling regulations for the assessment area, which allow for the daily harvest of two Arctic Grayling over 299 mm FL and one over 450 mm FL[8] for most of the year. Accessibility by anglers is a primary factor of exploitation (Northcote 1993). The remoteness of the Upper Beatton River likely limits angling pressure; however, access to the region is available via numerous resource roads. Further study is required to determine if these key factors are limiting to the Upper Beatton population.

5.0 CLOSURE

We trust that this report meets your current requirements. If you have any further questions, please do not hesitate to contact the undersigned.

Golder Associates Ltd.

Dustin Ford, RPBio
Associate, Project Manager

Shawn Redden, RPBio
Associate, Project Director, Senior Fisheries Biologist

DF/SR/cmc

https://golderassociates.sharepoint.com/sites/108146/project files/6 deliverables/issued to client_for wp/19121770-001-r-rev0/19121770-001-r-rev0-year 3 arctic grayling monitoring 19apr_21.docx

[8] Available at: http://www.env.gov.bc.ca/fw/fish/regulations/docs/1517/fishing_synopsis_2015-17_region7b.pdf

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APPENDIX A

2018 and 2019 Data Summaries

Table A1: Summary of effort and habitat data collected at backpack electrofishing index sites during the Beatton River Arctic Grayling Status Assessment, September 2018.

Date	Waterbody	Site Name	UTM Start[a]		UTM End[a]		Site Length (m)	Effort (s)	Water Temp. (°C)	Water Cond. (µS/cm)	Instream Velocity (m/s)	Cover Types (%)[b]								Dominant Substrate	Sub-Dominant Substrate	Mean Depth (m)	Max Depth (m)
			Easting	Northing	Easting	Northing						INT	SWD	LWD	TURB	TV	CB	SW	DW				
14-Sep	Beatton River	BER-05-EF-14-09-18	552285	6324070	552245	6324377	311	3356	5.6	160	<0.5	65	10	1	15	0	0	0	9	Cobble	Gravel	none	1.1
15-Sep	La Prise Creek	LAC-02-EF-15-09-18	566202	6362047	566144	6362311	196	2725	2.7	70	<0.5	5	30	5	5	10	15	10	20	Gravel	Silt	0.4	0.7
15-Sep	Bratland Creek	BRC-01-EF-15-09-18	571279	6359158	571224	6359261	113	1211	2.5	120	<0.5	10	55	5	0	10	5	0	15	Gravel	Silt	0.5	1
15-Sep	Julienne Creek	JUC-01-EF-15-09-18	543514	6330645	543597	6330691	140	487	5.3	340	<0.5	25	10	5	5	0	0	55	0	Sand	Gravel	0.15	0.7
15-Sep	Beatton River	BER-06-EF-15-09-18	543589	6330753	543814	6330679	290	1599	3	140	0.5–1.0	20	10	5	10	0	0	40	15	Gravel	Cobble	0.5	1.2
15-Sep	Beatton River	BER-08-EF-15-09-18	542708	6333714	542608	6333543	220	911	3	140	0.5–1.0	40	1	0	15	0	0	39	5	Cobble	Gravel	0.4	0.7
15-Sep	Beatton River	BER-09-EF-15-09-18	541747	6334994	541862	6335038	250	1555	3	140	0.5–1.0	30	5	0	10	0	0	35	20	Cobble	Gravel	0.3	1
16-Sep	Beatton River	BER-01-EF-16-09-18	592868	6349109	592662	6349036	150	1262	2.7	220	<0.5	5	30	20	25	0	5	0	15	Silt	Gravel	0.5	1.1
16-Sep	Holman Creek	HOC-01-EF-16-09-18	577133	6350174	577022	6350120	100	1531	2.6	225	<0.5	5	10	10	5	0	0	10	60	Silt	Gravel	0.6	1
16-Sep	Unnamed Tributary 1	UNC-01-EF-16-09-18	548157	6325155	548363	6325216	250	533	5.7	420	<0.5	30	3	2	0	5	5	50	5	Gravel	Cobble	0.15	0.6
16-Sep	Beatton River	BER-11-EF-16-09-18	525728	6326201	525517	6326142	250	1300	3	110	0.5–1.0	30	3	2	10	0	0	15	40	Cobble	Gravel	0.5	1
16-Sep	Beatton River	BER-10-EF-16-09-18	526086	6326199	526340	6326177	260	1547	3	110	<0.5	25	4	1	15	0	5	20	30	Cobble	Gravel	0.5	1
16-Sep	Atick Creek	ATC-01-EF-16-09-18	527034	6328461	527107	6328385	125	480	3.6	70	<0.5	10	0	0	5	5	5	65	10	Gravel	Sand	0.4	0.9

[a] UTM Zone 10V.
[b] Int = Interstices, SWD = Small Woody Debris, LWD = Large Woody Debris, TURB = Turbidity, TV = Terrestrial Vegetation, CB = Cut Bank, SW = Shallow Water, DP = Deep Water.

Table A2: Summary effort and habitat data collected at backpack electrofishing index sites during the Beatton River Arctic Grayling Status Assessment, August 2019.

Date	Waterbody	Site Name	UTM Start[a]		UTM End[a]		Site Length (m)	Effort (s)	Water Temp (°C)	Water Cond. (µS/cm)	Instream Velocity (m/s)	Cover Types (%)[b]								Dominant Substrate	Sub-Dominant Substrate	Mean Depth (m)	Max Depth (m)
			Easting	Northing	Easting	Northing						INT	SWD	LWD	TURB	TV	CB	SW	DW				
13-Aug	Beatton River	BER-09-EF-13-08-19	541747	6334994	541862	6335038	235	1940	10.9	70	0.5–1.0	75	3	2	4	1	5	0	10	cobble	sand	0.4	0.7
13-Aug	Beatton River	BER-08-EF-13-08-19	542608	6333543	542708	6333714	200	1644	12.7	70	0.5–1.0	72	1	1	0	1	5	10	10	cobble	sand	0.5	0.8
13-Aug	Julienne Creek	JUC-01-EF-13-08-19	543597	6330691	543514	6330645	100	2136	16.1	80	0.5–1.0	75	3	2	0	1	1	13	5	gravel	cobble	0.2	0.8
15-Aug	La Prise Creek	LAC-02A-EF-15-08-19	566144	6362311	565980	6362457	220	1598	13.5	80	<0.5	20	2	3	2	0	2	70	1	gravel	sand	0.2	0.6
15-Aug	La Prise Creek	LAC-02-EF-15-08-19	566202	6362047	566144	6362311	260	1268	13.5	80	<0.5	25	5	5	0	0	5	50	10	gravel	sand	0.4	1
15-Aug	Holman Creek	HOC-1-EF-15-08-19	577022	6350120	577133	6350174	All	1172	14.2	170	<0.5	0	30	30	0	10	0	15	15	silt	gravel	0.4	1
16-Aug	Atick Creek	ATC-01-EF-16-08-19	527107	6328385	527034	6328461	130	1221	9.1	60	>1.0	70	0	0	4	0	5	1	20	gravel	silt	0.6	1.1
16-Aug	Unnamed Tributary 1	UNC-01-EF-16-08-19	548363	6325216	548157	6325155	210	2147	10.4	80	0.5–1.0	15	2	3	10	10	9	50	1	-	-	0.4	0.9
16-Aug	Bratland Creek	BRC-01-EF-16-08-19	571279	6359158	571224	6359261	230	2015	14.9	170	<0.5	10	20	10	0	0	5	25	30	gravel	silt	0.3	0.9
16-Aug	Beatton River	BER-10-EF-16-08-19	526335	6326192	526086	6326199	290	962	10.4	70	0.5–1.0	5	5	10	0	10	30	10	30	silt	cobble	0.7	1.3
16-Aug	Beatton River	BER-11-EF-16-08-19	525517	6326142	525728	6326201	270	923	10.4	70	0.5–1.0	10	0	0	0	20	60	0	10	cobble	silt	0.8	1.2

[a] UTM Zone 10V.
[b] Int = Interstices, SWD = Small Woody Debris, LWD = Large Woody Debris, TURB = Turbidity, TV = Terrestrial Vegetation, CB = Cut Bank, SW = Shallow Water, DP = Deep Water.

Table A3: Summary effort and habitat data collected at angling sites during the Beatton River Arctic Grayling Status Assessment, August 2019.

Date	Waterbody	Site Name	UTM Start[a]		UTM End[a]		Sample Method[b]	Effort (h)	Water Temp (°C)	Water Cond. (µS/cm)	Instream Velocity (m/s)	Cover Types (%)[c]								Dominant Substrate	Sub-Dominant Substrate	Mean Depth (m)	Max Depth (m)
			Easting	Northing	Easting	Northing						INT	SWD	LWD	TURB	TV	CB	SW	DW				
13-Aug	Beatton River	BER-AN-466.5-13-08-19	543576	6330721	-[d]	-[d]	FF	0.93	12.7	60	0.5–1.0	25	2	3	5	0	5	30	30	cobble	sand	0.3	0.7
13-Aug	Beatton River	BER-AN-419.4-13-08-19	543444	6332934	543486	6333082	FF/SC	0.93	-[d]	-[d]	<0.5	70	0	10	10	0	0	0	10	silt	boulder	0.4	1
13-Aug	Beatton River	BER-AN-420.3-13-08-19	-[d]	-[d]	543062	6333621	FF/SC	0.70	-[d]	-[d]	<0.5	15	0	5	50	0	0	10	20	gravel	sand	0.5	1.2
13-Aug	Beatton River	BER-AN-421.2-13-08-19	-[d]	-[d]	542705	6334033	SC	0.33	-[d]	-[d]	-[d]	35	0	25	40	0	0	0	0	gravel	sand	0.4	1.1
13-Aug	Beatton River	BER-AN-422.2-13-08-19	-[d]	-[d]	542282	6334461	FF/SC	0.57	-[d]	-[d]	0.5–1.0	33	0	20	47	0	0	0	0	gravel	boulder	0.5	0.9
13-Aug	Beatton River	BER-AN-422.5-13-08-19	-[d]	-[d]	542185	6334644	FF/SC	0.83	-[d]	-[d]	0.5–1.0	30	10	10	50	0	0	0	0	gravel	cobble	0.4	0.6
13-Aug	Beatton River	BER-AN-423.2-13-08-19	-[d]	-[d]	541837	6335070	FF/SC	1.00	-[d]	-[d]	0.5–1.0	50	10	10	10	0	0	0	20	gravel	boulder	0.4	0.2
13-Aug	Julienne Creek	JUC-01-AN-13-08-19	-[d]	-[d]	-[d]	-[d]	FF/SC	0.90	12	-[d]	-[d]	5	5	10	60	0	0	10	10	gravel	sand	0.4	1
13-Aug	Beatton River	BER-AN-418.5-13-08-19	-[d]	-[d]	543678	6332202	FF/SC	1.03	12	-[d]	0.5–1.0	50	0	10	10	0	0	15	15	gravel	cobble	0.3	0.8
14-Aug	Beatton River	BER-AN-465.7-14-08-19	525919	6326164	525583	6326206	FF/SC	1.57	12.3	60	0.5–1.0	30	1	1	1	1	1	5	60	cobble	silt	0.5	0.6
14-Aug	Beatton River	BER-AN-465.7-14-08-19	525919	6326164	525583	6326206	FF/SC	1.60	12.3	60	0.5–1.0	30	1	1	1	1	1	5	60	cobble	silt	0.5	0.6
14-Aug	Beatton River	BER-AN-465.9-14-08-19	525428	6326155	525400	6326281	FF/SC	1.97	12.3	60	-[d]	30	2	3	5	0	5	40	15	cobble	sand	0.4	0.9
14-Aug	Beatton River	BER-AN-466.5-14-08-19	525400	6326281	543576	6330721	FF/SC	1.34	12.3	60	0.5–1.0	40	2	1	5	5	2	25	20	cobble	sand	0.4	0.8
14-Aug	Beatton River	BER-AN-467.9-14-08-19	524892	6326543	524784	6326448	FF	3.63	12.3	60	0.5–1.0	50	2	3	2	0	3	25	20	cobble	sand	0.5	0.9
14-Aug	Beatton River	BEA-AN-467.2-14-08-19	-[d]	-[d]	525100	6326856	FF	0.63	12.9	70	<0.5	15	0	10	25	0	0	0	50	gravel	sand	0.4	1.2
14-Aug	Beatton River	BER-AN-466.6-14-08-19	-[d]	-[d]	525181	6326494	FF	1.5	12.4	70	0.5–1.0	0	25	0	25	25	0	0	25	cobble	gravel	-[d]	-[d]
14-Aug	Beatton River	BER-AN-466.5-14-08-20	-[d]	-[d]	525295	6326476	FF	1.77	11.3	70	0.5–1.0	50	0	0	30	10	10	0	0	cobble	gravel	0.3	1
14-Aug	Beatton River	BER-AN-467.6-14-08-19	525139	6326687	525082	6326651	FF	0.70	12.9	70	<0.5	10	0	20	30	0	0	0	40	gravel	sand	0.6	1.3
14-Aug	Beatton River	BER-AN-467.5-14-08-19	525191	6326732	525139	6326687	FF	2.17	-[d]	-[d]	0.5–1.0	0	0	30	15	0	0	15	40	silt	cobble	0.5	1.5
16-Aug	Beatton River	BER-AN-476.4-16-08-19	-[d]	-[d]	521271	6327444	FF	4.30	11.3	60	0.5–1.0	10	0	0	20	20	20	0	30	cobble	silt	0.5	1.1
16-Aug	Beatton River	BER-AN-467.8-16-08-19	524912	6326578	524781	6326442	FF	2.37	10.4	70	>1.0	10	0	10	20	0	10	0	50	cobble	gravel	1	2

[a] UTM Zone 10V.
[b] FF = Fly Fishing, SC = Spin Casting.
[c] Int = Interstices, SWD = Small Woody Debris, LWD = Large Woody Debris, TURB = Turbidity, TV = Terrestrial Vegetation, CB = Cut Bank, SW = Shallow Water, DP = Deep Water.
[d] Data not collected.

Table A4: Biological data collected from fish captured during the Beatton River Arctic Grayling Status Assessment, September 2018.

Date	Site Name	Sample Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
14-Sep	BER-05-EF-14-09-18	1	Redside Shiner	76	4		
14-Sep	BER-05-EF-14-09-18	2	Redside Shiner	76	5		
14-Sep	BER-05-EF-14-09-18	3	Redside Shiner	81	6		
14-Sep	BER-05-EF-14-09-18	4	Lake Chub	76	4		
14-Sep	BER-05-EF-14-09-18	5	Lake Chub	64	2		
14-Sep	BER-05-EF-14-09-18	6	Lake Chub	69	3		
14-Sep	BER-05-EF-14-09-18	7	Lake Chub	64	3		
14-Sep	BER-05-EF-14-09-18	8	Lake Chub	55	2		
14-Sep	BER-05-EF-14-09-18	9	White Sucker	80	6		
14-Sep	BER-05-EF-14-09-18	10	Trout-perch	55	2		
14-Sep	BER-05-EF-14-09-18	11	Trout-perch	55	2		
14-Sep	BER-05-EF-14-09-18	12	Trout-perch	63	3		
14-Sep	BER-05-EF-14-09-18	13	Redside Shiner	72	5		
14-Sep	BER-05-EF-14-09-18	14	Redside Shiner	43	1		
14-Sep	BER-05-EF-14-09-18	15	Trout-perch	45	1		
14-Sep	BER-05-EF-14-09-18	16	Trout-perch	52	1		
14-Sep	BER-05-EF-14-09-18	17	Lake Chub	43	1		
14-Sep	BER-05-EF-14-09-18	18	Longnose Sucker	138	31		
14-Sep	BER-05-EF-14-09-18	19	Spoonhead Sculpin	80	5		
14-Sep	BER-05-EF-14-09-18	20	Redside Shiner	76	5		
14-Sep	BER-05-EF-14-09-18	21	Redside Shiner	80	6		
14-Sep	BER-05-EF-14-09-18	22	Redside Shiner	78	6		
14-Sep	BER-05-EF-14-09-18	23	Redside Shiner	76	5		
14-Sep	BER-05-EF-14-09-18	24	Lake Chub	83	6		
14-Sep	BER-05-EF-14-09-18	25	Lake Chub	49	1		
14-Sep	BER-05-EF-14-09-18	26	Lake Chub	49	1		
14-Sep	BER-05-EF-14-09-18	27	Lake Chub	49	1		
14-Sep	BER-05-EF-14-09-18	28	Trout-perch	58	2		
14-Sep	BER-05-EF-14-09-18	29	Trout-perch	57	2		
14-Sep	BER-05-EF-14-09-18	30	Trout-perch	46	1		
14-Sep	BER-05-EF-14-09-18	31	Redside Shiner	74	4		
14-Sep	BER-05-EF-14-09-18	32	Redside Shiner	75	4		
14-Sep	BER-05-EF-14-09-18	33	Lake Chub	89	6		
14-Sep	BER-05-EF-14-09-18	34	Lake Chub	69	4		
14-Sep	BER-05-EF-14-09-18	35	Lake Chub	78	6		
14-Sep	BER-05-EF-14-09-18	36	Lake Chub	63	3		
14-Sep	BER-05-EF-14-09-18	37	Lake Chub	65	3		
14-Sep	BER-05-EF-14-09-18	38	Lake Chub	63	3		
14-Sep	BER-05-EF-14-09-18	39	Lake Chub	62	3		

Date	Site Name	Sample Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
14-Sep	BER-05-EF-14-09-18	40	Lake Chub	58	2		
14-Sep	BER-05-EF-14-09-18	41	Lake Chub	60	3		
14-Sep	BER-05-EF-14-09-18	42	Lake Chub	51	2		
14-Sep	BER-05-EF-14-09-18	43	Trout-perch	52	2		
14-Sep	BER-05-EF-14-09-18	44	White Sucker	56	2		
14-Sep	BER-05-EF-14-09-18	45	Trout-perch	59	3		
14-Sep	BER-05-EF-14-09-18	46	Trout-perch	54	2		
14-Sep	BER-05-EF-14-09-18	47	Trout-perch	46	1		
14-Sep	BER-05-EF-14-09-18	48	Trout-perch	49	1		
14-Sep	BER-05-EF-14-09-18	49	Trout-perch	55	2		
14-Sep	BER-05-EF-14-09-18	50	Longnose Dace	74	4		
14-Sep	BER-05-EF-14-09-18	51	Redside Shiner	74	5		
14-Sep	BER-05-EF-14-09-18	52	Lake Chub	89	7		
14-Sep	BER-05-EF-14-09-18	53	Spoonhead Sculpin	86	6		
14-Sep	BER-05-EF-14-09-18	54	Lake Chub	69	4		
14-Sep	BER-05-EF-14-09-18	55	Lake Chub	65	4		
14-Sep	BER-05-EF-14-09-18	56	Lake Chub	63	3		
14-Sep	BER-05-EF-14-09-18	57	Lake Chub	62	3		
14-Sep	BER-05-EF-14-09-18	58	Trout-perch	66	3		
14-Sep	BER-05-EF-14-09-18	59	Trout-perch	44	1		
14-Sep	BER-05-EF-14-09-18	60	Trout-perch	27	0		
14-Sep	BER-05-EF-14-09-18	61	Sculpin Species	84	6		
14-Sep	BER-05-EF-14-09-18	62	Trout-perch	55	2		
14-Sep	BER-05-EF-14-09-18	63	Longnose Sucker	105	15		
14-Sep	BER-05-EF-14-09-18	64	White Sucker	90	8		
14-Sep	BER-05-EF-14-09-18	65	Trout-perch	53	2		
14-Sep	BER-05-EF-14-09-18	66	Longnose Dace	57	2		
14-Sep	BER-05-EF-14-09-18	67	Lake Chub	43	1		
14-Sep	BER-05-EF-14-09-18	68	Redside Shiner	78	5		
14-Sep	BER-05-EF-14-09-18	69	White Sucker	76	5		
14-Sep	BER-05-EF-14-09-18	70	Lake Chub	83	6		
14-Sep	BER-05-EF-14-09-18	71	Redside Shiner	93	9		
14-Sep	BER-05-EF-14-09-18	72	Spoonhead Sculpin	83	4		
14-Sep	BER-05-EF-14-09-18	73	Longnose Sucker	57	3		
14-Sep	BER-05-EF-14-09-18	74	Spoonhead Sculpin	82	5		
14-Sep	BER-05-EF-14-09-18	75	Longnose Dace	55	2		
15-Sep	BER-08-EF-15-09-18	76	Lake Chub	66	2		
15-Sep	BER-08-EF-15-09-18	77	Longnose Dace	49	2		
15-Sep	BER-08-EF-15-09-18	78	Brook Stickleback	64	2		
15-Sep	BER-08-EF-15-09-18	79	Longnose Sucker	181	68		
15-Sep	BER-08-EF-15-09-18	80	Longnose Sucker	162	50		

Date	Site Name	Sample Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
15-Sep	BER-08-EF-15-09-18	81	Longnose Sucker	159	46		
15-Sep	BER-08-EF-15-09-18	82	Longnose Sucker	140	33		
15-Sep	BER-08-EF-15-09-18	83	Longnose Sucker	105	14		
15-Sep	BER-08-EF-15-09-18	84	White Sucker	115	16		
15-Sep	BER-08-EF-15-09-18	85	Longnose Sucker	106	16		
15-Sep	BER-08-EF-15-09-18	86	Longnose Sucker	100	12		
15-Sep	BER-08-EF-15-09-18	87	White Sucker	95	7		
15-Sep	BER-08-EF-15-09-18	88	White Sucker	96	9		
15-Sep	BER-08-EF-15-09-18	89	Longnose Dace	64	1		
15-Sep	BER-08-EF-15-09-18	90	Longnose Sucker	94	11		
15-Sep	BER-08-EF-15-09-18	91	White Sucker	91	8		
15-Sep	BER-08-EF-15-09-18	92	Longnose Sucker	93	9		
15-Sep	BER-08-EF-15-09-18	93	Lake Chub	95	9		
15-Sep	BER-08-EF-15-09-18	94	Lake Chub	86	7		
15-Sep	BER-06-EF-15-09-18	95	Lake Chub	71	5		
15-Sep	BER-06-EF-15-09-18	96	Lake Chub	76	5		
15-Sep	BER-06-EF-15-09-18	97	Lake Chub	55	2		
15-Sep	BER-06-EF-15-09-18	98	Lake Chub	46	1		
15-Sep	BER-06-EF-15-09-18	99	Redside Shiner	78	5		
15-Sep	BER-06-EF-15-09-18	100	Redside Shiner	44	1		
15-Sep	BER-06-EF-15-09-18	101	White Sucker	84	6		
15-Sep	BER-06-EF-15-09-18	102	White Sucker	88	8		
15-Sep	BER-06-EF-15-09-18	103	Lake Chub	72	4		
15-Sep	BER-06-EF-15-09-18	104	Lake Chub	61	3		
15-Sep	BER-06-EF-15-09-18	105	Longnose Dace	65	2		
15-Sep	BER-06-EF-15-09-18	106	Trout-perch	70	4		
15-Sep	BER-06-EF-15-09-18	107	Lake Chub	65	3		
15-Sep	BER-06-EF-15-09-18	108	Lake Chub	51	2		
15-Sep	BER-06-EF-15-09-18	109	Lake Chub	60	2		
15-Sep	BER-06-EF-15-09-18	110	Lake Chub	51	1		
15-Sep	BER-06-EF-15-09-18	111	Lake Chub	56	2		
15-Sep	BER-06-EF-15-09-18	112	Lake Chub	69	4		
15-Sep	BER-06-EF-15-09-18	113	Lake Chub	51	1		
15-Sep	BER-06-EF-15-09-18	114	Lake Chub	73	4		
15-Sep	BER-06-EF-15-09-18	115	Lake Chub	48	1		
15-Sep	BER-06-EF-15-09-18	116	Redside Shiner	75	4		
15-Sep	BER-06-EF-15-09-18	117	Lake Chub	86	6		
15-Sep	BER-06-EF-15-09-18	118	Lake Chub	63	3		
15-Sep	BER-06-EF-15-09-18	119	Lake Chub	65	3		
15-Sep	BER-06-EF-15-09-18	120	White Sucker	78	6		
15-Sep	BER-06-EF-15-09-18	121	Lake Chub	48	2		

Date	Site Name	Sample Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
15-Sep	BER-06-EF-15-09-18	122	Trout-perch	54	2		
15-Sep	BER-06-EF-15-09-18	123	Trout-perch	65	3		
15-Sep	BER-06-EF-15-09-18	124	Lake Chub	60	3		
15-Sep	BER-06-EF-15-09-18	125	Lake Chub	60	3		
15-Sep	BER-06-EF-15-09-18	126	Lake Chub	69	3		
15-Sep	BER-06-EF-15-09-18	127	White Sucker	74	4		
15-Sep	BER-06-EF-15-09-18	128	Longnose Sucker	95	10		
15-Sep	BER-06-EF-15-09-18	129	Lake Chub	43	1		
15-Sep	BER-06-EF-15-09-18	130	Lake Chub	46	1		
15-Sep	BER-06-EF-15-09-18	131	Lake Chub	64	3		
15-Sep	BER-06-EF-15-09-18	132	Lake Chub	67	3		
15-Sep	JUC-01-EF-15-09-18	133	Longnose Sucker	164	45		
15-Sep	JUC-01-EF-15-09-18	134	Longnose Sucker	106	11		
15-Sep	JUC-01-EF-15-09-18	135	Lake Chub	68	3		
15-Sep	JUC-01-EF-15-09-18	136	Lake Chub	45	1		
15-Sep	JUC-01-EF-15-09-18	137	Lake Chub	69	4		
15-Sep	JUC-01-EF-15-09-18	138	Lake Chub	61	2		
15-Sep	JUC-01-EF-15-09-18	139	Lake Chub	46	1		
15-Sep	JUC-01-EF-15-09-18	140	Lake Chub	64	3		
15-Sep	JUC-01-EF-15-09-18	141	Lake Chub	66	3		
15-Sep	JUC-01-EF-15-09-18	142	Lake Chub	42	1		
15-Sep	JUC-01-EF-15-09-18	143	Longnose Sucker	104	10		
15-Sep	JUC-01-EF-15-09-18	144	Lake Chub	44	1		
15-Sep	JUC-01-EF-15-09-18	145	Lake Chub	62	2		
15-Sep	JUC-01-EF-15-09-18	146	Longnose Sucker	48	1		
15-Sep	BRC-01-EF-15-09-18	147	Arctic Grayling	198	72	900226000980923	3
15-Sep	BRC-01-EF-15-09-18	148	Arctic Grayling	191	70	900226000980890	3
15-Sep	BRC-01-EF-15-09-18	149	Arctic Grayling	197	77	900226000980759	3
15-Sep	BRC-01-EF-15-09-18	150	Arctic Grayling	180	57	900226000980606	2
15-Sep	BRC-01-EF-15-09-18	151	Arctic Grayling	129	19	900226000980547	1
15-Sep	BRC-01-EF-15-09-18	152	Arctic Grayling	67	3		0
15-Sep	BRC-01-EF-15-09-18	153	White Sucker	187	61		
15-Sep	BRC-01-EF-15-09-18	154	Lake Chub	87	8		
15-Sep	BRC-01-EF-15-09-18	155	Lake Chub	95	9		
15-Sep	BRC-01-EF-15-09-18	156	Lake Chub	84	6		
15-Sep	BRC-01-EF-15-09-18	157	White Sucker	116	17		
15-Sep	BRC-01-EF-15-09-18	158	Arctic Grayling	65	2		0
15-Sep	BRC-01-EF-15-09-18	159	Arctic Grayling	63	2		0
15-Sep	BRC-01-EF-15-09-18	160	Arctic Grayling	64	2		0
15-Sep	BRC-01-EF-15-09-18	161	Lake Chub	96	12		
15-Sep	BRC-01-EF-15-09-18	162	Arctic Grayling	64	2		0

Date	Site Name	Sample Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
15-Sep	BRC-01-EF-15-09-18	163	Arctic Grayling	63	2		0
15-Sep	BRC-01-EF-15-09-18	164	Arctic Grayling	71	3		0
15-Sep	BRC-01-EF-15-09-18	165	Arctic Grayling	66	2		0
15-Sep	BRC-01-EF-15-09-18	166	Brook Stickleback	65	2		
15-Sep	BRC-01-EF-15-09-18	167	Arctic Grayling	70	2		0
15-Sep	BRC-01-EF-15-09-18	168	Arctic Grayling	63	2		0
15-Sep	BRC-01-EF-15-09-18	169	Lake Chub	95	9		
15-Sep	BRC-01-EF-15-09-18	170	Longnose Sucker	107	15		
15-Sep	LAC-02-EF-15-09-18	171	Arctic Grayling	67	3		0
15-Sep	LAC-02-EF-15-09-18	172	Arctic Grayling	70	2		0
15-Sep	LAC-02-EF-15-09-18	173	Arctic Grayling	72	4		0
15-Sep	LAC-02-EF-15-09-18	174	Arctic Grayling	99	11	900226000980683	1
15-Sep	LAC-02-EF-15-09-18	175	Arctic Grayling	96	9	900226000255500	1
15-Sep	LAC-02-EF-15-09-18	176	Arctic Grayling	97	10	900226000980738	1
15-Sep	LAC-02-EF-15-09-18	177	Arctic Grayling	74	5		0
15-Sep	LAC-02-EF-15-09-18	178	Arctic Grayling	77	4		0
15-Sep	LAC-02-EF-15-09-18	179	Arctic Grayling	66	3		0
15-Sep	LAC-02-EF-15-09-18	180	Arctic Grayling	74	4		0
15-Sep	LAC-02-EF-15-09-18	181	Arctic Grayling	66	3		0
15-Sep	LAC-02-EF-15-09-18	182	Lake Chub	88	8		
15-Sep	LAC-02-EF-15-09-18	183	Lake Chub	71	4		
15-Sep	LAC-02-EF-15-09-18	184	Lake Chub	76	5		
15-Sep	LAC-02-EF-15-09-18	185	Lake Chub	67	2		
15-Sep	LAC-02-EF-15-09-18	186	Arctic Grayling	72	3		0
15-Sep	LAC-02-EF-15-09-18	187	Arctic Grayling	63	3		0
15-Sep	BER-09-EF-15-09-18	188	Lake Chub	64	3		
15-Sep	BER-09-EF-15-09-18	189	Lake Chub	78	5		
15-Sep	BER-09-EF-15-09-18	190	Lake Chub	79	5		
15-Sep	BER-09-EF-15-09-18	191	White Sucker	114	18		
15-Sep	BER-09-EF-15-09-18	192	White Sucker	131	26		
15-Sep	BER-09-EF-15-09-18	193	White Sucker	91	8		
15-Sep	BER-09-EF-15-09-18	194	Lake Chub	84	7		
15-Sep	BER-09-EF-15-09-18	195	White Sucker	94	10		
15-Sep	BER-09-EF-15-09-18	196	Redside Shiner	82	6		
15-Sep	BER-09-EF-15-09-18	197	Lake Chub	65	3		
15-Sep	BER-09-EF-15-09-18	198	Trout-perch	60	3		
15-Sep	BER-09-EF-15-09-18	199	Trout-perch	58	2		
15-Sep	BER-09-EF-15-09-18	200	Lake Chub	61	2		
15-Sep	BER-09-EF-15-09-18	201	Lake Chub	65	2		
15-Sep	BER-09-EF-15-09-18	202	Lake Chub	71	3		
15-Sep	BER-09-EF-15-09-18	203	Lake Chub	60	2		

Date	Site Name	Sample Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
15-Sep	BER-09-EF-15-09-18	204	Lake Chub	69	3		
15-Sep	BER-09-EF-15-09-18	205	Lake Chub	54	2		
15-Sep	BER-09-EF-15-09-18	206	Redside Shiner	81	6		
15-Sep	BER-09-EF-15-09-18	207	Lake Chub	70	4		
15-Sep	BER-09-EF-15-09-18	208	Lake Chub	65	3		
15-Sep	BER-09-EF-15-09-18	209	Lake Chub	74	4		
15-Sep	BER-09-EF-15-09-18	210	Trout-perch	51	1		
15-Sep	BER-09-EF-15-09-18	211	Redside Shiner	71	4		
15-Sep	BER-09-EF-15-09-18	212	Lake Chub	60	2		
15-Sep	BER-09-EF-15-09-18	213	Redside Shiner	41	1		
15-Sep	BER-09-EF-15-09-18	214	Lake Chub	64	3		
15-Sep	BER-09-EF-15-09-18	215	Trout-perch	49	1		
16-Sep	BER-10-EF-16-09-18	216	Arctic Grayling	198	91	900228000591160	3
16-Sep	BER-10-EF-16-09-18	217	Arctic Grayling	224	135	900230000079591	3
16-Sep	BER-10-EF-16-09-18	218	Arctic Grayling	191	84	900226000255549	2
16-Sep	BER-10-EF-16-09-18	219	Lake Chub	120	20		
16-Sep	BER-10-EF-16-09-18	220	Lake Chub	87	7		
16-Sep	BER-10-EF-16-09-18	221	White Sucker	73	5		
16-Sep	BER-10-EF-16-09-18	222	Lake Chub	68	4		
16-Sep	BER-10-EF-16-09-18	223	Lake Chub	63	2		
16-Sep	BER-10-EF-16-09-18	224	Lake Chub	65	3		
16-Sep	BER-10-EF-16-09-18	225	Lake Chub	48	1		
16-Sep	BER-10-EF-16-09-18	226	Lake Chub	60	3		
16-Sep	BER-10-EF-16-09-18	227	Trout-perch	54	2		
16-Sep	BER-10-EF-16-09-18	228	Longnose Sucker	140	37		
16-Sep	BER-10-EF-16-09-18	229	Longnose Sucker	109	16		
16-Sep	BER-10-EF-16-09-18	230	Longnose Sucker	86	8		
16-Sep	BER-10-EF-16-09-18	231	Longnose Sucker	93	10		
16-Sep	BER-10-EF-16-09-18	232	Lake Chub	79	5		
16-Sep	BER-11-EF-16-09-18	233	Lake Chub	74	5		
16-Sep	BER-11-EF-16-09-18	234	Lake Chub	66	3		
16-Sep	BER-11-EF-16-09-18	235	Lake Chub	65	3		
16-Sep	BER-11-EF-16-09-18	236	Trout-perch	71	5		
16-Sep	BER-11-EF-16-09-18	237	Trout-perch	56	2		
16-Sep	BER-11-EF-16-09-18	238	Longnose Dace	72	4		
16-Sep	BER-11-EF-16-09-18	239	White Sucker	83	7		
16-Sep	BER-11-EF-16-09-18	240	Longnose Sucker	113	19		
16-Sep	BER-11-EF-16-09-18	241	Longnose Sucker	91	10		
16-Sep	BER-11-EF-16-09-18	242	Lake Chub	64	3		
16-Sep	BER-11-EF-16-09-18	243	Lake Chub	72	4		
16-Sep	BER-11-EF-16-09-18	244	Lake Chub	70	4		

Date	Site Name	Sample Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
16-Sep	BER-11-EF-16-09-18	245	Longnose Sucker	94	10		
16-Sep	BER-11-EF-16-09-18	246	Longnose Sucker	86	5		
16-Sep	BER-11-EF-16-09-18	247	Trout-perch	70	4		
16-Sep	ATC-01-EF-16-09-18	248	Lake Chub	80	6		
16-Sep	ATC-01-EF-16-09-18	249	Lake Chub	93	9		
16-Sep	ATC-01-EF-16-09-18	250	Lake Chub	90	7		
16-Sep	ATC-01-EF-16-09-18	251	Lake Chub	82	6		
16-Sep	UNC-01-EF-16-09-18	252	Redside Shiner	74	3		
16-Sep	UNC-01-EF-16-09-18	253	Lake Chub	75	4		
16-Sep	UNC-01-EF-16-09-18	254	Lake Chub	73	4		
16-Sep	UNC-01-EF-16-09-18	255	Lake Chub	72	4		
16-Sep	UNC-01-EF-16-09-18	256	Lake Chub	76	5		
16-Sep	UNC-01-EF-16-09-18	257	Lake Chub	85	6		
16-Sep	UNC-01-EF-16-09-18	258	White Sucker	125	17		
16-Sep	UNC-01-EF-16-09-18	259	Lake Chub	74	3		
16-Sep	UNC-01-EF-16-09-18	260	Lake Chub	93	9		
16-Sep	UNC-01-EF-16-09-18	261	Lake Chub	74	4		
16-Sep	UNC-01-EF-16-09-18	262	Lake Chub	75	5		
16-Sep	UNC-01-EF-16-09-18	263	Lake Chub	83	6		
16-Sep	UNC-01-EF-16-09-18	264	Lake Chub	80	6		
16-Sep	UNC-01-EF-16-09-18	265	Lake Chub	73	4		
16-Sep	UNC-01-EF-16-09-18	266	Lake Chub	80	5		
16-Sep	UNC-01-EF-16-09-18	267	Lake Chub	74	4		
16-Sep	UNC-01-EF-16-09-18	268	Lake Chub	100	10		
16-Sep	UNC-01-EF-16-09-18	269	Lake Chub	44	1		
16-Sep	UNC-01-EF-16-09-18	270	Lake Chub	90	9		
16-Sep	UNC-01-EF-16-09-18	271	Lake Chub	82	6		
16-Sep	UNC-01-EF-16-09-18	272	Lake Chub	71	4		
16-Sep	UNC-01-EF-16-09-18	273	Lake Chub	68	4		
16-Sep	UNC-01-EF-16-09-18	274	Lake Chub	71	4		
16-Sep	UNC-01-EF-16-09-18	275	Lake Chub	73	4		
16-Sep	UNC-01-EF-16-09-18	276	Lake Chub	69	4		
16-Sep	UNC-01-EF-16-09-18	277	Lake Chub	81	6		
16-Sep	UNC-01-EF-16-09-18	278	Lake Chub	70	4		
16-Sep	UNC-01-EF-16-09-18	279	Lake Chub	68	4		
16-Sep	UNC-01-EF-16-09-18	280	Lake Chub	80	6		
16-Sep	UNC-01-EF-16-09-18	281	Lake Chub	68	3		
16-Sep	UNC-01-EF-16-09-18	282	Lake Chub	76	5		
16-Sep	UNC-01-EF-16-09-18	283	Lake Chub	78	5		
16-Sep	UNC-01-EF-16-09-18	284	Lake Chub	54	2		
16-Sep	UNC-01-EF-16-09-18	285	Arctic Grayling	75	4		0

Date	Site Name	Sample Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
16-Sep	HOC-01-EF-16-09-18	286	Lake Chub	71	4		
16-Sep	HOC-01-EF-16-09-18	287	Lake Chub	70	3		
16-Sep	HOC-01-EF-16-09-18	288	Lake Chub	58	2		
16-Sep	HOC-01-EF-16-09-18	289	Lake Chub	54	2		
16-Sep	HOC-01-EF-16-09-18	290	Lake Chub	59	2		
16-Sep	HOC-01-EF-16-09-18	291	Lake Chub	68	2		
16-Sep	HOC-01-EF-16-09-18	292	Lake Chub	71	3		
16-Sep	HOC-01-EF-16-09-18	293	White Sucker	69	3		
16-Sep	HOC-01-EF-16-09-18	294	Lake Chub	60	2		
16-Sep	HOC-01-EF-16-09-18	295	Lake Chub	50	1		
16-Sep	HOC-01-EF-16-09-18	296	Lake Chub	68	4		
16-Sep	HOC-01-EF-16-09-18	297	Lake Chub	61	2		
16-Sep	HOC-01-EF-16-09-18	298	Lake Chub	53	1		
16-Sep	HOC-01-EF-16-09-18	299	Lake Chub	62	3		
16-Sep	HOC-01-EF-16-09-18	300	Lake Chub	73	4		
16-Sep	HOC-01-EF-16-09-18	301	Lake Chub	60	2		
16-Sep	HOC-01-EF-16-09-18	302	Lake Chub	56	2		
16-Sep	HOC-01-EF-16-09-18	303	Lake Chub	55	2		
16-Sep	HOC-01-EF-16-09-18	304	Lake Chub	71	3		
16-Sep	HOC-01-EF-16-09-18	305	Lake Chub	59	2		
16-Sep	HOC-01-EF-16-09-18	306	Lake Chub	55	1		
16-Sep	HOC-01-EF-16-09-18	307	Lake Chub	59	2		
16-Sep	HOC-01-EF-16-09-18	308	Lake Chub	43	1		
16-Sep	HOC-01-EF-16-09-18	309	Lake Chub	58	2		
16-Sep	HOC-01-EF-16-09-18	310	Lake Chub	40	1		
16-Sep	HOC-01-EF-16-09-18	311	Lake Chub	58	2		
16-Sep	HOC-01-EF-16-09-18	312	Lake Chub	77	5		
16-Sep	HOC-01-EF-16-09-18	313	Lake Chub	76	4		
16-Sep	HOC-01-EF-16-09-18	314	Lake Chub	58	2		
16-Sep	HOC-01-EF-16-09-18	315	Lake Chub	57	2		
16-Sep	HOC-01-EF-16-09-18	316	Lake Chub	80	5		
16-Sep	HOC-01-EF-16-09-18	317	Lake Chub	65	3		
16-Sep	HOC-01-EF-16-09-18	318	Lake Chub	59	2		
16-Sep	HOC-01-EF-16-09-18	319	Trout-perch	56	2		
16-Sep	HOC-01-EF-16-09-18	320	Trout-perch	57	2		
16-Sep	HOC-01-EF-16-09-18	321	Trout-perch	48	2		
16-Sep	HOC-01-EF-16-09-18	322	Trout-perch	49	1		
16-Sep	HOC-01-EF-16-09-18	323	Lake Chub	65	3		
16-Sep	HOC-01-EF-16-09-18	324	Longnose Sucker	78	5		
16-Sep	HOC-01-EF-16-09-18	325	Lake Chub	56	1		
16-Sep	HOC-01-EF-16-09-18	326	Spoonhead Sculpin	77	4		

Date	Site Name	Sample Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
16-Sep	HOC-01-EF-16-09-18	327	Spoonhead Sculpin	66	3		
16-Sep	HOC-01-EF-16-09-18	328	Lake Chub	57	2		
16-Sep	HOC-01-EF-16-09-18	329	Lake Chub	65	2		
16-Sep	HOC-01-EF-16-09-18	330	Lake Chub	76	3		
16-Sep	HOC-01-EF-16-09-18	331	Lake Chub	53	2		
16-Sep	HOC-01-EF-16-09-18	332	Lake Chub	78	5		
16-Sep	HOC-01-EF-16-09-18	333	Trout-perch	58	3		
16-Sep	HOC-01-EF-16-09-18	334	Trout-perch	59	2		
16-Sep	HOC-01-EF-16-09-18	335	Lake Chub	52	1		
16-Sep	HOC-01-EF-16-09-18	336	Lake Chub	70	3		
16-Sep	HOC-01-EF-16-09-18	337	Lake Chub	92	8		
16-Sep	HOC-01-EF-16-09-18	338	Lake Chub	61	2		
16-Sep	HOC-01-EF-16-09-18	339	Lake Chub	76	4		
16-Sep	HOC-01-EF-16-09-18	340	Lake Chub	77	3		
16-Sep	HOC-01-EF-16-09-18	341	Lake Chub	57	2		
16-Sep	HOC-01-EF-16-09-18	342	Lake Chub	50	1		
16-Sep	HOC-01-EF-16-09-18	343	Lake Chub	80	6		
16-Sep	HOC-01-EF-16-09-18	344	Lake Chub	59	3		
16-Sep	HOC-01-EF-16-09-18	345	Lake Chub	60	2		
16-Sep	HOC-01-EF-16-09-18	346	Lake Chub	68	3		
16-Sep	HOC-01-EF-16-09-18	347	Lake Chub	77	4		
16-Sep	BER-01-EF-16-09-18	348	Largescale Sucker	260	179		
16-Sep	BER-01-EF-16-09-18	349	Flathead Chub	153	39		
16-Sep	BER-01-EF-16-09-18	350	Longnose Sucker	87	7		
16-Sep	BER-01-EF-16-09-18	351	Lake Chub	53	1		
16-Sep	BER-01-EF-16-09-18	352	Lake Chub	45	1		
16-Sep	BER-01-EF-16-09-18	353	Lake Chub	45	1		
16-Sep	BER-01-EF-16-09-18	354	Lake Chub	49	1		
16-Sep	BER-01-EF-16-09-18	355	Lake Chub	47	1		
16-Sep	BER-01-EF-16-09-18	356	Lake Chub	56	2		
16-Sep	BER-01-EF-16-09-18	357	Lake Chub	56	2		
16-Sep	BER-01-EF-16-09-18	358	Redside Shiner	77	5		
16-Sep	BER-01-EF-16-09-18	359	Redside Shiner	96	9		
16-Sep	BER-01-EF-16-09-18	360	Redside Shiner	78	4		
16-Sep	BER-01-EF-16-09-18	361	Trout-perch	45	1		
16-Sep	BER-01-EF-16-09-18	362	Lake Chub	19	0		
16-Sep	BER-01-EF-16-09-18	363	Lake Chub	45	1		
16-Sep	BER-01-EF-16-09-18	364	Trout-perch	45	1		
16-Sep	BER-01-EF-16-09-18	365	Trout-perch	57	1		
16-Sep	BER-01-EF-16-09-18	366	Lake Chub	67	2		
16-Sep	BER-01-EF-16-09-18	367	Lake Chub	55	2		

Date	Site Name	Sample Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
16-Sep	BER-01-EF-16-09-18	368	Lake Chub	45	1		
16-Sep	BER-01-EF-16-09-18	369	Trout-perch	48	1		
16-Sep	BER-01-EF-16-09-18	370	Trout-perch	48	1		
16-Sep	BER-01-EF-16-09-18	371	Lake Chub	64	3		
16-Sep	BER-01-EF-16-09-18	372	Trout-perch	44	1		
16-Sep	BER-01-EF-16-09-18	373	Trout-perch	50	1		
16-Sep	BER-01-EF-16-09-18	374	Trout-perch	54	1		
16-Sep	BER-01-EF-16-09-18	375	Lake Chub	44	1		
16-Sep	BER-01-EF-16-09-18	376	Lake Chub	20	0		
16-Sep	BER-01-EF-16-09-18	377	Lake Chub	70	4		
16-Sep	BER-01-EF-16-09-18	378	Trout-perch	43	1		
16-Sep	BER-01-EF-16-09-18	379	Longnose Dace	58	3		
16-Sep	BER-01-EF-16-09-18	380	Lake Chub	48	2		
16-Sep	BER-01-EF-16-09-18	381	Trout-perch	20	0		
16-Sep	BER-01-EF-16-09-18	382	Longnose Sucker	54	2		
16-Sep	BER-01-EF-16-09-18	383	Trout-perch	48	1		
16-Sep	BER-01-EF-16-09-18	384	Lake Chub	71	33		
16-Sep	BER-01-EF-16-09-18	385	Lake Chub	52	1		
16-Sep	BER-01-EF-16-09-18	386	Lake Chub	21	0		
16-Sep	BER-01-EF-16-09-18	387	Longnose Dace	40	1		
16-Sep	BER-01-EF-16-09-18	388	Trout-perch	47	1		
16-Sep	BER-01-EF-16-09-18	389	Lake Chub	78	4		
16-Sep	BER-01-EF-16-09-18	390	Trout-perch	54	2		

Table A5: Biological data for fish captured during the Beatton River Arctic Grayling Status Assessment, September 2019.

Date	Site Name	Fish Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
14-Aug-19	BER-AN-466.5-14-08-19	1	Arctic Grayling	168	43	900226001039587	2
14-Aug-19	BER-AN-466.5-14-08-19	2	Arctic Grayling	128	20	900226001039584	1
14-Aug-19	BER-AN-466.5-14-08-19	3	Arctic Grayling	165	44	900226001039525	1
14-Aug-19	BER-AN-466.5-14-08-19	4	Arctic Grayling	210	105	900228000635517	2
14-Aug-19	BER-AN-466.6-14-08-19	5	Arctic Grayling	128	20	900226001039571	1
14-Aug-19	BER-AN-466.6-14-08-19	6	Arctic Grayling	139	25	900226001039550	1
14-Aug-19	BER-AN-466.6-14-08-19	7	Arctic Grayling	140	26	900226001039539	1
14-Aug-19	BER-AN-467.2-14-08-19	8	Arctic Grayling	181	64	900226001039597	2
14-Aug-19	BER-AN-467.2-14-08-19	9	Arctic Grayling	193	77	900226001039501	2
14-Aug-19	BER-AN-467.2-14-08-19	10	Arctic Grayling	182	64	900226001039503	2
14-Aug-19	BER-AN-467.2-14-08-19	11	Arctic Grayling	176	57	900226001039538	2
14-Aug-19	BER-AN-467.2-14-08-19	12	Arctic Grayling	236	149	900228000635632	3
14-Aug-19	BER-AN-467.2-14-08-19	13	Arctic Grayling	228	123	900228000635766	3
14-Aug-19	BER-AN-467.2-14-08-19	14	Arctic Grayling	190	75		2
14-Aug-19	BER-AN-467.5-14-08-19	15	Arctic Grayling	264			4
14-Aug-19	BER-AN-467.6-14-08-19	16	Arctic Grayling	233	140	900228000635945	3
14-Aug-19	BER-AN-467.6-14-08-19	17	Arctic Grayling	215	96	900228000635555	2
14-Aug-19	BER-AN-467.6-14-08-19	18	Arctic Grayling	184	68	900226001039562	2
14-Aug-19	BER-AN-467.6-14-08-19	19	Arctic Grayling	222	99	900228000635563	3
14-Aug-19	BER-AN-467.6-14-08-19	20	Arctic Grayling	271	192	900228000635946	5
14-Aug-19	BER-AN-467.6-14-08-19	21	Arctic Grayling	192	76	900226001395536	2
15-Aug-19	HOC-1-EF-15-08-19	22	Trout-perch	52	2		
15-Aug-19	HOC-1-EF-15-08-19	23	Trout-perch	56	2		
15-Aug-19	HOC-1-EF-15-08-19	24	Trout-perch	44	1		
15-Aug-19	HOC-1-EF-15-08-19	25	Trout-perch	37	0		
15-Aug-19	HOC-1-EF-15-08-19	26	Trout-perch	42	0		
15-Aug-19	HOC-1-EF-15-08-19	27	Lake Chub	54	1		
15-Aug-19	HOC-1-EF-15-08-19	28	Redside Shiner	74	5		
15-Aug-19	HOC-1-EF-15-08-19	29	Lake Chub	73	4		
15-Aug-19	HOC-1-EF-15-08-19	30	Lake Chub	52	1		
15-Aug-19	HOC-1-EF-15-08-19	31	Longnose Sucker	67	3		
15-Aug-19	HOC-1-EF-15-08-19	32	Trout-perch	44	1		
15-Aug-19	HOC-1-EF-15-08-19	33	Lake Chub	67	3		
15-Aug-19	HOC-1-EF-15-08-19	34	Longnose Sucker	177	64		
15-Aug-19	HOC-1-EF-15-08-19	35	Lake Chub	38	0		
15-Aug-19	HOC-1-EF-15-08-19	36	Trout-perch	57	3		
15-Aug-19	HOC-1-EF-15-08-19	37	Sculpin Species	25	0		
15-Aug-19	HOC-1-EF-15-08-19	38	Longnose Sucker	99	10		
15-Aug-19	HOC-1-EF-15-08-19	39	Trout-perch	39	1		

Date	Site Name	Fish Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
15-Aug-19	HOC-1-EF-15-08-19	40	Lake Chub	68	3		
15-Aug-19	HOC-1-EF-15-08-19	41	Trout-perch	42	1		
15-Aug-19	HOC-1-EF-15-08-19	42	Lake Chub	38	0		
15-Aug-19	HOC-1-EF-15-08-19	43	Lake Chub	38	0		
15-Aug-19	HOC-1-EF-15-08-19	44	Lake Chub	60	2		
15-Aug-19	HOC-1-EF-15-08-19	45	Lake Chub	71	4		
15-Aug-19	HOC-1-EF-15-08-19	46	Trout-perch	43	0		
15-Aug-19	HOC-1-EF-15-08-19	47	Trout-perch	57	2		
15-Aug-19	HOC-1-EF-15-08-19	48	Largescale Sucker	92	8		
15-Aug-19	HOC-1-EF-15-08-19	49	Lake Chub	31	0		
15-Aug-19	HOC-1-EF-15-08-19	50	Longnose Dace	21	0		
15-Aug-19	HOC-1-EF-15-08-19	51	Trout-perch	57	2		
15-Aug-19	HOC-1-EF-15-08-19	52	Longnose Dace	55	2		
15-Aug-19	HOC-1-EF-15-08-19	53	Longnose Dace	59	2		
15-Aug-19	HOC-1-EF-15-08-19	54	Longnose Sucker	131	29		
15-Aug-19	HOC-1-EF-15-08-19	55	Trout-perch	41	1		
15-Aug-19	HOC-1-EF-15-08-19	56	Trout-perch	54	2		
15-Aug-19	HOC-1-EF-15-08-19	57	Lake Chub	67	3		
15-Aug-19	HOC-1-EF-15-08-19	58	Trout-perch	36	0		
15-Aug-19	HOC-1-EF-15-08-19	59	Trout-perch	57	3		
15-Aug-19	HOC-1-EF-15-08-19	60	Trout-perch	58	2		
15-Aug-19	HOC-1-EF-15-08-19	61	Trout-perch	56	2		
15-Aug-19	HOC-1-EF-15-08-19	62	White Sucker	252	199		
15-Aug-19	HOC-1-EF-15-08-19	63	Trout-perch	38	0		
15-Aug-19	HOC-1-EF-15-08-19	64	Trout-perch	58	2		
15-Aug-19	HOC-1-EF-15-08-19	65	Longnose Sucker	218	115		
15-Aug-19	HOC-1-EF-15-08-19	66	Lake Chub	71	4		
16-Aug-19	BER-11-EF-16-08-19	67	Lake Chub	71	5		
16-Aug-19	BER-11-EF-16-08-19	68	Lake Chub	47	2		
16-Aug-19	BER-11-EF-16-08-19	69	Lake Chub	67	4		
16-Aug-19	BER-11-EF-16-08-19	70	Lake Chub	81	7		
16-Aug-19	BER-11-EF-16-08-19	71	Trout-perch	59	2		
16-Aug-19	BER-11-EF-16-08-19	72	Lake Chub	74	4		
16-Aug-19	BER-11-EF-16-08-19	73	Trout-perch	78	5		
16-Aug-19	BER-11-EF-16-08-19	74	Trout-perch	73	4		
16-Aug-19	BER-11-EF-16-08-19	75	Longnose Sucker	89	9		
16-Aug-19	BER-11-EF-16-08-19	76	Trout-perch	72	4		
16-Aug-19	BER-11-EF-16-08-19	77	Lake Chub	82	6		
16-Aug-19	BER-10-EF-16-08-19	78	Lake Chub	97	11		
16-Aug-19	BER-10-EF-16-08-19	79	Lake Chub	69	4		

Date	Site Name	Fish Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
16-Aug-19	BER-10-EF-16-08-19	80	Lake Chub	43	0		
16-Aug-19	BER-10-EF-16-08-19	81	Lake Chub	68	4		
16-Aug-19	BER-10-EF-16-08-19	82	Brook Stickleback	42	1		
16-Aug-19	BER-10-EF-16-08-19	83	Longnose Dace	36	0		
16-Aug-19	BER-10-EF-16-08-19	84	Lake Chub	70	5		
16-Aug-19	BER-10-EF-16-08-19	85	Trout-perch	75	6		
16-Aug-19	BER-10-EF-16-08-19	86	Longnose Sucker	126	25		
16-Aug-19	BER-10-EF-16-08-19	87	Brook Stickleback	39	0		
16-Aug-19	BER-10-EF-16-08-19	88	Brook Stickleback	53	1		
16-Aug-19	BER-10-EF-16-08-19	89	Lake Chub	68	4		
16-Aug-19	BER-10-EF-16-08-19	90	Lake Chub	75	4		
16-Aug-19	BER-10-EF-16-08-19	91	Lake Chub	71	3		
16-Aug-19	BER-10-EF-16-08-19	92	White Sucker	87	9		
16-Aug-19	BER-10-EF-16-08-19	93	Lake Chub	76	6		
16-Aug-19	BER-10-EF-16-08-19	94	Lake Chub	76	5		
16-Aug-19	BER-10-EF-16-08-19	95	Lake Chub	77	5		
16-Aug-19	BER-10-EF-16-08-19	96	Brook Stickleback	51	1		
16-Aug-19	BER-10-EF-16-08-19	97	Trout-perch	81	5		
16-Aug-19	BER-10-EF-16-08-19	98	Lake Chub	79	6		
16-Aug-19	BER-10-EF-16-08-19	99	Longnose Dace	55	2		
16-Aug-19	BER-10-EF-16-08-19	100	Arctic Grayling	61	2		
16-Aug-19	BER-10-EF-16-08-19	101	Arctic Grayling	69	4		
16-Aug-19	BER-AN-476.4-16-08-19	102	Arctic Grayling	178	55	900226001039528	2
16-Aug-19	BER-AN-476.4-16-08-19	103	Arctic Grayling	196	73	900226001039515	2
16-Aug-19	BER-AN-476.4-16-08-19	104	Arctic Grayling	183	63	900226001039599	2
16-Aug-19	BER-AN-476.4-16-08-19	105	Arctic Grayling	190	71	900226001039559	2
16-Aug-19	BER-AN-476.4-16-08-19	106	Arctic Grayling	139	29	900226001039517	1
16-Aug-19	BER-09-EF-13-08-19	1000	Lake Chub	62	2		
16-Aug-19	BER-09-EF-13-08-19	1001	Lake Chub	71	3		
16-Aug-19	BER-09-EF-13-08-19	1002	Lake Chub	71	3		
16-Aug-19	BER-09-EF-13-08-19	1003	Longnose Sucker	146	40		
16-Aug-19	BER-09-EF-13-08-19	1004	Lake Chub	70	5		
16-Aug-19	BER-09-EF-13-08-19	1005	Trout-perch	70	4		
16-Aug-19	BER-09-EF-13-08-19	1006	Lake Chub	72	4		
16-Aug-19	BER-09-EF-13-08-19	1007	Lake Chub	66	4		
16-Aug-19	BER-09-EF-13-08-19	1008	Longnose Dace	52	2		
16-Aug-19	BER-09-EF-13-08-19	1009	Longnose Dace	60	3		
16-Aug-19	BER-09-EF-13-08-19	1010	Lake Chub	70	5		
16-Aug-19	BER-09-EF-13-08-19	1011	Longnose Dace	64	4		
16-Aug-19	BER-09-EF-13-08-19	1012	Trout-perch	55	4		

Date	Site Name	Fish Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
16-Aug-19	BER-09-EF-13-08-19	1013	Lake Chub	64	5		
16-Aug-19	BER-09-EF-13-08-19	1014	Longnose Sucker	91	2		
16-Aug-19	BER-09-EF-13-08-19	1015	Longnose Dace	65	4		
16-Aug-19	BER-09-EF-13-08-19	1016	Trout-perch	64	3		
16-Aug-19	BER-09-EF-13-08-19	1017	White Sucker	94	12		
16-Aug-19	BER-09-EF-13-08-19	1018	White Sucker	111	16		
16-Aug-19	BER-09-EF-13-08-19	1019	Longnose Dace	62	2		
16-Aug-19	BER-09-EF-13-08-19	1020	Longnose Sucker	137	32		
16-Aug-19	BER-09-EF-13-08-19	1021	Lake Chub	60	3		
16-Aug-19	BER-09-EF-13-08-19	1022	Lake Chub	60	3		
16-Aug-19	BER-09-EF-13-08-19	1023	White Sucker	96	1		
16-Aug-19	BER-09-EF-13-08-19	1024	Longnose Sucker	80	6		
16-Aug-19	BER-09-EF-13-08-19	1025	Lake Chub	61	3		
16-Aug-19	BER-09-EF-13-08-19	1026	Longnose Dace	64	4		
16-Aug-19	BER-09-EF-13-08-19	1027	White Sucker	93	9		
16-Aug-19	BER-09-EF-13-08-19	1028	Lake Chub	50	1		
16-Aug-19	BER-09-EF-13-08-19	1029	White Sucker	86	8		
16-Aug-19	BER-09-EF-13-08-19	1030	Trout-perch	65	3		
16-Aug-19	BER-09-EF-13-08-19	1031	Trout-perch	63	3		
16-Aug-19	BER-09-EF-13-08-19	1032	Longnose Dace	64	3		
16-Aug-19	BER-09-EF-13-08-19	1033	Spoonhead Sculpin	88	6		
16-Aug-19	BER-09-EF-13-08-19	1034	Longnose Dace	65	3		
16-Aug-19	BER-09-EF-13-08-19	1035	Lake Chub	40	1		
16-Aug-19	BER-09-EF-13-08-19	1036	Longnose Dace	53	1		
16-Aug-19	BER-09-EF-13-08-19	1037	White Sucker	85	8		
13-Aug-19	BER-08-EF-13-08-19	1038	Brook Stickleback	30	3		
13-Aug-19	BER-08-EF-13-08-19	1039	Lake Chub	40			
13-Aug-19	BER-08-EF-13-08-19	1040	Longnose Dace	33			
13-Aug-19	BER-08-EF-13-08-19	1041	Lake Chub	64	3		
13-Aug-19	BER-08-EF-13-08-19	1042	Lake Chub	67	3		
13-Aug-19	BER-08-EF-13-08-19	1043	Lake Chub	65	3		
13-Aug-19	BER-08-EF-13-08-19	1044	Lake Chub	52	2		
13-Aug-19	BER-08-EF-13-08-19	1045	Longnose Dace	56	2		
13-Aug-19	BER-08-EF-13-08-19	1046	Lake Chub	63	3		
13-Aug-19	BER-08-EF-13-08-19	1047	Brook Stickleback	34			
13-Aug-19	BER-08-EF-13-08-19	1048	Lake Chub	55	1		
13-Aug-19	BER-08-EF-13-08-19	1049	Longnose Dace	41			
13-Aug-19	BER-08-EF-13-08-19	1050	Lake Chub	45			
13-Aug-19	BER-08-EF-13-08-19	1051	Lake Chub	74	4		

Date	Site Name	Fish Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
13-Aug-19	BER-08-EF-13-08-19	1052	Lake Chub	62	3		
13-Aug-19	BER-08-EF-13-08-19	1053	Lake Chub	63	3		
13-Aug-19	BER-08-EF-13-08-19	1054	White Sucker	81	6		
13-Aug-19	BER-08-EF-13-08-19	1055	Lake Chub	73	5		
13-Aug-19	BER-08-EF-13-08-19	1056	Lake Chub	53	1		
13-Aug-19	BER-08-EF-13-08-19	1057	Brook Stickleback	64	2		
13-Aug-19	BER-08-EF-13-08-19	1058	Brook Stickleback	22			
13-Aug-19	BER-08-EF-13-08-19	1059	Lake Chub	70	3		
13-Aug-19	BER-08-EF-13-08-19	1060	Lake Chub	69	4		
13-Aug-19	BER-08-EF-13-08-19	1061	Lake Chub	66	3		
13-Aug-19	BER-08-EF-13-08-19	1062	Lake Chub	67	3		
13-Aug-19	BER-08-EF-13-08-19	1063	Lake Chub	63	2		
13-Aug-19	BER-08-EF-13-08-19	1064	Lake Chub	70	3		
13-Aug-19	BER-08-EF-13-08-19	1065	Lake Chub	74	4		
13-Aug-19	BER-08-EF-13-08-19	1066	Lake Chub	72	4		
13-Aug-19	BER-08-EF-13-08-19	1067	Longnose Dace	51	1		
13-Aug-19	BER-08-EF-13-08-19	1068	White Sucker	106	13		
13-Aug-19	BER-08-EF-13-08-19	1069	Lake Chub	55	1		
13-Aug-19	BER-08-EF-13-08-19	1070	Lake Chub	74	4		
13-Aug-19	BER-08-EF-13-08-19	1071	Lake Chub	82	5		
13-Aug-19	BER-08-EF-13-08-19	1072	White Sucker	90	8		
13-Aug-19	BER-08-EF-13-08-19	1073	Lake Chub	50	1		
13-Aug-19	BER-08-EF-13-08-19	1074	Lake Chub	52	1		
13-Aug-19	BER-08-EF-13-08-19	1075	Longnose Dace	64	3		
13-Aug-19	BER-08-EF-13-08-19	1076	Lake Chub	67	3		
13-Aug-19	BER-08-EF-13-08-19	1077	Lake Chub	71	4		
13-Aug-19	BER-08-EF-13-08-19	1078	Longnose Dace	56	2		
13-Aug-19	BER-08-EF-13-08-19	1079	Brook Stickleback	39			
13-Aug-19	BER-08-EF-13-08-19	1080	Longnose Dace	58	1		
13-Aug-19	BER-08-EF-13-08-19	1081	Brook Stickleback	44			
13-Aug-19	BER-08-EF-13-08-19	1082	Longnose Dace	62	2		
13-Aug-19	BER-08-EF-13-08-19	1083	Longnose Dace	54	1		
13-Aug-19	BER-08-EF-13-08-19	1084	Lake Chub	70	4		
13-Aug-19	BER-08-EF-13-08-19	1085	Longnose Dace	72	4		
13-Aug-19	JUC-01-EF-13-08-19	1086	Redside Shiner	73	6		
13-Aug-19	JUC-01-EF-13-08-19	1087	Redside Shiner	65	3		
13-Aug-19	JUC-01-EF-13-08-19	1088	White Sucker	100	5		
13-Aug-19	JUC-01-EF-13-08-19	1089	Lake Chub	84	7		
13-Aug-19	JUC-01-EF-13-08-19	1090	Lake Chub	54	2		
13-Aug-19	JUC-01-EF-13-08-19	1091	Lake Chub	66	3		

Date	Site Name	Fish Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
13-Aug-19	JUC-01-EF-13-08-19	1092	Lake Chub	67	3		
13-Aug-19	JUC-01-EF-13-08-19	1093	Longnose Dace	44			
13-Aug-19	JUC-01-EF-13-08-19	1094	Redside Shiner	79	3		
13-Aug-19	JUC-01-EF-13-08-19	1095	Lake Chub	76	1		
13-Aug-19	JUC-01-EF-13-08-19	1096	Lake Chub	35			
13-Aug-19	JUC-01-EF-13-08-19	1097	Lake Chub	73	2		
13-Aug-19	JUC-01-EF-13-08-19	1098	Trout-perch	69	4		
13-Aug-19	JUC-01-EF-13-08-19	1099	Trout-perch	57	2		
13-Aug-19	JUC-01-EF-13-08-19	1100	Lake Chub	58	2		
13-Aug-19	JUC-01-EF-13-08-19	1101	Lake Chub	74	5		
13-Aug-19	JUC-01-EF-13-08-19	1102	Redside Shiner	87	8		
13-Aug-19	JUC-01-EF-13-08-19	1103	Lake Chub	75	6		
13-Aug-19	JUC-01-EF-13-08-19	1104	Lake Chub	77	4		
13-Aug-19	JUC-01-EF-13-08-19	1105	Redside Shiner	74	4		
13-Aug-19	JUC-01-EF-13-08-19	1106	Lake Chub	54	1		
13-Aug-19	JUC-01-EF-13-08-19	1107	Lake Chub	76	4		
13-Aug-19	JUC-01-EF-13-08-19	1108	Lake Chub	49	1		
13-Aug-19	JUC-01-EF-13-08-19	1109	Lake Chub	64	1		
13-Aug-19	JUC-01-EF-13-08-19	1110	Redside Shiner	91	9		
13-Aug-19	JUC-01-EF-13-08-19	1111	Lake Chub	81	7		
13-Aug-19	JUC-01-EF-13-08-19	1112	Redside Shiner	75	5		
13-Aug-19	JUC-01-EF-13-08-19	1113	Redside Shiner	79	5		
13-Aug-19	JUC-01-EF-13-08-19	1114	Lake Chub	73	1		
13-Aug-19	JUC-01-EF-13-08-19	1115	Lake Chub	75	2		
13-Aug-19	JUC-01-EF-13-08-19	1116	Lake Chub	44			
13-Aug-19	JUC-01-EF-13-08-19	1117	Lake Chub	73	2		
13-Aug-19	JUC-01-EF-13-08-19	1118	Redside Shiner	76	7		
13-Aug-19	JUC-01-EF-13-08-19	1119	Longnose Dace	59	1		
13-Aug-19	JUC-01-EF-13-08-19	1120	Trout-perch	55	1		
13-Aug-19	JUC-01-EF-13-08-19	1121	Brook Stickleback	41			
13-Aug-19	JUC-01-EF-13-08-19	1122	Lake Chub	67	1		
13-Aug-19	JUC-01-EF-13-08-19	1123	Lake Chub	79	7		
13-Aug-19	JUC-01-EF-13-08-19	1124	Lake Chub	39			
13-Aug-19	JUC-01-EF-13-08-19	1125	Lake Chub	65	4		
13-Aug-19	JUC-01-EF-13-08-19	1126	Longnose Dace	39	2		
13-Aug-19	JUC-01-EF-13-08-19	1127	Lake Chub	92	10		
13-Aug-19	JUC-01-EF-13-08-19	1128	Redside Shiner	80	7		
13-Aug-19	JUC-01-EF-13-08-19	1129	Lake Chub	52	1		
13-Aug-19	JUC-01-EF-13-08-19	1130	White Sucker	84	6		
13-Aug-19	JUC-01-EF-13-08-19	1131	Lake Chub	105	12		

Date	Site Name	Fish Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
13-Aug-19	JUC-01-EF-13-08-19	1132	Redside Shiner	67	3		
13-Aug-19	JUC-01-EF-13-08-19	1133	Lake Chub	90	9		
13-Aug-19	JUC-01-EF-13-08-19	1134	Lake Chub	65	3		
13-Aug-19	JUC-01-EF-13-08-19	1135	Lake Chub	96	10		
13-Aug-19	JUC-01-EF-13-08-19	1136	Lake Chub	72	3		
13-Aug-19	JUC-01-EF-13-08-19	1137	Lake Chub	55	2		
13-Aug-19	JUC-01-EF-13-08-19	1138	Lake Chub	76	6		
13-Aug-19	JUC-01-EF-13-08-19	1139	Lake Chub	67	4		
13-Aug-19	JUC-01-EF-13-08-19	1140	Lake Chub	55	2		
13-Aug-19	JUC-01-EF-13-08-19	1141	Trout-perch	40	1		
13-Aug-19	JUC-01-EF-13-08-19	1142	Lake Chub	85	7		
13-Aug-19	JUC-01-EF-13-08-19	1143	Lake Chub	60	2		
13-Aug-19	JUC-01-EF-13-08-19	1144	Lake Chub	81	5		
13-Aug-19	JUC-01-EF-13-08-19	1145	Lake Chub	72	4		
13-Aug-19	JUC-01-EF-13-08-19	1146	Lake Chub	84	6		
13-Aug-19	JUC-01-EF-13-08-19	1147	Lake Chub	51	7		
13-Aug-19	JUC-01-EF-13-08-19	1148	Lake Chub	66	4		
13-Aug-19	JUC-01-EF-13-08-19	1149	Brook Stickleback	34			
13-Aug-19	JUC-01-EF-13-08-19	1150	Lake Chub	62	3		
13-Aug-19	JUC-01-EF-13-08-19	1151	Lake Chub	67	4		
13-Aug-19	JUC-01-EF-13-08-19	1152	Lake Chub	81	6		
13-Aug-19	JUC-01-EF-13-08-19	1153	Longnose Dace	68	4		
13-Aug-19	JUC-01-EF-13-08-19	1154	Brook Stickleback	40			
13-Aug-19	JUC-01-EF-13-08-19	1160	Lake Chub	72	5		
13-Aug-19	JUC-01-EF-13-08-19	1161	Lake Chub	72	5		
13-Aug-19	JUC-01-EF-13-08-19	1162	White Sucker	104	12		
13-Aug-19	JUC-01-EF-13-08-19	1163	Lake Chub	70	4		
13-Aug-19	JUC-01-EF-13-08-19	1164	Lake Chub	71	4		
13-Aug-19	JUC-01-EF-13-08-19	1165	Lake Chub	74	5		
13-Aug-19	JUC-01-EF-13-08-19	1166	Lake Chub	73	3		
13-Aug-19	JUC-01-EF-13-08-19	1167	Lake Chub	67	4		
13-Aug-19	JUC-01-EF-13-08-19	1168	Lake Chub	66	4		
13-Aug-19	JUC-01-EF-13-08-19	1169	Lake Chub	75	4		
13-Aug-19	JUC-01-EF-13-08-19	1170	Longnose Dace	51	1		
13-Aug-19	JUC-01-EF-13-08-19	1171	White Sucker	93	7		
13-Aug-19	JUC-01-EF-13-08-19	1172	Lake Chub	66	4		
13-Aug-19	JUC-01-EF-13-08-19	1173	White Sucker	112	18		
13-Aug-19	JUC-01-EF-13-08-19	1174	Longnose Dace	57	1		
13-Aug-19	JUC-01-EF-13-08-19	1175	Lake Chub	70	3		
13-Aug-19	JUC-01-EF-13-08-19	1176	Lake Chub	71	4		

Date	Site Name	Fish Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
13-Aug-19	JUC-01-EF-13-08-19	1177	Lake Chub	66	4		
13-Aug-19	JUC-01-EF-13-08-19	1178	Longnose Dace	54	2		
13-Aug-19	JUC-01-EF-13-08-19	1179	Lake Chub	76	6		
13-Aug-19	JUC-01-EF-13-08-19	1180	Lake Chub	95	9		
13-Aug-19	JUC-01-EF-13-08-19	1181	White Sucker	96	0		
13-Aug-19	JUC-01-EF-13-08-19	1182	Longnose Dace	84	8		
13-Aug-19	JUC-01-EF-13-08-19	1183	Trout-perch	65	4		
13-Aug-19	JUC-01-EF-13-08-19	1184	Longnose Sucker	104	12		
13-Aug-19	JUC-01-EF-13-08-19	1185	Longnose Dace	55	2		
13-Aug-19	BER-AN-466.5-13-08-19	1186	Arctic Grayling	167	52	900226001039462	2
13-Aug-19	BER-AN-466.5-13-08-19	1187	Arctic Grayling	234	145	900228000635342	
13-Aug-19	BER-AN-466.5-13-08-19	1188	Arctic Grayling	169	49	900226001039425	2
14-Aug-19	BER-AN-465.9-14-08-19	1189	Arctic Grayling	137	25	900226000294438	1
14-Aug-19	BER-AN-465.9-14-08-19	1190	Arctic Grayling	137	24	900226000173116	1
14-Aug-19	BER-AN-465.9-14-08-19	1191	Arctic Grayling	177	60	900223000980511	2
14-Aug-19	BER-AN-467.9-14-08-19	1192	Arctic Grayling	220	111	900228000636056	3
14-Aug-19	BER-AN-467.9-14-08-19	1193	Lake Chub	78	6		
15-Aug-19	LAC-02A-EF-15-08-19	1194	Arctic Grayling	54	1		0
15-Aug-19	LAC-02A-EF-15-08-19	1195	Arctic Grayling	61	2		0
15-Aug-19	LAC-02A-EF-15-08-19	1196	Arctic Grayling	56	1		0
15-Aug-19	LAC-02A-EF-15-08-19	1197	Arctic Grayling	55	1		0
15-Aug-19	LAC-02A-EF-15-08-19	1198	Lake Chub	94	11		
15-Aug-19	LAC-02A-EF-15-08-19	1199	Arctic Grayling	56	1		0
15-Aug-19	LAC-02A-EF-15-08-19	1200	Arctic Grayling	57	2		0
15-Aug-19	LAC-02A-EF-15-08-19	1201	Arctic Grayling	56	1		0
15-Aug-19	LAC-02A-EF-15-08-19	1202	Arctic Grayling	62	2		0
15-Aug-19	LAC-02A-EF-15-08-19	1203	Arctic Grayling	59	2		0
15-Aug-19	LAC-02A-EF-15-08-19	1204	Arctic Grayling	54	1		0
15-Aug-19	LAC-02A-EF-15-08-19	1205	Arctic Grayling	52	1		0
15-Aug-19	LAC-02A-EF-15-08-19	1206	Arctic Grayling	56	2		0
15-Aug-19	LAC-02A-EF-15-08-19	1207	Arctic Grayling	60	1		0
15-Aug-19	LAC-02A-EF-15-08-19	1208	Longnose Sucker	191	81		
15-Aug-19	LAC-02A-EF-15-08-19	1209	Arctic Grayling	60	2		0
15-Aug-19	LAC-02A-EF-15-08-19	1210	White Sucker	117	23		
15-Aug-19	LAC-02A-EF-15-08-19	1211	Arctic Grayling	62	2		0
15-Aug-19	LAC-02A-EF-15-08-19	1212	Arctic Grayling	56	1		0
15-Aug-19	LAC-02A-EF-15-08-19	1213	Arctic Grayling	55	2		0
15-Aug-19	LAC-02A-EF-15-08-19	1214	Arctic Grayling	60	2		0
15-Aug-19	LAC-02A-EF-15-08-19	1215	Lake Chub	99	12		
15-Aug-19	LAC-02A-EF-15-08-19	1216	Lake Chub	96	11		

Date	Site Name	Fish Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
15-Aug-19	LAC-02A-EF-15-08-19	1217	Arctic Grayling	122	17	900226001039484	1
15-Aug-19	LAC-02A-EF-15-08-19	1218	Arctic Grayling	57	1		0
15-Aug-19	LAC-02A-EF-15-08-19	1219	Arctic Grayling	177	54	900226001039504	2
15-Aug-19	LAC-02A-EF-15-08-19	1220	Arctic Grayling	55	2		0
15-Aug-19	LAC-02A-EF-15-08-19	1221	Arctic Grayling	54	2		0
15-Aug-19	LAC-02A-EF-15-08-19	1222	Arctic Grayling	59	2		0
15-Aug-19	LAC-02A-EF-15-08-19	1223	White Sucker	173	49		
15-Aug-19	LAC-02A-EF-15-08-19	1224	Longnose Sucker	116	18		
15-Aug-19	LAC-02A-EF-15-08-19	1225	Lake Chub	81	5		
15-Aug-19	LAC-02A-EF-15-08-19	1226	Lake Chub	91	10		
15-Aug-19	LAC-02A-EF-15-08-19	1227	Arctic Grayling	53	1		0
15-Aug-19	LAC-02A-EF-15-08-19	1228	Arctic Grayling	57	1		0
15-Aug-19	LAC-02A-EF-15-08-19	1229	Arctic Grayling	57	1		0
15-Aug-19	LAC-02-EF-15-08-19	1230	Arctic Grayling	56	1		0
15-Aug-19	LAC-02-EF-15-08-19	1231	Longnose Sucker	137	34		
15-Aug-19	LAC-02-EF-15-08-19	1232	Arctic Grayling	59	1		0
15-Aug-19	LAC-02-EF-15-08-19	1234	Arctic Grayling	158	46	900226001039420	1
15-Aug-19	LAC-02-EF-15-08-19	1235	Arctic Grayling	141	27	900226001039460	1
15-Aug-19	LAC-02-EF-15-08-19	1236	Arctic Grayling	116	14		1
15-Aug-19	LAC-02-EF-15-08-19	1237	Longnose Sucker	194	97		
15-Aug-19	LAC-02-EF-15-08-19	1238	Arctic Grayling	51	1		0
15-Aug-19	LAC-02-EF-15-08-19	1239	Arctic Grayling	55	1		0
15-Aug-19	LAC-02-EF-15-08-19	1240	Arctic Grayling	52	1		0
15-Aug-19	LAC-02-EF-15-08-19	1241	Arctic Grayling	56	1		0
15-Aug-19	LAC-02-EF-15-08-19	1242	Arctic Grayling	58	1		0
15-Aug-19	LAC-02-EF-15-08-19	1243	Arctic Grayling	116	15		1
15-Aug-19	LAC-02-EF-15-08-19	1244	Arctic Grayling	51	1		0
15-Aug-19	LAC-02-EF-15-08-19	1245	Arctic Grayling	49	1		0
15-Aug-19	LAC-02-EF-15-08-19	1246	Arctic Grayling	54	1		0
15-Aug-19	LAC-02-EF-15-08-19	1247	Arctic Grayling	116	15		1
15-Aug-19	LAC-02-EF-15-08-19	1248	Arctic Grayling	131	25	900226001039480	1
15-Aug-19	LAC-02-EF-15-08-19	1249	Arctic Grayling	124	19	900226001039573	1
15-Aug-19	LAC-02-EF-15-08-19	1250	Arctic Grayling	147	34	900226001039487	1
15-Aug-19	LAC-02-EF-15-08-19	1251	Longnose Sucker	174	65		
15-Aug-19	LAC-02-EF-15-08-19	1252	Arctic Grayling	163	45	900226001039533	1
15-Aug-19	LAC-02-EF-15-08-19	1253	Longnose Sucker	130	28		
15-Aug-19	LAC-02-EF-15-08-19	1254	Arctic Grayling	126	19	900226001039540	1
15-Aug-19	LAC-02-EF-15-08-19	1255	White Sucker	166	62		
15-Aug-19	LAC-02-EF-15-08-19	1256	Lake Chub	117	19		
15-Aug-19	LAC-02-EF-15-08-19	1257	Lake Chub	91	9		

Date	Site Name	Fish Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
15-Aug-19	LAC-02-EF-15-08-19	1258	Arctic Grayling	121	17	900226001039561	1
15-Aug-19	LAC-02-EF-15-08-19	1259	Longnose Sucker	96	12		
15-Aug-19	LAC-02-EF-15-08-19	1260	Arctic Grayling	51	1		0
15-Aug-19	LAC-02-EF-15-08-19	1261	Arctic Grayling	56	1		0
15-Aug-19	LAC-02-EF-15-08-19	1262	Arctic Grayling	58	1		0
15-Aug-19	LAC-02-EF-15-08-19	1263	Arctic Grayling	50	1		0
15-Aug-19	LAC-02-EF-15-08-19	1264	Arctic Grayling	54	2		0
15-Aug-19	LAC-02-EF-15-08-19	1265	Arctic Grayling	64	2		0
15-Aug-19	LAC-02-EF-15-08-19	1266	Arctic Grayling	59	1		0
15-Aug-19	LAC-02-EF-15-08-19	1267	Arctic Grayling	51	1		0
15-Aug-19	LAC-02-EF-15-08-19	1269	Arctic Grayling	58	1		0
15-Aug-19	LAC-02-EF-15-08-19	1270	Arctic Grayling	54	1		0
15-Aug-19	LAC-02-EF-15-08-19	1271	Arctic Grayling	59	1		0
15-Aug-19	LAC-02-EF-15-08-19	1272	Arctic Grayling	56	1		0
15-Aug-19	LAC-02-EF-15-08-19	1273	Arctic Grayling	61	2		0
15-Aug-19	LAC-02-EF-15-08-19	1274	Arctic Grayling	53	1		0
15-Aug-19	LAC-02-EF-15-08-19	1275	Arctic Grayling	55	1		0
15-Aug-19	LAC-02-EF-15-08-19	1276	Arctic Grayling	56	1		0
15-Aug-19	LAC-02-EF-15-08-19	1277	Arctic Grayling	56	1		0
15-Aug-19	LAC-02-EF-15-08-19	1278	Arctic Grayling	50	1		0
15-Aug-19	LAC-02-EF-15-08-19	1279	Arctic Grayling	56	1		0
15-Aug-19	LAC-02-EF-15-08-19	1280	Arctic Grayling	60	2		0
15-Aug-19	LAC-02-EF-15-08-19	1281	Arctic Grayling	54	1		0
15-Aug-19	LAC-02-EF-15-08-19	1282	Arctic Grayling	51	1		0
15-Aug-19	LAC-02-EF-15-08-19	1283	Arctic Grayling	56	2		0
16-Aug-19	ATC-01-EF-16-08-19	1284	Arctic Grayling	47			
16-Aug-19	ATC-01-EF-16-08-19	1285	Lake Chub	89	7		
16-Aug-19	ATC-01-EF-16-08-19	1286	Lake Chub	81	5		
16-Aug-19	ATC-01-EF-16-08-19	1287	Lake Chub	83	7		
16-Aug-19	ATC-01-EF-16-08-19	1288	Lake Chub	89	7		
16-Aug-19	ATC-01-EF-16-08-19	1289	Lake Chub	85	5		
16-Aug-19	ATC-01-EF-16-08-19	1290	Lake Chub	84	8		
16-Aug-19	ATC-01-EF-16-08-19	1291	Brook Stickleback	53			
16-Aug-19	ATC-01-EF-16-08-19	1292	Lake Chub	83	6		
16-Aug-19	ATC-01-EF-16-08-19	1293	Lake Chub	88	7		
16-Aug-19	ATC-01-EF-16-08-19	1294	Lake Chub	84	6		
16-Aug-19	ATC-01-EF-16-08-19	1295	Lake Chub	86	8		
16-Aug-19	ATC-01-EF-16-08-19	1296	Lake Chub	80	5		
16-Aug-19	ATC-01-EF-16-08-19	1297	Lake Chub	96	8		
16-Aug-19	ATC-01-EF-16-08-19	1298	Lake Chub	64	3		

Date	Site Name	Fish Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
16-Aug-19	ATC-01-EF-16-08-19	1299	Lake Chub	75	5		
16-Aug-19	ATC-01-EF-16-08-19	1300	Lake Chub	74	4		
16-Aug-19	ATC-01-EF-16-08-19	1301	Longnose Sucker	167	58		
16-Aug-19	ATC-01-EF-16-08-19	1302	Lake Chub	76	5		
16-Aug-19	ATC-01-EF-16-08-19	1303	Lake Chub	85	8		
16-Aug-19	ATC-01-EF-16-08-19	1304	Lake Chub	75	5		
16-Aug-19	ATC-01-EF-16-08-19	1305	Lake Chub	76	6		
16-Aug-19	ATC-01-EF-16-08-19	1306	Lake Chub	79	7		
16-Aug-19	ATC-01-EF-16-08-19	1307	Lake Chub	85	5		
16-Aug-19	ATC-01-EF-16-08-19	1308	Lake Chub	74	4		
16-Aug-19	ATC-01-EF-16-08-19	1309	Lake Chub	95	10		
16-Aug-19	ATC-01-EF-16-08-19	1310	Lake Chub	79	6		
16-Aug-19	ATC-01-EF-16-08-19	1311	Lake Chub	79	6		
16-Aug-19	ATC-01-EF-16-08-19	1312	Lake Chub	68	4		
16-Aug-19	ATC-01-EF-16-08-19	1313	Lake Chub	89	8		
16-Aug-19	ATC-01-EF-16-08-19	1314	Lake Chub	84	6		
16-Aug-19	ATC-01-EF-16-08-19	1315	Lake Chub	75	4		
16-Aug-19	ATC-01-EF-16-08-19	1316	Lake Chub	72	5		
16-Aug-19	ATC-01-EF-16-08-19	1317	Lake Chub	95	9		
16-Aug-19	ATC-01-EF-16-08-19	1318	Lake Chub	75	6		
16-Aug-19	ATC-01-EF-16-08-19	1319	Lake Chub	92	9		
16-Aug-19	ATC-01-EF-16-08-19	1320	Lake Chub	81	6		
16-Aug-19	UNC-01-EF-16-08-19	1321	Lake Chub	40	1		
16-Aug-19	UNC-01-EF-16-08-19	1322	Lake Chub	62	2		
16-Aug-19	UNC-01-EF-16-08-19	1323	Lake Chub	38	1		
16-Aug-19	UNC-01-EF-16-08-19	1324	Lake Chub	66	3		
16-Aug-19	UNC-01-EF-16-08-19	1325	Lake Chub	55	1		
16-Aug-19	UNC-01-EF-16-08-19	1326	Longnose Dace	39	1		
16-Aug-19	UNC-01-EF-16-08-19	1327	Trout-perch	52	2		
16-Aug-19	UNC-01-EF-16-08-19	1328	Trout-perch	55	2		
16-Aug-19	UNC-01-EF-16-08-19	1329	Lake Chub	42	1		
16-Aug-19	UNC-01-EF-16-08-19	1330	Trout-perch	58	3		
16-Aug-19	UNC-01-EF-16-08-19	1331	Longnose Dace	47	5		
16-Aug-19	UNC-01-EF-16-08-19	1332	Lake Chub	50	2		
16-Aug-19	UNC-01-EF-16-08-19	1333	Lake Chub	51	2		
16-Aug-19	UNC-01-EF-16-08-19	1334	Lake Chub	74	5		
16-Aug-19	UNC-01-EF-16-08-19	1335	Lake Chub	40	3		
16-Aug-19	UNC-01-EF-16-08-19	1336	Lake Chub	71	3		
16-Aug-19	UNC-01-EF-16-08-19	1337	Trout-perch	56	2		
16-Aug-19	UNC-01-EF-16-08-19	1338	Lake Chub	36	1		

Date	Site Name	Fish Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
16-Aug-19	UNC-01-EF-16-08-19	1339	Lake Chub	66	3		
16-Aug-19	UNC-01-EF-16-08-19	1340	Lake Chub	67	3		
16-Aug-19	UNC-01-EF-16-08-19	1341	Trout-perch	53	2		
16-Aug-19	UNC-01-EF-16-08-19	1342	Lake Chub	62	2		
16-Aug-19	UNC-01-EF-16-08-19	1343	Trout-perch	75	5		
16-Aug-19	UNC-01-EF-16-08-19	1344	Lake Chub	68	3		
16-Aug-19	UNC-01-EF-16-08-19	1345	Lake Chub	66	3		
16-Aug-19	UNC-01-EF-16-08-19	1346	Lake Chub	67	3		
16-Aug-19	UNC-01-EF-16-08-19	1347	Lake Chub	55	1		
16-Aug-19	UNC-01-EF-16-08-19	1348	Lake Chub	53	1		
16-Aug-19	UNC-01-EF-16-08-19	1349	Lake Chub	80	7		
16-Aug-19	UNC-01-EF-16-08-19	1350	Lake Chub	96	9		
16-Aug-19	UNC-01-EF-16-08-19	1351	Longnose Dace	38	1		
16-Aug-19	UNC-01-EF-16-08-19	1352	Longnose Dace	40	1		
16-Aug-19	UNC-01-EF-16-08-19	1353	Lake Chub	68	6		
16-Aug-19	UNC-01-EF-16-08-19	1354	Lake Chub	86	7		
16-Aug-19	UNC-01-EF-16-08-19	1355	Lake Chub	62	3		
16-Aug-19	UNC-01-EF-16-08-19	1356	Longnose Dace	56	3		
16-Aug-19	UNC-01-EF-16-08-19	1357	Lake Chub	36			
16-Aug-19	UNC-01-EF-16-08-19	1358	Lake Chub	54	1		
16-Aug-19	UNC-01-EF-16-08-19	1359	Longnose Dace	56	2		
16-Aug-19	UNC-01-EF-16-08-19	1360	Lake Chub	66	4		
16-Aug-19	UNC-01-EF-16-08-19	1361	Lake Chub	50	1		
16-Aug-19	UNC-01-EF-16-08-19	1362	Longnose Sucker	99	11		
16-Aug-19	UNC-01-EF-16-08-19	1363	White Sucker	84	7		
16-Aug-19	UNC-01-EF-16-08-19	1364	Lake Chub	86	7		
16-Aug-19	UNC-01-EF-16-08-19	1365	Longnose Dace	61	3		
16-Aug-19	UNC-01-EF-16-08-19	1366	Longnose Dace	56	2		
16-Aug-19	UNC-01-EF-16-08-19	1367	Longnose Sucker	90	8		
16-Aug-19	UNC-01-EF-16-08-19	1368	Longnose Dace	56	1		
16-Aug-19	UNC-01-EF-16-08-19	1369	Lake Chub	66	2		
16-Aug-19	UNC-01-EF-16-08-19	1370	Longnose Dace	59	2		
16-Aug-19	BRC-01-EF-16-08-19	1371	Arctic Grayling	222	74	900226001039464	3
16-Aug-19	BRC-01-EF-16-08-19	1372	Arctic Grayling	64	2		0
16-Aug-19	BRC-01-EF-16-08-19	1373	Arctic Grayling	124	10	900226001039529	1
16-Aug-19	BRC-01-EF-16-08-19	1374	Arctic Grayling	105	11		1
16-Aug-19	BRC-01-EF-16-08-19	1375	Arctic Grayling	114	13		1
16-Aug-19	BRC-01-EF-16-08-19	1376	Arctic Grayling	67	4		0
16-Aug-19	BRC-01-EF-16-08-19	1377	Arctic Grayling	54	1		0
16-Aug-19	BRC-01-EF-16-08-19	1378	Arctic Grayling	161	38	900226001039496	2

Date	Site Name	Fish Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
16-Aug-19	BRC-01-EF-16-08-19	1379	Arctic Grayling	111	16		1
16-Aug-19	BRC-01-EF-16-08-19	1380	Arctic Grayling	120	14	900226001039480	1
16-Aug-19	BRC-01-EF-16-08-19	1381	Arctic Grayling	121	16		1
16-Aug-19	BRC-01-EF-16-08-19	1382	Arctic Grayling	67	2		0
16-Aug-19	BRC-01-EF-16-08-19	1383	Arctic Grayling	119	13		1
16-Aug-19	BRC-01-EF-16-08-19	1384	Arctic Grayling	113	13		1
16-Aug-19	BRC-01-EF-16-08-19	1385	Arctic Grayling	54	1		0
16-Aug-19	BRC-01-EF-16-08-19	1386	Arctic Grayling	56	2		0
16-Aug-19	BRC-01-EF-16-08-19	1387	Arctic Grayling	66	2		0
16-Aug-19	BRC-01-EF-16-08-19	1388	Arctic Grayling	97	8		1
16-Aug-19	BRC-01-EF-16-08-19	1389	Arctic Grayling	105	13		1
16-Aug-19	BRC-01-EF-16-08-19	1390	Arctic Grayling	115	16		1
16-Aug-19	BRC-01-EF-16-08-19	1391	Arctic Grayling	127	19	900226001039451	1
16-Aug-19	BRC-01-EF-16-08-19	1392	Arctic Grayling	107	13		1
16-Aug-19	BRC-01-EF-16-08-19	1393	Arctic Grayling	145	28	900226001039444	1
16-Aug-19	BRC-01-EF-16-08-19	1394	Arctic Grayling	96	8		1
16-Aug-19	BRC-01-EF-16-08-19	1395	Arctic Grayling	96	9		1
16-Aug-19	BRC-01-EF-16-08-19	1396	Arctic Grayling	104	12		1
16-Aug-19	BRC-01-EF-16-08-19	1397	Arctic Grayling	103	10		1
16-Aug-19	BRC-01-EF-16-08-19	1398	Arctic Grayling	110	14		1
16-Aug-19	BRC-01-EF-16-08-19	1399	Arctic Grayling	144	26	900226001039553	1
16-Aug-19	BRC-01-EF-16-08-19	1400	Arctic Grayling	115	10		1
16-Aug-19	BRC-01-EF-16-08-19	1401	Arctic Grayling	101	8		1
16-Aug-19	BRC-01-EF-16-08-19	1402	Arctic Grayling	104	11		1
16-Aug-19	BRC-01-EF-16-08-19	1403	Arctic Grayling	101	9		1
16-Aug-19	BRC-01-EF-16-08-19	1404	Arctic Grayling	96	9		1
16-Aug-19	BRC-01-EF-16-08-19	1405	Arctic Grayling	96	7		1
16-Aug-19	BRC-01-EF-16-08-19	1406	Arctic Grayling	93	7		1
16-Aug-19	BRC-01-EF-16-08-19	1407	Arctic Grayling	61	2		0
16-Aug-19	BRC-01-EF-16-08-19	1408	Arctic Grayling	65	3		0
16-Aug-19	BRC-01-EF-16-08-19	1409	Arctic Grayling	66	3		0
16-Aug-19	BRC-01-EF-16-08-19	1410	Arctic Grayling	71	2		0
16-Aug-19	BRC-01-EF-16-08-19	1411	Arctic Grayling	65	2		0
16-Aug-19	BRC-01-EF-16-08-19	1412	Arctic Grayling	61	2		0
16-Aug-19	BRC-01-EF-16-08-19	1413	Arctic Grayling	64	2		0
16-Aug-19	BRC-01-EF-16-08-19	1414	Arctic Grayling	66	2		0
16-Aug-19	BRC-01-EF-16-08-19	1415	Arctic Grayling	62	2		0
16-Aug-19	BRC-01-EF-16-08-19	1416	Arctic Grayling	61	2		0
16-Aug-19	BRC-01-EF-16-08-19	1417	Arctic Grayling	54	1		0
16-Aug-19	BRC-01-EF-16-08-19	1418	Arctic Grayling	47	1		0

Date	Site Name	Fish Number	Species Code	Fork Length (mm)	Weight (g)	PIT Tag Number	Age
16-Aug-19	BRC-01-EF-16-08-19	1419	Arctic Grayling	92	7		1
16-Aug-19	BRC-01-EF-16-08-19	1420	Arctic Grayling	96	9		1

APPENDIX B

Photographic Plates

Plate 1 Upstream view of Beatton River angling site BER-AN-420.3, 13 August 2019.

Plate 2 Upstream view of Julienne Creek index site JUL-01-EF, 13 August 2019.

Plate 3 Arctic Grayling captured at Beatton River angling site BER-AN-466.5, 13 August 2019.

Plate 4 Upstream view of La Prise Creek index site LAC-02-EF, 15 August 2019.

Plate 5 Upstream view of Atick Creek index site ATC-01-EF, 16 August 2019.

Plate 6 Upstream view of Unnamed Tributary 1 index site UNC-01-EF, 16 August 2019.

Plate 7 Beaver dam located within Bratland Creek index site BRC-01-EF, 16 August 2019.

Plate 8 Upstream view of Beatton River angling site BER-AN-422.5, 13 August 2019.

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